



Application

13861 - 2020 Roadway Modernization

14013 - Robert Street Reconstruction (Kellogg to I-94)

Regional Solicitation - Roadways Including Multimodal Elements

Status:

Submitted

Submitted Date:

05/13/2020 3:14 PM

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## Primary Contact

Name:\*

Mr.

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Salutation

First Name

Middle Name

Last Name

Title:

Engineer IV

Department:

Public Works

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\*

St. Paul

Minnesota

55401

City

State/Province

Postal Code/Zip

Phone:\*

651-266-9147

Phone

Ext.

Fax:

What Grant Programs are you most interested in?

Regional Solicitation - Roadways Including Multimodal Elements

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## Organization Information

Name:

ST PAUL, CITY OF

Jurisdictional Agency (if different):

Organization Type:

City

Organization Website:

Address:

DEPT OF PUBLIC WORKS-CITY HALL ANNEX  
25 W 4TH ST #1500

\*

ST PAUL	Minnesota	55101
City	State/Province	Postal Code/Zip

County:

Ramsey

Phone:\*

651-266-9700	Ext.
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Fax:

PeopleSoft Vendor Number

0000003222A22

## Project Information

Project Name

Robert Street Reconstruction

Primary County where the Project is Located

Ramsey

Cities or Townships where the Project is Located:

Saint Paul

Jurisdictional Agency (If Different than the Applicant):

MnDOT



The proposed Robert Street Reconstruction project will improve traffic operations, multimodal safety, pedestrian facilities, and will accommodate transit for a 0.6-mile segment of Robert Street between the Interstate 94 bridge approach panel and the Mississippi River bridge approach panel. Robert Street is primarily an urban, four-lane undivided roadway with off-peak parking, classified as an A-minor Arterial located in Ramsey County.

The proposed roadway improvements will include:

- Widening of boulevards to provide streetscaping opportunities
- ADA improvements and count down timers
- Upgrades to traffic signals, lighting, curb and gutter, and drainage
- All-day on-street parking for several blocks along the corridor
- Roadway congestion mitigation at key intersections
- Space for future bus stops

These improvements are critical in meeting the existing and future needs of the region. There is an expected increase of 63,000 people and 65,000 jobs by 2030 within the area.

As the central business district in the State's capital city, downtown Saint Paul serves as a key access point to the Twin Cities regional transit system. This project is within walking distance of Union Depot with direct connections to the Green Line LRT,

**Brief Project Description (Include location, road name/functional class, type of improvement, etc.)**

Amtrak, both regional and local bus service, and several bicycle/pedestrian facilities. Residents, employees and visitors within the region need a reliable and time-competitive travel option to access these connections.

The Rush Line BRT is a planned 15-mile BRT project within a dedicated guideway serving 21 stations from the Union Depot in downtown Saint Paul to downtown White Bear Lake generally along Robert Street, Phalen Boulevard, Ramsey County Regional Railroad Authority right-of-way and Trunk Highway 61. As part of the Robert Street Reconstruction project, Robert Street is designed to be BAT (Business Access and Transit) lane-ready, meaning the roadway could be restriped to accommodate BAT lanes on Robert Street serving the Rush Line BRT and potentially other bus routes that operate on Robert Street.

It should be noted that MnDOT will be turning over jurisdictional responsibility of this roadway to the City of St. Paul when this project is completed. This territorial era roadway was reconstructed between 1913-1915 and the streetcar tracks were paved over in the early 1950's. The roadway is in very poor shape and needs to be modernized to meet today's needs.

*(Limit 2,800 characters; approximately 400 words)*

**TRANSPORTATION IMPROVEMENT PROGRAM (TIP)**  
**DESCRIPTION - will be used in TIP if the project is selected for funding. [See MnDOT's TIP description guidance.](#)**

**Project Length (Miles)**

*to the nearest one-tenth of a mile*

ROBERT STREET, FROM THE I-94 BRIDGE APPROACH PANEL TO THE MISSISSIPPI RIVER BRIDGE APPROACH PANEL, 0.6 MILES, RECONSTRUCT ROADWAY, ADA, LANDSCAPING, DRAINAGE, INSTALL SIGNALS, LIGHTING

0.6

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## Project Funding

Are you applying for competitive funds from another source(s) to implement this project?

No

If yes, please identify the source(s)

Federal Amount \$7,000,000.00

Match Amount \$11,000,000.00

*Minimum of 20% of project total*

Project Total \$18,000,000.00

*For transit projects, the total cost for the application is total cost minus fare revenues.*

Match Percentage 61.11%

*Minimum of 20%*

*Compute the match percentage by dividing the match amount by the project total*

Source of Match Funds MnDOT, City of Saint Paul

*A minimum of 20% of the total project cost must come from non-federal sources; additional match funds over the 20% minimum can come from other federal sources*

Preferred Program Year

Select one: 2025

*Select 2022 or 2023 for TDM projects only. For all other applications, select 2024 or 2025.*

Additional Program Years:

*Select all years that are feasible if funding in an earlier year becomes available.*

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## Project Information-Roadways

County, City, or Lead Agency City of Saint Paul

Functional Class of Road A-minor Reliver

Road System City Street

*TH, CSAH, MSAS, CO. RD., TWP. RD., CITY STREET*

Road/Route No.

*i.e., 53 for CSAH 53*

Name of Road Robert Street

*Example; 1st ST., MAIN AVE*

Zip Code where Majority of Work is Being Performed 55101

(Approximate) Begin Construction Date 04/01/2025

(Approximate) End Construction Date 11/03/2025

TERMINI:(Termini listed must be within 0.3 miles of any work)

From:  
(Intersection or Address) Interstate 94 bridge approach panel

To:  
(Intersection or Address) Mississippi River bridge approach panel

DO NOT INCLUDE LEGAL DESCRIPTION

Or At

Miles of Sidewalk (nearest 0.1 miles) 1.2

Miles of Trail (nearest 0.1 miles) 0

Miles of Trail on the Regional Bicycle Transportation Network (nearest 0.1 miles) 0

Primary Types of Work

GRADE, AGG BASE, PAVING/CONCRETE, SIDEWALK, PED RAMPS, CURB AND GUTTER, STORM SEWER, SIGNALS, LIGHTING, LANDSCAPING

Examples: GRADE, AGG BASE, BIT BASE, BIT SURF, SIDEWALK, CURB AND GUTTER, STORM SEWER, SIGNALS, LIGHTING, GUARDRAIL, BIKE PATH, PED RAMPS, BRIDGE, PARK AND RIDE, ETC.

#### BRIDGE/CULVERT PROJECTS (IF APPLICABLE)

Old Bridge/Culvert No.:

New Bridge/Culvert No.:

Structure is Over/Under  
(Bridge or culvert name):

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## Requirements - All Projects

### All Projects

1. The project must be consistent with the goals and policies in these adopted regional plans: Thrive MSP 2040 (2014), the 2040 Transportation Policy Plan (2018), the 2040 Regional Parks Policy Plan (2018), and the 2040 Water Resources Policy Plan (2015).

Check the box to indicate that the project meets this requirement. Yes

2. The project must be consistent with the 2040 Transportation Policy Plan. Reference the 2040 Transportation Plan goals, objectives, and strategies that relate to the project.

Briefly list the goals, objectives, strategies, and associated pages:

Goal A: Transportation System Stewardship:

Objective: Efficiently preserve and maintain the regional transportation system in a state of good repair.

Objective: Operate the regional transportation system to efficiently and cost-effectively connect people and freight to destinations

Strategies: A1 and A2 (Page 2.6)

Goal B: Safety and Security:

Objective: Reduce crashes and improve safety and security for all modes of passenger travel and freight transportation.

Strategies: B1, B4, B5, and B6 (Page 2.7)

Goal C: Access to Destinations:

Objective: Increase the availability of multimodal travel options, especially in congested highway corridors.

Objective: Increase travel time reliability and predictability for travel on highway and transit systems.

Objective: Ensure access to freight terminals such as river ports, airports, and intermodal rail yards.

Objective: Increase transit ridership and share of trips taken using transit bicycling and walking.

Objective: improve multimodal travel options for people of all ages and abilities to connect to jobs and other opportunities, particularly for historically underrepresented populations.

Strategies: C1, C2, C4, C7, C8, C9, C11, C12, and C17 (Page 2.8-2.10)

#### Goal D: Competitive Economy

Objective: Improve multimodal access to regional job concentrations identified in Thrive MSP 2040.

Objective: Invest in a multimodal transportation system to attract and retain businesses and residents.

Strategies: D1, D3 (Page 2.11)

#### Goal E: Healthy Environment

Objective: Increase the availability and attractiveness of transit, bicycling, and walking to encourage healthy communities and active car-free lifestyles.

Objective: Provide a transportation system that promotes community cohesion and connectivity for historically underrepresented populations.

Strategies: E1, E2, E3, E5, E6, and E7 (Page 2.12-2.13)

Goal F: Leveraging Transportation Investments to Guide Land Use.

Objective: Focus regional growth in areas that support the full range of multimodal travel.

Objective: Encourage local land use design that integrates highways, streets, transit, walking, and bicycling.

Strategies: F1, F2, F3, F4, F5, F6, and F7 (Page 2.14-2.15)

*Limit 2,800 characters, approximately 400 words*

*3. The project or the transportation problem/need that the project addresses must be in a local planning or programming document. Reference the name of the appropriate comprehensive plan, regional/statewide plan, capital improvement program, corridor study document [studies on trunk highway must be approved by the Minnesota Department of Transportation and the Metropolitan Council], or other official plan or program of the applicant agency [includes Safe Routes to School Plans] that the project is included in and/or a transportation problem/need that the project addresses.*

This portion of Robert Street was identified as a key infrastructure improvement for the expansion of the transit system.

#### 5-Year Capital Improvement Program

- Department of Public Works Five Year Capital Plan (Page 2)

#### Met Council 2040 Transportation Policy Plan

#### List the applicable documents and pages:

- Transit Investment Summary:

o Increased Revenue Scenario - Transitway System (Page 69-70)

- Chapter 6: Transit Investment Direction and Plan:

o Additional Transitways under Increased Revenue Scenario (Page 6.66)

o Additional Projects Under Study or to be Studied (Page 6.70)

*Limit 2,800 characters, approximately 400 words*

*4. The project must exclude costs for studies, preliminary engineering, design, or construction engineering. Right-of-way costs are only eligible as part of transit stations/stops, transit terminals, park-and-ride facilities, or pool-and-ride lots. Noise barriers, drainage projects, fences, landscaping, etc., are not eligible for funding as a standalone project, but can be included as part of the larger submitted project, which is otherwise eligible.*

**Check the box to indicate that the project meets this requirement.** Yes

*5. Applicants that are not State Aid cities or counties in the seven-county metro area with populations over 5,000 must contact the MnDOT Metro State Aid Office prior to submitting their application to determine if a public agency sponsor is required.*

**Check the box to indicate that the project meets this requirement.** Yes

*6. Applicants must not submit an application for the same project elements in more than one funding application category.*

**Check the box to indicate that the project meets this requirement.** Yes



7. The requested funding amount must be more than or equal to the minimum award and less than or equal to the maximum award. The cost of preparing a project for funding authorization can be substantial. For that reason, minimum federal amounts apply. Other federal funds may be combined with the requested funds for projects exceeding the maximum award, but the source(s) must be identified in the application. Funding amounts by application category are listed below.

**Strategic Capacity (Roadway Expansion):** \$1,000,000 to \$10,000,000

**Roadway Reconstruction/Modernization:** \$1,000,000 to \$7,000,000

**Traffic Management Technologies (Roadway System Management):** \$250,000 to \$3,500,000

**Spot Mobility and Safety:** \$1,000,000 to \$3,500,000

**Bridges Rehabilitation/Replacement:** \$1,000,000 to \$7,000,000

**Check the box to indicate that the project meets this requirement.** Yes

8. The project must comply with the Americans with Disabilities Act (ADA).

**Check the box to indicate that the project meets this requirement.** Yes

9. In order for a selected project to be included in the Transportation Improvement Program (TIP) and approved by USDOT, the public agency sponsor must either have a current Americans with Disabilities Act (ADA) self-evaluation or transition plan that covers the public right of way/transportation, as required under Title II of the ADA. The plan must be completed by the local agency before the Regional Solicitation application deadline. For the 2022 Regional Solicitation funding cycle, this requirement may include that the plan is updated within the past five years.

**The applicant is a public agency that employs 50 or more people and has a completed ADA transition plan that covers the public right of way/transportation.** Yes

**Date plan completed:** 01/13/2016

**Link to plan:** [https://www.stpaul.gov/sites/default/files/Media%20Root/ADA%20Transition%20Plan%20for%20Public%20Works\\_2016.pdf](https://www.stpaul.gov/sites/default/files/Media%20Root/ADA%20Transition%20Plan%20for%20Public%20Works_2016.pdf)

**The applicant is a public agency that employs fewer than 50 people and has a completed ADA self-evaluation that covers the public right of way/transportation.**

**Date self-evaluation completed:**

**Link to plan:**

**Upload plan or self-evaluation if there is no link** 1589309583435\_CityStPaulADAPlan.pdf

Upload as PDF

10. The project must be accessible and open to the general public.

**Check the box to indicate that the project meets this requirement.** Yes

11. The owner/operator of the facility must operate and maintain the project year-round for the useful life of the improvement, per FHWA direction established 8/27/2008 and updated 6/27/2017.

**Check the box to indicate that the project meets this requirement.** Yes

12. The project must represent a permanent improvement with independent utility. The term independent utility means the project provides benefits described in the application by itself and does not depend on any construction elements of the project being funded from other sources outside the regional solicitation, excluding the required non-federal match. Projects that include traffic management or transit operating funds as part of a construction project are exempt from this policy.

**Check the box to indicate that the project meets this requirement.** Yes

13. The project must not be a temporary construction project. A temporary construction project is defined as work that must be replaced within five years and is ineligible for funding. The project must also not be staged construction where the project will be replaced as part of future stages. Staged construction is eligible for funding as long as future stages build on, rather than replace, previous work.

Check the box to indicate that the project meets this requirement. Yes

14. The project applicant must send written notification regarding the proposed project to all affected state and local units of government prior to submitting the application.

Check the box to indicate that the project meets this requirement. Yes

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## Roadways Including Multimodal Elements

1. All roadway and bridge projects must be identified as a principal arterial (non-freeway facilities only) or A-minor arterial as shown on the latest TAB approved roadway functional classification map.

Check the box to indicate that the project meets this requirement. Yes

### Roadway Expansion and Reconstruction/Modernization and Spot Mobility projects only:

2. The project must be designed to meet 10-ton load limit standards.

Check the box to indicate that the project meets this requirement. Yes

### Bridge Rehabilitation/Replacement and Strategic Capacity projects only:

3. Projects requiring a grade-separated crossing of a principal arterial freeway must be limited to the federal share of those project costs identified as local (non-MnDOT) cost responsibility using MnDOT's Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities manual. In the case of a federally funded trunk highway project, the policy guidelines should be read as if the funded trunk highway route is under local jurisdiction.

Check the box to indicate that the project meets this requirement.

4. The bridge must carry vehicular traffic. Bridges can carry traffic from multiple modes. However, bridges that are exclusively for bicycle or pedestrian traffic must apply under one of the Bicycle and Pedestrian Facilities application categories. Rail-only bridges are ineligible for funding.

Check the box to indicate that the project meets this requirement.

### Bridge Rehabilitation/Replacement projects only:

5. The length of the bridge must equal or exceed 20 feet.

Check the box to indicate that the project meets this requirement.

6. The bridge must have a National Bridge Inventory Rating of 6 or less for rehabilitation projects and 4 or less for replacement projects.

Check the box to indicate that the project meets this requirement.

### Roadway Expansion, Reconstruction/Modernization, and Bridge Rehabilitation/Replacement projects only:

7. All roadway projects that involve the construction of a new/expanded interchange or new interchange ramps must have approval by the Metropolitan Council/MnDOT Interchange Planning Review Committee prior to application submittal. Please contact Michael Corbett at MnDOT (Michael.J.Corbett@state.mn.us or 651-234-7793) to determine whether your project needs to go through this process as described in Appendix F of the 2040 Transportation Policy Plan.

Check the box to indicate that the project meets this requirement. Yes

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## Requirements - Roadways Including Multimodal Elements

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### Specific Roadway Elements

CONSTRUCTION PROJECT ELEMENTS/COST  
ESTIMATES

Cost

Mobilization (approx. 5% of total cost)	\$1,175,000.00
Removals (approx. 5% of total cost)	\$925,000.00
Roadway (grading, borrow, etc.)	\$650,000.00
Roadway (aggregates and paving)	\$3,200,000.00
Subgrade Correction (muck)	\$0.00
Storm Sewer	\$1,250,000.00
Ponds	\$0.00
Concrete Items (curb & gutter, sidewalks, median barriers)	\$400,000.00
Traffic Control	\$1,000,000.00
Striping	\$5,000.00
Signing	\$95,000.00
Lighting	\$0.00
Turf - Erosion & Landscaping	\$150,000.00
Bridge	\$0.00
Retaining Walls	\$0.00
Noise Wall (not calculated in cost effectiveness measure)	\$0.00
Traffic Signals	\$2,000,000.00
Wetland Mitigation	\$0.00
Other Natural and Cultural Resource Protection	\$0.00
RR Crossing	\$0.00
Roadway Contingencies	\$2,800,000.00
Other Roadway Elements	\$500,000.00
<b>Totals</b>	<b>\$14,150,000.00</b>

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## Specific Bicycle and Pedestrian Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Path/Trail Construction	\$0.00
Sidewalk Construction	\$800,000.00
On-Street Bicycle Facility Construction	\$0.00
Right-of-Way	\$0.00
Pedestrian Curb Ramps (ADA)	\$300,000.00
Crossing Aids (e.g., Audible Pedestrian Signals, HAWK)	\$100,000.00
Pedestrian-scale Lighting	\$1,000,000.00
Streetscaping	\$850,000.00

Wayfinding	\$0.00
Bicycle and Pedestrian Contingencies	\$800,000.00
Other Bicycle and Pedestrian Elements	\$0.00
<b>Totals</b>	<b>\$3,850,000.00</b>

### Specific Transit and TDM Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Fixed Guideway Elements	\$0.00
Stations, Stops, and Terminals	\$0.00
Support Facilities	\$0.00
Transit Systems (e.g. communications, signals, controls, fare collection, etc.)	\$0.00
Vehicles	\$0.00
Contingencies	\$0.00
Right-of-Way	\$0.00
Other Transit and TDM Elements	\$0.00
<b>Totals</b>	<b>\$0.00</b>

### Transit Operating Costs

Number of Platform hours	0
Cost Per Platform hour (full loaded Cost)	\$0.00
Subtotal	\$0.00
Other Costs - Administration, Overhead,etc.	\$0.00

### Totals

Total Cost	\$18,000,000.00
Construction Cost Total	\$18,000,000.00
Transit Operating Cost Total	\$0.00

### Measure B: Project Location Relative to Jobs, Manufacturing, and Education

Existing Employment within 1 Mile:	97780
Existing Manufacturing/Distribution-Related Employment within 1 Mile:	4160

Existing Post-Secondary Students within 1 Mile:	6883
Upload Map	1589310410037_Regional Economy.pdf
<i>Please upload attachment in PDF form.</i>	

## Measure C: Current Heavy Commercial Traffic

*RESPONSE: Select one for your project, based on the Regional Truck Corridor Study:*

### Along Tier 1:

Miles: 0  
*(to the nearest 0.1 miles)*

### Along Tier 2:

Miles: 0  
*(to the nearest 0.1 miles)*

### Along Tier 3:

Miles: 0  
*(to the nearest 0.1 miles)*

The project provides a direct and immediate connection (i.e., intersects) with either a Tier 1, Tier 2, or Tier 3 corridor: Yes

None of the tiers:

## Measure A: Current Daily Person Throughput

Location	Robert Street, Between 4th Street and Kellogg Boulevard
Current AADT Volume	10500
Existing Transit Routes on the Project	3, 16, 21, 53, 54, 61, 63, 64, 68, 70, 71, 74, 94, 262, 265, 275, 294, 350, 351, 353, 361, 364, 365, 375, 417, 452, 480, 484, 489, 860, 902-METRO Green Line, Other

*For New Roadways only, list transit routes that will likely be diverted to the new proposed roadway (if applicable).*

Upload Transit Connections Map	1589310698946_Transit Connections.pdf
<i>Please upload attachment in PDF form.</i>	

## Response: Current Daily Person Throughput

Average Annual Daily Transit Ridership	0
Current Daily Person Throughput	13650.0

## Measure B: 2040 Forecast ADT

Use Metropolitan Council model to determine forecast (2040) ADT volume	Yes
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If checked, METC Staff will provide Forecast (2040) ADT volume

OR

Identify the approved county or city travel demand model to  
determine forecast (2040) ADT volume

Forecast (2040) ADT volume

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## Measure A: Connection to disadvantaged populations and projects benefits, impacts, and mitigation

1. **Sub-measure:** *Equity Population Engagement: A successful project is one that is the result of active engagement of low-income populations, people of color, persons with disabilities, youth and the elderly. Engagement should occur prior to and during a projects development, with the intent to provide direct benefits to, or solve, an expressed transportation issue, while also limiting and mitigating any negative impacts. Describe and map the location of any low-income populations, people of color, disabled populations, youth or the elderly within a ½ mile of the proposed project. Describe how these specific populations were engaged and provided outreach to, whether through community planning efforts, project needs identification, or during the project development process. Describe what engagement methods and tools were used and how the input is reflected in the projects purpose and need and design. Elements of quality engagement include: outreach and engagement to specific communities and populations that are likely to be directly impacted by the project; techniques to reach out to populations traditionally not involved in community engagement related to transportation projects; feedback from these populations identifying potential positive and negative elements of the proposed project through engagement, study recommendations, or plans that provide feedback from populations that may be impacted by the proposed project. If relevant, describe how NEPA or Title VI regulations will guide engagement activities.*

This project is an essential part of the City's efforts to revitalize downtown Saint Paul and has been included in the public engagement efforts hosted by the City for the Rush Line BRT project. This active engagement of equity populations within a ½ mile of the project (see attached map) has occurred and will continue as the project is developed.

-Robert Street/10th Street proposed Rush Line BRT Station:

- o Pedro Park Open House - Held for residents near Pedro Park where feedback included concerns about the southbound station location adjacent to Pedro Park due to space constraints.

- o Capitol River Council Development Review Committee - Presentation to downtown residents by district council staff. Feedback included the desire for the Robert Street reconstruction project and the Rush Line project construction to occur simultaneously to minimize construction impacts.

- o 10th Street Station Drop-in Discussions - Held for residents and businesses near Robert Street/10th Street. Feedback included the preference for the southbound 10th Street station platform to be nearside. This feedback was instrumental in making the station location change.

-Resident Council Meetings:

- o Exchange and Wabasha High-rise Resident Council Meeting - Presentation to underrepresented groups about expanding transit options between downtown Saint Paul and other surrounding communities.

Response:

*(Limit 2,800 characters; approximately 400 words)*

**2.Sub-measure:** *Equity Population Benefits and Impacts: A successful project is one that has been designed to provide direct benefits to low-income populations, people of color, persons with disabilities, youth and the elderly. All projects must mitigate potential negative benefits as required under federal law. Projects that are designed to provide benefits go beyond the mitigation requirement to proactively provide transportation benefits and solve transportation issues experienced by Equity populations.*

*a. Describe the projects benefits to low-income populations, people of color, children, people with disabilities, and the elderly. Benefits could relate to pedestrian and bicycle safety improvements; public health benefits; direct access improvements for residents or improved access to destinations such as jobs, school, health care or other; travel time improvements; gap closures; new transportation services or modal options, leveraging of other beneficial projects and investments; and/or community connection and cohesion improvements. Note that this is not an exhaustive list.*



The Robert Street project provides safety, access, and public health benefits to the City's equity populations in an area of concentrated poverty, in addition to leveraging other projects. It supports the City of Saint Paul and Metropolitan Council's goal of providing safe, convenient and affordable transportation for all individuals, particularly low-income populations, communities of color, children, the elderly, and people with disabilities. The City will adhere to the Saint Paul Street Design Manual guiding principles, including accommodating all modes of travel and ensuring safety for all users.

#### Safety:

The wide crossing distances that expose pedestrians to traffic will be mitigated by adding curb extensions at key intersections. All intersections will be upgraded to full ADA compliance including ramps, traffic signals, countdown timers, and Accessible Pedestrian Signals to further improve pedestrian safety. Safety buffers for added comfort will be provided with widened boulevards and parking lanes at key areas along the corridor to increase the separation between pedestrians and moving vehicles. The proposed upgrades will undoubtedly improve pedestrian connections to the downtown employment pool.

#### Response:

#### Access:

The project provides better access to jobs and destinations for all corridor users. The project promotes multimodal travel alternatives to single occupancy vehicles with connections to the Rush Line BRT project, the Capital City Bikeway network, more than 30 transit routes, and improved sidewalks and amenities.

The project will provide further benefits to people

with disabilities through greater access to economic opportunities such as the Metropolitan Center for Independent Living; a non-profit organization assisting people with disabilities to be successful in achieving independence.

#### Public Health:

The enhanced pedestrian facility will improve local connections to many social service programs for those populations where walking or transit is their main source of travel. For example, the project improves access to the Department of Human Services Minnesota Care - health program for Minnesotans with low incomes; Ramsey County Social Services - provides services including chemical dependency and mental health; and Naomi's Family Residence - shelter for women and children struggling with homelessness.

#### Leveraging Other Projects:

The planning and engagement for the Robert Street and Rush Line BRT projects are being coordinated to proactively evaluate transportation benefits and solve issues experienced by all users and abilities.

*(Limit 2,800 characters; approximately 400 words)*

*b. Describe any negative impacts to low-income populations, people of color, children, people with disabilities, and the elderly created by the project, along with measures that will be taken to mitigate them. Negative impacts that are not adequately mitigated can result in a reduction in points.*

*Below is a list of negative impacts. Note that this is not an exhaustive list.*

*Increased difficulty in street crossing caused by increased roadway width, increased traffic speed, wider turning radii, or other elements that negatively impact pedestrian access.*

*Increased noise.*

*Decreased pedestrian access through sidewalk removal / narrowing, placement of barriers along the walking path, increase in auto-oriented curb cuts, etc.*

*Project elements that are detrimental to location-based air quality by increasing stop/start activity at intersections, creating vehicle idling areas, directing an increased number of vehicles to a particular point, etc.*

*Increased speed and/or cut-through traffic.*

*Removed or diminished safe bicycle access.*

*Inclusion of some other barrier to access to jobs and other destinations.*

*Displacement of residents and businesses.*

*Mitigation of temporary construction/implementation impacts such as dust; noise; reduced access for travelers and to businesses; disruption of utilities; and eliminated street crossings.*

*Other*

The project is not anticipated to impose negative impacts to human health or environmental effects on low-income populations, communities of color, or vulnerable populations such as children, the elderly, and people with disabilities. The project elements are intended to enhance safety, improve pedestrian and bicyclist access, and reduce traffic and air quality concerns.

While dust and noise are inevitable once construction begins, proper measures will be taken to mitigate disruption during this time. During construction, access to businesses, housing, and a transit advantage will be maintained as to not adversely impact disadvantaged populations who live in or use the project corridor.

**Response:**

Furthermore, we anticipate the traffic volume on adjacent/alternate routes to increase during construction. After the project construction, overall congestion in the project area will decline due to the proposed roadway improvements such as the addition of continuous left-turn lanes to eliminate turning vehicles from through traffic and upgraded traffic signals with signal timing for improved travel times.

(Limit 2,800 characters; approximately 400 words)

**Select one:**

**3.Sub-measure: Bonus Points** Those projects that score at least 80% of the maximum total points available through sub-measures 1 and 2 will be awarded bonus points based on the geographic location of the project. These points will be assigned as follows, based on the highest-scoring geography the project contacts:

a.25 points to projects within an Area of Concentrated Poverty with 50% or more people of color

b.20 points to projects within an Area of Concentrated Poverty

c.15 points to projects within census tracts with the percent of population in poverty or population of color above the regional average percent

d.10 points for all other areas

**Project is located in an Area of Concentrated Poverty where 50% or more of residents are people of color (ACP50):**

**Project located in Area of Concentrated Poverty:** Yes

**Projects census tracts are above the regional average for population in poverty or population of color:**

**Project located in a census tract that is below the regional average for population in poverty or populations of color or includes children, people with disabilities, or the elderly:**

(up to 40% of maximum score )

Upload the "Socio-Economic Conditions" map used for this measure. The second map created for sub measure A1 can be uploaded on the Other Attachments Form, or can be combined with the "Socio-Economic Conditions" map into a single PDF and uploaded here.

**Upload Map** 1589311220103\_Socio-Economic Conditions.pdf

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## Measure B: Part 1: Housing Performance Score

City	Segment Length (For stand-alone projects, enter population from Regional Economy map) within each City/Township	Segment Length/Total Project Length	Score	Housing Score Multiplied by Segment percent
St. Paul	0.6	1.0	100.0	100.0

---

## Total Project Length

**Total Project Length** 0.6

Project length entered on the Project Information - General form.

---

## Housing Performance Score

**Total Project Length (Miles) or Population** 0.6

**Total Housing Score** 100.0

---

## Affordable Housing Scoring

---

### Part 2: Affordable Housing Access

*Reference Access to Affordable Housing Guidance located under Regional Solicitation Resources for information on how to respond to this measure and create the map.*

*If text box is not showing, click Edit or "Add" in top right of page.*

As shown in the Socio-Economic Conditions map, the Robert Street project is in an area of concentrated poverty. The City's Public Housing Agency provides a clean, safe and affordable living environment for eligible lower and very low-income individuals and families. These families pay 30 percent of their adjusted monthly income for rent and utilities.

The proposed Robert Street reconstruction project will improve access for residents of the following affordable housing developments within ½ mile of the project area, as shown in the attached map:

-Sibley Park Apartments, 211 7th Street

- o Existing development

- o 114 total units

- o 50 affordable units - 38-1BR, 11-2BR, 1-3BR

- o LIHTC 9 percent tax credit

-Crane Ordway, 281 5th Street

- o Existing development

- o 70 total units

- o 70 affordable units

- o LIHTC 4 percent and LIHTC 9 percent tax credit, subsidized-other

-Straus Apartments, 350 Sibley Street

- o Existing development

- o 49 total units

Response:

- o 34 affordable units - 7 Studio, 17-1BR, 9-2BR, 1-3BR

- o LIHTC 4 percent tax credit, housing tax credit, EDHC, FHF, ARIF, subsidized-other

- Tilsner Lofts, 300 Broadway Street

- o Existing development

- o 65 total units

- o 65 affordable units - 5 Studio, 16-1BR, 38-2BR, 6-3BR

- o LIHTC 4 percent tax credit

- Heritage House, 218 7th Street

- o Existing development

- o 58 total units

- o 58 affordable units - 58-1BR

- o Elderly Apartments

- o Section 8 (PBA)

As shown in the attached map, there are approximately 20 affordable housing developments within ½ mile of the project area. The other affordable housing developments not listed above include the Public Housing Agency, Wabasha Hi-rise, Renaissance Box, Lyon's Court, Sibley Court Apartments, Mears Park place, American House, Northern Warehouse, Minnesota Vista, Commerce Apartments, Pioneer Press Building, Exchange Hi-rise, Central Towers, Dorothy Day Residence, and

Higher Ground; Section 8 vouchers and/or other forms of subsidy are accepted.

(Limit 2,100 characters; approximately 300 words)

Upload map: 1589312086684\_RobertStreet\_Equity\_Maps.pdf

Measure A: Year of Roadway Construction

Year of Original Roadway Construction or Most Recent Reconstruction	Segment Length	Calculation	Calculation 2
1913	0.6	1147.8	1913.0
	1	1148	1913

Total Project Length

Total Project Length (as entered in "Project Information" form) 0.6

Average Construction Year

Weighted Year 1913

Total Segment Length (Miles)

Total Segment Length 0.6

Measure B: Geometric, Structural, or Infrastructure Improvements

Improved roadway to better accommodate freight movements: Yes



- Intersection improvements such as smaller turning radiuses will provide for better freight turning movements along the corridor.

**Response:**

- One of the two river ports in the Twin Cities metro region, the Saint Paul Port on the Mississippi river, is located within ½ mile of the project area. Freight movements to the river port will be greatly improved with the reconstruction of the deteriorated roadway pavement, installation of new traffic signals for better signal timing - hence reliable travel times and improved pedestrian visibility to minimize potential accidents.

*(Limit 700 characters; approximately 100 words)*

**Improved clear zones or sight lines:**

Yes

A variety of improvements will be made to improve clear zones and sight lines along the corridor:

- The addition of curb extensions will expand sight lines at intersections.

- Crossing improvements will be implemented on cross streets and along Robert Street where appropriate, to increase visibility of pedestrians and bicyclists at intersections.

**Response:**

- All access points will be evaluated.

- Upgraded and consistent street and pedestrian scale lighting will improve night visibility and safety via CPTED (Crime Prevention Through Environmental Design) principles.

- Boulevards will provide clear zones.

*(Limit 700 characters; approximately 100 words)*

**Improved roadway geometrics:**

Yes

- Roadway geometric improvements such as optimized turning radii and lane widths, all-day parking lanes, continuous left-turn lanes, crossing improvements, and other traffic calming improvements will reduce crossing distances and exposure for pedestrians and bicyclists while preserving auto movements.

**Response:**

- The construction of curb and gutter will provide added safety for pedestrians.

*(Limit 700 characters; approximately 100 words)*

**Access management enhancements:**

Yes

- The continuous left-turn lanes between 11th Street and 6th Street will improve the free flow speeds of traffic by eliminating turning vehicles from through traffic, thereby reducing congestion.

**Response:**

*(Limit 700 characters; approximately 100 words)*

**Vertical/horizontal alignment improvements:**

Yes

- Robert Street is fully developed with mostly straight horizontal and vertical alignments. The horizontal alignment is not expected to significantly change and therefore no permanent right-of-way acquisitions are anticipated. Changes to the horizontal alignment might include the removal and/or addition of left-turn lanes at specific intersections.

**Response:**

- The vertical alignment is also not expected to significantly change except for a few location-specific areas to optimize sight lines and stormwater management. The project will meet all applicable State & Federal design requirements.

*(Limit 700 characters; approximately 100 words)*

**Improved stormwater mitigation:**

Yes

**Response:**

- Streetscape elements such as bio-retention features and other sustainable landscaping practices will be evaluated as needed to address localized stormwater retention and necessary stormwater quality requirements.

*(Limit 700 characters; approximately 100 words)*

**Signals/lighting upgrades:**

Yes

- All intersections along the project corridor will be upgraded to accommodate pedestrian/ADA connectivity.

- Overhead traffic signal heads on mast arms will be installed and centered at each lane approach. This will help drivers choose the proper lane to navigate through the intersections.

**Response:**

- Accessible Pedestrian Signals (APS) and countdown timers will be installed at the intersections.

- Left-turn phases will be implemented as needed to improve traffic flow and safety.

- Upgraded and consistent street and pedestrian scale lighting will improve night visibility and safety via CPTED principles.

*(Limit 700 characters; approximately 100 words)*

**Other Improvements**

Yes

- The corridor will be designed based on the City's Streets Design Manual to prioritize the needs of the most vulnerable users and support the City's commitment to the complete streets policies.

**Response:**

## Measure A: Congestion Reduction/Air Quality

Total Peak Hour Delay Per Vehicle Without The Project (Seconds/ Vehicle)	Total Peak Hour Delay Per Vehicle With The Project (Seconds/ Vehicle)	Total Peak Hour Delay Per Vehicle Reduced by Project (Seconds/ Vehicle)	Volume without the Project (Vehicles per hour)	Volume with the Project (Vehicles Per Hour):	Total Peak Hour Delay Reduced by the Project:	Total Peak Hour Delay Reduced by the Project:	EXPLANA TION of methodolo gy used to calculate railroad crossing delay, if applicable.	Synchro or HCM Reports
9.0	12.0	-3	963	963	-2889	-2889	4th Street	158931317 3776_Robe rt Street Traffic Analysis.pdf
11.0	6.0	5.0	1058	1058	5290.0	5290.0	5th Street	158931650 2600_Robe rt Street Traffic Analysis.pdf
13.0	13.0	0	1735	1735	0	0	6th Street	158931655 7756_Robe rt Street Traffic Analysis.pdf
9.0	6.0	3.0	1000	1000	3000.0	3000.0	7th Place	158931663 2210_Robe rt Street Traffic Analysis.pdf
12.0	10.0	2.0	1609	1609	3218.0	3218.0	7th Street	158931669 5381_Robe rt Street Traffic Analysis.pdf

10.0	9.0	1.0	1095	1095	1095.0	1095.0	9th Street	158931674 6312_Robe rt Street Traffic Analysis.pdf
15.0	13.0	2.0	1190	1189	2380.0	2378.0	10th Street	158931679 6945_Robe rt Street Traffic Analysis.pdf
11.0	9.0	2.0	1369	1369	2738.0	2738.0	11th Street	158931685 4955_Robe rt Street Traffic Analysis.pdf
14.0	12.0	2.0	1289	1289	2578.0	2578.0	12th Street	158931690 5116_Robe rt Street Traffic Analysis.pdf
50.0	28.0	22.0	3520	3520	77440.0	77440.0	Kellogg Boulevard	158931696 2948_Robe rt Street Traffic Analysis.pdf
94848								

## Vehicle Delay Reduced

Total Peak Hour Delay Reduced	94850.0
Total Peak Hour Delay Reduced	0

## Measure B: Roadway projects that do not include new roadway segments or railroad grade-separation elements

Total (CO, NOX, and VOC) Peak Hour Emissions without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
15.05	12.62	2.43

## Total

Total Emissions Reduced: 2.43

Upload Synchro Report 1589397431001\_Robert Street Traffic Analysis.pdf

Please upload attachment in PDF form. (Save Form, then click 'Edit' in top right to upload file.)

## Measure B: Roadway projects that are constructing new roadway segments, but do not include railroad grade-separation elements (for Roadway Expansion applications only):

Total (CO, NOX, and VOC)  
Peak Hour Emissions  
without the Project  
(Kilograms):

0

Total (CO, NOX, and VOC)  
Peak Hour Emissions with  
the Project (Kilograms):

0

Total (CO, NOX, and VOC)  
Peak Hour Emissions  
Reduced by the Project  
(Kilograms):

0

## Total Parallel Roadway

Emissions Reduced on Parallel Roadways 0

Upload Synchro Report

Please upload attachment in PDF form. (Save Form, then click 'Edit' in top right to upload file.)

## New Roadway Portion:

Cruise speed in miles per hour with the project: 0

Vehicle miles traveled with the project: 0

Total delay in hours with the project: 0

Total stops in vehicles per hour with the project: 0

Fuel consumption in gallons: 0

Total (CO, NOX, and VOC) Peak Hour Emissions Reduced or  
Produced on New Roadway (Kilograms): 0

EXPLANATION of methodology and assumptions used:(Limit  
1,400 characters; approximately 200 words)

Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the  
Project (Kilograms): 0.0

## Measure B: Roadway projects that include railroad grade-separation elements

Cruise speed in miles per hour without the project: 0

Vehicle miles traveled without the project:	0
Total delay in hours without the project:	0
Total stops in vehicles per hour without the project:	0
Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons (F1)	0
Fuel consumption in gallons (F2)	0
Fuel consumption in gallons (F3)	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	0
EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)	

---

## Measure A: Roadway Projects that do not Include Railroad Grade-Separation Elements

### Crash Modification Factor Used:

*(Limit 700 Characters; approximately 100 words)*

### Rationale for Crash Modification Selected:

*(Limit 1400 Characters; approximately 200 words)*

Project Benefit (\$) from B/C Ratio	\$19,628,087.00
Total Fatal (K) Crashes:	0
Total Serious Injury (A) Crashes:	0
Total Non-Motorized Fatal and Serious Injury Crashes:	0
Total Crashes:	108
Total Fatal (K) Crashes Reduced by Project:	0
Total Serious Injury (A) Crashes Reduced by Project:	0
Total Non-Motorized Fatal and Serious Injury Crashes Reduced by Project:	0
Total Crashes Reduced by Project:	61
Worksheet Attachment	1589315400537_Robert Street Crash Analysis.pdf

*Please upload attachment in PDF form.*

---

## Roadway projects that include railroad grade-separation elements:

Current AADT volume:	0
Average daily trains:	0

Crash Risk Exposure eliminated:

0

---

**Measure A: Multimodal Elements and Existing Connections**



The Robert Street reconstruction improvements for the corridor include a road diet with the modification of the four-lane roadway to a three-lane facility with a center two-way left-turn lane. This improvement is consistent with FHWA's Proven Safety Countermeasures document that identifies the following safety benefits:

- Reducing rear-end and left-turn crashes due to the dedicated left-turn lane
- Crossing fewer lanes
- Providing a "complete streets" environment that better accommodates the needs of all road users

**Response:**

The project also includes widened boulevards, sidewalks and pedestrian-scaled lighting along the Robert Street corridor. FHWA's Proven Safety Countermeasures document indicates the importance for agencies to integrate pedestrian walkways into the transportation system to provide safer travel conditions for pedestrians.

The proposed Robert Street reconstruction project will improve pedestrian safety at the signalized intersections along the corridor with the pedestrian safety strategies identified in MnDOT's Best Practices for Pedestrians/Bicycle Safety. These improvements include:

- An upgrade of all adjacent traffic signals and adjustment of phase timing - to ensure that pedestrians have enough time to cross the street.
- Widened sidewalks - will improve wheelchair accessibility, safety, and comfort.
- Boulevards with landscaping - for proper clear

zone distinction and beautification

- Curb bump-outs - will serve as traffic calming measures while also serving the purpose of shortening crossing distances (exposure time) and increasing visibility between roadway users.

Other pedestrian safety improvements include:

- APS installations and ADA compliant curb ramps

- Smaller curb radii - will be provided at key locations to increase pedestrian safety by decreasing vehicle turning speeds at intersections.

- Access management - limiting vehicle access points benefits pedestrians and cyclists. This will also improve traffic operations with the use of appropriate traffic control devices and pavement striping/markings.

- Reduced speed limit - The speed limit will be reduced to 25 mph to adhere to the new residential roadway minimum speed limit set forth by the state. This will help reduce traffic crashes, noise levels, greenhouse gases, and overall cost to society.

*(Limit 2,800 characters; approximately 400 words)*

---

## **Measure A: Multimodal Elements and Existing Connections**

Robert Street is a high-density corridor with existing land use patterns that support active transportation and increasing development that demands it. The City's Complete Streets Policy will guide the design of this project, redistributing space within the right-of-way to the most vulnerable users: pedestrians, bicyclists and transit users.

In addition to improving the quality of pedestrian, bicycle, and transit access along the corridor, maintaining motor vehicle operations, access and quality of mobility is also a very important goal of the project. The design of the roadway will incorporate continuous left-turn lanes as a road diet safety measure for all users. The existing pedestrian curb ramps are non-compliant with current ADA standards, the pedestrian crosswalks are long (crossing over 50 feet and four to five lanes on most approaches), and most of the transit stops lack sufficient space to accommodate daily boardings. As part of this project, ADA compliant pedestrian ramps, APS push buttons, countdown timers, high visibility continental crosswalk markings, and pedestrian-scale lighting will be provided at each intersection along with widened sidewalks, sidewalk amenities, and streetscape improvements along the Robert Street project corridor. These measures will greatly enhance the interaction of pedestrians, bicyclists, vehicles and buses within the intersections.

Bike share stations will be located at the intersection of 10th and Robert Street. This intersection is also home to the proposed Pedro Park project, a proposed Rush Line BRT Station, and the proposed Capital City Bikeway project connection. The City's Capital City Bikeway project, a result of Metropolitan Council's plans for regional bicycle networks that connect through several

Response:

jurisdictions, will connect the residents, pedestrians, bicyclists, and transit users on Robert Street to the downtown bike network. The installation of this bikeway network and improved sidewalks across downtown Saint Paul will bring economic benefits to the City, including increased retail sales and property value, and fewer vacancies.

The project will prioritize access to transit service and mobility along arterial routes that connect to regional destinations and job concentrations. Improved reliability and efficiency of transit service will equate to time-cost savings and expanded job/destination access. This Roadway Modernization project complements the separate Transit Modernization effort led by Metro Transit to upgrade the current local transit station shelters and signs in a few key locations. The corridor is designed to be BAT (Business Access and Transit) lane ready, meaning the lanes could be redistributed to accommodate transit only lanes when needed.

*(Limit 2,800 characters; approximately 400 words)*

---

## Transit Projects Not Requiring Construction

*If the applicant is completing a transit application that is operations only, check the box and do not complete the remainder of the form. These projects will receive full points for the Risk Assessment.*

*Park-and-Ride and other transit construction projects require completion of the Risk Assessment below.*

**Check Here if Your Transit Project Does Not Require Construction**

---

## Measure A: Risk Assessment - Construction Projects

### 1)Layout (25 Percent of Points)

*Layout should include proposed geometrics and existing and proposed right-of-way boundaries.*

Layout approved by the applicant and all impacted jurisdictions (i.e., cities/counties that the project goes through or agencies that maintain the roadway(s)). A PDF of the layout must be attached along with letters from each jurisdiction to receive points.

100%

#### Attach Layout

Please upload attachment in PDF form.

Layout completed but not approved by all jurisdictions. A PDF of the layout must be attached to receive points.

Yes

50%

#### Attach Layout

1589314008303\_ROBERT STREET LAYOUT.pdf

Please upload attachment in PDF form.

Layout has not been started

0%

Anticipated date or date of completion

### 2)Review of Section 106 Historic Resources (15 Percent of Points)

No known historic properties eligible for or listed in the National Register of Historic Places are located in the project area, and project is not located on an identified historic bridge

100%

There are historical/archeological properties present but determination of no historic properties affected is anticipated.

Yes

100%

Historic/archeological property impacted; determination of no adverse effect anticipated

80%

Historic/archeological property impacted; determination of adverse effect anticipated

40%

Unsure if there are any historic/archaeological properties in the project area.

0%

Project is located on an identified historic bridge

### 3)Right-of-Way (25 Percent of Points)

Right-of-way, permanent or temporary easements either not required or all have been acquired

Yes

100%

Right-of-way, permanent or temporary easements required, plat, legal descriptions, or official map complete

50%

Right-of-way, permanent or temporary easements required, parcels identified

25%

Right-of-way, permanent or temporary easements required, parcels not all identified

0%

Anticipated date or date of acquisition

#### 4)Railroad Involvement (15 Percent of Points)

No railroad involvement on project or railroad Right-of-Way agreement is executed (include signature page, if applicable)

Yes

100%

#### Signature Page

Please upload attachment in PDF form.

Railroad Right-of-Way Agreement required; negotiations have begun

50%

Railroad Right-of-Way Agreement required; negotiations have not begun.

0%

Anticipated date or date of executed Agreement

#### 5) Public Involvement (20 percent of points)

*Projects that have been through a public process with residents and other interested public entities are more likely than others to be successful. The project applicant must indicate that events and/or targeted outreach (e.g., surveys and other web-based input) were held to help identify the transportation problem, how the potential solution was selected instead of other options, and the public involvement completed to date on the project. List Dates of most recent meetings and outreach specific to this project:*

Meeting with general public:

Meeting with partner agencies:

04/08/2020

Targeted online/mail outreach:

Number of respondents:

Meetings specific to this project with the general public and partner agencies have been used to help identify the project need.

100%

Targeted outreach to this project with the general public and partner agencies have been used to help identify the project need.

75%

At least one meeting specific to this project with the general public has been used to help identify the project need.

50%

At least one meeting specific to this project with key partner agencies has been used to help identify the project need.

Yes

50%

No meeting or outreach specific to this project was conducted, but the project was identified through meetings and/or outreach related to a larger planning effort.

25%

No outreach has led to the selection of this project.

0%

Response (Limit 2,800 characters; approximately 400 words):

---

## Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form):	\$18,000,000.00
Enter Amount of the Noise Walls:	\$0.00
Total Project Cost subtract the amount of the noise walls:	\$18,000,000.00
Enter amount of any outside, competitive funding:	\$0.00
Attach documentation of award:	
Points Awarded in Previous Criteria	
Cost Effectiveness	\$0.00

---

## Other Attachments





Photo 1

5.6 MB





Photo 2

2.9 MB

File Name	Description	File Size
Project fact sheet.pdf	Project Fact Sheet	715 KB
resolution.pdf	City Council Resolution	362 KB
St. Paul TH 3 Robert St.pdf	Letter of Support	543 KB



The Most Livable  
City in America

City of Saint Paul  
Department of Public Works  
Americans with Disabilities Act  
Transition Plan  
Revised January 13, 2016





City of Saint Paul  
Department of Public Works  
American's with Disabilities Act (ADA) Transition Plan  
Revised January 13, 2016

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## **Introduction**

The American's with Disabilities Act (ADA) of 1990 was signed into law on July 26, 1990. The ADA elevated the civil rights protection of people with disabilities to the same level as those protections in place based on race, color, sex, religion and national origin provided through the Civil Rights Act of 1964.

The ADA required public entities with more than 50 employees to develop a transition plan by July 26, 1992. The Public Works Department did not meet this plan deadline, but is fulfilling this important obligation now (Summer 2009). The Transition Plan must identify all structural modifications that are necessary for buildings and facilities to ensure that programs, services and activities are accessible to people with different abilities. This Transition Plan will identify the steps that we must take to complete the modifications and the estimated date the modifications will be complete.

Public Works has jurisdiction over streets and walkways in the City, and therefore must include in this Transition Plan our schedule for accessibility standards related to infrastructure. This plan addresses pedestrian curb ramps, appropriate access to right-of-way, accessible pedestrian traffic signals and vertical connections throughout the City.

## **Self Evaluation**

During the summer of 2009 all divisions of the Department of Public Works performed a self assessment of their facilities in accordance with most recent guidance on ADA compliance.

The Public Works Department used a workbook created by the Minnesota State Council on Disability. Copies of our self assessments are available upon written request.

## **Cost Information**

It is important to note that all costs listed in this document are in estimated 2014 dollars unless the project listed is already complete. That cost information will remain printed as of the completion date. As revisions are made to this transition plan, every effort will be made to update cost information as well.

## Facilities

City Hall Annex  
25 West 4<sup>th</sup> Street  
Saint Paul, Minnesota 55102

The City Hall Annex provides downtown office space for several departments of City government. The Public Works Department has offices on the 7<sup>th</sup> through 10<sup>th</sup> and 15<sup>th</sup> floors of the building.

The City Hall Annex is technically owned by the Real Estate Group of the Office of Financial Services, but since we use five floors of this building for our administrative offices, we are including it in this transition plan.

<u>Necessary Structural Changes</u>	<u>Applicable ADAAG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Handrail Skyway Stairs to City Hall	4.8.5	Handrail changes	12/31/2020	\$5,000
Rooms 701 & 704 signs on hinge side	4.30.6	Move room signs	6/30/2015	\$50
7 <sup>th</sup> Floor Counter*	7.2.2	No 36" section	12/31/2010	\$2,500
8 <sup>th</sup> Floor Office (Pagel's Office)	4.30.6	No room # or sign	6/30/2015	\$50
8 <sup>th</sup> Floor Counter	7.2.2	No 36" section	12/31/2015	\$2,500
9 <sup>th</sup> Floor Conference room*	4.30.6	No room # or sign	6/30/2010	\$50
East Stairway	4.8.5	Handrail changes	12/31/2020	\$10,000
West Stairway	4.8.5	Handrail changes	12/31/2020	\$10,000
Renovate 9 <sup>th</sup> Floor Restrooms	4.13-4.19	Complete renovation	12/31/2015	\$150,000
10 <sup>th</sup> Floor Counter	7.2.2	No 36" section	12/31/2015	\$2,500

\* Completed as of December 31, 2010

Street Maintenance Office Building and Shop  
873 North Dale Street  
Saint Paul, Minnesota 55103

The Street Maintenance building provides office space for the division as well as a staging and shop area for operations.

<u>Necessary Structural Changes</u>	<u>Applicable ADAAG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Parking Lot	4.6.3	Van Accessible Space Needed	6/31/2015	\$500
Parking Lot	4.6.6	Disability Transfer zone needed	6/31/2015	\$300
Front Counter*	7.2.2	No 36" section	12/31/2010	\$2,500
Building Alarms	4.28.3	Visual lacking	12/31/2016	\$10,000
ADA compliant Renovation **			12/31/2020	\$40,000
• Men's Room Stalls**	4.22.1	Need 1-5'		
• Men's Room**	4.22.3	Several clearance & misc issues		
• Shower Stalls (W & M)	4.21.3	No seat	12/31/2020	\$2,000
• Shower Stalls (W & M)	4.21.4	No grab bars	12/31/2020	\$2,000
• Break Room	4.2.4	Clearances		
Drinking Fountain	4.15.3-5	Clearances	12/31/2015	\$1,500

\* Completed March 2012

\*\* Completed April 2013

Additionally automatic door access was added at the main entrance with the March 2012 project.

Public Works Equipment  
891 North Dale Street  
Saint Paul, Minnesota 55103

Public Works Equipment operates a main maintenance building and a service station/car wash building. The main maintenance building provides office space for the division as well as a maintenance bays for heavy equipment maintenance and welding.

<u>Necessary Structural Changes</u>	<u>Applicable ADAAG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Parking Lot*	4.6.3	Van Accessible Space Needed	5/31/2010	\$500
Parking Lot*	4.6.6	Disability Transfer zone needed	5/31/2010	\$300
Room signs**	4.30.6	Not 60" latch side	6/30/2010	\$50
Door hardware**	4.13.9	Lever door handles +/- 10	12/31/2011	\$1,000
Stairways***	4.8.5	Handrail Changes	12/31/2017	\$15,000
2 <sup>nd</sup> floor toilet stalls***	4.22.1	Unisex accessible	12/31/2017	\$25,000

\* Completed October 14, 2011

\*\* Completed December 31, 2011

\*\*\* Capital Maintenance budget request under development for 2016/2017 cycle.

Additionally automatic door access was added at the north front Dale Street entrance and the hallway leading to the 2<sup>nd</sup> floor meeting room (accessible by existing elevator).



Traffic Operations Office Building and Shop  
899 North Dale Street  
Saint Paul, Minnesota 55103

The Traffic Operations building provides office space for the division as well as a staging and shop area for operations.

<u>Necessary Structural Changes</u>	<u>Applicable ADAAG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Parking Lot*	4.6.3	Van Accessible Space Needed	05/31/2010	\$500
Drinking Fountain*	4.15.2	Spout not 36"	12/31/2010	\$1,500
Drinking Fountain*	4.15.3	Water Flow	see above	see above
Drinking Fountain*	4.15.5	Knee space	see above	see above

\*All actions listed above were completed by January 24, 2011. In addition, automated entrance door improvements were completed in 2011.

Sewer Utility Maintenance Office Building and Shop  
419 Burgess Street  
Saint Paul, Minnesota 55103

The Sewer Utility Maintenance building provides office space for the division as well as a staging and shop area for operations.

<u>Necessary Structural Changes</u>	<u>Applicable ADAAG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Parking Lot*	4.6.3	One Add'l Handi-capped space needed	5/31/2010	\$500
Parking Lot*	4.6.6	Disability Transfer Zone Needed	5/31/2010	\$300
Room signs*	4.30.6	Not at 60"	5/31/2010	\$100
Front Counter*	7.2.2	No 36" section	12/31/2010	\$2,500

\*All actions listed above were completed by December 20, 2011.

## Public Infrastructure

### Pedestrian Curb Ramps

Saint Paul Public Works takes equal access for all very seriously, regardless of the physical abilities of the person visiting our facilities or traveling within or through the City by way of our transportation systems.

Saint Paul Public Works has been very proactive implementing accessibility features. We began installing corner quadrant pedestrian ramps in the early 1970s, and are continuing that spirit today by updating our pedestrian infrastructure as necessary when we reconstruct our streets and sidewalks or perform major maintenance through mill and overlay projects.

At this time (2009) we have five known corner quadrants out of approximately 30,000 that do not have pedestrian ramps.\* Most of our ramps are exposed aggregate ramps lacking the current truncated dome technology.

The City of Saint Paul is required to comply with the accessibility requirements of the Americans with Disabilities Act, Section 504 of the Rehabilitation Act, and the Minnesota Human Rights Act when it completes alterations of city streets. "Alterations" are defined by law and include projects such as new construction, reconstruction and mill and overlay projects. These laws state that whenever the City completes an alteration of a city street, it must install a new curb ramp that meets current accessibility standards at locations where no curb ramp exists, and bring all existing curb ramps into compliance with current accessibility standards.

When the City alters city streets, the City will comply with the following procedure:

1. The City will identify all intersections on altered streets that do not contain a curb ramp, and will identify all existing curb ramps on altered streets that do not comply with the accessibility standards in place at the time of the alteration.
2. The City will install new curb ramps that comply with the accessibility standards in place at the time of the alteration at any corner that does not contain a curb ramp.
3. The City will bring all existing curb ramps on altered streets into compliance with the accessibility standards in place at the time of the alteration.

Some of our pedestrian ramps are on Minnesota Department of Transportation State Aid routes or Trunk Highways. Other ramps are found on Ramsey County roadways. Saint Paul Public Works will coordinate with those agencies as appropriate as part of their reconstruction and transition plans.

<u>Necessary Structural Changes</u>	<u>Applicable PROWDG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
One arterial Pedestrian Ramp*	3.4	Ramp and Truncated Dome	12/31/2013	\$1,000
Four residential	3.4	Ramps and		

Pedestrian Ramps*		Truncated Domes	12/31/2013	\$4,000
Arterial Pedestrian Ramps	3.4	Need Truncated Domes	12/31/2030	\$10,000,000
Residential Pedestrian Ramps	3.4	Need Truncated Domes	12/31/2050	\$25,000,000

\* Completed by December 31, 2013, but we do still continue to find the occasional missed corner pedestrian ramp in the City. These are corrected within the year found if the construction season permits. If too late in the season they are reconstructed in the following year.

Records of the Public Works Sidewalk Division indicate that there have been at least 3,527 pedestrian ramp corners reconstructed between 2010 and 2013. These ramps were completed by MnDOT, Ramsey County, City Residential Street Vitality Program projects, Citywide Sidewalk Projects, Utility Companies, and private permit holders. When work like this is performed, pedestrian ramp corners are updated to current ADA standards.

## Equal Access to Public Rights-of-Way

Saint Paul Public Works is tasked with ensuring safe and accessible travel for all citizens and visitors, regardless of differences in mode, method or ability. As such it is particularly important that we adequately review, advise and permit uses that may partially obstruct the public way. Sidewalk cafes, advertising and other obstructions must be placed and managed in a way that enables all system users free access to the right-of-way.

Property owners or right-of-way users are required to maintain an accessible pedestrian path past their property of four (4) feet (or 48 inches). Property owners or right-of-way users that do not provide this minimum path are inappropriately restricting accessible routes and therefore will risk revocation of City approval for their specific use of the public right-of-way.

After snow events, it is the responsibility of property owners that have adjoining sidewalk right-of-way to clear those sidewalks within 24 hours and to provide a four (4) foot (or 48 inch) minimum accessible path throughout and at corner quadrants. It is important for property owners to remember that they may need to provide additional snow removal at corner quadrants after City snow plows clear streets. It is also important for safe public transportation use that the Metropolitan Council and bus stop/bus shelter franchisees clear snow from bus stops and shelters.

It is the responsibility of contractors and utilities working in the public right-of-way to maintain accessible pathways in construction projects and permitted projects. Please refer to the “Construction Guidance” section of the Minnesota Department of Transportation page at <http://www.dot.state.mn.us/ada/> and <http://www.workzonesafety.org/training/record/9856>

## Accessible Pedestrian Traffic Signals

The City of St. Paul Public Works Traffic and Lighting Division operates and maintains 385 Traffic Signals within City of St. Paul. Each signalized intersection typically has 4 pedestrian crossings. These signals are located on roadways under jurisdiction of Minnesota Department of Transportation (MnDOT), Ramsey County and the City of St. Paul. Of all the approach legs at the signals, approximately 12% are MnDOT Trunk Highways, 28% are Ramsey County State Aid Highways (CSAH), 44% are City of St. Paul Municipal State Aid (MSA) Routes and the remaining 16% are City of St. Paul local streets. The Trunk Highways and County State Aid Streets are typically higher volume arterial streets and the St. Paul MSA and local streets are lower volume collector type streets. Under maintenance agreements with MnDOT and Ramsey County, the City of St. Paul operates and maintains the traffic signals for the governmental unit which has jurisdiction of the roadway.

An Accessible Pedestrian Signal (APS) is a device that communicates information about pedestrian signal timing in a non-visual format such as audible tones, speech messages, and/or vibrating surfaces.

The Traffic and Lighting Division is in the process of formalizing a written policy for the installation of APS based on MN MUTCD, NCHRP 117A Accessible Pedestrian Signals: A Guide to Best Practices, along with the Draft PROWAG.

The general guidance for installation states:

### **New Construction, Alterations/Reconstruction and Retrofits**

- All new traffic signals and traffic signal replacement projects at intersections that include pedestrian facilities will be evaluated for APS along with curb ramps in compliance the MnMUTCD and as advised by draft NCHRP Best Practice and/or Draft PROWAG for location conditions.
- All projects that are reconstructing curb ramps at signalized intersections shall give consideration to upgrading the traffic signals with APS under the project, and at a minimum, the traffic signals shall be upgraded to “APS ready” and meet the requirements given in the MnMUTCD and as advised by NCHRP Best Practice and/or Draft PROWAG for location conditions. If a future project, with traffic signal work as part of the scope, is programmed, then the APS signal upgrades will not be required and will be constructed with the future programmed project.

In some cases APS should not be installed because of the adverse effect it could have on pedestrian safety as a result of the overall traffic circulation pattern of an area, or unusual geometric conditions where an APS would not provide the safety benefits necessary for the blind or visually impaired individuals to cross a street.

It should also be noted that some traffic signals cannot be retrofitted with APS without major costly modifications. Retrofitting of traffic signals shall be subject to approval by the City traffic Engineer. For these circumstances:

- The construction project process shall include documentation on the evaluation of location conditions for APS, in particular, when the results do not include full installation of APS under MnMUTCD, and as advised under NCHRP Best Practice and/or Draft PROWAG. This documentation serves to ensure
  - consistent application of standards,
  - the most complete understanding of the circumstances that limited full application of APS, and
  - provides the intended construction sequence for a phased implementation of APS

Any individual requests will be evaluated in the same manner to be incorporated in either the annual programs or projects.

Since the City of Saint Paul original submitted our transition plan we have increased the number of signalized intersections where all or some of the pedestrians crossing include APS from 16 signalized intersections to 135 signalized intersection with APS out of 385 Traffic Signals.

<u>Necessary Structural Changes</u>	<u>Applicable PROWDG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Signalized Intersections	3.5	Install as Appropriate	TBD	\$50,000 Per intersection

City of Saint Paul  
Department of Public Works  
Vertical Connections (Stairways)

Stairways in Saint Paul provide valuable connections between assets at differing heights. Whether they are placed on bluffs, between bridges or in parks, they are an important connection to our geography and our history.

Our intention is to maintain the integrity of historic structures whenever possible, opting to rehabilitate stairway structures if at all possible. If the existing asset in place has deteriorated to such a degree that rehabilitation is not a possibility, then the ADA becomes applicable during reconstruction planning.

For those stairway structures that are not replaced but rehabilitated, Saint Paul Public Works will do a thorough investigation of the alternate accessible route, ensure the route's reasonableness and review all related ADA appropriate measures.

<u>Necessary Structural Changes</u>	<u>Applicable PROWDG Standard</u>	<u>Action to be taken</u>	<u>Projected Completion</u>	<u>Projected Cost</u>
Pedestrian Stairway		If rehabbing review & ensure reasonable alt route	As needed	\$1,000 Per location
Pedestrian Stairway		If reconstructing engage Mayor's Comm* to create process	As needed	Unknown

\* Mayor's Advisory Committee for People with Disabilities





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## **CITY OF SAINT PAUL**

# **GRIEVANCE PROCEDURE UNDER THE AMERICANS WITH DISABILITIES ACT**

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This Grievance Procedure is established to meet the requirements of Title II of the Americans with Disabilities Act of 1990 (“ADA”). It may be used by anyone who wishes to file a complaint alleging discrimination on the basis of disability in the provision of services, activities, programs, or activities by the City of Saint Paul (“The City”). The City’s Personnel Policy governs employment-related complaints of disability discrimination. A grievant also has the option to file directly with the Department of Justice or other appropriate federal agency within 180 days from the date of the incident.

An individual in need of access to services, programs, or activities should complete and submit a “Request for Access” form to:

Alyssa Wetzel-Moore, ADA Coordinator  
Fax: (651) 266-8962  
Mail: 240 City Hall  
15 West Kellogg Blvd.  
Saint Paul, MN 55102

Alternatively, an individual may make an oral request by contacting the ADA Coordinator at (651) 266-8965. The Coordinator will put this request in writing to be signed by the requestor.

In the event that this request for access to services, programs, or activities cannot be resolved, an individual may file a grievance orally or in writing. A written grievance should be filed on the ADA Grievance Form. If it is not filed on the Grievance Form, it should be in writing and contain all of the following information:

- The name, address, and telephone number of the person filing the grievance.
- The name, address, and telephone number of the person alleging the ADA violation, if other than the person filing the grievance.
- A description of the alleged violation and the remedy sought.
- Information on whether a complaint has been filed with the Department of Justice or other federal or state civil rights agency or court.
- If a complaint has been filed, the name of the agency or court where the complaint was filed, the date the complaint was filed, and the name, address and telephone number of a contact person with the agency with which the complaint was filed.

An oral grievance can be filed by contacting the Coordinator at the address listed above or at (651) 266-8965. The ADA Coordinator, using the ADA Grievance Form, will put the oral grievance in writing to be signed by grievant. Alternative means of filing complaints will be made available for persons with disabilities upon request.

The complaint should be submitted by the grievant and/or her/his designee as soon as possible but no later than 60 calendar days after the alleged violation to the address listed above. The grievance will be either responded to or acknowledged within 20 working days of receipt.

Within 60 calendar days of the receipt, the Coordinator will conduct the investigation necessary to determine the validity of the alleged violation. If appropriate, the Coordinator will arrange to meet with the grievant to discuss the matter and attempt to reach an informal resolution to the grievance. Any informal resolution of the grievance will be documented in the City's ADA Grievance File.

If an informal resolution of the grievance is not reached, the Coordinator shall issue a written determination of the validity of the complaint and a description of the resolution no later than 90 days from the date of the City's receipt of the grievance. A copy will be forwarded to the grievant.

The grievant may request reconsideration if he/she is dissatisfied with the written determinations. The request for reconsideration shall be in writing and filed with the City Legislative Hearing Office, 15 West Kellogg Blvd., Room 310, Saint Paul, MN 55102 within 30 days after the Coordinator's determination has been mailed to the grievant. The Legislative Hearing Officer shall review the request for reconsideration and make a final determination within 90 days from the filing of the request. If the grievant is dissatisfied with City's handling of the grievance at any point, the grievant may file a complaint directly with the U.S. Department of Justice or other appropriate state or federal agency. Use of the City's grievance procedure is not a prerequisite to the pursuit of other remedies.

Because of the varying circumstances in any specific grievance, the City's resolution of a grievance does not create precedent that binds the City or upon which other complaining parties may rely.

Any written complaints received by Coordinator or her designee, appeals to the Legislative Hearing Officer, and responses from these two offices will be retained by Saint Paul for at least three years.

Please note: The City of Saint Paul employment policy and accommodation form is available at <http://www.stpaul.gov/index.aspx?NID=3007>  
<http://www.stpaul.gov/DocumentCenter/Home/View/13516>



## City of Saint Paul Americans with Disabilities Act Grievance Form

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### Complainant:

Name \_\_\_\_\_

Address \_\_\_\_\_ Apt. No. \_\_\_\_\_

City \_\_\_\_\_, State \_\_\_\_\_ ZIP Code \_\_\_\_\_

Telephone No. \_\_\_\_\_ Other Phone \_\_\_\_\_

E-mail \_\_\_\_\_

### Aggrieved Individual (if other than Complainant):

Name \_\_\_\_\_

Address \_\_\_\_\_ Apt. No. \_\_\_\_\_

City \_\_\_\_\_, State \_\_\_\_\_ ZIP Code \_\_\_\_\_

Telephone No. \_\_\_\_\_ Other Phone \_\_\_\_\_

E-mail \_\_\_\_\_

### Nature of the Complaint:

City Department Involved: \_\_\_\_\_ Date(s) of Occurrence: \_\_\_\_\_

Description of Violation: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Requested Action of City to Correct Alleged Violation: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

*~ Please see next page for additional questions ~*

**Has the complaint been filed with another bureau of the Department of Justice or any other Federal, State, or local civil rights agency or court?**

**Yes**\_\_\_\_\_ **No**\_\_\_\_\_ **If yes: Date Filed:**\_\_\_\_\_ **Agency or Court:** \_\_\_\_\_

**Contact Person:**\_\_\_\_\_ **Phone No.**\_\_\_\_\_

**Address:** \_\_\_\_\_ **Apt.**\_\_\_\_\_

**City**\_\_\_\_\_ **State**\_\_\_\_\_ **Zip Code**\_\_\_\_\_

**Do you intend to file with another agency or court?**

**Yes**\_\_\_\_\_ **No**\_\_\_\_\_ **If yes: Agency or Court:** \_\_\_\_\_

**Contact Person:**\_\_\_\_\_ **Phone No.**\_\_\_\_\_

**Address:** \_\_\_\_\_ **Apt.**\_\_\_\_\_

**City**\_\_\_\_\_ **State**\_\_\_\_\_ **Zip Code**\_\_\_\_\_

**Additional Comments:**

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**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Return to:**    **Alyssa Wetzel-Moore, ADA Coordinator**  
                  **Department of Human Rights and Equal Economic Opportunity (HREEO)**  
                  **240 City Hall**  
                  **15 West Kellogg Blvd.**  
                  **St. Paul, MN 55102**  
                  **Telephone: (651) 266-8965                      Fax: (651) 266-8962**  
                  **E-mail: ADACoordinator@ci.stpaul.mn.us**

MAYOR'S ADVISORY COMMITTEE FOR  
PEOPLE WITH DISABILITIES  
Scott Coleman, Chair



CITY OF SAINT PAUL

*Christopher B. Coleman, Mayor*

240 City Hall  
15 West Kellogg Boulevard  
Saint Paul, MN 55102-1681

Telephone: (651) 266-8966  
Facsimile: (651) 266-8962  
TDD: (651) 266-8977

February 24, 2010

Bruce Beese, Director of Public Works  
1500 City Hall Annex  
25 West Fourth Street  
Saint Paul, MN 55102

Re: MACPD Feedback to Public Works' Transition Plan

Dear Mr. Beese,

The Mayor's Advisory Committee for People with Disabilities (MACPD) would like to thank you for sharing your transition plan with us. We appreciate the hard work and thoroughness invested by the Department of Public Works to develop it. Over the past month, the MACPD has reviewed and discussed the Transition Plan. Based on what we have read, we have no revisions to suggest at this time.

Again, the MACPD appreciates you and department staff taking the time to meet with us and seeking our input. Please contact us through Alyssa Wetzel-Moore at 651-266-8965 or [Alyssa.Wetzel-Moore@ci.stpaul.mn.us](mailto:Alyssa.Wetzel-Moore@ci.stpaul.mn.us) if you have questions or would like to discuss this further.

Sincerely,

Scott Coleman, Chair

James Thayer, Vice Chair



CITY OF SAINT PAUL  
INTERDEPARTMENTAL MEMORANDUM

DATE: April 7, 2010

TO: Whom it May Concern

FROM: Robert L. Humphrey, Business Review Council Staff

RE: Saint Paul Business Review Council support for City of Saint Paul, Department of Public Works Americans with Disabilities Act Transition Plan as amended.

Please note that at this morning's Full Business Review Council there was a unanimously passed motion approving the Department of Public Works' Americans with Disabilities Act Transition plan dated January 6, 2010, with the amendment titled "Equal Access to the Public Right of Way, Page 10 of 18" striking the original page 10 of 18 language.

On behalf of Chair Mike Skillrud, and the entire Business Review Council, we thank Bruce Beese and Paul St. Martin for their patience and willingness to cover this matter in detail before our Council.

Feel free to contact me if you have any questions.

**RESOLUTION**  
**CITY OF SAINT PAUL, MINNESOTA**

8

Presented by

*Kathy Lent*

- 1 Whereas, the American's with Disabilities Act (ADA) of 1990 elevated the civil rights protection of  
2 people with disabilities to the same level as those protections in place based on race, color,  
3 religion and national origin provided through the Civil Rights Act of 1964; and  
4  
5 Whereas, the ADA was signed into law on July 26, 1990 [28 CFR 35.150]; and  
6  
7 Whereas, the ADA required public entities with more than 50 employees to develop a transition  
8 plan by July 26, 1992; and  
9  
10 Whereas, this transition plan must identify all structural modifications that are necessary for  
11 buildings and facilities to ensure that programs, services and activities are accessible to people  
12 with different abilities; and  
13  
14 Whereas, this transition plan must identify the steps to complete the modifications, the estimated  
15 date of completion and the cost associated with each modification; and  
16  
17 Whereas, the Saint Paul Public Works Department did not meet the July, 1992 deadline, but has  
18 prepared the attached transition plan for review and implementation; and  
19  
20 Whereas, the Mayor's Advisory Committee for People with Disabilities has reviewed the  
21 transition plan and has accepted it in its entirety; and  
22  
23 Whereas, the Business Review Council has reviewed the transition plan and will be making their  
24 comments by April, 21, 2010; and  
25  
26 Therefore, be it resolved, that the City Council of Saint Paul adopts the Public Works ADA  
27 Transition Plan and directs Public Works to follow the steps elaborated toward the goal of making  
28 Public Works' buildings and infrastructure accessible to all people.

	Yeas	Nays	Absent
Bostrom	✓		
Carter	✓		
Harris	✓		
Helgen	✓		
Lantry	✓		
Stark	✓		
Thune	✓		
	7	0	0

Adopted by Council: Date 4/21/2010

Adoption Certified by Council Secretary

By:

*Mary Erickson*

Approved by Mayor: Date 4/27/2010

By:

*Ch. Mulholland*

Requested by Department of Public Works:

By:

*[Signature]*

Public Works Director

Approved by the Office of Financial Services:

By:

*[Signature]*

Approved by City Attorney:

By:

*Lisa D. Veith*

Approved by Mayor for Submission to Council:

By:

*Ch. Mulholland*



# Regional Economy

Roadway Reconstruction/Modernization Project: Robert Street Reconstruction-Modernization | Map ID: 15827296943

## Results

**WITHIN ONE MI of project:**  
Postsecondary Students: 6883

Totals by City:

### St. Paul

Population: 34315

Employment: 97780

Mfg and Dist Employment: 4160



NCompass Technologies

- Project Points
- Postsecondary Education Centers
- Job Concentration Centers
- Manufacturing/Distribution Centers
- Project

0 0.075 0.15 0.3 0.45 0.6 Miles

Created: 2/26/2020  
LandscapeRSA5



For complete disclaimer of accuracy, please visit  
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>





## Transit Connections

Roadway Reconstruction/Modernization Project: Robert Street Reconstruction-Modernization | Map ID: 1582729694

## Results

Transit with a Direct Connection to project:

16 21 262 265 275 294 3 350 351 353 355  
361 364 365 375 417 452 480 484 489 53 54  
61 63 64 68 70 71 74 860 902 94 992

\*East 7th Street

\*Robert Street

\*Rush Line

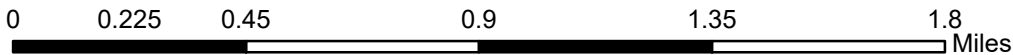
\*Green Line

\*Riverview

\*Gold Line

\*indicates Planned Alignments

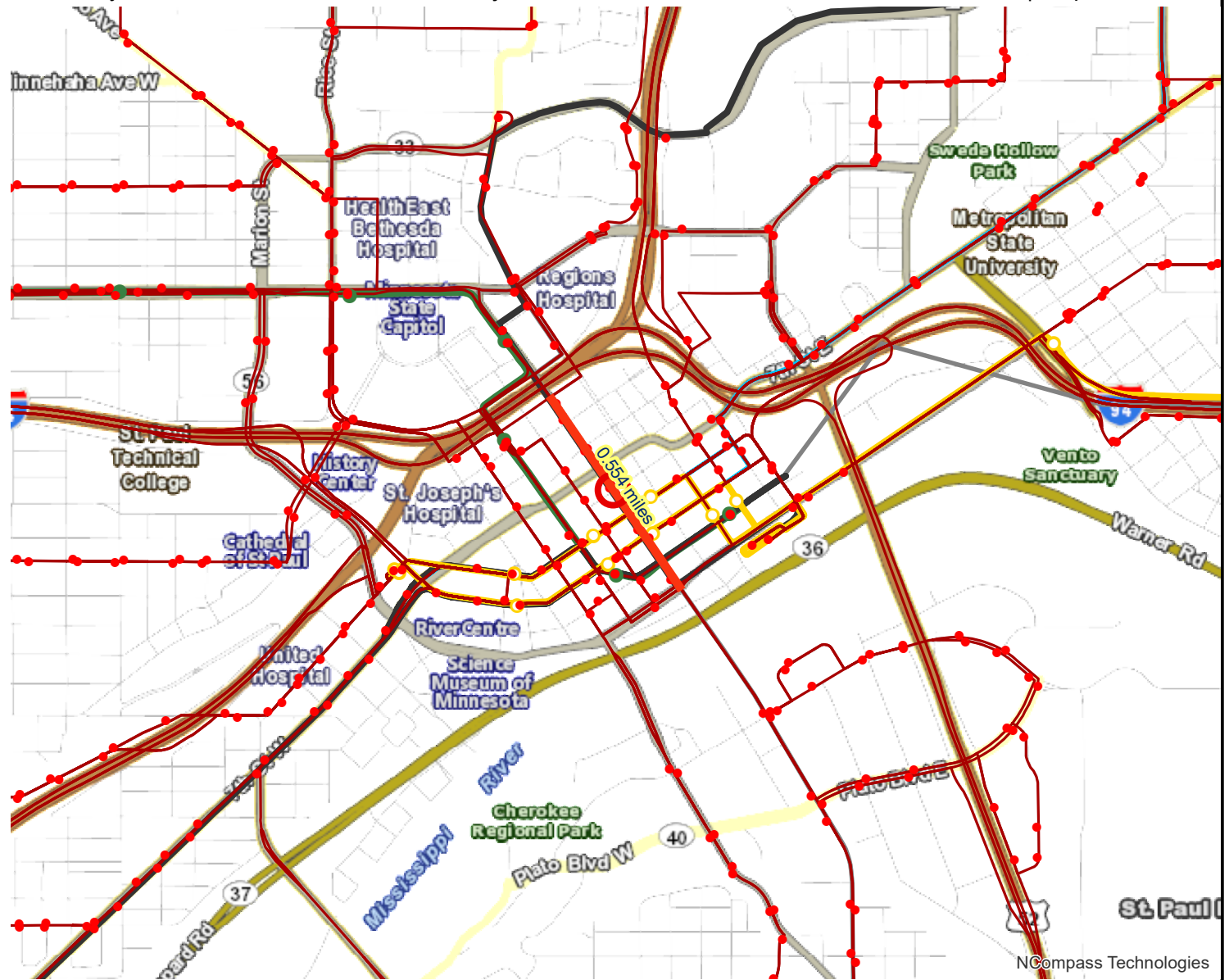
Transit Market areas: 1



Created: 2/26/2020  
LandscapeRSA3



For complete disclaimer of accuracy, please visit  
<https://giswebsite.metc.state.mn.us/gisite/notice.aspx>



NCompass Technologies

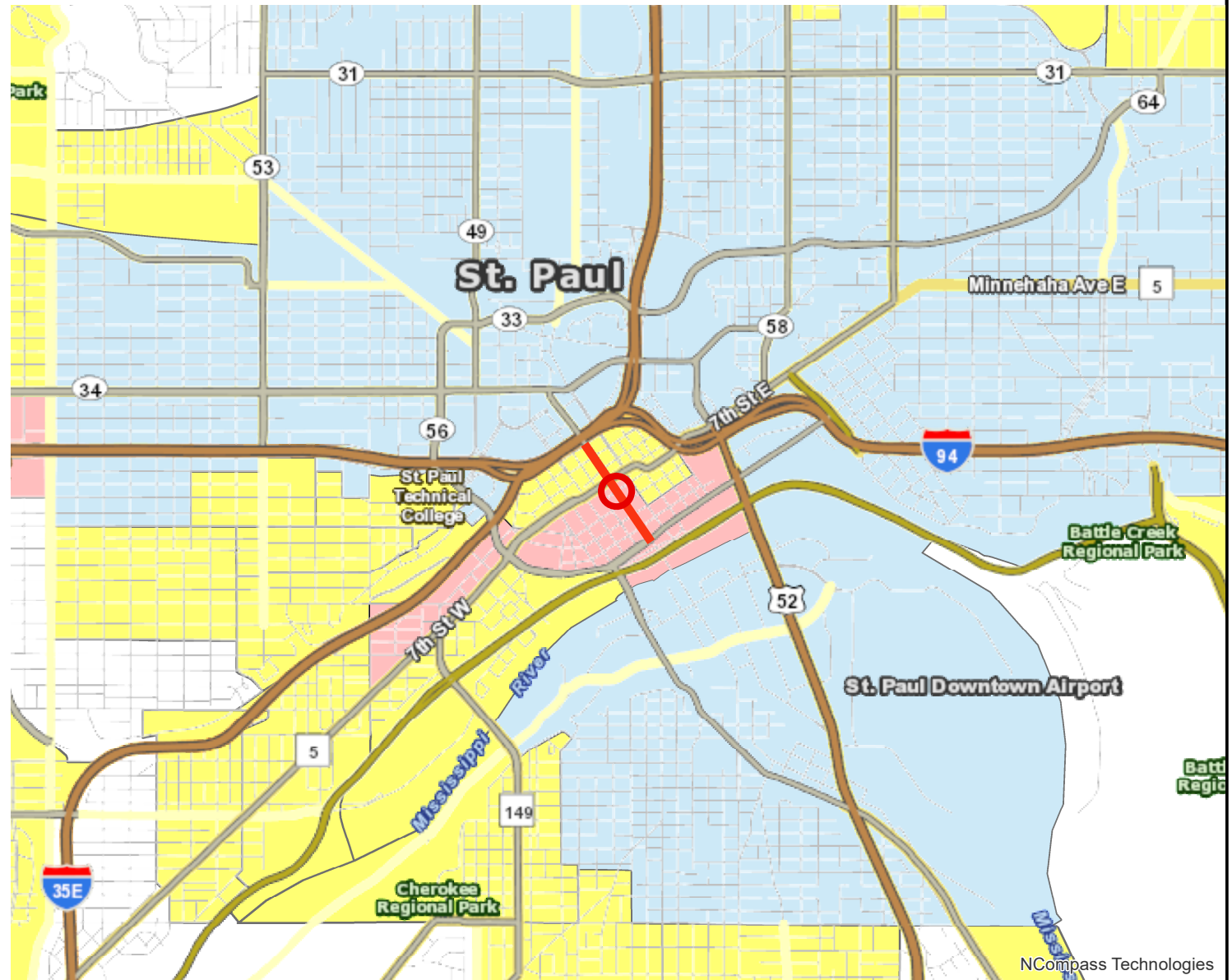
## Socio-Economic Conditions

Roadway Reconstruction/Modernization Project: Robert Street Reconstruction-Modernization | Map ID: 1582729694374

### Results

Project located **IN**  
Area of Concentrated Poverty:  
(0 to 24 Points)

Tracts within half-mile:  
33000 33700 34201  
34202 34400 36000  
36100 37100 42800



○ Points

— Lines

Area of Concentrated Poverty > 50% residents of color

Area of Concentrated Poverty

Above reg'l avg conc of race/poverty

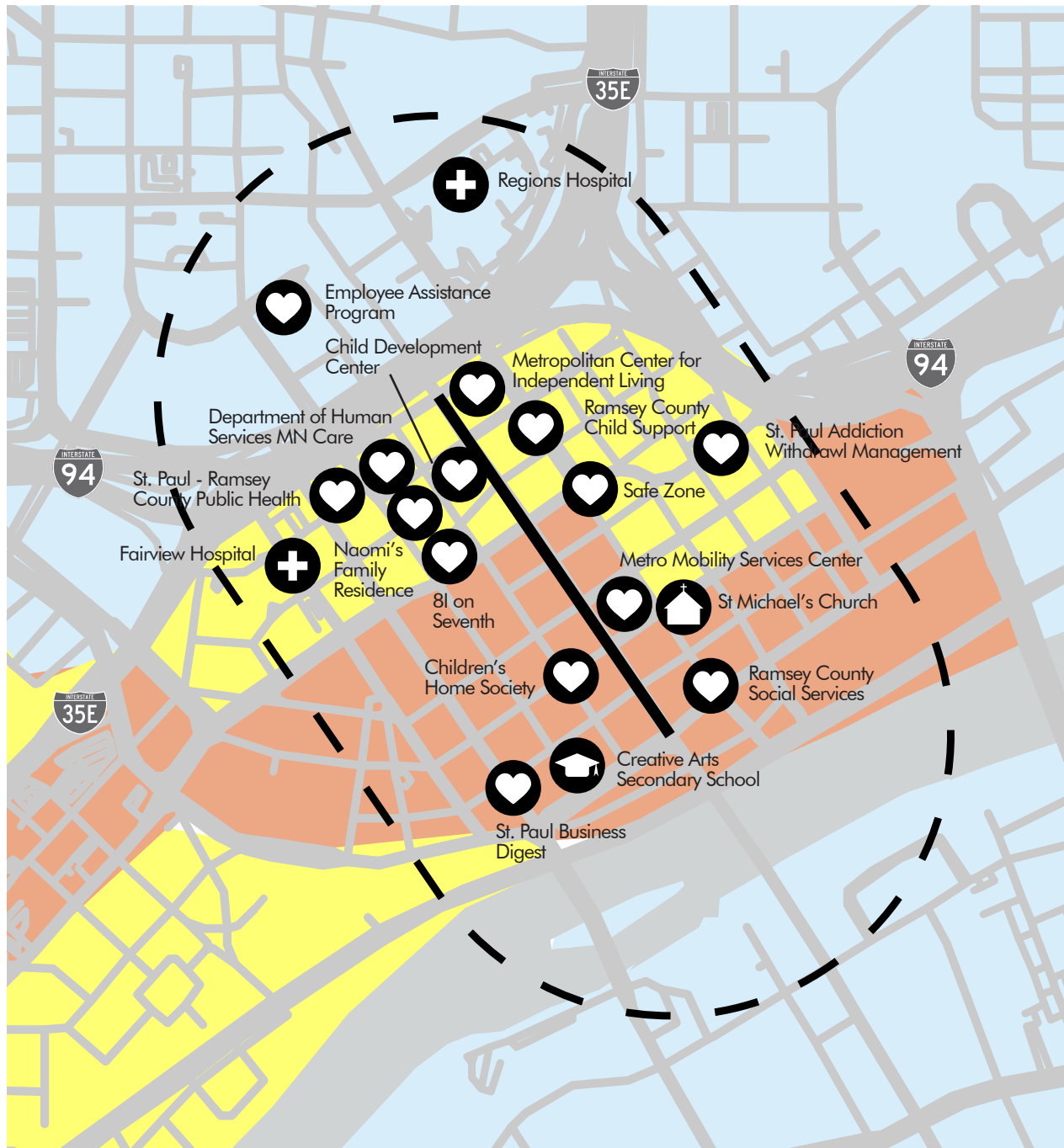
0 0.45 0.9 1.8 2.7 3.6 Miles

Created: 2/26/2020  
LandscapeRSA2



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<http://giswebsite.metc.state.mn.us/gisite/notice.aspx>





## Robert Street Reconstruction Equity Populations and Destinations

- Proposed project
- 1/2 mile project corridor
- Above regional average concentration of race / poverty
- Area of concentrated poverty
- Area of concentrated poverty > 50% residents of color

- Medical clinic
- School / daycare
- Place of worship
- Social services









1/4" = 1 MILE





## Robert Street Reconstruction Affordable Housing

-  Proposed project
-  1/2 mile project corridor
-  Above regional average concentration of race / poverty
-  Area of concentrated poverty
-  Area of concentrated poverty > 50% residents of color
-  Affordable housing



1/4" = 1 MILE



Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔↔	↔↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

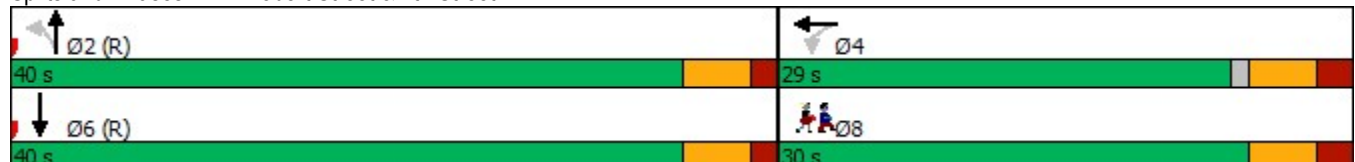
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15











Splits and Phases: 1: Robert Street & 4th Street



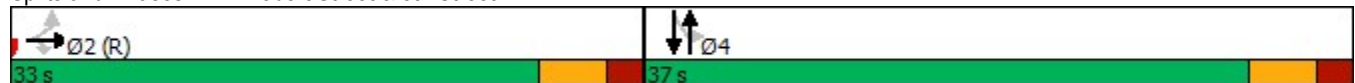














Robert Street  
Existing - AM Peak

03/26/2020  
2: Robert Street & 5th Street

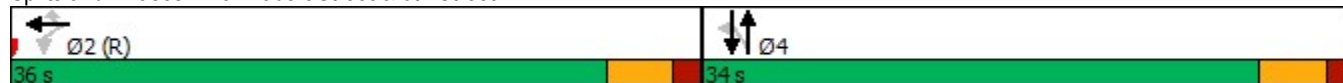
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1			Intersection LOS: B		
Intersection Capacity Utilization 56.5%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place

						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						























Splits and Phases: 4: Robert Street & 7th Place





Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

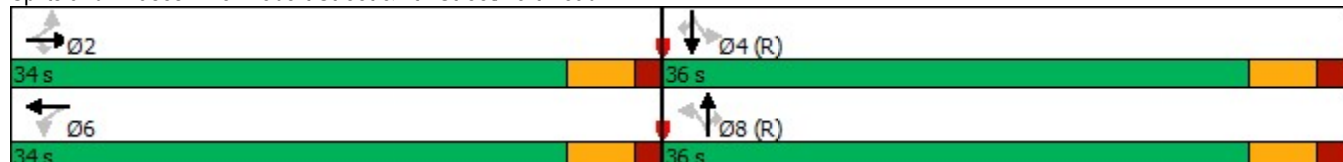
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6											
Intersection LOS: A											
Intersection Capacity Utilization 70.8%											
ICU Level of Service C											
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

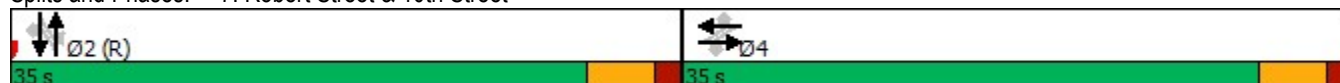


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

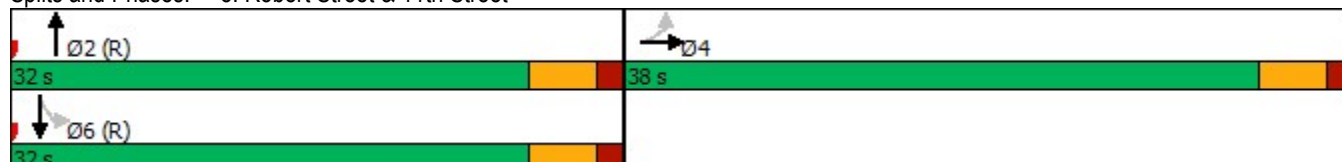
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

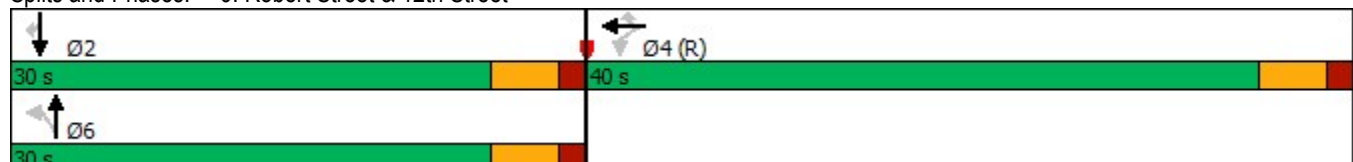
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

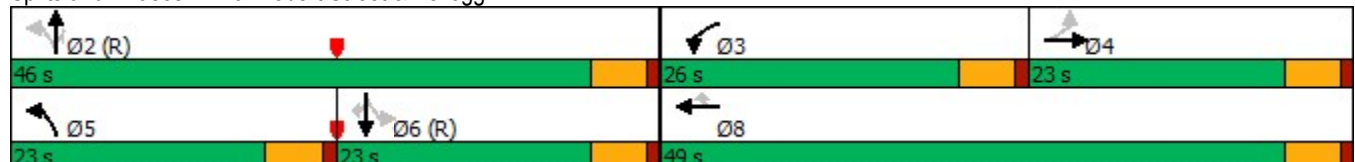
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

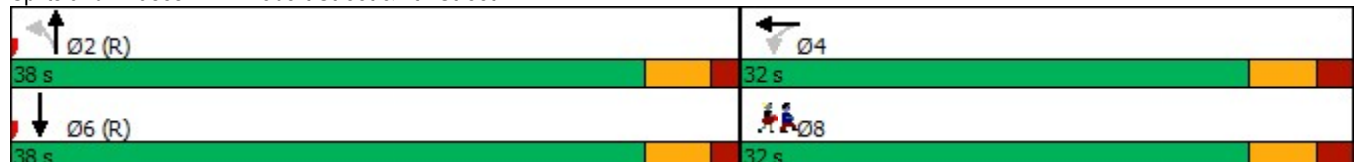
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

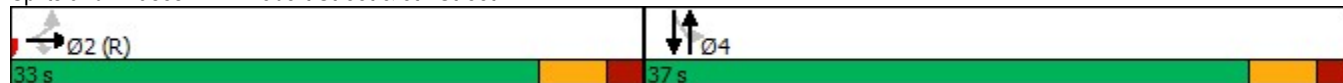
Intersection LOS: A

Intersection Capacity Utilization 61.4%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street

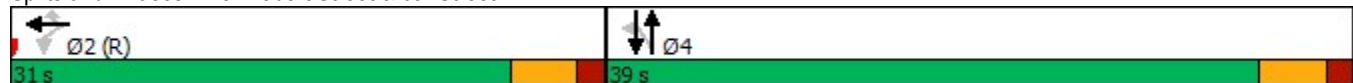


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
3: Robert Street & 6th Street

						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

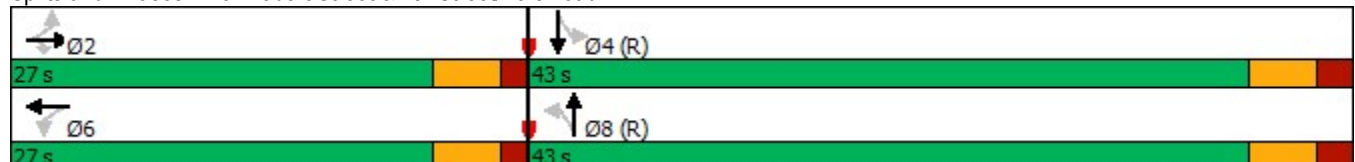
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

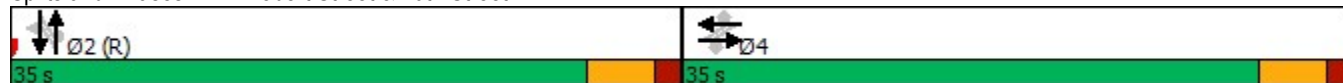


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

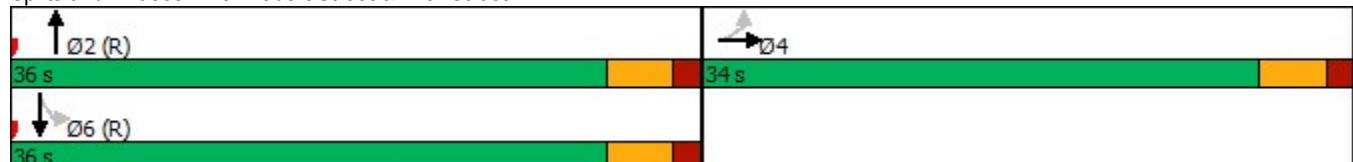
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

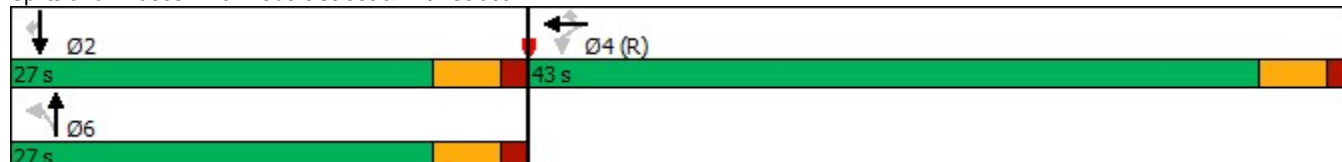
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

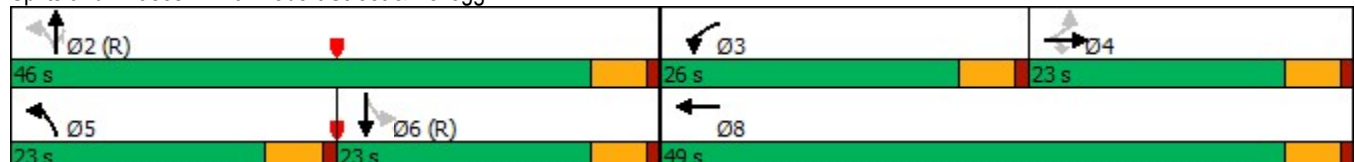
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

---

8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔↔	↔↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

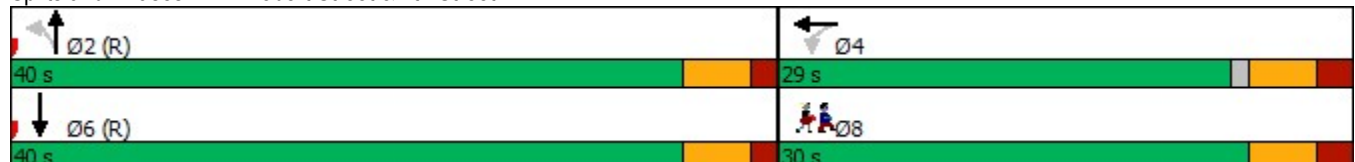
Intersection LOS: A











Intersection Capacity Utilization 48.7%

ICU Level of Service A

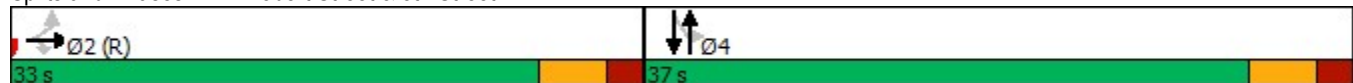
Analysis Period (min) 15













Splits and Phases: 1: Robert Street & 4th Street



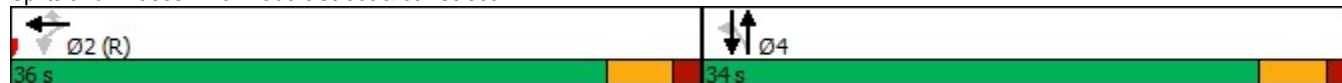
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1				Intersection LOS: B	
Intersection Capacity Utilization 56.5%				ICU Level of Service B	
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						













Splits and Phases: 3: Robert Street & 6th Street





Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

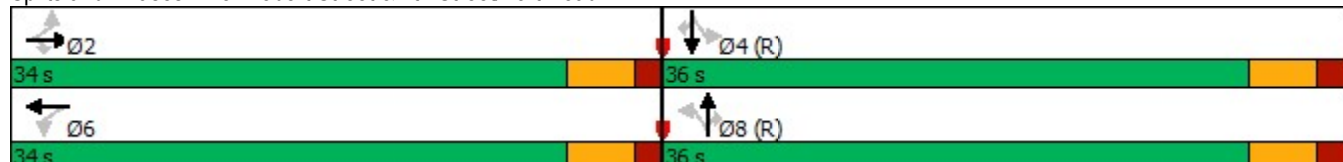
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

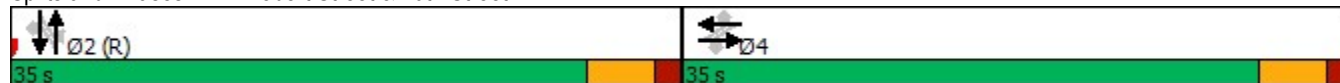


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

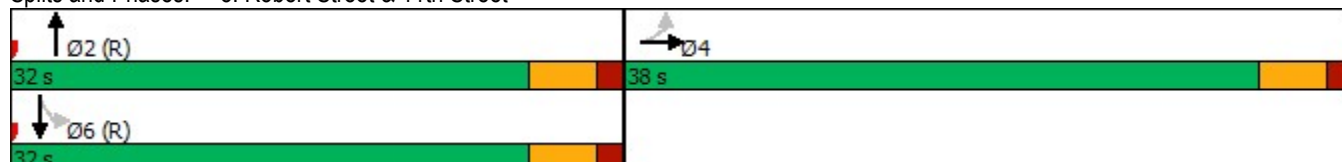
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

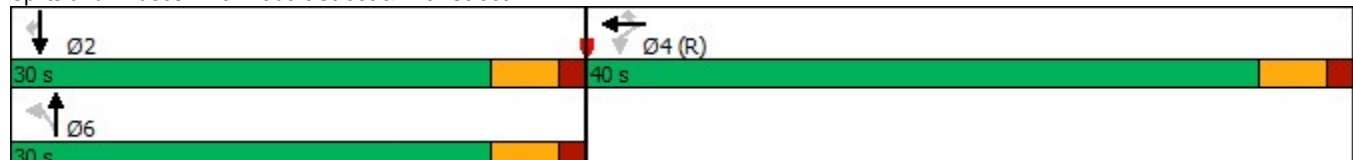
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

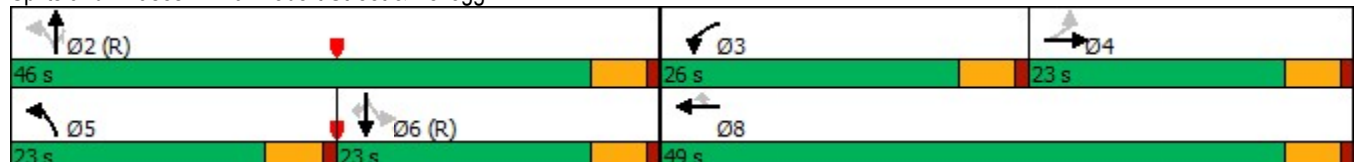
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18



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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

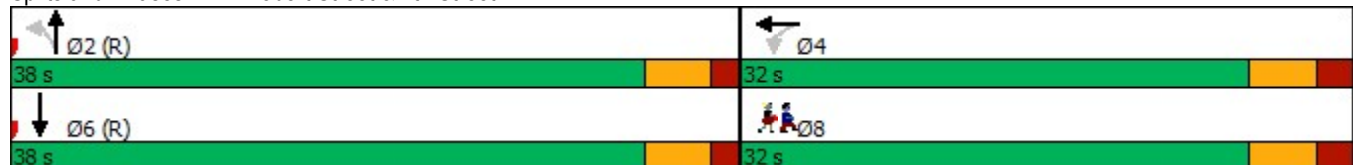
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

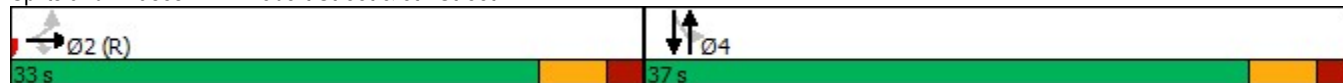
Intersection LOS: A

Intersection Capacity Utilization 61.4%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street

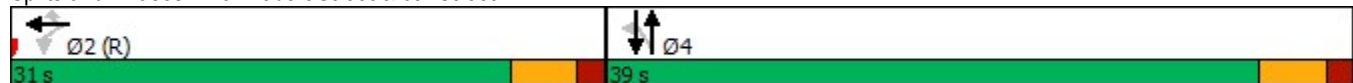


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
3: Robert Street & 6th Street

						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

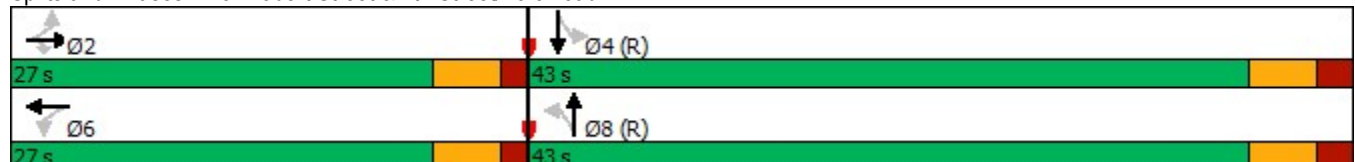
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

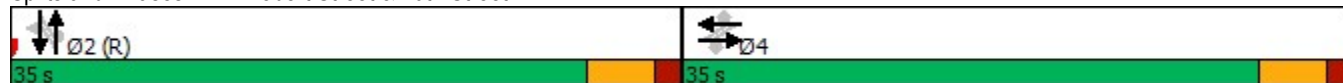


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



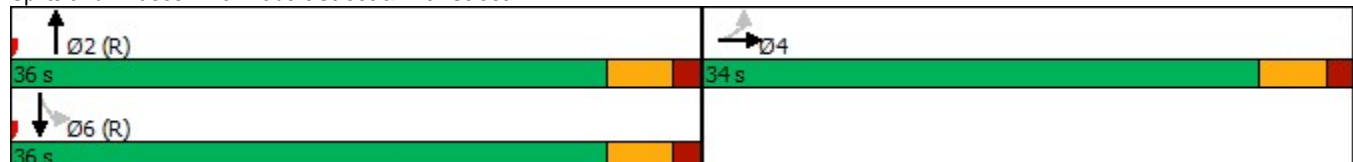


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↑↑↔	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.40				
Intersection Signal Delay: 9.0			Intersection LOS: A	
Intersection Capacity Utilization 49.1%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

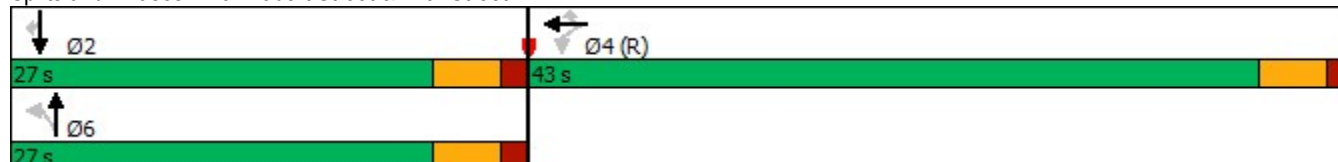
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

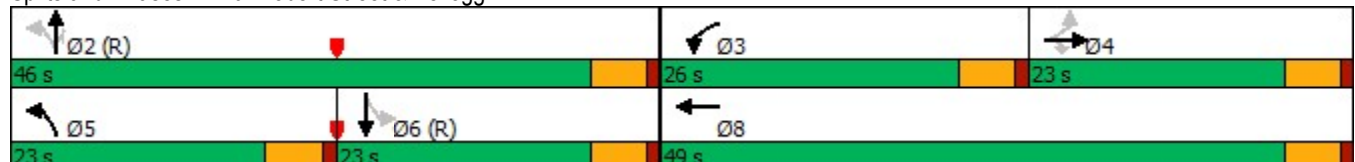
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔↔	↔↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

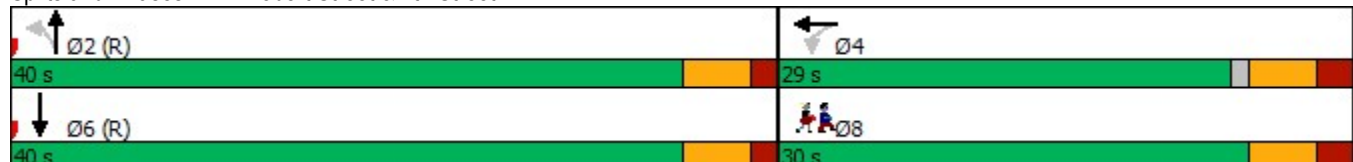
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A











Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street

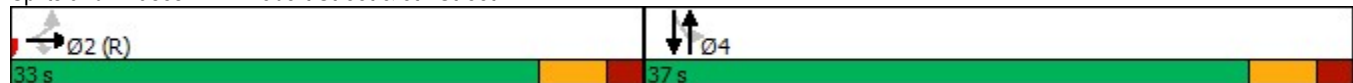


Robert Street  
Existing - AM Peak













03/26/2020  
2: Robert Street & 5th Street

					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1				Intersection LOS: B	
Intersection Capacity Utilization 56.5%				ICU Level of Service B	
Analysis Period (min) 15					

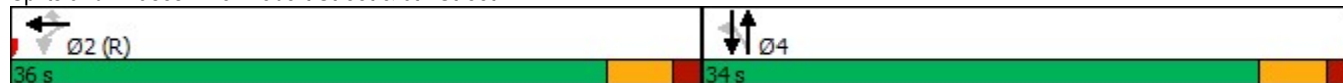
Splits and Phases: 2: Robert Street & 5th Street

















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

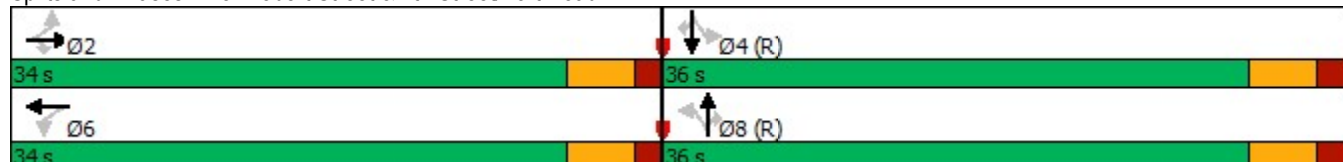
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 70.8%

ICU Level of Service C























Analysis Period (min) 15

Splits and Phases: 6: Robert Street & 9th Street

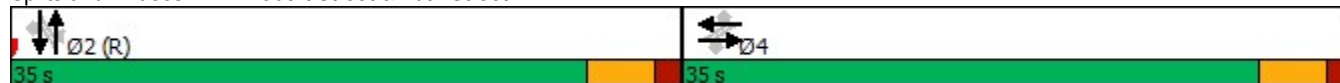


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

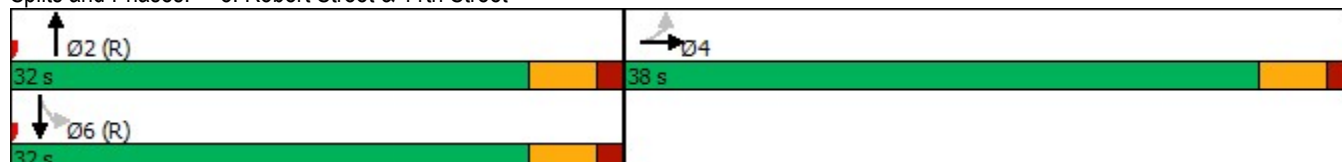
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

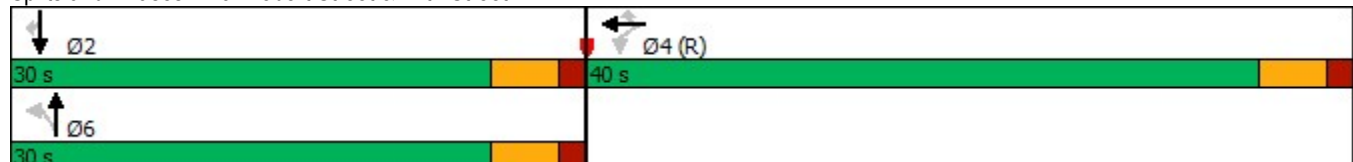
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

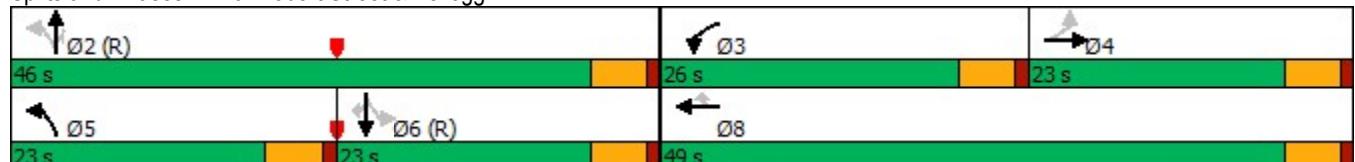
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg





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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

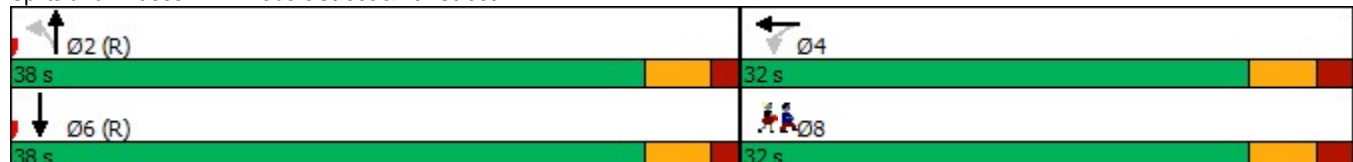
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑	↘	↑↑
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

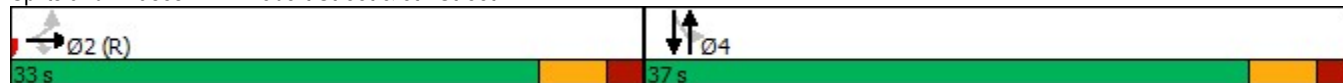
Intersection LOS: A













Intersection Capacity Utilization 61.4%

ICU Level of Service B

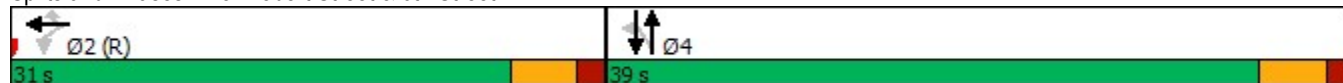
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

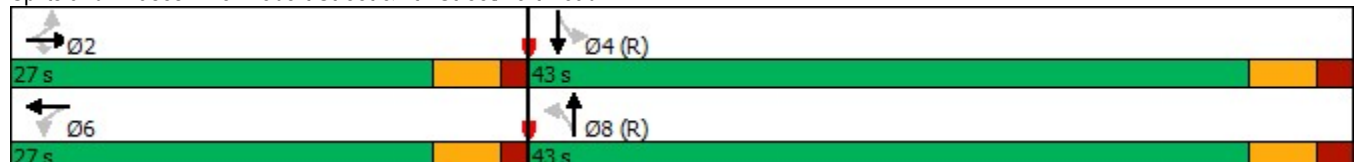
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									



















Splits and Phases: 6: Robert Street & 9th Street



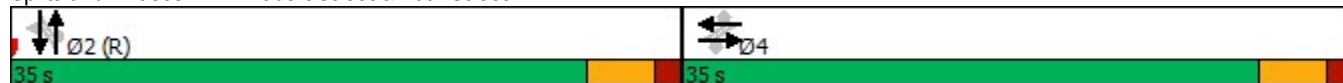


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street

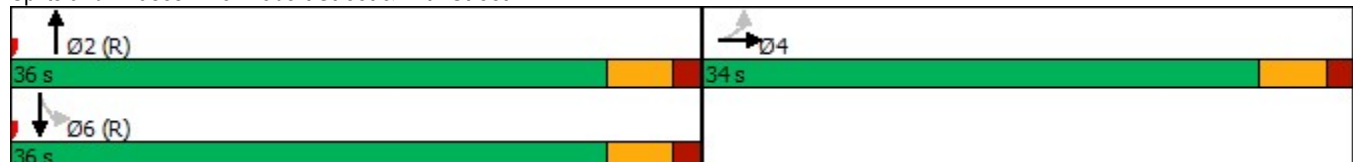


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↑↑↔	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.40				
Intersection Signal Delay: 9.0			Intersection LOS: A	
Intersection Capacity Utilization 49.1%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

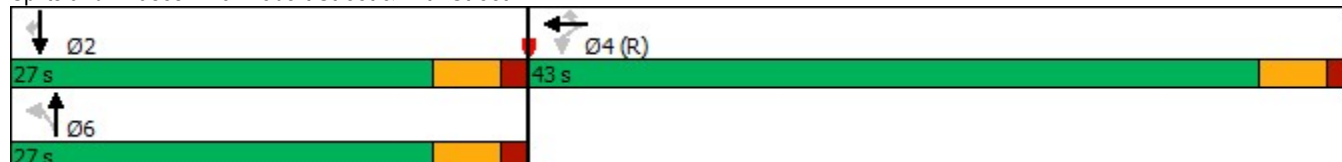
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

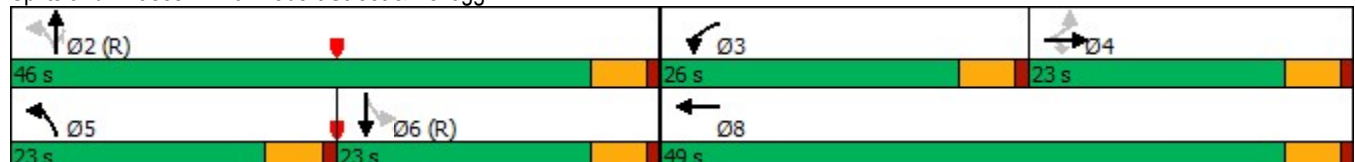
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

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Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

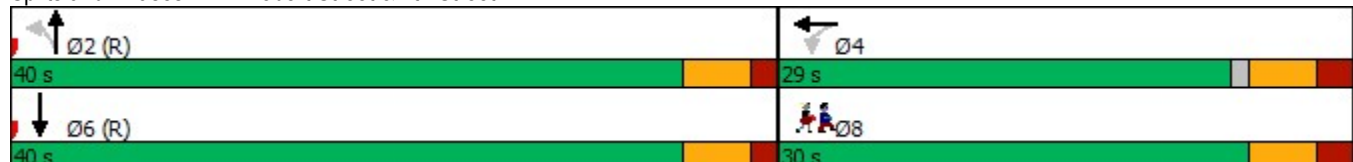
Intersection LOS: A

Intersection Capacity Utilization 48.7%











ICU Level of Service A

Analysis Period (min) 15

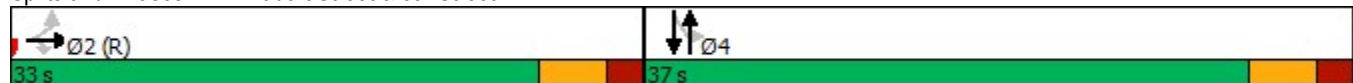
Splits and Phases: 1: Robert Street & 4th Street

















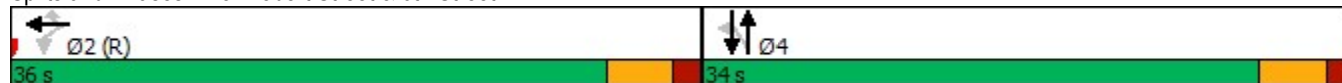
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1				Intersection LOS: B	
Intersection Capacity Utilization 56.5%				ICU Level of Service B	
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

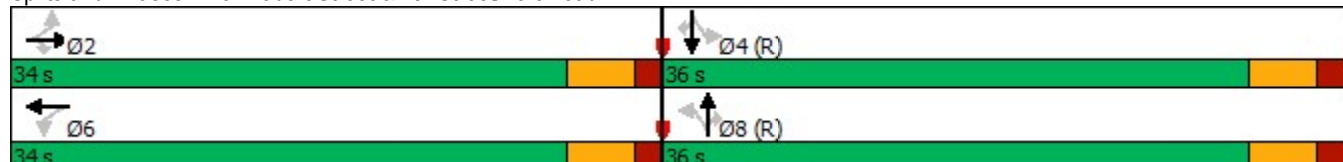
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

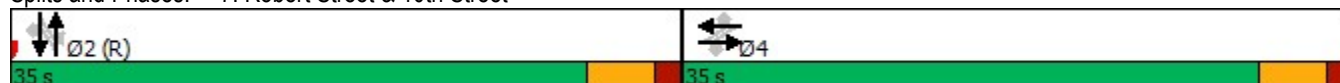


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

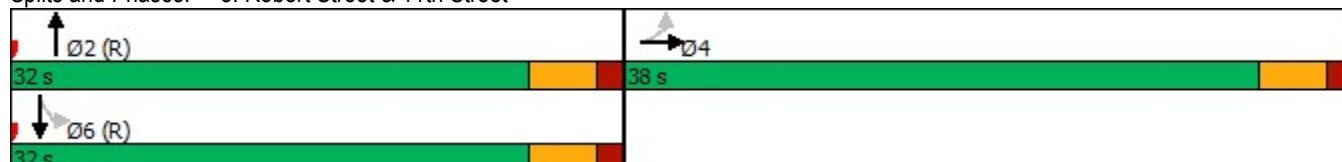
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

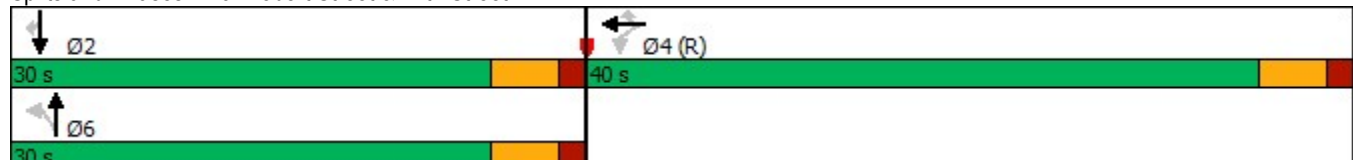
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15




















Splits and Phases: 9: Robert Street & 12th Street





Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

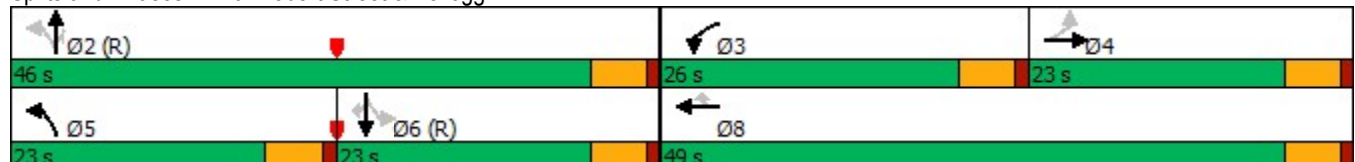
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

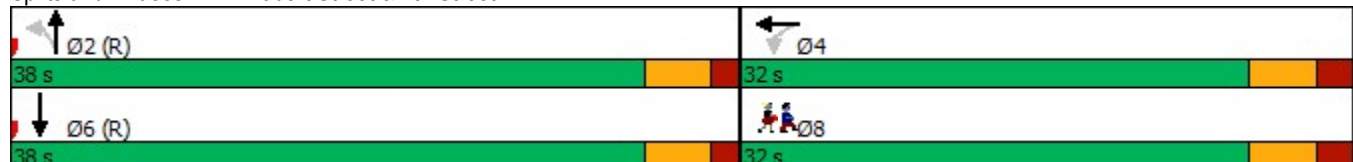
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↙	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

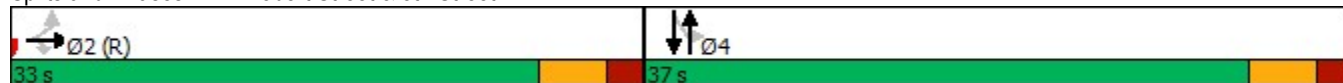
Intersection LOS: A













Intersection Capacity Utilization 61.4%

ICU Level of Service B

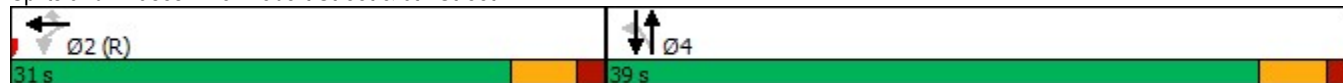
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

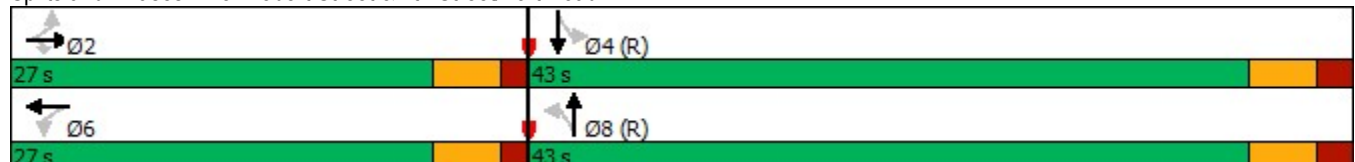
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

















Splits and Phases: 5: Robert Street & 7th Street/Fort Road





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

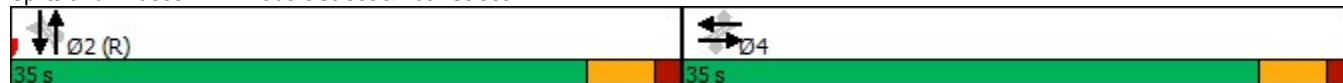


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

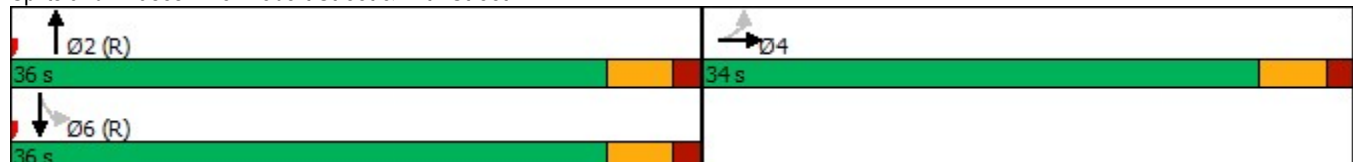
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

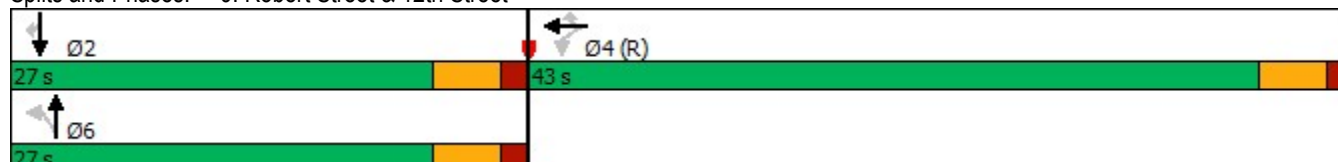
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

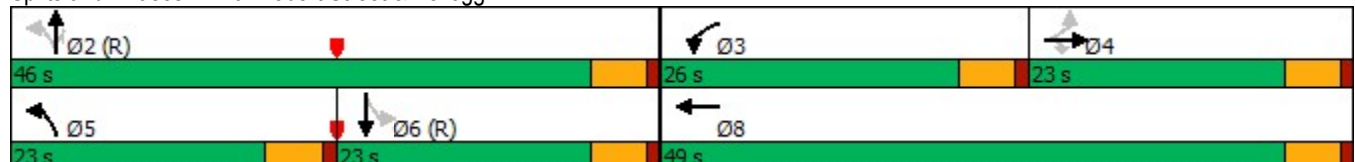
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

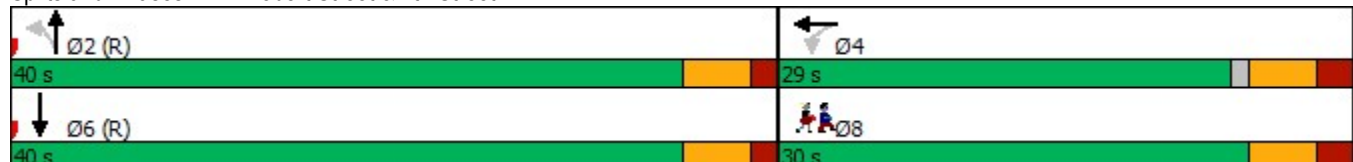
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A











Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street

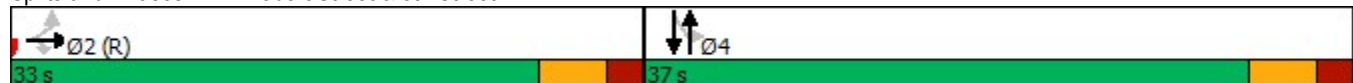














Robert Street  
Existing - AM Peak

03/26/2020  
2: Robert Street & 5th Street

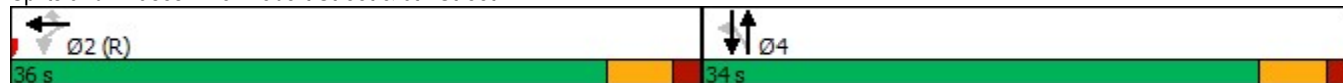
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1				Intersection LOS: B	
Intersection Capacity Utilization 56.5%				ICU Level of Service B	
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

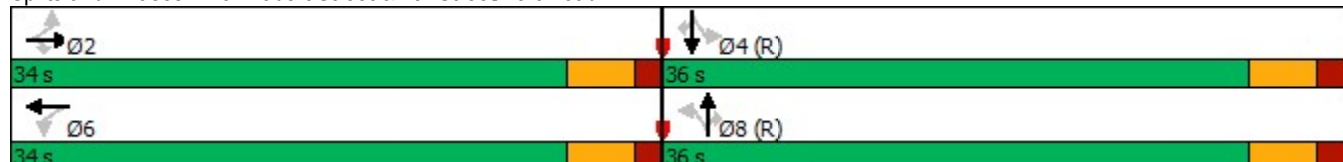
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

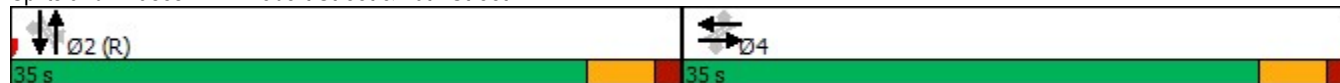


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

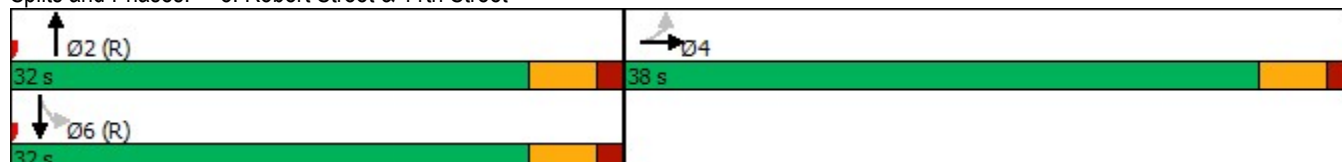
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street





Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

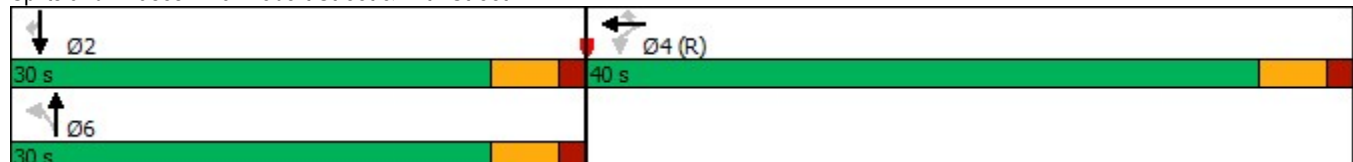
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

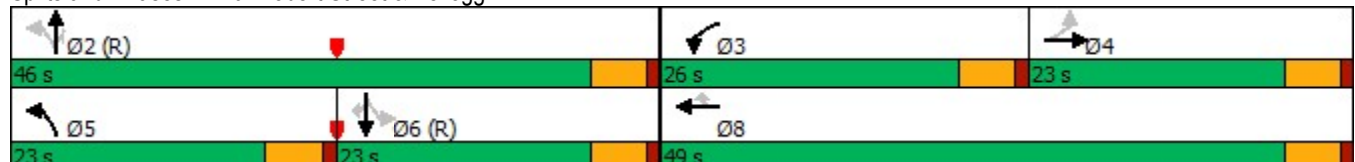
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↕	↕↕	↕↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

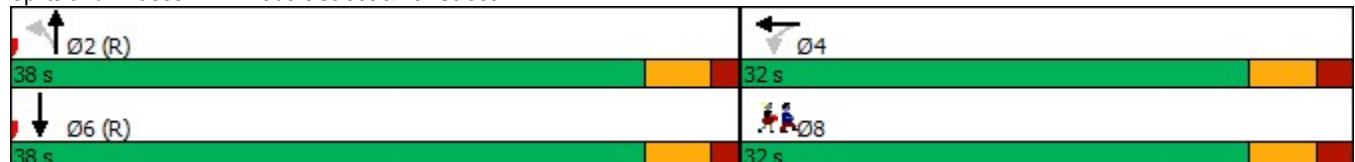
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

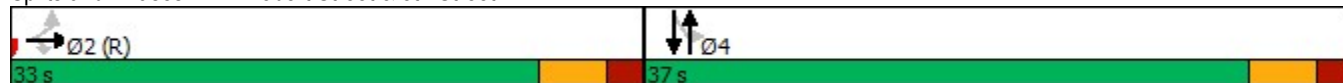
Intersection LOS: A

Intersection Capacity Utilization 61.4%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street

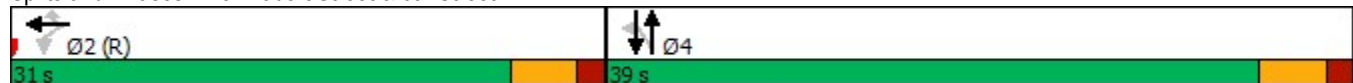


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
3: Robert Street & 6th Street

						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

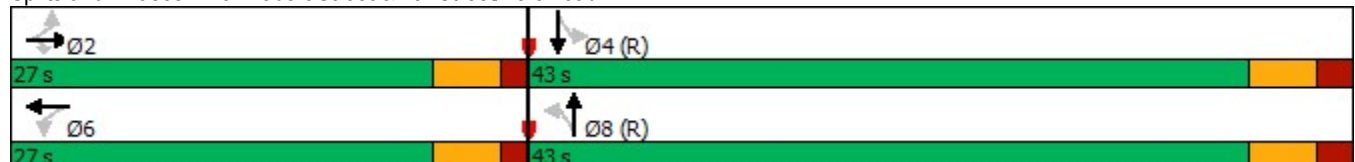
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

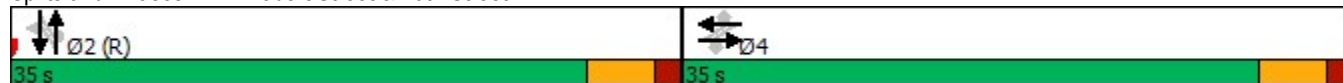


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street

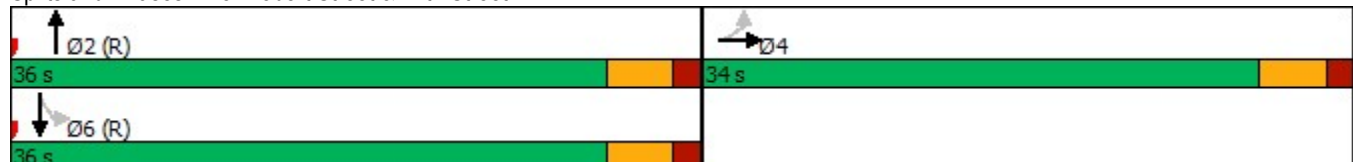


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↑↑↔	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.40				
Intersection Signal Delay: 9.0			Intersection LOS: A	
Intersection Capacity Utilization 49.1%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

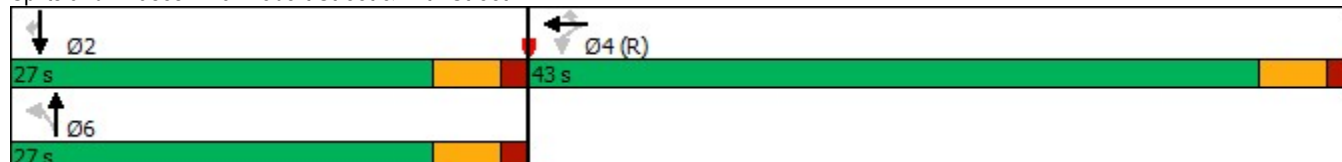
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

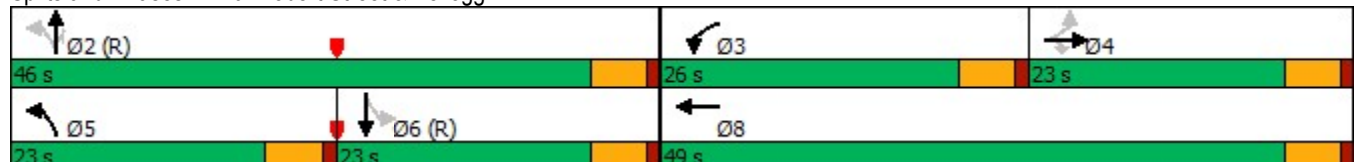
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76



# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

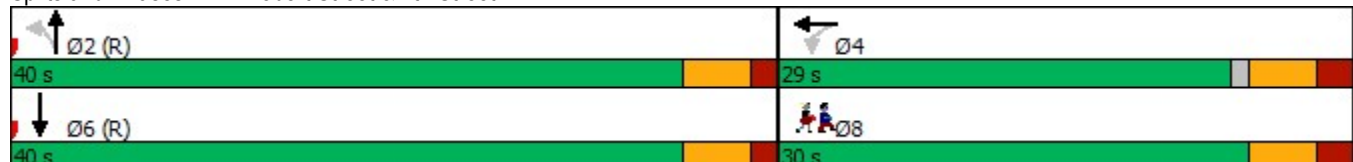
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 11.1

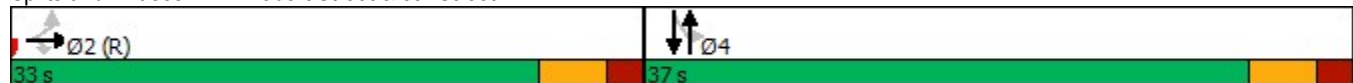
Intersection LOS: B













Intersection Capacity Utilization 56.5%

ICU Level of Service B

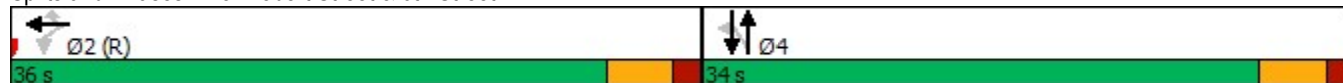
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

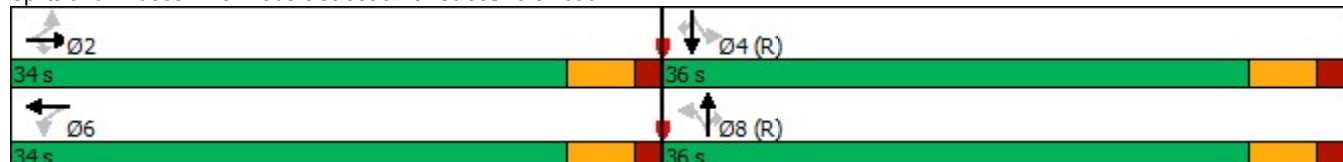
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

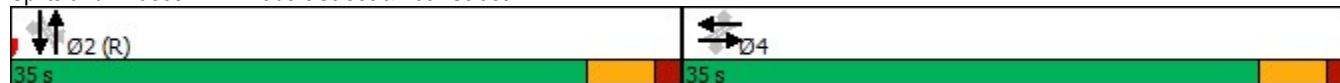


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street





	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

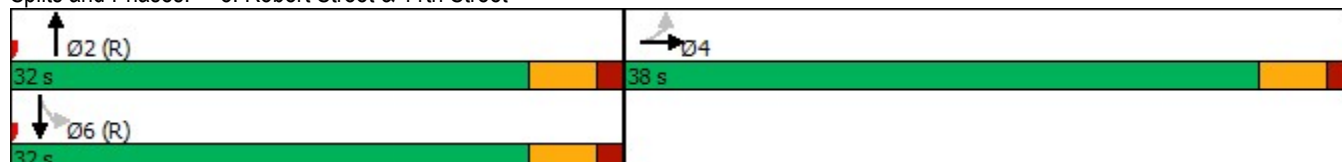
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

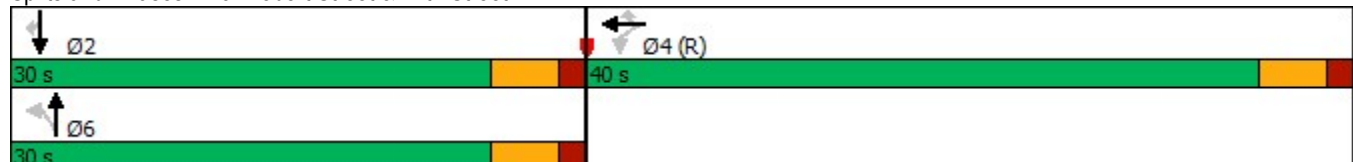
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

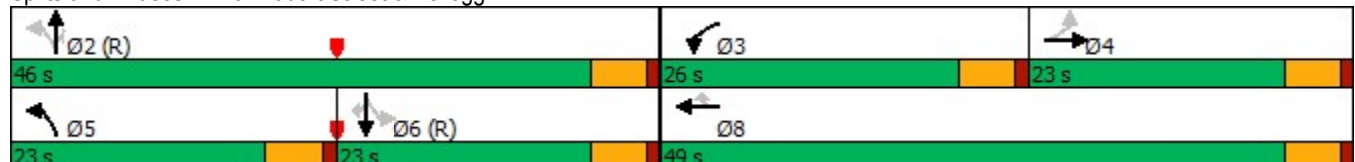
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

---

Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

---

8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



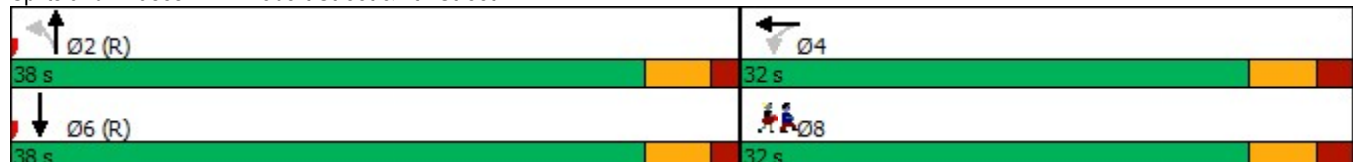
Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green  
 Natural Cycle: 50  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.39  
 Intersection Signal Delay: 11.6  
 Intersection Capacity Utilization 48.7%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑	↘	↑↑
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

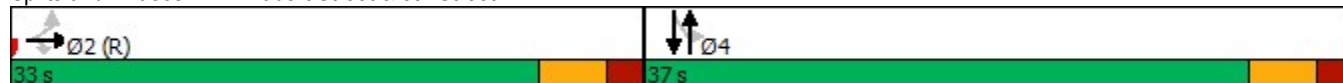
Intersection LOS: A













Intersection Capacity Utilization 61.4%

ICU Level of Service B

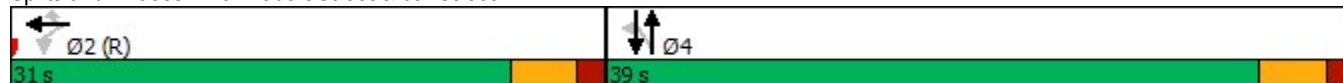
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

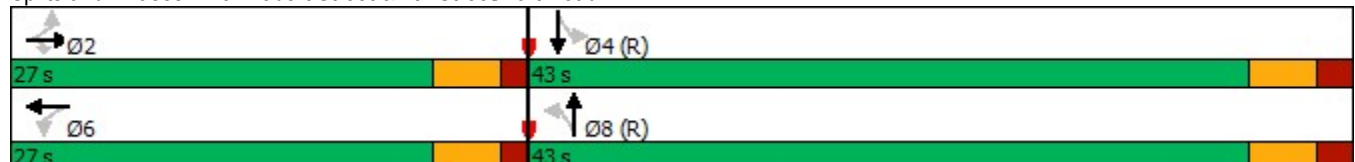
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

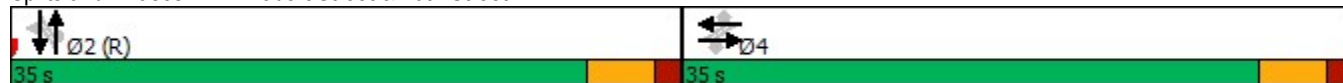


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 9.0

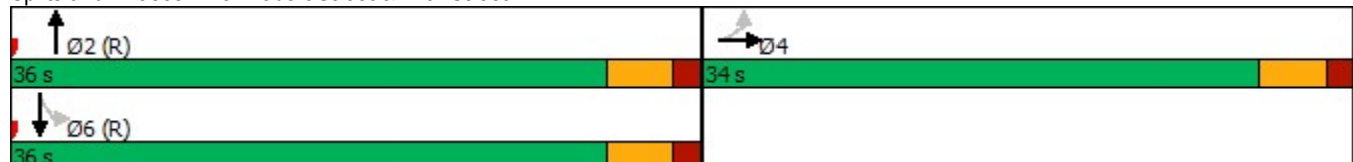
Intersection LOS: A

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

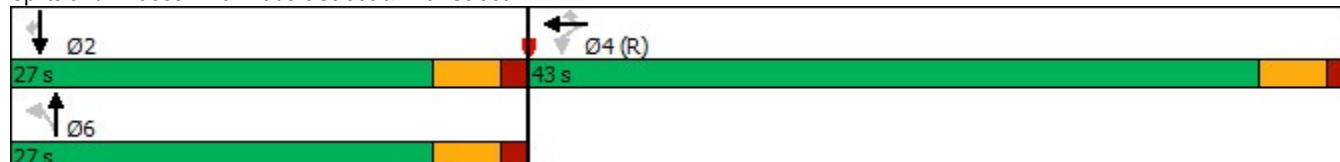
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

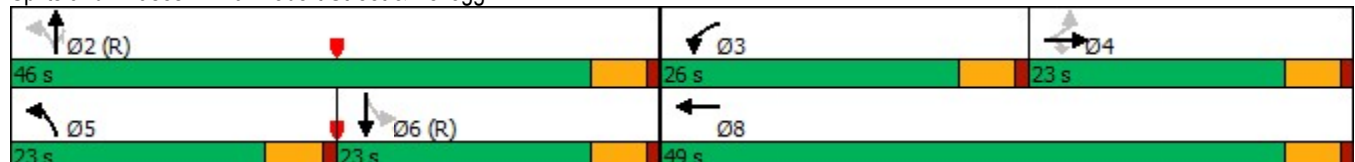
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17



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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

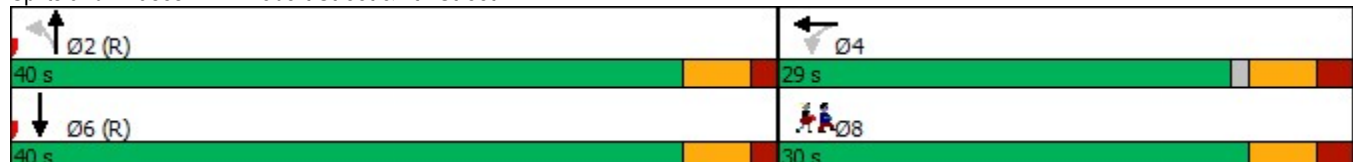
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A











Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street

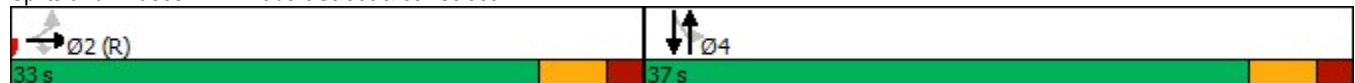














Robert Street  
Existing - AM Peak

03/26/2020  
2: Robert Street & 5th Street

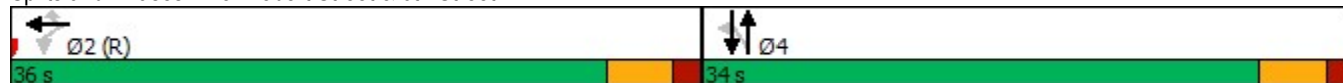
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1			Intersection LOS: B		
Intersection Capacity Utilization 56.5%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

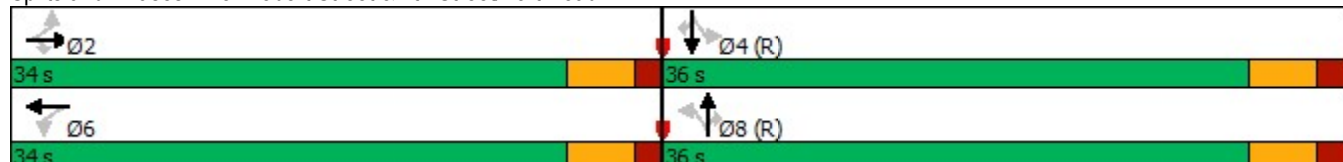
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											






















Splits and Phases: 6: Robert Street & 9th Street



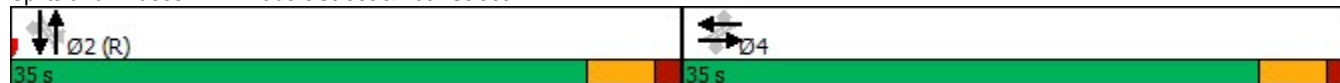


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

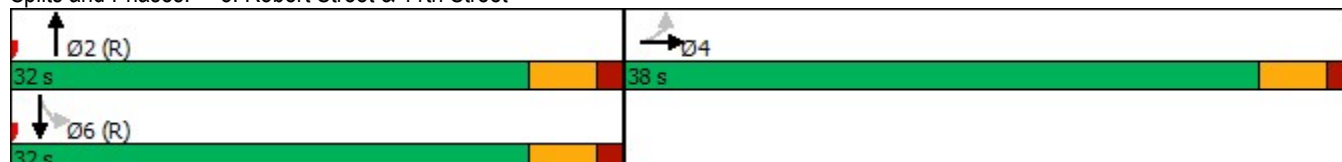
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

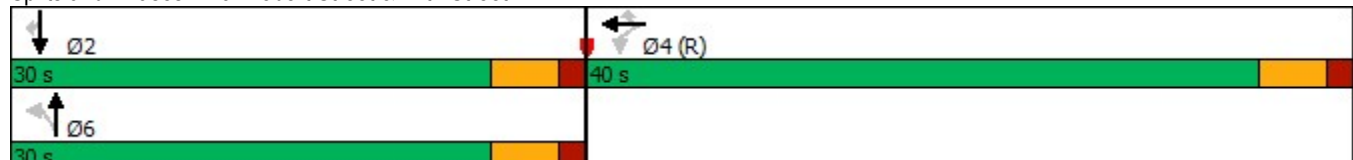
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

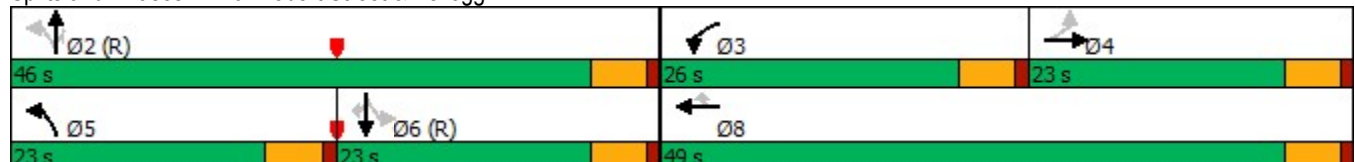
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

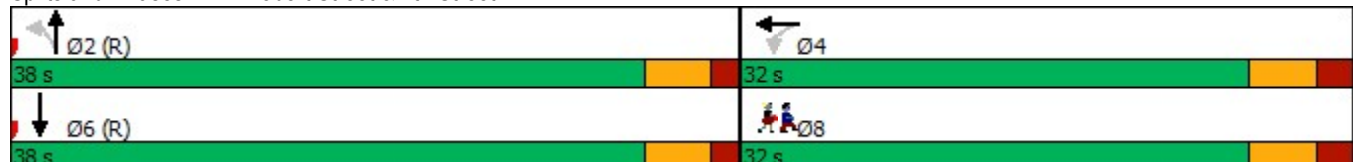
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

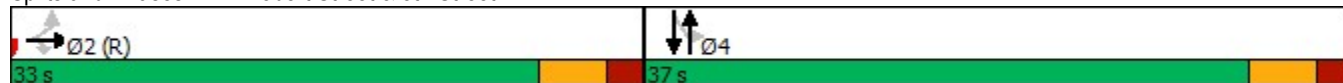
Intersection LOS: A

Intersection Capacity Utilization 61.4%













ICU Level of Service B

Analysis Period (min) 15

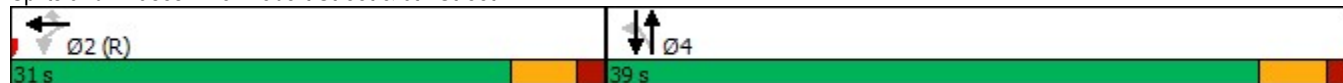
Splits and Phases: 2: Robert Street & 5th Street





						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A



















Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

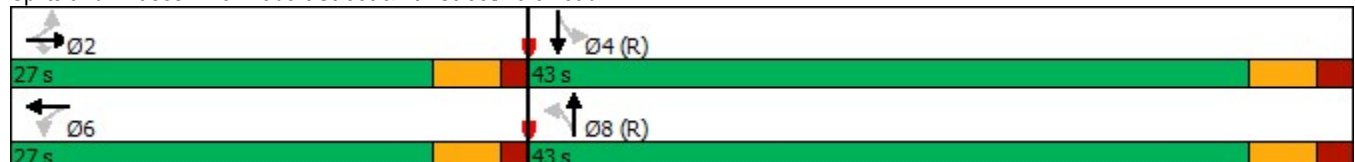
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

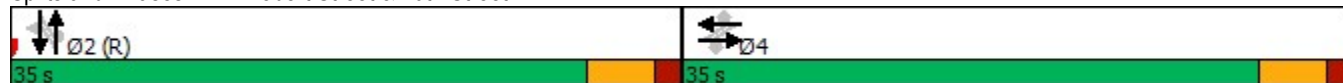


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

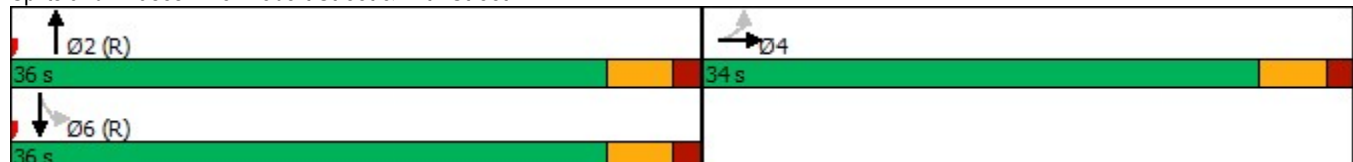
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

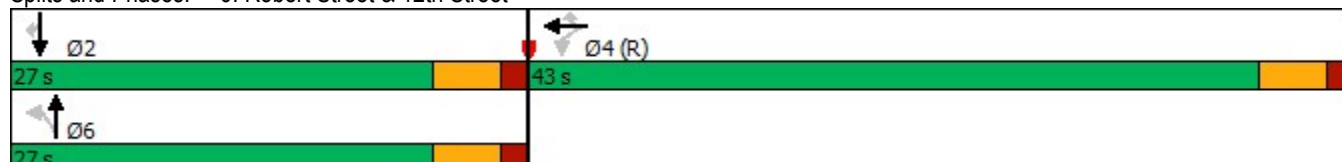
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

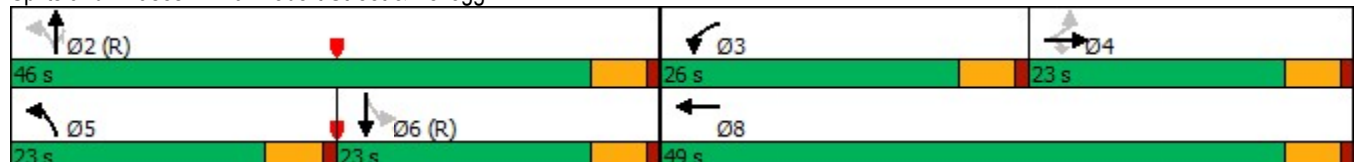
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg





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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

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Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

**Robert Street Application**

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

<b>Total Network Delay Reduction</b>		<b>94863</b>	<b>seconds</b>
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**Emissions**

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

<b>Total Reduction</b>		<b>2.43</b>
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

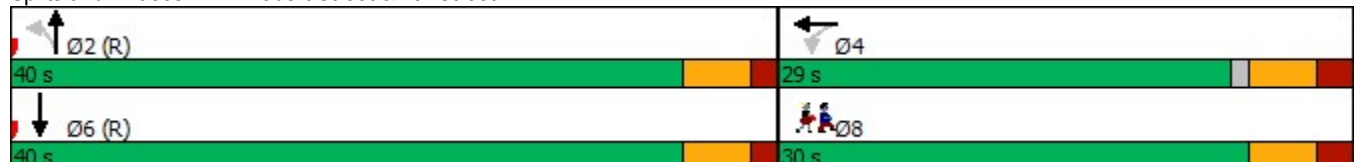
Intersection LOS: A











Intersection Capacity Utilization 48.7%

ICU Level of Service A

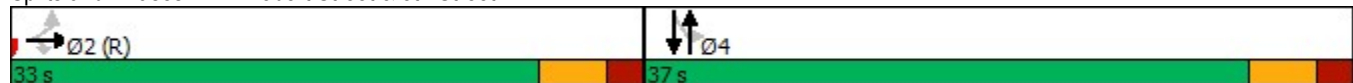
Analysis Period (min) 15













Splits and Phases: 1: Robert Street & 4th Street



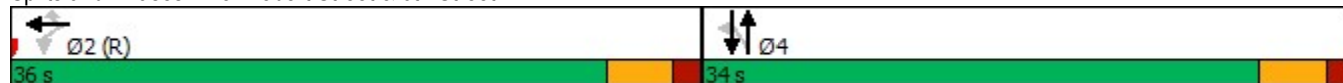
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1				Intersection LOS: B	
Intersection Capacity Utilization 56.5%				ICU Level of Service B	
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

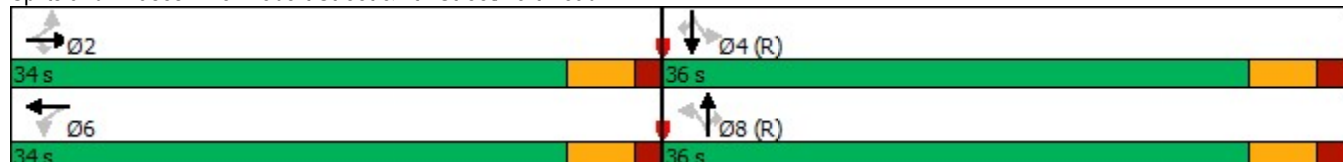
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C

Analysis Period (min) 15





















Splits and Phases: 5: Robert Street & 7th Street/Fort Road





Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 70.8%

ICU Level of Service C























Analysis Period (min) 15

Splits and Phases: 6: Robert Street & 9th Street

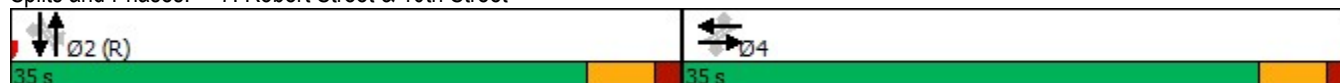


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

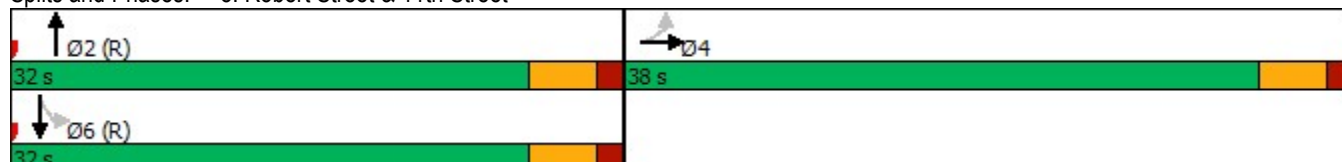
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

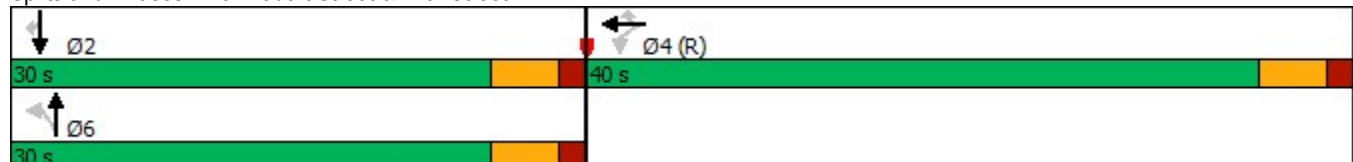
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

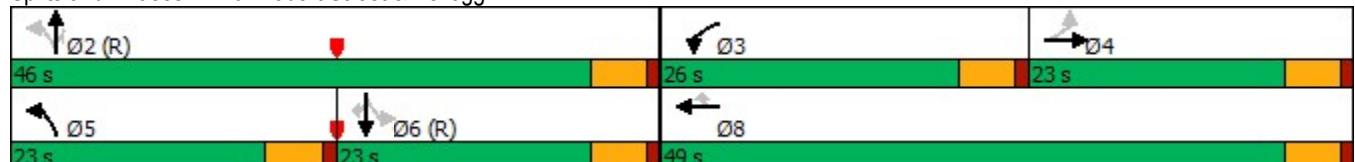
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

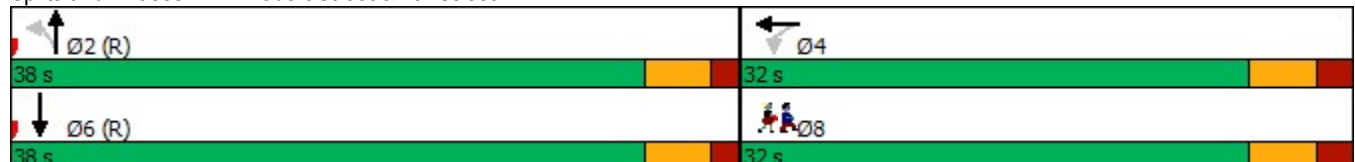
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

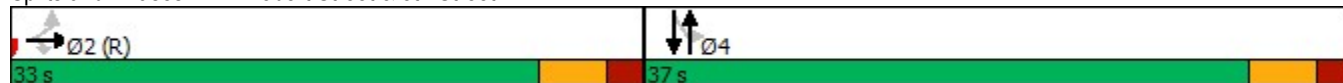
Intersection LOS: A

Intersection Capacity Utilization 61.4%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street

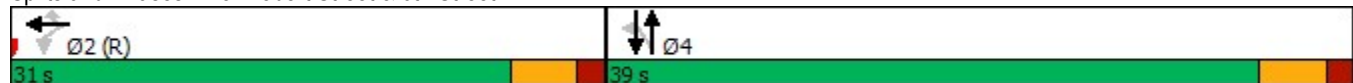


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
3: Robert Street & 6th Street

						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

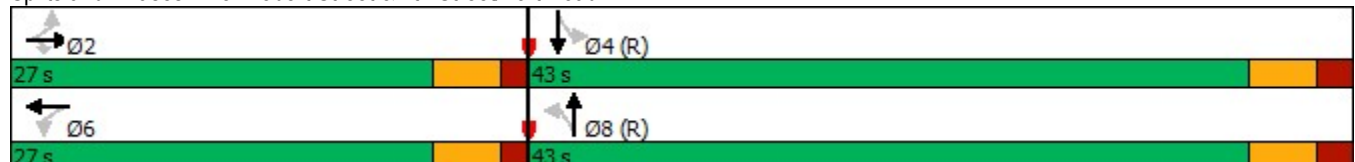
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

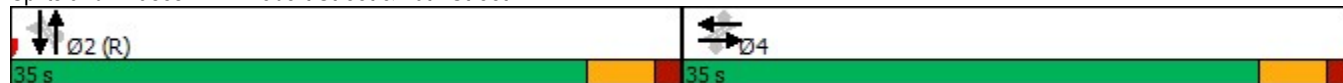


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street

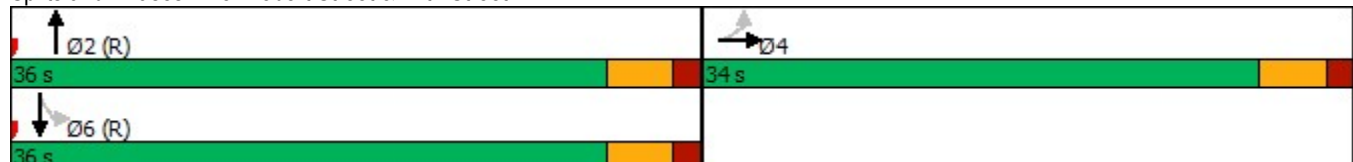


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↔↑↑↔	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 70				
Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green				
Natural Cycle: 45				
Control Type: Pretimed				
Maximum v/c Ratio: 0.40				
Intersection Signal Delay: 9.0			Intersection LOS: A	
Intersection Capacity Utilization 49.1%			ICU Level of Service A	
Analysis Period (min) 15				

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

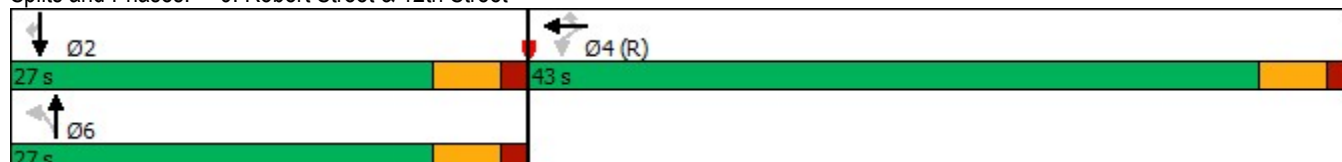
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15





















Splits and Phases: 9: Robert Street & 12th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

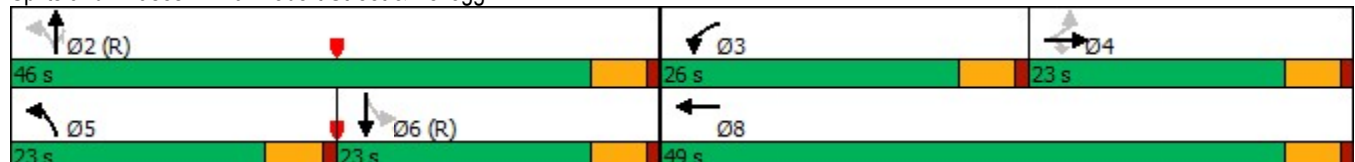
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

---

5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

---

7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔↔	↔↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

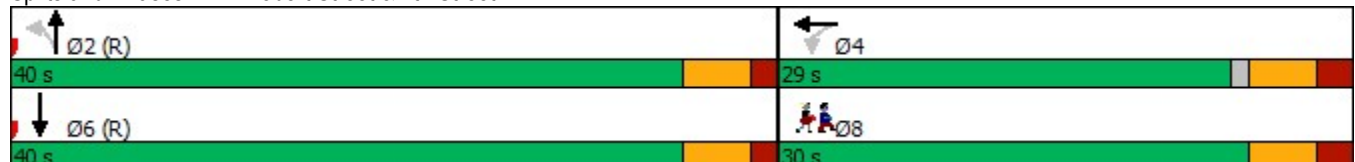
Intersection LOS: A











Intersection Capacity Utilization 48.7%

ICU Level of Service A

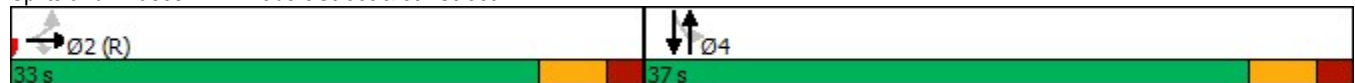
Analysis Period (min) 15













Splits and Phases: 1: Robert Street & 4th Street



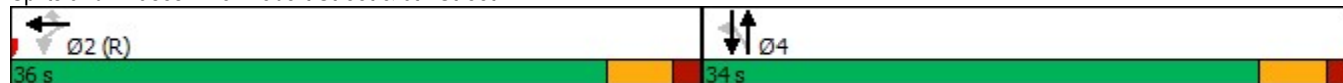
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1			Intersection LOS: B		
Intersection Capacity Utilization 56.5%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place

						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						























Splits and Phases: 4: Robert Street & 7th Place





Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

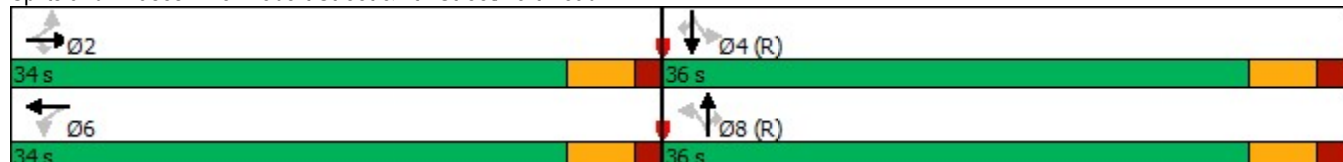
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

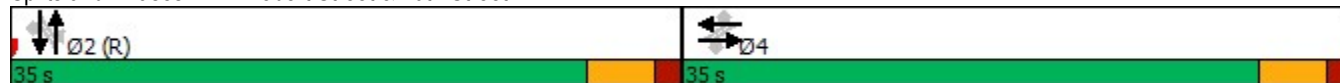


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

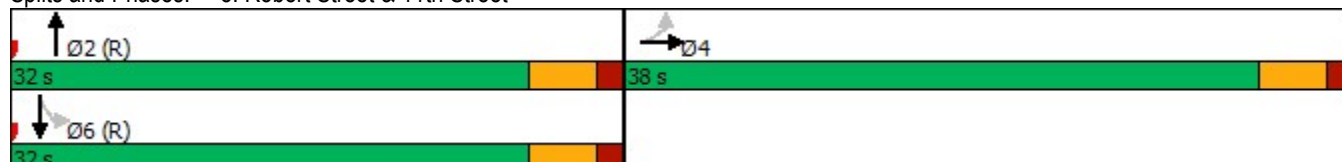
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

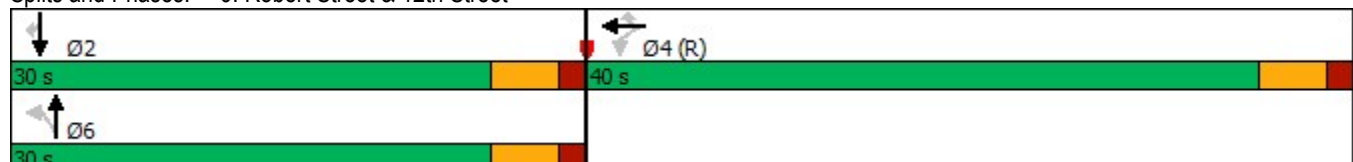
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

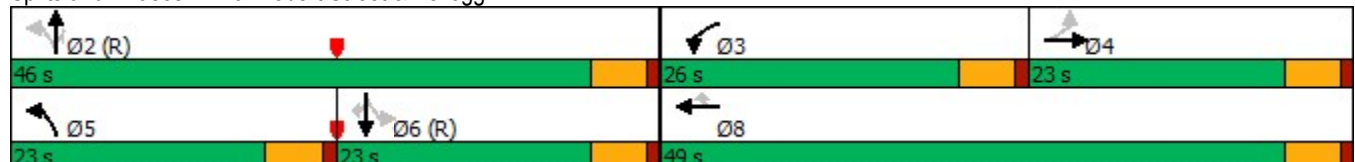
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

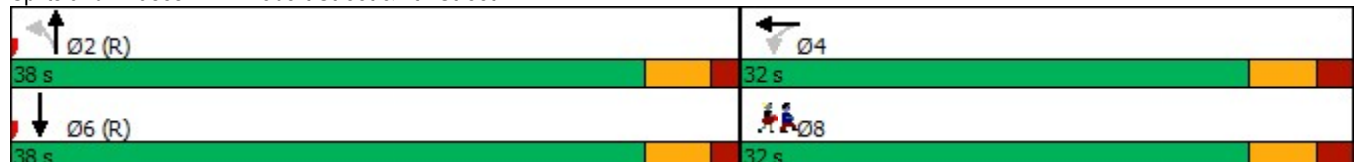
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

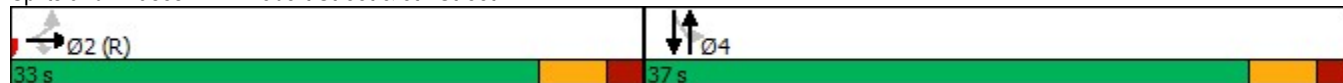
Intersection LOS: A

Intersection Capacity Utilization 61.4%

ICU Level of Service B













Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street

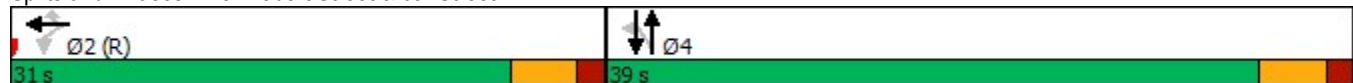


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
3: Robert Street & 6th Street

						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

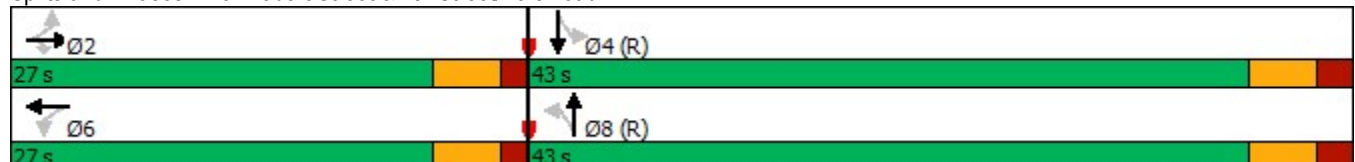
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

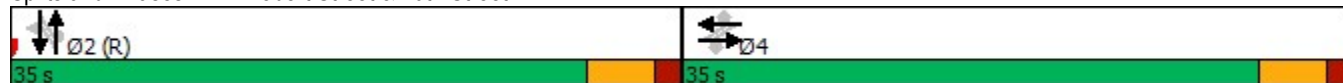


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

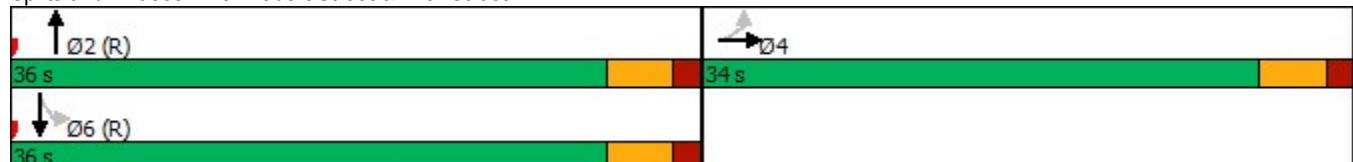
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

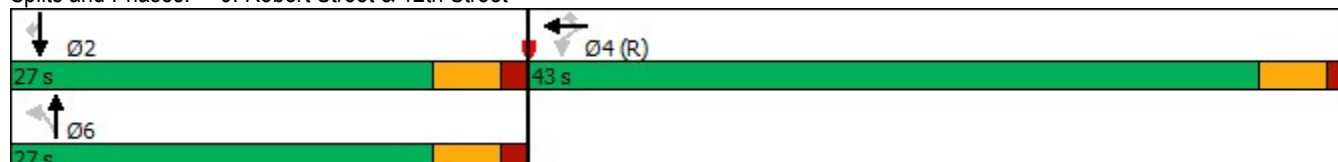
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160	
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160	
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		4		3	8	5	2			6	
Permitted Phases	4		4			2		2	6		
Detector Phase	4	4	4	3	8	5	2	2	6	6	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0	
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes	
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19	
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34	
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3	
LOS	D	D	A	D	C	C	C	A	C	C	
Approach Delay		25.1			34.1		19.0			29.4	
Approach LOS		C			C		B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

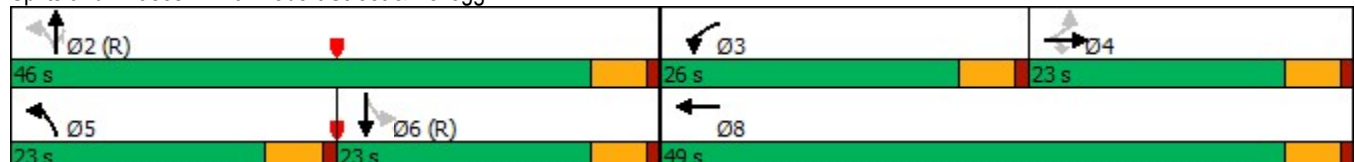
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

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9: Robert Street & 12th Street

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Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

**Robert Street Application**

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

<b>Total Network Delay Reduction</b>		<b>94863</b>	<b>seconds</b>
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**Emissions**

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

<b>Total Reduction</b>		<b>2.43</b>
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

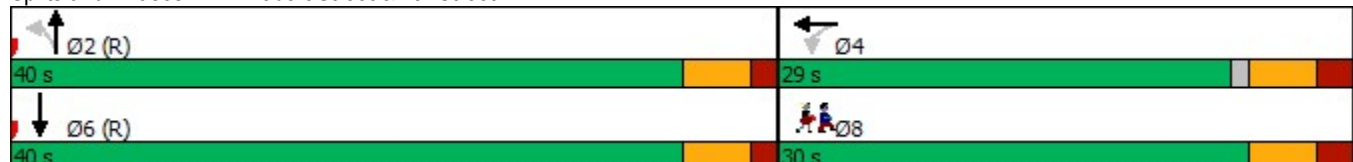
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A











Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street

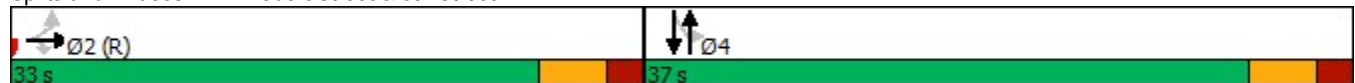














Robert Street  
Existing - AM Peak

03/26/2020  
2: Robert Street & 5th Street

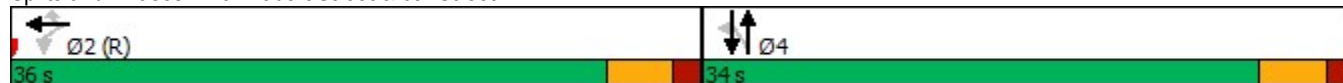
					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1			Intersection LOS: B		
Intersection Capacity Utilization 56.5%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						













Splits and Phases: 3: Robert Street & 6th Street





Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

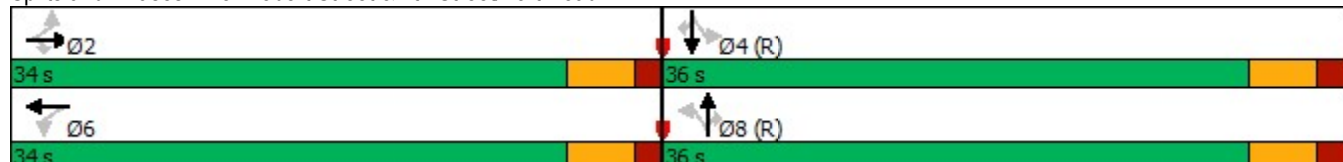
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

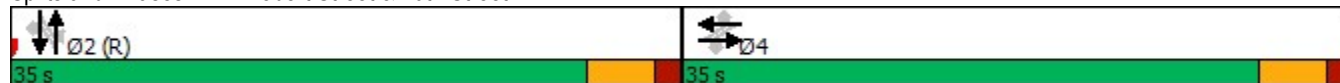


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

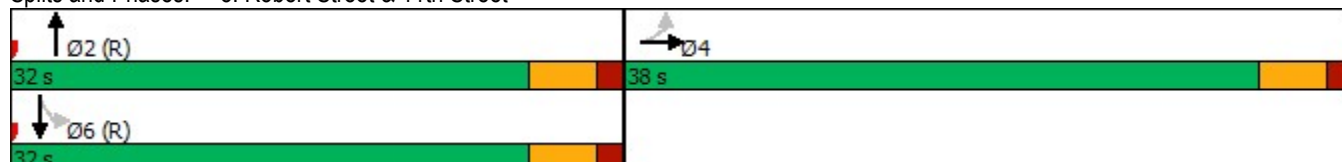
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	↑↑↑	↑	↑	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

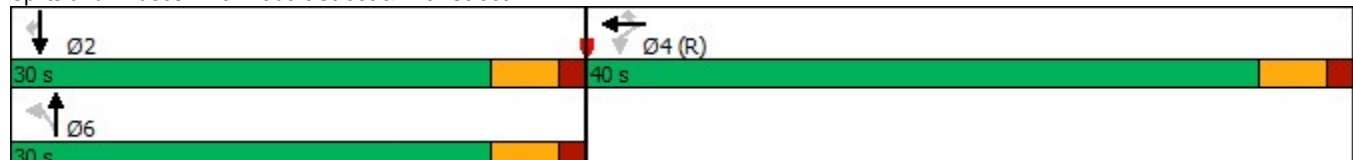
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

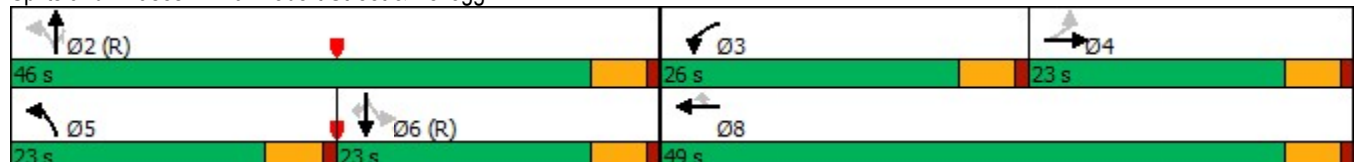
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18



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6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

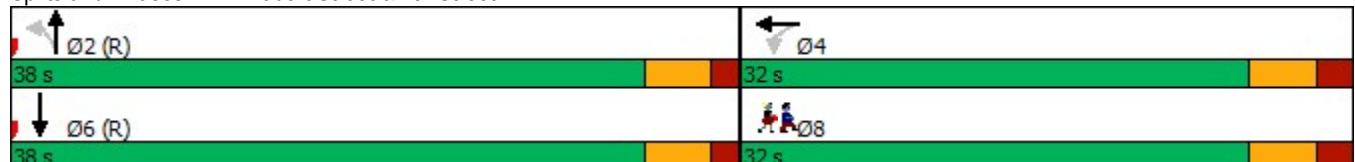
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↔↔↔	↗	↕↕	↖	↕↕
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

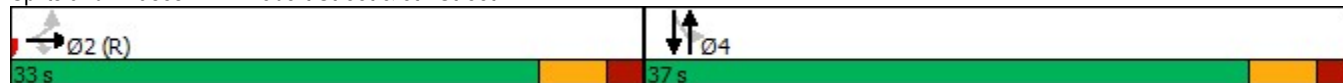
Intersection LOS: A













Intersection Capacity Utilization 61.4%

ICU Level of Service B

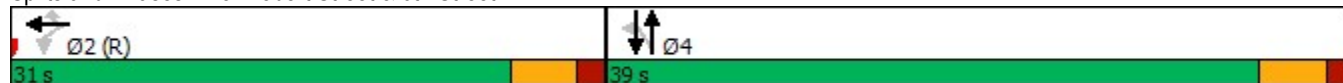
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↰↰	↰	↰	↰↰	↰	↰	↰	↰
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

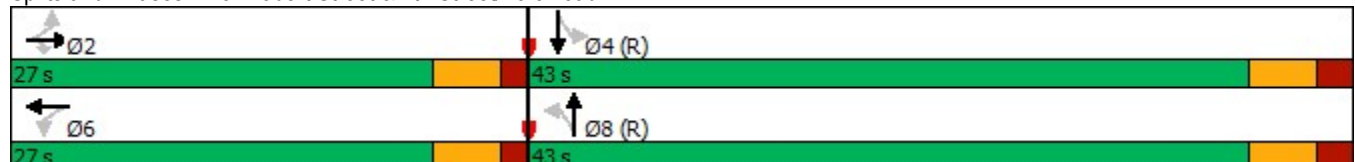
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street



















									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 6: Robert Street & 9th Street

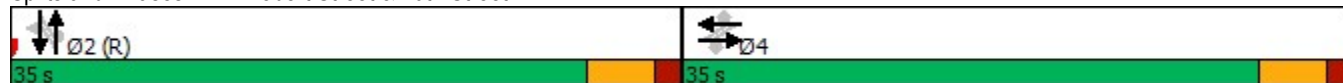


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street





Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

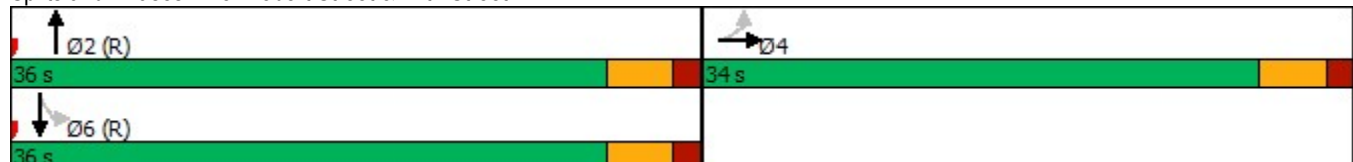
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

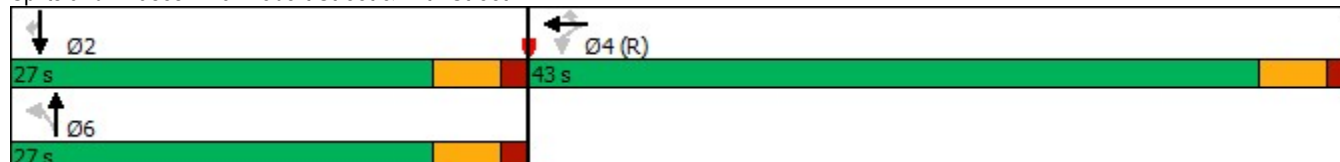
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

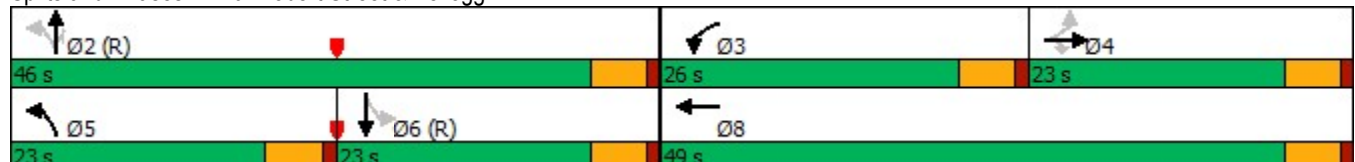
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

---

Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

---

Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

---

4: Robert Street & 7th Place

---

Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

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7: Robert Street & 10th Street

---

Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

---

8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

10: Robert Street & Kellogg

---

Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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Robert Street  
Existing - AM Peak

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↔	↔	↔	↔	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	29.0	40.0	40.0	40.0	30.0
Total Split (%)	41.4%	57.1%	57.1%	57.1%	43%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	24.5	35.0	35.0	35.0	
Actuated g/C Ratio	0.35	0.50	0.50	0.50	
v/c Ratio	0.16	0.06	0.37	0.18	
Control Delay	12.7	9.5	11.5	2.2	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	12.7	9.5	11.5	2.2	
LOS	B	A	B	A	
Approach Delay	12.7		11.4	2.2	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 28 (40%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 9.0

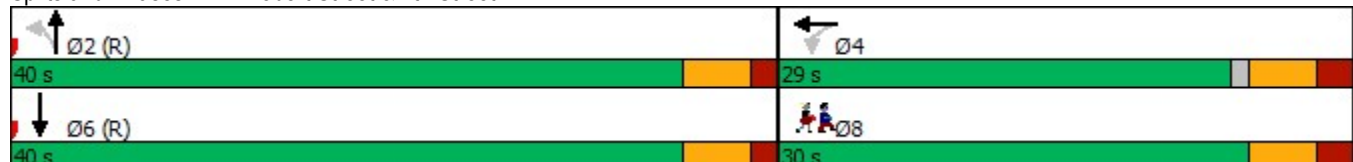
Intersection LOS: A

Intersection Capacity Utilization 48.7%

ICU Level of Service A











Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street

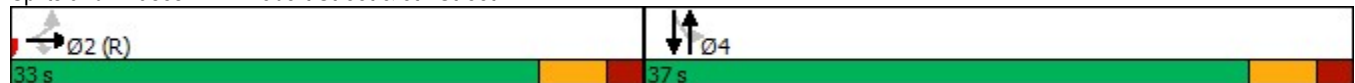


Robert Street  
Existing - AM Peak













03/26/2020  
2: Robert Street & 5th Street

					
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effct Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	10.6	14.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	4.7	10.6	14.4	11.7
LOS	B	A	B	B	B
Approach Delay	11.3		10.6		12.0
Approach LOS	B		B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 54 (77%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Pretimed					
Maximum v/c Ratio: 0.45					
Intersection Signal Delay: 11.1			Intersection LOS: B		
Intersection Capacity Utilization 56.5%			ICU Level of Service B		
Analysis Period (min) 15					

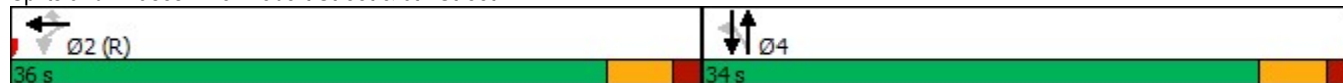
Splits and Phases: 2: Robert Street & 5th Street

















						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	36.0	36.0	36.0	34.0	34.0	34.0
Total Split (%)	51.4%	51.4%	51.4%	48.6%	48.6%	48.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	31.0	31.0	31.0	29.0	29.0	29.0
Actuated g/C Ratio	0.44	0.44	0.44	0.41	0.41	0.41
v/c Ratio	0.08	0.50	0.10	0.17	0.39	0.32
Control Delay	11.7	15.4	3.9	5.2	5.3	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	15.4	3.9	5.2	5.3	20.7
LOS	B	B	A	A	A	C
Approach Delay		14.3			5.3	20.7
Approach LOS		B			A	C
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.50						
Intersection Signal Delay: 12.8				Intersection LOS: B		
Intersection Capacity Utilization 56.5%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak

03/26/2020  
4: Robert Street & 7th Place























						
Lane Group	EBL	EBT	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	25	15	515	45	15	345
Future Volume (vph)	25	15	515	45	15	345
Turn Type	Perm	NA	NA	Perm	Perm	NA
Protected Phases		4	2			2
Permitted Phases	4			2	2	
Detector Phase	4	4	2	2	2	2
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0	22.0
Total Split (s)	24.0	24.0	46.0	46.0	46.0	46.0
Total Split (%)	34.3%	34.3%	65.7%	65.7%	65.7%	65.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	19.0	19.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.27	0.27	0.59	0.59	0.59	0.59
v/c Ratio	0.06	0.14	0.52	0.06	0.04	0.35
Control Delay	19.5	9.9	8.3	0.9	4.2	4.6
Queue Delay	0.0	0.0	3.1	0.0	0.0	0.2
Total Delay	19.5	9.9	11.3	0.9	4.2	4.8
LOS	B	A	B	A	A	A
Approach Delay		12.9	10.5			4.8
Approach LOS		B	B			A
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 49 (70%), Referenced to phase 2:NBSB, Start of Green						
Natural Cycle: 50						
Control Type: Pretimed						
Maximum v/c Ratio: 0.52						
Intersection Signal Delay: 8.6				Intersection LOS: A		
Intersection Capacity Utilization 50.4%				ICU Level of Service A		
Analysis Period (min) 15						

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak

03/26/2020  
5: Robert Street & 7th Street/Fort Road

											
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Future Volume (vph)	30	165	40	50	355	55	465	40	30	280	65
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4	
Permitted Phases	2		2	6		8		8	4		4
Detector Phase	2	2	2	6	6	8	8	8	4	4	4
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (s)	34.0	34.0	34.0	34.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	48.6%	48.6%	48.6%	48.6%	48.6%	51.4%	51.4%	51.4%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	29.0	29.0	29.0	29.0	29.0	30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	0.10	0.12	0.07	0.12	0.30	0.15	0.64	0.07	0.13	0.38	0.11
Control Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.0	1.9	18.2	16.9	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.4	0.0
Total Delay	13.5	13.0	4.8	13.6	13.8	5.0	7.4	1.9	18.2	17.3	11.0
LOS	B	B	A	B	B	A	A	A	B	B	B
Approach Delay		11.6			13.8		6.8			16.3	
Approach LOS		B			B		A			B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 50 (71%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 11.6

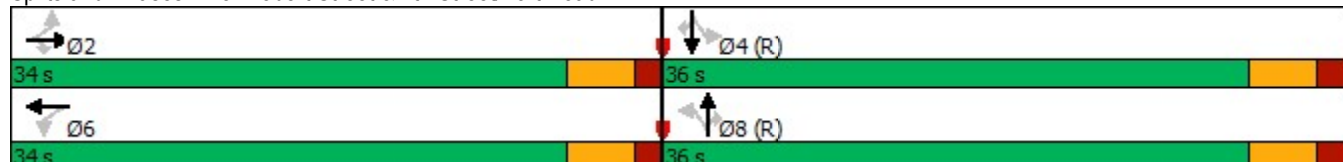
Intersection LOS: B

Intersection Capacity Utilization 72.0%

ICU Level of Service C





















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak

03/26/2020  
6: Robert Street & 9th Street






















											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Future Volume (vph)	5	10	40	75	10	30	475	15	10	330	85
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		4			2			2	
Permitted Phases	4		4		4	2		2	2		2
Detector Phase	4	4	4	4	4	2	2	2	2	2	2
Switch Phase											
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	26.0	26.0	26.0	44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	37.1%	37.1%	37.1%	37.1%	37.1%	62.9%	62.9%	62.9%	62.9%	62.9%	62.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		21.0		21.0	21.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio		0.30		0.30	0.30	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio		0.06		0.26	0.02	0.07	0.51	0.02	0.03	0.36	0.11
Control Delay		13.4		20.4	2.4	1.9	4.8	0.5	7.7	10.4	4.3
Queue Delay		0.0		0.0	0.0	0.0	3.1	0.0	0.0	0.4	0.0
Total Delay		13.4		20.4	2.4	1.9	7.9	0.5	7.7	10.8	4.3
LOS		B		C	A	A	A	A	A	B	A
Approach Delay		13.4		19.0			7.3			9.5	
Approach LOS		B		B			A			A	
Intersection Summary											
Cycle Length: 70											
Actuated Cycle Length: 70											
Offset: 65 (93%), Referenced to phase 2:NBSB, Start of Green											
Natural Cycle: 50											
Control Type: Pretimed											
Maximum v/c Ratio: 0.51											
Intersection Signal Delay: 9.6						Intersection LOS: A					
Intersection Capacity Utilization 70.8%						ICU Level of Service C					
Analysis Period (min) 15											

Splits and Phases: 6: Robert Street & 9th Street

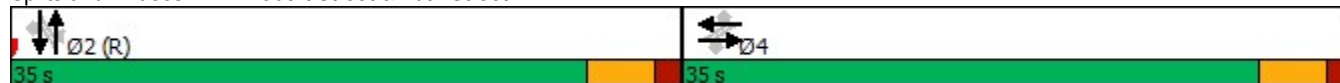


Robert Street  
Existing - AM Peak

03/26/2020  
7: Robert Street & 10th Street

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Future Volume (vph)	10	10	20	165	190	25	15	445	10	10	255	35
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		2
Detector Phase	4	4	4	4	4	4	2	2	2	2	2	2
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.62	0.02	0.04	0.35	0.06
Control Delay		11.9	4.0		20.5	4.6	11.8	13.1	2.9	12.4	15.6	6.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	11.8	13.2	2.9	12.4	15.6	6.1
LOS		B	A		C	A	B	B	A	B	B	A
Approach Delay		7.9			19.5			12.9			14.4	
Approach LOS		A			B			B			B	
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 60 (86%), Referenced to phase 2:NBSB, Start of Green												
Natural Cycle: 50												
Control Type: Pretimed												
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 15.2						Intersection LOS: B						
Intersection Capacity Utilization 67.6%						ICU Level of Service C						
Analysis Period (min) 15												

Splits and Phases: 7: Robert Street & 10th Street



	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	38.0	32.0	32.0	32.0
Total Split (%)	54.3%	45.7%	45.7%	45.7%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	33.0	27.0	27.0	27.0
Actuated g/C Ratio	0.47	0.39	0.39	0.39
v/c Ratio	0.35	0.39	0.08	0.24
Control Delay	10.6	10.1	10.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	10.6	10.2	10.8	11.5
LOS	B	B	B	B
Approach Delay	10.6	10.2		11.4
Approach LOS	B	B		B

#### Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 22 (31%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 10.6

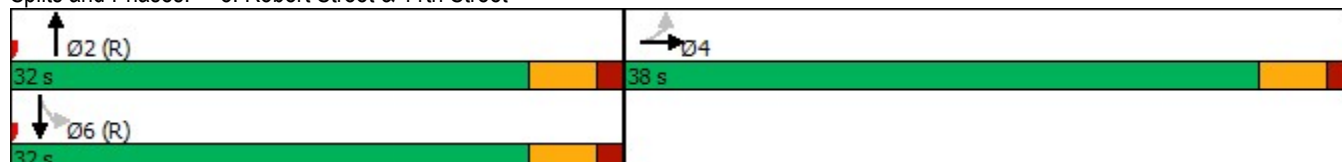
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	↗	↘	↑	↑	↗
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	40.0	40.0	30.0	30.0	30.0	30.0
Total Split (%)	57.1%	57.1%	42.9%	42.9%	42.9%	42.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	35.0	35.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.50	0.50	0.36	0.36	0.36	0.36
v/c Ratio	0.30	0.07	0.29	0.49	0.17	0.06
Control Delay	10.7	3.2	18.4	21.6	16.3	6.2
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	10.7	3.2	18.4	22.6	16.3	6.2
LOS	B	A	B	C	B	A
Approach Delay	10.2			21.4	13.9	
Approach LOS	B			C	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 14.2

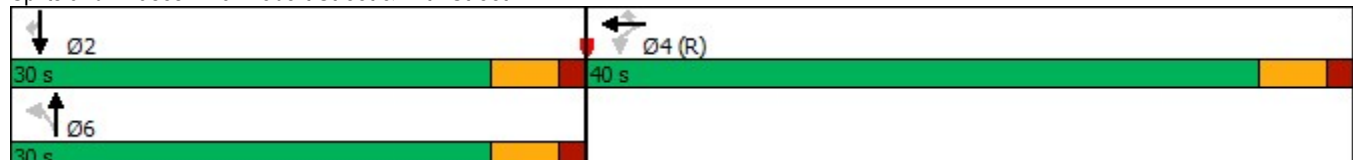
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A




















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak

03/26/2020  
10: Robert Street & Kellogg

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Future Volume (vph)	15	280	525	1200	105	230	485	260	5	160	50
Turn Type	Perm	NA	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4	3	8		5	2			6	
Permitted Phases	4				8	2		2	6		6
Detector Phase	4	4	3	8	8	5	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	7.0	10.0	10.0	7.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	26.0	49.0	49.0	23.0	46.0	46.0	23.0	23.0	23.0
Total Split (%)	24.2%	24.2%	27.4%	51.6%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lead/Lag	Lag	Lag	Lead			Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		18.0	21.0	44.0	44.0		41.0	41.0		18.0	18.0
Actuated g/C Ratio		0.19	0.22	0.46	0.46		0.43	0.43		0.19	0.19
v/c Ratio		0.61	1.36	0.98	0.15		0.62	0.34		0.29	0.13
Control Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		27.6	210.9	40.3	4.4		22.4	3.3		34.5	0.7
LOS		C	F	D	A		C	A		C	A
Approach Delay		27.6		76.9			17.3			26.6	
Approach LOS		C		E			B			C	

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 95

Control Type: Pretimed

Maximum v/c Ratio: 1.36

Intersection Signal Delay: 50.3

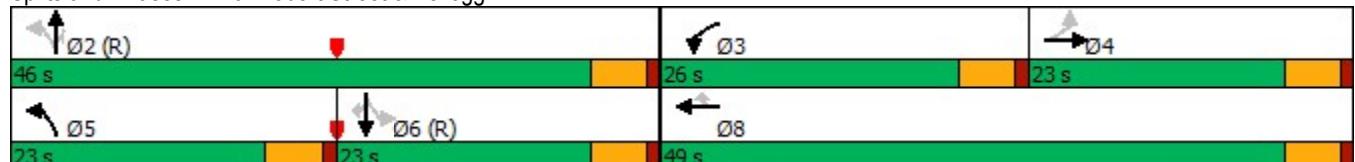
Intersection LOS: D

Intersection Capacity Utilization 80.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg





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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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2: Robert Street & 5th Street

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Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	1.02
NOx Emissions (kg)	0.20
VOC Emissions (kg)	0.24

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.51
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.12

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.77
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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6: Robert Street & 9th Street

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Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.55
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

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7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1190
Total Delay / Veh (s/v)	15
CO Emissions (kg)	0.71
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.16

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8: Robert Street & 11th Street

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Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	11
CO Emissions (kg)	0.76
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

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9: Robert Street & 12th Street

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Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	14
CO Emissions (kg)	0.91
NOx Emissions (kg)	0.18
VOC Emissions (kg)	0.21

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10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	50
CO Emissions (kg)	4.23
NOx Emissions (kg)	0.82
VOC Emissions (kg)	0.98

Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
1: Robert Street & 4th Street



Lane Group	WBT	NBL	NBT	SBT	Ø8
Lane Configurations	↕	↗	↕	↕	
Traffic Volume (vph)	55	25	580	205	
Future Volume (vph)	55	25	580	205	
Turn Type	NA	Perm	NA	NA	
Protected Phases	4		2	6	8
Permitted Phases		2			
Detector Phase	4	2	2	6	
Switch Phase					
Minimum Initial (s)	10.0	12.0	12.0	12.0	10.0
Minimum Split (s)	29.0	21.0	21.0	21.0	29.0
Total Split (s)	32.0	38.0	38.0	38.0	32.0
Total Split (%)	45.7%	54.3%	54.3%	54.3%	46%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	1.5	1.5	1.5	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.0	5.0	5.0	
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	26.5	33.0	33.0	33.0	
Actuated g/C Ratio	0.38	0.47	0.47	0.47	
v/c Ratio	0.15	0.06	0.39	0.19	
Control Delay	11.6	10.6	12.9	8.9	
Queue Delay	0.0	0.0	0.0	0.0	
Total Delay	11.6	10.6	12.9	8.9	
LOS	B	B	B	A	
Approach Delay	11.6		12.8	8.9	
Approach LOS	B		B	A	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 42 (60%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 11.6

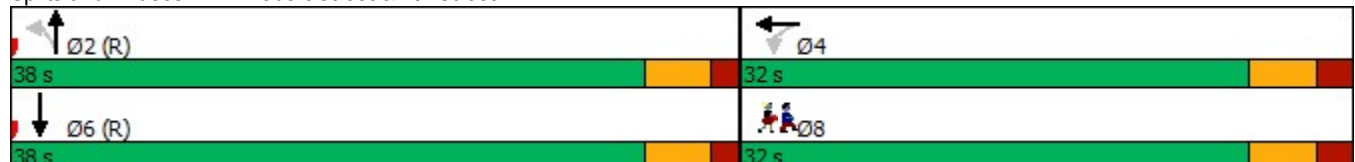
Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Robert Street & 4th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
2: Robert Street & 5th Street

	→	↘	↑	↙	↓
Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑	↘	↑↑
Traffic Volume (vph)	135	55	530	25	215
Future Volume (vph)	135	55	530	25	215
Turn Type	NA	Perm	NA	Perm	NA
Protected Phases	2		4		4
Permitted Phases		2		4	
Detector Phase	2	2	4	4	4
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.0	29.0	27.0	27.0	27.0
Total Split (s)	33.0	33.0	37.0	37.0	37.0
Total Split (%)	47.1%	47.1%	52.9%	52.9%	52.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	27.5	27.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.39	0.45	0.45	0.45
v/c Ratio	0.09	0.11	0.45	0.10	0.16
Control Delay	13.6	4.7	3.0	9.3	8.7
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	13.6	4.7	3.1	9.3	8.7
LOS	B	A	A	A	A
Approach Delay	11.3		3.1		8.7
Approach LOS	B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.0

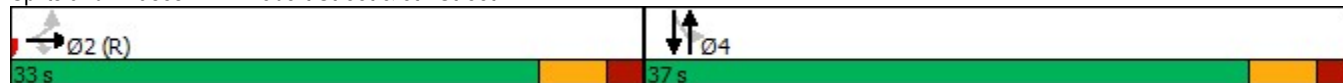
Intersection LOS: A













Intersection Capacity Utilization 61.4%

ICU Level of Service B

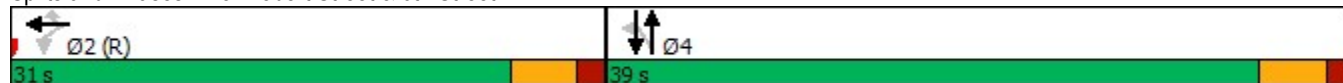
Analysis Period (min) 15

Splits and Phases: 2: Robert Street & 5th Street



						
Lane Group	WBL	WBT	WBR	NBL	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	50	695	60	55	500	190
Future Volume (vph)	50	695	60	55	500	190
Turn Type	Perm	NA	Perm	Perm	NA	NA
Protected Phases		2			4	4
Permitted Phases	2		2	4		
Detector Phase	2	2	2	4	4	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	25.0	25.0	25.0
Total Split (s)	31.0	31.0	31.0	39.0	39.0	39.0
Total Split (%)	44.3%	44.3%	44.3%	55.7%	55.7%	55.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	26.0	26.0	26.0	34.0	34.0	34.0
Actuated g/C Ratio	0.37	0.37	0.37	0.49	0.49	0.49
v/c Ratio	0.09	0.60	0.12	0.16	0.62	0.51
Control Delay	14.9	20.2	5.0	2.7	6.6	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.2
Total Delay	14.9	20.2	5.0	2.7	6.6	13.1
LOS	B	C	A	A	A	B
Approach Delay		18.7			6.2	13.1
Approach LOS		B			A	B
Intersection Summary						
Cycle Length: 70						
Actuated Cycle Length: 70						
Offset: 22 (31%), Referenced to phase 2:WBTL, Start of Green						
Natural Cycle: 55						
Control Type: Pretimed						
Maximum v/c Ratio: 0.62						
Intersection Signal Delay: 13.5				Intersection LOS: B		
Intersection Capacity Utilization 61.4%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 3: Robert Street & 6th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
4: Robert Street & 7th Place



Lane Group	EBL	EBT	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	25	15	515	15	345
Future Volume (vph)	25	15	515	15	345
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		4	2		2
Permitted Phases	4			2	
Detector Phase	4	4	2	2	2
Switch Phase					
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	22.0	22.0	22.0
Total Split (s)	23.0	23.0	47.0	47.0	47.0
Total Split (%)	32.9%	32.9%	67.1%	67.1%	67.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	42.0	42.0	42.0
Actuated g/C Ratio	0.26	0.26	0.60	0.60	0.60
v/c Ratio	0.07	0.15	0.57	0.05	0.34
Control Delay	20.3	10.4	2.9	6.8	8.3
Queue Delay	0.0	0.0	0.3	0.0	0.3
Total Delay	20.3	10.4	3.2	6.8	8.6
LOS	C	B	A	A	A
Approach Delay		13.5	3.2		8.6
Approach LOS		B	A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 58 (83%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.0

Intersection LOS: A

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Robert Street & 7th Place



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
5: Robert Street & 7th Street/Fort Road

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰	↗↗	↰	↰	↗↗	↰	↗	↰	↗
Traffic Volume (vph)	30	165	40	50	355	55	465	30	280
Future Volume (vph)	30	165	40	50	355	55	465	30	280
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	27.0	27.0	27.0	27.0	27.0	29.0	29.0	29.0	29.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	22.0	22.0	22.0	22.0	22.0	37.5	37.5	37.5	37.5
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio	0.13	0.16	0.09	0.16	0.40	0.13	0.57	0.10	0.39
Control Delay	19.0	17.9	6.6	18.9	19.4	2.1	3.8	5.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2
Total Delay	19.0	17.9	6.6	18.9	19.4	2.1	4.0	5.0	4.9
LOS	B	B	A	B	B	A	A	A	A
Approach Delay		16.1			19.4		3.8		4.9
Approach LOS		B			B		A		A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 68 (97%), Referenced to phase 4:SBTL and 8:NBTL, Start of Green

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.1

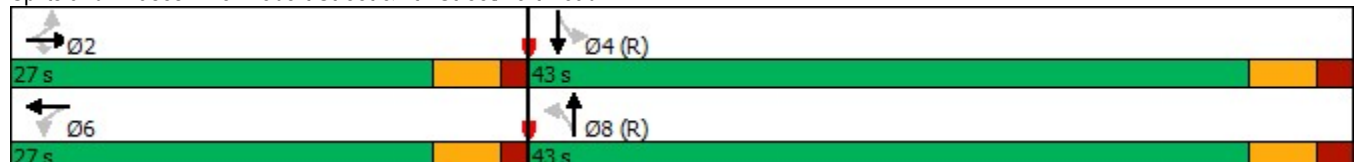
Intersection LOS: B

Intersection Capacity Utilization 74.8%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 5: Robert Street & 7th Street/Fort Road



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
6: Robert Street & 9th Street

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	5	10	40	75	10	30	475	10	330
Future Volume (vph)	5	10	40	75	10	30	475	10	330
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4		4			2		2
Permitted Phases	4		4		4	2		2	
Detector Phase	4	4	4	4	4	2	2	2	2
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	27.0	43.0	43.0	43.0	43.0
Total Split (%)	38.6%	38.6%	38.6%	38.6%	38.6%	61.4%	61.4%	61.4%	61.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		22.0		22.0	22.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio		0.31		0.31	0.31	0.54	0.54	0.54	0.54
v/c Ratio		0.05		0.25	0.02	0.08	0.55	0.03	0.48
Control Delay		12.8		19.5	2.3	3.3	5.0	7.1	10.2
Queue Delay		0.0		0.0	0.0	0.0	0.2	0.0	0.3
Total Delay		12.8		19.5	2.3	3.3	5.1	7.1	10.5
LOS		B		B	A	A	A	A	B
Approach Delay		12.8		18.1			5.0		10.4
Approach LOS		B		B			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green									
Natural Cycle: 50									
Control Type: Pretimed									
Maximum v/c Ratio: 0.55									
Intersection Signal Delay: 8.8					Intersection LOS: A				
Intersection Capacity Utilization 71.9%					ICU Level of Service C				
Analysis Period (min) 15									



















Splits and Phases: 6: Robert Street & 9th Street



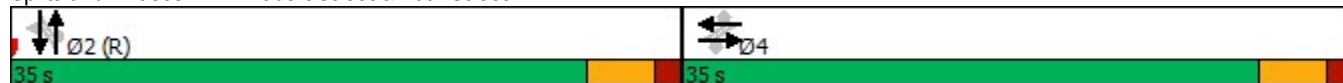


Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
7: Robert Street & 10th Street

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	10	20	165	190	25	15	445	10	255
Future Volume (vph)	10	10	20	165	190	25	15	445	10	255
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		4			4			2		2
Permitted Phases	4		4	4		4	2		2	
Detector Phase	4	4	4	4	4	4	2	2	2	2
Switch Phase										
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	21.0	21.0	21.0	21.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)		30.0	30.0		30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio		0.43	0.43		0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio		0.03	0.04		0.61	0.05	0.04	0.64	0.05	0.41
Control Delay		11.9	4.0		20.5	4.6	3.7	7.5	13.0	15.9
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0
Total Delay		11.9	4.0		20.5	4.6	3.7	7.7	13.0	15.9
LOS		B	A		C	A	A	A	B	B
Approach Delay		7.9			19.5			7.5		15.8
Approach LOS		A			B			A		B
Intersection Summary										
Cycle Length: 70										
Actuated Cycle Length: 70										
Offset: 10 (14%), Referenced to phase 2:NBSB, Start of Green										
Natural Cycle: 50										
Control Type: Pretimed										
Maximum v/c Ratio: 0.64										
Intersection Signal Delay: 13.5										
Intersection LOS: B										
Intersection Capacity Utilization 68.3%										
ICU Level of Service C										
Analysis Period (min) 15										

Splits and Phases: 7: Robert Street & 10th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
8: Robert Street & 11th Street

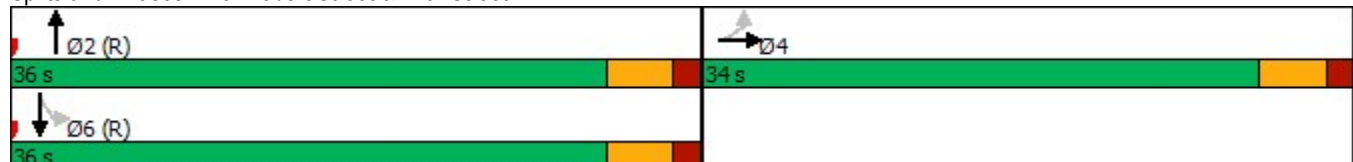
	→	↑	↘	↓
Lane Group	EBT	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑↑	↘	↑
Traffic Volume (vph)	465	290	20	155
Future Volume (vph)	465	290	20	155
Turn Type	NA	NA	Perm	NA
Protected Phases	4	2		6
Permitted Phases			6	
Detector Phase	4	2	6	6
Switch Phase				
Minimum Initial (s)	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	22.0	22.0	22.0
Total Split (s)	34.0	36.0	36.0	36.0
Total Split (%)	48.6%	51.4%	51.4%	51.4%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	Max
Act Effect Green (s)	29.0	31.0	31.0	31.0
Actuated g/C Ratio	0.41	0.44	0.44	0.44
v/c Ratio	0.40	0.35	0.07	0.21
Control Delay	13.3	1.7	10.1	10.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.3	1.7	10.1	10.6
LOS	B	A	B	B
Approach Delay	13.3	1.7		10.5
Approach LOS	B	A		B

Intersection Summary

Cycle Length: 70  
 Actuated Cycle Length: 70  
 Offset: 24 (34%), Referenced to phase 2:NBT and 6:SBTL, Start of Green  
 Natural Cycle: 45  
 Control Type: Pretimed  
 Maximum v/c Ratio: 0.40  
 Intersection Signal Delay: 9.0  
 Intersection Capacity Utilization 49.1%  
 Analysis Period (min) 15

Intersection LOS: A  
 ICU Level of Service A

Splits and Phases: 8: Robert Street & 11th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
9: Robert Street & 12th Street



Lane Group	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	←←←	←	←	↑	↑	↑
Traffic Volume (vph)	620	50	120	295	100	30
Future Volume (vph)	620	50	120	295	100	30
Turn Type	NA	Perm	Perm	NA	NA	Perm
Protected Phases	4			6	2	
Permitted Phases		4	6			2
Detector Phase	4	4	6	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	10.0	10.0	10.0	10.0
Minimum Split (s)	40.0	40.0	23.0	23.0	23.0	23.0
Total Split (s)	43.0	43.0	27.0	27.0	27.0	27.0
Total Split (%)	61.4%	61.4%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	38.0	38.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.54	0.54	0.31	0.31	0.31	0.31
v/c Ratio	0.28	0.06	0.33	0.55	0.19	0.06
Control Delay	9.0	2.7	13.4	15.9	18.6	7.1
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0
Total Delay	9.0	2.7	13.4	16.4	18.6	7.1
LOS	A	A	B	B	B	A
Approach Delay	8.5			15.5	15.9	
Approach LOS	A			B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 56 (80%), Referenced to phase 4:WBTL, Start of Green

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.5

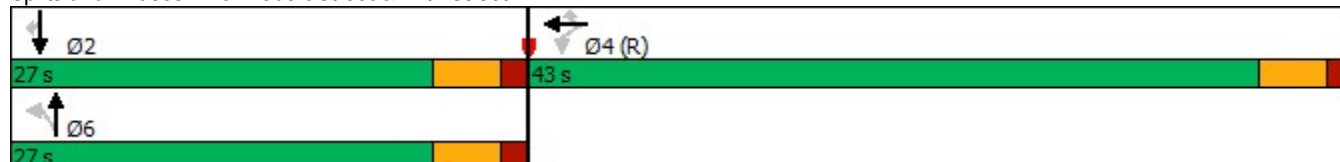
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A





















Analysis Period (min) 15

Splits and Phases: 9: Robert Street & 12th Street



Robert Street  
Existing - AM Peak - 3 Lane

03/26/2020  
10: Robert Street & Kellogg

										
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Future Volume (vph)	15	280	205	525	1200	230	485	260	5	160
Turn Type	Perm	NA	Perm	Prot	NA	pm+pt	NA	Perm	Perm	NA
Protected Phases		4		3	8	5	2			6
Permitted Phases	4		4			2		2	6	
Detector Phase	4	4	4	3	8	5	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	10.0	10.0	10.0	10.0
Minimum Split (s)	23.0	23.0	23.0	12.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	23.0	23.0	23.0	26.0	49.0	23.0	46.0	46.0	23.0	23.0
Total Split (%)	24.2%	24.2%	24.2%	27.4%	51.6%	24.2%	48.4%	48.4%	24.2%	24.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead		Lead			Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes			Yes	Yes
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	18.0	18.0	18.0	21.0	44.0	41.0	41.0	41.0	18.0	18.0
Actuated g/C Ratio	0.19	0.19	0.19	0.22	0.46	0.43	0.43	0.43	0.19	0.19
v/c Ratio	0.21	0.46	0.47	0.76	0.88	0.47	0.66	0.34	0.03	0.34
Control Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	36.8	8.2	42.2	30.9	21.2	26.4	3.3	32.2	29.3
LOS	D	D	A	D	C	C	C	A	C	C
Approach Delay		25.1			34.1		19.0			29.4
Approach LOS		C			C		B			C

Intersection Summary

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 28.4

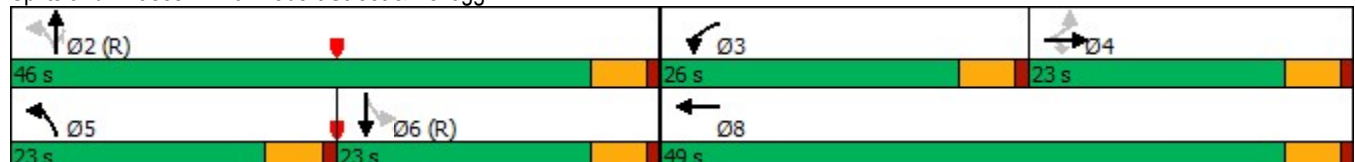
Intersection LOS: C

Intersection Capacity Utilization 95.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Robert Street & Kellogg



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1: Robert Street & 4th Street

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Direction	All
Future Volume (vph)	963
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.58
NOx Emissions (kg)	0.11
VOC Emissions (kg)	0.13

---

2: Robert Street & 5th Street

---

Direction	All
Future Volume (vph)	1058
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.37
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.09

---

3: Robert Street & 6th Street

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Direction	All
Future Volume (vph)	1735
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.99
NOx Emissions (kg)	0.19
VOC Emissions (kg)	0.23

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4: Robert Street & 7th Place

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Direction	All
Future Volume (vph)	1000
Total Delay / Veh (s/v)	6
CO Emissions (kg)	0.36
NOx Emissions (kg)	0.07
VOC Emissions (kg)	0.08

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5: Robert Street & 7th Street/Fort Road

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Direction	All
Future Volume (vph)	1609
Total Delay / Veh (s/v)	10
CO Emissions (kg)	0.72
NOx Emissions (kg)	0.14
VOC Emissions (kg)	0.17

---

6: Robert Street & 9th Street

---

Direction	All
Future Volume (vph)	1095
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.50
NOx Emissions (kg)	0.10
VOC Emissions (kg)	0.11

---

7: Robert Street & 10th Street

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Direction	All
Future Volume (vph)	1189
Total Delay / Veh (s/v)	13
CO Emissions (kg)	0.67
NOx Emissions (kg)	0.13
VOC Emissions (kg)	0.15

---

8: Robert Street & 11th Street

---

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	9
CO Emissions (kg)	0.61
NOx Emissions (kg)	0.12
VOC Emissions (kg)	0.14

---

9: Robert Street & 12th Street

---

Direction	All
Future Volume (vph)	1289
Total Delay / Veh (s/v)	12
CO Emissions (kg)	0.79
NOx Emissions (kg)	0.15
VOC Emissions (kg)	0.18

---

10: Robert Street & Kellogg

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Direction	All
Future Volume (vph)	3520
Total Delay / Veh (s/v)	28
CO Emissions (kg)	3.27
NOx Emissions (kg)	0.64
VOC Emissions (kg)	0.76

# Robert Street Application

1	4th Street		
	Existing Volume	963	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	8667	seconds
	Future Volume	963	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	11556	seconds
	Total Delay Reduction	-2889	seconds

2	5th Street		
	Existing Volume	1058	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	11638	seconds
	Future Volume	1058	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6348	seconds
	Total Delay Reduction	5290	seconds

3	6th Street		
	Existing Volume	1735	vehicles
	Existing Delay	13	sec/veh
	Existing Total Delay	22555	seconds
	Future Volume	1735	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	22555	seconds
	Total Delay Reduction	0	seconds

4	7th Pl		
	Existing Volume	1000	vehicles
	Existing Delay	9	sec/veh
	Existing Total Delay	9000	seconds
	Future Volume	1000	vehicles
	Future Delay	6	sec/veh
	Future Total Delay	6000	seconds
	Total Delay Reduction	3000	seconds

5	7th St		
	Existing Volume	1609	vehicles
	Existing Delay	12	sec/veh
	Existing Total Delay	19308	seconds
	Future Volume	1609	vehicles
	Future Delay	10	sec/veh
	Future Total Delay	16090	seconds
	Total Delay Reduction	3218	seconds

6	9th St		
	Existing Volume	1095	vehicles
	Existing Delay	10	sec/veh
	Existing Total Delay	10950	seconds
	Future Volume	1095	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	9855	seconds
	Total Delay Reduction	1095	seconds

7	10th Street		
	Existing Volume	1190	vehicles
	Existing Delay	15	sec/veh
	Existing Total Delay	17850	seconds
	Future Volume	1189	vehicles
	Future Delay	13	sec/veh
	Future Total Delay	15457	seconds
	Total Delay Reduction	2393	seconds

8	11th Street		
	Existing Volume	1369	vehicles
	Existing Delay	11	sec/veh
	Existing Total Delay	15059	seconds
	Future Volume	1369	vehicles
	Future Delay	9	sec/veh
	Future Total Delay	12321	seconds
	Total Delay Reduction	2738	seconds

9	12th Street		
	Existing Volume	1289	vehicles
	Existing Delay	14	sec/veh
	Existing Total Delay	18046	seconds
	Future Volume	1289	vehicles
	Future Delay	12	sec/veh
	Future Total Delay	15468	seconds
	Total Delay Reduction	2578	seconds

10	Kellogg		
	Existing Volume	3520	vehicles
	Existing Delay	50	sec/veh
	Existing Total Delay	176000	seconds
	Future Volume	3520	vehicles
	Future Delay	28	sec/veh
	Future Total Delay	98560	seconds
	Total Delay Reduction	77440	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

	Existing Volume		vehicles
	Existing Delay		sec/veh
	Existing Total Delay	0	seconds
	Future Volume		vehicles
	Future Delay		sec/veh
	Future Total Delay	0	seconds
	Total Delay Reduction	0	seconds

Total Network Delay Reduction		94863	seconds
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## Emissions

Existing	1	2	3	4	5	6	7	8	9	10	Total
CO	0.5	0.58	1.02	0.51	0.77	0.55	0.71	0.76	0.91	4.23	10.54
NOx	0.1	0.11	0.2	0.1	0.15	0.11	0.14	0.15	0.18	0.82	2.06
VOC	0.12	0.13	0.24	0.12	0.18	0.13	0.16	0.18	0.21	0.98	2.45
Total Existing										15.05	

Build	1	2	3	4	5	6	7	8	9	10	Total
CO	0.58	0.37	0.99	0.36	0.72	0.5	0.67	0.61	0.79	3.27	8.86
NOx	0.11	0.07	0.19	0.07	0.14	0.1	0.13	0.12	0.15	0.64	1.72
VOC	0.13	0.09	0.23	0.08	0.17	0.11	0.15	0.14	0.18	0.76	2.04
Total Existing										12.62	

Total Reduction	2.43
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**Traffic Safety Benefit-Cost Calculation**

Highway Safety Improvement Program (HSIP) Reactive Project

**A. Roadway Description**

<b>Route</b>	Robert St	<b>District</b>		<b>County</b>	Ramsey
<b>Begin RP</b>		<b>End RP</b>		<b>Miles</b>	
<b>Location</b>	between Kellogg Ave and 12th Ave				

**B. Project Description**

<b>Proposed Work</b>	Convert pedestal signals to mast arms				
<b>Project Cost*</b>	\$18,000,000	<b>Installation Year</b>	2024		
<b>Project Service Life</b>	20 years	<b>Traffic Growth Factor</b>	0.5%		

\* exclude Right of Way from Project Cost

**C. Crash Modification Factor**

0.56	Fatal (K) Crashes	<b>Reference</b>	CMF Clearinghouse		
0.56	Serious Injury (A) Crashes				
0.56	Moderate Injury (B) Crashes	<b>Crash Type</b>	All		
0.56	Possible Injury (C) Crashes				
0.49	Property Damage Only Crashes		<a href="http://www.CMFclearinghouse.org">www.CMFclearinghouse.org</a>		

**D. Crash Modification Factor (optional second CMF)**

0.26	Fatal (K) Crashes	<b>Reference</b>	CMF Clearinghouse		
0.26	Serious Injury (A) Crashes				
0.26	Moderate Injury (B) Crashes	<b>Crash Type</b>	Angle		
0.26	Possible Injury (C) Crashes				
0.26	Property Damage Only Crashes		<a href="http://www.CMFclearinghouse.org">www.CMFclearinghouse.org</a>		

**E. Crash Data**

<b>Begin Date</b>	1/1/2016	<b>End Date</b>	12/31/2018	3 years
<b>Data Source</b>	MnDOT			
<b>Crash Severity</b>	<b>All</b>	<b>Angle</b>		
K crashes				
A crashes				
B crashes	9	5		
C crashes	7	6		
PDO crashes	33	27		

**F. Benefit-Cost Calculation**

\$17,973,705	Benefit (present value)	B/C Ratio = 1.00
\$18,000,000	Cost	
Proposed project expected to reduce 18 crashes annually, 0 of which involving fatality or serious injury.		



## F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	\$1,360,000
A crashes	\$680,000
B crashes	\$210,000
C crashes	\$110,000
PDO crashes	\$12,000

Link: [mndot.gov/planning/program/appendix\\_a.html](http://mndot.gov/planning/program/appendix_a.html)

Real Discount Rate 1.2%  
 Traffic Growth Rate 0.5%  
 Project Service Life 20 years

## G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	\$0
A crashes	0.00	0.00	\$0
B crashes	7.66	2.55	\$536,200
C crashes	7.52	2.51	\$275,733
PDO crashes	36.81	12.27	\$147,240

**\$959,173**

## H. Amortized Benefit

Year	Crash Benefits	Present Value
2024	\$959,173	\$959,173
2025	\$963,969	\$952,539
2026	\$968,789	\$945,950
2027	\$973,633	\$939,407
2028	\$978,501	\$932,909
2029	\$983,394	\$926,456
2030	\$988,311	\$920,048
2031	\$993,252	\$913,684
2032	\$998,218	\$907,364
2033	\$1,003,210	\$901,088
2034	\$1,008,226	\$894,855
2035	\$1,013,267	\$888,665
2036	\$1,018,333	\$882,518
2037	\$1,023,425	\$876,414
2038	\$1,028,542	\$870,352
2039	\$1,033,685	\$864,331
2040	\$1,038,853	\$858,353
2041	\$1,044,047	\$852,416
2042	\$1,049,267	\$846,520
2043	\$1,054,514	\$840,664
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0

**Total = \$17,973,705**

**Traffic Safety Benefit-Cost Calculation**

Highway Safety Improvement Program (HSIP) Reactive Project

**A. Roadway Description**

Route	Robert St	District		County	Ramsey
Begin RP		End RP		Miles	
Location	between Kellogg Ave and 12th Ave				

**B. Project Description**

Proposed Work	Convert pedestal signals to mast arms		
Project Cost*	\$18,000,000	Installation Year	2024
Project Service Life	20 years	Traffic Growth Factor	0.5%

\* exclude Right of Way from Project Cost

**C. Crash Modification Factor**

0.59	Fatal (K) Crashes	Reference	CMF Clearinghouse
0.59	Serious Injury (A) Crashes		
0.59	Moderate Injury (B) Crashes	Crash Type	Rear End
0.59	Possible Injury (C) Crashes		
0.59	Property Damage Only Crashes		<a href="http://www.CMFclearinghouse.org">www.CMFclearinghouse.org</a>

**D. Crash Modification Factor (optional second CMF)**

	Fatal (K) Crashes	Reference	
	Serious Injury (A) Crashes		
	Moderate Injury (B) Crashes	Crash Type	
	Possible Injury (C) Crashes		
	Property Damage Only Crashes		<a href="http://www.CMFclearinghouse.org">www.CMFclearinghouse.org</a>

**E. Crash Data**

Begin Date	1/1/2016	End Date	12/31/2018	3 years
Data Source	MnDOT			

Crash Severity	Rear End	< optional 2nd CMF >
K crashes		
A crashes		
B crashes	1	
C crashes	2	
PDO crashes	18	

**F. Benefit-Cost Calculation**

\$1,654,382	Benefit (present value)	<b>B/C Ratio = 0.10</b>
\$18,000,000	Cost	

Proposed project expected to reduce 3 crashes annually, 0 of which involving fatality or serious injury.

## F. Analysis Assumptions

Crash Severity	Crash Cost
K crashes	\$1,360,000
A crashes	\$680,000
B crashes	\$210,000
C crashes	\$110,000
PDO crashes	\$12,000

Link: [mndot.gov/planning/program/appendix\\_a.html](http://mndot.gov/planning/program/appendix_a.html)

Real Discount Rate 1.2%  
 Traffic Growth Rate 0.5%  
 Project Service Life 20 years

## G. Annual Benefit

Crash Severity	Crash Reduction	Annual Reduction	Annual Benefit
K crashes	0.00	0.00	\$0
A crashes	0.00	0.00	\$0
B crashes	0.41	0.14	\$28,700
C crashes	0.82	0.27	\$30,067
PDO crashes	7.38	2.46	\$29,520

**\$88,287**

## H. Amortized Benefit

Year	Crash Benefits	Present Value
2024	\$88,287	\$88,287
2025	\$88,728	\$87,676
2026	\$89,172	\$87,070
2027	\$89,618	\$86,467
2028	\$90,066	\$85,869
2029	\$90,516	\$85,275
2030	\$90,969	\$84,685
2031	\$91,423	\$84,100
2032	\$91,881	\$83,518
2033	\$92,340	\$82,940
2034	\$92,802	\$82,367
2035	\$93,266	\$81,797
2036	\$93,732	\$81,231
2037	\$94,201	\$80,669
2038	\$94,672	\$80,111
2039	\$95,145	\$79,557
2040	\$95,621	\$79,007
2041	\$96,099	\$78,460
2042	\$96,579	\$77,917
2043	\$97,062	\$77,379
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0
0	\$0	\$0

**Total = \$1,654,382**

▼ Countermeasure: Convert signal from pedestal-mounted to mast arm

Compare		CMF	CRF(%)	Quality	Crash Type	Crash Severity	Area Type	Reference	Comments
<input type="checkbox"/>		0.51	49	★★★★	All	All		RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.71	29	★★★★	All	All		MCGEE ET AL., 2002	
<input type="checkbox"/>		0.56	44	★★★★	All	Fatal,Serious injury,Minor injury	All	RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.49	51	★★★★	All	Property damage only (PDO)	All	RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.59	41	★★★★	Rear end	All	All	RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.26	74	★★★★	Angle	All	All	RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.75	25	★★★★	All	All		MCGEE ET AL., 2002	
<input type="checkbox"/>		0.88	12	★★★★	Angle	All	All	RODEGERDTS ET AL., 2004	
<input type="checkbox"/>		0.37	63	★★★★	Angle	All		MCGEE ET AL., 2002	

Compare Reset Compare

\*NOTE: You can compare CMFs across countermeasures, subcategories, and categories.

## Robert Street and Kellogg Street (2016 - 2018)

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number Killed	Number of Officers	Narrative	Constructive	County	City	Township
1790299	325239	2/2/2016,	2016		7 Property D	0	1	Driver of P	M	RAMSEY	Saint Paul	
1808121	445254	4/14/2017,	2017		17 Minor Injur	0	2	Unit 2	M	RAMSEY	Saint Paul	
1811115	626385	8/8/2018,	2018		16 Property D	0	1	Unit #2	M	RAMSEY	Saint Paul	
1889363	647288	9/25/2018,	2018		12 Possible Inj	0	3	Unit 1 was	M	RAMSEY	Saint Paul	
1920266	337276	2/2/2016,	2016		7 Property D	0	1	On 02-02-	M	RAMSEY	Saint Paul	
1934280	492149	8/6/2017,	2017		21 Property D	0	2	On	M	RAMSEY	Saint Paul	
2045686	430581	3/20/2017,	2017		12 Unknown S	0	0	Hit and	M	RAMSEY	Saint Paul	
2109642	362482	7/7/2016,	2016		23 Property D	0	2	UNIT 1 TRAM	M	RAMSEY	Saint Paul	
2114498	648116	9/28/2018,	2018		16 Minor Injur	0	2	Unit 1 was	M	RAMSEY	Saint Paul	
2183833	415505	1/15/2017,	2017		18 Property D	0	2	UNIT 1 WA	M	RAMSEY	Saint Paul	
2287925	454634	5/22/2017,	2017		6 Property D	0	2	ROBERT/	M	Ramsey	Saint Paul	
2337449	322238	1/15/2016,	2016		15 Property D	0	2	driver unit	M	RAMSEY	Saint Paul	
2341583	596949	5/13/2018,	2018		14 Property D	0	2	ICC-	M	RAMSEY	Saint Paul	
2390154	363894	7/14/2016,	2016		17 Property D	0	2	Driver 1 wa	M	RAMSEY	Saint Paul	
2392302	397821	11/25/2016,	2016		10 Property D	0	2	Veh 1 was	M	RAMSEY	Saint Paul	
2393675	607346	6/21/2018,	2018		14 Property D	0	1	Driver was	M	RAMSEY	Saint Paul	
2393848	605933	6/21/2018,	2018		15 Possible Inj	0	1	Unit	M	RAMSEY	Saint Paul	
2425339	354106	6/4/2016,	2016		14 Property D	0	2	On	M	RAMSEY	Saint Paul	
2479760	413445	1/9/2017,	2017		16 Property D	0	1	Vehicle #1	M	RAMSEY	Saint Paul	
2507096	603448	6/11/2018,	2018		8 Possible Inj	0	2	V1 was	M	RAMSEY	Saint Paul	
2530686	398391	11/27/2016,	2016		21 Possible Inj	0	2	Statement	M	RAMSEY	Saint Paul	
2530810	390838	10/31/2016,	2016		21 Property D	0	2	Unit #2	M	RAMSEY	Saint Paul	
2577730	457937	6/7/2017,	2017		16 Minor Injur	0	1	Unit one	M	RAMSEY	Saint Paul	
2578670	318491	1/9/2016,	2016		21 Property D	0	2	On	M	RAMSEY	Saint Paul	
2581500	569453	2/26/2018,	2018		13 Property D	0	3	V1 was	M	RAMSEY	Saint Paul	
2584302	652015	10/15/2018,	2018		9 Property D	0	1	Driver	M	RAMSEY	Saint Paul	
2603578	495149	8/19/2017,	2017		17 Possible Inj	0	3	DRIVER	M	RAMSEY	Saint Paul	

Route Type	Route ID	Route Name	Mea	Roadway	N Divided	Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu
Non-numb	520000000	131.7128	4TH ST SE					Sideswipe -	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.257439	E KELLOGG	East				Angle	Motor Veh	On Roadw	Daylight	Unknown		
Non-numb	520000000	131.7084	N ROBERT	South				Front to Re	Motor Veh	On Roadw	Daylight	None		
Non-numb	520000000	131.7265	N ROBERT	Not Applicable				Angle	Motor Veh	On Roadw	Daylight	Unknown		
Non-numb	520000000	131.6913	4TH ST SE	South				Sideswipe -	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.272755	E KELLOGG	BLVD				Angle	Motor Veh	On Roadw	Dark (Stree	None		
Municipal	050002396	1.246836	E KELLOGG	Not Applicable					Parked Mo	Parking Lot	Daylight	None		
Municipal	050002396	1.253039	E KELLOGG	BLVD				Angle	Motor Veh	On Roadw	Dark (Stree	None		
Non-numb	520000000	131.7267	N ROBERT	ST				Angle	Motor Veh	On Roadw	Daylight	Unknown		
Municipal	050002396	1.222586	E KELLOGG	West				Front to Fr	Motor Veh	On Roadw	Dark (Stree	None		
Municipal	050002396	1.258145	E KELLOGG	West				Angle	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.256895	E KELLOGG	BLVD				Angle	Motor Veh	On Roadw	Daylight	None		
Non-numb	520000000	131.7274	N ROBERT	West				Angle	Motor Veh	On Roadw	Daylight	Unknown		
Municipal	050002396	1.275411	E KELLOGG	East				Front to Re	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.25558	E KELLOGG	BLVD				Angle	Motor Veh	On Roadw	Daylight	None		
Ramp or Cr	050002396	1.247442	E KELLOGG	Not Applicable					Other Traff	Parking Lot	Daylight	None		
Municipal	050002396	1.252467	E KELLOGG	BLVD					Pedestrian	On Roadw	Daylight	None		
Municipal	050002396	1.253331	E KELLOGG	BLVD				Angle	Motor Veh	On Roadw	Daylight	None		
Non-numb	520000000	131.7192	4TH ST SE	East				Angle	Motor Veh	On Roadw	Daylight	Road Surface Condition (wet, icy, s		
Non-numb	520000000	131.7184	N ROBERT	West				Front to Re	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.257669	E KELLOGG	BLVD				Front to Fr	Motor Veh	On Roadw	Dark (Stree	None		
Municipal	050002396	1.257966	E KELLOGG	Not Applic	4TH ST SE			Angle	Motor Veh	On Roadw	Dark (Stree	None		
Municipal	050002396	1.275902	E KELLOGG	North					Pedestrian	On Roadw	Daylight	None		
Municipal	050002396	1.27821	E KELLOGG	Not Applicable				Angle	Motor Veh	On Roadw	Dark (Stree	None		
Municipal	050002396	1.254457	E KELLOGG	North				Angle	Motor Veh	On Roadw	Daylight	None		
Non-numb	520000000	131.7248	N ROBERT	North		E KELLOGG		Angle	Motor Veh	On Roadw	Daylight	None		
Municipal	050002396	1.255285	E KELLOGG	West				Angle	Motor Veh	On Roadw	Daylight	None		

road_circu	Relative Int Traffic Con	Weather Pi	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehi	Unit1 Direc
	Four-Way I Traffic Con	Cloudy	Other	Dry	2		NOT APPLICABLE		Hit-And-Run Vehicle o	Southbound	
	Four-Way I Traffic Con	Rain	Cloudy	Wet	2		NOT APPLICABLE		Motor Veh Sport Utilit	Eastbound	
	Four-Way I Yield Sign	Clear		Dry	2		NOT APPLICABLE		Hit-And-Ru Passenger	Southbound	
	Four-Way I Traffic Con	Cloudy		Wet	2		NOT APPLICABLE		Motor Veh Sport Utilit	Westbound	
	Four-Way I Traffic Con	Cloudy		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Southbound	
	Four-Way I Traffic Con	Cloudy		Wet	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	
	Not at Inte No Control	Clear		Dry	2		NOT APPLICABLE		Hit-And-Ru Pickup	Unknown	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Northbound	
	Four-Way I Unknown	Clear		Wet	2		NOT APPLICABLE		Motor Veh Passenger	Southbound	
	Intersection Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Medium / I	Northbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Pickup	Westbound	
	Intersection Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	
	Intersection Traffic Con	Cloudy	Other	Dry	2		NOT APPLICABLE		Motor Veh Transit Bus	Eastbound	
	Four-Way I Traffic Con	Cloudy		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	
	Not at Inte Not Applic	Unknown		Dry	1	Activity Arc	Other	Unknown	Motor Veh Sport Utilit	Unknown	
	Four-Way I Traffic Con	Cloudy		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Eastbound	
snow, slush,	Intersection Unknown	Snow		Snow	2		NOT APPLICABLE		Hit-And-Ru Passenger	Southbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Sport Utilit	Southbound	
	Intersection Traffic Con	Rain		Wet	2		NOT APPLICABLE		Motor Veh Transit Bus	Northbound	
	Four-Way I Traffic Con	Clear		Wet	2		NOT APPLICABLE		Motor Veh Sport Utilit	Westbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Sport Utilit	Northbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Southbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Northbound	
	Four-Way I Traffic Con	Clear	Unknown	Dry	2		NOT APPLICABLE		Motor Veh Passenger	Northbound	
	Four-Way I Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh Passenger	Westbound	

Unit1 Factc	Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traffi	Unit1 Poste	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex
d		Parked or E	Two-Way, Not	Divided	Straight	Level						
Disregard C	Failure to Y	Motor Veh	Turning Lef	Two-Way, l	30	Straight	Level		Suspected	Apparently	55	Male
d		Motor Veh	Entering Tr	Two-Way, l	30	Straight	Level					
Ran Red Light		Motor Veh	Moving For	Two-Way, l	30	Straight	Downhill		No Appare	Apparently	45	Female
No Clear Contributing		Motor Veh	Moving For	Other	30	Straight	Level		No Appare	Apparently	40	Female
Ran Red Li	g Operated	Motor Veh	Moving For	Two-Way, l	35	Straight	Level		No Appare	Apparently	24	Male
		Parked Mo	Backing	Other	10	Straight	Level					
Ran Red Light		Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	32	Female
Failure to Yield Right-o		Motor Veh	Turning Lef	Other	35	Straight	Level		Suspected	Apparently	22	Male
No Clear Contributing		Motor Veh	Moving For	Two-Way, l	20	Straight	Level		No Appare	Apparently	79	Female
No Clear Contributing		Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	59	Male
Ran Red Light		Motor Veh	Moving For	Two-Way, Divided, Me	Straight	Level			No Appare	Apparently	28	Male
Ran Red Light		Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Unknown	35	Male
Unknown		Moving For	One Way T		30	Straight	Level		No Appare	Apparently	57	Male
Disregard Other Traffic		Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	31	Female
No Clear Contributing		Concrete T	Backing	Unknown	10	Straight	Level		No Appare	Apparently	58	Male
Unknown		Pedestrian	Turning Lef	Two-Way, Divided, Un	Straight	Level			No Appare	Apparently	26	Female
Failure to Yield Right-o		Motor Veh	Turning Lef	Two-Way, l	30	Straight	Level		No Appare	Apparently	19	Female
d		Motor Veh	Turning Lef	Two-Way, Not Divided	Curve Left	Level						
No Clear Contributing Action		Moving For	Two-Way, l		30	Straight	Level		No Appare	Apparently	52	Female
No Clear Contributing		Motor Veh	Moving For	Two-Way, l	30	Straight	Level		Possible Inj	Apparently	47	Male
Ran Red Li	g No Clear C	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	23	Female
No Clear Contributing		Pedestrian	Turning Rig	Two-Way, l	30	Straight	Level		No Appare	Apparently	30	Female
Ran Red Li	g No Clear C	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	48	Male
Ran Red Li	g No Clear Contributing		Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	51	Male
Unknown		Motor Veh	Turning Lef	Two-Way, l	30	Straight	Level		No Appare	Apparently	55	Male
Disregard C	Driver Dist	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	17	Male



Unit2 Type	Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type
Motor Veh Passenger	' Southboun	Unknown		Motor Veh	Moving Forward			No Appare	Apparently	40	Female	
Motor Veh Sport Utilit	Westboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	16	Male	
Motor Veh Sport Utilit	Southboun	No Clear Contributing	Action		Moving Forward			No Appare	Apparently	32	Female	
Motor Veh Passenger	' Northboun	Unknown		Motor Veh	Moving Forward			No Appare	Apparently	57	Male	Motor Veh
Hit-And-Run Vehicle	o Southbound			Motor Veh	Moving Forward							
Motor Veh Motorcycle	Northboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	50	Male	
Parked/Sta Passenger	' Unknown			Parked Mo	Parked or Entering or Leaving a Parked Position							
Motor Veh Passenger	' Southboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	29	Female	
Motor Veh Sport Utilit	Southboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	60	Female	
Motor Veh Passenger	' Westboun	Operated	Motor Vehic	Motor Veh	Moving Forward			No Appare	Apparently	27	Male	
Motor Veh Passenger	' Westboun	Failure to Yield Right-o	Motor Veh	Motor Veh	Moving Forward			No Appare	Apparently	26	Female	
Motor Veh Passenger	' Northboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	35	Male	
Motor Veh Passenger	' Northboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	57	Female	
Motor Veh Passenger	' Eastbound	No Clear Contributing	Action		Turning Right			No Appare	Apparently	31	Male	
Motor Veh Passenger	' Northboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	23	Female	
Pedestrian		No Improper Action			Walk/Cycle	Possible Injury (C)				58	Female	
Motor Veh Passenger	' Westboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	23	Female	
Motor Veh Sport Utilit	Eastbound	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Unknown	41	Male	
Motor Veh Passenger	' Westboun	Failure to Yield Right-of-Way			Turning Left	Possible Inj	Apparently			70	Female	
Motor Veh Passenger	' Westboun	Ran Red Light		Motor Veh	Moving Forward	Possible Inj	Apparently			23	Female	
Motor Veh Passenger	' Northboun	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	22	Male	
Pedestrian		Unknown			Walk/Cycle	Suspected	Apparently			67	Female	
Motor Veh Passenger	' Eastbound	No Clear Contributing		Motor Veh	Moving Forward			No Appare	Apparently	46	Female	
Motor Veh Sport Utilit	Northboun	No Clear Contributing	Action		Moving Forward			No Appare	Apparently	56	Female	Motor Veh
Hit-And-Ru	Medium / I Northbound				Turning Left							
Motor Veh Sport Utilit	Northboun	No Clear Contributing		Motor Veh	Moving Forward	Possible Inj	Apparently			61	Male	Motor Veh

Unit3 Vehic Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic

Pickup Southboun Unknown Motor Veh Moving Forward No Appare|Apparently 65 Male

Passenger | Northboun No Clear Contributing Action Vehicle Stopped or Sta No Appare|Apparently 30 Male

Passenger | Southboun No Clear Contributing , Motor Veh Vehicle Stopped or Sta No Appare|Apparently 43 Female

Unit4 Direc Unit4 Factc Unit4 Factc Unit4 Most Unit4 Vehic Unit4 Nonr Unit4 Injur Unit4 Physi Unit4 Age Unit4 Sex interchang otst\_inters city\_section

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utm <sub>x</sub>	utm <sub>y</sub>	x	y
492959.8	4976919	492959.8	4976919
492952.3	4976941	492952.3	4976941
492965	4976914	492965	4976914
492948.1	4976938	492948.1	4976938
492978.7	4976890	492978.7	4976890
492960.6	4976913	492960.6	4976913
492937.5	4976931	492937.5	4976931
492946.7	4976936	492946.7	4976936
492947.5	4976938	492947.5	4976938
492905.9	4976908	492905.9	4976908
492955.7	4976935	492955.7	4976935
492953.5	4976936	492953.5	4976936
492950.2	4976941	492950.2	4976941
492963.4	4976917	492963.4	4976917
492950.7	4976937	492950.7	4976937
492933.2	4976939	492933.2	4976939
492947	4976933	492947	4976933
492952.3	4976928	492952.3	4976928
492958.1	4976930	492958.1	4976930
492957.6	4976928	492957.6	4976928
492954.4	4976937	492954.4	4976937
492963.5	4976915	492963.5	4976915
492965	4976917	492965	4976917
492956.8	4976926	492956.8	4976926
492949.1	4976936	492949.1	4976936
492949.6	4976935	492949.6	4976935
492950.2	4976937	492950.2	4976937

Roberts Street and 4th Street 2016-2018

objectid	Incident ID	Date and Time	Year	Hour	Crash Seve	Number Kil	Number of Officer Nar	Constructic	County	City	Township
2109491	352684	5/30/2016,	2016		4 Property D	0	0 On	M	RAMSEY	Saint Paul	
2455454	620038	7/11/2018,	2018		8 Property D	0	2 Veh 1 and	M	RAMSEY	Saint Paul	

Route Type	Route ID	Route Name	Mea	Roadway	N Divided	Roadway	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu
Local (or Ci	100002396	0.068594	E 4TH ST					Other - Fixe	On Roadw	Dark (Stree	None			
Non-numb	520000000	131.8014	N ROBERT	North				Sideswipe - Motor Veh	On Roadw	Daylight	None			

road_circu	Relative Int	Traffic Con	Weather Pi	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1	Type	Unit1	Vehic	Unit1	Direc
	Four-Way I	Traffic Con	Clear	Other	Dry	2		NOT APPLICABLE		Hit-And-Ru	Passenger				Northboun
	Not at Inte	Not Applic	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger				Northboun

Unit1 Factc	Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traffi	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex
Operated	No Clear C	Other - Fixe	Moving For	Two-Way, Not	Divided	Straight	Level		No Appare	Apparently	15	Male
No Clear Contributing	Motor Veh	Vehicle Sto	Two-Way, I	30	Straight	Level		No Appare	Apparently	45	Female	



Unit2 Type	Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type
Motor Veh	Sport Utilit	Northboun	Failed to Keep in Prop	Motor Veh	Moving Forward		No Appare	Apparently		44	Female	

Unit3 Vehic Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic

[illegible]

utm_x	utm_y	x	y
492890.3	4977031	492890.3	4977031
492881.1	4977038	492881.1	4977038

## Robert St @ 5th

objectid	Incident ID	Date and T	Year	Hour	Crash Seve	Number Kil	Number of
1868732	394129	11/12/2016		2016	14 Property D	0	1
2361224	418454	1/25/2017,		2017	16 Possible Inj	0	1
2413880	590406	4/12/2018,		2018	16 Possible Inj	0	1

## 5th St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
Metro transit train was westbound on 4th St E, while in the intersection of Robert St N, a gra	M	RAMSEY	Saint Paul		Non-numb
Driver was going eastbound on 5th St. driver turned right onto Robert St from 5th ST and str	M	RAMSEY	Saint Paul		Non-numb
Unit 1 was traveling eastbound on 5th street turning left (northbound) onto Robert street wit	M	RAMSEY	Saint Paul		Non-numb

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
520000000	131.86	4TH ST SE	West	E 5TH ST		Train - LRT	On Roadw	Daylight	None			
520000000	131.86	4TH ST SE	South			Pedestrian	On Roadw	Dark (Stree	None			
520000000	131.86	N ROBERT	North			Pedestrian	On Roadw	Daylight	None			

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direc	Unit1 Factc
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Ran Red Lig
Four-Way I	Traffic Con	Clear	Other	Wet	2		NOT APPLICABLE		Motor Veh	Pickup	Southbound	Failure to Y
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northbound	Failure to Y



Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
ght	Moving For	Two-Way, l	30 Straight	Level	No Appare	Apparently	41 Male					
ield Right-o	Motor Veh	Moving For	Two-Way, l	15 Straight	Level	No Appare	Apparently	47 Male				Pedestrian
ield Right-o	Pedestrian	Turning Lef	Two-Way, l	30 Straight	Level	No Appare	Apparently	31 Male				Pedestrian

Unit2 Vehir Unit2 Direc Unit2 Factc Unit2 Factc Unit2 Most Unit2 Vehir Unit2 Nonr Unit2 Injur Unit2 Physi Unit2 Age Unit2 Sex Unit3 Type Unit3 Vehir

Unknown

No Improper Action

Walk/Cycle Possible Inj Apparently

Walk/Cycle Possible Inj Apparently

18 Female

55 Female

Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic Unit4 Direc

Unit4 Factc	Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx
												492829.1
												492833.8
										5TH ST AND ROBERT S		492827.4

utm_y	interchange	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid	
4977118				44.95	-93.09		52	-1E+07	5613255	102100
4977110				44.95	-93.09		52	-1E+07	5613244	102100
4977118		{4055D101-4F6B-4A4E		44.95	-93.09		52	-1E+07	5613255	102100

## Robert St @ 6th

objectid	Incident ID	Date and T	Year	Hour	Crash Seve	Number Kil	Number of
1783156	352308	5/27/2016,	2016	22	Possible Inj	0	2
1888559	492350	8/7/2017, ,	2017	16	Property D	0	1
1927367	447509	4/25/2017,	2017	10	Property D	0	1
1973688	623542	7/23/2018,	2018	9	Property D	0	2
2019841	433161	3/18/2017,	2017	5	Property D	0	1
2023558	535373	1/12/2018,	2018	16	Property D	0	0
2073390	341822	4/12/2016,	2016	12	Property D	0	4
2074390	504152	9/12/2017,	2017	21	Property D	0	2
2095001	321537	1/19/2016,	2016	15	Property D	0	2
2107264	447488	4/25/2017,	2017	11	Property D	0	0
2109984	503762	9/25/2017,	2017	7	Property D	0	1
2184654	445595	4/16/2017,	2017	16	Minor Injur	0	2
2211739	338737	3/28/2016,	2016	16	Property D	0	2
2263591	347778	5/9/2016, ,	2016	9	Property D	0	2
2366412	386569	10/14/201,	2016	12	Property D	0	2
2414089	387749	10/17/201,	2016	11	Property D	0	2

## St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
UNIT 1 WAS TRAVELING NB ROBERT APPROACHING 6TH ST. UNIT 2 WAS TRAVELING WB 6TH M		RAMSEY	Saint Paul		Non-numb
V1 which is passenger vehicle was going westbound on 6th Street and turning right on Minne M		RAMSEY	Saint Paul		Municipal S
Unit 1 said he was going Northbound on Robert St N at 5th St E. Unit 1 said he was on the left M		RAMSEY	Saint Paul		Municipal S
Vehicle #01 was E/B 6th St approaching Robert St. in the middle lane while vehicle # 02 was e M		RAMSEY	Saint Paul		Non-numb
NB ROBERT AT 6TH. DRIVER HAD FALLEN ASLEEP OR PASSED OUT, ROLLED INTO CURB, CONC M		Ramsey	Saint Paul		Municipal S
UNIT 2 WAS PARKED IN A CUT OUT FOR WAITING VEHICLES WHEN UNIT 1 DROVE BY HITTING M		RAMSEY	Saint Paul		Non-numb
Veh 1 was NB Robert St N crossing 6th St EVeh 2 was WB 6th St E crossing Robert St NVeh 3 w M		RAMSEY	Saint Paul		Municipal S
BOTH UNITS TRAVELING WB SIXTH ST AT ROBERT ST.-UNIT 1 WAS IN THE #3 LANE AND UNIT 2 M		Ramsey	Saint Paul		Municipal S
Veh 1 MN LIC 234-JMK driven by Ms. Moreland, Seonna rear-ended veh 1 MN LIC 505 TBB w/ M		RAMSEY	Saint Paul		Non-numb
NO ICC AVAILABLE.On 4/25/2017, at 1140 hours, I (OFF. YAUNG - SQUAD 246) was sent to the M		RAMSEY	Saint Paul		Municipal S
Sqd 203 (Sgt. Parsons) went to 401 N. Robert along with Squad 521 (Mackintosh) on a motor M		RAMSEY	Saint Paul		Non-numb
Vehicle #1 was a police vehicle going south on Robert Street approaching 6th Street. Police v M		RAMSEY	Saint Paul		Municipal S
Unit 2 in right lane was at bus stop. Unit 2 in middle lane passed Unit 1 on drivers side. Unit M		RAMSEY	Saint Paul		Municipal S
Veh 1 was WB on 6th St, Veh 2 was SB on Robert St stopped at a red light.Driver of Veh 1 said M		RAMSEY	Saint Paul		Municipal S
On 10/14/2016 at 1245 hrs, I, squad 532 (Redmond) was dispatched to a property damage ac M		RAMSEY	Saint Paul		Non-numb
Veh 1 was NB Robert St N crossing 6th St E.Veh 2 was WB 6th St E crossing Robert St N.Driver M		RAMSEY	Saint Paul		Municipal S

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
520000000	131.93	4TH ST SE	Not Applicable		Angle	Motor Veh On Roadw	Dark (Stree	None				
050002396	0.45	E 6TH ST			Sideswipe	Motor Veh On Roadw	Daylight	None				
050002396	0.46	E 6TH ST	North		Other	Motor Veh On Roadw	Daylight	None				
520000000	131.92	N ROBERT	Not Applicable		Angle	Motor Veh On Roadw	Daylight	None				
050002396	0.47	E 6TH ST	North			Curb On Roadsic	Dark (Stree	None				
520000000	131.94	4TH ST SE	South		Sideswipe	Motor Veh On Roadw	Sunset	Unknown				
050002396	0.47	E 6TH ST	Not Applicable		Angle	Motor Veh On Roadw	Daylight	None				
050002396	0.46	E 6TH ST	West		Angle	Motor Veh On Roadw	Dark (Stree	None				
520000000	131.93	4TH ST SE	South		Front to Re	Motor Veh On Roadw	Daylight	None				
050002396	0.47	E 6TH ST			Front to Re	Motor Veh In Parking I	Daylight	None				
520000000	131.93	4TH ST SE	South		Front to Re	Motor Veh In Parking I	Sunrise	None				
050002396	0.47	E 6TH ST	South		Angle	Motor Veh On Roadw	Daylight	None				
050002396	0.47	E 6TH ST			Sideswipe	Motor Veh On Roadw	Daylight	None				
050002396	0.47	E 6TH ST	West		Angle	Motor Veh On Roadw	Daylight	None				
520000000	131.91	4TH ST SE			Angle	Motor Veh On Roadw	Daylight	None				
050002396	0.46	E 6TH ST	Not Applicable		Angle	Motor Veh On Roadw	Daylight	None				



Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direc	Unit1 Fact
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northboun	Unknown
Intersection	Traffic Con	Clear	Other	Dry	2		NOT APPLICABLE		Motor Veh	Transit Bus	Westbound	Failed to Ke
Four-Way I	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northboun	No Clear Cc
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Southboun	Failure to Y
Not at Inte	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Northboun	Operated N
Not at Inte	Not Applic	Clear		Wet	2		NOT APPLICABLE		Hit-And-Ru	Pickup	Southbound	
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Northboun	Disregard C
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Improper T
Four-Way I	Traffic Con	Cloudy		Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Southboun	Following T
Not at Inte	Not Applic	Cloudy		Dry	2		NOT APPLICABLE		Hit-And-Ru	Passenger	Eastbound	
Other	Not Applic	Rain		Wet	2		NOT APPLICABLE		Motor Veh	Pickup	Northboun	Improper B
Intersection	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Southboun	No Clear Cc
Not at Inte	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Transit Bus	Westbound	No Clear Cc
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Disregard C
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northboun	Failure to Y
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northboun	No Clear Cc

Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
Step in Prop	Motor Veh Moving For	Two-Way, I	30	Straight	Level			No Appare	Apparently	17	Female	Motor Veh
Contributing	Cross Medi Moving For	One Way Trafficway	30	Straight	Level			No Appare	Apparently	31	Male	Parked/Sta
No Clear Cr	Motor Veh Moving For	Two-Way, I	30	Straight	Level			No Appare	Apparently	17	Male	Hit-And-Ru
Motor Vehic Curb	Motor Veh Turning Lef	One Way Trafficway	30	Straight	Level			No Appare	Apparently	18	Male	Motor Veh
	Moving For	Two-Way, I	35	Straight	Level			No Appare	Has Been C	36	Female	
	Motor Veh Moving For	Two-Way, I	30	Straight	Level							Parked/Sta
Other Traffic	Motor Veh Moving For	Two-Way, I	30	Straight	Level			No Appare	Apparently	47	Male	Motor Veh
Failed to Ke	Motor Veh Turning Lef	One Way T	30	Straight	Level			No Appare	Apparently	58	Female	Motor Veh
Too Closely	Motor Veh Moving For	Two-Way, I	30	Straight	Level			No Appare	Apparently	21	Female	Motor Veh
	Parked Mo Backing	One Way T	30	Straight	Level							Parked/Sta
Backing	Motor Veh Backing	Two-Way, I	30	Straight	Level			No Appare	Apparently	61	Male	Parked/Sta
Contributing	Motor Veh Moving For	Two-Way, I	30	Straight	Level			Suspected	Apparently	30	Male	Motor Veh
Contributing	Motor Veh Moving For	One Way T	35	Straight	Level			No Appare	Apparently	58	Male	Motor Veh
Other Traffic	Motor Veh Moving For	One Way T	30	Straight	Level			No Appare	Apparently	24	Male	Motor Veh
Field Right-o	Motor Veh Turning Lef	Two-Way, I	30	Straight	Level			No Appare	Apparently	34	Male	Motor Veh
Contributing	Motor Veh Moving For	Two-Way, I	30	Straight	Level			No Appare	Apparently	33	Male	Motor Veh

Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic
Passenger	Westbound	Unknown		Motor Veh	Moving Forward		No Appare	Apparently	27	Male		
Passenger	Westbound	Improper Turn/Merge		Ran Off Ro	Turning Right		No Appare	Apparently	34	Male		
Passenger	Northbound	Unknown		Motor Veh	Moving Forward				0			
Passenger	Southbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	78	Male		
Pickup	Southbound	No Clear Contributing		Motor Veh	Parked or Entering or L		No Appare	Apparently	42	Male		
Sport Utilit	Westbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	59	Male	Motor Veh	Passenger
Motorcoac	Westbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	51	Female		
Passenger	Southbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	45	Female		
Passenger	Eastbound	No Clear Contributing		Motor Veh	Parked or Entering or L		No Appare	Apparently	65	Male		
Passenger	Southbound			Motor Veh	Parked or Entering or Leaving a Parked Position							
Passenger	Westbound	Other Contributing Act		Motor Veh	Moving Forward		Suspected	Unknown	16	Female		
Transit Bus	Westbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	63	Male		
Other Light	Southbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	31	Male		
Passenger	Southbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	21	Female		
Passenger	Westbound	No Clear Contributing		Motor Veh	Moving Forward		No Appare	Apparently	42	Male		

Unit3 Direc	Unit3 Factc	Unit3 Factc	Unit3 Most	Unit3 Vehic	Unit3 Nonr	Unit3 Injur	Unit3 Physi	Unit3 Age	Unit3 Sex	Unit4 Type	Unit4 Vehic	Unit4 Direc
-------------	-------------	-------------	------------	-------------	------------	-------------	-------------	-----------	-----------	------------	-------------	-------------

Southboun	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta	No Appare	Apparently		60	Female	Motor Veh	Pickup	Southboun
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Unit4 Factc	Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx
												492768.2
												492749.1
											6TH ST AND ROBERT S	492755.2
											6TH ST AND ROBERT S	492768.1
											6TH ST AND ROBERT S	492769.5
											6TH ST AND ROBERT S	492756.5
No Clear Contributing	Motor Veh	Vehicle Stopped or Sta	No Appare	Apparently			60	Male			6TH ST AND ROBERT S	492768.7
											6TH ST AND ROBERT S	492761
												492768.3
											6TH ST AND ROBERT S	492776.3
												492756.5
											6TH ST AND ROBERT S	492769.2
											6TH ST AND ROBERT S	492778.7
											6TH ST AND ROBERT S	492768.4
												492781.4
											6TH ST AND ROBERT S	492768.1

utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid
4977204				44.95	-93.09		52	-1E+07 5613377	102100
4977186				44.95	-93.09		5	-1E+07 5613352	102100
4977195		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613364	102100
4977199		{7445D15D-06C6-4496		44.95	-93.09		52	-1E+07 5613370	102100
4977204		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613377	102100
4977218		{7445D15D-06C6-4496		44.95	-93.09		52	-1E+07 5613397	102100
4977203		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613376	102100
4977200		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613371	102100
4977205				44.95	-93.09		52	-1E+07 5613379	102100
4977208		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613382	102100
4977211				44.95	-93.09		52	-1E+07 5613387	102100
4977204		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613378	102100
4977209		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613384	102100
4977204		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613376	102100
4977183				44.95	-93.09		52	-1E+07 5613348	102100
4977203		{7445D15D-06C6-4496		44.95	-93.09		5	-1E+07 5613376	102100

## Robert St @ 7th P

objectid	Incident ID	Date and T	Year	Hour	Crash Seve	Number	Kil	Number of
1824309	649905	10/6/2018,	2018	17	Unknown S	0	0	0
2289311	334358	3/8/2016, :	2016	10	Property D	0	1	1
2367651	490981	7/26/2017,	2017	16	Unknown S	0	0	0

Place (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
Unit 2 was parked legally in a parking space. Unknown vehicle struck Unit 2 causing minor dai	M	RAMSEY	Saint Paul		Local (or Ci
Unit 2 legally parked in loading zone not occupied. Unit 1 backed into front of unit 2. Unit sus	M	RAMSEY	Saint Paul		Local (or Ci
VEHICLE 1 WAS A LEGALLY PARKED UNMARKED STATE PATROL SQUAD THAT WAS UNOCCUP	M	Ramsey	Saint Paul		Non-Traffic



Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
100002396	0.07	E 7TH PL				Parked Mo	Parking Lot	Sunset	None			
100002396	0.07	E 7TH PL	East			Parked Mo	On Roadwa	Daylight	None			
way		E 7TH PL	Not Applicable			Parked Mo	Parking Lot	Daylight	None			

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehi	Unit1 Direc	Unit1 Factc
Other		Cloudy		Dry	2		NOT APPLICABLE		Hit-And-Ru Pickup		Unknown	
Not at Inte	No Control	Clear		Dry	2		NOT APPLICABLE		Motor Veh Other		Westbound	Unknown
Other	No Control	Clear		Dry	2		NOT APPLICABLE		Parked/Sta Passenger		Not on Roadway	

Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
Motor Veh	Unknown	Other										Parked/Sta
	Backing	One Way T		30	Straight	Level		No Appare	Apparently	32	Male	Parked/Sta
Motor Veh	Parked or E	One Way T		10	Straight	Level						Hit-And-Ru

Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic
Passenger	Unknown			Parked Mo	Parked or Entering or Leaving a	Parked Position						
Sport Utilit	Westbound				Vehicle Stopped or Stalled in Roadway							
Passenger	Not on Roadway			Parked Mo	Unknown							

Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic Unit4 Direc

Unit4 Factc Unit4 Factc Unit4 Most Unit4 Vehic Unit4 Nonr Unit4 Injur Unit4 Physi Unit4 Age Unit4 Sex interchangiotst\_inters city\_sectionutmx

7TH PL AND ROBERT S' 492702.5

7TH PL AND ROBERT S' 492714.3

492710.2

utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid
4977297			{0B1DA084-B1E9-44C4	44.95	-93.09		10	-1E+07 5613508	102100
4977303			{0B1DA084-B1E9-44C4	44.95	-93.09		10	-1E+07 5613517	102100
4977314				44.95	-93.09		25	-1E+07 5613533	102100

## Robert St @ 7th

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number Killed	Number of Injuries
1816953	433330	4/4/2017	2017	20	Property Damage	0	1
1837344	636349	9/20/2018	2018	19	Property Damage	0	1
1868011	320240	1/14/2016	2016	17	Minor Injury	0	1
1959403	369549	8/6/2016	2016	21	Property Damage	0	2
1960363	534508	1/11/2018	2018	1	Property Damage	0	1
2072922	332683	3/1/2016	2016	8	Property Damage	0	2
2108430	323522	1/26/2016	2016	8	Property Damage	0	1
2108579	327054	2/6/2016	2016	23	Property Damage	0	2
2113302	635618	9/16/2018	2018	14	Minor Injury	0	1
2163000	371977	8/16/2016	2016	17	Property Damage	0	2
2212730	373582	8/23/2016	2016	8	Property Damage	0	3
2215457	495070	8/19/2017	2017	10	Property Damage	0	1
2264065	351953	5/25/2016	2016	20	Property Damage	0	2
2369296	663702	11/28/2018	2018	17	Property Damage	0	2
2414111	386694	10/14/2016	2016	21	Possible Injury	0	2
2424501	326874	2/6/2016	2016	9	Property Damage	0	2
2577698	433092	4/3/2017	2017	15	Unknown Severity	0	0



## St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
DRIVER OF #2 SAID WHILE STOPPED FOR RED LIGHT EB ON 7TH STREET, WAITING TO TURN N		RAMSEY	Saint Paul		State Trunk
Unit 2 was stopped at the red light on 7th waiting to cross Robert westbound. unit 1 struck ur M		RAMSEY	Saint Paul		State Trunk
Unit 1 was traveling southbound on Robert Street to go east on 7th. Unit 1 had a green light. M		RAMSEY	Saint Paul		Non-numb
Driver of Unit 2 stated she was Westbound on E. 7th St. with a green light, when Unit 1 enter M		RAMSEY	Saint Paul		State Trunk
Unit 1 was traveling eastbound west 7th, when its brakes went out and struck unit 2 heading M		RAMSEY	Saint Paul		State Trunk
It should be noted this accident took place at the intersection of 9th/Robert. The mapping to M		RAMSEY	Saint Paul		Non-numb
Driver of vehicle #2 told me she was driving W/B on E.7th street just entering the intersection M		RAMSEY	Saint Paul		State Trunk
Unit 1 was traveling west on 7th St.Unit 2 & 3, were stopped at the light on 7th & Robert St.U M		RAMSEY	Saint Paul		State Trunk
I, Officer T. Holte -sqd 522, was sent to the intersection of 7th St / Robert St for an accident w M		RAMSEY	Saint Paul		State Trunk
DRIVER OF #1 SAID WHILE WESTBOUND IN #1 LANE ON 7TH APPROACHING ROBERT HE FAILE M		RAMSEY	Saint Paul		State Trunk
Veh 2 and 3 were both stopped at a red light WB E 7th St at Robert St N in the center lane. Ve M		RAMSEY	Saint Paul		State Trunk
UNIT 2 WAS STOPPED ON 7TH ST E AT ROBERT ST N AT A RED LIGHT.UNIT 1 WAS TRAVELLING M		RAMSEY	Saint Paul		Non-numb
On 5/25/2016 at 2002 hrs, I, squad 532(Redmond) was dispatched to a property damage acci M		RAMSEY	Saint Paul		State Trunk
No ICC Available in Squad 1092. BWC Available Ofc. Redmond and ChristensenOn 11/28/2018 M		RAMSEY	Saint Paul		State Trunk
On 10/14/2016, at approx. 2159 hours, Unit 1, whom was a suspect in a violation of DANCO, M		RAMSEY	Saint Paul		State Trunk
Veh 1, traveling N/B Robert at 7th, attempted to change lanes after light turned green, strikir M		RAMSEY	Saint Paul		State Trunk
Hit and Run Property Damage Accident/No injuries/Moderate Damage. Squad 538 was dispa M		RAMSEY	Saint Paul		State Trunk

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
030000000	70.22	E 7TH ST	East		Front to Re	Motor Veh On Roadw	Dark (Stree	None				
030000000	70.32	E 7TH ST	West		Sideswipe -	Motor Veh On Roadw	Dark (Stree	None				
520000000	132.05	4TH ST SE	Not Applic	E 7TH ST		Pedestrian On Roadw	Dark (Stree	None				
030000000	70.22	E 7TH ST			Angle	Motor Veh On Roadw	Dark (Stree	None				
030000000	70.21	E 7TH ST	South		Front to Fr	Motor Veh On Roadw	Dark (Stree	None				
520000000	132.06	4TH ST SE			Angle	Motor Veh On Roadw	Daylight	None				
030000000	70.21	E 7TH ST	East		Other	Motor Veh On Roadw	Daylight	Road Surface Condition	Other			
030000000	70.21	E 7TH ST	Not Applicable		Front to Re	Motor Veh On Roadsic	Dark (Stree	None				
030000000	70.32	E 7TH ST	Not Applicable			Pedalcycle On Roadw	Daylight	None				
030000000	70.23	E 7TH ST	West		Front to Re	Motor Veh On Roadw	Daylight	Road Surface Condition (wet, icy, snow, slush,				
030000000	70.22	E 7TH ST	Not Applicable		Front to Re	Motor Veh On Roadw	Daylight	None				
520000000	132.05	4TH ST SE	West		Front to Re	Motor Veh On Roadw	Daylight	None				
030000000	70.21	E 7TH ST			Angle	Motor Veh On Roadw	Daylight	None				
030000000	70.32	E 7TH ST		N ROBERT	Front to Re	Motor Veh On Roadw	Dark (Stree	Unknown				
030000000	70.22	E 7TH ST	Not Applicable		Other	Motor Veh On Roadw	Dark (Stree	None				
030000000	70.22	E 7TH ST	North		Sideswipe -	Motor Veh On Roadw	Daylight	None				
030000000	70.21	E 7TH ST	Not Applicable			Parked Mo In Parking I	Daylight	None				

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1	Type	Unit1	Vehic	Unit1	Direc	Unit1	Factc
Intersection	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Hit-And-Ru	Sport Utilit	Eastbound					
Four-Way I	Traffic Con: Rain			Dry	2		NOT APPLICABLE		Hit-And-Ru	Passenger	Westbound					
Four-Way I	Traffic Con: Cloudy			Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Southbound	Unknown				
Other	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh	Pickup	Northbound	Ran Red Lig				
Intersection	Traffic Con: Rain			Wet	2		NOT APPLICABLE		Hit-And-Ru	Passenger	Eastbound					
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Disregard C				
Intersection	Traffic Con: Snow	Blowing Sa		Snow	2		NOT APPLICABLE		Hit-And-Ru	Passenger	Eastbound					
Four-Way I	Traffic Con: Clear			Snow	2		NOT APPLICABLE		Hit-And-Run	Vehicle o	Eastbound					
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh	Sport Utilit	Southbound	No Clear Cc				
Four-Way I	Traffic Con: Cloudy	Rain		Wet	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Following T				
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Westbound	Driver Distr				
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Hit-And-Ru	Passenger	Westbound					
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northbound	Ran Red Lig				
Four-Way I	Traffic Con: Snow			Snow	2		NOT APPLICABLE		Motor Veh	Passenger	Eastbound	Following T				
Four-Way I	Traffic Con: Cloudy	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger	Northbound	Operated N				
Four-Way I	Traffic Con: Clear			Wet	2		NOT APPLICABLE		Motor Veh	Cargo Van	Northbound	Failure to Y				
Intersection	Traffic Con: Cloudy			Dry	1	After the E	Other	No	Hit-And-Run	Vehicle o	Southbound					

Unit1 Facto	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
	Motor Veh	Unknown	Two-Way, l	30	Straight	Level						Motor Veh
	Motor Veh	Unknown	Two-Way, l	30	Straight	Level						Motor Veh
	Pedestrian	Turning Lef	Two-Way, l	30	Straight	Level		No Appare	Apparently	50	Male	Pedestrian
ght	Motor Veh	Moving For	One Way Trafficway		Straight	Level		No Appare	Apparently	39	Female	Motor Veh
	Motor Veh	Moving For	Two-Way, l	30	Straight	Level						Motor Veh
Other Traffic	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	62	Male	Motor Veh
	Motor Veh	Turning Lef	Two-Way, l	30	Straight	Level						Motor Veh
	Motor Veh	Moving For	Two-Way, l	30	Straight	Level						Motor Veh
ontributing	Pedalcyclis	Turning Lef	Two-Way, l	30	Straight	Level		No Appare	Apparently	64	Female	Bicycle
Too Closely	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	38	Male	Motor Veh
acted	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	32	Male	Motor Veh
	Motor Veh	Unknown	Two-Way, l	30	Straight	Level						Motor Veh
ght	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	21	Female	Motor Veh
Too Closely	Motor Veh	Moving For	Two-Way, l	30	Straight	Level		No Appare	Apparently	21	Female	Motor Veh
Ran Red Lig	Motor Veh	Moving For	Two-Way, l	35	Straight	Uphill		Possible Inj	Unknown	29	Male	Motor Veh
ield Right-o	Motor Veh	Changing L	Two-Way, l	30	Straight	Level		No Appare	Apparently	40	Male	Motor Veh
	Parked Mo	Turning Rig	Two-Way, l	30	Straight	Downhill						Parked/Sta



Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic Unit4 Direc

Eastbound No Clear Contributing , Motor Veh Moving Forward	No Appare  Apparently	41 Female
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Westbound No Clear Contributing , Motor Veh Vehicle Stopped or Sta No Appare	Apparently	44 Female
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Not on Roadway	Motor Veh Parked or Entering or Leaving a Parked Position
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Unit4 Factc	Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx
											MN5 From	492658.1
											7TH ST ANI MN5 From	492663.4
												492654.5
											MN5 From	492659.1
											MN5 From	492655.4
												492643.2
											MN5 From	492656.1
											MN5 From	492654.5
											7TH ST ANI MN5 From	492656.6
											MN5 From	492670.8
											MN5 From	492668.4
												492654.2
											MN5 From	492658.1
											7TH ST ANI MN5 From	492653.8
											MN5 From	492659.4
											MN5 From	492659.3
											MN5 From	492655.7

utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid
4977371			{50D321AE	44.95	-93.09		3	-1E+07 5613613	102100
4977375	{0FC5E147		{50D321AE	44.95	-93.09		3	-1E+07 5613619	102100
4977373				44.95	-93.09		52	-1E+07 5613615	102100
4977369			{50D321AE	44.95	-93.09		3	-1E+07 5613611	102100
4977369			{50D321AE	44.95	-93.09		3	-1E+07 5613610	102100
4977385				44.95	-93.09		52	-1E+07 5613634	102100
4977370			{50D321AE	44.95	-93.09		3	-1E+07 5613612	102100
4977367			{50D321AE	44.95	-93.09		3	-1E+07 5613608	102100
4977370	{0FC5E147		{50D321AE	44.95	-93.09		3	-1E+07 5613612	102100
4977381			{50D321AE	44.95	-93.09		3	-1E+07 5613628	102100
4977378			{50D321AE	44.95	-93.09		3	-1E+07 5613623	102100
4977370				44.95	-93.09		52	-1E+07 5613612	102100
4977368			{50D321AE	44.95	-93.09		3	-1E+07 5613610	102100
4977368	{0FC5E147		{50D321AE	44.95	-93.09		3	-1E+07 5613610	102100
4977375			{50D321AE	44.95	-93.09		3	-1E+07 5613619	102100
4977373			{50D321AE	44.95	-93.09		3	-1E+07 5613616	102100
4977369			{50D321AE	44.95	-93.09		3	-1E+07 5613610	102100



## Robert St @ 9th

objectid	Incident ID	Date and T	Year	Hour	Crash Seve	Number Kil	Number of
2188722	390070	10/28/2016		2016	13 Property D	0	1
2388926	327563	2/8/2016,		2016	15 Property D	0	2
2474474	430631	3/21/2017,		2017	9 Property D	0	1
2532899	604781	6/16/2018,		2018	21 Unknown S	0	0
2602390	420404	2/2/2017,		2017	16 Property D	0	2

## Robert St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
Vehicle 2 legally parked east of Robert ST on 9th St facing west in meter space 4817. Vehicle M		RAMSEY	Saint Paul		Municipal S
Veh 1 driven by Kevin Kareem White rear ended veh 2 S/B Robert near 9th Street. No injurie M		RAMSEY	Saint Paul		Non-numb
Unit #2 is a City operated work vehicle which was parked southbound on Robert St after the i M		RAMSEY	Saint Paul		Municipal S
Vehicle was parked legally in a parking spot (Backed in). Suspect vehicle backed into parked ve M		RAMSEY	Saint Paul		Non-numb
On 02/02/17 at 1634 hours, we, squad 532T (J. Yang/Redmond) responded to Robert St N/9th M		RAMSEY	Saint Paul		Municipal S

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
050002396	0.08	E 9TH PL	West			Parked Mo	In Parking l	Daylight	None			
520000000	132.14	4TH ST SE	South		Front to Re	Motor Veh	On Roadw	Daylight	None			
050002396	0.07	E 9TH PL	South			Parked Mo	On Roadw	Daylight	None			
520000000	132.13	N ROBERT ST				Parked Mo	Parking Lot	Dark (Stree	None			
050002396	0.08	E 9TH PL	West		Front to Re	Motor Veh	On Roadw	Daylight	None			

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direc	Unit1 Factc
Not at Inte	Not Applic	Clear		Dry	2			NOT APPLICABLE	Motor Veh	Pickup	Eastbound	Unknown
Not at Inte	Traffic Con	Blowing	Sand/Soil/Dirt	Snow	2			NOT APPLICABLE	Motor Veh	Passenger	' Southboun	Following T
Four-Way I	Traffic Con	Clear		Dry	1		Other	Yes	Motor Veh	School Bus	Southboun	No Clear Cc
Other		Clear		Dry	2			NOT APPLICABLE	Hit-And-Run	Vehicle o	Unknown	
Four-Way I	Traffic Con	Clear		Dry	2			NOT APPLICABLE	Motor Veh	Passenger	' Westboun	No Clear Cc

Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
	Motor Veh	Backing	Two-Way, I	30	Straight	Level		No Appare	Apparently	73	Male	Parked/Sta
Too Closely	Motor Veh	Moving For	Two-Way, Divided, Un		Straight	Downhill		No Appare	Apparently	33	Male	Motor Veh
Contributing	Parked Mo	Turning Rig	Two-Way, I	30	Straight	Level		No Appare	Apparently	56	Female	Parked/Sta
	Parked Motor Vehicle	Unknown										Parked/Sta
Contributing	Parked Mo	Vehicle Sto	Two-Way, I	25	Straight	Level		No Appare	Apparently	62	Female	Motor Veh

Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic
Passenger	Eastbound			Motor Veh	Parked or Entering or Leaving a Parked Position							
Sport Utilit	Southboun	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently		31	Female		
Other	Southbound			Motor Veh	Parked or Entering or Leaving a Parked Position							
Passenger	Unknown			Parked Mo	Parked or Entering or Leaving a Parked Position							
Passenger	Westbound	Following Too Closely		Parked Mo	Moving Forward	No Appare	Apparently		86	Male		

Unit3 Direc Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic Unit4 Direc

Unit4 Factc	Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx
										9TH PL AND ROBERT S	492603.6	
											492570.4	
										9TH PL AND ROBERT S	492596	
										9TH PL AND ROBERT S	492576.6	
										9TH PL AND ROBERT S	492608.3	



utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid
4977468			{1E4AE4D4-617B-4FB6	44.95	-93.09		5	-1E+07 5613750	102100
4977487				44.95	-93.09		52	-1E+07 5613777	102100
4977457			{1E4AE4D4-617B-4FB6	44.95	-93.09		5	-1E+07 5613735	102100
4977464			{1E4AE4D4-617B-4FB6	44.95	-93.09		52	-1E+07 5613744	102100
4977467			{1E4AE4D4-617B-4FB6	44.95	-93.09		5	-1E+07 5613750	102100

## Robert St @ 10th

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number of	Killed
1954163	623450	7/26/2018,	2018		7 Property D	0	1
2025742	581347	3/5/2018, (	2018		18 Property D	0	3
2076616	515773	11/8/2017,	2017		19 Possible Inj	0	1
2261483	424645	2/22/2017,	2017		15 Minor Injur	0	2
2393139	599591	5/24/2018,	2018		0 Minor Injur	0	1
2474509	431212	3/24/2017,	2017		9 Property D	0	3
2480056	514145	11/3/2017,	2017		18 Minor Injur	0	1
2501045	432802	4/2/2017, (	2017		6 Possible Inj	0	2

## 10th St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
Driver of vehicle #2 told me she was driving W/B on 10th street in the right lane with the green light. Driver 1 was travelling north bound on Robert Street. Driver 1 was unable to stop for the red light. Vehicle 1 was travelling westbound on 10th St and turning to travel southbound onto Robert Street. On 2/22/2017 at 1544 hours, Unit 1 was s/b Robert St. Unit 2 was e/b 10th St. Video from Luim M		RAMSEY	Saint Paul		Municipal Street
UNIT 2 was parked at the intersection of 10th and Robert St facing south at a red light. UNIT 1 was stopped at the traffic light WB 10th St. at Robert when veh#1 rear ended veh#2. 1M		RAMSEY	Saint Paul		Municipal Street
Unit 1 was traveling EB on 10th and turning NB unto Robert Street. Unit 1 struck a pedestrian. Unit 1 had defective brakes and was unable to stop at red light. Driver admitted to poor braking.		RAMSEY	Saint Paul		Municipal Street
		RAMSEY	Saint Paul		Non-numbered

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
050002396	0.42	E 10TH ST			Angle	Motor Veh	On Roadw	Daylight	None			
050002396	0.43	E 10TH ST	Not Applicable		Other	Motor Veh	On Roadw	Dark (Stree	Road Surface Condition (wet, icy, snow, slush,			
050002396	0.43	E 10TH ST	South			Pedestrian	On Roadw	Dark (Stree	None			
520000000	132.19	4TH ST SE	South		Angle	Motor Veh	On Roadw	Daylight	None			
520000000	132.19	N ROBERT	South		Front to Re	Motor Veh	On Roadw	Dark (Stree	None			
050002396	0.43	E 10TH ST			Front to Re	Motor Veh	On Roadw	Daylight	None			
050002396	0.43	E 10TH ST	Not Applic	4TH ST SE		Pedestrian	On Roadw	Dark (Stree	Unknown			
520000000	132.19	4TH ST SE	North		Front to Fr	Motor Veh	On Roadw	Sunrise	None			

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1	Type	Unit1	Vehic	Unit1	Direc	Unit1	Factc
Intersectio	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Hit-And-Run	Vehicle o		Eastbound		Improper T		
Intersectio	Traffic Con	Snow	Blowing Sa	Snow	2		NOT APPLICABLE		Motor Veh	Passenger		Northboun		Other Cont		
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger		Southboun		Unknown		
Four-Way I	Flashing O	Clear	Unknown	Dry	2		NOT APPLICABLE		Motor Veh	Passenger		Eastbound		Disregard C		
Four-Way I	Traffic Con	Cloudy		Dry	2		NOT APPLICABLE		Hit-And-Ru	Passenger		Southbound				
Four-Way I	Traffic Con	Cloudy		Wet	2		NOT APPLICABLE		Motor Veh	Passenger		Westbound		Driver Distr		
Four-Way I	Traffic Con	Snow	Rain	Wet	2		NOT APPLICABLE		Motor Veh	Passenger		Eastbound		Unknown		
Four-Way I	Traffic Con	Clear		Dry	2		NOT APPLICABLE		Motor Veh	Passenger		Northboun		Ran Red Lig		

Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
Failure to Y	Motor Vehicle In Trans	Two-Way, l		30				No Apparent Injury		39	Female	Motor Veh
ributing Act	Motor Veh Moving For	Two-Way, l		30	Straight	Level		No Appare	Apparently	27	Male	Motor Veh
	Pedestrian Turning Lef	Two-Way, l		30	Straight	Downhill		No Appare	Unknown	51	Female	Pedestrian
Operated M	Motor Veh Moving For	Two-Way, l		30	Straight	Level		No Appare	Apparently	26	Male	Motor Veh
	Motor Veh Moving For	Two-Way, Not Divided			Straight	Level						Motor Veh
acted	Motor Veh Moving For	Two-Way, l		30	Straight	Level		No Appare	Apparently	21	Male	Motor Veh
	Pedestrian Turning Lef	Two-Way, l		30	Straight	Level		No Appare	Apparently	46	Male	Pedestrian
Other Cont	Motor Veh Moving For	Two-Way, l		30	Straight	Hillcrest		Possible Inj	Apparently	45	Female	Motor Veh

Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic
Passenger	Westbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently	30 Female				
Passenger	Westbound	Other Contributing	Act	Motor Veh	Turning Right	No Appare	Apparently	40 Female			Motor Veh	Sport Utilit
		Unknown				Walk/Cycle	Possible Inj	Unknown	53 Female			
Sport Utilit	Northbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently	54 Male				
Passenger	Southbound	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta	Suspected	Apparently	28 Male				
Passenger	Westbound	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta	No Appare	Apparently	28 Female			Motor Veh	Passenger
		No Improper Action				Walk/Cycle	Suspected	Apparently	62 Male			
Sport Utilit	Westbound	Other Cont	No Clear	Contributing	Moving Forward	Possible Inj	Apparently	48 Female				

Unit3 Direc	Unit3 Factc	Unit3 Factc	Unit3 Most	Unit3 Vehic	Unit3 Nonr	Unit3 Injur	Unit3 Physi	Unit3 Age	Unit3 Sex	Unit4 Type	Unit4 Vehic	Unit4 Direc
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Westbound	Other	Contributing	Act	Motor Veh	Moving Forward		No Appare	Apparently	64	Male		
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Westbound	No Clear	Contributing	,	Motor Veh	Vehicle Stopped or Sta	No Appare	Apparently	36	Male			
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Unit4 Factc Unit4 Factc Unit4 Most Unit4 Vehic Unit4 Nonr Unit4 Injur Unit4 Physi Unit4 Age Unit4 Sex interchang otst\_inters city\_section utmx

10TH ST AND ROBERT: 492524.7

10TH ST AND ROBERT: 492529

10TH ST AND ROBERT: 492535.3

492531.9

10TH ST AND ROBERT: 492529.5

10TH ST AND ROBERT: 492534.5

10TH ST AND ROBERT: 492533.5

492534.1

utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid	
4977551		{424D6BDA-45A8-4AB		44.95	-93.09		5	-1E+07	5613867	102100
4977557		{424D6BDA-45A8-4AB		44.95	-93.09		5	-1E+07	5613876	102100
4977548		{424D6BDA-45A8-4AB		44.95	-93.09		5	-1E+07	5613864	102100
4977551				44.95	-93.09		52	-1E+07	5613868	102100
4977554		{424D6BDA-45A8-4AB		44.95	-93.09		52	-1E+07	5613872	102100
4977550		{424D6BDA-45A8-4AB		44.95	-93.09		5	-1E+07	5613867	102100
4977551		{424D6BDA-45A8-4AB		44.95	-93.09		5	-1E+07	5613868	102100
4977553				44.95	-93.09		52	-1E+07	5613870	102100

## Robert St @ 11th St (2016-2018)

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number Killed	Number of Injuries
1784232	433115	4/2/2017,	2017	20	Property Damage Only Crash	0	2
2094729	491150	8/2/2017,	2017	7	Property Damage Only Crash	0	1
2158208	409197	12/28/2016,	2016	10	Property Damage Only Crash	0	2
2189511	500672	9/12/2017,	2017	13	Possible Injury Crash	0	2
2190189	606851	6/19/2018,	2018	16	Possible Injury Crash	0	2
2386729	415056	1/13/2017,	2017	15	Minor Injury Crash	0	2
2108908	344594	4/25/2016,	2016	12	Property Damage Only Crash	0	2
2394809	652428	10/16/2018,	2018	15	Property Damage Only Crash	0	2
2448978	443423	4/4/2017,	2017	10	Property Damage Only Crash	0	2
1810789	540976	1/29/2018,	2018	13	Minor Injury Crash	0	3
2108291	320788	1/16/2016,	2016	13	Minor Injury Crash	0	2
2502534	329568	2/16/2016,	2016	11	Property Damage Only Crash	0	2
2026908	661773	11/20/2018,	2018	17	Property Damage Only Crash	0	2
2138204	584831	3/21/2018,	2018	17	Property Damage Only Crash	0	2
2261730	444763	4/12/2017,	2017	1	Property Damage Only Crash	0	2
2266304	394179	11/12/2016,	2016	15	Property Damage Only Crash	0	2
2287511	449597	4/24/2017,	2017	10	Property Damage Only Crash	0	2
2532766	670753	12/24/2018,	2018	11	Possible Injury Crash	0	2
2140139	673392	11/2/2018,	2018	14	Property Damage Only Crash	0	1
2165280	604809	6/17/2018,	2018	1	Property Damage Only Crash	0	1

8)

Officer Narrative	Constructio	County	City	Township	Route Type	Route ID
Driver #1 n/b Robert attempted to turn w/b 11th, realizing 11th is a one-w M		RAMSEY	Saint Paul		Municipal	050002396
#2 stated that she was EB on 11th st and that her light was green. She was M		RAMSEY	Saint Paul		Municipal	050002396
On 12/28/2016 at 1044 hours, squads were sent to the intersection of Robt M		RAMSEY	Saint Paul		Municipal	050002396
Driver #1 stated he was NB Robert Street and light was green for him to pr M		RAMSEY	Saint Paul		Municipal	050002396
Unit #1 and Unit #2 were traveling EB on 11th Street. Driver #1 stated he : M		RAMSEY	Saint Paul		Municipal	050002396
On 01/13/2017 at 1510 hours, Squad 234 (Lee) and Squad 250 (Clarkin) re M		RAMSEY	Saint Paul		Municipal	050002396
Vehicle one was driving southbound on Robert Street. Vehicle one failed t M		RAMSEY	Saint Paul		Municipal	050002396
Vehicle one and two were N/B Robert waiting to turn right to E/B 11th St. M		RAMSEY	Saint Paul		Non-numb	520000000
On 04-05-17 at 1200 hours sqd 245 while working the front desk was aske M		RAMSEY	Saint Paul		Municipal	050002396
Vehicle # 01 MN LIC# 083WKL was E/B on 11th St, and ran the stop light st M		RAMSEY	Saint Paul		Non-numb	520000000
driver unit#1 stated that he collided front end to front end with unit# 2 w/ M		RAMSEY	Saint Paul		Non-numb	520000000
Veh#2 was N/B on Robert Street (on left lane) approaching 11th Street. \ M		RAMSEY	Saint Paul		Non-numb	520000000
Unit #1 and #2 were both n/b Robert approaching 11th Street. Unit #1 sw M		RAMSEY	Saint Paul		Non-numb	520000000
Unit 2 was E/B 11th Street near Robert in the left lane. Unit 1 was E/B 11t M		RAMSEY	Saint Paul		Non-numb	520000000
On 04/12/2017, at approximately 1339 hours, I, OFF. K. BESAW (246) was M		RAMSEY	Saint Paul		Municipal	050002396
#2 stated that he was E.B. on 11th st. E. approaching the intersection on R M		RAMSEY	Saint Paul		Municipal	050002396
Veh 1 and Veh 2 were both WB on 11th St approaching Robert St. Veh 1 w M		RAMSEY	Saint Paul		Municipal	050002396
Vehicle #02 was E/B 11th St in the far north lane, when Vehicle #01 was in M		RAMSEY	Saint Paul		Non-numb	520000000
Note: Image was pulled from Google Maps. Some vehicles in image were r M		RAMSEY	Saint Paul		Municipal	050002396
UNIT 1 DROVE SOUTH THROUGH BP GAS STATION PARKING LOT. TOP OF : M		RAMSEY	Saint Paul		Municipal	050002396

Route	Mea	Roadway	N Divided	Roadway	Intersection	Manner of	First Harmf	Relative Tr	Lighting	Co Road	Circu	road_circu	Road	Circu	road_circu	Relative Int
0.28	E	11TH ST	North			Angle	Motor Veh On Roadw	Dark (Stree	None							Four-Way I
0.28	E	11TH ST	East			Angle	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST	North	4TH ST SE		Angle	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST	North	4TH ST SE		Angle	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST		N ROBERT		Angle	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST	North			Angle	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST	Not Applicable			Front to Re	Motor Veh On Roadw	Daylight	None							Four-Way I
132.25	N	ROBERT	Not Applicable			Front to Re	Motor Veh On Roadw	Daylight	None							T Intersecti
0.28	E	11TH ST				Front to Re	Motor Veh On Roadw	Daylight	None							Four-Way I
132.25	4TH ST SE	Not Applicable				Other	Motor Veh On Roadw	Daylight	None							Other
132.26	4TH ST SE	Not Applic	E 11TH ST			Sideswipe -	Motor Veh On Roadw	Daylight	None							Four-Way I
132.25	4TH ST SE	North				Sideswipe -	Motor Veh On Roadw	Daylight	None							Not at Inte
132.25	N ROBERT	Not Applicable				Sideswipe -	Motor Veh On Roadw	Dark (Unkn	None							Four-Way I
132.26	N ROBERT	East				Sideswipe -	Motor Veh On Roadw	Daylight	None							Intersection
0.28	E	11TH ST				Sideswipe -	Motor Veh On Roadw	Daylight	Unknown							Four-Way I
0.28	E	11TH ST	Not Applicable			Sideswipe -	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST				Sideswipe -	Motor Veh On Roadw	Daylight	None							Four-Way I
132.26	N ROBERT	Not Applicable				Sideswipe -	Motor Veh On Roadw	Daylight	None							Four-Way I
0.28	E	11TH ST				Other - Fix	Other	Daylight	Unknown							Other
0.29	E	11TH ST				Other - Fix	Parking Lot	Dark (Stree	None							Other

Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehic	Unit1 Direc	Unit1 Factc	Unit1 Factc
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Northboun	Driver Dist	Improper T			
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Hit-And-Ru	Pickup	Northbound					
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Northboun	Ran Red Light				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Northboun	Ran Red Light				
Traffic Con: Cloudy		Dry	99	NOT APPLICABLE	Motor Veh	Passenger	' Eastbound	Failure to Yield Right-o				
Traffic Con: Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Northboun	Unknown				
Traffic Con: Cloudy	Rain	Wet	2	NOT APPLICABLE	Motor Veh	Pickup	Southboun	Ran Red Light				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Northboun	Other Contributing Act				
Traffic Con: Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Northboun	Unknown				
Traffic Con: Clear	Other	Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Eastbound	Failure to Y Ran Red Lig				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Eastbound	Ran Red Lig Unknown				
No Control Clear	Cloudy	Dry	99	NOT APPLICABLE	Motor Veh	Passenger	( Northboun	Improper Turn/Merge				
Traffic Con: Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Northboun	Improper T Other Cont				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Pickup	Eastbound	Improper Turn/Merge				
Traffic Con: Cloudy		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Eastbound	Improper Turn/Merge				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Passenger	( Eastbound	Failure to Y Improper T				
Not Applic: Rain		Wet	2	NOT APPLICABLE	Motor Veh	Passenger	( Westboun	Improper Turn/Merge				
Traffic Con: Clear		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Eastbound	Improper Turn/Merge				
Not Applic: Unknown		Dry	2	NOT APPLICABLE	Motor Veh	Sport Utilit	Unknown	No Clear Contributing				
No Control Clear		Dry	2	NOT APPLICABLE	Motor Veh	Other Light	Southboun	No Clear Contributing				

Unit1 Most Unit1 Vehic Unit1 Traff Unit1 Poste Unit1 Horiz Unit1 Road Unit1 Nonr Unit1 Injur Unit1 Physi Unit1 Age Unit1 Sex Unit2 Type Unit2 Vehic													
Motor Veh Making a U Other	30	Straight	Level				No Appare	Apparently	24	Female	Motor Veh Passenger C		
Motor Veh Moving For Two-Way, I	30	Straight	Level								Motor Veh Pickup		
Motor Veh Moving For Two-Way, I	30	Straight	Level				No Appare	Apparently	59	Male	Motor Veh Pickup		
Motor Veh Moving For Two-Way, I	30	Straight	Level				Possible Inj	Apparently	70	Male	Motor Veh Passenger C		
Motor Veh Turning Rig Other		Straight	Level				No Appare	Apparently	41	Male	Motor Veh Passenger C		
Motor Veh Unknown One Way T	30	Straight	Level				Suspected	Apparently	53	Female	Motor Veh Passenger C		
Motor Veh Moving For Two-Way, I	30	Straight	Level				No Appare	Apparently	24	Male	Motor Veh Pickup		
Motor Veh Moving For One Way T	30	Straight	Level				No Appare	Apparently	53	Male	Motor Veh Passenger C		
Motor Veh Moving For Two-Way, I	30	Straight	Level				No Appare	Unknown	30	Male	Motor Veh Sport Utilit		
Motor Veh Moving For Two-Way, Not Divided		Straight	Level				No Appare	Apparently	27	Female	Motor Veh Passenger C		
Motor Veh Moving For One Way T	30	Straight	Level				No Appare	Apparently	29	Male	Motor Veh Passenger C		
Motor Veh Turning Rig Two-Way, I	30	Straight	Level				No Appare	Unknown	25	Male	Motor Veh Sport Utilit		
Motor Veh Changing L Two-Way, I	30	Straight	Level				No Appare	Apparently	43	Female	Motor Veh Sport Utilit		
Motor Veh Changing L One Way T	30	Straight	Level				No Appare	Apparently	48	Male	Motor Veh Passenger C		
Motor Veh Changing L Two-Way, I	30	Straight	Level				No Appare	Apparently	78	Female	Motor Veh Sport Utilit		
Motor Veh Turning Lef One Way T	30	Straight	Level				No Appare	Apparently	21	Male	Motor Veh Passenger C		
Motor Veh Turning Lef One Way T	30	Straight	Level				No Appare	Apparently	52	Female	Motor Veh Sport Utilit		
Motor Veh Turning Lef One Way Trafficway		Straight	Level				Possible Inj	Apparently	23	Male	Motor Veh Passenger C		
Other Post, Backing Other		Straight	Level				No Appare	Apparently	11	Male			
Other - Fixe Moving For Other	15	Straight	Level				No Appare	Apparently	33	Male			

Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic	Unit3 Direc
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	34	Female			
Northboun	No Clear	Contributing	Action	Turning Left		No Appare	Apparently	33	Female			
Northboun	No Clear	Contributing	Action	Moving Forward		No Appare	Apparently	64	Male			
Eastbound	No Clear	Contributing	Motor Veh	Turning Left		Possible Inj	Apparently	59	Female			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	52	Female			
Northboun	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	38	Male			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	59	Male			
Northboun	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta		No Appare	Apparently	64	Female			
Northboun	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta		No Appare	Unknown	50	Male			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	33	Female	Motor Veh	Motor Hon	Eastbound
Southboun	No Clear	Contributing	Motor Veh	Moving Forward		Suspected	Apparently	52	Female			
Northboun	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	40	Male			
Northboun	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	16	Male			
Eastbound	No Clear	Contributing	Action	Moving Forward		No Appare	Apparently	62	Female			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	32	Male			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	33	Male			
Westbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	81	Female			
Eastbound	No Clear	Contributing	Motor Veh	Moving Forward		No Appare	Apparently	52	Female			



Unit3 Factc Unit3 Factc Unit3 Most Unit3 Vehic Unit3 Nonr Unit3 Injur Unit3 Physi Unit3 Age Unit3 Sex Unit4 Type Unit4 Vehic Unit4 Direc Unit4 Factc

No Clear Contributing , Motor Veh Moving Forward No Appare Apparently 55 Male

Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx	utmy
										11TH ST AND ROBERT	492471.7	4977644
										11TH ST AND ROBERT	492464.4	4977640
										11TH ST AND ROBERT	492470	4977648
										11TH ST AND ROBERT	492470.6	4977642
										11TH ST AND ROBERT	492474.5	4977645
										11TH ST AND ROBERT	492473.9	4977644
										11TH ST AND ROBERT	492470.7	4977643
										11TH ST AND ROBERT	492474.2	4977639
										11TH ST AND ROBERT	492467.6	4977642
										11TH ST AND ROBERT	492472.3	4977642
											492467.7	4977646
											492474.6	4977639
										11TH ST AND ROBERT	492473.9	4977639
										11TH ST AND ROBERT	492469.7	4977646
										11TH ST AND ROBERT	492476	4977644
										11TH ST AND ROBERT	492468.8	4977643
										11TH ST AND ROBERT	492473.6	4977645
										11TH ST AND ROBERT	492468.6	4977645
										11TH ST AND ROBERT	492473.4	4977643
										11TH ST AND ROBERT	492490.3	4977640

interchang	intersection	city_section	latitude	longitude	shape	roadway_type	x	y	wkid
	{14C91206-579E-43A3		44.95	-93.1		5	-10363337.7	5613999	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363348	5613994	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363340.2	5614004	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363339.2	5613997	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363333.8	5614001	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363334.6	5614000	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363339.1	5613998	102100
	{14C91206-579E-43A3		44.95	-93.1		52	-10363334.1	5613992	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363343.5	5613996	102100
	{14C91206-579E-43A3		44.95	-93.1		52	-10363336.8	5613997	102100
			44.95	-93.1		52	-10363343.4	5614002	102100
			44.95	-93.1		52	-10363333.6	5613992	102100
	{14C91206-579E-43A3		44.95	-93.1		52	-10363334.6	5613992	102100
	{14C91206-579E-43A3		44.95	-93.1		52	-10363340.6	5614002	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363331.6	5613999	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363341.9	5613998	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363335	5614001	102100
	{14C91206-579E-43A3		44.95	-93.1		52	-10363342.1	5614000	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363335.3	5613997	102100
	{14C91206-579E-43A3		44.95	-93.1		5	-10363311.4	5613994	102100

## Robert St @ 12th

objectid	Incident ID	Date and Time	Year	Hour	Crash Severity	Number of Killed	Number of Injured
1940196	401584	12/9/2016,	2016		12 Property D	0	2
1959242	350556	5/21/2016,	2016		9 Possible Inj	0	2
2021351	326290	2/3/2016, :	2016		10 Minor Injur	0	2
2137583	399660	12/2/2016,	2016		13 Property D	0	3
2138075	496681	8/25/2017,	2017		17 Minor Injur	0	1
2361527	446235	4/19/2017,	2017		14 Property D	0	1
2413421	534066	1/9/2018, :	2018		11 Minor Injur	0	1
2422485	401330	12/8/2016,	2016		14 Property D	0	2

## 1 St (2016-2018)

Officer Narrative	Constructio	County	City	Township	Route Type
Vehicle 1 was SB on Robert Street, at 12th Street. Vehicle 2 was WB on 12th Street, crossing M		RAMSEY	Saint Paul		County Sta
On 05/21/2016, at 0937 hours, I, Officer J. Tiffany (SQD# 249) responded to a crash at Robert M		RAMSEY	Saint Paul		County Sta
Vehicle#1 west on 12th far left lane went through a solid red light and hit vehicle#2 south on M		RAMSEY	Saint Paul		Municipal S
On 12/02/2016 at 1346 hours, Squad 234 (Lee) responded to the intersection of Robert St N : M		RAMSEY	Saint Paul		County Sta
On 08/25/2017, I, OFF. K. BESAW (260) was dispatched to an accident, with injuries at the int M		RAMSEY	Saint Paul		County Sta
Per Driver #2 and witnesses, unit #1 was w/b 12th Street approaching Robert. Driver #1 was i M		RAMSEY	Saint Paul		County Sta
ICC-1664/BWC activated. Vehicle#1 was W/B on 12th ST towards Robert St N. on a green ligh M		RAMSEY	Saint Paul		Other Loca
Driver #1, JODI-LYNN ADAMSON HARTWIG said she was W/B 12th approaching Robert. She w M		RAMSEY	Saint Paul		County Sta

Route ID	Route Mea	Roadway N	Divided Ro	Intersection	Manner of	First Harmf	Relative Tr	Lighting Co	Road Circu	road_circu	Road Circu	road_circu
040000659	5.81	N ROBERT	West		Angle	Motor Veh	On Roadw	Daylight	None			
040000659	5.82	N ROBERT	Not Applicable		Angle	Motor Veh	On Roadw	Daylight	None			
050002396	0.09	E 12TH ST	South		Front to Fr	Motor Veh	On Roadw	Daylight	None			
040000659	5.81	N ROBERT	North		Angle	Motor Veh	On Roadw	Daylight	None			
040000659	5.82	N ROBERT	ST			Pedalcycle	On Roadw	Daylight	None			
040000659	5.82	N ROBERT	Not Applicable		Sideswipe	Motor Veh	On Roadw	Daylight	None			
040000659	5.81	N ROBERT	Not Applicable			Pedestrian	On Roadw	Daylight	Road Surface Condition (wet, icy, snow, slush,			
040000659	5.82	N ROBERT	Not Applic	E 12TH ST	Other	Motor Veh	On Roadw	Daylight	None			

Relative Int	Traffic Con	Weather P	Weather S	Surface Co	Work Zone	Work Zone	Work Zone	Workers Pr	Unit1 Type	Unit1 Vehi	Unit1 Direc	Unit1 Fact
Intersection	Traffic Con: Cloudy			Dry	2		NOT APPLICABLE		Motor Veh Pickup		Southboun	Disregard C
Four-Way I	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh Passenger		Northboun	Failure to Y
Four-Way I	Traffic Con: Clear	Cloudy		Slush	2		NOT APPLICABLE		Motor Veh Sport Utilit		Southboun	Ran Red Lig
Four-Way I	Traffic Con: Cloudy			Dry	2		NOT APPLICABLE		Motor Veh Passenger		Northboun	Ran Red Lig
Four-Way I	Traffic Con: Cloudy			Dry	2		NOT APPLICABLE		Motor Veh Passenger		Westboun	No Clear Cc
T Intersecti	Not Applic	Cloudy	Rain	Wet	2		NOT APPLICABLE		Hit-And-Ru Passenger		Westboun	Improper T
Intersection	Traffic Con: Cloudy			Wet	2		NOT APPLICABLE		Motor Veh Sport Utilit		Southboun	Unknown
Intersection	Traffic Con: Clear			Dry	2		NOT APPLICABLE		Motor Veh Sport Utilit		Westboun	Ran Red Lig

Unit1 Factc	Unit1 Most	Unit1 Vehic	Unit1 Traff	Unit1 Postc	Unit1 Horiz	Unit1 Road	Unit1 Nonr	Unit1 Injur	Unit1 Physi	Unit1 Age	Unit1 Sex	Unit2 Type
Other Traffic	Motor Veh	Moving For	Two-Way, I	30	Straight	Level		No Appare	Apparently	60	Female	Motor Veh
ield Right-o	Motor Veh	Moving For	Two-Way, I	30	Straight	Level		Possible Inj	Apparently	19	Female	Motor Veh
Unknown	Motor Veh	Moving For	Two-Way, I	30	Straight	Level		Suspected	Unknown	64	Female	Motor Veh
ght	Motor Veh	Moving For	Two-Way, I	30	Straight	Level		No Appare	Apparently	18	Female	Motor Veh
ontributing	Pedalcyclis	Moving For	Two-Way, I	30	Straight	Level		No Appare	Apparently	63	Male	Bicycle
urn/Merge	Motor Veh	Changing L	One Way T	30	Straight	Level				43	Female	Motor Veh
	Pedestrian	Turning Lef	Two-Way, Not Divided		Straight	Level		No Appare	Apparently	72	Female	Pedestrian
ght	Motor Veh	Moving For	One Way T	30	Straight	Level		No Appare	Apparently	52	Female	Motor Veh



Unit2 Vehic	Unit2 Direc	Unit2 Factc	Unit2 Factc	Unit2 Most	Unit2 Vehic	Unit2 Nonr	Unit2 Injur	Unit2 Physi	Unit2 Age	Unit2 Sex	Unit3 Type	Unit3 Vehic
Pickup	Westbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently		65	Male		
Passenger	Westbound	No Clear	Contributing	Motor Veh	Moving Forward	Possible Inj	Apparently		41	Female		
Pickup	Southbound	No Clear	Contributing	Motor Veh	Moving Forward	Suspected	Apparently		56	Male		
Sport Utilit	Southbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently		33	Female	Motor Veh	Passenger
		Failure to Obey Traffic Signs, Signals, or Office Walk/Cycle				Suspected	Medical Iss		35	Male		
Passenger	Westbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently		66	Male		
		No Improper Action				Walk/Cycle	Suspected	Apparently	55	Male		
Passenger	Northbound	No Clear	Contributing	Motor Veh	Moving Forward	No Appare	Apparently		24	Male		

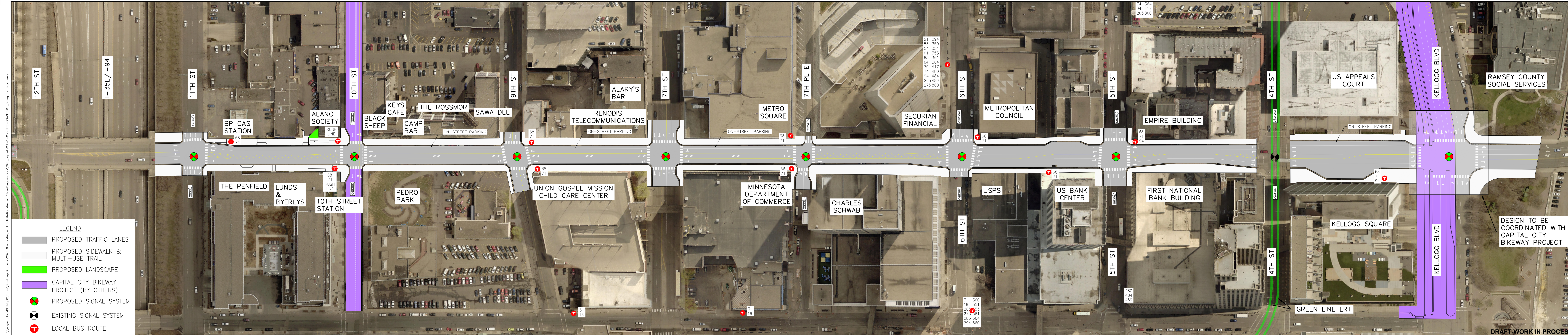
Unit3 Direc	Unit3 Factc	Unit3 Factc	Unit3 Most	Unit3 Vehic	Unit3 Nonr	Unit3 Injur	Unit3 Physi	Unit3 Age	Unit3 Sex	Unit4 Type	Unit4 Vehic	Unit4 Direc
-------------	-------------	-------------	------------	-------------	------------	-------------	-------------	-----------	-----------	------------	-------------	-------------

Southboun	No Clear	Contributing	Motor Veh	Vehicle Stopped or Sta	No Appare	Apparently		37	Female			
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Unit4 Factc	Unit4 Factc	Unit4 Most	Unit4 Vehic	Unit4 Nonr	Unit4 Injur	Unit4 Physi	Unit4 Age	Unit4 Sex	interchang	otst_inters	city_section	utmx
									ISTH 35E / ISTH 94,JACKSON ST			492406.2
									ISTH 35E / ISTH 94,JACKSON ST			492411.5
												492410.6
									ISTH 35E / ISTH 94,JACKSON ST			492408.3
									ISTH 35E / ISTH 94,JACKSON ST			492412.5
									ISTH 35E / ISTH 94,JACKSON ST			492412
									ISTH 35E / ISTH 94,JACKSON ST			492409.4
									ISTH 35E / ISTH 94,JACKSON ST			492410.4

utmy	interchang	intersection	city_section	latitude	longitude	shape	roadway_tx	y	wkid
4977735	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614128	102100
4977730	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614122	102100
4977728				44.95	-93.1		5	-1E+07 5614119	102100
4977740	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614135	102100
4977726	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614116	102100
4977730	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614121	102100
4977735	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		26	-1E+07 5614128	102100
4977730	{36F4DD60-A931-4074-9DEE-4D1:			44.95	-93.1		4	-1E+07 5614122	102100





Apr. 28 2020 12:02 pm \\sfrgroup\pc\pfr\Shop\Trans\Grant Applications\2020 Grants\Regional Solicitation\Robert Street\Dependencies\CAD\Layout\XSEEG-CIV-SITE-DOWNTOWN\_3.dwg By: cayanwade



# Project Summary

**Project Name:** Robert Street Reconstruction

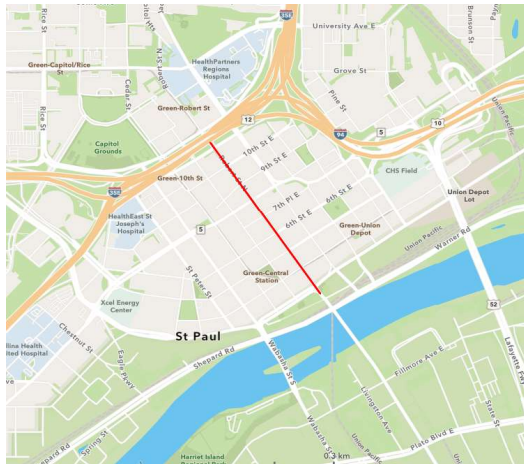
**Applicant:** City of Saint Paul

**Project Location:** Robert Street between the Interstate 94 bridge approach panel and the Mississippi River bridge approach panel

**Total Project Cost:** \$18,000,000

**Requested Federal Dollars:** \$7,000,000

**Project Map:**



**Before Photo:**



**Project Description:** The proposed project will reconstruct Robert Street from Interstate 94 to the Mississippi River. The corridor will be reconfigured to increase safety and improve conditions for all users. This project will include ADA compliant sidewalks, improved pedestrian crossings, boulevards with streetscaping, pedestrian-scale lighting, a reconfigured roadway section, new curb and gutter, and traffic signals with overhead signal heads for each lane approach. The roadway and sidewalks are currently in very poor condition and the project is proposed to be reconstructed in 2025.

**Project Benefits:** The reconstruction of Robert Street presents an opportunity to modernize a key connection to the Twin Cities regional transit system. The proposed project will provide the following benefits:

- Improved safety along the corridor for all users and abilities
- Accommodates the regional transit system
- Enhanced pedestrian travel with ADA compliant sidewalks, pedestrian-scaled lighting, and streetscaping
- Connection to the future Capital City bikeway network
- Improved roadway operations and safety with upgraded traffic signals
- Promotes neighborhood and economic vitality
- Designed to be Business Access and Transit (BAT\*) lane ready when Rush Line BRT is constructed

\*A BAT lane is a dedicated right-turn and transit lane

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<b>File #:</b>	RES 20-146	<b>Version:</b> 1	<b>Name:</b>	2020 Metropolitan Council Regional Solicitation Program Projects
<b>Type:</b>	Resolution		<b>Status:</b>	Passed
			<b>In control:</b>	<a href="#">City Council</a>
			<b>Final action:</b>	2/12/2020
<b>Title:</b>	Authorizing the Departments of Public Works and Parks and Recreation to submit nine project applications for federal funding into the 2020 Metropolitan Council Regional Solicitation Program and to authorize the commitment of a twenty percent local funding match plus engineering for any project that is awarded federal funding.			
<b>Sponsors:</b>	Amy Brendmoen			
	<a href="#">History (2)</a>	<a href="#">Text</a>	<a href="#">Public Comments (0)</a>	

#### Title

Authorizing the Departments of Public Works and Parks and Recreation to submit nine project applications for federal funding into the 2020 Metropolitan Council Regional Solicitation Program and to authorize the commitment of a twenty percent local funding match plus engineering for any project that is awarded federal funding.

#### Body

WHEREAS, The Departments of Public Works and Parks and Recreation are proposing to submit nine project applications for federal funding into the 2020 Metropolitan Council Regional Solicitation Program for funding in years 2024 and 2025; and

WHEREAS, there is a required twenty percent local funding match to any project awarded to an agency under the Regional Solicitation Program; and

WHEREAS, the City commits to ensuring that all sidewalks and bikeways included in these project applications will be fully open for use and cleared of snow throughout the winter, either by City staff or by adjacent property owners per existing City ordinances; and

WHEREAS, the projects to be submitted by the City under the Metropolitan Council Regional Solicitation are as follows:

- Kellogg/3<sup>rd</sup> Street Bridge Replacement
- Capital City Bikeway Construction - Kellogg Blvd from St. Peter to John Ireland
- Robert Street Reconstruction - Kellogg to 11th

- University Avenue Reconstruction - 35E to Lafayette
- Crossroads Elementary Safe Routes to School Project
- Burns/Suburban Sidewalk Infill Project
- Saint Paul Traffic Signal Enhancement and Modernization Phase 5
- Sam Morgan Regional Trail Segments 1 & 4 Reconstruction
- Point Douglas Regional Trail Phase 1 Construction

WHEREAS, these projects fall within appropriate funding categories and meet the conditions and requirements specified for eligibility of federal funding; now, therefore, be it

RESOLVED, that the Council of the City of Saint Paul authorizes submission of the project applications for possible award of federal transportation funds through the Metropolitan Council Regional Solicitation Program; and be it

FURTHER RESOLVED, that the Council of the City of Saint Paul authorizes the commitment of local funds on a twenty percent match basis plus engineering for any project awarded federal funding under the Regional Solicitation Program.





**MnDOT Metro District  
1500 West County Road B-2  
Roseville, MN 55113**

May 12, 2020

City of St. Paul  
25 W. 4th Street, 400 City Hall Annex  
Saint Paul, MN 55102

**Re: MnDOT Letter for City of St. Paul  
Metropolitan Council/Transportation Advisory Board 2020 Regional Solicitation Funding  
Request for TH 3, Robert St. Project**

Dear Paul Kurtz,

This letter documents MnDOT Metro District's recognition for the City of St. Paul to pursue funding for the Metropolitan Council/Transportation Advisory Board's (TAB) 2020 Regional Solicitation for TH 3 and Robert St. Project.

As proposed, this project impacts MnDOT right-of-way on TH 3/Robert St. As the agency with jurisdiction over various segments of this roadway, MnDOT will allow St. Paul to seek improvements proposed in the application. If funded, details of any future maintenance agreement with the City will need to be determined during the project development to define how the improvements will be maintained for the project's useful life.

Metro District does have other roadway investments planned to occur nearby and on this roadway over the next 5-6 years. Please coordinate project development with MnDOT Area staff so that our agencies can work together to best leverage our respective efforts.

MnDOT Metro District looks forward to continued cooperation with the City of St. Paul as this project moves forward and as we work together to improve safety and travel options within the Metro Area.

If you have questions or require additional information at this time, please reach out to North Area Manager Melissa Barnes at [Melissa.Barnes@state.mn.us](mailto:Melissa.Barnes@state.mn.us) or 651-234-7718.

Sincerely,

Michael Barnes, PE  
Metro District Engineer

CC:     Melissa Barnes, Metro District Area Manager  
          Molly McCartney, Metro Program Director  
          Dan Erickson, Metro State Aid Engineer