



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Regular Meeting
450 S. Parish, Johnstown, CO
Monday, April 7, 2025 at 7:00 P.M.

Mission Statement: Enhancing the quality of life of our residents, businesses, and visitors through community focused leadership.

Agenda

Call to Order

Pledge of Allegiance

Roll Call

Agenda Approval

Special Presentations

1. New Employee Introductions
2. Business of the Month

Public Comment

Consent Agenda

3. March 17, 2025 Town Council Meeting Minutes
4. March 2025 List of Bills
5. Ordinance 2025-265 Change of Zone for Waggoner Farms - Second Reading
6. Ordinance 2025-268 Amending the Johnstown Municipal Code Concerning Special Police Officers - Second Reading
7. Ordinance 2025-269 Regulation of Traffic by the Town of Johnstown; Adopting by Reference the 2024 Edition of the Model Traffic Code; Providing for Certain Deletions from and Additions and Modifications to such code; Repealing all Ordinances in conflict therewith; and providing penalties for violations thereof - Second Reading
8. Resolution 2025-10: Authorizing an audit of the YMCA of Northern Colorado
9. Resolution 2025-11: Authorized Signatures for Bank Accounts

Town Manager's Report

10. Town Manager's Report

Old Business

11. Beer and Wine Liquor License Renewal for Fabulous Nail and Bar

New Business

12. Roosevelt Way and Colorado Boulevard Roundabout Construction Contract Award

Public Hearing

13. New Beer and Wine Liquor License Application for ZW Restaurants LLC dba Little House
14. Ordinance No. 2025-270, Approving the Change of Zone for Zoning Case No. ZON24-0002.

Council Reports and Comments

Informational Items

15. Informational Items

Executive Session

Adjournment

Americans with Disabilities Act Notice

In accordance with the Americans with Disabilities Act and other applicable laws, persons who need accommodation in order to attend or participate in this meeting should contact Town Hall at 970-587-4664 no later than 48 hours before the meeting in order to request such assistance. De conformidad con la Ley de Discapacitados Estadounidenses y otras leyes vigentes, los individuos que necesitan adaptaciones funcionales para asistir o participar en esta reunión deberán comunicarse con la Municipalidad marcando el 970 587- 4664 a lo más tardar 48 horas antes de dicha reunión para solicitarla.

THE COMMUNITY THAT CARES





450 S. Parish Avenue
Johnstown, CO 80534
970.587.4664
JohnstownCO.gov

TOWN COUNCIL REGULAR MEETING
450 S. Parish, Johnstown, CO
Tuesday, March 17, 2025

MINUTES

CALL TO ORDER

At 7:00 Mayor Duncan called the meeting to order.

PLEDGE OF ALLEGIANCE

Mayor Duncan invited attendees to join in the Pledge of Allegiance.

ROLL CALL

Present:

Councilmember Menzies
Councilmember Morris
Councilmember Paranto
Mayor Duncan
Mayor Pro Tem Young
Councilmember Molinar

Absent:

Councilmember Berg

AGENDA APPROVAL

Mayor Duncan amended the agenda to add action following executive session after the executive session on the agenda.

Motion by Councilmember Molinar and seconded by Councilmember Menzies to approve the amended agenda.

Upon vote, the motion passed unanimously.

The Community that Cares

SPECIAL PRESENTATIONS

The McWhinney Family and the Town of Johnstown awarded \$10,000 to the Johnstown Senior Center to support and enhance vital programs and services.

PUBLIC COMMENT

Wieste Wullink, head coach of the local swim team expressed his concerns about the YMCA and the swim program being cancelled. He has questions about the budget and deficit they were told the swim team had.

Christina Rusco also expressed her concerns about the swim program being cancelled. The children put a lot of work into the team and they are suffering with no program.

Marci Deter echoed the comments and concerns related to the swim team and the YMCA.

Mayor Duncan provided members of the team with a Mayor's coin in recognition of their hard work over the season. There were additional people that spoke briefly regarding the swim program.

Jim Hatfield, 345 Hickory Lane, addressed ordinance 2025-266 and that it does not specifically address metropolitan districts along with HOAs. He also asked for consistency in the minutes,

CONSENT AGENDA

Item #5 was removed from the consent agenda.

Motion by Mayor Pro Tem Young and seconded by Councilmember Morris to approve the consent agenda which contained the following items:

- March 3, 2025 Town Council Meeting Minutes
- February 2025 Financial Statements
- Second Reading Ordinance 2025-267 Insurance Benefits for Part-Time Employees and Elected Officials

Upon vote, motion passed unanimously.

TOWN MANAGER REPORT

Town Manager Matt LeCerf provided a report.

OLD BUSINESS

Ordinance 2025-266 Adding Section 13-10(G) to the Johnstown Municipal Code Concerning Access to Indoor Water Meters and Repealing and Readopting Article VI of Chapter 13 of the Johnstown Municipal Code Concerning Water Conservation: Town Manager Matt LeCerf presented. Noting Mr. Hatfield's comments Council requested that Metropolitan districts be added to the sections that provide for water conservation requirements for HOAs.

Motion by Councilmember Menzies and seconded by Councilmember Morris to approve Ordinance 2025-266 on second reading as amended with the addition of the metropolitan districts.

Upon vote, motion passed unanimously.

NEW BUSINESS

Resolution 2025-08 Declaring Water Conservation Level 2: Utilities Director Ellen Hilbig presented the proposed water conservation level.

Motion by Councilmember Paranto and seconded by Councilmember Menzies to adopt Resolution 2025-06 Declaring Water Conservation Level 2.

Upon vote, motion passed unanimously.

Beer and Wine Liquor License Renewal for Fabulous Nail and Bar: Town Clerk Meghan Martinez presented. The applicant was not present.

Motion by Councilmember Paranto and seconded by Councilmember Morris to table this item to the April 7, 2025 meeting.

Upon vote, motion passed unanimously.

Mayor Duncan requested we see about an interpreter for the applicant.

Resolution 2025-09 Declaring Short-Term Moratorium on the Town of Johnstown's Acceptance of the Dedication of Consolidated Home Supply Ditch & Reservoir Company Water Shares Adjudicated for Municipal Use in District Court, Water Division No. 1, Case No. 20CW3011, and the Dedication of Water Shares that have not been adjudicated for Municipal Use: Town Manager Matt LeCerf presented the proposed resolution.

Motion by Mayor Pro Tem Young and seconded by Councilmember Morris to approve Resolution 2025-09 as presented.

Upon vote, motion passed unanimously.

PUBLIC HEARING

Ordinance 2025-268 Amending the Johnstown Municipal Code Concerning Special Police Officers:

At 8:02 Mayor Duncan opened the public hearing.

Police Chief Jeff Strossner presented.

At 8:04 Mayor Duncan closed the public hearing.

Motion by Councilmember Morris and seconded by Councilmember Molinar to approve Ordinance No. 2025-268 on first reading.

Upon vote, motion passed unanimously.

Ordinance No. 2025-269 For Regulation of Traffic by the Town of Johnstown; Adopting by Reference the 2024 edition of the Model Traffic Code; Providing for Certain Deletions from and Additions and Modifications to such Code; Repealing all Ordinances in conflict therewith; and providing penalties for violations thereof:

At 8:05 Mayor Duncan opened the public hearing.

Town Attorney Avi Rocklin presented the proposed ordinance. There was discussion related to zipper merging.

At 8:11 Mayor Duncan closed the public hearing.

Motion by Councilmember Molinar and seconded by Mayor Pro Tem Young to approve Ordinance 2025-269 as presented on first reading.

Upon vote, motion passed unanimously.

Ordinance 2025-265 Change of Zone for Waggoner Farms:

At 8:16 Mayor Duncan opened the public hearing.

Planning and Development Director Jeremy Gleim presented the proposed change of zone.

Dean Barber appeared on behalf of the applicant and addressed the Council.

At 8:34 Mayor Duncan closed the public hearing.

Motion by Councilmember Morris and seconded by Councilmember Molinar to approve Ordinance 2024-265 approving MU-NC zoning for Subdivision Case No. SUB23-0021 on first reading.

Upon vote, motion passed unanimously.

Resolution 2025-06 Preliminary Plat for Waggoner Farms:

At 8:36 Mayor Duncan opened the public hearing.

Planning and Development Director Jeremy Gleim presented.

Dean Barber addressed the Council on behalf of the applicant.

Jim Hatfield, 345 Hickory Lane inquired about the plans for fencing at the ditch to deter people and children from entering the ditch.

At 8:44 Mayor Duncan closed the public hearing.

Motion by Mayor Pro Tem Young and seconded by Councilmember Morris to approve Resolution No. 2025-06 approving the Preliminary Plat for Subdivision Case No. SUB23-0021.

Upon vote, motion passed unanimously.

COUNCIL REPORTS AND COMMENTS

Councilmember Molinar: Nothing at this time.

Councilmember Menzies: She mentioned the CSU basketball team photo at Buc-ees. She also thanked the McWhinney family for their donation to the senior center.

Mayor Pro Tem Young: He mentioned the audio system and asked that staff make sure everything is in working order moving forward.

Councilmember Morris: She gave a shout out to the PD for the building; it looks amazing. She asked about having public comment at the work session on March 24th.

Councilmember Paranto: He will be attending an event in Fort Collins and invited any of the Council to join him.

MAYOR'S COMMENTS

Mayor Duncan: Thanks to McWhinney for such a great gesture to the community. He thanked the Council for the dollar-for-dollar match. He asked Chief to give a short safety brief for St. Patrick's Day and encouraged everyone to be safe.

EXECUTIVE SESSION

Motion by Mayor Pro Tem Young and seconded by Councilmember Molinar to go into executive session to discuss a personnel matter under C.R.S. Section 24-6-402(4)(I) – Town Manager Evaluation.

Upon vote, motion passed unanimously.

At 8:57 Mayor Duncan recessed the meeting to go into executive session.

At 9:39 Mayor Duncan reconvened the meeting.

ACTION AFTER EXECUTIVE SESSION:

Motion by Councilmember Paranto and seconded by Councilmember Morris to increase the Town Manager's salary by 8.5%.

Upon vote, motion passed unanimously.

ADJOURNMENT

There being no further business for the Town Council, Mayor Duncan adjourned the meeting at 9:40 p.m.

Approved by Town Council:

Michael P. Duncan, Mayor

Attest:

Meghan C. Martinez, MMC, Town Clerk

Town of Johnstown
List of Bills - February 18, 2025 - March 17, 2025

<u>Vendor</u>	<u>Description</u>	<u>Dept</u>	<u>Amount</u>
24/7 Networks LLC	Computer equipment	PD/UTIL	27,474.33
2534 Retail Phase 1, LLC	Reimbursement agreement	ADM	76,757.09
4990 Ronald Reagan LLC	Police substation lease	PD	1,519.75
Ace Hardware	Supplies	ALL	1,028.10
All Copy Products, Inc	Copier supplies	PD	182.60
Aqua Engineering	Central expansion project	UTIL	23,311.78
Arapahoe Rental	Supplies	PW	425.59
Axon Enterprises, Inc.	Report writing equipment	PD	67,169.57
Benesch	CO Blvd & SH60/High Plains Blvd	PW	168,871.20
Bludot Technologies Inc.	CRM software	ADM	195.00
Browns Hill Engineering & Controls	Equipment maintenance	UTIL	5,896.80
Buc-ee's	Reimbursement agreement	ADM	264,466.77
Buckeye Welding Supply Co	Supplies	PW	140.50
Burns & McDonnell Engineering Co Inc.	Water treatment plant expansion	UTIL	140,792.42
Card Services	Training/travel/supplies	ALL	45,376.99
CDW Government	Computer equipment	PD	3,306.31
Cedar Supply	Supplies	PW	3,128.40
Central Weld County Water District	Interconnect	UTIL	703.20
CenturyLink	Phone/internet	PW/UTIL	905.11
Chambers Plumbing & Heating	Building maintenance	ADM	367.41
Cintas	Mat supplies/service	PW	538.17
City of Loveland	Facility rental	PD	600.00
CivicPlus	Software	ADM	1,620.68
Civil Resources	Raw water line project	UTIL	22,263.50
CMC Tire	Vehicle tires	PD	707.00
Colorado Advanced Life Support	CPR training	PD	162.00
Colorado Analytical Labs	Lab testing	UTIL	960.00
Colorado Demolition, Inc.	Sandra Drive house demolition	PW	23,610.75
Colorado Department of Transportation	I-25 project	PW	7,116.37
Colorado Greenbelt Management	Snow removal	PW	2,340.00
Colorado Tree Coalition	Arbor Day trees	PW	17,400.00
Community Center Refund	Community Center refunds	ADM	700.00
Connell Resources, Inc.	North Interceptor/Water line repair	PW	1,189,042.02
Consolidated Home Supply Ditch	Water legal	UTIL	8,272.40
Core & Main	Supplies	UTIL	242.83
Coren Printing, Inc	Supplies	UTIL	150.75
Costar Realty	Realty software	ADM	449.35
Coyote Ridge Construction	SH60 waterline project	PW	131,660.66
Cummins Sales and Service	Generator maintenance	PW/UTIL	865.45
Curtis Blue Line	Supplies	PD	504.00
D2C Architects	Development services/ Johnstown PD	ADM/PD	46,027.52
DataShield Corporation	Shred services	PD	50.00
Denali Water Solutions LLC	Sludge removal	UTIL	2,498.55
DES Pipeline Maintenance, LLC	Line cleaning/maintenance	UTIL	2,137.50
Dianne Morris	Reimbursement for conference	ADM	302.47
Dog Waste Depot	Park supplies	PW	479.82
Downtown Colorado Inc	Conference sponsorship	ADM	2,500.00
E-470 Public Highway Authority	Travel	ADM	59.10
Eiseman Ludmar Co	Uniforms	PD	38.24
Employee Reimbursement	Dues/training	ADM	749.00
Envirotech Services, Inc	Ice slicer chemicals	PW	30,519.83
Felsburg Holt & Ullevig Inc	Billback - Engineering services	ADM	2,315.00
Felsburg Holt & Ullevig Inc	Engineering services	ADM	1,232.50
First Class Security Systems	Fire system monitoring	PW	1,067.95
First National Bank	Custodial services	ADM	794.06
First Responder Trauma Counselors	Peer support	PD	1,665.00
Frontier Self Storage	Storage	PW	280.00

<u>Vendor</u>	<u>Description</u>	<u>Dept</u>	<u>Amount</u>
Galloway & Company, Inc.	Survey services	PW	2,900.00
Galls LLC	Uniforms	PD	211.60
Gard Lateral Ditch Company	Water assessments	PW	1,275.00
Glenn A. Jones Library	Monthly support	ADM	168,593.68
Grainger, Inc.	Supplies	UTIL	1,729.97
Graves Consulting	Compensation study	ADM	5,100.00
Greeley Monument Works Inc	Engraving	ADM	200.00
Gregory Electric LLC	YMCA electrical	ADM	23,055.10
Ground Engineering Consultants, Inc.	Water treatment plant expansion	UTIL	7,325.50
H.D. Fowler Company	Water meters	UTIL	1,333.50
Hach Company	Lab supplies	UTIL	157.40
Helton & Williamsen, P.C.	Billback - Legal services	ADM	2,340.00
Helton & Williamsen, P.C.	Water legal	UTIL	20,744.40
Hill & Robbins, PC	Water matters	UTIL	10,823.00
IMEG Corp	Billback - Engineering services	ADM	21,107.50
IMEG Corp	Engineering services	ADM	145.00
Infosend, Inc.	Newsletter/utility bill printing	ADM/UTIL	9,643.85
Insight North America LLC	Investment services	ADM	2,474.12
Iron Mountain Collision	Hail damage repair	ADM	12,135.41
J&S Contractors Supply Co.	Safety supplies	PW	3,170.46
John Deere Financial	Supplies	PW	1,265.06
Jones Plumbing Service	Building maintenance	PW	190.00
J-U-B Engineers, Inc.	SH60 waterline project	UTIL	7,876.75
Keith Smith A Joint Revocable Trust	Right-of-Way	PW	16,793.40
Keith Smith and Nellie Smith	Right-of-Way	PW	7,605.00
Kimball Midwest	Hardware supply setup	PW/UTIL	14,085.03
Kimley - Horn and Associates	Downtown masterplan	ADM	1,764.60
Kinsco, LLC	Uniforms	PD	2,039.00
Kumar & Associates, Inc	Police department expansion	PD	420.00
Language Line Services Inc.	Translation services	PD	17.22
Larimer County Sales Tax Administrator	Use Tax - Reimbursement	ADM	62,082.11
Larimer County Sheriff's Office	Hiring expense	PD	39.50
Larimer County Treasurer	Property taxes - Yelek closing	ADM	888.24
Law Office of Avi Rocklin LLC	Billback - Legal services	ADM	5,381.50
Law Office of Avi Rocklin LLC	Legal services	ADM	14,107.00
Lexipol, LLC	Software	PD	3,500.00
Little Thompson Water District	Interconnect	UTIL	177.06
Longmont Emergency Unit	Tank inspection	UTIL	1,000.00
Loveland Ford-Lincoln	Vehicle maintenance	PD	1,618.45
Mark Young Construction, LLC	Police department expansion	PD	741,134.72
Mary's Mountain Cookies	Reimbursement agreement	ADM	192.51
Matrix Design Group, Inc.	Stormwater master plan	PW	83,364.95
McGeady Becher P.C.	Billback - Legal services	ADM	2,626.00
Medicine for Business and Industry	Lab services	ADM	202.00
MGS Incorporated	Equipment maintenance	PW	1,108.10
Michael Lazar	Municipal Court Judge	ADM	2,550.00
Mile High Elevator LLC	Building maintenance	PW	234.74
Milliken Johnstown Electric	Building maintenance	UTIL	284.24
Mission Communications, LLC	Software subscription	UTIL	563.40
Moltz Construction Inc.	Central expansion project	UTIL	1,833,335.17
Motorola Solutions, Inc.	Police equipment	PD	2,191.39
MQ3 Construction LLC	Development deposit refund	ADM	2,844.75
MWH Constructors	Water treatment plant expansion	UTIL	1,228,609.14
Nalco Company LLC	Chemicals - wastewater	UTIL	14,778.49
Napa Auto Parts, Inc	Supplies	ALL	1,645.83
North Front Range MPO	Dues	ADM	2,807.00
Parkland USA Corp	Fuel	ALL	9,479.56
Peak Performance Imaging Solutions	Laserfiche software	ADM	27,035.00
Pioneer Press of Greeley Inc	Printing services	PD	112.00

<u>Vendor</u>	<u>Description</u>	<u>Dept</u>	<u>Amount</u>
Pitney Bowes	Postage	ADM	115.00
Pitney Bowes Bank Inc Purchase Power	Postage	ADM	272.40
PK Safety Supply	Safety supplies	UTIL	456.00
Poudre Valley REA	Utilities	PW	48,656.32
ProFirst Training and Consulting, LLC	Background evaluations	PD	975.00
PVS DX, INC	Chemicals - water/wastewater	PW	14,247.26
RCD Construction	Little Thompson Trail bridge	PW	90,650.83
Red Wing	Uniforms	PW	717.28
Reorganized Farmers Ditch Co.	Water assessments	ADM	475.00
Resource Central	Water conservation	UTIL	11,290.00
Revelation Steel, LLC	Supplies	PW	1,385.44
Ricoh USA	Copier	ADM	8,732.11
Rise Broadband	Phone/internet	UTIL	112.67
Rocky Mountain Dive Solutions	Tank inspections	UTIL	4,600.00
Rocky Mountain Water Environment Assoc.	Dues	UTIL	35.00
Ruby I. Trembath	Easement	PW	37,800.92
SAFEBuilt LLC	Inspection services	ADM	25,000.00
Sam's Club MC/SYNCB	General supplies	ALL	564.86
Sanbell	CO Blvd. & SH 60 project	PW	4,550.60
Sanborn Map Company, Inc	Stormwater master plan	PW	14,377.53
Sendas Communications LLC	Translation services	ADM	155.14
SiteOne Landscape Supply	Supplies	PW	192.50
SKM Engineering	SCADA	UTIL	557.00
SMH West, LLC	South Tank project	UTIL	19,999.96
Striglos	Software	ALL	149.00
Summit Compression LLC	Compressors	UTIL	28,979.27
TDS	Phone/internet	ALL	8,457.77
The Jamar Company	Building maintenance	PW	1,797.58
Thompson Crossing Metro District No 2	Reimbursement agreement	ADM	53,241.12
Tier One Networking, LLC	Computer supplies	ADM	458.00
TimberLAN	IT services	ALL	31,178.00
T-Mobile	Phone/internet	PD	33.15
TopShelf Printers	Supplies	ALL	6,607.36
Town of Frisco	Safety equipment	PD	2,000.00
Town of Johnstown	Utilities	ALL	729.19
Traffic Signal Controls Inc	Traffic signals	PW	15,560.00
Treatment Technology Holding	Chemicals - water	UTIL	10,960.00
Tri State Oil Reclaimers, Inc.	Oil recycling	PW	150.00
UC Health Medical Group	Lab testing	PD	198.36
United Power, Inc	Utilities	PW/UTIL	1,582.42
USA Bluebook	Lab supplies	UTIL	3,081.69
Utility Refund	Utility refunds	ADM	3,401.49
Verizon Wireless	Phone/internet	ALL	5,724.62
Wagner Equipment Co.	Equipment maintenance	PW	599.20
Warehouse Supply Inc	Vehicle maintenance	PW	49.56
Waste Connections of Colorado Inc.	Trash services	PW	94,834.86
Weld County Chiefs of Police Assn	Dues	PD	350.00
Weld County Dept of Public Health	Lab services	UTIL	1,125.00
Weld County Sheriff	Jail fees	PD	77.16
Wenk Associates, Inc	Park master plan project	PW	6,498.15
Western States Land Services LLC	Raw water line project	UTIL	4,210.99
Whiteside's Greeley	Uniforms	ADM	209.99
Working Spaces	Police department expansion	PD	24,371.70
Xcel Energy	Utilities	ALL	89,607.62
YMCA of Northern Colorado	Monthly support	ADM	39,672.50
			7,446,170.36



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Consent Agenda Communication

Agenda Date: April 7, 2025

Subject: Ordinance 2025-265 Change of Zone for Waggoner Farms - Second Reading

Attachments: 1. Ordinance 2025-265

Presented by: Jeremy Gleim, Planning and Development Director

Agenda Item Description:

Ordinance 2025-265 was approved upon first reading at the Town Council meeting on March 17, 2025.

EXECUTIVE DESCRIPTION

The applicant, MIC TDC Hwy 60 Johnstown, LLC, has submitted an application for a Change of Zone and Preliminary Plat for the property known as Waggoner Farm. The introduction and first reading of Ordinance 2025-265 (Ordinance) took place at the regular Town Council meeting on March 17, 2025. The Ordinance passed by vote of the Town Council at that meeting.

Strategic Plan Alignment:

Natural & Built Environment

- Expect and encourage community-centered design
- Support a broad range of housing options

Legal Advice:

The Town Attorney prepared Ordinance 2025-265

Financial Advice:

N/A

Recommended Action:

Approve Ordinance 2025-265, on second reading, to change the zone of Waggoner Farms from PUD-B to MU-NC.

Reviewed and Approved for Presentation

A handwritten signature in blue ink, appearing to be 'W. J. C.', is written above a horizontal line.

Town Manager

TOWN OF JOHNSTOWN, COLORADO
ORDINANCE NO. 2025-265

ORDINANCE APPROVING A CHANGE OF ZONE FOR PROPERTY KNOWN AS WAGGONER FARM, SITUATED IN THE SOUTHEAST QUARTER OF SECTION 1, TOWNSHIP 4 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF JOHNSTOWN, COUNTY OF WELD, STATE OF COLORADO, CONSISTING OF APPROXIMATELY 17.444 ACRES, FROM PLANNED UNIT DEVELOPMENT–BUSINESS (PUD-B) TO MIXED USE–NEIGHBORHOOD COMMERCIAL (MU-NC)

WHEREAS, the Town of Johnstown, Colorado (“Town”) is a Colorado home rule municipality, duly organized and existing under the laws of the State of Colorado and the Town’s Home Rule Charter; and

WHEREAS, the Town Council is vested with authority to administer the affairs of the Town; and

WHEREAS, MIC TDC Hwy 60 Johnstown, LLC, a Colorado limited liability company (“Owner”), applied to rezone the property known as Waggoner Farm, situated in the Southeast Quarter of Section 1, Township 4 North, Range 68 West of the 6th P.M., Town of Johnstown, County of Weld, State of Colorado, consisting of approximately 17.444 acres, being more particularly described on Exhibit A, which is attached hereto and incorporated herein by this reference (“Property”), from Planned Unit Development – Business (PUD-B) to Mixed Use – Neighborhood Commercial (MU-NC); and

WHEREAS, on September 25, 2024, the Town’s Planning and Zoning Commission held a public hearing and recommended approval of Mixed Use – Neighborhood Commercial (MU-NC) zoning for the Property; and

WHEREAS, on March 17, 2025, the Town Council held a public hearing to determine appropriate zoning for the Property and, based upon the evidence received at the hearing, finds that the requested rezoning of the Property to Mixed Use – Neighborhood Commercial (MU-NC) conforms to the *Johnstown Area Comprehensive Plan* and Section 17-2-3 of the Town of Johnstown Land Use and Development Code and should be approved.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, THAT:

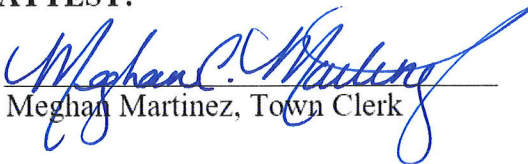
1. Zoning of the Property shall hereby and hereinafter be designated as Mixed Use – Neighborhood Commercial (MU-NC).
2. All other Ordinances, or parts thereof, in conflict with this Ordinance are hereby repealed. To the extent an outline development plan was previously approved for the Property in connection with the annexation of the Property and the initial zoning of the Property, the Property shall no longer be subject to such outline development plan.

3. This Ordinance, after its passage on final reading, shall be numbered, recorded, published and posted as required by the Home Rule Charter of the Town of Johnstown, Colorado ("Charter") and the adoption, posting and publication shall be authenticated by the signature of the Mayor and the Town Clerk and by the Certificate of Publication. This Ordinance shall become effective upon final passage as provided by the Charter.
4. Upon its effective date, the Town Clerk is hereby directed to file this Ordinance with the real estate records of the Weld County Clerk and Recorder.

INTRODUCED AND APPROVED on first reading by the Town Council of the Town of Johnstown, Colorado, this 7th day of March, 2025.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: 
Meghan Martinez, Town Clerk

By: 
Michael P. Duncan, Mayor

PASSED UPON FINAL APPROVAL AND ADOPTED on second reading by the Town Council of the Town of Johnstown, Colorado, this _____ day of _____, 2024.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor

EXHIBIT A
PROPERTY DESCRIPTION

COMMENCING at the Southeast Corner of said Section 1, and assuming the south line of said Southeast Quarter as bearing South 89°22'43" West, being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, a distance of 2,652.47 feet monumented by a #6 rebar with a 2" aluminum cap stamped LS 23500 at the Southeast Corner of Section 1 and monumented by a #6 rebar with a 2.5" aluminum cap stamped LS 12374 at the South Quarter Corner of Section 1, and with all other bearings contained herein relative thereto;

THENCE North 05°50'52" West, along the east line of said Southeast Quarter, a distance of 23.80 feet to the northeast corner of that parcel described in Right-of-Way Deed recorded May 3, 1957, in Book 1477 at Page 20, as reception No. 1253790 of the records of the Weld County Clerk and Recorder, and the POINT OF BEGINNING;

THENCE along the north lines of Right-of-Way parcels, Reception No. 1253788, Reception No. 1253789 and Reception No. 1253790 the following two courses;

THENCE South 89°43'16" West, a distance of 165.09 feet;

THENCE South 89°42'13" West a distance of 1,152.60 feet to a 1/2 " rebar with a 2" aluminum cap;

THENCE North 03°45'01" East, along an existing fence line, a distance of 387.19 feet to the centerline of the concrete irrigation canal of the Home Supply Ditch;

THENCE along the centerline of said Home Supply Ditch the following 13 courses;

THENCE North 27°55'00" East a distance of 98.10 feet;

THENCE North 33°55'52" East a distance of 73.03 feet;

THENCE North 46°52'30" East a distance of 47.66 feet;

THENCE North 60°59'36" East a distance of 22.85 feet;

THENCE North 77°48'56" East a distance of 156.81 feet;

THENCE North 79°39'59" East a distance of 84.00 feet;

THENCE North 87°54'42" East a distance of 44.57 feet;

THENCE South 86°04'26" East a distance of 306.85 feet;

THENCE North 88°52'57" East a distance of 52.70 feet;

THENCE North 82°05'53" East a distance of 50.11 feet;

THENCE North 80°27'37" East a distance of 40.02 feet;

THENCE North 73°56'16" East a distance of 42.04 feet;

THENCE North 64°47'00" East a distance of 62.02 feet;

THENCE South 72°42'18" East, departing said centerline, a distance of 187.87 feet to a #3 rebar;

THENCE South 67°15'47" East a distance of 96.96 feet to the east line of said Southeast Quarter;

THENCE South 05°50'52" East, along said east line, a distance of 561.52 feet to the north line of Reception No. 1253790, and the POINT OF BEGINNING.



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Consent Agenda Communication

Agenda Date: April 7, 2025

Subject: Ordinance 2025-268 Amending the Johnstown Municipal Code Concerning Special Police Officers - Second Reading

Attachments: 1. Ordinance 2025-268

Presented by: Jeff Strossner, Chief of Police

Agenda Item Description:

Ordinance 2025-268 was approved on first reading at the Town Council meeting on March 17, 2025.

Enforcement of the Town municipal code is not always best achieved through the use of POST-certified police officers. High levels of customer service and response can be achieved by utilizing specially trained and empowered civilian personnel, both paid and volunteer. Currently, the municipal code does not appear to specifically designate the powers of code enforcement officers or community service officers. This new ordinance will allow the Chief of Police to issue letters of authority providing limited police powers to community service officers, code enforcement officers, or similarly titled positions to enforce specified municipal codes including parking, limited traffic violations, or specific municipal criminal charges such as code enforcement, littering and rubbish, illegal burning, etc. Additionally, the ordinance allows for the appointment of special investigators to assist the department with defined criminal and/or background investigations.

The proposed ordinance will allow the Chief of Police to determine the best staffing models necessary to preserve public safety and respond to the non-emergent needs of the community and enhance the work of the department's investigations unit.

Strategic Plan Alignment:

Organizational Excellence & Public Trust

- Strengthen public trust and confidence

Safe & Welcoming Community

- Provide and maintain public safety services and awareness in our community
- Partner in creating more community based, community service and action opportunities

Quality Infrastructure & Facilities

- Establish and maintain levels of service

Legal Advice:

The Town Attorney prepared the Ordinance.

Financial Advice:

N/A

Recommended Action:

Recommend approval of Ordinance 2025-268 on consent agenda.

Reviewed and Approved for Presentation



Town Manager

TOWN OF JOHNSTOWN, COLORADO
ORDINANCE NO. 2025-268

**AN ORDINANCE ADDING SECTION 2-98 TO THE JOHNSTOWN
MUNICIPAL CODE CONCERNING SPECIAL POLICE OFFICERS**

WHEREAS, the Town of Johnstown, Colorado (“Town”) is a Colorado home rule municipality, duly organized and existing under the laws of the State of Colorado and the Town’s Home Rule Charter; and

WHEREAS, the Town Council is vested with authority to administer the affairs of the Town; and

WHEREAS, Article IV of Chapter 2 of the Johnstown Municipal Code (“Code”) regulates the Johnstown Police Department; and

WHEREAS, to provide a better defined process and mechanism for the Chief of Police to appoint special police officers to undertake certain police-related work, Town staff, including Chief Jeff Strossner, recommends that the Town Council amend Article IV of Chapter 2 of the Code to add Section 2-98, setting forth the procedure and parameters for the appointment of special police officers, including, but not limited to, community service officers, code enforcement officers and special investigators; and

WHEREAS, based on the recommendation of Town staff, the Town Council desires to amend Article IV of Chapter 2 of the Code to add Section 2-98; and

WHEREAS, the Town Council finds, determines and declares that this Ordinance is promulgated under the general police power of the Town and is in the best interests of the Town.

BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, AS FOLLOWS:

Section 1. Section 2-98 is hereby added to the Johnstown Municipal Code and shall read as follows:

Sec. 2-98. – Special police officers.

By letter of appointment, the Chief of Police may appoint any person as a special police officer. A special police officer may, at the discretion of the Chief of Police, be referred to as a community service officer, code enforcement officer or special investigator or by any other reasonable title and may be an employee or volunteer of the Town. A special police officer shall be a peace officer, possess only those powers, privileges and duties specified in the letter of appointment and conform to and be subject to all rules and regulations governing the Johnstown Police Department and all special rules and regulations the Chief of Police may make concerning special police officers. At the discretion of the Chief of Police, a special police officer may be removed or discharged from such position at any time with or without cause.

Section 2. Severability. If any part or provision of this Ordinance, or its application to any person or circumstance, is adjudged to be invalid or unenforceable, the invalidity or unenforceability of such part, provision, or application shall not affect any of the remaining parts, provisions or applications of this Ordinance that can be given effect without the invalid provision, part or application, and, to this end, the provisions and parts of this Ordinance are declared to be severable.

Section 3. Publication; Effective Date. This Ordinance, after its passage on final reading, shall be numbered, recorded, published and posted as required by the Home Rule Charter of the Town of Johnstown, Colorado ("Charter") and the adoption, posting and publication shall be authenticated by the signature of the Mayor and the Town Clerk. This Ordinance shall become effective upon final passage as provided by the Charter. Copies of the entire Ordinance are available at the office of the Town Clerk.

INTRODUCED, AND APPROVED on first reading by the Town Council of the Town of Johnstown, Colorado, this 17th day of March, 2025.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: Meghan C. Martinez
Meghan Martinez, Town Clerk

By: Michael P. Duncan
Michael P. Duncan, Mayor

PASSED UPON FINAL APPROVAL AND ADOPTED on second reading by the Town Council of the Town of Johnstown, Colorado, this ____ day of _____, 2025.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Consent Agenda Communication

Agenda Date: April 7, 2025

Subject: Ordinance 2025-269 Regulation of Traffic by the Town of Johnstown;
Adopting by Reference the 2024 Edition of the Model Traffic Code;
Providing for Certain Deletions from and Additions and Modifications to
such code; Repealing all Ordinances in conflict therewith; and providing
penalties for violations thereof - Second Reading

Attachments: 1. Ordinance 2025-269

Presented by: Jeff Strossner, Chief of Police

Agenda Item Description:

Ordinance 2025-269 was approved upon first reading at the Town Council meeting on March 17, 2025.

Enclosed for your review and consideration is a request to update the Town's existing traffic code to the new 2024 Model Traffic Code, plus additional deletions and amendments as noted in the ordinance. State law allows municipalities to adopt by reference all or any part of the model traffic code. The 2024 code includes the latest revisions enacted by the Colorado Legislature. The Town has modified some specific sections within the Code to simplify the statutes, making them clearer to understand and enforce.

Strategic Plan Alignment:

Safe & Welcoming Community

- Provide and maintain public safety services and awareness in our community

Legal Advice:

The Town Attorney prepared the Ordinance.

Financial Advice:

N/A

Recommended Action:

Approve Ordinance No. 2025-269, adopting the 2024 Model Traffic Code by Reference on second reading.

Reviewed and Approved for Presentation

A handwritten signature in blue ink, appearing to be 'W. J. C.', is written above a horizontal line.

Town Manager

**TOWN OF JOHNSTOWN, COLORADO
ORDINANCE NO. 2025-269**

AN ORDINANCE FOR THE REGULATION OF TRAFFIC BY THE TOWN OF JOHNSTOWN, COLORADO; ADOPTING BY REFERENCE THE 2024 EDITION OF THE MODEL TRAFFIC CODE; PROVIDING FOR CERTAIN DELETIONS FROM AND ADDITIONS AND MODIFICATIONS TO SUCH CODE; REPEALING ALL ORDINANCES IN CONFLICT THEREWITH; AND PROVIDING PENALTIES FOR VIOLATION THEREOF.

WHEREAS, the Town of Johnstown, Colorado (“Town”) is a Colorado home rule municipality, duly organized and existing under the laws of the State of Colorado and the Town’s Home Rule Charter; and

WHEREAS, the Town Council is vested with authority to administer the affairs of the Town; and

WHEREAS, pursuant to § 42-4-110(1)(b), C.R.S., municipalities may, in the manner prescribed by Parts 1 and 2 of Article 16 of Title 31, C.R.S., adopt by reference all or any part of a model traffic code to control and regulate the movement and parking of motor vehicles as provided by state traffic laws; and

WHEREAS, the Colorado Department of Transportation has prepared and adopted a 2024 revised edition of the Model Traffic Code for Colorado; and

WHEREAS, the Town Council desires to adopt the 2024 revised edition of the Model Traffic Code for Colorado, with deletions, additions and modifications as specified below.

BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, THAT:

Section 1. Section 8-21 of the Johnstown Municipal Code is hereby repealed and reenacted to read as follows:

Section 8-21. Adoption

Pursuant to Parts 1 and 2 of Article 16 of Title 31 and Part 4 of Article 15 of Title 30, there is hereby adopted by reference the 2024 Edition of the Model Traffic Code for Colorado (“Model Traffic Code”), promulgated and published as such by the Colorado Department of Transportation, Safety and Traffic Engineering Branch, 2829 W. Howard Place, Denver, CO 80204. The subject matter of the Model Traffic Code relates primarily to comprehensive traffic control regulations for the Town. The purpose of this Ordinance and the Code adopted herein is to provide a system of traffic regulations consistent with state law and generally conforming to similar regulations throughout the state and the nation. Three (3) copies of the Model Traffic Code adopted herein are now filed in the office of the Town Clerk and may be inspected during regular business hours.

Section 2. Section 8-22 of the Johnstown Municipal Code is hereby repealed and reenacted to read as follows:

Section 8-22. Deletions from the 2024 Model Traffic Code.

The 2024 edition of the Model Traffic Code is adopted subject to the following deletions:

- (1) Section 511; and
- (2) Section 1705.

Section 3. Section 8-23 of the Johnstown Municipal Code is hereby repealed and reenacted to read as follows:

Section 8-23. Additions or modifications to the 2024 Model Traffic Code. The 2024 edition of the Model Traffic Code is adopted subject to the following additions or modifications:

- (1) Section 604(1)(c)(I)(A) is hereby amended to read as follows:

604. Traffic control signal legend.

- (1)(c)(I)(A) Such vehicular traffic, after coming to a stop and yielding the right-of-way to pedestrians lawfully within an adjacent crosswalk and to other traffic lawfully using the intersection, may make a right turn, unless state or local road authorities within their respective jurisdictions have prohibited any such right turn by erecting an official sign at each intersection where such right turn is prohibited.

- (2) Section 614(1) is hereby amended to read as follows:

614. Designation of highway maintenance, repair, or construction zones - signs – increase in penalties for speeding violations.

(1)(a) If maintenance, repair or construction activities are occurring or will occur within four hours on a portion of a state highway, the department of transportation may designate such portion of the highway as a highway maintenance, repair or construction zone. Any person who commits traffic violations in a maintenance, repair or construction zone that is designated pursuant to this section is subject to increased penalties.

(b) If maintenance, repair or construction activities are occurring or will occur within four hours on a portion of a roadway that is not a state highway, the public entity conducting the activities may designate such portion of the roadway as a maintenance, repair or construction zone. Any person who commits traffic violations in a maintenance, repair or construction zone that is designated pursuant to this section is subject to increased penalties.

- (3) Section 1101(4) is hereby amended to read as follows:

1101. Speed limits.

- (4) No person shall drive a vehicle on a street or highway within the Town at a speed greater than the speed limit posted on official traffic control signs; or, if no speed limit is posted on an official traffic control sign, at a speed greater than set forth in subsection (2) of this section or as provided by ordinance as the maximum lawful speed limit, whichever is greater.

- (4) Section 1101(7) is hereby amended to read as follows:

- (7) Notwithstanding paragraphs (a), (b), and (c) of subsection (2) of this section, the Town may by ordinance adopt absolute speed limits as the maximum lawful speed limits in its jurisdiction.

(5) Section 1209 is hereby amended in full to read as follows:

1209. Owner liability for parking violations.

- (1) In any prosecution for an alleged violation of any of the parking restrictions imposed by this Part 12, proof that the particular vehicle described in the notice or complaint was stopped, standing or parked in violation of any such rule or regulation, together with proof that the defendant named in the notice or complaint was at the time of such stopping, standing or parking the registered owner of such vehicle, shall constitute in evidence a prima facie presumption that the registered owner of such vehicle was the person who stopped, placed or parked such vehicle at the place where and for the time during which such violation occurred.
- (2) In addition to any other liability provided for in this Code, the owner of a motor vehicle who is engaged in the business of leasing or renting motor vehicles is liable for payment of a parking violation fine unless the owner of the leased or rented motor vehicle was, at the time of the parking violation, in the care, custody or control of another person. To avoid liability for payment, the owner of the motor vehicle is required, within a reasonable time after notification of the parking violation, to furnish to the prosecutorial division of the appropriate jurisdiction the name and address of the person or company who lease, rented or otherwise had the care, custody or control of such vehicle. As a condition to avoid liability for payment of a parking violation, any person or company who leases or rents motor vehicles to another person shall attach to the leasing or rental agreement a notice stating that, pursuant to the requirements of this section, the operator of the vehicle is liable for payment of a parking violation fine incurred when the operator has the care, custody or control of the motor vehicle. The notice shall inform the operator that the operator name and address shall be furnished to the prosecutorial division of the appropriate jurisdiction when a parking violation fine is incurred by the operator.

(6) Section 1409 is hereby amended in full to read as follows:

1409. Compulsory insurance - penalty.

- (1) No owner of a motor vehicle or low power scooter required to be registered in this state shall operate the vehicle or permit it to be operated on the public highways of this municipality when the owner has failed to have a complying policy or certificate of self-insurance in full force and effect as required by state law.
- (2) No person shall operate a motor vehicle or low-power scooter on the public highways of this municipality without a complying policy or certificate of self-insurance in full force and effect as required by state law.
- (3) When an accident occurs, or when requested to do so following any lawful traffic contact or during any traffic investigation by a peace officer, an owner or operator of a motor vehicle or low-power scooter shall present to the requesting officer immediate evidence of a complying policy or certificate of self-insurance in full force and effect as required by state law.

- (a) As used in this section, “evidence of a complying policy or certificate of self-insurance in full force and effect” includes the presentation of such policy or certificate upon a cell phone or other electronic device.
- (b) If a complying policy or certificate of self-insurance is provided by a cell phone or other electronic device, the law enforcement officer to whom the operator presents the device and any law enforcement agency that employs the officer are immune from any civil damages resulting from the officer dropping or otherwise unintentionally damaging the cell phone or other electronic device.
- (4) Any person who violates the provisions of subsections (1), (2), or (3) of this section commits a misdemeanor.
- (5) Testimony of the failure of any owner or operator of a motor vehicle or low power scooter to present immediate evidence of a complying policy or certificate of self-insurance in full force and effect as required by state law, when requested to do so by a peace officer, shall constitute prima facie evidence, at a trial concerning a violation charged under subsection (1) or (2) of this section, that such owner or operator of a motor vehicle violated subsection (1) or (2) of this section.
- (6) No person charged with violating subsections (1), (2), or (3) of this section shall be convicted if the person produces a bona fide complying policy or certificate of self-insurance which was in full force and effect, as required by state law, at the time of the alleged violation.

(7) Section 1417 is hereby added to read as follows:

Section 1417. Expired license plates/registrations/temporary permit.

- (1) Pursuant to state law, § 42-3-114, C.R.S., as amended, every vehicle registration issued by the State of Colorado shall expire on the last day of the month at the end of each twelve-month registration period and shall be renewed, upon application by the owner, by the payment of the fees required by law, not later than thirty days after the date of expiration. No license plates other than those of the registration period to which they pertain shall be displayed on a motor vehicle operating on any street or highway within the Town.
- (2) No person shall lend to or knowingly permit the use by one not entitled thereto any certificate of title, registration card, or registration number plate issued to the person so lending or permitting the use thereof.
- (3) A temporary vehicle registration may not be used on any vehicle after the expiration of the period for which the permit was issued

(8) Section 1418 is hereby added to read as follows:

Section 1418. Driving while license denied or suspended.

- (1) It shall be unlawful for any person to drive a motor vehicle or off-highway vehicle upon any street or roadway in this Town with knowledge that such person’s license or privilege to drive, either as a resident or a nonresident, is under restraint for any reason.
- (2) For the purpose of this section, the following definitions shall apply:

- (a) 'Knowledge' means actual knowledge of any restraint from whatever source or knowledge of circumstances sufficient to cause a reasonable person to be aware that such person's license or privilege to drive was under restraint. 'Knowledge' does not mean knowledge of a particular restraint or knowledge of the duration of restraint.
- (b) 'Restraint' or 'restrained' means any denial or suspension of a person's license or privilege to drive a motor vehicle in this State, or any combination of denials or suspensions.
- (3) In any trial for a violation of this section, a duly authenticated copy of the record of the defendant's former convictions and judgments and alcohol-related driving offenses pursuant to Section 42-4-1301(1) or (2), C.R.S., from any court of record or certified copy of the record of any denial of a defendant's driving privilege under Section 42-2-126(2)(a), C.R.S., from the State of Colorado Department of Motor Vehicles shall be prima facie evidence of such convictions, judgments, or denial and may be used in evidence against such defendant.
- (4) In any prosecution for a violation of this section, the fact of the restraint may be established by certification that a notice was mailed by first-class mail pursuant to Section 42-2-119(2), C.R.S., to the known address of the defendant, or by delivery of such notice to the last known address of the defendant, or by personal service of such notice upon the defendant.

(9) Section 1419 is hereby added to read as follows:

Section 1419. Driving without a current driver's license.

- (1) No person shall drive any motor vehicle upon a street, road or highway within the Town unless such person has been issued a currently valid driver's or minor driver's license or an instruction permit by a State Department of Motor Vehicles.
- (2) No person who has been issued a currently valid driver's or minor driver's license or an instruction permit shall operate a motor vehicle upon a street, road or highway within the Town without having such license or permit in such person's immediate possession. A charge of a violation of this section shall be dismissed by the court if the defendant, at or before the defendant's scheduled court appearance, exhibits to the court a currently valid driver's or minor driver's license or an instruction permit issued to such person; provided that such currently valid driver's license or minor driver's license or instruction permit shall also have been valid on the date the defendant was issued the citation.
- (3) No person who has been issued a currently valid driver's or minor driver's license or an instruction permit shall drive a type or general class of motor vehicle upon a street, road or highway within the Town for which such person has not been issued the correct type or general class of license or permit.
- (4) The conduct of a driver of a motor vehicle which would otherwise constitute a violation of this section is justifiable and not unlawful when:
 - (a) It is necessary as an emergency measure to avoid an imminent public or private injury which is about to occur by reason of a situation occasioned or developed

through no conduct of said driver and which is of sufficient gravity that, according to ordinary standards of intelligence and morality, the desirability and urgency of avoiding the injury clearly outweigh the desirability of avoiding the injury sought to be prevented by this section, or the applicable conditions for exemption, as set forth in § 42-2-102, C.R.S., as amended, exist.

- (b) The issue of justification or exemption is an affirmative defense. Unless the prosecutor's evidence raises the issue involving the particular defense, the defendant, to raise the issue, shall present some credible evidence on that issue and bears the burden of proof regarding the affirmative defense.

- (9) Section 1420 is hereby added to read as follows:

Section 1420. Permitting unauthorized person to drive.

No person shall authorize or knowingly permit a motor vehicle owned by such person or under such person's hire or control to be driven upon any street or highway within the Town by any person who has not been issued a currently valid driver's or minor driver's license or an instruction permit or shall cause or knowingly permit such a person to drive a motor vehicle upon any street or highway in violation of the conditions or restrictions contained in a license or permit which has been issued to such other person.

- (10) Section 1421 is hereby added to read as follows:

Section 1421. Automatic point reduction.

If a person receives a penalty assessment notice for a violation and such person pays the fine and surcharge for the violation on or before the date the payment is due, the points assessed for the violation shall be reduced as follows:

- (1) For a violation having an assessment of three (3) or more points, the points are reduced by two (2) points.
- (2) For a violation having an assessment of two (2) points, the points are reduced by one (1) point.

Section 4. Penalties. It is unlawful for any person to violate any of the provisions adopted in this Ordinance. Every person convicted of a violation of any provision adopted in this Ordinance, notwithstanding the fines that may be contained in 2024 edition of the Model Traffic Code, shall be punished as provided in Johnstown Municipal Code Section 8-26.

Section 5. Application. This Ordinance shall apply to every street, alley, sidewalk area, driveway, park, and to every other public way or public place or public parking area, either within or outside the corporate limits of the Town, the use of the Town has jurisdiction and authority to regulate. The provisions of sections 1401, 1402 and 1413 of the adopted Model Traffic Code, respectively concerning reckless driving, careless driving and eluding a police officer, and those concerning accidents and accident reports, shall apply not only to public places and ways but also throughout the Town.

Section 6. Validity. If any part or parts of this Ordinance are for any reason held to be invalid such decision shall not affect the validity of the remaining portions of this Ordinance. The Town Council

hereby declares that it would have passed this Ordinance and each part or parts thereof, irrespective of the fact that any one part or parts be declared invalid.

Section 7. Repeal. Existing or parts of ordinances covering the same matters as embraced in this Ordinance are hereby repealed and all ordinances or parts of ordinances inconsistent with the provisions of this Ordinance are hereby repealed, except that this repeal shall not affect or prevent the prosecution or punishment of any person for any act done or committed in violation of any ordinance hereby repealed prior to the taking effect of this Ordinance.

Section 8. Interpretation. This Ordinance shall be so interpreted and construed as to effectuate its general purpose to conform with the State's uniform system for the regulation of vehicles and traffic. Article and section headings of the ordinance and the adopted Model Traffic Code shall not be deemed to govern, limit, modify or in any manner affect the scope, meaning or extent of the provisions of any article or section thereof.

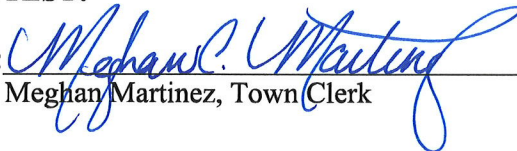
Section 9. Certification. The Town Clerk shall certify to the passage of this Ordinance and make not less than three copies of the adopted Code available for inspection by the public during regular business hours.

Section 10. Effective Date. This Ordinance, after its passage on final reading, shall be numbered, recorded, published and posted as required by the Home Rule Charter of the Town of Johnstown, Colorado and the adoption, posting and publication shall be authenticated by the signature of the Mayor and the Town Clerk and by the Certificate of Publication. This Ordinance shall become effective upon final passage as provided by the Charter. Copies of the entire Ordinance are available at the office of the Town Clerk.

INTRODUCED, AND APPROVED on first reading by the Town Council of the Town of Johnstown, Colorado, this 17th day of March, 2025.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: 
Meghan Martinez, Town Clerk

By: 
Michael P. Duncan, Mayor

PASSED UPON FINAL APPROVAL AND ADOPTED on second reading by the Town Council of the Town of Johnstown, Colorado, this _____ day of _____, 2024.

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Consent Agenda Communication

Agenda Date: April 7, 2025

Subject: Resolution 2025-10: Authorizing an audit of the YMCA of Northern Colorado

Attachments: 1. Resolution 2025-10

Presented by: Matt LeCerf, Town Manager

Agenda Item Description:

On March 24, 2025 Town Council met with representatives of the Northern Colorado YMCA (YMCA) during a work session to discuss the financial disposition and performance of the Johnstown YMCA facility, currently owned by the Town, but operated under contract by the YMCA. The work session was a result of two versions of the 2024 end of year financial statements submitted by the YMCA to the Town and reporting deficits that were materially significant from each other. During the work session, Town Council members inquired if the YMCA would be receptive to an audit beyond the contractual limit of the previous 3 fiscal years. Representatives acknowledged they were amenable to this option. Council also wanted the audit to be a forensic audit. The cost difference between a typical audit and a forensic audit is an element Staff is exploring as part of its due diligence as we evaluate potential financial auditing consultants to perform this work. Resolution 2025-10 reinforces the Town's desire to perform an audit and while it also allows for the Town Manager if necessary to proceed with this work. Notwithstanding this authorization, it is our full intention to bring back a recommendation to Council for approval that will include an engagement letter with the recommended firm.

There are many ways in which we can approach this audit that maybe worth considering by Council. Two options include:

- Auditing the YMCA from the contract date of April 1, 2019 - Present
- Alternatively Council might consider auditing the Johnstown YMCA system for the past 3 years and based on the initial findings, continue beyond the past three (3) years.

No direction is necessary at this time regarding the audit duration and can be further discussed at the meeting where the recommended auditor is provided, currently anticipated on April 21.

Strategic Plan Alignment:

Organizational Excellence & Public Trust

- Strengthen public trust and confidence

Quality Infrastructure & Facilities

- Ensure future viability of infrastructure and facilities
- Repair and maintain existing infrastructure, facilities and equipment

Legal Advice:

The Town Attorney drafted the Resolution as requested by the Town Manager.

Financial Advice:

NA

Recommended Action:

Approve Resolution 2025-10 as presented.

Reviewed and Approved for Presentation



Town Manager

**TOWN OF JOHNSTOWN, COLORADO
RESOLUTION NO. 2025-10**

**RESOLUTION AUTHORIZING AN AUDIT OF
THE YMCA OF NORTHERN COLORADO**

WHEREAS, the Town of Johnstown, Colorado (“Town”) is a Colorado home rule municipality, duly organized and existing under the laws of the State of Colorado and the Town’s Home Rule Charter; and

WHEREAS, the Town Council is the governing body of the Town and is vested with authority to administer the affairs of the Town; and

WHEREAS, on or about April 1, 2019, the Town and the Young Men’s Christian Association of Boulder Valley, d/b/a YMCA of Northern Colorado, a Colorado non-profit corporation (the “YMCA”), entered into that certain Facility Management Agreement; and

WHEREAS, Section 6.4 of the Facility Management Agreement provides, in part: “On an ongoing basis, the YMCA shall prepare and maintain accurate records of Facility Revenues and Facility Expenses. . . . At any time within three (3) years after the conclusion of a Facility Fiscal Year, the Town may . . . audit or have audited the YMCA’s operations during such Facility Fiscal Year and the YMCA shall cooperate with any such audit by promptly making its financial records available to the auditor upon reasonable notice and during normal business hours;” and

WHEREAS, despite the three (3) year time period contained in the Facility Management Agreement, YMCA representatives represented to the Town Council during a work session on March 24, 2025, that they are not opposed to an audit for the time period from the date of the execution of the Facility Management Agreement, April 1, 2019, to the present; and

WHEREAS, pursuant to the Facility Management Agreement, the Town desires to exercise its option to conduct an audit; and

WHEREAS, the Town Council finds that this Resolution is in the best interests of the Town.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, THAT:

Section 1. The Town Council hereby exercises its option to conduct an audit of the YMCA’s Facility Revenues and Facility Expenses, as such terms are defined in the Facility Management Agreement, and, at its discretion, to broaden the scope of the audit.

Section 2. The Town Council hereby authorizes the Town Manager to engage a duly qualified auditor and to take whatever other action is proper and appropriate to effectuate the audit. When the auditor is engaged, the Town shall determine the scope and time period for the audit.

Section 3. This Resolution shall be effective upon adoption.

PASSED, SIGNED, APPROVED, AND ADOPTED this ____ day of _____, 2025.

ATTEST:

TOWN OF JOHNSTOWN, COLORADO

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael Duncan, Mayor



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Consent Agenda Communication

Agenda Date: April 7, 2025
Subject: Resolution 2025-11: Authorized Signatures for Bank Accounts
Attachments: 1. Resolution 2025-11
Presented by: Mitzi McCoy, Deputy Town Manager

Agenda Item Description:

As the officers for the Town have recently changed, signers for the Town's bank accounts should be updated. Those signers include the following: Mayor, Mayor Pro Tem, Town Manager, Deputy Town Manager, and Finance Director. We are requesting that all persons who hold the titles designated as signers be added to all Town bank accounts.

Strategic Plan Alignment:

Organizational Excellence & Public Trust

- Engage, inform and involve the community

Legal Advice:

The Town Attorney provided the resolution presented for consideration.

Financial Advice:

NA

Recommended Action:

Approve Resolution 2025-11 as part of the Consent Agenda

Reviewed and Approved for Presentation

Town Manager

**TOWN OF JOHNSTOWN, COLORADO
RESOLUTION NO. 2025-11**

**A RESOLUTION AUTHORIZING THE DEPOSIT OF TOWN FUNDS AT
BANKS DESIGNATED BY THE BANKING BOARD AS ELIGIBLE PUBLIC
DEPOSITORIES**

WHEREAS, the Town of Johnstown, Colorado (the “Town”) wishes to designate certain banks as depositories for Town Savings funds; and

WHEREAS, the Public Deposit Protection Act, C.R.S. 11-10.5-101. Et seq., provides that public funds may only be deposited at banks designated by the banking board as eligible public depositories; and

WHEREAS, from time to time, the Town may request a bank, by written order, telephone, telegraph, or computer communication device, to transfer funds to other financial institutions or to another account at the bank for the benefit of and in the name of the Town, and the bank must have standing instructions upon which to act pursuant to such requests for the transfer of funds.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, THAT: the funds of the Town of Johnstown be, and the same are hereby, authorized to be added to or paid into accounts in banks designated by the banking board as eligible public depositories pursuant to C.R.S. 11-10.5-101, et seq., the Public Deposit Protection Act, and that said institutions be and are hereby authorized to pay withdrawals until further written notice to it signed in the name of the Town as indicated below by any two persons whose names appear below. Said institutions are authorized to supply any endorsement for the undersigned on any check or other instrument tendered for such accounts and are hereby relieved of any liability in connection with collection of such items which are handled by them without negligence. Withdrawals may not be made on account of such items until collected, and any amount not collected may be charged back to the account including expense incurred, and any other outside expense incurred relative to the account, including expense incurred, and relative to the account may be charged to it.

BE IT FURTHER RESOLVED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, that any two of the officers of the Town listed below are hereby authorized to deposit, withdraw, and transfer funds of the Town and to execute account agreements on behalf of the Town with the bank. Checks in the amount of less than Five Thousand (\$5,000.00) may be executed by one authorized signer without a second signature.

The authority conferred herein may be exercised by any two officers and shall continue in full force and effect until written notice of modification or revocation shall be received by the bank and the bank shall be protected in acting upon any form of notice which it in good faith believes to be genuine and what it proposes to be. Those persons designated are as follows:

Title
Mayor
Mayor Pro Tem
Town Manager
Deputy Town Manager
Finance Director

Name
Michael P. Duncan
Chad W. Young
Matthew LeCerf
Mitzi McCoy
Kristyn Unrein

Resolution 2025-05 is hereby repealed.

PASSED, SIGNED, APPROVED, AND ADOPTED this ____ day of _____, 2025.

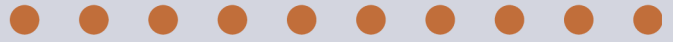
TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor

Town of Johnstown



TOWN MANAGER'S REPORT



April 2025
johnstownco.gov



TOWN MANAGER'S REPORT



Administration, Finance, Planning, and Human Resources

Upcoming Council Meetings & Work Sessions

If there are topics that the Council would like Staff to schedule for discussion, please let me know. The following topics are recommended for Council discussion (all meetings will be held in the Town Council Chambers unless otherwise indicated):

- 04/07/2025 – Regular Council Meeting
- 04/14/2025 – Work Session – Tentative 6 pm
- 04/21/2025 – Regular Council Meeting

2024 Audit

PBC (Prepared by Client) listing has been distributed to the Finance Staff, and we are beginning to pull these documents together.

YMCA Audit

Town Administration will be meeting with various auditing firms to discuss the pending YMCA audit. Staff hopes to provide information to Council on April 21 based on responses from the various firms.

Senior Center

February saw great attendance with total of 350 participants. March calendar is buzzing with regular events such as meals out, sporting events, exercise classes, music events, Friendly Fork meals, blood pressure checks, crafts, educational opportunities, and club activities.

Planning Department

The Master Plans for Centennial and Letford Park are nearing completion and will be presented to the Town Council, tentatively on April 21. Public input and engagement on this exciting project have been fantastic!

The Planning & Zoning Commission

Was not able to meet in March but should reconvene in April to consider a couple projects.

County Road 17 & Highway 34

The Town is coordinating and collaborating on interchange improvements at CR 17 and Highway 34. This project and the improvements is a collaborative between Weld County, Town of Windsor, City of Greeley, and Johnstown. An IGA and coordination with CDOT is critical on this US Highway.

TOWN MANAGER'S REPORT



Downtown Colorado Inc. In The Game Conference

The Town of Johnstown has been asked to host a mobile tour of Downtown Johnstown as part of DCI's annual conference which is being held in Greeley this year. The mobile tour will provide attendees with a walking tour of downtown which focuses on current projects such as the Downtown Masterplan, West Parish Avenue Alleyway Project, and Centennial Park Masterplan. The mobile tour will also include a Q&A Session with Mayor Pro Tem Chad Young, and Business Owner of Sexy Sammie's and Wing Shack, Brian Seifried. The Q&A Session will focus on why downtowns are unique and the challenges/benefits of locating a business in a downtown from the perspective of a business owner. The mobile tour will be held on April 3 from 11 am – 2 pm.

JDDA Connect

The Johnstown Downtown Development Association continues to host their newly branded JDDA Connect event which is a combination of their monthly general meeting and monthly B2B networking event. The event is held monthly on the 3rd Thursday of each month from 4-6pm with locations varying. For event details, visit Johnstown Downtown Calendar at: visitdowntownjohnstown.com/calendar

Hiring

The Town is actively seeking the following roles: Police Officer, Police Officer Cadet, Grants Manager, Water Treatment Chief Operator, Planner III, Police Records Supervisor, Water Efficiency Coordinator, Senior GIS Analyst, Public Works Director, Communications and Engagement Specialist, and Civil Engineer I.

Finance Director

We are so pleased to welcome Kristyn Unrein, Finance Director to the Town of Johnstown Team!

Public Works Director

Tim Hoos, the Town's new Public Works Director will begin on April 21 with the Town.

Municipal Court

March 2025 Court data is broken down for Council's review below, with a total of cases 114 being closed.

- Code Violations: 2
- Traffic Violations: 42
- Theft: 36
- Other Criminal Cases: 16
- Parking: 18

TOWN MANAGER'S REPORT



Police Department

Stats

Stats are from February 1- February 28, 2024

- Officers responded to 1113 calls for service.
- Officers responded to 30 traffic accidents.
- Officers conducted 92 traffic stops.
- Incident summary:
 - Suspicious Activity (31)
 - Code Violations (24)
 - Thefts (51)
 - Check Wellbeing (42)
 - Burglar Alarms (25)
 - Animal Complaints (51)
 - Disturbances (20)
 - Vandalisms (3)
 - Trespass (2)
- Traffic Citations (77)
- Physical Arrest (19)
- Top Arrest Types
 - Theft and Controlled Substance
- Case of Interest
 - JPD and Weld County SWAT served a search and arrest warrant in the Pioneer Ridge Subdivision.

Training - Advanced Search and Seizure

Officer Brady attended Advanced Search and Seizure class.

Training - Crisis Intervention Team

Officer Kassor attended the Crisis Intervention Team (CIT) training.

Training - Peer Support

Officer Kelley attended Peer Support training. This type of training is beneficial to the mental health of our officers.

Community Policing, Outreach, & Miscellaneous Items

PD Construction Project

- Officers are beginning to move back into the police department. We are all expecting to be moved back into the PD by the end of April.

Public Works

Crews completed 132 work orders this review period consisting of asphalt crack sealing, asphalt cold patching repair, street sweeping, gravel road grading, road sign repair, snow plowing, funerals, and a variety of other street and grounds-related work

TOWN MANAGER'S REPORT



Capital Improvement Update - Little Thompson River Pedestrian Bridge

RCD Construction, Inc., the Town's general contractor, successfully installed the soil riprap slope protection for the project. The contractor will begin the substructure of the pedestrian bridge.



* Construction of Little Thompson
River Pedestrian Bridge

Capital Improvement Update - Roosevelt Parkway & WCR13 Roundabout

Design reached 100% as planned at the end of March 2025. Construction and coordination is planned for the summer of 2025 with utility relocations starting in late April or early May.

Capital Improvement Update - State Highway 60 & WCR13

The Town's and our design consultant, performed a project kickoff meeting for the ultimate design of the intersection. Design is expected to be completed at the end of Q4 of 2025 with construction starting in early 2026.

Utilities

The department faced the challenging task of filling the Chief Water Treatment Plant Operator position following the retirement of Maurice Pribble, who brought 29 years of experience and a reputation for being able to solve just about any problem that came his way. After interviewing several well-qualified candidates the job was offered to the Town's Wastewater Treatment Operator, Blayne Banghart, who accepted the position. Blayne joined the Johnstown Operations team in 2021 right out of college and is now ready to take on the challenge of stepping into Maurice's highly regarded role, ensuring the continued success of the plant.

TOWN MANAGER'S REPORT



Water Treatment

Average Daily Flows: 1.59 out of 6 MGD treatment capacity.

Water Plant preparations for the summer season:

- The LG ultrasonic buoys have been installed in the Johnstown Reservoir to aid in algae control and help maintain water quality.
- Operations, with the assistance of the Collections and Distribution team, replenished the anthracite—a high-grade carbon media used in water filtration—in Filter 1 and Filter 2, restoring the media levels. These filters are crucial in removing impurities from the water before it's distributed from the plant, and this work will help maximize flow through the filters during the summer months.



*Carbon Media Replacement
for Filters

Low Point Wastewater Treatment Plant

Average Daily Flows: 0.45 out of 1.5 MGD treatment capacity.

- The plant operators are preparing to rotate operations between the three process tanks, taking one offline at a time. This task is important as it provides the team with an opportunity to inspect the submerged equipment and perform essential preventative maintenance.
- To enhance safety, new protocols and equipment for working in confined spaces have also been introduced.
- The Collections and Distribution team recently visited the plant for a cross-training session with the Wastewater operators. This session allowed both teams to gain a better understanding of each other's roles and improve their collaboration and skills.

Inspections & Installations

- 12,427' water main
- 1,492' sewer main
- 1,881' storm water
- 282 water/sewer inspections

TOWN MANAGER'S REPORT



Central Wastewater Treatment Plant

Average Daily Flows: 0.72 MGD out of 1 MGD treatment capacity.

- Denali started the partial dredging process to remove solids from Lagoon 1 and bring the lagoon levels down enough to enable the Contractor to construct the influent line to the new plant. At the same time, preventative maintenance is being done on some older equipment that will soon be replaced. This equipment is still vital, though, and needs to keep running smoothly until the new plant is finished.
- Coyote Ride is also working on a major project at the plant, installing bored waterlines under Highway 60 to connect the plant to the water system. In another part of the plant, the main wet well, a large underground tank, has been completed, and the excavation area on the west side of the DAF building has been filled in.

Sewer Collection & Water Distribution Systems (C&D)

- C&D responded to an emergency repair after a Contractor in the area accidentally damaged an unknown 2-inch water line extension. The team also repaired several faulty air release-vacuum valves on the raw water line from Lonetree Reservoir, which were failing to release trapped air and restricting the water flow to the water plant.
- March was also a busy month for new meter installations, with the department handling an unusually high number of permit requests. Additionally, team members from the C&D department attended the Colorado Rural Water Association conference to enhance their skills and knowledge in water distribution and sewer collection.'
- Locates: 1,351
- Meters: 132 new installs, 35 meter replacements



*Faulty Air Release-Vacuum Valve

TOWN MANAGER'S REPORT



Capital Projects - Water Treatment Plant Expansion

The contractor is continuing to work on site yard piping, procuring equipment and materials, and installation of below ground concrete structures. The contractor has completed the walls for the Disinfection Contact Basin and Distribution Pump station. In addition, the contractor has started installing the footers for the new treatment building. The contractor has also finished installing all the aggregate piers for the foundation to allow them to start preparing to install the slabs for the buildings.



*Faulty Air Release-Vacuum Valve

Capital Projects - Central Wastewater Treatment Plant

Construction of the MBR building, the secondary process basins, the solids holding tank, and the headworks continue to progress well. The contractor continues to install equipment, process piping, and yard piping throughout the site and in the new buildings. The contractor has started sludge removal from the lagoons in preparation for installing sewer main adjacent to the berm, this is anticipated to take several months. The removal of the sludge from the lagoons will allow for the level in the lagoons to be lowered to construct the new influent pipeline to the headworks in the road next to the lagoon.



* New Treatment Building

TOWN MANAGER'S REPORT



Capital Projects - SH60 Waterline Replacement and Extension

Tentatively, the full closure of SH60 from Parish Avenue to CR19 is planned to start the week of April 7, with a planned closure date of April 10. The intersection of Parish and Hwy 60 will be impacted for approximately three days while they tie into the existing water main in Parish Avenue. Currently the contractor is estimating that the improvements will take approximately 6 weeks. The boring contractor continues to work on the bores at the railroad near Colorado Sweet Gold and at the Central Wastewater Treatment Plant. The contractor has completed installing the mainline from the railroad tracks at Colorado Sweet Gold to the bore at the Central WWTP, including the crossing of CR19. They will complete the tie ins once the bores are completed.

Capital Projects - Lone Tree Raw Water Transmission Line

Town Staff continues to coordinate with the design engineer on finalizing the construction plans for the approximate 10-mile pipeline and pump station from the Lone Tree Reservoir to the Town's Water Treatment Plant. In March, Town Staff presented the project to the Larimer County Commissioners and Larimer County approved the 1041 permit. The design engineer continues to coordinate critical ditch, roadway, and railroad crossings. The landman that was contracted to manage the easement acquisition process continues sending out offer letters to keep the easement acquisition process moving forward. Once easements and permits are obtained, Town Staff will look to advertise the project for construction.



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Agenda Communication

Agenda Date: April 7, 2025

Subject: Beer and Wine Liquor License Renewal for Fabulous Nail and Bar

Attachments:

1. Fabulous Nails Renewal Application
2. Signed Stipulation - State Liquor Enforcement Division

Presented by: Meghan Martinez, Town Clerk

Agenda Item Description:

This item was tabled to this date at the March 17, 2025 Council Meeting.

Fabulous Nails and Bar has submitted a renewal application for its Beer and Wine Liquor License at 4900 Larimer Parkway, Johnstown, Colorado. Per the Johnstown Municipal Code, the Town Clerk may administratively approve annual license renewals, provided that the licensee has no pending actions, is not under official investigation, and has not had any adjudicated violations or stipulations within the past year.

The Colorado Department of Revenue Liquor Enforcement Division identified violations of the liquor code, including exceeding monetary limits for alcohol purchases from retail liquor stores and issues related to sales tax licensing and remittance. Following an investigation, the State Liquor Enforcement Division imposed a 17-day suspension on Fabulous Nails and Bar's Beer and Wine License, with eight active suspension days and nine days held in abeyance for one year. The active suspension period lasted from February 22, 2025, through 11:59 p.m. on March 1, 2025, during which the licensee was prohibited from serving alcohol.

Under the Colorado Liquor Code, once a violation is adjudicated and the suspension is served, the matter is considered resolved. However, the Johnstown Municipal Code requires that any license renewal involving a violation within the preceding year be forwarded to the Town Council for review, as the Town Clerk does not have the authority to approve such renewals. This item is being provided to Council under the requirements of the Johnstown Municipal Code.

Staff is requesting approval of the license as the licensee has been brought into compliance by the State Liquor Authority and the matter has been adjudicated through the process outlined above.

Strategic Plan Alignment:

Organizational Excellence & Public Trust

- Strengthen public trust and confidence

- Engage, inform and involve the community

Legal Advice:

The application and all supporting documents were reviewed by the Town Attorney.

Financial Advice:

N/A

Recommended Action:

As the matter has already been adjudicated by the State Liquor Authority, Staff recommends approval of the renewal with the condition of no further violations in the upcoming year.

Suggested Motions:**To Approve the Renewal:**

I move to approve the renewal of the Beer and Wine Liquor License for Fabulous Nails and Bar, located at 4900 Larimer Parkway, Johnstown, Colorado.

To Approve with Conditions:

I move to approve the renewal of the Beer and Wine Liquor License for Fabulous Nails and Bar, located at 4900 Larimer Parkway, Johnstown, Colorado, with the condition that the licensee have no further violations in the upcoming year.

Set a Public Hearing Concerning Denial of the Renewal:

I move to direct the Town Clerk to issue the licensee Notice to Show Cause on April 7, 2025 at the Johnstown Town Hall, 450 S. Parish Avenue, Johnstown, CO 80534 at 7:00p.m., why the Beer and Wine Liquor License for Fabulous Nails and Bar, located at 4900 Larimer Parkway, Johnstown, Colorado should not be revoked.

Reviewed and Approved for Presentation,

Town Manager

Submit to Local Licensing Authority

Fees Due	
Annual Renewal Application Fee	\$ 250
Renewal Fee	
Storage Permit \$100 X _____	\$
Sidewalk Service Area \$75.00	\$
Additional Optional Premise Hotel & Restaurant \$100 X _____	\$
Related Facility - Campus Liquor Complex \$160.00 per facility	\$
Amount Due/Paid	\$

Make check payable to: Colorado Department of Revenue. The State may convert your check to a one-time electronic banking transaction. Your bank account may be debited as early as the same day received by the State. If converted, your check will not be returned. If your check is rejected due to insufficient or uncollected funds, the Department may collect the payment amount directly from your banking account electronically.

Retail Liquor License Renewal Application

Please verify & update all information below. Return to city or county licensing authority by due date.

Note that the Division will not accept cash.

☒ Paid by check
☐ Paid online

Uploaded to MoveIt on Date

Licensee Name

Fabulous Nails & Bar

Doing Business As Name (DBA)

Fabulous Nails & Bar

Liquor License Number

03-12430

License Type

Beer & Wine (City)

Sales Tax License Number

41637624

Expiration Date

01/08/2025

Due Date

12/01/2024

Business Address

Street Address

4900 Larimer parkway, Johnstown CO 80534

Phone Number

(970) 889 1539

City

Johnstown

State

CO

ZIP Code

80534

Mailing Address

Street Address

5056 Kid st

City

Timnath

State

CO

ZIP Code

80547

Email

+kenny1011@gmail.com

Operating Manager

Date of Birth

KENNY Q. TRAN

10/11/1974

Home Address

Street Address

5056 Kidd St

Phone Number

970 8891539

City

Timnath

State

CO

ZIP Code

80547

1. Do you have legal possession of the premises at the street address?..... ☐ Yes ☐ No

Are the premises owned or rented?

☐ Owned

☒ Rented*

*If rented, expiration date of lease

02/2030

2. Are you renewing a storage permit, additional optional premises, sidewalk service area, or related facility?..... ☐ Yes ☒ No

If yes, please see the table in the upper right hand corner and include all fees due.

3. Are you renewing a takeout and/or delivery permit?..... ☐ Yes ☒ No

(Note: must hold a qualifying license type and be authorized for takeout and/or delivery license privileges)

If selecting 'Yes', an additional \$11.00 is required to renew the permit.

If so, which are you renewing?..... ☐ Delivery ☐ Takeout ☐ Both Takeout and Delivery

4. Since the date of filing of the last application, has the applicant, including its manager, partners, officer, directors, stockholders, members (LLC), managing members (LLC), or any other person with a 10% or greater financial interest in the applicant, been found in final order of a tax agency to be delinquent in the payment of any state or local taxes, penalties, or interest related to a business?..... ☐ Yes ☒ No

Since the date of filing of the last application, has the applicant, including its manager, partners, officer, directors, stockholders, members (LLC), managing members (LLC), or any other person with a 10% or greater financial interest in the applicant failed to pay any fees or surcharges imposed pursuant to section 44-3-503, C.R.S.?.....

☐ Yes ☒ No

5. Since the date of filing of the last application, has there been any change in financial interest (new notes, loans, owners, etc.) or organizational structure (addition or deletion of officers, directors, managing members or general partners)?..... ☐ Yes ☒ No

If yes, explain in detail and attach a listing of all liquor businesses in which these new lenders, owners (other than licensed financial institutions), officers, directors, managing members, or general partners are materially interested.

6. Since the date of filing of the last application, has the applicant or any of its agents, owners, managers, partners or lenders (other than licensed financial institutions) been convicted of a crime?..... ☐ Yes ☒ No

If yes, attach a detailed explanation.

7. Since the date of filing of the last application, has the applicant or any of its agents, owners, managers, partners or lenders (other than licensed financial institutions) been denied an alcohol beverage license, had an alcohol beverage license suspended or revoked, or had interest in any entity that had an alcohol beverage license denied, suspended or revoked?..... ☐ Yes ☒ No

If yes, attach a detailed explanation.

8. Does the applicant or any of its agents, owners, managers, partners or lenders (other than licensed financial institutions) have a direct or indirect interest in any other Colorado liquor license, including loans to or from any licensee or interest in a loan to any licensee?..... ☐ Yes ☒ No

If yes, attach a detailed explanation.

Affirmation & Consent

I declare under penalty of perjury in the second degree that this application and all attachments are true, correct and complete to the best of my knowledge.

Type or Print Name of Applicant/Authorized Agent of Business

KENNY Q TRAN

Title

OWNER

Signature

Date (MM/DD/YY)

12/01/2024

Report & Approval of City or County Licensing Authority

The foregoing application has been examined and the premises, business conducted and character of the applicant are satisfactory, and we do hereby report that such license, if granted, will comply with the provisions of Title 44, Articles 4 and 3, C.R.S., and Liquor Rules.

Therefore this application is approved.

Local Licensing Authority For

Title

Attest

Signature

Date (MM/DD/YY)

BEFORE THE EXECUTIVE DIRECTOR, DEPARTMENT OF REVENUE
STATE LICENSING AUTHORITY
STATE OF COLORADO

STIPULATION, AGREEMENT, AND ORDER

IN THE MATTER OF:

FABULOUS NAIL & BAR, INC. d/b/a Fabulous Nail & Bar
4900 Larimer Parkway
Johnstown, Colorado 80534

Beer & Wine (City) Liquor License No. 03-12430

Licensee.

LED Case No. LIQ2400000474

This STIPULATION, AGREEMENT, AND ORDER (“Order”) between the State of Colorado, Department of Revenue, Liquor Enforcement Division (“Division”) and Fabulous Nail & Bar, Inc. d/b/a Fabulous Nail & Bar, 4900 Larimer Parkway, Johnstown, Colorado 80534, Beer & Wine (City) Liquor License No. 03-12430 (“Licensee”), is offered for the purpose of settlement and to avoid the uncertainty and cost of future administrative action. The Division and Licensee hereby stipulate and agree as follows:

1. The Executive Director of the Department of Revenue as the State Licensing Authority (“State Licensing Authority”) has jurisdiction over Licensee and the subject matter herein pursuant to the provisions of subsections 44-3-201(1) and 44-3-202(1)(a), C.R.S.
2. Pursuant to subsection 44-3-601(1), C.R.S., the State Licensing Authority has the power, on its own motion or on complaint, after investigation and public hearing at which the licensee shall be afforded an opportunity to be heard, to fine a licensee or to suspend or revoke, in whole or in part, any license or permit issued by the State Licensing Authority for any violation by the licensee, or by any of the agents, servants, or employees of the licensee of the Liquor Code, Beer Code, Special Event Code, or Liquor Regulations.
3. On October 31, 2024, the State Licensing Authority served an Order to Show Cause, Notice of Hearing, and Notice of Duty to Answer on Licensee, alleging violations of the Liquor Code and Liquor Regulations, attached hereto as **Exhibit 1**.
4. The Division and Licensee have discussed the merits of the investigation and allegations and come to a mutual agreement and understanding to jointly propose to the State Licensing Authority a resolution of the allegations against Licensee, in lieu of proceeding

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 2

to hearing to determine the merits of such allegations in the Order to Show Cause. The terms and conditions of this Order are subject to approval by the State Licensing Authority.

5. Licensee admits to the following facts and violations:

- a. Licensee holds Beer & Wine (City) Liquor License No. 03-12430, with a licensed premises at 4900 Larimer Parkway, Johnstown, CO 80534. Kenny Thuy Tran (“Tran”) is the owner of Licensee.
- b. On April 11, 2024, an investigator from the Division spoke with Tran by phone, and Tran told the investigator he purchased approximately \$10,000.00 of liquor each year from liquor stores.
 - i. On April 24, 2024, Tran confirmed he purchased alcohol from liquor stores, and not from wholesalers.
- c. Licensee violated subsection 44-3-411(2)(a), C.R.S., which states every person selling malt and vinous liquors as provided in this section shall purchase malt and vinous liquors only from a wholesaler licensed pursuant to this article 3; except that, during a calendar year, any person selling malt and vinous liquors as provided in this section may purchase not more than two thousand dollars' worth of malt and vinous liquors from retailers licensed pursuant to sections 44-3-409, 44-3-410, and 44-4-104 (1)(c).
- d. Licensee violated Regulation 47-408(A)(1), 1 CCR 203-2, which states every person or entity licensed under the Liquor or Beer and Wine Codes to sell at retail shall purchase all alcohol beverage inventory, for the operation of its business, from a person or entity licensed to sell at wholesale pursuant to article 3 or 4 of title 44, C.R.S., except that a retailer licensed for on-premises consumption only may purchase not more than two thousand dollars' worth of such alcohol beverages during a calendar year from a retail liquor store or a liquor-licensed drugstore.
- e. Following the call on April 11, 2024, on April 12, 2024, the investigator issued a Demand for Records to Licensee, requesting “any and all receipts for the purchase of alcohol beverages from March 1, 2022, to March 1, 2024, to include retail liquor store and wholesaler purchases.” The Demand for Records provided a deadline to produce the requested information of April 22, 2024.
 - i. Licensee did not respond or otherwise produce any of the requested information by April 22, 2024.

Stipulation, Agreement, and Order
 Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
 Beer & Wine (City) Liquor License No. 03-12430
 Page 3

- ii. On April 24, 2024, Tran told the Division investigator that he did not retain receipts from alcohol purchases for alcohol served by Licensee.
- f. Licensee violated subsection 44-3-411(2)(b), C.R.S., a beer and wine licensee shall retain evidence of each purchase of malt and vinous liquors from a retailer licensed pursuant to section 44-3-409, 44-3-410, or 44-4-104 (1)(c), in the form of a purchase receipt showing the name of the licensed retailer, the date of purchase, a description of the malt or vinous liquor purchased, and the price paid for the purchase. The beer and wine licensee shall retain the receipt and shall make it available to the state and local licensing authorities at all times during business hours.
- g. Licensee violated section 44-3-701, C.R.S., which states each licensee shall keep a complete set of books of account, invoices, copies of orders, shipping instructions, bills of lading, weigh bills, correspondence, and all other records necessary to show fully the business transactions of such licensee, all of which shall be open at all times during business hours for the inspection and examination of the state licensing authority or its duly authorized representatives. The state licensing authority may require any licensee to furnish such information as it considers necessary for the proper administration of this article 3, and may require an audit to be made of the books of account and records on any occasions as it may consider necessary by an auditor to be selected by the state licensing authority, who shall likewise have access to all books and records of the licensee, and the expense thereof shall be paid by the licensee.
- h. Licensee violated Regulation 47-700(B), 1 CCR 203-2, which states each licensee shall retain all books and records necessary to show fully the business transactions of such licensee for a period of the current tax year and the three prior tax years. "Books" and "records" include documents or information in printed or paper form as well as documents or information maintained in a readable electronic or digital format. Licensees shall provide copies of books and records requested by the State and Local Licensing Authorities and their duly authorized representatives without unreasonable delay.
- i. Licensee violated Regulation 47-408(D), which states records maintained by the licensee in compliance with section 44-3-701, C.R.S., and regulations 47-700, 1 CCR 203-2, shall include all records of purchases of alcohol beverages.
- j. On April 24, 2024, Tran told the Division investigator that Licensee did not offer or serve sandwiches, snacks or food items.

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 4

- k. Licensee violated subsection 44-3-411(1), C.R.S., which states a beer and wine license shall be issued to persons selling malt and vinous liquors for consumption on the premises. Beer and wine licensees shall have sandwiches and light snacks available for consumption on the premises during business hours, but need not have meals available for consumption.
6. The Division and Licensee agree, in lieu of proceeding with an administrative hearing and subsequent proceedings, that Licensee shall serve a 17-day suspension of Beer & Wine (City) Liquor License No. 03-12430, with eight (8) active days of suspension and nine (9) days to be held in abeyance for a period of one year.
 - a. Licensee shall be actively suspended for eight consecutive days, starting at 12:00 a.m. on February 22, 2025, through 11:59 p.m. on March 1, 2025, during which time Licensee shall not serve alcohol of any kind to customers regardless of whether it is given without cost.
 - b. Licensee shall provide photographs of posted signs at the entrance of its licensed premises by sending an email to led_adminactions@state.co.us. The signs required to be posted at the entrance of Licensee's licensed premises shall comply with Regulation 47-600(E), 1 CCR 203-2, which states:

Every licensee whose license has been suspended by any licensing authority shall, if ordered by the licensing authority, post two notices in conspicuous places, one on the exterior and one on the interior of its premises, for the duration of the suspension. The notices shall be two feet in length and fourteen inches in width containing lettering not less than ½" in height, and shall be in the following form:

NOTICE OF SUSPENSION
ALCOHOL BEVERAGE LICENSES ISSUED FOR THESE PREMISES
HAVE BEEN SUSPENDED BY ORDER OF THE STATE-LOCAL
LICENSING AUTHORITY FOR VIOLATION OF THE COLORADO
LIQUOR/BEER AND WINE CODE.

Advertising or posting signs to the effect that the premises have been closed or business suspended for any reason other than by order of the Department suspending alcohol beverage license, shall be a violation of this rule.

- c. Nine days of the suspension imposed shall be held in abeyance for a period of one year, pending no subsequent violations of the Liquor Code or Liquor Regulations.

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 5

7. Licensee acknowledges receipt of sufficient notice, advisement of rights, and process of the proceedings and wishes to resolve all issues which were the subject of the investigation, by entering into this Order.
8. Except as reflected in this Order, neither the facts nor circumstances relating to the underlying investigation that formed the basis for this Order against the Licensee, nor any defenses that Licensee may have to such complaint or investigation, shall be at issue in a proceeding against Licensee for failure to comply with the terms of this Order.
9. This Order shall be admissible as evidence at any future hearing before the State Licensing Authority and may be used in connection with any future actions by the State Licensing Authority.
10. Licensee expressly agrees and acknowledges that Licensee has entered into this Order knowingly and voluntarily. Licensee acknowledges that the terms of this Order were mutually negotiated and agreed upon. Licensee was afforded an opportunity to consult with legal counsel of their choosing and affirms that Licensee has read this Order and fully understands its nature, meaning and content. Licensee agrees that upon execution of this Order, no subsequent action or assertion shall be maintained or pursued by Licensee asserting the invalidity in any manner of this Order.
11. Licensee understands, and knowingly and voluntarily waives, the following rights with respect to the allegations, facts, and issues that are the subject of this Order:
 - a. The right to a formal disciplinary hearing on the merits of the matters forming the basis of this Order and the right to require the Division to meet its burden of proof in a formal hearing;
 - b. The right to cross-examine all witnesses against Licensee at a formal hearing;
 - c. The right to subpoena witnesses, to present evidence and to testify on Licensee's own behalf at a formal hearing;
 - d. The right to engage in pre-hearing exchange of evidence with the Division and to review the Division's evidence prior to hearing; and
 - e. The right to file exceptions and seek administrative review of an initial decision.
12. By signing this Order, the Licensee consents to the terms and conditions described herein and agree to waive the right to judicial review of this Order pursuant to section 24-4-106, C.R.S.

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 6

13. All the costs and expenses incurred by Licensee related to this Order or compliance with this Order shall be the sole responsibility of the Licensee and shall not in any way be the obligation of the Division.
14. If approved by the State Licensing Authority, this Order shall become effective on the date this Order is served upon Licensee as set forth in the attached Certificate of Service. Should the State Licensing Authority reject the terms hereof, Licensee's admissions herein shall be deemed withdrawn, and the matter scheduled for a hearing after issuance of an Order to Show Cause by the State Licensing Authority.
15. Upon approval and order of the State Licensing Authority, this Order shall become a permanent part of the Division's records, and it shall be open to public inspection pursuant to applicable law and the Division's standard policies and procedures.
16. Upon execution by all parties, this Order and all its terms shall have the same force and effect as an order entered after a formal hearing pursuant to sections 24-4-105 and 44-3-601, C.R.S., except that it may not be appealed. Failure to comply with the terms of this Order may be sanctioned by the State Licensing Authority as set forth in the Liquor Code.
17. This Order may be executed by electronic means (facsimile, e-mail, DocuSign etc.), and any signatures delivered electronically will be deemed to be as valid as an original signature. This Order may be executed in counterparts and delivered by facsimile, U.S. Mail (or private carrier), or electronic transmission.
18. For the purpose of addressing any future violations of the Order, the Liquor Code, Beer Code, Special Event Code, or Liquor Rules shall hereby include all later adopted codes, rules, or regulations that are in effect at the time of the violation(s).
19. In the event that any provision of this Order is deemed unenforceable by a court of competent jurisdiction, such provision shall be severed, and the remainder of this Order shall be given full force and effect.
20. This Order constitutes the entire agreement and understanding between the parties, and supersedes all prior agreements and promises related to the allegations, facts and issues that are the subject of this Order, written or oral between the parties which modify, interpret, construe or affect this Order. Any other allegations, facts and issues not specifically raised or addressed in this Order have not been considered by the parties and are not made a part of this Order.

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 7

Michelle Stone-
Principato

Digitally signed by Michelle
Stone-Principato
Date: 2025.01.13 14:33:17
-07'00'

Michelle Stone-Principato
Division Director
Liquor Enforcement Division

Date in signature above.

DocuSigned by:

KENNY TRAN

By: 1nuv (Kenny) 1ran
2E5AAFF7C598485...
Owner of Fabulous Nail & Bar Inc. d/b/a
Fabulous Nail & Bar

DATE: 1/11/2025

APPROVED and ORDERED on the date set forth in the electronic signature below.

Heidi
Humphreys

Digitally signed by Heidi
Humphreys
Date: 2025.02.04
11:52:23 -07'00'

Heidi Humphreys
Executive Director/CEO
Colorado Department of Revenue
State Licensing Authority

Telecopy or electronic versions of this stipulation which contain telecopy facsimiles of signatures shall be deemed duplicate executed originals of this stipulation. This stipulation may be executed in counterparts and delivered by facsimile, U.S. Mail (or private carrier), or .pdf transmission.

Stipulation, Agreement, and Order
Fabulous Nail & Bar Inc. d/b/a Fabulous Nail & Bar
Beer & Wine (City) Liquor License No. 03-12430
Page 8

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of the foregoing **STIPULATION, AGREEMENT, AND ORDER** was placed in the United States Mail, first-class postage and pre-paid, and sent via electronic mail on the date set forth in the electronic signature below, addressed as follows:

Liquor Enforcement Division P.O. Box 17087 Denver, CO 80217-0087 dor_led@state.co.us	Fabulous Nail & Bar Inc. 4900 Larimer Parkway Johnstown, CO 80534 Tkenny1011@gmail.com
Deanna L. Westfall Senior Assistant Attorney General Marijuana, Liquor and Bankruptcy Unit Revenue & Regulatory Law Section Colorado Department of Law 1300 Broadway, 8 th Floor Denver CO, 80203 Deanna.westfall@coag.gov melissa.young@coag.gov raquel.mendez@coag.gov kellie.anderson@coag.gov	

By: **Alexandra Prichard**  Digitally signed by
Alexandra Prichard
Date: 2025.02.06
10:24:10 -07'00'

Alexandra Prichard



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Agenda Communication

Agenda Date: April 7, 2025

Subject: Roosevelt Way and Colorado Boulevard Roundabout Construction Contract Award

Attachments: 1. Project Location
2. Roundabout Aerial View

Presented by: Brandon Torrez, Senior Project Manager

Agenda Item Description:

The Public Works Department (Staff) design consultant, Alfred Benesch & Company (Benesch), has designed a proposed concrete roundabout intersection at Roosevelt Parkway and Colorado Boulevard which was approved by Town Council on August 19, 2024.

This project is intended to be constructed during the summer of 2025 while Roosevelt High School is on summer break to minimize disruptions. More specifically, Roosevelt High School's last day of school is May 22, 2025 with graduation the day after, followed by the Memorial Day Holiday. For the Roosevelt High School 2025-2026 school year, the first day of school begins on August 11, 2025. Benesch's final construction plans and documents were completed by March 28, 2025.

Using standard bid solicitation, contract award, and issuance of a notice to proceed durations that occur after construction plans are complete, the overall construction schedule and substantial completion before the first day of school would have been challenging, if unattainable. To avoid schedule delays, Staff privately solicited competent contractors based on the intended contractual scope within the 90% project plans. The contractors were provided with a proposal deadline of March 21, 2025. Within this proposal, contractors were not only required to provide an estimate bid amount for the work, but also a project schedule, and previous qualifying projects that were of similar scope and magnitude to the Roosevelt Roundabout. Staff carefully reviewed and evaluated all proposals submitted with a grading system to provide a score for the contractor. In total, the Town received project cost proposals from five (5) different contractors.

After careful consideration and review of all proposals, Staff recommends awarding the Roosevelt Roundabout project to Connell Resources, as their proposal had the highest overall score along with being the low bid contractor for the project with an amount of \$4,049,223.66.

As mentioned previously, final plans were received by March 28, 2025 which would then be provided to Connell Resources to provide their final contract cost for the project. The deadline for this final cost has been set for Friday April 11, 2025. The Town would then intend to enter into the construction agreement with Connell for that final amount.

Due to time being considered of the essence for this project, Staff recommends that a not to exceed construction award contract amount be considered for approval at this time. Staff recommend that the do not exceed construction award amount be set to \$4,500,000 which provides a \$450,776.44 (~11%) final contingency amount for Connell Resources based upon final design plan quantities.

Payment obligations for the capital intersection improvements are reliant upon three developments in the area. The Town is also aiding in financial contributions as a key stakeholder to the project. Staff are finalizing the negotiations of these reimbursement agreements and anticipate the following contributions below based on the recommended construction award amount.

Entity	Contribution Toward Construction Costs
Whitehall Development (Eleven LLC)	\$500,000.00
RE-5J	\$500,000.00
Granary Development (Hartford Homes)	\$1,000,000.00
Town of Johnstown	Amounts Exceeding \$2,000,000.00

It is important to note, that accomplishing this construction project based on the scope and linear process is going to take a miracle to fully complete by August 11. In lieu of potentially not completing this project in the time allotted, an interim solution is being contemplated, and we hope to be able to discuss this with you during a work session on April 14 to keep you apprised of the planned work.

In the FY 2025 budget, \$2.8 million was allocated for the roundabout project (\$180K for design), leaving an additional 1.88 million outstanding to recognize as an expenditure in the FY 2025 budget for this specific project. Within the same budget, is the design and construction associated with the Colorado Boulevard Improvements known as the 'Purvis Section' which is from the Johnstown Cemetery entrance north to the property line of the Purvis Development. This project is nearing completion of the design and construction is not expected within FY 2025. Staff believes that utilization of funds from the Colorado Blvd Improvements in FY 2025 will mitigate the necessity for a budget amendment.

Strategic Plan Alignment:

Quality Infrastructure & Facilities

- Establish and maintain levels of service
- Ensure future viability of infrastructure and facilities
- Repair and maintain existing infrastructure, facilities and equipment

Legal Advice:

The Town Attorney is currently working to complete review of the Town's Construction Contract Agreement to be used for contract execution.

Financial Advice:

The programming for the Roosevelt Roundabout Project is included in the 2025 Fiscal Year Budget for an amount of \$2,800,000 within the Streets Infrastructure account. This project is more than the allocated Fiscal Year budgeted amount by \$1,880,000. Within the same budget, is the design and construction associated with the Colorado Boulevard Improvements known as the 'Purvis Section' which is from the Johnstown Cemetery entrance north to the property line of the Purvis Development. This project is nearing completion of the design and construction is not expected within FY 2025. Staff believes that utilization of funds from the Colorado Blvd Improvements in FY

2025 will mitigate the necessity for a budget amendment. Therefore, a budget amendment is not needed at this time but may be requested in the future.

Recommended Action:

Staff recommend awarding the contract for the Roosevelt Roundabout Project to Connell Resources in an amount not to exceed \$4,500,000.00.

Suggested Motions:

For Approval: I move to approve the contract for the Roosevelt Roundabout Project as presented with Connell Resources in a not to exceed amount of \$4,500,000.00 and authorize the Town Manager to execute the contract, subject to final review by the Town Attorney and Town Manager.

For Denial: I move to deny the contract with Connell Resources.

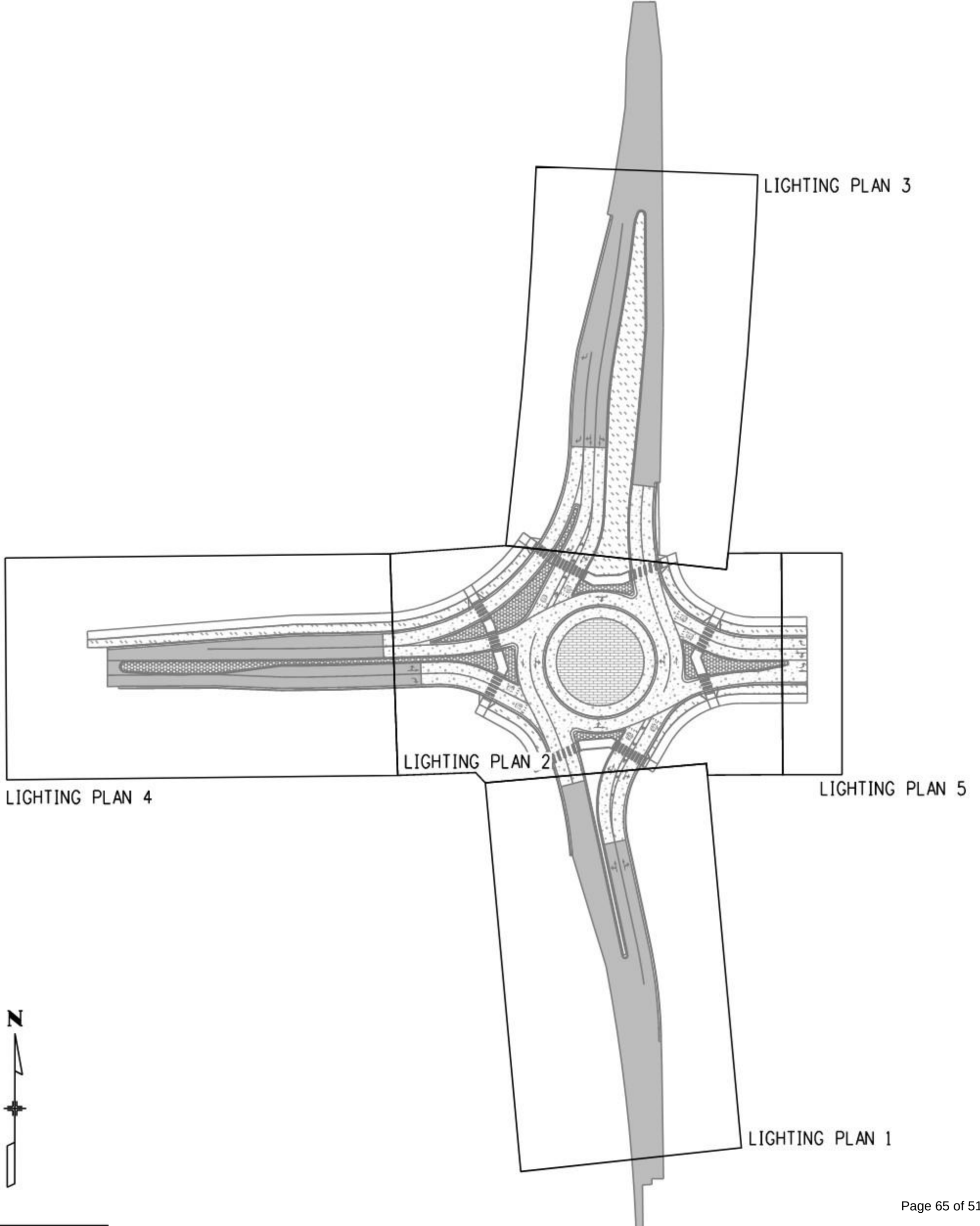
Reviewed and Approved for Presentation



Town Manager



Project Location





450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Agenda Communication

Agenda Date: April 7, 2025

Subject: New Beer and Wine Liquor License Application for ZW Restaurants LLC dba Little House

Attachments:

1. ZW Restaurant Application
2. Johnstown Police Department Report
3. Order Approving Beer and Wine License

Presented by: Meghan Martinez, Town Clerk

Agenda Item Description:

This item is a public hearing for a new Beer and Wine liquor license for ZW Restaurants dba Little House located at 417 Charlotte Street #D Johnstown, CO. When approving or denying an application, the Council acts as the local licensing authority and must consider if the reasonable requirements of the defined neighborhood are not presently being met by existing establishments, the desires of the adult inhabitants, and the number, type and availability of other similar liquor establishments located in or near the petitioned neighborhood as well as the moral character of the applicants.

Staff received the application in November but were not able to deem the application was completed until the beginning of March as elements of the application were missing or incomplete. The applicant has remedied the application, and it is now ready for consideration by the Council as the Local Licensing Authority for the Town of Johnstown.

Should the Council approve the application, it will be forwarded to the Colorado Liquor Enforcement Division for consideration by the State.

Strategic Plan Alignment:

Healthy & Resilient Economy

- Invest in the development of a vibrant and interconnected downtown
- Support the local labor market and work with partners to grow diverse employment opportunities.

Legal Advice:

The Town Attorney has reviewed the application and prepared the order attached to this item.

Financial Advice:

N/A

Recommended Action:

Consider approving a Beer and Wine License for ZW Restaurants dba Little House.

Suggested Motions:

For Approval: I move to approve the Beer and Wine License for ZW Restaurants dba Little House.

For Denial: I move to deny the Beer and Wine License for ZW Restaurants dba Little House.

Reviewed and Approved for Presentation



Town Manager

Colorado Liquor Retail License Application

* **Note that the Division will not accept cash** ☐ Paid by Check **Date Uploaded to MoveIt**

☐ Paid Online

☐ New License ☐ New-Concurrent ☐ Transfer of Ownership ☐ State Property Only ☐ Master file

- All answers must be printed in black ink or typewritten
- Applicant must check the appropriate box(es)
- Applicant should obtain a copy of the Colorado Liquor and Beer Code: SBG.Colorado.gov/Liquor

Applicant is applying as a/an ☐ Individual ☒ Limited Liability Company ☐ Association or Other
☐ Corporation ☐ Partnership (includes Limited Liability and Married Couple Partnerships)

Applicant Name If an LLC, name of LLC; if partnership, at least 2 partner's names; if corporation, name of corporation

ZW Restaurant LLC

FEIN Number

[REDACTED]

State Sales Tax Number

[REDACTED]

Trade Name of Establishment (DBA)

Little House

Business Telephone

970-806-5862

Address of Premises (specify exact location of premises, include suite/unit numbers)

417 Charlotte St #D

City

Johnstown

County

Weld

State

CO

ZIP Code

80534

Mailing Address (Number and Street)

417 Charlotte St #D

City or Town

Johnstown

State

CO

ZIP Code

80534

Email Address

Xue600222@icloud.com

If the premises currently has a liquor or beer license, you **must** answer the following questions.

Present Trade Name of Establishment (DBA)

Present State License Number

Present Class of License

Present Expiration Date

1. Is the applicant (including any of the partners if a partnership; members or managers if a limited liability company; or officers, stockholders or directors if a corporation) or managers under the age of twenty-one years?..... ☐ Yes ☒ No
2. Has the applicant (including any of the partners if a partnership; members or managers if a limited liability company; or officers, stockholders or directors if a corporation) or managers ever (in Colorado or any other state):
- a. Been denied an alcohol beverage license?..... ☐ Yes ☒ No
- b. Had an alcohol beverage license suspended or revoked?..... ☐ Yes ☒ No
- c. Had interest in another entity that had an alcohol beverage license suspended or revoked?..... ☐ Yes ☒ No

If you answered yes to a, b or c above, explain in detail on a separate sheet.

3. Has a liquor license application (same license class), that was located within 500 feet of the proposed premises, been denied within the preceding two years?..... ☐ Yes ☒ No

If "yes", explain in detail.

4. Are the premises to be licensed within 500 feet, of any public or private school that meets compulsory education requirements of Colorado law, or the principal campus of any college, university or seminary? ☐ Yes ☒ No
- or

Waiver by local ordinance? ☐ Yes ☒ No

Other

5. Is your Liquor Licensed Drugstore (LLDS) or Retail Liquor Store (RLS) within 1500 feet of another retail liquor license for off-premises sales in a jurisdiction with a population of greater than (>) 10,000? **NOTE:** The distance shall be determined by a radius measurement that begins at the principal doorway of the LLDS/RLS premises for which the application is being made and ends at the principal doorway of the Licensed LLDS/RLS..... ☐ Yes ☒ No

6. Is your Liquor Licensed Drugstore (LLDS) or Retail Liquor Store (RLS) within 3000 feet of another retail liquor license for off-premises sales in a jurisdiction with a population of less than (<) 10,000? **NOTE:** The distance shall be determined by a radius measurement that begins at the principal doorway of the LLDS/RLS premises for which the application is being made and ends at the principal doorway of the Licensed LLDS/RLS..... ☐ Yes ☒ No

For additional Retail Liquor Store only.

- a. Was your Retail Liquor Store License issued on or before January 1, 2016?.... ☐ Yes ☒ No
- b. Are you a Colorado resident?..... ☒ Yes ☐ No
7. Has a liquor or beer license ever been issued to the applicant (including any of the partners, if a partnership; members or manager if a Limited Liability Company; or officers, stockholders or directors if a corporation)? If yes, identify the name of the business and list any **current** financial interest in said business including any loans to or from a licensee..... ☒ Yes ☐ No
8. Does the applicant, as listed on line 2 of this application, **have legal possession of the premises by ownership**, lease or other arrangement?..... ☒ Yes ☐ No

☒ Ownership ☐ Lease ☐ Other (Explain in detail)

- a. If leased, list name of landlord and tenant, and date of expiration, **exactly** as they appear on the lease:

Landlord

Tenant

Expires

Zhenig's LLC

2W Restaurant LLC

9/30/34

- b. Is a percentage of alcohol sales included as compensation to the landlord?
If yes, complete question on page 9..... ☐ Yes ☒ No
- c. Attach a diagram that designates the area to be licensed in black bold outline (including dimensions) which shows the bars, brewery, walls, partitions, entrances, exits and what each room shall be utilized for in this business. This diagram should be no larger than 8½" X 11".

9. Who, besides the owners listed in this application (including persons, firms, partnerships, corporations, limited liability companies) will loan or give money, inventory, furniture or equipment to or for use in this business; or who will receive money from this business? Attach a separate sheet if necessary.

Last Name <i>Xue</i> <i>Zheng</i>		First Name <i>Xue</i>	
Date of Birth (MM/DD/YY) [Redacted]	FEIN or SSN Number [Redacted]	Interest/Percentage <i>50%</i>	
Last Name <i>Wei</i>		First Name <i>Channi</i>	
Date of Birth (MM/DD/YY) [Redacted]	FEIN or SSN Number [Redacted]	Interest/Percentage <i>50%</i>	
Last Name		First Name	
Date of Birth (MM/DD/YY)	FEIN or SSN Number	Interest/Percentage	

Attach copies of all notes and security instruments and any written agreement or details of any oral agreement, by which any person (including partnerships, corporations, limited liability companies, etc.) will share in the profit or gross proceeds of this establishment, and any agreement relating to the business which is contingent or conditional in any way by volume, profit, sales, giving of advice or consultation.

10. Optional Premises or Hotel and Restaurant Licenses with Optional Premises:

Has a local ordinance or resolution authorizing optional premises been adopted?.... ☐ Yes ☒ No

Number of additional Optional Premise areas requested. (See license fee chart)

For the addition of a Sidewalk Service Area per Regulation 47-302(A)(4), include a diagram of the service area and documentation received from the local governing body authorizing use of the sidewalk. Documentation may include but is not limited to a statement of use, permit, easement, or other legal permissions.

11. Liquor Licensed Drugstore (LLDS) applicants, answer the following:

- a. Is there a pharmacy, licensed by the Colorado Board of Pharmacy, located within the applicant's LLDS premise?..... ☐ Yes ☒ No

If "yes" a copy of license must be attached.

12. Club Liquor License applicants answer the following: **Attach a copy of applicable documentation**

a. Is the applicant organization operated solely for a national, social, fraternal, patriotic, political or athletic purpose and not for pecuniary gain?..... ☐ Yes ☐ No

b. Is the applicant organization a regularly chartered branch, lodge or chapter of a national organization which is operated solely for the object of a patriotic or fraternal organization or society, but not for pecuniary gain?..... ☐ Yes ☐ No

c. How long has the club been incorporated?.....

d. Has applicant occupied an establishment for three years (three years required) that was operated solely for the reasons stated above?..... ☐ Yes ☐ No

13. Brew-Pub, Distillery Pub or Vintner's Restaurant applicants answer the following:

a. Has the applicant received or applied for a Federal Permit? (Copy of permit or application must be attached)..... ☐ Yes ☐ No

14. Campus Liquor Complex applicants answer the following:

a. Is the applicant an institution of higher education?..... ☐ Yes ☐ No

b. Is the applicant a person who contracts with the institution of higher education to provide food services?..... ☐ Yes ☐ No

If "yes" please provide a copy of the contract with the institution of higher education to provide food services.

15. For all on-premises applicants.

a. For all Liquor Licensed Drugstores (LLDS) the Permitted Manager must also submit an Manager Permit Application - DR 8000 and fingerprints.

Last Name of Manager

First Name of Manager

16. Does this manager act as the manager of, or have a financial interest in, any other liquor licensed establishment in the State of Colorado? If yes, provide name, type of license and account number.....

☐ Yes ☒ No

Name

Type of License

Account Number

17. Related Facility - Campus Liquor Complex applicants answer the following:

- a.** Is the related facility located within the boundaries of the Campus Liquor Complex?..... ☐ Yes ☐ No

If yes, please provide a map of the geographical location within the Campus Liquor Complex.

If no, this license type is not available for issues outside the geographical location of the Campus Liquor Complex.

- b.** Designated Manager for Related Facility - Campus Liquor Complex

Last Name of Manager

First Name of Manager

18. Entertainment Facility License

If Applicant is applying for an Entertainment Facility License, you affirm that your business model and aligns with the statutory privileges and requirements: ☐ Yes ☐ No

Pursuant to 44-3-103(15.5) C.R.S., an Entertainment Facility means an establishment in which the primary business is to provide the public with sports or entertainment activities within its licensed premises; and that, incidental to its primary business, sells and serves alcohol beverages at retail for consumption on the licensed premises; and has sandwiches and light snacks available for consumption on the licensed premises.

If Applicant is applying for a Lodging Facility License, you affirm that your business model and aligns with the statutory privileges and requirements: ☐ Yes ☐ No

Pursuant to 44-3-103(29) C.R.S., a Lodging Facility means an establishment in which the primary business is to provide the public with sleeping rooms and meeting facilities; and that sells and serves alcohol beverages at retail for consumption on the licensed premises; and has sandwiches and light snacks available for consumption on the licensed premises.

19. Tax Information.

- a.** Has the applicant, including its manager, partners, officer, directors, stockholders, members (LLC), managing members (LLC), or any other person with a 10% or greater financial interest in the applicant, been found in final order of a tax agency to be delinquent in the payment of any state or local taxes, penalties, or interest related to a business?..... ☐ Yes ☒ No

- b.** Has the applicant, including its manager, partners, officer, directors, stockholders, members (LLC), managing members (LLC), or any other person with a 10% or greater financial interest in the applicant failed to pay any fees or surcharges imposed pursuant to section 44-3-503, C.R.S.?..... ☐ Yes ☒ No

If applicant is a corporation, partnership, association or limited liability company, applicant must list all **Officers, Directors, General Partners, and Managing Members**. In addition, applicant must list any stockholders, partners, or members with **ownership of 10% or more in the applicant**. All persons **listed below** must also attach form DR 8404-I (Individual History Record), and make an appointment with an approved State Vendor through their website. See application checklist, Section IV, for details.

Name Date of Birth (MM/DD/YY)

Street Address

City State ZIP Code Position % Owned

Name Date of Birth (MM/DD/YY)

Street Address

City State ZIP Code Position % Owned

Name Date of Birth (MM/DD/YY)

Street Address

City State ZIP Code Position % Owned

Name Date of Birth (MM/DD/YY)

Street Address

City State ZIP Code Position % Owned

Name Date of Birth (MM/DD/YY)

Street Address

City State ZIP Code Position % Owned

** If applicant is owned 100% by a parent company, please list the designated principal officer on above.

** Corporations - the President, Vice-President, Secretary and Treasurer must be accounted for above (Include ownership percentage if applicable)

** If total ownership percentage disclosed here does not total 100%, applicant must check this box:

☐ Applicant affirms that no individual other than these disclosed herein owns 10% or more of the applicant and does not have financial interest in a prohibited liquor license pursuant to Article 3 or 5, C.R.S.

I would like to apply for a Two-Year Renewal..... ☐ Yes ☐ No

Oath Of Applicant

I declare under penalty of perjury in the second degree that this application and all attachments are true, correct, and complete to the best of my knowledge. I also acknowledge that it is my responsibility and the responsibility of my agents and employees to comply with the provisions of the Colorado Liquor or Beer and Wine Code which affect my license.

Printed Name

Xue Zheng

Title

owner

Authorized Signature

Date (MM/DD/YY)

Report and Approval of Local Licensing Authority (City/County)

Date application filed with local authority

Date of local authority hearing (for new license applicants; cannot be less than 30 days from date of application)

For Transfer Applications Only - Is the license being transferred valid?..... ☐ Yes ☐ No

The Local Licensing Authority Hereby Affirms that each person required to file DR 8404-I (Individual History Record) or a DR 8000 (Manager Permit) has been:

☐ Fingerprinted

☐ Subject to background investigation, including NCIC/CCIC check for outstanding warrants

That the local authority has conducted, or intends to conduct, an inspection of the proposed premises to ensure that the applicant is in compliance with and aware of, liquor code provisions affecting their class of license

(Check One)

☐ Date of inspection or anticipated date

☐ Will conduct inspection upon approval of state licensing authority

☐ Is the Liquor Licensed Drugstore (LLDS) or Retail Liquor Store (RLS) within 1,500 feet of another retail liquor license for off-premises sales in a jurisdiction with a population of > 10,000?

☐ Yes ☐ No

☐ Is the Liquor Licensed Drugstore (LLDS) or Retail Liquor Store (RLS) within 3,000 feet of another retail liquor license for off-premises sales in a jurisdiction with a population of < 10,000? ☐ Yes ☐ No

NOTE: The distance shall be determined by a radius measurement that begins at the principal doorway of the LLDS/RLS premises for which the application is being made and ends at the principal doorway of the Licensed LLDS/RLS.

☐ Does the Liquor-Licensed Drugstore (LLDS) have at least twenty percent (20%) of the applicant's gross annual income derived from the sale of food, during the prior twelve (12) month period? ☐ Yes ☐ No

The foregoing application has been examined; and the premises, business to be conducted, and character of the applicant are satisfactory. We do report that such license, if granted, will meet the reasonable requirements of the neighborhood and the desires of the adult inhabitants, and will comply with the provisions of Title 44, Article 4 or 3, C.R.S., and Liquor Rules. **Therefore, this application is approved.**

Local Licensing Authority Approves this license for a two-year renewal..... ☐ Yes ☐ No

If "No", please cite the law, regulation, local ordinance or resolution that gives the local licensing authority the ability to deny the applicant and grounds for denial. Also, please provide any and all investigative reports, and administrative or criminal action that relate or justify this denial.

Proof of Violation

Local Licensing Authority for Telephone Number ☐ Town, City
☐ County

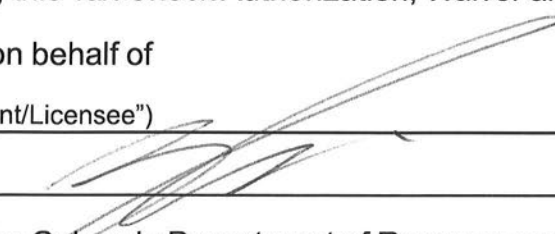
Printed Name		Title	
Signature		Date (MM/DD/YY)	
Printed Name		Title	
Signature		Date (MM/DD/YY)	

Tax Check Authorization, Waiver, and Request to Release Information

I, Xue zheng.

am signing this Tax Check Authorization, Waiver and Request to Release Information (hereinafter
"Waiver") on behalf of

(the "Applicant/Licensee")


to permit the Colorado Department of Revenue and any other state or local taxing authority to release information and documentation that may otherwise be confidential, as provided below. If I am signing this Waiver for someone other than myself, including on behalf of a business entity, I certify that I have the authority to execute this Waiver on behalf of the Applicant/Licensee.

The Executive Director of the Colorado Department of Revenue is the State Licensing Authority, and oversees the Colorado Liquor Enforcement Division as his or her agents, clerks, and employees. The information and documentation obtained pursuant to this Waiver may be used in connection with the Applicant/Licensee's liquor license application and ongoing licensure by the state and local licensing authorities. The Colorado Liquor Code, section 44-3-101. et seq. ("Liquor Code"), and the Colorado Liquor Rules, 1 CCR 203-2 ("Liquor Rules"), require compliance with certain tax obligations, and set forth the investigative, disciplinary and licensure actions the state and local licensing authorities may take for violations of the Liquor Code and Liquor Rules, including failure to meet tax reporting and payment obligations.

The Waiver is made pursuant to section 39-21-113(4), C.R.S., and any other law, regulation, resolution or ordinance concerning the confidentiality of tax information, or any document, report or return filed in connection with state or local taxes. This Waiver shall be valid until the expiration or revocation of a license, or until both the state and local licensing authorities take final action to approve or deny any application(s) for the renewal of the license, whichever is later. Applicant/Licensee agrees to execute a new waiver for each subsequent licensing period in connection with the renewal of any license, if requested.

By signing below, Applicant/Licensee requests that the Colorado Department of Revenue and any other state or local taxing authority or agency in the possession of tax documents or information, release information and documentation to the Colorado Liquor Enforcement Division, and is duly authorized employees, to act as the Applicant's/Licensee's duly authorized representative under section 39-21-113(4), C.R.S., solely to allow the state and local licensing authorities, and their duly authorized employees, to investigate compliance with the Liquor Code and Liquor Rules. Applicant/Licensee authorizes the state and local licensing authorities, their duly authorized employees, and their legal representatives, to use the information and documentation obtained using this Waiver in any administrative or judicial action regarding the application or license.

Name (Individual/Business)

ZW Restaurant LLC

Social Security Number/Tax Identification Number

Home Phone Number

Business/Work Phone Number

970-806-5862

Street Address

417 Charlotte St #D

City

Johnston

State

CO

ZIP Code

80534

Printed name of person signing on behalf of the Applicant/Licensee

Xue L Zheng

Applicant/Licensee's Signature (Signature authorizing the disclosure of confidential tax information)

Date Signed

11-4-24

Privacy Act Statement

Providing your Social Security Number is voluntary and no right, benefit or privilege provided by law will be denied as a result of refusal to disclose it. § 7 of Privacy Act, 5 USCS § 552a (note).

APPLICANT NAME:
ADDRESS:
TYPE OF LICENSE:
PUBLIC HEARING:

PETITION TO THE JOHNSTOWN LIQUOR AUTHORITY

Applicant Name: ZW Restaurant LLC

D/B/A: Little House

Site Location: 417 Charlotte St #D Johnstown CO 80534

Type of License:

Public Hearing:

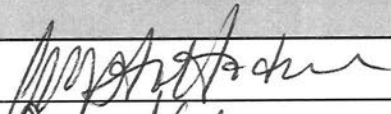
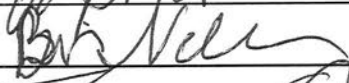
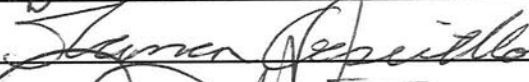
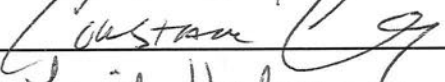
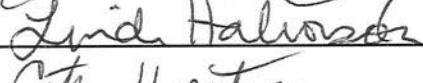
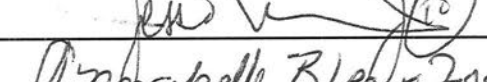
Defined Neighborhood: Only the area pertaining to the Town of Johnstown within a 1/2-mile radius surrounding the proposed license location

(See Map)

I, the undersigned, am aware that an application for a _____ type liquor license has been filed with the Johnstown Town Clerk on _____ by: _____ doing business as _____ and proposed to be located at _____. I am at least 21 years of age and am a resident or owner or manager of a business located within the defined neighborhood boundaries of the proposed liquor establishment. I have indicated below whether I consider the granting of the above-mentioned liquor license to be desirable and necessary for the reasonable requirements of the neighborhood.

All signatures must sign in the presence of petition circulator.

APPLICANT NAME:
 ADDRESS:
 TYPE OF LICENSE:
 PUBLIC HEARING:

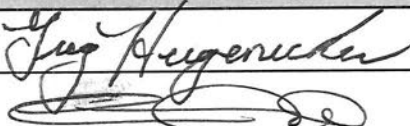
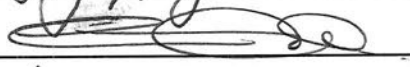
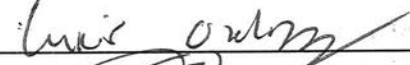
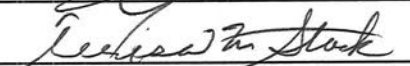
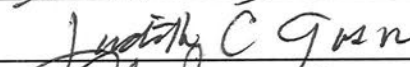
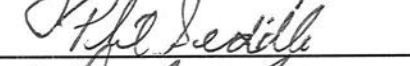
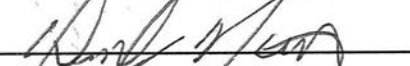
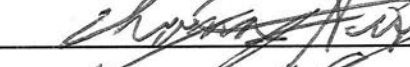
Signature	Printed Name	Address	Business Owner, Business Manager, Resident	Date Signed	Favor ✓	Oppose ✓
	Crystal Hodges	308 Charlotte St	Res	9/13	✓	
	Brianna Nelson	302 Charlotte St	Res	9/13	✓	
	Beymar Castillo	202 Charlotte St	Res	9/13	✓	
	DANIEL HOLGUIN	7 Raymond Place	RES	9/13	✓	
	John Schilling	215 N 1 ST	RES	9/13	✓	
	Brandon Bathauer	114 W Raymond	Res	9/13	✓	
	Constanza Cruz	445 S. Charlotte St	RES	9/13	✓	
	Linda Halvorsen	520 Charlotte St	Res	9/13	✓	
	Cathy Hempstead	9 S Estes	RES	9/13	✓	
	Scott Peterson	10 S. Estes	Res	9/13/24	✓	
	SCOTT SLAUGH	618 CHARLOTTE	RES	9/13/24	✓	
	Jesse Molinar	700 Charlotte St	Res	9.13.24	✓	
	Annabelle Bleg-Tromas	521 Charlotte	Res	9/13/24	✓	

APPLICANT NAME:
ADDRESS:
TYPE OF LICENSE:
PUBLIC HEARING:

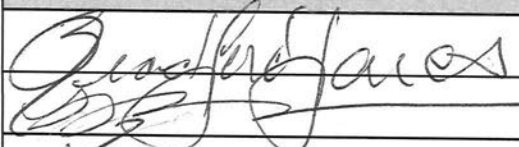
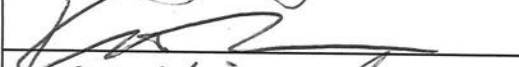
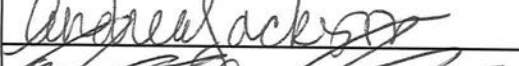
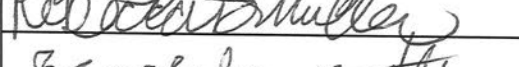
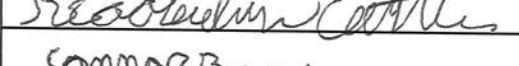
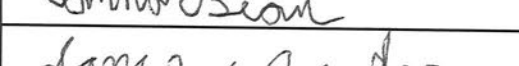
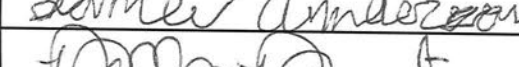
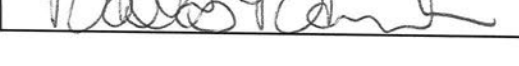
[Handwritten signature]

Signature	Printed Name	Address	Business Owner, Business Manager, Resident	Date Signed	Favor ✓	Oppose ✓
<i>Deanne Lowe</i>	Deanne Lowe	618 Avenue St	R	9/14/24	✓	
<i>Thomas J. Lane</i>	Thomas J. Lane	125 N 1st St	R	9/14/24	✓	
<i>Holly Stinson</i>	Holly Stinson	1112 Sandoz	R	9/23/24	✓	
<i>David M. Garcia</i>	David M. Garcia	9 Raymond	R	9/28/24	✓	
<i>Dana Karcher</i>	Dana Karcher	623 Charlotte St	R	10/1/24	✓	
<i>Nancy Lash</i>	Nancy Lash	19 N. Idaho Ave	R	10/3/24	✓	
<i>CAROLYN RICE</i>	CAROLYN RICE	3660 Holmes Ln	R	10/3/24	✓	
<i>Lori Vandiver</i>	Lori Vandiver	220 S. Laura Ave	R	10/3/24	✓	
<i>LEANN LARSON</i>	LEANN LARSON	1452 Harvester	R	10/3/24	✓	
<i>MISSA COLEY</i>	MISSA COLEY	154 S. CAMOULE AVE	R	10/9/24	✓	
<i>Shannon Pettis</i>	Shannon Pettis	23 N Estes Ave	R	10/9/24	✓	
<i>Shannon Pettis</i>	Shannon Pettis	25 N Estes Ave	R	10/9/24	✓	
<i>Luis H. Zumbardo</i>	Luis H. Zumbardo	613 N First St	N	10/9/24	✓	

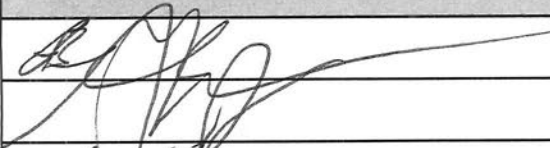
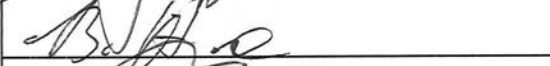
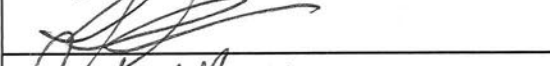
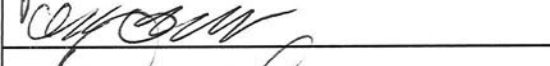
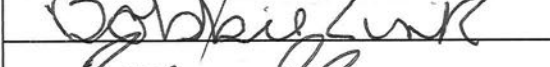
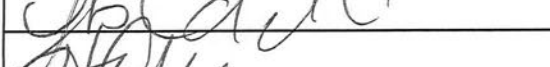
APPLICANT NAME:
ADDRESS:
TYPE OF LICENSE:
PUBLIC HEARING:

Signature	Printed Name	Address	Business Owner, Business Manager, Resident	Date Signed	Favor ✓	Oppose ✓
	Greg Hergenreder	713 N. 1 st St	Res.	10-9-24	✓	
	KEVIN GRIM	90 N CREELEY AVE	RES.	10-9-24	✓	
	Luis Fernandez	70 N Greeley Ave		10-9-24	✓	
	Brian Rose	9 N Greeley Ave	RES	10-9-24	✓	
	Teresa M. Stark	830 Charlotte St.	Res	10-9-24	✓	
	Judith C Gosnell	823 Charlotte St	Res.	10-9-24	✓	
	Phil Sedillo	825 Charlotte St	RES.	10-9-24	✓	
	DONALD NESBY	901 Charlotte	RES	10-9-24	✓	
	Tyler Phillips	921 Charlotte St	RES	10-9-24	✓	
	Alex McCraw	16 N Columbine Ave	RES	10/18/24	✓	
	HEIDI TURNER	611 WADAS CT	RES	10-20-24	✓	
	THOMAS HORNUM	613 WADAS CT.	RES	10-20	✓	
	Randall Ray	620 Wadas St	Rec	10-20	✓	

APPLICANT NAME:
 ADDRESS:
 TYPE OF LICENSE:
 PUBLIC HEARING:

Signature	Printed Name	Address	Business Owner, Business Manager, Resident	Date Signed	Favor ✓	Oppose ✓
	Bradford Jones	478 Charlotte St	R	9-14-24	✓	
	Toni Beaver	430 Saint Charles Pl Johnstown CO 80534	R	9/14/24	✓	
	Keith Hanson	450 ST. CHARLES PL Johnstown CO 80534	R	9/14/24	✓	
	Frederick Mustard	1554 S. Lowlands Johnstown CO 80534	R	9/14/24	✓	
	Andrea Jackson	1050 ESTES AVE Johnstown CO 80534	R	9/14/24	✓	
	Brenda Jackson	29719 Staghornet Johnstown CO 80534	R	9/14/24	✓	
	John Hansen Bates	3667 Holmes Ln Johnstown CO 80534	R	9/14/24	✓	
	Jerry A. Dey	604 Aurora St Johnstown CO 80534	R	9/14/24	✓	
	Rebecca Fortmuller	3749 Grandview St. Johnstown CO 80534	R	09/14/2024	✓	
	Brooklyn Coulters	318 Ricker Ln Johnstown CO 80534	R	9/14/2024	✓	
	Connor Beach	2125 W 97TH AVE. Westminster CO 80031	R	9/14/24	✓	
	James Anderson	231 Honey Suckleyway Johnstown CO 80534	R	9/14/24	✓	
	Dallas Daniels	4110 Charlotte St Johnstown CO	R	9-14-24	✓	

APPLICANT NAME:
ADDRESS:
TYPE OF LICENSE:
PUBLIC HEARING:

Signature	Printed Name	Address	Business Owner, Business Manager, Resident	Date Signed	Favor ✓	Oppose ✓
	Ben Shepard	622 Wadas Ct.	R	10-20-24	✓	
	Brian Hunt	623 Wadas Ct	Owner	10-20-	✓	
	Krysta Avernaheuer	703 Country Acres Dr.	Owner	10-20-24	✓	
	Brenda Richie	705 Country Ave Dr	R	10/20/24	✓	
	Owen Brown	709 Country Ave Dr	R	10/20/24	✓	
	Leo Lynn	212 Country Ave	R	10/20/24	✓	
	Bobbie Zink	717 COUNTRY ACRES		10/20/24	✓	
	Jenna Parker	30 S. Denver Ave	Owner	10/20/24	✓	
	David Klag	501 Charlotte ^{Jolys} Town	R	10/28/24	✓	
	Teressa Galindo	506 Peterson Pr.	R	10/28/24	✓	
	Holly Oliver	511 Peterson ^{#14} Pr	R	10/28/24	✓	
	JARROD HESS	21 S. ESTES.	R	10/28/24	✓	



Individual History Record

To be completed by the following persons, as applicable: sole proprietors; general partners regardless of percentage ownership, and limited partners owning 10% or more of the partnership; all principal officers of a corporation, all directors of a corporation, and any stockholder of a corporation owning 10% or more of the outstanding stock; managing members or officers of a limited liability company, and members owning 10% or more of the company; and any intended registered manager of Hotel and Restaurant, Tavern, Lodging Facility, and Entertainment Facility class of retail license

Notice: This individual history record requires information that is necessary for the licensing investigation or inquiry. All questions must be answered in their entirety or the license application may be delayed or denied. If a question is not applicable, please indicate so by "N/A". **Any deliberate misrepresentation or material omission may jeopardize the license application.** (Please attach a separate sheet if necessary to enable you to answer questions completely)

Name of Business

ZW Restaurant Inc

Home Phone Number

970-966-3962

Cellular Number

970-966-3962

Your Full Name (last, first, middle)

Zheng Xue Liang

List any other names you have used

N/A

Mailing address (if different from residence)

417 Charlotte St #D Johnstown CO 80534

Email Address

Xue600222@icloud.com

1. List current residence address. Include any previous addresses within the last five years. (Attach separate sheet if necessary)

Current Street and Number

1903 WindSong Dr

Current City, State, ZIP

Johnstown CO 80534

From:

2021

To:

now

Previous Street and Number

103 N Josephine Ave #19

Previous City, State, ZIP

Milliken CO 80543

From:

2017

To:

2021

Individual History Record (Continued)

2. List all employment within the last five years. Include any self-employment. (Attach separate sheet if necessary)

Name of Employer or Business

Little House

Address (Street, Number, City, State, ZIP)

417 Charlotte St #D Johnstown CO 80534

Position Held

Owner

From:

2016 Jan

To:

2022 Aug

Name of Employer or Business

Roman Logistics LLC

Address (Street, Number, City, State, ZIP)

4555 E 37th St Loveland CO 80538

Position Held

Amazon delivery driver

From:

2022 Oct

To:

2023 Apr

Name of Employer or Business

J M Smucker Co

Address (Street, Number, City, State, ZIP)

2900 Peak Ave Longmont CO 80504

Position Held

Tech

From:

2023 May

To:

2024 July

3. List the name(s) of relatives working in or holding a financial interest in the Colorado alcohol beverage industry.

Name of Relative

Relationship to You:

Position Held

Name of Licensee

Name of Relative

Relationship to You:

Position Held

Name of Licensee

Individual History Record (Continued)

Name of Relative

Position Held

Relationship to You:

Name of Licensee

Name of Relative

Position Held

Relationship to You:

Name of Licensee

4. Have you ever applied for, held, or had an interest in a Colorado Liquor or Beer License, or loaned money, furniture, fixtures, equipment or inventory to any licensee?

☐ Yes ☒ No

(If yes, answer in detail.)

5. Have you ever received a violation notice, suspension, or revocation for a liquor law violation, or have you applied for or been denied a liquor or beer license anywhere in the United States?.....

☐ Yes ☒ No

(If yes, answer in detail.)

6. Have you ever been convicted of a crime or received a suspended sentence, deferred sentence, or forfeited bail for any offense in criminal or military court or do you have any charges pending?.....

☐ Yes ☒ No

(If yes, answer in detail.)

7. Are you currently under probation (supervised or unsupervised), parole, or completing the requirements of a deferred sentence?.....

☐ Yes ☒ No

(If yes, answer in detail.)

Individual History Record (Continued)

8. Have you ever had any professional license suspended, revoked, or denied?... ☐ Yes ☒ No

(If yes, answer in detail.)

Personal and Financial Information

Unless otherwise provided by law, the personal information required in this section will be treated as confidential. The personal information required in this section is solely for identification purposes.

Date of Birth

Social Security Number

Place of Birth

China

U.S. Citizen



Yes



No

If Naturalized, state where

NM Abq

When

2010

Name of District Court

Naturalization Certificate Number

Date of Certification

If an Alien, Give Alien's Registration Card Number

Permanent Residence Card Number

Height

5'10

Weight

190

Hair Color

Black

Eye Color

Bro

Gender

M

Do you have a current Driver's License/ID? If so, give number and state. ☒ Yes ☐ No

Driver's License Number

Driver's License State

CO

Financial Information

9. Total purchase price or investment being made by the applying entity, corporation, partnership, limited liability company, other.....

N/A

10. List the total amount of the **personal** investment, made by the person listed on page 1 in this business including any notes, loans, cash, services or equipment, operating capital, stock purchases or fees paid.....

N/A

NOTE: If corporate investment only, please skip to and complete question 12

NOTE: Question 10 should reflect the total of questions 11 and 13

Personal and Financial Information (Continued)

Name of Lender

Address

Term

Security

Amount

Name of Lender

Address

Term

Security

Amount

Name of Lender

Address

Term

Security

Amount

Oath of Applicant

I declare under penalty of perjury that this application and all attachments are true, correct, and complete to the best of my knowledge.

Electronic signature is not accepted, physical signature is required.

Print Signature

Title

Date (MM/DD/YY)

Personal and Financial Information (Continued)

11. Provide details of the personal investment described in question 10. You must account for all of the sources of this investment. (Attach a separate sheet if needed)

Type: Cash, Services or Equipment

Account Type

Bank Name

Amount

Type: Cash, Services or Equipment

Account Type

Bank Name

Amount

Type: Cash, Services or Equipment

Account Type

Bank Name

Amount

Type: Cash, Services or Equipment

Account Type

Bank Name

Amount

12. Provide details of the corporate investment described in question 9. You must account for all of the sources of this investment. (Attach a separate sheet if needed)

Type: Cash, Services or Equipment

Loans

Account Type

Bank Name

Amount

Type: Cash, Services or Equipment

Loans

Account Type

Bank Name

Amount

Type: Cash, Services or Equipment

Loans

Account Type

Bank Name

Amount

13. Loan Information (Attach copies of all notes or loans)

Name of Lender

Address

Term

Security

Amount

Individual History Record

To be completed by the following persons, as applicable: sole proprietors; general partners regardless of percentage ownership, and limited partners owning 10% or more of the partnership; all principal officers of a corporation, all directors of a corporation, and any stockholder of a corporation owning 10% or more of the outstanding stock; managing members or officers of a limited liability company, and members owning 10% or more of the company; and any intended registered manager of Hotel and Restaurant, Tavern, Lodging Facility, and Entertainment Facility class of retail license

Notice: This individual history record requires information that is necessary for the licensing investigation or inquiry. All questions must be answered in their entirety or the license application may be delayed or denied. If a question is not applicable, please indicate so by "N/A". **Any deliberate misrepresentation or material omission may jeopardize the license application.** (Please attach a separate sheet if necessary to enable you to answer questions completely)

Name of Business

ZW Restaurant inc

Home Phone Number

626 493-1146

Cellular Number

626-493-1146

Your Full Name (last, first, middle)

Wei Chunni

List any other names you have used

N/A

Mailing address (if different from residence)

417 Charlotte St #D Johnstown CO 80534

Email Address

Jennywe66@icloud.com

1. List current residence address. Include any previous addresses within the last five years. (Attach separate sheet if necessary)

Current Street and Number

903 Crestone St

From:

2023 Aug

Previous Street and Number

10065 W Dartmouth Ave

From:

2022 Aug B-201

Current City, State, ZIP

Johnstown CO 80534

To:

Now

Previous City, State, ZIP

Lakewood CO 80227

To:

2023 Aug

Individual History Record (Continued)

2. List all employment within the last five years. Include any self-employment. (Attach separate sheet if necessary)

Name of Employer or Business

Sunshine Massage Inc

Address (Street, Number, City, State, ZIP)

1864 S Wadsworth Blvd #9 Lakewood CO 80232

Position Held

Massager

From:

2022 Aug

To:

2024 Aug

Name of Employer or Business

ZW Restaurant Inc

Address (Street, Number, City, State, ZIP)

417 Charlotte St

Position Held

Owner

From:

2024 Sep

To:

Now

Name of Employer or Business

before 2022 is in China

Address (Street, Number, City, State, ZIP)

Position Held

From:

To:

3. List the name(s) of relatives working in or holding a financial interest in the Colorado alcohol beverage industry.

Name of Relative

Relationship to You:

Position Held

Name of Licensee

Name of Relative

Relationship to You:

Position Held

Name of Licensee

Individual History Record (Continued)

Name of Relative

Position Held

Name of Relative

Position Held

Relationship to You:

Name of Licensee

Relationship to You:

Name of Licensee

4. Have you ever applied for, held, or had an interest in a Colorado Liquor or Beer License, or loaned money, furniture, fixtures, equipment or inventory to any licensee? ☐ Yes ☒ No

(If yes, answer in detail.)

5. Have you ever received a violation notice, suspension, or revocation for a liquor law violation, or have you applied for or been denied a liquor or beer license anywhere in the United States?..... ☐ Yes ☒ No

(If yes, answer in detail.)

6. Have you ever been convicted of a crime or received a suspended sentence, deferred sentence, or forfeited bail for any offense in criminal or military court or do you have any charges pending?..... ☐ Yes ☒ No

(If yes, answer in detail.)

7. Are you currently under probation (supervised or unsupervised), parole, or completing the requirements of a deferred sentence?..... ☐ Yes ☒ No

(If yes, answer in detail.)

Individual History Record (Continued)

8. Have you ever had any professional license suspended, revoked, or denied?... ☐ Yes ☒ No

(If yes, answer in detail.)

Personal and Financial Information

Unless otherwise provided by law, the personal information required in this section will be treated as confidential. The personal information required in this section is solely for identification purposes.

Date of Birth

Social Security Number

Place of Birth

China

U.S. Citizen

☐ Yes ☒ No

If Naturalized, state where

When

Name of District Court

Naturalization Certificate Number

Date of Certification

If an Alien, Give Alien's Registration Card Number

Permanent Residence Card Number

Height

5'05"

Weight

130

Hair Color

Black

Eye Color

Brown

Gender

F

Do you have a current Driver's License/ID? If so, give number and state. ☒ Yes ☐ No

Driver's License Number

Driver's License State

CO

Financial Information

9. Total purchase price or investment being made by the applying entity, corporation, partnership, limited liability company, other.....

N/A

10. List the total amount of the **personal** investment, made by the person listed on page 1 in this business including any notes, loans, cash, services or equipment, operating capital, stock purchases or fees paid.....

N/A

NOTE: If corporate investment only, please skip to and complete question 12

NOTE: Question 10 should reflect the total of questions 11 and 13

Personal and Financial Information (Continued)

11. Provide details of the personal investment described in question 10. You must account for all of the sources of this investment. (Attach a separate sheet if needed)

Type: Cash, Services or Equipment	Account Type
Bank Name	Amount
Type: Cash, Services or Equipment	Account Type
Bank Name	Amount
Type: Cash, Services or Equipment	Account Type
Bank Name	Amount
Type: Cash, Services or Equipment	Account Type
Bank Name	Amount

12. Provide details of the corporate investment described in question 9. You must account for all of the sources of this investment. (Attach a separate sheet if needed)

Type: Cash, Services or Equipment	Loans	Account Type
Bank Name	Amount	
Type: Cash, Services or Equipment	Loans	Account Type
Bank Name	Amount	
Type: Cash, Services or Equipment	Loans	Account Type
Bank Name	Amount	

13. Loan Information (Attach copies of all notes or loans)

Name of Lender	Address
Term	Security
Amount	

Personal and Financial Information (Continued)

Name of Lender

Address

Term

Security

Amount

Name of Lender

Address

Term

Security

Amount

Name of Lender

Address

Term

Security

Amount

Oath of Applicant

I declare under penalty of perjury that this application and all attachments are true, correct, and complete to the best of my knowledge.

Electronic signature is not accepted, physical signature is required.

Channi Wei

Print Signature

Channi Wei

Title

owner

Date (MM/DD/YY)

2/12/25



Document must be filed electronically.
Paper documents are not accepted.
Fees & forms are subject to change.
For more information or to print copies
of filed documents, visit www.coloradosos.gov.

Colorado Secretary of State
Date and Time: 08/05/2024 09:08 AM
ID Number: 20241830034
Document number: 20241830034
Amount Paid: \$20.00

ABOVE SPACE FOR OFFICE USE ONLY

Statement of Trade Name of a Reporting Entity

filed pursuant to §7-71-103 and §7-71-107 of the Colorado Revised Statutes (C.R.S)

1. For the reporting entity delivering this statement, its ID number, true name, form of entity and the jurisdiction under the law of which it is formed are

ID Number	<u>20241829207</u> <i>(Colorado Secretary of State ID number)</i>
True name	<u>ZW RESTAURANT INC.</u>
Form of entity	<u>Corporation</u>
Jurisdiction	<u>Colorado</u>

2. The trade name under which such entity transacts business or conducts activities or contemplates transacting business or conducting activities in this state is

LITTLE HOUSE

3. A brief description of the kind of business transacted or activities conducted or contemplated to be transacted or conducted in this state under such trade name is

A CHINESE RESTAURANT

4. *(If the following statement applies, adopt the statement by marking the box and include an attachment.)*

☐ This document contains additional information as provided by law.

5. *(Caution: Leave blank if the document does not have a delayed effective date. Stating a delayed effective date has significant legal consequences. Read instructions before entering a date.)*

(If the following statement applies, adopt the statement by entering a date and, if applicable, time using the required format.)

The delayed effective date and, if applicable, time of this document are _____
(mm/dd/yyyy hour:minute am/pm)

Notice:

Causing this document to be delivered to the Secretary of State for filing shall constitute the affirmation or acknowledgment of each individual causing such delivery, under penalties of perjury, that such document is such individual's act and deed, or that such individual in good faith believes such document is the act and deed of the person on whose behalf such individual is causing such document to be delivered for filing, taken in conformity with the requirements of part 3 of article 90 of title 7, C.R.S. and, if applicable, the constituent documents and the organic statutes, and that such individual in good faith believes the facts stated in such document are true and such document complies with the requirements of that Part, the constituent documents, and the organic statutes.

This perjury notice applies to each individual who causes this document to be delivered to the Secretary of State, whether or not such individual is identified in this document as one who has caused it to be delivered.

6. The true name and mailing address of the individual causing this document to be delivered for filing are

LUO	GUANHU		
(Last)	(First)	(Middle)	(Suffix)
719 66TH AVE			
(Street number and name or Post Office Box information)			
GREELEY	CO	80634	
(City)	(State)	(Postal/Zip Code)	
CO	United States		
(Province – if applicable)	(Country – if not US)		

(If the following statement applies, adopt the statement by marking the box and include an attachment.)

☐ This document contains the true name and mailing address of one or more additional individuals causing the document to be delivered for filing.

Disclaimer:

This form/cover sheet, and any related instructions, are not intended to provide legal, business or tax advice, and are furnished without representation or warranty. While this form/cover sheet is believed to satisfy minimum legal requirements as of its revision date, compliance with applicable law, as the same may be amended from time to time, remains the responsibility of the user of this form/cover sheet. Questions should be addressed to the user's legal, business or tax advisor(s).

OFFICE OF THE SECRETARY OF STATE
OF THE STATE OF COLORADO

CERTIFICATE OF DOCUMENT FILED

I, Jena Griswold, as the Secretary of State of the State of Colorado, hereby certify that, according to the records of this office, the attached document is a true and complete copy of the

Articles of Incorporation

with Document # 20241829207 of
ZW RESTAURANT INC.

Colorado Corporation

(Entity ID # 20241829207)

consisting of 2 pages.

This certificate reflects facts established or disclosed by documents delivered to this office on paper through 08/01/2024 that have been posted, and by documents delivered to this office electronically through 08/04/2024@ 18:26:19.

I have affixed hereto the Great Seal of the State of Colorado and duly generated, executed, and issued this official certificate at Denver, Colorado on 08/04/2024 @ 18:26:19 in accordance with applicable law. This certificate is assigned Confirmation Number 16267845 .



Jena Griswold

Secretary of State of the State of Colorado

*****End of Certificate*****

Notice: A certificate issued electronically from the Colorado Secretary of State's website is fully and immediately valid and effective. However, as an option, the issuance and validity of a certificate obtained electronically may be established by visiting the Validate a Certificate page of the Secretary of State's website, <https://www.coloradosos.gov/biz/CertificateSearchCriteria.do> entering the certificate's confirmation number displayed on the certificate, and following the instructions displayed. Confirming the issuance of a certificate is merely optional and is not necessary to the valid and effective issuance of a certificate. For more information, visit our website, <https://www.coloradosos.gov> click "Businesses, trademarks, trade names" and select "Frequently Asked Questions."

Commercial Lease

This Commercial Lease ("Lease") is dated as of September 14, 2024, by and between ZHENG'S LLC ("Landlord") and ZW RESTAURANT INC ("Tenant"). The parties agree as follows:

Premises. The Landlord, in consideration of the lease payments provided in this Lease, leases to the Tenant Restaurant space on 417 charlotte st #D johnstown Co 80534 ("Premises") located at 417 Charlotte St #D, johnstown, Colorado 80534.

Term. The lease term will begin on September 14, 2024 and will terminate on September 01, 2034.

Lease Payments. The Tenant shall pay to the Landlord monthly installments of \$2,700.00, payable in advance on the first day of each month. Lease payments shall be made to the Landlord at 417 charlotte st, Johnstown, Colorado 80534. The payment address may be changed from time to time by the Landlord.

Possession. The Tenant shall be entitled to possession on the first day of the term of this Lease and shall yield possession to the Landlord on the last day of the term of this Lease unless otherwise agreed by both parties in writing. At the expiration of the term, the Tenant shall remove their goods and effects and peaceably yield up the Premises to the Landlord in as good a condition as when delivered to the Tenant, ordinary wear and tear excepted.

Use of Premises. The Tenant may use the Premises only for Restaurant only. The Premises may be used for any other purpose only with the prior written consent of the Landlord, which shall not be unreasonably withheld. The Tenant shall notify the Landlord of any anticipated extended absence from the Premises not later than the first day of the extended absence.

Exclusivity. The Landlord shall not directly or indirectly, through any employee, agent, or otherwise, lease any space within the property (except the Premises herein described) or permit the use or occupancy of any such space whose primary business activity is in, or may result in, competition with the Tenant's primary business activity. The Landlord hereby gives the Tenant the exclusive right to conduct their primary business activity on the property.

Property Insurance. The Landlord and the Tenant shall each maintain appropriate insurance for their respective interests in the Premises and property located on the Premises. The Landlord shall be named as an additional insured in such policies. The Tenant shall deliver appropriate evidence to the Landlord as proof that adequate insurance is in force issued by companies reasonably satisfactory to the Landlord. The Landlord shall receive advance written notice from the insurer prior to any termination of such insurance policies. The Tenant shall also maintain any other insurance which the Landlord may reasonably require for the protection of the Landlord's interest in the Premises. The Tenant is responsible for maintaining casualty insurance on its own property.

Liability Insurance. The Tenant shall maintain liability insurance on the Premises in a total aggregate sum of at least \$1,000,000.00. The Tenant shall deliver appropriate evidence to the Landlord as proof that adequate insurance is in force issued by companies reasonably satisfactory to the Landlord. The Landlord shall receive advance written notice from the insurer prior to any termination of such insurance policies.

Taxes. Taxes attributable to the Premises or the use of the Premises shall be allocated as follows:

(a) Real Estate Taxes. The Landlord shall pay all real estate taxes and assessments for the Premises.

(b) **Personal Taxes.** The Tenant shall pay all personal taxes and any other charges that may be levied against the Premises and which are attributable to the Tenant's use of the Premises, along with all sales and/or use taxes (if any) that may be due in connection with lease payments.

Termination Upon Sale of Premises. Notwithstanding any other provision of this Lease, the Landlord may terminate this lease upon 30 days' written notice to the Tenant that the Premises have been sold.

Defaults. The Tenant shall be in default of this Lease if the Tenant fails to fulfill any lease obligation or term by which the Tenant is bound. Subject to any governing provisions of law to the contrary, if the Tenant fails to cure any financial obligation within 5 days (or any other obligation within 10 days) after written notice of such default is provided by the Landlord to the Tenant, the Landlord may take possession of the Premises without further notice (to the extent permitted by law), and without prejudicing the Landlord's rights to damages. In the alternative, the Landlord may elect to cure any default, and the cost of such action shall be added to the Tenant's financial obligations under this Lease. The Tenant shall pay all costs, damages, and expenses (including reasonable attorney fees and expenses) suffered by the Landlord by reason of the Tenant's defaults. All sums of money or charges required to be paid by the Tenant under this Lease shall be additional rent, whether or not such sums or charges are designated as "additional rent." The rights provided by this paragraph are cumulative in nature and are in addition to any other rights afforded by law.

Holdover. If the Tenant maintains possession of the Premises for any period after the termination of this Lease ("Holdover Period"), the Tenant shall pay to the Landlord lease payment(s) during the Holdover Period at a rate equal to the most recent rate preceding the Holdover Period. Such holdover shall constitute a month-to-month extension of this Lease.

Cumulative Rights. The rights of the parties under this Lease are cumulative and shall not be construed as exclusive unless otherwise required by law.

Notice. Notices under this Lease shall not be deemed valid unless given or served in writing and forwarded by mail, postage prepaid, addressed as follows:

The Landlord:

ZHENG'S LLC
417 CHARLOTTE ST
JOHNSTOWN, Colorado 80534

The Tenant:

ZW RESTAURANT INC
417 Charlotte St #D
johnstown, Colorado 80534

Such addresses may be changed from time to time by any party by providing notice as set forth above. Notices mailed in accordance with the above provisions shall be deemed received on the third day after posting.

Governing Law. This Lease shall be construed in accordance with the laws of Colorado.

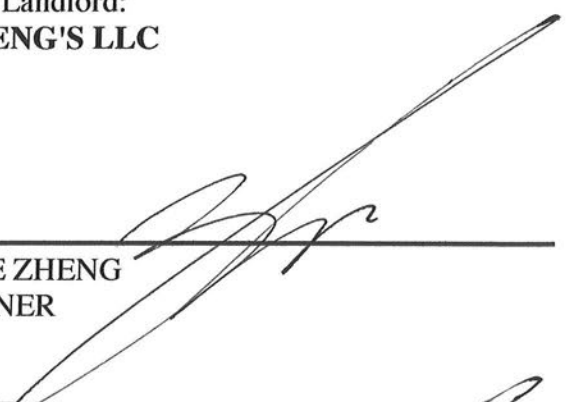
Entire Agreement/Amendment. This Lease contains the entire agreement of the parties, and there are no other promises, conditions, understandings, or other agreements, whether oral or written, relating to the subject matter of this Lease. This Lease may be modified or amended in writing if the writing is signed by the party obligated under the amendment.

Severability. If any portion of this Lease shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this Lease is invalid or unenforceable but that by limiting such provision, it would become valid and enforceable, then such provision shall be deemed to be written, construed, and enforced as so limited.

Waiver. The failure of either party to enforce any provisions of this Lease shall not be construed as a waiver or limitation of that party's right to subsequently enforce and compel strict compliance with every provision of this Lease.

Binding Effect. The provisions of this Lease shall be binding upon and inure to the benefit of both parties and their respective legal representatives, successors, and assigns.

The Landlord:
ZHENG'S LLC

By: 
XUE ZHENG
OWNER

Date: 9. 14. 24

The Tenant:
ZW RESTAURANT INC

By:  *chunni wei*
XUE ZHENG, CHUNNI WEI

Date: 9. 14. 24



450 S. Parish Avenue
Johnstown, CO 80534
970.587.4664
JohnstownCO.gov

DATE: March 12, 2025

TOWN OF JOHNSTOWN POLICE DEPARTMENT

ZW Restaurant LLC dba Little House

- Name and address of Applicant} ZW Restaurant LLC
417 Charlotte St #D
Johnstown CO 80534
1. Trade Name and Address} Little House
417 Charlotte St #D
Johnstown CO 80534
2. Date of Application: September 14, 2024
3. Type of Application: Beer and Wine (city)
4. Investigation: Police Department Case#}
A. Applicant has made application for renewal of their Beer and Wine license.
B. Applicant has operated legally during its last license period.
C. Cooperation with law enforcement has been good.
5. Findings of fact:
A. Applicant has applied for a Beer and Wine License.
B. The required fees were submitted.
C. It is my recommendation that the renewal be approved.


POLICE COMMANDER

03/12/2025

DATE

The Community that Cares

TOWN OF JOHNSTOWN LIQUOR LICENSING AUTHORITY 450 S. Parish Avenue Johnstown, CO 80534 Phone No. (970) 587-4664 IN THE MATTER OF: ZW RESTAURANT, INC. 417 Charlotte Street, Suite D Johnstown, CO 80534	<u>Δ AUTHORITY USE ONLY Δ</u>
ORDER GRANTING BEER AND WINE LICENSE TO ZW RESTAURANT, INC.	

THIS MATTER came before the Town of Johnstown Liquor Licensing Authority (“Authority”) on the Application of ZW Restaurant, Inc., a Colorado corporation (“Applicant”), for a Beer and Wine License for a premises located at 417 Charlotte Street, Suite D, Johnstown, Colorado 80534 (“Application”).

The Authority, having conducted a public hearing on April 7, 2025, after due notice, reviewed the Application and considered the evidence adduced by Town staff’s investigation and the evidence presented by the Applicant and parties in interest, as the term is defined in C.R.S. §44-3-311(5)(b), including but not limited to the petition circulated by the Applicant, hereby FINDS AS FOLLOWS:

1. The Applicant paid the appropriate fees;
2. The Applicant is entitled to possession of the premises where the beer and wine license is to be exercised;
3. The Applicant is of good moral character and entitled to hold the beer and wine license;
4. The location of the premises complies with the Town of Johnstown zoning requirements; and
5. The reasonable requirements of the designated neighborhood, the desires of the adult inhabitants of the designated neighborhood and the number, type and availability of alcohol beverage outlets support the issuance of the beer and wine license.

Based on the foregoing, the Authority hereby ORDERS that ZW Restaurant, Inc.'s application for a Beer and Wine License is GRANTED.

Done and dated this ____ day of April, 2025.

BY THE AUTHORITY:

Michael P. Duncan
Mayor, Town of Johnstown
Chairperson, Liquor Licensing Authority

ATTEST:

Meghan Martinez, Town Clerk

CERTIFICATE OF SERVICE

I hereby certify that on this ____ day of _____, 2025, a true and correct copy of the foregoing Order was sent by certified mail to:

ZW Restaurant, Inc.
417 Charlotte Street, Suite D
Johnstown, CO 80534

Meghan Martinez



450 S. Parish Avenue
Johnstown, CO 80534
970-587-4664
JohnstownCO.gov

Town Council Agenda Communication

Agenda Date: April 7, 2025

Subject: Ordinance No. 2025-270, Approving the Change of Zone for Zoning Case No. ZON24-0002.

Attachments:

1. PZC Staff Report - February 26, 2025
2. Ordinance 2025-270
3. Ordinance 2025-270 - Exhibit A
4. Land Use Application
5. Vicinity Map
6. Zoning Map
7. Mountain View Farms ODP
8. Traffic Impact Study
9. Staff Presentation
10. Applicant Presentation

Presented by: Jeremy Gleim, Planning and Development Director

Agenda Item Description:

EXECUTIVE DESCRIPTION:

For your consideration, Zoning Case No. ZON24-0002, to change the approved zoning of Mountain View Farms West from PUD-MU to Residential Zoning (R-1 and R-2), MU-RC (Mixed Use - Regional Commercial), and I-1 (Light Industrial). Mountain View West was annexed into the corporate boundaries of the Town of Johnstown via Ordinance 2008-797 and zoned PUD-MU by way of Ordinance 2008-804. Mountain View Farms West is located in the northwest quadrant of the I-25 and Highway 402 Interchange.

The initial intent of PUD-MU zoning was to provide for the integration of commercial, retail, live/work, residential, and gateway uses to facilitate self-sustaining development. The proposed zoning will still hold those values, but it is proposed to include light industrial zoning uses to create a barrier between the high-traffic I-25 corridor and the residential development. The proposed zoning is intended to provide the Town with a concentration of retail, commercial, office, recreational, cultural, entertainment, civic/government uses, as well as a variety of residential housing types.

Staff finds that the proposed rezoning of the property is consistent with the intent of the Comprehensive Plan as adopted in 2021, and the Land Use and Development Code as adopted in 2023. The proposed rezone is also consistent with the Future Land Use Map, adopted by the Town indicating that this specific area lies within the high density/intensity, medium density/intensity, gateway center, and activity center.

PLANNING & ZONING COMMISSION SUMMARY

On February 26, 2025, a public hearing was held before the Planning and Zoning Commission. This public hearing concluded with a unanimous vote (6-0) to recommend that the Town Council approve the consideration of Zoning Case No. ZON24-0002; to rezone Mountain View Farms West from PUD-MU to Residential Zoning (R-1 and R-2), MU-RC (Mixed Use – Regional Commercial), and I-1 (Light Industrial). Notices advertising this public hearing were mailed to all property owners within 800 feet of the subject property. Most of the public comments received during this public hearing regarded the status of Charlotte Court and roadway improvements.

Charlotte Court is a Larimer County (County) public roadway and is not within the Town of Johnstown limits. The applicant is coordinating with the County on necessary improvements to this roadway for access to the subject property; however, those efforts are being coordinated as part of a preliminary plat proposal and are not inherently tied to this zoning application.

PUBLIC NOTICE

On January 29, 2025, a neighborhood meeting was held at the Loveland Fire Rescue Authority Station Number 10. Notices advertising this meeting were mailed to all property owners within 800 feet of the subject property. Six (6) members of the community attended this neighborhood meeting to ask questions and raise concerns about the proposed change in zoning. Most of the topics of concern regarded access and circulation to Charlotte Court, access and circulation to the property north of the project site, roundabout designs on Highway 402, and drainage.

On February 26, 2025, a public hearing was held before the Planning and Zoning Commission. This public hearing concluded with a unanimous vote (6-0) to recommend that the Town Council approve the consideration of Zoning Case No. ZON24-0002. Notices advertising this public hearing were mailed to all property owners within 800 feet of the subject property. Most of the public comments received during this public hearing regarded the status of Charlotte Court and roadway improvements.

On March 20, 2025, a public hearing notice was sent to Johnstown Breeze for publication on March 27, 2025; notifying the public that a public hearing would be held before the Town Council to consider the rezoning of this property. On March 28, 2025, notices advertising this meeting were mailed to all property owners within 800 feet of the subject property.

Notices for the neighborhood meeting, the Planning and Zoning Commission Public Hearing, and the Town Council Public Hearing are in full compliance with the Town of Johnstown Municipal Code, Chapter 17 Land Use and Development Code, Article 2 Applications and Procedures.

Strategic Plan Alignment:

Natural & Built Environment

- Expect and encourage community-centered design
- Support a broad range of housing options

Legal Advice:

The Town Attorney has provided Ordinance 2025-270.

Financial Advice:

N/A.

Recommended Action:

The Planning & Zoning Commission recommends that the Town Council approve Ordinance 2025-270 for a Change of Zone for Zoning Case No. ZON24-0002.

Suggested Motions:**For Approval**

I move to approve Ordinance No. 2025-270, authorizing the Change of Zone pursuant to Zoning Case No. ZON24-0002 on first reading.

For Denial

I move to deny Ordinance No. 2025-270 on first reading.

Reviewed and Approved for Presentation

Town Manager



450 S. Parish Avenue
Johnstown, CO 80534
970.587.4664
JohnstownCO.gov

Planning and Zoning Commission Agenda Memorandum

AGENDA DATE: February 26, 2025

SUBJECT: Zoning Case No. ZON24-0002: Rezone of Mountain View Farms West PUD to R-1, R-2, MU-RC and I-1

ACTION PROPOSED: Consideration of Zoning Case No. ZON24-0002 to change the zoning of Mountain View Farms West PUD to R-1, R-2, MU-RC and I-1.

LOCATION: A Parcel of Land situated in the Southwest Quarter of Section 22, Township 5 North, Range 68 West of the 6th P.M., Larimer County, Colorado.
5531 East Highway 402, Johnstown, CO 80534

APPLICANT: West Ridge Holdco LLC.

ATTACHMENTS:

1. Application
2. Vicinity Map
3. Zoning Map
4. Mountain View Farms ODP
5. Traffic Impact Study
6. Staff Presentation
7. Applicant Presentation

PRESENTED BY: James Shrout, Planner I
Jeremy Gleim, AICP, Planning & Development Director

BACKGROUND & SUMMARY

West Ridge Holdco LLC. (Applicant) is seeking to rezone approximately 133 acres of land from PUD-MU to four different zoning designations: I-1 (Industrial Light 27.1 acres), MU-RC (Mixed Use-Regional Commercial 49.5 acres), R-1 (Residential 36.7 acres), and R-2 (Residential 20.1 acres).

The subject property is currently identified as Mountain View Farms and was annexed into the Town of Johnstown in 2008 under Ordinance 2008-797 and zoned by way of Ordinance 2008-804.

The Community that Cares

SURROUNDING ZONING & LAND USE

North: Rural Residential – Unincorporated Larimer County
South: PUD-MU (Mixed Use) – City of Loveland
East: I-25 & PUD-MU (Mixed Use) – Town of Johnstown
West: Rural Residential – Unincorporated Larimer County

PUBLIC NOTICE & AGENCY REFERRALS

Notices were mailed to all property owners within 800 feet of the property subject to this public hearing on January 15, 2025. This notice provided the date, time, and location of the Planning and Zoning Commission hearing, as well as a description of the project. Notice for the Planning & Zoning Commission hearing was published in the local newspaper of widest circulation, the Johnstown Breeze, on Wednesday, January 29, 2025.

LAND USE DESIGNATION

The property is subject to two land use designations: High Density/Intensity (HDI) on the eastern half, and Medium Density/Intensity (MDI) on the western half.

Pursuant to the Town’s adopted Comprehensive Plan,

A High Density/Intensity area (HDI) will be generally characterized by a high percentage of non-residential uses, with some residential possibly integrated into larger development areas. These HDI corridors and nodes will accommodate and experience larger volume of traffic and be located along busy arterial and highway corridors, and especially at interchanges and intersections.

These areas are intended to provide high-quality, high-visibility locations for retail, office, and employment activities, with some light industrial uses that can appropriately mitigate impacts and contribute to the employment base. These areas will have taller, larger-scale structures, a wider span of business hours, large parking areas, and a mix of uses that create economic synergies. Gathering spaces, entertainment venues, and walkable and enjoyable retail areas may be located adjacent to larger “big box” retailers. Town Gateways will also benefit from these HDI locations where most travelers may first be made aware that they are in Johnstown.

While HDI areas are largely served by vehicular transportation with speeds of 35 mph or more, these areas may also serve as ideal locations for transit facilities, and multi-modal trails that allow cyclists and pedestrians to safely connect to the services offered from neighboring residential areas. Residential may be integrated into mixed-use structures, or be provided as stand-alone complexes, whereby residents can easily access employment, entertainment, and shopping opportunities, as well as the nearby transportation network and any transit facilities.

The intent and desired character of MDI areas, as described in the Town's adopted Comprehensive Plan, is described as follows:

A Medium Density/Intensity area (MDI) will generally be characterized by a more balanced, and wider-ranging mix of land uses—incorporating walk-up apartment buildings, townhomes, small lot (3,500-5,000 SF) attached and detached single-family housing, in close proximity to neighborhood-scale shopping, personal services, restaurants, small medical facilities, and facilities such as libraries and recreational centers. MDI areas may also occur along arterials and other major corridors, and may serve as the next layer away from the High Density/Intensity areas they may neighbor, as a transition to lower density neighborhoods. MDI's will offer complete neighborhoods with a diversity of shops and services, including schools and civic facilities, within walking or biking distance from residential areas; and offer good walking connections along with larger-scale multi-modal trails.

Commercial uses may be developed as stand-alone sites or be grouped in small 10 to 20-acre centers or campuses. Johnstown's Downtown would be ideal for this level of development. Reuse and redevelopment of existing structures may occur, with historic residences and structures changing to offices, boutiques, or personal services with alley-served parking. Commercial centers in an MDI will feature more walkability, perhaps offering covered arcades or awnings, pedestrian-scaled signage, shade trees and nice landscaping that helps slow traffic and break-up parking areas, and enjoyable outdoor spaces to gather. Rooftop and sidewalk patios, along with courtyard plazas offer patrons enjoyable places to meet and eat, gather and chat with friends.

Residential neighborhoods will provide a range of housing options and provide street and trail connections to adjacent neighborhoods. Housing will be encouraged to provide porches that extend closer to the sidewalks, and garages that are alley-loaded or setback to offer a safer, slower, and more interesting streetscape. Future considerations may include accessory dwelling or carriage house units to increase affordability and diversity. These are great neighborhoods to encourage and accommodate a diversity of lifestyles and income ranges, and allow active-agers to remain in Johnstown once larger family homes and yards may be less desirable.

ACTIVITY CENTER OVERLAY

The property is also subject to an Activity Center overlay, as depicted in the Town's adopted Comprehensive Plan. As described in the Comprehensive Plan,

Activity Centers have been identified as strategic areas that support local and regional transportation networks, living, employment, recreation, and services. These areas are intended to be mixed-use centers that make a highly efficient use of space by offering high-density residential areas supported by a diversity of shops and services and a vibrant public realm. Activity Centers continue to develop at highway interchanges, Downtown, and generally in conformance with other characteristics of a High Density/Intensity area. While three of the four activity centers are located along the I-25 corridor making them

convenient for motorized travelers, these centers should also connect to the Town's trail network, facilitating and encouraging active modes of transportation, and enhancing recreation opportunities for the community. These centers are ideal opportunities for the Town to consider future transit or other transportation services, and connections to nearby systems.

GATEWAY

The intersection of I-25 and State Highway 402 has been identified in the Town's Comprehensive Plan as a Gateway, which is further described as, "unique entrances into Town. Gateways are intended to define our community —both in terms of physical limits and identity, to welcome residents and visitors, and to slow traffic well outside Town limits. These gateways should be designed and landscaped to create cohesive, attractive, and celebratory landmarks that pay homage to Johnstown's character and values

The subject property lies at the northwest corner of the gateway intersection. As development occurs in the future, it will be expected that gateway treatments be incorporated into the design.

PROJECT DESCRIPTION & ANALYSIS

The subject property is currently identified as Mountain View Farms PUD and was annexed into the Town of Johnstown in 2008. The property's annexation included an associated development agreement and a concurrent zoning application which zoned the property PUD (Mixed Use Zoning) upon annexation. The zoning case included a Conceptual Outline Development Plan (ODP) which designated the property a mixed of uses including commercial, regional activities center district, medium density residential, and low density residential.

The Applicant is proposing to change the zoning from PUD to a combination of straight zoning designations. The proposed changes are very similar to the uses identified in the Mountain View Farms PUD. The primary benefit of changing the zoning to more traditional designations is that it will better align with the Town's Land Use & Development Code and Comprehensive Plan.

As previously mentioned, this rezone proposes to establish four different zoning designations:

- I-1 (Industrial Light): 27.1 acres;
- MU-RC (Mixed Use-Regional Commercial): 49.5 acres;
- R-1 (Residential): 36.7 acres; and,
- R-2 (Residential): 20.1 acres.

I-1 (Industrial Light)

Pursuant to the LUDC, the I-1 district provides primarily service, employment, manufacturing, and distribution uses at a scale, intensity and format that will not have significant impact on adjacent uses, and which can mix with supporting and compatible service and retail uses characteristic of mixed and flex business areas. General application of this zoning designation is adjacent to heavier industrial areas, as a transition to less intense uses, and limited application as an employment component of mixed-use or commercial areas in the High Intensity Area.

The Applicant is proposing approximately 27 acres of I-1 zoning in the northeast corner of the project site, adjacent to Interstate 25 (I-25). These types of uses are appropriate along interstate

highways, because they tend to provide a good buffer for roadway noises. The proposed location of the I-1 zoning district lies within the HDI area of the property and is an appropriate zoning designation for the prescribed HDI land use area.

MU-RC (Regional Commercial)

Pursuant to the LUDC, the MU-RC provides regional commercial, entertainment, and/or employment destinations. While compact, walkable, or transit-served locations and formats are preferred – particularly in areas designated as activity centers, this district may accommodate some higher-intensity and larger format commercial uses – particularly if they are removed from or on the periphery of activity centers or otherwise located to not disrupt walkable patterns. Limited application within Activity Centers in the Moderate Intensity areas. General application for commercial areas in the High Intensity Area.

The Applicant is proposing approximately 49 acres of MU-RC zoning in the southeast corner of the project site, adjacent to I-25 on the east and State Highway 402 on the south. This portion of the project is located in the HDI land use area and is subject to the Activity Center overlay. Based on those circumstances, the MU-RC zoning designation is appropriately sited pursuant to Applicant's proposal.

R-1 (Single-Family Neighborhood)

Pursuant to the LUDC, the R-1 district provides residential living (detached houses) in lower-density suburban or walkable neighborhood settings with access to supporting uses such as schools, churches, parks, and other public facilities. General application in low and moderate intensity areas, to provide a compatible range of lots in suburban or walkable neighborhoods. Limited applicability in greenbelt areas, where restricting site factors, hazards, or natural features may be properly mitigated and integrated into low density development patterns or coordinated with the conservation pattern.

The Applicant is proposing approximately 37 acres of R-1 zoning in the northwest corner of the project site. This portion of the project site is located in an MDI land use area. A five (5) lot single-family detached neighborhood in unincorporated Larimer County lies to the immediate west. R-1 zoning is appropriate for designation in MDI land use areas; therefore, the proposed location of this zoning district is consistent with the Town's Comprehensive Plan.

R-2 (Mixed Density Neighborhood)

Pursuant to the LUDC, the R-2 district provides residential living (range of small-scale residential building types) in compact, walkable neighborhood settings, allowing a mix of housing unit options, and integration or transition to complementary and supporting non-residential uses. A well-designed public realm provides the focal point to integrate a variety of building types with a consistent neighborhood character. General application in moderate and high-intensity areas, as a complementary component of connected and walkable neighborhoods or the predominant residential component of downtown, mixed-use areas, and transit-served nodes.

The Applicant is proposing approximately 20 acres of R-2 zoning in the southwest corner of the project site. This portion of the project site is located in an MDI land use area. R-2 zoning is appropriate for designation in MDI land use areas; therefore, the proposed location of this zoning district is consistent with the Town's Comprehensive Plan.

NEIGHBORHOOD MEETING

On January 29, 2025, a neighborhood meeting was held at the Loveland Fire Rescue Authority Station Number 10. Notices advertising this meeting were mailed to all property owners within 800 feet of the subject property. Six (6) members of the community attended this neighborhood meeting to ask questions and raise concerns about the proposed change in zoning. The primary topics of discussion included:

- Access and circulation to Charlotte Court;
- Access and circulation to the property north of the project site;
- Roundabout designs on Highway 402; and,
- Drainage

These issues are currently being addressed through a preliminary plat application for the subject property; however, they are not directly affected by the zoning proposal.

ZONING & DEVELOPMENT STANDARDS

The Town of Johnstown Land Use and Development Code identifies the following criteria for review of a rezone proposal decision:

1. The rezone furthers one or more of the purposes of these regulations in Section 17-1-3, and on balance any purposes that may be undermined are outweighed by the benefits of the purposes it furthers.
2. The proposal is consistent with the goals and objectives of the Comprehensive Plan and any other plan, policy, or guidance adopted pursuant to that plan.
3. The change is consistent with the intent of the proposed zoning district, specifically considering:
 - a. The design of streets, civic spaces, and other open space;
 - b. The pattern, scale, and format of buildings and sites; and
 - c. The compatibility and transition with other complementary uses and development in the vicinity.
4. The change is necessary for at least one of the following reasons:
 - a. There has been a material change in the character of the area or in the Town generally, such that the proposed rezone is in the public interest.
 - b. The change will serve a community need or provide an amenity or benefit to the surrounding area that was not anticipated at the time of the initial zoning.
5. The town or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.
6. Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design, and engineering practices or are outweighed by broader public benefits to the surrounding community.

7. If owner initiated, at least two-thirds of the subject property owners within the change zone boundary have signed the application.
8. If owner initiated, the subject property has not been included in a rezone action in the prior 12 months, with the exception of property in the H-A zoning district which was established concurrently with annexation.
9. The recommendations of any professional staff and advisory review bodies have been considered.

COMPREHENSIVE PLAN ALIGNMENT

The proposed mix of zoning designations comply with the intent and character of the HDI and MDI land use areas, as defined in the Town's adopted Comprehensive Plan.

STRATEGIC PLAN ALIGNMENT

- Natural & Built Environment
 - *Guide growth in the community through appropriate annexation, zoning, planning, and land use development.*

Staff finds that the proposed rezone is consistent with the goal and strategy referenced above, pursuant to the adopted Johnstown Strategic Plan.

RECOMMENDED ACTION:

Staff recommends approval of this change of zone request pursuant to findings of fact listed below:

1. ***The rezone furthers one or more of the purposes of these regulations in Section 17-1-3, and on balance any purposes that may be undermined are outweighed by the benefits of the purposes it furthers, because:***
 This rezone will ensure the long-term value and the physical, social, and economic well-being of the residents and businesses through coordinated public and private investment. This rezone will promote planning and urban design that emphasizes distinct places and unique elements of community character throughout Johnstown. The rezone will assist in the division of the town into zones and districts that promote the character, intensity, and development patterns of distinct places identified in the Comprehensive Plan. This rezone will create compatibility within the area and will be transitional between complimentary districts, uses, and buildings.
2. ***The proposal is consistent with the goals and objectives of the Comprehensive Plan and any other plan, policy, or guidance adopted pursuant to that plan, because:***
 This proposal is consistent with Goal W1 and W2 of the Comprehensive Plan by strengthening employment centers to diversify the Town's economic base and provide more jobs within the corporate boundaries of the Town, and by balancing more intense commercial uses along major highway corridors, respectively.

3. ***The change is consistent with the intent of the proposed zoning district, specifically considering, because:***

The proposed mix of zoning designations have been thoughtfully located for consistency with the High and Medium Density/Intensity land use areas, the Activity Center overlay, and compatibility with surrounding uses.

4. ***The change is necessary for at least one of the following reasons, because:***

a. *There has been a material change in the character of the area or in the Town generally, such that the proposed rezone is in the public interest.* The Town undertook a comprehensive update of the Land Use and Development Code in 2023 and the proposed change will align better with those updates.

b. *The change will serve a community need or provide an amenity or benefit to the surrounding area that was not anticipated at the time of the initial zoning.* The change will serve a community need and benefit to the surrounding area by diversifying employment options and providing regional commercial property at a major gateway.

5. ***The town or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district, because:***

The Town and other responsible agencies have services in the vicinity of the project site. Utility infrastructure and demand analysis will supplement future development applications.

6. ***Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design, and engineering practices or are outweighed by broader public benefits to the surrounding community, because:***

The subject property will be governed by the adopted Land Use and Development Code to lessen the impact on adjacent property owners.

7. ***If owner initiated, at least two-thirds of the subject property owners within the change zone boundary have signed the application, because:***

One property is subject to this proposed change in zoning and is owner-initiated.

SUGGESTED MOTIONS:

For Approval: I move that the Planning & Zoning Commission recommends that the Town Council **APPROVE** the Change of Zone pursuant to Zoning Case No. ZON24-0002

For Denial: I move that the Planning & Zoning Commission recommends that the Town Council **DENY** the Change of Zone pursuant to Zoning Case No. ZON24-0002.

TOWN OF JOHNSTOWN, COLORADO
ORDINANCE NO. 2025-270

ORDINANCE APPROVING THE REZONING OF PROPERTY KNOWN AS WEST RIDGE, SITUATED IN THE SOUTHWEST QUARTER OF SECTION 22, TOWNSHIP 5 NORTH, RANGE 68 WEST OF THE 6TH P.M., TOWN OF JOHNSTOWN, COUNTY OF LARIMER, STATE OF COLORADO, CONSISTING OF APPROXIMATELY 133.386 ACRES, FROM PLANNED UNIT DEVELOPMENT TO SINGLE-FAMILY NEIGHBORHOOD (R-1) (PARCEL 1), MIXED-DENSITY NEIGHBORHOOD (R-2) (PARCEL 2), REGIONAL COMMERCIAL (MU-RC) (PARCEL 3), AND INDUSTRIAL LIGHT (I-1) (PARCEL 4)

WHEREAS, the Town of Johnstown, Colorado (“Town”) is a Colorado home rule municipality, duly organized and existing under the laws of the State of Colorado and the Town’s Home Rule Charter; and

WHEREAS, the Town Council is vested with authority to administer the affairs of the Town; and

WHEREAS, West Ridge Holdco LLC, a Colorado limited liability company, applied to rezone the property known as West Ridge, situated in the Southwest Quarter of Section 22, Township 5 North, Range 68 West of the 6th P.M., Town of Johnstown, County of Larimer, State of Colorado, consisting of approximately 133.386 acres, being more particularly described on Exhibit A, which is attached hereto and incorporated herein by this reference (“Property”), from Planned Unit Development to Single-Family Neighborhood (R-1) (Parcel 1), Mixed-Density Neighborhood (R-2) (Parcel 2), Regional Commercial (MU-RC) (Parcel 3), and Industrial Light (I-1) (Parcel 4); and

WHEREAS, on February 26, 2025, the Town’s Planning and Zoning Commission held a public hearing and recommended approval of Single-Family Neighborhood (R-1) zoning for Parcel 1, Mixed-Density Neighborhood (R-2) zoning for Parcel 2, Regional Commercial (MU-RC) zoning for Parcel 3, and Industrial Light (I-1) zoning for Parcel 4; and

WHEREAS, on April 7, 2025, the Town Council held a public hearing to determine appropriate zoning for the Property and, based upon the recommendation of the Planning and Zoning Commission and the evidence received at the hearing, finds that the requested rezoning of the Property conforms to the *Johnstown Area Comprehensive Plan* and Section 17-2-3 of the Town of Johnstown Land Use and Development Code and should be approved.

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF JOHNSTOWN, COLORADO, THAT:

1. Zoning of the Property described on Exhibit A shall hereby and hereinafter be designated as follows:
 - a. Parcel 1 - Single-Family Neighborhood (R-1);
 - b. Parcel 2 - Mixed-Density Neighborhood (R-2);

- c. Parcel 3 - Regional Commercial (MU-RC); and
 - d. Parcel 4 - Industrial Light (I-1)
-
- 2. All other Ordinances, or parts thereof, in conflict with this Ordinance are hereby repealed, including Ordinance 2008-804. The Outline Development Plan for Mountain View Farms that was previously approved for the Property in connection with the annexation and initial zoning of the Property shall no longer be in effect or binding upon the Property.
 - 3. This Ordinance, after its passage on final reading, shall be numbered, recorded, published and posted as required by the Home Rule Charter of the Town of Johnstown, Colorado (“Charter”) and the adoption, posting and publication shall be authenticated by the signature of the Mayor and the Town Clerk and by the Certificate of Publication. This Ordinance shall become effective upon final passage as provided by the Charter.
 - 4. Upon its effective date, the Town Clerk is hereby directed to file this Ordinance with the real estate records of the Larimer County Clerk and Recorder.

INTRODUCED AND APPROVED on first reading by the Town Council of the Town of Johnstown, Colorado, this __ day of _____, 2025

TOWN OF JOHNSTOWN, COLORADO

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor

PASSED UPON FINAL APPROVAL AND ADOPTED on second reading by the Town Council of the Town of Johnstown, Colorado, this _____ day of _____, 2025.

ATTEST:

By: _____
Meghan Martinez, Town Clerk

By: _____
Michael P. Duncan, Mayor

EXHIBIT A
PROPERTY DESCRIPTION

WEST RIDGE ZONING MAP
TOWN OF JOHNSTOWN, COLORADO
SITUATE IN THE SOUTHWEST QUARTER OF SECTION 22, TOWNSHIP 5 NORTH, RANGE 68 WEST OF THE 6TH P.M.
TOWN OF JOHNSTOWN, COUNTY OF LARIMER, STATE OF COLORADO
133.386 ACRES

PROPERTY DESCRIPTION

A parcel of land situate in the Southwest Quarter of Section Twenty-two (22), Township Five North (T.5N.), Range Sixty-eight West (R.68W.) of the Sixth Principal Meridian (6th P.M.) being more particularly described as follows:

Parcel 1:

The Southwest 1/4 of Section 22, Township 5 North, Range 68 West of the 6th P.M., County of Larimer, State of Colorado, less that portion contained in that deed recorded May 27, 1986 at Reception No. 86026975 and less that portion deeded to the County of Larimer, State of Colorado for road purposes in Book 934 at Page 55 and less that portion deeded to the Board of County commissioners of Larimer County for highway right of way in that deed recorded August 4, 1942 in Book 742 at Page 164 and less that portion contained in the Rule and Order recorded September 26, 1961 in Book 1152 at Page 302 , AND EXCEPTING THEREFROM those portions conveyed to Department of Transportation, State of Colorado by Warranty Deed recorded December 15, 2020 at Reception No. 20200105901.

Parcel 2:

All that portion of the Southwest One-Quarter of Section 22, Township 5 North, Range 68 West of the of the 6th P.M., Larimer County, Colorado more particularly described as follows: Considering the South line of said Southwest One-Quarter of Section 22 as bearing North 89°06'54" East with all bearings contained herein relative thereto. Beginning at the Southwest corner of said Section 22; thence along said South line of the Southwest One-Quarter of Section 22 North 89°06'54" East 1149.27 feet; thence leaving said South line North 01°25'15" East 1326.08 feet; thence South 89°17'38" West 1187.38 feet to the West line of said Southwest One-Quarter of Section 22; thence along said West line South 00°13'51" East 1328.80 feet to the Point of Beginning. Less that portion contained in that Deed recorded December 30, 1986 at Reception No. 86076437 and also less that portion deeded to the County of Larimer, State of Colorado for road purposes in Book 934 at Page 55 , County of Larimer, State of Colorado. AND EXCEPTING THEREFROM those portions conveyed to Department of Transportation, State of Colorado by Warranty Deed recorded December 15, 2020 at Reception No. 20200105901.

Source: Heritage Title Company Order No. 459-HS0810671-414, Amendment No. 9, dated March 5, 2024.

Said parcels contain 5,810,281 Square Feet or 133.386 Acres more or less by this survey.

OWNER: West Ridge HoldCo, LLC, a Colorado limited liability company

By: As:

Witness my hand and seal this day of , 20 .

NOTARIAL CERTIFICATE

STATE OF COLORADO)
ss
COUNTY OF WELD)
The foregoing instrument was acknowledged before me by as this day of , 20 .
Witness my Hand and Official Seal.
My commission expires: .

TOWN COUNCIL APPROVAL

This Map to be known as West Ridge Zoning Map is approved and accepted to the Town of Johnstown, Colorado by Ordinance Number , passed and adopted on final reading at a regular meeting of the Town Council of the Town of Johnstown, Colorado held on the day of , 20 .

Attest:
Mayor Town Clerk

BASIS OF BEARINGS AND LINEAL UNIT DEFINITION

Assuming the West line of the Southwest Quarter of Section 22, Township 5 North, Range 68 West of the 6th P.M., monumented as shown on this plat, as bearing North 00°42'39" East, a distance of 2634.37 feet and with all other bearings contained herein relative thereto.

The lineal dimensions as contained herein are based upon the "U.S. Survey Foot."

TITLE COMMITMENT NOTE

For all information regarding easements, rights-of-way and title of records, Majestic Surveying, LLC relied upon Title Commitment Number 459-HS0810671-414, Amendment No. 9, dated March 5, 2024, as prepared by Heritage Title Company to delineate the aforesaid information. This survey does not constitute a title search by Majestic Surveying, LLC to determine ownership or easements of record.

SURVEYOR'S CERTIFICATE

I, Steven Parks, a Colorado Licensed Professional Land Surveyor, do hereby state that this Zoning Map is an accurate representation of the property to the best of my knowledge, information, belief, and in my professional opinion. I further state that this certificate does not extend to any unnamed parties or the successors and/or assigns.

PRELIMINARY

Steven Parks - On Behalf of Majestic Surveying, LLC
Colorado Licensed Professional Land Surveyor #38348

DESCRIPTIONS OF PROPOSED REZONING PARCELS

Parcel 1 - Proposed R-1 Zoning

A parcel of land, situate in the Southwest Quarter (SW1/4) of Section Twenty-two (22), Township Five North (T.5N.), Range Sixty-eight West (R.68W.) of the Sixth Principal Meridian (6th P.M.), Town of Johnstown, County of Larimer, State of Colorado and being more particularly described as follows:

COMMENCING at the Southwest Corner of said Section 22 and assuming the West line of said SW1/4 as bearing North 00°42'39" East, a distance of 2,634.37 feet Monumented by a 2.5" aluminum cap in a monument box stamped LS 20676 at the South end, and a 2.5" aluminum cap stamped LS 12374 at the North end, and with all other bearings contained herein relative thereto;

THENCE North 00°42'39" East, along said West line, a distance of 1,467.74 feet to the POINT OF BEGINNING; THENCE North 00°42'39" East, continuing along said West line, a distance of 1,166.63 feet to the West Quarter Corner of said Section 22; THENCE South 89°45'29" East, along the North line of said SW1/4, a distance of 1,364.53 feet; THENCE South 00°03'35" West a distance of 909.11 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the West a distance of 179.61 feet, having a Radius of 475.00 feet, a Delta of 21°39'54" and is subtended by a Chord that bears South 10°53'32" West a distance of 178.54 feet to a Point of Tangency (PT); THENCE South 21°43'28" West a distance of 99.64 feet; THENCE North 89°17'21" West a distance of 1,307.53 feet to the POINT OF BEGINNING.

Said described parcel of land contains 1,600,575 Square Feet or 36.744 Acres, more or less (±).

Parcel 2 - Proposed R-2 Zoning

A parcel of land, situate in the Southwest Quarter (SW1/4) of Section Twenty-two (22), Township Five North (T.5N.), Range Sixty-eight West (R.68W.) of the Sixth Principal Meridian (6th P.M.), Town of Johnstown, County of Larimer, State of Colorado and being more particularly described as follows:

COMMENCING at the Southwest corner of said Section 22 and assuming the West line of said SW1/4 as bearing North 00°42'39" East, a distance of 2,634.37 feet Monumented by a 2.5" aluminum cap in a monument box stamped LS 20676 on the South end, and a 2.5" aluminum cap stamped LS 12374 on the North end, and with all other bearings contained herein relative thereto;

THENCE North 00°42'39" East, along said West line, a distance of 676.42 feet to the POINT OF BEGINNING; THENCE North 00°42'39" East, continuing along said West line, a distance of 791.32 feet; THENCE South 89°17'21" East a distance of 1,307.53 feet; THENCE South 21°43'28" West a distance of 260.33 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the Southeast a distance of 179.61 feet, having a Radius of 475.00 feet, a Delta of 21°39'54" and is subtended by a Chord that bears South 10°53'32" West a distance of 178.54 feet to a Point of Tangency (PT); THENCE South 00°03'35" West a distance of 209.11 feet; THENCE North 89°56'25" West a distance of 211.21 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the South a distance of 175.55 feet, having a Radius of 475.00 feet, a Delta of 21°10'29" and is subtended by a Chord that bears South 79°28'20" West a distance of 174.55 feet to a Point of Tangency (PT); THENCE South 68°53'06" West a distance of 237.69 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the North a distance of 175.55 feet, having a Radius of 475.00 feet, a Delta of 21°10'29" and is subtended by a Chord that bears South 79°28'20" West a distance of 174.55 feet to a Point of Tangency (PT); THENCE North 89°56'25" West a distance of 410.76 feet to the POINT OF BEGINNING.

Said described parcel of land contains 875,342 Square Feet or 20.095 Acres, more or less (±).

Parcel 3 - Proposed MU-RC Zoning

A parcel of land, situate in the Southwest Quarter (SW1/4) of Section Twenty-two (22), Township Five North (T.5N.), Range Sixty-eight West (R.68W.) of the Sixth Principal Meridian (6th P.M.), Town of Johnstown, County of Larimer, State of Colorado and being more particularly described as follows:

COMMENCING at the Southwest corner of said Section 22 and assuming the West line of said SW1/4 as bearing North 00°42'39" East, a distance of 2,634.37 feet Monumented by a 2.5" aluminum cap in a monument box stamped LS 20676 on the South end, and a 2.5" aluminum cap stamped LS 12374 on the North end, and with all other bearings contained herein relative thereto;

THENCE North 00°42'39" East, along said West line, a distance of 636.42 feet to the POINT OF BEGINNING; THENCE North 00°42'39" East, continuing along said West line, a distance of 40.00 feet; THENCE South 89°56'25" East a distance of 410.76 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the North a distance of 175.55 feet, having a Radius of 475.00 feet, a Delta of 21°10'29" and is subtended by a Chord that bears North 79°28'20" East a distance of 174.55 feet to a Point of Tangency (PT); THENCE North 68°53'06" East a distance of 237.69 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the South a distance of 175.55 feet, having a Radius of 475.00 feet, a Delta of 21°10'29" and is subtended by a Chord that bears North 79°28'20" East a distance of 174.55 feet to a Point of Tangency (PT); THENCE South 89°56'25" East a distance of 211.21 feet; THENCE North 00°03'35" East a distance of 209.11 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the Southeast a distance of 179.61 feet, having a Radius of 475.00 feet, a Delta of 21°39'54" and is subtended by a Chord that bears North 10°53'32" East a distance of 178.54 feet to a Point of Tangency (PT); THENCE North 21°43'28" East a distance of 260.33 feet; THENCE South 89°17'21" East a distance of 1,018.55 feet to a point on the West line of the right-of-way addition to I-25 and State Highway 402 recorded December 15, 2020 as Reception Number 20200105901 of the Records of the Larimer County Clerk and Recorder; The following 12 courses are along the West and North lines of said right-of-way addition. THENCE South 00°48'37" West a distance of 868.09 feet; THENCE South 09°22'34" West a distance of 320.50 feet; THENCE South 31°42'58" East a distance of 33.25 feet; THENCE South 05°55'50" West a distance of 86.26 feet; THENCE South 45°55'59" West a distance of 90.93 feet; THENCE South 80°09'56" West a distance of 102.98 feet; THENCE South 89°32'13" West a distance of 190.80 feet; THENCE North 86°40'02" West a distance of 248.58 feet; THENCE South 89°48'52" West a distance of 78.25 feet; THENCE South 86°00'13" West a distance of 133.48 feet; THENCE North 89°47'20" West a distance of 283.77 feet; THENCE South 84°04'47" West a distance of 338.57 feet to a point on the North line of the State Highway 402 right-of-way as recorded July 16, 1952 as Book 934 Page 55 of the Records of the Larimer County Clerk and Recorder; THENCE North 89°56'25" West, along said North right-of-way line, a distance of 490.94 feet to a point on the East line of that parcel recorded December 30, 1986 as Reception Number 19860076437 of the Records of the Larimer County Clerk and Recorder; THENCE North 00°42'39" East, along said East line, a distance of 606.42 feet to the Northeast corner of said parcel; THENCE North 89°56'25" West, along the North line of said parcel, a distance of 359.18 feet to the POINT OF BEGINNING.

Said described parcel of land contains 2,153,890 Square Feet or 49.447 Acres, more or less (±).

DESCRIPTIONS OF PROPOSED REZONING PARCELS continued

Parcel 4 - Proposed I-1 Zoning

A parcel of land, situate in the Southwest Quarter (SW1/4) of Section Twenty-two (22), Township Five North (T.5N.), Range Sixty-eight West (R.68W.) of the Sixth Principal Meridian (6th P.M.), Town of Johnstown, County of Larimer, State of Colorado and being more particularly described as follows:

COMMENCING at the West Quarter Corner of said Section 22 and assuming the North line of said SW1/4 as bearing South 89°45'29" East, a distance of 2,646.62 feet Monumented by a 2.5" aluminum cap stamped LS 12374 on the West end, and a #6 rebar with a 3.25" aluminum cap stamped LS 16847 on the East end, and with all other bearings contained herein relative thereto;

THENCE South 89°45'29" East, along said North line, a distance of 1,364.53 feet to the POINT OF BEGINNING; THENCE South 89°45'29" East, continuing along said North line, a distance of 1,032.08 feet, to a point on the West right-of-way line of I-25, which bears 250.01 feet along said North line from the Center Quarter Corner of said Section 22; THENCE South 00°47'12" West, along said West right-of-way line as recorded September 26, 1961 as Book 1152 Page 305 of the Records of the Larimer County Clerk and Recorder, a distance of 305.10 feet; The following 2 courses are along the West right-of-way line of I-25 as recorded December 15, 2020 as Reception Number 20200105901 of the Records of the Larimer County Clerk and Recorder. THENCE South 06°35'54" West a distance of 679.41 feet; THENCE South 00°48'37" West a distance of 205.32 feet; THENCE North 89°17'21" West a distance of 1,018.55 feet; THENCE North 21°43'28" East a distance of 99.64 feet to a Point of Curvature (PC); THENCE along the arc of a curve concave to the West a distance of 179.61 feet, having a Radius of 475.00 feet, a Delta of 21°39'54" and is subtended by a Chord that bears North 10°53'32" East a distance of 178.54 feet to a Point of Tangency (PT); THENCE North 00°03'35" East a distance of 909.11 feet to the POINT OF BEGINNING.

Said described parcel of land contains 1,180,473 Square Feet or 27.100 Acres, more or less (±).

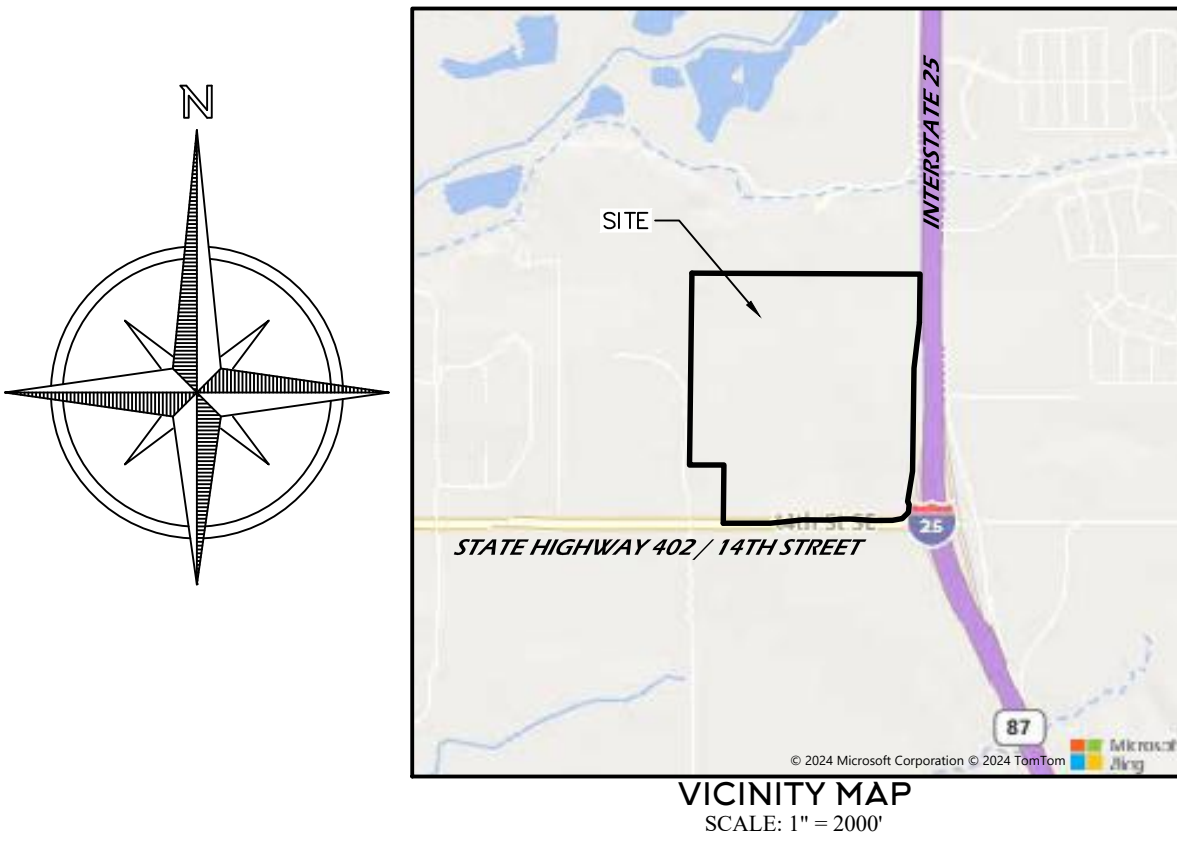
NOTES:

- 1. Current property address: 5531 E. Highway 402 & Vacant Land, Johnstown, CO 80534 Source: Heritage Title Company Order No. 459-HS0810671-414, Amendment No. 9, dated March 5, 2024
- 2. There may be other documents related to the Subject Property that were not discovered by the land surveyor.
- 3. Adjacent property owner information per the Larimer County Assessor's Map.
- 4. Annexation and zoning information per the Town of Johnstown and City of Loveland Zoning Map and GIS.
- 5. The ditch centerline, as surveyed by Paul A. Hernandez and recorded February 22, 2005 at Reception Number 20050014155, has been shown, however no easement width was stated. A 20' Ditch Easement was dedicated with Reception No. 20210054639 but this location does not coincide with the located position of the Guard Lateral ditch. A 20' Ditch Easement may exist centered on the existing ditch location.
- 6. The Irrigation Pipeline Easement Agreement recorded January 26, 2023 at Reception Number 20230003347 indicates that a 20 foot wide pipeline easement exists between the Subject Parcel and the Magalski parcel, adjacent to the Southwest, but does not define a location for the easement. The easement is intended to serve the Magalski parcel with water from the Gard Lateral Ditch. No evidence of an existing service line to the Magalski parcel was discovered during this survey.

NOTICE

According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon. (13-80-105 C.R.S. 2012)

	PROJECT NO: 2024199	PROJECT NAME: WEST RIDGE	REVISIONS:	DATE:
	DATE: 8-7-2024	CLIENT: CALIBER	REVISED PARCELS 3 & 4 - AU	9-5-24
	DRAWN BY: AU	FILE NAME: 2024199ZONE		
	CHECKED BY: SIP	SCALE: N/A		



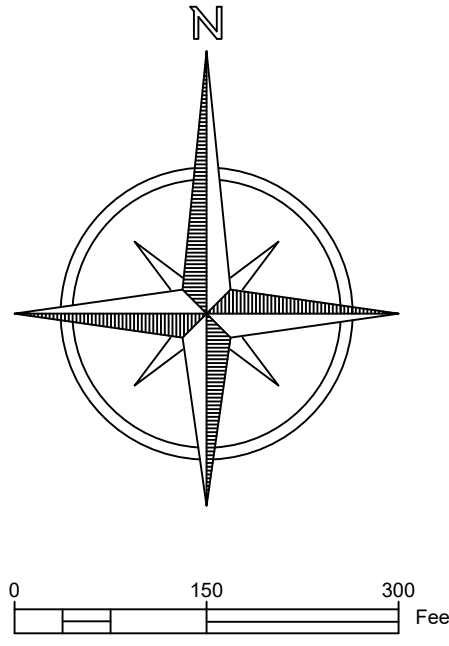
LEGEND

- ALIQUOT CORNER AS DESCRIBED
- FOUND MONUMENT AS DESCRIBED
- FOUND #5 REBAR WITH YELLOW PLASTIC CAP, "EPS GROUP," LS38049
- CALCULATED POSITION
- FOUND #4 REBAR WITH RED PLASTIC CAP LS 38348
- FLOW LINE AS DESCRIBED
- BOUNDARY LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- SECTION LINE

PROJECT NO: 2024199	PROJECT NAME: WEST RIDGE	REVISIONS:	DATE:
DATE: 8-7-2024	CLIENT: CALIBER	REVISED PARCELS 3 & 4 - AU	9-5-24
DRAWN BY: AU	FILE NAME: 2024199ZONE		
CHECKED BY: SIP	SCALE: N/A		

1
SHEET 1 OF 2

WEST RIDGE ZONING MAP
TOWN OF JOHNSTOWN, COLORADO



LEGEND

- ALIQUOT CORNER AS DESCRIBED
- FOUND MONUMENT AS DESCRIBED
- FOUND #5 REBAR WITH YELLOW PLASTIC CAP, "EPS GROUP," LS38049
- CALCULATED POSITION
- FOUND #4 REBAR WITH RED PLASTIC CAP LS 38348
- FLOW LINE AS DESCRIBED
- BOUNDARY LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- SECTION LINE

SURVEYOR'S CERTIFICATE

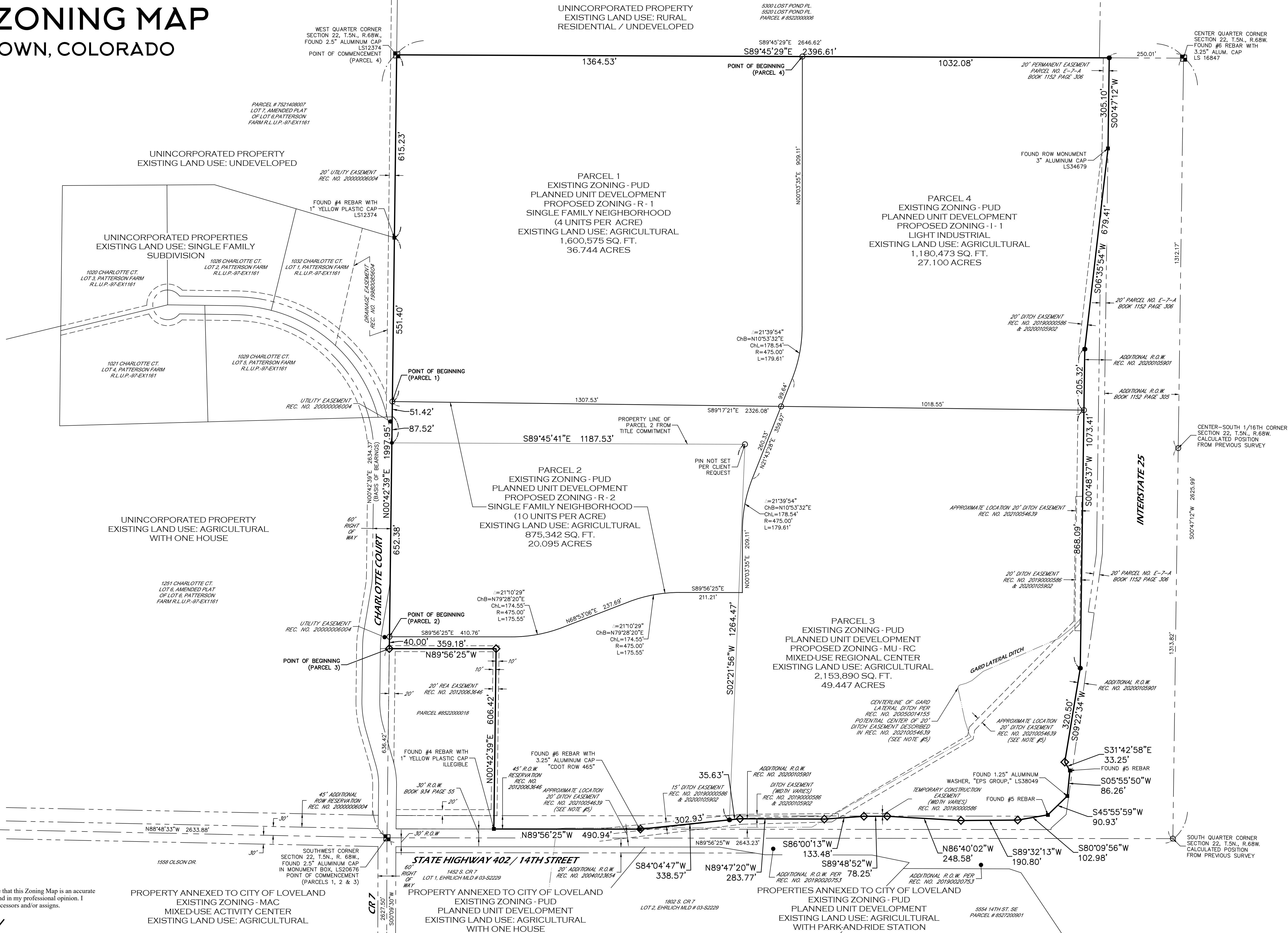
I, Steven Parks, a Colorado Licensed Professional Land Surveyor, do hereby state that this Zoning Map is an accurate representation of the property to the best of my knowledge, information, belief, and in my professional opinion. I further state that this certificate does not extend to any unnamed parties or the successors and/or assigns.

PRELIMINARY

Steven Parks - On Behalf of Majestic Surveying, LLC
Colorado Licensed Professional Land Surveyor #38348

NOTICE

According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon. (13-80-105 C.R.S. 2012)



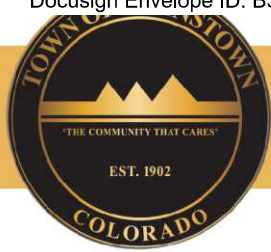


MAJESTIC SURVEYING
MAJESTIC SURVEYING, LLC 1111 DIAMOND VALLEY DRIVE #104, WINDSOR, CO 80550

PROJECT NO: 2024199	PROJECT NAME: WEST RIDGE	REVISIONS:	DATE:
DATE: 8-7-2024	CLIENT: CALIBER	REVISED PARCELS 3 & 4 - AU	9-5-24
DRAWN BY: AU	FILE NAME: 2024199ZONE		
CHECKED BY: SIP	SCALE: 1" = 150'		

2

SHEET 2 OF 2



Town of Johnstown

Please circle **ALL** applicable portions that apply to your project.

LAND USE APPLICATION				
Project Name:	West Ridge Filing 1			
Description:	Major infrastructure construction plans, plat and rezone from ODP to straight zoning			
General:	Annexation	Zoning	Site Plan	Variance
	Conditional Use			USR (use by special review)
PD/PUD:	Outline Development	Preliminary Development	Final Development Plan	Combined Prelim/Final Development Plan
Subdivision:	Replat	Preliminary Plat	Final Plat	Prelim/Final Plat
Amendment:	LUDC	Future Land Use	Comprehensive Plan	
Floodplain:	Development Permit	C-LOMER Review		
SITE INFORMATION				
Address:	5531 East Highway 402			
Applicant:	West Ridge Holdco LLC			
Email:	Roy.Bade@caliberco.com		Telephone:	480-398-4594
Consultant/Representative:	TST Inc, Consulting Engineers - Jon Sweet			
Email:	jsweet@tstinc.com		Telephone:	970-488-2128
Parcel Number(s):	8522000017 and 8522000008			

Landowner Authorization: (REQUIRED)

The undersigned (1) affirm ownership or authorized representation thereof of the subject property, and (2) hereby authorizes the individuals or entities listed herein as "applicant and/or representative" to represent me/us in ALL aspects of the land use process for the project being submitted with this application.

***Landowner(s):**

***Telephone:** 480-295-7600

DocuSigned by:

Roy Bade

89FC82B2D821473...

Signature of Landowner

Signature of Landowner

*Attach a statement of authority and certificate of good standing, if this application is a cooperation or other entity

*If your use is not stated please reach out to the planning department at planning@johnstownco.gov to receive further information

The Community That Cares

johnstown.colorado.gov

P: 970.587.4664 | 450 S. Parish Ave, Johnstown CO 80534 | F: 970.587.0141



Town of Johnstown

DEVELOPMENT REVIEW COST AGREEMENT & ACKNOWLEDGEMENT

***PROJECT NAME:** West Ridge Filing 1

The Town of Johnstown engages external reviewers, including attorneys and engineers, to ensure appropriate review of all proposed land use actions and developments. We incur direct costs associated with notifications and publications of public hearings, ordinances, and land use actions. The Cost Reimbursement required by Section 4-91 of the Johnstown Municipal Code ensures that direct expenses incurred are reimbursed to the Town:

All development proposals, including, but not limited to, annexation, subdivision, zoning, rezoning, site plans and final development plans, shall require a cost agreement to be entered into between landowners or developers and the Town to provide for reimbursement to the Town for the cost of planning services, engineering services, legal services and consultants used by the Town to assist in evaluating landowners' or developers' requests and to assist the Town in negotiation, review, consultation and advice. Such agreement shall also reimburse the Town for other related costs, including but not limited to legal publication costs and administrative costs. The cost agreement shall require that the landowner or developer submit a deposit to the Town in the amount provided by resolution adopted by Town Council.

Initial Deposit. One project may include multiple types. An initial deposit is required for all projects. Additional funds may be necessary depending on the scale, scope, and quality of the project and plans, and will be requested by the Town, as needed. Unused funds, after project completion, are fully refundable.

\$500	Minor Replat/Lot Line Adjustment (Administrative Subdivision) Variance Floodplain Development Permit	\$ _____
\$2000	Conditional Use Grant Amendment to Land Use Code or Comprehensive Plan Change of Zone C-LOMR (Floodplain) Review	\$ _____
\$5000	Use by Special Review Annexation with "Straight" Zoning (HA, SF-1, etc) Amendment to or Stand-alone CD's & Engineering Reports	\$ _____
\$10,000	Site Development Plan Subdivision (<20 Acres) & PUD Development Plan Amendment to Outline Development Plan	\$ _____
\$20,000	Subdivision (>20 Acres) & PUD Development Plan Annexation with Zoning PUD with Outline Dev Plan	\$ <u>20,000</u>
(No deposit needed for Home Model Reviews)		TOTAL: \$ <u>20,000</u>

*Create new Account for (*LLC/Inc/Co or Person): West Ridge Holdco LLC

*Email invoices to: invoicing@caliberco.com

*Contact Phone: 480-295-7600

*Address for Refunds: West Ridge Holdco LLC, 8901 E. Mountain View Rd, Ste 150 Scottsdale AZ

***I acknowledge the review reimbursement requirement, per JMC§4-91, and hereby deposit funds for this purpose:**

Name: Roy Bade Signature:  Date: 9/16/2024

Title: Chief Development Officer Entity*: West Ridge Holdco, LLC

Attach a Statement of Authority and Certificate of Good Standing, if this is a corporate or other entity.

The Community That Cares

johnstown.colorado.gov

P: 970.587.4664 | 450 S. Parish Ave, Johnstown CO 80534 | F: 970.587.0141



Town of Johnstown

Annual Water Demand Worksheet

Project Name: West Ridge Subdivision: Filing 1

Site Address: 5531 East Highway 402 Parcel #: 8522000008, 8522000017

Applicant/Project Owner: West Ridge Holdco LLC
Email: Roy.Bade@caliberco.com Phone: 480-398-4594

Consultant /Representative: TST Inc, Consulting Engineers - Jon Sweet
Email: jsweet@tstinc.com Phone: 970-488-2128

Submitted: [Signature] 9/16/24
Signature (required) Date

Project Summary

Detailed Description of Proposed Land Use: Major infrastructure design only. The Tracts will be developed in the future by separate application.

Commercial/Industrial – Type of business, expected number of employees. Attach records for comparable projects.
n/a

Raw Water Source: ☐ Eligible for Existing Water Bank for Project/Owner: _____

IF: ☐ Home Supply -or- ☐ Other Ditch Co: _____ Attach Historical Use data & Ditch Co trace.

Certificate #s: _____

Court Case #: _____

Overall Site Summary:

Must match Development Plan data

Total Lot Size:	<u>5,810,281</u> SF	(<u>133.4</u> Ac)
Building Coverage	<u>0</u> SF	<u>0</u> % of Total Lot Size
Walks, Drives, Parking	<u>197,156</u> SF	<u>3.5</u> %
Landscaped Areas – Irrigated	<u>225,654</u> SF	<u>3.9</u> %
Landscaped Areas – Right-of-way	<u>97,531</u> SF	
Landscaped Areas – Non-Irrigated	<u>1,119,881</u> SF	<u>19</u> %

The Community That Cares

johnstown.colorado.gov

P: 970.587.4664 | 450 S. Parish Ave, Johnstown CO 80534 | F: 970.587.0141

Irrigation Demand

I. All Uses - General L.S. areas (parks, common area, greenbelts, entry features, right of way, etc.)

a. Spray-irrigated Area - i.e., Sod/Seed	78,542 SF	÷ 43,560 =	1.803 Acres
			x 2.5 AF/Ac =
b. Spray-irrigation Demand			4.51 AF
c. *Drip-irrigated Area – i.e., mulched beds	19,006 SF	÷ 43,560 =	0.436 Acres
			x 1.5 AF/Ac =
d. *Drip-irrigated Demand			0.655 AF
e. *Xeriscape-irrigated Area (not eligible in 2534 Water Bank areas, include in Drip SF)	158,122 SF	÷ 43,560 =	3.63 Acres
			x 1.0 AF/Ac =
f. *Xeric-irrigated Demand			3.63 AF
I. Irrigation Demand (b + d + f)			8.79 AF

*Some non-potable systems are not able to accommodate a demand difference and require all landscape areas at a 2.5 AF/ac rate. If non-potable water is used, check with individual system administrator.

II. Residential – Single Family Detached (a-c) & Single Family Attached/Townhome/Multifamily (d-f)

a. Total # SFD Lots	Lots	---	---	---
b. Ave Irrigated SF/Lot	SF/Lot	Total SF	÷ 43,560 =	Acres
				X 2.5 ac-ft/ac
c. Irrigation Demand				AF
d. Total # SFA/TH/MF Units	Units			
e. Ave Irrigated SF/Unit	SF/Unit	Total SF	÷ 43,560 =	Acres
				X 2.5 ac-ft/ac
f. Irrigation Demand				AF
II. Irrigation Demand (c + f)				AF

III. TOTAL Irrigation Demand: I + II = 8.79 AF

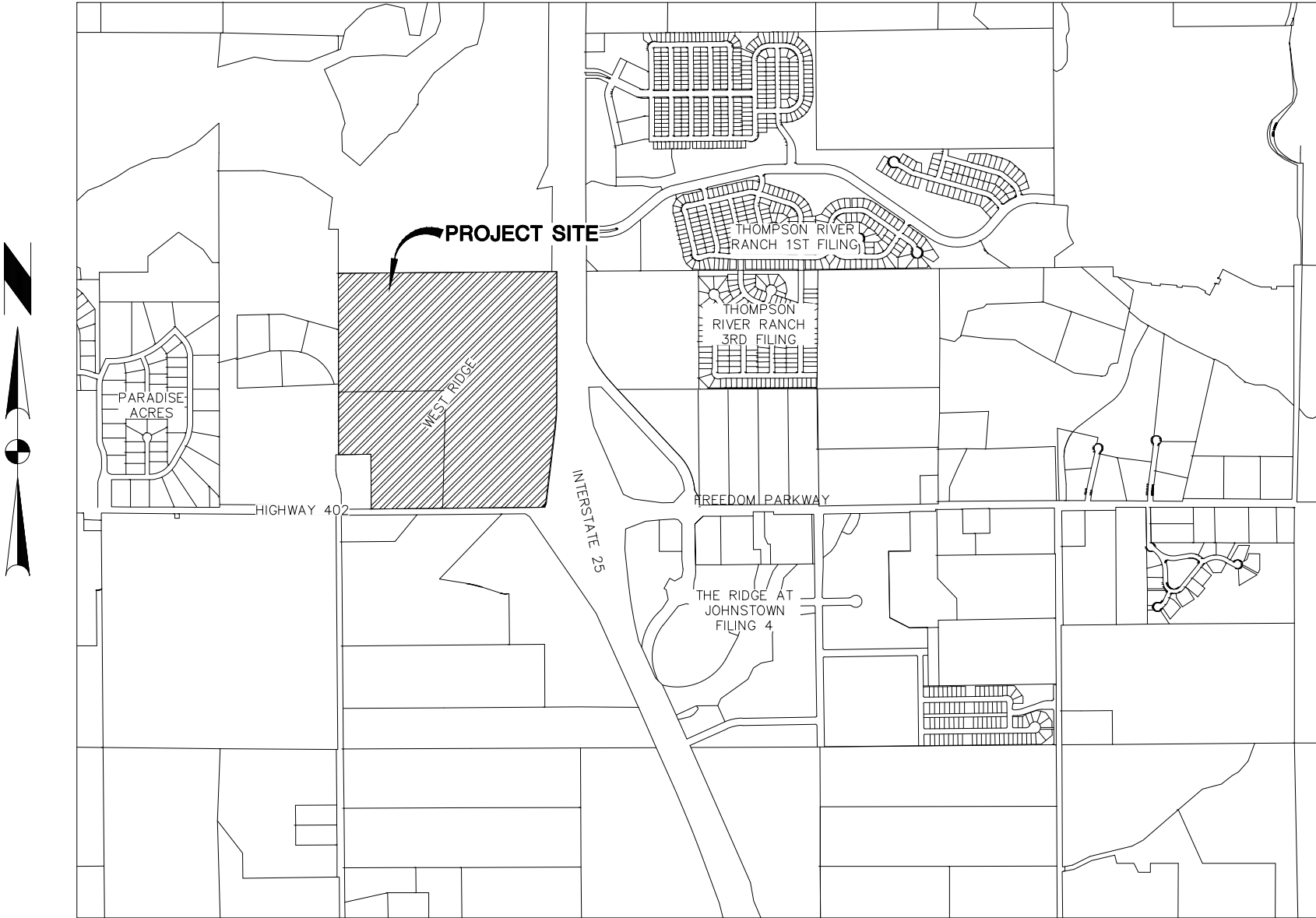
IV. Indoor Use

Land Use	# Units / Lots / SF	Municipal Code Rates	Annual Requirement (AF)
☐ Single Family Detached	Lots	x 0.33 AF/Lot	AF
☐ Single Family Attached / TH / Multifamily	Units	x 0.29 AF/Unit	AF
☐ General Commercial	SF	x 0.10 GPD/SF x 0.00112 =	AF
☐ General Office	SF	x 0.16 GPD/SF x 0.00112 =	AF
☐ Light Industrial / Flex	SF	x 0.06 GPD/SF x 0.00112 =	AF
☐ Other (describe*):	SF	*Attach detailed explanation of proposed AF calculation	AF
Total Indoor Use (a + b + c + d + e + f)		---	AF

ANNUAL WATER USE

	Demand	Factor	Consumptive Use
Total Irrigation Use (from III.)	8.79 AF	x 0.85 =	7.47 AF
Total Indoor Use (from IV.)	AF	x 0.05 =	AF
TOTAL Annual Water Use	AF	---	7.47 AF

WEST RIDGE FILING 1



VICINITY MAP
NOT TO SCALE

WEST RIDGE ZONING MAP

TOWN OF JOHNSTOWN, COLORADO

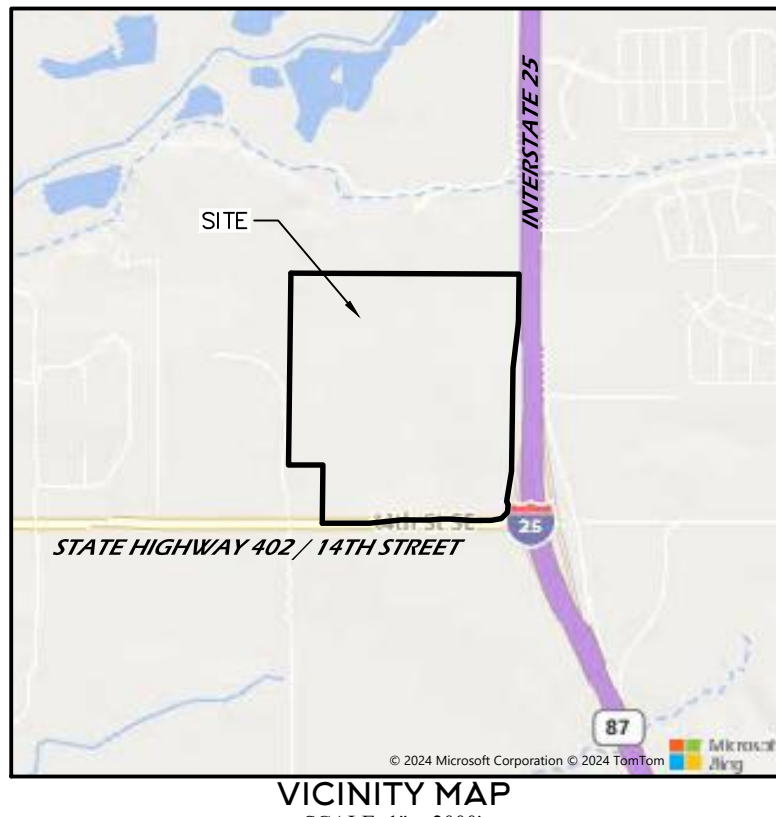
SITUATE IN THE SOUTHWEST QUARTER OF SECTION 22, TOWNSHIP 5 NORTH, RANGE 68 WEST OF THE 6TH P.M.

TOWN OF JOHNSTOWN, COUNTY OF LARIMER, STATE OF COLORADO

133.386 ACRES

PRELIMINARY

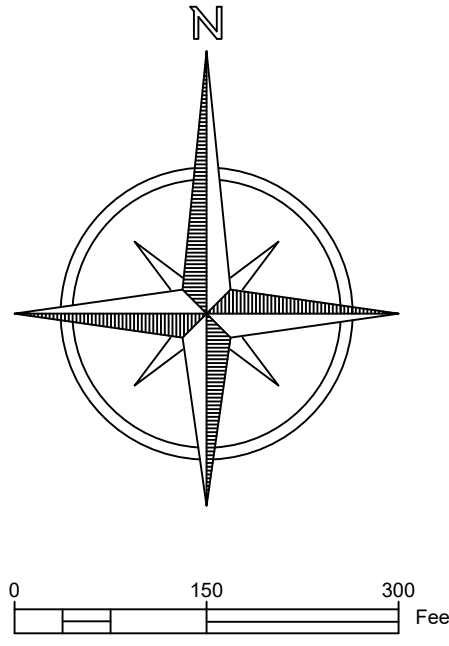
 MAJESTIC SURVEYING MAJESTIC SURVEYING, LLC 1111 DIAMOND VALLEY DRIVE #104, WINDSOR, CO 80550	PROJECT NO: 2024199	PROJECT NAME: WEST RIDGE	REVISIONS:	DATE:	1 SHEET 1 OF 2
	DATE: 8-7-2024	CLIENT: CALIBER	REVISED PARCELS 3 & 4 - AU	9-5-24	
	DRAWN BY: AU	FILE NAME: 2024199ZONE			
	CHECKED BY: SIP	SCALE: N/A			



LEGEND

-  ALIQUOT CORNER AS DESCRIBED
 FOUND MONUMENT AS DESCRIBED
 FOUND #5 REBAR WITH YELLOW PLASTIC CAP, "EPS GROUP," LS38049
 CALCULATED POSITION
 FOUND #4 REBAR WITH RED PLASTIC CAP LS 38348
 FLOW LINE AS DESCRIBED
 BOUNDARY LINE
 EASEMENT LINE
 RIGHT OF WAY LINE
 SECTION LINE

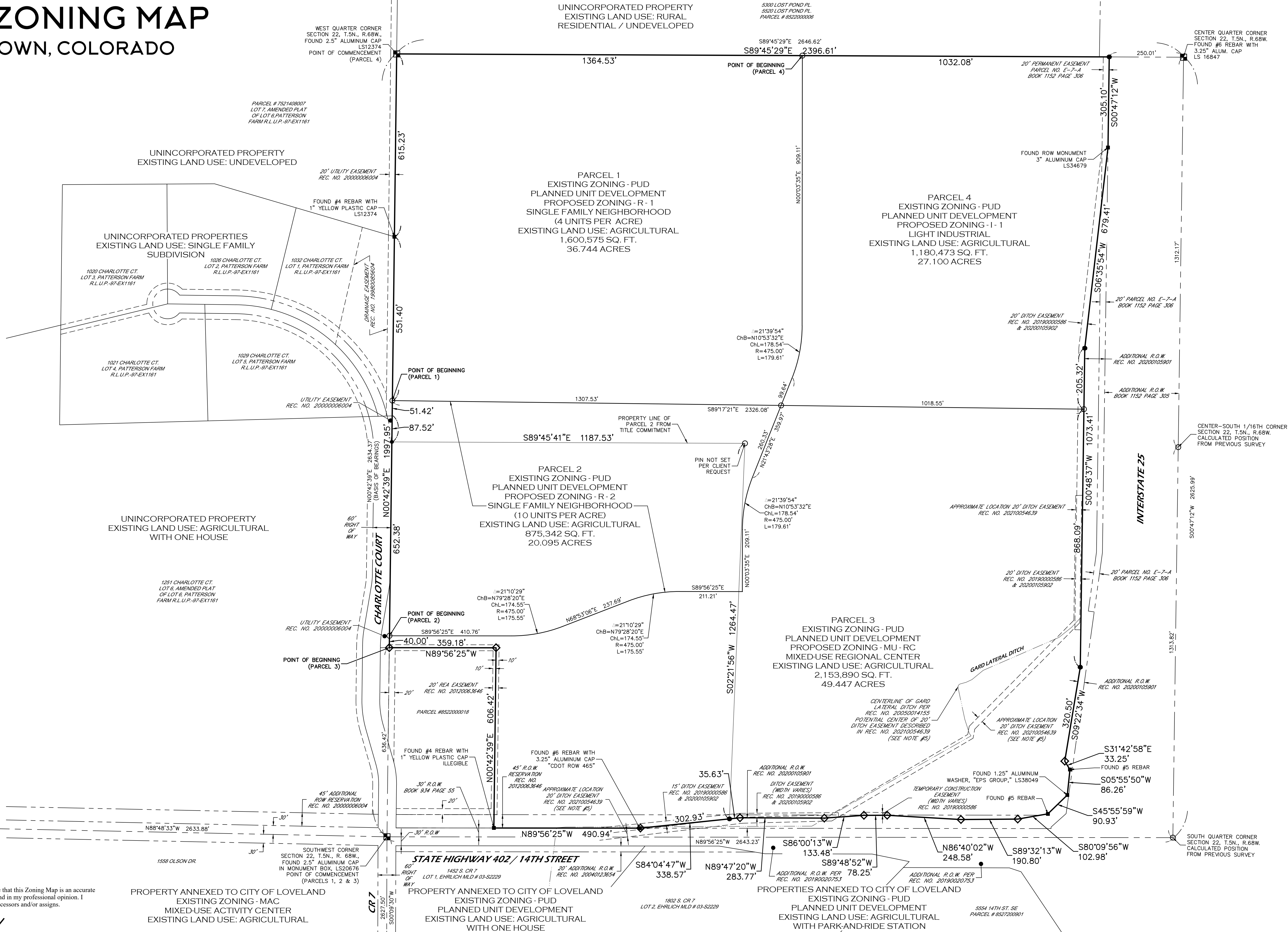
WEST RIDGE ZONING MAP
TOWN OF JOHNSTOWN, COLORADO



LEGEND
- Aliquot corner as described
- Found monument as described
- Found #5 rebar with yellow plastic cap, 'EPS GROUP,' LS38049
- Calculated position
- Found #4 rebar with red plastic cap LS 38348
- Flow line as described
- Boundary line
- Easement line
- Right of way line
- Section line

SURVEYOR'S CERTIFICATE
I, Steven Parks, a Colorado Licensed Professional Land Surveyor, do hereby state that this Zoning Map is an accurate representation of the property to the best of my knowledge, information, belief, and in my professional opinion. I further state that this certificate does not extend to any unnamed parties or the successors and/or assigns.
PRELIMINARY
Steven Parks - On Behalf of Majestic Surveying, LLC
Colorado Licensed Professional Land Surveyor #38348

NOTICE
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon. (13-80-105 C.R.S. 2012)



Majestic Surveying logo and project details table.

PROJECT NO: 2024199	PROJECT NAME: WEST RIDGE	REVISIONS:	DATE:
DATE: 8-7-2024	CLIENT: CALIBER	REVISED PARCELS 3 & 4 - AU	9-5-24
DRAWN BY: AU	FILE NAME: 2024199ZONE		
CHECKED BY: SIP	SCALE: 1" = 150'		

2 SHEET 2 OF 2

F:\Projects\Mountain_View_Farms\Planning\Drawings\REZONING MAP.dwg, Layout1, 02/08/08 9:32:52AM, otl

PUD-MIXED (PUD-MU) USE LEGAL DESCRIPTION

Legal description of a tract of land being a portion of the Southwest Quarter of Section 22, Township 5 North, Range 68 West of the 6th Principal Meridian, County of Larimer, State of Colorado, being more particularly described as follows:

Beginning at the Southwest Corner of said Section 22 and considering the South line of the Southwest Quarter of said Section 22 as bearing North 84°06'54" East and with all bearings contained herein relative thereto; thence along the West line of the Southwest Quarter of said Section 22 North 00°13'51" West 30.00 feet to a point on the Northern right-of-way line of Colorado State Highway 402; thence along said Northern right-of-way line North 84°06'54" East 354.18 feet to the TRUE POINT OF BEGINNING; thence continuing along said Northern right-of-way line North 84°06'54" East 1,873.44 feet to a point on the Westerly line of Johnson's Corner Annexation No. 3 according to the plat on file in the office of the Clerk and Recorder said County; thence along said West line North 00°17'06" West 4.22 feet; thence North 67°05'34" East 67.10 feet; thence North 06°50'24" East 866.80 feet; thence North 00°17'06" West 1,668.15 feet along said Westerly line and its Northern prolongation to a point on the North line of the Southwest Quarter of said Section 22; thence along said North line South 84°17'38" West 2,390.62 feet to the West One-Quarter Corner of said Section 22; thence along the West line of the Southwest Quarter of said Section 22 South 00°13'51" East 1,417.60 feet to a point on the North line of that certain parcel of land described in deed recorded under Reception No. 86676487 dated 12/30/1986; thence along the Northernly and Easterly lines of said parcel of land North 84°06'54" East 354.18 feet; thence South 00°13'51" East 606.42 feet to the TRUE POINT OF BEGINNING.

The above described tract of land contains 136.510 acres more or less.

PROPERTY DESCRIPTION

The Mountain View Farms Annexation and Outline Development Plan is a Planned Unit Development of approximately 136.51 acres located on the Northwest corner of the intersection of Interstate 25 and Colorado State Highway 402. The subject property is both legally contiguous with the Johnstown City Limits as well as within the Johnstown's Growth Management Area (GMA).

Upon annexation to the Town of Johnstown, the Outline Development Plan proposes to zone the property PUD - Mixed Use (PUD-MU). The intent of the zoning district is to provide for an integration of commercial, retail, live/work, residential, and gateway uses in order to facilitate a self-sustaining development. Quality design guidelines are to be developed at the time of the Preliminary Development Plan Submittal.

The annexation is anticipated to benefit Johnstown primarily in the capture of building permit fees, use taxes, and sales tax revenue resulting from the development of a new Mixed Use Community. This new Mixed Use Community shall offer a mix of retail, commercial and residential uses and shall assist the town in the creation of new jobs for its residents. Items shown on the Community Needs List shall thus benefit indirectly from the annexation and zoning of the proposed property. Throughout its design, the PUD will incorporate quality and innovative design solutions that are intended to enhance the overall Johnstown community as well as provide urban buffers and open space for the town.

The proposed Mixed Use zoning district and Outline Development Plan is intended to provide the town with a concentration of retail, commercial, office, recreational, cultural, entertainment, civic/government uses as well as a variety of residential housing types. Organized in such a way as to provide a fully self-sustaining live, work and play community, the Outline Development Plan shall establish such regulatory controls as to reasonably assure the town that a harmonious relationship between the proposed uses and the Johnstown community will occur.

PUD - MIXED USE (PUD-MU) ZONING DISTRICT DESCRIPTION

INTRODUCTION. Within the 136.51 acre Mountain View Farms Addition (MVF), the Outline Development Plan identifies eight distinct sub-area development districts that are intended to identify and more particular land uses and characteristics to occur throughout the development. Because the entire development is designated as PUD-Mixed Use, there will be overlap in the character of the various sub-areas. Nuances between sub-areas are primarily focused on the mix of land uses, the types of activity nodes, and the recommended massing and scale of buildings.

The Activity Nodes within the Outline Development Plan are envisioned as areas where a greater concentration of people and/or development would be expected within a sub-area. These Activity Nodes would serve as anchors for each sub-area. The varying types of Activity Nodes identified for the MVF Development shall include retail/entertainment, open space/recreation, civic/worship/community, and residential neighborhood gathering spaces.

Detailed descriptions of each sub-area follows and is intended to identify some of the key urban design characteristics of each sub-area in relation to the others.

CIRCULATION FEATURES. To establish Mountain View Farms Addition (MVF) as an identifiable and uniquely sustainable community, the major roadways within MVF are planned with enhanced streetscapes that and a distinctive character. Overlaid onto the Outline Development Plan is a Corridor Streetscape Diagram. This diagram identifies the primary collector roads, locations of entry features, enhanced streetscapes, edge conditions and recommended "gateway" architectural features intended to both unify and announce entry into the MVF Development.

Highway 402 is a scenic corridor and should be required to maintain special design considerations such as consistent building setbacks from Highway 402 to maintain mountain views and view corridors, consistent landscaping, high-quality building design, and limits on the number of access points into the development.

To highlight major entries in the MVF Development from Highway 402 and to announce arrival as viewed from I-25, entry feature locations are identified on the land use diagram. In addition to the streetscape landscape, these entry features will be designed under a future landscape plan and are recommended to contain special entry architecture, landscape and identification signage.

SUB-AREA MU-1. At the heart of the MVF Development, Sub-area MU-1 would bring together the full and varied functions of everyday community living from large format retailers and offices, to entertainment and shopping. Anticipated as the main hub of MVF, this sub-area would offer a greater intensity and combination of uses with retail/commercial, sidewalk cafes, cinemas, familiar shops, offices and service stores. Vertically and horizontally mixed with a variety of higher density residential uses in close proximity.

An entertainment node such as a theater complex and/or major civic space may serve as the anchor for this sub-area. Multi-story buildings with well detailed architectural elements would establish a greater intensity of uses at the center of the MVF Development.

Plaza spaces, forecourts and small village greens would be interspersed throughout this sub-area to create and celebrate public spaces. Community activities such as a farmer's market, ice skating rink and community festivals could be key activity generators in this sub-area.

Both the architecture and the street would be scaled to the pedestrian. With generous walkways built to the front walls of buildings, storefronts will establish a consistent rhythm with ample window openings to enliven the walking/shopping, and employment experience.

Carefully integrated on-street parking and possible structured parking would encourage and strengthen the notion of "park once" allowing for greater walkability throughout this and other sub-areas.

The careful attention to architectural and street/pedestrian detail, the mingling of varied uses, and the scaling of this sub-area all promote and encourage a dynamic atmosphere that establishes this as the core hub of the MVF Development.

SUB-AREA MU-2. Located along the eastern and southern edges of the MVF Development near the intersection of Highway 402 and I-25, this corner will punctuate the western entry into Johnstown. With strong visibility from both Highway 402 and I-25, this sub-area will introduce "gateway" architecture or "landmark" structures into Johnstown and the MVF Development.

Because of the higher volumes of traffic typical of highways and arterial roads this corner is expected to draw corporate format retailers in a land use mix that emphasizes retail/commercial, restaurants, hotels and possibly low rise office uses.

To ensure a vibrant land use mix that would encourage a pedestrian environment, higher density residential uses are also envisioned in close proximity to this sub-area.

To maintain a human scale, large building masses would be articulated and arranged into smaller building elements to diminish the scale of the buildings. The thoughtful placement of public plazas, pedestrian corridors, courtyards and village greens throughout this area would further enhance the pedestrian experience and establish the rich and varied mixed use environment.

SUB-AREA MU-3. Envisioned as both residential and support non-residential, this sub-area will offer a unique blend of soft urban living being reserved for the upper floors, with ground floors dedicated to home-based businesses and/or flexible office and retail/commercial space.

These multi-story townhomes and a live/work environment will frame the streets with tree-lined walkways and on-street parking to create a highly walkable residential and employment neighborhood. Small ground floor non-residential support uses would punctuate the street-scape of this sub-area, providing a vertical mix of residential and retail/commercial uses which create a complete live/work community.

SUB-AREA MU-4 AND MU-5. Planned predominantly as a mixed residential area these sub-areas would take advantage of the close proximity to the MU-1 and MU-2 sub-areas.

A variety of residential types are envisioned for these sub-areas ranging from medium density residential to small lot single family residential that would help transition the mixed use corridor of MU-1, 2 and 3 to the existing lower density residential uses to the north and west. These sub-areas would also accommodate small neighborhood-serving retail uses along the streetscape.

SUB-AREA MU-6. Planned as a very low density residential the MU-6 sub-area maintains a character and scale compatible with the existing residential area located to the north and west of the development. A planned buffer adjacent to the north and west property boundary would offer a linear trail corridor serving both residential areas while also conveying a corridor for wildlife.

The architecture within this sub-area should be in scale with the nearby residential area west of MVF. Building heights would be established at no greater than a two story mass.

SUB-AREA MU-7 AND MU-8. Each of these sub-areas are primarily envisioned to serve as open space and landscape buffers for both on-site and adjacent off-site land uses.

Sub-area MU-7 should provide needed setback and buffer areas for the I-25 and Highway 402 corridor as well as provide an open space transition from the Mixed Use land uses along the north and west boundaries of the property. This sub-area should also provide for pedestrian-way, greenbelts, detention ponds and drainage-ways.

Sub-area MU-8 may also function in all the same ways as Sub-area MU-7; however, this sub-area has also been envisioned as providing possible sustainability for the MVF Development through the use of this land as a wind and solar energy generation technologies farm. This site may be used to employ existing and future wind and solar technology to generate sustainable energy for this development as well as to put unused electrical energy back into the electrical grid.

USES PERMITTED BY RIGHT WITHIN THE PUD-MU ZONING DISTRICT

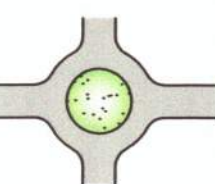
- Commercial, Retail, Office, medical, corporate campus, live work, and Gateway uses as allowed in the CB Zone Districts.
- Educational institutions, Colleges, Schools (public and private) and Daycare uses.
- Multi-Family Residential uses as allowed in the SF-2 Zoning District.
- Single Family Detached Residential Uses as allowed in the SF-1 Zoning District.

LAND USE SUMMARY

THE FOLLOWING LIST OF SUB-AREAS (DEVELOPMENT DISTRICTS) COMPRISING THE MOUNTAIN VIEW FARMS DEVELOPMENT. EACH SUB-AREA HAS BEEN DESIGNATED WITH AN ACREAGE RANGE WHICH MAY BE ALLOWED TO VARY AS MUCH AS 20% (GREATER OR LESSER) AT THE TIME A SITE SPECIFIC DEVELOPMENT PLAN IS SUBMITTED.

MU-1	30-35 AC	MIXED USE REGIONAL ACTIVITIES CENTER DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE A MIX OF LARGE FORMAT RETAIL/COMMERCIAL, ENTERTAINMENT, RESTAURANTS, LOW TO MEDIUM RISE OFFICE, MEDICAL FACILITIES, HOTELS/LODGINGS, MIXED-USE RESIDENTIAL (RESIDENTIAL ABOVE RETAIL/COMMERCIAL), PUBLIC AND QUASI PUBLIC USES, CIVIC USES, ETC...
MU-2	18-20 AC	MIXED USE CORRIDOR COMMERCIAL DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE A MIX OF RETAIL/COMMERCIAL, RESTAURANTS, LOW RISE OFFICE, HOTELS/LODGINGS, CONVENIENCE SERVICES, ETC...
MU-3	12-15 AC	MIXED USE LIVE/WORK DISTRICT USES WITHIN THIS DISTRICT MAY BE PRIMARILY MEDIUM DENSITY RESIDENTIAL USES WITHIN A COMMON BUILDING WHICH ALSO PROVIDES "SUPPORT" NON-RESIDENTIAL USES ON THE GROUND LEVEL. RESIDENTIAL USES MAY OCCUR ON THE GROUND LEVEL WITH "SUPPORT" NON-RESIDENTIAL OR ABOVE A "SUPPORT" NON-RESIDENTIAL USE. SUCH "SUPPORT" NON-RESIDENTIAL USES MAY INCLUDE: BOUTIQUE RETAIL, PERSONAL SERVICES, COFFEE SHOPS, NEWS STANDS/BOOK SHOPS, PROFESSIONAL SERVICES, ART/SCULPTURE AND MUSIC STUDIOS, ETC... PERMITTED GROSS DENSITY RANGE SHALL BE 6-12 DWELLING UNITS PER ACRE.
MU-4	15-20 AC	MEDIUM DENSITY RESIDENTIAL DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE MULTI-FAMILY RESIDENTIAL DWELLINGS SUCH AS, TOWNHOMES, ALLEY ACCESS DETACHED/ATTACHED HOMES, ATTACHED SINGLE FAMILY (MORE THAN 3 UNITS), CONDOMINIUMS, APARTMENTS, URBAN STYLE LOFTS, AS WELL AS SOME SMALL NEIGHBORHOOD-SERVING SHOPS WHICH MAY PUNCTUATE THE CORNERS OF THIS SUB-AREA PERMITTED GROSS DENSITY RANGE SHALL BE 6-16 DWELLING UNITS PER ACRE.
MU-5	15-20 AC	LOW DENSITY RESIDENTIAL DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE SINGLE FAMILY RESIDENTIAL DWELLINGS, SUCH AS, SINGLE FAMILY DETACHED HOMES, SINGLE FAMILY ATTACHED HOMES (WITH UP TO 3 ATTACHED UNITS, SINGLE FAMILY DETACHED/ATTACHED ALLEY ACCESS HOMES, PATIO HOMES, CLUSTER HOMES ETC... PERMITTED GROSS DENSITY RANGE SHALL BE 3-6 DWELLING UNITS PER ACRE.
MU-6	10-15 AC	VERY LOW DENSITY RESIDENTIAL DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE SINGLE FAMILY DETACHED HOMES AND "LIFE STYLE" PATIO HOMES, ETC... PERMITTED DENSITY RANGE SHALL BE 1-3 DWELLING UNITS PER ACRE.
MU-7	20-25 AC	OPEN SPACE/PARKS DISTRICT USES WITHIN THIS DISTRICT MAY INCLUDE LANDSCAPE BUFFERYARDS, GREENBELTS, PEDESTRIAN WAYS, POCKET PARKS, PARKS, ACTIVE PLAY AREAS, DETENTION PONDS, DRAINAGE WAYS, ETC.
MU-8	4-6 AC	WIND/SOLAR ENERGY FARM AND DETENTION FACILITY USES WITHIN THIS AREA MAY INCLUDE DETENTION PONDS, LANDSCAPE BUFFERYARDS, LANDSCAPED STREETSCAPE, OPEN SPACE AREAS AND OPEN SPACE AREAS DEDICATED TO WIND/SOLAR ENERGY ELECTRICAL GENERATION TECHNOLOGIES, ETC...

LEGEND



PRIMARY COLLECTOR ROAD CIRCULATION SYSTEM WITH MINOR ROUNDABOUTS



MAJOR ENTRY IDENTIFICATION FEATURE



MINOR ENTRY IDENTIFICATION FEATURE



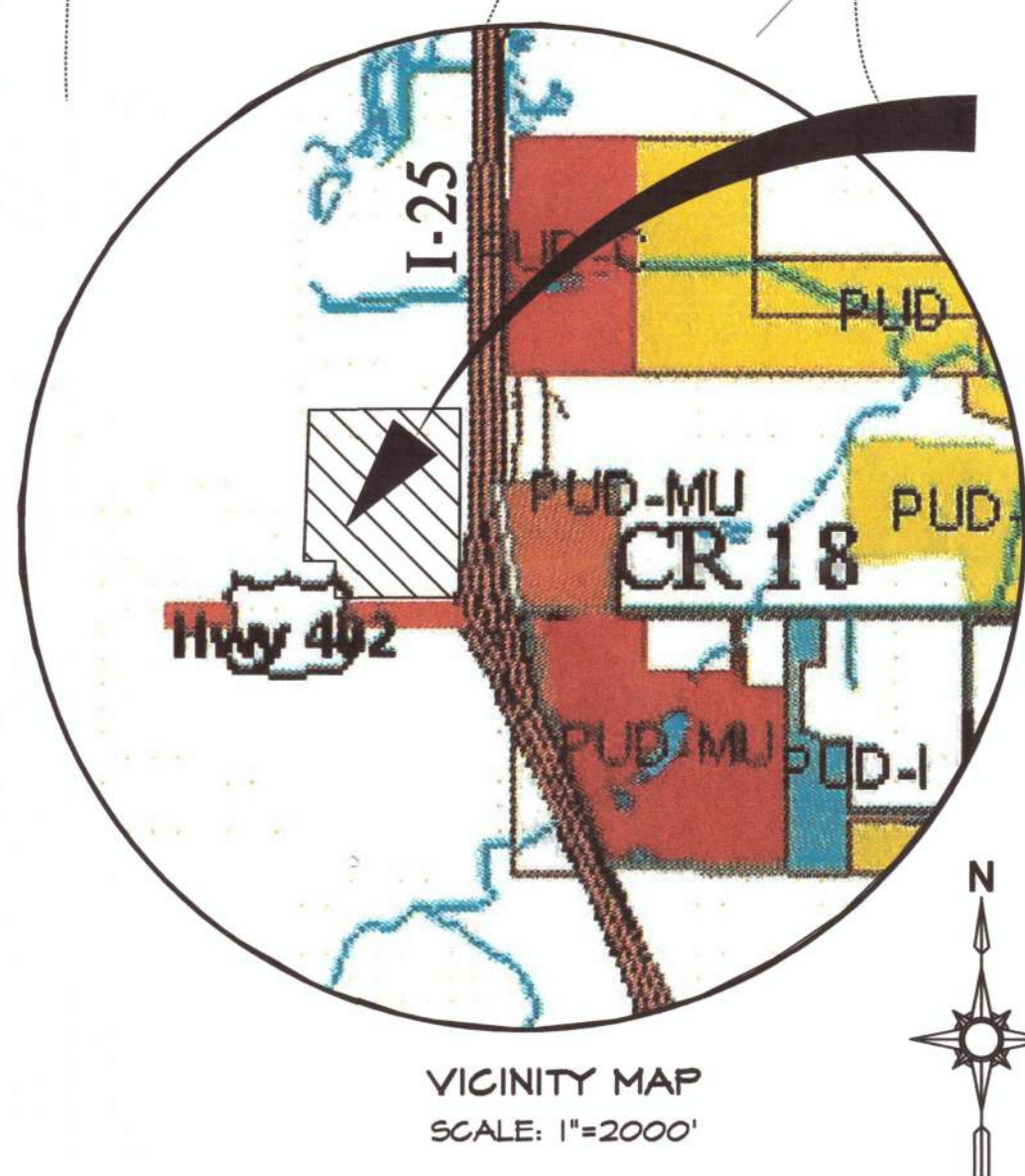
MAJOR ACTIVITY NODE



MINOR ACTIVITY NODE



GATEWAY ARCHITECTURAL FEATURE



VICINITY MAP
SCALE: 1"=2000'

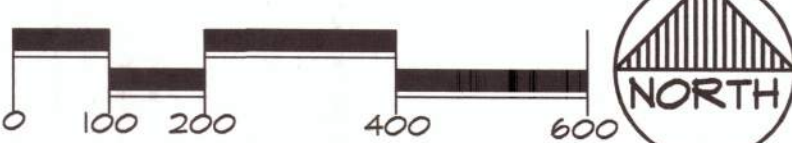
MOUNTAIN VIEW FARMS 136.5± ACRES ZONED: PUD-MU

OWNER/APPLICANT:

MOUNTAIN VIEW FARMS, INC.
ATTN: BARBARA JOHNSON
707 N. COUNTY ROAD 7
LOVELAND, CO 80537
(970) 663-6444

PLANNER/ENGINEER:

LANDMARK ENGINEERING LTD.
ATTN: KEN MERRITT, APA, ASLA
3521 W. EISENHOWER BLVD.
LOVELAND, CO 80537
(970) 667-6286



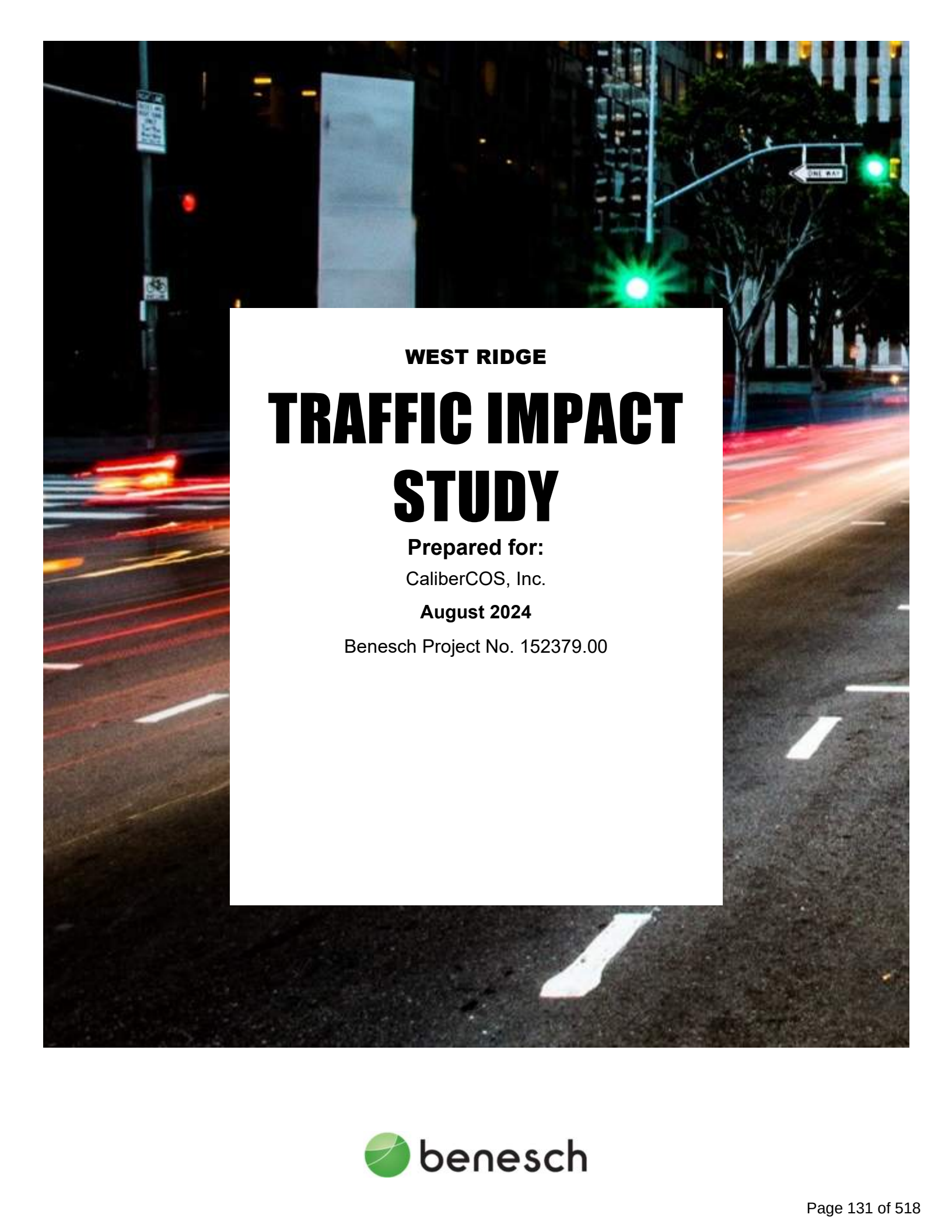
REVISIONS	By	Date
Description		

Landmark Engineering
Engineers Planners Surveyors Architects Geotechnical
3521 West Eisenhower Blvd., Loveland, Colorado 80537
(970) 667-6286 Fax (970) 667-6286
www.landmarktd.com

DATE: 2/6/08
SCALE: 1"=200'
DRAWN: LLO
CHECKED: KM
APPROVED: KM

CLIENT:	MOUNTAIN VIEW FARMS
TITLE:	MOUNTAIN VIEW FARMS TOWN OF JOHNSTOWN, COLORADO OUTLINE DEVELOPMENT PLAN
JOB NO.:	JOHNS
SHEET	714601-202
OF	1

This document is an instrument of professional service of Landmark Engineering Ltd. (L.E.). Landmark shall, to the fullest extent permitted by law, be held harmless.



WEST RIDGE

TRAFFIC IMPACT STUDY

Prepared for:

CaliberCOS, Inc.

August 2024

Benesch Project No. 152379.00

TABLE OF CONTENTS

1. Introduction	1
2. Data Collection.....	3
3. Existing Conditions.....	5
3.1 Existing Network Characteristics	5
3.2 Existing Conditions Capacity Analysis	7
3.3 Crash Analysis.....	9
4. Background Conditions	11
4.1 Signal Warrants	11
4.2 Geometric Improvements	14
4.3 Background Conditions Capacity Analysis.....	15
4.4 Background Conditions Queuing Analysis	18
5. Site Characteristics	20
5.1 Trip Generation.....	20
5.2 Access Characteristics	22
5.3 Trip Distribution	22
5.4 Erlich City Development	22
6. Site Access Analysis	30
6.1 Safety Analysis	30
6.2 Capacity Analysis	32
6.3 Queuing Analysis.....	33
7. Total Traffic Conditions	34
7.1 2030 Total Traffic Capacity Analysis.....	34
7.2 2045 Total Traffic Capacity Analysis.....	35
8. Access Control Plan Amendment.....	39
9. Summary.....	42
9.1 Existing Conditions	42
9.2 2030 Background Conditions.....	42
9.3 2045 Background Conditions.....	43
9.4 2030 Total Traffic Conditions	43

9.5 2045 Total Traffic Conditions	44
---	----

LIST OF FIGURES

Figure 1. Vicinity Map.....	2
Figure 2. Existing Conditions, Peak Hour Volumes.	4
Figure 3. Existing Conditions, Lane Configuration and Traffic Control.....	6
Figure 4. PDO Crash Trends (2018-2022)	Error! Bookmark not defined.
Figure 5. Injury Crash Trends (2018-2022)	10
Figure 6. 2030 Background Conditions, Peak Hour Volumes.	12
Figure 7. 2045 Background Conditions, Peak Hour Volumes.	13
Figure 8. Site Plan.	21
Figure 9. West Ridge Trip Distribution.....	24
Figure 10. West Ridge Site Trips	25
Figure 11. Erlich City Trip Distribution	26
Figure 12. Erlich City Site Trips.....	27
Figure 13. 2030 Total Traffic Conditions, Peak Hour Volumes.	28
Figure 14. 2045 Total Traffic Conditions, Peak Hour Volumes.	29
Figure 15. SH 402 ACP Proposed Modifications	40

LIST OF TABLES

Table 1. Existing Network Summary.	5
Table 2. Intersection Level of Service Criteria.	7
Table 3. Existing Conditions, Capacity Analysis Summary.....	8
Table 4. Intersection Safety Performance	10
Table 5. 2030 Background Conditions Signal Warrant Analysis Summary	11
Table 6. Future Year Background Conditions, Capacity Analysis Summary (Pt. 1)	16
Table 7. Future Year Background Conditions, Capacity Analysis Summary (Pt. 2)	17
Table 8. Future Year Background Conditions, Queuing Analysis Summary	19
Table 9. West Ridge Trip Generation Summary	20
Table 10. Erlich City Trip Generation Summary	23
Table 11. Predicted Crashes for LCR 7 & Highway 402.....	31
Table 12. Predicted Crashes for Site Access & Highway 402.....	31
Table 13. Total Predicted Crashes	31
Table 14. Intersection Level of Service Summary	32
Table 15. Critical Queue Summary - SH 402 & LCR 7	33
Table 16. Critical Queue Summary - SH 402 & Site Access.....	33
Table 18. Total Traffic Conditions, Capacity Analysis Summary (Pt. 1).....	36
Table 19. Total Traffic Conditions, Capacity Analysis Summary (Pt. 2).....	37
Table 20. Total Traffic Conditions, Queuing Analysis Summary	38

LIST OF APPENDICES

Appendix A: Traffic Impact Study Scoping Form
Appendix B: Data Collection
Appendix C: Trip Generation
Appendix D: Existing Crash Analysis
Appendix E: Signal Warrant Evaluations
Appendix F: Future Year Background Capacity Analysis
Appendix G: Future Year Background Conditions Capacity and Queuing Analysis
Appendix H: Future Year Alternatives Analysis – Crash Analysis Worksheets
Appendix I: Future Year Total Traffic Conditions – Capacity Analysis Worksheets
Appendix J: Future Year Total Traffic Conditions – Capacity and Queuing Analysis
Appendix K: Site Access Exhibits

1. INTRODUCTION

This report documents analyses conducted to assess the traffic impacts of a proposed development in Loveland, Colorado. The development is located in the northwest corner of the Interstate 25 (I-25) & State Highway 402 (SH 402) interchange. The approximate location of the proposed development is shown on the Vicinity Map in **Figure 1**.

This report presents the potential impacts of the proposed development on the existing roadway network and, as appropriate, recommends additional turn lanes, storage bay modifications, and intersection control methods per City of Loveland, Larimer County, and Colorado Department of Transportation (CDOT) standards. The study intersections include the following:

- Boise Avenue & SH 402
- County Road 9E (CR 9E) & SH 402
- Charlotte Court / CR 7 & SH 402
- Park & Ride Access & SH 402
- I-25 Southbound Ramps & SH 402
- I-25 Northbound Ramps & SH 402
- Frontage Road & SH 402

The following scenarios were analyzed considering weekday AM and PM peak hour periods:

- Existing Conditions
- 2030 Background
- 2045 Background
- 2030 Total Traffic
- 2045 Total Traffic

The current site plan also contemplates a new, full movement access along SH 402 between the southbound I-25 ramp terminal and Larimer County Road 7 (LCR). This contrasts with the recommendations of the SH 402 Access Control Plan (*SH 402 ACP*) that shows access at this location as three-quarter movement. As such, a full movement drive at this location would require an amendment to the *SH 402 ACP* predicated on an analysis of the corridor with the higher level of access supporting no negative impacts to operations or safety. A section of this report is dedicated to addressing site access with respect to the impact on the *SH 402 ACP*.

A scoping effort was conducted with representatives from CDOT, Larimer County, Town of Johnstown, and City of Loveland and was documented in a scoping form. This was approved by the parties mentioned above and is included in **Appendix A** for reference.

LEGEND

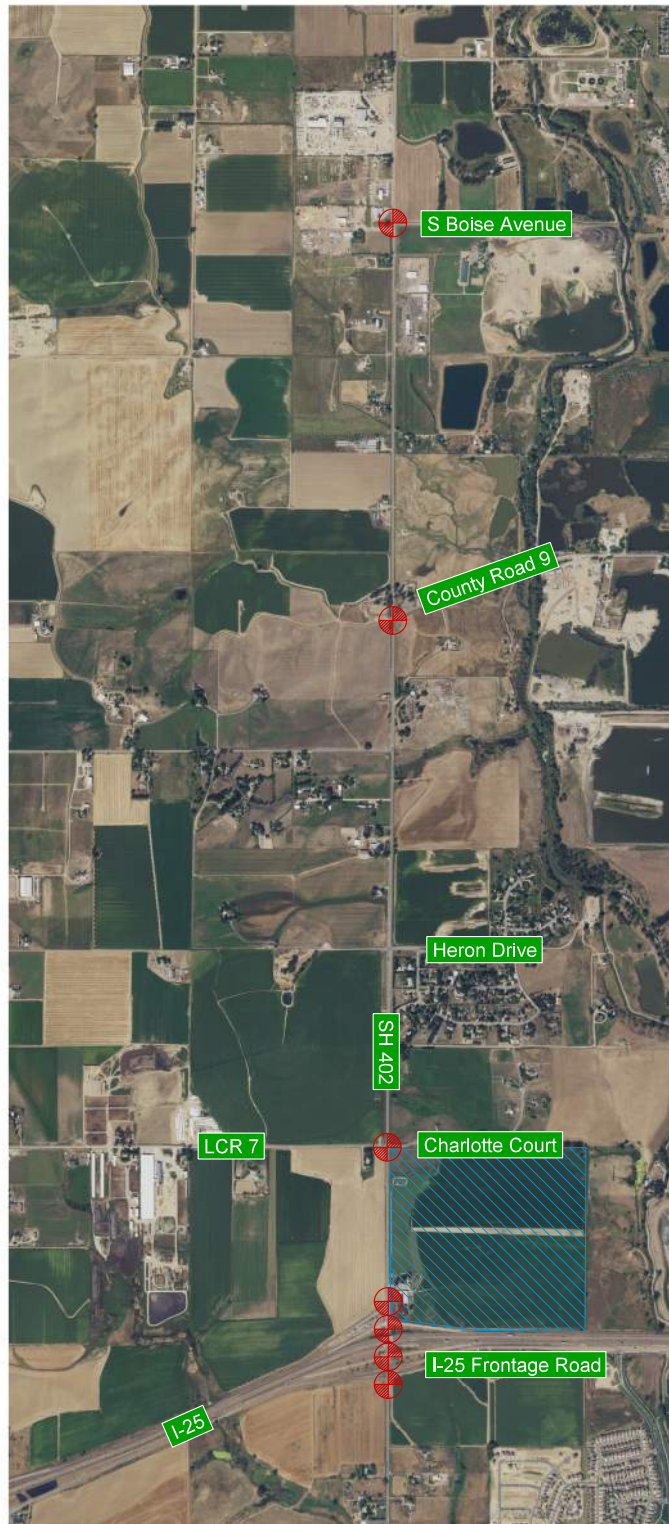
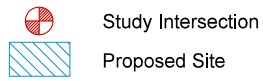


Figure 1. Vicinity Map.

2. DATA COLLECTION

The data collection effort included acquiring peak period turning movement counts and existing intersection signal timings. Existing street and intersection geometry and storage lengths were collected from aerial photos.

Peak hour turning movement counts were collected at the following intersections:

- Boise Avenue & SH 402
- CR 9 & SH 402
- I-25 Southbound Ramps & SH 402
- I-25 Northbound Ramps & SH 402
- I-25 Frontage Road & SH 402

Counts were conducted during the AM peak hour from 7:00 AM – 9:00 AM and PM peak hour from 4:00pm – 6:00pm. Peak hours occurred from 7:15 AM – 8:15 AM and 4:15 PM – 5:15 PM for the AM and PM periods, respectively.

Additionally, 12-hour turning movement counts were collected at the following locations:

- Charlotte Court & SH 402
- Park & Ride Access & SH 402

Counts included bike and pedestrian volumes. All the turning movement count data was taken on Thursday, October 20, 2022 under clear weather and typical traffic conditions. Finally, twenty-four-hour directional counts were taken at the approximate location of the site access point.

Lane configuration and traffic control were collected from the CDOT and aerial images.

Signal timings for the intersection of Boise Avenue and SH 402 were provided by the City of Loveland. Adaptive intersection timing plans are currently used at the intersection, so typical peak operations movement splits and cycle lengths were assumed based on data logs provided. These signal timings were used for peak hour period analysis.

All data collection was conducted in coordination with the requirements set forth in a scoping meeting conducted on February 23, 2023. Existing peak hour traffic count data is illustrated in **Figure 2**. All traffic count data is provided in **Appendix B**.

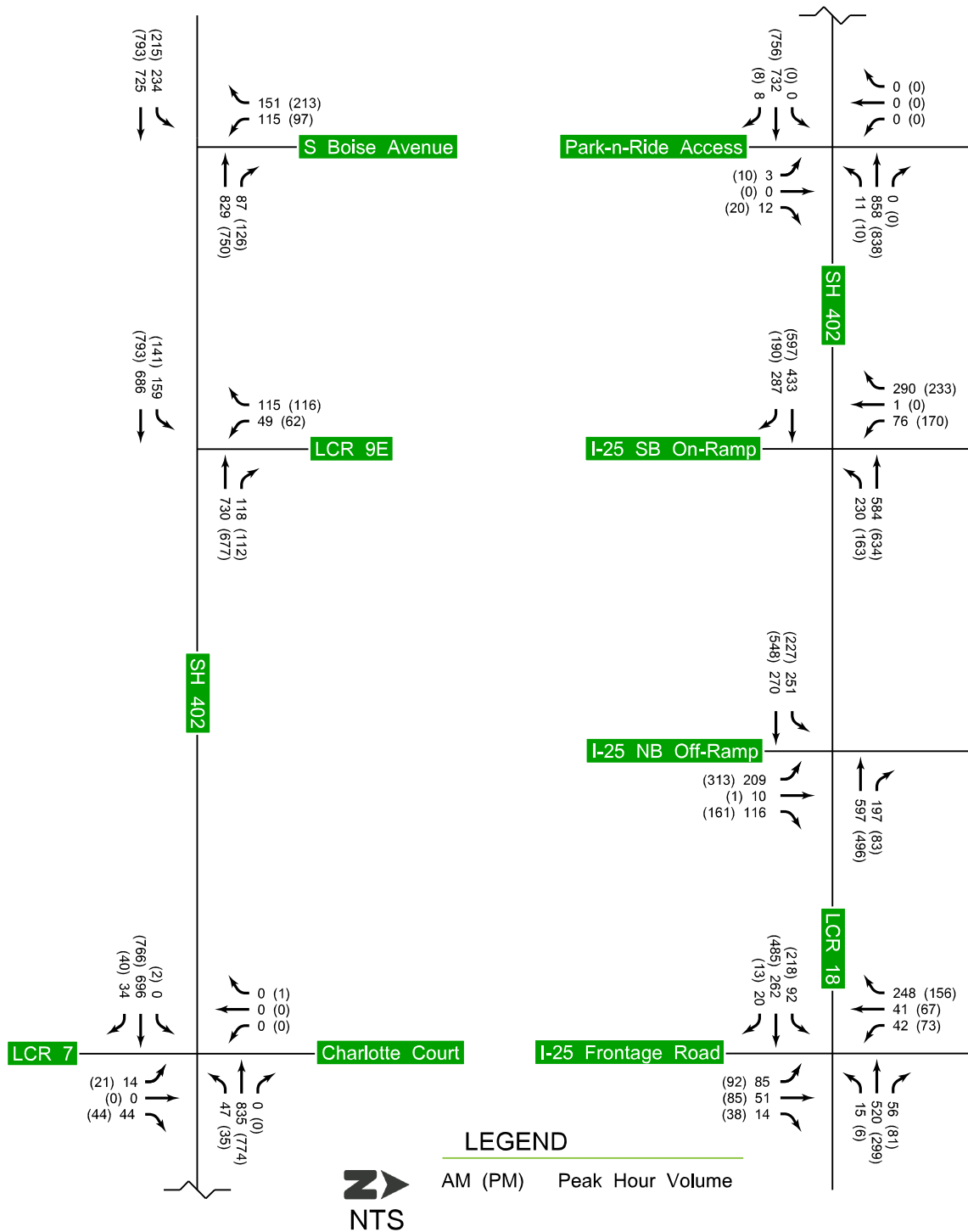


Figure 2. Existing Conditions, Peak Hour Volumes.

3. EXISTING CONDITIONS

Existing traffic conditions were evaluated to identify any existing deficiencies and to provide a baseline for comparison purposes.

3.1 Existing Network Characteristics

Within the study area there are six roadways that were considered during analysis: SH 402, Boise Avenue, CR 9E, CR 7/Charlotte Court, I-25, and Frontage Road.

Roadway functional classifications for these streets were obtained from the *Connect Loveland Transportation Master Plan*. Other data was obtained from aerial imagery and from the CDOT Online Transportation Information System (OTIS). Current network characteristics were determined and are summarized in **Table 1**.

Table 1. Existing Network Summary.

Roadway	Functional Classification	Typical Section	Median Type	Posted Speed
SH 402 (W of I-25)	Minor Arterial*	Two Lane	Undivided	55 mph
SH 402 (I-25 to Frontage Rd)	Minor Arterial*	Four Lane	Divided	35 mph
SH 402 (E of Frontage Rd)	Minor Arterial*	Two Lane	Undivided	55 mph
Boise Avenue	Minor Arterial	Two Lane	Undivided	35 mph
CR 9E	Minor Arterial	Two Lane	Undivided	45 mph
CR 7	Major Collector	Two Lane	Undivided	45 mph
Charlotte Court	Local	Two Lane	Undivided	25 mph
I-25	Freeway	Four Lane	Divided	75 mph
Frontage Road	Major Collector	Two Lane	Undivided	35 mph

*CDOT Classification is Non-Rural Principal Highway (NR-A)

A short-duration count station is located as MP 4.306, approximately one-quarter mile east of LCR 9, shows the daily traffic at 13,400 vehicle per day (vpd) as of June 2019. Traffic counts at this station have been consistent (between 13,000 vpd and 14,000 vpd) since 2012, with a temporary increase in 2018 to 15,500 vpd. All volumes discussed above are seasonally adjusted using monthly summaries from the continuous count station located on US 34, just north of the site.

The intersection of Boise Avenue & SH 402 is signalized. The I-25 & SH 402 ramp terminal intersections as well as the Frontage Road are multilane roundabouts. All other study intersections are currently two-way stop controlled (TWSC). Existing lane configuration and traffic control for the study network are illustrated in **Figure 3**.

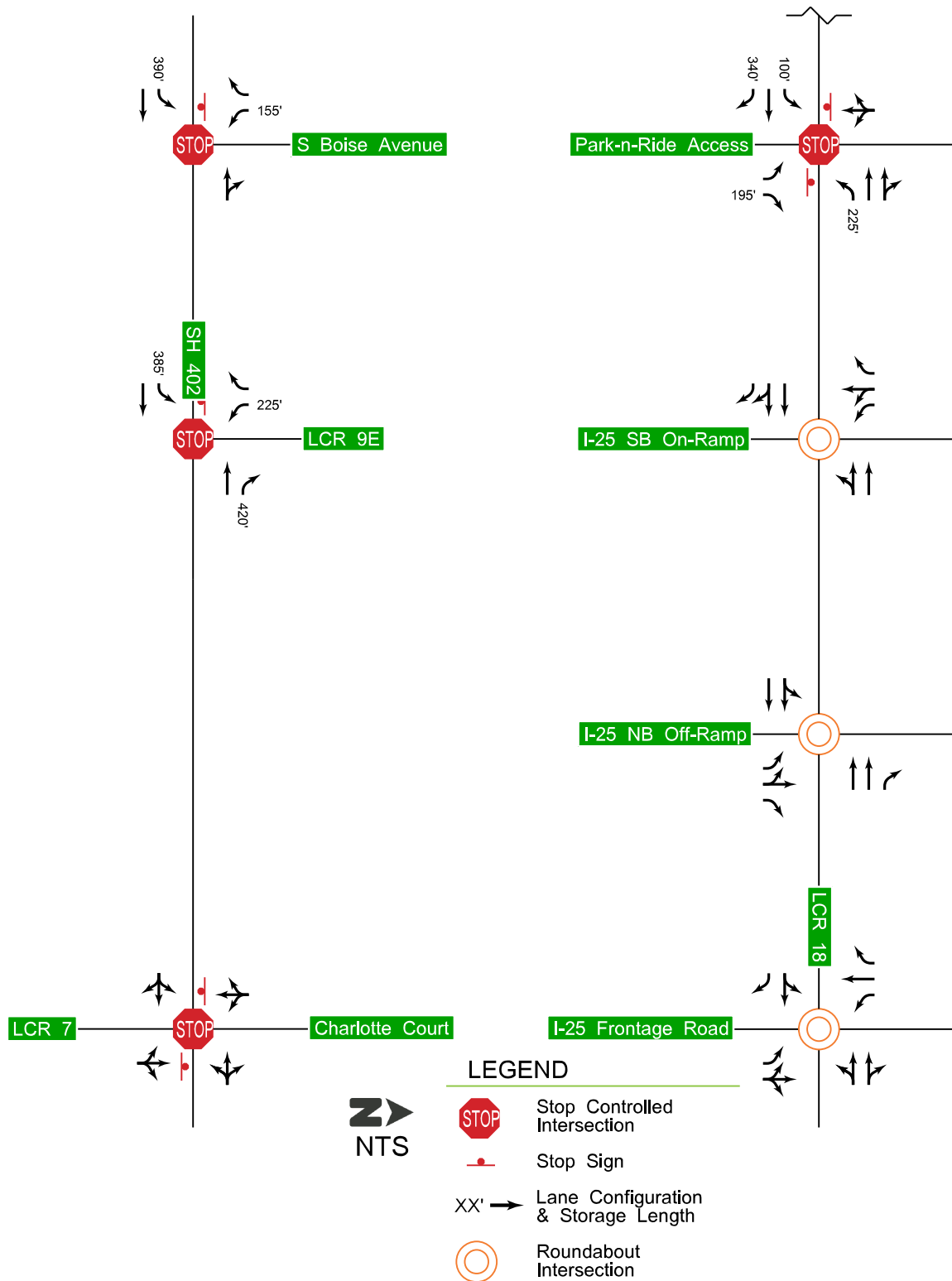


Figure 3. Existing Conditions, Lane Configuration and Traffic Control.

3.2 Existing Conditions Capacity Analysis

Capacity analysis was performed for the study intersections using the existing lane configurations and traffic control. Analysis was conducted using Synchro Version 11 based on the *Highway Capacity Manual* (HCM) delay methodologies. SIDRA was also used to analyze the capacity of the roundabout, which uses its own capacity model based on HCM methodologies called SIDRA Roundabout (HCM). For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 2** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively. Queuing analysis was conducted referencing the 95th percentile queue length. This represents the queue length that has a 5 percent probability of being exceeded during the peak hour period.

Table 2. Intersection Level of Service Criteria.

Level of Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
<i>Highway Capacity Manual (6th Edition)</i>		

The analyzed intersections along SH 402 are operating at an overall LOS D or better during both peak hours. Individual movements at all intersections are operating at a LOS D or better with adequate storage for the 95th percentile queue lengths during all peak hours with the exception of the following:

- Boise Avenue & SH 402 - The southbound left-turn lane movement (AM/PM) operates at a LOS E. The average delay per vehicle for this movement is 67/74 seconds. The southbound right-turn lane movement (PM) operates at LOS E. The average delay per vehicle for this movement is 58 seconds.
- CR 9E & SH 402 - The southbound left-turn lane movement (AM/PM) operates at a LOS F. The average delay per vehicle for this movement is 236/257.
- CR 7/Charlotte Court & SH 402 - The northbound approach (AM/PM) operates at a LOS E/F. The average delay per vehicle for this movement is 43/57.

- Park-n-Ride & SH 402 – The northbound left-turn lane movement (AM/PM) operates at LOS E. The average delay per vehicle for this movement is 36/37 seconds.

It is common for minor street stop control approaches to arterials to operate with higher delays during peak periods when traffic volumes are highest.

The Existing Conditions Capacity Analysis Summary is illustrated in Table 3. Detailed results are provided in **Appendix C**.

Table 3. Existing Conditions, Capacity Analysis Summary

Intersection	Movement	AM		PM	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Boise & SH 402 Signal	EBL	C	29.6	B	12.2
	EBT	A	5.9	A	5.3
	WBTR	B	19.1	B	12.3
	SBL	E	66.7	E	74.1
	SBR	D	46.9	E	57.5
	Overall	B	18.9	B	13.7
LCR 9E & SH 402 TWSC	EBL	B	11.6	B	10.6
	SBL	F	235.6	F	256.6
	SBR	C	19.6	C	17.2
LCR 7 & SH 402 TWSC	NB	E	43.2	F	57.1
	SB	A	0.0	A	9.6
	EB	A	0.0	A	10.0
	WB	A	9.7	B	14.8
Park/Ride & SH 402 TWSC	NBL	E	35.8	E	37.4
	NBR	C	15.2	C	15.5
	EBL*	A	0.0	A	0.0
	WBL	A	9.6	A	9.7
I-25 SB & SH 402 Roundabout	WB	A	4.5	A	4.3
	SB	A	6.1	A	6.4
	EB	A	4.1	A	6.1
I-25 NB & SH 402 Roundabout	NB	A	6.0	A	8.1
	WB	A	8.5	A	8.5
	EB	A	3.8	A	4.2
Frontage Road & SH 402 Roundabout	NB	A	5.5	B	10.1
	WB	A	6.9	A	6.7
	SB	A	8.9	A	5.6
	EB	A	6.0	B	11.5

*No volume was observed for this movement during peak hours.

3.3 Crash Analysis

Crash data was provided from CDOT between MP 3.5 and MP 4.31 along SH 402. This is approximately 1,100 feet west of the LCR 7 intersection through the I-25 interchange. Crash data was provided for the period between January 2018 and December 2022 (5 years). During that time:

- Only one fatality was reported in 2018, which was located at the LCR 7 intersection and was an approach turn crash involving an impaired driver.
- There were four crashes at non intersection locations, while the remaining 127 crashes were intersection related.
- Property damage only (PDO) crashes increased in 2021 and 2020 at the I-25 ramp terminals after their reconstruction as roundabouts. This is a common phenomenon after roundabouts are constructed and occurs in the first few years as drivers familiarize themselves with navigation. Injury crashes decreased during this same period.

Injury and PDO crashes are summarized **Figure 4** and **Figure 5** below.

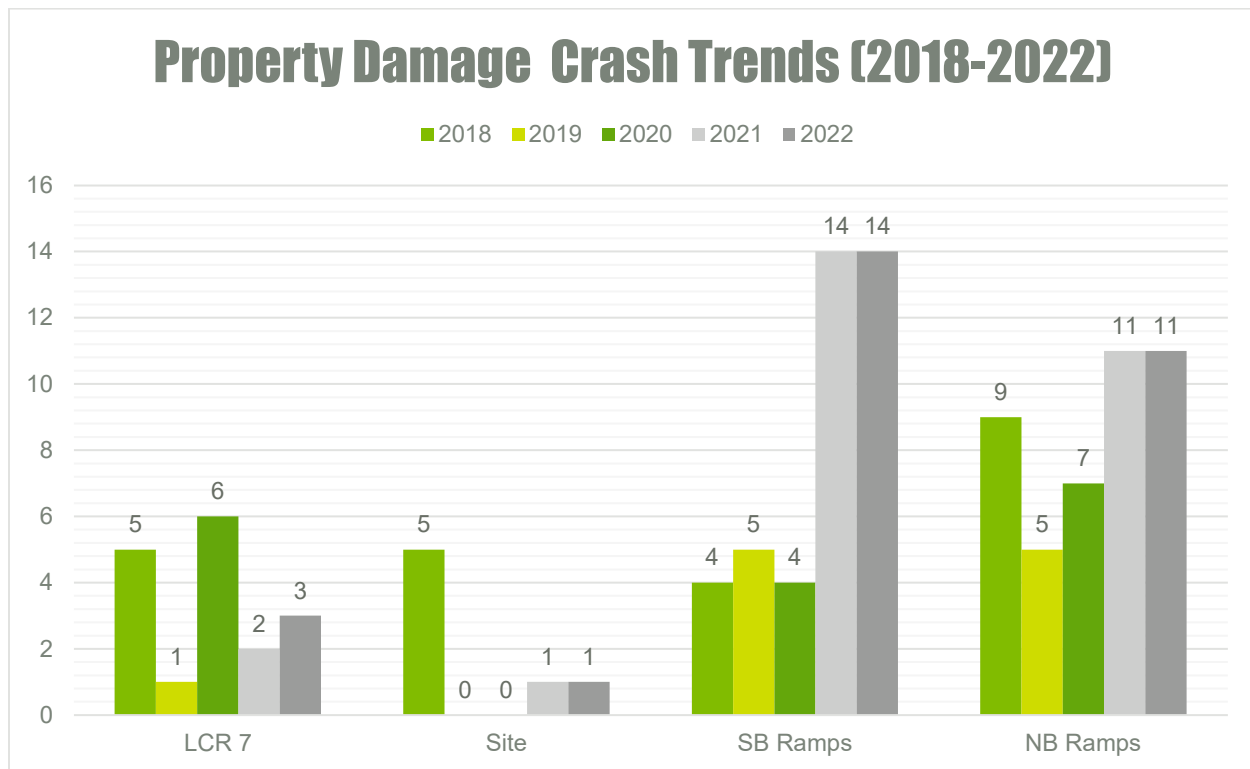


Figure 4. PDO Crash Trends (2018-2022)

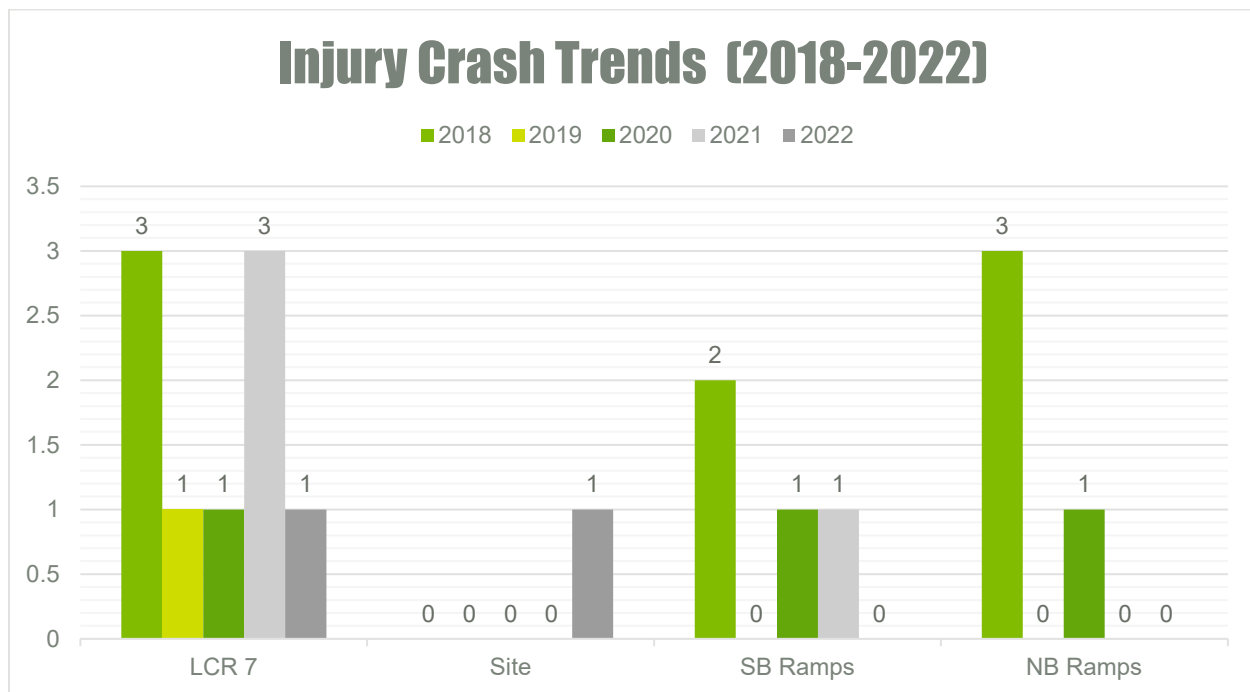


Figure 5. Injury Crash Trends (2018-2022)

The CDOT Traffic Safety & Engineering Services division has published Safety Performance Function (SPF) models in interactive worksheets. These worksheets include calibrated SPF models for various CDOT facility types and are based on the methodology prescribed in the *Highway Safety Manual*. The primary outputs of these tools are annual crashes (CPMPY) and level of safety service (LOSS) for both all crashes and fatal or injury (FI) crashes. LOSS is a qualitative representation of the how far above or below the predicted crashes are as compared to the expected crashes and depicts the potential for crash reduction.

Table 4. Intersection Safety Performance

Intersection	All CPMPY	All LOSS	FI CPMPY	FI LOSS
LCR 7	5.28	3	1.92	3
Park/Ride (Site)	1.39	4	0.23	2
SB Ramps	6.33	4	0.67	3
NB Ramps	6.59	4	0.67	3

The analysis above indicates that all intersections could be candidates for some crash reduction. It should be noted that the PDO crashes at the I-25 ramp terminals increased after installation of the roundabouts, as discussed above. Also note that the LCR 7 intersection is recommended for turn lane improvements and a traffic signal in latter sections of this report which are anticipated to improve overall safety at the intersection. Detail results of the crash analyses, including existing crash data are included in **Appendix D**.

4. BACKGROUND CONDITIONS

This scenario considers operations of the future roadway network considering background traffic growth without the proposed development. Future average daily traffic (ADT) volumes were obtained by applying growth rates obtained from the CDOT OTIS and as agreed upon during the scoping effort for this study. Anticipated growth percentages (1.5% annually) were applied directly to peak hour volumes for all analysis periods to develop the background traffic volumes for the future years 2030 and 2045. Additionally, a new signalized intersection called Boyd Lake Road is anticipated to be built between LCR 9E and LCR 7. Traffic volumes for this new intersection were also agreed upon during the scoping effort. These are illustrated in **Figure 6** and **Figure 7** on the following pages.

4.1 Signal Warrants

A traffic signal may be justified if traffic conditions meet any of the applicable nine signal warrants described in the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD provides criteria for conducting an engineering study to determine whether a traffic signal is appropriate at any intersection. Based on the data available, Four-Hour Vehicular Volume Warrant (Warrant 2), the Peak Hour Warrant (Warrant 3), and the Crash Experience (Warrant 7) were evaluated for the existing unsignalized study intersections. The remaining warrant were not applicable for the corridor conditions.

The unsignalized study intersections of SH 402 & LCR 9E and SH 402 & LCR 7 satisfy at least one warrant under 2030 Background conditions. SH 402 & LCR 9E satisfies volume-based warrants and SH 402 & LCR 7 satisfies crash-based warrants with multiple 12-month periods with five or more crashes recorded. Signal warrants are summarized in **Table 5**.

Table 5. 2030 Background Conditions Signal Warrant Analysis Summary

Intersection	Warrant 2 (4-Hour)	Warrant 3 (Peak Hour)	Warrant 7 (Crash Experience)	Signalized?
SH 402 & LCR 9E	Satisfied	Satisfied	Not Satisfied	Yes
SH 402 & LCR 7	Not Satisfied	Not Satisfied	Satisfied	Yes

Signal warrant volume analysis sheets are provided in **Appendix E**.

Figure 6. 2030 Background Conditions, Peak Hour Volumes

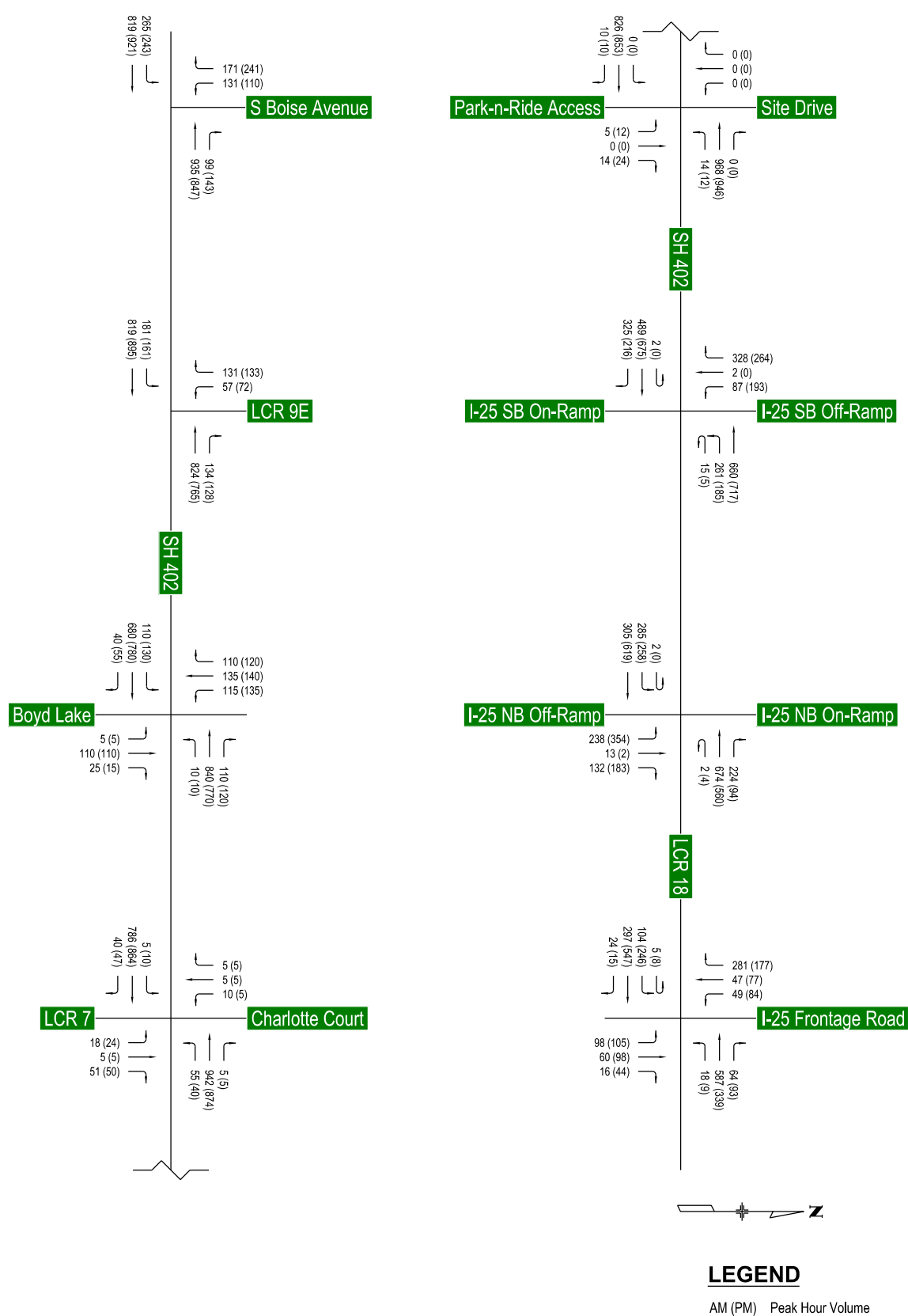
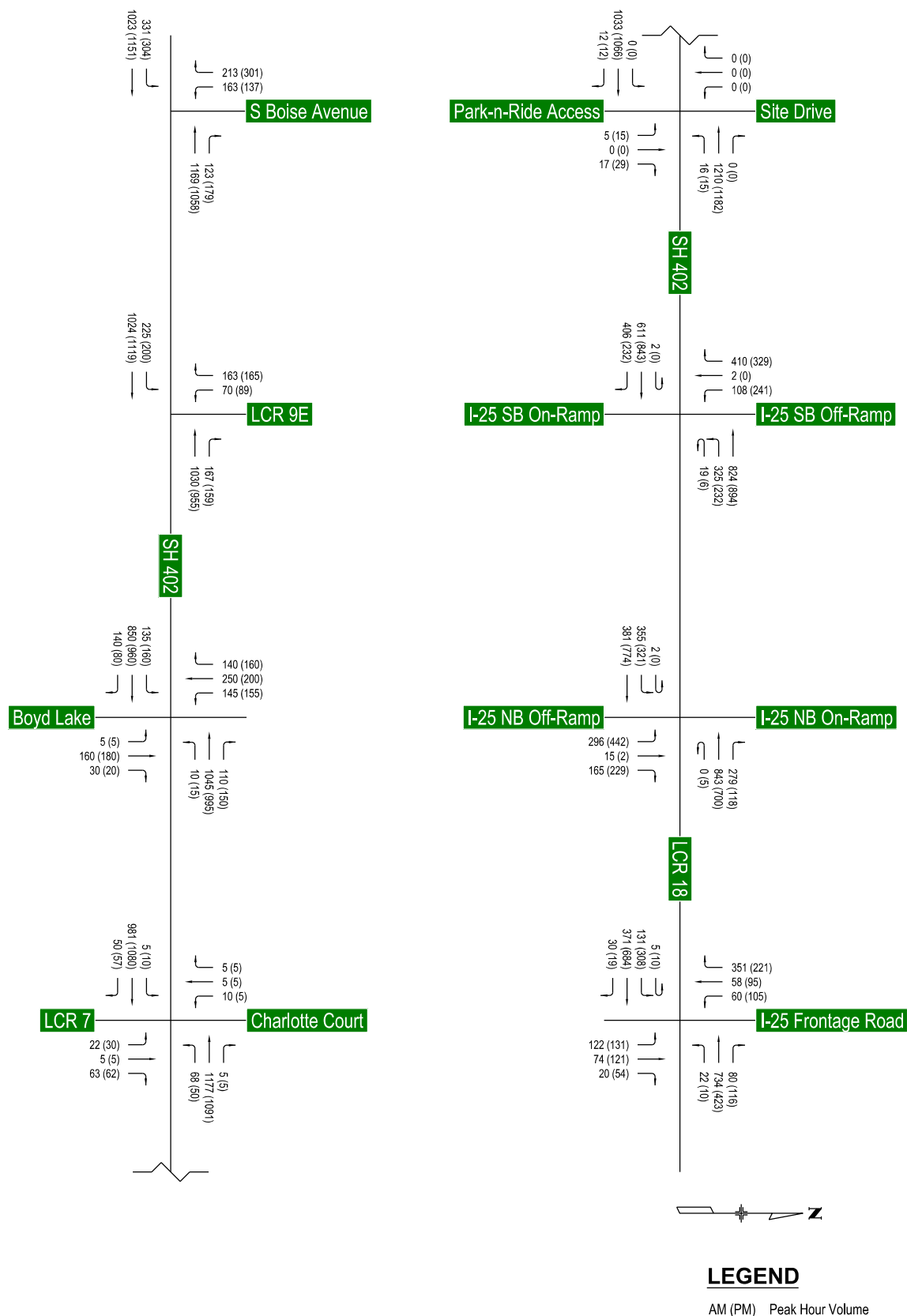


Figure 7. 2045 Background Conditions, Peak Hour Volumes



4.2 Geometric Improvements

Based on the *SH 402 ACP*, the corridor from Boise Avenue to I-25 is anticipated to be widened to improve capacity along the corridor. This is not anticipated to occur by the Future Year 2030 conditions, so this improvement has been included in the analysis only for the Future Year 2045 conditions. Additionally, the Future Year 2045 analysis also assumed that Country Road 18 would be widened immediately east of the Frontage Road roundabouts.

4.2.1 Turn Lane Warrants

4.2.1.1 Left-Turn Lanes

The CDOT State Highway Access Code (SHAC) states that for an NR-A highway that left-turn auxiliary lanes are required for left turn volumes greater than 10 vehicles per hour (vph). Based on 2030 Background Traffic conditions, the following left-turn lanes are warranted based on the AM and PM peak hour periods:

- Eastbound and Westbound at SH 402 & LCR 7
 - The westbound left turn movement exceeds this in the Existing Conditions and by 2030, the eastbound left turn movement may also exceed the threshold.
- Eastbound and Westbound at SH 402 & Boyd Lake Road
 - It is anticipated that the turning volumes will exceed the threshold upon construction. Furthermore, this intersection is assumed to be signalized immediately.

4.2.1.2 Right-Turn Lanes

The SHAC states that for an NR-A highway that right-turn auxiliary lanes are required for right turn volumes greater than 25 vph. Based on 2030 Background Traffic conditions, the following right-turn lanes are warranted based on the AM and PM peak hour periods:

- Westbound at SH 402 & Boise
 - The westbound right turn movement exceeds this in the Existing Conditions
- Eastbound at SH 402 & LCR 7
 - The eastbound right turn movement exceeds this in the Existing Conditions.

4.3 Background Conditions Capacity Analysis

4.3.1 2030 Background Capacity Analysis

Capacity analysis was performed for Future Year 2030 conditions using the methodologies presented in **Section 3.2**.

All the signalized intersections are expected to operate at an overall LOS C or better during both peak hour periods. Individual movements are expected to operate at a LOS D or better with acceptable 95th-percentile queue lengths during both peak hour periods with the exceptions of the movements summarized below.

- Boise Avenue & SH 402 - The southbound left-turn lane movement (AM) is expected to operate at a LOS E. The average delay per vehicle for this movement is 61 seconds.
- Park-n-Ride Access & SH 402 - The northbound left-turn lane movement (AM/PM) is expected to operate at a LOS E/F. The average delay per vehicle for this movement is 46/50 seconds.

All the roundabout intersections are expected to operate at an overall and by movement LOS B or better. The Future Year 2030 Capacity Analysis Summary is illustrated in **Tables 6** and **7**. Detailed results are provided in **Appendix G**.

4.3.2 2045 Background Capacity Analysis

Capacity analysis was performed for Future Year 2045 conditions using the methodologies presented in **Section 3.2**.

All the signalized intersections are expected to operate at an overall LOS C or better both peak hour periods. Individual movements are expected to operate at a LOS D or better with acceptable 95th-percentile queue lengths during both peak hour periods with the exceptions of the movements summarized below.

- Park-n-Ride Access & SH 402 - The northbound left-turn lane movement (AM/PM) is expected to operate at a LOS F. The average delay per vehicle for this movement is 103/129 seconds.

All the roundabout intersections are expected to operate at an overall and by movement LOS B or better. The Future Year 2045 capacity analysis summary is illustrated in **Tables 6** and **7**. Detailed results are provided in **Appendix G**.

Table 6. Future Year Background Conditions, Capacity Analysis Summary (Pt. 1)

Intersection	Movement	2030				2045			
		AM		PM		AM		PM	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Boise & SH 402 Signal	EBL	D	43.2	C	27.4	C	29.5	B	17.6
	EBT	A	5.1	B	12.4	A	4.4	A	7.2
	WBT	D	37.1	C	21.1	C	29.3	B	14.2
	WBR	A	6.3	A	2.9	B	17.0	A	2.8
	SBL	E	61.1	D	37.6	D	51.5	D	52.2
	SBR	C	30.6	C	32.2	C	20.7	D	50.2
	Overall	C	26.6	B	19.0	C	21.0	B	16.3
LCR 9E & SH 402 Signal	EBL	A	9.0	B	12.8	B	19.8	A	9.1
	EBT	A	8.8	A	9.5	A	6.4	A	8.8
	WBT	A	6.2	B	14.3	C	29.1	A	5.9
	WBR	A	0.8	A	2.0	A	6.1	A	1.0
	SBL	D	46.3	D	45.8	D	37.3	D	48.4
	SBR	D	38.9	D	38.5	C	33.7	D	43.3
	Overall	A	8.8	B	12.9	B	18.8	B	10.4
Boyd Lake & SH 402 Signal	EBL	B	19.5	C	21.1	B	12.4	C	20.8
	EBT	C	24.8	C	21.5	A	0.5	D	40.9
	EBR	B	12.2	A	9.8	A	0.1	C	26.8
	WBL	B	13.4	B	16.6	B	11.2	B	18.9
	WBT	C	21.5	C	25.2	B	17.1	C	24.4
	WBR	A	7.3	A	8.6	A	7.3	B	11.7
	NBL	D	41.2	D	42.9	D	39.3	D	44.5
	NBT	D	48.1	D	51.0	D	50.0	D	54.1
	NBR	A	0.0	A	0.0	A	0.0	A	0.0
	SBL	D	40.4	D	43.1	D	36.2	D	39.1
	SBT	D	41.2	D	42.5	C	33.1	D	38.1
	SBR	C	34.7	C	33.1	C	29.4	C	30.6
	Overall	C	26.0	C	26.4	B	15.9	C	33.1

Table 7. Future Year Background Conditions, Capacity Analysis Summary (Pt. 2)

Intersection	Movement	2030				2045			
		AM		PM		AM		PM	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
LCR 7 & SH 402 Signal	EBL	B	13.5	B	14.8	A	8.0	A	7.1
	EBT	B	14.6	B	19.9	B	10.8	B	10.2
	EBR	A	6.6	A	8.2	A	7.1	A	6.6
	WBL	B	10.9	B	16.2	A	7.4	A	7.3
	WBT	B	17.1	B	19.8	A	9.9	A	9.2
	WBR	A	0.0	A	0.0	A	0.0	A	0.0
	NBL	D	43.2	D	39.2	D	35.1	D	51.5
	NBTR	D	45.3	D	40.2	D	37.6	D	53.7
	SBL	D	45.8	D	40.8	D	37.7	D	54.0
	SBTR	D	42.1	D	38.0	C	34.0	D	49.4
	Overall	B	17.1	C	20.6	B	11.4	B	11.6
Park/Ride & SH 402 TWSC	NBL	E	45.7	F	50.0	F	103.2	F	129.4
	NBR	C	16.4	C	17.3	B	13.4	B	13.6
	EBL	A	0.0	A	0.0	A	0.0	A	0.0
	WBL	B	10.0	B	10.1	B	11.3	B	11.5
I-25 SB & SH 402 Roundabout	WB	A	4.7	A	4.3	A	5.2	A	4.7
	SB	A	6.7	A	5.5	B	10.2	A	6.9
	EB	A	3.7	A	5.6	A	4.6	A	7.4
I-25 NB & SH 402 Roundabout	NB	A	5.0	A	5.7	A	5.7	A	7.0
	WB	A	7.3	A	7.2	B	11.1	B	10.1
	EB	A	3.9	A	4.6	A	4.3	A	5.2
Frontage Road & SH 402 Roundabout	NB	A	5.4	B	15.2	A	6.9	B	12.0
	WB	A	4.6	A	7.7	B	11.9	A	9.2
	SB	A	4.2	A	4.6	A	8.7	A	5.2
	EB	A	7.3	B	19.8	A	6.2	A	9.2

4.4 Background Conditions Queuing Analysis

A queueing analysis was performed for the road network for each volume scenario to understand the required storage length for turn lanes at intersections along SH 402. The 95th percentile queue lengths were reported for each location. In general, most existing turn lanes have adequate storage to contain the expected queues. The eastbound left-turn lane length at Boise Avenue is 400 feet with queues of 325 feet. This leaves approximately 355 feet of deceleration, when including the taper length in deceleration. The SHAC prescribes 435 feet for a posted speed of 45 mph.

Several through movements are expected to reach or exceed 500 feet along SH 402 in the 2030 Background scenario due to the street approaching capacity for a two-lane highway. These are mitigated with the four-lane widening in the 2045 Background scenario. The expected queues are listed in **Table 8**.

Detailed results are provided in **Appendix G**.

August 2024

Table 8. Future Year Background Conditions, Queuing Analysis Summary

Intersection	Movement	2030		2045		Link Distance (ft)
		AM	PM	AM	PM	
		Queue (ft)	Queue (ft)	Queue (ft)	Queue (ft)	
Boise & SH 402 Signal	EBL	325	225	275	235	1200
	EBT	190	250	110	165	
	WBT	550	505	195	275	7200
	WBR	240	320	65	135	
	SBL	175	120	165	170	785
	SBR	220	165	225	180	
	-	-	-	-	-	-
LCR 9E & SH 402 Signal	EBL	225	125	185	180	720
	EBT	250	255	130	135	
	WBT	200	150	185	145	3135
	WBR	35	50	50	35	
	SBL	110	90	85	115	740
	SBR	130	105	125	120	
	-	-	-	-	-	-
Boyd Lake & SH 402 Signal	EBL	105	110	105	215	3125
	EBT	325	310	95	310	
	EBR	25	20	35	115	
	WBL	145	25	35	95	
	WBT	475	510	190	270	3900
	WBR	260	425	25	45	
	NBL	15	30	20	70	
	NBT	120	120	165	235	675
	NBL	40	30	95	95	
	SBL	145	190	150	165	
	SBT	140	180	190	280	820
	SBR	60	110	130	125	
	-	-	-	-	-	-

Intersection	Movement	2030		2045		Link Distance (ft)
		AM	PM	AM	PM	
		Queue (ft)	Queue (ft)	Queue (ft)	Queue (ft)	
LCR 7 & SH 402 Signal	EBL	30	100	20	25	3900
	EBT	315	390	95	150	
	EBR	30	170	15	35	
	WBL	65	50	60	45	1160
	WBT	235	260	145	145	
	WBR	15	15	10	10	
	NBL	55	85	45	75	520
	NBTR	55	105	50	65	
	SBL	30	20	40	0	680
	SBTR	20	15	20	25	
	-	-	-	-	-	-
Park/Ride & SH 402 TWSC	NBL	25	45	25	45	540
	NBR	45	50	40	40	
	EBR	0	0	0	0	1160
	WBL	25	25	30	30	1165
I-25 SB & SH 402 Roundabout	WB	90	0	130	0	680
	SB	10	15	10	20	710
I-25 NB & SH 402 Roundabout	EB	35	50	50	85	1165
	NB	20	25	25	35	720
	WB	65	50	150	95	840
Frontage Road & SH 402 Roundabout	EB	50	80	70	110	680
	NB	20	70	20	45	735
	WB	10	40	125	50	1440
	SB	30	25	80	30	850
	EB	65	535	45	85	840

5. SITE CHARACTERISTICS

The proposed development is a mixed-use site. The development is assumed to be built out by 2030 for the purposed of this study. The proposed project area is presented in **Figure 8**.

5.1 Trip Generation

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the *Trip Generation Manual (11th Edition)*. Trip generation characteristics absent any trip reductions expected for the site are shown in **Table 9**.

Based on the *ITE Trip Generation Handbook*, a mixed-use reduction was applied based on methodologies laid out the National Cooperative Highway Research Program (NCHRP) 684 methodology. A pass-by reduction was also applied for Land Use Code (LUC) 934 and LUC 945. Detailed ITE trip generation information is provided in **Appendix F**.

Table 9. West Ridge Trip Generation Summary

Land Use	ITE Code	Average Weekday	Net AM Peak Hour			Net PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
General Light Industrial	110	3,166	448	395	53	271	38	233
Single-Family Detached Housing	210	1,142	80	20	60	73	46	27
Single-Family Attached Housing	215	1,448	91	23	68	74	44	30
Shopping Plaza (40k-105k, No Supermarket)	821	5,064	121	76	45	250	123	127
Strip Retail Plaza (<40k)	822	382	16	10	6	31	16	15
High-Turnover (Sit-Down Restaurant)	932	2,144	179	99	80	116	71	45
Fast-Food Restaurant with Drive-Through Window	934	7,013	624	319	305	318	166	152
Convenience Store/Gas Station GFA (2-4k)	945	2,121	120	60	60	95	48	47

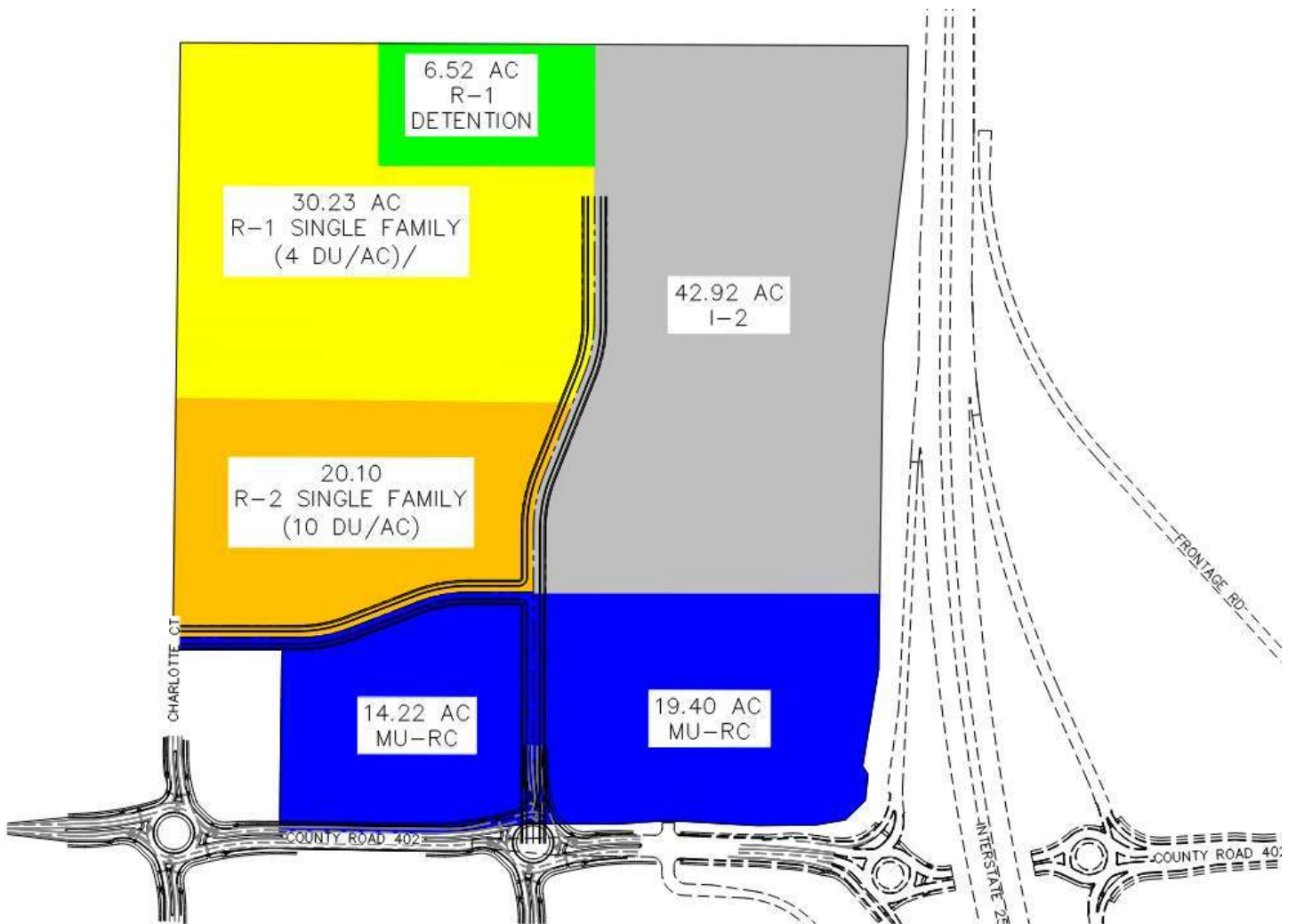


Figure 8. Site Plan.

5.2 Access Characteristics

As shown on the site plan presented in **Figure 8**, the proposed development is located on the northwest quadrant of the I-25 & SH 402 interchange. Two access points for the proposed development are planned: one drive along SH 402 and one full access drive along Charlette Court. The exact location of the access along SH 402 is undetermined; however, it is intended to generally be located midway between the southbound I-25 ramp terminal and LCR 7. This location is consistent with an unnamed drive (access point 90) shown in the *SH 402 ACP*.

The access along SH 402 is shown as full movement in the proposed site plan, which is a higher form of access than what is shown in the *SH 402 ACP*. Therefore, the access will also be considered as right-in, right-out (RIRO) and three-quarter movement (3/4 movement) to understand traffic operations as compared to the *SH 402 ACP* recommendations.

5.3 Trip Distribution

Trip generation and distribution was provided to agency staff for review using the LCUASS TIS Base Assumptions form. The expected trip distribution volumes for the proposed development are shown in **Figure 9**. The resulting Site Trips, including pass-by reductions, are shown in **Figure 10**.

Note that the SH 402 & Site Access and SH 402 & LCR 7 intersections are shown with three different distributions, concurrent to the three access configurations being examined for the site. The study is being conducted under the assumption that these are the only two intersections in the study area that would have significant differences in traffic resulting from the various access configurations.

5.4 Erlich City Development

For the 2045 scenario it is assumed that the Erlich City development will have been started or completed. This development is slated for the south side of SH 402 opposite the West Ridge development. The Erlich City development is in the preliminary zoning phase and therefore details are scarce. However, initial documents show the development connecting to SH 402 at LCR 7 and the West Ridge site access point as well as connecting to LCR 16 to the south.

Like the West Ridge process the potential site traffic was developed using ITE Trip Generation Manual and applied to the roadway network. Trip generation characteristics absent any trip reductions expected for the site are shown in **Table 10**. Also like the West Ridge development, a mixed-use reduction was applied based on methodologies laid out in the NCHRP 684 methodology

and pass-by reductions also applied for LUC 934 and LUC 945. Detailed ITE trip generation information is provided in **Appendix F**.

For trip distribution the northernmost plots of land are predicted to access SH 402 while 1/3rd of the southern plots are predicted to access SH 402 while the remaining traffic accesses LCR 16. This distribution is included in the **Table 10** trip distribution. A similar distribution pattern to West Ridge was applied with a slight bias to traffic accessing I-25 due to a lack of northbound on ramp at LCR 16 and I-25. The expected trip distribution volumes for the proposed development are shown in **Figure 11**. The resulting Site Trips, including pass-by reductions, are shown in **Figure 12**.

Table 10. Erlich City Trip Generation Summary

Land Use	ITE Code	Average Weekday	Net AM Peak Hour			Net PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Low-Rise Residential with Ground Floor Retail	230	3,440	317	73	244	216	154	62
Business Park	770	4,479	389	331	58	293	77	216
Shopping Center (>150k)	820	4,997	91	57	34	306	147	159
Shopping Plaza (40k-150k)	821	3,039	63	40	23	156	77	79
Strip Retail Plaza (<40k)	822	1,226	43	26	17	99	50	49
High-Turnover (Sit-Down Restaurant)	932	1,448	104	58	46	82	51	31
Fast-Food Restaurant with Drive-Through Window	934	4,208	322	165	157	199	104	95

The resulting 2030 Total Traffic Conditions and 2045 Total Traffic Conditions volume scenarios are illustrated in **Figure 13** and **Figure 14**, respectively.

Figure 9. West Ridge Trip Distribution

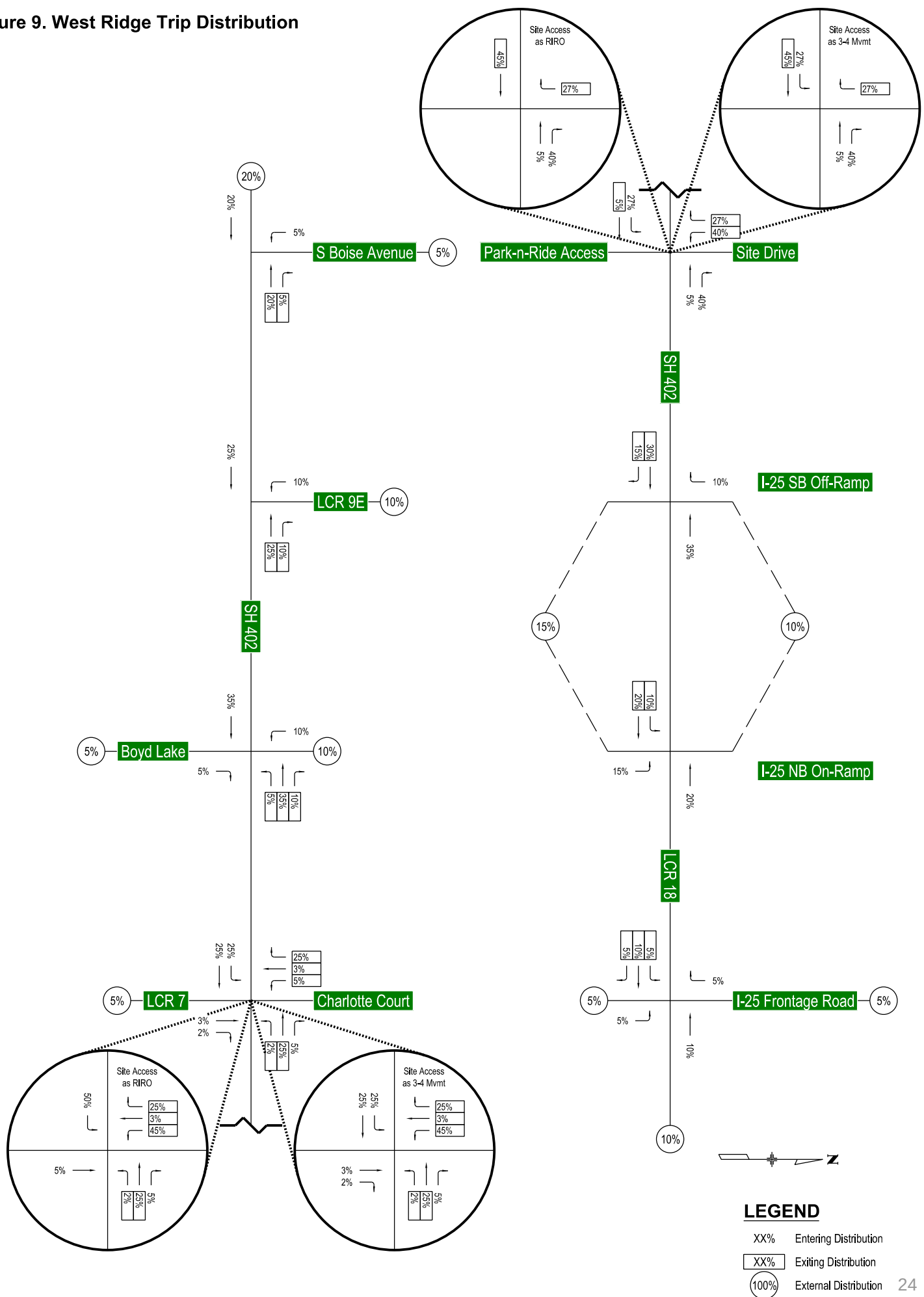


Figure 10. West Ridge Site Trips

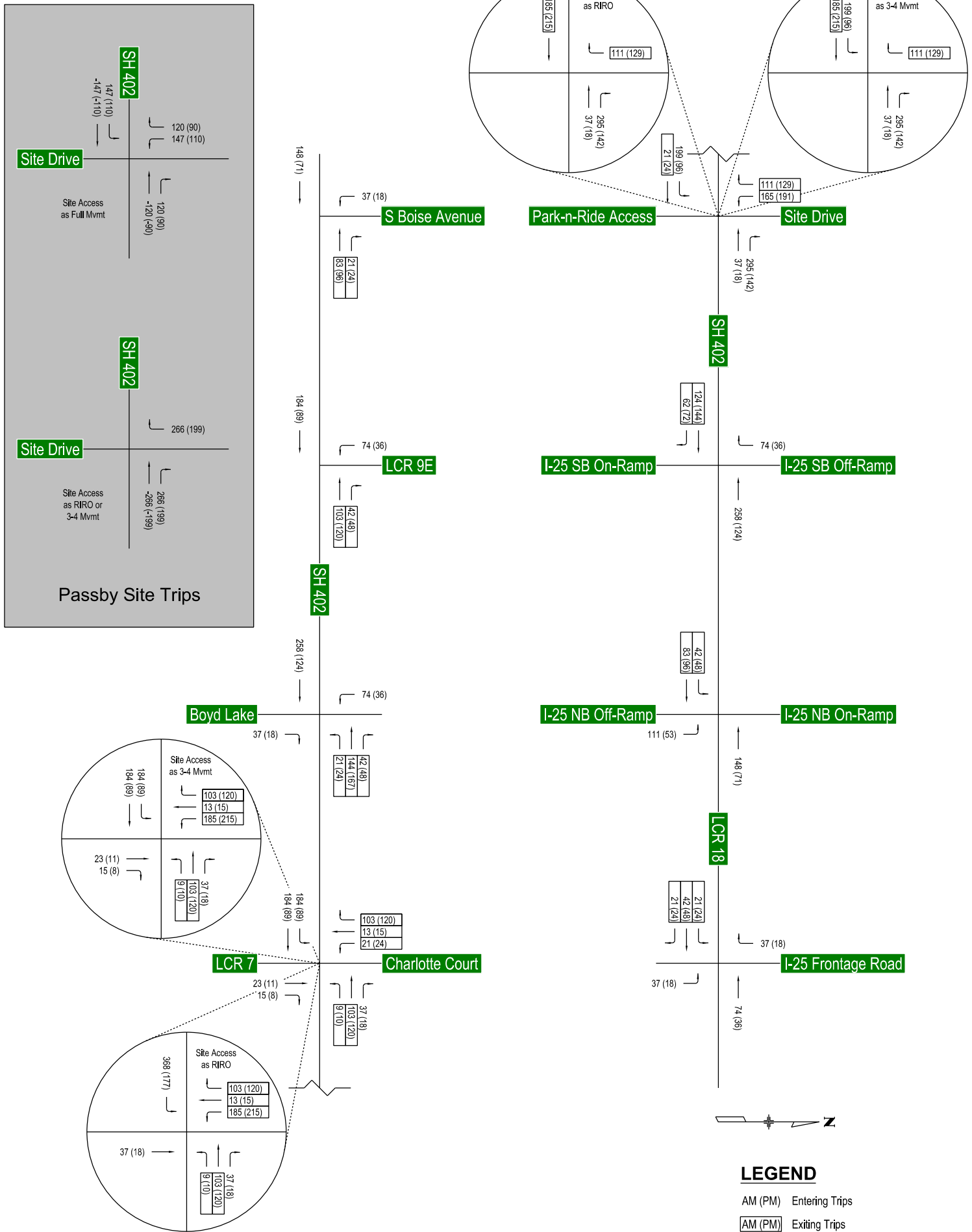


Figure 11. Erlich City Trip Distribution

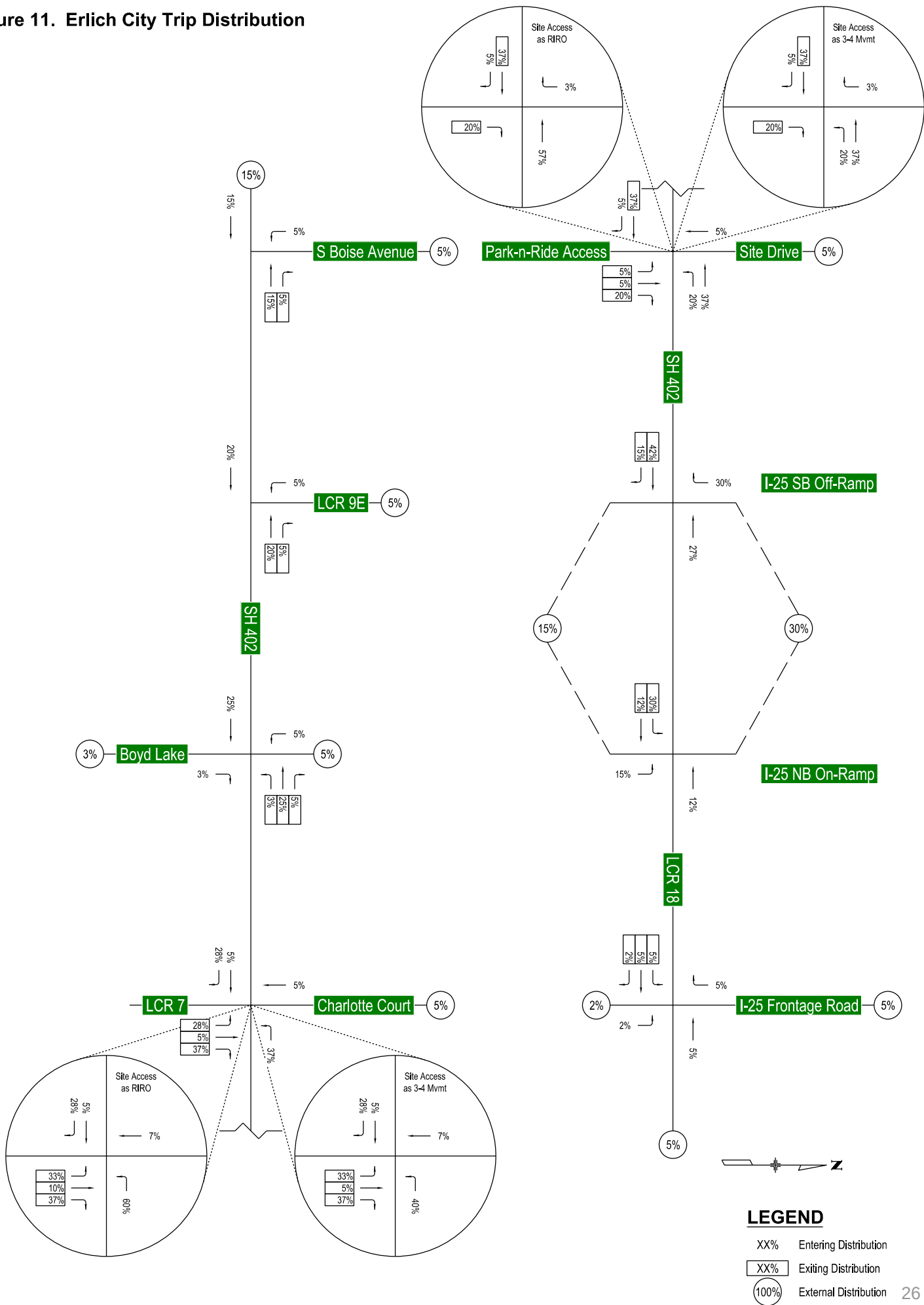
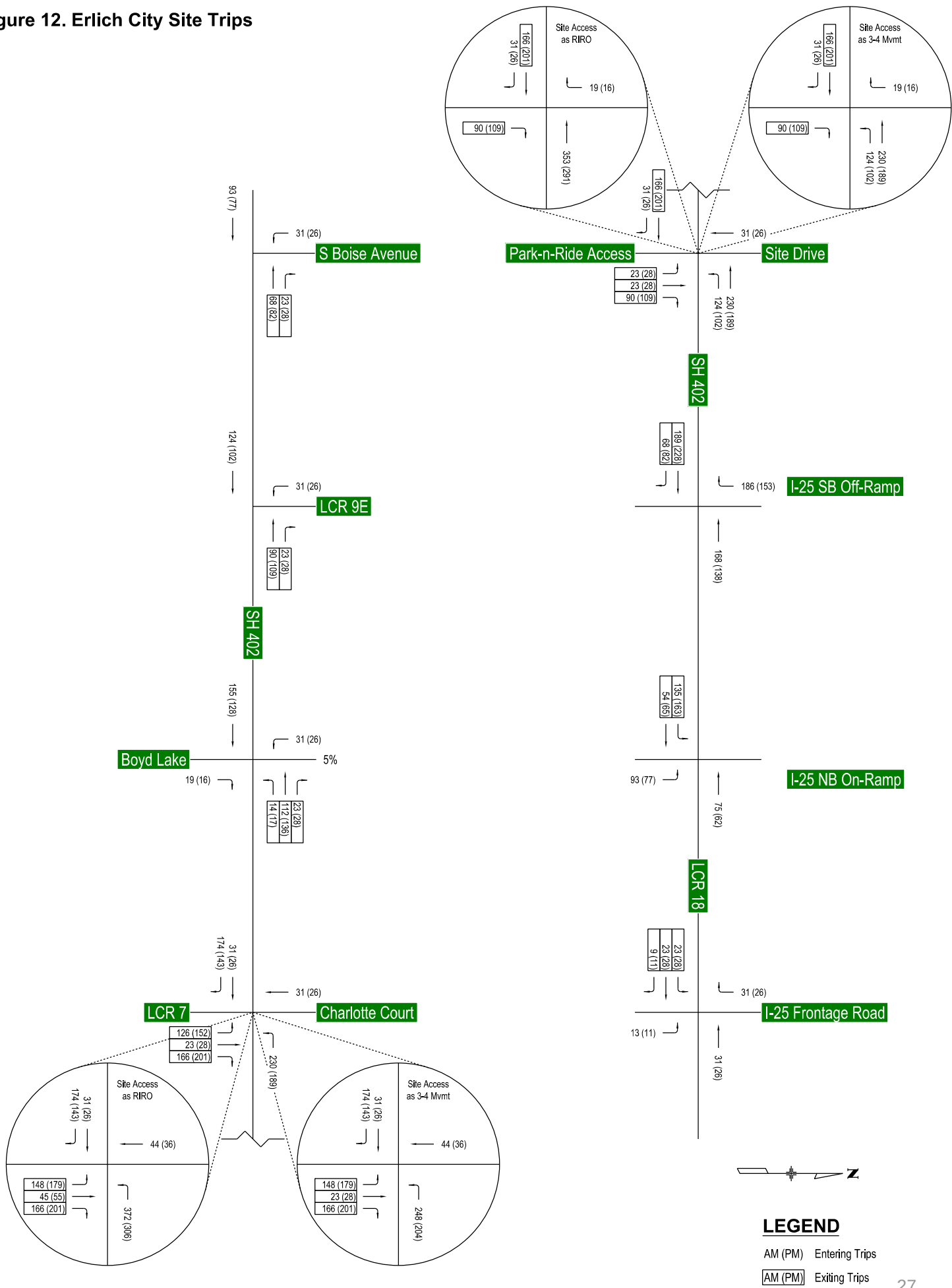
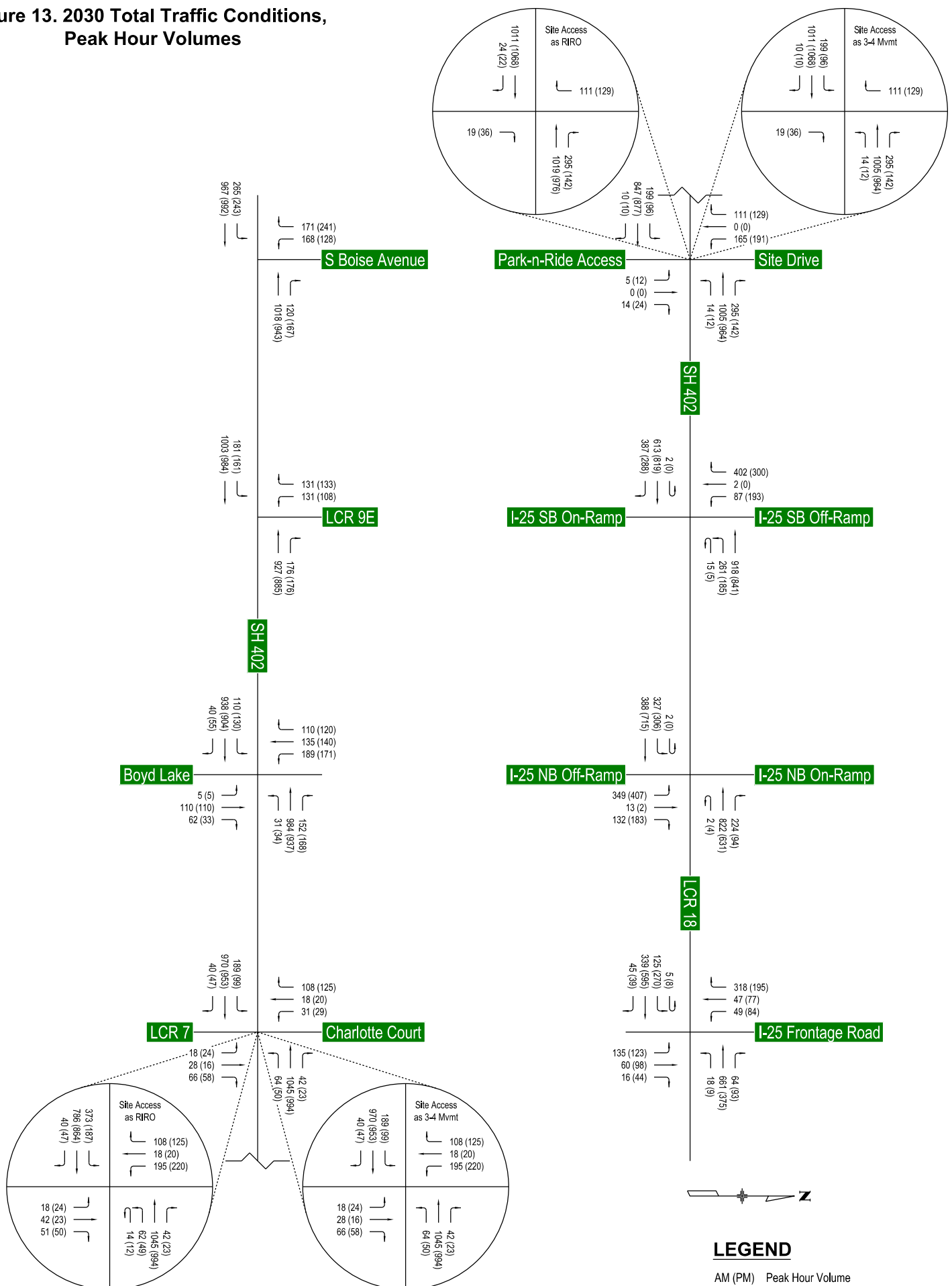


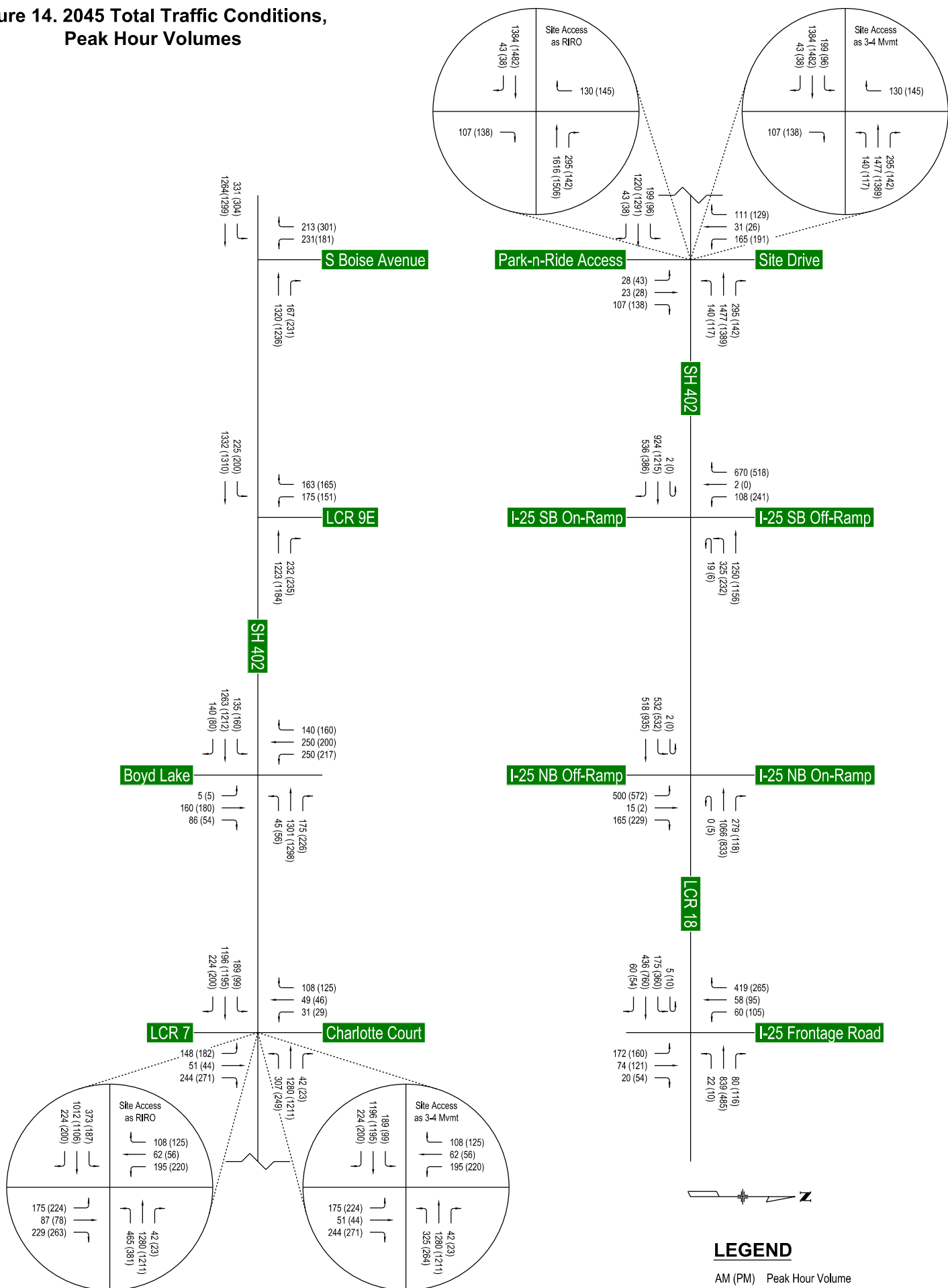
Figure 12. Erlich City Site Trips



**Figure 13. 2030 Total Traffic Conditions,
Peak Hour Volumes**



**Figure 14. 2045 Total Traffic Conditions,
Peak Hour Volumes**



6. SITE ACCESS ANALYSIS

This analysis contemplates several configurations of the Site Access, some of which are not aligned with the recommendations of the *SH 402 ACP*. Therefore, specific analyses were conducted to understand the relative operations resulting from various combinations of access and intersection control at the Site Access and LCR 7. All analyses in this section were performed for the 2045 volume scenarios that included the ultimate widening for SH 402.

6.1 Safety Analysis

Methodology found in the 2010 Highway Safety Manual (HSM) was used to estimate the relative difference in number of expected crashes near the site, relative to several access and intersection control alternatives. This analysis also included the LCR 7 intersection because restrictions at the Site Access would result in traffic increases, and therefore increased potential for crashes, at this location.

The HSM includes methodology that predicts crashes using the traffic and geometric characteristics of the roadway, as well as observed crash data that is used for calibration. Safety Performance Functions (SPF), the statistical “base” models, are developed using the daily traffic volumes and base geometric conditions. To provide a relative comparison among the access and intersection control alternatives, the predicted crash frequency is then multiplied by the Crash Modification Factors (CMF) associated with planned geometric or traffic control alternatives. For this analysis, the methodology used is included in Chapter 12 of HSM, Predictive Method for Urban and Suburban Arterials methodology. It provides calculations based on single or multiple vehicle crash types, for roadway segments and intersections, and by crash severity.

Six different scenarios were analyzed for the impact various access configurations may have on safety. These include a signal at LCR 7 combined with the Site Access as a RIRO, 3-4 movement, signalized full movement, and roundabout. The remaining two combinations included a roundabout at LCR 7 with the Site Access as a 3-4 movement and roundabout. Results of the analysis are summarized below in **Tables 11** through **13**. Detailed results of the crash analysis are provided in **Appendix H**.

Table 11 shows the effect on crashes at the LCR 7 intersection. This summary shows that a combination of two roundabouts is expected to have the fewest predicted crashes. Note that the crashes at LCR 7 would be expected to increase slightly due to an increase in volume. Additionally, a FHWA publication titled *Safety Evaluation of Turning Movement Restrictions at Stop-Controlled Intersections* shows a CMF of 1.10 at the downstream intersection which is primarily related to additional U-turns.

Table 11. Predicted Crashes for LCR 7 & Highway 402

Access Combination		Crashes		
LCR 7	Access	FAT/INJ	PDO	Total
Signal	RIRO	2.6	4.7	7.3
Signal	3/4 Mvmt	2.5	4.4	6.9
Signal	RAB	2.3	4.2	6.5
Signal	Signal	2.3	4.2	6.5
RAB	RAB	1.9	3.4	5.3
RAB	3/4 Mvmt	2.0	3.6	5.6

Table 12 shows the predicted number of annual crashes at the Site Access. As expected, the RIRO configuration shows the fewest crashes due to several conflict points being omitted. 3-4 Movement crashes are the next least with limited conflict points and as expected roundabouts will have less crashes compared to signals.

Table 12. Predicted Crashes for Site Access & Highway 402

Access Combination		Crashes		
LCR 7	Access	FAT/INJ	PDO	Total
Signal	RIRO (North)	0.8	1.4	2.2
Signal	RIRO (South)	0.7	1.2	1.9
Signal	3/4 Mvmt	1.5	1.8	3.3
Signal	RAB	1.9	3.3	5.2
Signal	Signal	2.4	4.2	6.6
RAB	RAB	1.9	3.3	5.2
RAB	3/4 Mvmt	1.5	1.8	3.3

Finally, total crashes are summarized in **Table 13** below. These show the scenario with both intersections as roundabouts as having a similar number of predicted annual crashes with the one with a signal at LCR7 and a 3-4 movement at the Site Access. The combinations with LCR 7 as a signal or roundabout and Site Access as a 3-4 movement and the one with LCR 7 and Site Access as roundabouts demonstrated the fewest predicted annual crashes.

Table 13. Total Predicted Crashes

Access Combination		Crashes		
LCR 7	Access	FAT/INJ	PDO	Total
Signal	RIRO	4.1	7.3	11.4
Signal	3/4 Mvmt	4.0	6.2	10.2
Signal	RAB	4.2	7.5	11.7
Signal	Signal	4.7	8.4	13.1
RAB	RAB	3.8	6.7	10.5
RAB	3/4 Mvmt	3.5	5.4	8.9

6.2 Capacity Analysis

Capacity analyses were conducted for the SH 402 & LCR 7 and SH 402 & Site Access intersections under the access and traffic control combinations discussed in the crash analysis section above. These analyses were conducted using the 2045 Total Traffic volume scenario. Analysis was conducted using Synchro Version 11 based on the *Highway Capacity Manual* (HCM) delay methodologies. SIDRA was also used to analyze the capacity of the roundabouts. Results of the analyses indicate that the two intersections are expected to operate with the least total delay if LCR 7 is a signal and the Site Access is a RIRO movement. If both intersections were to be full movement intersections the signal options would provide better AM peak hour operations while there would be similar PM operations.

The Site Access and LCR 7 intersections were analyzed as both a 2x1 and 2x2 lane configuration with and without right-turn bypasses. Acceptable delay for the Site Access was achieved with two-lane approaches and two circulating lanes for eastbound and westbound, a westbound right-turn bypass lane, one-lane approaches (through/left) with a single circulating lane for northbound and southbound, and northbound and southbound right-turn bypasses. For the LCR 7 roundabout acceptable delay was achieved with two-lane approaches and two circulating lanes for eastbound and westbound, eastbound and westbound right-turn bypasses, and two-lane approaches (right and through/left) with a single circulating lane for northbound and southbound.

A summary of the overall intersection delay for each alternative is shown in **Table 14** below. Detailed results are provided in **Appendix I**.

Table 14. Intersection Level of Service Summary

Access Combination		LCR 7		Site Access	
LCR 7	Access	AM	PM	AM	PM
Signal	RIRO	C (28.2)	C (29.8)	A (1.7)	A (2.3)
Signal	3/4 Mvmt	C (27.4)	C (30.5)	A (4.6)	A (3.2)
Signal	RAB	C (22.0)	C (24.1)	C (25.1)	B (18.2)
Signal	Signal	B (16.1)	B (16.1)	B (17.2)	B (17.4)
RAB	RAB	C (26.6)	B (17.4)	C (25.1)	B (18.2)
RAB	3/4 Mvmt	D (40.3)	C (25.4)	A (4.6)	A (3.2)

6.3 Queuing Analysis

The 95th percentile queuing was also analyzed at the two intersections for the various access and intersection control alternatives. **Tables 15 and 16** show the critical queue lengths, meaning those that are the longest of any movement (left, through, or right) at an approach. Eastbound and westbound link distances are shown to demonstrate any conflicts between queues along SH 402.

Those shown in italics in the tables below are left turn queues. All other critical queues are through movements. As shown below, once SH 402 is widened to four lanes in each direction queues are reduced to manageable lengths and are expected to be able to be stored within turn lanes of reasonable length. Therefore, queuing was shown to not be a determining factor in the selection of an access alternative.

Table 15. Critical Queue Summary - SH 402 & LCR 7

Access Combination		AM		PM	
LCR 7	Access	EB	WB	EB	WB
Signal	RIRO	375'	285'	315'	275'
Signal	3/4 Mvmt	360'	260'	385'	325'
Signal	RAB	325'	265'	295'	220'
Signal	Signal	375'	280'	335'	210'
RAB	RAB	475'	730'	420'	290'
RAB	3/4 Mvmt	880'	845'	485'	510'
Link Distance		3900'	1160'	3900'	1160'

Table 16. Critical Queue Summary - SH 402 & Site Access

Access Combination		AM		PM	
LCR 7	Access	EB	WB	EB	WB
Signal	RIRO	-	-	-	-
Signal	3/4 Mvmt	138'	43'	28'	38'
Signal	RAB	800'	610'	555'	350'
Signal	Signal	280'	325'	305'	320'
RAB	RAB	800'	610'	555'	350'
RAB	3/4 Mvmt	138'	43'	28'	38'
Link Distance		1160'	1165'	1160'	1165'

7. TOTAL TRAFFIC CONDITIONS

This scenario considers operations of the future roadway network considering background traffic growth (as presented in **Section 4**) with the addition of proposed development volumes. **Figure 13** and **Figure 14** illustrate the expected 2030 Total Traffic and 2045 Total Traffic volumes, respectively (as presented in **Section 5**).

7.1 2030 Total Traffic Capacity Analysis

Capacity analysis was performed for 2030 plus Site Conditions using the methodologies described in **Section 3.2**. The 2030 Total Traffic conditions are based on geometry and intersection control that is LCR 7 with two approach lanes to a two-lane circulating roundabout on SH 402 and single approach lanes with one-lane circulating for the north and south approaches. It also assumes the new Site Access is constructed with two approach lanes to a two-lane circulating roundabout with the north leg only having one approach. The Park-n-Ride intersection would remain in place and be converted to a RIRO driveway. All other intersections west of LCR 7 are as shown in the 2030 Background scenarios and those east of the Site Access are unchanged from Existing conditions. The same or similar transitions between the intersections of LCR 7 and the Site Access would be constructed in accordance with the adjusted intersection location. The SH 402 four-lane widening is not considered for this scenario.

All the signalized intersections are expected to operate at an overall LOS D or better both peak hour periods. Individual movements are expected to operate at a LOS D or better with acceptable 95th-percentile queue lengths during both peak hour periods with the exceptions of the movements summarized below.

- Boise Avenue & SH 402 - The eastbound left-turn lane movement (AM) is expected to operate at LOS E. The average delay per vehicle for this movement is 64 seconds. The southbound left-turn lane movement (AM) is expected to operate at a LOS E. The average delay per vehicle for this movement is 69 seconds.
- Boyd Lake Avenue & SH 402 – The northbound thru lane movement (AM) is expected to operate at a LOS E. The average delay per vehicle for this movement is 71 seconds. The southbound left-turn lane (AM/PM) is expected to operate at LOS E. The average delay per vehicle for this movement is 68/69 seconds.

All the roundabout intersections are expected to operate at an overall and by movement LOS C or better. The 2030 plus Site capacity analysis summary is illustrated in **Table 17** and **18**. The 95th percentile queues are summarized in **Table 19**. Detailed results are provided in **Appendix J**.

7.2 2045 Total Traffic Capacity Analysis

Capacity analysis was performed for 2045 Total Traffic Conditions using the methodologies described in **Section 3.2**. The 2045 Total Traffic conditions are based on geometry and intersection control described in **Section 6.2** with LCR 7 and Site Access are 2x1 roundabouts with the necessary right-turn bypasses. The Park-n-Ride access has been eliminated and tied into the south leg of the Site Access roundabout with the Erlich city development. The SH 402 four-lane widening has been implemented and all other study intersections west of LCR 7 have been signalized and improved with left and right turn lanes. The roundabouts east of LCR 7 are unchanged from 2030 Total Traffic conditions with the exception of County Road 18 being widened immediately east of the Frontage Road roundabout to allow two eastbound through lanes.

All the signalized intersections are expected to operate at an overall LOS D or better both peak hour periods. Individual movements are expected to operate at a LOS D or better with acceptable 95th-percentile queue lengths during both peak hour periods. All roundabout intersections are expected to operate at an overall LOS C or better both peak hour periods. Individual movements are expected to operate at a LOS C or better with acceptable 95th-percentile queue lengths during both peak hour periods with the exceptions of the movements summarized below.

- I-25 NB & SH 402 - The westbound movement (AM) is expected to operate at LOS E. The average delay per vehicle for this movement is 50 seconds. The westbound 95th-percentile queue (AM) is expected to be 670'.
- LCR 7/Charlotte Court & SH 402 - The westbound 95th-percentile queue (AM) is expected to be 730'.
- Site Access/Erlich City Access & SH 402 - The 95th-percentile queue (AM) is expected to be 800'. The eastbound 95th-percentile queue (AM/PM) is expected to be 610'/555'.

The queue lengths are exacerbated by the high existing percentage of heavy vehicles. Lower percentages of heavy vehicles may occur if SH 402 becomes a roundabout corridor which will reduce these queues. The 2045 plus Site capacity analysis summary is illustrated in **Table 17** and **Table 18**. The 95th percentile queues are summarized in **Table 19**. Detailed results are provided in **Appendix J**.

Table 17. Total Traffic Conditions, Capacity Analysis Summary (Pt. 1)

Intersection	Movement	2030				2045			
		AM		PM		AM		PM	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Boise & SH 402 Signal	EBL	E	64.3	C	30.9	D	36.7	C	26.9
	EBT	A	8.3	B	11.5	A	6.6	A	7.4
	WBT	C	26.9	C	25.4	D	35.8	B	15.6
	WBR	A	3.2	A	3.3	A	8.4	A	3.6
	SBL	E	68.8	C	33.7	D	53.4	D	39.2
	SBR	D	35.7	C	25.7	C	20.1	D	35.1
	Overall	C	26.2	B	19.9	C	24.5	B	15.8
LCR 9E & SH 402 Signal	EBL	C	28.1	C	21.7	A	7.7	A	6.4
	EBT	B	11.6	B	11.9	A	8.7	A	7.2
	WBT	B	16.2	C	25.0	A	1.1	A	0.3
	WBR	A	1.7	A	3.3	A	0.2	A	0.0
	SBL	D	47.3	D	38.1	D	43.2	D	43.1
	SBR	D	35.3	C	26.2	C	32.0	D	37.1
	Overall	B	16.4	B	18.6	A	8.2	A	6.4
Boyd Lake & SH 402 Signal	EBL	D	43.6	C	32.0	B	18.3	C	23.1
	EBT	C	22.2	B	19.9	C	29.3	C	34.8
	EBR	A	6.9	A	6.5	B	16.6	C	20.4
	WBL	C	21.4	B	17.6	C	31.9	B	16.8
	WBT	D	39.8	C	29.2	C	20.3	C	22.6
	WBR	A	8.6	A	7.8	A	6.7	B	13.6
	NBL	D	50.5	D	42.6	D	39.3	C	32.4
	NBT	E	70.6	D	38.4	D	48.8	C	28.6
	NBR	D	49.4	A	0.0	D	43.5	C	25.4
	SBL	E	67.8	E	68.6	D	49.4	D	45.9
	SBT	D	40.6	D	39.4	C	31.3	C	29.0
	SBR	C	34.4	C	33.8	C	29.4	C	23.6
	Overall	D	35.5	C	28.7	C	27.7	C	28.4

Table 178. Total Traffic Conditions, Capacity Analysis Summary (Pt. 2)

Intersection	Movement	2030				2045			
		AM		PM		AM		PM	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
LCR 7 & SH 402 Roundabout	NB	B	11.5	A	9.7	C	31.1	C	23.7
	WB	B	10.1	A	7.8	C	31.7	B	18.8
	SB	B	14.4	B	12.8	C	20.7	B	17.8
	EB	A	8.4	A	7.5	C	20.8	B	13.8
Site Access & SH 402 Roundabout	NB	-	-	-	-	B	10.1	B	10.3
	WB	A	12.0	A	8.5	C	25.3	B	14.1
	SB	C	31.9	C	28.6	C	27.0	B	17.6
	EB	A	8.9	A	9.3	C	26.1	C	24.2
Park/Ride & SH 402 RIRO	EBR	A	0.0	A	0.0	-	-	-	-
	NBR	B	13.0	B	13.8	-	-	-	-
I-25 SB & SH 402 Roundabout	WB	A	5.9	A	5.4	B	19.8	A	5.2
	SB	B	10.6	A	6.2	C	27.4	B	13.5
	EB	A	4.3	A	6.3	A	6.8	B	11.3
I-25 NB & SH 402 Roundabout	NB	A	6.0	A	6.4	A	8.7	B	10.2
	WB	B	11.8	A	8.8	E	50.2	C	22.2
	EB	A	4.3	A	4.9	A	5.3	A	6.1
Frontage Road & SH 402 Roundabout	NB	A	6.5	B	15.4	A	8.7	B	11.2
	WB	B	10.4	A	8.0	B	17.4	B	10.0
	SB	A	7.6	A	4.7	C	30.4	A	5.3
	EB	A	8.6	B	19.3	A	7.2	B	10.3

August 2024

Table 19. Total Traffic Conditions, Queuing Analysis Summary

Intersection	Movement	2030		2045		Link Distance (ft)
		AM	PM	AM	PM	
		Queue (ft)	Queue (ft)	Queue (ft)	Queue (ft)	
Boise & SH 402 Signal	EBL	430	200	340	225	1200
	EBT	620	265	170	150	
	WBT	1120	385	390	285	7200
	WBR	720	75	65	80	
	SBL	210	145	230	195	785
	SBR	190	150	185	200	
	-	-	-	-	-	-
LCR 9E & SH 402 Signal	EBL	240	120	150	175	7200
	EBT	285	220	175	155	
	WBT	465	420	335	260	3135
	WBR	55	55	95	80	
	SBL	155	125	185	185	740
	SBR	145	85	120	105	
	-	-	-	-	-	-
Boyd Lake & SH 402 Signal	EBL	135	115	115	130	3125
	EBT	350	240	290	310	
	EBR	25	25	90	45	
	WBL	50	40	70	55	
	WBT	565	285	275	270	3900
	WBR	50	40	55	90	
	NBL	20	25	20	35	
	NBT	130	150	170	140	675
	NBR	80	45	60	45	
	SBL	190	350	265	325	
	SBT	165	355	205	275	820
	SBR	115	80	95	90	
	-	-	-	-	-	-

Intersection	Movement	2030		2045		Link Distance (ft)
		AM	PM	AM	PM	
		Queue (ft)	Queue (ft)	Queue (ft)	Queue (ft)	
LCR 7 & SH 402 Roundabout	NB	30	20	115	105	3900
	WB	120	90	730	420	1160
	SB	45	45	50	50	520
	EB	110	90	475	290	680
Site Access/Park-n-Ride & SH 402 Roundabout	NB	-	-	30	35	540
	WB	210	120	800	350	1165
	SB	150	155	120	95	680
	EB	115	115	610	555	1160
Park/Ride & SH 402 RIRO	EBR	0	0	-	-	-
	NBR	35	40	-	-	-
I-25 SB & SH 402 Roundabout	WB	135	95	255	0	680
	SB	10	15	15	20	710
	EB	50	65	115	220	1165
I-25 NB & SH 402 Roundabout	NB	30	30	55	70	720
	WB	145	75	670	210	840
	EB	70	100	0	195	680
Frontage Road & SH 402 Roundabout	NB	30	75	45	40	735
	WB	90	45	210	65	1440
	SB	60	25	245	35	850
	EB	95	535	65	105	840

8. ACCESS CONTROL PLAN AMENDMENT

In March 2021, CDOT and the communities along SH 402 between I-25 and US 287 approved the *SH 402 Access Control Plan*. The approval of the proposed access to the West Ridge development will require an amendment to the plan. The adopted plan anticipates the following access configuration near the location of the proposed access:

- Access point 87 (LCR 7 & Charlotte Court)
 - Full movement; Four-legged Intersection; candidate for signalization
- Access points 89 and 90 (~1,175 feet west of SB I-25 RAB)
 - $\frac{3}{4}$ movement (conditional); unsignalized
 - May be limited to right-in, right-out if safety or operational issues develop
- Access point 91 (Park-n-ride access ~725 feet west of SB I-25 RAB)
 - Close access and move to Access point 90
- Access point 91.5 (~725 feet west of SB I-25 RAB)
 - right-in, right-out (conditional); unsignalized
 - shall close when Access 89 is implemented.

Access for this site is being considered for a location at access points 89/90 as shown in the *SH 402 ACP*. The proposal will generally follow the consolidation as described above but would elevate the level of access at access point 89/90 to full movement. For this to be acceptable, an evaluation of the proposed changes would need to demonstrate no overall negative impacts as compared to the *SH 402 ACP*.

An interim analysis contemplates the following changes to the access for the Design Year 2030.

- Access point 87 (LCR 7 & Charlotte Court)
 - Full movement signalized intersection on opening day
 - Convert to a roundabout
- Access points 89 and 90 (~1,165 feet west of SB I-25 RAB)
 - Full movement roundabout intersection
- Access point 91 (Park-n-ride access ~725 feet west of SB I-25 RAB)
 - Converted to a RIRO driveway
- Access point 91.5 (~725 feet west of SB I-25 RAB)
 - Close with construction of the site

The final analysis contemplates the following additional changes to the access for the Design Year 2045.

- Access point 87 (LCR 7 & Charlotte Court)
 - A roundabout with four-lane widening
- Access point 91 (Park-n-ride access ~725 feet west of SB I-25 RAB)
 - Close access and move to Access point 90 to be south leg of the roundabout

The proposed location for access points 89/90, which would be the Site Access on the north leg and the Erlich City and Park-n-Ride access as the south leg, would result in a center-to-center intersection spacing of approximately 1,160 feet among LCR 7, the Site Access, and the Southbound I-25 Ramp Terminal. Proposed access modifications are depicted in **Figure 15**.



Background Image Credit: Loveland State Highway 402 Access Control Plan (Stolfus & Associates)

Figure 15. SH 402 ACP Proposed Modifications

Several analyses were conducted to determine the optimal access configurations and intersection control including capacity and queuing analyses and predictive crash analysis. Analyses were focused on the relative differences at SH 402 & LCR 7 and SH 402 & Site Access as those would be impacted by changes in traffic patterns due to access restrictions at the Site Access.

Analyses are discussed in detail within Section 6 and Section 7 of this report. To reiterate the findings of those analyses, an ultimate configuration of full-movement intersections as roundabouts at SH 402 & LCR 7 and SH 402 & Site Access are expected to provide comparable operations, as the base condition of full movement (signalized) at SH 402 & LCR 7 and three-quarter movement at SH 402 & Site Access. This is due to the following factors:

- Safety Analysis – The Site Access as a roundabout is expected to perform similarly as to the three-quarter condition and the LCR 7 intersection slightly better due to the benefits of conversion to a roundabout and elimination of traffic diversion from the Site Access.

- Capacity Analysis – As roundabouts in the ultimate condition the SH 402 & LCR 7 and SH 402 & Site Access intersections show similar PM delay. While AM delay is slightly higher, but still acceptable.
- Queueing Analysis – Similar to capacity analysis results, 95th percentile queues are expected to be higher in the AM and similar in the PM.
- 2030 RIRO Park-n-Ride – The interim Park-n-Ride conversion to a RIRO has no noticeable effect on 2030 safety, capacity, or queueing. Additional U-turns at the adjacent roundabouts also do not have noticeable effects on those intersections. For safety it is recommended that the median between eastbound and westbound traffic be raised to eliminate any left-turn or mid-block U-turn movements.

In addition to the analyses discussed above, configuring the SH 402 & LCR 7 and SH 402 & Site Access intersections as roundabouts is a natural extension of the three roundabouts located at the I-25 ramp terminals and the frontage road. As the area urbanizes, this segment of the corridor can provide an ideal setting for all users to feel comfortable traveling the corridor and provide improved safety and traffic calming over an alternative with conventional intersections.

The Town of Johnstown and the developer of the property are respectfully requesting an amendment to the *SH 402 ACP* to allow the intersection to be constructed as a full movement roundabout. Traffic analysis of the intersection under this configuration are shown to be acceptable and, in some ways, more beneficial as compared to the current configuration shown in the *SH 402 ACP*.

The approved *SH 402 ACP* shows SH 402 & LCR 7 as a full-movement signal and the Site Access as a three-quarter movement intersection midway between LCR 7 and the Southbound I-25 Ramp Terminal. It is recommended that the Site Access be modified in the *SH 402 ACP* from the $\frac{3}{4}$ movement intersection to roundabout on opening day of the development. The LCR 7 intersection may be constructed as a signal with turn lane improvements on opening day but should ultimately be constructed as a roundabout when the four-lane widening is performed.

9. SUMMARY

This study documents the expected traffic volumes added to the network and identifies recommendations related to site access and public improvements for each a mixed-use development in Johnstown, Colorado. This site is located on the northwest corner of the I-25 & SH 402 interchange. Based on the preceding analysis, the following can be concluded:

- The site is expected to add 22,480 daily trips, 1,679 trips in the AM peak hour, and 1,228 trips in the PM peak hour.
- The proposed site access is a full-movement intersection along SH 402 between LCR 7 and SB I-25 ramps and a full-movement intersection on LCR 7. The access along SH 402 is a higher level of access as compared to what is shown in the *SH 402 ACP*. This requires an ACP amendment.
- Several design alternatives were considered for the intersections of SH 402 & LCR 7 and SH 402 & Site Access. These include various combinations of LCR as a signal or roundabout combined with Site Access as a signal, RIRO, 3-4 movement, or roundabout.
- The alternative with both intersections as roundabouts appears to perform similarly to signalized intersections is the recommended configuration for the long-term horizon.
 - In the short term a traffic signal may be constructed here until the ultimate widening of SH 402 is performed.

Proposed drives and recommended improvements should be constructed following agency guidelines. Additionally, the following improvements should be made commensurate to each traffic volume scenario shown below.

9.1 Existing Conditions

No improvements.

9.2 2030 Background Conditions

Boise Ave and SH 402:

- Add westbound right-turn lane

CR 9E and SH 402:

- Signalize Intersection

CR 7/Charlotte Court and SH 402:

- Roundabout Intersection. Two-lane eastbound and westbound approaches with two-circulating lanes and one-lane northbound and southbound approaches with one-circulating lane.

- Signalize Intersection. Note interim signalization is justified based on linear growth to ultimate traffic volumes should it be selected. Eastbound left-turn and right-turn lanes and a westbound left-turn lane will be required for a signalized intersection.

9.3 2045 Background Conditions

- Widen SH 402 to a four-lane divided section.
- Widen County Road 18 immediately east of Frontage Road to a four-lane divided section.
- Left and right turn lanes should be constructed along all SH 402 (EB/WB) approaches.
- Signalized intersections will include:
 - Boise Avenue
 - LCR 9E
 - Boyd Lake Road
- Roundabout intersections should include:
 - LCR 7
 - I-25SB Ramps
 - I-25 NB Ramps
 - Frontage Road

9.4 2030 Total Traffic Conditions

Park-n-Ride and SH 402:

- Construct intersection as RIRO.
- Construct raised median between Site Access and SB I-25 ramps.

Site Access and SH 402:

- Construct intersection as roundabout. Two-lane approach and two-circulating lanes eastbound and westbound and one-lane approach and one-circulating lane southbound.

LCR 7/Charlotte Court and SH 402:

A traffic signal with dedicated left and right turn lanes for each approach is expected to provide acceptable operations in the short term and approximately ten years beyond that. Note that this intersection satisfies the crash signal warrant. Should the intersection not be signalized by the opening day of the site, it is expected that the intersection would satisfy volume-based signal warrants with site traffic. Additional turn lane improvements should include left and right turn lanes on all approaches.

An exhibit showing the potential configuration of the SH 402 Corridor with a signal at LCR 7 and the ultimate roundabout at the Site Access is shown in **Appendix K**.

Contingent on funding becoming available, it would be ideal to construct the intersection in its final configuration as a roundabout immediately. This would optimize traffic operations, avoid

“throw away” infrastructure, and avoid future disruption of traffic during reconstruction. If constructed, the roundabout should be coupled with widening of SH 402.

9.5 2045 Total Traffic Conditions

- Close Park-n-Ride access and combine with Erlich City for south leg of Site Access roundabout.
- Construct the Site Access as a roundabout, aligning the access to the property south of SH 402 as the south leg. Add right-turn bypasses for westbound, northbound, and southbound approaches.
- Construct LCR 7/Charlotte Ct as a roundabout adding right-turn bypasses for eastbound and westbound approaches.

An exhibit showing the ultimate recommended configuration of the SH 402 Corridor with a roundabout at LCR 7 and the Site Access is shown in **Appendix K**.

APPENDIX A

Traffic Impact Study Scoping Form

Attachment A

Transportation Impact Study Base Assumptions

Project Information			
Project Name West Ridge			
Project Location Northwest corner of I-25 & Highway 402			
TIS Assumptions			
Type of Study	Full: x		Intermediate:
	MTIS:		Memo:
Study Area Boundaries	North: Property Line		South: Highway 402
	East: I-25 Frontage Road		West: Boise Ave
Study Years	Short Range: 2030		Long Range: 2045
Future Traffic Growth Rate	1.5% (per 1.35 20yr growth factor from CDOT OTIS)		
Study Intersections	1. All access drives		5. LCR 7 & Hwy 402
	2. Boise & Hwy 402		6. I-25 SB Ramps & Hwy 402
	3. Boyd Lake Rd & Hwy 402 (future)		7. I-25 NB Ramps & Hwy 402
	4. LCR 9 & Hwy 402		8. I-25 Frontage Rd & Hwy 402
Time Period for Study	AM: 7:00-9:00	PM: 4:00-6:00	Sat Noon:
Trip Generation Rates	See attached		
Trip Adjustment Factors	Passby: See attached		Captive Market: 10% Daily (estimated); 10% AM; 20% PM
Overall Trip Distribution	SEE ATTACHED SKETCH		
Mode Split Assumptions	100% vehicular		
Design Vehicle Information	WB-67		
Committed Roadway Improvements	LCR 7 Extension (north leg) and full signalization Future 4-Lane widening of Highway 402 Future Boyd Lake Road intersection (signalized)		
Other Traffic Studies	Highway 402 Access Control Plan		
Areas Requiring Special Study	HSM-Based Safety Analysis Progression Analysis - include flows and queues in the TSD		

Date: February 23, 2023 _____

Traffic Engineer: _____

Local Entity Engineer: _____

APPENDIX B

Data Collection



All Traffic Data Services

SITE 7_E - CO-402 EAST OF CHARLOTTE COURT

Time	EB	WB	Total
10/20/2022	10	11	21
10/20/2022 12:15:00 AM	6	13	19
10/20/2022 12:30:00 AM	5	8	13
10/20/2022 12:45:00 AM	4	6	10
10/20/2022 1:00:00 AM	4	7	11
10/20/2022 1:15:00 AM	2	6	8
10/20/2022 1:30:00 AM	3	9	12
10/20/2022 1:45:00 AM	3	4	7
10/20/2022 2:00:00 AM	3	6	9
10/20/2022 2:15:00 AM	6	5	11
10/20/2022 2:30:00 AM	6	6	12
10/20/2022 2:45:00 AM	4	3	7
10/20/2022 3:00:00 AM	5	5	10
10/20/2022 3:15:00 AM	13	4	17
10/20/2022 3:30:00 AM	9	3	12
10/20/2022 3:45:00 AM	22	7	29
10/20/2022 4:00:00 AM	22	8	30
10/20/2022 4:15:00 AM	30	8	38
10/20/2022 4:30:00 AM	35	17	52
10/20/2022 4:45:00 AM	38	23	61
10/20/2022 5:00:00 AM	73	13	86
10/20/2022 5:15:00 AM	82	28	110
10/20/2022 5:30:00 AM	93	64	157
10/20/2022 5:45:00 AM	135	70	205
10/20/2022 6:00:00 AM	128	78	206
10/20/2022 6:15:00 AM	148	107	255
10/20/2022 6:30:00 AM	189	149	338
10/20/2022 6:45:00 AM	178	168	346
10/20/2022 7:00:00 AM	186	156	342
10/20/2022 7:15:00 AM	186	215	401
10/20/2022 7:30:00 AM	191	252	443
10/20/2022 7:45:00 AM	204	209	413
10/20/2022 8:00:00 AM	159	206	365
10/20/2022 8:15:00 AM	152	167	319
10/20/2022 8:30:00 AM	154	165	319
10/20/2022 8:45:00 AM	136	162	298
10/20/2022 9:00:00 AM	115	120	235
10/20/2022 9:15:00 AM	134	107	241
10/20/2022 9:30:00 AM	103	131	234
10/20/2022 9:45:00 AM	99	126	225
10/20/2022 10:00:00 AM	110	107	217
10/20/2022 10:15:00 AM	93	114	207
10/20/2022 10:30:00 AM	118	115	233
10/20/2022 10:45:00 AM	105	140	245
10/20/2022 11:00:00 AM	124	98	222
10/20/2022 11:15:00 AM	104	108	212
10/20/2022 11:30:00 AM	116	123	239
10/20/2022 11:45:00 AM	106	105	211
Total	3,951	3,762	7,713
Percentage	51.2%	48.8%	
Peak Hour	7:00 AM	7:15 AM	7:15 AM
Volume	767	882	1,622
PHF	0.940	0.875	0.915



All Traffic Data Services

SITE 7_E - CO-402 EAST OF CHARLOTTE COURT

Time	EB	WB	Total
10/20/2022 12:00:00 PM	109	136	245
10/20/2022 12:15:00 PM	114	108	222
10/20/2022 12:30:00 PM	121	139	260
10/20/2022 12:45:00 PM	93	120	213
10/20/2022 1:00:00 PM	107	113	220
10/20/2022 1:15:00 PM	117	130	247
10/20/2022 1:30:00 PM	132	138	270
10/20/2022 1:45:00 PM	113	122	235
10/20/2022 2:00:00 PM	128	149	277
10/20/2022 2:15:00 PM	144	130	274
10/20/2022 2:30:00 PM	134	164	298
10/20/2022 2:45:00 PM	162	163	325
10/20/2022 3:00:00 PM	138	159	297
10/20/2022 3:15:00 PM	145	172	317
10/20/2022 3:30:00 PM	172	187	359
10/20/2022 3:45:00 PM	175	217	392
10/20/2022 4:00:00 PM	190	197	387
10/20/2022 4:15:00 PM	197	188	385
10/20/2022 4:30:00 PM	211	186	397
10/20/2022 4:45:00 PM	205	199	404
10/20/2022 5:00:00 PM	189	187	376
10/20/2022 5:15:00 PM	205	237	442
10/20/2022 5:30:00 PM	183	208	391
10/20/2022 5:45:00 PM	130	167	297
10/20/2022 6:00:00 PM	125	152	277
10/20/2022 6:15:00 PM	133	149	282
10/20/2022 6:30:00 PM	124	137	261
10/20/2022 6:45:00 PM	89	130	219
10/20/2022 7:00:00 PM	65	88	153
10/20/2022 7:15:00 PM	64	99	163
10/20/2022 7:30:00 PM	62	68	130
10/20/2022 7:45:00 PM	55	56	111
10/20/2022 8:00:00 PM	38	59	97
10/20/2022 8:15:00 PM	46	38	84
10/20/2022 8:30:00 PM	46	50	96
10/20/2022 8:45:00 PM	37	59	96
10/20/2022 9:00:00 PM	29	41	70
10/20/2022 9:15:00 PM	38	39	77
10/20/2022 9:30:00 PM	33	35	68
10/20/2022 9:45:00 PM	26	30	56
10/20/2022 10:00:00 PM	23	20	43
10/20/2022 10:15:00 PM	26	27	53
10/20/2022 10:30:00 PM	12	24	36
10/20/2022 10:45:00 PM	8	24	32
10/20/2022 11:00:00 PM	10	18	28
10/20/2022 11:15:00 PM	8	13	21
10/20/2022 11:30:00 PM	5	14	19
10/20/2022 11:45:00 PM	10	7	17
Total	4,726	5,293	10,019
Percentage	47.2%	52.8%	
Peak Hour	4:30 PM	4:45 PM	4:30 PM
Volume	810	831	1,619
PHF	0.960	0.877	0.916
Grand Total	8,677	9,055	17,732
Percentage	48.9%	51.1%	



(303) 216-2439
www.alltrafficdata.net

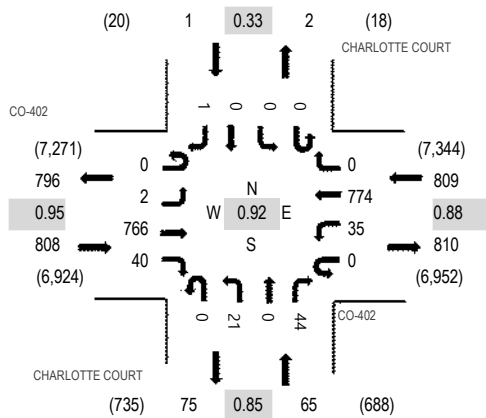
Location: 7 CHARLOTTE COURT & CO-402 AM

Date: Thursday, October 20, 2022

Peak Hour: 04:30 PM - 05:30 PM

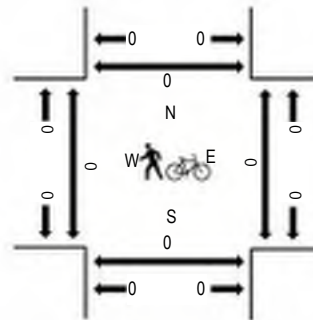
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				CHARLOTTE COURT Northbound				CHARLOTTE COURT Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
6:00 AM	0	1	121	4	0	4	74	0	0	3	0	7	0	0	0	1	215	1,176	0	0	0	0
6:15 AM	0	0	143	5	0	14	93	0	0	3	0	4	0	1	0	0	263	1,310	0	0	0	0
6:30 AM	0	0	177	2	0	9	140	0	0	3	0	12	0	0	0	0	343	1,454	0	0	0	0
6:45 AM	0	0	167	4	0	9	159	0	0	5	0	10	0	1	0	0	355	1,568	0	0	0	0
7:00 AM	0	0	181	3	0	10	146	0	0	4	0	5	0	0	0	0	349	1,639	0	0	0	0
7:15 AM	0	0	172	3	0	10	205	0	0	3	0	14	0	0	0	0	407	1,671	0	0	0	0
7:30 AM	0	0	177	10	0	8	244	0	0	4	0	14	0	0	0	0	457	1,590	0	0	0	0
7:45 AM	0	0	196	9	0	12	197	0	0	3	0	8	0	0	0	1	426	1,461	0	0	0	0
8:00 AM	0	0	151	12	0	17	189	0	0	4	0	8	0	0	0	0	381	1,352	0	0	0	0
8:15 AM	0	0	145	4	0	12	155	0	0	2	0	7	0	0	0	1	326	1,216	0	0	0	0
8:30 AM	0	0	148	7	0	6	159	0	0	2	0	5	0	1	0	0	328	1,145	0	0	0	0
8:45 AM	0	1	131	11	0	6	156	0	0	7	0	5	0	0	0	0	317	1,067	0	0	0	0
9:00 AM	0	1	108	4	1	7	112	0	0	6	0	6	0	0	0	0	245	978	0	0	0	0
9:15 AM	0	0	125	6	0	4	102	1	0	7	0	9	0	0	0	1	255	965	0	0	0	0
9:30 AM	0	1	96	7	0	9	122	0	0	8	0	7	0	0	0	0	250	934	0	0	0	0
9:45 AM	0	0	94	1	0	7	118	1	0	2	0	5	0	0	0	0	228	931	0	0	0	0
10:00 AM	0	0	103	7	0	2	105	0	0	8	0	7	0	0	0	0	232	962	0	0	0	0
10:15 AM	1	0	87	4	0	14	100	0	0	12	0	6	0	0	0	0	224	971	0	0	0	0
10:30 AM	0	0	108	6	0	5	110	0	0	8	0	9	0	1	0	0	247	979	0	0	0	0
10:45 AM	0	0	99	5	0	7	133	0	0	7	0	5	0	1	0	2	259	990	0	0	0	0
11:00 AM	0	0	120	9	0	10	88	0	0	10	0	4	0	0	0	0	241	968	0	0	0	0
11:15 AM	0	0	98	6	0	3	105	0	0	14	0	6	0	0	0	0	232	992	0	0	0	0
11:30 AM	0	0	109	9	0	5	118	0	0	10	0	7	0	0	0	0	258	1,003	0	0	0	0
11:45 AM	0	1	98	10	0	8	97	0	0	14	0	8	0	0	1	0	237	1,025	0	0	0	0
12:00 PM	0	0	102	10	0	4	131	1	0	9	0	7	1	0	0	0	265	1,015	0	0	0	0
12:15 PM	0	0	104	8	0	10	97	1	0	13	0	10	0	0	0	0	243	989	0	0	0	0
12:30 PM	0	0	113	11	0	5	134	0	0	8	0	8	0	0	0	1	280	1,009	0	0	0	0
12:45 PM	0	0	88	8	0	7	112	1	0	6	0	5	0	0	0	0	227	1,020	0	0	0	0
1:00 PM	0	0	104	10	0	4	109	0	0	9	0	3	0	0	0	0	239	1,036	0	0	0	0
1:15 PM	0	0	114	11	0	8	122	0	0	5	0	3	0	0	0	0	263	1,088	0	0	0	0
1:30 PM	0	0	125	10	0	11	127	0	0	11	0	7	0	0	0	0	291	1,108	0	0	0	0
1:45 PM	0	0	108	4	0	3	119	0	0	4	0	5	0	0	0	0	243	1,130	0	0	0	0
2:00 PM	0	1	124	6	0	7	142	0	0	6	0	4	0	0	0	1	291	1,225	0	0	1	0
2:15 PM	0	0	133	5	0	5	125	0	0	4	0	11	0	0	0	0	283	1,247	0	0	0	0
2:30 PM	0	0	130	6	0	8	156	0	0	9	0	4	0	0	0	0	313	1,299	0	0	0	0

2:45 PM	0	0	155	5	0	5	158	0	0	8	0	7	0	0	0	0	338	1,365	0	0	0	0
3:00 PM	0	0	129	9	0	9	149	1	0	6	0	9	0	0	0	1	313	1,434	0	0	0	0
3:15 PM	0	2	133	7	0	8	164	0	0	7	0	11	0	1	0	2	335	1,521	0	0	0	0
3:30 PM	0	0	160	9	0	10	177	0	0	11	0	12	0	0	0	0	379	1,583	0	0	0	0
3:45 PM	0	0	166	6	0	14	202	1	0	9	0	9	0	0	0	0	407	1,620	0	0	0	0
4:00 PM	0	0	183	6	0	10	187	0	0	7	0	7	0	0	0	0	400	1,631	0	0	0	0
4:15 PM	0	0	191	6	0	7	181	0	0	6	0	6	0	0	0	0	397	1,624	0	0	0	0
4:30 PM	0	0	200	13	0	13	173	0	0	6	0	11	0	0	0	0	416	1,683	0	0	0	0
4:45 PM	0	2	196	9	0	6	193	0	0	3	0	9	0	0	0	0	418	1,670	0	0	0	0
5:00 PM	0	0	177	8	0	10	177	0	0	9	0	12	0	0	0	0	393	1,560	0	0	0	0
5:15 PM	0	0	193	10	0	6	231	0	0	3	0	12	0	0	0	1	456		0	0	0	0
5:30 PM	0	0	171	9	0	15	193	0	0	3	0	12	0	0	0	0	403		0	0	0	0
5:45 PM	0	0	118	8	0	9	158	0	0	3	0	12	0	0	0	0	308		0	0	0	0
Count Total	1	10	6,571	342	1	392	6,944	7	0	314	0	374	1	6	1	12	14,976		0	0	1	0
Peak Hour	0	2	766	40	0	35	774	0	0	21	0	44	0	0	0	1	1,683		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

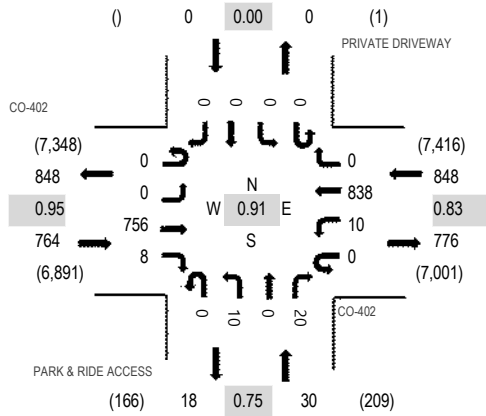
Location: 8 PARK & RIDE ACCESS & CO-402 AM

Date: Thursday, October 20, 2022

Peak Hour: 04:45 PM - 05:45 PM

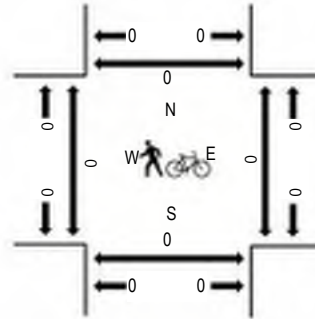
Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				PARK & RIDE ACCESS Northbound				PRIVATE DRIVEWAY Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
6:00 AM	0	0	120	0	0	12	75	0	0	3	0	7	0	0	0	0	217	1,172	0	0	0	0
6:15 AM	0	0	152	1	0	3	111	0	0	0	0	5	0	0	0	0	272	1,352	0	0	0	0
6:30 AM	0	0	182	1	0	2	140	0	0	1	0	1	0	0	0	0	327	1,467	0	0	0	0
6:45 AM	0	0	179	2	0	7	165	0	0	0	0	3	0	0	0	0	356	1,585	0	0	0	0
7:00 AM	0	0	180	3	0	6	201	0	0	2	0	5	0	0	0	0	397	1,624	0	0	0	0
7:15 AM	0	0	176	4	0	1	206	0	0	0	0	0	0	0	0	0	387	1,585	0	0	0	0
7:30 AM	0	0	178	1	0	4	259	0	0	0	0	3	0	0	0	0	445	1,511	0	0	0	0
7:45 AM	0	0	198	0	0	0	192	0	0	1	0	4	0	0	0	0	395	1,380	0	0	0	0
8:00 AM	0	0	151	2	0	1	200	0	0	1	0	3	0	0	0	0	358	1,270	0	0	0	0
8:15 AM	0	0	147	1	0	0	163	0	0	0	0	2	0	0	0	0	313	1,151	0	0	0	0
8:30 AM	0	0	151	1	0	2	159	0	0	0	0	1	0	0	0	0	314	1,080	0	0	0	0
8:45 AM	0	0	124	2	0	0	155	0	0	1	0	3	0	0	0	0	285	1,005	0	0	0	0
9:00 AM	0	0	116	1	0	4	114	0	0	0	0	4	0	0	0	0	239	953	0	0	0	0
9:15 AM	0	0	135	1	0	0	104	0	0	1	0	1	0	0	0	0	242	933	0	0	0	0
9:30 AM	0	0	103	0	0	2	129	0	0	1	0	4	0	0	0	0	239	899	0	0	0	0
9:45 AM	0	0	100	1	0	2	127	0	0	0	0	3	0	0	0	0	233	891	0	0	0	0
10:00 AM	0	0	110	0	0	1	105	0	0	1	0	2	0	0	0	0	219	906	0	0	0	0
10:15 AM	0	0	95	0	0	3	107	0	0	0	0	3	0	0	0	0	208	909	0	0	0	0
10:30 AM	0	0	115	3	0	0	113	0	0	0	0	0	0	0	0	0	231	926	0	0	0	0
10:45 AM	0	1	108	0	0	0	136	0	0	0	0	3	0	0	0	0	248	929	0	0	0	0
11:00 AM	0	0	121	1	0	2	97	0	0	1	0	0	0	0	0	0	222	901	0	0	0	0
11:15 AM	0	0	108	2	0	2	109	0	0	0	0	4	0	0	0	0	225	930	0	0	0	0
11:30 AM	0	0	115	0	0	0	118	0	0	0	0	1	0	0	0	0	234	934	0	0	0	0
11:45 AM	0	0	110	0	0	2	108	0	0	0	0	0	0	0	0	0	220	956	0	0	0	0
12:00 PM	0	0	109	1	0	4	133	0	0	1	0	3	0	0	0	0	251	961	0	0	0	0
12:15 PM	0	0	112	2	0	1	110	0	0	1	0	3	0	0	0	0	229	913	0	0	0	0
12:30 PM	0	0	121	0	0	0	133	0	0	0	0	2	0	0	0	0	256	947	0	0	0	0
12:45 PM	0	0	99	1	0	1	123	0	0	0	0	1	0	0	0	0	225	962	0	0	0	0
1:00 PM	0	0	95	0	0	2	106	0	0	0	0	0	0	0	0	0	203	1,005	0	0	0	0
1:15 PM	0	0	123	2	0	0	132	0	0	1	0	5	0	0	0	0	263	1,081	0	0	0	0
1:30 PM	0	0	130	1	0	3	136	0	0	0	0	1	0	0	0	0	271	1,073	0	0	0	0
1:45 PM	0	0	127	0	0	1	134	0	0	2	0	4	0	0	0	0	268	1,089	0	0	0	0
2:00 PM	0	0	125	0	0	2	148	0	0	1	0	3	0	0	0	0	279	1,164	0	0	0	0
2:15 PM	0	0	120	0	0	2	129	0	0	2	0	2	0	0	0	0	255	1,204	0	0	0	0
2:30 PM	0	0	123	0	0	0	161	0	0	0	0	3	0	0	0	0	287	1,268	0	0	0	0

2:45 PM	0	0	172	2	0	4	158	0	0	0	0	7	0	0	0	0	343	1,356	0	0	0	0
3:00 PM	0	0	139	1	0	4	163	0	0	3	0	9	0	0	0	0	319	1,418	0	0	0	0
3:15 PM	0	0	142	2	0	1	167	0	0	3	0	4	0	0	0	0	319	1,502	0	0	0	0
3:30 PM	0	0	167	3	0	7	189	0	0	2	0	7	0	0	0	0	375	1,572	0	0	0	0
3:45 PM	0	0	182	1	0	6	208	0	0	2	0	6	0	0	0	0	405	1,591	0	0	0	0
4:00 PM	0	0	190	2	0	2	202	0	0	0	0	7	0	0	0	0	403	1,595	0	0	0	0
4:15 PM	0	0	186	1	0	3	190	0	0	2	0	7	0	0	0	0	389	1,578	0	0	0	0
4:30 PM	0	0	209	0	0	2	178	0	0	1	0	4	0	0	0	0	394	1,641	0	0	0	0
4:45 PM	0	0	202	2	0	2	195	0	0	2	0	6	0	0	0	0	409	1,642	0	0	0	0
5:00 PM	0	0	176	1	0	3	197	0	0	4	0	5	0	0	0	0	386	1,547	0	0	0	0
5:15 PM	0	0	203	3	0	4	236	0	0	1	0	5	0	0	0	0	452		0	0	0	0
5:30 PM	0	0	175	2	0	1	210	0	0	3	0	4	0	0	0	0	395		0	0	0	0
5:45 PM	0	0	135	0	0	1	173	0	0	0	0	5	0	0	0	0	314		0	0	0	0
Count Total	0	1	6,836	54	0	112	7,304	0	0	44	0	165	0	0	0	0	14,516		0	0	0	0
Peak Hour	0	0	756	8	0	10	838	0	0	10	0	20	0	0	0	0	1,642		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

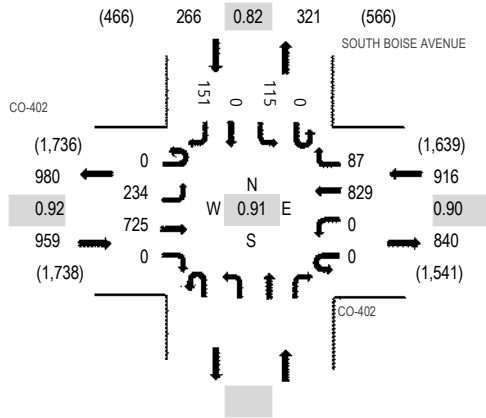
Location: 1 SOUTH BOISE AVENUE & CO-402 AM

Date: Thursday, October 20, 2022

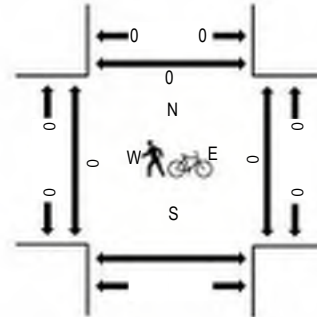
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				SOUTH BOISE AVENUE Northbound				SOUTH BOISE AVENUE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	34	154	0	0	0	0	144	11				0	17	0	35	395	2,053	0	0	0	0
7:15 AM	0	62	173	0	0	0	0	195	16				0	20	0	32	498	2,141	0	0	0	0
7:30 AM	0	63	197	0	0	0	0	226	32				0	31	0	38	587	2,116	0	0	0	0
7:45 AM	0	65	177	0	0	0	0	225	25				0	35	0	46	573	1,957	0	0	0	0
8:00 AM	0	44	178	0	0	0	0	183	14				0	29	0	35	483	1,790	0	0	0	0
8:15 AM	0	45	155	0	0	0	0	199	26				0	17	0	31	473		0	0	0	0
8:30 AM	0	34	163	0	0	0	0	164	17				0	21	0	29	428		0	0	0	0
8:45 AM	0	43	151	0	0	0	0	127	35				0	23	0	27	406		0	0	0	0
Count Total	0	390	1,348	0	0	0	0	1,463	176				0	193	0	273	3,843		0	0	0	0
Peak Hour	0	234	725	0	0	0	0	829	87				0	115	0	151	2,141		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

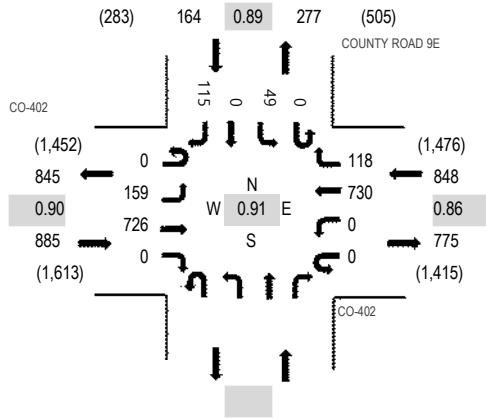
Location: 2 COUNTY ROAD 9E & CO-402 AM

Date: Thursday, October 20, 2022

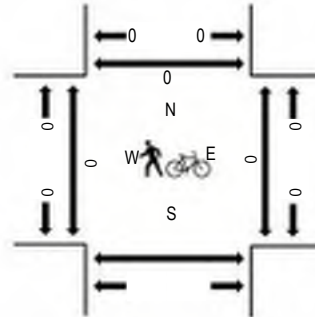
Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				COUNTY ROAD 9E Northbound				COUNTY ROAD 9E Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	33	167	0	0	0	0	123	25				0	7	0	20	375	1,852	0	0		0
7:15 AM	0	29	181	0	0	0	0	175	33				0	13	0	32	463	1,897	0	0		0
7:30 AM	0	44	188	0	0	0	0	214	32				0	9	0	32	519	1,822	0	0		0
7:45 AM	0	51	197	0	0	0	0	179	22				0	12	0	34	495	1,652	0	0		0
8:00 AM	0	35	160	0	0	0	0	162	31				0	15	0	17	420	1,520	0	0		0
8:15 AM	0	42	151	0	0	0	0	129	29				0	12	0	25	388		0	0		0
8:30 AM	0	31	132	0	0	0	0	141	18				0	13	0	14	349		0	0		0
8:45 AM	0	26	146	0	0	0	0	139	24				0	12	0	16	363		0	0		0
Count Total	0	291	1,322	0	0	0	0	1,262	214				0	93	0	190	3,372		0	0		0
Peak Hour	0	159	726	0	0	0	0	730	118				0	49	0	115	1,897		0	0		0



(303) 216-2439
www.alltrafficdata.net

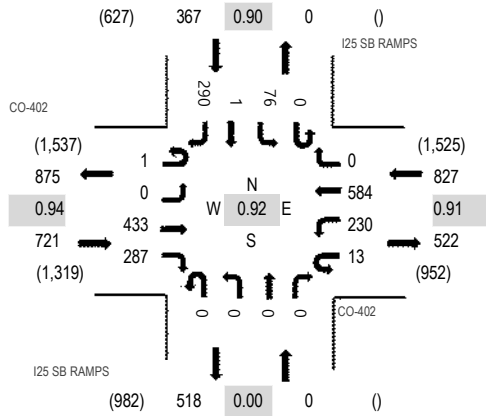
Location: 3 I25 SB RAMPS & CO-402 AM

Date: Thursday, October 20, 2022

Peak Hour: 07:15 AM - 08:15 AM

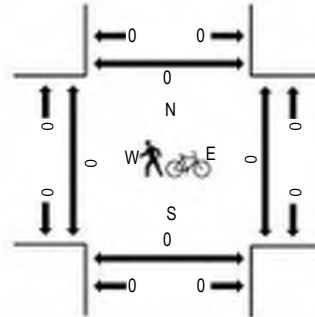
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				I25 SB RAMPS Northbound				I25 SB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	80	78	2	63	123	0	0	0	0	0	0	15	1	42	404	1,885	0	0	0	0
7:15 AM	1	0	110	81	5	74	149	0	0	0	0	0	0	23	0	79	522	1,915	0	0	0	0
7:30 AM	0	0	100	79	4	50	148	0	0	0	0	0	0	27	1	56	465	1,772	0	0	0	0
7:45 AM	0	0	120	65	3	55	149	0	0	0	0	0	0	15	0	87	494	1,700	0	0	0	0
8:00 AM	0	0	103	62	1	51	138	0	0	0	0	0	0	11	0	68	434	1,586	0	0	0	0
8:15 AM	0	0	97	69	2	45	104	0	0	0	0	0	0	22	0	40	379		0	0	0	0
8:30 AM	0	0	80	60	1	48	136	0	0	0	0	0	0	15	0	53	393		0	0	0	0
8:45 AM	0	0	87	47	1	52	121	0	0	0	0	0	0	28	1	43	380		0	0	0	0
Count Total	1	0	777	541	19	438	1,068	0	0	0	0	0	0	156	3	468	3,471		0	0	0	0
Peak Hour	1	0	433	287	13	230	584	0	0	0	0	0	0	76	1	290	1,915		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

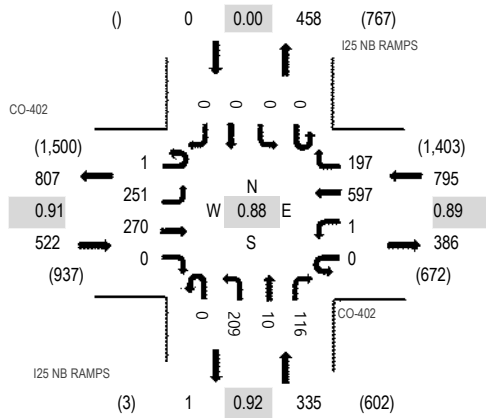
Location: 4 I25 NB RAMPS & CO-402 AM

Date: Thursday, October 20, 2022

Peak Hour: 07:15 AM - 08:15 AM

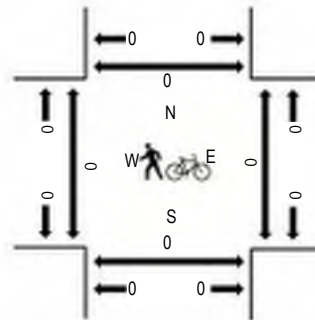
Peak 15-Minutes: 07:15 AM - 07:30 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				I25 NB RAMPS Northbound				I25 NB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	43	51	0	0	1	159	31	0	30	0	14	0	0	0	0	329	1,622	0	0	0	0
7:15 AM	0	72	72	0	0	0	179	53	0	53	3	35	0	0	0	0	467	1,652	0	0	0	0
7:30 AM	1	58	69	0	0	0	141	74	0	53	0	27	0	0	0	0	423	1,520	0	0	0	0
7:45 AM	0	67	73	0	0	1	143	41	0	53	1	24	0	0	0	0	403	1,413	0	0	0	0
8:00 AM	0	54	56	0	0	0	134	29	0	50	6	30	0	0	0	0	359	1,320	0	0	0	0
8:15 AM	0	47	66	0	0	0	126	29	0	46	1	20	0	0	0	0	335		0	0	0	0
8:30 AM	0	48	47	0	0	0	115	19	0	66	1	20	0	0	0	0	316		0	0	0	0
8:45 AM	0	64	49	0	0	1	101	26	0	50	0	19	0	0	0	0	310		0	0	0	0
Count Total	1	453	483	0	0	3	1,098	302	0	401	12	189	0	0	0	0	2,942		0	0	0	0
Peak Hour	1	251	270	0	0	1	597	197	0	209	10	116	0	0	0	0	1,652		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

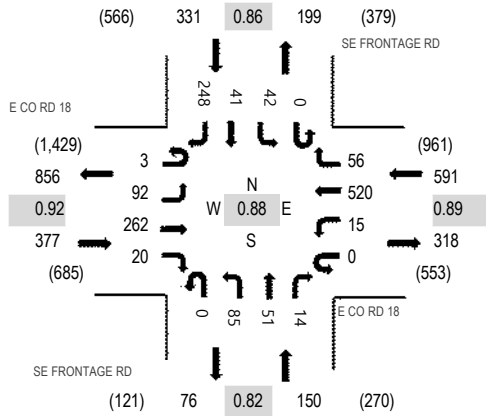
Location: 5 SE FRONTAGE RD & E CO RD 18 AM

Date: Thursday, October 20, 2022

Peak Hour: 07:00 AM - 08:00 AM

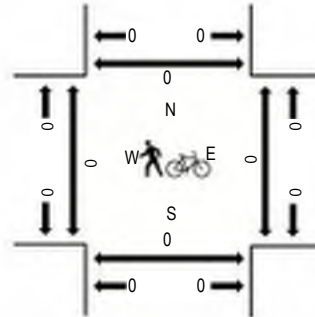
Peak 15-Minutes: 07:30 AM - 07:45 AM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E CO RD 18 Eastbound				E CO RD 18 Westbound				SE FRONTAGE RD Northbound				SE FRONTAGE RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	2	15	49	2	0	1	105	6	0	18	9	4	0	14	10	64	299	1,449	0	0	0	0
7:15 AM	0	27	71	8	0	1	153	13	0	18	8	4	0	8	7	66	384	1,439	0	0	0	0
7:30 AM	1	29	67	5	0	3	141	24	0	28	14	4	0	13	15	68	412	1,308	0	0	0	0
7:45 AM	0	21	75	5	0	10	121	13	0	21	20	2	0	7	9	50	354	1,134	0	0	0	0
8:00 AM	3	30	48	2	0	1	109	12	0	16	7	1	0	7	7	46	289	1,033	0	0	0	0
8:15 AM	0	24	58	5	0	1	74	8	0	18	6	0	0	7	4	48	253		0	0	0	0
8:30 AM	2	18	43	6	0	3	71	8	0	14	9	5	0	13	6	40	238		0	0	0	0
8:45 AM	0	23	43	3	0	1	66	16	0	22	19	3	0	7	6	44	253		0	0	0	0
Count Total	8	187	454	36	0	21	840	100	0	155	92	23	0	76	64	426	2,482		0	0	0	0
Peak Hour	3	92	262	20	0	15	520	56	0	85	51	14	0	42	41	248	1,449		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

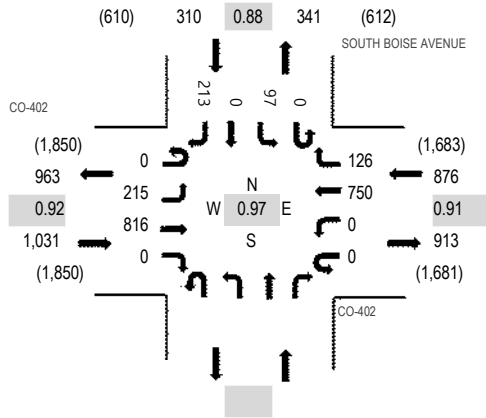
Location: 1 SOUTH BOISE AVENUE & CO-402 PM

Date: Thursday, October 20, 2022

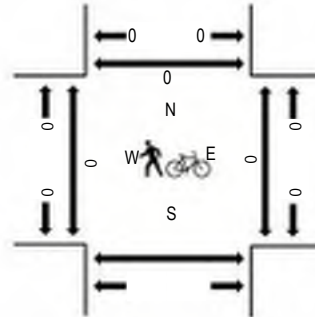
Peak Hour: 04:00 PM - 05:00 PM

Peak 15-Minutes: 04:15 PM - 04:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				SOUTH BOISE AVENUE Northbound				SOUTH BOISE AVENUE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	47	183	0	0	0	0	211	29				0	26	0	49	545	2,217	0	0	0	0
4:15 PM	0	60	195	0	0	0	0	214	24				0	19	0	62	574	2,155	0	0	0	0
4:30 PM	0	60	220	0	0	0	0	155	38				0	25	0	53	551	2,127	0	0	0	0
4:45 PM	0	48	218	0	0	0	0	170	35				0	27	0	49	547	2,064	0	0	0	0
5:00 PM	0	42	171	0	0	0	0	146	29				0	38	0	57	483	1,926	0	0	0	0
5:15 PM	0	40	199	0	0	0	0	183	37				0	23	0	64	546		0	0	0	0
5:30 PM	0	35	168	0	0	0	0	193	36				0	15	0	41	488		0	0	0	0
5:45 PM	0	31	133	0	0	0	0	162	21				0	21	0	41	409		0	0	0	0
Count Total	0	363	1,487	0	0	0	0	1,434	249				0	194	0	416	4,143		0	0	0	0
Peak Hour	0	215	816	0	0	0	0	750	126				0	97	0	213	2,217		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

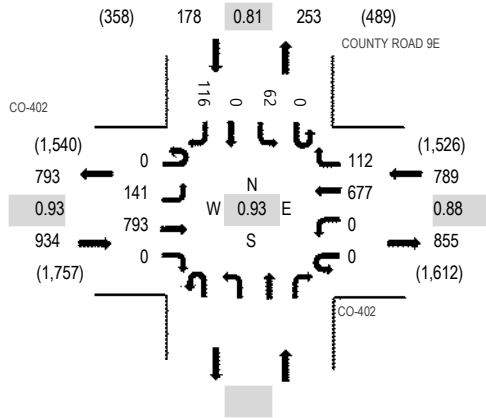
Location: 2 COUNTY ROAD 9E & CO-402 PM

Date: Thursday, October 20, 2022

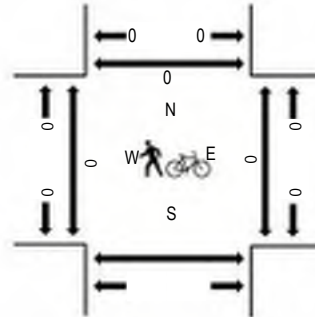
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:15 PM - 05:30 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles on Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				COUNTY ROAD 9E Northbound				COUNTY ROAD 9E Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	41	182	0	0	0	0	169	24				0	24	0	35	475	1,882	0	0		0
4:15 PM	0	22	201	0	0	0	0	156	31				0	17	0	29	456	1,847	0	0		0
4:30 PM	0	31	209	0	0	0	0	158	19				0	15	0	23	455	1,901	0	0		0
4:45 PM	0	48	204	0	0	0	0	173	23				0	22	0	26	496	1,889	0	0		0
5:00 PM	0	27	184	0	0	0	0	153	33				0	12	0	31	440	1,759	0	0		0
5:15 PM	0	35	196	0	0	0	0	193	37				0	13	0	36	510		0	0		0
5:30 PM	0	30	182	0	0	0	0	169	27				0	14	0	21	443		0	0		0
5:45 PM	0	41	124	0	0	0	0	141	20				0	13	0	27	366		0	0		0
Count Total	0	275	1,482	0	0	0	0	1,312	214				0	130	0	228	3,641		0	0		0
Peak Hour	0	141	793	0	0	0	0	677	112				0	62	0	116	1,901		0	0		0



(303) 216-2439
www.alltrafficdata.net

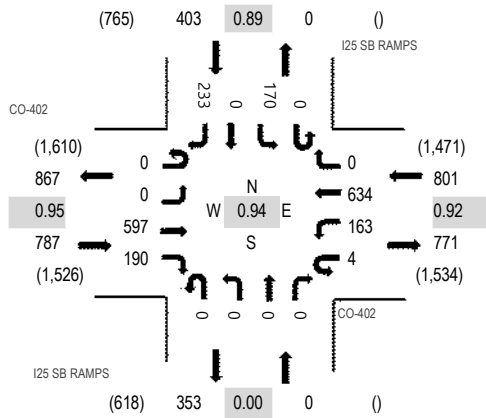
Location: 3 I25 SB RAMPS & CO-402 PM

Date: Thursday, October 20, 2022

Peak Hour: 04:00 PM - 05:00 PM

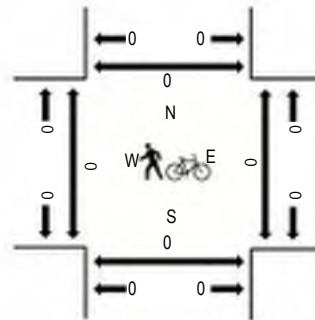
Peak 15-Minutes: 04:15 PM - 04:30 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				I25 SB RAMPS Northbound				I25 SB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	135	46	3	35	178	0	0	0	0	0	0	44	0	61	502	1,991	0	0	0	0
4:15 PM	0	0	151	53	1	36	175	0	0	0	0	0	0	50	0	63	529	1,959	0	0	0	0
4:30 PM	0	0	167	46	0	45	173	0	0	0	0	0	0	41	0	51	523	1,894	0	0	0	0
4:45 PM	0	0	144	45	0	47	108	0	0	0	0	0	0	35	0	58	437	1,781	0	0	0	0
5:00 PM	0	0	167	39	1	41	127	0	0	0	0	0	0	40	1	54	470	1,771	0	0	0	0
5:15 PM	1	0	168	28	2	41	131	0	0	0	0	0	0	40	1	52	464		0	0	0	0
5:30 PM	0	0	136	29	1	30	134	0	0	0	0	0	0	34	0	46	410		0	0	0	0
5:45 PM	0	0	139	32	1	22	139	0	0	0	0	0	0	34	1	59	427		0	0	0	0
Count Total	1	0	1,207	318	9	297	1,165	0	0	0	0	0	0	318	3	444	3,762		0	0	0	0
Peak Hour	0	0	597	190	4	163	634	0	0	0	0	0	0	170	0	233	1,991		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

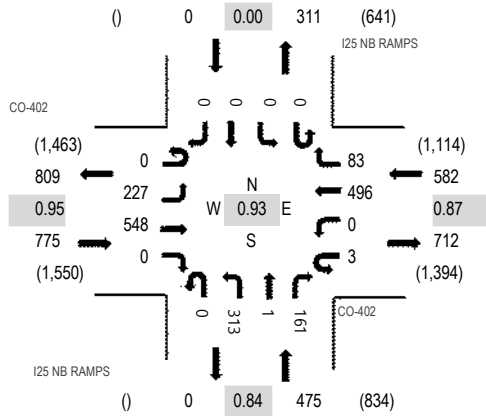
Location: 4 I25 NB RAMPS & CO-402 PM

Date: Thursday, October 20, 2022

Peak Hour: 04:00 PM - 05:00 PM

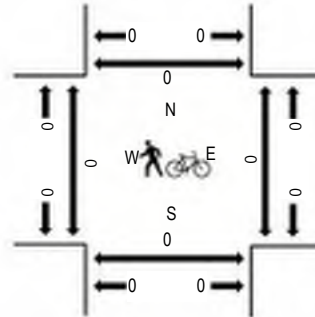
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	CO-402 Eastbound				CO-402 Westbound				I25 NB RAMPS Northbound				I25 NB RAMPS Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	49	130	0	0	0	136	31	0	93	0	34	0	0	0	0	473	1,832	0	0	0	0
4:15 PM	0	70	140	0	2	0	118	17	0	93	0	41	0	0	0	0	481	1,793	0	0	0	0
4:30 PM	0	55	153	0	1	0	120	20	0	97	1	43	0	0	0	0	490	1,724	0	0	0	0
4:45 PM	0	53	125	0	0	0	122	15	0	30	0	43	0	0	0	0	388	1,655	0	0	0	0
5:00 PM	0	63	153	0	1	0	117	22	0	48	0	30	0	0	0	0	434	1,666	0	0	0	0
5:15 PM	0	65	150	0	1	0	116	20	0	36	2	22	0	0	0	0	412		0	0	0	0
5:30 PM	0	63	117	0	0	0	124	26	0	46	0	45	0	0	0	0	421		0	0	0	0
5:45 PM	0	55	109	0	1	0	90	14	0	77	0	53	0	0	0	0	399		0	0	0	0
Count Total	0	473	1,077	0	6	0	943	165	0	520	3	311	0	0	0	0	3,498		0	0	0	0
Peak Hour	0	227	548	0	3	0	496	83	0	313	1	161	0	0	0	0	1,832		0	0	0	0



(303) 216-2439
www.alltrafficdata.net

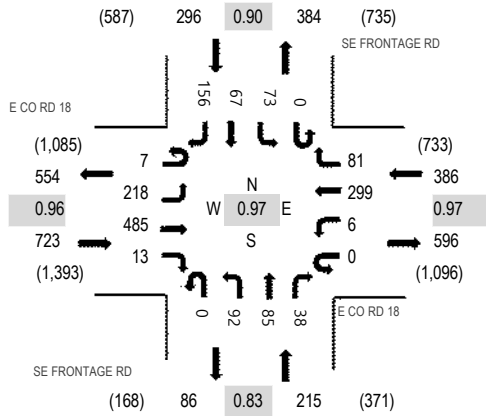
Location: 5 SE FRONTAGE RD & E CO RD 18 PM

Date: Thursday, October 20, 2022

Peak Hour: 04:15 PM - 05:15 PM

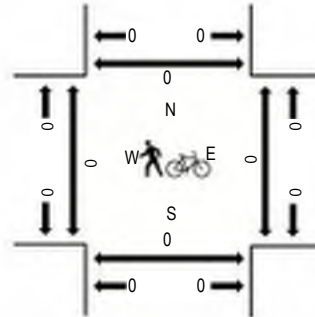
Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk



Traffic Counts

Interval Start Time	E CO RD 18 Eastbound				E CO RD 18 Westbound				SE FRONTAGE RD Northbound				SE FRONTAGE RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	5	55	107	4	0	0	67	24	0	23	11	6	0	16	14	54	386	1,597	0	0	0	0
4:15 PM	2	53	123	4	0	0	80	19	0	19	16	7	0	17	22	38	400	1,620	0	0	0	0
4:30 PM	0	57	129	3	0	1	78	20	0	22	23	13	0	19	17	37	419	1,589	0	0	0	0
4:45 PM	2	53	116	2	0	2	77	22	0	22	23	5	0	17	14	37	392	1,561	0	0	0	0
5:00 PM	3	55	117	4	0	3	64	20	0	29	23	13	0	20	14	44	409	1,487	0	0	0	0
5:15 PM	2	44	115	5	0	2	79	13	0	21	10	6	0	20	21	31	369		0	0	0	0
5:30 PM	7	67	92	6	0	3	78	13	0	22	17	5	0	27	14	40	391		0	0	0	0
5:45 PM	4	66	87	4	0	0	50	18	0	16	13	6	0	13	9	32	318		0	0	0	0
Count Total	25	450	886	32	0	11	573	149	0	174	136	61	0	149	125	313	3,084		0	0	0	0
Peak Hour	7	218	485	13	0	6	299	81	0	92	85	38	0	73	67	156	1,620		0	0	0	0

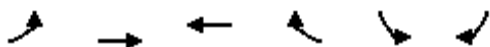
APPENDIX C

Existing Conditions Capacity Analysis

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

07/24/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	234	725	829	87	115	151
Future Volume (veh/h)	234	725	829	87	115	151
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	257	797	911	96	126	44
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	328	1469	1130	119	154	228
Arrive On Green	0.06	0.80	0.69	0.69	0.09	0.09
Sat Flow, veh/h	1753	1841	1637	173	1711	1522
Grp Volume(v), veh/h	257	797	0	1007	126	44
Grp Sat Flow(s),veh/h/ln	1753	1841	0	1810	1711	1522
Q Serve(g_s), s	5.0	19.3	0.0	48.6	9.0	3.2
Cycle Q Clear(g_c), s	5.0	19.3	0.0	48.6	9.0	3.2
Prop In Lane	1.00			0.10	1.00	1.00
Lane Grp Cap(c), veh/h	328	1469	0	1249	154	228
V/C Ratio(X)	0.78	0.54	0.00	0.81	0.82	0.19
Avail Cap(c_a), veh/h	434	1469	0	1249	246	310
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.0	4.5	0.0	13.5	55.9	46.5
Incr Delay (d2), s/veh	6.7	1.4	0.0	5.6	10.9	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	4.8	0.0	17.3	4.3	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.6	5.9	0.0	19.1	66.7	46.9
LnGrp LOS	C	A	A	B	E	D
Approach Vol, veh/h		1054	1007		170	
Approach Delay, s/veh		11.7	19.1		61.6	
Approach LOS		B	B		E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.5	94.3			107.7	17.3
Change Period (Y+Rc), s	6.0	8.0			8.0	6.0
Max Green Setting (Gmax), s	15.0	72.0			93.0	18.0
Max Q Clear Time (g_c+l1), s	7.0	50.6			21.3	11.0
Green Ext Time (p_c), s	0.4	7.3			5.8	0.2
Intersection Summary						
HCM 6th Ctrl Delay			18.9			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	8.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	159	686	730	118	49	115
Future Vol, veh/h	159	686	730	118	49	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	385	-	-	420	225	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	5	5	6	6	10	10
Mvmt Flow	175	754	802	130	54	126
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	932	0	-	0	1906	802
Stage 1	-	-	-	-	802	-
Stage 2	-	-	-	-	1104	-
Critical Hdwy	4.15	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.245	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	722	-	-	-	72	372
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	306	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	722	-	-	-	55	372
Mov Cap-2 Maneuver	-	-	-	-	55	-
Stage 1	-	-	-	-	324	-
Stage 2	-	-	-	-	306	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.2	0		84.1		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	722	-	-	-	55	372
HCM Lane V/C Ratio	0.242	-	-	-	0.979	0.34
HCM Control Delay (s)	11.6	-	-	-	235.6	19.6
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.9	-	-	-	4.4	1.5

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

07/24/2024

Intersection												
Int Delay, s/veh	0.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	732	8	11	858	0	3	0	12	0	0	0
Future Vol, veh/h	0	732	8	11	858	0	3	0	12	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	340	225	-	-	0	-	195	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	4	4	4	10	10	10	0	0	0
Mvmt Flow	0	804	9	12	943	0	3	0	13	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	943	0	0	813	0	0	1300	-	804	1782	1780	472
Stage 1	-	-	-	-	-	-	804	-	-	967	967	-
Stage 2	-	-	-	-	-	-	496	-	-	815	813	-
Critical Hdwy	4.13	-	-	4.16	-	-	7.45	-	6.35	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.25	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.65	-	-	6.1	5.5	-
Follow-up Hdwy	2.219	-	-	2.238	-	-	3.595	-	3.395	3.5	4	3.3
Pot Cap-1 Maneuver	725	-	-	801	-	-	121	0	366	58	83	544
Stage 1	-	-	-	-	-	-	361	0	-	277	335	-
Stage 2	-	-	-	-	-	-	508	0	-	374	395	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	725	-	-	801	-	-	120	-	366	55	82	544
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	-	-	55	82	-
Stage 1	-	-	-	-	-	-	361	-	-	277	330	-
Stage 2	-	-	-	-	-	-	500	-	-	361	395	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			19.3			0		
HCM LOS							C			A		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	120	366	725	-	-	801	-	-	-
HCM Lane V/C Ratio	0.027	0.036	-	-	-	0.015	-	-	-
HCM Control Delay (s)	35.8	15.2	0	-	-	9.6	-	-	0
HCM Lane LOS	E	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.1	0.1	0	-	-	0	-	-	-

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	696	34	47	835	0	14	0	44	0	0	0
Future Vol, veh/h	0	696	34	47	835	0	14	0	44	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	6	6	6	0	0	0
Mvmt Flow	0	765	37	52	918	0	15	0	48	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	918	0	0	802	0	0	1806	1806	784	1830	1824	918
Stage 1	-	-	-	-	-	-	784	784	-	1022	1022	-
Stage 2	-	-	-	-	-	-	1022	1022	-	808	802	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.16	6.56	6.26	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.56	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.554	4.054	3.354	3.5	4	3.3
Pot Cap-1 Maneuver	739	-	-	817	-	-	60	77	387	60	78	332
Stage 1	-	-	-	-	-	-	380	398	-	287	316	-
Stage 2	-	-	-	-	-	-	280	308	-	378	399	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	739	-	-	817	-	-	54	67	387	47	68	332
Mov Cap-2 Maneuver	-	-	-	-	-	-	54	67	-	47	68	-
Stage 1	-	-	-	-	-	-	380	398	-	287	275	-
Stage 2	-	-	-	-	-	-	244	268	-	331	399	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.5			43.2			0		
HCM LOS							E			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	156	739	-	-	817	-	-	-				
HCM Lane V/C Ratio	0.409	-	-	-	0.063	-	-	-				
HCM Control Delay (s)	43.2	0	-	-	9.7	0	-	0				
HCM Lane LOS	E	A	-	-	A	A	-	A				
HCM 95th %tile Q(veh)	1.8	0	-	-	0.2	-	-	-				

SITE LAYOUT

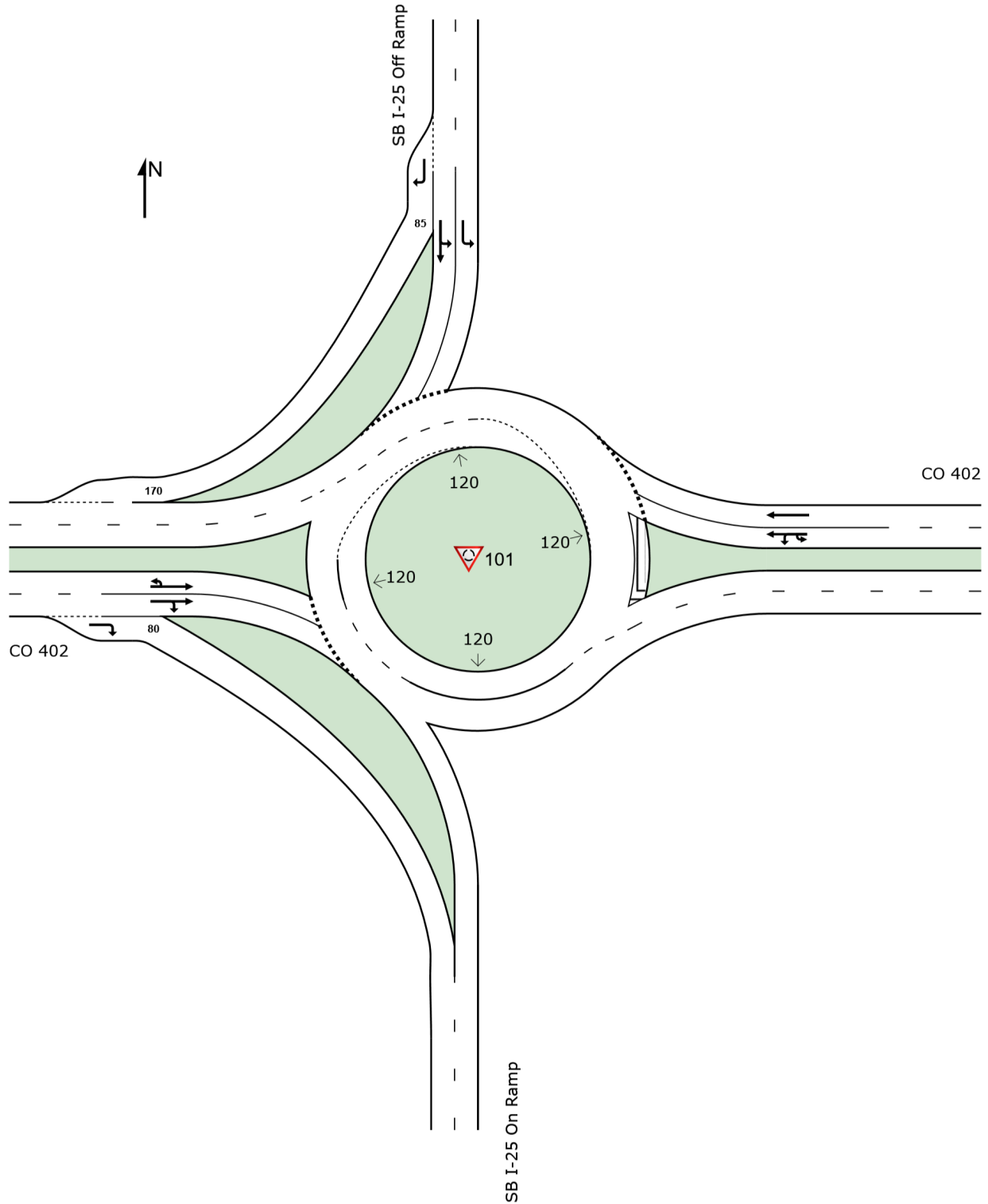
 **Site: 101 [402 & SB I-25 (Site Folder: West Ridge)]**

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & SB I-25 (Site Folder: West Ridge)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	[Dist] ft				
			veh/h		veh/h		v/c	sec							mph
East: CO 402															
1u	U	All MCs	14	9.0	14	9.0	0.345	4.5	LOS A	1.9	49.9	0.02	0.00	0.02	17.3
1	L2	All MCs	250	9.0	250	9.0	0.345	4.5	LOS A	1.9	49.9	0.02	0.00	0.02	33.1
6	T1	All MCs	635	9.0	635	9.0	0.345	4.5	LOS A	1.9	49.9	0.02	0.00	0.02	23.5
Approach			899	9.0	899	9.0	0.345	4.5	LOS A	1.9	49.9	0.02	0.00	0.02	26.9
North: SB I-25 Off Ramp															
7	L2	All MCs	83	9.0	83	9.0	0.089	8.8	LOS A	0.3	6.8	0.61	0.60	0.61	27.5
4	T1	All MCs	1	9.0	1	9.0	0.089	8.5	LOS A	0.2	6.5	0.60	0.59	0.60	37.4
14	R2	All MCs	315	9.0	315	9.0	0.205	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	42.2
Approach			399	9.0	399	9.0	0.205	6.1	LOS A	0.3	6.8	0.13	0.13	0.13	37.8
West: CO 402															
5u	U	All MCs	1	8.0	1	8.0	0.266	7.0	LOS A	1.1	28.0	0.50	0.36	0.50	19.3
2	T1	All MCs	471	8.0	471	8.0	0.266	6.8	LOS A	1.1	28.0	0.48	0.35	0.48	23.6
12	R2	All MCs	312	8.0	312	8.0	0.200	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			784	8.0	784	8.0	0.266	4.1	LOS A	1.1	28.0	0.29	0.21	0.29	31.4
All Vehicles			2082	8.6	2082	8.6	0.345	4.7	LOS A	1.9	49.9	0.14	0.10	0.14	30.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 4:49:51 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\AM_Existing Roundabouts.sip9

SITE LAYOUT

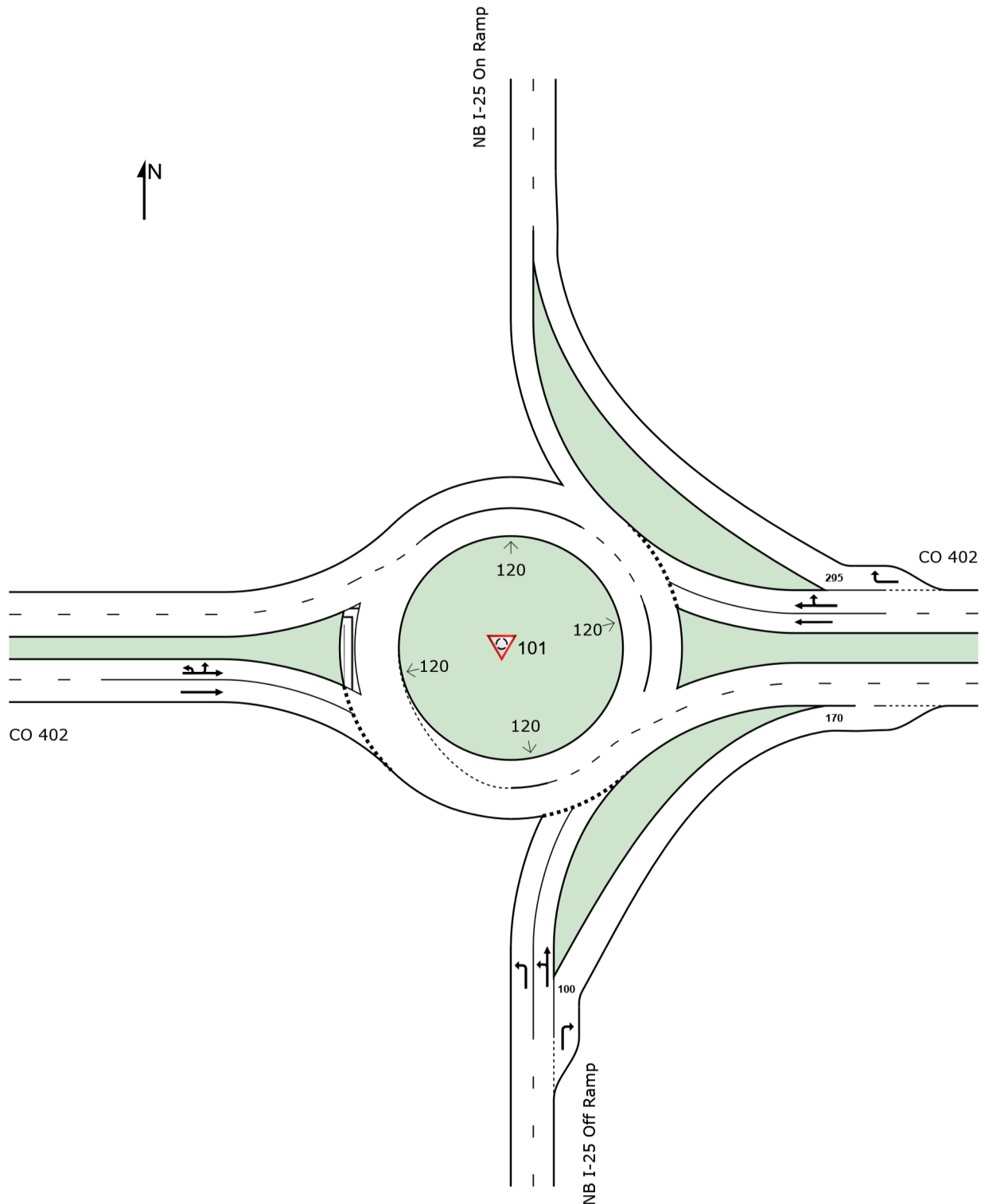
Site: 101 [402 & NB I-25 (Site Folder: West Ridge)]

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: West Ridge)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	227	10.0	227	10.0	0.176	7.3	LOS A	0.6	15.6	0.55	0.47	0.55	27.3
8	T1	All MCs	11	10.0	11	10.0	0.176	7.1	LOS A	0.6	15.1	0.54	0.46	0.54	36.5
18	R2	All MCs	126	10.0	126	10.0	0.083	3.5	LOS A	0.0	0.0	0.00	0.00	0.00	41.0
Approach			364	10.0	364	10.0	0.176	6.0	LOS A	0.6	15.6	0.36	0.31	0.36	31.2
East: CO 402															
6	T1	All MCs	649	10.0	649	10.0	0.452	11.3	LOS B	2.4	64.1	0.65	0.67	0.89	19.0
16	R2	All MCs	214	10.0	214	10.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			863	10.0	863	10.0	0.452	8.5	LOS A	2.4	64.1	0.49	0.50	0.67	20.9
West: CO 402															
5u	U	All MCs	1	9.0	1	9.0	0.217	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	19.6
5	L2	All MCs	273	9.0	273	9.0	0.217	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	33.4
2	T1	All MCs	293	9.0	293	9.0	0.217	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			567	9.0	567	9.0	0.217	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	29.7
All Vehicles			1795	9.7	1795	9.7	0.452	6.5	LOS A	2.4	64.1	0.31	0.30	0.39	25.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 4:51:29 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\AM_Existing Roundabouts.sip9

SITE LAYOUT

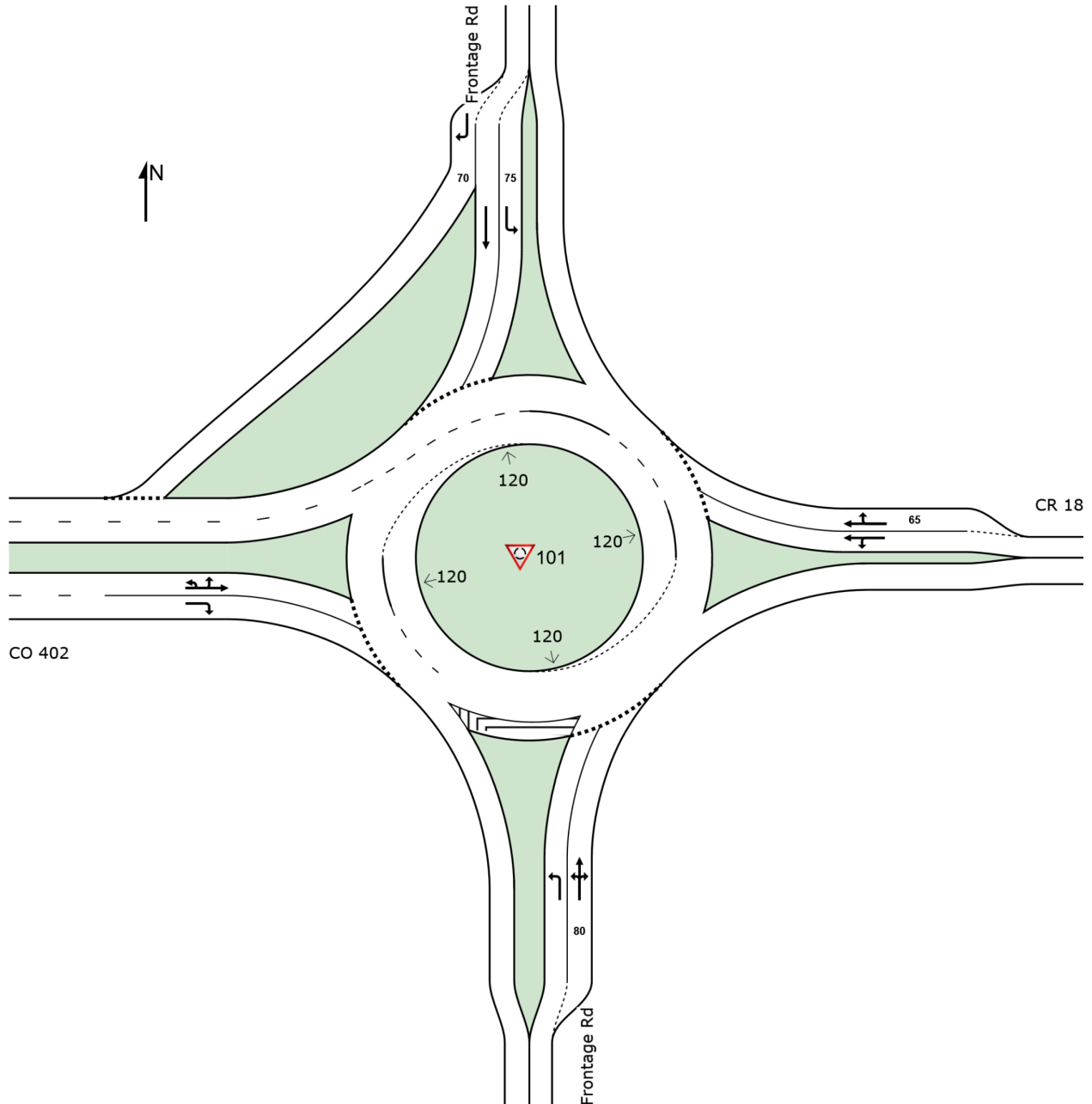
 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: West Ridge)]**

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Monday, August 5, 2024 5:15:55 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\AM_Existing Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: West Ridge)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing AM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]		[Total HV]					[Veh. veh	Dist]				
			veh/h	%	veh/h	%	v/c	sec			ft			mph	
South: Frontage Rd															
3	L2	All MCs	92	9.0	92	9.0	0.101	5.5	LOS A	0.3	9.2	0.48	0.37	0.48	30.4
8	T1	All MCs	55	9.0	55	9.0	0.101	5.5	LOS A	0.3	9.2	0.48	0.37	0.48	33.2
18	R2	All MCs	15	9.0	15	9.0	0.101	5.5	LOS A	0.3	9.2	0.48	0.37	0.48	38.1
Approach			163	9.0	163	9.0	0.101	5.5	LOS A	0.3	9.2	0.48	0.37	0.48	32.3
East: CR 18															
1	L2	All MCs	16	7.0	16	7.0	0.322	7.0	LOS A	1.4	37.7	0.46	0.30	0.46	37.7
6	T1	All MCs	565	7.0	565	7.0	0.322	6.9	LOS A	1.4	37.7	0.45	0.29	0.45	39.3
16	R2	All MCs	61	7.0	61	7.0	0.322	6.7	LOS A	1.4	36.7	0.44	0.28	0.44	39.0
Approach			642	7.0	642	7.0	0.322	6.9	LOS A	1.4	37.7	0.45	0.29	0.45	39.2
North: Frontage Rd															
7	L2	All MCs	46	4.0	46	4.0	0.065	5.8	LOS A	0.2	5.4	0.53	0.48	0.53	37.4
4	T1	All MCs	45	4.0	45	4.0	0.069	6.4	LOS A	0.2	5.9	0.56	0.51	0.56	33.2
14	R2	All MCs	270	4.0	270	4.0	0.377	9.9	LOS A	1.7	43.3	0.64	0.62	0.78	28.5
Approach			360	4.0	360	4.0	0.377	8.9	LOS A	1.7	43.3	0.62	0.59	0.72	30.8
West: CO 402															
5u	U	All MCs	3	9.0	3	9.0	0.331	6.1	LOS A	1.5	41.1	0.28	0.13	0.28	21.1
5	L2	All MCs	100	9.0	100	9.0	0.331	6.1	LOS A	1.5	41.1	0.28	0.13	0.28	29.2
2	T1	All MCs	285	9.0	285	9.0	0.331	6.1	LOS A	1.5	41.1	0.28	0.13	0.28	39.3
12	R2	All MCs	22	9.0	22	9.0	0.019	3.4	LOS A	0.1	1.8	0.21	0.09	0.21	32.1
Approach			410	9.0	410	9.0	0.331	6.0	LOS A	1.5	41.1	0.28	0.13	0.28	36.0
All Vehicles			1575	7.0	1575	7.0	0.377	7.0	LOS A	1.7	43.3	0.45	0.32	0.47	35.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

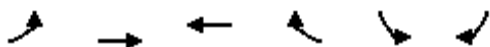
SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 5:15:57 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\AM_Existing Roundabouts.sip9

HCM 6th Signalized Intersection Summary 3: SH 402 & S Boise Ave

07/24/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	215	816	750	126	97	213
Future Volume (veh/h)	215	816	750	126	97	213
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	222	841	773	130	100	61
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	422	1514	1143	192	127	190
Arrive On Green	0.05	0.83	0.74	0.74	0.07	0.07
Sat Flow, veh/h	1739	1826	1548	260	1795	1598
Grp Volume(v), veh/h	222	841	0	903	100	61
Grp Sat Flow(s),veh/h/ln	1739	1826	0	1809	1795	1598
Q Serve(g_s), s	4.4	20.4	0.0	36.5	7.7	4.9
Cycle Q Clear(g_c), s	4.4	20.4	0.0	36.5	7.7	4.9
Prop In Lane	1.00			0.14	1.00	1.00
Lane Grp Cap(c), veh/h	422	1514	0	1335	127	190
V/C Ratio(X)	0.53	0.56	0.00	0.68	0.79	0.32
Avail Cap(c_a), veh/h	513	1514	0	1335	244	294
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	3.8	0.0	9.6	64.0	56.5
Incr Delay (d2), s/veh	1.0	1.5	0.0	2.8	10.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	4.8	0.0	12.2	3.9	2.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	5.3	0.0	12.3	74.1	57.5
LnGrp LOS	B	A	A	B	E	E
Approach Vol, veh/h		1063	903		161	
Approach Delay, s/veh		6.7	12.3		67.8	
Approach LOS		A	B		E	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.7	111.4			124.1	15.9
Change Period (Y+Rc), s	6.0	8.0			8.0	6.0
Max Green Setting (Gmax), s	14.0	87.0			107.0	19.0
Max Q Clear Time (g_c+I1), s	6.4	38.5			22.4	9.7
Green Ext Time (p_c), s	0.3	7.3			6.4	0.3
Intersection Summary						
HCM 6th Ctrl Delay			13.7			
HCM 6th LOS			B			

Intersection						
Int Delay, s/veh	10.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	141	793	677	112	62	116
Future Vol, veh/h	141	793	677	112	62	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	385	-	-	420	225	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	4	4	5	5
Mvmt Flow	152	853	728	120	67	125
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	848	0	-	0	1885	728
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	1157	-
Critical Hdwy	4.12	-	-	-	6.45	6.25
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	2.218	-	-	-	3.545	3.345
Pot Cap-1 Maneuver	790	-	-	-	76	418
Stage 1	-	-	-	-	473	-
Stage 2	-	-	-	-	295	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	790	-	-	-	~ 61	418
Mov Cap-2 Maneuver	-	-	-	-	~ 61	-
Stage 1	-	-	-	-	382	-
Stage 2	-	-	-	-	295	-
Approach	EB	WB		SB		
HCM Control Delay, s	1.6	0		100.6		
HCM LOS	F					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	790	-	-	-	61	418
HCM Lane V/C Ratio	0.192	-	-	-	1.093	0.298
HCM Control Delay (s)	10.6	-	-	-	256.6	17.2
HCM Lane LOS	B	-	-	-	F	C
HCM 95th %tile Q(veh)	0.7	-	-	-	5.4	1.2
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

07/24/2024

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	756	8	10	838	0	10	0	20	0	0	0
Future Vol, veh/h	0	756	8	10	838	0	10	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	340	225	-	-	0	-	195	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	4	4	4	4	4	4	0	0	0
Mvmt Flow	0	831	9	11	921	0	11	0	22	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	921	0	0	840	0	0	1314	-	831	1790	1783	461
Stage 1	-	-	-	-	-	-	831	-	-	943	943	-
Stage 2	-	-	-	-	-	-	483	-	-	847	840	-
Critical Hdwy	4.145	-	-	4.16	-	-	7.36	-	6.26	7.3	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	-	-	6.1	5.5	-
Follow-up Hdwy	2.2285	-	-	2.238	-	-	3.538	-	3.338	3.5	4	3.3
Pot Cap-1 Maneuver	734	-	-	782	-	-	123	0	365	58	83	553
Stage 1	-	-	-	-	-	-	359	0	-	286	344	-
Stage 2	-	-	-	-	-	-	530	0	-	359	384	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	734	-	-	782	-	-	122	-	365	54	82	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	-	-	54	82	-
Stage 1	-	-	-	-	-	-	359	-	-	286	339	-
Stage 2	-	-	-	-	-	-	523	-	-	337	384	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			22.8			0		
HCM LOS							C			A		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	122	365	734	-	-	782	-	-	-
HCM Lane V/C Ratio	0.09	0.06	-	-	-	0.014	-	-	-
HCM Control Delay (s)	37.4	15.5	0	-	-	9.7	-	-	0
HCM Lane LOS	E	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.3	0.2	0	-	-	0	-	-	-

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	2	766	40	35	774	0	21	0	44	0	0	1
Future Vol, veh/h	2	766	40	35	774	0	21	0	44	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	3	3	3	4	4	4	2	2	2	0	0	0
Mvmt Flow	2	833	43	38	841	0	23	0	48	0	0	1
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	841	0	0	876	0	0	1777	1776	855	1800	1797	841
Stage 1	-	-	-	-	-	-	859	859	-	917	917	-
Stage 2	-	-	-	-	-	-	918	917	-	883	880	-
Critical Hdwy	4.13	-	-	4.14	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.236	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	790	-	-	762	-	-	64	83	358	63	81	368
Stage 1	-	-	-	-	-	-	351	373	-	329	354	-
Stage 2	-	-	-	-	-	-	326	351	-	343	368	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	790	-	-	762	-	-	59	75	358	50	73	368
Mov Cap-2 Maneuver	-	-	-	-	-	-	59	75	-	50	73	-
Stage 1	-	-	-	-	-	-	349	371	-	327	321	-
Stage 2	-	-	-	-	-	-	294	318	-	296	366	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.4			57.1			14.8		
HCM LOS							F			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	136	790	-	-	762	-	-	368				
HCM Lane V/C Ratio	0.52	0.003	-	-	0.05	-	-	0.003				
HCM Control Delay (s)	57.1	9.6	0	-	10	0	-	14.8				
HCM Lane LOS	F	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	2.5	0	-	-	0.2	-	-	0				

SITE LAYOUT

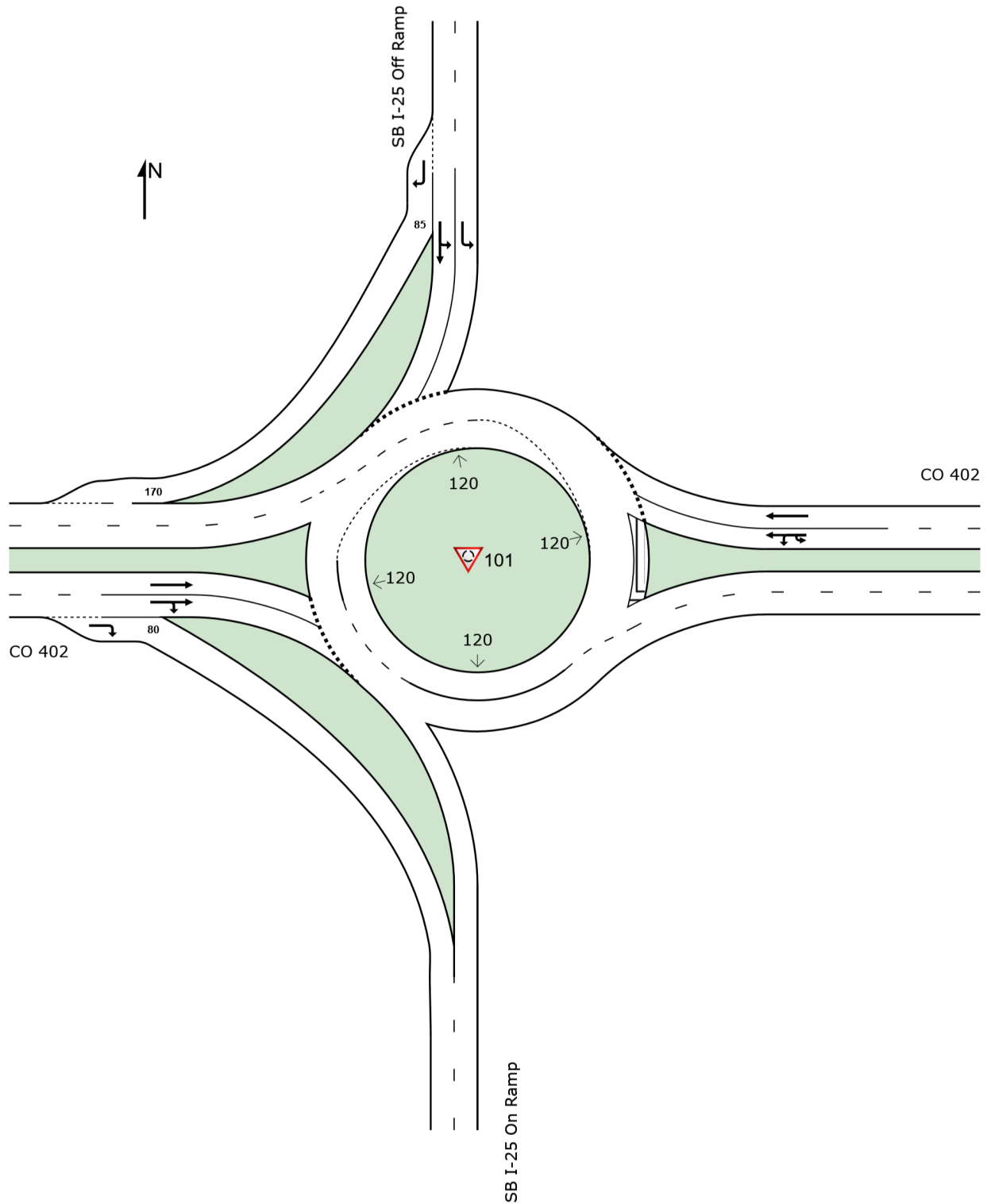
 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

Existing PM Peak Hour

Site Category: Existing Design

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing PM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	4	5.0	4	5.0	0.321	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	19.5
1	L2	All MCs	177	5.0	177	5.0	0.321	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	37.6
6	T1	All MCs	689	5.0	689	5.0	0.321	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	26.4
Approach			871	5.0	871	5.0	0.321	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	29.5
North: SB I-25 Off Ramp															
7	L2	All MCs	185	6.0	185	6.0	0.173	8.9	LOS A	0.6	14.4	0.62	0.60	0.62	27.6
4	T1	All MCs	1	6.0	1	6.0	0.173	8.6	LOS A	0.5	14.0	0.61	0.59	0.61	37.6
14	R2	All MCs	253	6.0	253	6.0	0.160	4.5	LOS A	0.0	0.0	0.00	0.00	0.00	42.3
Approach			439	6.0	439	6.0	0.173	6.4	LOS A	0.6	14.4	0.26	0.25	0.26	34.4
West: CO 402															
2	T1	All MCs	649	7.0	649	7.0	0.364	8.1	LOS A	1.6	41.9	0.53	0.39	0.53	22.8
12	R2	All MCs	207	7.0	207	7.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			855	7.0	855	7.0	0.364	6.1	LOS A	1.6	41.9	0.41	0.30	0.41	27.9
All Vehicles			2165	6.0	2165	6.0	0.364	5.4	LOS A	1.6	41.9	0.21	0.17	0.21	30.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 4:54:21 PM

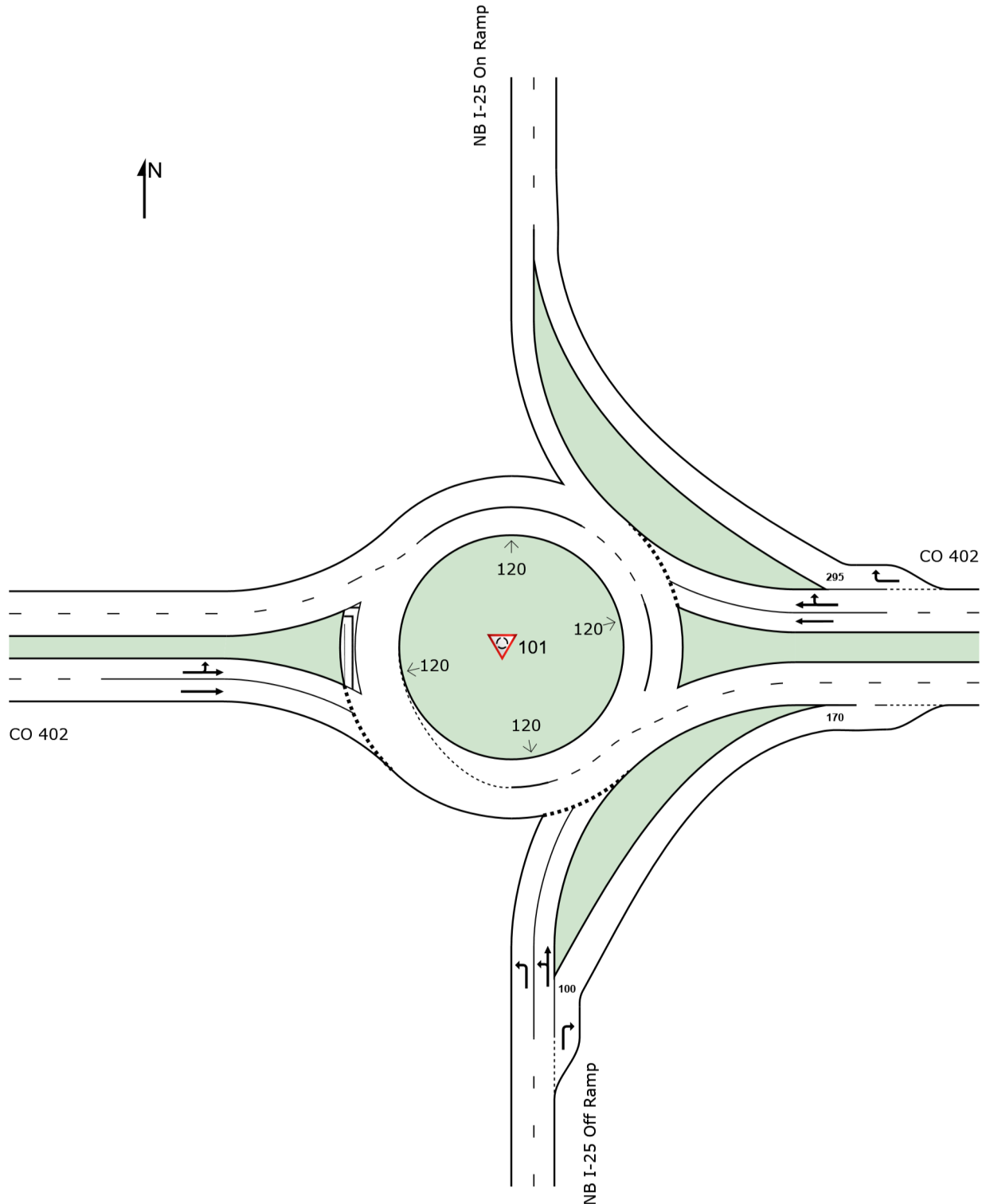
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\PM_Existing Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Existing PM Peak Hour
Site Category: Existing Design
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing PM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh.]	Dist]				
South: NB I-25 Off Ramp															
3	L2	All MCs	340	4.0	340	4.0	0.295	10.2	LOS B	1.1	28.4	0.65	0.64	0.72	25.8
8	T1	All MCs	1	4.0	1	4.0	0.295	9.8	LOS A	1.1	27.8	0.64	0.63	0.71	35.2
18	R2	All MCs	175	4.0	175	4.0	0.108	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	41.3
Approach			516	4.0	516	4.0	0.295	8.1	LOS A	1.1	28.4	0.43	0.42	0.48	29.5
East: CO 402															
6	T1	All MCs	539	7.0	539	7.0	0.379	9.9	LOS A	1.7	44.8	0.63	0.60	0.76	19.6
16	R2	All MCs	90	7.0	90	7.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			629	7.0	629	7.0	0.379	8.5	LOS A	1.7	44.8	0.54	0.52	0.65	20.6
West: CO 402															
5	L2	All MCs	247	5.0	247	5.0	0.311	4.2	LOS A	0.0	0.0	0.00	0.00	0.00	35.6
2	T1	All MCs	596	5.0	596	5.0	0.311	4.2	LOS A	0.0	0.0	0.00	0.00	0.00	24.4
Approach			842	5.0	842	5.0	0.311	4.2	LOS A	0.0	0.0	0.00	0.00	0.00	28.3
All Vehicles			1988	5.4	1988	5.4	0.379	6.6	LOS A	1.7	44.8	0.28	0.27	0.33	26.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 4:54:53 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\PM_Existing Roundabouts.sip9

SITE LAYOUT

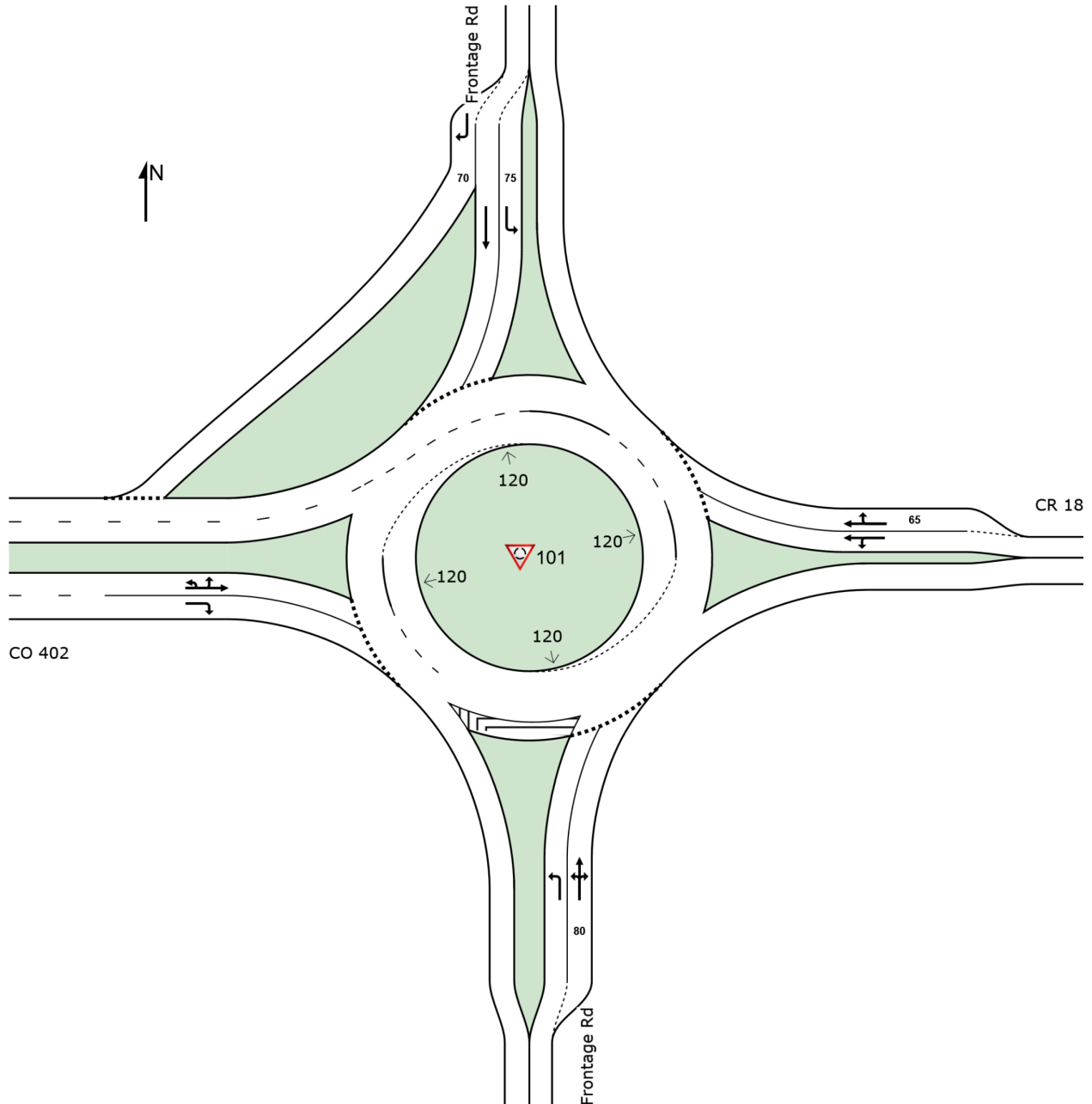
 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Existing PM Peak Hour

Site Category: Existing Design

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Monday, August 5, 2024 5:14:43 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\PM_Existing Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing PM Peak Hour

Site Category: Existing Design

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	100	9.0	100	9.0	0.192	9.5	LOS A	0.6	16.1	0.64	0.61	0.64	29.5
8	T1	All MCs	92	9.0	92	9.0	0.257	10.5	LOS B	0.8	22.4	0.66	0.63	0.67	32.5
18	R2	All MCs	41	9.0	41	9.0	0.257	10.5	LOS B	0.8	22.4	0.66	0.63	0.67	37.2
Approach			234	9.0	234	9.0	0.257	10.1	LOS B	0.8	22.4	0.65	0.62	0.66	32.2
East: CR 18															
1	L2	All MCs	7	4.0	7	4.0	0.243	6.9	LOS A	1.0	24.8	0.53	0.41	0.53	37.8
6	T1	All MCs	325	4.0	325	4.0	0.243	6.7	LOS A	1.0	24.8	0.52	0.40	0.52	39.4
16	R2	All MCs	88	4.0	88	4.0	0.243	6.5	LOS A	0.9	24.3	0.51	0.39	0.51	39.1
Approach			420	4.0	420	4.0	0.243	6.7	LOS A	1.0	24.8	0.52	0.40	0.52	39.3
North: Frontage Rd															
7	L2	All MCs	79	6.0	79	6.0	0.091	5.0	LOS A	0.3	8.0	0.45	0.35	0.45	37.5
4	T1	All MCs	73	6.0	73	6.0	0.090	5.3	LOS A	0.3	8.1	0.47	0.37	0.47	33.4
14	R2	All MCs	170	6.0	170	6.0	0.194	6.0	LOS A	0.7	18.4	0.48	0.37	0.48	29.2
Approach			322	6.0	322	6.0	0.194	5.6	LOS A	0.7	18.4	0.47	0.36	0.47	32.8
West: CO 402															
5u	U	All MCs	8	4.0	8	4.0	0.657	11.6	LOS B	5.4	139.5	0.58	0.32	0.59	18.9
5	L2	All MCs	237	4.0	237	4.0	0.657	11.6	LOS B	5.4	139.5	0.58	0.32	0.59	27.6
2	T1	All MCs	527	4.0	527	4.0	0.657	11.6	LOS B	5.4	139.5	0.58	0.32	0.59	37.0
12	R2	All MCs	14	4.0	14	4.0	0.013	3.3	LOS A	0.0	1.2	0.27	0.13	0.27	32.2
Approach			786	4.0	786	4.0	0.657	11.5	LOS B	5.4	139.5	0.57	0.32	0.59	33.7
All Vehicles			1761	5.0	1761	5.0	0.657	9.1	LOS A	5.4	139.5	0.55	0.39	0.56	34.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Monday, August 5, 2024 5:14:44 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\Existing\PM_Existing Roundabouts.sip9

APPENDIX D

Existing Crash Analysis

Intersection Safety Performance Functions

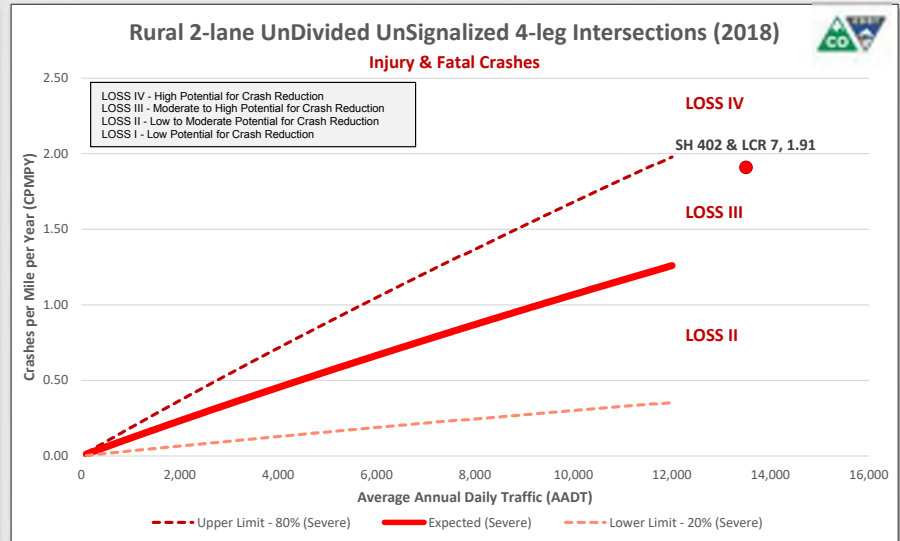
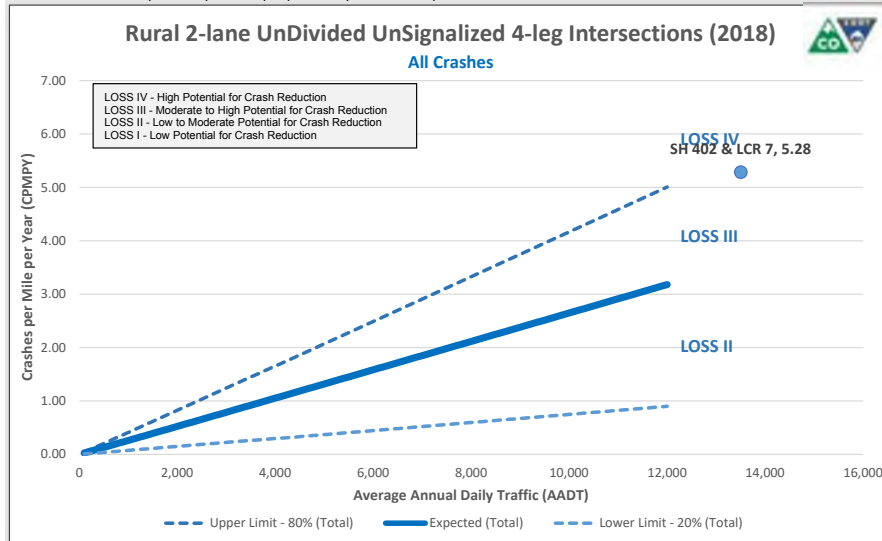
Choose a Model: **Rural 2-lane UnDivided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & LCR 7	13,500	1,500	1/1/2018	12/31/2022	17	9	1	5.28	1.91

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

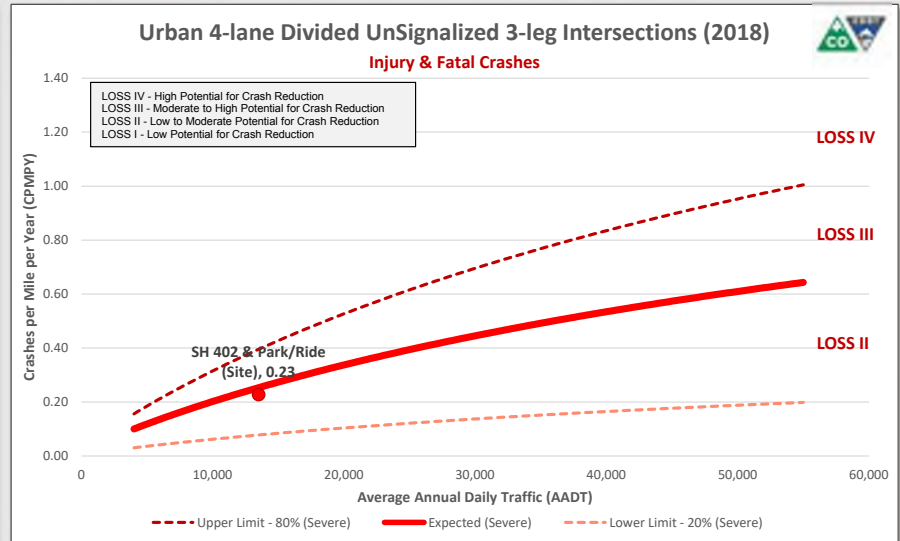
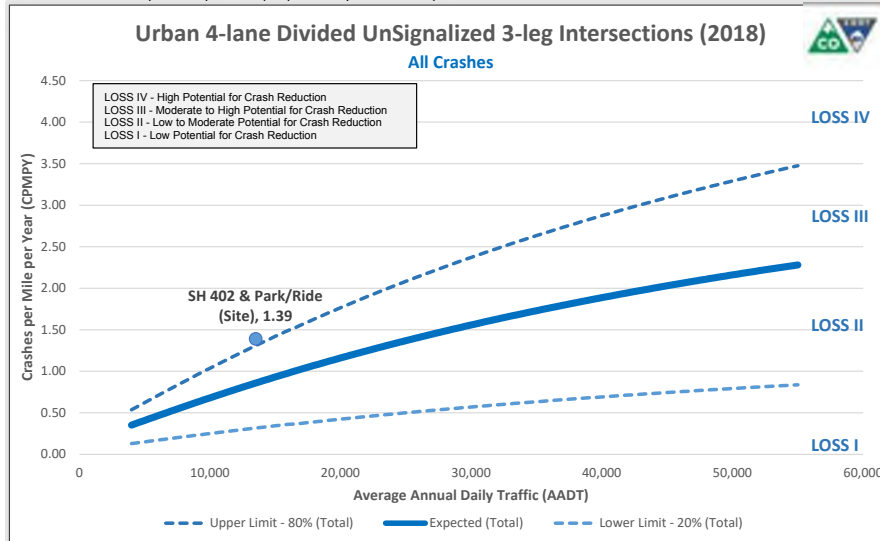
Choose a Model: **Urban 4-lane Divided UnSignalized 3-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & Park/Ride (Site)	13,500	1,000	1/1/2018	12/31/2022	7	1	0	1.39	0.23

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

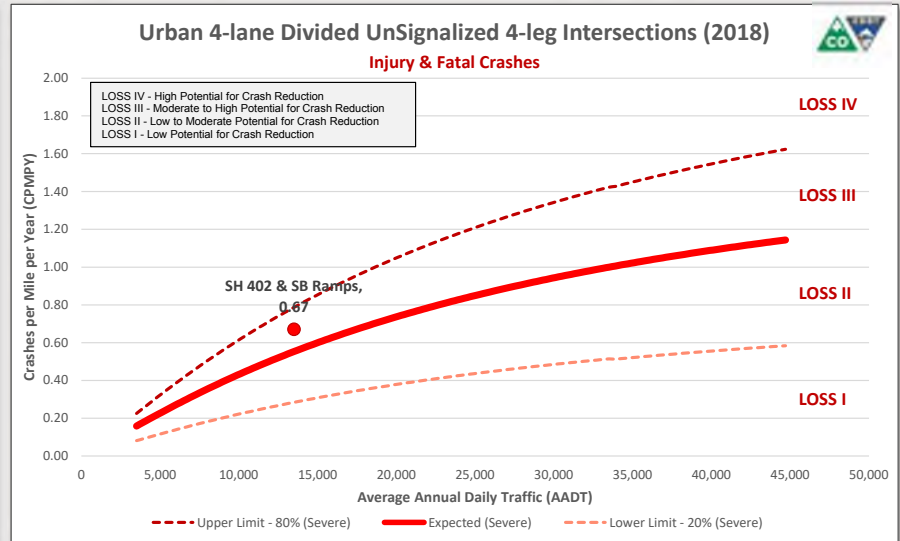
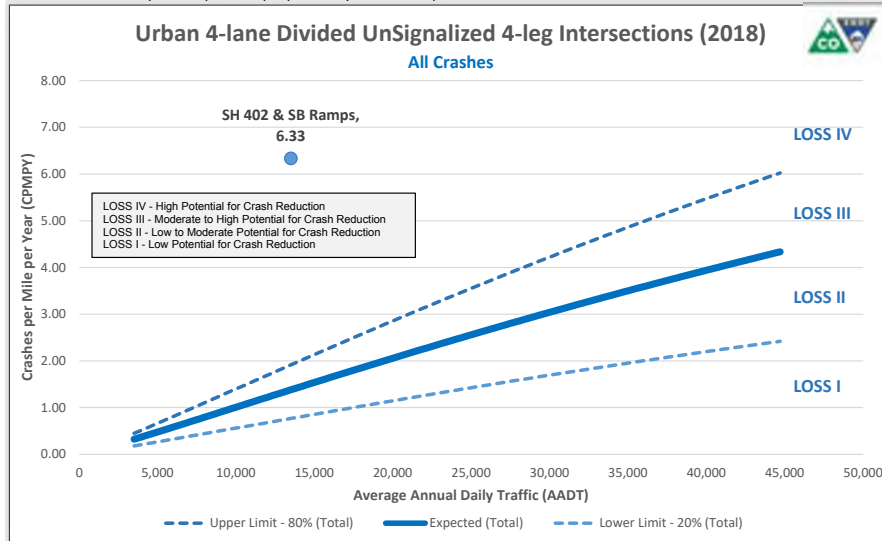
Choose a Model: **Urban 4-lane Divided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & SB Ramps	13,500	5,000	1/1/2018	12/31/2022	41	4	0	6.33	0.67

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

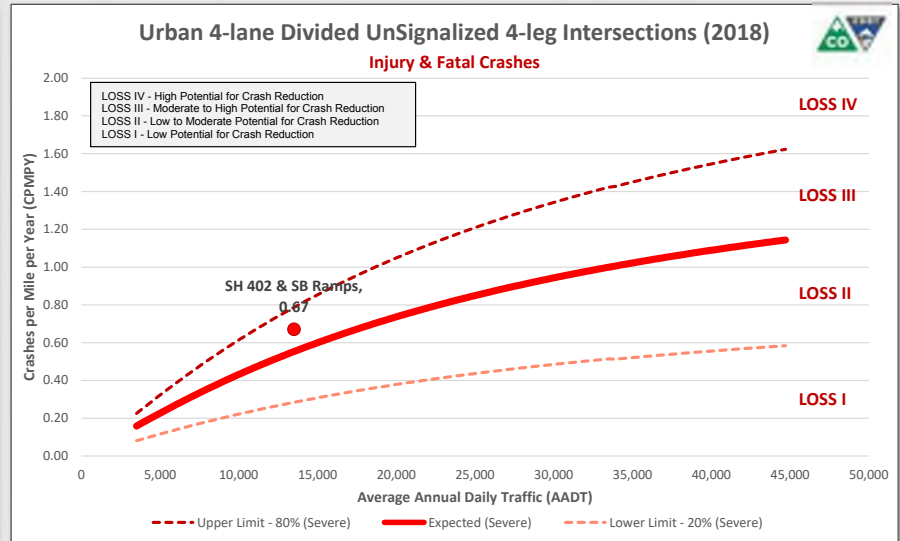
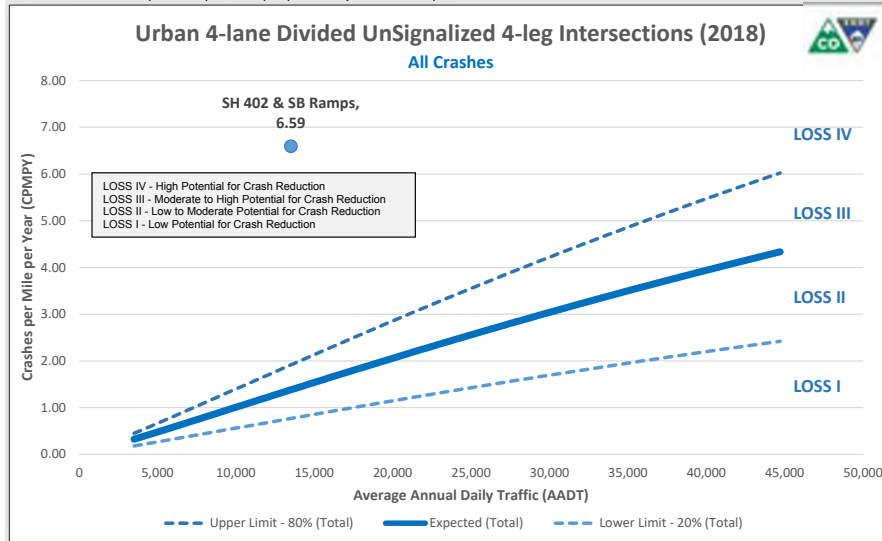
Choose a Model: **Urban 4-lane Divided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & SB Ramps	13,500	5,000	1/1/2018	12/31/2022	43	4	0	6.59	0.67

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



system	rte	sec	mp	date	time	severity	inlevel_1	inlevel_2	inlevel_3	inlevel_4	inlevel_5	location	road_desc	vehicles	contour	condition	lighting	weather	limit1	limit2	ramp	accptcy	rear_end	dir_1	vehicle_1	driver_1
STATE HIGHWAY	402 A	3.5	5/9/2018	1602 INJ	6	0	1	0	0	0	0	0 ON	NON-INTERSECTION	3	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	1/17/2020	924 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			SIDESWIPE (SAME DIRECTION)	W	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	12/13/2019	658 PDD	1	0	0	0	0	0	0	0 OFF RIGHT	AT INTERSECTION	1	STRAIGHT ON-LEVEL	DRY	DAWN OR DUSK	NONE	45	UK	N		SIGN	S	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	6/1/2018	1726 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			APPROACH TURN	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	2/2/2018	1553 PDD	2	0	0	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	8/29/2018	1809 FAT	0	1	1	0	0	1	0	1 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			APPROACH TURN	E	PICKUP TRUCK/UTILITY VAN	ALCOHOL/DRUGS
STATE HIGHWAY	402 A	3.74	3/2/2020	2153 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DARK-LIGHTED	NONE	55	55 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	1/5/2018	1715 INJ	1	2	1	0	0	0	0	0 ON	INTERSECTION RELATED	4	STRAIGHT ON-LEVEL	DRY	DAWN OR DUSK	NONE	55	55 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	4/18/2018	1810 PDD	4	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	4/30/2019	1659 INJ	1	1	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	WET	DAYLIGHT	SNOW/SLEET/HAIL	30	30 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	6/28/2020	1049 INJ	2	1	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	W	PASSENGER CAR/VAN	K9/MEDICATION/DRUGS
STATE HIGHWAY	402 A	3.74	3/10/2020	1300 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	40	40 N			SIDESWIPE (SAME DIRECTION)	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	3/16/2018	1352 INJ	0	1	0	0	2	0	2	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-GRADE	DRY	DAYLIGHT	NONE	55	55 N			APPROACH TURN	W	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	7/16/2020	1342 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	3/10/2020	2047 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHTED	NONE	UK	UK	N		REAR-END	E	SUV	ALCOHOL INVOLVED
STATE HIGHWAY	402 A	3.74	10/24/2018	1836 PDD	2	0	0	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHTED	NONE	30	30 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.74	2/17/2020	653 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	30	30 N			REAR-END	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.75	10/21/2018	2025 PDD	4	0	0	0	0	0	0	0 ON	NON-INTERSECTION	3	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHTED	NONE	30	30 N			REAR-END	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.93	4/19/2018	1605 PDD	2	0	0	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 N			REAR-END	E	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.95	3/14/2018	1734 PDD	2	0	0	0	0	0	0	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	E	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	3.95	3/14/2018	1803 PDD	4	0	0	0	0	0	0	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4	6/14/2018	1707 PDD	3	0	0	0	0	0	0	0 ON	NON-INTERSECTION	3	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	45	45 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.02	5/11/2018	1430 PDD	2	0	0	0	0	0	0	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	45	45 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	11/22/2019	1027 PDD	0	0	0	0	0	0	0	0 OFF RIGHT	ROUNDABOUT	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	UK	UK	N		LIGHT/UTILITY POLE	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	6/17/2020	1700 INJ	1	1	0	0	0	0	0	0 ON	ROUNDABOUT	2	CURVE ON-GRADE	DRY	DAYLIGHT	NONE	35	35 N			BROADSIDE	S	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	5/13/2020	1451 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	30	30 N			SIDESWIPE (SAME DIRECTION)	S	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	1/19/2020	649 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	STRAIGHT ON-LEVEL	DRY	DAWN OR DUSK	NONE	35	35 N			BROADSIDE	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	11/2/2019	1607 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	30	30 N			BROADSIDE	S	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	11/14/2019	1143 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	CURVE ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			SIDESWIPE (SAME DIRECTION)	W	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	11/11/2020	1750 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DARK-LIGHTED	NONE	35	35 N			SIDESWIPE (SAME DIRECTION)	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.11	7/23/2020	1024 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	30	30 N			SIDESWIPE (SAME DIRECTION)	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.14	8/11/2018	1557 PDD	5	0	0	0	0	0	0	0 ON	RAMP	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	55 Y (T)			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.17	4/8/2018	51 INJ	2	1	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DARK-UNLIGHTED	NONE	35	35 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.18	3/5/2018	1709 PDD	1	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	UK	35 N			REAR-END	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.18	3/24/2019	2101 PDD	1	0	0	0	0	0	0	0 OFF RIGHT	AT INTERSECTION	1	STRAIGHT ON-GRADE	DRY	DARK-UNLIGHTED	NONE	55	UK	N		EMBANKMENT CUT/FILL SLOPE	S	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.22	11/20/2018	703 INJ	1	1	0	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	45	45 N			REAR-END	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.22	6/13/2018	1810 PDD	3	0	0	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	55	45 N			REAR-END	E	PASSENGER CAR/VAN	ALCOHOL INVOLVED
STATE HIGHWAY	402 A	4.23	4/8/2019	849 PDD	0	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	UK	30 N			REAR-END	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.23	3/23/2018	1100 PDD	2	0	0	0	0	0	0	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.26	5/25/2018	551 INJ	1	0	1	0	0	0	0	0 ON	NON-INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	W	MOTORCYCLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.27	7/4/2018	1600 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.27	9/5/2018	1430 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			APPROACH TURN	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.27	10/1/2018	1828 INJ	0	2	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAWN OR DUSK	NONE	35	35 N			APPROACH TURN	W	PICKUP TRUCK/UTILITY VAN	ALCOHOL INVOLVED
STATE HIGHWAY	402 A	4.3	9/16/2020	916 PDD	1	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	UK	35 N			SIDESWIPE (SAME DIRECTION)	UK	UNKNOWN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	2/10/2020	1331 INJ	0	1	0	0	0	0	0	0 OFF RIGHT	ROUNDABOUT	1	CURVE ON-LEVEL	DRY	DAYLIGHT	NONE	35	UK	N		OVERTURNING	W	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	5/4/2019	1106 PDD	6	0	0	0	0	0	0	0 ON	NON-INTERSECTION	3	CURVE ON-LEVEL	DRY	DAYLIGHT	NONE	45	45 N			REAR-END	N	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	3/30/2019	1532 PDD	3	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	30	30 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	10/27/2020	1128 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	35	35 N			SIDESWIPE (SAME DIRECTION)	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	5/18/2020	1630 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			SIDESWIPE (SAME DIRECTION)	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	12/10/2020	1552 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	35	35 N			BROADSIDE	N	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	11/13/2020	2235 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DARK-LIGHTED	NONE	35	35 N			SIDESWIPE (SAME DIRECTION)	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	11/7/2020	1341 PDD	2	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	30	30 N			BROADSIDE	N	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.3	8/6/2020	1408 PDD	3	0	0	0	0	0	0	0 ON	ROUNDABOUT	2	UNKNOWN	DRY	DAYLIGHT	NONE	30	30 N			BROADSIDE	N	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.31	5/10/2019	0 PDD	2	0	0	0	0	0	0	0 ON	INTERSECTION RELATED	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			VEHICLE CARGO/DEBRIS	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.31	7/19/2019	1330 PDD	1	0	0	0	0	0	0	0 OFF RIGHT	AT INTERSECTION	1	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	UK	N		SIGN	E	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.31	3/5/2018	1448 PDD	2	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	DRY	DAYLIGHT	NONE	35	35 N			REAR-END	E	SUV	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.31	5/18/2018	1707 PDD	0	0	0	0	0	0	0	0 ON	AT INTERSECTION	2	STRAIGHT ON-LEVEL	WET	DAWN OR DUSK	RAIN	35	35 N			REAR-END	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED
STATE HIGHWAY	402 A	4.31	6/2/2018	1620 INJ	3	0	1	0	0	0	0	0 ON	AT INTERSECTION	3	STRAIGHT ON-LEVEL	DRY										

factor_1	speed_1	veh_move_1	dir_2	vehicle_2	driver_2	factor_2	speed_2	veh_move_2	loc_01	link	loc_02	city	county	latitude	longitude
NO APPARENT CONTRIBUTING FACTOR	17	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402	AT	4800 BLK	LOVELAND	LARIMER	40.378132	-105.006997
NO APPARENT CONTRIBUTING FACTOR	40	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	DRIVER UNFAMILAR WITH AREA	UK	10 GOING STRAIGHT	14TH ST SE CR 7	AT	CR 7	LOVELAND	LARIMER	40.378091	-105.002427
DRIVER UNFAMILAR WITH AREA	5	MAKING RIGHT TURN			NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR			HWY 402	AT	HWY 402	LOVELAND	LARIMER	40.378091	-105.002446
NO APPARENT CONTRIBUTING FACTOR	15	MAKING LEFT TURN	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		50 GOING STRAIGHT	CR 7 S	AT	HWY 402 E	LOVELAND	LARIMER	40.378091	-105.002444
DRIVER PREOCCUPIED		GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HIGHWAY 402 E	AT	CR 7 / CHARLOTTE CT	LOVELAND	LARIMER	40.378091	-105.002444
NO APPARENT CONTRIBUTING FACTOR	UK	MAKING LEFT TURN	W	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402	AT	CHARLOTTE CT	LOVELAND	LARIMER	40.378106	-105.002567
UNKNOWN	UK	GOING STRAIGHT	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	CHARLOTTE CT (NOT IN CORIS)	LOVELAND	LARIMER	40.378091	-105.002427
NO APPARENT CONTRIBUTING FACTOR	40	SLOWING	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		40 SLOWING	HWY 402	AT	CR 7	JOHNSTOWN	WELD	40.378091	-105.002444
NO APPARENT CONTRIBUTING FACTOR	40	SLOWING	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		40 SLOWING	HWY 402	AT	CR 7	LARIMER	LARIMER	40.378091	-105.002444
NO APPARENT CONTRIBUTING FACTOR	35	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 SLOWING	HWY 402	AT	CR 7	LARIMER	LARIMER	40.378091	-105.002446
UNKNOWN	45	MAKING LEFT TURN	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	UNKNOWN	UK	GOING STRAIGHT	HWY 402	AT	CR 7	JOHNSTOWN	LARIMER	40.378091	-105.002427
NO APPARENT CONTRIBUTING FACTOR	10	OTHER	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 GOING STRAIGHT	HWY 402	AT	CR 7	JOHNSTOWN	LARIMER	40.378091	-105.002427
NO APPARENT CONTRIBUTING FACTOR	10	MAKING LEFT TURN	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402	AT	CR 7	LOVELAND	LARIMER	40.378091	-105.002444
NO APPARENT CONTRIBUTING FACTOR	55	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 SLOWING	HWY 402 E	AT	CHARLOTTE CT	LOVELAND	LARIMER	40.378091	-105.002427
UNKNOWN	UK	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	MAKING LEFT TURN	HWY 402 E	AT	CR 7	LOVELAND	LARIMER	40.378091	-105.002427
DRIVER FATIGUE	45	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		40 SLOWING	HWY 402 E	AT	CR 7 S	JOHNSTOWN	LARIMER	40.378091	-105.002444
DRIVER INEXPERIENCE	40	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402 E	AT	CR 7 S	JOHNSTOWN	LARIMER	40.378091	-105.002427
UNKNOWN	30	GOING STRAIGHT	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		30 SLOWING	HWY 402	AT	LCR 7 S	JOHNSTOWN	WELD	40.378091	-105.002258
NO APPARENT CONTRIBUTING FACTOR	35	GOING STRAIGHT	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		15 AVOIDING OBJECT/VEHICLE IN ROAD	HWY 402	AT	00393FW MM 4	LARIMER	LARIMER	40.378097	-104.998894
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	5500 E	LOVELAND	LARIMER	40.378097	-104.99852
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	5500 E	LOVELAND	LARIMER	40.378097	-104.99852
NO APPARENT CONTRIBUTING FACTOR	30	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 SLOWING	HWY 402	AT	MM 4	JOHNSTOWN	WELD	40.378099	-104.997586
NO APPARENT CONTRIBUTING FACTOR	10	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		5 SLOWING	HWY 402	AT	MM 4	JOHNSTOWN	WELD	40.378099	-104.997212
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT			NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR			HWY 402	AT	5570 E HWY 402	JOHNSTOWN	LARIMER	40.377711	-104.994196
DRIVER UNFAMILAR WITH AREA	25	MAKING RIGHT TURN	W	SUV	NO IMPAIRMENT SUSPECTED	DRIVER UNFAMILAR WITH AREA		25 GOING STRAIGHT	HWY 402	AT	I-25 SB OFF RAMP	JOHNSTOWN	LARIMER	40.378001	-104.994124
NO APPARENT CONTRIBUTING FACTOR	20	OTHER	S	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	OTHER	HWY 402	AT	I-25 SB ON RAMP	JOHNSTOWN	LARIMER	40.378001	-104.994124
NO APPARENT CONTRIBUTING FACTOR	15	GOING STRAIGHT	S	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		35 GOING STRAIGHT	HWY 402	AT	I-25 SB ON RAMP (NEW CONFIG)	JOHNSTOWN	LARIMER	40.378001	-104.994124
NO APPARENT CONTRIBUTING FACTOR	15	OTHER	S	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		25 OTHER	HWY 402	AT	I-25 SB RAMPS	JOHNSTOWN	WELD	40.377981	-104.993938
NO APPARENT CONTRIBUTING FACTOR	20	OTHER	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 GOING STRAIGHT	HWY 402	AT	I-25 SB RAMPS	JOHNSTOWN	WELD	40.377981	-104.993938
NO APPARENT CONTRIBUTING FACTOR	35	UNKNOWN	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		35 GOING STRAIGHT	HWY 402	AT	I-25 EXIT 255 ROUND ABOUT	JOHNSTOWN	LARIMER	40.378001	-104.994124
DRIVER UNFAMILAR WITH AREA	25	GOING STRAIGHT	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		25 GOING STRAIGHT	HWY 402	AT	I-25 SB ONRAMP ROUND ABOUT	JOHNSTOWN	LARIMER	40.378001	-104.994124
DRIVER PREOCCUPIED	40	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	LOVELAND PARK AND RIDE (NOT IN CORIS)	LOVELAND	LARIMER	40.378103	-104.994097
DRIVER PREOCCUPIED	40	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		15 GOING STRAIGHT	HWY 402	AT	99999FW	JOHNSTOWN	WELD	40.378104	-104.994409
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402 EB	AT	I-25 SB RAMPS	JOHNSTOWN	LARIMER	40.378104	-104.994222
ILLNESS	55	OTHER			NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		I-25 SB OFF RAMP	HWY 402	AT	HWY 402	LARIMER	LARIMER	40.378104	-104.994182
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 GOING STRAIGHT	HWY 402	AT	99999FW I-25	JOHNSTOWN	LARIMER	40.378105	-104.993475
DRIVER PREOCCUPIED	45	GOING STRAIGHT	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	99999FW I-25 OVERPASS	LOVELAND	LARIMER	40.378105	-104.993475
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402	AT	I-25	JOHNSTOWN	LARIMER	40.378106	-104.99324
DRIVER PREOCCUPIED	35	GOING STRAIGHT	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402 EB	AT	I-25 UNDERPASS	JOHNSTOWN	WELD	40.378105	-104.993288
DRIVER PREOCCUPIED	10	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		5 SLOWING	HWY 402	AT	00030FW I-25 NB ON RAMP	JOHNSTOWN	WELD	40.378106	-104.992727
NO APPARENT CONTRIBUTING FACTOR	25	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		15 GOING STRAIGHT	HWY 402	AT	I-25 NB ON RAMP	JOHNSTOWN	WELD	40.378107	-104.99254
DRIVER PREOCCUPIED	10	MAKING LEFT TURN	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		35 GOING STRAIGHT	HWY 402	AT	I-25 NB ON RAMP	JOHNSTOWN	LARIMER	40.378107	-104.99254
UNKNOWN	35	MAKING LEFT TURN	E	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		10 GOING STRAIGHT	HWY 402	AT	I-25 SB OFF RAMP	JOHNSTOWN	LARIMER	40.378107	-104.99254
UNKNOWN	UK	UNKNOWN	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		15 GOING STRAIGHT	HWY 402	AT	I-25 NB RAMPS	JOHNSTOWN	LARIMER	40.378229	-104.991721
DRIVER INEXPERIENCE	21	OTHER			NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR			HWY 402	AT	I-25 NB RAMPS (NEW CONFIG)	JOHNSTOWN	LARIMER	40.378229	-104.991721
NO APPARENT CONTRIBUTING FACTOR	30	GOING STRAIGHT	N	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		25 SLOWING	HWY 402	AT	FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378107	-104.991975
NO APPARENT CONTRIBUTING FACTOR	10	SLOWING	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	SLOWING	HWY 402	AT	99999FW I-25 NB ON/OFF RAMP	JOHNSTOWN	LARIMER	40.378107	-104.991975
NO APPARENT CONTRIBUTING FACTOR	15	UNKNOWN	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		15 UNKNOWN	HWY 402	AT	INTERSTATE 25	JOHNSTOWN	LARIMER	40.378229	-104.991721
NO APPARENT CONTRIBUTING FACTOR	25	GOING STRAIGHT	W	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		25 GOING STRAIGHT	HWY 402	AT	I-25	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER INEXPERIENCE	10	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 CHANGING LANES	HWY 402	AT	I-25 NORTHBOUND OFF RAMP ROUNDABOUT	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER UNFAMILAR WITH AREA	20	UNKNOWN	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 MAKING LEFT TURN	HWY 402 OVERPASS/MIDDLE ROUNDABOUT	AT	I-25	JOHNSTOWN	LARIMER	40.378108	-104.991871
UNKNOWN	15	MAKING RIGHT TURN	E	PICKUP TRUCK/UTILITY VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		25 CHANGING LANES	HWY 402 OVERPASS/MIDDLE ROUNDABOUT	AT	I-25	JOHNSTOWN	LARIMER	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	20	GOING STRAIGHT	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 GOING STRAIGHT	HWY 402	AT	I-25 NB OFF RAMP	JOHNSTOWN	LARIMER	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	20	GOING STRAIGHT	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER INEXPERIENCE	10	MAKING RIGHT TURN			NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR			HWY 402	AT	I-25 FRONTAGE RD E	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER PREOCCUPIED	5	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	DRIVER PREOCCUPIED		5 GOING STRAIGHT	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	WELD	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	20	GOING STRAIGHT	E	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	WELD	40.378108	-104.991871
DISTRACTED BY PASSENGER	45	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	WELD	40.378108	-104.991871
UNKNOWN	5	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		5 GOING STRAIGHT	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	E	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER PREOCCUPIED	5	BACKING	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	HWY 402 / CR 18	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	55	GOING STRAIGHT	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		35 GOING STRAIGHT	I-25 FRONTAGE RD SE	AT	HWY 402	JOHNSTOWN	WELD	40.378108	-104.991871
NO APPARENT CONTRIBUTING FACTOR	55	GOING STRAIGHT	W	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		35 GOING STRAIGHT	I-25 FRONTAGE RD SE	AT	HWY 402	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER PREOCCUPIED	5	GOING STRAIGHT	N	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		0 STOPPED IN TRAFFIC	SE FRONTAGE RD	AT	HWY 402	JOHNSTOWN	LARIMER	40.378108	-104.991871
DRIVER UNFAMILAR WITH AREA	5	WRONG WAY	N	TRUCK GVW > 10K/BUSSES > 15 PEOPLE	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		10 MAKING LEFT TURN	HWY 402	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378235	-104.988756
DRIVER UNFAMILAR WITH AREA	25	GOING STRAIGHT	W	PASSENGER CAR/VAN	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	HWY 402 (NEW CONFIG)	AT	I-25 FRONTAGE RD SE	JOHNSTOWN	LARIMER	40.378235	-104.988756
NO APPARENT CONTRIBUTING FACTOR	10	GOING STRAIGHT	S	BICYCLE	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR	UK	GOING STRAIGHT	I-25 FRONTAGE RD SE	AT	HWY 402	JOHNSTOWN	LARIMER	40.378262	-104.988792
NO APPARENT CONTRIBUTING FACTOR	20	MAKING LEFT TURN	NW	SUV	NO IMPAIRMENT SUSPECTED	NO APPARENT CONTRIBUTING FACTOR		20 MAKING LEFT TURN	HWY 402	AT	SE FRONTAGE ROAD	JOHNSTOWN	LARIMER	40.377981	-104.988547

CUID	System Code	Rd_Number	Rd_Section	City_Street	Road Description	City	County	Location 1	Link	Location 2	Location	Crash Type	MHE	First HE
56418	2 402A	3.73			Non-Intersection	LOVELAND	LARIMER	HWY 402	99999FW	CR 7	Ran off left side	Overtuning/Rollover	Overtuning/Rollover	Overtuning/Rollover
99936	2 402A	3.741			At Intersection	LOVELAND	LARIMER	HWY 402	AT	CR 7	On Roadway	Rear-End	Front to Rear	Front to Rear
176108	2 402A	3.741			At Intersection	LOVELAND	LARIMER	HWY 402	AT	CR 7 / CHARLOTTE CT	On Roadway	Rear-End	Front to Rear	Front to Rear
203851	2 402A	3.741			At Intersection	LOVELAND	LARIMER	HWY 402	AT	CR 7	On Roadway	Light Pole/Utility Pole	Light Pole/Utility Pole	Light Pole/Utility Pole
218518	2 402A	3.741			At Intersection	LOVELAND	LARIMER	HWY 402	AT	CR 7	Ran off left side	Sign	Sign	Sign
221226	2 402A	3.741			At Intersection	JOHNSTOWN	LARIMER	HWY 402	AT	CR 7	On Roadway	Rear-End	Front to Rear	Front to Rear
274216	2 402A	3.741			At Intersection	JOHNSTOWN	LARIMER	HWY 402	AT	CR 7	On Roadway	Rear-End	Front to Rear	Front to Rear
150473	2 402A	3.75			Non-Intersection	LOVELAND	LARIMER	HWY 402	99999FE	CR 7	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
157846	2 402A	3.75			Intersection Related	LOVELAND	LARIMER	HWY 402	99999FE	CR 7 / CHARLOTTE CT	On Roadway	Rear-End	Front to Side	Front to Rear
234433	2 402A	3.92			Non-Intersection	JOHNSTOWN	LARIMER	HWY 402	0.25MW	I-25 SB ON RAMP	On Roadway	Sideswipe Opposite Direct	Side to Side-Opposite Dire	Side to Side-Opposite Dire
236661	2 402A	3.92			Non-Intersection	JOHNSTOWN	LARIMER	HWY 402	0.25MW	I-25 SB ON RAMP	On Roadway	Parked Motor Vehicle	Parked Motor Vehicle	Parked Motor Vehicle
188244	2 402A	4.050			At Intersection	JOHNSTOWN	LARIMER	HWY 402	00300FW	I-25 SB ON RAMP	On Roadway	Rear-End	Front to Rear	Front to Rear
55980	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 OFF RAMP SB	On Roadway	Broadside	Front to Side	Front to Side
120011	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP (W ROUND	On Roadway	Broadside	Front to Side	Front to Side
125185	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RNDABT	Center median/ Island	Sign	Sign	Sign
126461	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB OFF RAMP	Ran off left side	Traffic Signal Pole	Traffic Signal Pole	Traffic Signal Pole
130808	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB ON RAMP	On Roadway	Sideswipe Same Direction	Front to Side	Front to Side
135101	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
140732	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RNDABT	On Roadway	Broadside	Side to Side-Same Directio	Side to Side-Same Directio
162511	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Broadside	Front to Front	Front to Front
162551	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
172461	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
177404	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 OFF RAMP	On Roadway	Broadside	Front to Side	Front to Side
186373	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB OFF RAMP	On Roadway	Broadside	Front to Side	Front to Side
192272	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB ON RAMP	Ran off right side	Light Pole/Utility Pole	Light Pole/Utility Pole	Light Pole/Utility Pole
193621	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB ON RAMP	On Roadway	Rear-End	Front to Rear	Front to Rear
194267	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
194546	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	Center median/ Island	Traffic Signal Pole	Traffic Signal Pole	Traffic Signal Pole
196926	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Rear to Side	Rear to Side
212243	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Front to Side	Front to Side
215604	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RNDABT	On Roadway	Overtuning/Rollover	Overtuning/Rollover	Overtuning/Rollover
241356	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB OFF RAMP	On Roadway	Broadside	Front to Side	Front to Side
243365	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25	On Roadway	Vehicle Debris or Cargo	Vehicle Debris or Cargo	Vehicle Debris or Cargo
254438	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 OFF RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
255074	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
256464	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB OFF RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
258014	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
261231	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB OFF RAMP	On Roadway	Rear-End	Front to Rear	Front to Rear
261766	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB ROUNDABOUT W	On Roadway	Overtaking Turn	Front to Rear	Front to Rear
279319	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAB W	On Roadway	Parked Motor Vehicle	Parked Motor Vehicle	Parked Motor Vehicle
307827	2 402A	4.110			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SB RAMP	Ran off right side	Sign	Sign	Sign
56277	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB ON RAMP	On Roadway	Broadside	Front to Rear	Front to Rear
119800	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB OFF RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
135152	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Broadside	Side to Side-Same Directio	Side to Side-Same Directio
140205	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB OFF RAMP	On Roadway	Overtaking Turn	Side to Side-Same Directio	Side to Side-Same Directio
151605	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Sideswipe Same Direction	Front to Side	Front to Side
170706	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB OFF RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
170733	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
179960	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB ON RAMP	Ran off right side	Light Pole/Utility Pole	Light Pole/Utility Pole	Curb
186328	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Overtaking Turn	Front to Side	Front to Side
186357	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
194583	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	I-25 NB OFF RAMP	AT	HWY 402	Ran off right side	Traffic Signal Pole	Traffic Signal Pole	Traffic Signal Pole
197071	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 OVERPASS	On Roadway	Broadside	Front to Side	Front to Side
210561	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB OVERPASS	On Roadway	Broadside	Front to Side	Front to Side
217297	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	I-25 NB OFF RAMP	AT	HWY 402	On Roadway	Broadside	Front to Side	Front to Side
219258	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	I-25 NB OFF RAMP	AT	HWY 402	On Roadway	Broadside	Front to Side	Front to Side
226010	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB OFF RAMP	On Roadway	Broadside	Front to Side	Front to Side
232429	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Sideswipe Same Direction	Front to Side	Front to Side
261240	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	Ran off left side	Light Pole/Utility Pole	Light Pole/Utility Pole	Light Pole/Utility Pole
265142	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAB E	On Roadway	Broadside	Front to Side	Front to Side
265163	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAB E	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
265988	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAB	On Roadway	Broadside	Front to Side	Front to Side
269613	2 402A	4.295			Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NB RAMP	On Roadway	Broadside	Front to Side	Front to Side
136132	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 NE FRONTAGE RD	On Roadway	Broadside	Front to Side	Front to Side
164592	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 FRONTAGE RD SE	AT	CR 18	On Roadway	Broadside	Front to Side	Front to Side
164996	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 FRONTAGE RD SE	On Roadway	Rear-End	Front to Rear	Front to Rear
176673	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 SE FRONTAGE RD	AT	HWY 402	On Roadway	Broadside	Front to Side	Front to Side
179630	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 SE FRONTAGE RD	AT	LCR 18 (NOT CDOT)	On Roadway	Broadside	Front to Side	Front to Side
185661	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	CR 18	AT	I-25 SE FRONTAGE RD	On Roadway	Rear-End	Front to Rear	Front to Rear
186330	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	CR 18	AT	I-25 SE FRONTAGE RD	On Roadway	Overtaking Turn	Side to Side-Same Directio	Side to Side-Same Directio
212745	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SE FRONTAGE RD	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
225513	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402 (NOT CDOT)	AT	I-25 FRONTAGE RD SE	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
233156	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 FRONTAGE RD SE	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
243326	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 SE FRONTAGE RD	On Roadway	Broadside	Front to Side	Front to Side
248933	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	CR 18	AT	I-25 SE FRONTAGE RD	On Roadway	Broadside	Front to Side	Front to Side
259753	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 FRONTAGE RD SE	AT	HWY 402	On Roadway	Rear-End	Front to Rear	Front to Rear
272654	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	HWY 402	AT	I-25 FRONTAGE RD	On Roadway	Sideswipe Same Direction	Side to Side-Same Directio	Side to Side-Same Directio
277530	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 FRONTAGE RD SE	AT	HWY 402	On Roadway	Rear-End	Front to Rear	Front to Rear
315548	3 025A	255.272	P		Roundabout	JOHNSTOWN	LARIMER	I-25 SE FRONTAGE RD	AT	HWY 402	On Roadway	Broadside	Front to Side	Front to Side

Second HE	Third HE	Fourth HE	Wild Animal	Latitude	Longitude	TU-1 Type	TU-2 Type	TU-3 Type	TU-1 Direction	TU-2 Direction	TU-3 Direction	TU-1 Movement	TU-2 Movement
Electical/Utility Box				40.37808	-105.00252	SUV			East			Other (Describe in Narrativ	
				40.37808	-105.00252	Passenger Car/Passenger \	SUV		West	West		Going Straight	Stopped in Traffic
				40.37808	-105.00252	Pickup Truck/Utility Van	Pickup Truck/Utility Van		West	West		Going Straight	Stopped in Traffic
				40.37808	-105.00252	SUV			West			Making U-Turn	
				40.37808	-105.00252	Passenger Car/Passenger \			East			Making Right Turn	
				40.37809	-105.00248	Passenger Car/Passenger \	Passenger Car/Passenger \		West	West		Going Straight	Slowing
				40.37808	-105.00251	SUV	Passenger Car/Passenger \	Pickup Truck/Utility Van	West	West	West	Going Straight	Going Straight
				40.37807	-105.00252	Unknown (Hit and Run Onl	Passenger Car/Passenger \		West			Other (Describe in Narrativ	Going Straight
				40.37809	-105.00234	Passenger Car/Passenger \	Passenger Car/Passenger \	Medium/Heavy Trucks Cro	West	West	East	Out of Control	Stopped in Traffic
						Motorcycle	SUV		East	West		Other (Describe in Narrativ	Other (Describe in Narrativ
Embankment	Side to Side-Opposite Dire	Ditch		40.37809	-104.99664	Medium/Heavy Trucks Cro	Passenger Car/Passenger \		West	West		Making Left Turn	Stopped in Traffic
						Passenger Car/Passenger \	Pickup Truck/Utility Van		West	North		Going Straight	Going Straight
						Passenger Car/Passenger \	Pickup Truck/Utility Van		West	North		Entering Traffic Way/Merg	Negotiating a Curve
						Passenger Car/Passenger \			East			Entering Traffic Way/Merg	
						SUV			East			Other (Describe in Narrativ	
						SUV	Pickup Truck/Utility Van		East	East		Changing Lanes	Going Straight
						Passenger Car/Passenger \	Passenger Car/Passenger \		South	South		Going Straight	Going Straight
						Medium/Heavy Trucks Cro	Passenger Car/Passenger \		North	East		Making Right Turn	Going Straight
						SUV	Passenger Car/Passenger \		West	Unknown		Going Straight	Going Straight
						Medium/Heavy Trucks sta	SUV		West	West		Other (Describe in Narrativ	Going Straight
Sign				40.37803	-104.99393	Pickup Truck/Utility Van	SUV		West	West		Going Straight	Going Straight
						Pickup Truck/Utility Van	Pickup Truck/Utility Van		South	West		Going Straight	Going Straight
						Passenger Car/Passenger \	Motorcycle		South	West		Entering Traffic Way/Merg	Going Straight
				40.37824	-104.99417	SUV			South			Making Right Turn	
				40.378	-104.99422	Medium/Heavy Trucks sta	Passenger Car/Passenger \		West	West		Negotiating a Curve	Negotiating a Curve
						SUV	SUV		West	West		Changing Lanes	Going Straight
						Passenger Car/Passenger \			East			Backing	
				40.37808	-104.99407	Medium/Heavy Trucks Cro	Passenger Car/Passenger \		South	South		Going Straight	Going Straight
				40.37801	-104.99424	Passenger Car/Passenger \	Pickup Truck/Utility Van		West	West		Going Straight	Going Straight
						Medium/Heavy Trucks sta			West			Making Left Turn	
Curb						Passenger Car/Passenger \	Medium/Heavy Trucks Cro		West	South		Going Straight	Going Straight
				40.37768	-104.99422	Medium/Heavy Trucks sta	Passenger Car/Passenger \		East	East		Negotiating a Curve	Negotiating a Curve
				40.37799	-104.9943	Passenger Car/Passenger \	Passenger Car/Passenger \		West	West		Changing Lanes	Going Straight
				40.37803	-104.99416	SUV	SUV		Southwest	Southwest		Changing Lanes	Making Left Turn
				40.37806	-104.99468	SUV			West			Entering Traffic Way/Merg	Going Straight
						Passenger Car/Passenger \	Passenger Car/Passenger \		West	West		Negotiating a Curve	Negotiating a Curve
				40.37791	-104.99368	Passenger Car/Passenger \	Passenger Car/Passenger \		West	West		Going Straight	Stopped in Traffic
						Pickup Truck/Utility Van	Pickup Truck/Utility Van		West	West		Making Left Turn	Going Straight
						Medium/Heavy Trucks Cro	Pickup Truck/Utility Van		East	Southwest		Negotiating a Curve	Parked
				40.37776	-104.9943	SUV			East			Going Straight	
Light Pole/Utility Pole						Passenger Car/Passenger \	Pickup Truck/Utility Van		North	East		Entering Traffic Way/Merg	Entering Traffic Way/Merg
						SUV	Passenger Car/Passenger \		West	West		Going Straight	Negotiating a Curve
						Medium/Heavy Trucks Cro	Pickup Truck/Utility Van		North	East		Entering Traffic Way/Merg	Negotiating a Curve
						SUV	SUV		East	East		Making Left Turn	Going Straight
						Pickup Truck/Utility Van	SUV		East	East		Entering Traffic Way/Merg	Going Straight
						SUV	Passenger Car/Passenger \		East	East		Going Straight	Going Straight
						Passenger Car/Passenger \	Passenger Car/Passenger \		East	East		Entering Traffic Way/Merg	Going Straight
				40.37821	-104.99183	Passenger Car/Passenger \			West			Negotiating a Curve	
				40.37788	-104.99149	Passenger Car/Passenger \	Medium/Heavy Trucks Cro		West	West		Making Right Turn	Going Straight
				40.37818	-104.9915	Pickup Truck/Utility Van	Passenger Car/Passenger \		West	West		Entering Traffic Way/Merg	Going Straight
Front to Rear				40.37799	-104.99141	Passenger Car/Passenger \			North			Entering Traffic Way/Merg	
						Pickup Truck/Utility Van	Pickup Truck/Utility Van		North	Northwest		Going Straight	Entering Traffic Way/Merg
				40.37784	-104.99156	Pickup Truck/Utility Van	Passenger Car/Passenger \		North	East		Making Right Turn	Going Straight
				40.37784	-104.99156	SUV	Passenger Car/Passenger \		North	East		Making Left Turn	Going Straight
				40.37785	-104.99155	Passenger Car/Passenger \	Pickup Truck/Utility Van		North	East		Making Right Turn	Going Straight
				40.37784	-104.99155	SUV	Pickup Truck/Utility Van		East	North		Going Straight	Going Straight
						Pickup Truck/Utility Van	Passenger Car/Passenger \		North	North		Other (Describe in Narrativ	Other (Describe in Narrativ
				40.37791	-104.99179	Passenger Car/Passenger \			East			Going Straight	
						Passenger Car/Passenger \	SUV		North	East		Going Straight	Going Straight
						Passenger Car/Passenger \	Passenger Car/Passenger \		West	West		Going Straight	Going Straight
Front to Side						Passenger Car/Passenger \	Passenger Car/Passenger \		North	East		Making Right Turn	Going Straight
				40.37784	-104.99156	Passenger Car/Passenger \	Pickup Truck/Utility Van		North	East		Entering Traffic Way/Merg	Negotiating a Curve
				40.37827	-104.9888	Pickup Truck/Utility Van	SUV		South	West		Going Straight	Going Straight
				40.37816	-104.98841	SUV	Passenger Car/Passenger \		North	West		Entering Traffic Way/Merg	Entering Traffic Way/Merg
				40.37819	-104.98845	Passenger Car/Passenger \	Pickup Truck/Utility Van		West	West		Going Straight	Slowing
				40.37792	-104.98861	Passenger Car/Passenger \	Passenger Car/Passenger \		South	West		Entering Traffic Way/Merg	Negotiating a Curve
				40.37817	-104.98842	Passenger Car/Passenger \	Pickup Truck/Utility Van		North	West		Entering Traffic Way/Merg	Going Straight
				40.37792	-104.98851	Unknown (Hit and Run Onl	Passenger Car/Passenger \		East	East		Entering Traffic Way/Merg	Swerve/Avoidance
				40.37795	-104.98846	Passenger Car/Passenger \	Medium/Heavy Trucks sta		East			Passing	Making Left Turn
				40.37807	-104.98842	Medium/Heavy Trucks sta	Passenger Car/Passenger \		North	North		Going Straight	Going Straight
Light Pole/Utility Pole				40.37789	-104.98871	SUV	Pickup Truck/Utility Van		East			Weaving	Going Straight
				40.37788	-104.98866	SUV	Passenger Car/Passenger \		West	West		Going Straight	Going Straight
				40.37794	-104.98849	SUV	Pickup Truck/Utility Van		North	East		Entering Traffic Way/Merg	Going Straight
				40.37825	-104.9888	Medium/Heavy Trucks sta	SUV		South	West		Going Straight	Going Straight
				40.3781	-104.9884	Passenger Car/Passenger \	Passenger Car/Passenger \	Unknown (Hit and Run Onl	West	West	East	Going Straight	Going Straight
				40.37817	-104.98837	Medium/Heavy Trucks sta	Pickup Truck/Utility Van		West	West		Negotiating a Curve	Negotiating a Curve
				40.37817	-104.98835	Pickup Truck/Utility Van	Passenger Car/Passenger \	Working Vehicle/Equipme	West	West	West	Going Straight	Stopped in Traffic
				40.37826	-104.9888	SUV	Passenger Car/Passenger \		South	West		Going Straight	Going Straight

TU-3 Movement	Approach	Overtaking	Turn	Record Status	Processing Status	Agency Id	Crash Date	Crash Time	Number Killed	Number Injured	Injury 00	Injury 01	Injury 02	Injury 03	Injury 04	Severity
Slowing Going Straight	Not Applicable	Coded	Completed	LVPD	1/15/2021 07:53:00	0	1	0	0	1	0	0	1	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	2/2/2021 17:12:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	10/14/2021 06:28:00	0	1	1	0	1	0	1	0	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	1/25/2022 06:01:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	3/26/2022 06:24:00	0	0	1	0	0	0	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/16/2022 16:17:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/11/2022 17:30:00	0	1	2	1	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	6/24/2021 16:21:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	LVPD	8/6/2021 15:57:00	0	4	2	0	2	2	2	2	0	0	0 INJ
	Not Applicable	Coded	Completed	JPD	6/17/2022 11:57:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/17/2022 11:57:00	0	1	1	0	0	1	0	0	1	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/19/2021 10:45:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	1/14/2021 16:00:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	CSP	6/6/2021 17:00:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	3/31/2021 00:20:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	2/17/2021 08:30:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	5/23/2021 10:52:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/10/2021 10:16:00	0	1	4	0	1	4	0	1	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/28/2021 16:40:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/6/2021 12:42:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/1/2021 10:30:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/28/2021 12:02:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/21/2021 09:36:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/15/2021 17:09:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	12/15/2021 09:47:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	1/21/2022 07:37:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	12/27/2021 06:47:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	12/27/2021 21:17:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	1/27/2022 17:23:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	3/12/2022 23:31:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	3/25/2022 11:55:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/28/2022 08:08:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/28/2022 11:57:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/28/2022 17:55:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/25/2022 17:48:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/29/2022 18:22:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/28/2022 14:26:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/18/2022 10:40:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Overtaking Turn	Coded	Completed	JPD	9/15/2022 12:05:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	12/1/2022 08:23:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	2/4/2022 19:37:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	1/16/2021 17:32:00	0	0	0	0	0	0	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/29/2021 08:29:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	5/26/2021 11:59:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Overtaking Turn	Coded	Completed	JPD	6/17/2021 14:07:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/3/2021 17:33:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/25/2021 08:46:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/25/2021 19:14:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/30/2021 21:15:00	0	0	0	0	0	0	0	0	0	0	0 PDO
	Overtaking Turn	Coded	Completed	JPD	11/9/2021 15:25:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/17/2021 15:07:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	12/26/2021 17:00:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	1/27/2022 16:56:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	2/15/2022 06:45:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/4/2022 11:58:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/5/2022 06:46:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	4/20/2022 08:47:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/11/2022 15:30:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/13/2022 19:13:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/1/2022 12:30:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/3/2022 14:59:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/30/2022 15:26:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	7/25/2022 15:41:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	5/21/2021 15:11:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/11/2021 07:23:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	9/16/2021 14:11:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/15/2021 14:47:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	10/28/2021 13:48:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/13/2021 15:58:00	0	0	1	0	0	1	0	0	0	0	0 PDO
	Overtaking Turn	Coded	Completed	JPD	11/12/2021 10:40:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	3/18/2022 09:15:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	5/6/2022 16:58:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	6/8/2022 07:39:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	7/16/2022 17:35:00	0	0	7	0	0	7	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	8/2/2022 11:51:00	0	0	2	0	0	2	0	0	0	0	0 PDO
Going Straight	Not Applicable	Coded	Completed	JPD	9/6/2022 15:49:00	0	0	3	0	0	3	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/2/2022 07:50:00	0	0	2	0	0	2	0	0	0	0	0 PDO
	Not Applicable	Coded	Completed	JPD	11/21/2022 14:55:00	0	0	3	0	0	3	0	0	0	0	0 PDO
Stopped in Traffic	Not Applicable	Coded	Completed	JPD	9/8/2022 16:44:00	0	0	2	0	0	2	0	0	0	0	0 PDO

APPENDIX E

Signal Warrant Evaluations

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 402 (2030 Base)** Lanes: **2** Major Approach Speed: **55**
Minor Street: **LCR 9E** Lanes: **2** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☒ Yes ☐ No
 2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☐ No
- "70%" volume level **may** be used if Question 1 or 2 above is answered "Yes" ☒ MAY ☐ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

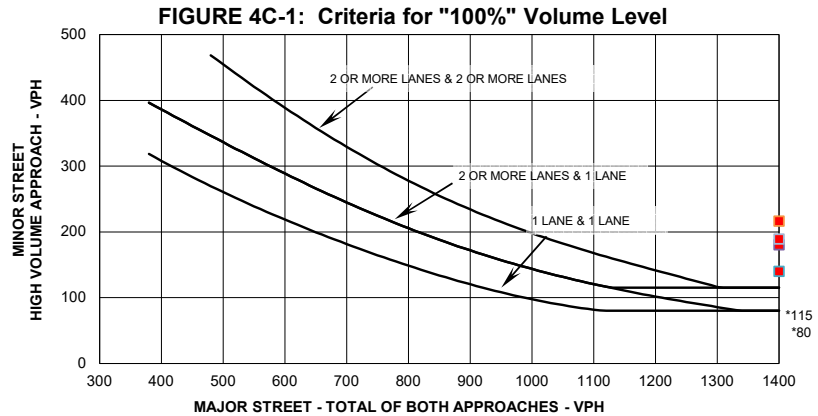
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

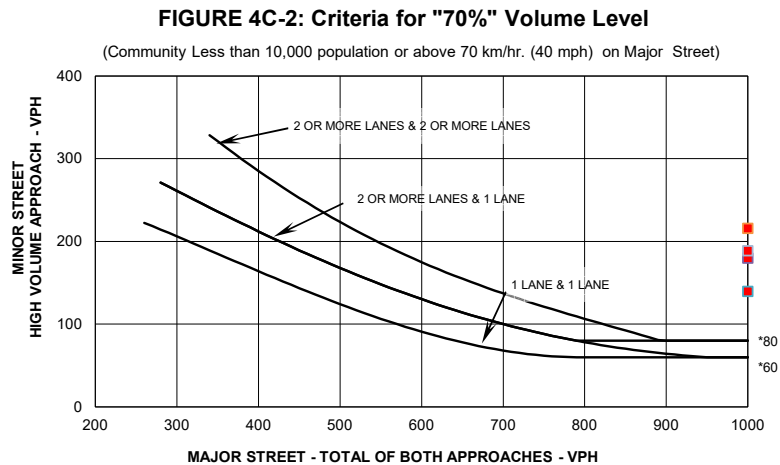
Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1908	180
8-9 AM	1573	140
4-5 PM	1905	216
5-6 PM	1794	189



* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1908	180
8-9 AM	1573	140
4-5 PM	1905	216
5-6 PM	1794	189



* Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 402 (2030 Base)**
Minor Street: **LCR 9E**

Lanes: **2** Major Approach Speed: **55**
Lanes: **2** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph?
2. Is the intersection in a built-up area of an isolated community with a population < 10,000?

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes"

☒ MAY

☒ Yes ☐ No

☐ Yes ☒ No

☒ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

*If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.*

Applicable: ☒ Yes ☐ No

Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
AM	1953	185

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.
AM	1953	185

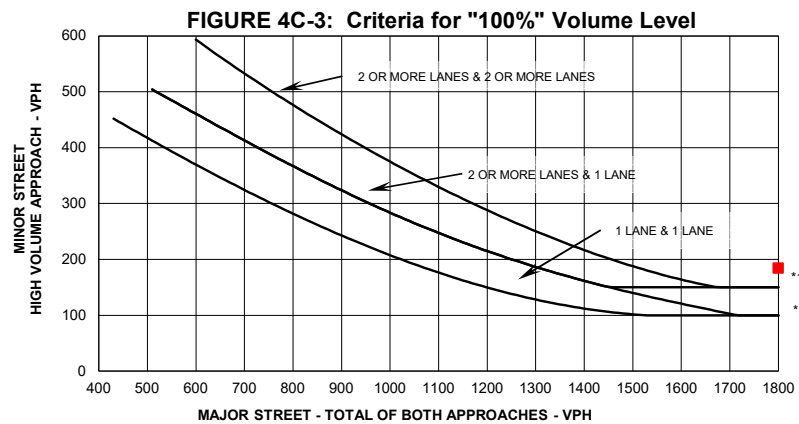
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?:	☐ Yes	☐ No

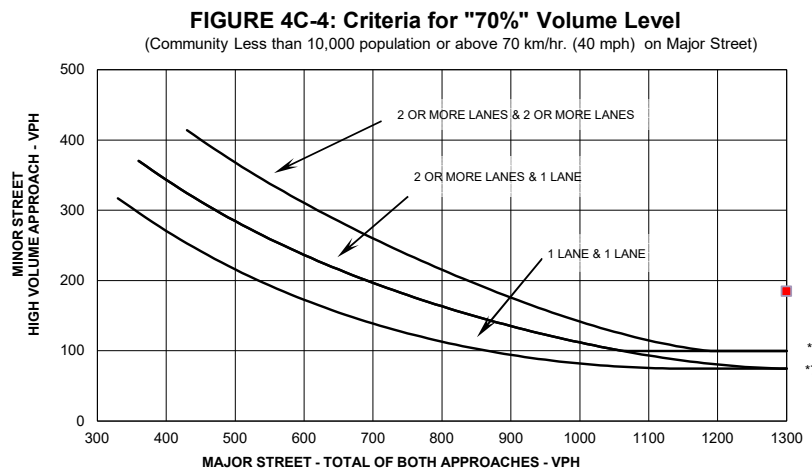
2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?:	☐ Yes	☐ No

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?:	☐ Yes	☐ No

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 75 phi applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 402 (2030 Base)** Lanes: **2** Major Approach Speed: **55**
Minor Street: **LCR 9E** Lanes: **2** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☒ Yes ☐ No
 2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☐ No
- "70%" volume level **may** be used if Question 1 or 2 above is answered "Yes" ☒ MAY ☐ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

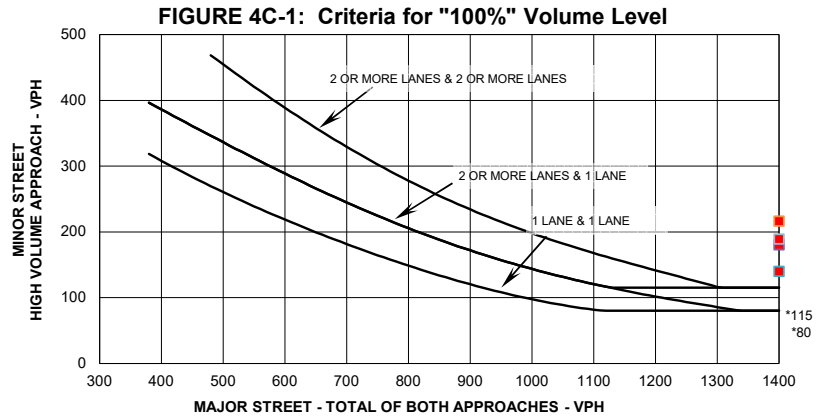
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

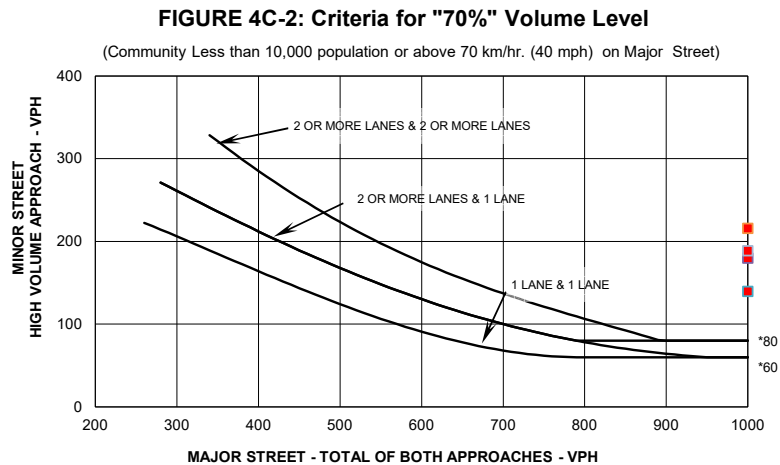
Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1908	180
8-9 AM	1573	140
4-5 PM	1905	216
5-6 PM	1794	189



* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1908	180
8-9 AM	1573	140
4-5 PM	1905	216
5-6 PM	1794	189



* Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 402 (2030 Base)**
Minor Street: **LCR 9E**

Lanes: **2** Major Approach Speed: **55**
Lanes: **2** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph?
2. Is the intersection in a built-up area of an isolated community with a population < 10,000?

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes"

☒ MAY

☒ Yes ☐ No

☐ Yes ☒ No

☒ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

*If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.*

Applicable: ☒ Yes ☐ No

Satisfied: ☒ Yes ☐ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
PM	1941	201

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.
PM	1941	201

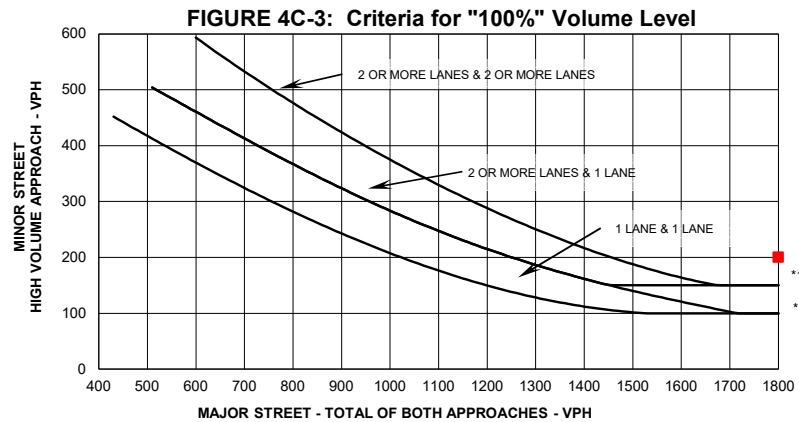
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?:	☐ Yes	☐ No

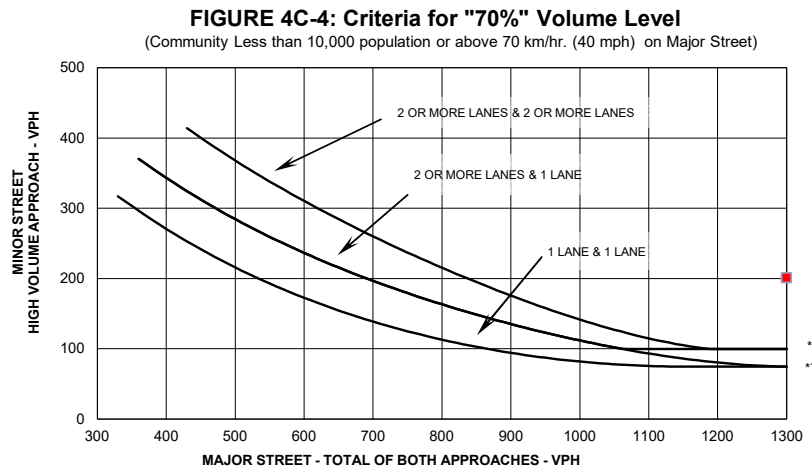
2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?:	☐ Yes	☐ No

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?:	☐ Yes	☐ No

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 75 phi applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 502 (2030 Base)** Lanes: **1** Major Approach Speed: **55**
Minor Street: **LCR 7** Lanes: **1** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☒ Yes ☐ No
 2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☐ No
- "70%" volume level **may** be used if Question 1 or 2 above is answered "Yes" ☒ MAY ☐ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

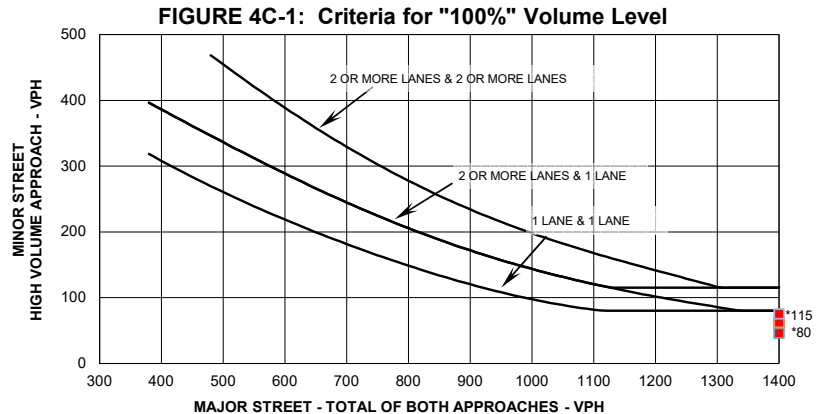
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

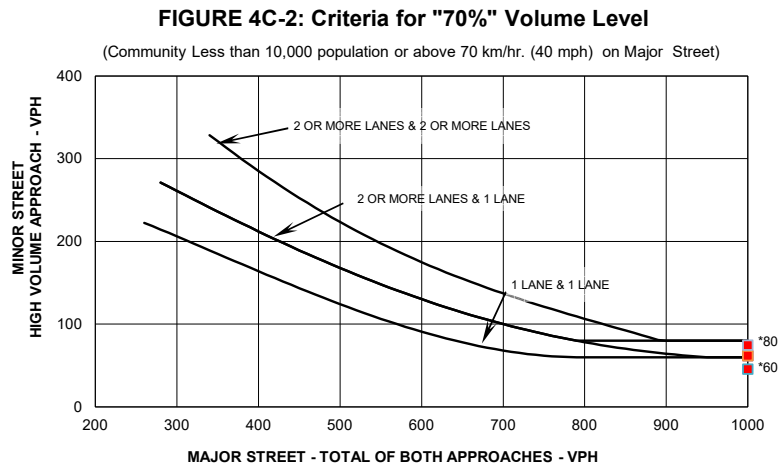
Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1784	62
8-9 AM	1476	46
4-5 PM	1776	62
5-6 PM	1682	75



* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1784	62
8-9 AM	1476	46
4-5 PM	1776	62
5-6 PM	1682	75



* Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 502 (2030 Base)**
Minor Street: **LCR 7**

Lanes: **1** Major Approach Speed: **55**
Lanes: **1** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph?
2. Is the intersection in a built-up area of an isolated community with a population < 10,000?

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes"

☒ MAY

☒ Yes ☐ No

☐ Yes ☒ No

☒ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No

Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
AM	1816	66

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.
AM	1816	66

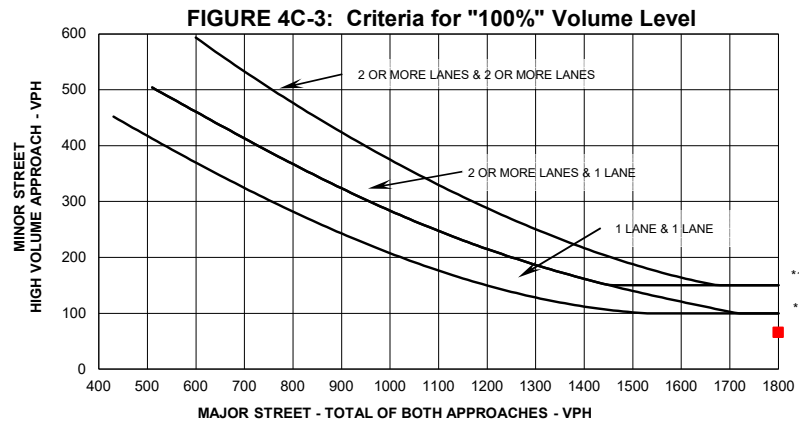
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?:	☐ Yes	☐ No

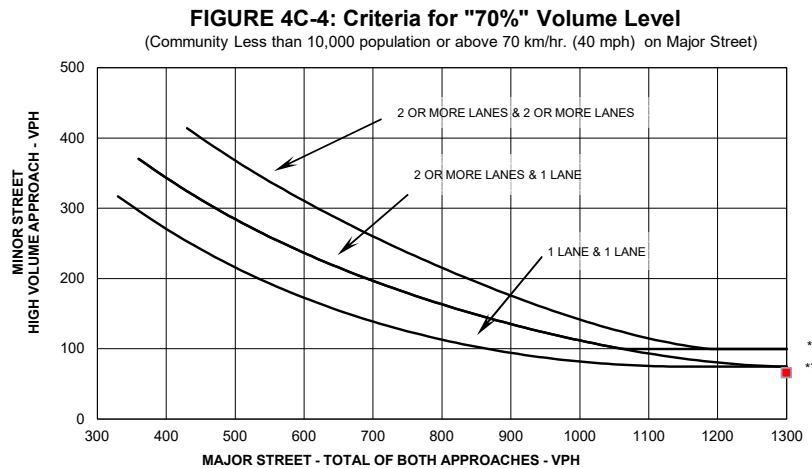
2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?:	☐ Yes	☐ No

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?:	☐ Yes	☐ No

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 75 phi applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 502 (2030 Base)** Lanes: **1** Major Approach Speed: **55**
Minor Street: **LCR 7** Lanes: **1** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph? ☒ Yes ☐ No
 2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☐ No
- "70%" volume level **may** be used if Question 1 or 2 above is answered "Yes" ☒ MAY ☐ 70% ☐ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

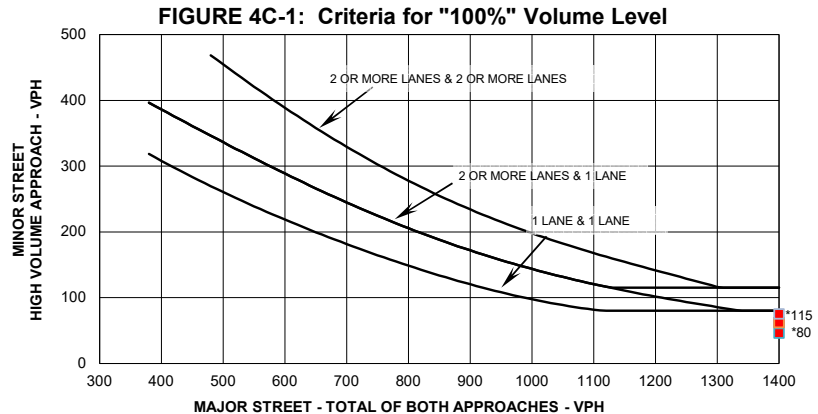
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

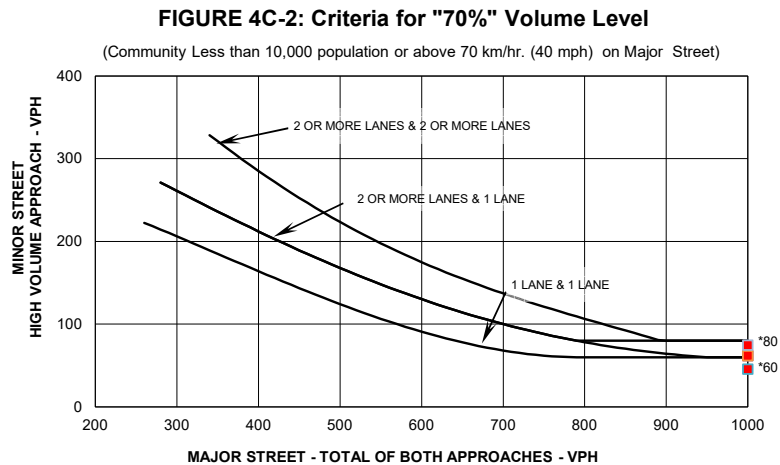
Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1784	62
8-9 AM	1476	46
4-5 PM	1776	62
5-6 PM	1682	75



* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
7-8 AM	1784	62
8-9 AM	1476	46
4-5 PM	1776	62
5-6 PM	1682	75



* Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.

State of Florida Department of Transportation
TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING
October 2020

City: **Loveland**
County: _____
District: _____

Engineer: **JEM**
Date: **August 13, 2024**

Major Street: **SH 502 (2030 Base)**
Minor Street: **LCR 7**

Lanes: **1** Major Approach Speed: **55**
Lanes: **1** Minor Approach Speed: **45**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph?
2. Is the intersection in a built-up area of an isolated community with a population < 10,000?

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes"

☒ MAY

☒ Yes ☐ No

☐ Yes ☒ No

☒ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

*If all three criteria are fulfilled **or** the plotted point lies above the appropriate line, then the warrant is satisfied.*

Applicable: ☒ Yes ☐ No

Satisfied: ☐ Yes ☒ No

Unusual condition justifying use of warrant:

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour 100% Volume		
Time	Major Vol.	Minor Vol.
PM	1822	74

Peak Hour 70% Volume		
Time	Major Vol.	Minor Vol.
PM	1822	74

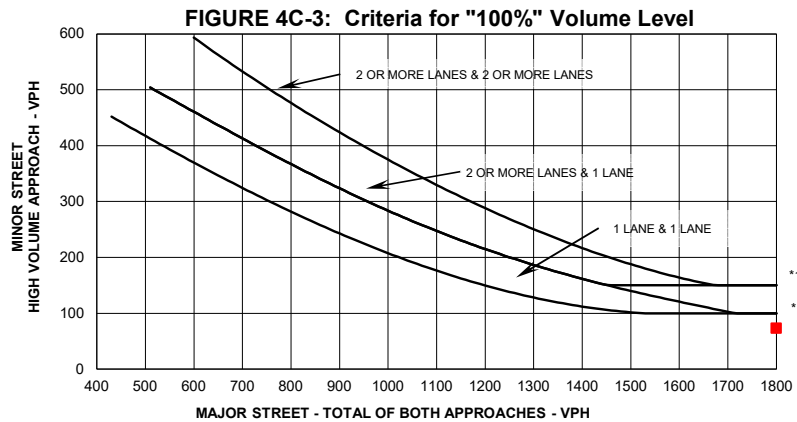
Criteria

1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?:	☐ Yes	☐ No

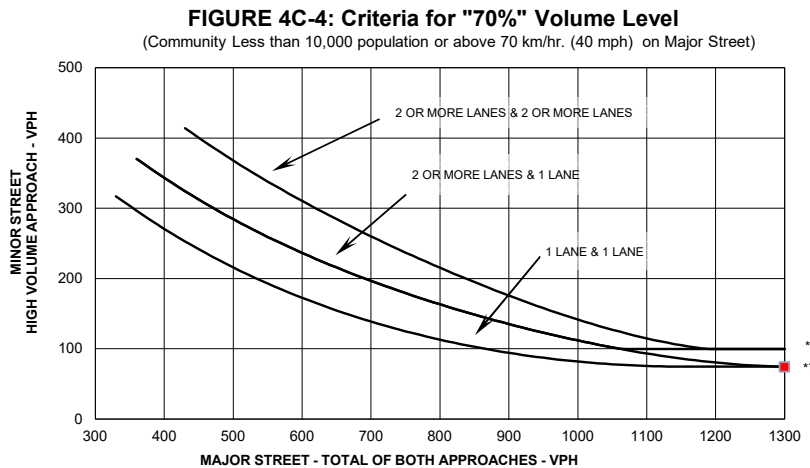
2. Volume on Minor Approach One-Direction *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?:	☐ Yes	☐ No

3. Total Intersection Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?:	☐ Yes	☐ No

Plot volume combination on the applicable figure below.



* Note: 150 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 100 vph applies as the lower threshold volume threshold for a minor street approach with one lane.



* Note: 100 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 75 phi applies as the lower threshold volume threshold for a minor street approach with one lane.

APPENDIX F

Trip Generation

Trip Generation - West Ridge

ITE Trip Generation, 11th Edition

Daily Trip Generation															
ITE 11th Ed				Trip Gen.	Daily Peak	Mixed-Use	Net Daily	Trip Distribution		Total Daily Trips		Pass-By	Pass-by Trips		
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Peak Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit	
110	General Light Industrial	650,000	SF	4.87	3,166	10%	2,850	50%	50%	1,425	1,425	0%	0	0	
210	Single-Family Detached Housing	121	Dwelling Units	9.43	1,142	10%	1,028	50%	50%	514	514	0%	0	0	
215	Single-Family Attached Housing	201	Dwelling Units	7.20	1,448	10%	1,304	50%	50%	652	652	0%	0	0	
821	Shopping Plaza (40k-150k, No Supermarket)	75,000	SF	67.52	5,064	10%	4,558	50%	50%	2,279	2,279	0%	0	0	
822	Strip Retail Plaza (<40k)	7,000	SF	54.45	382	10%	344	50%	50%	172	172	0%	0	0	
932	High-Turnover (Sit-Down) Restaurant	20,000	SF	107.20	2,144	10%	1,930	50%	50%	965	965	0%	0	0	
934	Fast-Food Restaurant with Drive-Through Window	15,000	SF	467.48	7,013	10%	6,312	50%	50%	3,156	3,156	0%	0	0	
945	Convenience Store/Gas Station GFA (2-4k)	8	VFP	265.12	2,121	10%	1,909	50%	50%	955	955	0%	0	0	
Total					22,480		20,235			10,118	10,118		0	0	

AM Peak Hour Trips															
ITE 11th Ed				Trip Gen.	AM Peak	Mixed-Use	Net AM Peak	Trip Distribution		Total AM Trips		Pass-By	Pass-by Trips		Primary Trips
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit	
110	General Light Industrial	650,000	SF	0.74	481	7%	448	88%	12%	395	53	0%	0	0	395
210	Single-Family Detached Housing	121	Dwelling Units	0.70	85	7%	80	25%	75%	20	60	0%	0	0	20
215	Single-Family Attached Housing	201	Dwelling Units	0.48	97	7%	91	25%	75%	23	68	0%	0	0	23
821	Shopping Plaza (40k-150k, No Supermarket)	75,000	SF	1.73	130	7%	121	62%	38%	76	45	40%	25	25	51
822	Strip Retail Plaza (<40k)	7,000	SF	2.36	17	7%	16	60%	40%	10	6	0%	0	0	10
932	High-Turnover (Sit-Down) Restaurant	20,000	SF	9.57	192	7%	179	55%	45%	99	80	43%	39	39	60
934	Fast-Food Restaurant with Drive-Through Window	15,000	SF	44.61	670	7%	624	51%	49%	319	305	50%	156	156	163
945	Convenience Store/Gas Station GFA (2-4k)	8	VFP	16.06	129	7%	120	50%	50%	60	60	76%	46	46	14
Total					1,801		1,679			1,002	677		266	266	736

PM Peak Hour Trips															
ITE 11th Ed				Trip Gen.	PM Peak	Mixed-Use	Net PM Peak	Trip Distribution		Total PM Trips		Pass-By	Pass-by Trips		Primary Trips
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit	
110	General Light Industrial	650,000	SF	0.65	423	36%	271	14%	86%	38	233	0%	0	0	38
210	Single-Family Detached Housing	121	Dwelling Units	0.94	114	36%	73	63%	37%	46	27	0%	0	0	46
215	Single-Family Attached Housing	201	Dwelling Units	0.57	115	36%	74	59%	41%	44	30	0%	0	0	44
821	Shopping Plaza (40k-150k, No Supermarket)	75,000	SF	5.19	390	36%	250	49%	51%	123	127	40%	50	50	73
822	Strip Retail Plaza (<40k)	7,000	SF	6.59	47	36%	31	50%	50%	16	15	0%	0	0	16
932	High-Turnover (Sit-Down) Restaurant	20,000	SF	9.05	181	36%	116	61%	39%	71	45	43%	25	25	46
934	Fast-Food Restaurant with Drive-Through Window	15,000	SF	33.03	496	36%	318	52%	48%	166	152	55%	88	88	78
945	Convenience Store/Gas Station GFA (2-4k)	8	VFP	18.42	148	36%	95	50%	50%	48	47	75%	36	36	12
Total					1,914		1,228			552	676		199	199	353

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	West Ridge			Organization:	Benesch
Project Location:	Loveland, CO			Performed By:	JEM
Scenario Description:	Site			Date:	6/25/2024
Analysis Year:	2045			Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				276	157	119
Restaurant				862	448	414
Cinema/Entertainment				0	0	0
Residential				182	47	135
Hotel				0	0	0
All Other Land Uses ²				481	424	57
				1,801	1,076	725

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		15	0	1	0
Restaurant	0	13		0	2	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	27	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,801	1,076	725
Internal Capture Percentage	7%	5%	8%
External Vehicle-Trips ⁵	1,683	1,017	666
External Transit-Trips ⁵	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	9%	13%
Restaurant	9%	4%
Cinema/Entertainment	N/A	N/A
Residential	6%	21%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	West Ridge			Organization:	Benesch
Project Location:	Loveland, CO			Performed By:	JEM
Scenario Description:	Site			Date:	6/25/2024
Analysis Year:	2045			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				585	290	295
Restaurant				677	369	308
Cinema/Entertainment				0	0	0
Residential				229	140	89
Hotel				0	0	0
All Other Land Uses ²				423	60	363
				1,914	859	1,055

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		86	0	64	0
Restaurant	0	126		0	22	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	29	19	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,914	859	1,055
Internal Capture Percentage	36%	40%	33%
External Vehicle-Trips ⁵	1,222	513	709
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	53%	51%
Restaurant	28%	48%
Cinema/Entertainment	N/A	N/A
Residential	61%	54%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Trip Generation - Erlich City

ITE Trip Generation, 11th Edition

Daily Trip Generation

ITE 11th Ed				Trip Gen.	Daily Peak	Mixed-Use	Net Daily	Trip Distribution		Total Daily Trips		Pass-By	Pass-by Trips	
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Peak Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit
230	Low-Rise Residential with Ground Floor Retail	1,000	Dwelling Units	3.44	3,440	10%	3,096	50%	50%	1,548	1,548	0%	0	0
770	Business Park	400,000	SF	12.44	4,976	10%	4,479	50%	50%	2,240	2,240	0%	0	0
820	Shopping Center (>150k)	150,000	SF	37.01	5,552	10%	4,997	50%	50%	2,499	2,499	0%	0	0
821	Shopping Center (40-150k)	50,000	SF	67.52	3,376	10%	3,039	50%	50%	1,520	1,520	0%	0	0
822	Strip Retail Plaza (<40k)	25,000	SF	54.45	1,362	10%	1,226	50%	50%	613	613	0%	0	0
932	High-Turnover (Sit-Down) Restaurant	15,000	SF	107.20	1,608	10%	1,448	50%	50%	724	724	0%	0	0
934	Fast-Food Restaurant with Drive-Through Window	10,000	SF	467.48	4,675	10%	4,208	50%	50%	2,104	2,104	0%	0	0
Total					24,989		22,493			11,248	11,248		0	0

AM Peak Hour Trips

ITE 11th Ed				Trip Gen.	AM Peak	Mixed-Use	Net AM Peak	Trip Distribution		Total AM Trips		Pass-By	Pass-by Trips		Primary Trips	
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit	Enter	Exit
230	Low-Rise Residential with Ground Floor Retail	1,000	Dwelling Units	0.44	440	28%	317	23%	77%	73	244	0%	0	0	73	244
770	Business Park	400,000	SF	1.35	540	28%	389	85%	15%	331	58	0%	0	0	331	58
820	Shopping Center (>150k)	150,000	SF	0.84	126	28%	91	62%	38%	57	34	29%	14	14	43	20
821	Shopping Center (40-150k)	50,000	SF	1.73	87	28%	63	62%	38%	40	23	40%	13	13	27	10
822	Strip Retail Plaza (<40k)	25,000	SF	2.36	59	28%	43	60%	40%	26	17	0%	0	0	26	17
932	High-Turnover (Sit-Down) Restaurant	15,000	SF	9.57	144	28%	104	55%	45%	58	46	43%	23	23	35	23
934	Fast-Food Restaurant with Drive-Through Window	10,000	SF	44.61	447	28%	322	51%	49%	165	157	50%	81	81	84	76
Total					1,843		1,329			750	579		131	131	619	448

PM Peak Hour Trips

ITE 11th Ed				Trip Gen.	PM Peak	Mixed-Use	Net PM Peak	Trip Distribution		Total PM Trips		Pass-By	Pass-by Trips		Primary Trips	
Code	Land Use	Size	Units	Avg.	Trips	Reduction	Trips	Enter	Exit	Enter	Exit	Reduction	Enter	Exit	Enter	Exit
230	Low-Rise Residential with Ground Floor Retail	1,000	Dwelling Units	0.36	360	40%	216	71%	29%	154	62	0%	0	0	154	62
770	Business Park	400,000	SF	1.22	488	40%	293	26%	74%	77	216	0%	0	0	77	216
820	Shopping Center (>150k)	150,000	SF	3.4	510	40%	306	48%	52%	147	159	29%	45	45	102	114
821	Shopping Center (40-150k)	50,000	SF	5.19	260	40%	156	49%	51%	77	79	40%	32	32	45	47
822	Strip Retail Plaza (<40k)	25,000	SF	6.59	165	40%	99	50%	50%	50	49	0%	0	0	50	49
932	High-Turnover (Sit-Down) Restaurant	15,000	SF	9.05	136	40%	82	61%	39%	51	31	43%	18	18	33	13
934	Fast-Food Restaurant with Drive-Through Window	10,000	SF	33.03	331	40%	199	52%	48%	104	95	55%	55	55	49	40
Total					2,250	0	1,351			660	691		150	150	510	541

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Erlch City			Organization:	Benesch
Project Location:	Loveland, CO			Performed By:	JEM
Scenario Description:	Site			Date:	7/12/2024
Analysis Year:	2045			Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				540	459	81
Retail				275	169	106
Restaurant				593	308	285
Cinema/Entertainment				0	0	0
Residential				441	102	339
Hotel				0	0	0
All Other Land Uses ²				0	0	0
				1,849	1,038	811

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		23	51	0	0	0
Retail	18		14	0	2	0
Restaurant	64	14		0	5	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	3	62	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	1,849	1,038	811
Internal Capture Percentage	28%	25%	32%
External Vehicle-Trips ⁵	1,323	775	548
External Transit-Trips ⁵	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	19%	91%
Retail	24%	32%
Restaurant	41%	29%
Cinema/Entertainment	N/A	N/A
Residential	7%	21%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

NCHRP 684 Internal Trip Capture Estimation Tool					
Project Name:	Erich City			Organization:	Benesch
Project Location:	Loveland, CO			Performed By:	JEM
Scenario Description:	Site			Date:	7/12/2024
Analysis Year:	2045			Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				489	127	362
Retail				938	456	482
Restaurant				469	256	213
Cinema/Entertainment				0	0	0
Residential				361	256	105
Hotel				0	0	0
All Other Land Uses ²				0	0	0
				2,257	1,095	1,162

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses ²	1.00	0%	0%	1.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		36	5	0	7	0
Retail	10		74	0	118	0
Restaurant	6	87		0	38	0
Cinema/Entertainment	0	0	0		0	0
Residential	4	44	22	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	2,257	1,095	1,162
Internal Capture Percentage	40%	41%	39%
External Vehicle-Trips ⁵	1,355	644	711
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	16%	13%
Retail	37%	42%
Restaurant	39%	62%
Cinema/Entertainment	N/A	N/A
Residential	64%	67%
Hotel	N/A	N/A

¹ Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.
³ Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i>).
⁴ Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made.
⁵ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.
⁶ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

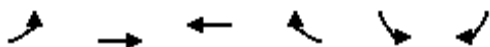
APPENDIX G

Future Year Background Conditions and Queueing Capacity Analysis

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

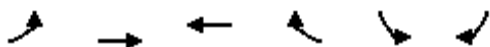
08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	265	819	935	99	131	171
Future Volume (veh/h)	265	819	935	99	131	171
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	291	900	1027	88	144	118
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	453	1527	1074	1072	178	482
Arrive On Green	0.21	0.83	0.58	0.58	0.10	0.10
Sat Flow, veh/h	1753	1841	1841	1560	1711	1522
Grp Volume(v), veh/h	291	900	1027	88	144	118
Grp Sat Flow(s),veh/h/ln	1753	1841	1841	1560	1711	1522
Q Serve(g_s), s	12.2	19.6	63.1	2.2	9.9	0.0
Cycle Q Clear(g_c), s	12.2	19.6	63.1	2.2	9.9	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	453	1527	1074	1072	178	482
V/C Ratio(X)	0.64	0.59	0.96	0.08	0.81	0.24
Avail Cap(c_a), veh/h	453	1527	1074	1072	328	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.62	0.62	1.00	1.00
Uniform Delay (d), s/veh	40.1	3.4	23.6	6.2	52.6	30.4
Incr Delay (d2), s/veh	3.1	1.7	13.5	0.1	8.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	3.7	27.0	0.9	4.6	2.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.2	5.1	37.1	6.3	61.1	30.6
LnGrp LOS	D	A	D	A	E	C
Approach Vol, veh/h		1191	1115		262	
Approach Delay, s/veh		14.4	34.6		47.4	
Approach LOS		B	C		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	29.5	74.0			103.5	16.5
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	15.0	70.0			89.0	23.0
Max Q Clear Time (g_c+I1), s	14.2	65.1			21.6	11.9
Green Ext Time (p_c), s	0.1	2.9			7.2	0.6
Intersection Summary						
HCM 6th Ctrl Delay			26.6			
HCM 6th LOS			C			

HCM 6th Signalized Intersection Summary 5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	181	819	824	134	57	131	
Future Volume (veh/h)	181	819	824	134	57	131	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1752	1752	
Adj Flow Rate, veh/h	199	900	905	121	63	34	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	6	6	6	6	10	10	
Cap, veh/h	412	1373	1202	1261	264	314	
Arrive On Green	0.05	0.76	0.88	0.88	0.16	0.16	
Sat Flow, veh/h	1725	1811	1811	1535	1668	1485	
Grp Volume(v), veh/h	199	900	905	121	63	34	
Grp Sat Flow(s),veh/h/ln	1725	1811	1811	1535	1668	1485	
Q Serve(g_s), s	4.2	28.6	21.0	0.7	4.0	2.2	
Cycle Q Clear(g_c), s	4.2	28.6	21.0	0.7	4.0	2.2	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	412	1373	1202	1261	264	314	
V/C Ratio(X)	0.48	0.66	0.75	0.10	0.24	0.11	
Avail Cap(c_a), veh/h	478	1373	1202	1261	264	314	
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00	
Upstream Filter(I)	0.75	0.75	0.57	0.57	1.00	1.00	
Uniform Delay (d), s/veh	8.3	7.0	3.6	0.7	44.2	38.2	
Incr Delay (d2), s/veh	0.7	1.8	2.5	0.1	2.1	0.7	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	7.9	3.6	0.3	1.8	2.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	9.0	8.8	6.2	0.8	46.3	38.9	
LnGrp LOS	A	A	A	A	D	D	
Approach Vol, veh/h		1099	1026	97			
Approach Delay, s/veh		8.8	5.5	43.7			
Approach LOS		A	A	D			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				96.0	24.0	11.4	84.6
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				91.0	19.0	11.0	75.0
Max Q Clear Time (g_c+I1), s				30.6	6.0	6.2	23.0
Green Ext Time (p_c), s				7.2	0.2	0.2	7.7
Intersection Summary							
HCM 6th Ctrl Delay			8.8				
HCM 6th LOS			A				

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	786	40	55	942	5	18	5	51	10	5	5
Future Volume (veh/h)	5	786	40	55	942	5	18	5	51	10	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	5	864	23	60	1035	0	20	5	56	11	5	5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	248	1247	1057	364	1302	1104	285	22	244	238	142	142
Arrive On Green	0.01	0.67	0.67	0.04	0.70	0.00	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	1767	1856	1572	1767	1856	1572	1394	131	1462	1331	851	851
Grp Volume(v), veh/h	5	864	23	60	1035	0	20	0	61	11	0	10
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	1572	1394	0	1592	1331	0	1702
Q Serve(g_s), s	0.1	34.3	0.6	1.2	45.1	0.0	1.5	0.0	4.0	0.9	0.0	0.6
Cycle Q Clear(g_c), s	0.1	34.3	0.6	1.2	45.1	0.0	2.1	0.0	4.0	4.8	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.50
Lane Grp Cap(c), veh/h	248	1247	1057	364	1302	1104	285	0	265	238	0	284
V/C Ratio(X)	0.02	0.69	0.02	0.16	0.79	0.00	0.07	0.00	0.23	0.05	0.00	0.04
Avail Cap(c_a), veh/h	310	1247	1057	374	1302	1104	285	0	265	238	0	284
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.79	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	12.1	6.5	10.7	12.1	0.0	42.8	0.0	43.3	45.4	0.0	41.9
Incr Delay (d2), s/veh	0.0	2.5	0.0	0.2	5.1	0.0	0.5	0.0	2.0	0.4	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	12.1	0.2	0.4	15.7	0.0	0.5	0.0	1.7	0.3	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.5	14.6	6.6	10.9	17.1	0.0	43.2	0.0	45.3	45.8	0.0	42.1
LnGrp LOS	B	B	A	B	B	A	D	A	D	D	A	D
Approach Vol, veh/h	892			1095			81			21		
Approach Delay, s/veh	14.4			16.8			44.8			44.1		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	25.0		9.3	85.7		25.0		5.8	89.2			
Change Period (Y+Rc), s	5.0		5.0	5.0		5.0		5.0	5.0			
Max Green Setting (Gmax), s	20.0		5.0	80.0		20.0		5.0	80.0			
Max Q Clear Time (g_c+I1), s	6.0		3.2	36.3		6.8		2.1	47.1			
Green Ext Time (p_c), s	0.2		0.0	6.6		0.0		0.0	8.8			
Intersection Summary												
HCM 6th Ctrl Delay	17.1											
HCM 6th LOS	B											

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	680	40	10	840	110	5	110	25	115	135	110
Future Volume (veh/h)	110	680	40	10	840	110	5	110	25	115	135	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	120	739	14	11	913	59	5	120	0	125	147	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	277	1192	1020	320	1139	1045	249	312	284	288	393	398
Arrive On Green	0.03	0.43	0.43	0.01	0.61	0.61	0.01	0.17	0.00	0.05	0.21	0.21
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	120	739	14	11	913	59	5	120	0	125	147	44
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.9	37.0	0.6	0.3	44.7	1.6	0.3	6.9	0.0	6.0	8.1	2.6
Cycle Q Clear(g_c), s	2.9	37.0	0.6	0.3	44.7	1.6	0.3	6.9	0.0	6.0	8.1	2.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	277	1192	1020	320	1139	1045	249	312	284	288	393	398
V/C Ratio(X)	0.43	0.62	0.01	0.03	0.80	0.06	0.02	0.38	0.00	0.43	0.37	0.11
Avail Cap(c_a), veh/h	308	1192	1020	371	1139	1045	312	312	284	288	393	398
HCM Platoon Ratio	0.67	0.67	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.73	0.73	0.73	0.58	0.58	0.58	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	23.1	12.2	13.4	17.9	7.2	41.2	44.5	0.0	39.3	40.6	34.6
Incr Delay (d2), s/veh	0.8	1.8	0.0	0.0	3.6	0.1	0.0	3.6	0.0	1.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	17.1	0.2	0.1	17.3	0.5	0.1	3.4	0.0	3.0	3.7	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	24.8	12.2	13.4	21.5	7.3	41.2	48.1	0.0	40.4	41.2	34.7
LnGrp LOS	B	C	B	B	C	A	D	D	A	D	D	C
Approach Vol, veh/h	873			983			125			316		
Approach Delay, s/veh	23.9			20.5			47.8			40.0		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	24.0	5.5	80.5	4.8	29.2	8.9	77.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	20.0	5.0	73.0	5.0	21.0	7.0	71.0				
Max Q Clear Time (g_c+I1), s	8.0	8.9	2.3	39.0	2.3	10.1	4.9	46.7				
Green Ext Time (p_c), s	0.0	0.3	0.0	4.9	0.0	0.6	0.0	6.6				
Intersection Summary												
HCM 6th Ctrl Delay	26.0											
HCM 6th LOS	C											

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	0.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	826	10	14	968	0	5	0	14	0	0	0
Future Vol, veh/h	0	826	10	14	968	0	5	0	14	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	0	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	908	11	15	1064	0	5	0	15	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1064	0	0	919	0	0	1470	-	908	2015	2013	532
Stage 1	-	-	-	-	-	-	908	-	-	1094	1094	-
Stage 2	-	-	-	-	-	-	562	-	-	921	919	-
Critical Hdwy	4.145	-	-	4.145	-	-	7.345	-	6.245	7.345	6.545	6.945
Critical Hdwy Stg 1	-	-	-	-	-	-	6.145	-	-	6.545	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.545	-	-	6.145	5.545	-
Follow-up Hdwy	2.2285	-	-	2.2285	-	-	3.5285	-	3.3285	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	648	-	-	735	-	-	96	0	331	38	58	491
Stage 1	-	-	-	-	-	-	327	0	-	228	287	-
Stage 2	-	-	-	-	-	-	478	0	-	322	347	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	648	-	-	735	-	-	94	-	331	36	57	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	94	-	-	36	57	-
Stage 1	-	-	-	-	-	-	327	-	-	228	281	-
Stage 2	-	-	-	-	-	-	468	-	-	307	347	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			24.1			0		
HCM LOS							C			A		

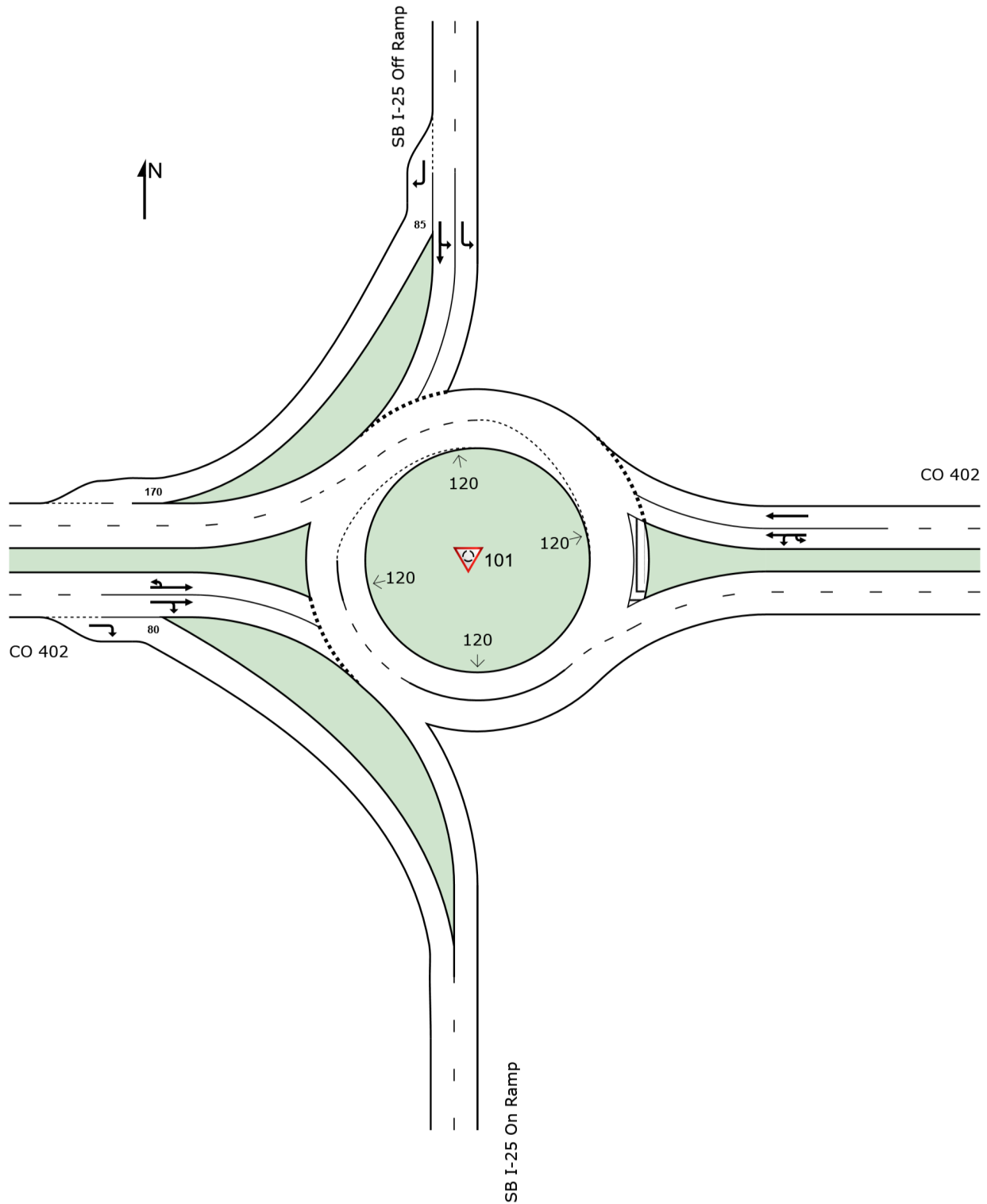
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	94	331	648	-	-	735	-	-	-
HCM Lane V/C Ratio	0.058	0.046	-	-	-	0.021	-	-	-
HCM Control Delay (s)	45.7	16.4	0	-	-	10	-	-	0
HCM Lane LOS	E	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.2	0.1	0	-	-	0.1	-	-	-

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

AM 2030 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	16	9.0	16	9.0	0.378	4.8	LOS A	3.2	86.3	0.05	0.01	0.05	17.2
1	L2	All MCs	284	9.0	284	9.0	0.378	4.8	LOS A	3.2	86.3	0.05	0.01	0.05	32.9
6	T1	All MCs	717	9.0	717	9.0	0.378	4.7	LOS A	3.2	86.5	0.05	0.01	0.05	23.6
Approach			1017	9.0	1017	9.0	0.378	4.7	LOS A	3.2	86.5	0.05	0.01	0.05	26.9
North: SB I-25 Off Ramp															
7	L2	All MCs	95	9.0	95	9.0	0.061	5.1	LOS A	0.2	6.0	0.56	0.50	0.56	29.5
4	T1	All MCs	2	9.0	2	9.0	0.061	4.5	LOS A	0.2	6.0	0.55	0.48	0.55	39.7
14	R2	All MCs	357	9.0	357	9.0	0.231	7.2	LOS A	0.0	0.0	0.00	0.00	0.00	42.2
Approach			453	9.0	453	9.0	0.231	6.7	LOS A	0.2	6.0	0.12	0.11	0.12	38.6
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.264	6.5	LOS A	1.2	32.8	0.51	0.37	0.51	19.5
2	T1	All MCs	532	8.0	532	8.0	0.264	6.1	LOS A	1.3	33.7	0.50	0.36	0.50	24.1
12	R2	All MCs	353	8.0	353	8.0	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			887	8.0	887	8.0	0.264	3.7	LOS A	1.3	33.7	0.30	0.22	0.30	31.8
All Vehicles			2358	8.6	2358	8.6	0.378	4.7	LOS A	3.2	86.5	0.16	0.10	0.16	30.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:02:50 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\AM_2030 Base_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Base

Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	259	8.0	259	8.0	0.148	5.3	LOS A	0.6	15.2	0.51	0.41	0.51	28.4
8	T1	All MCs	14	8.0	14	8.0	0.148	4.8	LOS A	0.6	15.2	0.50	0.40	0.50	38.0
18	R2	All MCs	143	8.0	143	8.0	0.092	3.7	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			416	8.0	416	8.0	0.148	4.8	LOS A	0.6	15.2	0.33	0.27	0.33	32.2
East: CO 402															
1u	U	All MCs	2	8.0	2	8.0	0.420	9.8	LOS A	2.4	63.7	0.66	0.60	0.76	20.0
6	T1	All MCs	733	8.0	733	8.0	0.420	9.1	LOS A	2.4	64.1	0.65	0.57	0.73	19.9
16	R2	All MCs	243	8.0	243	8.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			978	8.0	978	8.0	0.420	6.9	LOS A	2.4	64.1	0.49	0.43	0.55	21.6
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.237	4.0	LOS A	1.8	46.9	0.04	0.00	0.04	17.9
5	L2	All MCs	310	8.0	310	8.0	0.237	4.0	LOS A	1.8	46.9	0.04	0.00	0.04	31.1
2	T1	All MCs	332	8.0	332	8.0	0.237	3.8	LOS A	1.8	47.2	0.04	0.00	0.04	22.6
Approach			643	8.0	643	8.0	0.237	3.9	LOS A	1.8	47.2	0.04	0.00	0.04	27.4
All Vehicles			2038	8.0	2038	8.0	0.420	5.5	LOS A	2.4	64.1	0.32	0.26	0.34	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:02:38 PM

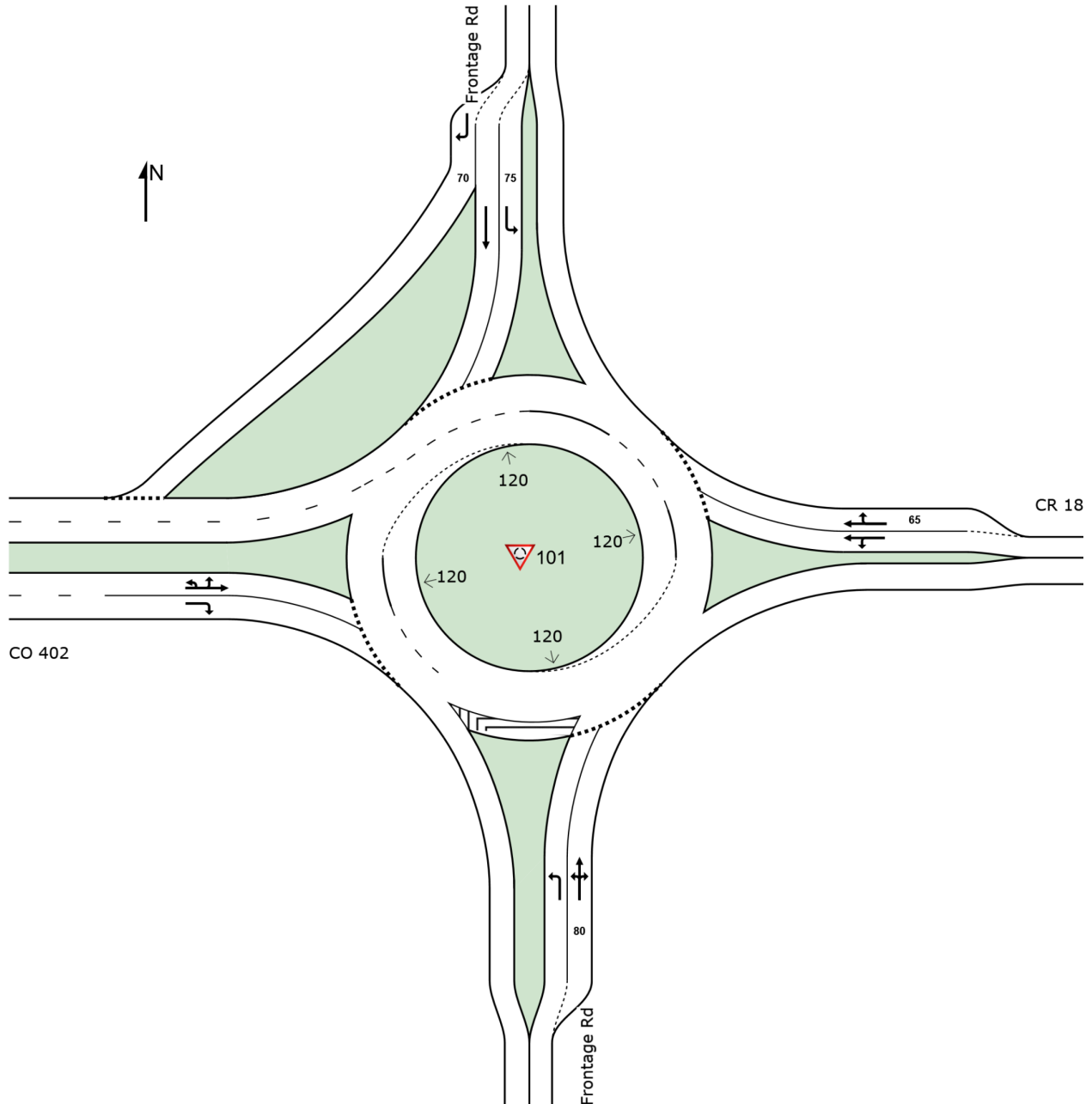
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\AM_2030 Base_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

AM 2030 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Tuesday, August 13, 2024 4:02:28 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\AM_2030 Base_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]	ft			mph
South: Frontage Rd															
3	L2	All MCs	107	9.0	107	9.0	0.112	5.7	LOS A	0.6	17.2	0.63	0.46	0.63	30.4
8	T1	All MCs	65	9.0	65	9.0	0.112	5.0	LOS A	0.6	17.2	0.62	0.44	0.62	33.2
18	R2	All MCs	17	9.0	17	9.0	0.112	5.0	LOS A	0.6	17.2	0.62	0.44	0.62	38.1
Approach			189	9.0	189	9.0	0.112	5.4	LOS A	0.6	17.2	0.63	0.45	0.63	32.3
East: CR 18															
1	L2	All MCs	20	7.0	20	7.0	0.081	4.6	LOS A	0.4	9.5	0.44	0.29	0.44	38.0
6	T1	All MCs	63	7.0	63	7.0	0.081	4.6	LOS A	0.4	9.5	0.44	0.29	0.44	39.9
16	R2	All MCs	70	7.0	70	7.0	0.081	4.6	LOS A	0.4	9.5	0.43	0.29	0.43	39.8
Approach			152	7.0	152	7.0	0.081	4.6	LOS A	0.4	9.5	0.43	0.29	0.43	39.4
North: Frontage Rd															
7	L2	All MCs	53	4.0	53	4.0	0.040	3.0	LOS A	0.2	4.4	0.30	0.16	0.30	38.1
4	T1	All MCs	51	4.0	51	4.0	0.043	3.4	LOS A	0.2	4.7	0.32	0.17	0.32	33.8
14	R2	All MCs	305	4.0	305	4.0	0.225	4.5	LOS A	1.1	29.6	0.34	0.18	0.34	30.2
Approach			410	4.0	410	4.0	0.225	4.2	LOS A	1.1	29.6	0.33	0.18	0.33	32.2
West: CO 402															
5u	U	All MCs	5	9.0	5	9.0	0.403	7.4	LOS A	2.4	64.1	0.37	0.20	0.37	20.5
5	L2	All MCs	113	9.0	113	9.0	0.403	7.4	LOS A	2.4	64.1	0.37	0.20	0.37	28.8
2	T1	All MCs	323	9.0	323	9.0	0.403	7.4	LOS A	2.4	64.1	0.37	0.20	0.37	38.7
12	R2	All MCs	26	9.0	26	9.0	0.037	5.4	LOS A	0.2	4.2	0.32	0.18	0.32	31.7
Approach			467	9.0	467	9.0	0.403	7.3	LOS A	2.4	64.1	0.37	0.19	0.37	35.4
All Vehicles			1218	7.1	1218	7.1	0.403	5.6	LOS A	2.4	64.1	0.40	0.24	0.40	34.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:02:28 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\AM_2030 Base_Roundabouts.sip9

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	327	285	703	275	179	263
Average Queue (ft)	220	81	325	64	108	114
95th Queue (ft)	323	189	546	240	171	219
Link Distance (ft)		1168	7117			438
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	390			250	155	
Storage Blk Time (%)			11	0	3	4
Queuing Penalty (veh)			11	0	4	5

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	284	317	259	52	159	142
Average Queue (ft)	117	130	105	10	49	66
95th Queue (ft)	227	250	200	33	106	127
Link Distance (ft)		7117	3060			697
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	385			420	225	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Park-n-Ride Access & SH 402

Movement	WB	WB	NB	NB
Directions Served	L	T	L	R
Maximum Queue (ft)	28	178	30	53
Average Queue (ft)	5	38	6	15
95th Queue (ft)	22	123	23	42
Link Distance (ft)		555	373	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	150		150	
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	30	347	28	73	296	26	108	67	48	45
Average Queue (ft)	7	211	8	27	140	2	15	24	8	4
95th Queue (ft)	26	313	28	62	233	12	51	54	30	20
Link Distance (ft)	3814			1096			474			634
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	250		250	250		250	150		150	
Storage Blk Time (%)		2			0					
Queuing Penalty (veh)		1			0					

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	131	305	33	424	520	425	27	132	44	178	153	64
Average Queue (ft)	54	225	8	18	365	58	2	71	15	77	77	28
95th Queue (ft)	105	324	24	143	474	259	13	120	39	142	136	58
Link Distance (ft)	3060			3814			517			559		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400		400	400		400	200		200	200		200
Storage Blk Time (%)					3	0						
Queuing Penalty (veh)					4	0						

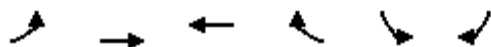
Zone Summary

Zone wide Queuing Penalty: 27

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

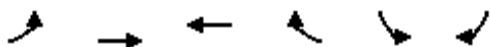
08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	243	921	847	143	110	241
Future Volume (veh/h)	243	921	847	143	110	241
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	251	949	873	117	113	154
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	323	1296	1083	1217	341	425
Arrive On Green	0.08	0.71	0.58	0.58	0.19	0.19
Sat Flow, veh/h	1739	1826	1856	1572	1795	1598
Grp Volume(v), veh/h	251	949	873	117	113	154
Grp Sat Flow(s),veh/h/ln	1739	1826	1856	1572	1795	1598
Q Serve(g_s), s	5.4	31.4	37.0	1.8	5.4	7.8
Cycle Q Clear(g_c), s	5.4	31.4	37.0	1.8	5.4	7.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	323	1296	1083	1217	341	425
V/C Ratio(X)	0.78	0.73	0.81	0.10	0.33	0.36
Avail Cap(c_a), veh/h	382	1296	1083	1217	341	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.72	0.72	1.00	1.00
Uniform Delay (d), s/veh	19.1	8.8	16.4	2.8	35.0	29.8
Incr Delay (d2), s/veh	8.3	3.7	4.7	0.1	2.6	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	9.3	13.9	1.0	2.6	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.4	12.4	21.1	2.9	37.6	32.2
LnGrp LOS	C	B	C	A	D	C
Approach Vol, veh/h		1200	990		267	
Approach Delay, s/veh		15.6	18.9		34.5	
Approach LOS		B	B		C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.6	63.4			76.0	24.0
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	11.0	55.0			71.0	19.0
Max Q Clear Time (g_c+I1), s	7.4	39.0			33.4	9.8
Green Ext Time (p_c), s	0.2	5.4			7.6	0.5
Intersection Summary						
HCM 6th Ctrl Delay			19.0			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary 5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	161	895	765	128	72	133	
Future Volume (veh/h)	161	895	765	128	72	133	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1841	1841	1826	1826	
Adj Flow Rate, veh/h	173	962	823	116	77	34	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	4	4	5	5	
Cap, veh/h	375	1403	1217	1291	290	331	
Arrive On Green	0.05	0.75	0.66	0.66	0.17	0.17	
Sat Flow, veh/h	1781	1870	1841	1560	1739	1547	
Grp Volume(v), veh/h	173	962	823	116	77	34	
Grp Sat Flow(s),veh/h/ln	1781	1870	1841	1560	1739	1547	
Q Serve(g_s), s	3.5	31.8	32.9	1.7	4.6	2.1	
Cycle Q Clear(g_c), s	3.5	31.8	32.9	1.7	4.6	2.1	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	375	1403	1217	1291	290	331	
V/C Ratio(X)	0.46	0.69	0.68	0.09	0.27	0.10	
Avail Cap(c_a), veh/h	425	1403	1217	1291	290	331	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.66	0.66	0.59	0.59	1.00	1.00	
Uniform Delay (d), s/veh	12.2	7.7	12.5	1.9	43.6	37.9	
Incr Delay (d2), s/veh	0.6	1.8	1.8	0.1	2.2	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.4	9.3	11.5	0.9	2.1	2.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	12.8	9.5	14.3	2.0	45.8	38.5	
LnGrp LOS	B	A	B	A	D	D	
Approach Vol, veh/h		1135	939		111		
Approach Delay, s/veh		10.0	12.7		43.6		
Approach LOS		B	B		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				95.0	25.0	10.7	84.3
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				90.0	20.0	9.0	76.0
Max Q Clear Time (g_c+I1), s				33.8	6.6	5.5	34.9
Green Ext Time (p_c), s				8.1	0.2	0.1	6.4
Intersection Summary							
HCM 6th Ctrl Delay			12.9				
HCM 6th LOS			B				

HCM 6th Signalized Intersection Summary 18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	864	47	40	874	5	24	5	50	5	5	5
Future Volume (veh/h)	10	864	47	40	874	5	24	5	50	5	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	11	939	27	43	950	0	26	5	54	5	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	253	1178	998	267	1213	1028	344	28	304	297	177	177
Arrive On Green	0.01	0.63	0.63	0.03	0.65	0.00	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	1767	1856	1572	1767	1856	1572	1394	135	1458	1333	851	851
Grp Volume(v), veh/h	11	939	27	43	950	0	26	0	59	5	0	10
Grp Sat Flow(s),veh/h/ln	1767	1856	1572	1767	1856	1572	1394	0	1593	1333	0	1702
Q Serve(g_s), s	0.3	44.9	0.8	1.0	43.6	0.0	1.8	0.0	3.7	0.4	0.0	0.6
Cycle Q Clear(g_c), s	0.3	44.9	0.8	1.0	43.6	0.0	2.4	0.0	3.7	4.0	0.0	0.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.92	1.00		0.50
Lane Grp Cap(c), veh/h	253	1178	998	267	1213	1028	344	0	332	297	0	355
V/C Ratio(X)	0.04	0.80	0.03	0.16	0.78	0.00	0.08	0.00	0.18	0.02	0.00	0.03
Avail Cap(c_a), veh/h	304	1178	998	284	1213	1028	344	0	332	297	0	355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	16.2	8.1	15.9	14.7	0.0	38.8	0.0	39.1	40.7	0.0	37.8
Incr Delay (d2), s/veh	0.0	3.7	0.0	0.3	5.1	0.0	0.4	0.0	1.2	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	16.8	0.2	0.4	16.4	0.0	0.6	0.0	1.5	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.8	19.9	8.2	16.2	19.8	0.0	39.2	0.0	40.2	40.8	0.0	38.0
LnGrp LOS	B	B	A	B	B	A	D	A	D	D	A	D
Approach Vol, veh/h		977			993			85			15	
Approach Delay, s/veh		19.5			19.7			39.9			38.9	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		30.0	8.8	81.2		30.0	6.5	83.5				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		25.0	5.0	75.0		25.0	5.0	75.0				
Max Q Clear Time (g_c+I1), s		5.7	3.0	46.9		6.0	2.3	45.6				
Green Ext Time (p_c), s		0.3	0.0	7.1		0.0	0.0	7.2				
Intersection Summary												
HCM 6th Ctrl Delay			20.6									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	780	55	10	770	120	5	110	15	135	140	120
Future Volume (veh/h)	130	780	55	10	770	120	5	110	15	135	140	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	141	848	37	11	837	83	5	120	0	147	152	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	270	1114	954	246	1045	1005	251	281	258	310	409	425
Arrive On Green	0.05	0.60	0.60	0.01	0.56	0.56	0.01	0.15	0.00	0.08	0.22	0.22
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	141	848	37	11	837	83	5	120	0	147	152	31
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.9	40.3	1.1	0.3	42.9	2.4	0.3	7.0	0.0	8.2	8.3	1.8
Cycle Q Clear(g_c), s	3.9	40.3	1.1	0.3	42.9	2.4	0.3	7.0	0.0	8.2	8.3	1.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	270	1114	954	246	1045	1005	251	281	258	310	409	425
V/C Ratio(X)	0.52	0.76	0.04	0.04	0.80	0.08	0.02	0.43	0.00	0.47	0.37	0.07
Avail Cap(c_a), veh/h	301	1114	954	297	1045	1005	314	281	258	310	409	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.70	0.70	0.70	0.61	0.61	0.61	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.0	18.0	9.7	16.5	21.1	8.5	42.8	46.3	0.0	38.0	39.9	32.8
Incr Delay (d2), s/veh	1.1	3.5	0.1	0.0	4.0	0.1	0.0	4.7	0.0	5.1	2.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	15.8	0.4	0.1	17.4	0.7	0.1	3.5	0.0	3.9	4.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	21.5	9.8	16.6	25.2	8.6	42.9	51.0	0.0	43.1	42.5	33.1
LnGrp LOS	C	C	A	B	C	A	D	D	A	D	D	C
Approach Vol, veh/h	1026			931			125			330		
Approach Delay, s/veh	21.0			23.6			50.7			41.9		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	23.0	6.5	76.5	5.8	31.2	10.9	72.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.0	18.0	5.0	68.0	5.0	22.0	8.0	65.0				
Max Q Clear Time (g_c+I1), s	10.2	9.0	2.3	42.3	2.3	10.3	5.9	44.9				
Green Ext Time (p_c), s	0.0	0.3	0.0	5.9	0.0	0.6	0.1	5.5				
Intersection Summary												
HCM 6th Ctrl Delay	26.4											
HCM 6th LOS	C											

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	0.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	853	10	12	946	0	12	0	24	0	0	0
Future Vol, veh/h	0	853	10	12	946	0	12	0	24	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	150	-	150	150	-	-	0	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	937	11	13	1040	0	13	0	26	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1040	0	0	948	0	0	1483	-	937	2022	2014	520
Stage 1	-	-	-	-	-	-	937	-	-	1066	1066	-
Stage 2	-	-	-	-	-	-	546	-	-	956	948	-
Critical Hdwy	4.145	-	-	4.145	-	-	7.345	-	6.245	7.345	6.545	6.945
Critical Hdwy Stg 1	-	-	-	-	-	-	6.145	-	-	6.545	5.545	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.545	-	-	6.145	5.545	-
Follow-up Hdwy	2.2285	-	-	2.2285	-	-	3.5285	-	3.3285	3.5285	4.0285	3.3285
Pot Cap-1 Maneuver	662	-	-	717	-	-	94	0	318	38	58	500
Stage 1	-	-	-	-	-	-	315	0	-	237	296	-
Stage 2	-	-	-	-	-	-	488	0	-	307	337	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	662	-	-	717	-	-	93	-	318	34	57	500
Mov Cap-2 Maneuver	-	-	-	-	-	-	93	-	-	34	57	-
Stage 1	-	-	-	-	-	-	315	-	-	237	291	-
Stage 2	-	-	-	-	-	-	479	-	-	282	337	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.1			28.2			0		
HCM LOS							D			A		

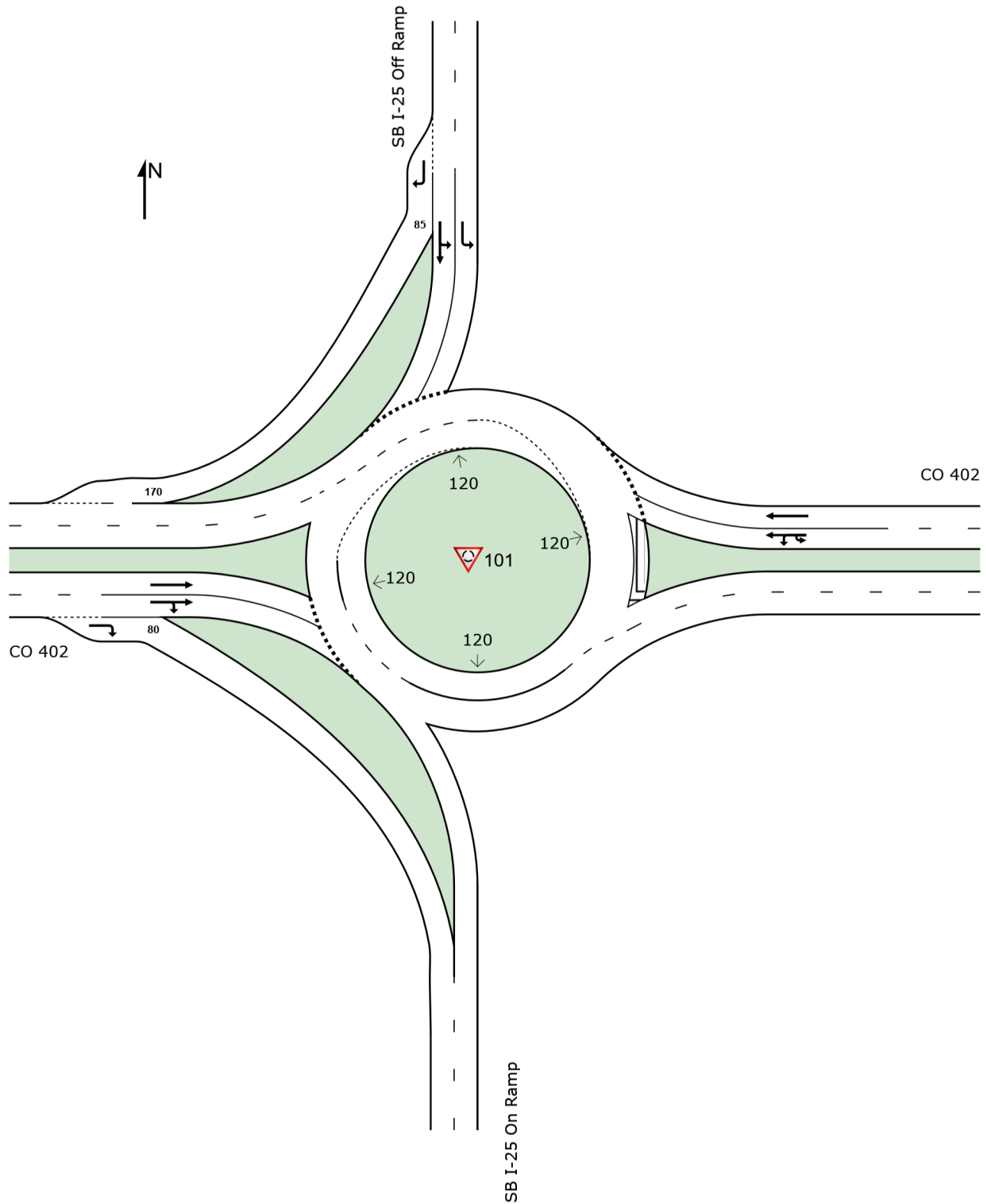
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	93	318	662	-	-	717	-	-	-
HCM Lane V/C Ratio	0.142	0.083	-	-	-	0.018	-	-	-
HCM Control Delay (s)	50	17.3	0	-	-	10.1	-	-	0
HCM Lane LOS	F	C	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.5	0.3	0	-	-	0.1	-	-	-

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

PM 2030 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh.]	[Dist]				
			veh/h		veh/h		v/c	sec		veh	ft				mph
East: CO 402															
1u	U	All MCs	5	5.0	5	5.0	0.352	4.4	LOS A	0.0	0.0	0.00	0.00	0.00	19.5
1	L2	All MCs	201	5.0	201	5.0	0.352	4.4	LOS A	0.0	0.0	0.00	0.00	0.00	37.5
6	T1	All MCs	779	5.0	779	5.0	0.352	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	26.6
Approach			986	5.0	986	5.0	0.352	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	29.6
North: SB I-25 Off Ramp															
7	L2	All MCs	210	6.0	210	6.0	0.122	5.3	LOS A	0.5	11.9	0.55	0.48	0.55	29.5
4	T1	All MCs	1	6.0	1	6.0	0.122	4.7	LOS A	0.5	11.9	0.54	0.46	0.54	39.8
14	R2	All MCs	287	6.0	287	6.0	0.181	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	42.3
Approach			498	6.0	498	6.0	0.181	5.5	LOS A	0.5	11.9	0.23	0.20	0.23	35.6
West: CO 402															
2	T1	All MCs	734	7.0	734	7.0	0.363	7.4	LOS A	1.9	49.7	0.55	0.40	0.55	23.2
12	R2	All MCs	235	7.0	235	7.0	0.149	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			968	7.0	968	7.0	0.363	5.6	LOS A	1.9	49.7	0.41	0.31	0.41	28.3
All Vehicles			2452	6.0	2452	6.0	0.363	5.1	LOS A	1.9	49.7	0.21	0.16	0.21	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:03:55 PM

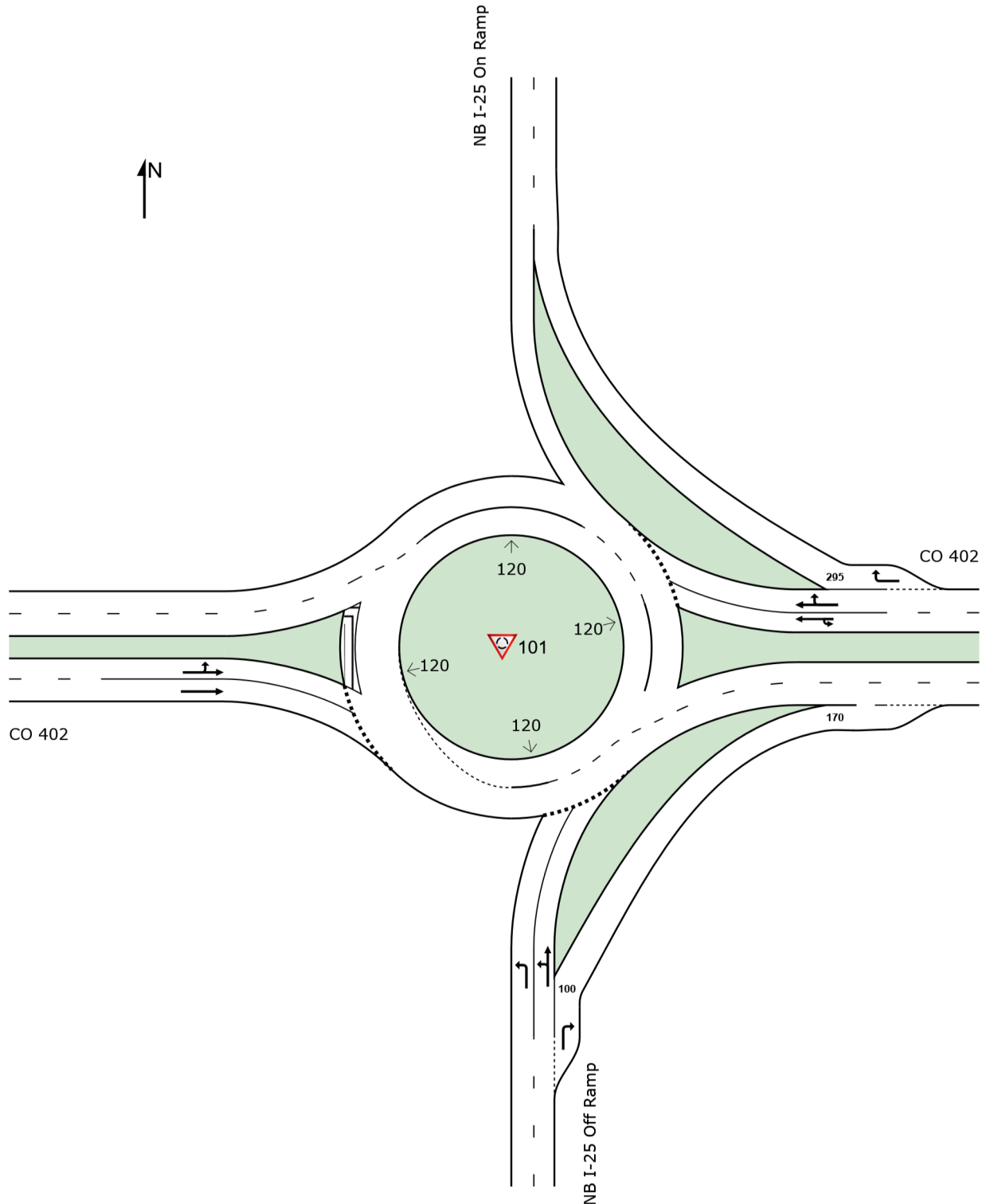
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\PM_2030 Base_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

PM 2030 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & NB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				
			veh/h		veh/h		v/c	sec							mph
South: NB I-25 Off Ramp															
3	L2	All MCs	385	4.0	385	4.0	0.219	6.3	LOS A	0.9	23.5	0.59	0.52	0.59	27.8
8	T1	All MCs	2	4.0	2	4.0	0.219	5.7	LOS A	0.9	23.5	0.58	0.50	0.58	37.6
18	R2	All MCs	199	4.0	199	4.0	0.123	4.5	LOS A	0.0	0.0	0.00	0.00	0.00	41.3
Approach			586	4.0	586	4.0	0.219	5.7	LOS A	0.9	23.5	0.39	0.34	0.39	31.3
East: CO 402															
1u	U	All MCs	4	7.0	4	7.0	0.362	9.2	LOS A	1.8	47.8	0.66	0.57	0.68	20.2
6	T1	All MCs	609	7.0	609	7.0	0.362	8.4	LOS A	1.9	49.3	0.65	0.54	0.66	20.2
16	R2	All MCs	102	7.0	102	7.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			715	7.0	715	7.0	0.362	7.2	LOS A	1.9	49.3	0.56	0.47	0.57	21.2
West: CO 402															
5	L2	All MCs	280	5.0	280	5.0	0.343	4.6	LOS A	2.9	75.6	0.07	0.01	0.07	32.4
2	T1	All MCs	673	5.0	673	5.0	0.343	4.5	LOS A	2.9	76.0	0.07	0.01	0.07	21.8
Approach			953	5.0	953	5.0	0.343	4.6	LOS A	2.9	76.0	0.07	0.01	0.07	25.4
All Vehicles			2254	5.4	2254	5.4	0.362	5.7	LOS A	2.9	76.0	0.31	0.24	0.31	25.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:04:08 PM

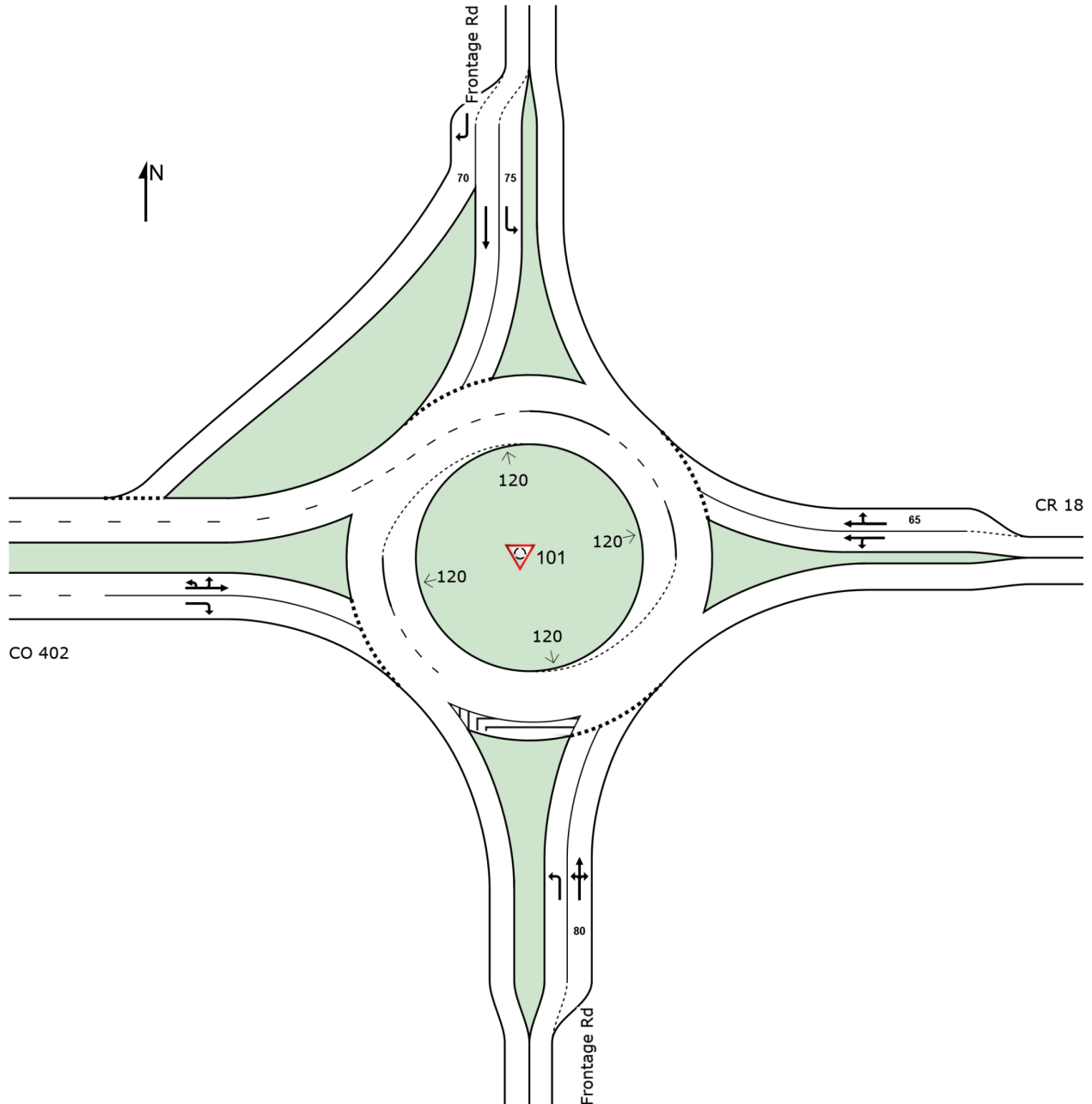
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\PM_2030 Base_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

PM 2030 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Tuesday, August 13, 2024 4:04:20 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\PM_2030 Base_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	114	9.0	114	9.0	0.337	17.5	LOS B	2.3	60.4	0.97	0.83	0.98	28.0
8	T1	All MCs	107	9.0	107	9.0	0.338	13.5	LOS B	2.6	69.7	1.00	0.80	1.00	32.0
18	R2	All MCs	48	9.0	48	9.0	0.338	13.5	LOS B	2.6	69.7	1.00	0.80	1.00	36.6
Approach			268	9.0	268	9.0	0.338	15.2	LOS B	2.6	69.7	0.99	0.81	0.99	31.3
East: CR 18															
1	L2	All MCs	10	4.0	10	4.0	0.296	7.8	LOS A	1.5	39.3	0.62	0.49	0.62	37.5
6	T1	All MCs	368	4.0	368	4.0	0.296	7.8	LOS A	1.5	39.4	0.62	0.48	0.62	38.9
16	R2	All MCs	101	4.0	101	4.0	0.296	7.6	LOS A	1.5	39.4	0.62	0.48	0.62	38.8
Approach			479	4.0	479	4.0	0.296	7.7	LOS A	1.5	39.4	0.62	0.48	0.62	38.8
North: Frontage Rd															
7	L2	All MCs	91	6.0	91	6.0	0.084	4.0	LOS A	0.4	9.8	0.49	0.35	0.49	37.8
4	T1	All MCs	84	6.0	84	6.0	0.092	4.8	LOS A	0.4	10.3	0.51	0.38	0.51	33.5
14	R2	All MCs	192	6.0	192	6.0	0.175	4.8	LOS A	0.8	21.6	0.51	0.37	0.51	30.0
Approach			367	6.0	367	6.0	0.175	4.6	LOS A	0.8	21.6	0.50	0.37	0.50	33.3
West: CO 402															
5u	U	All MCs	9	4.0	9	4.0	0.828	20.0	LOS C	20.6	530.5	0.85	0.98	1.39	16.5
5	L2	All MCs	267	4.0	267	4.0	0.828	20.0	LOS C	20.6	530.5	0.85	0.98	1.39	25.5
2	T1	All MCs	616	4.0	616	4.0	0.828	20.0	LOS C	20.6	530.5	0.85	0.98	1.39	33.9
12	R2	All MCs	16	4.0	16	4.0	0.025	5.7	LOS A	0.1	2.6	0.39	0.24	0.39	31.6
Approach			909	4.0	909	4.0	0.828	19.8	LOS B	20.6	530.5	0.84	0.97	1.37	31.0
All Vehicles			2024	5.0	2024	5.0	0.828	13.6	LOS B	20.6	530.5	0.75	0.73	0.99	33.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:04:21 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2030\PM_2030 Base_Roundabouts.sip9

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	286	294	546	275	178	235
Average Queue (ft)	127	141	298	115	63	87
95th Queue (ft)	222	250	501	317	120	161
Link Distance (ft)		1168	7117			438
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	390			250	155	
Storage Blk Time (%)			13	0		1
Queuing Penalty (veh)			19	1		1

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	130	276	226	80	75	110
Average Queue (ft)	72	144	66	14	47	60
95th Queue (ft)	123	253	150	47	87	101
Link Distance (ft)		7117	3060			697
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	385			420	225	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 16: Park-n-Ride Access & SH 402

Movement	WB	WB	WB	NB	NB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	28	178	86	52	79
Average Queue (ft)	5	21	5	13	22
95th Queue (ft)	22	100	35	41	50
Link Distance (ft)		555	555	373	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	150			150	
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	TR	L	TR
Maximum Queue (ft)	274	412	275	51	307	28	174	206	26	24
Average Queue (ft)	16	258	38	20	160	2	26	32	4	3
95th Queue (ft)	97	388	168	46	260	12	83	103	17	15
Link Distance (ft)	3814			1096			474			634
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	250		250	250		250	150		150	
Storage Blk Time (%)		9	0		1			1		
Queuing Penalty (veh)		5	0		0			0		

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	130	353	18	26	537	425	48	130	44	204	255	127
Average Queue (ft)	55	219	6	5	353	128	7	70	9	112	107	49
95th Queue (ft)	106	310	18	22	507	422	28	118	28	188	178	107
Link Distance (ft)	3060			3814			517			559		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400		400	400		400	200		200	200		200
Storage Blk Time (%)					6	0				1		
Queuing Penalty (veh)					7	0				2		

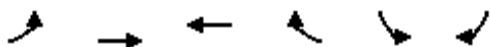
Zone Summary

Zone wide Queuing Penalty: 36

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024

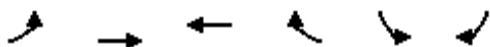


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	331	1023	1169	123	163	213
Future Volume (veh/h)	331	1023	1169	123	163	213
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	364	1124	1285	91	179	223
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	601	2695	1539	686	221	624
Arrive On Green	0.28	0.77	0.44	0.44	0.13	0.13
Sat Flow, veh/h	1753	3589	3589	1560	1711	1522
Grp Volume(v), veh/h	364	1124	1285	91	179	223
Grp Sat Flow(s),veh/h/ln	1753	1749	1749	1560	1711	1522
Q Serve(g_s), s	11.0	10.9	32.5	3.5	10.2	0.0
Cycle Q Clear(g_c), s	11.0	10.9	32.5	3.5	10.2	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	601	2695	1539	686	221	624
V/C Ratio(X)	0.61	0.42	0.84	0.13	0.81	0.36
Avail Cap(c_a), veh/h	601	2695	1539	686	325	716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.80	0.80	1.00	1.00
Uniform Delay (d), s/veh	27.7	3.9	24.8	16.7	42.3	20.4
Incr Delay (d2), s/veh	1.7	0.5	4.5	0.3	9.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	2.1	12.7	1.2	4.8	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.5	4.4	29.3	17.0	51.5	20.7
LnGrp LOS	C	A	C	B	D	C
Approach Vol, veh/h		1488	1376		402	
Approach Delay, s/veh		10.5	28.4		34.4	
Approach LOS		B	C		C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	33.1	49.0			82.1	17.9
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	22.0	44.0			71.0	19.0
Max Q Clear Time (g_c+I1), s	13.0	34.5			12.9	12.2
Green Ext Time (p_c), s	0.7	5.5			8.9	0.8
Intersection Summary						
HCM 6th Ctrl Delay			21.0			
HCM 6th LOS			C			

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	225	1024	1030	167	70	163	
Future Volume (veh/h)	225	1024	1030	167	70	163	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1752	1752	
Adj Flow Rate, veh/h	247	1125	1132	130	77	148	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	6	6	6	6	10	10	
Cap, veh/h	330	2478	2042	1187	300	381	
Arrive On Green	0.08	0.72	0.20	0.20	0.18	0.18	
Sat Flow, veh/h	1725	3532	3532	1535	1668	1485	
Grp Volume(v), veh/h	247	1125	1132	130	77	148	
Grp Sat Flow(s),veh/h/ln	1725	1721	1721	1535	1668	1485	
Q Serve(g_s), s	5.2	13.6	29.7	3.9	4.0	8.2	
Cycle Q Clear(g_c), s	5.2	13.6	29.7	3.9	4.0	8.2	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	330	2478	2042	1187	300	381	
V/C Ratio(X)	0.75	0.45	0.55	0.11	0.26	0.39	
Avail Cap(c_a), veh/h	509	2478	2042	1187	300	381	
HCM Platoon Ratio	1.00	1.00	0.33	0.33	1.00	1.00	
Upstream Filter(I)	0.88	0.88	0.74	0.74	1.00	1.00	
Uniform Delay (d), s/veh	16.8	5.8	28.3	6.0	35.2	30.7	
Incr Delay (d2), s/veh	3.0	0.5	0.8	0.1	2.1	3.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	3.1	3.3	13.6	2.3	1.7	7.5	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	19.8	6.4	29.1	6.1	37.3	33.7	
LnGrp LOS	B	A	C	A	D	C	
Approach Vol, veh/h		1372	1262	225			
Approach Delay, s/veh		8.8	26.7	34.9			
Approach LOS		A	C	C			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				77.0	23.0	12.7	64.3
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				72.0	18.0	18.0	49.0
Max Q Clear Time (g_c+I1), s				15.6	10.2	7.2	31.7
Green Ext Time (p_c), s				9.0	0.4	0.5	7.1
Intersection Summary							
HCM 6th Ctrl Delay			18.8				
HCM 6th LOS			B				

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (veh/h)	5	981	50	68	1177	5	22	5	63	10	5	5
Future Volume (veh/h)	5	981	50	68	1177	5	22	5	63	10	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	5	1078	24	75	1293	0	24	5	69	11	5	5
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	282	2208	985	384	2339	1043	316	19	267	256	153	153
Arrive On Green	0.01	0.63	0.63	0.04	0.66	0.00	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1394	107	1482	1315	851	851
Grp Volume(v), veh/h	5	1078	24	75	1293	0	24	0	74	11	0	10
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1394	0	1589	1315	0	1702
Q Serve(g_s), s	0.1	16.5	0.6	1.4	19.5	0.0	1.4	0.0	4.0	0.7	0.0	0.5
Cycle Q Clear(g_c), s	0.1	16.5	0.6	1.4	19.5	0.0	1.9	0.0	4.0	4.7	0.0	0.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.93	1.00		0.50
Lane Grp Cap(c), veh/h	282	2208	985	384	2339	1043	316	0	286	256	0	306
V/C Ratio(X)	0.02	0.49	0.02	0.20	0.55	0.00	0.08	0.00	0.26	0.04	0.00	0.03
Avail Cap(c_a), veh/h	359	2208	985	448	2339	1043	316	0	286	256	0	306
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.0	10.1	7.1	7.2	8.9	0.0	34.6	0.0	35.3	37.3	0.0	33.8
Incr Delay (d2), s/veh	0.0	0.7	0.0	0.2	0.9	0.0	0.5	0.0	2.2	0.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	5.2	0.2	0.4	5.8	0.0	0.5	0.0	1.7	0.3	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.0	10.8	7.1	7.4	9.9	0.0	35.1	0.0	37.4	37.6	0.0	34.0
LnGrp LOS	A	B	A	A	A	A	D	A	D	D	A	C
Approach Vol, veh/h		1107			1368			98			21	
Approach Delay, s/veh		10.7			9.8			36.9			35.9	
Approach LOS		B			A			D			D	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		23.0	9.4	67.6		23.0	5.6	71.4				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		18.0	8.0	59.0		18.0	5.0	62.0				
Max Q Clear Time (g_c+I1), s		6.0	3.4	18.5		6.7	2.1	21.5				
Green Ext Time (p_c), s		0.3	0.0	8.2		0.0	0.0	10.7				
Intersection Summary												
HCM 6th Ctrl Delay			11.4									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	850	140	10	1045	110	5	160	30	145	250	140
Future Volume (veh/h)	135	850	140	10	1045	110	5	160	30	145	250	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	147	924	84	11	1136	63	5	174	0	158	272	93
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	328	2276	1015	395	1898	996	200	216	183	270	486	412
Arrive On Green	0.11	1.00	1.00	0.53	0.53	0.53	0.12	0.12	0.00	0.09	0.26	0.26
Sat Flow, veh/h	1781	3554	1585	605	3554	1585	1107	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	147	924	84	11	1136	63	5	174	0	158	272	93
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	605	1777	1585	1107	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.6	0.0	0.0	0.9	21.9	1.5	0.4	9.1	0.0	7.5	12.6	4.6
Cycle Q Clear(g_c), s	3.6	0.0	0.0	0.9	21.9	1.5	0.4	9.1	0.0	7.5	12.6	4.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	328	2276	1015	395	1898	996	200	216	183	270	486	412
V/C Ratio(X)	0.45	0.41	0.08	0.03	0.60	0.06	0.02	0.80	0.00	0.59	0.56	0.23
Avail Cap(c_a), veh/h	388	2276	1015	395	1898	996	293	374	317	280	655	555
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.90	0.90	0.90	0.84	0.84	0.84	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.5	0.0	0.0	11.1	16.0	7.2	39.3	43.1	0.0	33.3	32.1	29.1
Incr Delay (d2), s/veh	0.9	0.5	0.1	0.1	1.2	0.1	0.0	6.9	0.0	2.9	1.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.2	0.0	0.1	7.8	0.4	0.1	4.4	0.0	3.3	5.5	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	0.5	0.1	11.2	17.1	7.3	39.3	50.0	0.0	36.2	33.1	29.4
LnGrp LOS	B	A	A	B	B	A	D	D	A	D	C	C
Approach Vol, veh/h	1155			1210				179			523	
Approach Delay, s/veh	2.0			16.6				49.7			33.4	
Approach LOS	A			B				D			C	
Timer - Assigned Phs	1	2	4			6	7	8				
Phs Duration (G+Y+Rc), s	14.4	16.6	69.0			31.0	10.6	58.4				
Change Period (Y+Rc), s	5.0	5.0	5.0			5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	20.0	55.0			35.0	9.0	41.0				
Max Q Clear Time (g_c+I1), s	9.5	11.1	2.0			14.6	5.6	23.9				
Green Ext Time (p_c), s	0.0	0.5	7.0			1.6	0.1	7.0				
Intersection Summary												
HCM 6th Ctrl Delay	15.9											
HCM 6th LOS	B											

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1033	12	16	1210	0	5	0	17	0	0	0
Future Vol, veh/h	0	1033	12	16	1210	0	5	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	250	-	-	0	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	2
Mvmt Flow	0	1135	13	18	1330	0	5	0	19	0	0	0

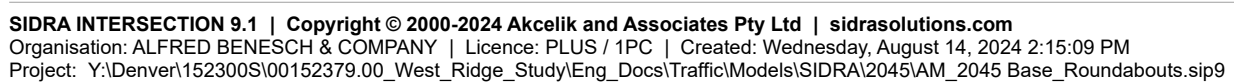
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1330	0	0	1148	0	0	1836	-	568	1934	2514	665
Stage 1	-	-	-	-	-	-	1135	-	-	1366	1366	-
Stage 2	-	-	-	-	-	-	701	-	-	568	1148	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.56	-	6.96	7.56	6.56	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	-	-	6.56	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	-	-	6.56	5.56	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	3.53	-	3.33	3.53	4.03	3.32
Pot Cap-1 Maneuver	510	-	-	599	-	-	47	0	464	39	27	403
Stage 1	-	-	-	-	-	-	214	0	-	154	211	-
Stage 2	-	-	-	-	-	-	393	0	-	472	270	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	510	-	-	599	-	-	46	-	464	37	26	403
Mov Cap-2 Maneuver	-	-	-	-	-	-	46	-	-	37	26	-
Stage 1	-	-	-	-	-	-	214	-	-	154	205	-
Stage 2	-	-	-	-	-	-	381	-	-	453	270	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	31.4	0
HCM LOS			D	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	46	464	510	-	-	599	-	-	-
HCM Lane V/C Ratio	0.119	0.04	-	-	-	0.029	-	-	-
HCM Control Delay (s)	93.6	13.1	0	-	-	11.2	-	-	0
HCM Lane LOS	F	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0.4	0.1	0	-	-	0.1	-	-	-

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	21	9.0	21	9.0	0.472	5.3	LOS A	4.8	127.8	0.06	0.01	0.06	17.0
1	L2	All MCs	353	9.0	353	9.0	0.472	5.3	LOS A	4.8	127.8	0.06	0.01	0.06	32.6
6	T1	All MCs	896	9.0	896	9.0	0.472	5.2	LOS A	4.8	128.0	0.06	0.01	0.06	23.2
Approach			1270	9.0	1270	9.0	0.472	5.2	LOS A	4.8	128.0	0.06	0.01	0.06	26.6
North: SB I-25 Off Ramp															
7	L2	All MCs	117	9.0	117	9.0	0.083	5.9	LOS A	0.3	8.5	0.61	0.57	0.61	29.0
4	T1	All MCs	2	9.0	2	9.0	0.083	5.0	LOS A	0.3	8.5	0.61	0.54	0.61	39.4
14	R2	All MCs	446	9.0	446	9.0	0.289	11.4	LOS B	0.0	0.0	0.00	0.00	0.00	42.2
Approach			565	9.0	565	9.0	0.289	10.2	LOS B	0.3	8.5	0.13	0.12	0.13	38.4
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.353	8.1	LOS A	1.7	46.3	0.59	0.46	0.59	18.9
2	T1	All MCs	664	8.0	664	8.0	0.353	7.6	LOS A	1.8	48.2	0.58	0.45	0.58	23.1
12	R2	All MCs	441	8.0	441	8.0	0.282	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			1108	8.0	1108	8.0	0.353	4.6	LOS A	1.8	48.2	0.35	0.27	0.35	31.0
All Vehicles			2942	8.6	2942	8.6	0.472	5.9	LOS A	4.8	128.0	0.18	0.13	0.18	30.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:07:05 PM

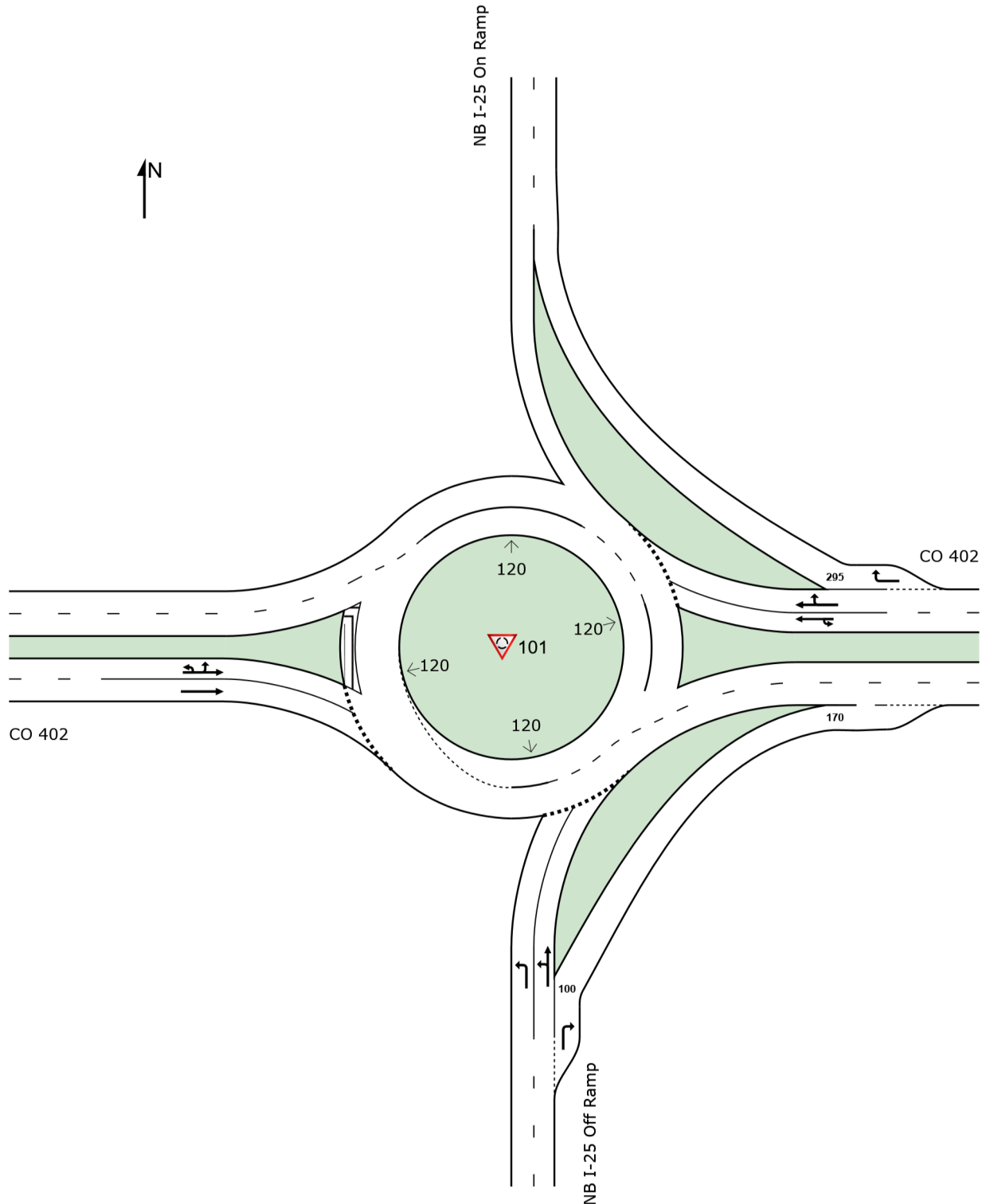
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\AM_2045 Base_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

AM 2045 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:15:12 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\AM_2045 Base_Roundabouts.sip9

MOVEMENT SUMMARY

 Site: 101 [402 & NB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: NB I-25 Off Ramp															
3	L2	All MCs	336	8.0	336	8.0	0.208	6.4	LOS A	0.8	22.1	0.57	0.50	0.57	27.8
8	T1	All MCs	17	8.0	17	8.0	0.208	5.7	LOS A	0.8	22.1	0.56	0.47	0.56	37.5
18	R2	All MCs	188	8.0	188	8.0	0.121	4.5	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			541	8.0	541	8.0	0.208	5.7	LOS A	0.8	22.1	0.37	0.32	0.37	31.7
East: CO 402															
1u	U	All MCs	2	8.0	2	8.0	0.617	16.1	LOS B	5.1	136.0	0.81	0.97	1.28	17.8
6	T1	All MCs	958	8.0	958	8.0	0.617	14.7	LOS B	5.6	147.9	0.80	0.95	1.26	17.7
16	R2	All MCs	317	8.0	317	8.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			1277	8.0	1277	8.0	0.617	11.1	LOS B	5.6	147.9	0.60	0.71	0.94	19.9
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.309	4.4	LOS A	2.6	69.2	0.05	0.01	0.05	17.7
5	L2	All MCs	403	8.0	403	8.0	0.309	4.4	LOS A	2.6	69.2	0.05	0.01	0.05	30.8
2	T1	All MCs	433	8.0	433	8.0	0.309	4.2	LOS A	2.6	69.7	0.05	0.01	0.05	22.4
Approach			839	8.0	839	8.0	0.309	4.3	LOS A	2.6	69.7	0.05	0.01	0.05	27.1
All Vehicles			2657	8.0	2657	8.0	0.617	7.9	LOS A	5.6	147.9	0.38	0.41	0.55	24.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:07:39 PM

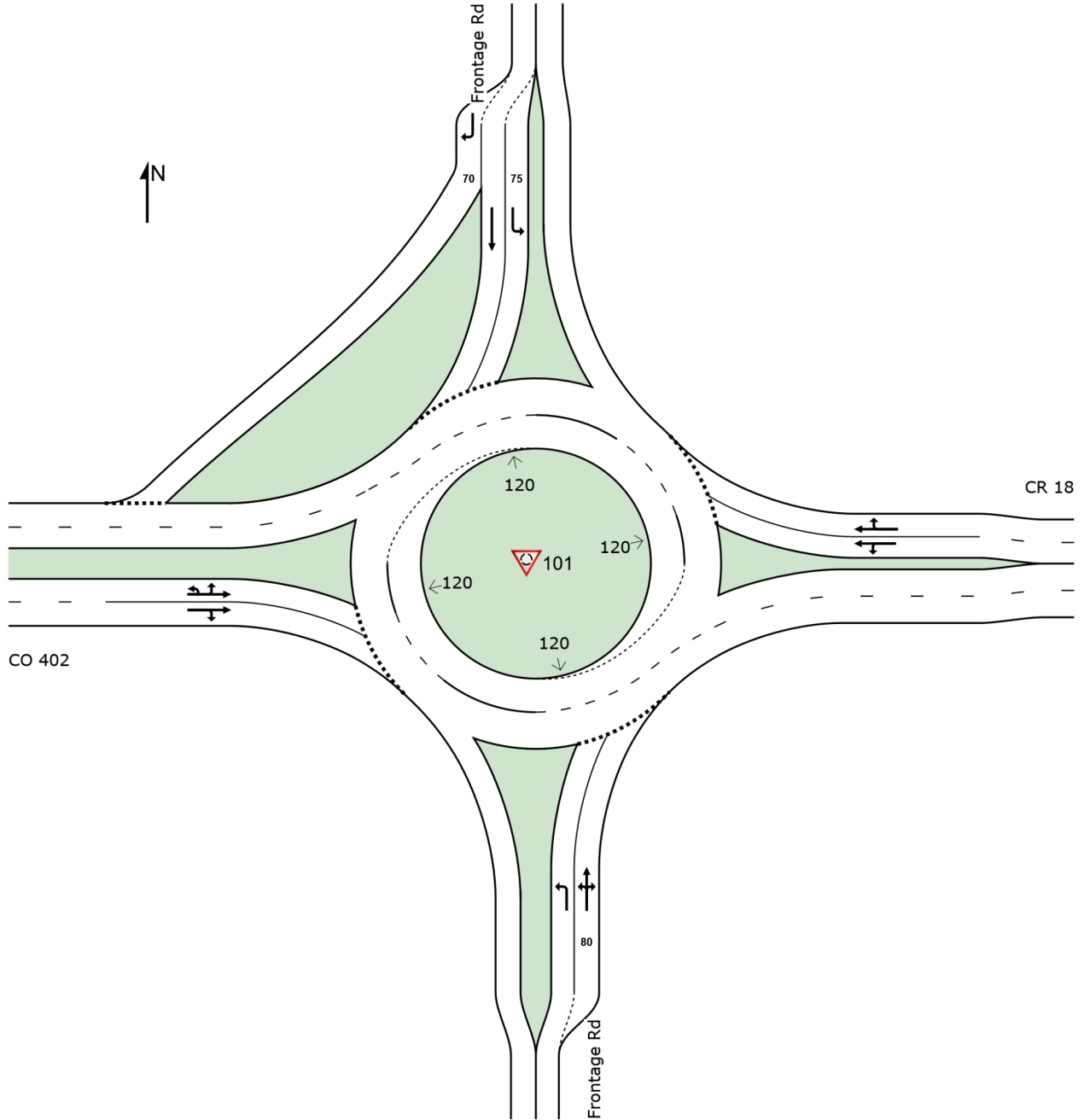
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\AM_2045 Base_Roundabouts.sip9

SITE LAYOUT

 Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]

AM 2045 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
 Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:15:47 PM
 Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\AM_2045 Base_Roundabouts.sip9

MOVEMENT SUMMARY

 Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Queue Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Frontage Rd															
3	L2	All MCs	139	9.0	139	9.0	0.172	7.1	LOS A	0.7	18.6	0.58	0.49	0.58	30.1
8	T1	All MCs	84	9.0	84	9.0	0.172	6.7	LOS A	0.7	18.6	0.57	0.48	0.57	33.0
18	R2	All MCs	23	9.0	23	9.0	0.172	6.7	LOS A	0.7	18.6	0.57	0.48	0.57	37.7
Approach			245	9.0	245	9.0	0.172	6.9	LOS A	0.7	18.6	0.57	0.49	0.57	32.0
East: CR 18															
1	L2	All MCs	25	7.0	25	7.0	0.548	11.7	LOS B	4.6	120.5	0.68	0.59	0.90	36.7
6	T1	All MCs	834	7.0	834	7.0	0.548	11.6	LOS B	4.6	120.5	0.68	0.59	0.89	37.2
16	R2	All MCs	91	7.0	91	7.0	0.548	11.6	LOS B	4.6	120.4	0.68	0.59	0.89	37.6
Approach			950	7.0	950	7.0	0.548	11.6	LOS B	4.6	120.5	0.68	0.59	0.89	37.2
North: Frontage Rd															
7	L2	All MCs	68	4.0	68	4.0	0.079	4.9	LOS A	0.4	9.8	0.66	0.55	0.66	37.6
4	T1	All MCs	66	4.0	66	4.0	0.101	6.7	LOS A	0.4	11.5	0.67	0.60	0.67	33.2
14	R2	All MCs	399	4.0	399	4.0	0.455	9.7	LOS A	2.9	76.1	0.77	0.73	0.93	28.5
Approach			533	4.0	533	4.0	0.455	8.7	LOS A	2.9	76.1	0.74	0.69	0.87	30.9
West: CO 402															
5u	U	All MCs	6	9.0	6	9.0	0.291	6.2	LOS A	1.6	42.8	0.39	0.22	0.39	20.6
5	L2	All MCs	149	9.0	149	9.0	0.291	6.2	LOS A	1.6	42.8	0.39	0.22	0.39	28.8
2	T1	All MCs	422	9.0	422	9.0	0.291	6.2	LOS A	1.6	42.8	0.39	0.22	0.39	39.5
12	R2	All MCs	34	9.0	34	9.0	0.291	6.2	LOS A	1.6	42.8	0.39	0.22	0.39	31.5
Approach			610	9.0	610	9.0	0.291	6.2	LOS A	1.6	42.8	0.39	0.22	0.39	35.8
All Vehicles			2339	7.0	2339	7.0	0.548	9.1	LOS A	4.6	120.5	0.61	0.51	0.72	34.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:15:48 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\AM_2045 Base_Roundabouts.sip9

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	376	186	164	226	241	87	179	276
Average Queue (ft)	212	66	49	105	105	27	87	87
95th Queue (ft)	324	152	105	195	191	66	162	172
Link Distance (ft)		1168	1168	7113	7113			426
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					250	155	
Storage Blk Time (%)	0				0		4	0
Queuing Penalty (veh)	0				0		8	1

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	219	134	137	202	203	76	135	103
Average Queue (ft)	105	62	73	81	78	20	54	52
95th Queue (ft)	177	122	125	175	177	57	116	93
Link Distance (ft)		7113	7113	3063	3063			685
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	385					420	225	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 16: Park-n-Ride Access & SH 402

Movement	EB	WB	NB	NB
Directions Served	T	L	L	R
Maximum Queue (ft)	22	28	26	43
Average Queue (ft)	1	4	4	11
95th Queue (ft)	10	19	19	30
Link Distance (ft)	1535		362	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250		150
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	22	93	112	66	98	143	154	26	70	46	26	46
Average Queue (ft)	1	48	59	9	33	63	78	1	23	17	4	9
95th Queue (ft)	10	88	105	36	67	117	135	9	53	39	19	31
Link Distance (ft)		3813	3813			1535	1535			462	622	622
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			250	250			250	150			
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	113	113	117	41	47	160	189	40	49	201	44	172
Average Queue (ft)	57	42	44	9	11	68	74	6	10	81	14	88
95th Queue (ft)	98	88	97	28	35	139	145	23	32	141	35	150
Link Distance (ft)		3063	3063			3813	3813			505		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400			400	250		250	250
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 22: Boyd Lake & SH 402

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	203	127
Average Queue (ft)	105	49
95th Queue (ft)	167	101
Link Distance (ft)	547	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

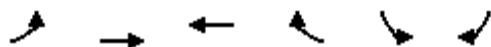
Zone Summary

Zone wide Queuing Penalty: 9

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024

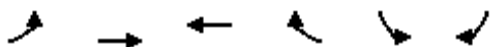


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	304	1151	1058	179	137	301
Future Volume (veh/h)	304	1151	1058	179	137	301
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	313	1187	1091	136	141	282
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	399	2602	2238	1279	321	412
Arrive On Green	0.08	0.75	0.63	0.63	0.18	0.18
Sat Flow, veh/h	1739	3561	3618	1572	1795	1598
Grp Volume(v), veh/h	313	1187	1091	136	141	282
Grp Sat Flow(s),veh/h/ln	1739	1735	1763	1572	1795	1598
Q Serve(g_s), s	8.3	18.2	22.9	2.5	9.8	22.3
Cycle Q Clear(g_c), s	8.3	18.2	22.9	2.5	9.8	22.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	399	2602	2238	1279	321	412
V/C Ratio(X)	0.79	0.46	0.49	0.11	0.44	0.68
Avail Cap(c_a), veh/h	608	2602	2238	1279	385	469
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.88	0.88	1.00	1.00
Uniform Delay (d), s/veh	13.8	6.7	13.5	2.7	51.3	46.8
Incr Delay (d2), s/veh	3.8	0.6	0.7	0.1	0.9	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	5.4	8.3	1.6	4.5	9.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.6	7.2	14.2	2.8	52.2	50.2
LnGrp LOS	B	A	B	A	D	D
Approach Vol, veh/h		1500	1227		423	
Approach Delay, s/veh		9.4	12.9		50.9	
Approach LOS		A	B		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.1	93.9			110.0	30.0
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	28.0	67.0			100.0	30.0
Max Q Clear Time (g_c+I1), s	10.3	24.9			20.2	24.3
Green Ext Time (p_c), s	0.8	8.9			9.9	0.7
Intersection Summary						
HCM 6th Ctrl Delay			16.3			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	200	1119	955	159	89	165	
Future Volume (veh/h)	200	1119	955	159	89	165	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1841	1841	1826	1826	
Adj Flow Rate, veh/h	215	1203	1027	127	96	133	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	4	4	5	5	
Cap, veh/h	423	2564	2192	1301	360	412	
Arrive On Green	0.06	0.72	0.83	0.83	0.21	0.21	
Sat Flow, veh/h	1781	3647	3589	1560	1739	1547	
Grp Volume(v), veh/h	215	1203	1027	127	96	133	
Grp Sat Flow(s),veh/h/ln	1781	1777	1749	1560	1739	1547	
Q Serve(g_s), s	5.8	20.0	11.2	0.9	6.5	9.7	
Cycle Q Clear(g_c), s	5.8	20.0	11.2	0.9	6.5	9.7	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	423	2564	2192	1301	360	412	
V/C Ratio(X)	0.51	0.47	0.47	0.10	0.27	0.32	
Avail Cap(c_a), veh/h	636	2564	2192	1301	360	412	
HCM Platoon Ratio	1.00	1.00	1.33	1.33	1.00	1.00	
Upstream Filter(I)	0.89	0.89	0.81	0.81	1.00	1.00	
Uniform Delay (d), s/veh	8.3	8.2	5.3	0.9	46.6	41.2	
Incr Delay (d2), s/veh	0.8	0.6	0.6	0.1	1.8	2.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	2.0	6.4	2.9	0.7	3.0	9.2	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	9.1	8.8	5.9	1.0	48.4	43.3	
LnGrp LOS	A	A	A	A	D	D	
Approach Vol, veh/h		1418	1154	229			
Approach Delay, s/veh		8.8	5.3	45.4			
Approach LOS		A	A	D			
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				106.0	34.0	13.3	92.7
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				101.0	29.0	25.0	71.0
Max Q Clear Time (g_c+I1), s				22.0	11.7	7.8	13.2
Green Ext Time (p_c), s				10.0	0.6	0.5	8.4
Intersection Summary							
HCM 6th Ctrl Delay			10.4				
HCM 6th LOS			B				

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	1080	57	50	1091	5	30	5	62	5	5	5
Future Volume (veh/h)	10	1080	57	50	1091	5	30	5	62	5	5	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	11	1174	33	54	1186	0	33	5	67	5	5	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	342	2458	1096	358	2525	1126	274	18	243	216	140	140
Arrive On Green	0.01	0.70	0.70	0.03	0.72	0.00	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1767	3526	1572	1767	3526	1572	1394	110	1479	1318	851	851
Grp Volume(v), veh/h	11	1174	33	54	1186	0	33	0	72	5	0	10
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1767	1763	1572	1394	0	1589	1318	0	1702
Q Serve(g_s), s	0.3	21.2	0.9	1.2	20.1	0.0	2.9	0.0	5.6	0.5	0.0	0.7
Cycle Q Clear(g_c), s	0.3	21.2	0.9	1.2	20.1	0.0	3.5	0.0	5.6	6.0	0.0	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.93	1.00		0.50
Lane Grp Cap(c), veh/h	342	2458	1096	358	2525	1126	274	0	261	216	0	280
V/C Ratio(X)	0.03	0.48	0.03	0.15	0.47	0.00	0.12	0.00	0.28	0.02	0.00	0.04
Avail Cap(c_a), veh/h	408	2458	1096	416	2525	1126	274	0	261	216	0	280
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.85	0.85	0.85	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	7.1	9.6	6.6	7.1	8.5	0.0	50.7	0.0	51.2	53.8	0.0	49.2
Incr Delay (d2), s/veh	0.0	0.6	0.0	0.2	0.6	0.0	0.9	0.0	2.6	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	7.0	0.3	0.4	6.5	0.0	1.1	0.0	2.4	0.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	7.1	10.2	6.6	7.3	9.1	0.0	51.6	0.0	53.8	54.0	0.0	49.4
LnGrp LOS	A	B	A	A	A	A	D	A	D	D	A	D
Approach Vol, veh/h	1218					1240		105		15		
Approach Delay, s/veh	10.1					9.1		53.1		51.0		
Approach LOS	B					A		D		D		
Timer - Assigned Phs	2		3	4	6		7	8				
Phs Duration (G+Y+Rc), s	28.0		9.4	102.6	28.0		6.7	105.3				
Change Period (Y+Rc), s	5.0		5.0	5.0	5.0		5.0	5.0				
Max Green Setting (Gmax), s	23.0		9.0	93.0	23.0		7.0	95.0				
Max Q Clear Time (g_c+I1), s	7.6		3.2	23.2	8.0		2.3	22.1				
Green Ext Time (p_c), s	0.3		0.0	9.8	0.0		0.0	9.8				
Intersection Summary												
HCM 6th Ctrl Delay	11.6											
HCM 6th LOS	B											

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	960	80	15	995	150	5	180	20	155	200	160
Future Volume (veh/h)	160	960	80	15	995	150	5	180	20	155	200	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	1043	58	16	1082	96	5	196	0	168	217	149
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	304	1997	891	233	1847	962	260	384	352	341	601	603
Arrive On Green	0.02	0.19	0.19	0.02	0.52	0.52	0.21	0.21	0.00	0.09	0.32	0.32
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1016	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	174	1043	58	16	1082	96	5	196	0	168	217	149
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1016	1870	1585	1781	1870	1585
Q Serve(g_s), s	6.0	37.1	4.2	0.6	29.4	3.5	0.6	13.0	0.0	10.1	12.5	9.0
Cycle Q Clear(g_c), s	6.0	37.1	4.2	0.6	29.4	3.5	0.6	13.0	0.0	10.1	12.5	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	304	1997	891	233	1847	962	260	384	352	341	601	603
V/C Ratio(X)	0.57	0.52	0.07	0.07	0.59	0.10	0.02	0.51	0.00	0.49	0.36	0.25
Avail Cap(c_a), veh/h	415	1997	891	293	1847	962	260	384	352	389	601	603
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	0.89	0.89	0.89	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	40.1	26.7	18.8	23.2	11.5	44.4	49.4	0.0	38.0	36.5	29.7
Incr Delay (d2), s/veh	1.5	0.9	0.1	0.1	1.2	0.2	0.1	4.8	0.0	1.1	1.7	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	17.8	1.5	0.2	11.7	1.2	0.1	6.5	0.0	4.4	5.9	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	40.9	26.8	18.9	24.4	11.7	44.5	54.1	0.0	39.1	38.1	30.6
LnGrp LOS	C	D	C	B	C	B	D	D	A	D	D	C
Approach Vol, veh/h	1275			1194			201			534		
Approach Delay, s/veh	37.6			23.3			53.9			36.4		
Approach LOS	D			C			D			D		
Timer - Assigned Phs	1	2	3	4	6		7	8				
Phs Duration (G+Y+Rc), s	16.2	33.8	6.3	83.7	50.0		12.3	77.7				
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0		4.0	5.0				
Max Green Setting (Gmax), s	16.0	25.0	7.0	74.0	45.0		17.0	64.0				
Max Q Clear Time (g_c+I1), s	12.1	15.0	2.6	39.1	14.5		8.0	31.4				
Green Ext Time (p_c), s	0.1	0.6	0.0	7.8	1.6		0.3	8.2				
Intersection Summary												
HCM 6th Ctrl Delay	33.1											
HCM 6th LOS	C											

HCM 6th TWSC
16: Park-n-Ride Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1066	12	15	1182	0	15	0	29	0	0	0
Future Vol, veh/h	0	1066	12	15	1182	0	15	0	29	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	250	250	-	-	0	-	150	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	1171	13	16	1299	0	16	0	32	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1299	0	0	1184	0	0	1853	-	586	1917	2515	650
Stage 1	-	-	-	-	-	-	1171	-	-	1331	1331	-
Stage 2	-	-	-	-	-	-	682	-	-	586	1184	-
Critical Hdwy	4.16	-	-	4.16	-	-	7.56	-	6.96	7.56	6.56	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	6.56	-	-	6.56	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.56	-	-	6.56	5.56	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	3.53	-	3.33	3.53	4.03	3.33
Pot Cap-1 Maneuver	524	-	-	580	-	-	45	0	451	40	27	409
Stage 1	-	-	-	-	-	-	203	0	-	162	220	-
Stage 2	-	-	-	-	-	-	404	0	-	461	259	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	524	-	-	580	-	-	44	-	451	36	26	409
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	-	-	36	26	-
Stage 1	-	-	-	-	-	-	203	-	-	162	214	-
Stage 2	-	-	-	-	-	-	393	-	-	428	259	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	53.1	0
HCM LOS			F	A

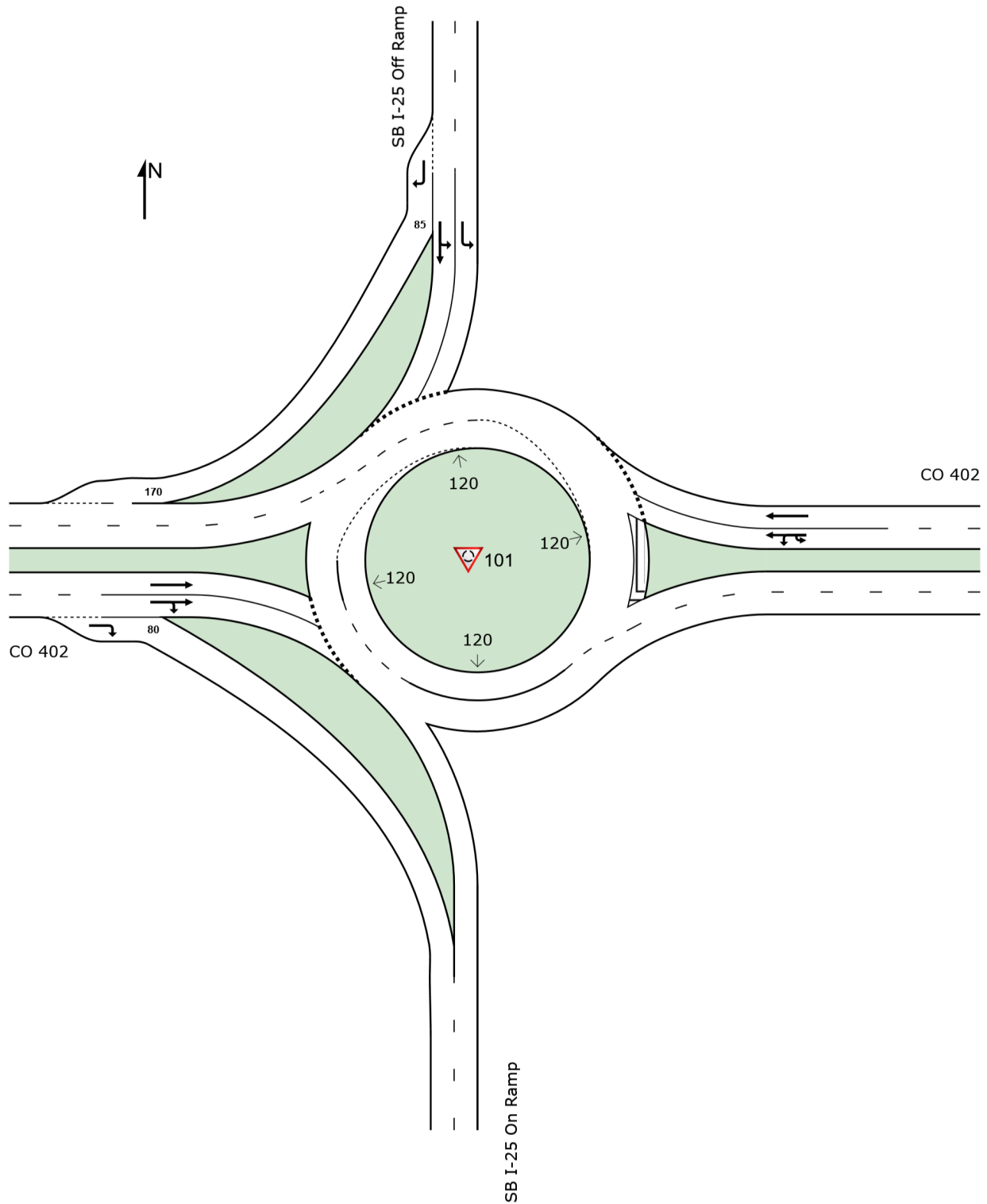
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	44	451	524	-	-	580	-	-	-
HCM Lane V/C Ratio	0.375	0.071	-	-	-	0.028	-	-	-
HCM Control Delay (s)	129.4	13.6	0	-	-	11.4	-	-	0
HCM Lane LOS	F	B	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	1.3	0.2	0	-	-	0.1	-	-	-

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

PM 2045 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	6	5.0	6	5.0	0.430	4.8	LOS A	0.0	0.0	0.00	0.00	0.00	19.5
1	L2	All MCs	247	5.0	247	5.0	0.430	4.8	LOS A	0.0	0.0	0.00	0.00	0.00	37.5
6	T1	All MCs	951	5.0	951	5.0	0.430	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	26.6
Approach			1204	5.0	1204	5.0	0.430	4.7	LOS A	0.0	0.0	0.00	0.00	0.00	29.6
North: SB I-25 Off Ramp															
7	L2	All MCs	256	6.0	256	6.0	0.159	6.1	LOS A	0.6	16.2	0.60	0.55	0.60	29.1
4	T1	All MCs	1	6.0	1	6.0	0.159	5.3	LOS A	0.6	16.2	0.59	0.52	0.59	39.4
14	R2	All MCs	350	6.0	350	6.0	0.221	7.5	LOS A	0.0	0.0	0.00	0.00	0.00	42.3
Approach			607	6.0	607	6.0	0.221	6.9	LOS A	0.6	16.2	0.25	0.23	0.25	35.3
West: CO 402															
2	T1	All MCs	897	7.0	897	7.0	0.474	9.5	LOS A	3.1	81.7	0.64	0.54	0.76	22.0
12	R2	All MCs	247	7.0	247	7.0	0.157	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			1144	7.0	1144	7.0	0.474	7.4	LOS A	3.1	81.7	0.50	0.43	0.60	26.6
All Vehicles			2955	6.0	2955	6.0	0.474	6.2	LOS A	3.1	81.7	0.25	0.21	0.28	29.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:09:12 PM

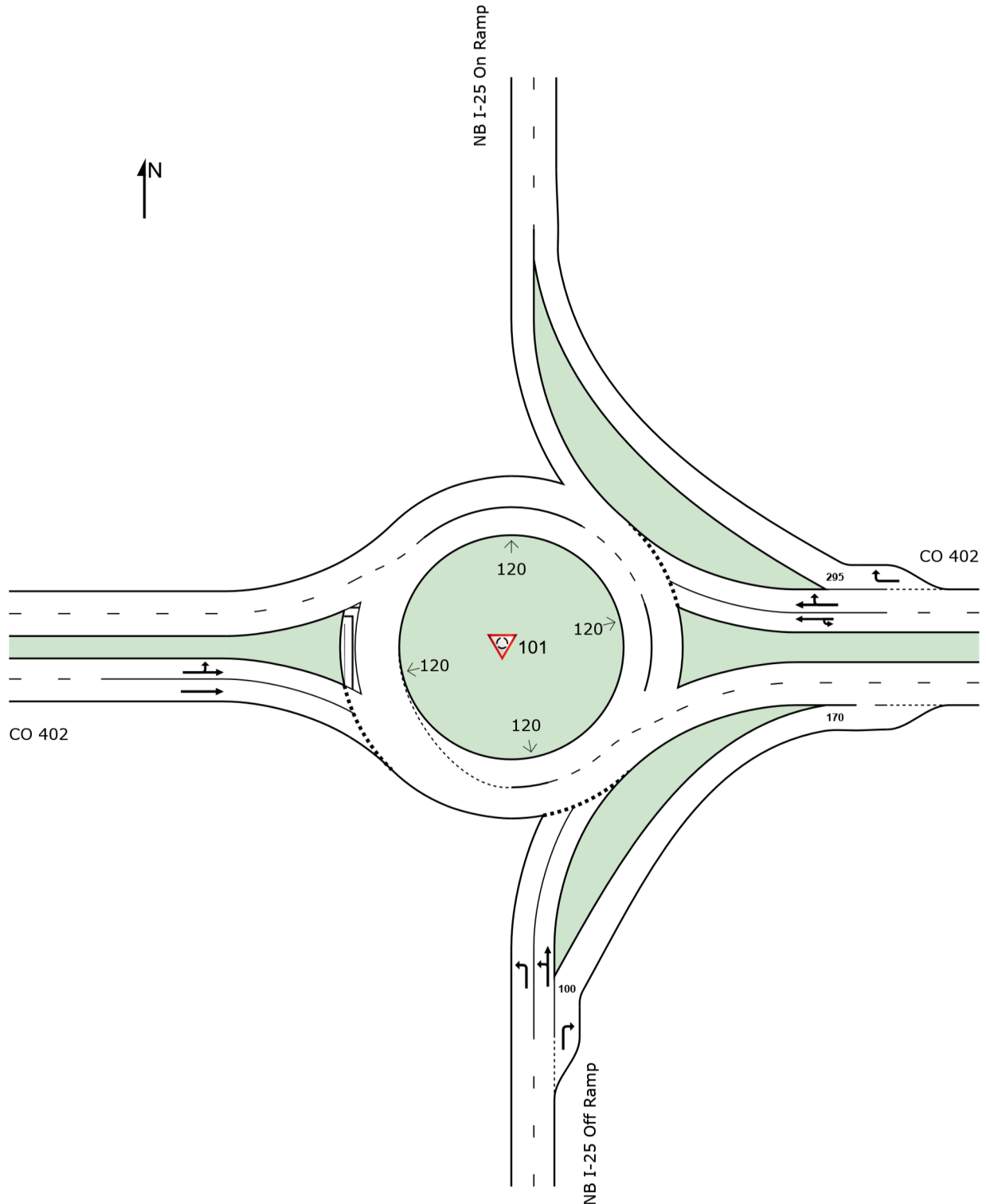
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\PM_2045 Base_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

PM 2045 Base
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	475	4.0	475	4.0	0.294	7.7	LOS A	1.3	33.5	0.66	0.60	0.66	27.0
8	T1	All MCs	2	4.0	2	4.0	0.294	6.9	LOS A	1.3	33.5	0.65	0.58	0.65	36.9
18	R2	All MCs	246	4.0	246	4.0	0.152	5.7	LOS A	0.0	0.0	0.00	0.00	0.00	41.3
Approach			724	4.0	724	4.0	0.294	7.0	LOS A	1.3	33.5	0.43	0.40	0.44	30.6
East: CO 402															
1u	U	All MCs	5	7.0	5	7.0	0.500	13.0	LOS B	3.3	86.1	0.76	0.82	1.04	18.8
6	T1	All MCs	753	7.0	753	7.0	0.500	11.8	LOS B	3.5	92.3	0.76	0.79	1.01	18.8
16	R2	All MCs	127	7.0	127	7.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			885	7.0	885	7.0	0.500	10.1	LOS B	3.5	92.3	0.65	0.68	0.87	20.0
West: CO 402															
5	L2	All MCs	345	5.0	345	5.0	0.424	5.2	LOS A	4.1	107.5	0.09	0.01	0.09	32.0
2	T1	All MCs	832	5.0	832	5.0	0.424	5.1	LOS A	4.2	108.1	0.09	0.01	0.09	21.5
Approach			1177	5.0	1177	5.0	0.424	5.2	LOS A	4.2	108.1	0.09	0.01	0.09	25.1
All Vehicles			2786	5.4	2786	5.4	0.500	7.2	LOS A	4.2	108.1	0.36	0.33	0.43	24.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 4:09:22 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\PM_2045 Base_Roundabouts.sip9

SITE LAYOUT

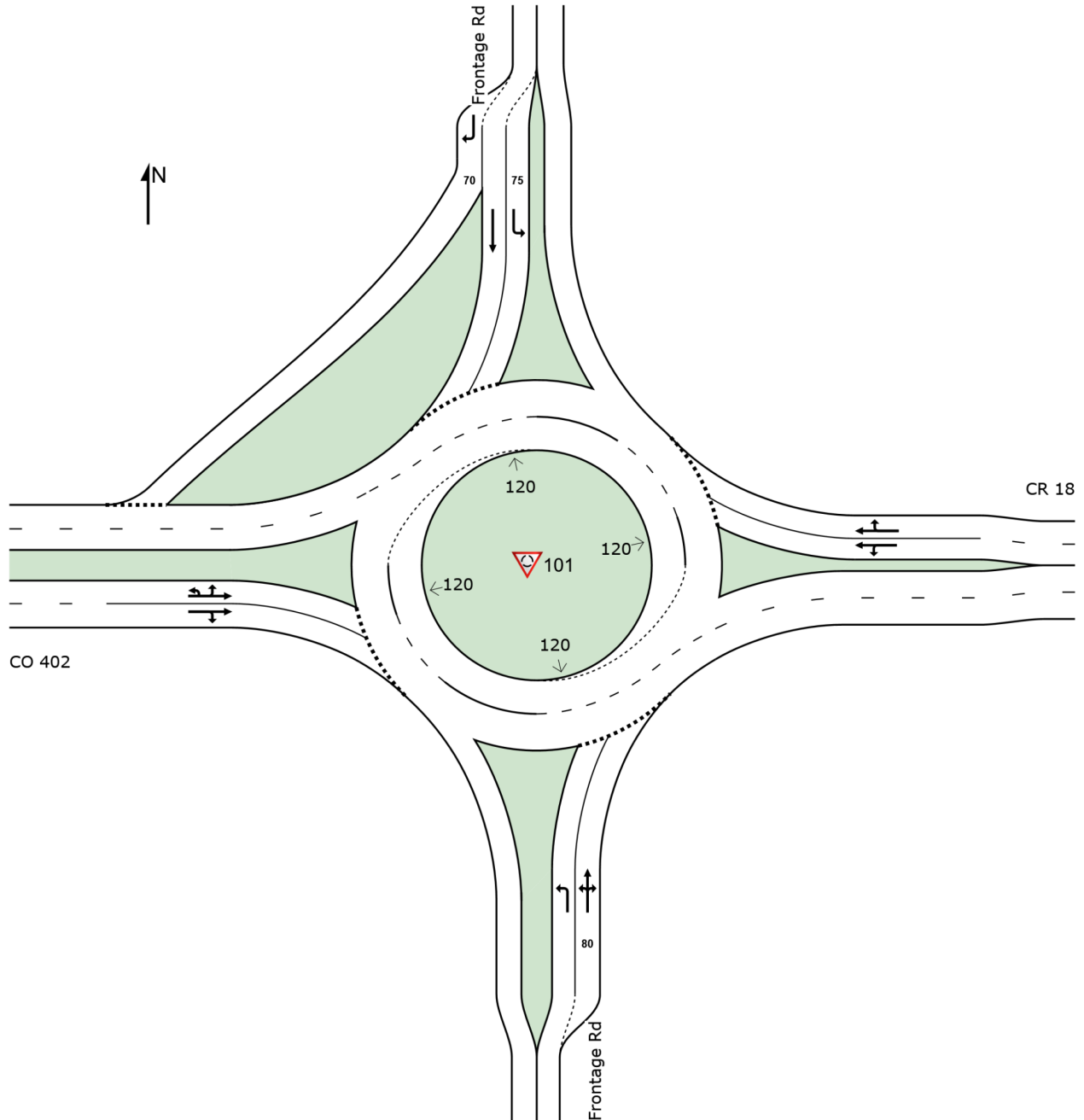
 Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]

PM 2045 Base

Site Category: (None)

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:16:57 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\PM_2045_Base_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Base

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Frontage Rd															
3	L2	All MCs	135	9.0	135	9.0	0.302	13.0	LOS B	1.3	34.0	0.73	0.73	0.79	28.8
8	T1	All MCs	125	9.0	125	9.0	0.328	11.3	LOS B	1.5	40.4	0.74	0.72	0.81	32.3
18	R2	All MCs	56	9.0	56	9.0	0.328	11.3	LOS B	1.5	40.4	0.74	0.72	0.81	37.0
Approach			315	9.0	315	9.0	0.328	12.0	LOS B	1.5	40.4	0.74	0.73	0.80	31.8
East: CR 18															
1	L2	All MCs	10	4.0	10	4.0	0.369	9.4	LOS A	1.9	49.8	0.67	0.55	0.68	37.2
6	T1	All MCs	436	4.0	436	4.0	0.369	9.2	LOS A	1.9	49.8	0.67	0.55	0.67	38.3
16	R2	All MCs	120	4.0	120	4.0	0.369	9.0	LOS A	1.9	49.7	0.67	0.54	0.67	38.4
Approach			566	4.0	566	4.0	0.369	9.2	LOS A	1.9	49.8	0.67	0.55	0.67	38.3
North: Frontage Rd															
7	L2	All MCs	108	6.0	108	6.0	0.105	4.4	LOS A	0.5	12.6	0.54	0.40	0.54	37.7
4	T1	All MCs	98	6.0	98	6.0	0.116	5.4	LOS A	0.5	13.3	0.56	0.44	0.56	33.4
14	R2	All MCs	228	6.0	228	6.0	0.219	5.5	LOS A	1.1	28.2	0.57	0.43	0.57	29.8
Approach			434	6.0	434	6.0	0.219	5.2	LOS A	1.1	28.2	0.56	0.42	0.56	33.2
West: CO 402															
5u	U	All MCs	10	4.0	10	4.0	0.502	9.2	LOS A	3.3	84.3	0.54	0.34	0.54	19.3
5	L2	All MCs	318	4.0	318	4.0	0.502	9.2	LOS A	3.3	84.3	0.54	0.34	0.54	27.8
2	T1	All MCs	705	4.0	705	4.0	0.502	9.2	LOS A	3.3	84.3	0.54	0.34	0.54	38.4
12	R2	All MCs	20	4.0	20	4.0	0.502	9.2	LOS A	3.3	84.3	0.54	0.34	0.54	30.9
Approach			1053	4.0	1053	4.0	0.502	9.2	LOS A	3.3	84.3	0.54	0.34	0.54	34.5
All Vehicles			2368	5.0	2368	5.0	0.502	8.9	LOS A	3.3	84.3	0.60	0.46	0.61	34.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:16:58 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\2045\PM_2045 Base_Roundabouts.sip9

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	367	234	170	339	363	275	179	221
Average Queue (ft)	137	94	65	221	224	90	105	116
95th Queue (ft)	235	194	145	341	357	260	175	205
Link Distance (ft)		1168	1168	7113	7113			426
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					250	155	
Storage Blk Time (%)					7	0	4	3
Queuing Penalty (veh)					12	0	12	5

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	222	182	190	162	141	51	115	140
Average Queue (ft)	104	99	107	86	95	13	65	55
95th Queue (ft)	179	178	175	148	152	41	112	109
Link Distance (ft)		7113	7113	3063	3063			685
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	385					420	225	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 16: Park-n-Ride Access & SH 402

Movement	EB	EB	WB	NB	NB
Directions Served	T	T	L	L	R
Maximum Queue (ft)	22	20	28	45	63
Average Queue (ft)	1	1	9	7	21
95th Queue (ft)	7	9	30	28	52
Link Distance (ft)	1535	1535		362	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			250		150
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report

08/14/2024

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	TR
Maximum Queue (ft)	27	228	237	46	74	138	135	18	68	91	24	109
Average Queue (ft)	4	112	123	8	30	75	90	1	24	30	1	14
95th Queue (ft)	19	196	214	32	59	123	137	6	56	65	9	52
Link Distance (ft)		3813	3813			1535	1535			462	622	622
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			250	250			250	150			
Storage Blk Time (%)			0									
Queuing Penalty (veh)			0									

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	213	338	341	62	26	365	381	409	27	220	45	174
Average Queue (ft)	89	208	223	14	11	238	253	36	4	132	13	92
95th Queue (ft)	158	301	308	38	29	345	361	156	19	186	32	155
Link Distance (ft)		3063	3063			3813	3813			505		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400			400	250		250	250
Storage Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				

Intersection: 22: Boyd Lake & SH 402

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	225	107
Average Queue (ft)	123	54
95th Queue (ft)	200	101
Link Distance (ft)	547	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	250	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 29

APPENDIX H

Future Year Alternatives Analysis – Crash Analysis Worksheets

Intersection Safety Performance Functions

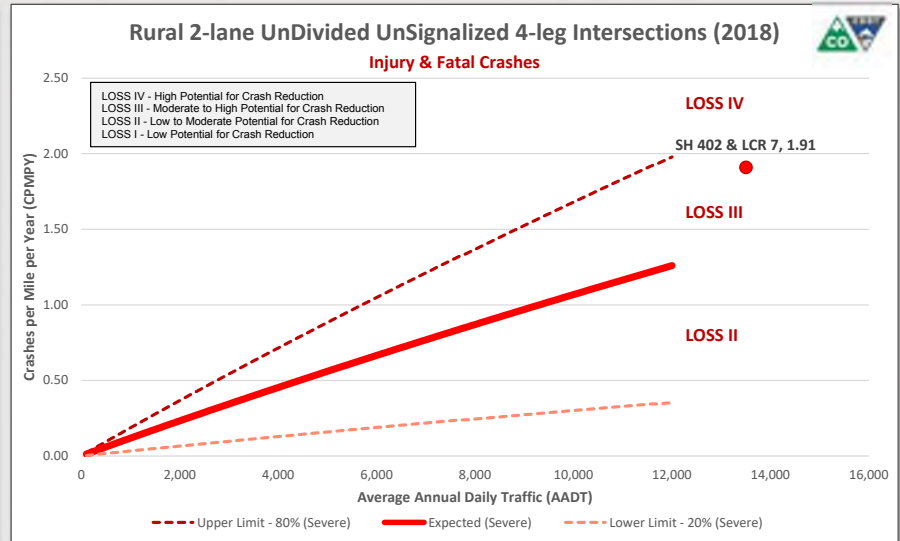
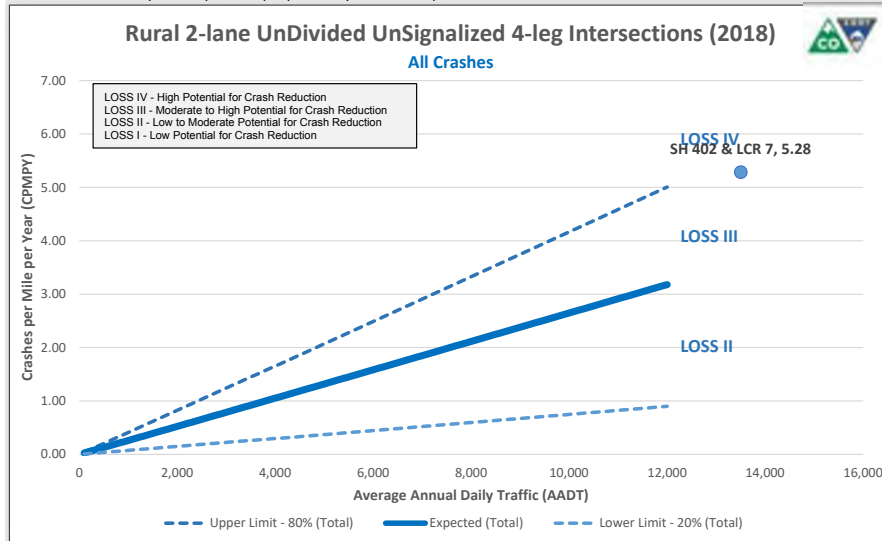
Choose a Model: **Rural 2-lane UnDivided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & LCR 7	13,500	1,500	1/1/2018	12/31/2022	17	9	1	5.28	1.91

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

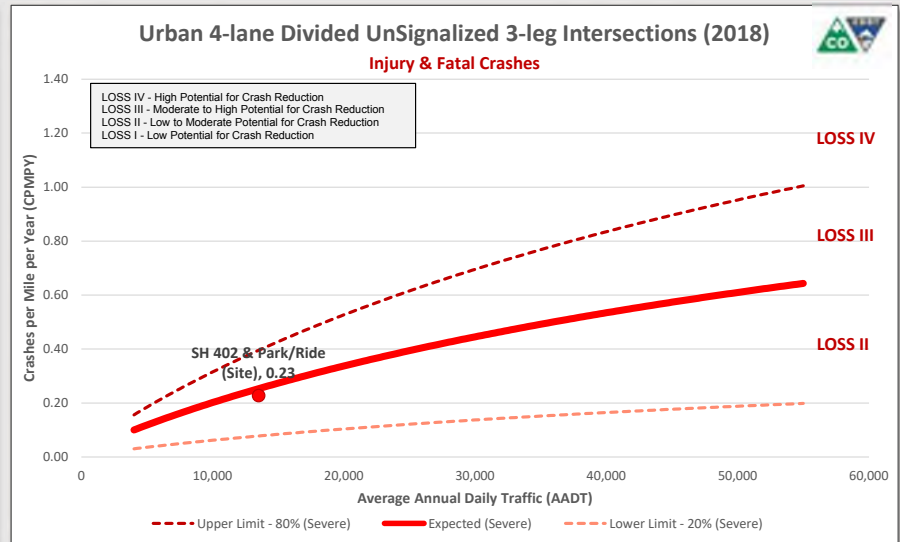
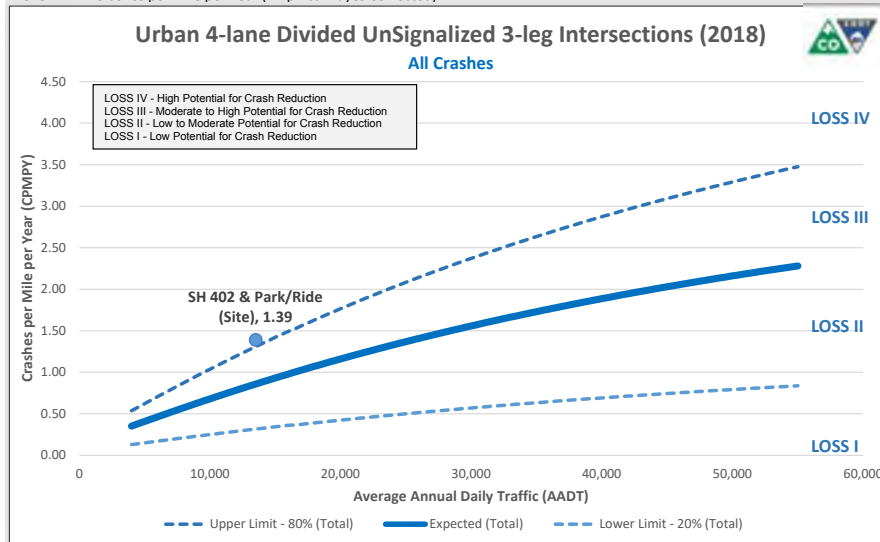
Choose a Model: **Urban 4-lane Divided UnSignalized 3-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & Park/Ride (Site)	13,500	1,000	1/1/2018	12/31/2022	7	1	0	1.39	0.23

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

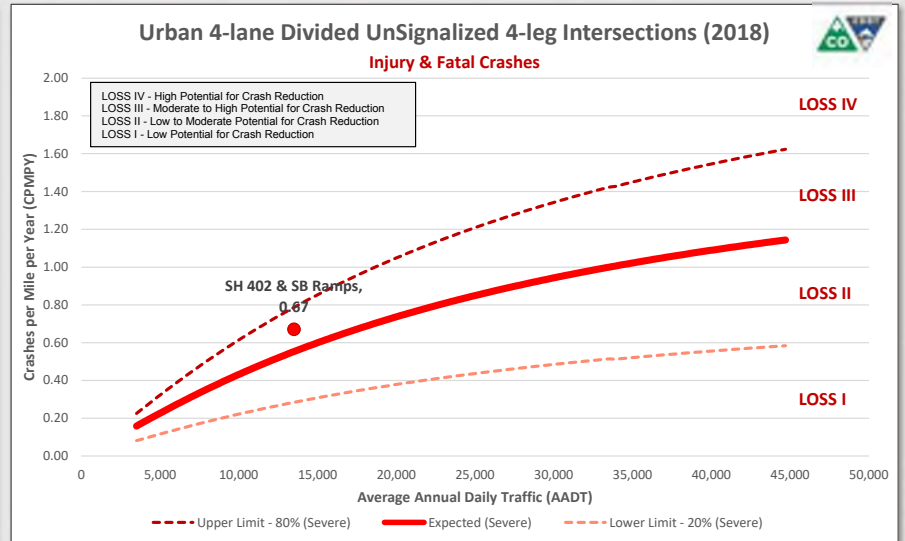
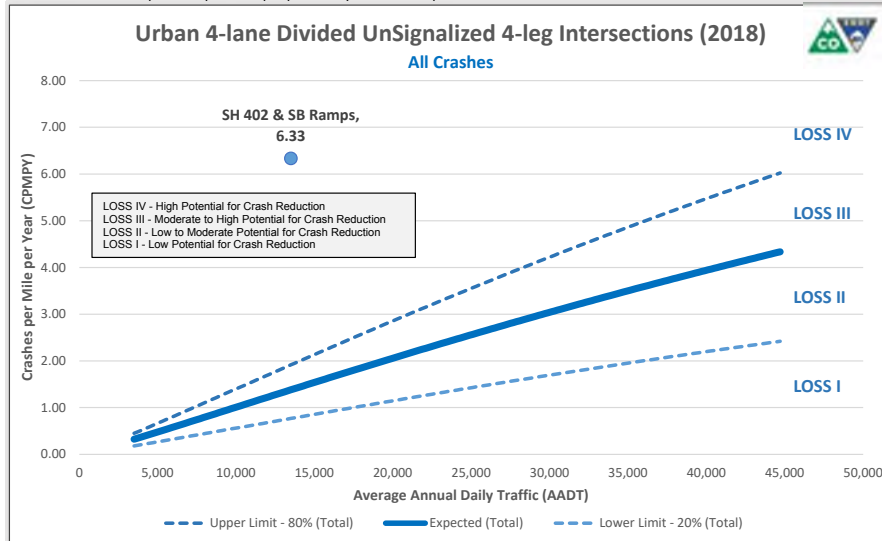
Choose a Model: **Urban 4-lane Divided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & SB Ramps	13,500	5,000	1/1/2018	12/31/2022	41	4	0	6.33	0.67

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Intersection Safety Performance Functions

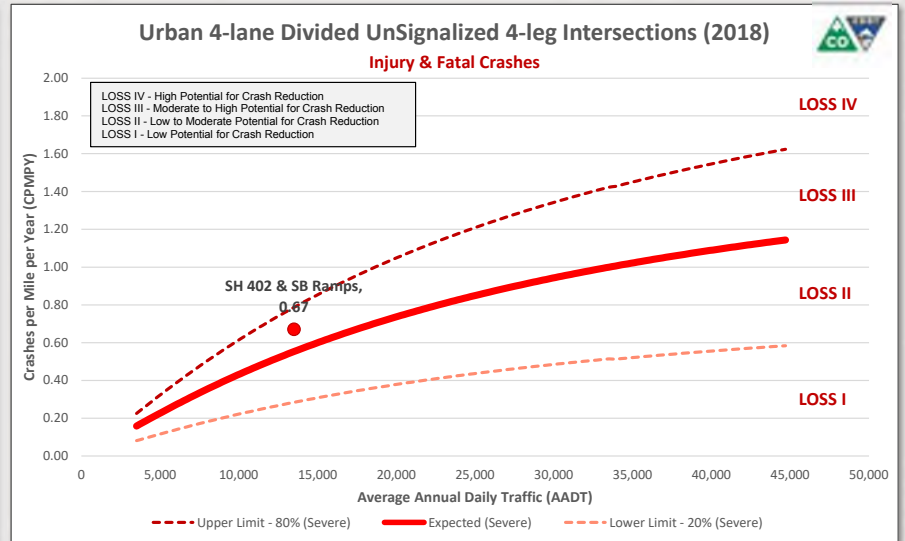
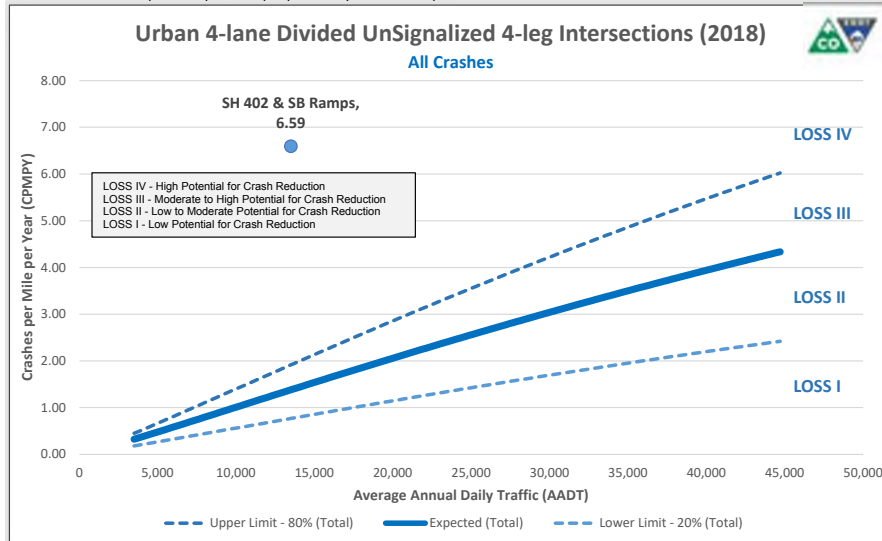
Choose a Model: **Urban 4-lane Divided UnSignalized 4-leg Intersections (2018)**

ID or Label	Road A	Road B	Crash History Date		Number of Crashes			CPMPY ^C	
	AADT ^A	AADT ^A	Begin	End	PDO ^B Crash	Injury Crash	Fatal Crash	Total	Injury & Fatal
SH 402 & SB Ramps	13,500	5,000	1/1/2018	12/31/2022	43	4	0	6.59	0.67

A. AADT - Average Annual Daily Traffic. If only one AADT is provided, it is assumed as the major AADT and the minor AADT will be calculated at 10% of the major AADT.

B. PDO - Property Damage Only

C. CPMPY - Crashes per Mile per Year (Empirical Bayes Corrected)



Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections						
General Information			Location Information			
Analyst	JEM		Roadway	SH 402		
Agency or Company	Benesch		Intersection	LCR 7 - Signal (Site - RIRO)		
Date Performed	08/13/24		Jurisdiction	CDOT/Johnstown/Loveland		
			Analysis Year	2045		
Input Data			Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)			--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)		--	44,500		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)		--	13,000		
Intersection lighting (present/not present)			Not Present	Present		
Calibration factor, C _i			1.00	1.00		
Data for unsignalized intersections only:			--	--		
Number of major-road approaches with left-turn lanes (0,1,2)			0	2		
Number of major-road approaches with right-turn lanes (0,1,2)			0	2		
Data for signalized intersections only:			--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]			0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]			--	4		
Type of left-turn signal phasing for Leg #1			Permissive	Protected / Permissive		
Type of left-turn signal phasing for Leg #2			--	Protected / Permissive		
Type of left-turn signal phasing for Leg #3			--	Protected / Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)			--	Protected / Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]			0	0		
Intersection red light cameras (present/not present)			Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only				10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})			--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection			0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)			Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection			0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	0.85	1.00	0.91	1.00	0.49

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	14.030	1.000	14.030	0.49	1.00	6.880
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.825	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.355	4.981	0.49	1.00	2.443
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	8.765	$(5)_{TOTAL} - (5)_{FI}$ 0.645	9.049	0.49	1.00	4.437

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	2.443	1.000	4.437	6.880
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.450	1.099	0.483	2.143	3.243
Head-on collision	0.049	0.120	0.030	0.133	0.253
Angle collision	0.347	0.848	0.244	1.083	1.930
Sideswipe	0.099	0.242	0.032	0.142	0.384
Other multiple-vehicle collision	0.055	0.134	0.211	0.936	1.071

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.688	1.000	0.688	0.49	1.00	0.337
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.149	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.218	0.150	0.49	1.00	0.074
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.536	$(5)_{TOTAL} - (5)_{FI}$ 0.782	0.538	0.49	1.00	0.264

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.074	1.000	0.264	0.337
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.001	0.001
Collision with fixed object	0.744	0.055	0.870	0.229	0.284
Collision with other object	0.072	0.005	0.070	0.018	0.024
Other single-vehicle collision	0.040	0.003	0.023	0.006	0.009
Single-vehicle noncollision	0.141	0.010	0.034	0.009	0.019

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.015	1.00	1.00	0.015
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.015

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.880	0.337	7.218	0.015	0.108
Fatal and injury (FI)	--	--	--	--	0.108

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	1.099	2.143	3.243
Head-on collisions (from Worksheet 2D)	0.120	0.133	0.253
Angle collisions (from Worksheet 2D)	0.848	1.083	1.930
Sideswipe (from Worksheet 2D)	0.242	0.142	0.384
Other multiple-vehicle collision (from Worksheet 2D)	0.134	0.936	1.071
Subtotal	2.443	4.437	6.880
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.055	0.229	0.284
Collision with other object (from Worksheet 2F)	0.005	0.018	0.024
Other single-vehicle collision (from Worksheet 2F)	0.003	0.006	0.009
Single-vehicle noncollision (from Worksheet 2F)	0.010	0.009	0.019
Collision with pedestrian (from Worksheet 2G or 2I)	0.015	0.000	0.015
Collision with bicycle (from Worksheet 2J)	0.108	0.000	0.108
Subtotal	0.197	0.264	0.461
Total	2.640	4.701	7.341

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	7.3
Fatal and injury (FI)	2.6
Property damage only (PDO)	4.7

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	LCR 7 - Signal (Site - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	42,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	10,000		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive		
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #3		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected / Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	0.85	1.00	0.91	1.00	0.49

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.416	1.000	12.416	0.49	1.00	6.089
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.254	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.354	4.397	0.49	1.00	2.156
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.759	$(5)_{TOTAL} - (5)_{FI}$ 0.646	8.019	0.49	1.00	3.933

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	2.156	1.000	3.933	6.089
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	0.970	0.483	1.899	2.870
Head-on collision	0.049	0.106	0.030	0.118	0.224
Angle collision	0.347	0.748	0.244	0.960	1.708
Sideswipe	0.099	0.213	0.032	0.126	0.339
Other multiple-vehicle collision	0.055	0.119	0.211	0.830	0.948

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.616	1.000	0.616	0.49	1.00	0.302
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.135	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.220	0.135	0.49	1.00	0.066
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.480	$(5)_{TOTAL} - (5)_{FI}$ 0.780	0.481	0.49	1.00	0.236

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.066	1.000	0.236	0.302
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.001
Collision with fixed object	0.744	0.049	0.870	0.205	0.254
Collision with other object	0.072	0.005	0.070	0.017	0.021
Other single-vehicle collision	0.040	0.003	0.023	0.005	0.008
Single-vehicle noncollision	0.141	0.009	0.034	0.008	0.017

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.014	1.00	1.00	0.014
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.014

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.089	0.302	6.391	0.015	0.096
Fatal and injury (FI)	--	--	--	--	0.096

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.970	1.899	2.870
Head-on collisions (from Worksheet 2D)	0.106	0.118	0.224
Angle collisions (from Worksheet 2D)	0.748	0.960	1.708
Sideswipe (from Worksheet 2D)	0.213	0.126	0.339
Other multiple-vehicle collision (from Worksheet 2D)	0.119	0.830	0.948
Subtotal	2.156	3.933	6.089
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.001
Collision with fixed object (from Worksheet 2F)	0.049	0.205	0.254
Collision with other object (from Worksheet 2F)	0.005	0.017	0.021
Other single-vehicle collision (from Worksheet 2F)	0.003	0.005	0.008
Single-vehicle noncollision (from Worksheet 2F)	0.009	0.008	0.017
Collision with pedestrian (from Worksheet 2G or 2I)	0.014	0.000	0.014
Collision with bicycle (from Worksheet 2J)	0.096	0.000	0.096
Subtotal	0.176	0.236	0.412
Total	2.332	4.168	6.501

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	6.5
Fatal and injury (FI)	2.3
Property damage only (PDO)	4.2

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	LCR 7 - Signal (Site - RAB)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	42,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	10,000		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive		
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #3		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected / Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF COMB
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	0.85	1.00	0.91	1.00	0.49

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.416	1.000	12.416	0.49	1.00	6.089
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.254	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	4.397	0.49	1.00	2.156
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.759	$(5)_{TOTAL} - (5)_{FI}$	8.019	0.49	1.00	3.933
						0.646				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	2.156	1.000	3.933	6.089
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.450	0.970	0.483	1.899	2.870
Head-on collision	0.049	0.106	0.030	0.118	0.224
Angle collision	0.347	0.748	0.244	0.960	1.708
Sideswipe	0.099	0.213	0.032	0.126	0.339
Other multiple-vehicle collision	0.055	0.119	0.211	0.830	0.948

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.616	1.000	0.616	0.49	1.00	0.302
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.135	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	0.135	0.49	1.00	0.066
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.480	$(5)_{TOTAL} - (5)_{FI}$	0.481	0.49	1.00	0.236
						0.780				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.066	1.000	0.236	0.302
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.001
Collision with fixed object	0.744	0.049	0.870	0.205	0.254
Collision with other object	0.072	0.005	0.070	0.017	0.021
Other single-vehicle collision	0.040	0.003	0.023	0.005	0.008
Single-vehicle noncollision	0.141	0.009	0.034	0.008	0.017

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	-9.53	0.40	0.26	0.45	0.04	0.014
Fatal and Injury (FI)	--	--	--	--	--	0.014

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.089	0.302	6.391	0.015	0.096
Fatal and injury (FI)	--	--	--	--	0.096

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.970	1.899	2.870
Head-on collisions (from Worksheet 2D)	0.106	0.118	0.224
Angle collisions (from Worksheet 2D)	0.748	0.960	1.708
Sideswipe (from Worksheet 2D)	0.213	0.126	0.339
Other multiple-vehicle collision (from Worksheet 2D)	0.119	0.830	0.948
Subtotal	2.156	3.933	6.089
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.001
Collision with fixed object (from Worksheet 2F)	0.049	0.205	0.254
Collision with other object (from Worksheet 2F)	0.005	0.017	0.021
Other single-vehicle collision (from Worksheet 2F)	0.003	0.005	0.008
Single-vehicle noncollision (from Worksheet 2F)	0.009	0.008	0.017
Collision with pedestrian (from Worksheet 2G or 2I)	0.014	0.000	0.014
Collision with bicycle (from Worksheet 2J)	0.096	0.000	0.096
Subtotal	0.176	0.236	0.412
Total	2.332	4.168	6.501

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	6.5
Fatal and injury (FI)	2.3
Property damage only (PDO)	4.2

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	LCR 7 - Signal (Site - 3/4 Mvmt)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	42,500		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	12,500		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive		
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #3		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected / Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	0.85	1.00	0.91	1.00	0.49

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	13.236	1.000	13.236	0.49	1.00	6.491
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.531	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$	4.680	0.49	1.00	2.295
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	8.285	$(5)_{TOTAL}-(5)_{FI}$	8.557	0.49	1.00	4.196
						0.646				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	2.295	1.000	4.196	6.491
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	1.033	0.483	2.027	3.059
Head-on collision	0.049	0.112	0.030	0.126	0.238
Angle collision	0.347	0.796	0.244	1.024	1.820
Sideswipe	0.099	0.227	0.032	0.134	0.361
Other multiple-vehicle collision	0.055	0.126	0.211	0.885	1.012

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} *(5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.660	1.000	0.660	0.49	1.00	0.323
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.145	$(4)_{FI}/((4)_{FI}+(4)_{PDO})$	0.145	0.49	1.00	0.071
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.512	$(5)_{TOTAL}-(5)_{FI}$	0.514	0.49	1.00	0.252
						0.779				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.071	1.000	0.252	0.323
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.001	0.001
Collision with fixed object	0.744	0.053	0.870	0.219	0.272
Collision with other object	0.072	0.005	0.070	0.018	0.023
Other single-vehicle collision	0.040	0.003	0.023	0.006	0.009
Single-vehicle noncollision	0.141	0.010	0.034	0.009	0.019

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.015	1.00	1.00	0.015
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.015

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.491	0.323	6.815	0.015	0.102
Fatal and injury (FI)	--	--	--	--	0.102

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	1.033	2.027	3.059
Head-on collisions (from Worksheet 2D)	0.112	0.126	0.238
Angle collisions (from Worksheet 2D)	0.796	1.024	1.820
Sideswipe (from Worksheet 2D)	0.227	0.134	0.361
Other multiple-vehicle collision (from Worksheet 2D)	0.126	0.885	1.012
Subtotal	2.295	4.196	6.491
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.001	0.001
Collision with fixed object (from Worksheet 2F)	0.053	0.219	0.272
Collision with other object (from Worksheet 2F)	0.005	0.018	0.023
Other single-vehicle collision (from Worksheet 2F)	0.003	0.006	0.009
Single-vehicle noncollision (from Worksheet 2F)	0.010	0.009	0.019
Collision with pedestrian (from Worksheet 2G or 2I)	0.015	0.000	0.015
Collision with bicycle (from Worksheet 2J)	0.102	0.000	0.102
Subtotal	0.188	0.252	0.441
Total	2.483	4.448	6.932

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	6.9
Fatal and injury (FI)	2.5
Property damage only (PDO)	4.4

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	LCR 7 - RAB (Site - RAB)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	42,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	10,000		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected		
Type of left-turn signal phasing for Leg #2		--	Protected		
Type of left-turn signal phasing for Leg #3		--	Protected		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	2		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.85	1.00	0.91	1.00	0.40

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.416	1.000	12.416	0.40	1.00	4.949
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.254	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	4.397	0.40	1.00	1.752
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.759	$(5)_{TOTAL} - (5)_{FI}$	8.019	0.40	1.00	3.196
						0.646				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.752	1.000	3.196	4.949
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.450	0.789	0.483	1.544	2.332
Head-on collision	0.049	0.086	0.030	0.096	0.182
Angle collision	0.347	0.608	0.244	0.780	1.388
Sideswipe	0.099	0.173	0.032	0.102	0.276
Other multiple-vehicle collision	0.055	0.096	0.211	0.674	0.771

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.616	1.000	0.616	0.40	1.00	0.246
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.135	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	0.135	0.40	1.00	0.054
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.480	$(5)_{TOTAL} - (5)_{FI}$	0.481	0.40	1.00	0.192
						0.780				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.054	1.000	0.192	0.246
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.040	0.870	0.167	0.207
Collision with other object	0.072	0.004	0.070	0.013	0.017
Other single-vehicle collision	0.040	0.002	0.023	0.004	0.007
Single-vehicle noncollision	0.141	0.008	0.034	0.007	0.014

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	-9.53	0.40	0.26	0.45	0.04	0.012
Fatal and Injury (FI)	--	--	--	--	--	0.012

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.949	0.246	5.194	0.015	0.078
Fatal and injury (FI)	--	--	--	--	0.078

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.789	1.544	2.332
Head-on collisions (from Worksheet 2D)	0.086	0.096	0.182
Angle collisions (from Worksheet 2D)	0.608	0.780	1.388
Sideswipe (from Worksheet 2D)	0.173	0.102	0.276
Other multiple-vehicle collision (from Worksheet 2D)	0.096	0.674	0.771
Subtotal	1.752	3.196	4.949
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.040	0.167	0.207
Collision with other object (from Worksheet 2F)	0.004	0.013	0.017
Other single-vehicle collision (from Worksheet 2F)	0.002	0.004	0.007
Single-vehicle noncollision (from Worksheet 2F)	0.008	0.007	0.014
Collision with pedestrian (from Worksheet 2G or 2I)	0.012	0.000	0.012
Collision with bicycle (from Worksheet 2J)	0.078	0.000	0.078
Subtotal	0.144	0.192	0.335
Total	1.896	3.388	5.284

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	5.3
Fatal and injury (FI)	1.9
Property damage only (PDO)	3.4

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections				
General Information		Location Information		
Analyst	JEM	Roadway	SH 402	
Agency or Company	Benesch	Intersection	LCR 7 - RAB (Site - 3/4 Mvmt)	
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland	
		Analysis Year	2045	
Input Data		Base Conditions	Site Conditions	
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG	
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	42,500	
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	12,500	
Intersection lighting (present/not present)		Not Present	Present	
Calibration factor, C _i		1.00	1.00	
Data for unsignalized intersections only:		--	--	
Number of major-road approaches with left-turn lanes (0,1,2)		0	2	
Number of major-road approaches with right-turn lanes (0,1,2)		0	2	
Data for signalized intersections only:		--	--	
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4	
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4	
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4	
Type of left-turn signal phasing for Leg #1		Permissive	Protected	
Type of left-turn signal phasing for Leg #2		--	Protected	
Type of left-turn signal phasing for Leg #3		--	Protected	
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected	
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0	
Intersection red light cameras (present/not present)		Not Present	Not Present	
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10	
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	2	
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0	
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present	
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0	

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.85	1.00	0.91	1.00	0.40

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	13.236	1.000	13.236	0.40	1.00	5.276
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.531	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	4.680	0.40	1.00	1.865
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	8.285	$(5)_{TOTAL} - (5)_{FI}$	8.557	0.40	1.00	3.411
						0.646				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.865	1.000	3.411	5.276
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	0.839	0.483	1.647	2.487
Head-on collision	0.049	0.091	0.030	0.102	0.194
Angle collision	0.347	0.647	0.244	0.832	1.479
Sideswipe	0.099	0.185	0.032	0.109	0.294
Other multiple-vehicle collision	0.055	0.103	0.211	0.720	0.822

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.660	1.000	0.660	0.40	1.00	0.263
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.145	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	0.145	0.40	1.00	0.058
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.512	$(5)_{TOTAL} - (5)_{FI}$	0.514	0.40	1.00	0.205
						0.779				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.058	1.000	0.205	0.263
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.001
Collision with fixed object	0.744	0.043	0.870	0.178	0.221
Collision with other object	0.072	0.004	0.070	0.014	0.019
Other single-vehicle collision	0.040	0.002	0.023	0.005	0.007
Single-vehicle noncollision	0.141	0.008	0.034	0.007	0.015

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C _i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.013	1.00	1.00	0.013
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.013

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	5.276	0.263	5.539	0.015	0.083
Fatal and injury (FI)	--	--	--	--	0.083

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.839	1.647	2.487
Head-on collisions (from Worksheet 2D)	0.091	0.102	0.194
Angle collisions (from Worksheet 2D)	0.647	0.832	1.479
Sideswipe (from Worksheet 2D)	0.185	0.109	0.294
Other multiple-vehicle collision (from Worksheet 2D)	0.103	0.720	0.822
Subtotal	1.865	3.411	5.276
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.001
Collision with fixed object (from Worksheet 2F)	0.043	0.178	0.221
Collision with other object (from Worksheet 2F)	0.004	0.014	0.019
Other single-vehicle collision (from Worksheet 2F)	0.002	0.005	0.007
Single-vehicle noncollision (from Worksheet 2F)	0.008	0.007	0.015
Collision with pedestrian (from Worksheet 2G or 2I)	0.013	0.000	0.013
Collision with bicycle (from Worksheet 2J)	0.083	0.000	0.083
Subtotal	0.154	0.205	0.359
Total	2.019	3.616	5.634

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	5.6
Fatal and injury (FI)	2.0
Property damage only (PDO)	3.6

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - North RIRO (LCR 7 - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST		
AADT _{major} (veh/day)	AADT _{MAX} = 45,700 (veh/day)	--	25,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 9,300 (veh/day)	--	1,700		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	0		
Number of major-road approaches with right-turn lanes (0,1,2)		0	1		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0		
Type of left-turn signal phasing for Leg #1		Permissive	Permissive		
Type of left-turn signal phasing for Leg #2		--	Permissive		
Type of left-turn signal phasing for Leg #3		--	Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	5		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.535	1.000	2.535	0.78	1.00	1.983
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.969	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.355	0.900	0.78	1.00	0.704
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.760	$(5)_{TOTAL} - (5)_{FI}$ 0.645	1.635	0.78	1.00	1.279

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	0.704	1.000	1.279	1.983
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.421	0.296	0.440	0.563	0.859
Head-on collision	0.045	0.032	0.023	0.029	0.061
Angle collision	0.343	0.241	0.262	0.335	0.577
Sideswipe	0.126	0.089	0.040	0.051	0.140
Other multiple-vehicle collision	0.065	0.046	0.235	0.301	0.346

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.248	1.000	0.248	0.78	1.00	0.194
Fatal and Injury (FI)	--	--	--	--	0.077	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.304	0.075	0.78	1.00	0.059
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.176	$(5)_{TOTAL} - (5)_{FI}$ 0.696	0.172	0.78	1.00	0.135

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.059	1.000	0.135	0.194
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.000
Collision with animal	0.003	0.000	0.018	0.002	0.003
Collision with fixed object	0.762	0.045	0.834	0.112	0.157
Collision with other object	0.090	0.005	0.092	0.012	0.018
Other single-vehicle collision	0.039	0.002	0.023	0.003	0.005
Single-vehicle noncollision	0.105	0.006	0.030	0.004	0.010

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	1.983	0.194	2.177	0.021	0.046
Fatal and injury (FI)	--	--	--	--	0.046

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	1.983	0.194	2.177	0.016	0.035
Fatal and injury (FI)	--	--	--	--	0.035

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.296	0.563	0.859
Head-on collisions (from Worksheet 2D)	0.032	0.029	0.061
Angle collisions (from Worksheet 2D)	0.241	0.335	0.577
Sideswipe (from Worksheet 2D)	0.089	0.051	0.140
Other multiple-vehicle collision (from Worksheet 2D)	0.046	0.301	0.346
Subtotal	0.704	1.279	1.983
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.002	0.003
Collision with fixed object (from Worksheet 2F)	0.045	0.112	0.157
Collision with other object (from Worksheet 2F)	0.005	0.012	0.018
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.006	0.004	0.010
Collision with pedestrian (from Worksheet 2G or 2I)	0.046	0.000	0.046
Collision with bicycle (from Worksheet 2J)	0.035	0.000	0.035
Subtotal	0.139	0.135	0.274
Total	0.843	1.414	2.257

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	2.3
Fatal and injury (FI)	0.8
Property damage only (PDO)	1.4

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - South RIRO (LCR 7 - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	3ST		
AADT _{major} (veh/day)	AADT _{MAX} = 45,700 (veh/day)	--	20,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 9,300 (veh/day)	--	1,800		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	0		
Number of major-road approaches with right-turn lanes (0,1,2)		0	1		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	0		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0		
Type of left-turn signal phasing for Leg #1		Permissive	Permissive		
Type of left-turn signal phasing for Leg #2		--	Permissive		
Type of left-turn signal phasing for Leg #3		--	Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	5		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
1.00	1.00	0.86	1.00	0.91	1.00	0.78

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-13.36	1.11	0.41	0.80	2.026	1.000	2.026	0.78	1.00	1.585
Fatal and Injury (FI)	-14.01	1.16	0.30	0.69	0.761	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	0.718	0.78	1.00	0.561
Property Damage Only (PDO)	-15.38	1.20	0.51	0.77	1.387	$(5)_{TOTAL} - (5)_{FI}$	1.308	0.78	1.00	1.023
						0.646				

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	0.561	1.000	1.023	1.585
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.421	0.236	0.440	0.450	0.687
Head-on collision	0.045	0.025	0.023	0.024	0.049
Angle collision	0.343	0.193	0.262	0.268	0.461
Sideswipe	0.126	0.071	0.040	0.041	0.112
Other multiple-vehicle collision	0.065	0.036	0.235	0.240	0.277

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-6.81	0.16	0.51	1.14	0.246	1.000	0.246	0.78	1.00	0.192
Fatal and Injury (FI)	--	--	--	--	0.076	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$	0.076	0.78	1.00	0.059
Property Damage Only (PDO)	-8.36	0.25	0.55	1.29	0.172	$(5)_{TOTAL} - (5)_{FI}$	0.170	0.78	1.00	0.133
						0.693				

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.059	1.000	0.133	0.192
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.003	0.000	0.000
Collision with animal	0.003	0.000	0.018	0.002	0.003
Collision with fixed object	0.762	0.045	0.834	0.111	0.156
Collision with other object	0.090	0.005	0.092	0.012	0.018
Other single-vehicle collision	0.039	0.002	0.023	0.003	0.005
Single-vehicle noncollision	0.105	0.006	0.030	0.004	0.010

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	1.585	0.192	1.777	0.021	0.037
Fatal and injury (FI)	--	--	--	--	0.037

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	1.585	0.192	1.777	0.016	0.028
Fatal and injury (FI)	--	--	--	--	0.028

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.236	0.450	0.687
Head-on collisions (from Worksheet 2D)	0.025	0.024	0.049
Angle collisions (from Worksheet 2D)	0.193	0.268	0.461
Sideswipe (from Worksheet 2D)	0.071	0.041	0.112
Other multiple-vehicle collision (from Worksheet 2D)	0.036	0.240	0.277
Subtotal	0.561	1.023	1.585
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.002	0.003
Collision with fixed object (from Worksheet 2F)	0.045	0.111	0.156
Collision with other object (from Worksheet 2F)	0.005	0.012	0.018
Other single-vehicle collision (from Worksheet 2F)	0.002	0.003	0.005
Single-vehicle noncollision (from Worksheet 2F)	0.006	0.004	0.010
Collision with pedestrian (from Worksheet 2G or 2I)	0.037	0.000	0.037
Collision with bicycle (from Worksheet 2J)	0.028	0.000	0.028
Subtotal	0.125	0.133	0.258
Total	0.686	1.157	1.843

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	1.8
Fatal and injury (FI)	0.7
Property damage only (PDO)	1.2

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - Signal (LCR 7 - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	44,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	7,500		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	1		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected / Permissive		
Type of left-turn signal phasing for Leg #2		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #3		--	Protected / Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected / Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.96	0.88	1.00	0.91	1.00	0.51

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.214	1.000	12.214	0.51	1.00	6.239
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.219	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.357	4.362	0.51	1.00	2.228
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.593	$(5)_{TOTAL} - (5)_{FI}$ 0.643	7.852	0.51	1.00	4.011

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	2.228	1.000	4.011	6.239
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.450	1.003	0.483	1.937	2.940
Head-on collision	0.049	0.109	0.030	0.120	0.230
Angle collision	0.347	0.773	0.244	0.979	1.752
Sideswipe	0.099	0.221	0.032	0.128	0.349
Other multiple-vehicle collision	0.055	0.123	0.211	0.846	0.969

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.588	1.000	0.588	0.51	1.00	0.301
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.127	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.215	0.126	0.51	1.00	0.065
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.463	$(5)_{TOTAL} - (5)_{FI}$ 0.785	0.462	0.51	1.00	0.236

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.065	1.000	0.236	0.301
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.001
Collision with fixed object	0.744	0.048	0.870	0.205	0.253
Collision with other object	0.072	0.005	0.070	0.017	0.021
Other single-vehicle collision	0.040	0.003	0.023	0.005	0.008
Single-vehicle noncollision	0.141	0.009	0.034	0.008	0.017

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.013	1.00	1.00	0.013
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.013

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	6.239	0.301	6.540	0.015	0.098
Fatal and injury (FI)	--	--	--	--	0.098

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	1.003	1.937	2.940
Head-on collisions (from Worksheet 2D)	0.109	0.120	0.230
Angle collisions (from Worksheet 2D)	0.773	0.979	1.752
Sideswipe (from Worksheet 2D)	0.221	0.128	0.349
Other multiple-vehicle collision (from Worksheet 2D)	0.123	0.846	0.969
Subtotal	2.228	4.011	6.239
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.001
Collision with fixed object (from Worksheet 2F)	0.048	0.205	0.253
Collision with other object (from Worksheet 2F)	0.005	0.017	0.021
Other single-vehicle collision (from Worksheet 2F)	0.003	0.005	0.008
Single-vehicle noncollision (from Worksheet 2F)	0.009	0.008	0.017
Collision with pedestrian (from Worksheet 2G or 2I)	0.013	0.000	0.013
Collision with bicycle (from Worksheet 2J)	0.098	0.000	0.098
Subtotal	0.175	0.236	0.411
Total	2.404	4.247	6.651

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	6.7
Fatal and injury (FI)	2.4
Property damage only (PDO)	4.2

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - 3/4 Mvmt (LCR 7 - RAB)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4ST		
AADT _{major} (veh/day)	AADT _{MAX} = 46,800 (veh/day)	--	46,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 5,900 (veh/day)	--	4,000		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	1		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0		
Type of left-turn signal phasing for Leg #1		Permissive	Permissive		
Type of left-turn signal phasing for Leg #2		--	Permissive		
Type of left-turn signal phasing for Leg #3		--	Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.53	1.00	0.86	1.00	0.91	1.00	0.42

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-8.90	0.82	0.25	0.40	7.224	1.000	7.224	0.42	1.00	3.006
Fatal and Injury (FI)	-11.13	0.93	0.28	0.48	3.245	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.436	3.149	0.42	1.00	1.311
Property Damage Only (PDO)	-8.74	0.77	0.23	0.40	4.198	$(5)_{TOTAL} - (5)_{FI}$ 0.564	4.074	0.42	1.00	1.695

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.311	1.000	1.695	3.006
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.338	0.443	0.374	0.634	1.077
Head-on collision	0.041	0.054	0.030	0.051	0.105
Angle collision	0.440	0.577	0.335	0.568	1.145
Sideswipe	0.121	0.159	0.044	0.075	0.233
Other multiple-vehicle collision	0.060	0.079	0.217	0.368	0.447

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-5.33	0.33	0.12	0.65	0.453	1.000	0.453	0.42	1.00	0.189
Fatal and Injury (FI)	--	--	--	--	0.127	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.276	0.125	0.42	1.00	0.052
Property Damage Only (PDO)	-7.04	0.36	0.25	0.54	0.332	$(5)_{TOTAL} - (5)_{FI}$ 0.724	0.328	0.42	1.00	0.136

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.052	1.000	0.136	0.189
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.026	0.004	0.004
Collision with fixed object	0.679	0.035	0.847	0.116	0.151
Collision with other object	0.089	0.005	0.070	0.010	0.014
Other single-vehicle collision	0.051	0.003	0.007	0.001	0.004
Single-vehicle noncollision	0.179	0.009	0.049	0.007	0.016

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	3.006	0.189	3.195	0.022	0.070
Fatal and injury (FI)	--	--	--	--	0.070

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.006	0.189	3.195	0.018	0.058
Fatal and injury (FI)	--	--	--	--	0.058

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.443	0.634	1.077
Head-on collisions (from Worksheet 2D)	0.054	0.051	0.105
Angle collisions (from Worksheet 2D)	0.577	0.568	1.145
Sideswipe (from Worksheet 2D)	0.159	0.075	0.233
Other multiple-vehicle collision (from Worksheet 2D)	0.079	0.368	0.447
Subtotal	1.311	1.695	3.006
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.004	0.004
Collision with fixed object (from Worksheet 2F)	0.035	0.116	0.151
Collision with other object (from Worksheet 2F)	0.005	0.010	0.014
Other single-vehicle collision (from Worksheet 2F)	0.003	0.001	0.004
Single-vehicle noncollision (from Worksheet 2F)	0.009	0.007	0.016
Collision with pedestrian (from Worksheet 2G or 2I)	0.070	0.000	0.070
Collision with bicycle (from Worksheet 2J)	0.058	0.000	0.058
Subtotal	0.180	0.136	0.316
Total	1.490	1.832	3.322

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	3.3
Fatal and injury (FI)	1.5
Property damage only (PDO)	1.8

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - 3/4 Mvmt (LCR 7 - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4ST		
AADT _{major} (veh/day)	AADT _{MAX} = 46,800 (veh/day)	--	46,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 5,900 (veh/day)	--	4,000		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	1		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	2		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	3		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	0		
Type of left-turn signal phasing for Leg #1		Permissive	Permissive		
Type of left-turn signal phasing for Leg #2		--	Permissive		
Type of left-turn signal phasing for Leg #3		--	Permissive		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Permissive		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	6		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF _{1i}	CMF _{2i}	CMF _{3i}	CMF _{4i}	CMF _{5i}	CMF _{6i}	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.53	1.00	0.86	1.00	0.91	1.00	0.42

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-8.90	0.82	0.25	0.40	7.224	1.000	7.224	0.42	1.00	3.006
Fatal and Injury (FI)	-11.13	0.93	0.28	0.48	3.245	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.436	3.149	0.42	1.00	1.311
Property Damage Only (PDO)	-8.74	0.77	0.23	0.40	4.198	$(5)_{TOTAL} - (5)_{FI}$ 0.564	4.074	0.42	1.00	1.695

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.311	1.000	1.695	3.006
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.338	0.443	0.374	0.634	1.077
Head-on collision	0.041	0.054	0.030	0.051	0.105
Angle collision	0.440	0.577	0.335	0.568	1.145
Sideswipe	0.121	0.159	0.044	0.075	0.233
Other multiple-vehicle collision	0.060	0.079	0.217	0.368	0.447

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-5.33	0.33	0.12	0.65	0.453	1.000	0.453	0.42	1.00	0.189
Fatal and Injury (FI)	--	--	--	--	0.127	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.276	0.125	0.42	1.00	0.052
Property Damage Only (PDO)	-7.04	0.36	0.25	0.54	0.332	$(5)_{TOTAL} - (5)_{FI}$ 0.724	0.328	0.42	1.00	0.136

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.052	1.000	0.136	0.189
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.001	0.000	0.026	0.004	0.004
Collision with fixed object	0.679	0.035	0.847	0.116	0.151
Collision with other object	0.089	0.005	0.070	0.010	0.014
Other single-vehicle collision	0.051	0.003	0.007	0.001	0.004
Single-vehicle noncollision	0.179	0.009	0.049	0.007	0.016

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	3.006	0.189	3.195	0.022	0.070
Fatal and injury (FI)	--	--	--	--	0.070

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
--	--	--	--

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections						
(1)	(2)					(7)
Crash Severity Level	SPF Coefficients					Predicted N _{pedi}
	from Table 12-14					(4)*(5)*(6)
	a	b	c	d	e	
Total	--	--	--	--	--	--
Fatal and Injury (FI)	--	--	--	--	--	--

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bike}	Predicted N_{bike}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	3.006	0.189	3.195	0.018	0.058
Fatal and injury (FI)	--	--	--	--	0.058

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.443	0.634	1.077
Head-on collisions (from Worksheet 2D)	0.054	0.051	0.105
Angle collisions (from Worksheet 2D)	0.577	0.568	1.145
Sideswipe (from Worksheet 2D)	0.159	0.075	0.233
Other multiple-vehicle collision (from Worksheet 2D)	0.079	0.368	0.447
Subtotal	1.311	1.695	3.006
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.004	0.004
Collision with fixed object (from Worksheet 2F)	0.035	0.116	0.151
Collision with other object (from Worksheet 2F)	0.005	0.010	0.014
Other single-vehicle collision (from Worksheet 2F)	0.003	0.001	0.004
Single-vehicle noncollision (from Worksheet 2F)	0.009	0.007	0.016
Collision with pedestrian (from Worksheet 2G or 2I)	0.070	0.000	0.070
Collision with bicycle (from Worksheet 2J)	0.058	0.000	0.058
Subtotal	0.180	0.136	0.316
Total	1.490	1.832	3.322

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	3.3
Fatal and injury (FI)	1.5
Property damage only (PDO)	1.8

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - RAB (LCR 7 - RAB)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	44,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	7,500		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected		
Type of left-turn signal phasing for Leg #2		--	Protected		
Type of left-turn signal phasing for Leg #3		--	Protected		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	2		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.85	1.00	0.91	1.00	0.40

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.214	1.000	12.214	0.40	1.00	4.868
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.219	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.357	4.362	0.40	1.00	1.739
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.593	$(5)_{TOTAL} - (5)_{FI}$ 0.643	7.852	0.40	1.00	3.130

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.739	1.000	3.130	4.868
		(2) * (3) _{FI}		(4) * (5) _{PDO}	(3) + (5)
Rear-end collision	0.450	0.782	0.483	1.512	2.294
Head-on collision	0.049	0.085	0.030	0.094	0.179
Angle collision	0.347	0.603	0.244	0.764	1.367
Sideswipe	0.099	0.172	0.032	0.100	0.272
Other multiple-vehicle collision	0.055	0.096	0.211	0.660	0.756

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6) * (7) * (8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.588	1.000	0.588	0.40	1.00	0.235
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.127	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.215	0.126	0.40	1.00	0.050
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.463	$(5)_{TOTAL} - (5)_{FI}$ 0.785	0.462	0.40	1.00	0.184

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.050	1.000	0.184	0.235
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.038	0.870	0.160	0.198
Collision with other object	0.072	0.004	0.070	0.013	0.017
Other single-vehicle collision	0.040	0.002	0.023	0.004	0.006
Single-vehicle noncollision	0.141	0.007	0.034	0.006	0.013

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C _i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.011	1.00	1.00	0.011
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.011

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.868	0.235	5.103	0.015	0.077
Fatal and injury (FI)	--	--	--	--	0.077

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.782	1.512	2.294
Head-on collisions (from Worksheet 2D)	0.085	0.094	0.179
Angle collisions (from Worksheet 2D)	0.603	0.764	1.367
Sideswipe (from Worksheet 2D)	0.172	0.100	0.272
Other multiple-vehicle collision (from Worksheet 2D)	0.096	0.660	0.756
Subtotal	1.739	3.130	4.868
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.038	0.160	0.198
Collision with other object (from Worksheet 2F)	0.004	0.013	0.017
Other single-vehicle collision (from Worksheet 2F)	0.002	0.004	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.007	0.006	0.013
Collision with pedestrian (from Worksheet 2G or 2I)	0.011	0.000	0.011
Collision with bicycle (from Worksheet 2J)	0.077	0.000	0.077
Subtotal	0.138	0.184	0.322
Total	1.876	3.314	5.190

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	5.2
Fatal and injury (FI)	1.9
Property damage only (PDO)	3.3

Worksheet 2A -- General Information and Input Data for Urban and Suburban Arterial Intersections					
General Information			Location Information		
Analyst	JEM	Roadway	SH 402		
Agency or Company	Benesch	Intersection	Site - RAB (LCR 7 - Signal)		
Date Performed	08/13/24	Jurisdiction	CDOT/Johnstown/Loveland		
		Analysis Year	2045		
Input Data		Base Conditions	Site Conditions		
Intersection type (3ST, 3SG, 4ST, 4SG)		--	4SG		
AADT _{major} (veh/day)	AADT _{MAX} = 67,700 (veh/day)	--	44,000		
AADT _{minor} (veh/day)	AADT _{MAX} = 33,400 (veh/day)	--	7,500		
Intersection lighting (present/not present)		Not Present	Present		
Calibration factor, C _i		1.00	1.00		
Data for unsignalized intersections only:		--	--		
Number of major-road approaches with left-turn lanes (0,1,2)		0	2		
Number of major-road approaches with right-turn lanes (0,1,2)		0	2		
Data for signalized intersections only:		--	--		
Number of approaches with left-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with right-turn lanes (0,1,2,3,4) [for 3SG, use maximum value of 3]		0	4		
Number of approaches with left-turn signal phasing [for 3SG, use maximum value of 3]		--	4		
Type of left-turn signal phasing for Leg #1		Permissive	Protected		
Type of left-turn signal phasing for Leg #2		--	Protected		
Type of left-turn signal phasing for Leg #3		--	Protected		
Type of left-turn signal phasing for Leg #4 (if applicable)		--	Protected		
Number of approaches with right-turn-on-red prohibited [for 3SG, use maximum value of 3]		0	0		
Intersection red light cameras (present/not present)		Not Present	Not Present		
Sum of all pedestrian crossing volumes (PedVol) -- Signalized intersections only			10		
Maximum number of lanes crossed by a pedestrian (n _{lanesx})		--	2		
Number of bus stops within 300 m (1,000 ft) of the intersection		0	0		
Schools within 300 m (1,000 ft) of the intersection (present/not present)		Not Present	Not Present		
Number of alcohol sales establishments within 300 m (1,000 ft) of the intersection		0	0		

Worksheet 2B -- Crash Modification Factors for Urban and Suburban Arterial Intersections						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
CMF for Left-Turn Lanes	CMF for Left-Turn Signal Phasing	CMF for Right-Turn Lanes	CMF for Right Turn on Red	CMF for Lighting	CMF for Red Light Cameras	Combined CMF
CMF 1i	CMF 2i	CMF 3i	CMF 4i	CMF 5i	CMF 6i	CMF _{COMB}
from Table 12-24	from Table 12-25	from Table 12-26	from Equation 12-35	from Equation 12-36	from Equation 12-37	(1)*(2)*(3)*(4)*(5)*(6)
0.66	0.78	0.85	1.00	0.91	1.00	0.40

Worksheet 2C -- Multiple-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bimv}	Proportion of Total Crashes	Adjusted N_{bimv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bimv}
	from Table 12-10			from Table 12-10	from Equation 12-21		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.99	1.07	0.23	0.39	12.214	1.000	12.214	0.40	1.00	4.868
Fatal and Injury (FI)	-13.14	1.18	0.22	0.33	4.219	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.357	4.362	0.40	1.00	1.739
Property Damage Only (PDO)	-11.02	1.02	0.24	0.44	7.593	$(5)_{TOTAL} - (5)_{FI}$ 0.643	7.852	0.40	1.00	3.130

Worksheet 2D -- Multiple-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections

(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted $N_{bimv (FI)}$ (crashes/year)	Proportion of Collision Type _(PDO)	Predicted $N_{bimv (PDO)}$ (crashes/year)	Predicted $N_{bimv (TOTAL)}$ (crashes/year)
	from Table 12-11	(9) _{FI} from Worksheet 2C	from Table 12-11	(9) _{PDO} from Worksheet 2C	(9) _{PDO} from Worksheet 2C
Total	1.000	1.739	1.000	3.130	4.868
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Rear-end collision	0.450	0.782	0.483	1.512	2.294
Head-on collision	0.049	0.085	0.030	0.094	0.179
Angle collision	0.347	0.603	0.244	0.764	1.367
Sideswipe	0.099	0.172	0.032	0.100	0.272
Other multiple-vehicle collision	0.055	0.096	0.211	0.660	0.756

Worksheet 2E -- Single-Vehicle Collisions by Severity Level for Urban and Suburban Arterial Intersections

(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)
Crash Severity Level	SPF Coefficients			Overdispersion Parameter, k	Initial N_{bisv}	Proportion of Total Crashes	Adjusted N_{bisv}	Combined CMFs	Calibration Factor, C_i	Predicted N_{bisv}
	from Table 12-12			from Table 12-12	from Eqn. 12-24; (FI) from Eqn. 12-24 or 12-27		(4) _{TOTAL} * (5)	(7) from Worksheet 2B		(6)*(7)*(8)
	a	b	c							
Total	-10.21	0.68	0.27	0.36	0.588	1.000	0.588	0.40	1.00	0.235
Fatal and Injury (FI)	-9.25	0.43	0.29	0.09	0.127	$(4)_{FI} / ((4)_{FI} + (4)_{PDO})$ 0.215	0.126	0.40	1.00	0.050
Property Damage Only (PDO)	-11.34	0.78	0.25	0.44	0.463	$(5)_{TOTAL} - (5)_{FI}$ 0.785	0.462	0.40	1.00	0.184

Worksheet 2F -- Single-Vehicle Collisions by Collision Type for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(6)
Collision Type	Proportion of Collision Type _(FI)	Predicted N _{bisv (FI)} (crashes/year)	Proportion of Collision Type _(PDO)	Predicted N _{bisv (PDO)} (crashes/year)	Predicted N _{bisv (TOTAL)} (crashes/year)
	from Table 12-13	(9) _{FI} from Worksheet 2E	from Table 12-13	(9) _{PDO} from Worksheet 2E	(9) _{PDO} from Worksheet 2E
Total	1.000	0.050	1.000	0.184	0.235
		(2)*(3) _{FI}		(4)*(5) _{PDO}	(3)+(5)
Collision with parked vehicle	0.001	0.000	0.001	0.000	0.000
Collision with animal	0.002	0.000	0.002	0.000	0.000
Collision with fixed object	0.744	0.038	0.870	0.160	0.198
Collision with other object	0.072	0.004	0.070	0.013	0.017
Other single-vehicle collision	0.040	0.002	0.023	0.004	0.006
Single-vehicle noncollision	0.141	0.007	0.034	0.006	0.013

Worksheet 2G -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Stop-Controlled Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N _{bimv}	Predicted N _{bisv}	Predicted N _{bi}	f _{pedi}	Predicted N _{pedi}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-16	(4)*(5)
Total	--	--	--	--	--
Fatal and injury (FI)	--	--	--	--	--

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-30

Worksheet 2H -- Crash Modification Factors for Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections			
(1)	(2)	(3)	(4)
CMF for Bus Stops	CMF for Schools	CMF for Alcohol Sales Establishments	Combined CMF
CMF _{1p}	CMF _{2p}	CMF _{3p}	
from Table 12-28	from Table 12-29	from Table 12-30	(1)*(2)*(3)
1.00	1.00	1.00	1.00

Worksheet 2I -- Vehicle-Pedestrian Collisions for Urban and Suburban Arterial Signalized Intersections										
(1)	(2)					(3)	(4)	(5)	(6)	(7)
Crash Severity Level	SPF Coefficients					Overdispersion Parameter, k	$N_{pedbase}$	Combined CMF	Calibration factor, C_i	Predicted N_{pedi}
	from Table 12-14						from Equation 12-29	(4) from Worksheet 2H		(4)*(5)*(6)
	a	b	c	d	e					
Total	-9.53	0.40	0.26	0.45	0.04	0.24	0.011	1.00	1.00	0.011
Fatal and Injury (FI)	--	--	--	--	--	--	--	--	1.00	0.011

Worksheet 2J -- Vehicle-Bicycle Collisions for Urban and Suburban Arterial Intersections					
(1)	(2)	(3)	(4)	(5)	(7)*
Crash Severity Level	Predicted N_{bimv}	Predicted N_{bisv}	Predicted N_{bi}	f_{bikei}	Predicted N_{bikei}
	(9) from Worksheet 2C	(9) from Worksheet 2E	(2) + (3)	from Table 12-17	(4)*(5)
Total	4.868	0.235	5.103	0.015	0.077
Fatal and injury (FI)	--	--	--	--	0.077

* Column 6 has been removed due to redundant application of calibration factors and inconsistency with HSM Equation 12-31

Worksheet 2K -- Crash Severity Distribution for Urban and Suburban Arterial Intersections			
(1)	(2)	(3)	(4)
Collision type	Fatal and injury (FI)	Property damage only (PDO)	Total
	(3) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J	(5) from Worksheet 2D and 2F	(6) from Worksheet 2D and 2F; (7) from 2G or 2I and 2J
MULTIPLE-VEHICLE			
Rear-end collisions (from Worksheet 2D)	0.782	1.512	2.294
Head-on collisions (from Worksheet 2D)	0.085	0.094	0.179
Angle collisions (from Worksheet 2D)	0.603	0.764	1.367
Sideswipe (from Worksheet 2D)	0.172	0.100	0.272
Other multiple-vehicle collision (from Worksheet 2D)	0.096	0.660	0.756
Subtotal	1.739	3.130	4.868
SINGLE-VEHICLE			
Collision with parked vehicle (from Worksheet 2F)	0.000	0.000	0.000
Collision with animal (from Worksheet 2F)	0.000	0.000	0.000
Collision with fixed object (from Worksheet 2F)	0.038	0.160	0.198
Collision with other object (from Worksheet 2F)	0.004	0.013	0.017
Other single-vehicle collision (from Worksheet 2F)	0.002	0.004	0.006
Single-vehicle noncollision (from Worksheet 2F)	0.007	0.006	0.013
Collision with pedestrian (from Worksheet 2G or 2I)	0.011	0.000	0.011
Collision with bicycle (from Worksheet 2J)	0.077	0.000	0.077
Subtotal	0.138	0.184	0.322
Total	1.876	3.314	5.190

Worksheet 2L -- Summary Results for Urban and Suburban Arterial Intersections	
(1)	(2)
Crash severity level	Predicted average crash frequency, $N_{predicted\ int}$ (crashes/year)
	(Total) from Worksheet 2K
Total	5.2
Fatal and injury (FI)	1.9
Property damage only (PDO)	3.3

APPENDIX I

Future Year Alternatives Analysis – Capacity Analysis and Queuing Analysis

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	373	1021	224	465	1280	42	175	87	229	195	62	108
Future Volume (veh/h)	373	1021	224	465	1280	42	175	87	229	195	62	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	410	1122	131	511	1407	11	192	96	240	214	68	67
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	518	1569	700	662	1635	729	376	334	448	336	353	434
Arrive On Green	0.09	0.45	0.45	0.10	0.46	0.46	0.06	0.18	0.18	0.07	0.19	0.19
Sat Flow, veh/h	3428	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	410	1122	131	511	1407	11	192	96	240	214	68	67
Grp Sat Flow(s),veh/h/ln	1714	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	6.4	25.9	5.0	7.9	35.6	0.4	6.0	4.5	12.9	7.0	3.1	3.2
Cycle Q Clear(g_c), s	6.4	25.9	5.0	7.9	35.6	0.4	6.0	4.5	12.9	7.0	3.1	3.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	518	1569	700	662	1635	729	376	334	448	336	353	434
V/C Ratio(X)	0.79	0.72	0.19	0.77	0.86	0.02	0.51	0.29	0.54	0.64	0.19	0.15
Avail Cap(c_a), veh/h	565	1569	700	748	1635	729	376	334	448	336	353	434
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.3	22.6	16.8	18.9	23.9	14.5	33.3	35.5	30.2	33.8	34.1	27.4
Incr Delay (d2), s/veh	5.3	2.1	0.4	4.4	6.2	0.0	1.2	2.2	4.5	4.0	1.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	9.8	1.7	2.9	14.2	0.1	4.1	2.1	5.1	1.8	1.5	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.6	24.7	17.2	23.3	30.1	14.5	34.5	37.6	34.7	37.8	35.3	28.1
LnGrp LOS	C	C	B	C	C	B	C	D	C	D	D	C
Approach Vol, veh/h	1663					1929		528		349		
Approach Delay, s/veh	24.6					28.2		35.1		35.5		
Approach LOS	C					C		D		D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	23.0	15.5	49.5	11.0	24.0	13.6	51.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	7.0	18.0	13.0	42.0	6.0	19.0	10.0	45.0				
Max Q Clear Time (g_c+I1), s	9.0	14.9	9.9	27.9	8.0	5.2	8.4	37.6				
Green Ext Time (p_c), s	0.0	0.4	0.6	6.3	0.0	0.4	0.3	4.8				
Intersection Summary												
HCM 6th Ctrl Delay			28.2									
HCM 6th LOS			C									

HCM 6th TWSC
16: Erlich City Access/Site Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑			↑			↑
Traffic Vol, veh/h	0	1384	43	0	1616	295	0	0	107	0	0	130
Future Vol, veh/h	0	1384	43	0	1616	295	0	0	107	0	0	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	200	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	1521	47	0	1776	324	0	0	118	0	0	143
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	784	-	-	888
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	334	0	0	285
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	334	-	-	285
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			21.5			29.7		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1						
Capacity (veh/h)	334	-	-	-	-	285						
HCM Lane V/C Ratio	0.352	-	-	-	-	0.501						
HCM Control Delay (s)	21.5	-	-	-	-	29.7						
HCM Lane LOS	C	-	-	-	-	D						
HCM 95th %tile Q(veh)	1.5	-	-	-	-	2.6						

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	NB	SB
Directions Served	R	R
Maximum Queue (ft)	141	172
Average Queue (ft)	53	72
95th Queue (ft)	101	127
Link Distance (ft)	486	558
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	170	176	424	428	197	140	220	309	299	41	186	129
Average Queue (ft)	87	94	226	251	66	93	100	196	208	14	103	57
95th Queue (ft)	146	139	341	371	128	132	154	281	280	33	160	108
Link Distance (ft)			3802	3802				1079	1079			457
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400	400			400	400	400			400	250	
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			1	0								

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	NB	SB	SB	SB
Directions Served	R	L	T	R
Maximum Queue (ft)	172	254	110	103
Average Queue (ft)	75	126	50	42
95th Queue (ft)	136	212	91	80
Link Distance (ft)			617	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	250	250		250
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Zone Summary

Zone wide Queuing Penalty: 1

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 					 	 	
Traffic Volume (veh/h)	187	1106	200	381	1211	23	224	78	263	220	56	125
Future Volume (veh/h)	187	1106	200	381	1211	23	224	78	263	220	56	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	203	1202	91	414	1316	0	243	85	60	239	61	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	319	1481	660	569	1657	739	454	334	283	431	334	283
Arrive On Green	0.05	0.42	0.42	0.10	0.47	0.00	0.10	0.18	0.18	0.10	0.18	0.18
Sat Flow, veh/h	3428	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	203	1202	91	414	1316	0	243	85	60	239	61	32
Grp Sat Flow(s),veh/h/ln	1714	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	3.8	30.0	2.3	4.9	31.6	0.0	10.5	3.9	2.5	10.5	2.8	1.7
Cycle Q Clear(g_c), s	3.8	30.0	2.3	4.9	31.6	0.0	10.5	3.9	2.5	10.5	2.8	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	319	1481	660	569	1657	739	454	334	283	431	334	283
V/C Ratio(X)	0.64	0.81	0.14	0.73	0.79	0.00	0.53	0.25	0.21	0.55	0.18	0.11
Avail Cap(c_a), veh/h	319	1481	660	569	1657	739	454	334	283	431	334	283
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.69	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	25.5	7.7	40.4	22.4	0.0	29.9	35.2	20.0	29.9	34.8	34.3
Incr Delay (d2), s/veh	2.9	3.5	0.3	4.7	4.0	0.0	1.2	1.8	1.7	1.6	1.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	11.7	1.2	4.7	12.2	0.0	4.7	1.9	1.3	4.9	1.4	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	29.0	8.0	45.0	26.4	0.0	31.1	37.1	21.7	31.4	36.0	35.1
LnGrp LOS	C	C	A	D	C	A	C	D	C	C	D	D
Approach Vol, veh/h		1496			1730			388			332	
Approach Delay, s/veh		27.6			30.9			31.0			32.6	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	23.0	15.0	47.0	15.0	23.0	10.0	52.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.5	18.0	10.0	42.0	10.5	18.0	5.0	47.0				
Max Q Clear Time (g_c+I1), s	12.5	5.9	6.9	32.0	12.5	4.8	5.8	33.6				
Green Ext Time (p_c), s	0.0	0.4	0.5	5.3	0.0	0.3	0.0	6.9				
Intersection Summary												
HCM 6th Ctrl Delay				29.8								
HCM 6th LOS				C								

HCM 6th TWSC
16: Erlich City Access/Site Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑			↑			↑
Traffic Vol, veh/h	0	1482	38	0	1506	142	0	0	138	0	0	145
Future Vol, veh/h	0	1482	38	0	1506	142	0	0	138	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	200	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	1629	42	0	1655	156	0	0	152	0	0	159
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	836	-	-	828
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	308	0	0	312
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	308	-	-	312
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0			27.5			28		
HCM LOS							D			D		
Minor Lane/Major Mvmt	NBLn1			EBT			EBR			WBT		
Capacity (veh/h)	308			-			-			-		
HCM Lane V/C Ratio	0.492			-			-			-		
HCM Control Delay (s)	27.5			-			-			-		
HCM Lane LOS	D			-			-			-		
HCM 95th %tile Q(veh)	2.6			-			-			-		

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	NB	SB
Directions Served	R	R
Maximum Queue (ft)	289	164
Average Queue (ft)	140	66
95th Queue (ft)	263	120
Link Distance (ft)	486	558
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	T
Maximum Queue (ft)	136	164	327	307	64	180	300	281	303	21	264	134
Average Queue (ft)	50	74	239	245	35	98	123	206	211	7	119	45
95th Queue (ft)	108	127	302	313	59	156	200	273	274	23	218	94
Link Distance (ft)			3802	3802				1079	1079			457
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400	400			400	400	400			400	250	
Storage Blk Time (%)											0	
Queuing Penalty (veh)											1	

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	NB	SB	SB	SB
Directions Served	R	L	T	R
Maximum Queue (ft)	157	216	69	137
Average Queue (ft)	72	124	37	61
95th Queue (ft)	128	202	68	111
Link Distance (ft)			617	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	250	250		250
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 1

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 						 	
Traffic Volume (veh/h)	189	1196	224	324	1280	42	175	51	244	195	62	108
Future Volume (veh/h)	189	1196	224	324	1280	42	175	51	244	195	62	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	208	1314	131	356	1407	11	192	56	256	214	68	67
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	263	1710	763	528	1694	755	363	334	401	342	334	408
Arrive On Green	0.08	0.48	0.48	0.08	0.48	0.48	0.06	0.18	0.18	0.06	0.18	0.18
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	208	1314	131	356	1407	11	192	56	256	214	68	67
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	5.9	30.6	4.7	5.2	34.5	0.4	6.0	2.6	14.5	6.0	3.1	3.3
Cycle Q Clear(g_c), s	5.9	30.6	4.7	5.2	34.5	0.4	6.0	2.6	14.5	6.0	3.1	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	263	1710	763	528	1694	755	363	334	401	342	334	408
V/C Ratio(X)	0.79	0.77	0.17	0.67	0.83	0.01	0.53	0.17	0.64	0.63	0.20	0.16
Avail Cap(c_a), veh/h	300	1710	763	614	1694	755	363	334	401	342	334	408
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	21.1	14.5	19.4	22.5	13.6	33.7	34.7	33.1	34.5	34.9	28.6
Incr Delay (d2), s/veh	9.0	2.5	0.4	2.4	4.9	0.0	1.4	1.1	7.6	3.6	1.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	11.4	1.5	1.8	13.3	0.1	4.2	1.2	5.9	2.2	1.5	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	23.7	14.8	21.7	27.4	13.6	35.1	35.7	40.7	38.1	36.3	29.5
LnGrp LOS	C	C	B	C	C	B	D	D	D	D	D	C
Approach Vol, veh/h		1653			1774			504			349	
Approach Delay, s/veh		23.8			26.1			38.0			36.1	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	23.0	12.5	53.5	11.0	23.0	13.0	53.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	18.0	10.0	46.0	6.0	18.0	10.0	46.0				
Max Q Clear Time (g_c+I1), s	8.0	16.5	7.2	32.6	8.0	5.3	7.9	36.5				
Green Ext Time (p_c), s	0.0	0.2	0.4	7.2	0.0	0.4	0.1	5.8				
Intersection Summary												
HCM 6th Ctrl Delay				27.4								
HCM 6th LOS				C								

HCM 6th TWSC
16: Erlich City Access/Site Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	199	1384	43	140	1477	295	0	0	107	0	0	130
Future Vol, veh/h	199	1384	43	140	1477	295	0	0	107	0	0	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	250	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	219	1521	47	154	1623	324	0	0	118	0	0	143
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1947	0	0	1568	0	0	-	-	784	-	-	812
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	4.16	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	293	-	-	412	-	-	0	0	334	0	0	320
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	293	-	-	412	-	-	-	-	334	-	-	320
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	5.6			1.4			21.5			25		
HCM LOS							C			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	334	293	-	-	412	-	-	320				
HCM Lane V/C Ratio	0.352	0.746	-	-	0.373	-	-	0.446				
HCM Control Delay (s)	21.5	46.1	-	-	18.9	-	-	25				
HCM Lane LOS	C	E	-	-	C	-	-	D				
HCM 95th %tile Q(veh)	1.5	5.5	-	-	1.7	-	-	2.2				

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	R	R
Maximum Queue (ft)	472	854	862	136	18	17	37	122	82
Average Queue (ft)	296	253	208	62	1	2	8	54	43
95th Queue (ft)	551	744	713	113	6	10	26	103	76
Link Distance (ft)		1079	1079		1010	1010		486	558
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	250			250			250		
Storage Blk Time (%)	54	0							
Queuing Penalty (veh)	376	0							

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	T	R
Maximum Queue (ft)	158	447	401	133	115	126	285	258	48	198	67	172
Average Queue (ft)	88	242	263	50	64	67	161	172	4	101	28	77
95th Queue (ft)	135	346	359	97	106	107	246	257	20	164	63	136
Link Distance (ft)		3802	3802				1079	1079			457	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400	400			400	250		250
Storage Blk Time (%)		0	0									
Queuing Penalty (veh)		1	0									

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	197	91	103
Average Queue (ft)	116	36	45
95th Queue (ft)	189	76	90
Link Distance (ft)		616	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		250
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 377

HCM 6th Signalized Intersection Summary 18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	1195	200	264	1211	23	224	44	271	220	56	125
Future Volume (veh/h)	99	1195	200	264	1211	23	224	44	271	220	56	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	108	1299	91	287	1316	0	243	48	69	239	61	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	188	1704	760	472	1760	785	457	309	262	456	291	247
Arrive On Green	0.05	0.48	0.48	0.07	0.50	0.00	0.13	0.17	0.17	0.12	0.16	0.16
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	108	1299	91	287	1316	0	243	48	69	239	61	32
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	4.2	36.2	2.3	0.9	35.8	0.0	13.6	2.7	3.8	13.6	3.4	2.1
Cycle Q Clear(g_c), s	4.2	36.2	2.3	0.9	35.8	0.0	13.6	2.7	3.8	13.6	3.4	2.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	188	1704	760	472	1760	785	457	309	262	456	291	247
V/C Ratio(X)	0.57	0.76	0.12	0.61	0.75	0.00	0.53	0.16	0.26	0.52	0.21	0.13
Avail Cap(c_a), veh/h	216	1704	760	472	1760	785	467	309	262	456	291	247
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.69	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.7	25.4	6.0	48.0	24.0	0.0	35.4	42.8	29.3	36.2	44.1	43.5
Incr Delay (d2), s/veh	1.9	2.3	0.2	2.2	3.0	0.0	1.1	1.1	2.4	1.1	1.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	14.1	1.3	4.0	14.0	0.0	5.8	1.3	1.9	6.0	1.7	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	27.6	6.2	50.3	27.0	0.0	36.5	43.8	31.7	37.3	45.7	44.6
LnGrp LOS	C	C	A	D	C	A	D	D	C	D	D	D
Approach Vol, veh/h	1498			1603			360			332		
Approach Delay, s/veh	26.4			31.1			36.6			39.6		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	25.0	13.0	63.0	20.2	23.8	11.1	64.9				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	20.0	8.0	58.0	16.4	18.1	8.0	58.0				
Max Q Clear Time (g_c+I1), s	15.6	5.8	2.9	38.2	15.6	5.4	6.2	37.8				
Green Ext Time (p_c), s	0.0	0.3	0.4	8.7	0.1	0.3	0.0	8.6				
Intersection Summary												
HCM 6th Ctrl Delay	30.5											
HCM 6th LOS	C											

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	1482	38	117	1389	142	0	0	138	0	0	145
Future Vol, veh/h	96	1482	38	117	1389	142	0	0	138	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	250	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	105	1629	42	129	1526	156	0	0	152	0	0	159
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1682	0	0	1671	0	0	-	-	836	-	-	763
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	4.16	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	372	-	-	376	-	-	0	0	308	0	0	345
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	372	-	-	376	-	-	-	-	308	-	-	345
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			1.4			27.5			24.1		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	308	372	-	-	376	-	-	345				
HCM Lane V/C Ratio	0.492	0.284	-	-	0.342	-	-	0.462				
HCM Control Delay (s)	27.5	18.5	-	-	19.5	-	-	24.1				
HCM Lane LOS	D	C	-	-	C	-	-	C				
HCM 95th %tile Q(veh)	2.6	1.1	-	-	1.5	-	-	2.3				

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	R	R
Maximum Queue (ft)	139	156	22	472	1059	1092	472	224	174
Average Queue (ft)	70	14	1	294	347	299	16	141	71
95th Queue (ft)	123	81	7	546	1011	956	156	230	134
Link Distance (ft)		1079	1079		1010	1010		486	558
Upstream Blk Time (%)					6	6			
Queuing Penalty (veh)					48	49			
Storage Bay Dist (ft)	250			250			250		
Storage Blk Time (%)				54	15	0			
Queuing Penalty (veh)				374	17	0			

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	T	R
Maximum Queue (ft)	136	429	418	71	178	174	312	319	15	216	108	270
Average Queue (ft)	66	230	230	31	78	82	209	217	2	140	30	125
95th Queue (ft)	125	372	381	54	159	157	317	323	10	199	75	214
Link Distance (ft)		3802	3802				1079	1079			457	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400	400			400	250		250
Storage Blk Time (%)		1	1									0
Queuing Penalty (veh)		1	1									1

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	259	133	133
Average Queue (ft)	155	42	74
95th Queue (ft)	226	98	127
Link Distance (ft)		616	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		250
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Zone Summary

Zone wide Queuing Penalty: 491

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 		 	 						 	
Traffic Volume (veh/h)	189	1196	224	307	1280	42	148	51	244	31	49	108
Future Volume (veh/h)	189	1196	224	307	1280	42	148	51	244	31	49	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	208	1314	131	337	1407	11	163	56	256	34	54	67
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	292	2078	927	573	2059	918	331	350	391	278	294	353
Arrive On Green	0.07	0.59	0.59	0.06	0.58	0.58	0.06	0.19	0.19	0.03	0.16	0.16
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	208	1314	131	337	1407	11	163	56	256	34	54	67
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	5.6	29.3	4.5	4.7	33.2	0.4	7.0	3.0	17.5	1.9	3.0	4.1
Cycle Q Clear(g_c), s	5.6	29.3	4.5	4.7	33.2	0.4	7.0	3.0	17.5	1.9	3.0	4.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	2078	927	573	2059	918	331	350	391	278	294	353
V/C Ratio(X)	0.71	0.63	0.14	0.59	0.68	0.01	0.49	0.16	0.65	0.12	0.18	0.19
Avail Cap(c_a), veh/h	411	2078	927	737	2059	918	331	350	391	316	294	353
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	16.1	11.0	14.9	17.3	10.5	40.4	40.8	40.4	40.5	43.8	37.7
Incr Delay (d2), s/veh	2.5	1.1	0.2	1.0	1.9	0.0	1.1	1.0	8.3	0.2	1.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	10.5	1.4	1.5	12.1	0.1	0.9	1.5	7.3	0.9	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	17.2	11.3	15.9	19.1	10.5	41.6	41.7	48.7	40.7	45.2	38.9
LnGrp LOS	C	B	B	B	B	B	D	D	D	D	D	D
Approach Vol, veh/h		1653			1755			475			155	
Approach Delay, s/veh		17.2			18.5			45.4			41.5	
Approach LOS		B			B			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.4	26.6	11.3	74.7	11.0	23.0	11.9	74.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	20.0	13.0	65.0	7.0	19.0	16.0	62.0				
Max Q Clear Time (g_c+I1), s	3.9	19.5	6.7	31.3	9.0	6.1	7.6	35.2				
Green Ext Time (p_c), s	0.0	0.1	0.6	11.1	0.0	0.3	0.3	10.7				
Intersection Summary												
HCM 6th Ctrl Delay			22.0									
HCM 6th LOS			C									

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	T	R
Maximum Queue (ft)	159	312	332	84	130	130	257	261	35	241	91	380
Average Queue (ft)	90	220	228	34	46	58	173	189	5	105	32	97
95th Queue (ft)	153	311	324	64	87	101	264	264	17	188	75	207
Link Distance (ft)		3802	3802				995	995			457	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400	400			400	250		250
Storage Blk Time (%)										0		1
Queuing Penalty (veh)										0		3

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	88	114	131
Average Queue (ft)	28	42	39
95th Queue (ft)	65	94	83
Link Distance (ft)		616	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		250
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 3

HCM 6th Signalized Intersection Summary 18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	1195	200	249	1211	23	182	44	271	29	46	125
Future Volume (veh/h)	99	1195	200	249	1211	23	182	44	271	29	46	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	108	1299	91	271	1316	0	198	48	69	32	50	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	207	1763	786	491	1791	799	401	409	347	352	334	283
Arrive On Green	0.05	0.50	0.50	0.06	0.51	0.00	0.07	0.22	0.22	0.03	0.18	0.18
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	108	1299	91	271	1316	0	198	48	69	32	50	32
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	3.4	29.2	2.1	0.0	29.3	0.0	7.0	2.1	2.8	1.5	2.3	1.7
Cycle Q Clear(g_c), s	3.4	29.2	2.1	0.0	29.3	0.0	7.0	2.1	2.8	1.5	2.3	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	207	1763	786	491	1791	799	401	409	347	352	334	283
V/C Ratio(X)	0.52	0.74	0.12	0.55	0.73	0.00	0.49	0.12	0.20	0.09	0.15	0.11
Avail Cap(c_a), veh/h	239	1763	786	491	1791	799	401	409	347	406	334	283
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.6	19.8	6.1	39.3	19.3	0.0	31.1	31.2	20.1	31.8	34.6	34.3
Incr Delay (d2), s/veh	1.5	2.1	0.2	1.3	2.7	0.0	0.9	0.6	1.3	0.1	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	10.6	1.0	3.1	10.8	0.0	4.1	1.0	1.4	0.6	1.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	21.9	6.4	40.6	22.0	0.0	32.0	31.8	21.4	31.9	35.5	35.1
LnGrp LOS	C	C	A	D	C	A	C	C	C	C	D	D
Approach Vol, veh/h		1498			1587			315			114	
Approach Delay, s/veh		21.0			25.2			29.6			34.4	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	27.1	11.0	55.0	11.0	23.0	10.2	55.8				
Change Period (Y+Rc), s	4.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	19.0	6.0	50.0	7.0	18.0	7.0	49.0				
Max Q Clear Time (g_c+I1), s	3.5	4.8	2.0	31.2	9.0	4.3	5.4	31.3				
Green Ext Time (p_c), s	0.0	0.3	0.3	8.5	0.0	0.2	0.0	8.1				
Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary

16: Erlich City Access/Site Access & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	1220	43	140	1477	295	28	23	107	165	31	111
Future Volume (veh/h)	199	1220	43	140	1477	295	28	23	107	165	31	111
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	219	1341	33	154	1623	246	31	25	36	181	34	103
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	248	1972	49	388	1908	851	322	297	252	376	355	425
Arrive On Green	0.16	1.00	1.00	0.06	0.54	0.54	0.03	0.16	0.16	0.06	0.19	0.19
Sat Flow, veh/h	1767	3516	86	1767	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	219	672	702	154	1623	246	31	25	36	181	34	103
Grp Sat Flow(s),veh/h/ln	1767	1763	1840	1767	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	5.7	0.0	0.0	3.8	39.1	8.5	1.4	1.1	2.0	6.0	1.5	5.1
Cycle Q Clear(g_c), s	5.7	0.0	0.0	3.8	39.1	8.5	1.4	1.1	2.0	6.0	1.5	5.1
Prop In Lane	1.00		0.05	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	989	1032	388	1908	851	322	297	252	376	355	425
V/C Ratio(X)	0.88	0.68	0.68	0.40	0.85	0.29	0.10	0.08	0.14	0.48	0.10	0.24
Avail Cap(c_a), veh/h	303	989	1032	496	1908	851	377	297	252	376	355	425
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.64	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	0.0	0.0	8.8	19.5	12.5	33.5	35.8	36.1	33.7	33.3	28.5
Incr Delay (d2), s/veh	15.5	2.4	2.3	0.7	5.0	0.9	0.1	0.6	1.2	1.0	0.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.7	0.7	1.3	14.4	2.7	0.6	0.6	0.8	1.1	0.7	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.2	2.4	2.3	9.4	24.5	13.3	33.6	36.3	37.3	34.7	33.9	29.9
LnGrp LOS	D	A	A	A	C	B	C	D	D	C	C	C
Approach Vol, veh/h	1593				2023				92			
Approach Delay, s/veh	6.9				22.0				35.8			
Approach LOS	A				C				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	20.0	9.9	60.1	6.9	23.1	11.9	58.1				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0				
Max Green Setting (Gmax), s	6.0	16.0	12.0	50.0	6.0	16.0	11.0	51.0				
Max Q Clear Time (g_c+I1), s	8.0	4.0	5.8	2.0	3.4	7.1	7.7	41.1				
Green Ext Time (p_c), s	0.0	0.1	0.2	10.7	0.0	0.3	0.2	7.1				
Intersection Summary												
HCM 6th Ctrl Delay	17.2											
HCM 6th LOS	B											
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	189	1196	224	307	1280	42	148	51	244	31	49	108
Future Volume (veh/h)	189	1196	224	307	1280	42	148	51	244	31	49	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	208	1314	131	337	1407	11	163	56	256	34	54	67
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	383	1756	783	532	1733	773	356	370	427	311	334	406
Arrive On Green	0.08	0.50	0.50	0.14	0.98	0.98	0.05	0.20	0.20	0.03	0.18	0.18
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	208	1314	131	337	1407	11	163	56	256	34	54	67
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	5.7	29.8	4.6	4.9	3.3	0.0	5.0	2.5	14.2	1.5	2.5	3.3
Cycle Q Clear(g_c), s	5.7	29.8	4.6	4.9	3.3	0.0	5.0	2.5	14.2	1.5	2.5	3.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	383	1756	783	532	1733	773	356	370	427	311	334	406
V/C Ratio(X)	0.54	0.75	0.17	0.63	0.81	0.01	0.46	0.15	0.60	0.11	0.16	0.16
Avail Cap(c_a), veh/h	421	1756	783	595	1733	773	356	370	427	345	334	406
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.74	0.74	0.74	0.43	0.43	0.43	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.6	20.1	13.7	16.7	0.4	0.4	33.7	33.0	31.7	31.8	34.6	28.7
Incr Delay (d2), s/veh	0.9	2.2	0.3	0.8	1.9	0.0	0.9	0.9	6.1	0.2	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	10.9	1.5	1.4	0.7	0.0	3.4	1.2	5.7	0.7	1.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.5	22.3	14.1	17.5	2.3	0.4	34.6	33.9	37.8	31.9	35.7	29.6
LnGrp LOS	B	C	B	B	A	A	C	C	D	C	D	C
Approach Vol, veh/h	1653					1755		475		155		
Approach Delay, s/veh	20.3					5.2		36.3		32.2		
Approach LOS	C					A		D		C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.1	24.9	12.2	54.8	10.0	23.0	12.8	54.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	18.0	9.0	48.0	5.0	18.0	10.0	47.0				
Max Q Clear Time (g_c+I1), s	3.5	16.2	6.9	31.8	7.0	5.3	7.7	5.3				
Green Ext Time (p_c), s	0.0	0.2	0.3	8.1	0.0	0.3	0.1	12.4				
Intersection Summary												
HCM 6th Ctrl Delay	16.1											
HCM 6th LOS	B											

Queuing and Blocking Report
Baseline

08/14/2024

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	279	328	328	169	365	367	102	53	89	102	156	46
Average Queue (ft)	119	152	164	49	216	213	30	24	31	47	84	16
95th Queue (ft)	245	260	280	102	323	301	66	54	70	82	134	40
Link Distance (ft)		1064	1064		992	992			485			560
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			250			250	150		150	150	
Storage Blk Time (%)	2	2			3	2					0	
Queuing Penalty (veh)	11	3			4	6					0	

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	SB
Directions Served	R
Maximum Queue (ft)	68
Average Queue (ft)	30
95th Queue (ft)	65
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	150
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	T	R
Maximum Queue (ft)	270	415	406	172	180	110	236	280	35	191	88	171
Average Queue (ft)	132	229	256	48	59	66	152	163	7	101	27	73
95th Queue (ft)	244	348	375	104	113	106	250	279	20	188	65	133
Link Distance (ft)		3802	3802				1064	1064			457	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400	400			400	250		250
Storage Blk Time (%)		0	0									
Queuing Penalty (veh)		0	0									

Intersection: 18: LCR 7/Charlotte Court & SH 402

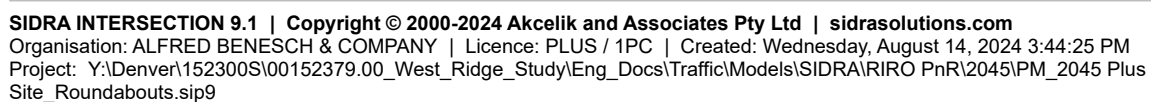
Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	50	113	67
Average Queue (ft)	15	39	38
95th Queue (ft)	39	87	70
Link Distance (ft)		616	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		250
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 25

 Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: LCR 7															
3	L2	All MCs	198	3.0	198	3.0	0.621	25.7	LOS C	3.7	94.8	0.87	0.98	1.27	28.2
8	T1	All MCs	48	3.0	48	3.0	0.621	25.7	LOS C	3.7	94.8	0.87	0.98	1.27	18.8
18	R2	All MCs	295	3.0	295	3.0	0.621	22.1	LOS C	4.0	102.5	0.87	0.97	1.26	25.3
Approach			540	3.0	540	3.0	0.621	23.7	LOS C	4.0	102.5	0.87	0.97	1.27	26.0
East: CO 402															
1	L2	All MCs	271	3.0	271	3.0	0.793	19.8	LOS B	15.9	406.5	0.94	0.93	1.61	25.6
6	T1	All MCs	1316	3.0	1316	3.0	0.793	18.9	LOS B	16.3	418.3	0.93	0.92	1.57	34.2
16	R2	All MCs	25	3.0	25	3.0	0.015	2.4	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1612	3.0	1612	3.0	0.793	18.8	LOS B	16.3	418.3	0.92	0.91	1.55	33.0
North: Carlotte Ct															
7	L2	All MCs	34	3.0	34	3.0	0.306	19.7	LOS B	1.4	35.1	0.85	0.88	0.92	22.2
4	T1	All MCs	53	3.0	53	3.0	0.306	19.7	LOS B	1.4	35.1	0.85	0.88	0.92	21.0
14	R2	All MCs	136	3.0	136	3.0	0.361	16.6	LOS B	1.9	47.6	0.86	0.89	0.96	29.8
Approach			223	3.0	223	3.0	0.361	17.8	LOS B	1.9	47.6	0.86	0.88	0.94	26.8
West: CO 402															
5	L2	All MCs	108	3.0	108	3.0	0.713	15.9	LOS B	11.0	281.1	0.87	0.79	1.30	29.9
2	T1	All MCs	1299	3.0	1299	3.0	0.713	15.3	LOS B	11.2	286.8	0.86	0.77	1.28	36.4
12	R2	All MCs	217	3.0	217	3.0	0.134	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1624	3.0	1624	3.0	0.713	13.8	LOS B	11.2	286.8	0.75	0.67	1.11	36.8
All Vehicles			3999	3.0	3999	3.0	0.793	17.4	LOS B	16.3	418.3	0.84	0.82	1.30	33.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:44:26 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

Site_Roundabouts.sip9

SITE LAYOUT

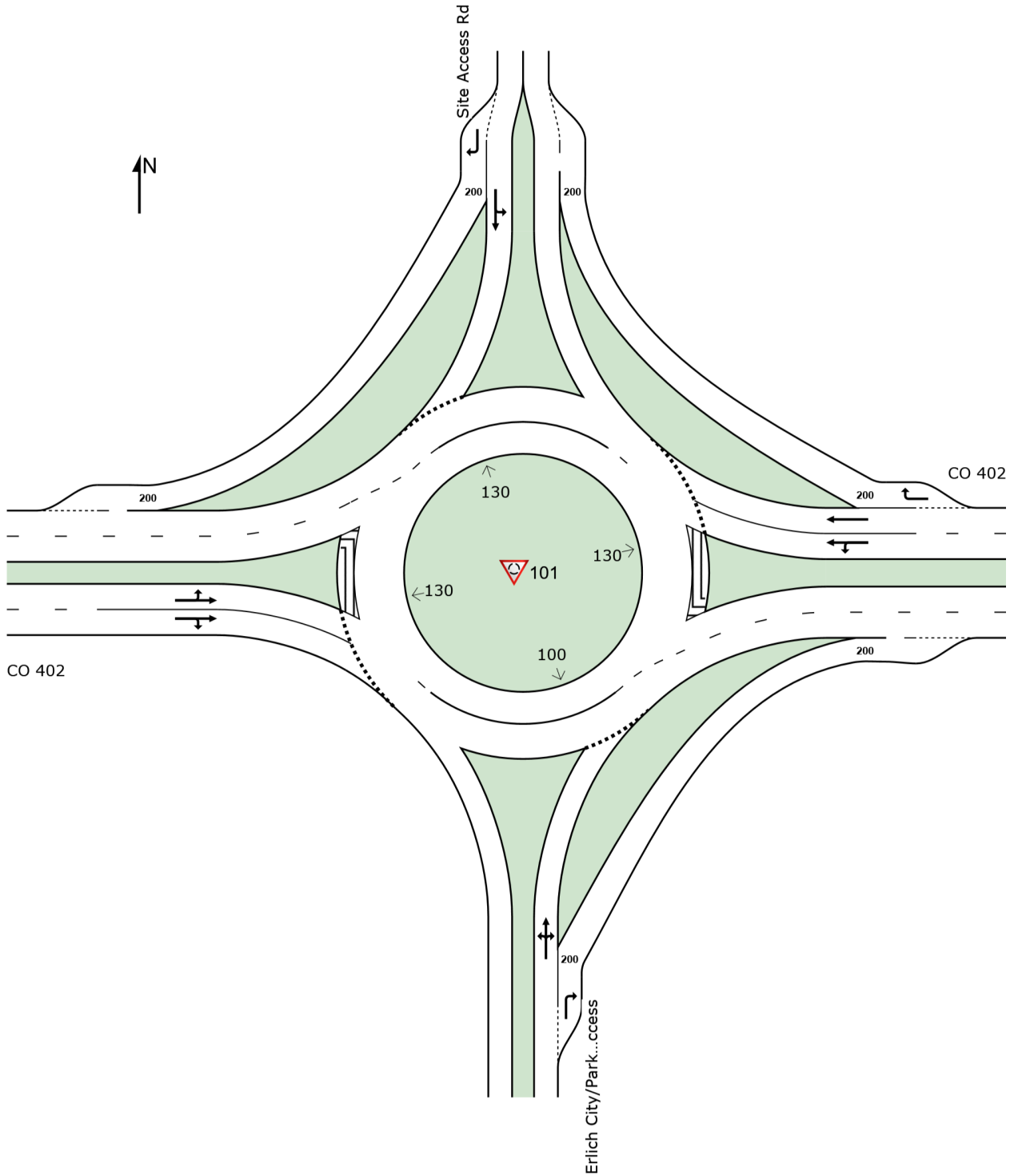
 Site: 101 [402 & Site Access/PnR (Site Folder: General)]

PM 2045 Plus Site

Site Category: (None)

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:42:48 PM

Project: Y:\Denver\152300S\00152379.00 West Ridge Study\Eng Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: Erlich City/Park-n-Ride Access															
3	L2	All MCs	47	3.0	47	3.0	0.262	17.8	LOS B	1.3	32.6	0.87	0.86	0.87	25.9
8	T1	All MCs	30	3.0	30	3.0	0.262	17.8	LOS B	1.3	32.6	0.87	0.86	0.87	25.8
18	R2	All MCs	150	3.0	150	3.0	0.092	6.4	LOS A	0.0	0.0	0.00	0.00	0.00	36.2
Approach			227	3.0	227	3.0	0.262	10.3	LOS B	1.3	32.6	0.30	0.29	0.30	31.8
East: CO 402															
1	L2	All MCs	127	3.0	127	3.0	0.757	15.5	LOS B	13.5	345.4	0.79	0.60	1.03	29.1
6	T1	All MCs	1634	3.0	1634	3.0	0.757	15.1	LOS B	13.5	345.4	0.78	0.58	0.99	31.0
16	R2	All MCs	167	3.0	167	3.0	0.103	3.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1928	3.0	1928	3.0	0.757	14.1	LOS B	13.5	345.4	0.72	0.53	0.91	31.5
North: Site Access Rd															
7	L2	All MCs	225	3.0	225	3.0	0.606	23.8	LOS C	3.7	94.9	0.89	1.04	1.25	20.7
4	T1	All MCs	28	3.0	28	3.0	0.606	23.8	LOS C	3.7	94.9	0.89	1.04	1.25	21.7
14	R2	All MCs	152	3.0	152	3.0	0.093	7.3	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			405	3.0	405	3.0	0.606	17.6	LOS B	3.7	94.9	0.56	0.65	0.78	22.1
West: CO 402															
5	L2	All MCs	113	3.0	113	3.0	0.856	25.1	LOS C	20.7	530.6	1.00	1.12	1.96	21.0
2	T1	All MCs	1519	3.0	1519	3.0	0.856	24.2	LOS C	21.6	552.9	1.00	1.11	1.93	26.6
12	R2	All MCs	41	3.0	41	3.0	0.856	23.4	LOS C	21.6	552.9	1.00	1.10	1.91	26.7
Approach			1673	3.0	1673	3.0	0.856	24.2	LOS C	21.6	552.9	1.00	1.11	1.94	26.1
All Vehicles			4233	3.0	4233	3.0	0.856	18.2	LOS B	21.6	552.9	0.79	0.76	1.27	28.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:48 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

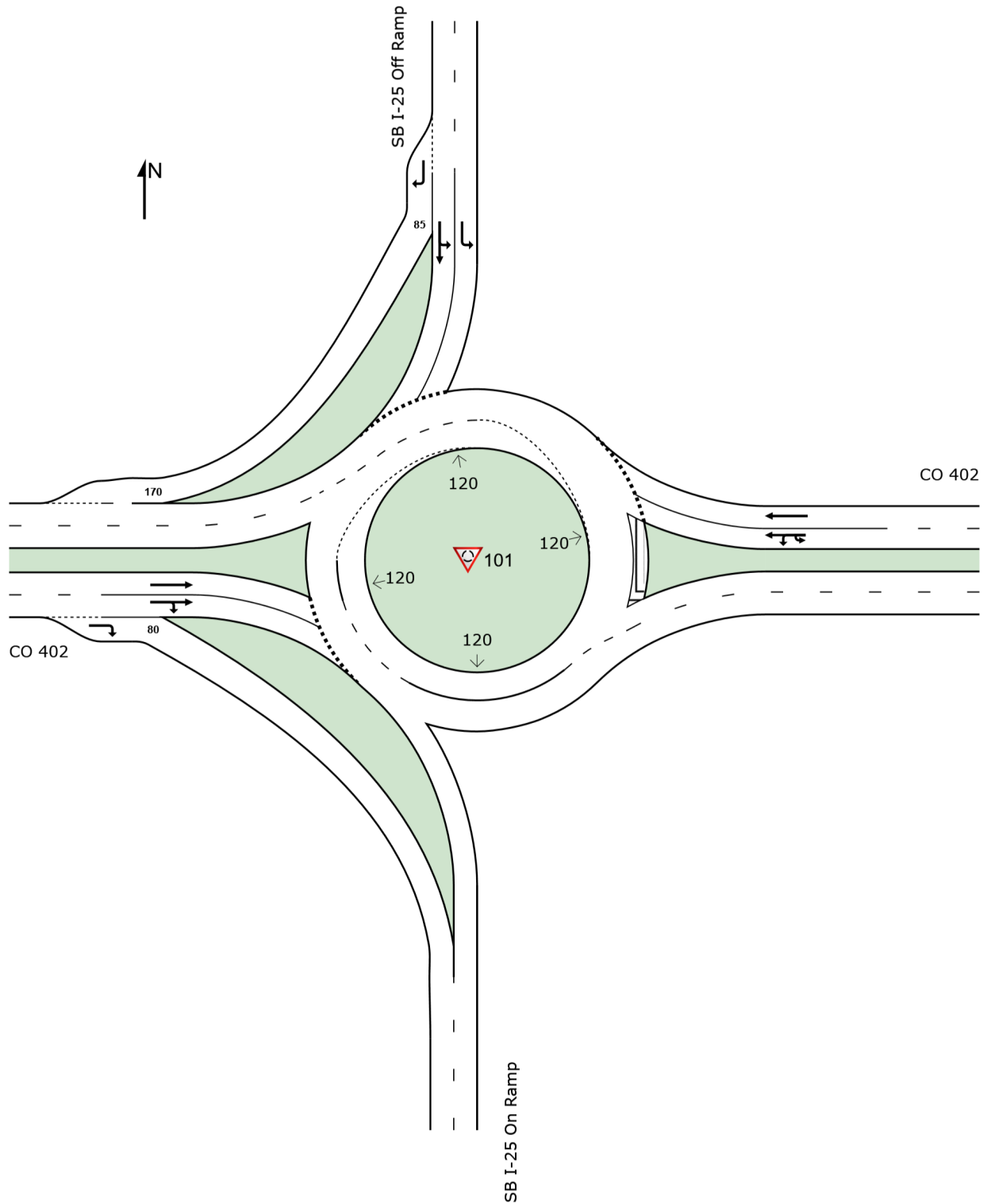
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Queue [Veh. veh	Back Of Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	6	5.0	6	5.0	0.529	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	19.6
1	L2	All MCs	247	5.0	247	5.0	0.529	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	37.9
6	T1	All MCs	1230	5.0	1230	5.0	0.529	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	26.4
Approach			1483	5.0	1483	5.0	0.529	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	29.0
North: SB I-25 Off Ramp															
7	L2	All MCs	256	6.0	256	6.0	0.174	6.7	LOS A	0.7	18.7	0.65	0.61	0.65	28.7
4	T1	All MCs	1	6.0	1	6.0	0.174	5.8	LOS A	0.7	18.7	0.65	0.59	0.65	39.2
14	R2	All MCs	551	6.0	551	6.0	0.348	16.7	LOS B	0.0	0.0	0.00	0.00	0.00	42.3
Approach			809	6.0	809	6.0	0.348	13.5	LOS B	0.7	18.7	0.21	0.19	0.21	36.6
West: CO 402															
2	T1	All MCs	1293	7.0	1293	7.0	0.685	14.9	LOS B	8.2	216.7	0.78	0.80	1.29	19.3
12	R2	All MCs	411	7.0	411	7.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			1703	7.0	1703	7.0	0.685	11.3	LOS B	8.2	216.7	0.59	0.61	0.98	24.6
All Vehicles			3995	6.1	3995	6.1	0.685	9.5	LOS A	8.2	216.7	0.29	0.30	0.46	28.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:23 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

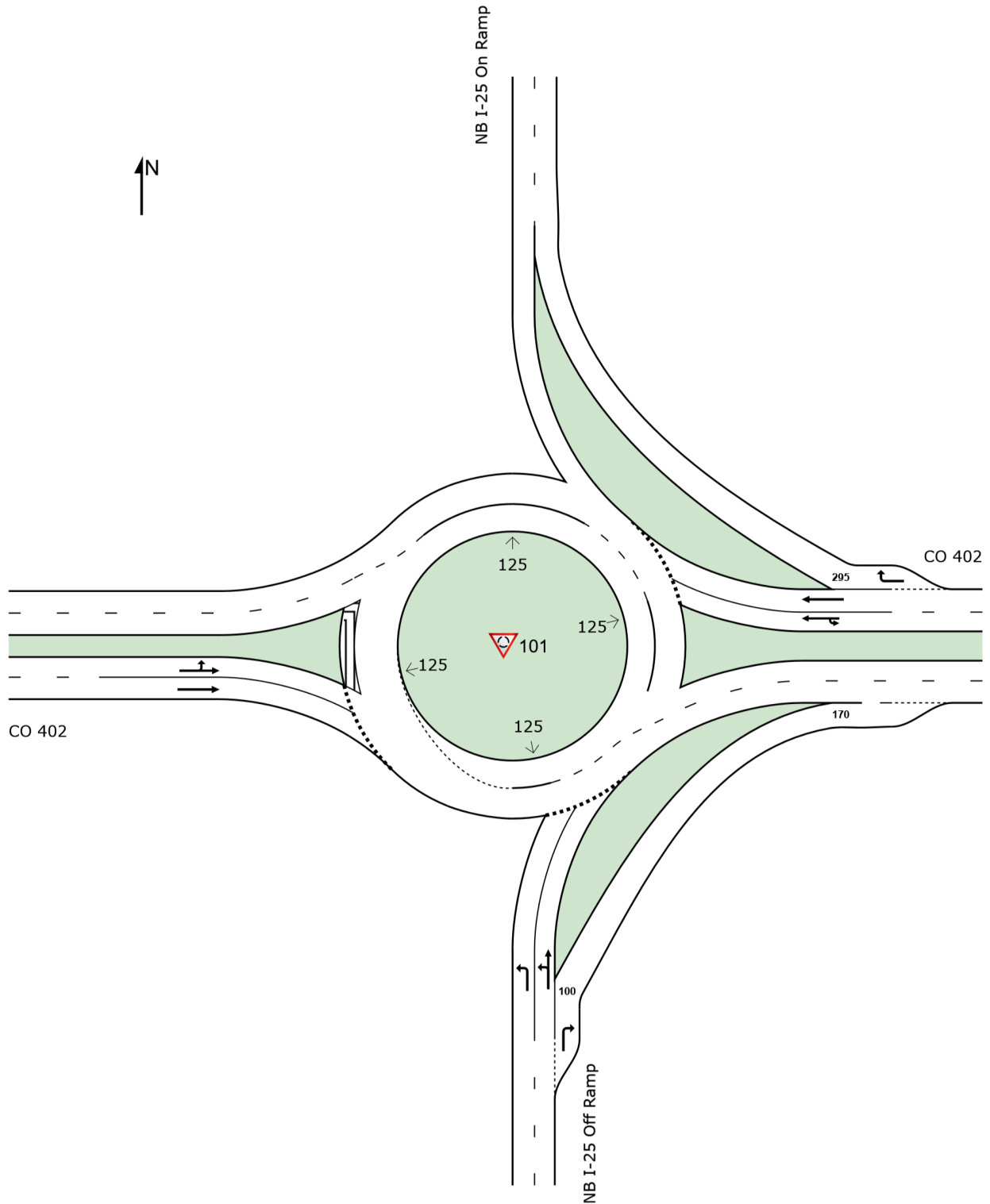
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of	Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] ft				
			veh/h		veh/h		v/c	sec							mph
South: NB I-25 Off Ramp															
3	L2	All MCs	615	4.0	615	4.0	0.436	11.1	LOS B	2.5	65.4	0.77	0.79	1.01	25.4
8	T1	All MCs	2	4.0	2	4.0	0.436	9.6	LOS A	2.5	65.4	0.77	0.76	0.98	35.4
18	R2	All MCs	243	4.0	243	4.0	0.150	8.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			860	4.0	860	4.0	0.436	10.2	LOS B	2.5	65.4	0.55	0.56	0.72	28.5
East: CO 402															
1u	U	All MCs	5	7.0	5	7.0	0.754	29.0	LOS C	6.7	176.7	0.92	1.26	1.72	14.6
6	T1	All MCs	896	7.0	896	7.0	0.754	25.3	LOS C	7.8	206.7	0.93	1.26	1.71	14.7
16	R2	All MCs	127	7.0	127	7.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.8
Approach			1028	7.0	1028	7.0	0.754	22.2	LOS C	7.8	206.7	0.82	1.10	1.50	16.1
West: CO 402															
5	L2	All MCs	572	5.0	572	5.0	0.565	6.2	LOS A	7.3	190.1	0.12	0.02	0.12	31.0
2	T1	All MCs	1005	5.0	1005	5.0	0.565	6.0	LOS A	7.3	191.0	0.12	0.02	0.12	21.1
Approach			1577	5.0	1577	5.0	0.565	6.1	LOS A	7.3	191.0	0.12	0.02	0.12	25.3
All Vehicles			3466	5.3	3466	5.3	0.754	11.9	LOS B	7.8	206.7	0.43	0.48	0.68	22.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:33 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

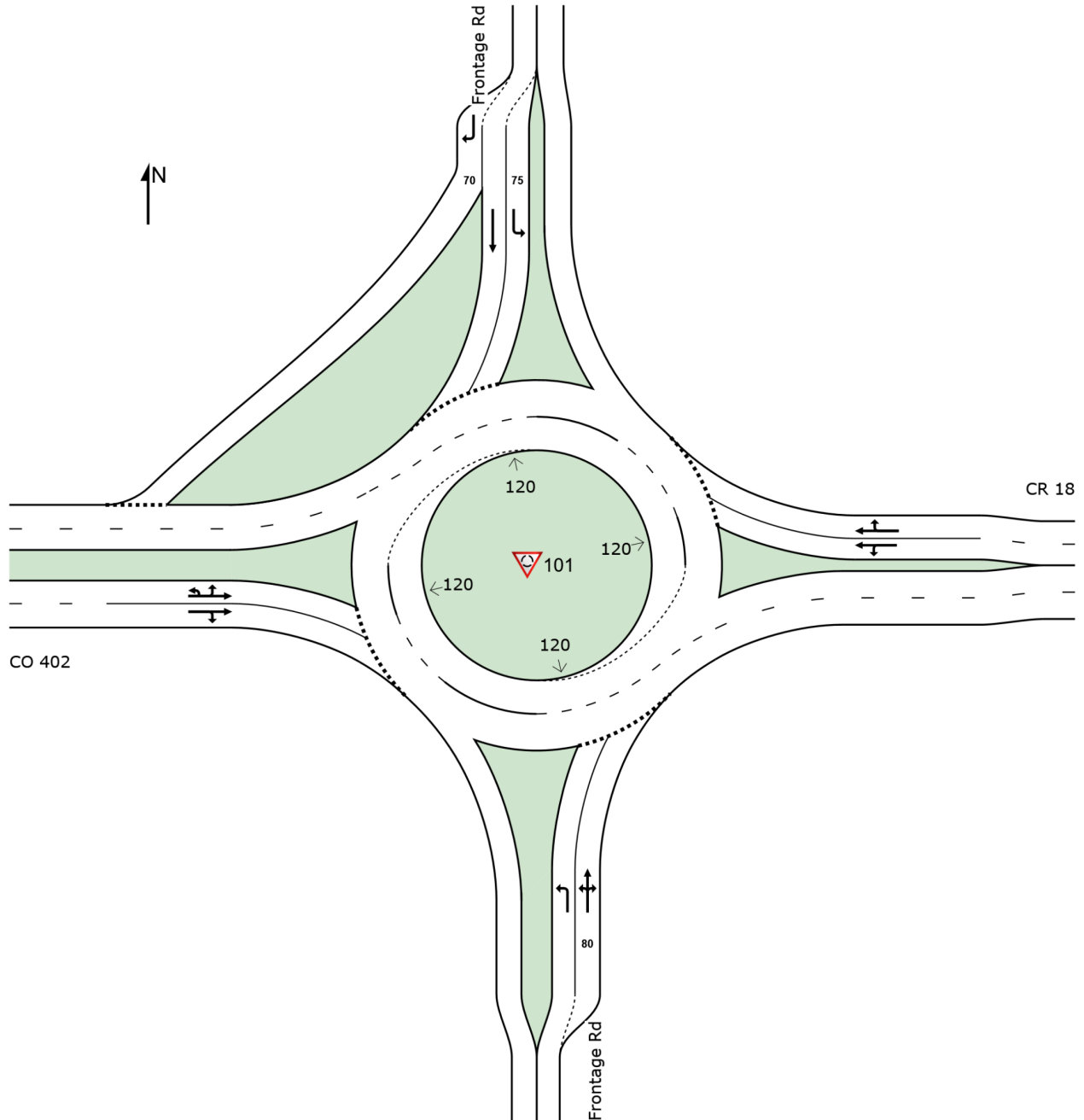
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:42:38 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: Frontage Rd															
3	L2	All MCs	165	2.0	165	2.0	0.316	12.0	LOS B	1.5	39.3	0.76	0.75	0.81	29.0
8	T1	All MCs	125	2.0	125	2.0	0.316	10.4	LOS B	1.5	39.3	0.76	0.72	0.79	32.5
18	R2	All MCs	56	2.0	56	2.0	0.316	10.4	LOS B	1.5	39.3	0.76	0.72	0.79	37.3
Approach			345	2.0	345	2.0	0.316	11.2	LOS B	1.5	39.3	0.76	0.73	0.80	31.8
East: CR 18															
1	L2	All MCs	10	2.0	10	2.0	0.414	10.2	LOS B	2.4	62.2	0.70	0.62	0.80	37.1
6	T1	All MCs	500	2.0	500	2.0	0.414	10.1	LOS B	2.5	62.4	0.70	0.61	0.80	37.9
16	R2	All MCs	120	2.0	120	2.0	0.414	9.8	LOS A	2.5	62.4	0.70	0.61	0.79	38.2
Approach			630	2.0	630	2.0	0.414	10.0	LOS B	2.5	62.4	0.70	0.61	0.79	38.0
North: Frontage Rd															
7	L2	All MCs	108	2.0	108	2.0	0.101	4.3	LOS A	0.5	12.2	0.56	0.42	0.56	37.9
4	T1	All MCs	98	2.0	98	2.0	0.113	5.3	LOS A	0.5	12.9	0.57	0.46	0.57	33.4
14	R2	All MCs	273	2.0	273	2.0	0.255	5.8	LOS A	1.3	33.3	0.60	0.46	0.60	29.8
Approach			479	2.0	479	2.0	0.255	5.3	LOS A	1.3	33.3	0.59	0.45	0.59	33.0
West: CO 402															
5u	U	All MCs	10	2.0	10	2.0	0.569	10.3	LOS B	4.1	104.7	0.58	0.37	0.58	18.8
5	L2	All MCs	371	2.0	371	2.0	0.569	10.3	LOS B	4.1	104.7	0.58	0.37	0.58	27.4
2	T1	All MCs	784	2.0	784	2.0	0.569	10.3	LOS B	4.1	104.7	0.57	0.36	0.57	38.0
12	R2	All MCs	56	2.0	56	2.0	0.569	10.3	LOS B	4.1	102.5	0.57	0.36	0.57	30.7
Approach			1221	2.0	1221	2.0	0.569	10.3	LOS B	4.1	104.7	0.57	0.37	0.57	33.9
All Vehicles			2675	2.0	2675	2.0	0.569	9.5	LOS A	4.1	104.7	0.63	0.49	0.66	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:39 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

Site_Roundabouts.sip9

HCM 6th Signalized Intersection Summary

16: Erlich City Access/Site Access & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	1291	38	117	1389	142	43	28	138	191	26	129
Future Volume (veh/h)	96	1291	38	117	1389	142	43	28	138	191	26	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	105	1419	13	129	1526	126	47	31	63	210	29	46
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	198	1813	17	354	1808	901	373	334	367	393	378	394
Arrive On Green	0.09	1.00	1.00	0.05	0.51	0.51	0.04	0.18	0.18	0.06	0.20	0.20
Sat Flow, veh/h	1767	3580	33	1767	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	105	699	733	129	1526	126	47	31	63	210	29	46
Grp Sat Flow(s),veh/h/ln	1767	1763	1850	1767	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	2.9	0.0	0.0	3.5	37.2	3.7	2.1	1.4	3.2	6.0	1.3	2.3
Cycle Q Clear(g_c), s	2.9	0.0	0.0	3.5	37.2	3.7	2.1	1.4	3.2	6.0	1.3	2.3
Prop In Lane	1.00		0.02	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	893	937	354	1808	901	373	334	367	393	378	394
V/C Ratio(X)	0.53	0.78	0.78	0.36	0.84	0.14	0.13	0.09	0.17	0.53	0.08	0.12
Avail Cap(c_a), veh/h	220	893	937	383	1808	901	397	334	367	393	378	394
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.65	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.4	0.0	0.0	10.4	20.9	9.9	31.5	34.2	30.6	33.6	32.2	28.9
Incr Delay (d2), s/veh	1.4	4.5	4.3	0.6	5.0	0.3	0.2	0.6	1.0	1.4	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	1.1	1.1	1.4	15.9	1.3	0.9	0.7	1.3	1.8	0.6	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	4.5	4.3	11.1	26.0	10.2	31.7	34.7	31.6	35.0	32.6	29.5
LnGrp LOS	C	A	A	B	C	B	C	C	C	D	C	C
Approach Vol, veh/h	1537		1781				141		285			
Approach Delay, s/veh	5.5		23.8				32.3		33.9			
Approach LOS	A		C				C		C			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.0	23.0	10.4	55.6	8.6	25.4	9.7	56.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	18.0	7.0	49.0	5.0	19.0	6.0	50.0				
Max Q Clear Time (g_c+I1), s	8.0	5.2	5.5	2.0	4.1	4.3	4.9	39.2				
Green Ext Time (p_c), s	0.0	0.2	0.0	11.5	0.0	0.2	0.0	8.0				
Intersection Summary												
HCM 6th Ctrl Delay	17.4											
HCM 6th LOS	B											
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

18: LCR 7/Charlotte Court & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	1195	200	249	1211	23	182	44	271	29	46	125
Future Volume (veh/h)	99	1195	200	249	1211	23	182	44	271	29	46	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	108	1299	91	271	1316	0	198	48	69	32	50	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	329	1728	771	479	1790	798	419	428	363	352	334	283
Arrive On Green	0.05	0.49	0.49	0.12	1.00	0.00	0.08	0.23	0.23	0.03	0.18	0.18
Sat Flow, veh/h	1767	3526	1572	3428	3526	1572	1767	1856	1572	1767	1856	1572
Grp Volume(v), veh/h	108	1299	91	271	1316	0	198	48	69	32	50	32
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1714	1763	1572	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	3.4	29.8	2.1	0.0	0.0	0.0	8.0	2.0	2.8	1.5	2.3	1.7
Cycle Q Clear(g_c), s	3.4	29.8	2.1	0.0	0.0	0.0	8.0	2.0	2.8	1.5	2.3	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	329	1728	771	479	1790	798	419	428	363	352	334	283
V/C Ratio(X)	0.33	0.75	0.12	0.57	0.74	0.00	0.47	0.11	0.19	0.09	0.15	0.11
Avail Cap(c_a), veh/h	378	1728	771	513	1790	798	419	428	363	406	334	283
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.69	0.69	0.69	0.50	0.50	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	20.6	6.1	37.3	0.0	0.0	29.8	30.4	19.4	31.8	34.6	34.3
Incr Delay (d2), s/veh	0.4	2.1	0.2	0.6	1.4	0.0	0.8	0.5	1.2	0.1	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	10.9	1.0	2.8	0.3	0.0	3.8	0.9	1.4	0.6	1.1	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	22.7	6.4	37.9	1.4	0.0	30.6	30.9	20.6	31.9	35.5	35.1
LnGrp LOS	B	C	A	D	A	A	C	C	C	C	D	D
Approach Vol, veh/h	1498			1587			315			114		
Approach Delay, s/veh	21.2			7.6			28.4			34.4		
Approach LOS	C			A			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.9	28.1	11.0	54.0	12.0	23.0	9.2	55.8				
Change Period (Y+Rc), s	4.0	5.0	5.0	* 5	4.0	5.0	4.0	5.0				
Max Green Setting (Gmax), s	6.0	20.0	7.0	* 49	8.0	18.0	8.0	48.0				
Max Q Clear Time (g_c+I1), s	3.5	4.8	2.0	31.8	10.0	4.3	5.4	2.0				
Green Ext Time (p_c), s	0.0	0.3	0.4	8.1	0.0	0.2	0.0	11.2				

Intersection Summary

HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	R	L	T
Maximum Queue (ft)	120	322	319	154	322	335	59	93	75	122	192	46
Average Queue (ft)	55	183	190	59	208	221	20	38	28	64	109	15
95th Queue (ft)	101	286	304	118	300	318	45	78	67	107	170	39
Link Distance (ft)		1064	1064		992	992			485			560
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			250			250	150		150	150	
Storage Blk Time (%)		4			2	4					3	
Queuing Penalty (veh)		3			2	6					5	

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	SB
Directions Served	R
Maximum Queue (ft)	142
Average Queue (ft)	66
95th Queue (ft)	118
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	150
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	T	R
Maximum Queue (ft)	116	416	384	50	112	106	233	236	29	193	186	250
Average Queue (ft)	58	242	244	30	48	60	131	137	4	81	33	106
95th Queue (ft)	112	333	314	49	92	99	206	205	14	145	97	191
Link Distance (ft)		3802	3802				1064	1064			457	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400	400			400	250		250
Storage Blk Time (%)		0	0									0
Queuing Penalty (veh)		0	0									0

Intersection: 18: LCR 7/Charlotte Court & SH 402

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (ft)	50	91	154
Average Queue (ft)	9	27	51
95th Queue (ft)	32	63	97
Link Distance (ft)		616	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	250		250
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 17

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	199	1384	43	140	1477	295	0	0	107	0	0	130
Future Vol, veh/h	199	1384	43	140	1477	295	0	0	107	0	0	130
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	250	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	219	1521	47	154	1623	324	0	0	118	0	0	143

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1947	0	0	1568	0	0	-	-	784	-	-	812
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	4.16	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	293	-	-	412	-	-	0	0	334	0	0	320
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	293	-	-	412	-	-	-	-	334	-	-	320
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	5.6			1.4			21.5			25		
HCM LOS							C			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	334	293	-	-	412	-	-	320
HCM Lane V/C Ratio	0.352	0.746	-	-	0.373	-	-	0.446
HCM Control Delay (s)	21.5	46.1	-	-	18.9	-	-	25
HCM Lane LOS	C	E	-	-	C	-	-	D
HCM 95th %tile Q(veh)	1.5	5.5	-	-	1.7	-	-	2.2

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	R	R	R
Maximum Queue (ft)	403	334	97	105	19	55	99	130
Average Queue (ft)	218	42	5	46	1	7	47	48
95th Queue (ft)	397	180	36	82	9	27	86	91
Link Distance (ft)		1012	1012		1011		492	564
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250			250		250		
Storage Blk Time (%)	29							
Queuing Penalty (veh)	199							

HCM 6th TWSC
16: Erlich City Access/Site Access & SH 402

08/14/2024

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	1482	38	117	1389	142	0	0	138	0	0	145
Future Vol, veh/h	96	1482	38	117	1389	142	0	0	138	0	0	145
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	250	-	-	250	-	250	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	105	1629	42	129	1526	156	0	0	152	0	0	159

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1682	0	0	1671	0	0	-	-	836	-	-	763
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.16	-	-	4.16	-	-	-	-	6.96	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.23	-	-	2.23	-	-	-	-	3.33	-	-	3.33
Pot Cap-1 Maneuver	372	-	-	376	-	-	0	0	308	0	0	345
Stage 1	-	-	-	-	-	-	0	0	-	0	0	-
Stage 2	-	-	-	-	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	372	-	-	376	-	-	-	-	308	-	-	345
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			1.4			27.5			24.1		
HCM LOS							D			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	308	372	-	-	376	-	-	345
HCM Lane V/C Ratio	0.492	0.284	-	-	0.342	-	-	0.462
HCM Control Delay (s)	27.5	18.5	-	-	19.5	-	-	24.1
HCM Lane LOS	D	C	-	-	C	-	-	C
HCM 95th %tile Q(veh)	2.6	1.1	-	-	1.5	-	-	2.3

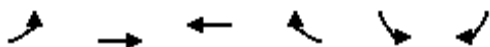
Intersection: 16: Erlich City Access/Site Access & SH 402

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	R	R
Maximum Queue (ft)	453	476	22	472	1055	1060	472	317	579
Average Queue (ft)	134	40	3	318	293	271	18	145	274
95th Queue (ft)	363	213	15	511	847	848	157	255	620
Link Distance (ft)		1012	1012		1011	1011		492	564
Upstream Blk Time (%)					4	7			3
Queuing Penalty (veh)					32	63			0
Storage Bay Dist (ft)	250			250			250		
Storage Blk Time (%)	17			71	12	7			
Queuing Penalty (veh)	123			491	14	10			

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	331	1264	1320	167	231	213
Future Volume (veh/h)	331	1264	1320	167	231	213
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	364	1389	1451	140	254	225
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	512	2576	1539	957	297	639
Arrive On Green	0.25	0.74	0.44	0.44	0.17	0.17
Sat Flow, veh/h	1753	3589	3589	1560	1711	1522
Grp Volume(v), veh/h	364	1389	1451	140	254	225
Grp Sat Flow(s),veh/h/ln	1753	1749	1749	1560	1711	1522
Q Serve(g_s), s	14.0	17.4	39.7	3.8	14.4	0.0
Cycle Q Clear(g_c), s	14.0	17.4	39.7	3.8	14.4	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	512	2576	1539	957	297	639
V/C Ratio(X)	0.71	0.54	0.94	0.15	0.86	0.35
Avail Cap(c_a), veh/h	512	2576	1539	957	393	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.63	0.63	1.00	1.00
Uniform Delay (d), s/veh	32.1	5.8	26.8	8.2	40.1	19.7
Incr Delay (d2), s/veh	4.6	0.8	9.0	0.2	13.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	4.1	16.2	1.8	7.0	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	6.6	35.8	8.4	53.4	20.1
LnGrp LOS	D	A	D	A	D	C
Approach Vol, veh/h		1753	1591		479	
Approach Delay, s/veh		12.8	33.4		37.8	
Approach LOS		B	C		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	29.7	49.0			78.7	21.3
Change Period (Y+Rc), s	5.0	* 5			5.0	4.0
Max Green Setting (Gmax), s	20.0	* 44			68.0	23.0
Max Q Clear Time (g_c+I1), s	16.0	41.7			19.4	16.4
Green Ext Time (p_c), s	0.4	1.8			12.4	0.9

Intersection Summary

HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

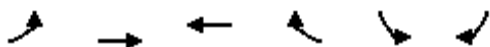
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	225	1332	1223	232	175	163	
Future Volume (veh/h)	225	1332	1223	232	175	163	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1752	1752	
Adj Flow Rate, veh/h	247	1464	1344	190	192	163	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	6	6	6	6	10	10	
Cap, veh/h	396	2409	1964	1183	334	415	
Arrive On Green	0.08	0.70	1.00	1.00	0.20	0.20	
Sat Flow, veh/h	1725	3532	3532	1535	1668	1485	
Grp Volume(v), veh/h	247	1464	1344	190	192	163	
Grp Sat Flow(s),veh/h/ln	1725	1721	1721	1535	1668	1485	
Q Serve(g_s), s	5.5	22.2	0.0	0.0	10.4	8.9	
Cycle Q Clear(g_c), s	5.5	22.2	0.0	0.0	10.4	8.9	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	396	2409	1964	1183	334	415	
V/C Ratio(X)	0.62	0.61	0.68	0.16	0.58	0.39	
Avail Cap(c_a), veh/h	535	2409	1964	1183	334	415	
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.78	0.78	0.54	0.54	1.00	1.00	
Uniform Delay (d), s/veh	6.4	7.8	0.0	0.0	36.2	29.2	
Incr Delay (d2), s/veh	1.3	0.9	1.1	0.2	7.1	2.8	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.6	5.8	0.3	0.1	4.7	8.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	7.7	8.7	1.1	0.2	43.2	32.0	
LnGrp LOS	A	A	A	A	D	C	
Approach Vol, veh/h		1711	1534		355		
Approach Delay, s/veh		8.6	1.0		38.0		
Approach LOS		A	A		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				75.0	25.0	12.9	62.1
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				70.0	20.0	16.0	49.0
Max Q Clear Time (g_c+I1), s				24.2	12.4	7.5	2.0
Green Ext Time (p_c), s				13.5	0.7	0.4	12.9
Intersection Summary							
HCM 6th Ctrl Delay			8.2				
HCM 6th LOS			A				

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

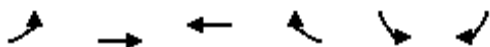
08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	135	1263	140	45	1301	175	5	160	86	250	250	140
Future Volume (veh/h)	135	1263	140	45	1301	175	5	160	86	250	250	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	142	1329	76	47	1369	103	5	168	91	263	263	147
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	2218	989	190	1888	1032	201	217	184	320	516	437
Arrive On Green	0.02	0.21	0.21	0.53	0.53	0.53	0.12	0.12	0.12	0.12	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	412	3554	1585	1116	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	142	1329	76	47	1369	103	5	168	91	263	263	147
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	412	1777	1585	1116	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.4	33.9	3.9	9.2	29.4	2.4	0.4	8.7	5.4	12.0	11.8	7.4
Cycle Q Clear(g_c), s	3.4	33.9	3.9	33.8	29.4	2.4	0.4	8.7	5.4	12.0	11.8	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	2218	989	190	1888	1032	201	217	184	320	516	437
V/C Ratio(X)	0.54	0.60	0.08	0.25	0.73	0.10	0.02	0.78	0.50	0.82	0.51	0.34
Avail Cap(c_a), veh/h	291	2218	989	190	1888	1032	329	430	365	320	729	618
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	28.4	16.5	28.8	17.9	6.5	39.3	42.9	41.5	33.9	30.5	28.9
Incr Delay (d2), s/veh	1.3	0.9	0.1	3.1	2.5	0.2	0.0	5.9	2.1	15.5	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	16.0	1.2	1.0	10.7	0.7	0.1	4.2	2.1	6.6	5.2	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	29.3	16.6	31.9	20.3	6.7	39.3	48.8	43.5	49.4	31.3	29.4
LnGrp LOS	B	C	B	C	C	A	D	D	D	D	C	C
Approach Vol, veh/h	1547		1519				264		673			
Approach Delay, s/veh	27.7		19.8				46.8		37.9			
Approach LOS	C		B				D		D			
Timer - Assigned Phs	1	2	4		6		7	8				
Phs Duration (G+Y+Rc), s	16.0	16.6	67.4		32.6		9.3	58.1				
Change Period (Y+Rc), s	4.0	5.0	5.0		5.0		4.0	5.0				
Max Green Setting (Gmax), s	12.0	23.0	51.0		39.0		7.0	40.0				
Max Q Clear Time (g_c+I1), s	14.0	10.7	35.9		13.8		5.4	35.8				
Green Ext Time (p_c), s	0.0	0.9	7.7		1.8		0.0	3.1				
Intersection Summary												
HCM 6th Ctrl Delay	27.7											
HCM 6th LOS	C											

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

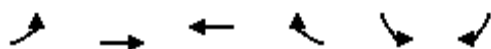
08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	304	1299	1236	231	181	301
Future Volume (veh/h)	304	1299	1236	231	181	301
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	313	1339	1274	167	187	294
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	357	2484	2010	1186	330	447
Arrive On Green	0.10	0.72	0.57	0.57	0.18	0.18
Sat Flow, veh/h	1739	3561	3618	1572	1795	1598
Grp Volume(v), veh/h	313	1339	1274	167	187	294
Grp Sat Flow(s),veh/h/ln	1739	1735	1763	1572	1795	1598
Q Serve(g_s), s	6.9	17.8	24.3	2.9	9.5	16.2
Cycle Q Clear(g_c), s	6.9	17.8	24.3	2.9	9.5	16.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	357	2484	2010	1186	330	447
V/C Ratio(X)	0.88	0.54	0.63	0.14	0.57	0.66
Avail Cap(c_a), veh/h	555	2484	2010	1186	341	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.75	0.75	1.00	1.00
Uniform Delay (d), s/veh	17.3	6.6	14.5	3.4	37.2	31.8
Incr Delay (d2), s/veh	9.7	0.8	1.2	0.2	2.1	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.5	8.2	1.5	4.3	6.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.9	7.4	15.6	3.6	39.2	35.1
LnGrp LOS	C	A	B	A	D	D
Approach Vol, veh/h		1652	1441		481	
Approach Delay, s/veh		11.1	14.2		36.7	
Approach LOS		B	B		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.6	62.0			76.6	23.4
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	21.0	45.0			71.0	19.0
Max Q Clear Time (g_c+I1), s	8.9	26.3			19.8	18.2
Green Ext Time (p_c), s	0.7	8.6			11.8	0.2
Intersection Summary						
HCM 6th Ctrl Delay			15.8			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary 5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	200	1310	1184	235	151	163	
Future Volume (veh/h)	200	1310	1184	235	151	163	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1841	1841	1826	1826	
Adj Flow Rate, veh/h	215	1409	1273	192	162	66	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	4	4	5	5	
Cap, veh/h	408	2559	2114	1224	313	279	
Arrive On Green	0.07	0.72	1.00	1.00	0.18	0.18	
Sat Flow, veh/h	1781	3647	3589	1560	1739	1547	
Grp Volume(v), veh/h	215	1409	1273	192	162	66	
Grp Sat Flow(s),veh/h/ln	1781	1777	1749	1560	1739	1547	
Q Serve(g_s), s	4.3	18.4	0.0	0.0	8.4	3.7	
Cycle Q Clear(g_c), s	4.3	18.4	0.0	0.0	8.4	3.7	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	408	2559	2114	1224	313	279	
V/C Ratio(X)	0.53	0.55	0.60	0.16	0.52	0.24	
Avail Cap(c_a), veh/h	540	2559	2114	1224	313	279	
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.82	0.82	0.67	0.67	1.00	1.00	
Uniform Delay (d), s/veh	5.5	6.5	0.0	0.0	37.1	35.1	
Incr Delay (d2), s/veh	0.9	0.7	0.3	0.0	6.0	2.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	4.6	0.1	0.0	4.0	3.5	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	6.4	7.2	0.3	0.0	43.1	37.1	
LnGrp LOS	A	A	A	A	D	D	
Approach Vol, veh/h		1624	1465		228		
Approach Delay, s/veh		7.1	0.3		41.4		
Approach LOS		A	A		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				77.0	23.0	11.6	65.4
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				72.0	18.0	14.0	53.0
Max Q Clear Time (g_c+I1), s				20.4	10.4	6.3	2.0
Green Ext Time (p_c), s				12.8	0.4	0.3	12.0
Intersection Summary							
HCM 6th Ctrl Delay			6.4				
HCM 6th LOS			A				

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1212	80	56	1298	226	5	180	54	217	200	160
Future Volume (veh/h)	160	1212	80	56	1298	226	5	180	54	217	200	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	1276	45	59	1366	129	5	189	1	228	211	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	1889	843	225	1807	806	272	539	457	320	539	557
Arrive On Green	0.02	0.18	0.18	0.04	0.51	0.51	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1014	1870	1585	1193	1870	1585
Grp Volume(v), veh/h	168	1276	45	59	1366	129	5	189	1	228	211	157
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1014	1870	1585	1193	1870	1585
Q Serve(g_s), s	4.3	33.6	2.4	1.5	30.7	4.4	0.4	8.0	0.0	18.7	9.1	7.1
Cycle Q Clear(g_c), s	4.3	33.6	2.4	1.5	30.7	4.4	9.5	8.0	0.0	26.7	9.1	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	1889	843	225	1807	806	272	539	457	320	539	557
V/C Ratio(X)	0.66	0.68	0.05	0.26	0.76	0.16	0.02	0.35	0.00	0.71	0.39	0.28
Avail Cap(c_a), veh/h	303	1889	843	257	1807	806	274	542	460	323	542	561
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	33.2	20.3	16.2	19.6	13.2	32.4	28.2	25.4	38.8	28.6	23.3
Incr Delay (d2), s/veh	3.2	1.6	0.1	0.6	3.0	0.4	0.0	0.4	0.0	7.1	0.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	16.1	0.8	0.6	11.5	1.4	0.1	3.5	0.0	5.8	3.9	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	34.8	20.4	16.8	22.6	13.6	32.4	28.6	25.4	45.9	29.0	23.6
LnGrp LOS	C	C	C	B	C	B	C	C	C	D	C	C
Approach Vol, veh/h	1489			1554			195			596		
Approach Delay, s/veh	33.0			21.7			28.7			34.1		
Approach LOS	C			C			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	33.8		8.0	58.2		33.8		10.4	55.8			
Change Period (Y+Rc), s	5.0		4.0	5.0		5.0		4.0	5.0			
Max Green Setting (Gmax), s	29.0		5.8	51.2		29.0		9.0	48.0			
Max Q Clear Time (g_c+I1), s	11.5		3.5	35.6		28.7		6.3	32.7			
Green Ext Time (p_c), s	0.8		0.0	7.4		0.1		0.1	8.1			
Intersection Summary												
HCM 6th Ctrl Delay	28.4											
HCM 6th LOS	C											

SITE LAYOUT

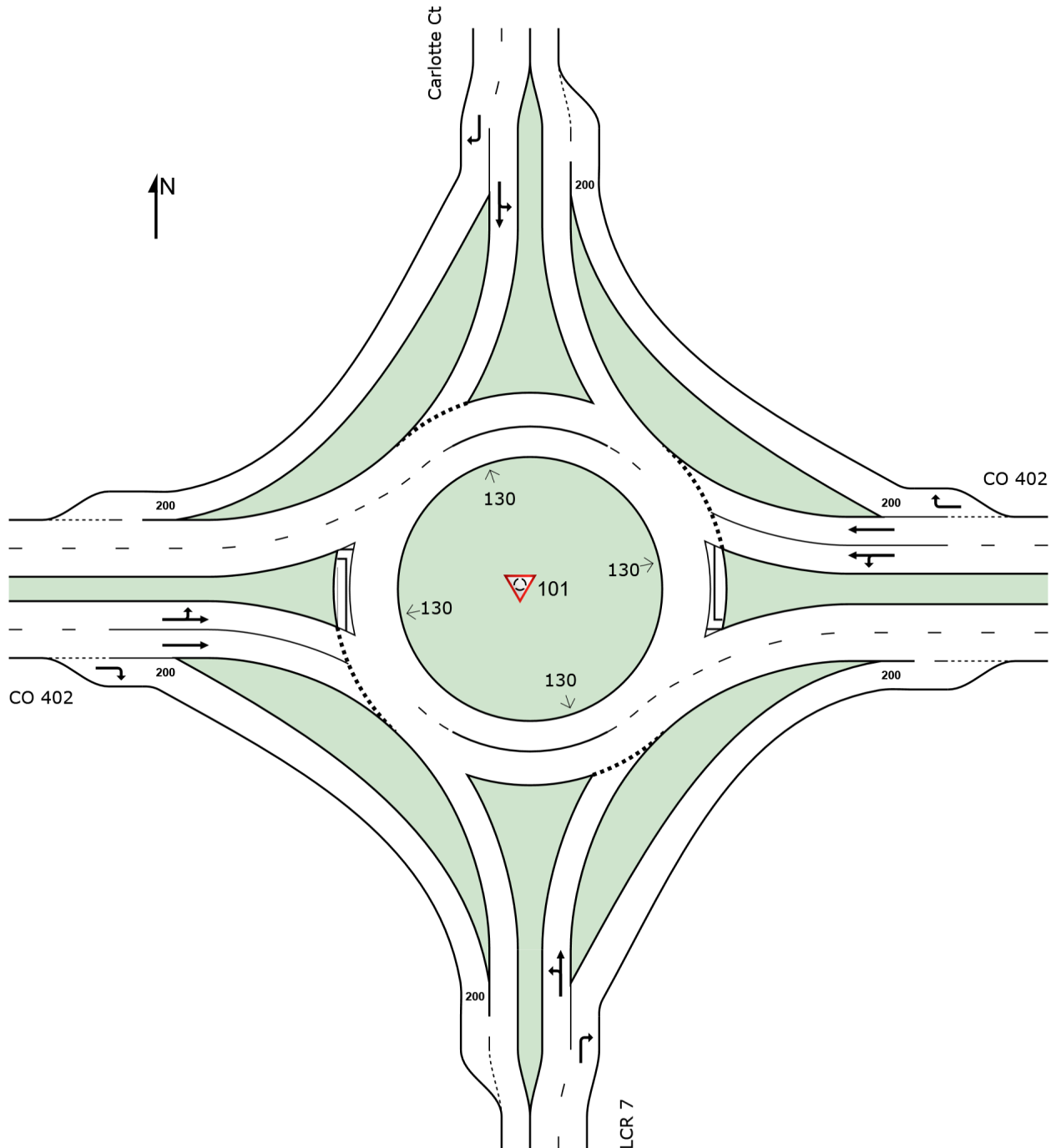
 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

AM 2045 Plus Site - Site Access 3/4ths Mvmt

Site Category: (None)

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | [sidrasolutions.com](https://www.sidrasolutions.com)

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:53:11 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\3-4ths Mvmt\AM_2045 Plus Site_LCR7 Rdbt - PnR 3-4ths.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site - Site Access 3/4ths Mvmt

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: LCR 7															
3	L2	All MCs	192	3.0	192	3.0	0.661	29.3	LOS C	4.2	108.7	0.92	1.02	1.32	27.2
8	T1	All MCs	56	3.0	56	3.0	0.661	29.3	LOS C	4.2	108.7	0.92	1.02	1.32	18.0
18	R2	All MCs	268	3.0	268	3.0	0.165	7.9	LOS A	0.0	0.0	0.00	0.00	0.00	38.0
Approach			516	3.0	516	3.0	0.661	18.2	LOS B	4.2	108.7	0.44	0.49	0.64	29.4
East: CO 402															
1	L2	All MCs	356	3.0	356	3.0	0.957	40.5	LOS D	30.8	787.4	1.00	1.52	2.74	19.3
6	T1	All MCs	1407	3.0	1407	3.0	0.957	38.8	LOS D	32.9	841.7	1.00	1.52	2.72	27.2
16	R2	All MCs	46	3.0	46	3.0	0.028	2.7	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1809	3.0	1809	3.0	0.957	38.2	LOS D	32.9	841.7	0.97	1.48	2.66	25.9
North: Carlotte Ct															
7	L2	All MCs	214	3.0	214	3.0	0.881	59.0	LOS E	7.4	190.0	0.97	1.39	1.92	14.4
4	T1	All MCs	68	3.0	68	3.0	0.881	59.0	LOS E	7.4	190.0	0.97	1.39	1.92	13.5
14	R2	All MCs	119	3.0	119	3.0	0.073	7.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			401	3.0	401	3.0	0.881	43.6	LOS D	7.4	190.0	0.69	0.98	1.35	17.0
West: CO 402															
5	L2	All MCs	208	3.0	208	3.0	1.007	57.3	LOS F	30.9	790.6	1.00	1.71	3.30	19.9
2	T1	All MCs	1314	3.0	1314	3.0	1.007	54.8	LOS F	34.3	878.1	1.00	1.73	3.31	23.5
12	R2	All MCs	246	3.0	246	3.0	0.151	4.4	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1768	3.0	1768	3.0	1.007	48.1	LOS D	34.3	878.1	0.86	1.48	2.85	24.6
All Vehicles			4495	3.0	4495	3.0	1.007	40.3	LOS D	34.3	878.1	0.84	1.32	2.38	24.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 1:31:29 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\3-4ths Mvmt\AM_2045 Plus

Site_LCR7 Rdbt - PnR 3-4ths.sip9

SITE LAYOUT

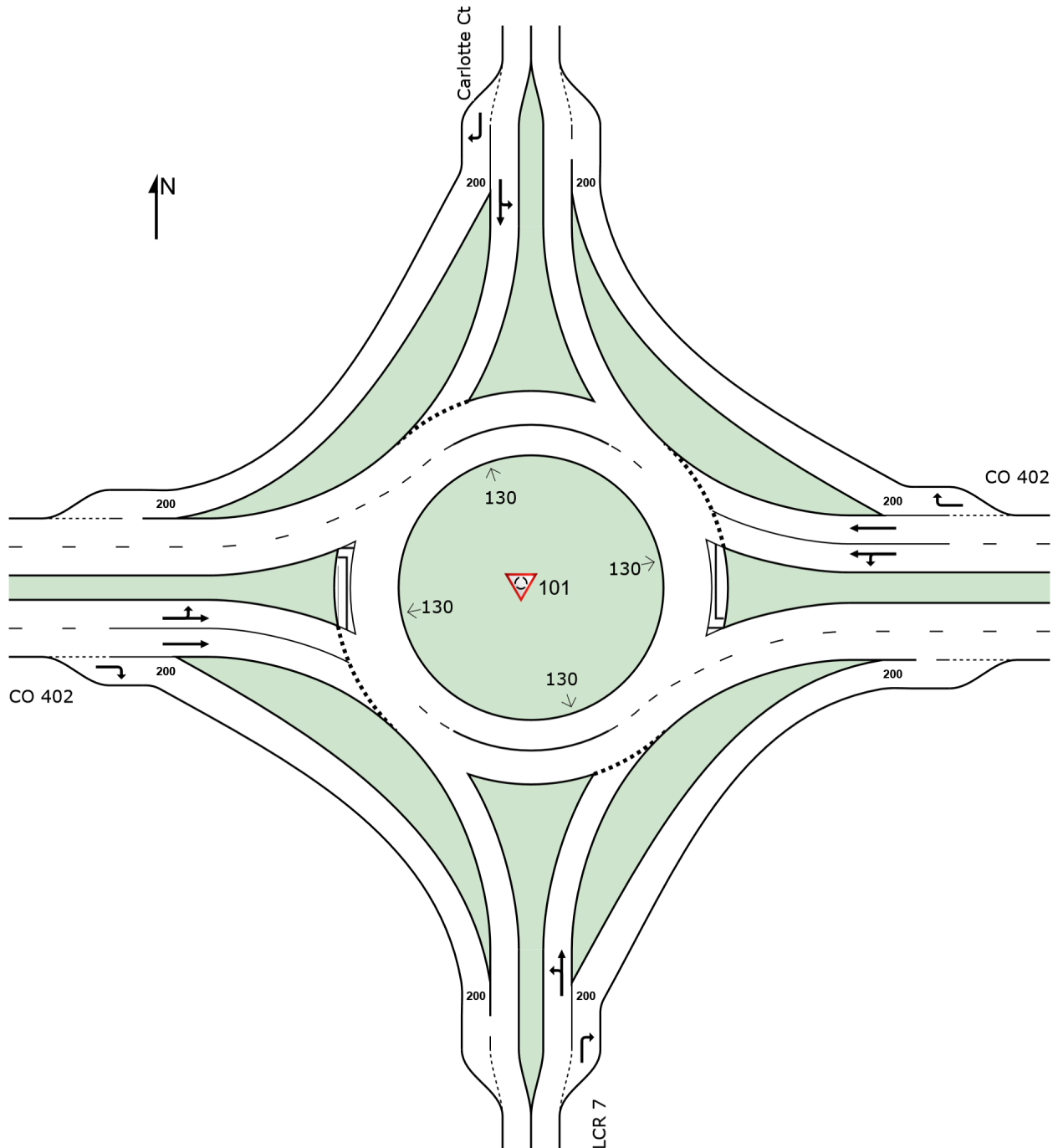
 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

PM 2045 Plus Site - Site Access 3/4ths Mvmt

Site Category: (None)

Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Tuesday, August 13, 2024 1:30:18 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\3-4ths Mvmt\PM_2045 Plus Site_LCR7 Rdbt - PnR 3-4ths.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site - Site Access 3/4ths Mvmt

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: LCR 7															
3	L2	All MCs	243	3.0	243	3.0	0.733	33.2	LOS C	5.2	133.8	0.93	1.08	1.48	26.0
8	T1	All MCs	48	3.0	48	3.0	0.733	33.2	LOS C	5.2	133.8	0.93	1.08	1.48	17.2
18	R2	All MCs	295	3.0	295	3.0	0.181	7.5	LOS A	0.0	0.0	0.00	0.00	0.00	38.0
Approach			586	3.0	586	3.0	0.733	20.3	LOS C	5.2	133.8	0.46	0.53	0.73	28.6
East: CO 402															
1	L2	All MCs	287	3.0	287	3.0	0.843	24.4	LOS C	19.0	486.8	1.00	1.10	1.91	23.8
6	T1	All MCs	1316	3.0	1316	3.0	0.843	23.3	LOS C	19.9	508.4	1.00	1.08	1.88	32.4
16	R2	All MCs	25	3.0	25	3.0	0.015	2.4	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1628	3.0	1628	3.0	0.843	23.2	LOS C	19.9	508.4	0.98	1.07	1.86	31.1
North: Carlotte Ct															
7	L2	All MCs	239	3.0	239	3.0	0.868	53.9	LOS E	7.4	190.2	0.97	1.38	1.90	15.1
4	T1	All MCs	61	3.0	61	3.0	0.868	53.9	LOS E	7.4	190.2	0.97	1.38	1.90	14.1
14	R2	All MCs	136	3.0	136	3.0	0.084	6.2	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			436	3.0	436	3.0	0.868	39.1	LOS D	7.4	190.2	0.67	0.95	1.31	17.7
West: CO 402															
5	L2	All MCs	108	3.0	108	3.0	0.869	30.7	LOS C	17.5	449.2	1.00	1.23	2.17	25.4
2	T1	All MCs	1299	3.0	1299	3.0	0.869	29.0	LOS C	18.9	484.1	1.00	1.23	2.14	30.6
12	R2	All MCs	217	3.0	217	3.0	0.134	3.9	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1624	3.0	1624	3.0	0.869	25.8	LOS C	18.9	484.1	0.87	1.07	1.86	31.5
All Vehicles			4274	3.0	4274	3.0	0.869	25.4	LOS C	19.9	508.4	0.84	0.98	1.65	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Tuesday, August 13, 2024 1:30:20 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\3-4ths Mvmt\PM_2045 Plus

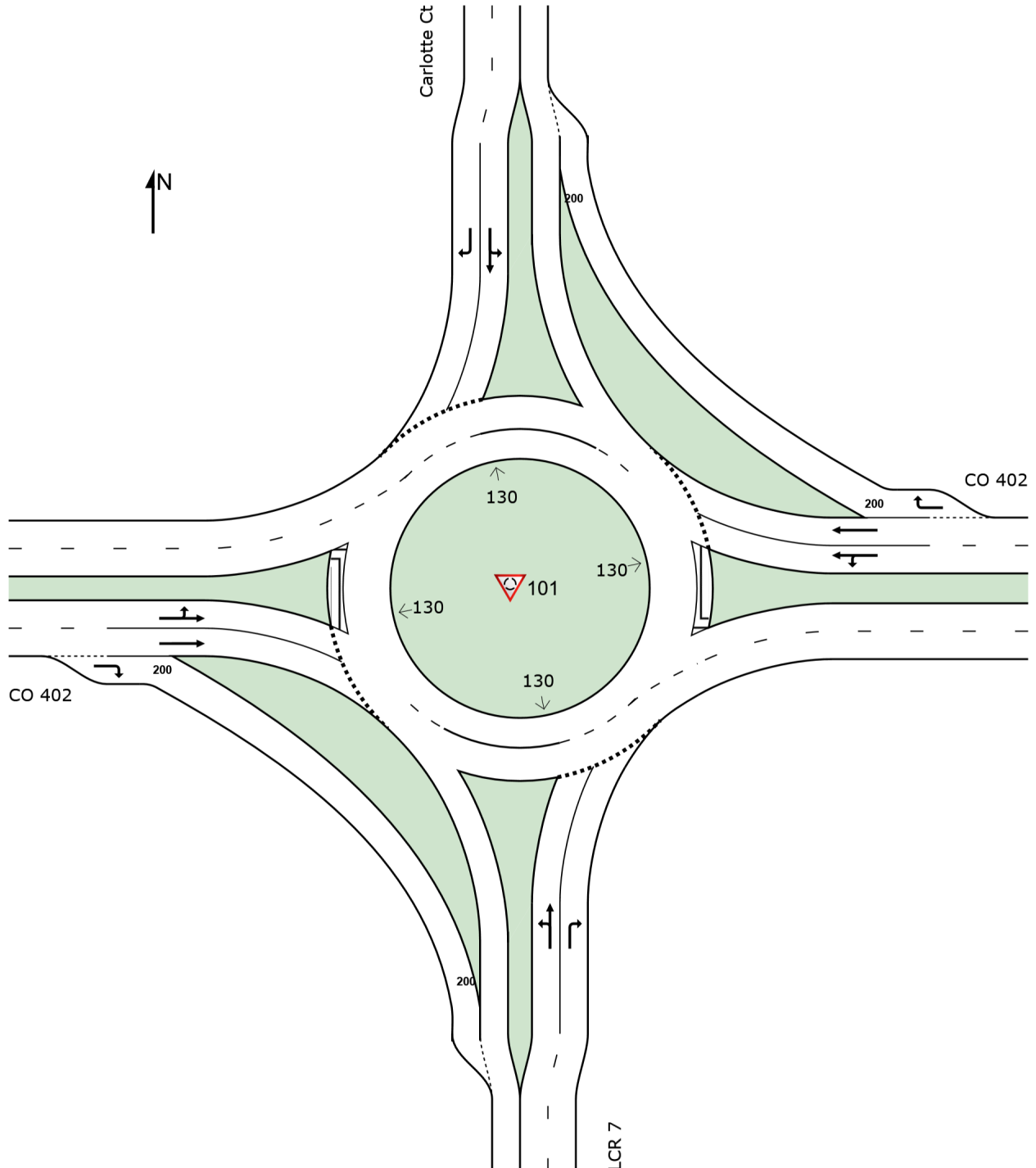
Site_LCR7 Rdbt - PnR 3-4ths.sip9

SITE LAYOUT

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:41:10 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: LCR 7															
3	L2	All MCs	163	3.0	163	3.0	0.673	34.0	LOS C	4.1	103.9	0.91	1.03	1.34	25.9
8	T1	All MCs	56	3.0	56	3.0	0.673	34.0	LOS C	4.1	103.9	0.91	1.03	1.34	17.1
18	R2	All MCs	268	3.0	268	3.0	0.673	28.8	LOS C	4.5	114.1	0.91	1.02	1.33	22.8
Approach			487	3.0	487	3.0	0.673	31.1	LOS C	4.5	114.1	0.91	1.02	1.33	23.4
East: CO 402															
1	L2	All MCs	337	3.0	337	3.0	0.921	33.7	LOS C	26.8	685.3	1.00	1.36	2.42	21.0
6	T1	All MCs	1407	3.0	1407	3.0	0.921	32.2	LOS C	28.3	725.3	1.00	1.36	2.39	29.2
16	R2	All MCs	46	3.0	46	3.0	0.028	2.7	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1790	3.0	1790	3.0	0.921	31.7	LOS C	28.3	725.3	0.97	1.32	2.33	27.9
North: Carlotte Ct															
7	L2	All MCs	34	3.0	34	3.0	0.351	23.6	LOS C	1.6	41.4	0.88	0.92	0.98	21.1
4	T1	All MCs	54	3.0	54	3.0	0.351	23.6	LOS C	1.6	41.4	0.88	0.92	0.98	20.0
14	R2	All MCs	119	3.0	119	3.0	0.360	18.7	LOS B	1.9	47.5	0.88	0.91	0.97	29.1
Approach			207	3.0	207	3.0	0.360	20.7	LOS C	1.9	47.5	0.88	0.91	0.98	25.6
West: CO 402															
5	L2	All MCs	208	3.0	208	3.0	0.834	24.4	LOS C	17.6	450.2	1.00	1.09	1.88	26.9
2	T1	All MCs	1314	3.0	1314	3.0	0.834	23.3	LOS C	18.4	472.2	1.00	1.08	1.85	32.7
12	R2	All MCs	246	3.0	246	3.0	0.151	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1768	3.0	1768	3.0	0.834	20.8	LOS C	18.4	472.2	0.86	0.93	1.60	33.1
All Vehicles			4252	3.0	4252	3.0	0.921	26.6	LOS C	28.3	725.3	0.92	1.10	1.85	29.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:41:11 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

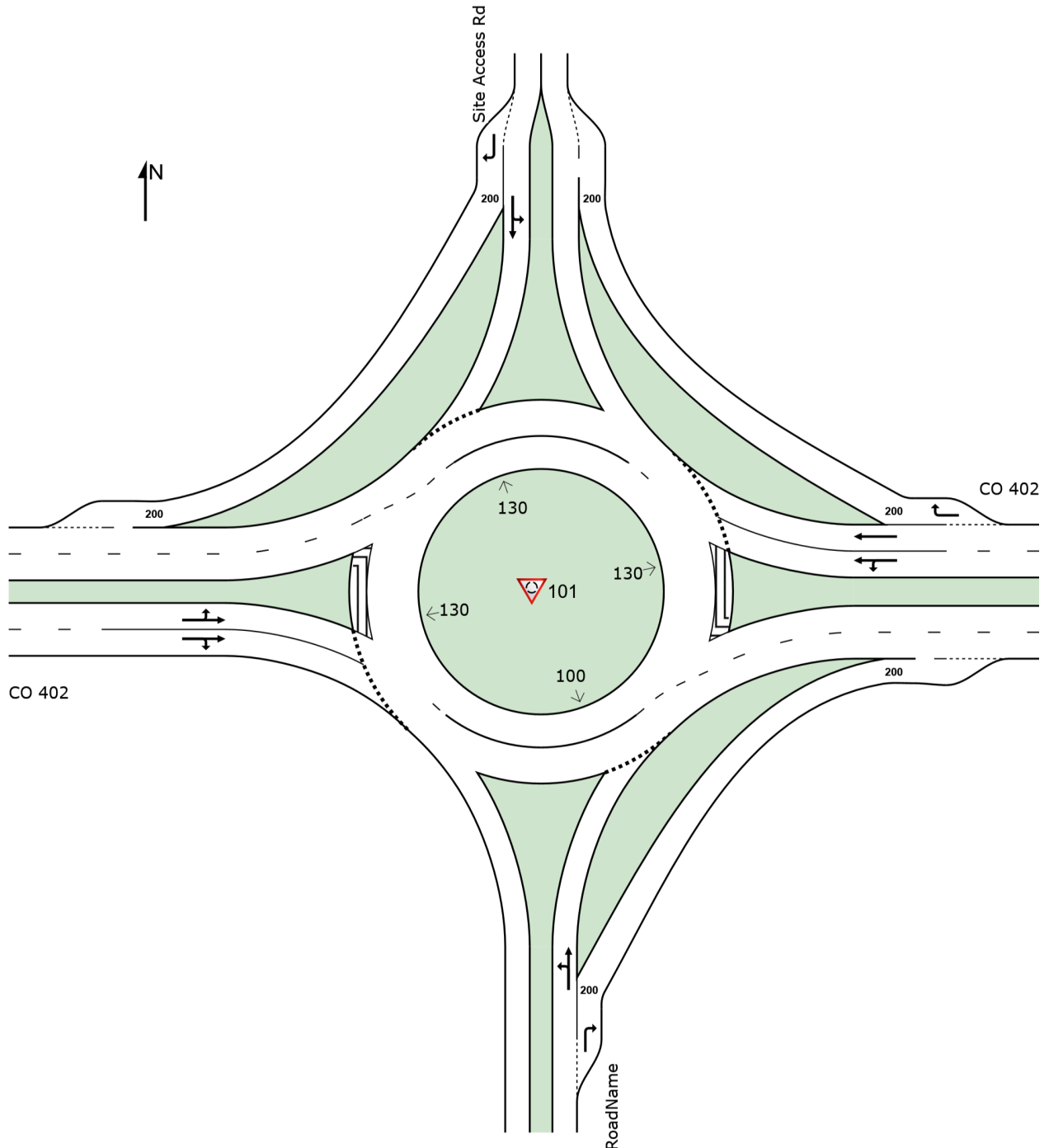
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:39:35 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: RoadName															
3	L2	All MCs	41	3.0	41	3.0	0.228	17.1	LOS B	1.1	28.1	0.87	0.85	0.87	26.1
8	T1	All MCs	25	3.0	25	3.0	0.228	17.1	LOS B	1.1	28.1	0.87	0.85	0.87	26.0
18	R2	All MCs	116	3.0	116	3.0	0.072	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	36.2
Approach			183	3.0	183	3.0	0.228	10.1	LOS B	1.1	28.1	0.31	0.31	0.31	31.7
East: CO 402															
1	L2	All MCs	152	3.0	152	3.0	0.912	30.1	LOS C	30.1	769.6	1.00	1.28	2.14	24.0
6	T1	All MCs	1738	3.0	1738	3.0	0.912	29.1	LOS C	31.2	797.7	1.00	1.25	2.11	24.8
16	R2	All MCs	347	3.0	347	3.0	0.213	4.4	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			2237	3.0	2237	3.0	0.912	25.3	LOS C	31.2	797.7	0.84	1.06	1.78	26.2
North: Site Access Rd															
7	L2	All MCs	194	3.0	194	3.0	0.714	37.9	LOS D	4.7	119.8	0.94	1.13	1.38	17.7
4	T1	All MCs	34	3.0	34	3.0	0.714	37.9	LOS D	4.7	119.8	0.94	1.13	1.38	18.9
14	R2	All MCs	131	3.0	131	3.0	0.080	8.1	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			358	3.0	358	3.0	0.714	27.0	LOS C	4.7	119.8	0.60	0.72	0.88	19.8
West: CO 402															
5	L2	All MCs	234	3.0	234	3.0	0.876	27.0	LOS C	22.8	582.5	1.00	1.18	2.06	20.3
2	T1	All MCs	1435	3.0	1435	3.0	0.876	26.0	LOS C	23.8	608.4	1.00	1.17	2.04	25.8
12	R2	All MCs	47	3.0	47	3.0	0.876	25.2	LOS C	23.8	608.4	1.00	1.17	2.02	26.0
Approach			1716	3.0	1716	3.0	0.876	26.1	LOS C	23.8	608.4	1.00	1.17	2.04	24.9
All Vehicles			4494	3.0	4494	3.0	0.912	25.1	LOS C	31.2	797.7	0.86	1.05	1.75	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:35 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

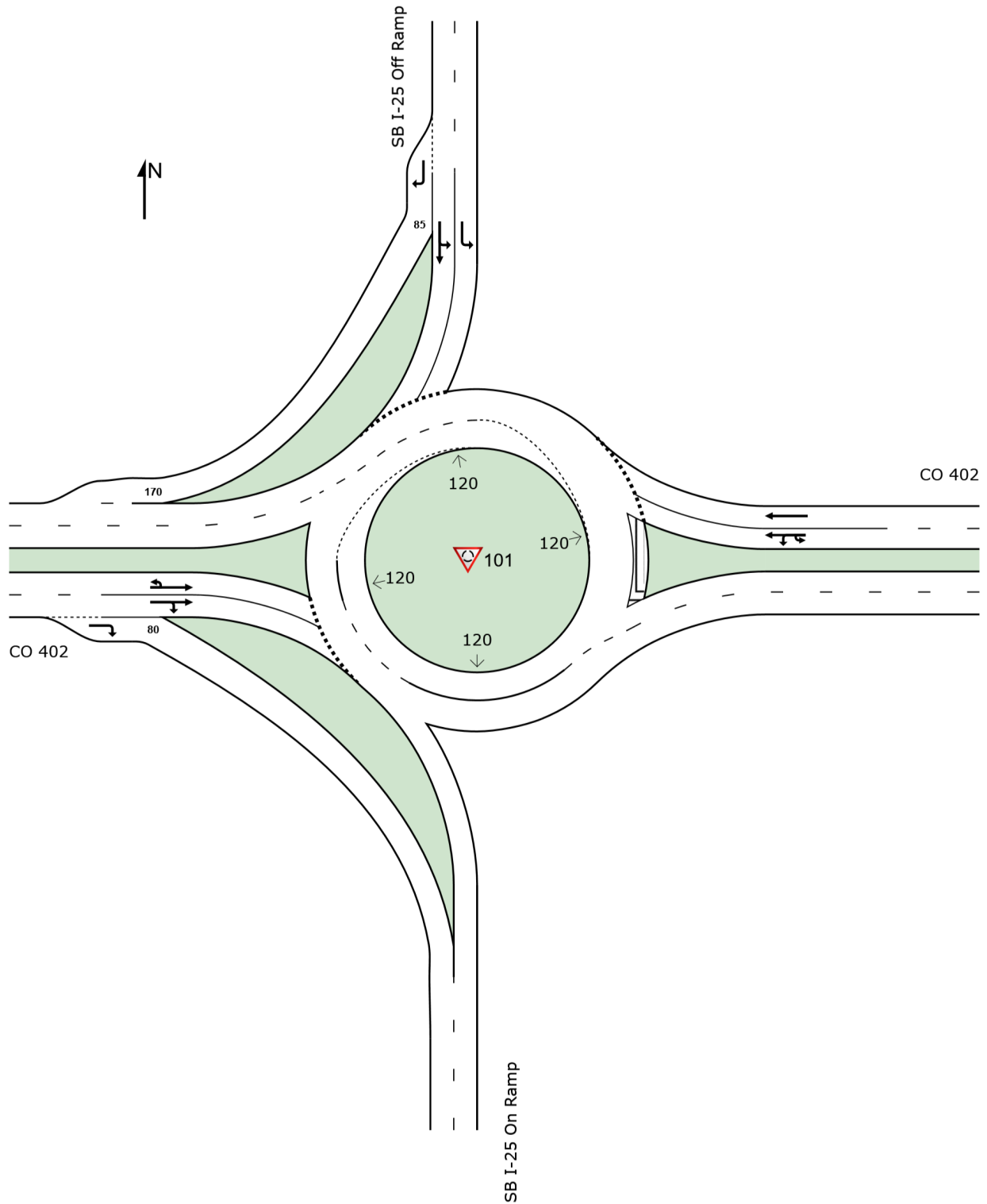
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh]	Dist ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	21	9.0	21	9.0	0.644	6.3	LOS A	9.5	253.5	0.08	0.01	0.08	16.8
1	L2	All MCs	353	9.0	353	9.0	0.644	6.3	LOS A	9.5	253.5	0.08	0.01	0.08	32.5
6	T1	All MCs	1359	9.0	1359	9.0	0.644	23.5	LOS C	9.5	253.5	0.08	0.01	0.08	22.2
Approach			1733	9.0	1733	9.0	0.644	19.8	LOS B	9.5	253.5	0.08	0.01	0.08	25.0
North: SB I-25 Off Ramp															
7	L2	All MCs	117	9.0	117	9.0	0.100	7.2	LOS A	0.4	11.5	0.71	0.68	0.71	28.3
4	T1	All MCs	2	9.0	2	9.0	0.100	6.0	LOS A	0.4	11.5	0.71	0.66	0.71	38.8
14	R2	All MCs	728	9.0	728	9.0	0.473	30.7	LOS C	0.0	0.0	0.00	0.00	0.00	42.2
Approach			848	9.0	848	9.0	0.473	27.4	LOS C	0.4	11.5	0.10	0.10	0.10	39.4
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.537	11.5	LOS B	4.2	110.9	0.69	0.63	0.94	17.7
2	T1	All MCs	1004	8.0	1004	8.0	0.537	10.8	LOS B	4.3	113.3	0.68	0.61	0.90	21.3
12	R2	All MCs	583	8.0	583	8.0	0.373	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			1589	8.0	1589	8.0	0.537	6.8	LOS A	4.3	113.3	0.43	0.38	0.57	29.0
All Vehicles			4170	8.6	4170	8.6	0.644	16.4	LOS B	9.5	253.5	0.22	0.17	0.27	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:10 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

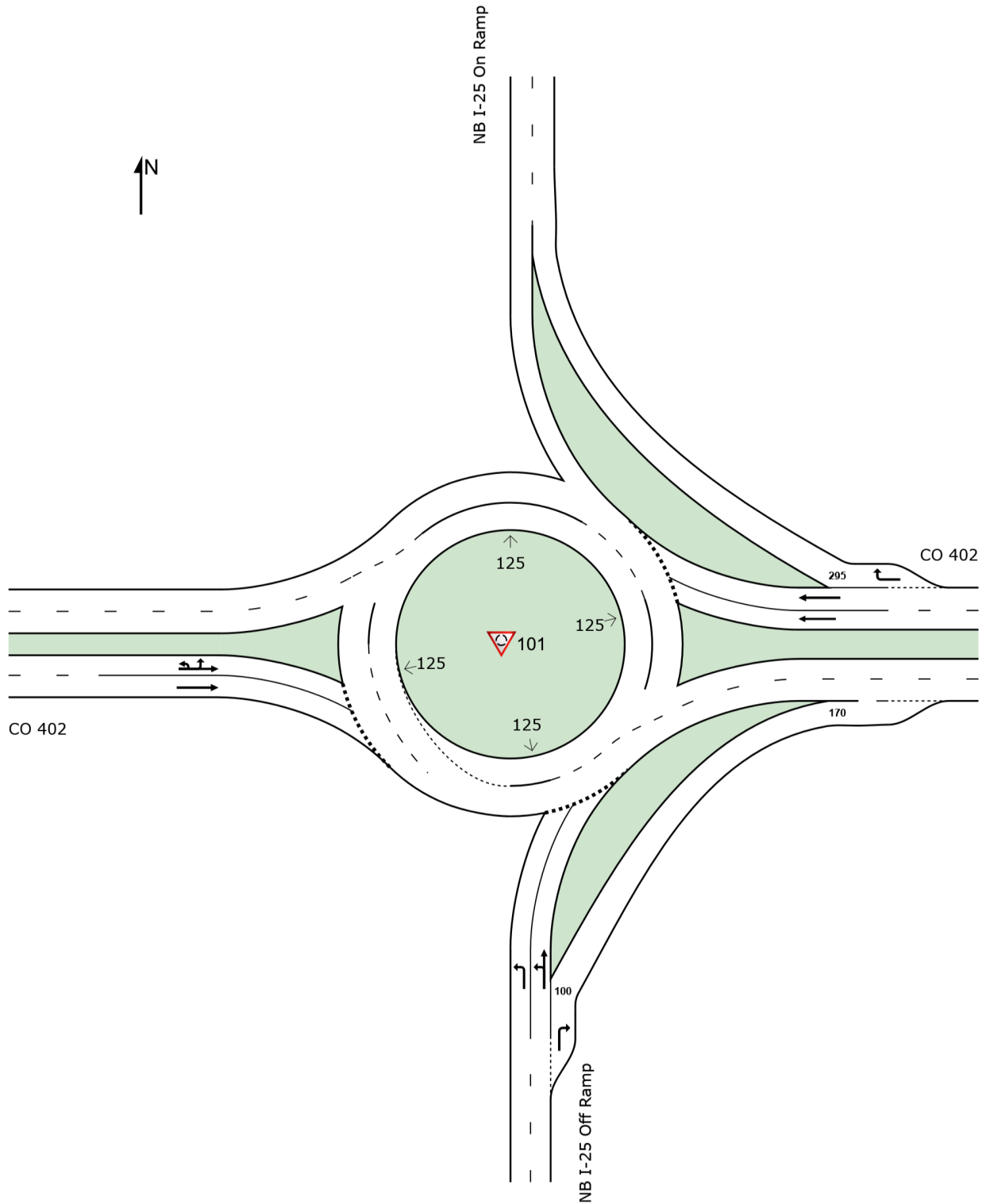
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & NB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	568	8.0	568	8.0	0.389	9.7	LOS A	1.9	51.6	0.69	0.68	0.86	26.1
8	T1	All MCs	17	8.0	17	8.0	0.389	8.5	LOS A	1.9	51.6	0.68	0.66	0.83	35.8
18	R2	All MCs	188	8.0	188	8.0	0.121	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	41.2
Approach			773	8.0	773	8.0	0.389	8.7	LOS A	1.9	51.6	0.52	0.52	0.65	28.9
East: CO 402															
6	T1	All MCs	1211	8.0	1211	8.0	1.011	63.3	LOS F	25.0	665.3	1.00	2.39	3.77	9.1
16	R2	All MCs	317	8.0	317	8.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.8
Approach			1528	8.0	1528	8.0	1.011	50.2	LOS E	25.0	665.3	0.79	1.90	2.98	11.6
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.492	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	19.6
5	L2	All MCs	605	8.0	605	8.0	0.492	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	33.4
2	T1	All MCs	589	8.0	589	8.0	0.471	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	25.0
Approach			1195	8.0	1195	8.0	0.492	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	30.0
All Vehicles			3497	8.0	3497	8.0	1.011	25.7	LOS C	25.0	665.3	0.46	0.94	1.45	18.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:19 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

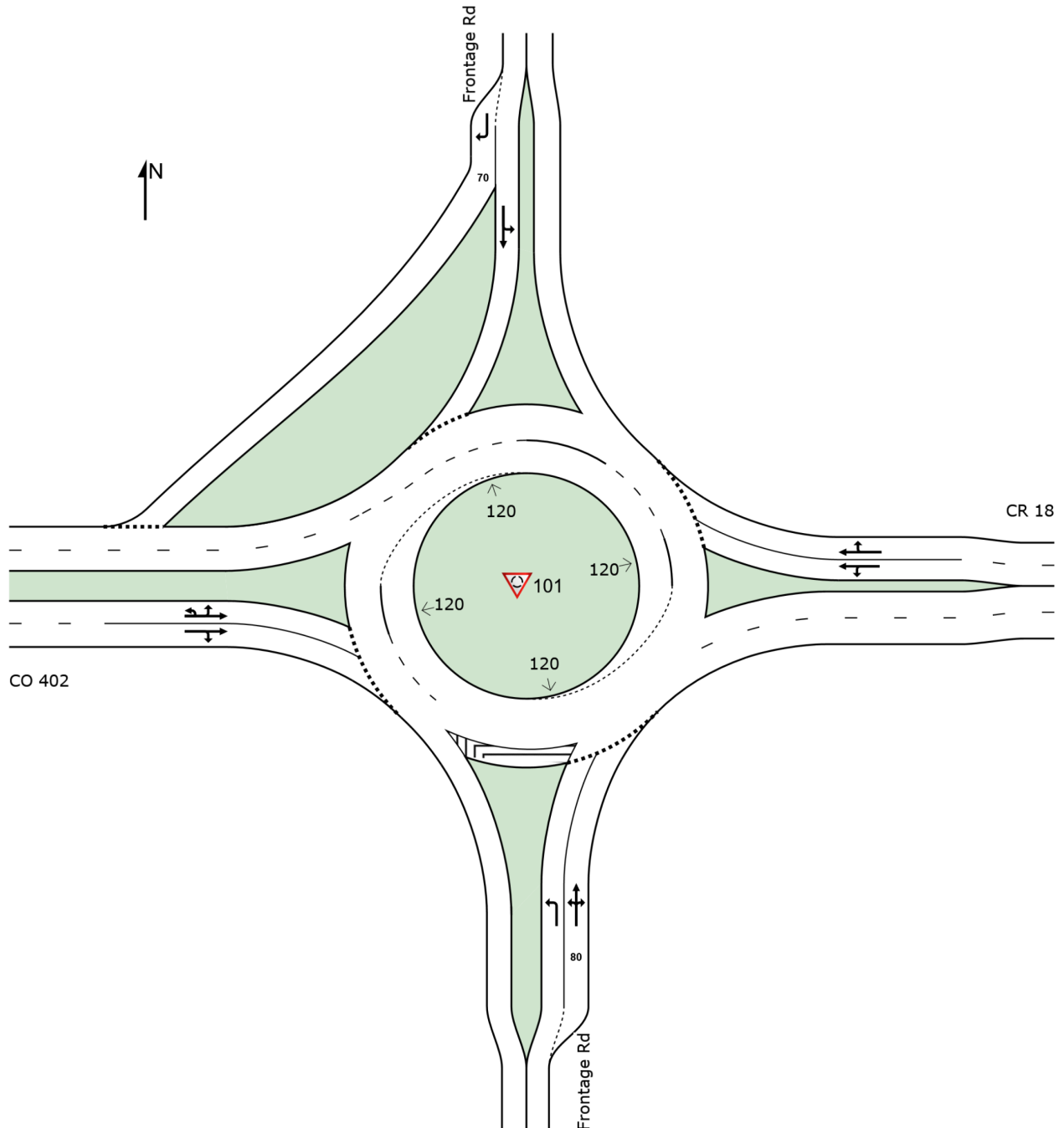
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:39:25 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	195	9.0	195	9.0	0.241	9.2	LOS A	1.6	41.9	0.81	0.65	0.81	29.8
8	T1	All MCs	84	9.0	84	9.0	0.241	7.9	LOS A	1.6	41.9	0.81	0.63	0.81	32.6
18	R2	All MCs	23	9.0	23	9.0	0.241	7.9	LOS A	1.6	41.9	0.81	0.63	0.81	37.2
Approach			302	9.0	302	9.0	0.241	8.7	LOS A	1.6	41.9	0.81	0.64	0.81	31.3
East: CR 18															
1	L2	All MCs	25	7.0	25	7.0	0.690	17.6	LOS B	7.9	208.0	0.83	0.86	1.39	35.6
6	T1	All MCs	953	7.0	953	7.0	0.690	17.4	LOS B	7.9	209.6	0.83	0.86	1.38	34.9
16	R2	All MCs	91	7.0	91	7.0	0.690	17.2	LOS B	7.9	209.6	0.83	0.85	1.38	36.1
Approach			1069	7.0	1069	7.0	0.690	17.4	LOS B	7.9	209.6	0.83	0.86	1.38	35.1
North: Frontage Rd															
7	L2	All MCs	68	4.0	68	4.0	0.245	9.9	LOS A	1.1	29.5	0.76	0.70	0.76	37.1
4	T1	All MCs	66	4.0	66	4.0	0.245	9.9	LOS A	1.1	29.5	0.76	0.70	0.76	32.1
14	R2	All MCs	476	4.0	476	4.0	0.851	36.2	LOS D	9.4	242.3	0.95	1.33	2.07	22.4
Approach			610	4.0	610	4.0	0.851	30.4	LOS C	9.4	242.3	0.91	1.19	1.79	25.7
West: CO 402															
5u	U	All MCs	6	9.0	6	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	20.2
5	L2	All MCs	199	9.0	199	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	28.4
2	T1	All MCs	495	9.0	495	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	39.0
12	R2	All MCs	68	9.0	68	9.0	0.369	7.2	LOS A	2.3	62.9	0.44	0.25	0.44	31.3
Approach			768	9.0	768	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	35.0
All Vehicles			2750	7.1	2750	7.1	0.851	16.5	LOS B	9.4	242.3	0.74	0.74	1.15	32.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:26 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

Site_Roundabouts.sip9

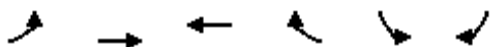
APPENDIX J

Future Year Total Traffic Conditions Capacity and Queuing Analysis

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024

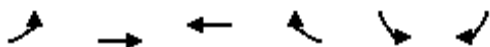


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	265	967	1018	120	168	171
Future Volume (veh/h)	265	967	1018	120	168	171
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	291	1063	1119	95	185	165
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	319	1474	1184	1201	217	377
Arrive On Green	0.12	0.80	0.64	0.64	0.13	0.13
Sat Flow, veh/h	1753	1841	1841	1560	1711	1522
Grp Volume(v), veh/h	291	1063	1119	95	185	165
Grp Sat Flow(s),veh/h/ln	1753	1841	1841	1560	1711	1522
Q Serve(g_s), s	11.3	30.0	60.9	1.6	11.6	10.1
Cycle Q Clear(g_c), s	11.3	30.0	60.9	1.6	11.6	10.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	319	1474	1184	1201	217	377
V/C Ratio(X)	0.91	0.72	0.95	0.08	0.85	0.44
Avail Cap(c_a), veh/h	329	1474	1184	1201	249	406
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.47	0.47	1.00	1.00
Uniform Delay (d), s/veh	36.0	5.2	17.9	3.1	47.0	34.9
Incr Delay (d2), s/veh	28.3	3.1	9.0	0.1	21.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	6.5	22.7	0.7	6.2	3.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	64.3	8.3	26.9	3.2	68.8	35.7
LnGrp LOS	E	A	C	A	E	D
Approach Vol, veh/h		1354	1214		350	
Approach Delay, s/veh		20.3	25.1		53.2	
Approach LOS		C	C		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.3	74.7			92.1	17.9
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	14.0	68.0			86.0	16.0
Max Q Clear Time (g_c+I1), s	13.3	62.9			32.0	13.6
Green Ext Time (p_c), s	0.1	3.3			10.1	0.3
Intersection Summary						
HCM 6th Ctrl Delay			26.2			
HCM 6th LOS			C			

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	181	1003	927	176	131	131	
Future Volume (veh/h)	181	1003	927	176	131	131	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1752	1752	
Adj Flow Rate, veh/h	199	1102	1019	167	144	57	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	6	6	6	6	10	10	
Cap, veh/h	265	1367	1203	1285	288	336	
Arrive On Green	0.05	0.75	0.66	0.66	0.17	0.17	
Sat Flow, veh/h	1725	1811	1811	1535	1668	1485	
Grp Volume(v), veh/h	199	1102	1019	167	144	57	
Grp Sat Flow(s),veh/h/ln	1725	1811	1811	1535	1668	1485	
Q Serve(g_s), s	3.8	42.0	47.5	2.2	8.6	3.4	
Cycle Q Clear(g_c), s	3.8	42.0	47.5	2.2	8.6	3.4	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	265	1367	1203	1285	288	336	
V/C Ratio(X)	0.75	0.81	0.85	0.13	0.50	0.17	
Avail Cap(c_a), veh/h	313	1367	1203	1285	288	336	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.59	0.59	0.25	0.25	1.00	1.00	
Uniform Delay (d), s/veh	23.1	8.5	14.2	1.6	41.2	34.2	
Incr Delay (d2), s/veh	5.0	3.1	2.0	0.1	6.1	1.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	3.7	11.0	15.2	1.2	3.9	3.2	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	28.1	11.6	16.2	1.7	47.3	35.3	
LnGrp LOS	C	B	B	A	D	D	
Approach Vol, veh/h		1301	1186		201		
Approach Delay, s/veh		14.1	14.1		43.9		
Approach LOS		B	B		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				87.0	23.0	9.9	77.1
Change Period (Y+Rc), s				4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s				83.0	19.0	9.0	70.0
Max Q Clear Time (g_c+I1), s				44.0	10.6	5.8	49.5
Green Ext Time (p_c), s				10.5	0.3	0.2	7.9
Intersection Summary							
HCM 6th Ctrl Delay			16.4				
HCM 6th LOS			B				

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	938	40	31	984	152	5	110	62	189	135	110
Future Volume (veh/h)	110	938	40	31	984	152	5	110	62	189	135	110
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	129	1104	29	36	1158	107	6	129	24	222	159	63
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	160	1241	1052	182	1197	1014	165	160	164	261	410	412
Arrive On Green	0.04	0.66	0.66	0.02	0.64	0.64	0.09	0.09	0.09	0.10	0.22	0.22
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1227	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	129	1104	29	36	1158	107	6	129	24	222	159	63
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1227	1870	1585	1781	1870	1585
Q Serve(g_s), s	2.9	58.2	0.8	0.8	70.3	3.1	0.5	8.1	1.7	12.0	8.7	3.7
Cycle Q Clear(g_c), s	2.9	58.2	0.8	0.8	70.3	3.1	0.5	8.1	1.7	12.0	8.7	3.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	160	1241	1052	182	1197	1014	165	160	164	261	410	412
V/C Ratio(X)	0.81	0.89	0.03	0.20	0.97	0.11	0.04	0.80	0.15	0.85	0.39	0.15
Avail Cap(c_a), veh/h	175	1241	1052	225	1197	1014	193	203	199	261	452	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.53	0.53	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	16.6	6.9	20.9	20.4	8.3	50.4	53.9	49.0	45.2	40.0	34.2
Incr Delay (d2), s/veh	12.8	5.6	0.0	0.5	19.3	0.2	0.1	16.7	0.4	22.6	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	21.3	0.2	0.5	30.8	1.0	0.2	4.5	0.6	7.5	4.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	22.2	6.9	21.4	39.8	8.6	50.5	70.6	49.4	67.8	40.6	34.4
LnGrp LOS	D	C	A	C	D	A	D	E	D	E	D	C
Approach Vol, veh/h	1262			1301			159			444		
Approach Delay, s/veh	24.0			36.7			66.6			53.3		
Approach LOS	C			D			E			D		
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	16.0	14.3	6.1	83.6		30.3	8.9	80.8				
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0		4.0	4.0	4.0				
Max Green Setting (Gmax), s	12.0	13.0	5.0	74.0		29.0	6.0	73.0				
Max Q Clear Time (g_c+I1), s	14.0	10.1	2.8	60.2		10.7	4.9	72.3				
Green Ext Time (p_c), s	0.0	0.2	0.0	6.8		0.9	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay	35.5											
HCM 6th LOS	D											

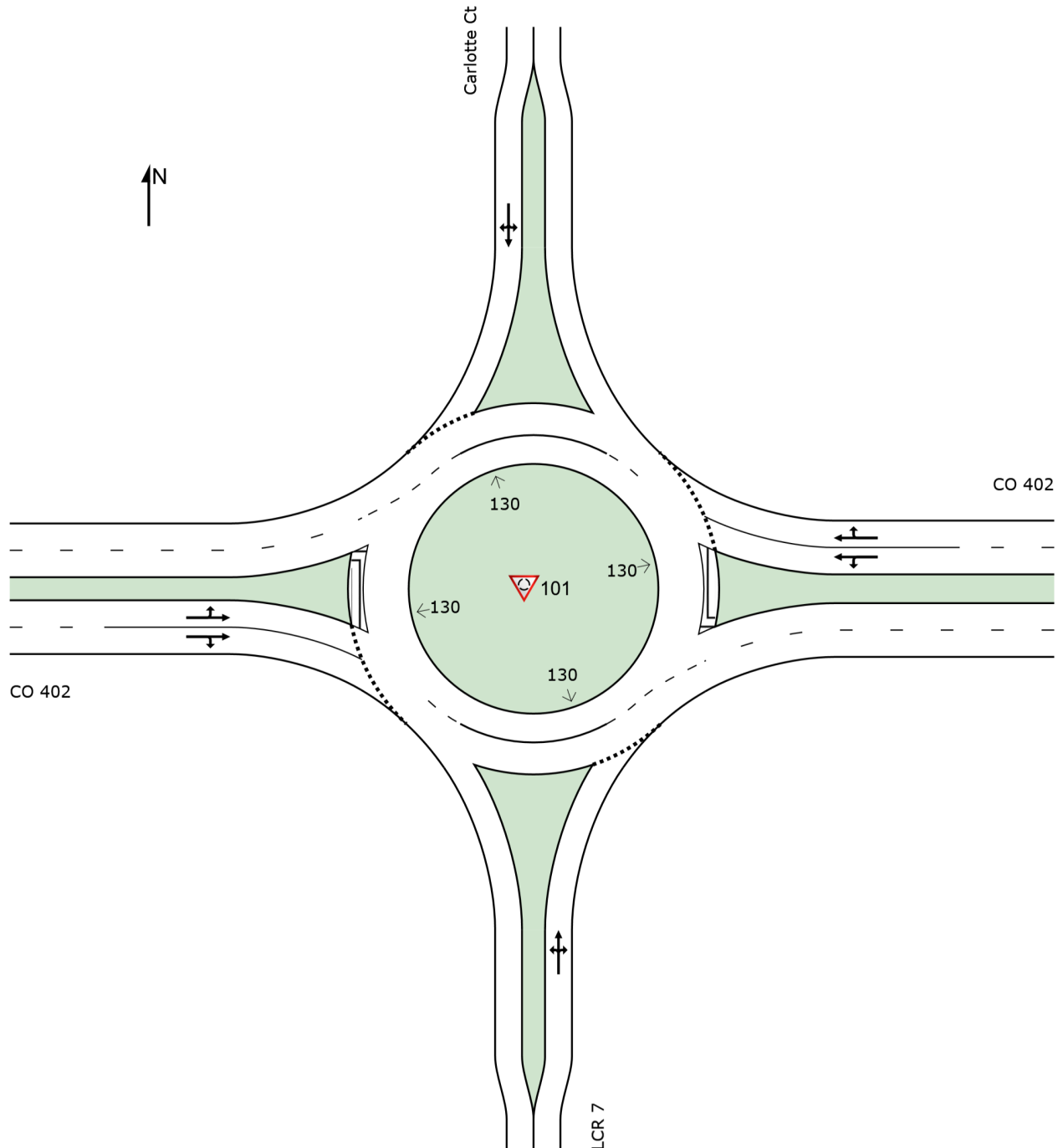
Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	1012	24	0	1319	0	19
Future Vol, veh/h	1012	24	0	1319	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	140	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	3	3	3	3
Mvmt Flow	1112	26	0	1449	0	21
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	556
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.33
Pot Cap-1 Maneuver	-	-	0	-	0	472
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	472
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		13	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1		EBT	EBR	WBT	
Capacity (veh/h)	472		-	-	-	
HCM Lane V/C Ratio	0.044		-	-	-	
HCM Control Delay (s)	13		-	-	-	
HCM Lane LOS	B		-	-	-	
HCM 95th %tile Q(veh)	0.1		-	-	-	

SITE LAYOUT

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

AM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:51:23 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: LCR 7															
3	L2	All MCs	20	3.0	20	3.0	0.259	11.5	LOS B	1.0	25.5	0.70	0.70	0.70	35.2
8	T1	All MCs	31	3.0	31	3.0	0.259	11.5	LOS B	1.0	25.5	0.70	0.70	0.70	23.6
18	R2	All MCs	73	3.0	73	3.0	0.259	11.5	LOS B	1.0	25.5	0.70	0.70	0.70	30.2
Approach			123	3.0	123	3.0	0.259	11.5	LOS B	1.0	25.5	0.70	0.70	0.70	29.4
East: CO 402															
1	L2	All MCs	70	3.0	70	3.0	0.569	10.4	LOS B	4.6	116.9	0.64	0.42	0.65	30.7
6	T1	All MCs	1148	3.0	1148	3.0	0.569	10.1	LOS B	4.6	116.9	0.63	0.41	0.64	38.9
16	R2	All MCs	46	3.0	46	3.0	0.569	9.8	LOS A	4.5	115.1	0.63	0.40	0.63	26.8
Approach			1265	3.0	1265	3.0	0.569	10.1	LOS B	4.6	116.9	0.63	0.41	0.64	38.2
North: Carlotte Ct															
7	L2	All MCs	34	3.0	34	3.0	0.377	14.4	LOS B	1.7	44.1	0.74	0.81	0.90	24.1
4	T1	All MCs	20	3.0	20	3.0	0.377	14.4	LOS B	1.7	44.1	0.74	0.81	0.90	22.8
14	R2	All MCs	119	3.0	119	3.0	0.377	14.4	LOS B	1.7	44.1	0.74	0.81	0.90	30.4
Approach			173	3.0	173	3.0	0.377	14.4	LOS B	1.7	44.1	0.74	0.81	0.90	28.6
West: CO 402															
5	L2	All MCs	208	3.0	208	3.0	0.528	8.6	LOS A	4.2	107.6	0.45	0.23	0.45	32.3
2	T1	All MCs	1066	3.0	1066	3.0	0.528	8.4	LOS A	4.2	108.4	0.45	0.23	0.45	39.9
12	R2	All MCs	44	3.0	44	3.0	0.528	8.3	LOS A	4.2	108.4	0.44	0.23	0.44	38.4
Approach			1318	3.0	1318	3.0	0.528	8.4	LOS A	4.2	108.4	0.45	0.23	0.45	38.5
All Vehicles			2878	3.0	2878	3.0	0.569	9.7	LOS A	4.6	116.9	0.56	0.36	0.57	37.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:42:51 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus

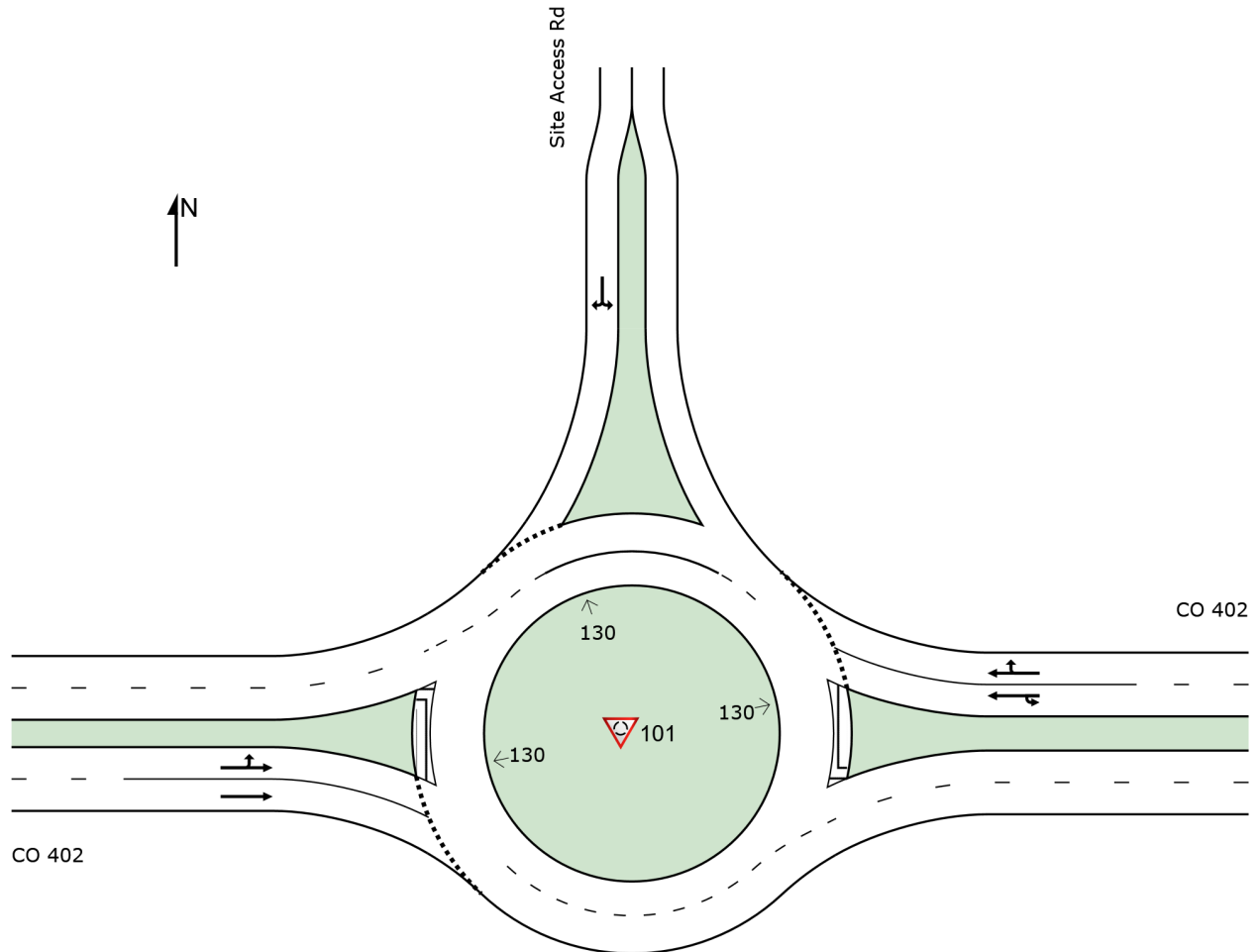
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

AM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | [sidrasolutions.com](https://www.sidrasolutions.com)

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:51:21 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	ft				mph
East: CO 402															
1u	U	All MCs	16	3.0	16	3.0	0.664	12.5	LOS B	8.2	209.4	0.72	0.52	0.86	31.7
6	T1	All MCs	1182	3.0	1182	3.0	0.664	12.1	LOS B	8.2	209.4	0.72	0.50	0.82	33.0
16	R2	All MCs	347	3.0	347	3.0	0.664	11.5	LOS B	7.6	193.8	0.70	0.48	0.77	25.8
Approach			1546	3.0	1546	3.0	0.664	12.0	LOS B	8.2	209.4	0.71	0.50	0.81	31.2
North: Site Access Rd															
7	L2	All MCs	194	3.0	194	3.0	0.745	31.9	LOS C	5.7	146.3	0.88	1.20	1.60	18.8
14	R2	All MCs	131	3.0	131	3.0	0.745	31.9	LOS C	5.7	146.3	0.88	1.20	1.60	19.0
Approach			325	3.0	325	3.0	0.745	31.9	LOS C	5.7	146.3	0.88	1.20	1.60	18.9
West: CO 402															
5	L2	All MCs	234	3.0	234	3.0	0.529	9.3	LOS A	4.4	111.8	0.61	0.37	0.61	26.0
2	T1	All MCs	1008	3.0	1008	3.0	0.529	8.8	LOS A	4.5	114.9	0.60	0.36	0.60	34.7
Approach			1242	3.0	1242	3.0	0.529	8.9	LOS A	4.5	114.9	0.60	0.36	0.60	32.7
All Vehicles			3113	3.0	3113	3.0	0.745	12.8	LOS B	8.2	209.4	0.69	0.52	0.81	29.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:42:44 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus

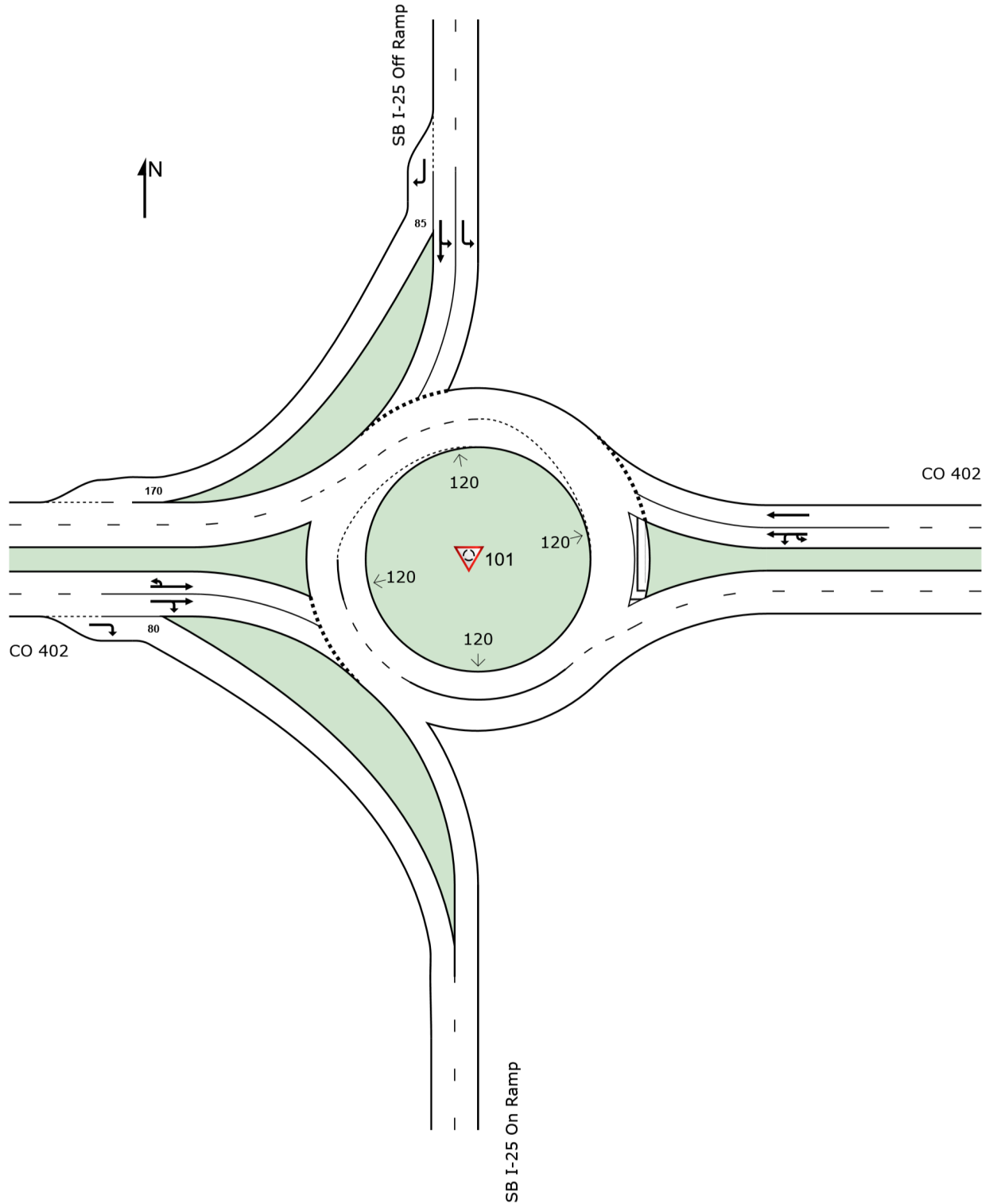
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

AM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
East: CO 402															
1u	U	All MCs	16	9.0	16	9.0	0.486	6.0	LOS A	4.9	131.8	0.12	0.02	0.12	16.9
1	L2	All MCs	284	9.0	284	9.0	0.486	6.0	LOS A	4.9	131.8	0.12	0.02	0.12	32.6
6	T1	All MCs	998	9.0	998	9.0	0.486	5.9	LOS A	4.9	132.0	0.12	0.02	0.12	22.5
Approach			1298	9.0	1298	9.0	0.486	5.9	LOS A	4.9	132.0	0.12	0.02	0.12	25.4
North: SB I-25 Off Ramp															
7	L2	All MCs	95	9.0	95	9.0	0.070	6.0	LOS A	0.3	7.3	0.63	0.58	0.63	29.0
4	T1	All MCs	2	9.0	2	9.0	0.070	5.1	LOS A	0.3	7.3	0.62	0.56	0.62	39.4
14	R2	All MCs	437	9.0	437	9.0	0.284	11.6	LOS B	0.0	0.0	0.00	0.00	0.00	42.2
Approach			534	9.0	534	9.0	0.284	10.6	LOS B	0.3	7.3	0.11	0.11	0.11	38.9
West: CO 402															
5u	U	All MCs	8	8.0	8	8.0	0.336	7.4	LOS A	1.7	44.0	0.54	0.40	0.54	19.1
2	T1	All MCs	666	8.0	666	8.0	0.336	7.0	LOS A	1.7	45.3	0.53	0.38	0.53	23.4
12	R2	All MCs	421	8.0	421	8.0	0.269	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			1095	8.0	1095	8.0	0.336	4.3	LOS A	1.7	45.3	0.33	0.24	0.33	31.0
All Vehicles			2926	8.6	2926	8.6	0.486	6.2	LOS A	4.9	132.0	0.20	0.12	0.20	29.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:38:57 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus

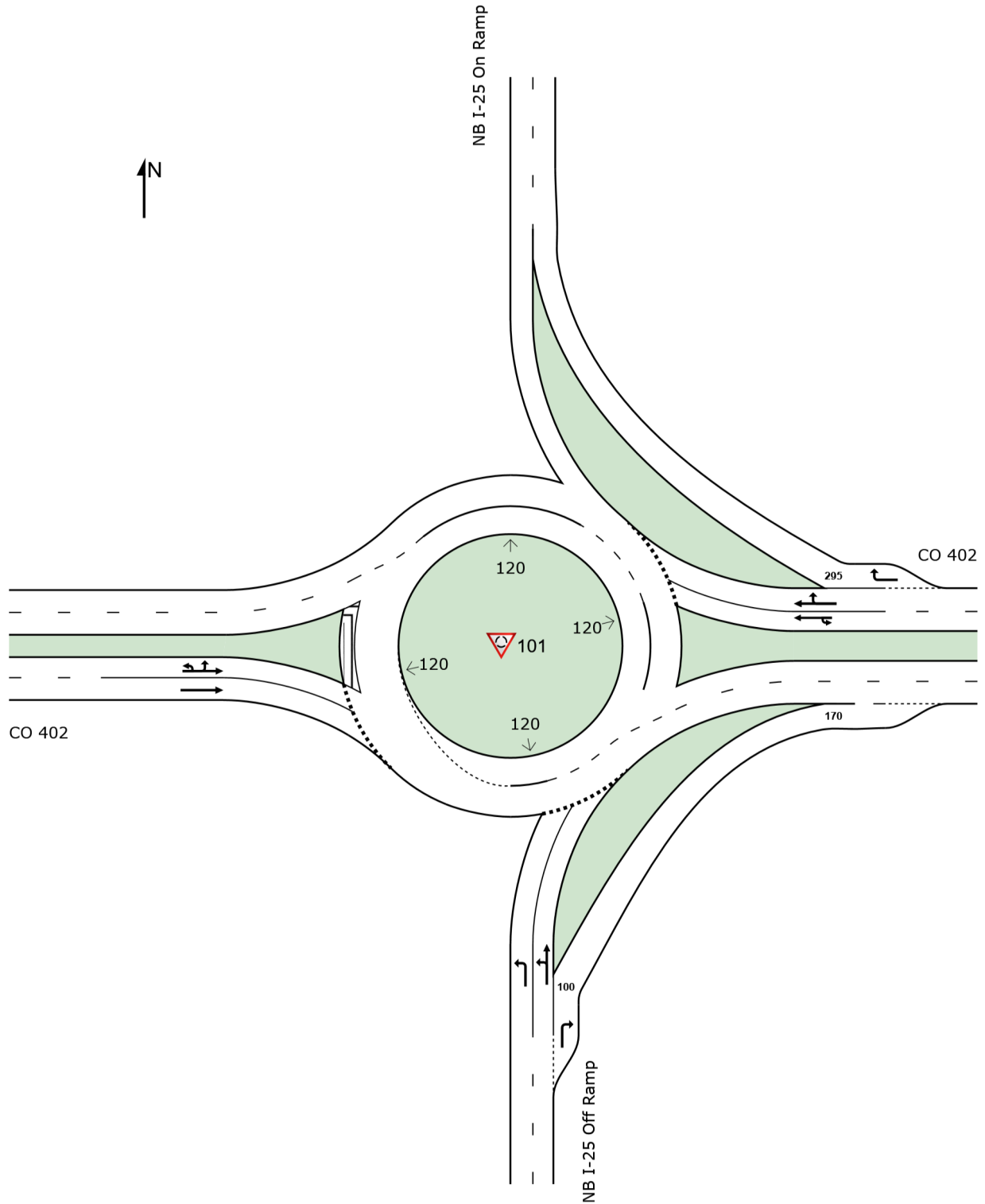
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

AM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & NB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	397	8.0	397	8.0	0.240	6.7	LOS A	1.0	25.9	0.58	0.50	0.58	27.6
8	T1	All MCs	15	8.0	15	8.0	0.240	6.1	LOS A	1.0	25.9	0.57	0.48	0.57	37.2
18	R2	All MCs	150	8.0	150	8.0	0.096	4.2	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			561	8.0	561	8.0	0.240	6.0	LOS A	1.0	25.9	0.42	0.37	0.42	30.6
East: CO 402															
1u	U	All MCs	2	8.0	2	8.0	0.617	16.5	LOS B	5.0	132.3	0.81	0.98	1.29	17.7
6	T1	All MCs	934	8.0	934	8.0	0.617	15.0	LOS B	5.4	144.6	0.81	0.95	1.26	17.7
16	R2	All MCs	255	8.0	255	8.0	0.164	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			1191	8.0	1191	8.0	0.617	11.8	LOS B	5.4	144.6	0.63	0.75	0.99	19.6
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.300	4.3	LOS A	2.5	66.6	0.05	0.01	0.05	17.8
5	L2	All MCs	372	8.0	372	8.0	0.300	4.3	LOS A	2.5	66.6	0.05	0.01	0.05	31.0
2	T1	All MCs	441	8.0	441	8.0	0.300	4.2	LOS A	2.5	67.1	0.05	0.01	0.05	22.3
Approach			815	8.0	815	8.0	0.300	4.3	LOS A	2.5	67.1	0.05	0.01	0.05	27.0
All Vehicles			2567	8.0	2567	8.0	0.617	8.1	LOS A	5.4	144.6	0.40	0.43	0.57	24.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:42:28 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus

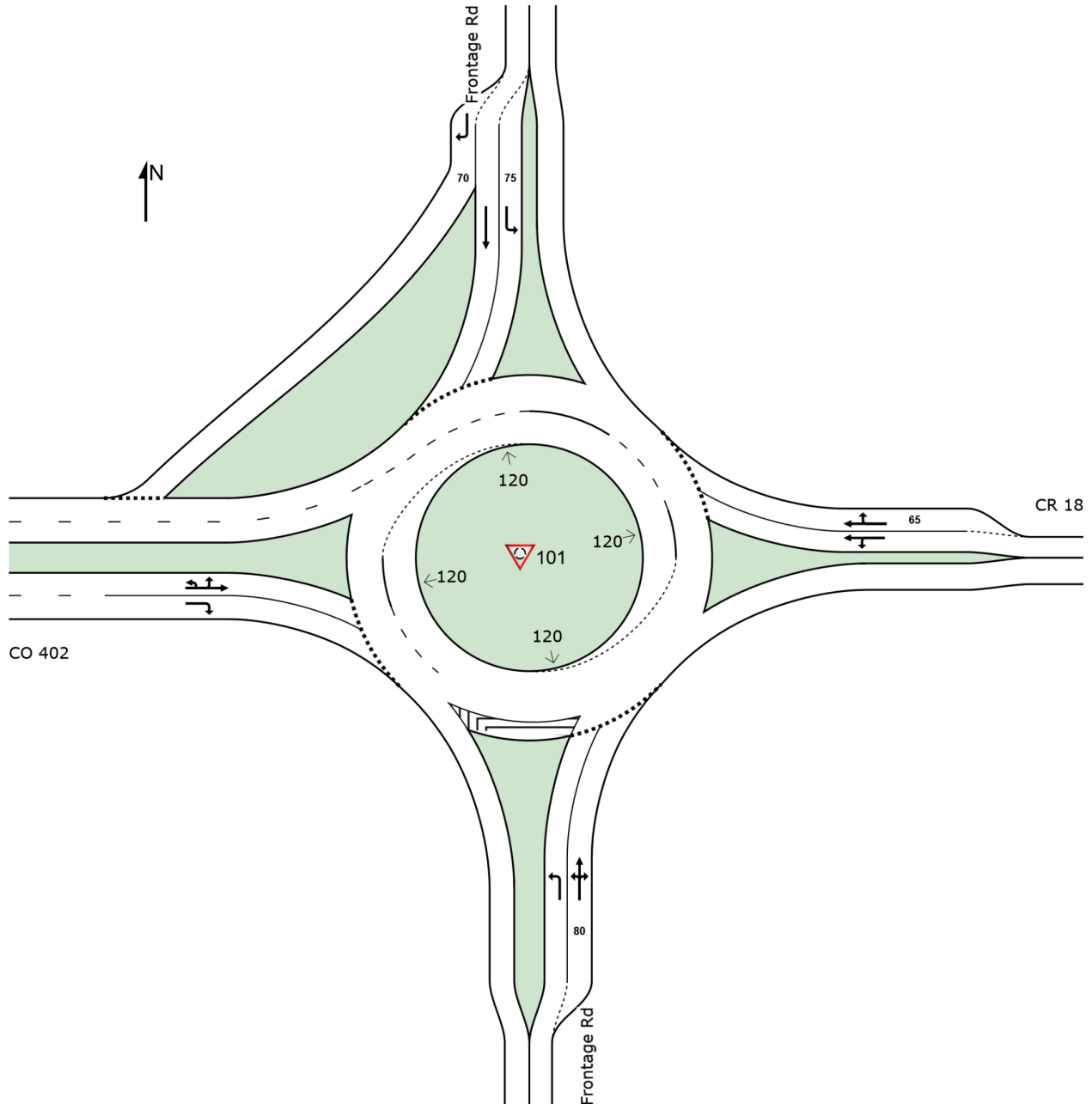
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

AM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:51:18 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	[Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	153	9.0	153	9.0	0.160	6.8	LOS A	1.0	26.2	0.71	0.54	0.71	30.2
8	T1	All MCs	68	9.0	68	9.0	0.160	6.0	LOS A	1.0	26.2	0.70	0.52	0.70	32.9
18	R2	All MCs	18	9.0	18	9.0	0.160	6.0	LOS A	1.0	26.2	0.70	0.52	0.70	37.7
Approach			240	9.0	240	9.0	0.160	6.5	LOS A	1.0	26.2	0.71	0.53	0.71	31.7
East: CR 18															
1	L2	All MCs	20	7.0	20	7.0	0.487	10.4	LOS B	3.4	89.8	0.65	0.53	0.75	37.0
6	T1	All MCs	751	7.0	751	7.0	0.487	10.4	LOS B	3.4	89.8	0.65	0.52	0.75	37.8
16	R2	All MCs	73	7.0	73	7.0	0.487	10.3	LOS B	3.4	89.6	0.65	0.52	0.75	38.0
Approach			844	7.0	844	7.0	0.487	10.4	LOS B	3.4	89.8	0.65	0.52	0.75	37.7
North: Frontage Rd															
7	L2	All MCs	56	4.0	56	4.0	0.061	4.5	LOS A	0.3	7.2	0.62	0.52	0.62	37.7
4	T1	All MCs	53	4.0	53	4.0	0.077	6.0	LOS A	0.3	8.4	0.64	0.56	0.64	33.3
14	R2	All MCs	361	4.0	361	4.0	0.392	8.3	LOS A	2.2	57.3	0.72	0.64	0.79	28.9
Approach			470	4.0	470	4.0	0.392	7.6	LOS A	2.2	57.3	0.70	0.62	0.75	31.1
West: CO 402															
5u	U	All MCs	6	9.0	6	9.0	0.495	8.8	LOS A	3.5	93.4	0.45	0.24	0.45	20.0
5	L2	All MCs	142	9.0	142	9.0	0.495	8.8	LOS A	3.5	93.4	0.45	0.24	0.45	28.4
2	T1	All MCs	385	9.0	385	9.0	0.495	8.8	LOS A	3.5	93.4	0.45	0.24	0.45	38.1
12	R2	All MCs	51	9.0	51	9.0	0.073	5.9	LOS A	0.3	9.0	0.35	0.21	0.35	31.6
Approach			584	9.0	584	9.0	0.495	8.6	LOS A	3.5	93.4	0.44	0.24	0.44	34.6
All Vehicles			2139	7.1	2139	7.1	0.495	8.8	LOS A	3.5	93.4	0.61	0.47	0.66	34.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:51:19 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\AM_2030 Plus

Site_Roundabouts.sip9

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	611	1183	1143	622	237	218
Average Queue (ft)	205	209	650	243	133	104
95th Queue (ft)	430	618	1118	718	207	187
Link Distance (ft)		1168	7285			438
Upstream Blk Time (%)		1				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	390			400	155	
Storage Blk Time (%)	3	3	23		12	0
Queuing Penalty (veh)	32	8	28		21	0

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	306	393	456	75	172	179
Average Queue (ft)	124	144	278	19	91	78
95th Queue (ft)	240	282	462	52	155	143
Link Distance (ft)		7285	3069			697
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	385			420	225	
Storage Blk Time (%)		0	1			
Queuing Penalty (veh)		0	1			

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	WB	WB	WB	B17	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	T	T	R	L	T	R
Maximum Queue (ft)	133	378	56	48	597	61	39	135	90	210	212	146
Average Queue (ft)	66	230	6	20	357	20	1	75	31	116	86	53
95th Queue (ft)	133	348	25	50	565	47	13	128	76	188	164	112
Link Distance (ft)		3069			3014		688	628			772	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400		400	400		400		250	250			250
Storage Blk Time (%)					7							
Queuing Penalty (veh)					13							

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 26: PnR Access & SH 402

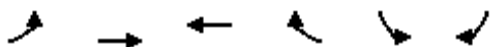
Movement	NB
Directions Served	R
Maximum Queue (ft)	46
Average Queue (ft)	11
95th Queue (ft)	33
Link Distance (ft)	340
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 104

HCM 6th Signalized Intersection Summary 3: SH 402 & S Boise Ave

08/14/2024

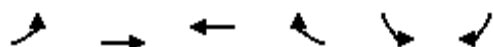


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	243	992	943	167	128	241
Future Volume (veh/h)	243	992	943	167	128	241
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	251	1023	972	145	132	194
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	337	1339	1052	1171	319	479
Arrive On Green	0.12	0.73	0.57	0.57	0.18	0.18
Sat Flow, veh/h	1739	1826	1856	1572	1795	1598
Grp Volume(v), veh/h	251	1023	972	145	132	194
Grp Sat Flow(s),veh/h/ln	1739	1826	1856	1572	1795	1598
Q Serve(g_s), s	5.8	30.6	42.9	2.3	5.9	8.7
Cycle Q Clear(g_c), s	5.8	30.6	42.9	2.3	5.9	8.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	337	1339	1052	1171	319	479
V/C Ratio(X)	0.75	0.76	0.92	0.12	0.41	0.41
Avail Cap(c_a), veh/h	337	1339	1052	1171	319	479
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.45	0.45	1.00	1.00
Uniform Delay (d), s/veh	22.2	7.3	17.7	3.2	32.8	25.1
Incr Delay (d2), s/veh	8.7	4.2	7.6	0.1	0.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	7.8	16.2	1.1	2.6	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	30.9	11.5	25.4	3.3	33.7	25.7
LnGrp LOS	C	B	C	A	C	C
Approach Vol, veh/h		1274	1117		326	
Approach Delay, s/veh		15.3	22.5		28.9	
Approach LOS		B	C		C	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.0	55.0			70.0	20.0
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	11.0	51.0			66.0	16.0
Max Q Clear Time (g_c+I1), s	7.8	44.9			32.6	10.7
Green Ext Time (p_c), s	0.2	3.4			8.6	0.5
Intersection Summary						
HCM 6th Ctrl Delay			19.9			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↰	↑	↰	↰	↰	↰	
Traffic Volume (veh/h)	161	984	885	176	108	133	
Future Volume (veh/h)	161	984	885	176	108	133	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1841	1841	1826	1826	
Adj Flow Rate, veh/h	173	1058	952	152	116	61	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	4	4	5	5	
Cap, veh/h	323	1347	1051	1187	330	463	
Arrive On Green	0.11	0.72	0.57	0.57	0.19	0.19	
Sat Flow, veh/h	1781	1870	1841	1560	1739	1547	
Grp Volume(v), veh/h	173	1058	952	152	116	61	
Grp Sat Flow(s),veh/h/ln	1781	1870	1841	1560	1739	1547	
Q Serve(g_s), s	3.2	36.5	46.0	2.6	5.8	2.9	
Cycle Q Clear(g_c), s	3.2	36.5	46.0	2.6	5.8	2.9	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	323	1347	1051	1187	330	463	
V/C Ratio(X)	0.54	0.79	0.91	0.13	0.35	0.13	
Avail Cap(c_a), veh/h	325	1347	1051	1187	330	463	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	0.61	0.61	0.41	0.41	1.00	1.00	
Uniform Delay (d), s/veh	20.6	9.0	19.1	3.2	35.1	25.6	
Incr Delay (d2), s/veh	1.0	2.9	5.9	0.1	2.9	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	2.2	10.3	17.4	1.4	2.6	3.0	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	21.7	11.9	25.0	3.3	38.1	26.2	
LnGrp LOS	C	B	C	A	D	C	
Approach Vol, veh/h		1231	1104		177		
Approach Delay, s/veh		13.3	22.0		34.0		
Approach LOS		B	C		C		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				77.0	23.0	14.9	62.1
Change Period (Y+Rc), s				5.0	4.0	4.0	5.0
Max Green Setting (Gmax), s				72.0	19.0	11.0	57.0
Max Q Clear Time (g_c+I1), s				38.5	7.8	5.2	48.0
Green Ext Time (p_c), s				9.2	0.3	0.2	4.4
Intersection Summary							
HCM 6th Ctrl Delay			18.6				
HCM 6th LOS			B				
Notes							

HCM 6th Signalized Intersection Summary

22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	904	55	35	937	168	5	110	33	171	140	120
Future Volume (veh/h)	130	904	55	35	937	168	5	110	33	171	140	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	153	1064	11	41	1102	117	6	129	0	201	165	105
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	210	1232	1044	232	1204	1021	201	374	368	243	374	392
Arrive On Green	0.05	0.66	0.66	0.03	0.64	0.64	0.20	0.20	0.00	0.20	0.20	0.20
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1109	1870	1585	1261	1870	1585
Grp Volume(v), veh/h	153	1064	11	41	1102	117	6	129	0	201	165	105
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1109	1870	1585	1261	1870	1585
Q Serve(g_s), s	3.2	49.6	0.3	0.8	56.2	3.1	0.5	6.5	0.0	15.5	8.5	5.9
Cycle Q Clear(g_c), s	3.2	49.6	0.3	0.8	56.2	3.1	9.0	6.5	0.0	22.0	8.5	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	210	1232	1044	232	1204	1021	201	374	368	243	374	392
V/C Ratio(X)	0.73	0.86	0.01	0.18	0.92	0.11	0.03	0.34	0.00	0.83	0.44	0.27
Avail Cap(c_a), veh/h	224	1232	1044	272	1204	1021	201	374	368	243	374	392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.58	0.58	0.58	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	14.9	6.5	17.2	17.0	7.5	42.6	37.8	0.0	48.2	38.6	33.4
Incr Delay (d2), s/veh	6.4	5.0	0.0	0.4	12.2	0.2	0.1	0.5	0.0	20.5	0.8	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	17.6	0.1	0.4	22.5	0.9	0.1	2.9	0.0	6.8	3.9	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.0	19.9	6.5	17.6	29.2	7.8	42.6	38.4	0.0	68.6	39.4	33.8
LnGrp LOS	C	B	A	B	C	A	D	D	A	E	D	C
Approach Vol, veh/h	1228			1260			135			471		
Approach Delay, s/veh	21.3			26.8			38.5			50.6		
Approach LOS	C			C			D			D		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	26.0		7.6	76.4		26.0		9.2	74.8			
Change Period (Y+Rc), s	4.0		4.0	4.0		4.0		4.0	4.0			
Max Green Setting (Gmax), s	22.0		6.0	70.0		22.0		6.0	70.0			
Max Q Clear Time (g_c+I1), s	11.0		2.8	51.6		24.0		5.2	58.2			
Green Ext Time (p_c), s	0.4		0.0	7.4		0.0		0.0	6.3			
Intersection Summary												
HCM 6th Ctrl Delay	28.7											
HCM 6th LOS	C											

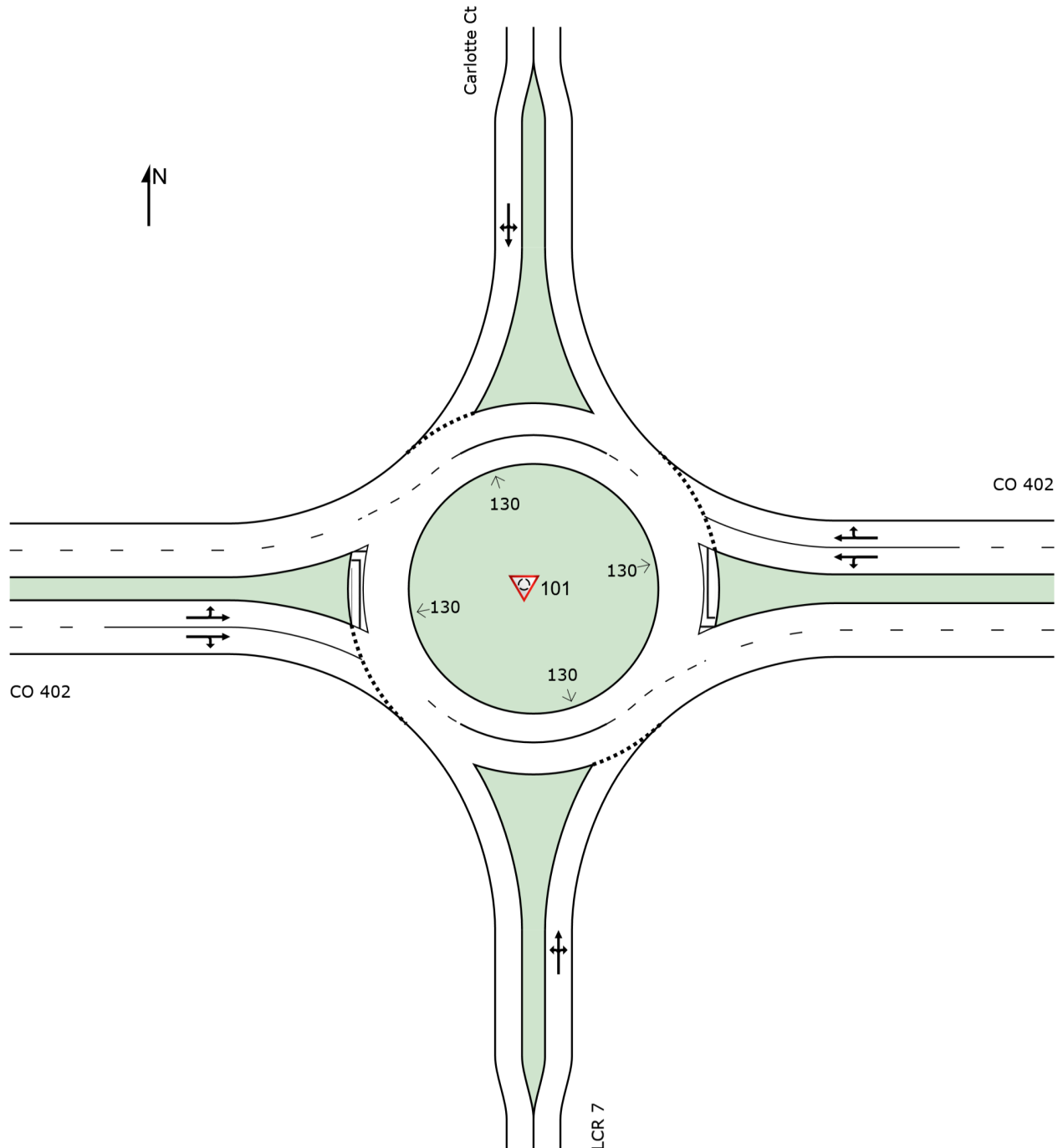
Intersection						
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗		↑↑		↗
Traffic Vol, veh/h	1068	22	0	1130	0	36
Future Vol, veh/h	1068	22	0	1130	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	140	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	1174	24	0	1242	0	40
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	587
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.96
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.33
Pot Cap-1 Maneuver	-	-	0	-	0	450
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	450
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		13.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)	450	-	-	-		
HCM Lane V/C Ratio	0.088	-	-	-		
HCM Control Delay (s)	13.8	-	-	-		
HCM Lane LOS	B	-	-	-		
HCM 95th %tile Q(veh)	0.3	-	-	-		

SITE LAYOUT

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

PM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:49:57 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist] ft				mph
South: LCR 7															
3	L2	All MCs	26	3.0	26	3.0	0.205	9.7	LOS A	0.8	19.4	0.65	0.64	0.65	35.9
8	T1	All MCs	17	3.0	17	3.0	0.205	9.7	LOS A	0.8	19.4	0.65	0.64	0.65	24.2
18	R2	All MCs	63	3.0	63	3.0	0.205	9.7	LOS A	0.8	19.4	0.65	0.64	0.65	31.0
Approach			107	3.0	107	3.0	0.205	9.7	LOS A	0.8	19.4	0.65	0.64	0.65	31.3
East: CO 402															
1	L2	All MCs	54	3.0	54	3.0	0.474	8.0	LOS A	3.4	86.9	0.45	0.25	0.45	32.3
6	T1	All MCs	1080	3.0	1080	3.0	0.474	7.8	LOS A	3.4	87.6	0.45	0.24	0.45	40.3
16	R2	All MCs	25	3.0	25	3.0	0.474	7.6	LOS A	3.4	87.6	0.44	0.24	0.44	27.8
Approach			1160	3.0	1160	3.0	0.474	7.8	LOS A	3.4	87.6	0.45	0.24	0.45	39.8
North: Carlotte Ct															
7	L2	All MCs	32	3.0	32	3.0	0.368	12.8	LOS B	1.6	41.6	0.70	0.76	0.85	24.8
4	T1	All MCs	22	3.0	22	3.0	0.368	12.8	LOS B	1.6	41.6	0.70	0.76	0.85	23.4
14	R2	All MCs	136	3.0	136	3.0	0.368	12.8	LOS B	1.6	41.6	0.70	0.76	0.85	31.0
Approach			189	3.0	189	3.0	0.368	12.8	LOS B	1.6	41.6	0.70	0.76	0.85	29.4
West: CO 402															
5	L2	All MCs	108	3.0	108	3.0	0.471	7.6	LOS A	3.5	89.5	0.39	0.19	0.39	33.1
2	T1	All MCs	1036	3.0	1036	3.0	0.471	7.5	LOS A	3.5	90.0	0.39	0.19	0.39	40.7
12	R2	All MCs	51	3.0	51	3.0	0.471	7.3	LOS A	3.5	90.0	0.38	0.18	0.38	39.0
Approach			1195	3.0	1195	3.0	0.471	7.5	LOS A	3.5	90.0	0.39	0.19	0.39	39.8
All Vehicles			2650	3.0	2650	3.0	0.474	8.1	LOS A	3.5	90.0	0.45	0.27	0.46	38.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:41:26 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus

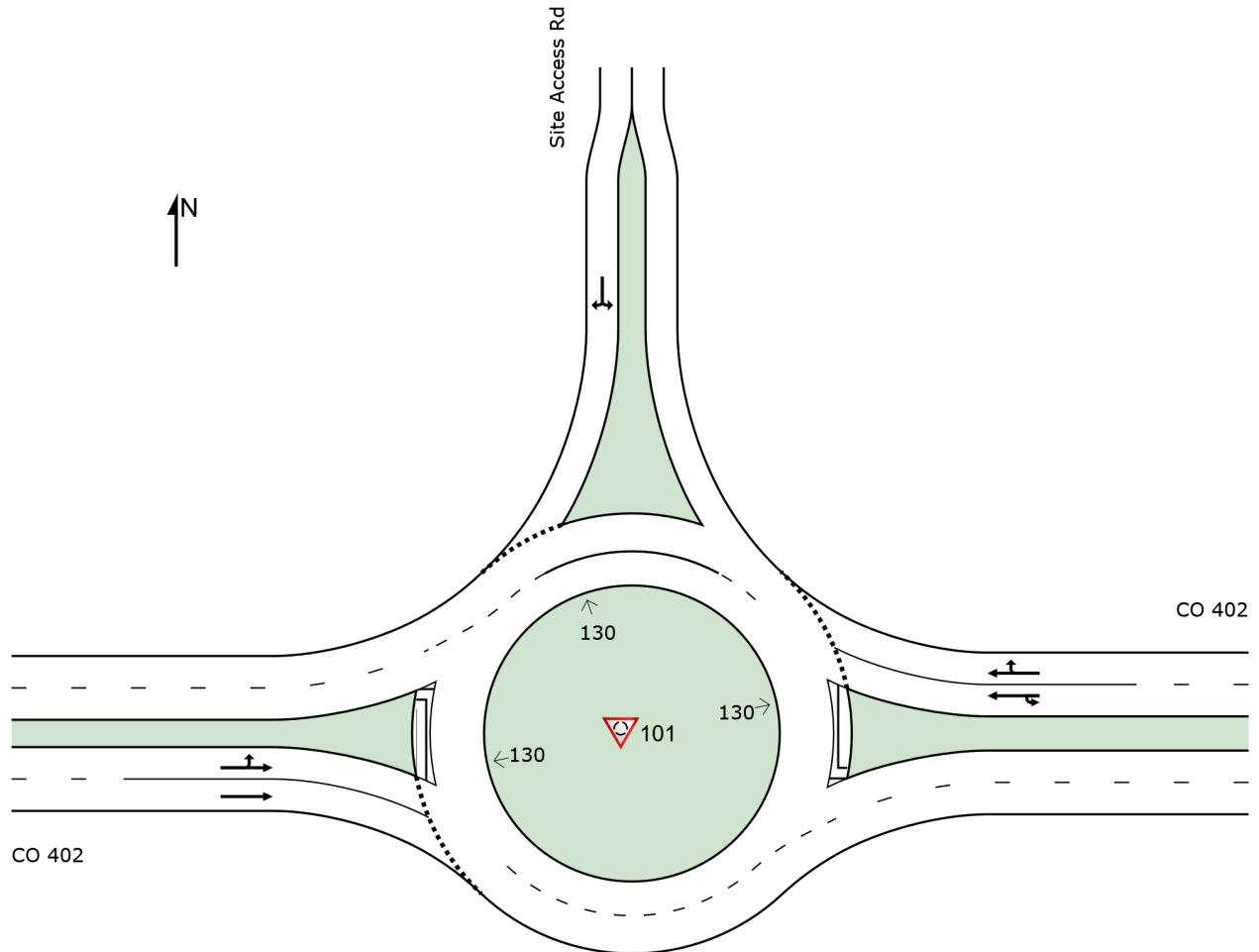
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

PM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | [sidrasolutions.com](https://www.sidrasolutions.com)
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:49:56 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	[Dist] ft				
East: CO 402															
1u	U	All MCs	14	3.0	14	3.0	0.532	8.7	LOS A	4.6	117.2	0.47	0.23	0.47	34.2
6	T1	All MCs	1148	3.0	1148	3.0	0.532	8.5	LOS A	4.6	118.4	0.46	0.23	0.46	35.5
16	R2	All MCs	167	3.0	167	3.0	0.532	8.3	LOS A	4.6	118.4	0.46	0.22	0.46	27.4
Approach			1329	3.0	1329	3.0	0.532	8.5	LOS A	4.6	118.4	0.46	0.23	0.46	34.3
North: Site Access Rd															
7	L2	All MCs	225	3.0	225	3.0	0.747	28.6	LOS C	5.9	151.8	0.85	1.22	1.67	19.5
14	R2	All MCs	152	3.0	152	3.0	0.747	28.6	LOS C	5.9	151.8	0.85	1.22	1.67	19.8
Approach			376	3.0	376	3.0	0.747	28.6	LOS C	5.9	151.8	0.85	1.22	1.67	19.6
West: CO 402															
5	L2	All MCs	113	3.0	113	3.0	0.526	9.6	LOS A	4.2	108.4	0.64	0.40	0.64	26.3
2	T1	All MCs	1044	3.0	1044	3.0	0.526	9.3	LOS A	4.3	110.7	0.63	0.40	0.63	34.9
Approach			1156	3.0	1156	3.0	0.526	9.3	LOS A	4.3	110.7	0.63	0.40	0.63	33.9
All Vehicles			2862	3.0	2862	3.0	0.747	11.5	LOS B	5.9	151.8	0.58	0.43	0.69	31.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:41:21 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus

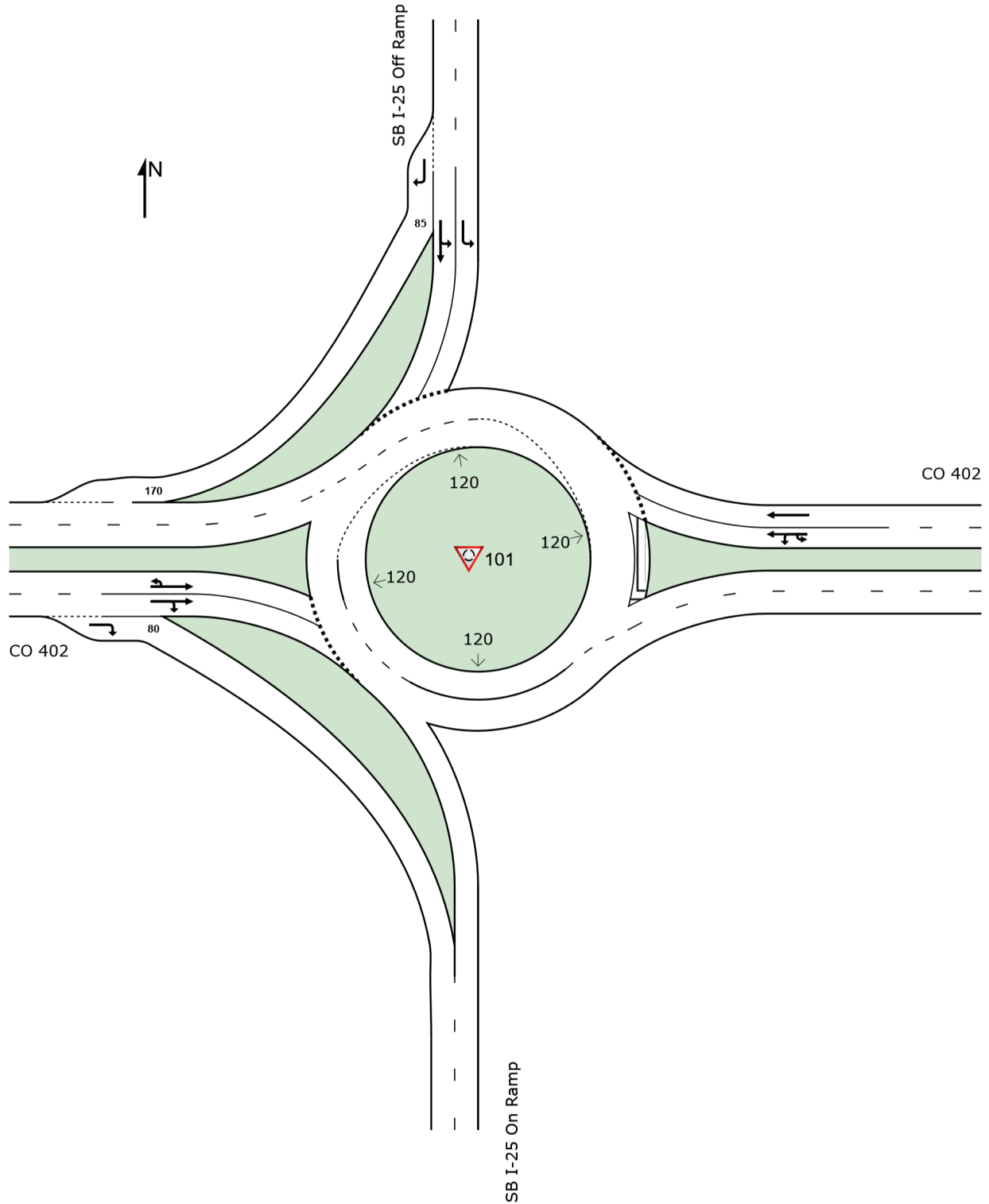
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

PM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	5	5.0	5	5.0	0.398	5.5	LOS A	3.5	92.2	0.15	0.03	0.15	17.2
1	L2	All MCs	197	5.0	197	5.0	0.398	5.5	LOS A	3.5	92.2	0.15	0.03	0.15	33.9
6	T1	All MCs	895	5.0	895	5.0	0.398	5.4	LOS A	3.6	92.6	0.14	0.03	0.14	22.7
Approach			1097	5.0	1097	5.0	0.398	5.4	LOS A	3.6	92.6	0.14	0.03	0.14	25.3
North: SB I-25 Off Ramp															
7	L2	All MCs	205	6.0	205	6.0	0.129	5.8	LOS A	0.5	13.5	0.60	0.54	0.60	29.2
4	T1	All MCs	1	6.0	1	6.0	0.129	5.1	LOS A	0.5	13.5	0.59	0.52	0.59	39.6
14	R2	All MCs	319	6.0	319	6.0	0.202	6.5	LOS A	0.0	0.0	0.00	0.00	0.00	42.3
Approach			526	6.0	526	6.0	0.202	6.2	LOS A	0.5	13.5	0.24	0.21	0.24	35.9
West: CO 402															
5u	U	All MCs	13	7.0	13	7.0	0.438	8.9	LOS A	2.4	64.2	0.59	0.45	0.61	18.5
2	T1	All MCs	871	7.0	871	7.0	0.438	8.4	LOS A	2.4	64.2	0.58	0.43	0.59	22.5
12	R2	All MCs	306	7.0	306	7.0	0.194	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			1191	7.0	1191	7.0	0.438	6.3	LOS A	2.4	64.2	0.43	0.32	0.44	27.9
All Vehicles			2813	6.0	2813	6.0	0.438	5.9	LOS A	3.6	92.6	0.28	0.19	0.29	28.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:40:51 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus

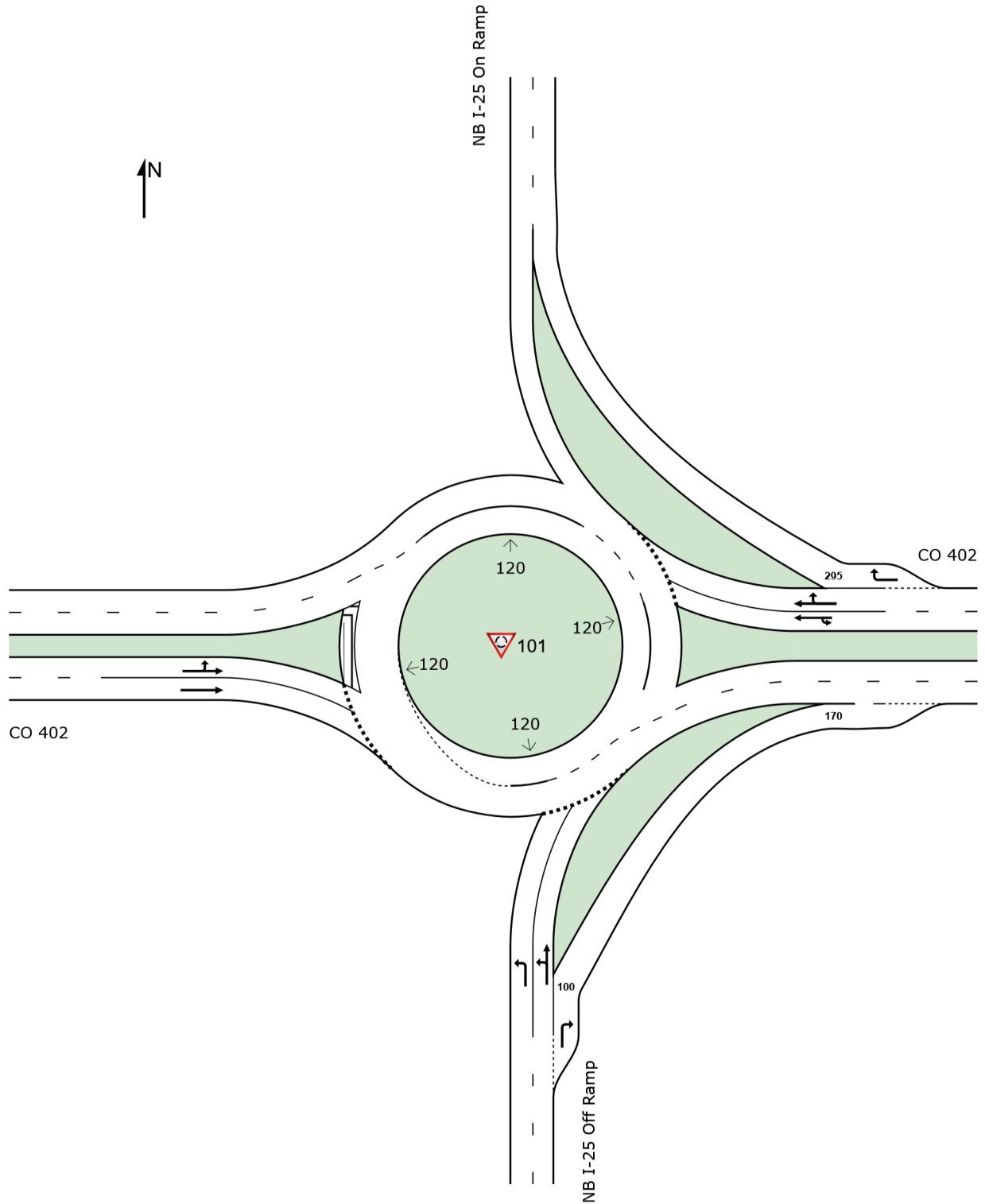
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

PM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Dist	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	ft				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	438	4.0	438	4.0	0.262	7.1	LOS A	1.1	29.1	0.63	0.57	0.63	27.3
8	T1	All MCs	2	4.0	2	4.0	0.262	6.3	LOS A	1.1	29.1	0.62	0.55	0.62	37.2
18	R2	All MCs	197	4.0	197	4.0	0.122	4.9	LOS A	0.0	0.0	0.00	0.00	0.00	41.3
Approach			637	4.0	637	4.0	0.262	6.4	LOS A	1.1	29.1	0.44	0.39	0.44	30.6
East: CO 402															
1u	U	All MCs	4	7.0	4	7.0	0.434	11.1	LOS B	2.5	67.0	0.72	0.72	0.89	19.5
6	T1	All MCs	678	7.0	678	7.0	0.434	10.1	LOS B	2.7	70.1	0.71	0.69	0.86	19.5
16	R2	All MCs	101	7.0	101	7.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.7
Approach			784	7.0	784	7.0	0.434	8.8	LOS A	2.7	70.1	0.62	0.60	0.75	20.5
West: CO 402															
5	L2	All MCs	329	5.0	329	5.0	0.395	5.0	LOS A	3.7	95.0	0.08	0.01	0.08	32.1
2	T1	All MCs	769	5.0	769	5.0	0.395	4.8	LOS A	3.7	95.6	0.08	0.01	0.08	21.6
Approach			1098	5.0	1098	5.0	0.395	4.9	LOS A	3.7	95.6	0.08	0.01	0.08	25.3
All Vehicles			2518	5.4	2518	5.4	0.434	6.5	LOS A	3.7	95.6	0.34	0.29	0.38	25.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:41:07 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus

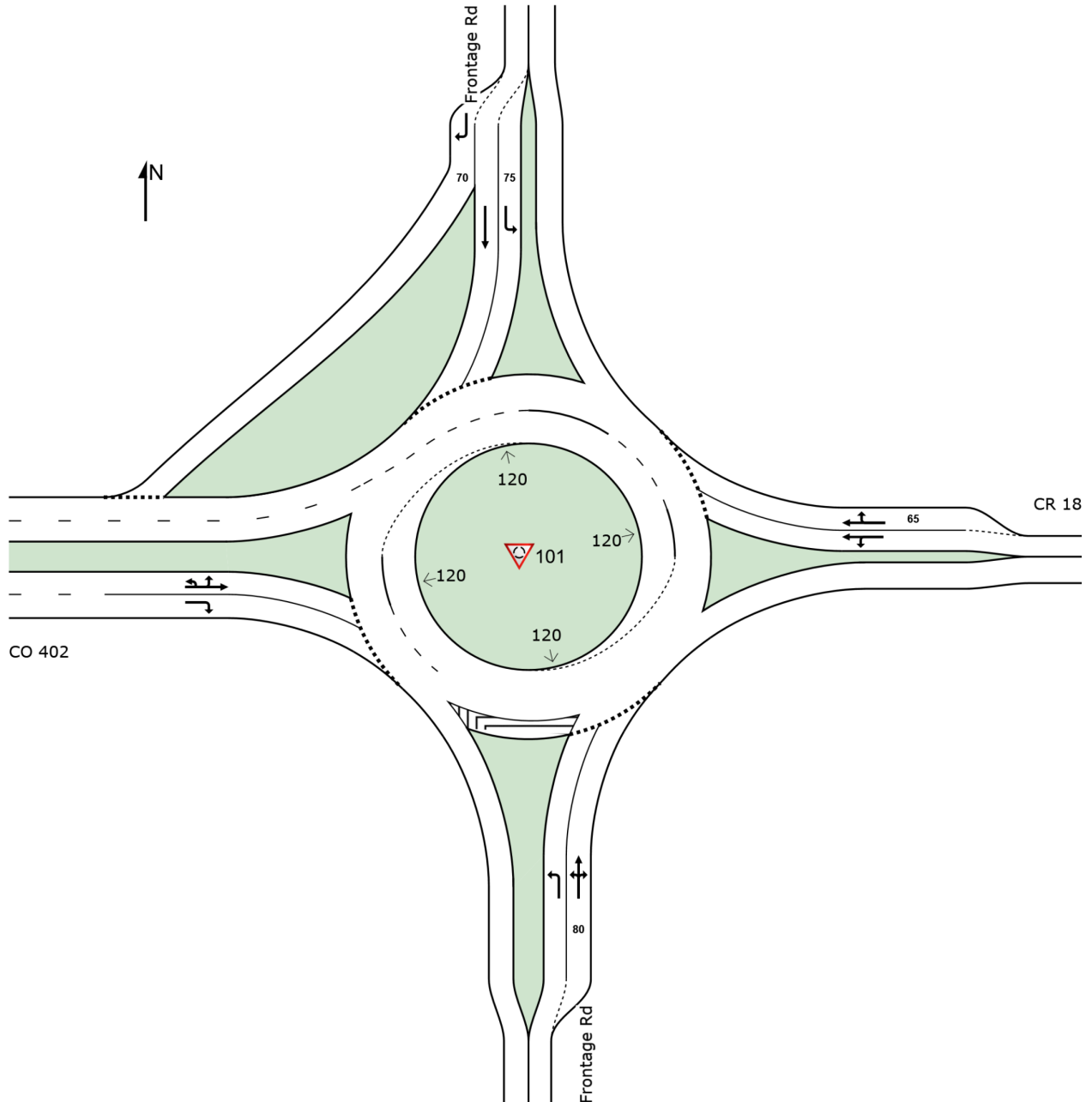
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

PM 2030 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 2:49:54 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2030 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				
South: Frontage Rd															
3	L2	All MCs	127	9.0	127	9.0	0.345	17.4	LOS B	2.7	71.3	0.97	0.83	0.99	28.1
8	T1	All MCs	101	9.0	101	9.0	0.345	13.7	LOS B	2.7	71.3	1.00	0.81	1.00	31.9
18	R2	All MCs	45	9.0	45	9.0	0.345	13.7	LOS B	2.7	71.3	1.00	0.81	1.00	36.4
Approach			273	9.0	273	9.0	0.345	15.4	LOS B	2.7	71.3	0.99	0.82	1.00	31.1
East: CR 18															
1	L2	All MCs	9	4.0	9	4.0	0.308	8.1	LOS A	1.6	41.1	0.63	0.50	0.63	37.5
6	T1	All MCs	387	4.0	387	4.0	0.308	8.0	LOS A	1.6	41.3	0.63	0.50	0.63	38.8
16	R2	All MCs	96	4.0	96	4.0	0.308	7.9	LOS A	1.6	41.3	0.63	0.49	0.63	38.7
Approach			492	4.0	492	4.0	0.308	8.0	LOS A	1.6	41.3	0.63	0.50	0.63	38.7
North: Frontage Rd															
7	L2	All MCs	87	6.0	87	6.0	0.080	4.0	LOS A	0.4	9.2	0.49	0.36	0.49	37.8
4	T1	All MCs	79	6.0	79	6.0	0.089	4.9	LOS A	0.4	9.8	0.51	0.39	0.51	33.5
14	R2	All MCs	201	6.0	201	6.0	0.185	5.0	LOS A	0.9	22.7	0.52	0.38	0.52	30.0
Approach			367	6.0	367	6.0	0.185	4.7	LOS A	0.9	22.7	0.51	0.38	0.51	33.2
West: CO 402															
5u	U	All MCs	8	4.0	8	4.0	0.829	19.9	LOS B	20.6	532.0	0.85	0.95	1.35	16.5
5	L2	All MCs	278	4.0	278	4.0	0.829	19.9	LOS B	20.6	532.0	0.85	0.95	1.35	25.6
2	T1	All MCs	613	4.0	613	4.0	0.829	19.9	LOS B	20.6	532.0	0.85	0.95	1.35	33.9
12	R2	All MCs	40	4.0	40	4.0	0.060	6.0	LOS A	0.3	6.6	0.39	0.26	0.39	31.5
Approach			940	4.0	940	4.0	0.829	19.3	LOS B	20.6	532.0	0.83	0.92	1.31	31.0
All Vehicles			2072	5.0	2072	5.0	0.829	13.5	LOS B	20.6	532.0	0.75	0.71	0.97	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 2:49:55 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2030\PM_2030 Plus

Site_Roundabouts.sip9

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	273	311	434	97	156	172
Average Queue (ft)	104	130	233	30	76	80
95th Queue (ft)	196	263	385	75	142	148
Link Distance (ft)		1168	7285			438
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	390			400	155	
Storage Blk Time (%)			1		0	1
Queuing Penalty (veh)			1		1	1

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	140	219	511	74	135	95
Average Queue (ft)	71	135	219	16	73	49
95th Queue (ft)	116	217	420	53	123	83
Link Distance (ft)		7285	3069			697
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	385			420	225	
Storage Blk Time (%)			1			
Queuing Penalty (veh)			2			

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	R	L	T	R
Maximum Queue (ft)	130	303	39	45	324	41	26	172	69	412	510	110
Average Queue (ft)	59	131	6	17	174	17	5	77	15	189	151	35
95th Queue (ft)	113	239	23	38	281	37	21	146	42	347	355	76
Link Distance (ft)		3069			3014			628			772	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400		400	400		400	250		250	250		250
Storage Blk Time (%)										16	0	
Queuing Penalty (veh)										43	0	

Intersection: 26: PnR Access & SH 402

Movement	EB	NB
Directions Served	T	R
Maximum Queue (ft)	41	43
Average Queue (ft)	1	19
95th Queue (ft)	14	37
Link Distance (ft)	329	340
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

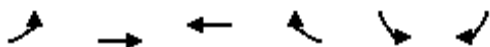
Zone Summary

Zone wide Queuing Penalty: 47

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	331	1264	1320	167	231	213
Future Volume (veh/h)	331	1264	1320	167	231	213
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1841	1796	1796
Adj Flow Rate, veh/h	364	1389	1451	140	254	225
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	4	4	4	4	7	7
Cap, veh/h	512	2576	1539	957	297	639
Arrive On Green	0.25	0.74	0.44	0.44	0.17	0.17
Sat Flow, veh/h	1753	3589	3589	1560	1711	1522
Grp Volume(v), veh/h	364	1389	1451	140	254	225
Grp Sat Flow(s),veh/h/ln	1753	1749	1749	1560	1711	1522
Q Serve(g_s), s	14.0	17.4	39.7	3.8	14.4	0.0
Cycle Q Clear(g_c), s	14.0	17.4	39.7	3.8	14.4	0.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	512	2576	1539	957	297	639
V/C Ratio(X)	0.71	0.54	0.94	0.15	0.86	0.35
Avail Cap(c_a), veh/h	512	2576	1539	957	393	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.63	0.63	1.00	1.00
Uniform Delay (d), s/veh	32.1	5.8	26.8	8.2	40.1	19.7
Incr Delay (d2), s/veh	4.6	0.8	9.0	0.2	13.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	4.1	16.2	1.8	7.0	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	6.6	35.8	8.4	53.4	20.1
LnGrp LOS	D	A	D	A	D	C
Approach Vol, veh/h		1753	1591		479	
Approach Delay, s/veh		12.8	33.4		37.8	
Approach LOS		B	C		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	29.7	49.0			78.7	21.3
Change Period (Y+Rc), s	5.0	* 5			5.0	4.0
Max Green Setting (Gmax), s	20.0	* 44			68.0	23.0
Max Q Clear Time (g_c+I1), s	16.0	41.7			19.4	16.4
Green Ext Time (p_c), s	0.4	1.8			12.4	0.9

Intersection Summary

HCM 6th Ctrl Delay	24.5
HCM 6th LOS	C

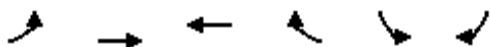
Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	225	1332	1223	232	175	163	
Future Volume (veh/h)	225	1332	1223	232	175	163	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1811	1811	1811	1811	1752	1752	
Adj Flow Rate, veh/h	247	1464	1344	190	192	163	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	
Percent Heavy Veh, %	6	6	6	6	10	10	
Cap, veh/h	396	2409	1964	1183	334	415	
Arrive On Green	0.08	0.70	1.00	1.00	0.20	0.20	
Sat Flow, veh/h	1725	3532	3532	1535	1668	1485	
Grp Volume(v), veh/h	247	1464	1344	190	192	163	
Grp Sat Flow(s),veh/h/ln	1725	1721	1721	1535	1668	1485	
Q Serve(g_s), s	5.5	22.2	0.0	0.0	10.4	8.9	
Cycle Q Clear(g_c), s	5.5	22.2	0.0	0.0	10.4	8.9	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	396	2409	1964	1183	334	415	
V/C Ratio(X)	0.62	0.61	0.68	0.16	0.58	0.39	
Avail Cap(c_a), veh/h	535	2409	1964	1183	334	415	
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.78	0.78	0.54	0.54	1.00	1.00	
Uniform Delay (d), s/veh	6.4	7.8	0.0	0.0	36.2	29.2	
Incr Delay (d2), s/veh	1.3	0.9	1.1	0.2	7.1	2.8	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.6	5.8	0.3	0.1	4.7	8.1	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	7.7	8.7	1.1	0.2	43.2	32.0	
LnGrp LOS	A	A	A	A	D	C	
Approach Vol, veh/h		1711	1534		355		
Approach Delay, s/veh		8.6	1.0		38.0		
Approach LOS		A	A		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				75.0	25.0	12.9	62.1
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				70.0	20.0	16.0	49.0
Max Q Clear Time (g_c+I1), s				24.2	12.4	7.5	2.0
Green Ext Time (p_c), s				13.5	0.7	0.4	12.9
Intersection Summary							
HCM 6th Ctrl Delay			8.2				
HCM 6th LOS			A				

HCM 6th Signalized Intersection Summary

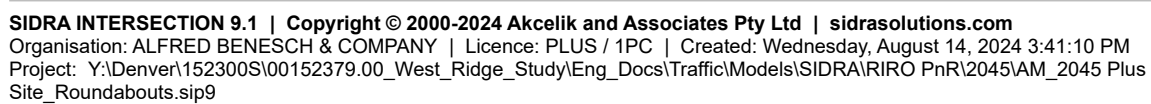
22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	1263	140	45	1301	175	5	160	86	250	250	140
Future Volume (veh/h)	135	1263	140	45	1301	175	5	160	86	250	250	140
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	142	1329	76	47	1369	103	5	168	91	263	263	147
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	2218	989	190	1888	1032	201	217	184	320	516	437
Arrive On Green	0.02	0.21	0.21	0.53	0.53	0.53	0.12	0.12	0.12	0.12	0.28	0.28
Sat Flow, veh/h	1781	3554	1585	412	3554	1585	1116	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	142	1329	76	47	1369	103	5	168	91	263	263	147
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	412	1777	1585	1116	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.4	33.9	3.9	9.2	29.4	2.4	0.4	8.7	5.4	12.0	11.8	7.4
Cycle Q Clear(g_c), s	3.4	33.9	3.9	33.8	29.4	2.4	0.4	8.7	5.4	12.0	11.8	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	2218	989	190	1888	1032	201	217	184	320	516	437
V/C Ratio(X)	0.54	0.60	0.08	0.25	0.73	0.10	0.02	0.78	0.50	0.82	0.51	0.34
Avail Cap(c_a), veh/h	291	2218	989	190	1888	1032	329	430	365	320	729	618
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.76	0.76	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	28.4	16.5	28.8	17.9	6.5	39.3	42.9	41.5	33.9	30.5	28.9
Incr Delay (d2), s/veh	1.3	0.9	0.1	3.1	2.5	0.2	0.0	5.9	2.1	15.5	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	16.0	1.2	1.0	10.7	0.7	0.1	4.2	2.1	6.6	5.2	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.3	29.3	16.6	31.9	20.3	6.7	39.3	48.8	43.5	49.4	31.3	29.4
LnGrp LOS	B	C	B	C	C	A	D	D	D	D	C	C
Approach Vol, veh/h	1547		1519				264		673			
Approach Delay, s/veh	27.7		19.8				46.8		37.9			
Approach LOS	C		B				D		D			
Timer - Assigned Phs	1	2	4		6		7	8				
Phs Duration (G+Y+Rc), s	16.0	16.6	67.4		32.6		9.3	58.1				
Change Period (Y+Rc), s	4.0	5.0	5.0		5.0		4.0	5.0				
Max Green Setting (Gmax), s	12.0	23.0	51.0		39.0		7.0	40.0				
Max Q Clear Time (g_c+I1), s	14.0	10.7	35.9		13.8		5.4	35.8				
Green Ext Time (p_c), s	0.0	0.9	7.7		1.8		0.0	3.1				
Intersection Summary												
HCM 6th Ctrl Delay			27.7									
HCM 6th LOS			C									

 Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: LCR 7															
3	L2	All MCs	163	3.0	163	3.0	0.673	34.0	LOS C	4.1	103.9	0.91	1.03	1.34	25.9
8	T1	All MCs	56	3.0	56	3.0	0.673	34.0	LOS C	4.1	103.9	0.91	1.03	1.34	17.1
18	R2	All MCs	268	3.0	268	3.0	0.673	28.8	LOS C	4.5	114.1	0.91	1.02	1.33	22.8
Approach			487	3.0	487	3.0	0.673	31.1	LOS C	4.5	114.1	0.91	1.02	1.33	23.4
East: CO 402															
1	L2	All MCs	337	3.0	337	3.0	0.921	33.7	LOS C	26.8	685.3	1.00	1.36	2.42	21.0
6	T1	All MCs	1407	3.0	1407	3.0	0.921	32.2	LOS C	28.3	725.3	1.00	1.36	2.39	29.2
16	R2	All MCs	46	3.0	46	3.0	0.028	2.7	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1790	3.0	1790	3.0	0.921	31.7	LOS C	28.3	725.3	0.97	1.32	2.33	27.9
North: Carlotte Ct															
7	L2	All MCs	34	3.0	34	3.0	0.351	23.6	LOS C	1.6	41.4	0.88	0.92	0.98	21.1
4	T1	All MCs	54	3.0	54	3.0	0.351	23.6	LOS C	1.6	41.4	0.88	0.92	0.98	20.0
14	R2	All MCs	119	3.0	119	3.0	0.360	18.7	LOS B	1.9	47.5	0.88	0.91	0.97	29.1
Approach			207	3.0	207	3.0	0.360	20.7	LOS C	1.9	47.5	0.88	0.91	0.98	25.6
West: CO 402															
5	L2	All MCs	208	3.0	208	3.0	0.834	24.4	LOS C	17.6	450.2	1.00	1.09	1.88	26.9
2	T1	All MCs	1314	3.0	1314	3.0	0.834	23.3	LOS C	18.4	472.2	1.00	1.08	1.85	32.7
12	R2	All MCs	246	3.0	246	3.0	0.151	4.3	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1768	3.0	1768	3.0	0.834	20.8	LOS C	18.4	472.2	0.86	0.93	1.60	33.1
All Vehicles			4252	3.0	4252	3.0	0.921	26.6	LOS C	28.3	725.3	0.92	1.10	1.85	29.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:41:11 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

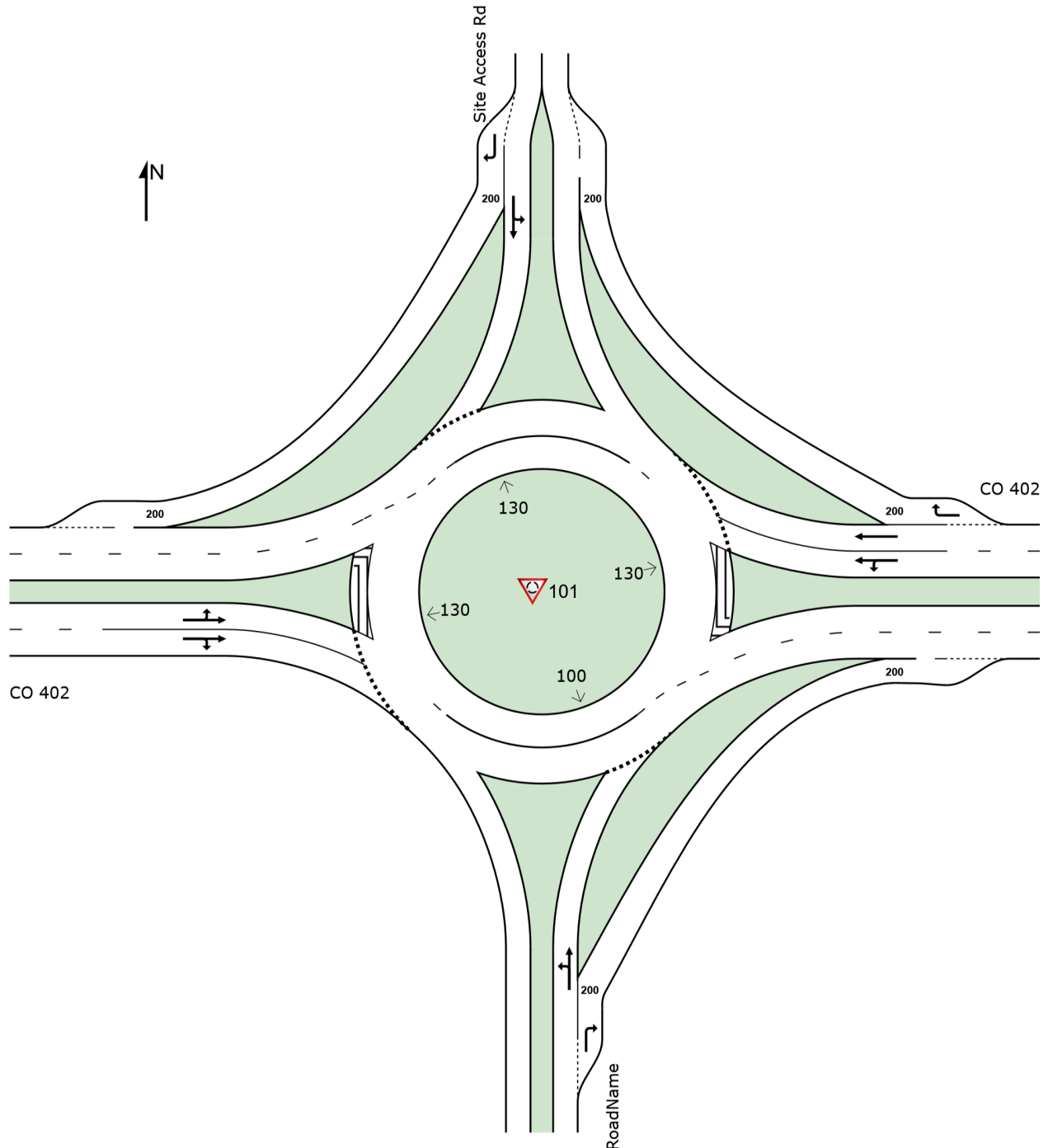
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:39:35 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	[Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: RoadName															
3	L2	All MCs	41	3.0	41	3.0	0.228	17.1	LOS B	1.1	28.1	0.87	0.85	0.87	26.1
8	T1	All MCs	25	3.0	25	3.0	0.228	17.1	LOS B	1.1	28.1	0.87	0.85	0.87	26.0
18	R2	All MCs	116	3.0	116	3.0	0.072	6.1	LOS A	0.0	0.0	0.00	0.00	0.00	36.2
Approach			183	3.0	183	3.0	0.228	10.1	LOS B	1.1	28.1	0.31	0.31	0.31	31.7
East: CO 402															
1	L2	All MCs	152	3.0	152	3.0	0.912	30.1	LOS C	30.1	769.6	1.00	1.28	2.14	24.0
6	T1	All MCs	1738	3.0	1738	3.0	0.912	29.1	LOS C	31.2	797.7	1.00	1.25	2.11	24.8
16	R2	All MCs	347	3.0	347	3.0	0.213	4.4	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			2237	3.0	2237	3.0	0.912	25.3	LOS C	31.2	797.7	0.84	1.06	1.78	26.2
North: Site Access Rd															
7	L2	All MCs	194	3.0	194	3.0	0.714	37.9	LOS D	4.7	119.8	0.94	1.13	1.38	17.7
4	T1	All MCs	34	3.0	34	3.0	0.714	37.9	LOS D	4.7	119.8	0.94	1.13	1.38	18.9
14	R2	All MCs	131	3.0	131	3.0	0.080	8.1	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			358	3.0	358	3.0	0.714	27.0	LOS C	4.7	119.8	0.60	0.72	0.88	19.8
West: CO 402															
5	L2	All MCs	234	3.0	234	3.0	0.876	27.0	LOS C	22.8	582.5	1.00	1.18	2.06	20.3
2	T1	All MCs	1435	3.0	1435	3.0	0.876	26.0	LOS C	23.8	608.4	1.00	1.17	2.04	25.8
12	R2	All MCs	47	3.0	47	3.0	0.876	25.2	LOS C	23.8	608.4	1.00	1.17	2.02	26.0
Approach			1716	3.0	1716	3.0	0.876	26.1	LOS C	23.8	608.4	1.00	1.17	2.04	24.9
All Vehicles			4494	3.0	4494	3.0	0.912	25.1	LOS C	31.2	797.7	0.86	1.05	1.75	25.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:35 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

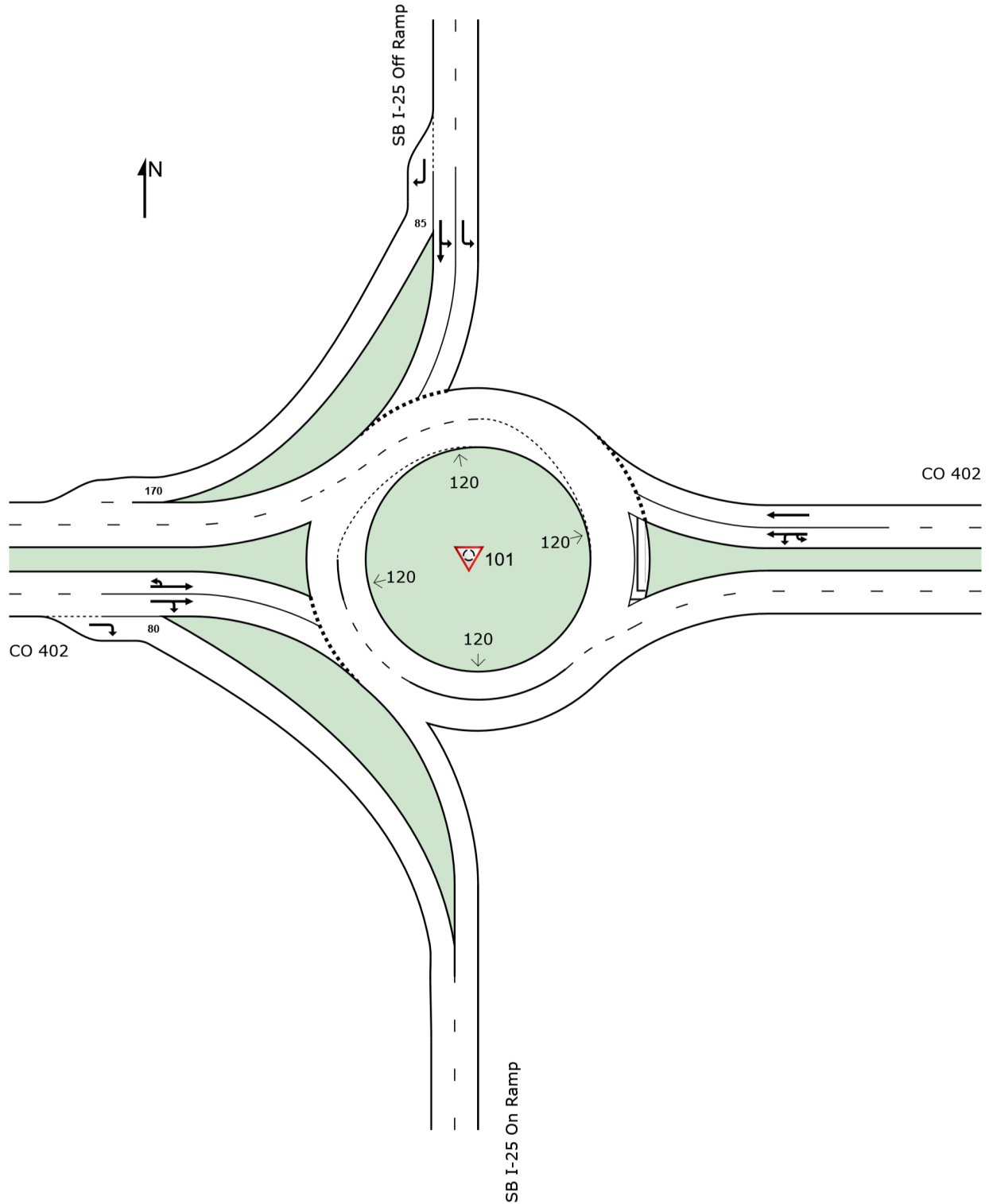
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & SB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %		Arrival Flows [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
East: CO 402															
1u	U	All MCs	21	9.0	21	9.0	0.644	6.3	LOS A	9.5	253.5	0.08	0.01	0.08	16.8
1	L2	All MCs	353	9.0	353	9.0	0.644	6.3	LOS A	9.5	253.5	0.08	0.01	0.08	32.5
6	T1	All MCs	1359	9.0	1359	9.0	0.644	23.5	LOS C	9.5	253.5	0.08	0.01	0.08	22.2
Approach			1733	9.0	1733	9.0	0.644	19.8	LOS B	9.5	253.5	0.08	0.01	0.08	25.0
North: SB I-25 Off Ramp															
7	L2	All MCs	117	9.0	117	9.0	0.100	7.2	LOS A	0.4	11.5	0.71	0.68	0.71	28.3
4	T1	All MCs	2	9.0	2	9.0	0.100	6.0	LOS A	0.4	11.5	0.71	0.66	0.71	38.8
14	R2	All MCs	728	9.0	728	9.0	0.473	30.7	LOS C	0.0	0.0	0.00	0.00	0.00	42.2
Approach			848	9.0	848	9.0	0.473	27.4	LOS C	0.4	11.5	0.10	0.10	0.10	39.4
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.537	11.5	LOS B	4.2	110.9	0.69	0.63	0.94	17.7
2	T1	All MCs	1004	8.0	1004	8.0	0.537	10.8	LOS B	4.3	113.3	0.68	0.61	0.90	21.3
12	R2	All MCs	583	8.0	583	8.0	0.373	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.1
Approach			1589	8.0	1589	8.0	0.537	6.8	LOS A	4.3	113.3	0.43	0.38	0.57	29.0
All Vehicles			4170	8.6	4170	8.6	0.644	16.4	LOS B	9.5	253.5	0.22	0.17	0.27	29.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:10 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

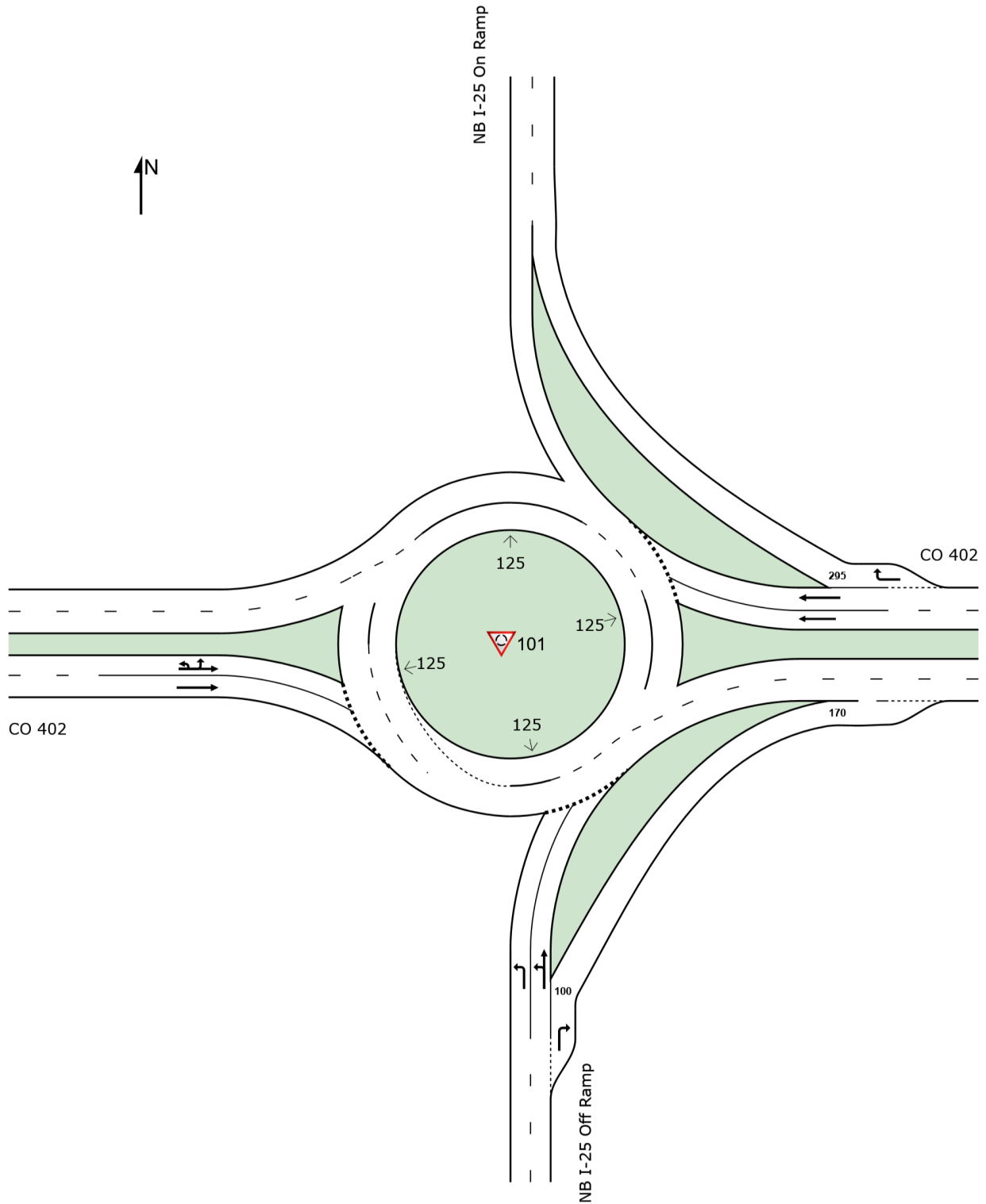
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

AM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: NB I-25 Off Ramp															
3	L2	All MCs	568	8.0	568	8.0	0.389	9.7	LOS A	1.9	51.6	0.69	0.68	0.86	26.1
8	T1	All MCs	17	8.0	17	8.0	0.389	8.5	LOS A	1.9	51.6	0.68	0.66	0.83	35.8
18	R2	All MCs	188	8.0	188	8.0	0.121	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	41.2
Approach			773	8.0	773	8.0	0.389	8.7	LOS A	1.9	51.6	0.52	0.52	0.65	28.9
East: CO 402															
6	T1	All MCs	1211	8.0	1211	8.0	1.011	63.3	LOS F	25.0	665.3	1.00	2.39	3.77	9.1
16	R2	All MCs	317	8.0	317	8.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.8
Approach			1528	8.0	1528	8.0	1.011	50.2	LOS E	25.0	665.3	0.79	1.90	2.98	11.6
West: CO 402															
5u	U	All MCs	2	8.0	2	8.0	0.492	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	19.6
5	L2	All MCs	605	8.0	605	8.0	0.492	5.4	LOS A	0.0	0.0	0.00	0.00	0.00	33.4
2	T1	All MCs	589	8.0	589	8.0	0.471	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	25.0
Approach			1195	8.0	1195	8.0	0.492	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	30.0
All Vehicles			3497	8.0	3497	8.0	1.011	25.7	LOS C	25.0	665.3	0.46	0.94	1.45	18.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

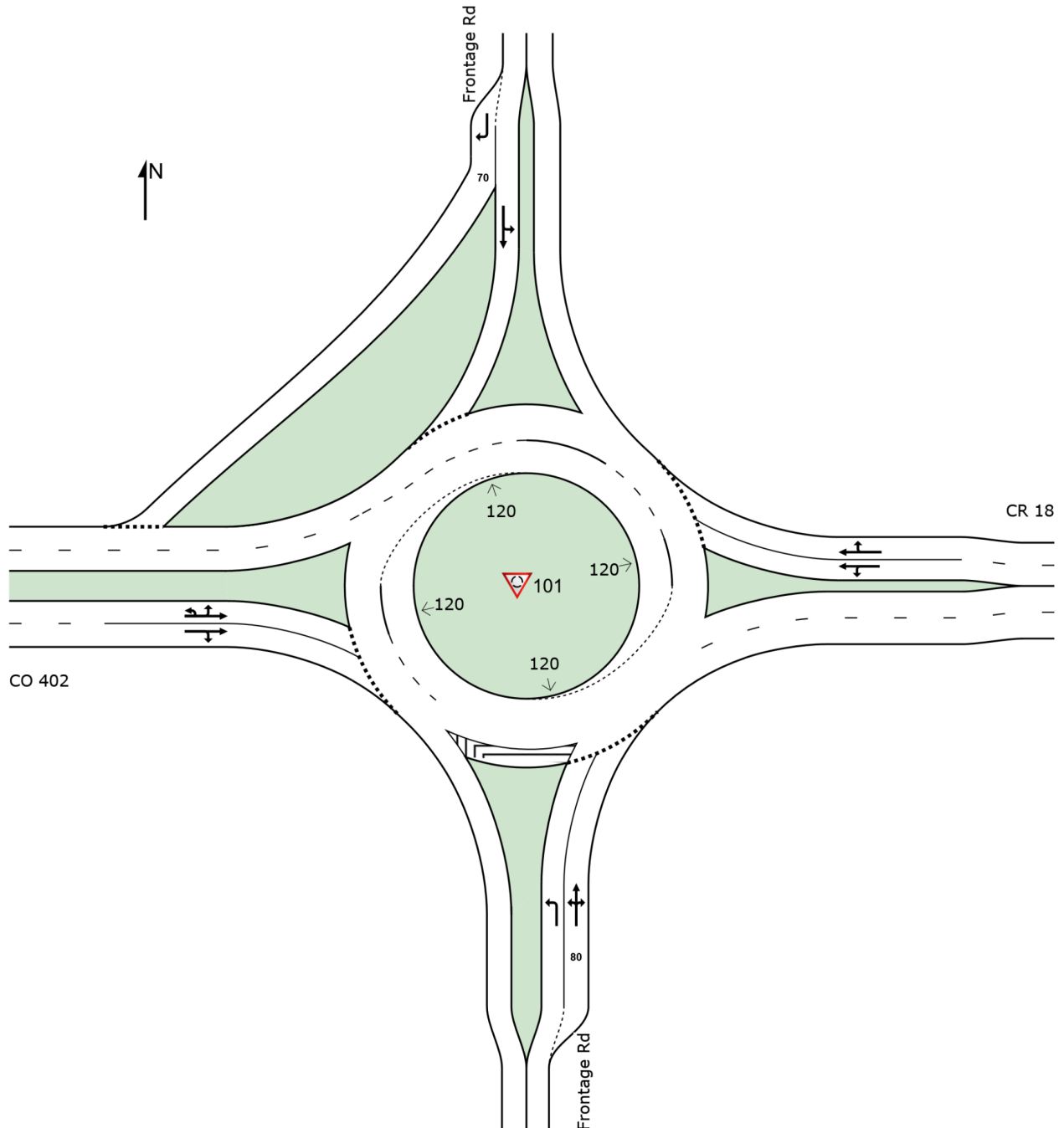
Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:19 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

Site_Roundabouts.sip9

 Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Page 471 of 518

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

AM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	195	9.0	195	9.0	0.241	9.2	LOS A	1.6	41.9	0.81	0.65	0.81	29.8
8	T1	All MCs	84	9.0	84	9.0	0.241	7.9	LOS A	1.6	41.9	0.81	0.63	0.81	32.6
18	R2	All MCs	23	9.0	23	9.0	0.241	7.9	LOS A	1.6	41.9	0.81	0.63	0.81	37.2
Approach			302	9.0	302	9.0	0.241	8.7	LOS A	1.6	41.9	0.81	0.64	0.81	31.3
East: CR 18															
1	L2	All MCs	25	7.0	25	7.0	0.690	17.6	LOS B	7.9	208.0	0.83	0.86	1.39	35.6
6	T1	All MCs	953	7.0	953	7.0	0.690	17.4	LOS B	7.9	209.6	0.83	0.86	1.38	34.9
16	R2	All MCs	91	7.0	91	7.0	0.690	17.2	LOS B	7.9	209.6	0.83	0.85	1.38	36.1
Approach			1069	7.0	1069	7.0	0.690	17.4	LOS B	7.9	209.6	0.83	0.86	1.38	35.1
North: Frontage Rd															
7	L2	All MCs	68	4.0	68	4.0	0.245	9.9	LOS A	1.1	29.5	0.76	0.70	0.76	37.1
4	T1	All MCs	66	4.0	66	4.0	0.245	9.9	LOS A	1.1	29.5	0.76	0.70	0.76	32.1
14	R2	All MCs	476	4.0	476	4.0	0.851	36.2	LOS D	9.4	242.3	0.95	1.33	2.07	22.4
Approach			610	4.0	610	4.0	0.851	30.4	LOS C	9.4	242.3	0.91	1.19	1.79	25.7
West: CO 402															
5u	U	All MCs	6	9.0	6	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	20.2
5	L2	All MCs	199	9.0	199	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	28.4
2	T1	All MCs	495	9.0	495	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	39.0
12	R2	All MCs	68	9.0	68	9.0	0.369	7.2	LOS A	2.3	62.9	0.44	0.25	0.44	31.3
Approach			768	9.0	768	9.0	0.369	7.2	LOS A	2.4	63.1	0.44	0.25	0.44	35.0
All Vehicles			2750	7.1	2750	7.1	0.851	16.5	LOS B	9.4	242.3	0.74	0.74	1.15	32.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:39:26 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\AM_2045 Plus

Site_Roundabouts.sip9

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	410	226	205	416	430	97	309	247
Average Queue (ft)	191	93	79	290	282	28	138	94
95th Queue (ft)	340	163	169	386	380	63	228	185
Link Distance (ft)		1168	1168	7114	7114			722
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					400	155	
Storage Blk Time (%)	0				1		9	0
Queuing Penalty (veh)	2				1		20	1

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	179	192	170	378	347	114	207	151
Average Queue (ft)	88	116	114	226	230	50	119	65
95th Queue (ft)	146	172	165	335	331	93	185	118
Link Distance (ft)		7114	7114	3063	3063			685
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					420	225	
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Queuing and Blocking Report

Baseline

08/14/2024

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	157	370	320	163	69	249	293	82	27	197	65	296
Average Queue (ft)	62	182	189	34	27	167	193	18	3	97	30	155
95th Queue (ft)	111	286	274	90	68	241	271	53	17	167	59	261
Link Distance (ft)		3063	3063			3735	3735			615		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400			400	250		250	250
Storage Blk Time (%)												1
Queuing Penalty (veh)												2

Intersection: 22: Boyd Lake & SH 402

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	243	110
Average Queue (ft)	113	47
95th Queue (ft)	205	91
Link Distance (ft)	760	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

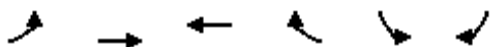
Zone Summary

Zone wide Queuing Penalty: 26

HCM 6th Signalized Intersection Summary

3: SH 402 & S Boise Ave

08/14/2024

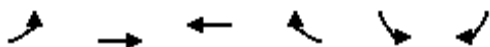


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	304	1299	1236	231	181	301
Future Volume (veh/h)	304	1299	1236	231	181	301
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1826	1826	1856	1856	1885	1885
Adj Flow Rate, veh/h	313	1339	1274	167	187	294
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	5	5	3	3	1	1
Cap, veh/h	357	2484	2010	1186	330	447
Arrive On Green	0.10	0.72	0.57	0.57	0.18	0.18
Sat Flow, veh/h	1739	3561	3618	1572	1795	1598
Grp Volume(v), veh/h	313	1339	1274	167	187	294
Grp Sat Flow(s),veh/h/ln	1739	1735	1763	1572	1795	1598
Q Serve(g_s), s	6.9	17.8	24.3	2.9	9.5	16.2
Cycle Q Clear(g_c), s	6.9	17.8	24.3	2.9	9.5	16.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	357	2484	2010	1186	330	447
V/C Ratio(X)	0.88	0.54	0.63	0.14	0.57	0.66
Avail Cap(c_a), veh/h	555	2484	2010	1186	341	457
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.75	0.75	1.00	1.00
Uniform Delay (d), s/veh	17.3	6.6	14.5	3.4	37.2	31.8
Incr Delay (d2), s/veh	9.7	0.8	1.2	0.2	2.1	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.5	8.2	1.5	4.3	6.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.9	7.4	15.6	3.6	39.2	35.1
LnGrp LOS	C	A	B	A	D	D
Approach Vol, veh/h		1652	1441		481	
Approach Delay, s/veh		11.1	14.2		36.7	
Approach LOS		B	B		D	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.6	62.0			76.6	23.4
Change Period (Y+Rc), s	5.0	5.0			5.0	5.0
Max Green Setting (Gmax), s	21.0	45.0			71.0	19.0
Max Q Clear Time (g_c+I1), s	8.9	26.3			19.8	18.2
Green Ext Time (p_c), s	0.7	8.6			11.8	0.2
Intersection Summary						
HCM 6th Ctrl Delay			15.8			
HCM 6th LOS			B			

HCM 6th Signalized Intersection Summary

5: SH 402 & LCR 9E

08/14/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations							
Traffic Volume (veh/h)	200	1310	1184	235	151	163	
Future Volume (veh/h)	200	1310	1184	235	151	163	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approach		No	No		No		
Adj Sat Flow, veh/h/ln	1870	1870	1841	1841	1826	1826	
Adj Flow Rate, veh/h	215	1409	1273	192	162	66	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	4	4	5	5	
Cap, veh/h	408	2559	2114	1224	313	279	
Arrive On Green	0.07	0.72	1.00	1.00	0.18	0.18	
Sat Flow, veh/h	1781	3647	3589	1560	1739	1547	
Grp Volume(v), veh/h	215	1409	1273	192	162	66	
Grp Sat Flow(s),veh/h/ln	1781	1777	1749	1560	1739	1547	
Q Serve(g_s), s	4.3	18.4	0.0	0.0	8.4	3.7	
Cycle Q Clear(g_c), s	4.3	18.4	0.0	0.0	8.4	3.7	
Prop In Lane	1.00			1.00	1.00	1.00	
Lane Grp Cap(c), veh/h	408	2559	2114	1224	313	279	
V/C Ratio(X)	0.53	0.55	0.60	0.16	0.52	0.24	
Avail Cap(c_a), veh/h	540	2559	2114	1224	313	279	
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00	
Upstream Filter(I)	0.82	0.82	0.67	0.67	1.00	1.00	
Uniform Delay (d), s/veh	5.5	6.5	0.0	0.0	37.1	35.1	
Incr Delay (d2), s/veh	0.9	0.7	0.3	0.0	6.0	2.0	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.2	4.6	0.1	0.0	4.0	3.5	
Unsig. Movement Delay, s/veh							
LnGrp Delay(d),s/veh	6.4	7.2	0.3	0.0	43.1	37.1	
LnGrp LOS	A	A	A	A	D	D	
Approach Vol, veh/h		1624	1465		228		
Approach Delay, s/veh		7.1	0.3		41.4		
Approach LOS		A	A		D		
Timer - Assigned Phs				4	6	7	8
Phs Duration (G+Y+Rc), s				77.0	23.0	11.6	65.4
Change Period (Y+Rc), s				5.0	5.0	5.0	5.0
Max Green Setting (Gmax), s				72.0	18.0	14.0	53.0
Max Q Clear Time (g_c+I1), s				20.4	10.4	6.3	2.0
Green Ext Time (p_c), s				12.8	0.4	0.3	12.0
Intersection Summary							
HCM 6th Ctrl Delay			6.4				
HCM 6th LOS			A				

HCM 6th Signalized Intersection Summary

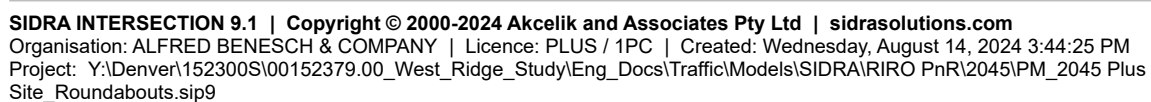
22: Boyd Lake & SH 402

08/14/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	1212	80	56	1298	226	5	180	54	217	200	160
Future Volume (veh/h)	160	1212	80	56	1298	226	5	180	54	217	200	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	168	1276	45	59	1366	129	5	189	1	228	211	157
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	256	1889	843	225	1807	806	272	539	457	320	539	557
Arrive On Green	0.02	0.18	0.18	0.04	0.51	0.51	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1781	3554	1585	1781	3554	1585	1014	1870	1585	1193	1870	1585
Grp Volume(v), veh/h	168	1276	45	59	1366	129	5	189	1	228	211	157
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1585	1014	1870	1585	1193	1870	1585
Q Serve(g_s), s	4.3	33.6	2.4	1.5	30.7	4.4	0.4	8.0	0.0	18.7	9.1	7.1
Cycle Q Clear(g_c), s	4.3	33.6	2.4	1.5	30.7	4.4	9.5	8.0	0.0	26.7	9.1	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	1889	843	225	1807	806	272	539	457	320	539	557
V/C Ratio(X)	0.66	0.68	0.05	0.26	0.76	0.16	0.02	0.35	0.00	0.71	0.39	0.28
Avail Cap(c_a), veh/h	303	1889	843	257	1807	806	274	542	460	323	542	561
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.82	0.82	0.82	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	33.2	20.3	16.2	19.6	13.2	32.4	28.2	25.4	38.8	28.6	23.3
Incr Delay (d2), s/veh	3.2	1.6	0.1	0.6	3.0	0.4	0.0	0.4	0.0	7.1	0.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	16.1	0.8	0.6	11.5	1.4	0.1	3.5	0.0	5.8	3.9	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	34.8	20.4	16.8	22.6	13.6	32.4	28.6	25.4	45.9	29.0	23.6
LnGrp LOS	C	C	C	B	C	B	C	C	C	D	C	C
Approach Vol, veh/h	1489				1554				195			
Approach Delay, s/veh	33.0				21.7				28.7			
Approach LOS	C				C				C			
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	33.8		8.0	58.2		33.8		10.4	55.8			
Change Period (Y+Rc), s	5.0		4.0	5.0		5.0		4.0	5.0			
Max Green Setting (Gmax), s	29.0		5.8	51.2		29.0		9.0	48.0			
Max Q Clear Time (g_c+I1), s	11.5		3.5	35.6		28.7		6.3	32.7			
Green Ext Time (p_c), s	0.8		0.0	7.4		0.1		0.1	8.1			
Intersection Summary												
HCM 6th Ctrl Delay	28.4											
HCM 6th LOS	C											

 Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & Charlotte/LCR7 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]	ft			mph
South: LCR 7															
3	L2	All MCs	198	3.0	198	3.0	0.621	25.7	LOS C	3.7	94.8	0.87	0.98	1.27	28.2
8	T1	All MCs	48	3.0	48	3.0	0.621	25.7	LOS C	3.7	94.8	0.87	0.98	1.27	18.8
18	R2	All MCs	295	3.0	295	3.0	0.621	22.1	LOS C	4.0	102.5	0.87	0.97	1.26	25.3
Approach			540	3.0	540	3.0	0.621	23.7	LOS C	4.0	102.5	0.87	0.97	1.27	26.0
East: CO 402															
1	L2	All MCs	271	3.0	271	3.0	0.793	19.8	LOS B	15.9	406.5	0.94	0.93	1.61	25.6
6	T1	All MCs	1316	3.0	1316	3.0	0.793	18.9	LOS B	16.3	418.3	0.93	0.92	1.57	34.2
16	R2	All MCs	25	3.0	25	3.0	0.015	2.4	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1612	3.0	1612	3.0	0.793	18.8	LOS B	16.3	418.3	0.92	0.91	1.55	33.0
North: Carlotte Ct															
7	L2	All MCs	34	3.0	34	3.0	0.306	19.7	LOS B	1.4	35.1	0.85	0.88	0.92	22.2
4	T1	All MCs	53	3.0	53	3.0	0.306	19.7	LOS B	1.4	35.1	0.85	0.88	0.92	21.0
14	R2	All MCs	136	3.0	136	3.0	0.361	16.6	LOS B	1.9	47.6	0.86	0.89	0.96	29.8
Approach			223	3.0	223	3.0	0.361	17.8	LOS B	1.9	47.6	0.86	0.88	0.94	26.8
West: CO 402															
5	L2	All MCs	108	3.0	108	3.0	0.713	15.9	LOS B	11.0	281.1	0.87	0.79	1.30	29.9
2	T1	All MCs	1299	3.0	1299	3.0	0.713	15.3	LOS B	11.2	286.8	0.86	0.77	1.28	36.4
12	R2	All MCs	217	3.0	217	3.0	0.134	3.8	LOS A	0.0	0.0	0.00	0.00	0.00	45.7
Approach			1624	3.0	1624	3.0	0.713	13.8	LOS B	11.2	286.8	0.75	0.67	1.11	36.8
All Vehicles			3999	3.0	3999	3.0	0.793	17.4	LOS B	16.3	418.3	0.84	0.82	1.30	33.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stoeline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:44:26 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

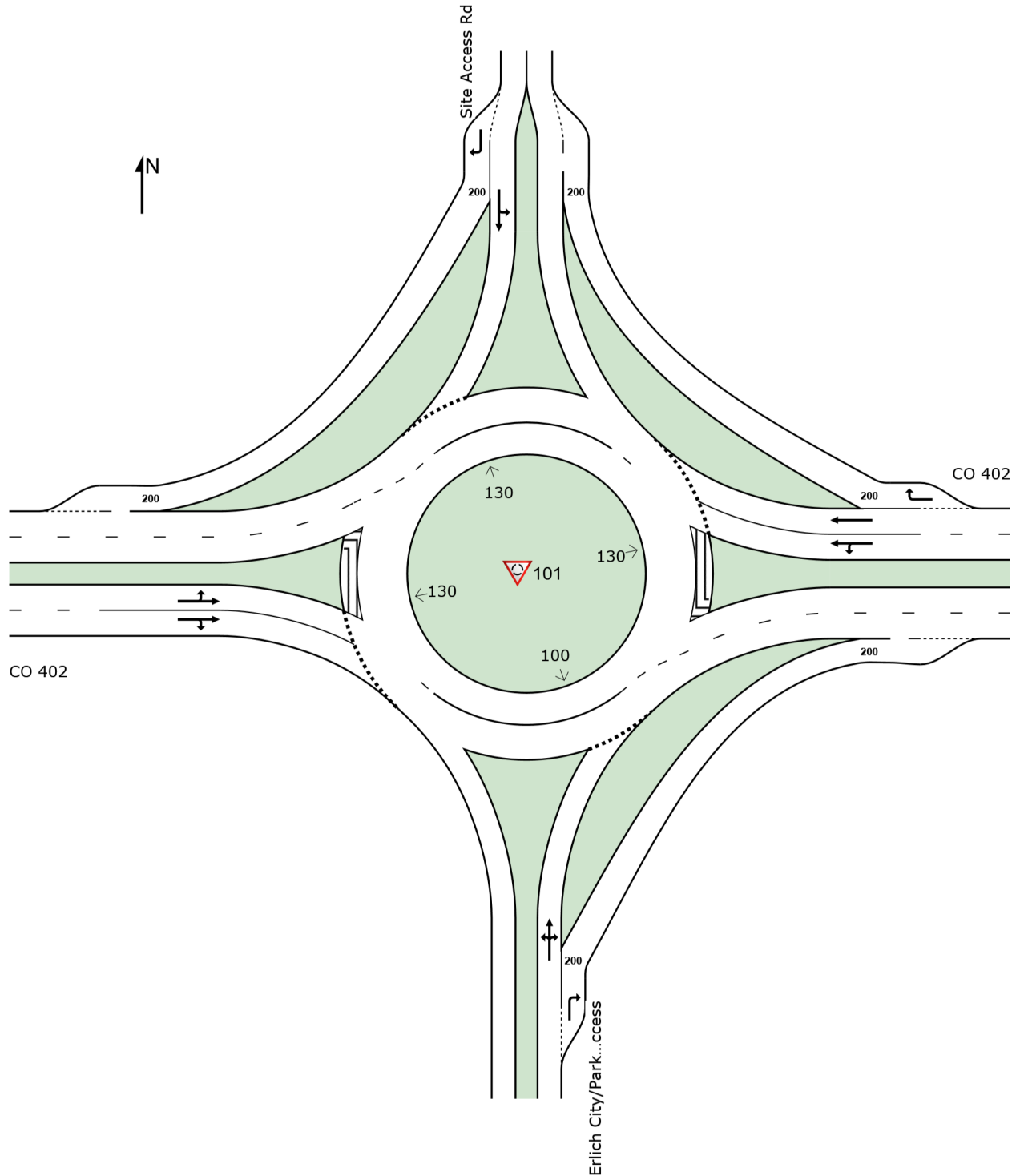
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:42:48 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402 & Site Access/PnR (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				mph
			veh/h		veh/h		v/c	sec			ft				
South: Erlich City/Park-n-Ride Access															
3	L2	All MCs	47	3.0	47	3.0	0.262	17.8	LOS B	1.3	32.6	0.87	0.86	0.87	25.9
8	T1	All MCs	30	3.0	30	3.0	0.262	17.8	LOS B	1.3	32.6	0.87	0.86	0.87	25.8
18	R2	All MCs	150	3.0	150	3.0	0.092	6.4	LOS A	0.0	0.0	0.00	0.00	0.00	36.2
Approach			227	3.0	227	3.0	0.262	10.3	LOS B	1.3	32.6	0.30	0.29	0.30	31.8
East: CO 402															
1	L2	All MCs	127	3.0	127	3.0	0.757	15.5	LOS B	13.5	345.4	0.79	0.60	1.03	29.1
6	T1	All MCs	1634	3.0	1634	3.0	0.757	15.1	LOS B	13.5	345.4	0.78	0.58	0.99	31.0
16	R2	All MCs	167	3.0	167	3.0	0.103	3.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.6
Approach			1928	3.0	1928	3.0	0.757	14.1	LOS B	13.5	345.4	0.72	0.53	0.91	31.5
North: Site Access Rd															
7	L2	All MCs	225	3.0	225	3.0	0.606	23.8	LOS C	3.7	94.9	0.89	1.04	1.25	20.7
4	T1	All MCs	28	3.0	28	3.0	0.606	23.8	LOS C	3.7	94.9	0.89	1.04	1.25	21.7
14	R2	All MCs	152	3.0	152	3.0	0.093	7.3	LOS A	0.0	0.0	0.00	0.00	0.00	24.9
Approach			405	3.0	405	3.0	0.606	17.6	LOS B	3.7	94.9	0.56	0.65	0.78	22.1
West: CO 402															
5	L2	All MCs	113	3.0	113	3.0	0.856	25.1	LOS C	20.7	530.6	1.00	1.12	1.96	21.0
2	T1	All MCs	1519	3.0	1519	3.0	0.856	24.2	LOS C	21.6	552.9	1.00	1.11	1.93	26.6
12	R2	All MCs	41	3.0	41	3.0	0.856	23.4	LOS C	21.6	552.9	1.00	1.10	1.91	26.7
Approach			1673	3.0	1673	3.0	0.856	24.2	LOS C	21.6	552.9	1.00	1.11	1.94	26.1
All Vehicles			4233	3.0	4233	3.0	0.856	18.2	LOS B	21.6	552.9	0.79	0.76	1.27	28.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:48 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

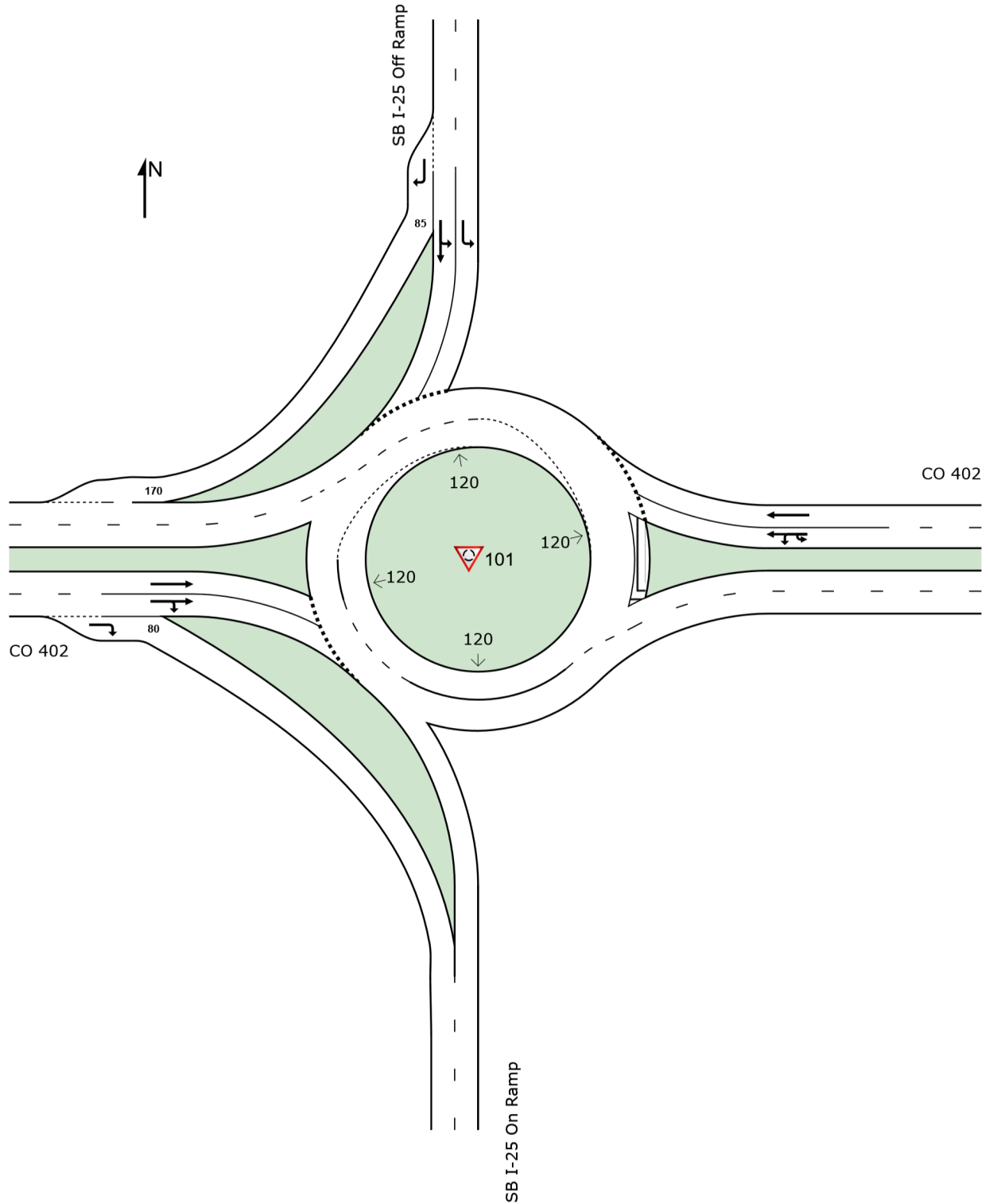
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [402 & SB I-25 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh.]	[Dist]				
			veh/h		veh/h		v/c	sec		veh	ft				mph
East: CO 402															
1u	U	All MCs	6	5.0	6	5.0	0.529	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	19.6
1	L2	All MCs	247	5.0	247	5.0	0.529	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	37.9
6	T1	All MCs	1230	5.0	1230	5.0	0.529	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	26.4
Approach			1483	5.0	1483	5.0	0.529	5.2	LOS A	0.0	0.0	0.00	0.00	0.00	29.0
North: SB I-25 Off Ramp															
7	L2	All MCs	256	6.0	256	6.0	0.174	6.7	LOS A	0.7	18.7	0.65	0.61	0.65	28.7
4	T1	All MCs	1	6.0	1	6.0	0.174	5.8	LOS A	0.7	18.7	0.65	0.59	0.65	39.2
14	R2	All MCs	551	6.0	551	6.0	0.348	16.7	LOS B	0.0	0.0	0.00	0.00	0.00	42.3
Approach			809	6.0	809	6.0	0.348	13.5	LOS B	0.7	18.7	0.21	0.19	0.21	36.6
West: CO 402															
2	T1	All MCs	1293	7.0	1293	7.0	0.685	14.9	LOS B	8.2	216.7	0.78	0.80	1.29	19.3
12	R2	All MCs	411	7.0	411	7.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			1703	7.0	1703	7.0	0.685	11.3	LOS B	8.2	216.7	0.59	0.61	0.98	24.6
All Vehicles			3995	6.1	3995	6.1	0.685	9.5	LOS A	8.2	216.7	0.29	0.30	0.46	28.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:23 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

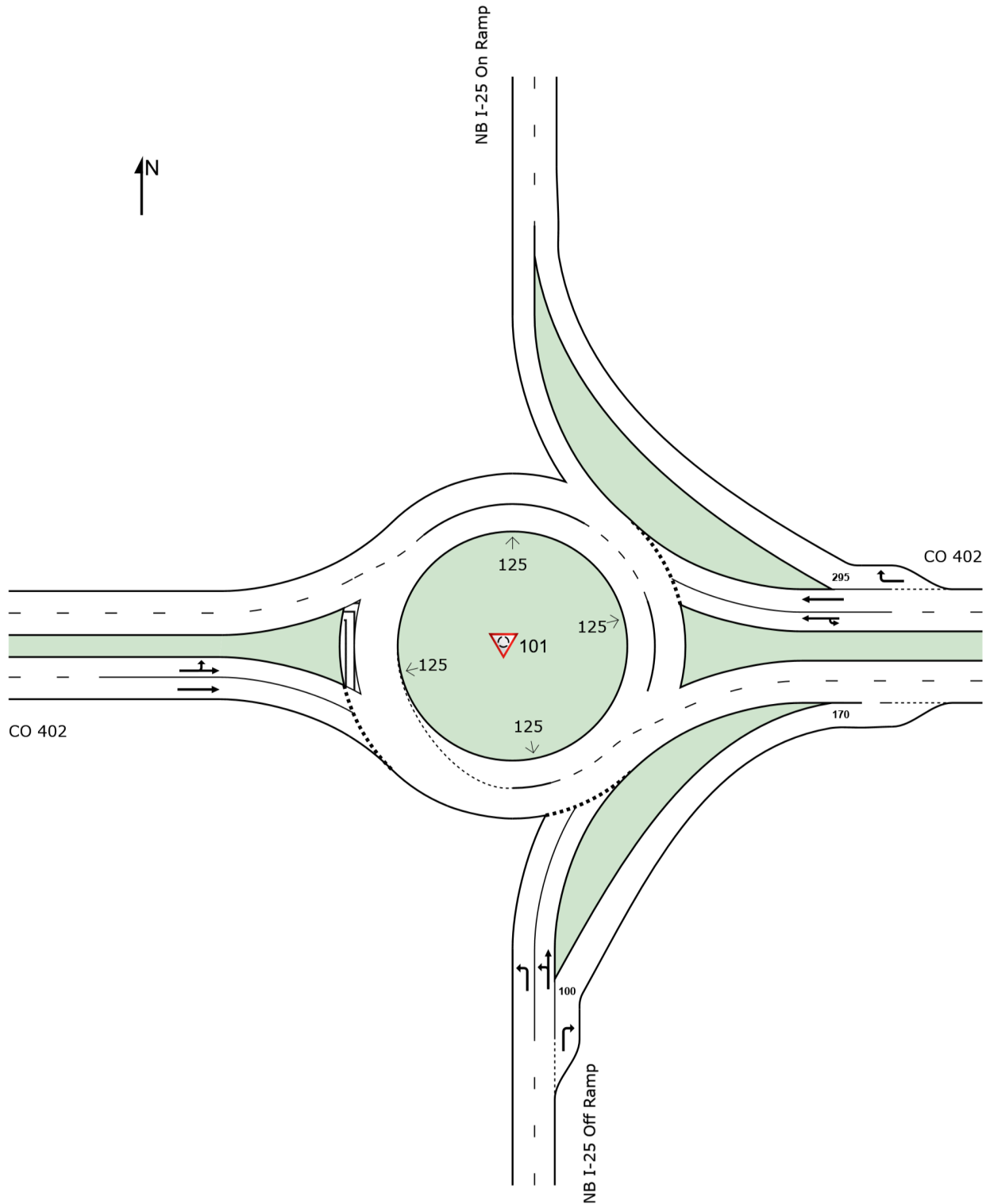
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402 & NB I-25 (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 Site: 101 [402 & NB I-25 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				mph
South: NB I-25 Off Ramp															
3	L2	All MCs	615	4.0	615	4.0	0.436	11.1	LOS B	2.5	65.4	0.77	0.79	1.01	25.4
8	T1	All MCs	2	4.0	2	4.0	0.436	9.6	LOS A	2.5	65.4	0.77	0.76	0.98	35.4
18	R2	All MCs	243	4.0	243	4.0	0.150	8.0	LOS A	0.0	0.0	0.00	0.00	0.00	41.4
Approach			860	4.0	860	4.0	0.436	10.2	LOS B	2.5	65.4	0.55	0.56	0.72	28.5
East: CO 402															
1u	U	All MCs	5	7.0	5	7.0	0.754	29.0	LOS C	6.7	176.7	0.92	1.26	1.72	14.6
6	T1	All MCs	896	7.0	896	7.0	0.754	25.3	LOS C	7.8	206.7	0.93	1.26	1.71	14.7
16	R2	All MCs	127	7.0	127	7.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	24.8
Approach			1028	7.0	1028	7.0	0.754	22.2	LOS C	7.8	206.7	0.82	1.10	1.50	16.1
West: CO 402															
5	L2	All MCs	572	5.0	572	5.0	0.565	6.2	LOS A	7.3	190.1	0.12	0.02	0.12	31.0
2	T1	All MCs	1005	5.0	1005	5.0	0.565	6.0	LOS A	7.3	191.0	0.12	0.02	0.12	21.1
Approach			1577	5.0	1577	5.0	0.565	6.1	LOS A	7.3	191.0	0.12	0.02	0.12	25.3
All Vehicles			3466	5.3	3466	5.3	0.754	11.9	LOS B	7.8	206.7	0.43	0.48	0.68	22.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:33 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

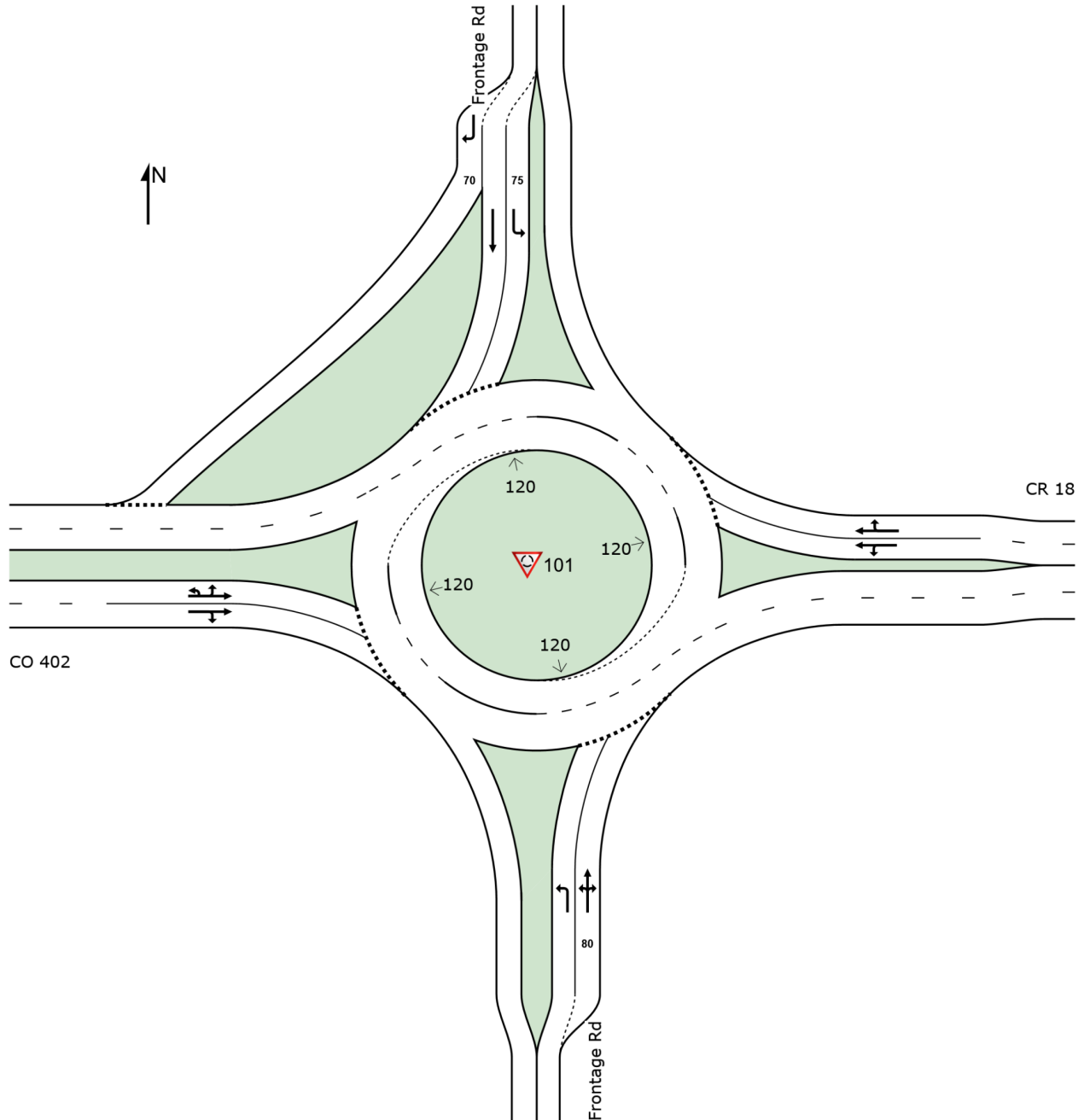
Site_Roundabouts.sip9

SITE LAYOUT

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

PM 2045 Plus Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Created: Wednesday, August 14, 2024 3:42:38 PM
Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus
Site_Roundabouts.sip9

MOVEMENT SUMMARY

 **Site: 101 [402/CR18 & Frontage Rd (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

PM 2045 Plus Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	[Dist] ft				mph
South: Frontage Rd															
3	L2	All MCs	165	2.0	165	2.0	0.316	12.0	LOS B	1.5	39.3	0.76	0.75	0.81	29.0
8	T1	All MCs	125	2.0	125	2.0	0.316	10.4	LOS B	1.5	39.3	0.76	0.72	0.79	32.5
18	R2	All MCs	56	2.0	56	2.0	0.316	10.4	LOS B	1.5	39.3	0.76	0.72	0.79	37.3
Approach			345	2.0	345	2.0	0.316	11.2	LOS B	1.5	39.3	0.76	0.73	0.80	31.8
East: CR 18															
1	L2	All MCs	10	2.0	10	2.0	0.414	10.2	LOS B	2.4	62.2	0.70	0.62	0.80	37.1
6	T1	All MCs	500	2.0	500	2.0	0.414	10.1	LOS B	2.5	62.4	0.70	0.61	0.80	37.9
16	R2	All MCs	120	2.0	120	2.0	0.414	9.8	LOS A	2.5	62.4	0.70	0.61	0.79	38.2
Approach			630	2.0	630	2.0	0.414	10.0	LOS B	2.5	62.4	0.70	0.61	0.79	38.0
North: Frontage Rd															
7	L2	All MCs	108	2.0	108	2.0	0.101	4.3	LOS A	0.5	12.2	0.56	0.42	0.56	37.9
4	T1	All MCs	98	2.0	98	2.0	0.113	5.3	LOS A	0.5	12.9	0.57	0.46	0.57	33.4
14	R2	All MCs	273	2.0	273	2.0	0.255	5.8	LOS A	1.3	33.3	0.60	0.46	0.60	29.8
Approach			479	2.0	479	2.0	0.255	5.3	LOS A	1.3	33.3	0.59	0.45	0.59	33.0
West: CO 402															
5u	U	All MCs	10	2.0	10	2.0	0.569	10.3	LOS B	4.1	104.7	0.58	0.37	0.58	18.8
5	L2	All MCs	371	2.0	371	2.0	0.569	10.3	LOS B	4.1	104.7	0.58	0.37	0.58	27.4
2	T1	All MCs	784	2.0	784	2.0	0.569	10.3	LOS B	4.1	104.7	0.57	0.36	0.57	38.0
12	R2	All MCs	56	2.0	56	2.0	0.569	10.3	LOS B	4.1	102.5	0.57	0.36	0.57	30.7
Approach			1221	2.0	1221	2.0	0.569	10.3	LOS B	4.1	104.7	0.57	0.37	0.57	33.9
All Vehicles			2675	2.0	2675	2.0	0.569	9.5	LOS A	4.1	104.7	0.63	0.49	0.66	34.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: SIDRA HCM.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: ALFRED BENESCH & COMPANY | Licence: PLUS / 1PC | Processed: Wednesday, August 14, 2024 3:42:39 PM

Project: Y:\Denver\152300S\00152379.00_West_Ridge_Study\Eng_Docs\Traffic\Models\SIDRA\RIRO PnR\2045\PM_2045 Plus

Site_Roundabouts.sip9

Intersection: 3: SH 402 & S Boise Ave

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	250	161	158	295	321	95	229	210
Average Queue (ft)	138	86	75	162	168	34	109	116
95th Queue (ft)	221	147	144	282	285	77	191	200
Link Distance (ft)		1168	1168	7114	7114			722
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					400	155	
Storage Blk Time (%)							6	3
Queuing Penalty (veh)							17	5

Intersection: 5: SH 402 & LCR 9E

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (ft)	238	178	172	246	249	112	184	136
Average Queue (ft)	98	78	85	158	166	34	105	64
95th Queue (ft)	175	137	151	256	255	76	181	105
Link Distance (ft)		7114	7114	3063	3063			685
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	390					420	225	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 22: Boyd Lake & SH 402

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	R	L	T	T	R	L	T	R	L
Maximum Queue (ft)	157	339	325	59	68	290	305	144	48	175	62	342
Average Queue (ft)	72	188	196	16	29	177	199	44	9	82	22	196
95th Queue (ft)	128	308	301	42	55	255	266	90	32	138	45	321
Link Distance (ft)		3063	3063			3735	3735			615		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	400			400	400			400	250		250	250
Storage Blk Time (%)												16
Queuing Penalty (veh)												57

Intersection: 22: Boyd Lake & SH 402

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	336	108
Average Queue (ft)	153	44
95th Queue (ft)	275	90
Link Distance (ft)	760	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Zone Summary

Zone wide Queuing Penalty: 79

APPENDIX K

Site Access Exhibit

7/12/2023 2:40 PM



REVISIONS	
DATE	DESCRIPTION

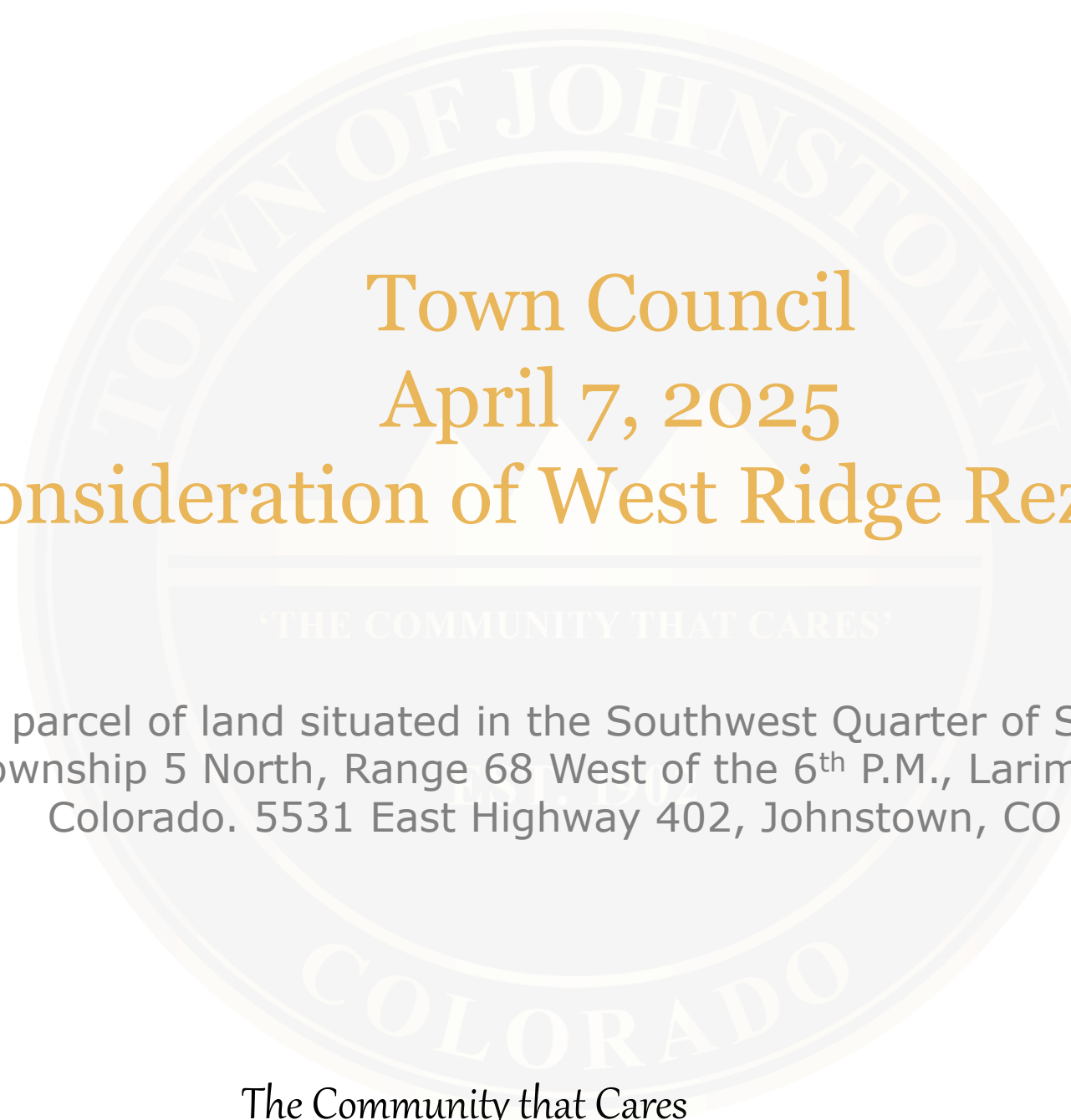
DRAWN	BAMG
CHECKED	JFS
DESIGNED	BAMG
FILENAME	2023-07-11 0003_ROUNDABOUT

WEST RIDGE

ROUNDABOUT EXHIBIT

TST
TST, INC.
CONSULTING ENGINEERS
748 Whalers Way
Suite 200 Fort Collins
Colorado 80525
Phone: 970.226.0557

JOB NO. 1258.0003.00
SCALE 1" = 150'
DATE JULY 2023
SHEET 1 of 1



Town Council April 7, 2025 Consideration of West Ridge Rezoning

A parcel of land situated in the Southwest Quarter of Section 22,
Township 5 North, Range 68 West of the 6th P.M., Larimer County,
Colorado. 5531 East Highway 402, Johnstown, CO 80534



The Community that Cares

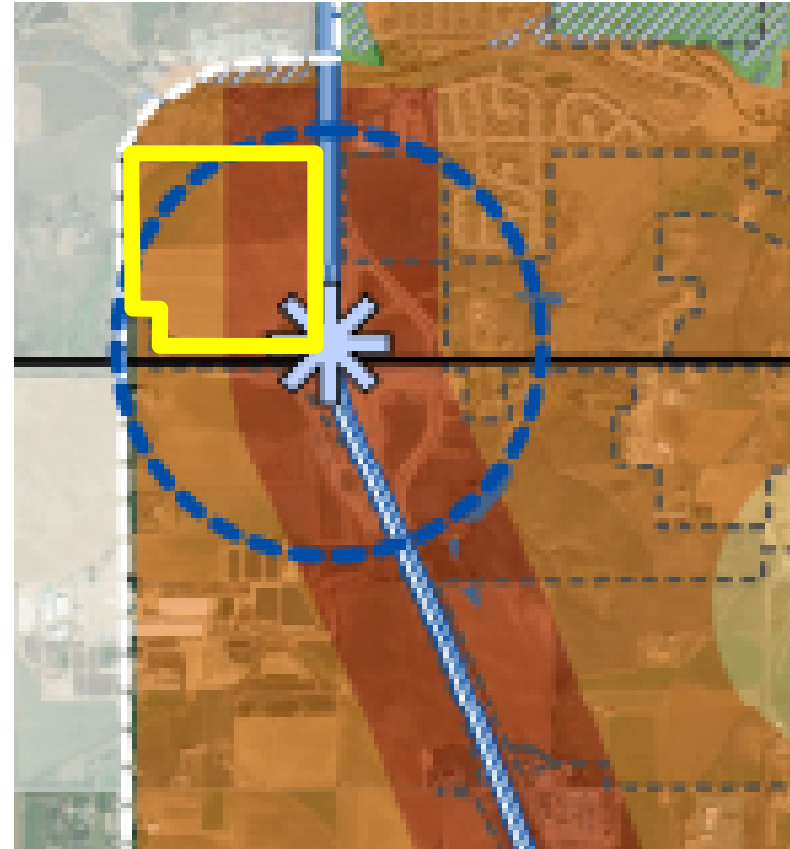
The property subject to the rezoning is located in the northwest quadrant of I-25 and State Highway 402. The property was annexed in 2008 and zoned PUD-MU.

Action proposed:
Rezone from Mountain View West PUD to R-1 (Single-Family Residential), R-2 (Mixed Density Residential), MU-RC (Mixed Use Regional Commercial), and I-1 (Industrial Light)



Future Land Use Map Alignment

- ◆ West Ridge is a proposed Gateway and Activity Center as indicated by the 2021 Johnstown Comprehensive Plan.
- ◆ The Eastern portion of the property is indicated to be high density/intensity and the Western portion of the property is indicated to be medium density/intensity.
- ◆ Proposed uses include Residential, Retail/Commercial, and Entertainment.



Current Zoning

The Southeast quadrant of the property indicated in red will be the mixed-use Regional Activity Center District and include retail and commercial uses.

The Northeast quadrant of the property indicated in orange is proposed for residential and live/work uses.

The Western portion of the property outlined in yellow is proposed for low-density residential uses.





WEST RIDGE ZONING MAP

TOWN OF JOHNSTOWN, COLORADO



LEGEND

- ALLEY CORNER AS DESCRIBED
 ■ FOUND MONUMENT AS DESCRIBED
 ◆ FOUND IN RECORD WITH YELLOW PLASTIC CAP, "BPS GROUP" LE33049
 ○ CALCULATED POSITION
 ◆ FOUND IN RECORD WITH RED PLASTIC CAP LE 30348
 _____ FLOW LINE AS DESCRIBED
 _____ BOUNDARY LINE
 _____ EASEMENT LINE
 _____ RIGHT OF WAY LINE
 _____ SECTION LINE

SURVEYORS CERTIFICATE

I, Steven Parks, a Colorado Licensed Professional Land Surveyor, do hereby state that this Zoning Map is an accurate representation of the property to the best of my knowledge, information, belief, and in my professional opinion. I further state that this certificate does not extend to any assumed parties or the successors and/or assigns.

PRELIMINARY

Steven Parks - On Behalf of Majestic Surveying, LLC
Colorado Licensed Professional Land Surveyor #30341

PROPERTY ANNEXED TO CITY OF LOVELAND EXISTING ZONING - MAC MIXED-USE ACTIVITY CENTER EXISTING LAND USE: AGRICULTURAL	CITY OF LOVELAND PLANNING DEPARTMENT	PROPERTY ANNEXED TO CITY OF LOVELAND EXISTING ZONING - PUD PLANNED UNIT DEVELOPMENT EXISTING LAND USE: AGRICULTURAL
---	---	--

CONCLUSIONS

According to California law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown herein. (15.00-101 C.R.S. 201.2)

UNINCORPORATED PROPERTY
EXISTING LAND USE: RURAL
RESIDENTIAL / UNDEVELOPED

本報社址：上海南京路
 電話：二二二二
 發行所：上海南京路

R-1

I-1

R-2

MU-RC

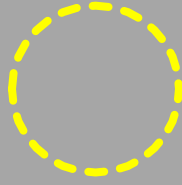


MAJESTIC SURVEYING

PROJECT NO 2024089	PROJECT NAME WEST RIDGE	REVISIONS	DATE
DATE 8-9-2024	CLIENT CALMER	REVISED PARCELS 3 & 4 - AU	8-9-24
DRAWN BY: AU	FILE NAME 2024089CONE		
CHECKED BY: SJP	SCALE 1" = 160'		

2

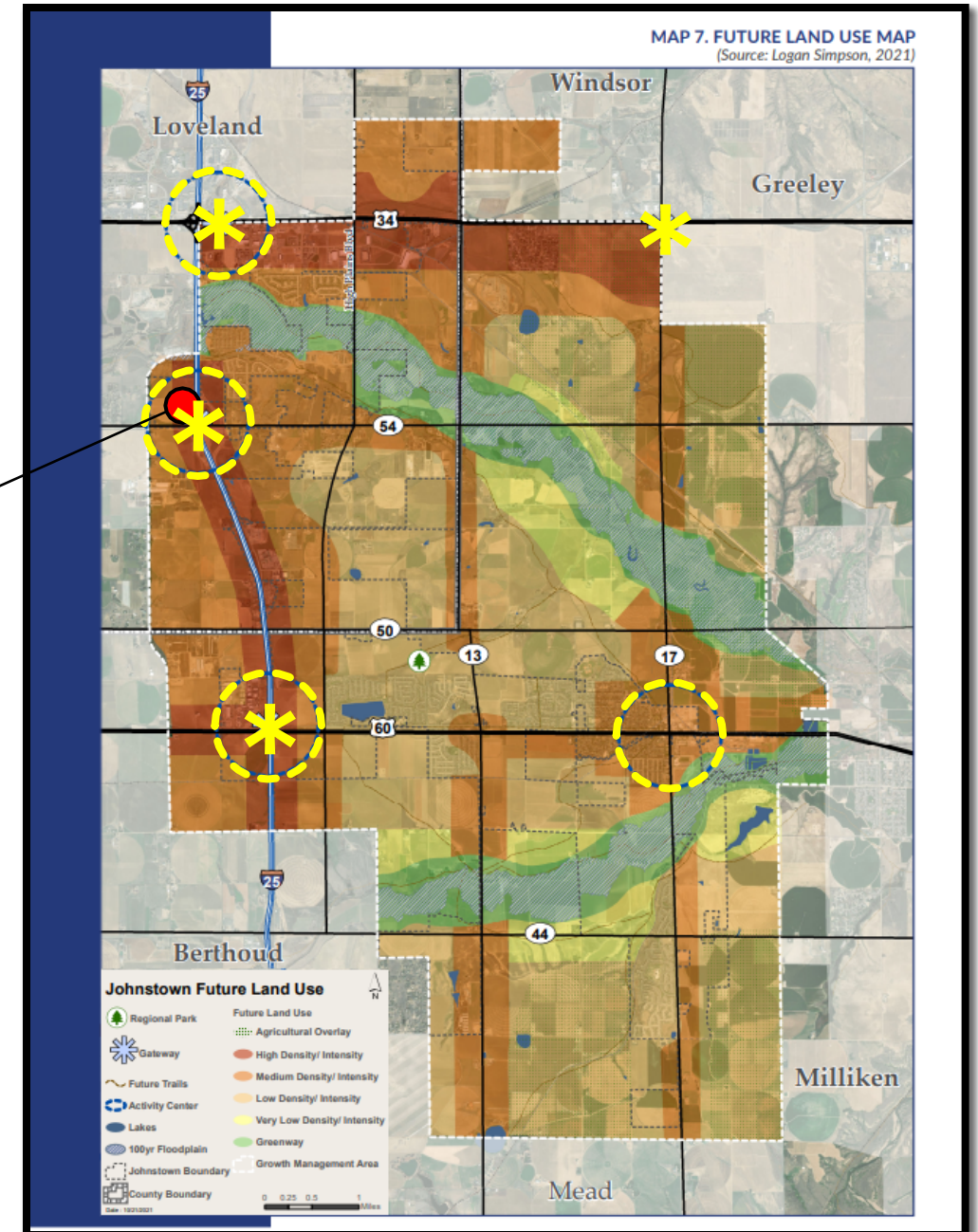
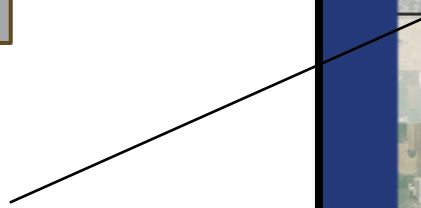
Activity Centers



Gateways



Project Site



Comprehensive Plan Alignment

The current zoning of the property is defined as PUD, to allow for mixed-use of office, retail, commercial, industrial, and residential uses. The Johnstown Future Land Use map identifies this area as Medium Density/Intensity (MDI). The MDI may serve as a transition between the High-Density/Intensity (HDI) area to the east along I-25 and the lower-density (agricultural) properties to the West in Larimer County.

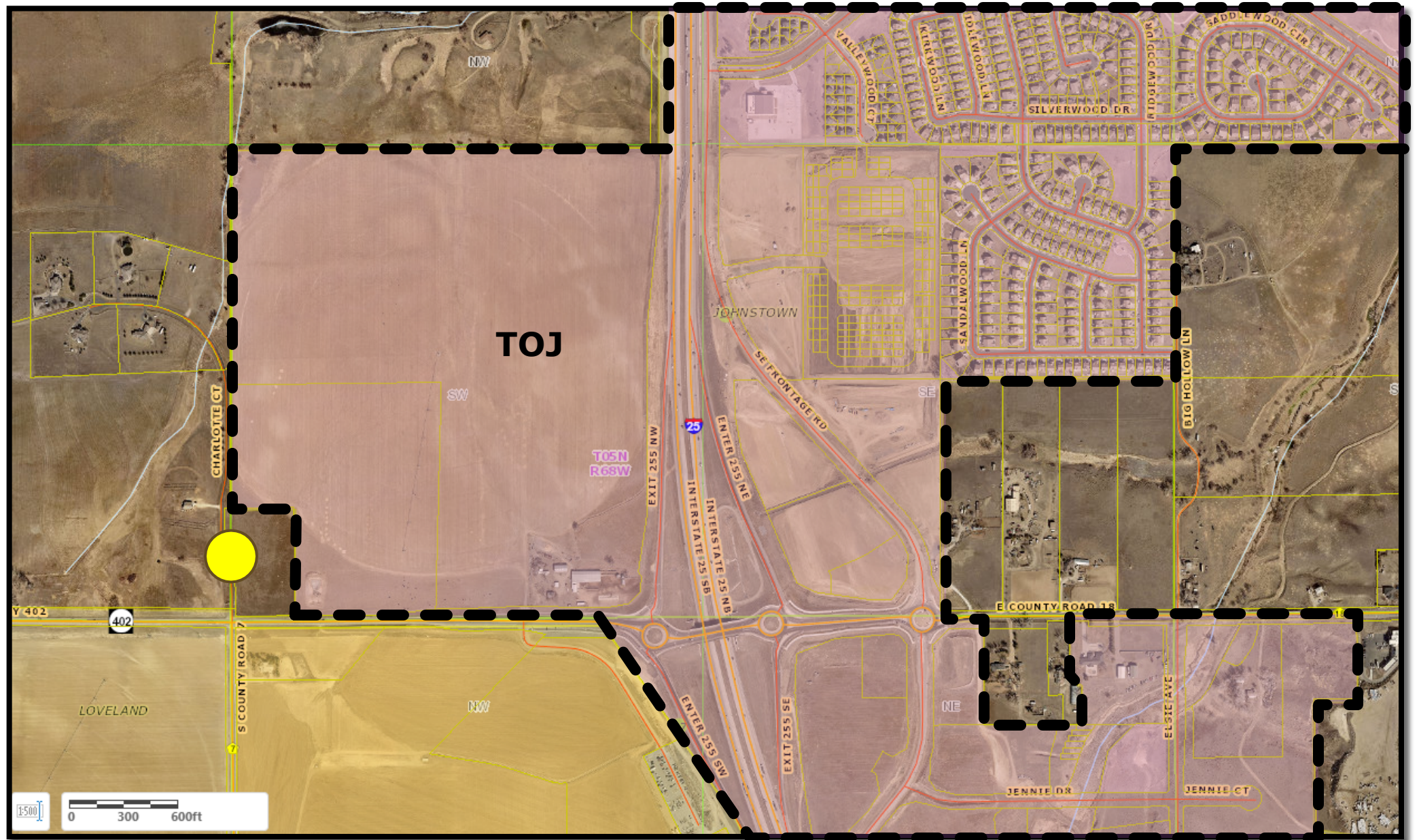
Strategic Plan Alignment

Natural and Build Environment

Guide growth in the community through appropriate annexation, zoning, planning, and land use development.



The Community that Cares



Planning & Zoning Commission

On February 26, 2025, a public hearing was held before the Planning and Zoning Commission to forward a recommendation to the Town Council for rezoning case number ZON24-0002. This public hearing concluded with a unanimous vote (6-0) to recommend that the Town Council approve the consideration of this case.

During the public hearing, concerns regarding the roadway improvements of Charlotte Court were heard.



The Community that Cares



CALIBER

THE WEALTH DEVELOPMENT
COMPANY

West Ridge Rezoning

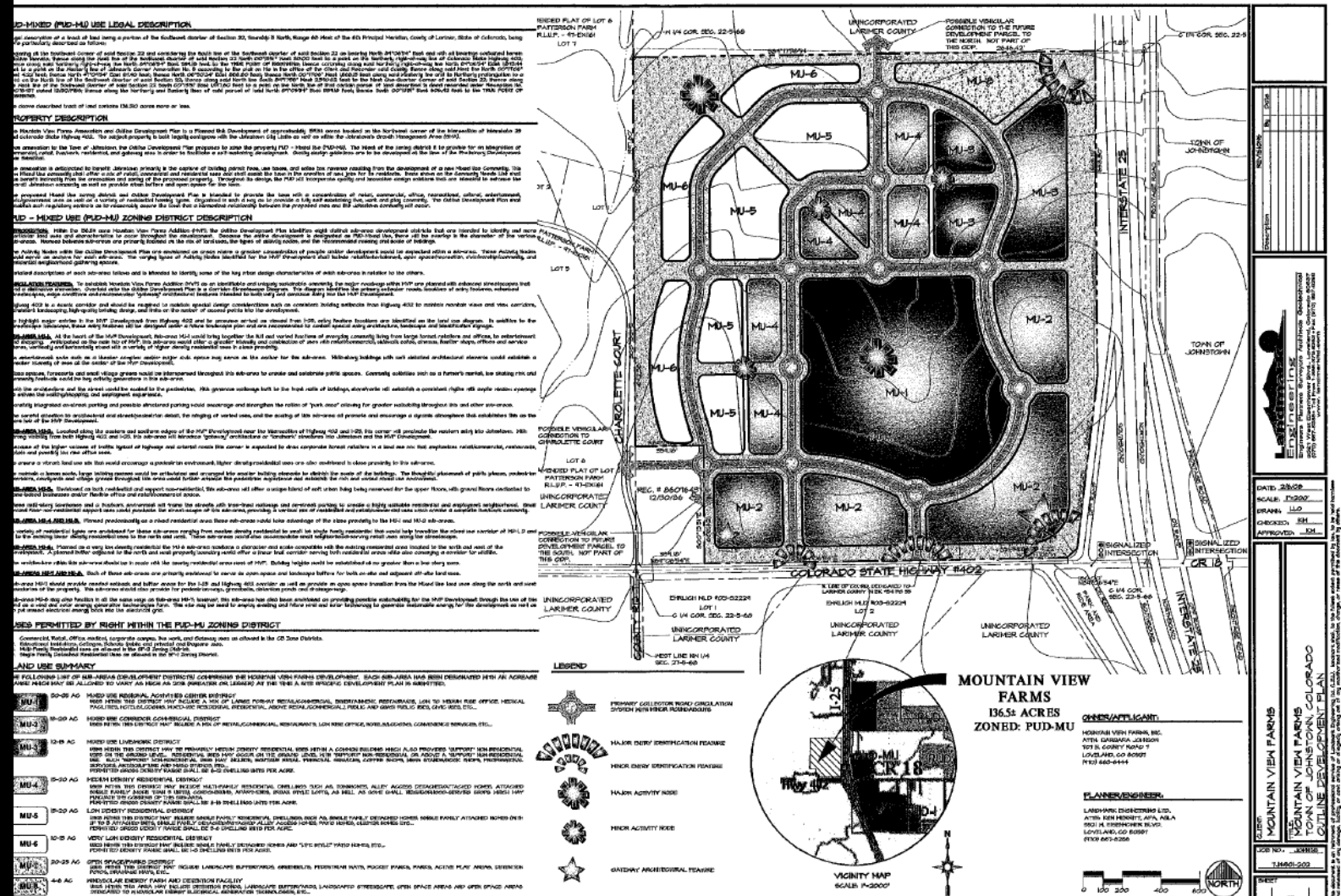
Town Council

April 7, 2025

Existing Site Facts

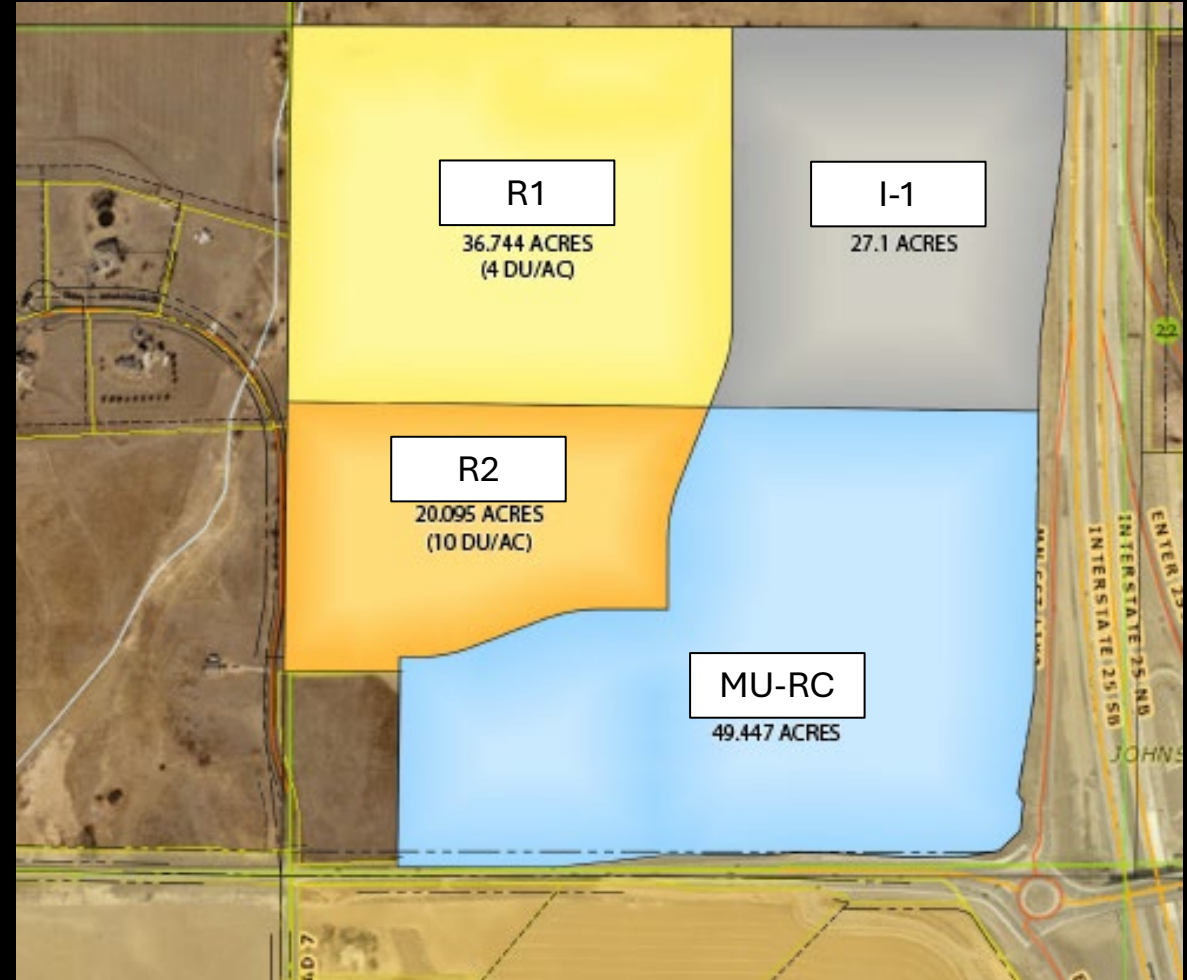
- Consists of two (2) parcels totaling approximately 133 acres.
- Site is mainly used for agricultural purposes today with an existing residence along Hwy 402.
- The property was annexed into Johnstown and zoned in 2008 as the Mountain View Farms Planned Unit Development (PUD)
 - Mix of allowed uses include commercial, multi-family, retail, hotels, entertainment, office.
- Future Land Use Plan designates this area as a combination of use types including; High Density/Intensity, Medium Density/Intensity, Activity Center and Gateway.

- The approval provided an “outline” development plan
- Allows for a mixture of use types including commercial, multi-family, single family, office, industrial, and entertainment uses
- Residential was located along the western perimeter; commercial/industrial focused along Highway 402 and I-25
- No plat or development plan was submitted



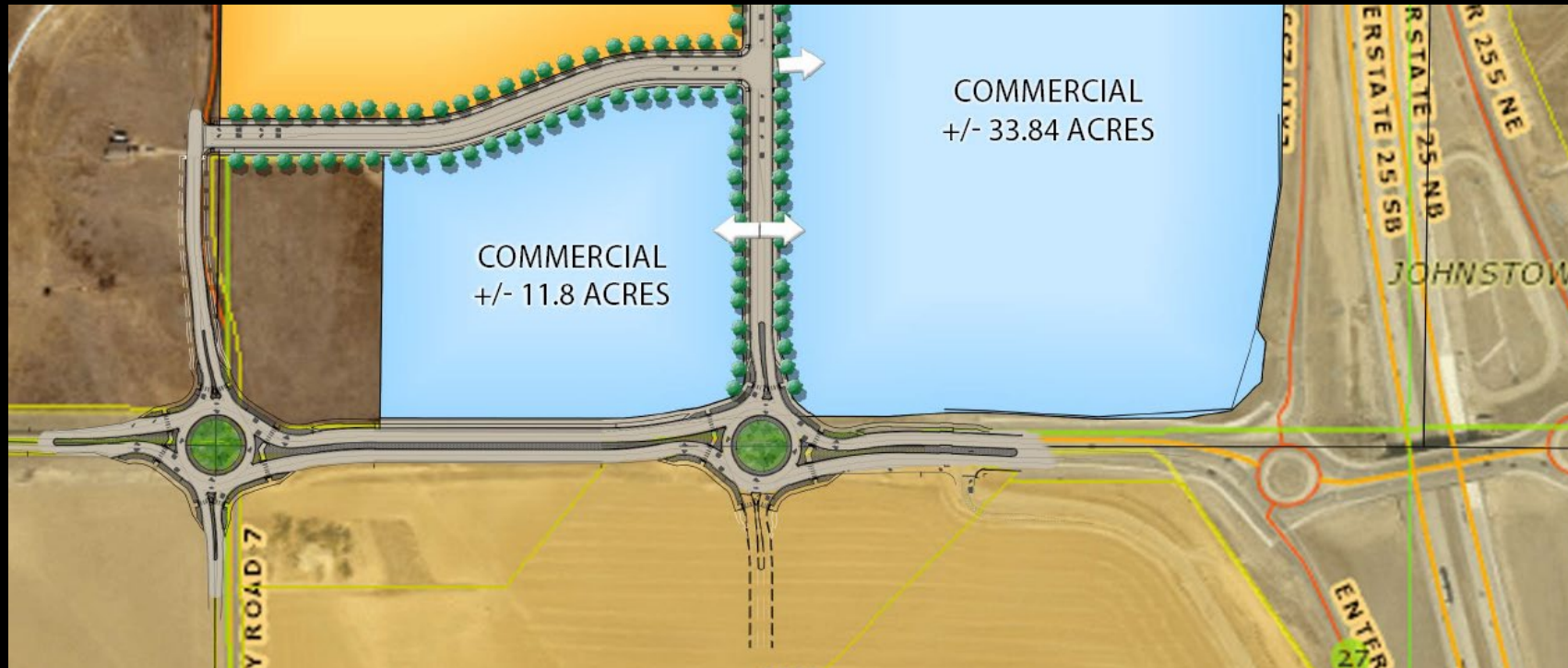
Proposed Zoning

- Mixed Use Zoning
 - R-1 – Single Family Detached
 - Single family detached homes only
 - R-2 – Single Family Neighborhood
 - Single family detached homes and townhomes
 - MU-RC (Mixed-Use Regional Commercial)
 - Retail, commercial, entertainment uses, office and multi-family
 - I-1 – Light Industrial
 - Targeting low impact industrial uses (ex. flex industrial, warehouses, etc.)



Roadway Improvements

- Caliber has been working with Larimer County, Loveland, Johnstown, and CDOT to discuss the required improvements on SH 402
- Two roundabouts are required on Highway 402 to facilitate traffic flow
- Design driven and required by CDOT and Loveland – limited access



Larimer County – Charlotte Ct ROW

- Formal letter sent to residents by Larimer County on June 16, 2023
- Determined Charlotte Ct as Public ROW
- Discussed the existing gate
- Possibility of abandoning public ROW north of connection point and adding gate
- Caliber has made commitments to assist the neighborhood efforts of ROW abandonment north of Charlotte connection

LARIMER COUNTY | ENGINEERING DEPARTMENT

P.O. Box 1190, Fort Collins, Colorado 80522-1190, 970.498.5700, Larimer.org

June 16, 2023

Dear Resident,

Recently, the remotely-operated gate that has been installed across Charlotte Ct just north of State Highway (SH) 402 was tagged by the County as needing to be removed. A sign indicating that the road is private was also removed at the same time. Our intent was to send you this letter prior to flagging the gate but due to a miscommunication it ended up happening in reverse order, and for that we apologize.

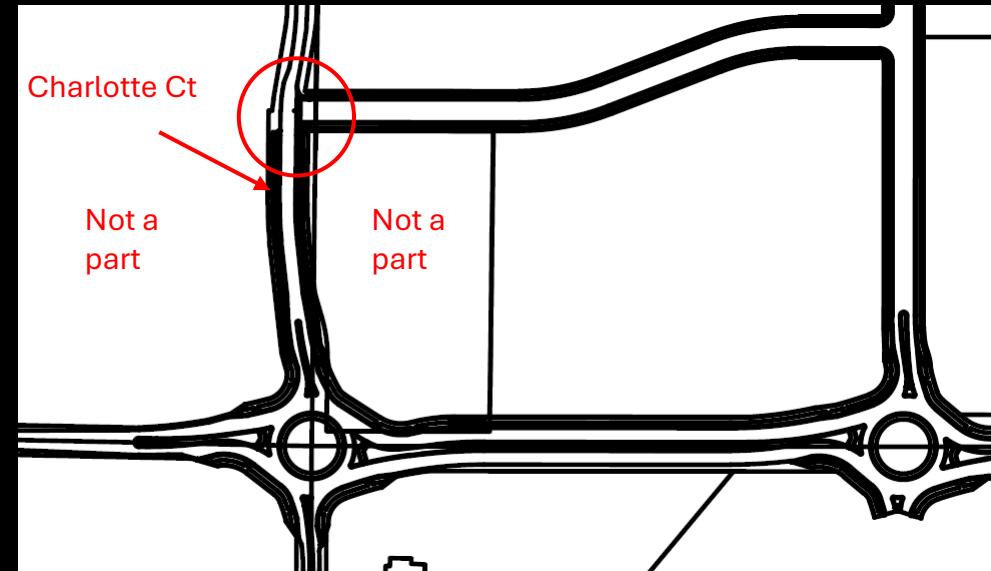
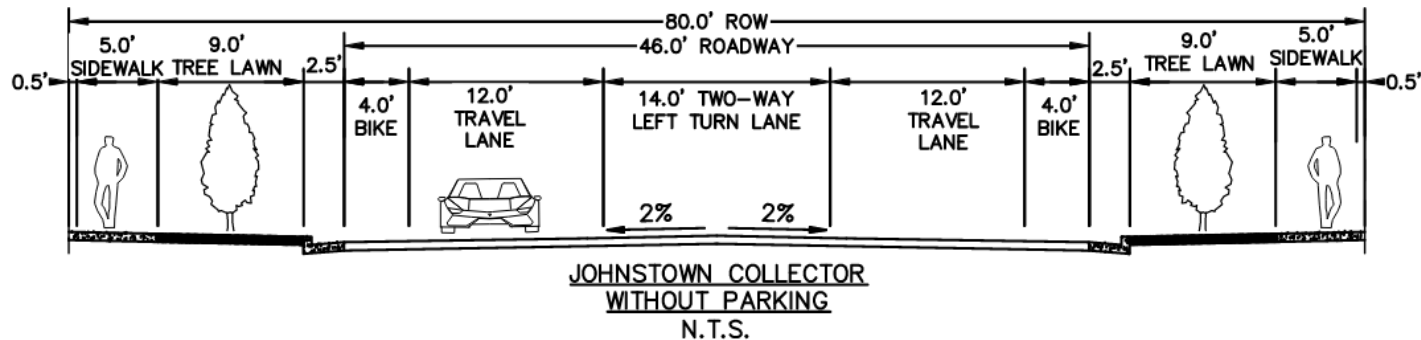
If you would like more information or have questions, please feel free to contact either myself or Mark Peterson, the County Engineer (mpeterson@larimer.org; 970-498-5714).

Sincerely,

Rusty McDaniel
Assistant County Engineer
rmcdaniel@larimer.org
970-498-5730

Charlotte Court ROW

- Charlotte Court to be improved south of connection
- 60-80' of total Right of Way (ROW)
- Sidewalks and landscaping on both sides of roadway
- Requires acquisition of land from adjacent owners
- Charlotte Court will not be improved north of the adjacent internal West Ridge roadway



Summary and Next Steps

- The site is already zoned for mixed use development
- Caliber is adjusting the parcel lines and zoning boundaries, maintaining the residential along the western perimeter and commercial along SH 402
- Design and inclusion of two roundabouts driven by CDOT, Loveland, and Larimer County
- Caliber has made commitments to neighbors in neighborhood meeting and Planning Commission hearing to assist in Charlotte Court efforts
- Unanimous recommendation of approval by PZ Commission
- Further outreach required for the ultimate ROW acquisition of Charlotte Court

JOHNSTOWN HISTORICAL SOCIETY		Jan-25	Y-T-D	2025 BUDGET	VARIANCE	NOTES
BEGINNING CHECKING BALANCE		\$111,016.52				
INFLOWS	Donations / Sponsorships	\$60.00	\$110.00	\$4,000.00	-\$3,890.00	Donations from Parish House Tour donations
	Fundraising			\$300.00	-\$300.00	
	Collections Donations			\$500.00	-\$500.00	
	Grants					
	Interest - Investments	\$41.40	\$103.31	\$550.00	-\$446.69	
	Memberships	\$75.00	\$75.00	\$300.00	-\$225.00	5 year membership paid in advanced, Patty York
	Memorials					
	JHS Special Event Funding			\$5,000.00	-\$5,000.00	
	TOJ 1-time Cash Payment		\$10,000.00	\$10,000.00	\$0.00	
	TOJ - Salaries Advancement		\$71,150.00	\$71,150.00	\$0.00	
	Misc Income					
	Investments	\$20,000.00	\$20,000.00			Opened 2nd CD of \$20,000
	T OJ (grant match)					
	TOJ (budget reimbursable)					
INFLOWS TOTAL		\$20,176.40	\$101,438.31	\$91,800.00	\$9,638.31	
TOTAL AVAILABLE FUNDS		\$131,192.92				
OUTFLOWS	Advertising	\$110.00	\$160.00	\$1,000.00	\$840.00	J-town Breeze - monthly & Classified ads
	Buildings/Grounds	-\$6.58	\$23.22	\$250.00	\$226.78	JHS CC credit, return of xmas lights (January expense)
	Collections	\$3.88	\$3.88	\$1,600.00	\$1,596.12	Open House prints for Susie Stein
	Computer Expenses					
	Equipment & Furniture				\$0.00	
	Fundraising	\$600.00	\$650.00		-\$650.00	Schroeder Concert (requesting reimbursement from RHS)
	Insurance, Bldg. Contents			\$2,750.00	\$2,750.00	
	Investments	\$20,000.00	\$20,000.00			Opened 2nd CD for \$20,000
	Internet					
	Legal Fees/Consulting Fees					
	Licenses/Memberships					
	Memorial Recognitions					
	Miscellaneous			\$500.00	\$500.00	
	Postage			\$100.00	\$100.00	
	Programming/Gifts			\$200.00	\$200.00	
	Salaries - TOJ/Parish House			\$71,150.00	\$71,150.00	Jan & Feb paid in March, will be billed monthly hereafter
	Web Page /Wired Impact	\$219.00	\$219.00			Plan is to have 100% of this reimbursed by TOJ
	Service Agreements/Filings		\$25.00	\$750.00	\$725.00	
	Subscriptions, Periodicals					
	Supplies, Janitorial	\$46.51	\$46.51	\$500.00	\$453.49	Toilet bowl brush, Astrobrights Cardstock
	TOJ Special Event Expenditures			\$5,000.00	\$5,000.00	
	JHS Independence Expenses			\$8,000.00	\$8,000.00	
	Grant Payments					
OUTFLOWS TOTAL		\$20,972.81	\$21,127.61	\$91,800.00	\$70,672.39	
JHS \$15K CD	Collections Allocation	\$1,002.76				
JHS \$15K CD	JHS Allocation	\$14,273.28				
JHS \$20K CD	100% JHS	\$20,000.00				
Ending Balance JHS Grant		\$818.59				
JHS Ending Checking Account		\$74,125.48				
Total Ending Balance - All Accounts		\$110,220.11				

JHS 2025 Balance Sheet

INCOME	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
Donations	\$50.00	\$60.00											\$110.00
Memberships	\$0.00	\$75.00											\$75.00
Fundraising	\$0.00	\$0.00											\$0.00
TOJ JHS Salaries	\$71,150	\$0.00											\$71,150.00
TOJ 1-Time Assist	\$10,000	\$0.00											
Investment (CD)	\$0	\$20,000.00											
Interest (CD)	\$61.91	\$41.40											\$103.31
Grants	\$0.00	\$0.00											
Miscellaneous													\$0.00
TOTAL	\$81,261.91	\$20,176.40	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$101,438.31
EXPENSES													
B&G	\$29.80	\$39.93											\$69.73
Fundraising	\$50.00	\$600.00											\$650.00
Collections	\$0.00	\$3.88											\$3.88
JHS Salaries	\$0.00	\$0.00											
JHS 1-Time Expenses	\$0.00	\$0.00											
Investment (CD)	\$0.00	\$20,000.00											\$20,000.00
Bills	\$75.00	\$329.00											\$404.00
Grants	\$0.00	\$0.00											\$0.00
TOTAL	\$154.80	\$20,972.81	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$21,127.61



Mayor Michael Duncan
450 S Parish Ave
JOHNSTOWN, CO 80534

Dear Mayor Michael Duncan,

On behalf of the Arbor Day Foundation, I'm happy to extend my warmest congratulations to Johnstown on successfully achieving 2024 Tree City USA status. This well-deserved recognition is a testament to your community's unwavering commitment to the planting, care, and celebration of trees.

In an era where cities and towns are facing increasing challenges related to air quality, public health, and climate resilience, nurturing urban forests has never been more important. By prioritizing tree stewardship, you've not only helped enhance Johnstown's beauty and livability, but you've also invested in a healthier, more sustainable future for your residents.

The Arbor Day Foundation's Tree City USA program has a long legacy of supporting a nationwide network of passionate organizers and tireless tree planters. Since 1976, we've connected with more than 3,500 communities of all sizes to create and maintain green spaces. While we may all work in different corners of the country, we are all working in unison to create positive change through trees.

To be named a Tree City USA is to be part of something bigger.

Whether Johnstown is newer to the Tree City USA recognition program, or you've been part of our network for decades, we hope you are as excited as we are to share this accomplishment with your local media and your residents. To that end, we've included a press release for you to distribute at your convenience. A digital copy of the press release and other materials can be found in the Tree City USA Resource Center online at arborday.org/TreeCitytoolkit.

Once again, congratulations on this outstanding achievement and thank you for your dedication to Johnstown's tree canopy. We believe cities that take care of their trees, take care of their people.

Best Regards,

Dan Lambe
Chief Executive of the Arbor Day Foundation



FOR IMMEDIATE RELEASE

Johnstown Contact:

{Name}

{Phone}

{Email}

Arbor Day Foundation Contact:

Jasmine Putney

Arbor Day Foundation

402-216-9307

jputney@arborday.org

JOHNSTOWN EARNS 2024 TREE CITY USA RECOGNITION FROM ARBOR DAY FOUNDATION

JOHNSTOWN, Colorado (2/28/2025) – The Arbor Day Foundation named Johnstown a 2024 Tree City USA in honor of its commitment to plant, grow, and maintain trees to benefit its community.

The Arbor Day Foundation is a global nonprofit with a mission to inspire people to plant, nurture and celebrate trees. Its network of more than a million supporters and partners has helped the organization plant more than 500 million trees in forests and communities across more than 60 countries since 1972. The Tree City USA program has recognized cities and towns that leverage urban forestry to enhance the livability and sustainability of their local area for over 40 years.

"We all have a role to play in shaping our future and tree champions like Johnstown are leading the way," said Michelle Saulnier, Vice President of Programs at the Arbor Day Foundation. "Trees are critical infrastructure, building resiliency and fostering good health in our nation's cities. We're proud Johnstown is among the Arbor Day Foundation's growing network of communities dedicated to creating positive impact through trees."

In cities and neighborhoods, trees are proven to help mitigate the urban heat island effect, reduce stormwater runoff, improve air quality, and boost mental and physical health. When the right trees are planted in the right places, they can also reduce traffic noise, increase property values, and lower energy costs for homeowners.

{OPTIONAL QUOTE FROM CITY OFFICIAL/LOCAL TREE CITY REPRESENTATIVE}

To earn Tree City USA recognition, a city must uphold four core standards including maintaining a tree board or department, having a community tree ordinance, spending at least \$2 per capita on urban forestry, and participating in an Arbor Day celebration.

The Arbor Day Foundation's Tree City USA program is operated in partnership with the National Association of State Foresters and the USDA Forest Service. To learn more about the program or how to apply, visit arborday.org.

About the Arbor Day Foundation

The Arbor Day Foundation is a global nonprofit inspiring people to plant, nurture, and celebrate trees. They foster a growing community of more than 1 million leaders, innovators, planters, and supporters united by their bold belief that a more hopeful future can be shaped through the power of trees. For more than 50 years, they've answered critical need with action, planting more than half a billion trees alongside their partners. And this is only the beginning.

The Arbor Day Foundation is a 501(c)(3) nonprofit pursuing a future where all life flourishes through the power of trees. Learn more at arborday.org.



Town of Johnstown

February 2025 Building Permit Statistics

Single Family Residential

Current Month: 35 Issued ytd: 150

Commercial

*New Building Issued ytd 4

Duplex	3-plex	4-plex	5-plex	6-plex	7-plex	Apartment Bldgs
7	0	0	0	0	0	0

Other Residential

(basements/alterations/additions)

Issued ytd 234

Other Commercial

* (tenant finish/alterations/additions)

Issued ytd 30

Fees collected at permit issuance	Residential YTD	Commercial YTD
Construction Valuation	\$55,345,281.63	\$11,292,965.00
Building permit fees	\$407,685.54	\$140,522.64
F&F or F&F Credit	\$0.00	\$0.00
Paving	\$0.00	\$0.00
Water Upgrade	\$0.00	\$0.00
Water & Sewer Reimbursement	\$0.00	\$0.00
Raw Water Development Fee	\$899,613.00	\$0.00
Water Meter	\$72,215.00	\$0.00
Water Tap	\$1,036,332.00	\$0.00
Sewer Tap	\$1,331,759.00	\$0.00
Regional Sewer Development fees	\$683,000.00	\$0.00
Sewer Inspection Fee	\$14,300.00	\$0.00
Park	\$71,500.00	\$0.00
Use Tax	\$902,305.14	\$216,707.16
Larimer Use Tax	\$87,189.28	\$9,324.20
Open Space Impact Fee	\$200,674.00	\$0.00
Library Impact Fee	\$192,957.00	\$0.00
Public Facilities Impact Fee	\$267,041.00	\$0.00
Police Facilities Impact Fee	\$121,553.00	\$0.00
Transportation Facilities Impact Fee	\$466,783.00	\$0.00
402 Interchange Fee	\$24,338.00	\$0.00
High Plains Blvd Reimbursement Fee	\$0.00	\$0.00
West Water Fee	\$112,520.00	\$0.00
Reinspection Fee	\$4,600.00	\$150.00
TOTAL FEES (YTD)	\$ 6,896,364.96	\$366,704.00

The Community That Cares

www.TownofJohnstown.com

P: 970.587.4664 | 450 S. Parish Ave, Johnstown CO | F: 970.587.0141

Building permits issued for individual dwelling units - 1991 to (date)

Single family, duplex, 3-plex, 4-plex, 5-plex, 6-plex, 7-plex*						
Year	Issued	Month avg		Year	Issued	Month avg
1961 - 90	165	0.0		2016	132	11.00
1991	2	0.17		2017	140	11.67
1992	5	0.42		2018	126	10.50
1993	7	0.75		2019	87	7.25
1994	47	3.92		2020	108	9.75
1995	106	8.83		2021	184	15.33
1996	145	12.00		2022	446	37.16
1997	143	11.92		2023*	411	41.10
1998	175	14..58		2024	526	43.84
1999	145	12.08		2025	150	50
2000	134	11.92				
2001	152	12.67		TOTAL	6744	
2002	262	21.92				
2003	284	24.17				
2004	331	27.67				
2005	375	31.33				
2006	180	15.75				
2007	160	133.42				
2008	97	8.00				
2009	89	7.42				
2010	124	10.33				
2011	184	15.34				
2012	310	25.84				
2013	378	31.50				
2014	272	22.67				
2015	162	13.50				

*Starting in 2023, number represents total number of units constructed including all single-family type structures. This number does not include apartments. Prior to 2023, the number represents single-family units only.

The Community That Cares

www.TownofJohnstown.com

P: 970.587.4664 | 450 S. Parish Ave, Johnstown CO | F: 970.587.0141