GDP City Council Hearing Conditions Acceptance

a. [ACCEPT] Prior to the City Council hearing on the GDP, the applicant shall revise the plans so that the Xcel transmission poles south of Rockcress Drive be lowered rather than construction of retaining wall between the transmission poles and right of way.

b. [ACCEPT] Prior to the City Council hearing on the GDP, the applicant shall revise the drainage and utility reports to address Public Works comments in the letter dated May 26, 2020.

c. [ACCEPT] Prior to the City Council hearing on the GDP, the applicant shall provide written verification from North Metro Fire Rescue providing preliminary support of right of way acquisition for the Campus Drive and 96th Street intersection.

d. [ACCEPT WITH MODIFICATION] Prior to the City Council hearing on the GDP, a note shall be added to the GDP stating that all future developments will need to submit an updated traffic study as part of the PUD review that demonstrates acceptable roadway capacity consistent with the master Traffic Study approved with the GDP. ~~including acceptable capacity at the NW Parkway/US 36 Interchange, Rockcress Drive and NW Parkway intersection and 96th Street and Via Varra intersection before such development can proceed.~~

Rationale for Modification:

- It is standard best practice to have traffic studies for components (PUDs) of the project performed to ensure compliance with the master traffic study.
- "Acceptable" is very subjective and difficult to agree to amongst a series of differing stakeholders/parties.
- The inclusion of highway interchange performance for a traffic study on a vertical development is atypical.
- The deleted references to the regional interchanges are impacted by traffic well beyond the city and this development.
- Select findings were addressed in the master traffic study and would be demonstrated via compliance with the master traffic study.
- Written approval from respective entities, including CDOT and Northwest Parkway, is already required as a separate agreed upon condition.

e. [ACCEPT] Prior to the City Council hearing on the GDP, the applicant shall provide approval of the intersection and road connections from any impacted entities, including City and County of Broomfield, CDOT, NW Parkway Authority, and Boulder County.

f. [ACCEPT WITH MODIFICATION] Prior to the City Council hearing on the GDP, a concurrency requirement for development on Parcels A and B shall be added to the GDP limiting all senior residential development on Parcel A until both the release of permits of a 3-building corporate campus on Parcel B and the issuance of foundation inspection for the first building of the corporate campus development on Parcel B.

Rationale for Modification:

- We appreciate the City's interest in balancing the tax contributions between commercial and residential uses.

- This compromise awards the City the confidence that the Medtronic will be committed to and diligently pursuing build out of its campus before the introduction of senior living.
- It also allows our other partner, Erickson Senior Living, to confidently advance their plans for a complete, long-term facility.

g. [ACCEPT WITH MODIFICATION] Prior to the City Council hearing on the GDP, a concurrency requirement for residential and commercial development on Parcels C, D and E shall be added to the GDP limiting any residential development to no more than 450* units until development within the GDP planning area achieves certificates of occupancy for at least 1,000,000 sq. ft. of commercial development, inclusive of a minimum of 10,000 sq. ft. of sales tax generating retail or restaurant development. *Units are fair market and exclude the affordable units.

Rationale for Modification:

- We will further the concurrency language from our proposal to strive for more commercial tax base support.
- As noted in the fiscal study, residential is a critical aspect of the plan to support organic and sustainable retail and commercial demand.
- Retailers are unlikely to commit to a project until demonstrated residential density is within the service area which is why upfront residential is a necessary for economic vitality.

BRUE·BAUKOL
CAPITAL PARTNERS

May 29, 2020

VIA: EMAIL

Mr. Rob Zuccaro
Planning Director
City of Louisville
749 Main Street
Louisville, CO 80027

RE: ConocoPhillips Campus GDP 1st Amendment and Comprehensive Plan Amendment Proposal, Fifth Submittal, "Redtail Ridge Master Plan"

Dear Mr. Zuccaro,

Since our third submittal in late November, Brue Baukol Capital Partners ("BBCP") has diligently continued to seek public input of the proposal and evaluated land use alternatives.

Advisory Board, Community Groups and Site Tours
In December, we had the opportunity to present our GDP plan to the Open Space Advisory Board, Parks and Public Landscaping Advisory Board, as well as the Recreation Advisory Board where we gained great insight into their values and how we could modify the land use plan to align and help the City achieve its goals. Additionally, we hosted our first of six public site tours where we heard firsthand from over 100 residents about their priorities and potential concerns. On January 16th, we held our third, large community meeting, unveiling an illustrative concept plan and renderings to better demonstrate how the Redtail Ridge development could look once complete. In addition, we have had meetings with several community groups and organizations. Each opportunity with the public has enabled us to learn more about what matters most and what resonates with Louisville residents.

Virtual Tour, Webinar and Telephone Town Hall Series
In light of COVID-19, BBCP has sought to continue engaging the local community, keeping them apprised of changes/evolutions of the development program as well as answering questions from residents. To substitute for the inability to host on-site tours, a virtual tour and video was created and uploaded to the project website. Additionally, a series of five webinars as well as a telephone town hall were offered in May. Total attendance and participation for these events totaled more than 200 community members.

We have listened intently and in earnest and, as such, have incorporated a series of substantive changes to our proposal. Recurring themes or patterns that we observed during public outreach include: lowering and redistributing the density, improving circulation around and through the Project Site, prioritizing safety around the Monarch School campuses, contributing to the continuous open space and trail networks, the need for accessible and entry-level housing, support for senior living, overall integration with the rest of the City, and financial responsibility.

We believe you will find our new plan incorporates all these themes and demonstrates thoughtful revisions that improve public benefit.

Lowering & Redistributing Density
The development proposal has been revised to reduce total density by 1.2 million square feet - from 6.4 million square feet to 5.2 million square feet (excluding parking). The new maximum square footage including parking is now 5.88 million square feet. This change now aligns with a Suburban densification category under the Comprehensive Plan.

Beyond reducing overall density, the land uses have shifted to integrate seamlessly with the surrounding community fabric. For instance, and in direct response to city and community feedback, development no longer abuts 88th Street or Campus Drive adjacent to the school campuses – allowing a continued rural, open experience similar to the existing conditions.

Improving Circulation Around the Project Site
The Project Site in its entirety is 475 acres, about a mile-wide east to west. It takes 10 minutes driving to circumvent the fenced-off property. Creating the first-ever public roadway network through the property presents efficiencies for many stakeholders.

To name one, the community's largest employer and Redtail Ridge neighbor, Avista Adventist Hospital, stands to benefit from the Campus Drive extension, Tape Drive formalization, and north-south avenues within the master plan which greatly improve access to their facility for clients and service providers alike.

Prioritizing Safety for Monarch School Campuses
The community's children and their safety are top priority for all; the newly proposed Campus Drive, jointly designed with the Boulder Valley School District, incorporates wide, multi-use paths for separated bicycle and pedestrian access as well as roundabouts for traffic flow ease and speed management. The extension of the roadway to 96th Street provides a critical, secondary access point not only for parents and buses, but also emergency service vehicles for this K-12 campus.

Continuous Open Space & Trail Networks
Not only does Campus Drive present a fundamental piece to the Louisville roadway network, it is flanked by open space, parks and undeveloped green space preserving a direct Western view to the Flatirons to be enjoyed by all.

The new land program offers 39.7 acres of publicly dedicated open space that then link to adjacent open space lands off-site, safeguarding an expansive natural habitat corridor. Nestled adjacent to the open space network, a 15.6-acre publicly dedicated park area has been identified to allow for much-needed multi-use sports fields and related programming that would be the City's first, solely owned sports field complex. Linking all these recreational amenities together miles of trail ways.

Need for Housing: Entry-Level & Senior Living
Over the past year, we have repeatedly heard comments like the following:

1) Where are these employees going to live?

2) My kids cannot afford to live in the city that they grew up in.
3) I have lived in Louisville 20 years; I would like to downsize and stay within my community but have limited to no options.

The revised development program includes select housing product, identified to meet needs within the City that are not being adequately addressed. It also demonstrates a commitment to affordable price points for the multi-family residential and addresses the region's housing crisis.

Integration with the City & Financial Responsibility

All the while, the proposal offers a headquarters to a valued, primary employer and a strong tax base – rebounding from the greatly diminished property taxes currently generated by the Project Site. The long-term economic vitality of Louisville is essential. Redtail Ridge aims to support this exceptional community by bearing the full expense of on-site and off-site capital improvements, resulting in no incurred capital outlay to the City.

We are proud to submit this modified development program and supporting documents for your consideration and hopeful approval at the June 11th, 2020 Planning Commission Hearing.

Our team is available for any follow up questions or items that may arise upon your review of the submittal package.

Sincerely,

Jordan Swisher
Vice President
Brue Baukol Capital Partners

Enclosures:

1. Applicant Letter
    a. Planning Commission Presentation
2. Revised GDP
    a. GDP Sheets
    b. Phasing Plan
3. Engineering, Market Study and Economic Reports
    a. Revised Traffic and Mobility Study
    b. Revised Dewberry Technical Memo 1
    c. Revised Dewberry Technical Memo 2
    d. Final Master Drainage Report
    e. Revised Final Master Utility Report
    f. Draft Dewberry Tech Memo – Water Flows (pending FINAL City Comments)
    g. Revised EPS Market Study
    h. Revised Erickson Economic Impact Report
4. Other Requested Exhibits
    a. Density Analysis & 3D Model
    b. Certification of Notice to Mineral Rights Owners
    c. BVSD ROW Resolution
    d. Conceptual Fire Station Layout
    e. Alternative Grading Solution for 88th & Campus Dr.
    f. Filing 2 Xcel Retaining Wall Example
    g. Alternative Under Evaluation - Filing 2 Xcel Transmission Line Lowering
    h. Sample Park Grading
    i. Communications Tower Access Easement Drawing
5. Comprehensive Plan Letter & Proposed Redlined Amended Pages

PLANNING COMMISSION
LOUISVILLE, COLORADO
JUNE 11, 2020

BRUE·BAUKOL
CAPITAL PARTNERS
TRYBA ARCHITECTS

Redtail Ridge

AGENDA

1. Welcome and Introductions
2. Site Review
3. Public & Fiscal Benefit
4. Development Costs
5. Responsiveness
6. Current Plan & Key Topics
7. Medtronic Update
8. Closing

OUR TEAM

- We are a **local**, Denver-based group committed to thoughtful development
- The majority of our team **grew up in Boulder County, graduated from CU Boulder and continue to reside in the Louisville area**
- Our portfolio includes mixed-use, senior living, office, industrial, for-sale residential, land development and multifamily projects
- We have developed or currently manage $600 million worth of assets, including:
  - The Foundry, a public-private partnership in Downtown Loveland
  - The Jones District, a 4MM SF mixed-use development at I-25 and Dry Creek
  - Denargo Market, a 13-acre development in Denver's RiNo Art District
  - The Standard at Gateway, a 138-acre development near DIA

CHAD BRUE
CHIEF EXECUTIVE OFFICER & FOUNDER

GEOFF BAUKOL
PRESIDENT & PARTNER

BRUE·BAUKOL
CAPITAL PARTNERS

JORDAN SWISHER
VICE PRESIDENT

GARRETT HONEYMAN
VICE PRESIDENT

OUR TEAM

TRYBA ARCHITECTS

Urban Design

FOX TUTTLE

Transportation Planning

HKS HARRIS KOCHER SMITH

Civil Engineering

CRL

Public Outreach

SITE OVERVIEW

GUIDING PRINCIPLES

We are Committed to Investing in Louisville's Vision for a Liveable, Innovative, and Economically Diverse Community

Uniquely Louisville

Multimodal Connections

Integrated Open Space

Balanced Economy

PUBLIC BENEFIT:

1. Dormant Site Opened to the Public
2. Publicly Dedicated Land
3. Trail Network Enhancement
4. Park Land
5. Enhanced Area Access and Circulation
6. Improved Safety

PUBLIC BENEFIT

Dormant Site Opened to the Public

Gated Entry on Tape Drive off Northwest Parkway

Existing Infrastructure On-Site

Gated Entry on Tape Drive off 88th St

The site has been vacant for

12+ years

since Storage Tek's departure

PUBLIC BENEFIT Publicly Dedicated and Protected Lands

LOUISVILLE PUBLIC LAND DEDICATION	AC
OPEN SPACE	39.7
PARK LAND	15.6
TRAIL CORRIDOR LAND	3.6
FIRE STATION	0.7
SUBTOTAL	**59.6**

LOUISVILLE CONSERVATION EASEMENTS	AC
CONSERVATION EASEMENT	9.4
SUBTOTAL	**9.4**

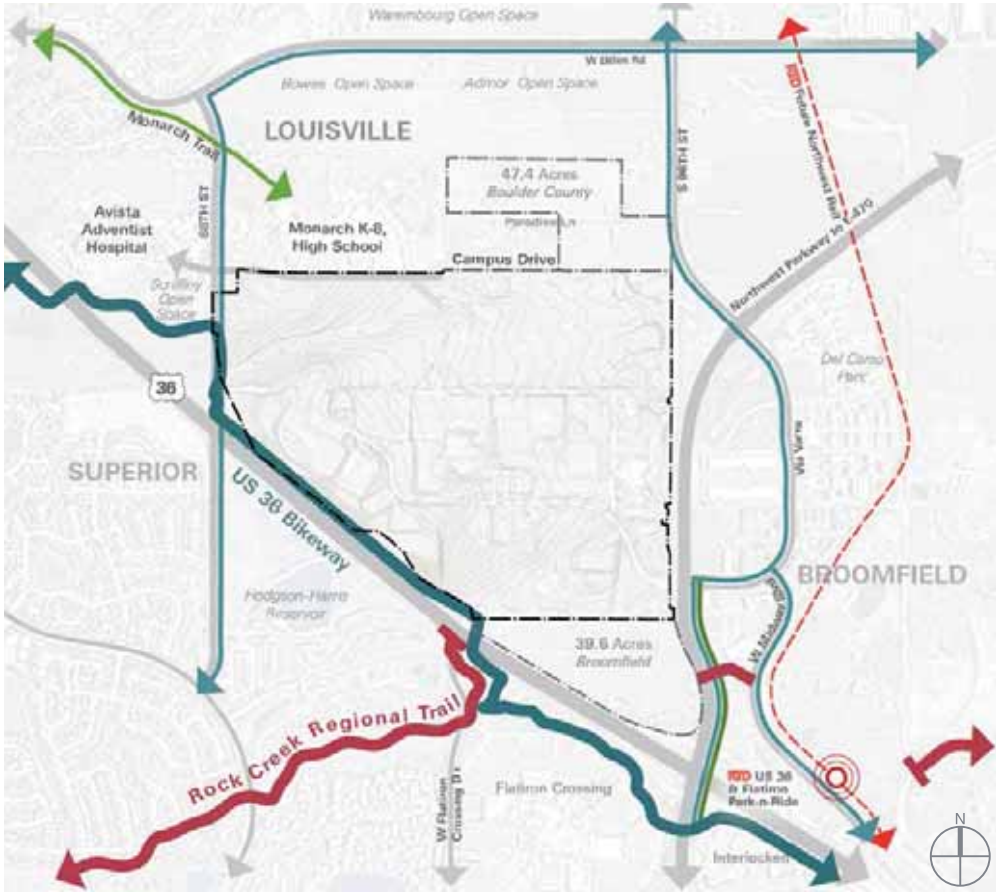
TOTAL PROTECTED LOUISVILLE LAND **69.1 AC**

Required Land Dedication *40 AC*

ADDITIONAL EASEMENTS	AC
BROOMFIELD CONSERVATION EASEMENT	40.0
ENCUMBERED EASEMENTS *(NON-DEVELOPABLE)*	2.0
TOTAL	**42.0**

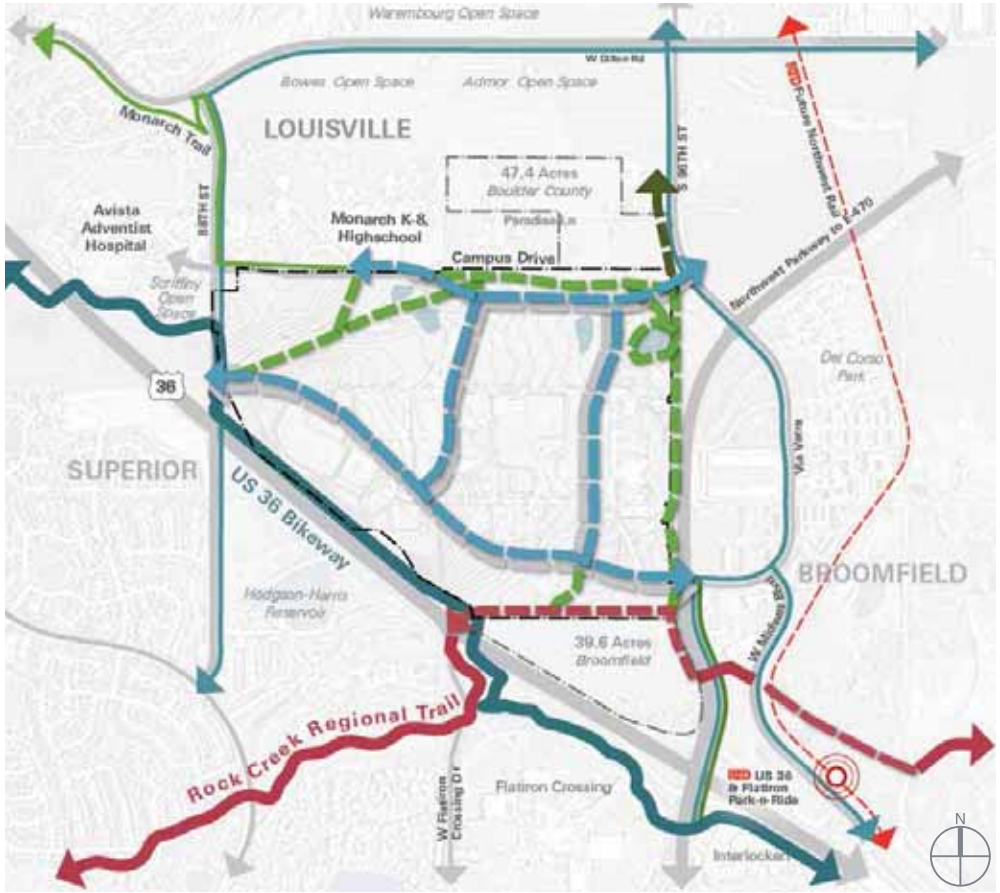
PUBLIC BENEFIT Trail Network Enhancement

Today



- Rock Creek Regional Trail
- US 36 Bikeway
- Bicycle Lanes
- Local Trail

Enhanced



- Proposed Rock Creek Regional Trail Connection
- Proposed Trail
- Proposed Downtown Louisville Trail
- Proposed Protected Bicycle Lanes

PUBLIC BENEFIT

Over 15 Miles of Pedestrian and Bicycle Facilities

	Miles
Total Softscape Trails:	1.4
Total Hardscape Trails:	1.4
Total Sidewalks:	6.4
Total Bike Lanes:	6.2
Total Pedestrian/Bicycle Facilities:	**15.4**

Redtail Ridge Loop
3.2 Miles

The Rockcress Loop
1.5 Miles

Park-to-Pond Trail
1.0 Mile

PUBLIC BENEFIT New Park Space

15.6-Acre Conceptual Park Plan *(Final Design by City of Louisville)*

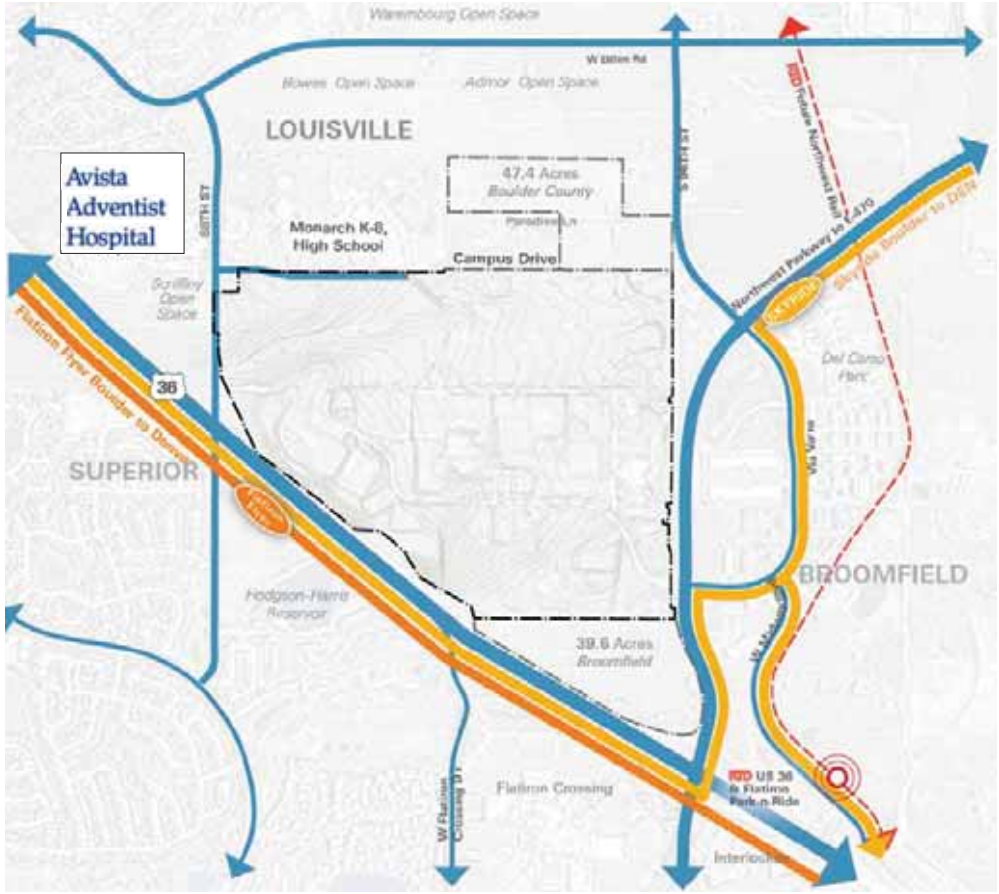
Park Scale Comparisons

Louisville Community Park
15.5 Acres

Cleo Mudrock Park
8.2 Acres

PUBLIC BENEFIT Enhanced Area Access & Circulation

Today



- Arterial Highway
- Collector Road
- Local Road
- RTD Flatiron Flyer (BRT)
- RTD Skyride
- RTD Local Louisville
- RTD Future Northwest Lightrail

Enhanced

- Arterial Highway
- Collector Road
- Local Road
- RTD Flatiron Flyer (BRT)
- RTD Skyride
- RTD Local Louisville
- Right-In/Right Out Access
- RTD Future Northwest Lightrail
- Future Collector Road
- Future Local Road
- Full Access

PUBLIC BENEFIT Improved Safety, Complete Streets

PUBLIC BENEFIT Safety and School Circulation Enhancement

Ease of Access and Circulation:

Making the connection to 96th Street with Campus Drive is projected to reroute 75% of the traffic backlog at 96th/Dillon to 88th/Dillon.

Improved Emergency Access to Schools:

Distance to reach the school campus is reduced by:

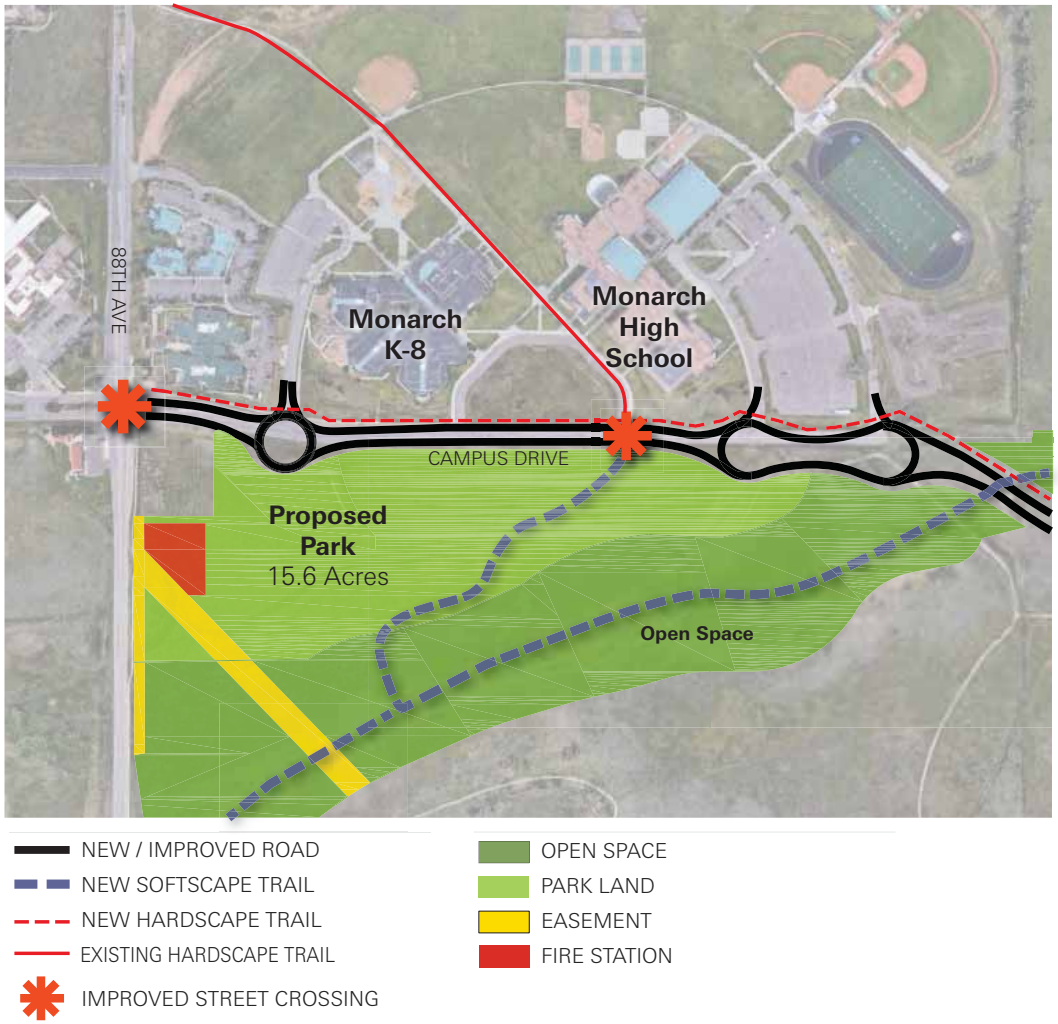
- 1 mile from the nearest Fire Station
- 2 miles from US 36

BVSD-Approved Design and Right-of-Way Dedication:

Roundabouts designed by traffic engineer and approved by BVSD for optimal school traffic operational flow during the morning and afternoon rush

Safe Crossings:

- 25 mph before entering school zone
- Raised pedestrian crosswalk to cross Campus Dr.
- Softscape trail through park lands connecting to pedestrian crossings to school
- Extension/widening of multi-use pathways
- Pedestrian underpasses for limited vehicular interactions



FISCAL BENEFIT

Gross Property Tax Benefits

Property Tax Recipient	*2018*	*2019*	*Proposed Build-out*	*Near Term Benefits*	
				Medtronic	*Erickson Ph. I*
Boulder Valley School District	508,008	5,648	12,580,000	2,100,000	550,000
Boulder County	249,257	2,741	6,110,000	1,020,000	270,000
City of Louisville	82,311	927	2,060,000	350,000	90,000
Fire Department	69,364	1,236	2,750,000	460,000	120,000
Northern Water	8,225	93	260,000	40,000	10,000
Urban Drainage & Flood Control	7,532	105	230,000	40,000	10,000
TOTAL	**$924,684**	**$10,749**	**$23,990,000**	**$4,010,000**	**$1,050,000**
		2019 Annual Taxes: $10,749		**Projected Near Term Annual Taxes: $5,060,000**	

FISCAL BENEFIT Beyond Property Tax Benefits

ADDITIONAL ONGOING REVENUE AND STIMULUS BENEFITS TO THE CITY

1. **Sales tax revenue** generated by retail, driven by office users and residential
2. High disposable income residents in Senior Living community with strong **positive impact on local businesses**
3. Substantial employee **economic impact capture**: dining, shopping, entertainment
4. **Lodging tax revenue** generated by hotels, as well as hotel occupant spending in community
5. **Construction fees**, including permit fees, building use taxes, consumer use taxes and sales taxes on durable goods, etc.

NEAR TERM CONSTRUCTION BENEFITS

Medtronic

- Construction of the **$135MM Corporate Campus** is expected to generate **$3.5 million in tax revenue**
- Net positive to the City of Louisville is $2.0 million after rebate package

Source: Louisville City Council Meeting Material, October 15, 2019

Erickson Living — Add more Living to your Life®

- Associated construction, permit fees, and tax revenue with estimated $277MM total project cost

Source: Reading Economic Impact Report

DEVELOPMENT COSTS

No Tax Burden for Louisville Residents

$0 additional tax burden on Louisville residents

DEVELOPMENT COSTS

Metropolitan Districts

The Redtail Ridge Metropolitan Districts were **conditionally approved by Louisville City Council** on February 18, 2020. The Service Plans will be amended and resubmitted with the Subdivision late in Summer 2020 to allow for updated construction costs.

- The Redtail Ridge Metropolitan Districts impose an additional property tax ("mill levy") solely on Redtail Ridge property.
- This mill levy is applied to Debt and Operations used to pay for installation or construction of Public Improvements necessary to serve the project.
- The long-term tax-exempt financing of the Public Improvements will assure the **most efficient and cost-effective financing** for the future taxpayers in the development.
- The **City carries no financial obligation** for the Debt.

RESPONSIVENESS We Listened and Responded to Community Feedback

The Plan improved thanks to the Louisville community's input & comments.

30+ Meetings with Community Members, Neighbors, Schools, Business Associations, and Stakeholders

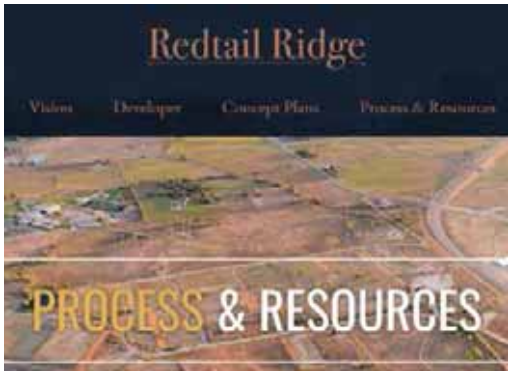
600+ Specific Comments Provided from the Community

100+ Residents Participated in On-Site Tours

- Avista Adventist Hospital
- BVSD
- CAC
- Colorado Technology Center Boards
- Coal Creek Ranch HOA
- Community Meetings
- Commuting Solutions
- Downtown Business Association
- Farmer's Market
- Flatiron Mall
- GM at Flatiron Mall
- Lions Club
- Louisville Chamber of Commerce
- Louisville Goddard School
- Louisville Historical Museum
- Open Space Advisory Board
- Parks and Public Landscaping Advisory Board
- Recreation Advisory Board
- Select members of Business Retention & Development Committee

Site Tour Dec 14, 2019

Community Meeting #1 Aug 19, 2019



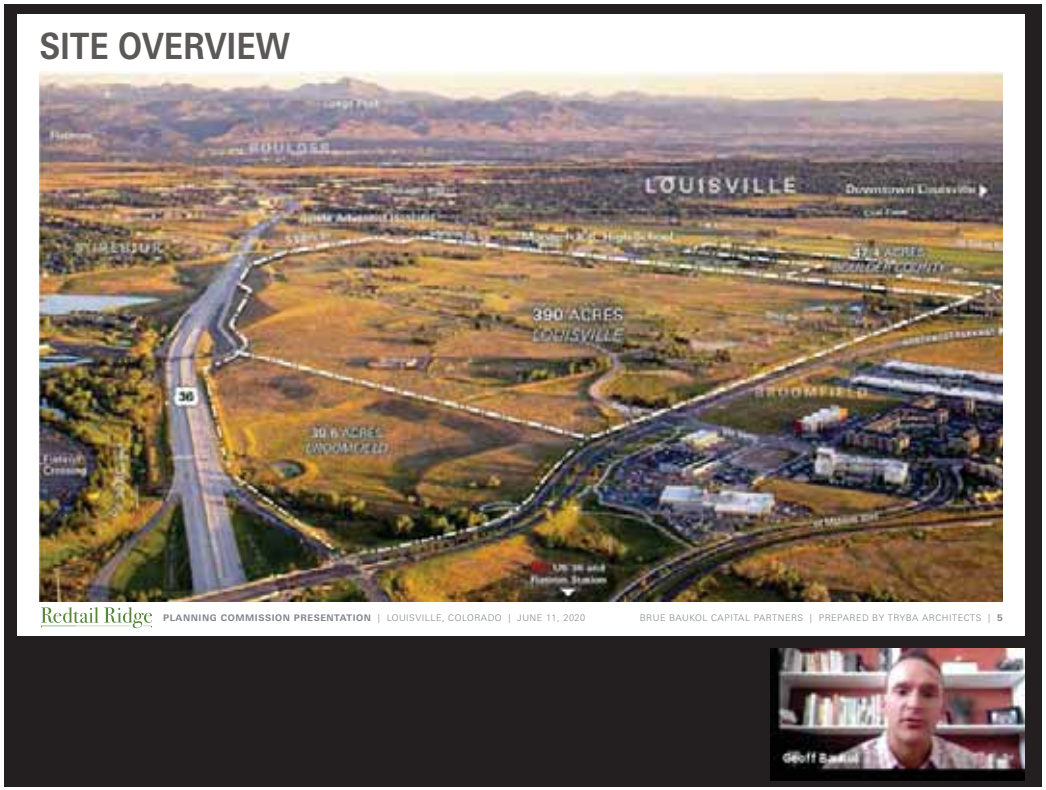
Informative & Transparent Website with Feedback Collection

RESPONSIVENESS

Continued Public Engagement During the COVID-19 Pandemic

Live Public Information Webinars (May 14, 16, 18 & 26)

Virtual Telephone Town Hall (May 20th)

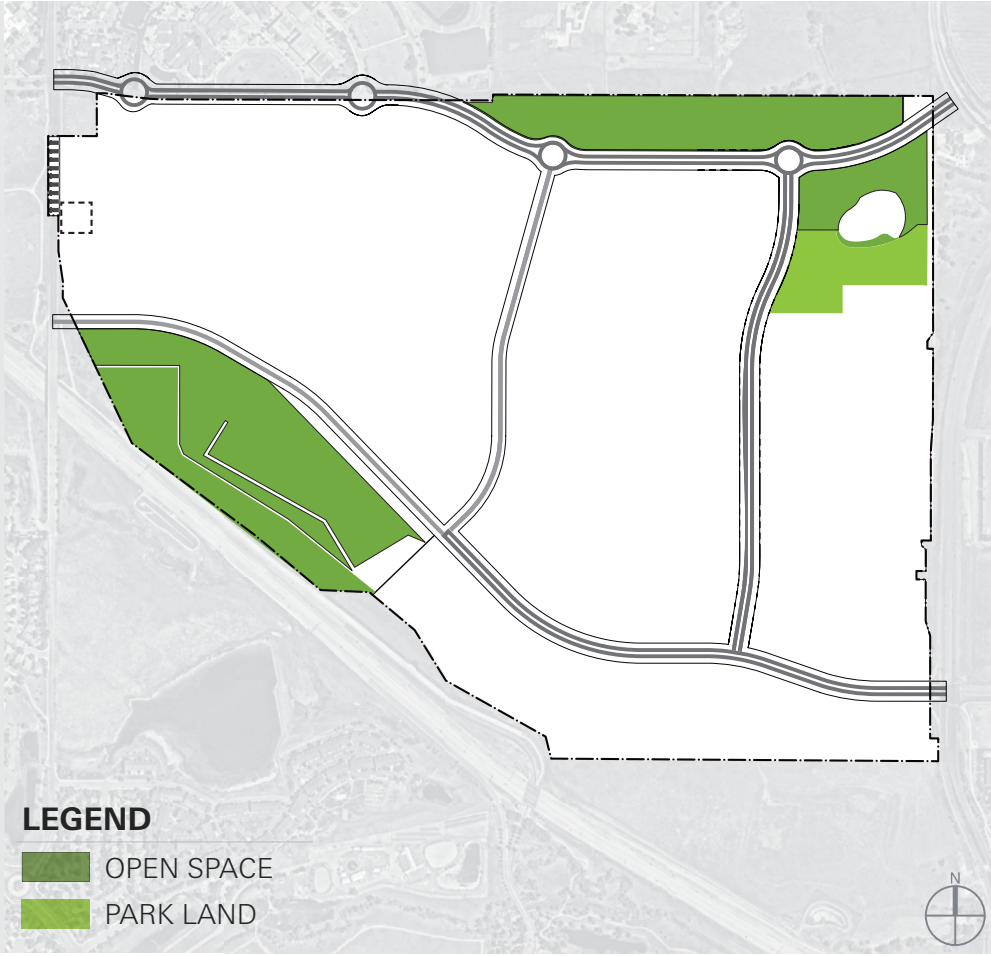


Virtual Site Tour Video (https://vimeo.com/414966278)

RESPONSIVENESS

Increase and Relocation of Public Land Dedication

Prior GDP Submittal



Current Plan

RESPONSIVENESS Density Reduction

PRIOR GDP SUBMITTAL	AREA (SF)
OFFICE	3,050,000
SENIOR HOUSING	2,500,000
HOTEL	680,000
RETAIL	170,000
RESIDENTIAL	-
TOTAL*	**6,400,000**

CURRENT PLAN SUBMITTAL	AREA (SF)	*CHANGE*
OFFICE	2,250,000	*(800,000)*
SENIOR HOUSING	1,800,000	*(700,000)*
HOTEL	200,000	*(480,000)*
RETAIL	70,000	*(100,000)*
RESIDENTIAL	900,000	*900,000*
TOTAL*	**5,220,000**	***(1,180,000)***

*NOT INCLUDING STRUCTURED PARKING

DENSITY

Further Reduction of Scale Not Feasible

The current Metro District Service Plans generate bonds for $135 million to build public infrastructure improvements allowing the development to cover infrastructure costs and pay its own way.

The infrastructure and public benefit costs are primarily fixed, so the density of the project and the required improvements are not correlated linearly.

In order to pay for all of the improvements and accommodate a density decrease from 6.4MM SF to 5.22MM SF, the mill levy has been increased, placing it among the highest mill levies in the market.

Further **decreasing the density below 5.22MM SF creates a deficit for the project, and an inability to pay for the required infrastructure and the public benefits.**

REDTAIL RIDGE

BUILD 5.2 MM SF DEVELOPMENT Current Service Plan* - Bond Financing Scenario

	Max SF	*Est. Bonds for Public Improvements*	
Medtronic (D2)	530,000	16,420,000	12%
Erickson (D3)	1,800,000	13,290,000	10%
Mixed-Use/Commercial (D4)	2,890,000	105,290,000	78%
Total (excl. parking)	**5,220,000**	**135,000,000**	**100%**

CURRENT ZONING

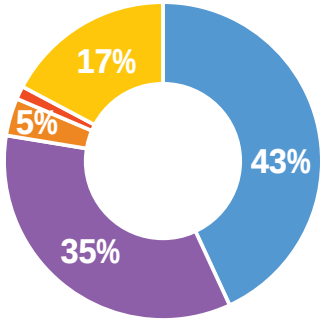
BUILD ONLY 2.5 MM SF DEVELOPMENT

	Max SF	*Est. Bonds for Public Improvements*	
Medtronic (D2)	530,000	16,420,000	12%
Erickson (D3)	1,800,000	13,290,000	10%
Mixed-Use/Commercial (D4)	170,000	6,190,000	5%
Total (excl. parking)	**2,500,000**	**35,900,000**	**27%**
		Results in a deficit of $99.1MM for public improvements compared with the Redtail Ridge proposal	

* Per Current Metro District Service Plan, Subject to Final Cost Estimates.

DENSITY DISTRIBUTION Allowable Program Density & Conceptual Land Uses

PROGRAM SUMMARY	AREA (SF)
OFFICE	2,250,000
SENIOR LIVING	1,800,000
HOTEL	200,000
RETAIL	70,000
RESIDENTIAL	900,000
TOTAL BEFORE PARKING	**5,220,000**



48% of development is located in Parcel C along NW Pkwy.

NOTE: The development plans shown are illustrative only. Individual development parcel plans will be finalized during the planned unit development (PUD) process.

KEY TOPICS

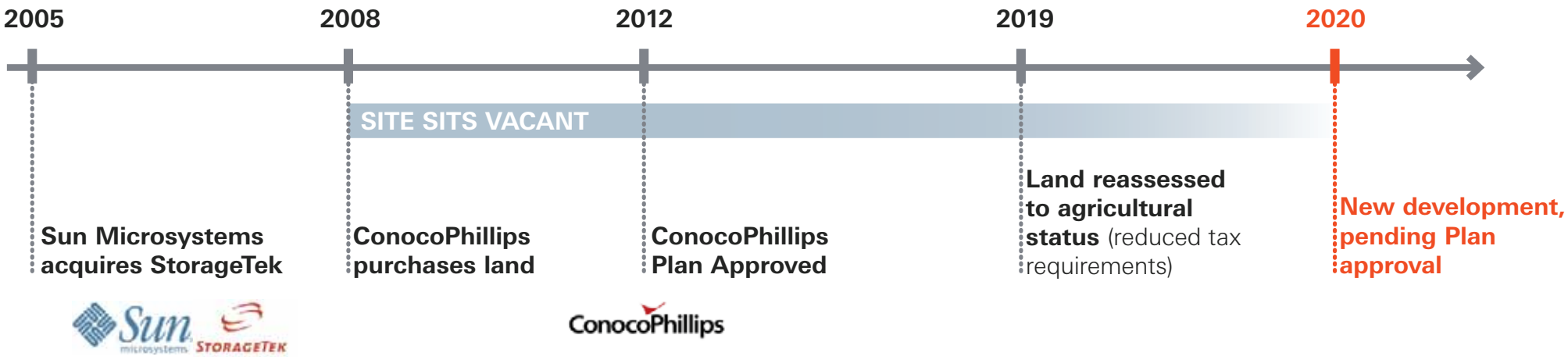
1. Density
2. Building Heights
3. Traffic
4. Residential Uses

DENSITY

Site History vs. Proposed: Area (Square Footage) and Employee Count

Former Storage Tek campus.

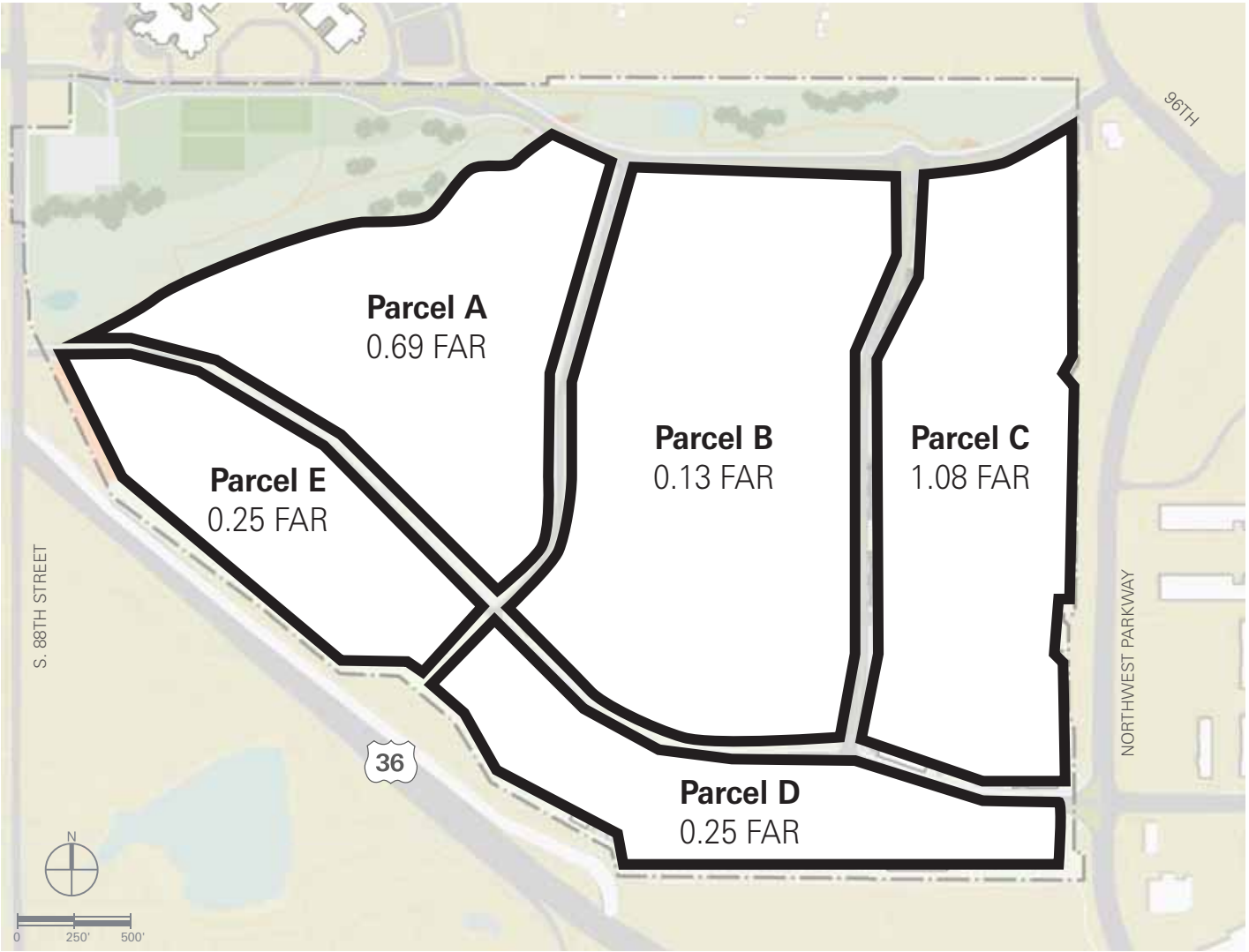
Development or Plan	Area* (SF)	Employees
STORAGETEK *(built)*	1.7M	4,800
ConocoPhillips *(approved)*	2.5M	7,000
Redtail Ridge *(proposed, at full build-out)*	5.2M	8,400



*Does not include structured parking

DENSITY

Suburban Density & Anticipated Implementation Schedule



0.48

Average Development FAR* at Full Site Build-Out

(below the City's Suburban FAR Classification of 0.50 as defined in the City's Comprehensive Plan)

20-years

Anticipated Site Build-Out

**FAR, or Floor Area Ratio, is the total area of allowable development divided by the total property boundary area. An FAR of 0.5 means a building's total enclosed area can only be 1/2 as big as the property on which it sits.*

DENSITY Local Development Comparisons

ARISTA DEVELOPMENT - BROOMFIELD, CO

	ARISTA (APPROVED)	REDTAIL RIDGE (PROPOSED)
TOTAL ACRES	184.6	389.1
TOTAL DEVELOPMENT AREA (SF) *(INCLUDING PARKING)*	2,583,000	5,886,000
AVERAGE DEVELOPMENT FAR	0.75	0.48
ALLOWABLE BUILDING HEIGHTS (STORIES)	1-6	1-5
RESIDENTIAL UNITS	2,250	2,226
OPEN/PARK SPACE (AC) *(EXCLUDING CONSERVATION EASEMENTS)*	24.73	59.6

DENSITY Local Development Comparisons

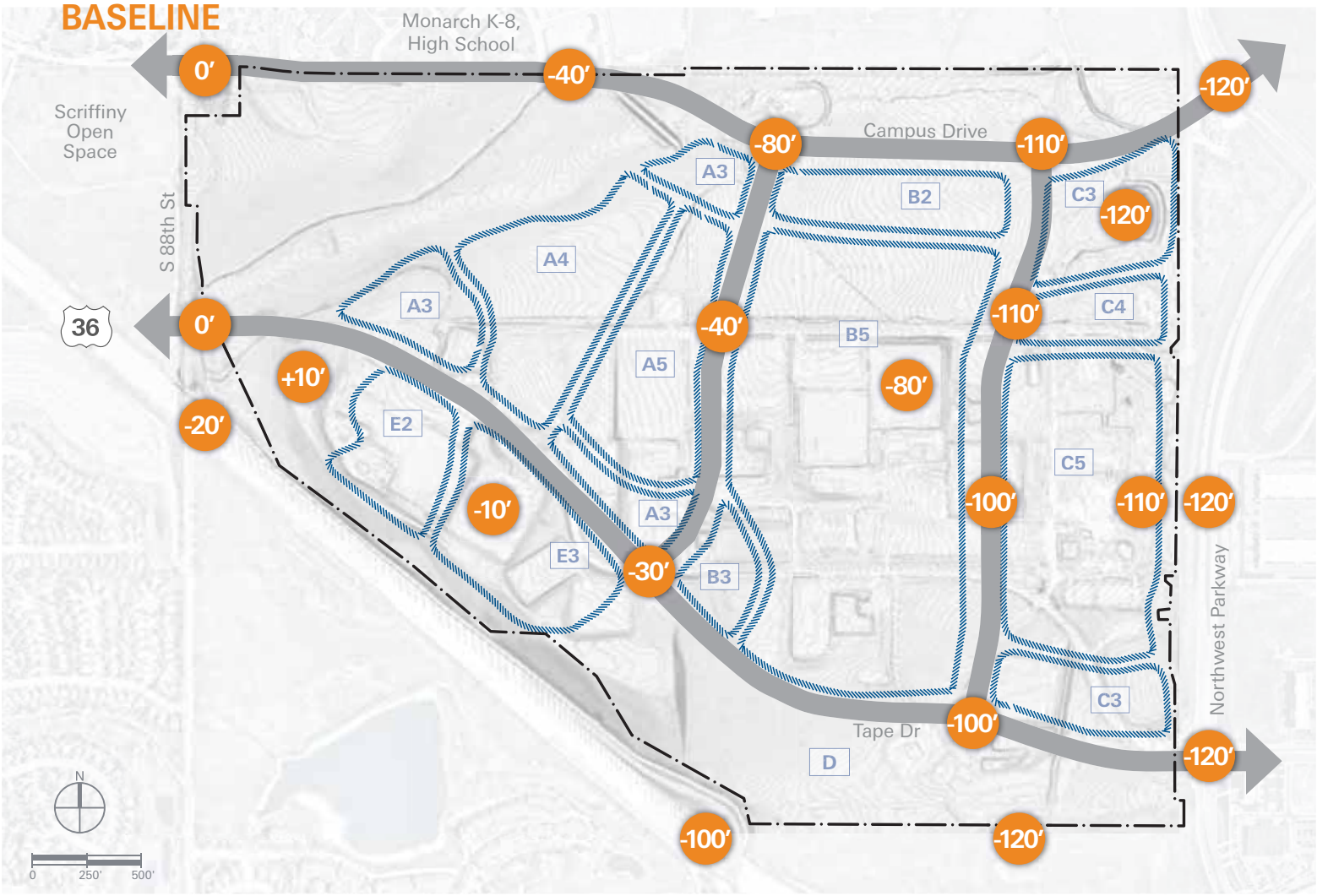
TOWN CENTER - SUPERIOR, CO

	TOWN CENTER[1] (APPROVED)	REDTAIL RIDGE (PROPOSED)
TOTAL ACRES	156.4	389.1
TOTAL DEVELOPMENT AREA (SF)[2] *INCLUDING PARKING*	4,783,000	5,886,000
AVERAGE DEVELOPMENT FAR	0.70	0.48
ALLOWABLE BUILDING HEIGHTS (STORIES)	1-6	1-5
RESIDENTIAL UNITS	1,400	2,226
OPEN/PARK SPACE (AC) *(EXCLUDING CONSERVATION EASEMENTS)*	48.5	59.6

1. Per Town of Superior Planned Development Plan Amendment 3, June 2016
2. Assumptions: 2500 GSF/residential unit and 550 GSF/hotel room assumed.

BUILDING HEIGHTS

Site Topography & Building Height Relationship



Topography on the site varies immensely.

Proposed building height subareas limit density along key roads and viewsheds.

PARCEL A

- A3 *3 STORIES*
- A4 *4 STORIES*
- A5 *5 STORIES*

PARCEL B

- B2 *2 STORIES*
- B3 *3 STORIES*
- B5 *5 STORIES*

PARCEL C

- C3 *3 STORIES*
- C4 *4 STORIES*
- C5 *5 STORIES*

PARCEL D

- D 4 STORIES

PARCEL E

- E2 *2 STORIES*
- E3 *3 STORIES*

BUILDING HEIGHTS Conceptual 3D Views

BUILDING HEIGHTS Conceptual 3D Views

BUILDING HEIGHTS Conceptual 3D Views

BUILDING HEIGHTS Conceptual 3D Views

BUILDING HEIGHTS Conceptual 3D Views

TRAFFIC Impact & Mitigation

Improving Circulation & Traffic Flow:

- Significant investment in on-site and off-site roadway improvements
- Significant regional improvements
- Efficient roadway design
- Redistribution and dissemination of peak rush hour

Encouraging Alternative Travel Modes:

- Complete Street Design
- Trail network and Mobility network Connections
- Transportation Demand Management Policies
- Shuttles for Senior Care Facility

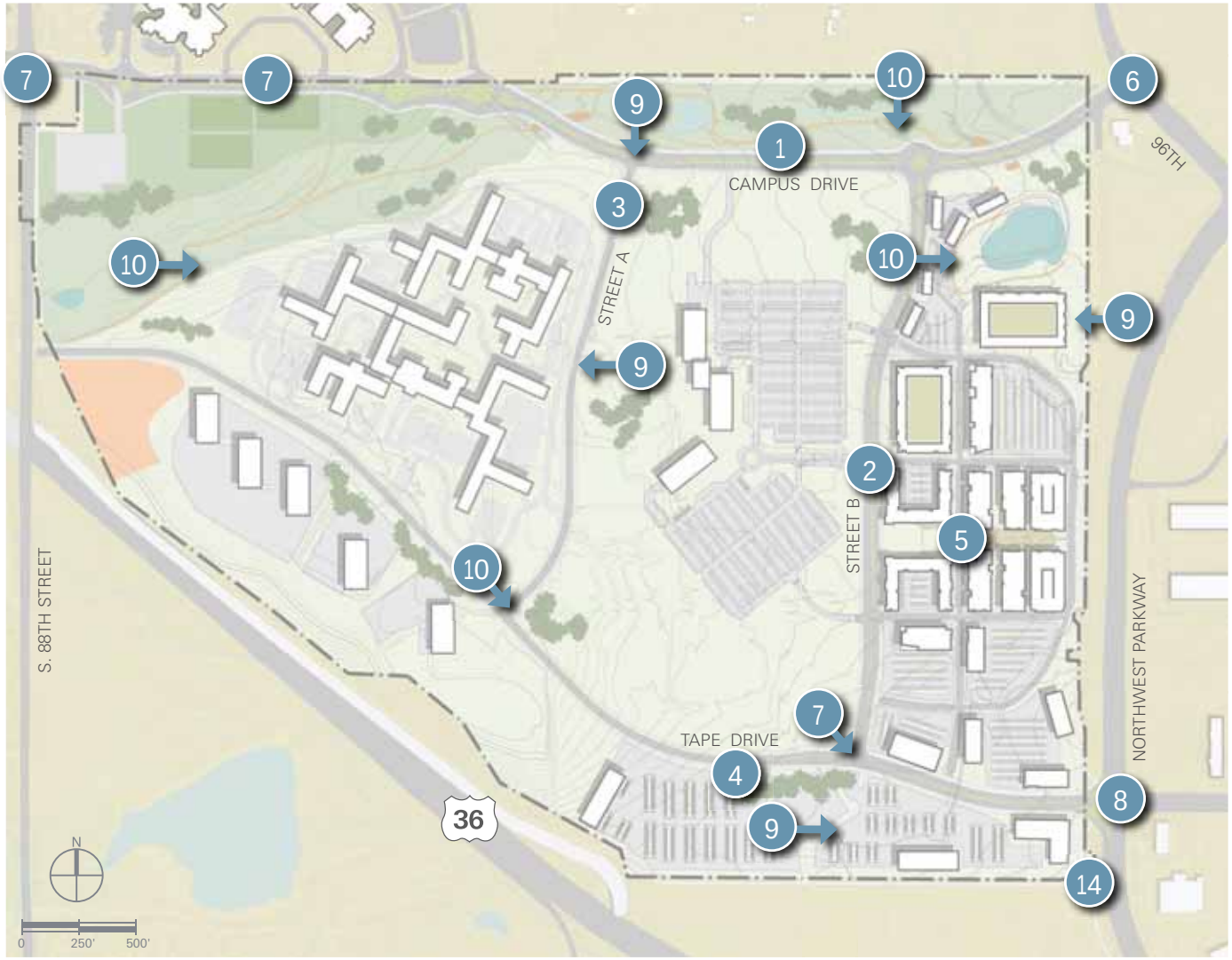
Trip Generation Estimates Comparison

Redtail Ridge does not add a significant amount of peak hour traffic when compared with the approved ConocoPhillips plan.

Development	*Trip Generation Estimates*	
	AM Peak Hr	*PM Peak Hr*
ConocoPhillips	2,660	2,455
Redtail Ridge	2,350	2,609
Redtail vs. ConocoPhillips (%)	*-12%*	*+6%*

TRAFFIC

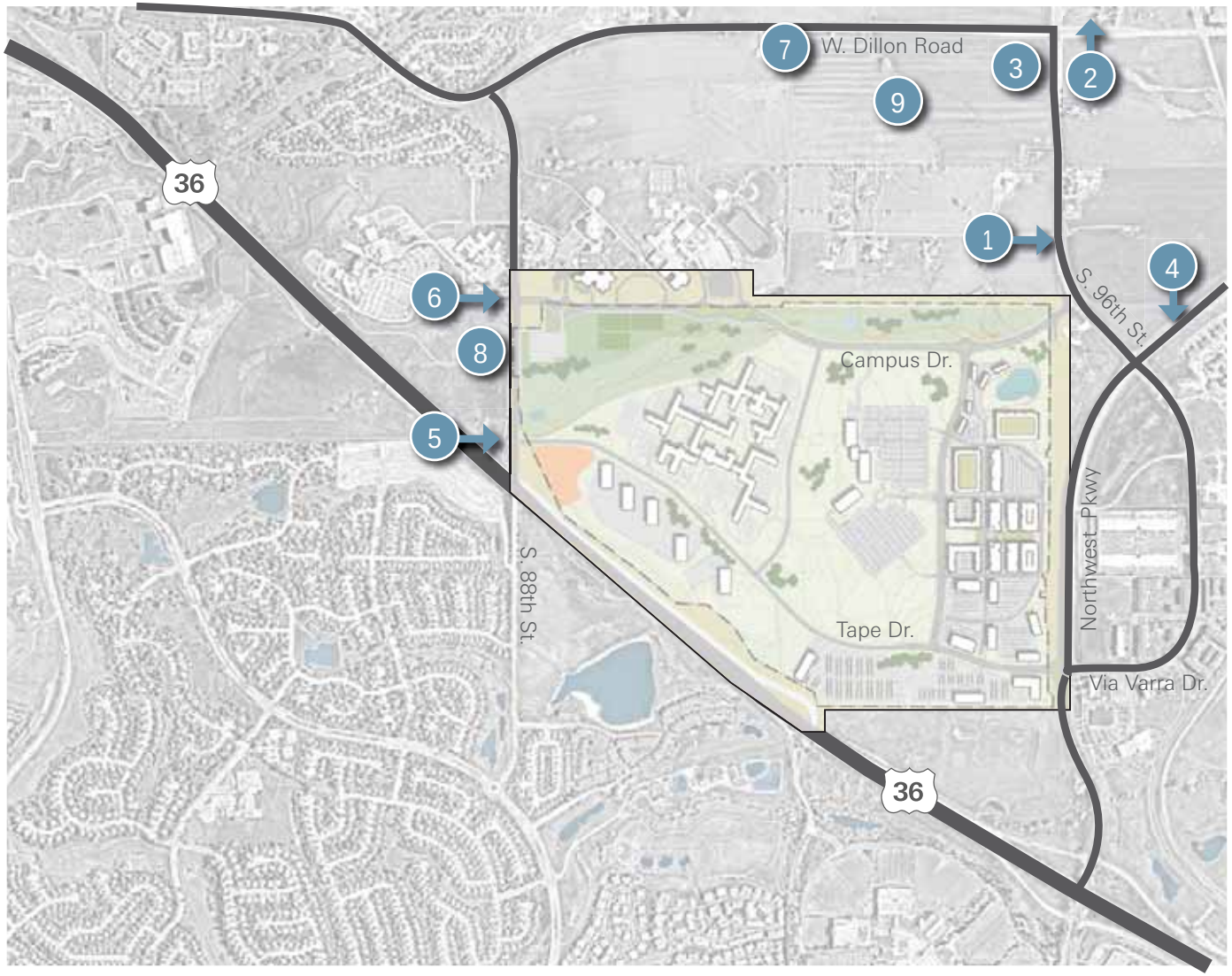
On-Site Traffic Improvements



IMPROVEMENT		EST. COST
Right-of-Way Improvements		
1	Campus Drive	
2	Street B	
3	Street A	
4	Tape Drive	
5	Local Street Grid	
6	96th & Campus Intersection Improvements	
	Subtotal:	*89,400,000*
Pedestrian Elements		
7	Above-Grade Pedestrian Crossings	
8	Above-Grade Tape & Via Varra Enhancement	
9	Hardscape Trails	
10	Softscape Trails	
	Subtotal:	*2,200,000*
Other		
	Subtotal:	*3,400,000*
Total On-Site Improvements Paid by the Development:		**$95,000,000**

TRAFFIC

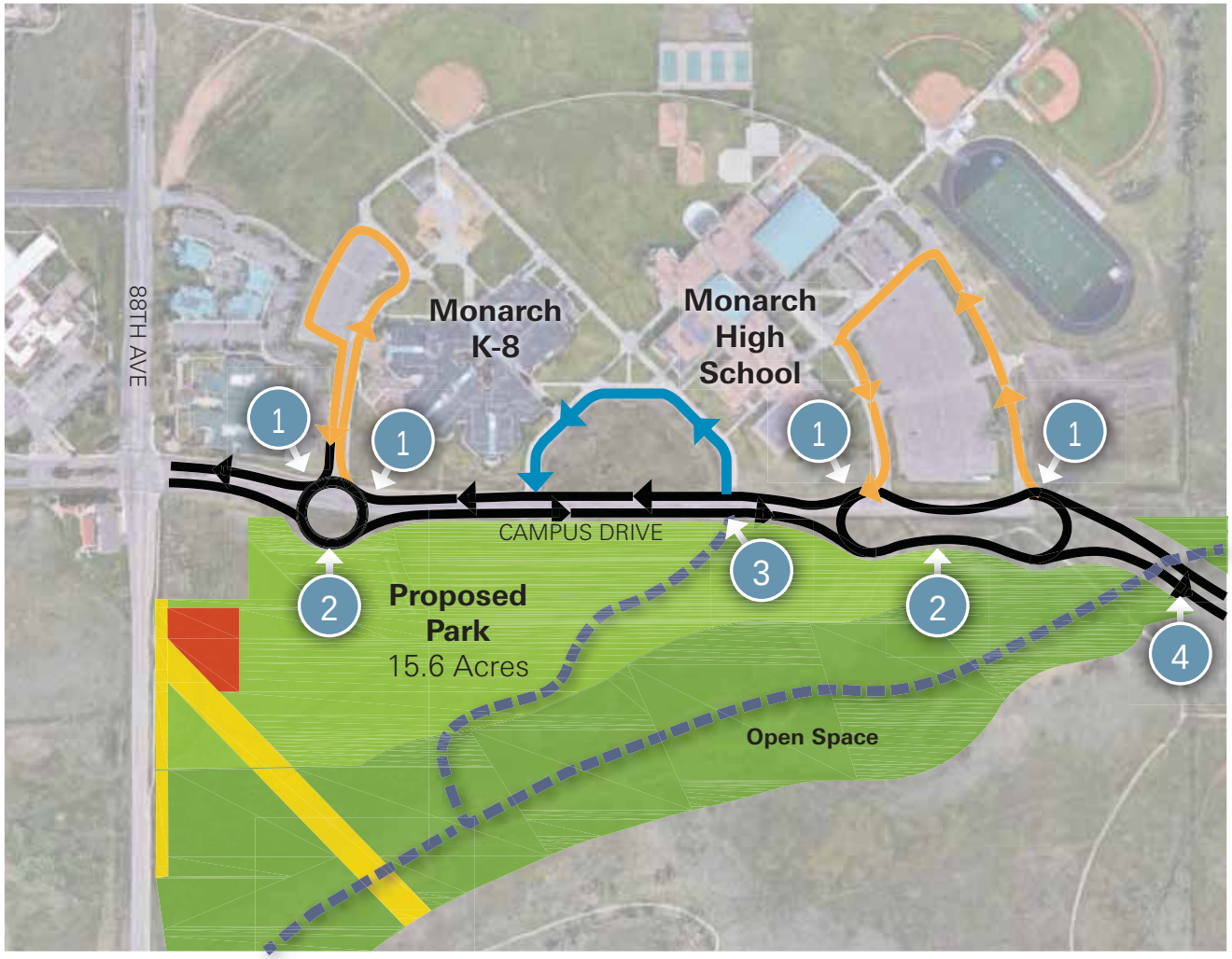
Off-Site Traffic Improvements



IMPROVEMENT	EST. COST
Right of Way	
1 Expand 96th St. 1/2 Northwest Pkwy to Dillon	
2 Expand 96th St. 1/2 Mile north of Dillon	
3 96th & Dillon-Dual Left Turn Lanes & Intersection Capacity	
4 NW Pkwy & 96th - Triple Northbound	
5 88th & Tape Turn Lanes	
6 88th & Campus Lengthen Turn Lanes	
Subtotal:	*21,500,000*
Pedestrian	
8 Dillon Pedestrian Underpass	
8 88th Street Multi-use Path Extension	
9 Softscape Downtown Connector Trail	
Subtotal:	*5,600,000*
Total Off-Site Improvements Paid by the Development:	**$27,100,000**

TRAFFIC

School Access Improvements



1. The creation of right turn entry into the school campuses, eliminating left turn congestion and oncoming car conflicts.
2. The roundabouts ease traffic flow while naturally reducing speed along Campus Drive.
3. The raised pedestrian crossing offers additional safe crossing between the roundabouts.
4. Extending Campus Drive to 96th allows access (including buses) from the east.

LEGEND

- NEW / IMPROVED ROAD
- SCHOOL BUS DROP OFF / PICKUP
- PARENT DROP OFF / PICKUP
- SOFTSCAPE TRAIL

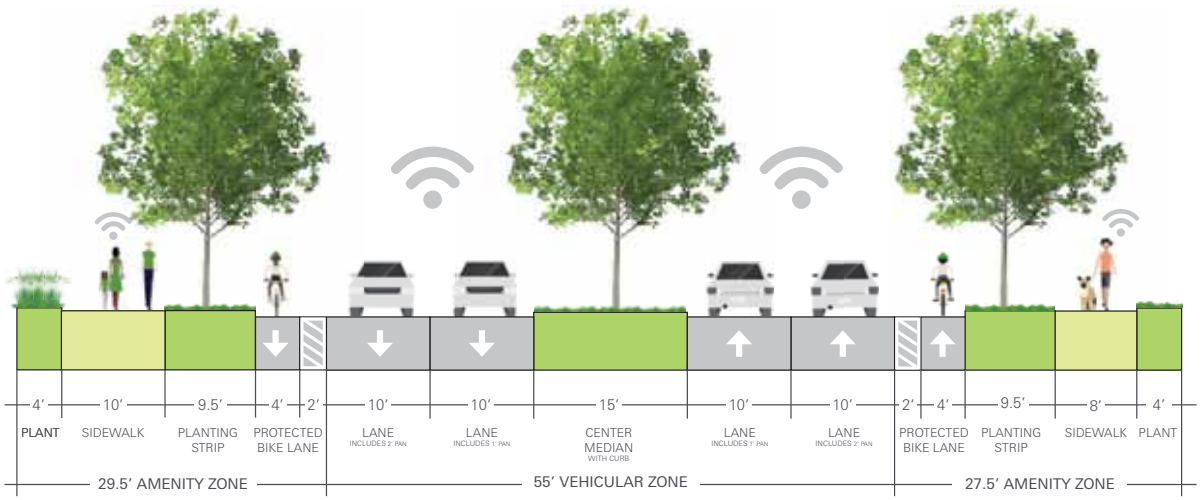
- OPEN SPACE
- PARK LAND
- EASEMENT
- FIRE STATION

TRAFFIC

Complete Streets

- Balance the needs of people who are driving, walking cycling and rolling in, to, and through the development
- Enhance safety for all users
- Encourages non-vehicular travel options

Proposed Campus Drive Street Section



Campus Drive - Bike Trail

Scenic Boulevard

Roundabout

TRAFFIC

Traffic Demand Management

Traffic Demand Management (TDM) is a multi-faceted approach to mitigating traffic resulting from development.

The TDM Strategy for Redtail Ridge includes the following strategies:

- Connections to the regional trail network
- Enhance the internal trail network
- Increase mix of land uses to reduce traffic
- Member of Commuting Solutions (a Transportation Management Association in Louisville)
- Erickson on-site and off-site daily shuttle service
- Hiring a transportation coordinator for the entire project
- Ecopass discounts for employers and employees
- Vanpool and Carpool Coordination
- Bike access, parking and amenities for commuters
- Walk and Bike to Work Sponsorships

Commuting Solutions

RESIDENTIAL USES Mixture of Uses **Creates Place** & Supports Traffic Mitigation

Creating Place

Modern successful developments and creations of **vibrant places** all include residential due to its support of the retail and commercial uses and its ability to create an "18-hour" community.

Traffic Comparison

Land Uses	*Size*	*units*	*Avg Weekday Trips* *Total*
General Office Building	900	KSF	8,766
Multifamily Housing (mid-rise)	900	units	4,896
Continuing Care Retirement Community	900	units	2,160
		Subtotal	**15,822**
*Benefits of mixing **Multifamily Housing** land uses and Office on site, vs. Office land uses only*			*(3,870)* *-44%*
*Benefits of mixing **Senior Housing** land uses and Office on site, vs. Office land uses only*			*(6,606)* *-75%*

*Mixing office, senior housing and residential uses **reduces** the average weekday trips.*

Source: Fox Tuttle Transportation Group

RESIDENTIAL USES The Need for Workforce, Entry-Level & Affordable Housing

Public comments and feedback from the community encouraged us to support the inclusion of workforce, entry-level and affordable housing on site.

Boulder County recognizes that the City of Louisville has adopted the regional housing goals articulated in the Regional Affordable Housing Strategic Plan, in addition to pursuing local affordable housing targets and specific affordable housing development projects. **The County encourages the P66 project, and all future development in communities across the county, to contribute to county-wide goals related to housing.**

The county encourages inclusion of a **range of housing sizes and types** to help achieve greater diversity in the region's housing stock. The county also encourages all residential developments to include a portion dedicated to serving **low and moderate income members of the community.**

Integrating low and moderate income housing across the community and improving the diversity of the region's housing stock will help make incremental progress toward **addressing the region's affordable housing challenges**. It also helps offer housing solutions to meet the wide ranging and evolving needs of the Boulder County community.

– Boulder County

Kestrel Housing Development

Medtronic General Company Overview

- Stable and strong, global Fortune 500 company
- Boulder County's largest private employer
- Highly educated employees and high paying jobs
- Established in the community
- Commerce anchor that will spur positive economic activity in the community

TECH CRUNCH

March 30, 2020

Medtronic is sharing its portable ventilator design specifications and code for free to all

Medtronic

New & Retained Jobs in the Community

Medtronic employees living in Louisville today

400+

500+

existing Medtronic **jobs retained** in Louisville due to Redtail Ridge development

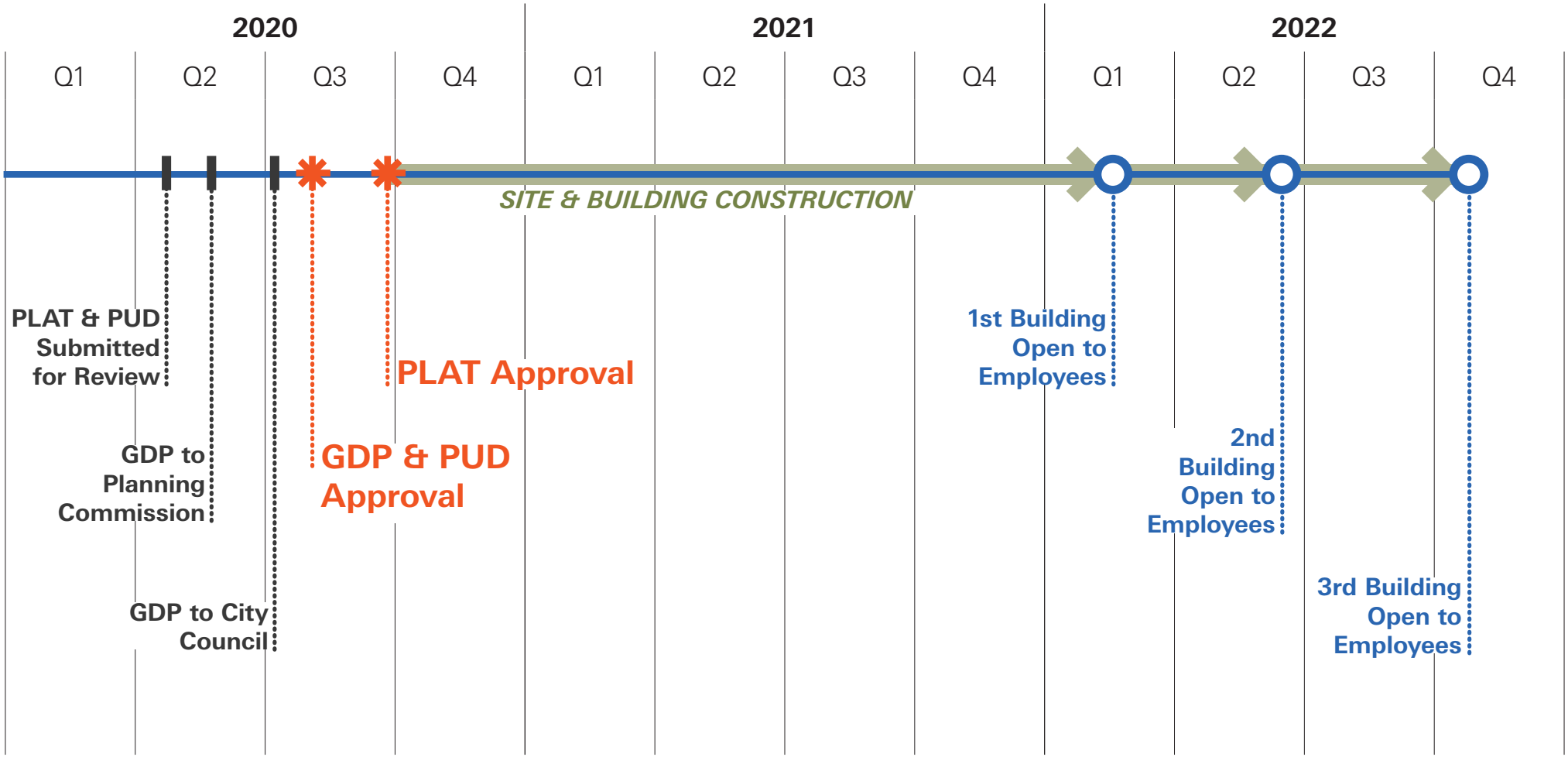
500 to 1,000

new jobs created and to be **located in Louisville** if the GDP and PUD are approved

2,000+

existing Boulder County Medtronic **jobs retained** due to Redtail Ridge development

Medtronic Schedule



IN SUMMARY

THIS PLAN IS...

1. Created by the Community
2. Benefits the Community
3. Provides long-term fiscal stability for the Community

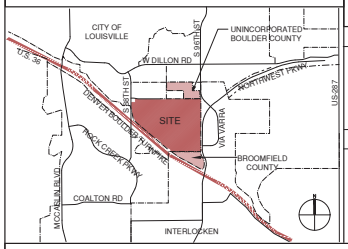
THANK YOU!
VISIT US: WWW.REDTAILRIDGELOUISVILLE.COM
Facebook Redtail Ridge Colorado
Instagram @redtailridgeco
Twitter @redtailridgeco
LinkedIn Redtail Ridge Colorado
BRUE·BAUKOL
CAPITAL PARTNERS
TRYBA ARCHITECTS

CONOCOPHILLIPS CAMPUS GENERAL DEVELOPMENT PLAN, 1ST AMENDMENT

REDTAIL RIDGE MASTER PLAN

PART OF THE SOUTH HALF OF SECTION 20, THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH P.M.

VICINITY MAP



GENERAL BUILDING HEIGHTS & SETBACKS

MAXIMUM BUILDING HEIGHTS

MAXIMUM BUILDING HEIGHTS PROPOSED ON THE SITE WILL EXCEED LIMITATIONS SET FORTH IN THE CITY CODE OR ADOPTED DESIGN STANDARDS (ADS).

PROPOSED MAXIMUM BUILDING HEIGHTS IN EXCESS OF ADS REQUIREMENTS WILL REQUIRE CITY COUNCIL APPROVAL THROUGH THE PUD DEVELOPMENT PLAN REVIEW PROCESS AND ARE NOT APPROVED BY THIS GDP. REFER TO THE DEVELOPMENT PROGRAM ON SHEET 2 FOR PROPOSED BUILDING HEIGHT LIMITATIONS PER PARCEL.

BUILDING SETBACKS

BUILDING SETBACKS PROPOSED ON THE SITE WILL NOT VARY FROM THE LIMITATIONS SET FORTH IN THE ADS UNLESS NOTED ON SHEET 2.

SETBACKS THAT VARY FROM ADS REQUIREMENTS WILL REQUIRE CITY COUNCIL APPROVAL THROUGH THE PUD DEVELOPMENT PLAN REVIEW PROCESS AND ARE NOT APPROVED BY THIS GDP.

SITE INFORMATION

GROSS DEVELOPABLE AREA (GDP BOUNDARY):	389.1 ACRES
ZONING:	PLANNED COMMUNITY ZONED DISTRICT (PCZD) - COMMERCIAL/RESIDENTIAL
PLANNED ACCESS:	NORTHWEST PARKWAY, CAMPUS DRIVE, SOUTH 88TH STREET, TAPE DRIVE

SHEET INDEX

SHEET 1 COVER SHEET
SHEET 2 DEVELOPMENT PLAN
SHEET 3 CIRCULATION PLAN

PERMITTED USES

PERMITTED USES SPECFIC TO PARCEL A

- ACCESSORY BUILDINGS AND USES, INCLUDING BUT NOT LIMITED TO: MEDICAL AND DENTAL CLINICS, RESTAURANTS AND DINING FACILITIES, PLACES OF WORSHIP INDOOR AND OUTDOOR RECREATION, RETAIL AND BANKING FACILITIES, BEAUTY SALONS AND BARBER SHOPS, DAY CARE CENTERS
- PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS INCLUDING SUCH AMENITIES AS OUTDOOR ART EXHIBIT FACILITIES, STATUARY, FOUNTAINS AND LANDSCAPING FEATURES
- REST, NURSING, AND RETIREMENT HOMES AND OTHER RESIDENTIAL CARE FACILITIES FOR USERS 55+ IN AGE, INCLUDING: CONGREGATE HOUSING/INDEPENDENT LIVING, ASSISTED LIVING, MEMORY CARE,SKILLED NURSING, HIGH ACUITY ASSISTED LIVING, ACTIVE ADULT COMMUNITIES/AGE RESTRICTED APARTMENTS
- TRANSPORTATION TERMINALS, PARKING LOTS AND PARKING BUILDINGS

PERMITTED USES SPECIFIC TO PARCEL B

- ACCESSORY BUILDINGS AND USES, INCLUDING BUT NOT LIMITED TO BANKING, CHILDCARE, INDOOR EATING ESTABLISHMENTS, ESTABLISHMENTS FOR RETAILING OF CONVENIENCE GOODS, HEALTH OR ATHLETIC CLUBS
- PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS INCLUDING SUCH AMENITIES AS OUTDOOR ART EXHIBIT FACILITIES, STATUARY, FOUNTAINS AND LANDSCAPING FEATURES
- PROFESSIONAL, BUSINESS AND ADMINISTRATIVE OFFICES
- RESEARCH/OFFICE AND CORPORATE USES AND FACILITIES FOR THE MANUFACTURING, FABRICATION, PROCESSING, OR ASSEMBLY OF SCIENTIFIC OR TECHNICAL PRODUCTS OR OTHER PRODUCTS, IF SUCH USES ARE COMPATIBLE WITH SURROUNDING AREAS, SUCH FACILITIES SHALL BE COMPLETELY ENCLOSED AND ANY NOISE, SMOKE, DUST, ODOR, OR OTHER ENVIRONMENTAL CONTAMINATION PRODUCED BY SUCH FACILITIES CONFINED TO THE LOT UPON WHICH SUCH FACILITIES ARE LOCATED AND CONTROLLED IN ACCORDANCE WITH ALL APPLICABLE CITY, STATE AND FEDERAL REGULATIONS
- TRANSPORTATION TERMINALS, PARKING LOTS AND PARKING BUILDINGS
- RESEARCH AND DEVELOPMENT
- TRAINING

	PERMITTED USES SPECIFIC TO PARCELS C, D & E	PARCEL		
	USE GROUPS	C	D	E
1	ACCESSORY BUILDINGS AND USES	Y	Y	Y
2	RETAIL TRADE**	Y	Y	N
3	CULTURAL FACILITIES SUCH AS MUSEUMS, THEATRES, ART GALLERIES, AND CHURCHES	Y	Y	N
4	PERSONAL SERVICE SHOP	Y	Y	N
5	MEDICAL AND DENTAL CLINICS, FINANCIAL INSTITUTIONS, ANIMAL HOSPITAL, SMALL ANIMAL CLINICS	Y	Y	N
6	ESTABISHMENTS FOR RETAILING OF CONVENIENCE GOODS, INCLUDING BUT NOT LIMITED TO VARIETY STORE, HARDWARE STORES, SUPERMARKETS, SPORTING GOOD STORES, SHOE STORES, AND DRUGSTORES*	Y	Y	N
7	HEALTH OR ATHLETIC CLUBS, SPAS, DANCE STUDIOS, AND FITNESS STUDIOS	Y	Y	Y
8	HOTELS AND EXTENDED STAY LODGING FACILITIES, INCLUDING RESTAURAUNTS AND OTHER INCIDENTAL COMMERCIAL USES INSIDE THE PRINCIPAL BUILDING	Y	Y	Y
9	LIMITED WHOLESALE SALES	Y	Y	N
10	INDOOR EATING AND DRINKING ESTABLISHMENTS*	Y	Y	N
11	MULTI-UNIT RESIDENTIAL DWELLINGS	Y	Y	N
12	OUTDOOR SPECIALTY USES INCLUDING SIDEWALK CAFES AND OUTDOOR MARKETPLACES TO PROVIDE UNIQUE CONGREGATING PLACES FOR SALES AND SHOPPER INTERESTS	Y	Y	Y
13	PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS INCLUDING SUCH AMENITIES AS OUTDOOR ART EXHIBIT FACILITIES, STATUARY, FOUNTAINS AND LANDSCAPING FEATURES	Y	Y	Y
14	PROFESSIONAL, BUSINESS AND ADMINISTRATIVE OFFICES	Y	Y	Y
15	RECREATIONAL FACILITIES, BOTH INDOOR AND OUTDOORS, SUCH AS ICE SKATING AND ROLLER-SKATING RINKS WHICH MAY BE DESIGNED AS INTERGRAL PARTS OF A CENTER	Y	Y	Y
16	RESEARCH/OFFICE AND CORPORATE USES AND FACILITIES FOR THE MANUFACTURING, FABRICATION, PROCESSING, OR ASSEMBLY OF SCIENTIFIC OR TECHNICAL PRODUCTS OR OTHER PRODUCTS, IF SUCH USES ARE COMPATIBLE WITH SURROUNDING AREAS, SUCH FACILITIES SHALL BE COMPLETELY ENCLOSED AND ANY NOISE, SMOKE, DUST, ODOR, OR OTHER ENVIRONMENTAL CONTAMINATION PRODUCED BY SUCH FACILITIES CONFINED TO THE LOT UPON WHICH SUCH FACILITIES ARE LOCATED AND CONTROLLED IN ACCORDANCE WITH ALL APPLICABLE CITY, STATE AND FEDERAL REGULATIONS	Y	Y	Y
17	CHILDCARE CENTERS	Y	Y	Y
18	TRANSPORTATION TERMINALS, PARKING LOTS AND PARKING BUILDINGS	Y	Y	Y

PERMITTED USE KEY:

Y = YES **N** = NO *Drive-thru facilities shall not be permitted. ** Any marajuana-related trade or business shall not be permitted.

BUILDING PERMITS

WITH RESPECT TO BUILDING PERMITS FOR RESIDENTIAL USES IN PARCELS C AND D OF THE AMENDED GDP WHICH ARE NOT SUBJECT TO THE AFFORDABLE RENTAL RATE LIMITS, THE CITY AGREES THAT OWNER SHALL BE ENTITLED TO SUCH PERMITS IN ACCORDANCE WITH THE FOLLOWING BASE PERMIT AND INCENTIVE PERMIT PHASING PROGRAM: (I) OWNER SHALL BE ENTITLED TO BUILDING PERMITS FOR MULTI-FAMILY RENTAL RESIDENTIAL USE SUFFICIENT TO ALLOW FOR CONSTRUCTION OF 300 UNITS. (II) OWNER SHALL BE ENTITLED TO BUILDING PERMITS FOR THE MULTI-FAMILY RENTAL RESIDENTIAL USE SUFFICIENT TO ALLOW FOR CONSTRUCTION OF AN ADDITIONAL 300 UNITS ONCE APPROXIMATELY 250,000 SQUARE FEET OF COMMERCIAL DEVELOPMENT WITHIN PARCELS C, D OR E HAS BEEN ISSUED CERTIFICATES OF OCCUPANCY PROVIDED THERE IS NOT LESS THAN 10,000 SQUARE FEET OF RETAIL DEVELOPMENT WITHIN SUCH COMMERCIAL DEVELOPMENT. (III) OWNER SHALL BE ENTITLED TO BUILDING PERMITS FOR THE MULTI-FAMILY RENTAL RESIDENTIAL USE SUFFICIENT TO ALLOW FOR CONSTRUCTION OF AN ADDITIONAL 300 UNITS ONCE APPROXIMATELY 25,000 SQUARE FEET OF RETAIL DEVELOPMENT WITHIN SUCH COMMERCIAL DEVELOPMENT.

LEGAL DESCRIPTION

A PARCEL OF LAND SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE CENTER QUARTER CORNER OF SAID SECTION 20;

THENCE SOUTH 89°48'50" EAST ALONG THE NORTH LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 20, A DISTANCE OF 2,625.59 FEET;

THENCE SOUTH 00°02'13" EAST ALONG A LINE PARALLEL WITH AND 30 FEET WEST OF THE EAST LINE OF THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 20, A DISTANCE OF 1,326.76 FEET TO A POINT ON THE SOUTH LINE OF THE NORTH HALF OF SAID SOUTHEAST QUARTER;

THENCE SOUTH 00°02'35" EAST ALONG A LINE PARALLEL WITH AND 30 FEET WEST OF THE EAST LINE OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SAID SECTION 20, A DISTANCE OF 85.45 FEET TO THE NORTH CORNER OF PARCEL TK-71-2 DESCRIBED AT RECEPTION NO. 2386686 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL THE FOLLOWING THREE (3) COURSES:

1. SOUTH 33°27'26" WEST, A DISTANCE OF 60.64 FEET;
2. SOUTH 01°40'28" WEST, A DISTANCE OF 45.12 FEET;
3. SOUTH 88°19'32" EAST, A DISTANCE OF 34.84 FEET TO A POINT 30 FEET WEST OF SAID EAST LINE;

THENCE SOUTH 00°02'35" EAST ALONG A LINE PARALLEL WITH AND 30 FEET WEST OF SAID EAST LINE, A DISTANCE OF 404.28 FEET TO A POINT OF NON-TANGENT CURVATURE AT THE NORTH CORNER OF PARCEL TK-71 DESCRIBED AT RECEPTION NO. 2309730 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL THE FOLLOWING THREE (3) COURSES:

1. ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 86.28 FEET, SAID CURVE HAVING A RADIUS OF 2,441.83 FEET, A CENTRAL ANGLE OF 02°01'28", AND A CHORD WHICH BEARS SOUTH 04°26'27" WEST A CHORD DISTANCE OF 86.27 FEET;
2. SOUTH 03°25'43" WEST, A DISTANCE OF 124.37 FEET;
3. SOUTH 00°02'35" EAST AND ALONG THE WEST LINE OF PARCEL TK-71-1 DESCRIBED AT RECEPTION NO. 2309730 IN THE RECORDS OF BOULDER COUNTY, A DISTANCE OF 529.71 FEET TO A POINT ON THE SOUTH LINE OF THE SAID SOUTHEAST QUARTER AND A POINT ON THE NORTH LINE OF PARCEL 12 AS DESCRIBED AT RECEPTION NO. 1560711 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL 12 THE FOLLOWING FOUR (4) COURSES:

1. NORTH 89°42'42" WEST, A DISTANCE OF 55.73 FEET;
2. SOUTH 00°00'35" WEST, A DISTANCE OF 30.02 FEET;
3. SOUTH 44°51'26" EAST, A DISTANCE OF 35.44 FEET;
4. SOUTH 00°00'35" WEST, A DISTANCE OF 127.21 FEET TO A POINT ON THE NORTH LINE OF THAT PARCEL DESCRIBED AT RECEPTION NO. 520800 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL THE FOLLOWING THREE (3) COURSES:

1) NORTH 89°59'25" WEST, A DISTANCE OF 55.00 FEET;

2) SOUTH 00°00'35" WEST, A DISTANCE OF 50.00 FEET;

3) SOUTH 89°59'25" EAST, A DISTANCE OF 55.00 FEET TO THE NORTHWEST CORNER OF PARCEL 10 AS DESCRIBED AT RECEPTION NO. 1560711 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL 10 THE FOLLOWING TWO (2) COURSES:

1. SOUTH 00°00'35" WEST ALONG THE WEST LINE OF SAID PARCEL AND ALONG A LINE PARALLEL WITH AND 75 FEET WEST OF THE SAID EAST LINE, A DISTANCE OF 247.79 FEET;
2. SOUTH 16°40'03" EAST ALONG THE SOUTHEASTERLY LINE OF SAID PARCEL, A DISTANCE OF 93.77 FEET TO THE NORTH CORNER OF PARCEL TK-75 DESCRIBED AT RECEPTION NO. 2309730 IN THE RECORDS OF BOULDER COUNTY;

THENCE SOUTH 00°00'35" WEST ALONG A LINE PARALLEL WITH THE EAST LINE OF SAID SECTION 29 AND ALONG THE WEST LINE OF SAID TK-75, A DISTANCE OF 611.12 FEET;

THENCE SOUTH 89°48'45" EAST ALONG THE SOUTH LINE OF SAID TK-75, A DISTANCE OF 48.09 FEET TO A POINT ON THE EAST LINE OF THE NORTHEAST QUARTER OF SAID SECTION 29;

THENCE SOUTH 00°00'35" WEST ALONG SAID EAST LINE, A DISTANCE OF 136.13 FEET TO A POINT ON THE SOUTH LINE OF THE NORTH HALF OF THE NORTHEAST QUARTER OF SAID SECTION 29;

THENCE NORTH 89°42'42" WEST ALONG SAID SOUTH LINE, A DISTANCE OF 2,308.62 FEET TO A POINT ON THE NORTHEAST LINE OF THE LAND CONVEYED TO THE CITY OF BROOMFIELD BY GIFT DEED RECORDED AT RECEPTION NO. 2013403 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL THE FOLLOWING FIVE (5) COURSES:

1. NORTH 14°13'32" WEST, A DISTANCE OF 140.04 FEET;
2. NORTH 60°44'04" WEST, A DISTANCE OF 682.66 FEET;
3. NORTH 31°43'59" WEST, A DISTANCE OF 355.27 FEET;
4. NORTH 50°04'57" WEST, A DISTANCE OF 351.37 FEET;
5. NORTH 87°28'56" WEST, A DISTANCE OF 246.66 FEET TO THE EASTERN CORNER OF PARCEL 328 AS DESCRIBED BY SPECIAL WARRANTY DEED RECORDED AT RECEPTION NO. 3411796 IN THE RECORDS OF BOULDER COUNTY;

THENCE NORTH 58°29'24" WEST ALONG THE NORTHEASTERLY LINE OF SAID PARCEL, A DISTANCE OF 186.70 FEET TO A POINT ON THE RIGHT-OF-WAY OF HIGHWAY 36;

THENCE NORTH 50°07'12" WEST ALONG SAID RIGHT-OF-WAY, A DISTANCE OF 356.68 FEET TO A POINT ON THE SOUTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 20 AND THE SOUTH CORNER OF PARCEL 32A OF SAID SPECIAL WARRANTY DEED;

THENCE CONTINUING NORTH 50°07'12" WEST ALONG THE NORTHEAST LINE OF SAID PARCEL 32A, A DISTANCE OF 1,028.45 FEET TO A POINT ON THE EAST LINE OF THAT PARCEL DESCRIBED AT BOOK 880, PAGE 98 IN THE RECORDS OF BOULDER COUNTY;

THENCE NORTH 25°26'59" WEST ALONG SAID EAST LINE AND ALONG THE EAST LINE OF THAT PARCEL DESCRIBED AT BOOK 878, PAGE 503, A DISTANCE OF 842.57 TO THE SOUTH CORNER OF THAT PARCEL DESCRIBED AT RECEPTION NO. 1989419 IN THE RECORDS OF BOULDER COUNTY;

THENCE ALONG THE PERIMETER OF SAID PARCEL THE FOLLOWING FOUR (4) COURSES:

1. NORTH 00°54'00" EAST, A DISTANCE OF 95.53 FEET;
2. NORTH 08°22'46" WEST, A DISTANCE OF 184.53 FEET;
3. NORTH 00°09'09" WEST ALONG A LINE PARALLEL WITH THE WEST LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 20, A DISTANCE OF 213.70 FEET;
4. SOUTH 89°50'51" WEST, A DISTANCE OF 34.06 FEET TO A POINT 25.00 FEET EAST OF THE WEST LINE OF SAID SOUTHWEST QUARTER;

THENCE NORTH 00°09'09" WEST ALONG A LINE PARALLEL WITH AND 25 FEET FROM THE SAID WEST LINE, A DISTANCE OF 473.64 FEET TO A POINT ON THE SOUTH LINE OF THAT PARCEL DESCRIBED AT RECEPTION NO. 1819920 IN THE RECORDS OF BOULDER COUNTY EXTENDED WESTERLY;

THENCE SOUTH 89°48'38" EAST ALONG SAID SOUTH LINE AND SAID SOUTH LINE EXTENDED, A DISTANCE OF 265.23 FEET TO THE SOUTHEAST CORNER OF SAID PARCEL;

THENCE NORTH 00°09'09" WEST ALONG THE EAST LINE OF SAID PARCEL, A DISTANCE OF 256.00 FEET TO A POINT ON THE SOUTH RIGHT-OF-WAY LINE OF CAMPUS DRIVE AS DEDICATED BY LOUISVILLE CAMPUS RECORDED AT RECEPTION NO. 1669751;

THENCE ALONG SAID SOUTH LINE THE FOLLOWING FOUR (4) COURSES:

1. SOUTH 89°48'38" EAST ALONG SAID NORTH LINE, A DISTANCE OF 50.02 FEET;
2. SOUTH 82°25'28" EAST, A DISTANCE OF 202.23 FEET TO A POINT OF NON-TANGENT CURVATURE;
3. ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 139.86 FEET, SAID CURVE HAVING A RADIUS OF 1,085.00 FEET, A CENTRAL ANGLE OF 07°23'09", AND A CHORD WHICH BEARS SOUTH 86°07'04" EAST A CHORD DISTANCE OF 139.77 FEET;
4. SOUTH 89°48'38" EAST, A DISTANCE OF 1,975.05 FEET TO A POINT ON THE EAST LINE SAID SOUTHWEST QUARTER;

THENCE NORTH 00°02'50" EAST ALONG SAID EAST LINE, A DISTANCE OF 35.00 FEET TO THE POINT OF BEGINNING;

EXCEPTING THEREFROM THAT PARCEL CONVEYED TO PUBLIC SERVICE COMPANY OF COLORADO BY DEED RECORDED AT RECEPTION NO. 531604.

SAID PARCEL CONTAINS 16,949,252 SQUARE FEET OR 389.10 ACRES, MORE OR LESS.

CERTIFICATIONS AND SIGNATURES

CITY COUNCIL CERTIFICATION:

APPROVED THIS ___ DAY OF _____, 20__ BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO.

ORDINANCE NO. _____ SERIES _____

MAYOR SIGNATURE _____

CITY CLERK SIGNATURE _____

PLANNING COMMISSION CERTIFICATION:

APPROVED THIS _____ DAY OF _____, 20__ BY THE PLANNING COMMISSION OF THE CITY OF LOUISVILLE, COLORADO.

RESOLUTION NO.: _____ SERIES _____

CLERK AND RECORDED CERTIFICATE:(COUNTY OF BOULDER, STATE OF COLORADO)

I HEREBY CERTIFY THAT THIS INSTRUMENT WAS FILED IN MY OFFICE AT _____ O'CLOCK ____ THIS ___ DAY OF _____, 20__ AND IS RECORDED IN PLAN FILE _____, FEE _____ PAID, _____ FILM NO. _____ RECEPTION

CLERK AND RECORDER _____

OWNERSHIP SIGNATURE BLOCK:

BY SIGNING THIS GDP 1ST AMENDMENT, THE OWNER ACKNOWLEDGES AND ACCEPTS ALL THE REQUIREMENTS AND INTENT SET FORTH IN THIS GDP. WITNESS MY/OUR HAND(S) SEAL(S) THIS _____ DAY OF _____, 20___.

PHILLIPS 66 COMPANY,
a Delaware Corporation

By: _____

BRUE·BAUKOL CAPITAL PARTNERS

TRYBA ARCHITECTS
1620 Logan Street
Denver Colorado 80203
303.831.4010

HARRIS KOCHER SMITH

FOX TUTTLE

CONOCOPHILLIPS CAMPUS GENERAL DEVELOPMENT PLAN, 1ST AMENDMENT
Redtail Ridge
CITY OF LOUISVILLE, BOULDER COUNTY, STATE OF COLORADO
2270 SO. 88TH STREET, LOUISVILLE, CO

ISSUED FOR:	DATE:
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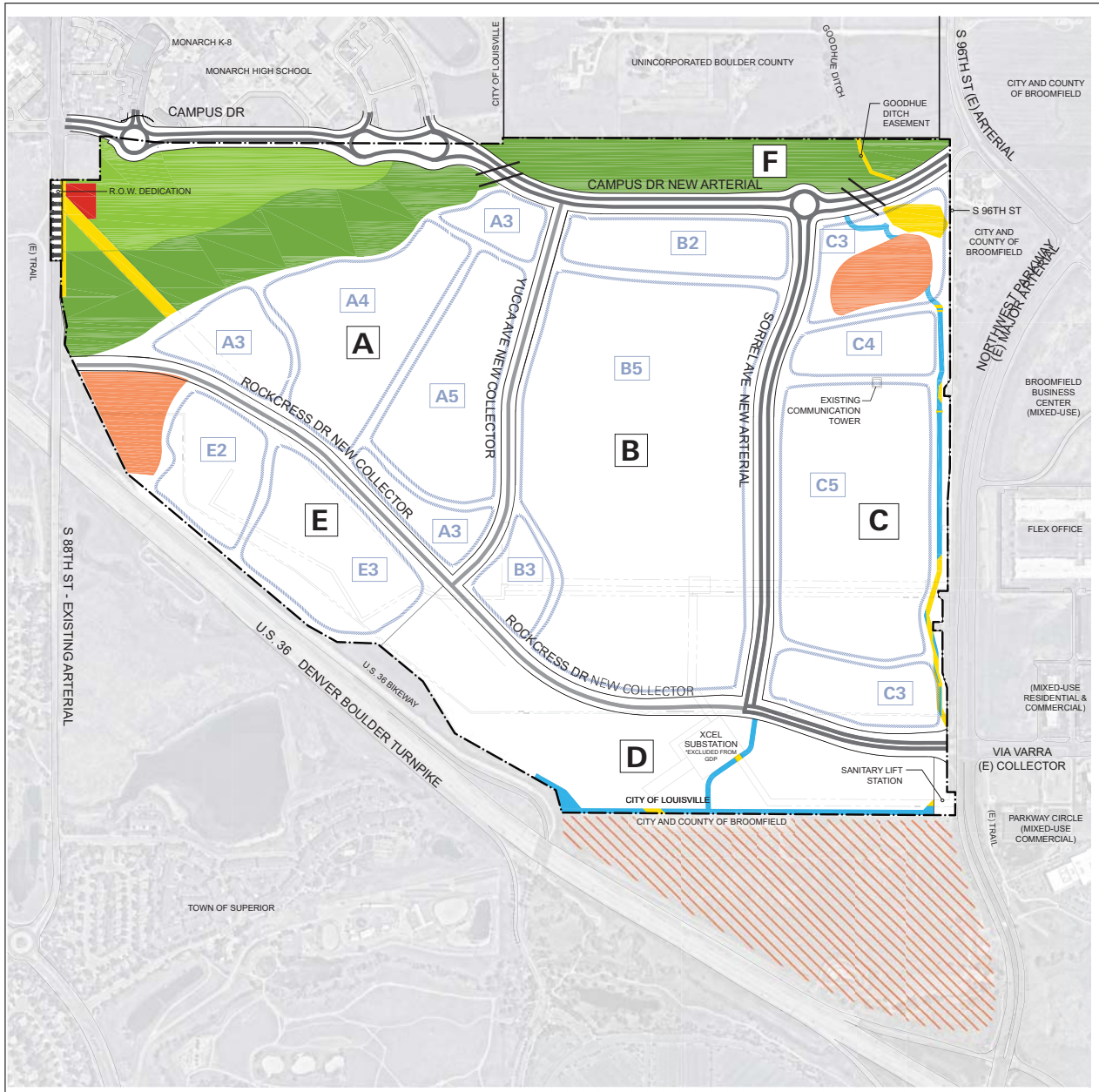
GDP SUBMITTAL #5	05/29/2020

COVER SHEET

SHEET



DEVELOPMENT PROGRAM

PARCEL	DEVELOPABLE AREA (AC)	MAX. ALLOWABLE DEVELOPMENT (GSF)[1]	MAXIMUM BLDG HEIGHT / MAXIMUM BLDG STORIES (REFER TO MAP)[2]	FAR	RESIDENTIAL UNIT LIMIT
A	60.0	1,800,000	SUBAREA A3 = 45 FEET / 3 STORIES SUBAREA A4 = 60 FEET / 4 STORIES SUBAREA A5 = 75 FEET / 5 STORIES	0.69	1,326
B	91.4	530,000	SUBAREA B2 = 30 FEET / 2 STORIES SUBAREA B3 = 45 FEET / 3 STORIES SUBAREA B5 = 90 FEET / 5 STORIES	0.13	-
C	60.5	2,836,000	SUBAREA C3 = 45 FEET / 3 STORIES SUBAREA C4 = 60 FEET / 4 STORIES SUBAREA C5 = 75 FEET / 5 STORIES	1.08	900
D	36.6	390,000	60 FEET / 4 STORIES	0.25	-
E	30.6	330,000	SUBAREA E2 = 35 FEET / 2 STORIES SUBAREA E3 = 45 FEET / 3 STORIES	0.25	-
F	-	0	N/A	N/A	N/A
TOTAL	**278.9**	**5,886,000**		**0.48**	**2,226**

1. GROSS SQUARE FOOTAGES FOR PARCEL B, PARCEL C, AND PARCEL D ARE PROPOSED AND MAY BE TRANSFERRED BETWEEN PARCELS B, C AND D, WHICH SHALL BE SET FORTH IN THE PUD REQUEST FOR EACH PARCEL PROVIDED THAT SUCH PUD REQUESTS SHALL BE SIGNED BY EACH OF THE OWNERS OF PARCELS B, C AND D AT THE TIME OF SUCH REQUEST BEFORE A TRANSFER OF GROSS SQUARE FOOTAGE WILL BE EFFECTIVE.
2. RESIDENTIAL UNIT LIMITS FOR PARCEL C AND PARCEL D ARE PROPOSED AND MAY BE TRANSFERRED BETWEEN PARCELS C AND D, WHICH SHALL BE SET FORTH IN THE PUD REQUEST FOR EACH PARCEL PROVIDED THAT SUCH PUD REQUESTS SHALL BE SIGNED BY EACH OF THE OWNERS OF PARCELS C AND D AT THE TIME OF SUCH REQUEST BEFORE A TRANSFER OF RESIDENTIAL UNITS WILL BE EFFECTIVE.
3. SUBAREA BOUNDARIES ARE CONCEPTUAL; BUILDING HEIGHT, STORIES, AND PLACMENT SHALL BE CONFIRMED DURING PUD PROCESS.
4. MAXIMUM BUILDING HEIGHTS PROPOSED ON PARCEL C WILL EXCEED LIMITATIONS SET FORTH IN THE ADS. TO OFFSET THE TALLER BUILDING HEIGHTS THAT WILL BE REQUESTED THROUGH THE PUD DEVELOPMENT PLAN REVIEW PROCESS, IN PARCEL C DEVELOPER WILL CONSTRUCT A PLAZA OR PARK WITH A COMBINATION OF HARD AND SOFT-SCAPED LANDSCAPING.

DEVELOPMENT ACREAGE

PARCEL	TOTAL ACRES	LAND DEDICATION (EXACT LOCATION TO BE DETERMINED DURING PLAT PROCESS): ENCUMBERED & PUBLIC PURPOSE EASEMENTS	PUBLIC LANDS (AC): OPEN SPACE	TRAIL CORRIDOR	PUBLIC SAFETY	PARK	DEVELOPABLE (AC)
A	101.1	2.0	22.8	-	0.7	15.6	60.1
B	91.4	-	-	-	-	-	91.4
C	68.2	6.3	-	1.4	-	-	60.5
D	38.7	0.1	-	2.2	-	-	36.3
E	35.6	5.0	-	-	-	-	30.6
F	17.1	0.2	16.9	-	-	-	-
ROW	37.0	-	-	-	-	-	-
TOTAL	**389.10**	**13.6**	**39.7**	**3.6**	**0.7**	**15.6**	**278.9**

TOTAL PUBLIC + OTHER: 69.2 AC *(18% OF TOTAL ACREAGE)*

TOTAL PUBLIC LANDS: 59.6 AC *(15% OF TOTAL ACREAGE)*

GENERAL NOTES

1. THE LAND PLAN SHOWN IN THIS GDP IS CONCEPTUAL IN NATURE AND THE EXACT ACREAGE AND LOCATION OF ANY DEVELOPMENT PARCEL OR PUBLIC LANDS SHALL BE FINALLY DETERMINED DURING THE PLATTING PROCESS; PROVIDED, HOWEVER, THE TOTAL AMOUNT PROVIDED FOR PUBLIC LANDS SHALL NOT BE LESS THAN 15 ACRES FOR PARKS, 38 ACRES FOR OPEN SPACE, 3 ACRES FOR TRAILS AND .7 ACRES FOR PUBLIC SAFETY.
2. ALL PUBLIC LANDS SHALL BE DEDICATED TO THE CITY OF LOUISVILLE WITH THE RECORDING OF THE FIRST FINAL SUBDIVISION PLAT ON THE PROPERTY.
3. EXISTING COMMUNICATION TOWER TO BE MAINTAINED WITH SUFFICIENT ACCESS AND MAINTENANCE EASEMENTS PROVIDED. ANY RELOCATION OF THE COMMUNICATION TOWER BY DEVELOPER SHALL CONTINUE TO PROVIDE SUFFICIENT ACCESS AND MAINTENANCE EASEMENTS.
4. OWNER SHALL ENSURE THAT NO FEWER THAN 224 OF THE MULTI-FAMILY RENTAL RESIDENTIAL UNITS IN PARCEL C OR D SHALL BE MADE AVAILABLE AT RENTAL RATES THAT DO NOT EXCEED THE RENT LIMITS SET BY THE COLORADO HOUSING & FINANCE AUTHORITY ANNUALLY FOR RENTERS WITH INCOMES OF 60% OF THE BOULDER COUNTY AVERAGE MEDIAN INCOME (AMI), FOR A PERIOD OF 40 (FORTY) YEARS FROM THE DATE OF THE FIRST CERTIFICATE OF OCCUPANCY ISSUED FOR THE FIRST MULTI-FAMILY RENTAL RESIDENTIAL UNIT.

DESIGN GUIDELINES

DEVELOPMENT WILL MEET ADS REQUIREMENTS EXCEPT AS NOTED BELOW. THE FOLLOWING ARE INTENDED TO BE CONCEPTUAL MINIMUM GUIDELINES FOR PARCEL C TO MEET THE GOAL OF CREATING A QUALITY PEDESTRIAN-ORIENTED DEVELOPMENT.

STREET DESIGN

A. BLOCKS MAY HAVE ON-STREET PARKING.

B. MAIN STREET

I. A NORTH-SOUTH MAIN STREET SHALL EXIST WITH ENHANCED STREETSCAPING, PAVING MATERIALS, STREET FURNISHING, STREET TREES, AND LIGHTING.

II. VEHICULAR GARAGE ENTRANCES OR SURFACE PARKING ENTRANCES SHALL NOT BE ACCESSED FROM THE MAIN STREET

III. ON-STREET PARKING SHALL BE PROVIDED ON THE MAIN STREET

IV. MAIN STREET SHALL PRIORITIZE SIDEWALKS AND PEDESTRIAN CROSSINGS; SIDEWALKS SHALL BE A MINIMUM OF 8' WIDE ON MAIN STREET AND PEDESTRIAN CROSSINGS SHOULD REDUCE THE STREET CROSSING WIDTH THROUGH THE USE OF CURB BULB-OUTS. PLANTING ZONES ADJACENT TO SIDEWALKS SHALL MEET ADS STANDARDS.

PLAZA

A. A PLAZA OR PARK WITH A COMBINATION OF HARD AND SOFT-SCAPED LANDSCAPING THAT HIGHLIGHTS AND FRAMES WESTERLY VIEWS TOWARDS THE MOUNTAINS SHALL BE PROVIDED. TOTAL PLAZA SPACE SHALL BE A MINIMUM OF TWO ACRES AND MAY SPAN ACROSS MAIN STREET.

B. SURFACE LOT PARKING SHALL NOT BE IMMEDIATELY ADJACENT TO THE PLAZA.

BUILD-TO & SETBACK REQUIREMENTS

A. BUILDINGS SHALL HAVE NO MINIMUM SETBACKS.

B. BUILDINGS ON MAIN STREET SHALL HAVE NO SETBACK FOR AT LEAST 50% OF THE MAIN STREET-FACING FAÇADE, AND NO MORE THAN A 15' SETBACK.

LEGEND

- DEVELOPMENT AREAS
- OPEN SPACE (PUBLIC LAND)
- PARKS (PUBLIC LAND)
- TRAIL CORRIDOR (PUBLIC LAND)
- PUBLIC SAFETY (PUBLIC LAND)
- ENCUMBERED EASEMENTS
- PUBLIC PURPOSE EASEMENTS
- CONSERVATION EASEMENTS (OFF-SITE)
- A PARCEL LABEL
- SUBAREA BOUNDARY

BRUE·BAUKOL CAPITAL PARTNERS

TRYBA ARCHITECTS
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HARRIS KOCHER SMITH

FOX TUTTLE

CONOCOPHILLIPS CAMPUS GENERAL DEVELOPMENT PLAN, 1ST AMENDMENT

Redtail Ridge

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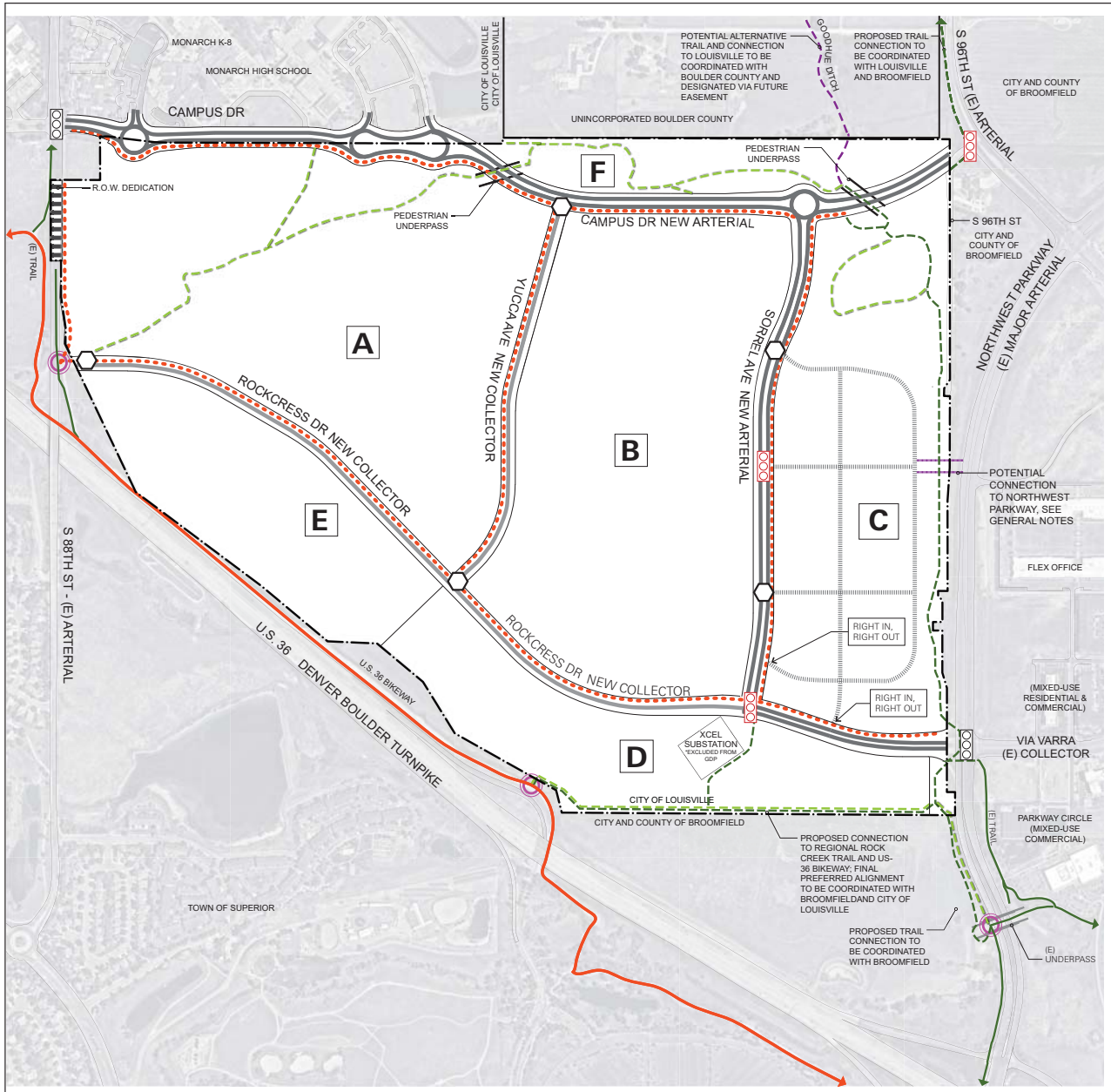
DEVELOPMENT PLAN

SHEET

2 OF 3



GENERAL NOTES

1. TRAFFIC CIRCULATION PATTERNS, TRAIL, AND BIKEWAY ALIGNMENTS DEPICTED ACROSS THE PARCELS ARE CONCEPTUAL AND SUBJECT TO MODIFICATION.
2. CAMPUS DRIVE ROADWAY DESIGN IS A CONCEPTUAL LAYOUT AND WILL BE MODIFIED TO ACCOMMODATE BOULDER VALLEY SCHOOL DISTRICT CONCERNS PRIOR TO PLAT.
3. "SIGNALIZED INTERSECTIONS" AND "RIGHT IN" ON STREET B AND TAPE DRIVE ARE CONCEPTUAL AND SUBJECT TO MODIFICATION UPON DEVELOPMENT OF ABUTTING PROPERTY.
4. ALL BLOCKS WITHIN PARCEL C WILL FOLLOW LMC. BLOCKS ARE CONCEPTUAL AND SUBJECT TO MODIFICATION. OWNERSHIP AND MAINTENANCE OF THE BLOCKS WILL BE EVALUATED DURING PUD PROCESS.
5. 30' TRAIL CORRIDOR DEDICATION PLANNED AT PLAT.
6. DEVELOPER SHALL REASONABLY COOPERATE WITH THE CITY IN THE FUTURE TO PROVIDE AN EASEMENT FOR EITHER AN OVERPASS OR UNDERPASS PEDESTRIAN CROSSING TO THE PROPOSED NORTHWEST PARKWAY TRAIL.

LEGEND

- SIDE STREET STOP CONTROL
- (E) SIGNALIZED INTERSECTION
- PROPOSED SIGNALIZED INTERSECTION
- ARTERIAL
- COLLECTOR
- MULTI-USE PATH & ON-STREET BICYCLE LANES
- TRAIL- HARDSCAPE (PUBLIC)
- TRAIL - SOFTSCAPE (PUBLIC)
- ALTERNATIVE TRAIL
- (E) TWO-WAY PROTECTED BIKEWAY
- (E) MULTI-USE PATH
- POTENTIAL BLOCKS
- REGIONAL TRAIL CONNECTION
- POTENTIAL CONNECTION
- (E) PEDESTRIAN UNDERPASS
- NEW PEDESTRIAN UNDERPASS
- PARCEL BOUNDARY
- A PARCEL LABEL

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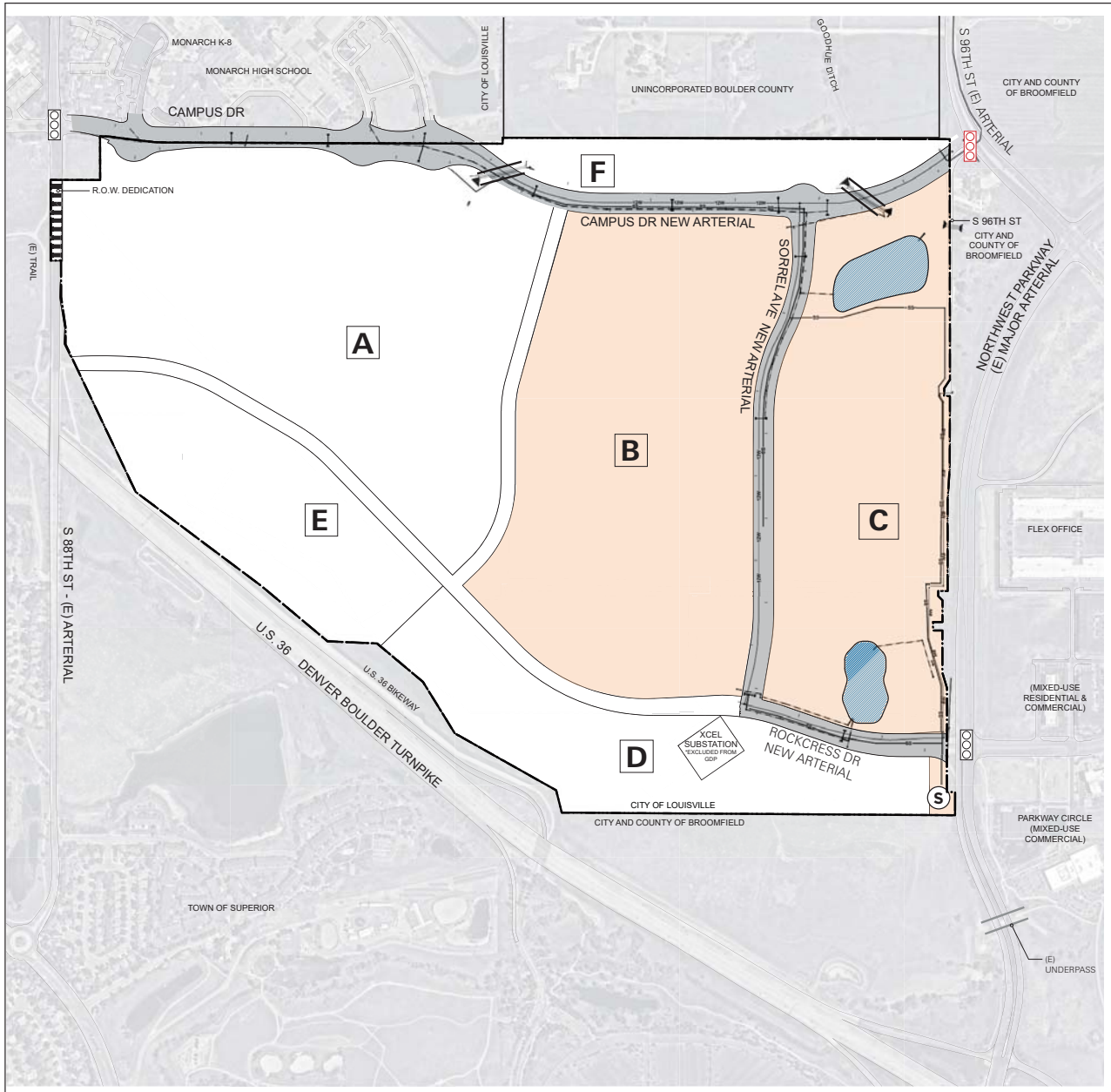
CIRCULATION PLAN

SHEET

3 OF 3



INFRASTRUCTURE PHASING NARRATIVE - 1

GENERAL NOTE:

1. THE PHASING PLANS FOR PUBLIC IMPROVEMENTS SHOWN ON THIS SHEET ARE ILLUSTRATIVE AND ARE INTENDED ONLY TO GUIDE POTENTIAL PHASING OF IMPROVEMENTS. DEVELOPMENT OF THE PROPERTY SHALL PROCEED IN ACCORDANCE WITH A CITY-APPROVED PHASING PLAN AS ESTABLISHED IN A SUBDIVISION AGREEMENT IN CONJUNCTION WITH EACH SUBDIVISION AND PUD REQUEST WHICH SHALL ADDRESS THE SCOPE, NATURE AND EXTENT OF PUBLIC IMPROVEMENTS NECESSARY TO SUPPORT THE DEVELOPMENT WITHIN SUCH SUBDIVISION.

LEGEND

- (E) SIGNALIZED INTERSECTION
- PROPOSED SIGNALIZED INTERSECTION
- NEW SANITARY LIFT STATION
- NEW ROAD
- DEVELOPMENT PHASE 1
- FUTURE DEVELOPMENT PHASE
- (E) DETENTION POND
- PROPOSED DETENTION
- UTILITIES - WATER
- UTILITIES - SEWER SYSTEM
- UTILITIES - STORM
- (E) PEDESTRIAN UNDERPASS
- NEW PEDESTRIAN UNDERPASS
- PARCEL LABEL
- PARCEL BOUNDARY

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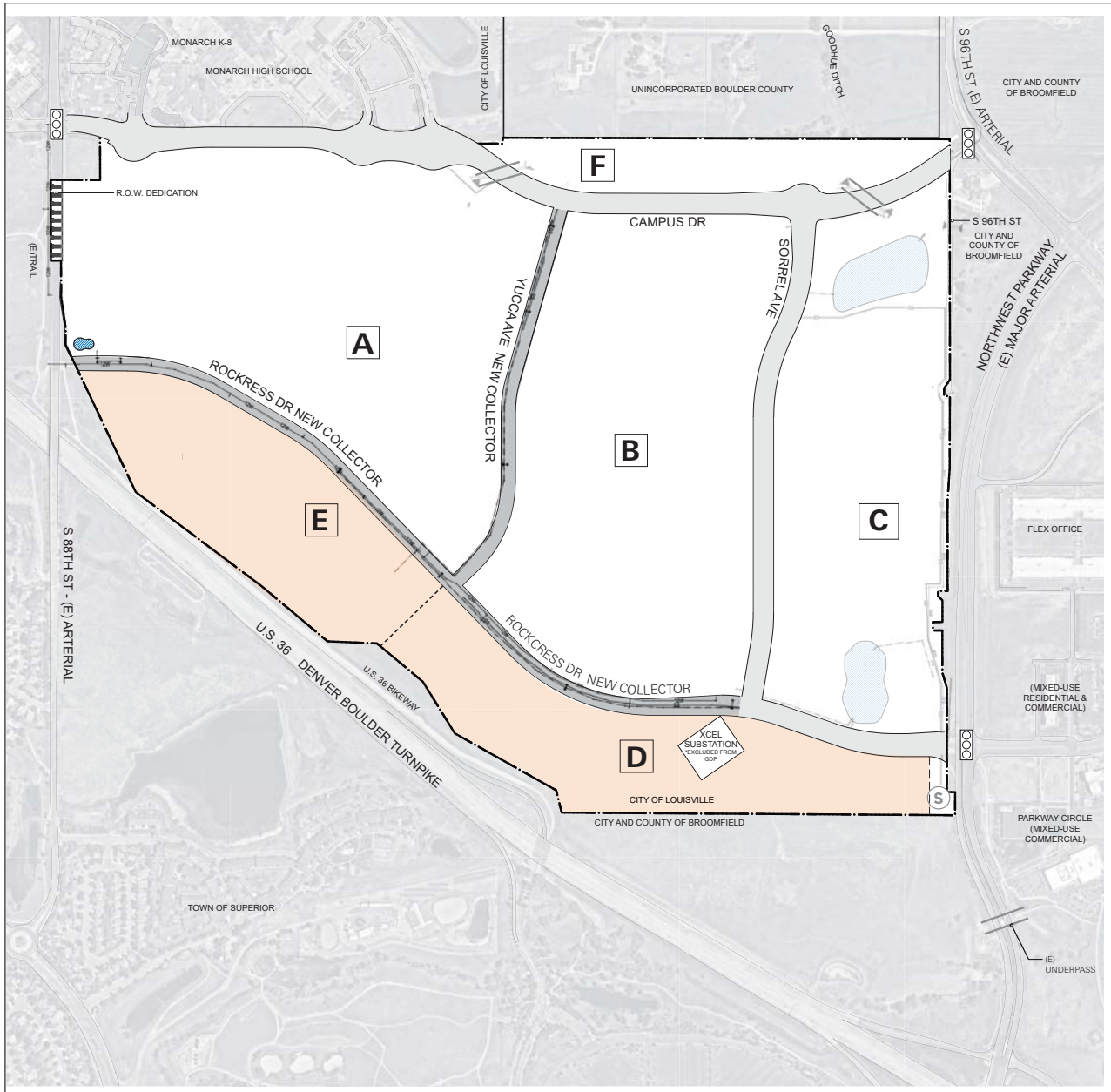
INFRASTRUCTURE PHASING NARRATIVE - 1

PHASING EXHIBIT



INFRASTRUCTURE PHASING NARRATIVE - 2

GENERAL NOTE:

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LEGEND

- (E) SIGNALIZED INTERSECTION
- PROPOSED SIGNALIZED INTERSECTION
- (E) SANITARY LIFT STATION
- NEW ROAD
- (E) ROAD
- DEVELOPMENT PHASE 2
- FUTURE DEVELOPMENT PHASE
- (E) DETENTION POND
- PROPOSED DETENTION
- UTILITIES - WATER
- UTILITIES - SEWER SYSTEM
- UTILITIES - STORM
- (E) PEDESTRIAN UNDERPASS
- NEW PEDESTRIAN UNDERPASS
- PARCEL LABEL
- PARCEL BOUNDARY

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INFRASTRUCTURE PHASING NARRATIVE - 2

PHASING EXHIBIT

PHASING NARRATIVE - **PUBLIC LANDS**

GENERAL NOTES:

1. DEVELOPMENT OF THE PUBLIC LANDS DEPICTED ON THIS SHEET SHALL PROCEED IN ACCORDANCE WITH A CITY-APPROVED PHASING PLAN IN CONJUNCTION WITH THE APPROPRIATE SUBDIVISION ENCOMPASSING SUCH PUBLIC LANDS. THE APPLICABLE PUD REQUEST SHALL ADDRESS THE SCOPE, NATURE AND EXTENT OF PUBLIC IMPROVEMENTS TO BE CONSTRUCTED WITHIN THE APPLICABLE PUBLIC LANDS.

LEGEND

- OPEN SPACE - PUBLIC LAND
- NON-PUBLIC DEDICATED LAND
- TRAIL - HARDSCAPE (PUBLIC)
- TRAIL - SOFTSCAPE (PUBLIC)
- (E) MULTI-USE PATH
- (E) TWO-WAY PROTECTED BIKEWAY
- PARKS
- TRAIL CORRIDOR
- ENCUMBERED EASEMENTS
- DETENTION POND
- PUBLIC PURPOSE EASEMENTS
- CONSERVATION EASEMENTS (OFF-SITE)
- REGIONAL TRAIL CONNECTIONS
- (E) PEDESTRIAN UNDERPASS
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PHASING NARRATIVE - PUBLIC LANDS

PHASING EXHIBIT

Redtail Ridge
Traffic and Mobility Study

Date: May 21, 2020
Previous Draft: April 21, 2020

Submitted To:
Brue Baukol Capital Partners
1555 Blake Street, Suite 210
Denver, CO 80202

Submitted By:
Fox Tuttle Transportation Group, LLC
1624 Market Street, Suite 202
Denver, CO 80202

FOX TUTTLE

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I – Percent Contribution

EXECUTIVE SUMMARY

The purpose of this study is to evaluate potential traffic and mobility projects within and around the proposed Redtail Ridge development. The project site is generally bounded by S. 88th Street to the west, Campus Drive to the north, S. 96th Street/Northwest Parkway to the east and US 36 to the south. The first phase of the proposed development is anticipated to be completed in Year 2025 and includes 505 units at the continuing care retirement community; 500,000 square feet of office corporate headquarters, 10,000 square feet of general retail space, 600 multifamily residential units, 240 hotel rooms, and 300,000 square feet of general office building space, with the corporate office opening as early as Year 2022. The full build out of the project includes a total of 1,326 units at the continuing care retirement community; 500,000 square feet of office corporate headquarters, 70,000 square feet of general retail space, 900 multifamily residential units, 240 hotel rooms, and 1,750,000 square feet of general office building space. Accounting for anticipated non-single occupancy vehicle (non-SOV) trips and internal capture trip reduction, the full build out of the project site is estimated to generate approximately 27,274 daily, 2,382 AM peak hour, and 2,646 PM peak hour trips.

Traffic Changes Since Storage Tek Closure

While the project area is currently vacant, this site was previously occupied by Storage Tek. Many changes have taken place in the Redtail Ridge project area since Storage Tek was an active campus in the late 1990's. New single-family residential neighborhoods and a mixed-use town center have been built in Superior; in Broomfield, a major regional shopping center at Flatiron Crossing and a mix of uses along the eastern side of what is now the Northwest Parkway and Interlocken Loop have been constructed; and the City of Louisville has added new uses to the Colorado Technology Center. Over this timeline the number of open enrollment students attending Monarch K8 and Monarch High School, who are not provided school bus services, has remained consistent. This growth has utilized the vehicle traffic capacity previously used by traffic generated by Storage Tek on the S. 88th Street, Dillon Road, and S.96th Street corridors.

Project Area Trip Generation Comparison

After Storage Tek vacated the project area, ConocoPhillips proposed to build a new research, training, and office development on the former Storage Tek site. At build out, the total development was not to exceed 2,500,000 square feet of building area. ConocoPhillips completed a traffic study as part of its development proposal. The project was approved by the City of Louisville in Year 2010; however, ConocoPhillips did not move forward with the project. **Table E.1** provides a comparison of the trip generation estimates for the full buildout of the Redtail Ridge development with the former Storage Tek site and the formerly approved ConocoPhillips development.

Table E.1. Trip Generation Comparison

Development	Trip Generation Estimates		
	Daily	**AM Peak Hour**	**PM Peak Hour**
Storage Tek	12,400	1,600	1,400
ConocoPhillips	17,500	2,660	2,455
Redtail Ridge	27,274	2,382	2,646
Redtail % Diff. to Storage Tek	*+120%*	*+49%*	*+89%*
Redtail % Diff. to ConocoPhillips	***+56%***	***-10%***	***+8%***

Comparing the estimated peak hour trips indicates the current proposal generates 49 to 89 percent more trips than Storage Tek; and 10 percent fewer trips in the AM peak hour and eight (8) percent more trips in the PM peak hour compared to the formally approved ConocoPhillips development. The AM and PM peak hour trips were used for comparison since detailed traffic operation analysis is based on the peak hours. While daily traffic volumes provide planning level thresholds for roadway capacities, improvements are recommended based on the peak hour intersection capacity analysis.

Current Study Area Traffic and Safety Conditions

The Dillon Road/S. 88th Street and S. 88th Street/Campus Drive intersections are currently operating at LOS E or worse during the AM peak hour. Both intersections are heavily influenced by traffic generated by the Monarch school campus. Queues on S. 88th Street from Campus Drive were observed to extend to Dillon Road, and westbound left-turn queues on Dillon Road were observed to extend more than 2,500 feet. To address the existing operational issues during the AM peak hour, previous studies have recommended that Campus Drive be extended from where it dead ends 2,200 feet east of S. 88th Street to S. 96th Street to provide an alternative access to the Monarch school campus.

In addition, under existing conditions the Northwest Parkway/S. 96th Street/Via Varra intersection is approaching capacity in the AM peak and the Dillon Road/S. 96th Street intersection is approaching capacity in the PM peak hour. Both Dillon Road and S. 96th Street are currently two-lane roadways, but the existing daily traffic volumes on both roadways are pushing the planning level daily traffic volume thresholds that are typically assumed for a two-lane roadway. Dillon Road and S. 96th Street are two-lane roadways but expand to provide two through lanes in all directions at the Dillon Road/S. 96th Street intersection. While this increases the capacity through the intersection, this also results in poor lane utilization and occasionally some inefficiencies when vehicles exit the intersection and merge back down to one-lane.

The roadways around the project site are currently designed to optimize motor vehicle travel during peak times at speeds that present challenges for non-motorized travelers. Based on information provided in the City of Louisville *Transportation Master Plan* (TMP), four (4) existing

arterial intersections near the Redtail Ridge project were identified as high crash locations, including the Dillon Road/S. 88th Street, Dillon Road/S. 96th Street, S. 88th Street/Campus Drive, and Northwest Parkway/S. 96th Street/Via Varra intersections. Also, three of the locations have documented bicycle crashes. The Dillon Road/S. 88th Street intersection has the highest number of bicycle crashes in the City of Louisville.

Near-Term Improvements

To address the expected issues at the study intersections, the improvements listed below are recommended to accommodate the project development anticipated to be completed by Year 2025. In addition to safety and improving traffic operations, these improvements are also designed to reduce crashes and improve operations for the Monarch school campus.

- Extend Campus Drive from where it dead ends east of S. 88th Street to S. 96th Street
- S. 88th Street/Campus Drive** extend the northbound right-turn lane
- S. 96th Street/Dillon Road** construct dual eastbound and westbound left-turn lanes on Dillon Road
- Widen S. 96th Street** to a four-lane roadway between Dillon Road and Northwest Parkway and extend the four-lane roadway to the north of the Dillon Road intersection a minimum of one-half mile
- S. 96th Street/Campus Drive (new intersection) construct a southbound right-turn lane, dual eastbound left-turn lanes with an eastbound right-turn lane, dual northbound left-turn lanes, and provide three northbound through lanes that extend from the Northwest Parkway/S. 96th Street/Via Varra intersection through the Campus Drive intersection. The three northbound through lanes will merge to two through lanes north of Campus Drive.
- Northwest Parkway/S. 96th Street** construct triple northbound left-turn lanes on Northwest Parkway to turn onto northbound S. 96th Street and modify the southbound right-turn lane movement to be controlled on Northwest Parkway.

  *** Indicates an improvement that was also recommended under Year 2025 background conditions (without the project).*

Additional improvements beyond which have asterisks above were recommended under Year 2025 background conditions without the project to accommodate anticipated traffic volumes and conditions without the Campus Drive extension project. The Campus Drive extension project is located on the Redtail Ridge property and will only be constructed as part of a development project. The additional improvements needed to accommodate Year 2025 background conditions without the Campus Drive extension are listed below:

- Widen S. 88th Street between Dillon Road and Campus Drive to a four-lane roadway
- Dillon Road/S. 88th Street modify the westbound approach on Dillon Road from one left-turn lane and two through lanes, to dual left-turn lanes and one through lane

- S. 88th Street/Campus Drive construct a second northbound through lane that would begin approximately 500 feet south of Campus Drive

Potential Network Improvements

There are currently multiple ongoing projects that have the potential to affect traffic volumes, traffic patterns, and future transportation improvement assumptions in the study area in the mid- to long-term scenarios. While it is currently unknown if/when these projects will move forward, the projects are important to consider when determining future infrastructure needs for the study area:

Jefferson Parkway: *The Level 1 Traffic and Revenue Study for Jefferson Parkway* was completed for the Jefferson Parkway Public Highway Authority (JPPHA) and finalized in April 2018. The purpose of the study was to provide forecasts of traffic and revenue for the proposed Jefferson Parkway. The proposed Jefferson Parkway is a 9.2-mile toll road running along the northwestern perimeter of the Denver Metro area. The future roadway will be a limited access expressway with two lanes of travel in each direction from SH 128 (south of US 36) to SH 93 (south of SH 72). One of the scenarios considered in the study was the "Northwest Parkway Extension", which includes the Redtail Ridge study area on Northwest Parkway between S. 96th Street/Via Varra and the US 36 interchange. The study noted that Northwest Parkway would be reconstructed to separate toll and local traffic which would include constructing new interchanges and a frontage road system to accommodate local traffic. If the Northwest Parkway Extension project is constructed, the future interchanges and frontage road system would provide additional capacity to the Redtail Ridge study network.

RTD Bus Rapid Transit (BRT): The *Northwest Area Mobility Study (NAMS)* study identified the S. 96th Street/Highway 42 as one of the six candidate Arterial Bus Rapid Transit corridors. All corridors were evaluated, and recommendations were made for transit priority elements such as transit signal priority, queue jump lanes and headway-based scheduling. Operations and maintenance costs for the corridors were also prepared. The NAMS Policy Advisory Committee (PAC) recommended that all six (6) arterial BRT projects be implemented with system-wide service improvements. This corridor was recently identified as a Priority 3 corridor in the *RTD Regional Bus Rapid Transit Study*, the Metro Mayors Caucus is reviewing a ballot initiative to fund this corridor as part of regional ballot initiative, and the City of Louisville has applied for a grant to further study this service as part of a revised Highway 42 corridor study (see below).

State Highway 42 (SH 42): The City of Louisville is in the process of securing Denver Regional Council of Governments (DRCOG) funding for an updated study and plan for the SH 42 corridor. The proposed plan will provide design for improvements that address transportation, growth and land development challenges outlined in the DRCOG Metro Vision plan, including: increasing mobility options for individuals without a car or with mobility challenges, reducing traffic congestion, reducing traffic crashes and improving overall safety, and addressing access issues related to population and economic growth and development along this corridor.

Long-Term Improvements

The City of Louisville's *TMP* recommends building more Great/Complete streets citywide. The Redtail Ridge project team is recommending to help build Great/Complete Street design treatments for the S. 88th Street, Dillon Road, and S. 96th Street corridors and intersections consistent with the TMP's policies. Such streets and intersections will be designed and operated to be safe and accessible for all users, regardless of ability, age, or mode. Most importantly, Great Streets have been shown to reduce conflicts that lead to crashes.

To accommodate the trips generated by the full buildout of the Redtail Ridge development in Year 2040, the following capacity improvements are expected to be needed:

- Northwest Parkway/US 36 interchange – the South Ramps are expected to be at capacity with Year 2040 background traffic volumes and over capacity with Year 2030 + project traffic volumes. Additional capacity is needed to accommodate the projected traffic volumes with and without the project site trips. The additional capacity will likely require that the bridge be widened. A coordinated study should occur to begin to look at interchange concepts.
- Northwest Parkway between S. 96th Street/Via Varra and US 36 – continue coordination with Northwest Parkway Authority, City of Louisville, and City and County of Broomfield to study the future corridor needs. The Northwest Parkway intersections at 96th Street/Via Varra and at Tape Drive/Via Varra are anticipated to be near/at capacity between Year 2030-2035 with the project trips.
    - One option to improve operations through Year 2040 would be to add a third southbound through lane on Northwest Parkway from northeast of the 96th Street/Via Varra intersection to the US 36 interchange.
    - Additional study is needed to determine the optimal design for this corridor to accommodate the future needs and if/how the corridor will tie into the future US 36 interchange design. Further, if Jefferson Parkway is built, additional traffic volumes beyond what were projected for this study would be anticipated on Northwest Parkway and should be considered. As previously noted, previous studies have suggested that the future Northwest Parkway will be grade separated with frontage roads for local access.

Note that additional improvements beyond what are listed above were recommended under Year 2040 background conditions to accommodate anticipated traffic volumes/conditions without the Campus Drive extension project. The additional improvements under Year 2040 background conditions include:

- Widen Dillon Road between S. 88th Street and S. 96th Street to a four-lane roadway
- Dillon Road/S. 96th Street: construct dual northbound and southbound left-turn lanes

A summary of the recommended improvements and estimated year the improvement is needed is shown in **Table E.2**.

Internal Intersections

Fox Tuttle Transportation Group has worked with the Redtail Ridge team to design an internal roadway network that can accommodate the full buildout of the project trips safely and efficiently. The internal roadway consists of the Campus Drive extension to S. 96th Street, construction of Tape Drive between S. 88th Street and Northwest Parkway, as well as construction of Street A and Street B between Campus Drive and Tape Drive.

- Campus Drive: recommended to be a four-lane roadway between S. 88th Street and S. 96th Street. Roundabout access is recommended at the Monarch school campus to the K-8 and High School main accesses as well as at Street B. The Campus Drive/Street A intersection is anticipated to operate acceptably as an unsignalized intersection with side-street stop control.
- Tape Drive: recommended to be a four-lane roadway between Street B and Northwest Parkway and to transition to two-lane collector west of Street B. The Street B intersection is anticipated to need to be signalized after Year 2030 to provide acceptable operations; the remaining intersections are expected to operate acceptably as unsignalized.
- Street A: recommended to be a two-lane collector
- Street B: recommended to be a four-lane roadway with left-turn lanes at all full-movement accesses/intersections. The central intersection is anticipated to need to be signalized after Year 2030 to provide acceptable operations; the remaining intersections are expected to operate acceptably as unsignalized.

Next Steps

- Additional study and concept development are needed for the Northwest Parkway corridor and at the US 36 interchange.
- After the GDP submittal, vertical developers will be required to submit PUD documents prior to construction, including traffic conformance letters. The PUD documents will identify if/when traffic signals at the internal intersections are projected to be warranted as well as signal timing modifications/adjustments needed to the study intersections. In addition, the vertical developers will be required to submit building specific Travel Demand Management (TDM) Plans. The projected non-single occupancy vehicle (non-SOV) goals will be evaluated and adjusted as needed to reach goals. The Metro District will monitor the plan's effectiveness and make changes as needed to reach goals.

Table E.2 – Improvement Phasing Summary

Recommendation (Intersection/Segment)	Project Need (Expected Timeline/Year)		Notes
	Background (No Project)	With Project	
Campus Drive Extension	(N/A) - located on the Redtail Ridge project property	-Construct with first phase of the development (Opening Year 2022)	
McCaslin Boulevard / Dillon Road	--	--	Signal timing should continually be monitored to manage queues.
Dillon Road / S. 88th Street	-Restripe to provide dual WB left-turn lanes (2020) – *assumes Campus Drive is not extended*	--	
Dillon Road (Between S. 88th Street and S. 96th Street)	-Widen to four-lane roadway (shortly after 2030) *assumes Campus Drive is not extended*	-Dillon Road is nearing capacity in Year 2040. Monitor the corridor and if traffic volumes increase at a higher rate than projected, Dillon Road may need to be expanded to a four-lane roadway	The City noted a desire to maintain Dillon Road as a two-lane roadway. Based on projected volumes, a two-lane is expected to operate acceptably with traffic generated by the project. However, without the Campus Drive extension, Dillon Road is expected to need to be a four-lane around 2030.
Dillon Road / S. 96th Street	-Construct dual EB/WB left-turn lanes (2020-2021) -Construct dual NB/SB left-turn lanes (2035-2040) *assumes Campus Drive is not extended*	-Construct dual EB/WB left-turn lanes (2022 with Campus Drive Ext.) -Monitor and if long queues/cycle failure begins to occur construct dual NB/SB left-turn lanes (after 2040)	
S. 96th Street (Between Dillon Road and Northwest Parkway)	-Widen to four-lane roadway (2025)	-Widen to four-lane roadway (2022 with Campus Drive Ext.)	
S. 96th Street (North of Dillon Road)	-Widen to four-lane roadway between Dillon Road and SH 42 (shortly after 2030)	-Widen to four-lane roadway ~ 1/2 mile to the north (2025) -Widen to four-lane roadway to SH 42 (shortly after 2030)	Coordination with the SH 42 BRT project and other development/studies along S. 96th Street should occur to refine timing needs.
S. 88th Street (Between Dillon Road and Campus Drive)	-Widen to a four-lane roadway (2020) *assumes Campus Drive is not extended*	--	
S. 88th Street (Between Campus Drive and Red Rock Pkwy)	--	--	Expected to operate acceptably as a two-lane with turn lanes at key intersection.
S. 88th Street / Campus Drive	-Construct a second NB thru lane that would begin approx. 500 feet south of Campus Drive (2020) *assumes Campus Drive is not extended* -Extend the NB right-turn lane to provide a minimum of 500 feet of storage (2020)	-Extend the NB right-turn lane to provide a minimum of 500 feet of storage (with Campus Drive extension)	
S. 88th Street / Tape Drive	(N/A)	-Construct a SB left-turn lane and NB right-turn lane on S. 88th Street (with opening of Tape Drive, ~Year 2023).	
S. 88th Street and Rock Creek Pkwy	--	--	No improvements anticipated to be needed
S. 96th Street / Campus Drive	(N/A)	-Construct dual NB left-turn lanes and a SB right-turn lane on S. 96th Street, and dual EB left-turn and an EB right-turn lane on Campus Drive (2022 with Campus Drive Ext.). Signalize intersection when warranted.	
Northwest Parkway / S. 96th Street / Via Varra	-Construct triple NB left-turn lanes on NWP (2025) -Capacity improvements on NWP – see note (2030-2035)	-Construct triple NB left-turn lanes on NWP (2025); -Capacity improvements on NWP – see note (2030-2035)	Constructing a third SB thru lane from north of S. 96th Street to the US 36 interchange is expected to improve operations. However, this may not be the optimal design for travel time. Previous studies have recommended that this intersection be grade separated in the future. Therefore, a separate corridor study is recommended rather than specific intersection recommendations.
Northwest Parkway / Tape Drive / Via Varra	-Capacity improvements on NWP – see note (2030-2035)	-Capacity improvements on NWP – see note (2030-2035)	See note for Northwest Parkway / 96th Street / Via Varra intersection
Northwest Parkway / US 36 Interchange	-New interchange needed (2040)	-New interchange needed (2027-2028)	To address the anticipated capacity constraints, the interchange needs to be modified to provide additional capacity or an alternative access to this area needs to be provided via US 36. A follow-up study should be conducted that looks at future grade separation concepts along Northwest Parkway and evaluates all interchange configuration operations for US 36.

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

1.0 INTRODUCTION

The Fox Tuttle Transportation Group has prepared this traffic and mobility study for the proposed development of the land bounded by S. 88th Street to the west, Campus Drive to the north, S. 96th Street/Northwest Parkway to the east and US 36 to the south (see **Figure 1:** Vicinity Map). The development is known as “Redtail Ridge” and proposes to develop a mix of office, senior care housing, multifamily housing, hotel and retail uses. A previous report was submitted for the former project name “Nawatny Ridge” in September 2019. This study evaluates an update land use development plan and supersedes the recommendations provided in the previous study.

The project area is currently vacant, but prior to being sold to Sun Microsystems in 2005, Storage Tek headquarters and production plant was located on the project site. Storage Tek consisted of approximately 1,700,000 square feet of building area. In 2008, ConocoPhillips purchased the property and demolished the buildings in 2009. This area has since been vacant. When Storage Tek was fully active in the late 1990’s, approximately 4,000 employees worked on the campus and the campus generated approximately 12,400 vehicles per day (vpd), 1,600 vehicles per hour (vph) during the AM peak and 1,400 vph during the PM peak. The site was served by two access points along Tape Drive which intersects with S. 88th Street to the west and Northwest Parkway to the east. Currently vehicles are not permitted to drive on Tape Drive and there are barricades blocking vehicles from accessing the roadway on both the west and east sides of the property.

The purpose of this study is to assist in identifying potential traffic and mobility projects within the study area as a result of each of phase of this project. The traffic study evaluates peak hour intersection operations and roadway conditions in the study area with and without the project generated traffic. The information contained in this study is anticipated to be used by the City staff in identifying any intersection or roadway deficiencies and potential improvements for each scenario. This study focuses on the weekday AM and PM peak hours, which represent the periods of highest trip generation for the proposed uses and of adjacent street traffic.

FOX TUTTLE
TRANSPORTATION GROUP

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

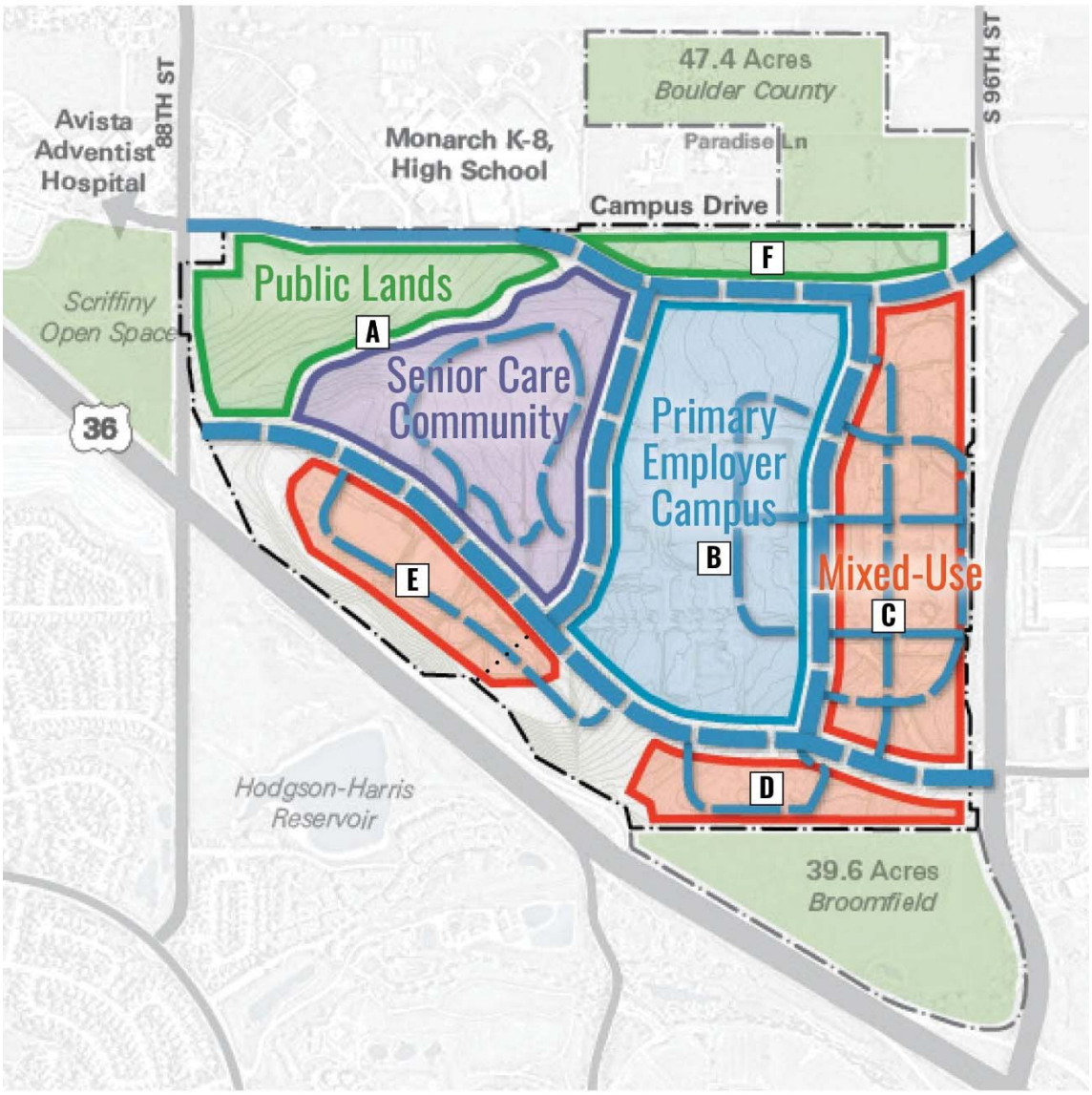
VICINITY MAP

FT Project #	19055	Original Scale	NTS	Date	1/21/20	Drawn by	EJK	Figure #	1

2.0 PROJECT DESCRIPTION

The proposed project was split into three (3) different development areas. The western area of the project is anticipated to develop as continuing care retirement community (Parcel A), the central area is anticipated to be developed as an office corporate headquarters (Parcel B), and the eastern/southern area is anticipated to be a mixed-use zone with a combination of residential, retail, hotel, and office use (Parcels C, D, and E). Note that no development is planned for Parcel F. A concept showing the preliminary proposed internal roadway network, proposed access to the external network, and the development areas is provided in **Figure 2**

Figure 2. Proposed Land Use and Internal Roadways



While subject to change, the proposed land use type/size and estimated timeframe for when each phase will be completed and fully occupied is summarized below:

Anticipated Development Prior to Year 2025

- Parcel A: 505 units in the continuing care retirement community
- Parcel B: 500,000 square feet of office corporate headquarters (central area anticipated to be fully built-out in Year 2022)
- Parcel C / D / E: 600 multifamily residential units, 240 hotel rooms, 10,000 square feet of general retail space, 590,000 square feet of office building space

Additional Growth Anticipated to be Completed Between Year 2025 and Year 2030

- Parcel A: 505 units in the continuing care retirement community
- Parcel C / D / E: 300 multifamily residential units, 15,000 square feet of general retail space, 300,000 square feet of office building space

Additional Growth Anticipated to be Completed Between Year 2030 and Year 2035

- Parcel A: 316 units in the continuing care retirement community
- Parcel C / D / E: 20,000 square feet of general retail space, 490,000 square feet of office building space

Additional Growth Anticipated to be Completed Between Year 2035 and Year 2040

- Parcel C / D / E: 25,000 square feet of general retail space, 370,000 square feet of office building space

Full Build Out (Cumulative Development)

- Parcel A: 1,326 units in the continuing care retirement community
- Parcel B: 500,000 square feet of office corporate headquarters
- Parcel C / D / E: 900 multifamily residential units, 240 hotel rooms, 70,000 square feet of general retail space, 1,750,000 square feet of office building space

With the first development (estimated to be completed/opened in Year 2022), Campus Drive will be extended to connect between S. 88th Street and S. 96th Street (it currently dead ends at Monarch High School, approximately 2,200 feet east of S. 88th Street). This new connection will serve traffic generated by the proposed development, as well existing traffic currently traveling through the Dillon Road/S. 88th Street and S. 88th Street/Campus Drive intersections which will now have an alternative route. With the Campus Drive extension, a new full-movement signalized access is proposed along S. 96th Street at the northeast corner of the site near where Old 96th Street/Disc Drive currently intersects as a 3/4 movement access.

A summary table showing the scenarios proposed to be evaluated in this project is shown in **Table 1.** This study evaluates Year 2025, Year 2030, and Year 2040 with and without the project. Note that while detailed traffic analysis was not completed for Year 2035, the development phasing was utilized to estimate the timeline for when improvements would be needed.

Table 1. Scenario Summary

Scenario	Background Traffic	Development Traffic Prior to Year 2025	Development Traffic Prior to Year 2030	Build Out Development Traffic	Campus Drive Extension
Existing	✓				
Year 2052 Background	✓				
Year 205 Background + Project Trips	✓	✓			✓
Year 2030 Background	✓				
Year 2030 Background + Project Trips	✓	✓	✓		✓
Year 2040 Background	✓				
Year 2040 Background + Project Trips	✓	✓	✓	✓	✓

3.0 PREVIOUS STUDIES

This section summarizes recently completed traffic and/or multimodal transportation studies in the study area. An overview of the study is provided below as well as key considerations for the Redtail Ridge study.

ConocoPhillips Campus Traffic Impact Study

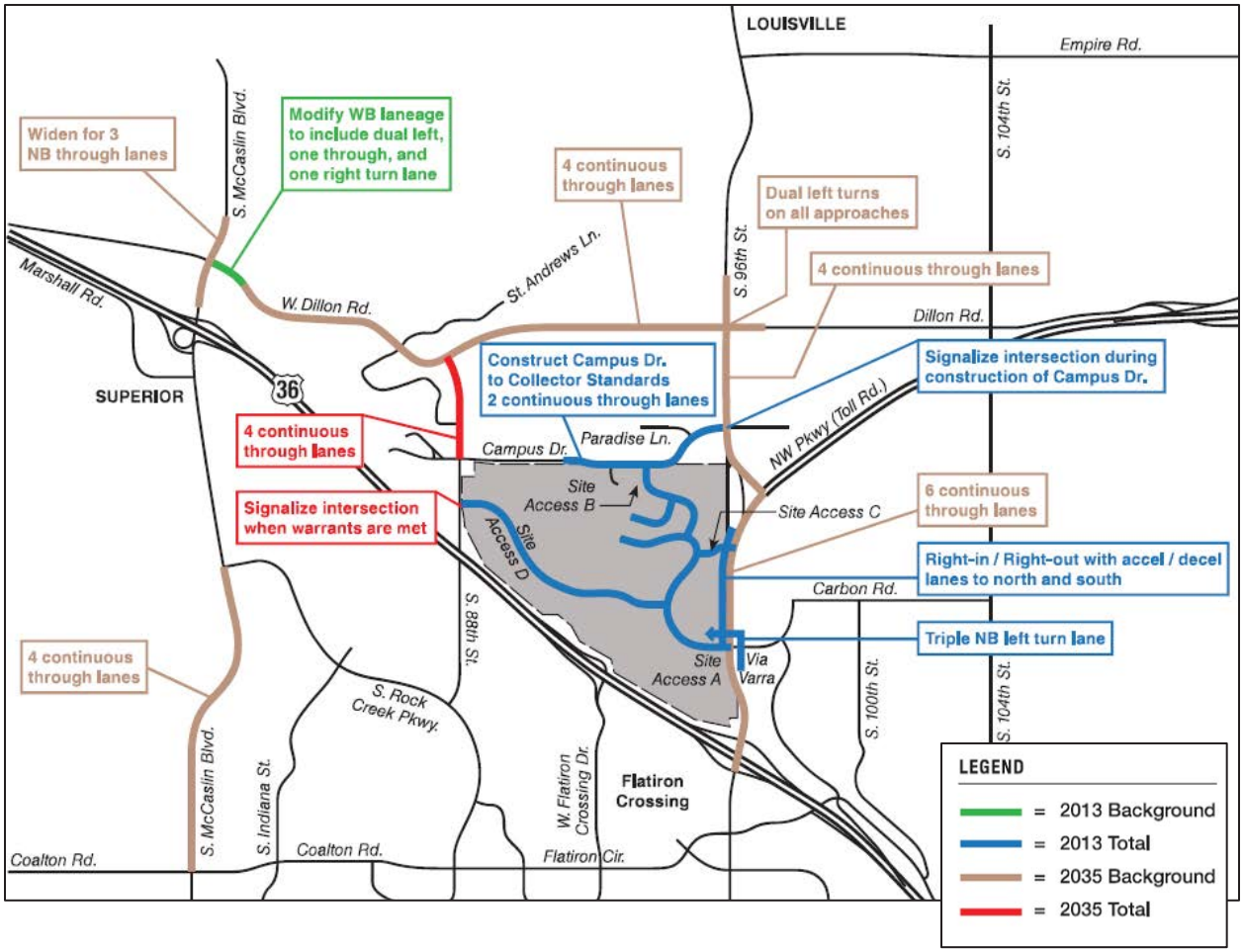
In 2010 ConocoPhillips proposed to build a new research, training, and office development on the former Storage Tek site. At build out, the total development was not to exceed 2,500,000 square feet of building area and was anticipated to generate approximately 17,500 daily, 2,660 AM peak hour, and 2,455 PM peak hour vehicle trips. The site proposed to have four access points, a full movement access at the signalized west approach of the Northwest Parkway/Tape Drive/Via Varra intersection; a right-in/right-out access along Northwest Parkway between S. 96th Street and Tape Drive/Via Varra; a full-movement access along Campus Drive (Campus Drive was proposed to extend to the east to connect with S. 96th Street where Paradise Lane currently intersects); and an access along S. 88th Street where Tape Drive intersects.

The study evaluated Year 2013 and Year 2035 with and without the project site trips. Recommendations were identified under the background and with project trip scenarios. Those improvements were illustrated in Figure ES-1 in the Traffic Impact Study (TIS) and are also shown in **Figure 3**. Notable recommended improvements include extending Campus Drive to S. 96th Street, expanding Northwest Parkway to a six-lane facility between S. 96th Street and US 36;

expanding Dillon Road, S. 96th Street, and S. 88th Street to four-lane facilities, and constructing dual left-turn lanes on all approaches of the Dillon Road/S. 96th Street intersection.

Key Considerations for Redtail Ridge: The ConocoPhillips study evaluated the same project area that is being evaluated for the Redtail Ridge study. Although the project was approved by the City of Louisville in 2010, ConocoPhillips did not move forward with the project and most of the recommended improvements identified in the study have not been built. In addition to infrastructure improvements, Transportation Demand Management strategies, bicycle infrastructure improvements, and transit improvements were also recommended to reduce vehicular traffic to/from the site.

Figure 3. Summary of Roadway Improvements (ConocoPhillips Campus TIS)



Parkway Circle South Retail Development Traffic Impact Study

The Parkway Circle South Retail Development (Land Rover Dealership) TIS is the most recent TIS to be completed for the Parkway Circle development area and is dated December 2016. A master traffic study for the development was completed in Year 2001. The Parkway Circle development area is located east of Northwest Parkway, west of the railroad tracks, and expands to the north and south of Via Varra in Broomfield, CO.

Key Considerations for Redtail Ridge: The Parkway Circle development area is located adjacent to the Redtail Ridge study area. Two of the primary entrances/exits to/from the Parkway Circle development are shared study intersections with the Redtail Ridge traffic study (the accesses located along Northwest Parkway at the S. 96th Street/Via Varra and Tape Drive/Via Varra).

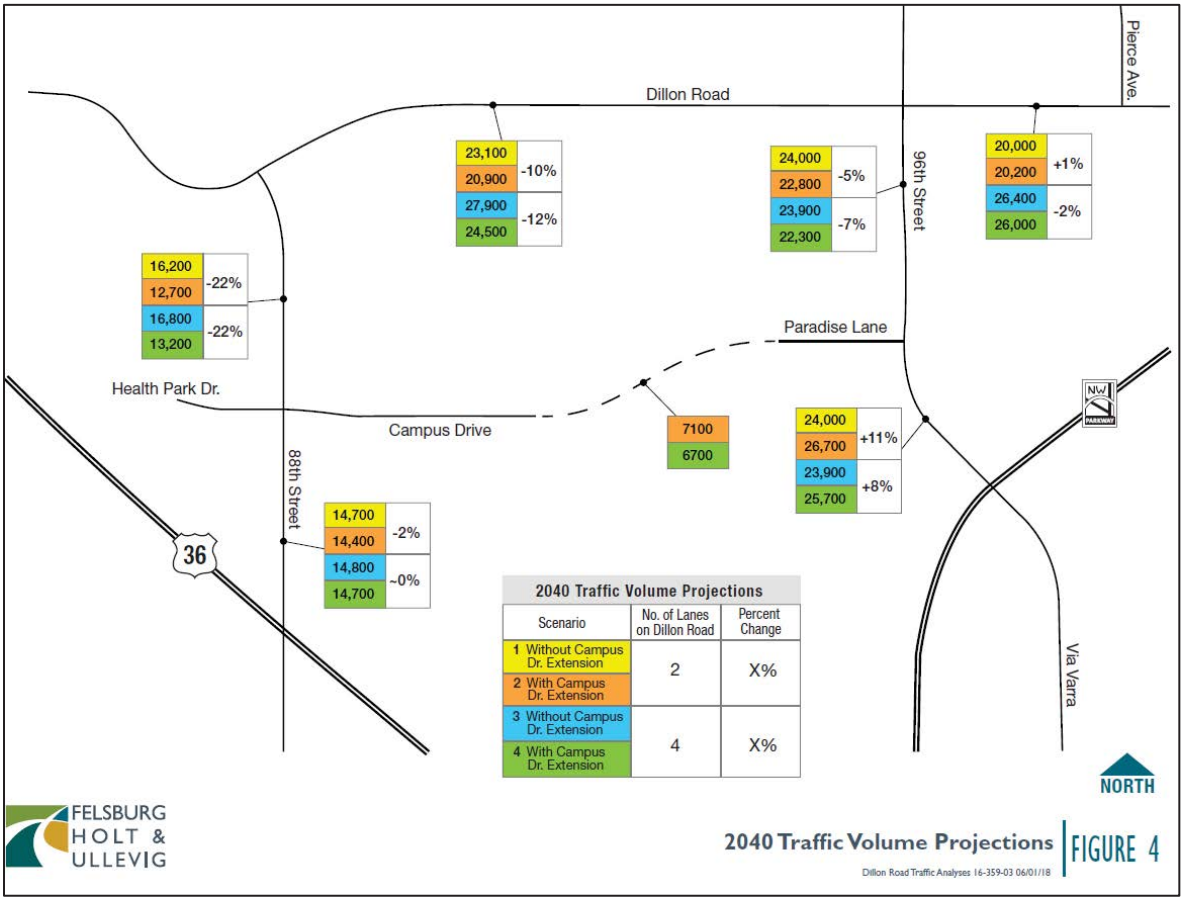
The Parkway Circle development area is approximately half built-out currently and is anticipated to be fully built out prior to Year 2040. Since the 2016 TIS, the auto dealership and some of the proposed retail to the south of Via Varra has been constructed and is open/operating. However, since this area is not fully built out, traffic generated by the undeveloped parcels in the Parkway Circle development was accounted for in the background traffic growth assumed for the Redtail Ridge analysis.

88th Street/Campus Drive Traffic Evaluation

In May 2018, a traffic analysis was completed along S. 88th Street and for the potential extension of Campus Drive to S. 96th Street for the Town of Superior. Based on field observations completed for the study, it was noted that there is congestion along S. 88th Street at Campus Drive prior to the Monarch schools starting. While queues entering Monarch school campus (southbound left-turn and northbound right-turn) along S. 88th Street do extend beyond the available turn lane storage consistently near the start of school, the queues were observed to occur for a relatively short amount of time and were slow rolling queues.

To address the existing congestion issues, the study recommended the extension of Campus Drive to the east to connect at S. 96th Street. This extension was expected to reduce congestion along S. 88th Street for the school. The Campus Drive extension was projected to accommodate 6,700 to 7,100 vpd in Year 2040 and a two-lane roadway was anticipated to operate acceptably. Projected Year 2040 daily traffic volumes were provided in Figure 3 from the S. 88th Street/Campus Drive study (see **Figure 4** below). At the S. 96th Street/Campus Drive intersection, dual northbound left-turn lanes on S. 96th Street and a free-flow right turn deceleration lane on southbound S. 96th Street were recommended.

Figure 4. 2040 Traffic Volume Projections (88th Street/Campus Drive and Dillon Road Studies)



Key Considerations for Redtail Ridge: Redtail Ridge shares study roadways and intersections with the S. 88th Street/Campus Drive Traffic Evaluation study. The Redtail Ridge project assumes that the Campus Drive extension will be constructed with the first phase of development (Year 2022). However, the S. 88th Street/Campus Drive Traffic Evaluation did not have the land use forecasts that are outlined in this study for the Redtail Ridge project. Further, since the completion of the 2018 study, the start/end times for the Monarch K-8 and High School have changed. The new hours for K-8 are 8:00 AM to 3:05 PM and for the High School are 8:30 AM to 3:30 PM.

Dillon Road Corridor Study

This corridor study was completed for the City of Louisville in June 2018 and evaluated Dillon Road between S. 88th Street and 104th Street as part of the City's ongoing planning efforts. The purpose of this study was to understand existing travel constraints and to plan for improvements as traffic grows and as new development occurs along the corridor.

The study evaluated the operations of the Campus Drive extension on Dillon Road and on S. 88th Street (see **Figure 4** above, which is also Figure 4 in the Dillon Road Corridor Study). The study

estimated that the Campus Drive extension was expected to reduce daily traffic volumes on Dillon Road by 10-12 percent and on Campus Drive by approximately 22 percent. The corridor study's findings determined that the projected 20,900 vpd on Dillon Road in Year 2040 was likely to continue to function acceptably as a two-lane roadway. Further, Dillon Road as a two-lane would help restrict the level of motorists it attracts.

Key Considerations for Redtail Ridge: Redtail Ridge shares study roadways and intersections with the Dillon Road Corridor Study. As noted in the S. 88th Street/Campus Drive study, the Dillon Road Corridor Study also recommends that Campus Drive be extended to S. 96th Street to reduce traffic volumes on S. 88th Street north of Campus Drive and along Dillon Road between S. 88th Street and S. 96th Street. It should be noted that the Dillon Road Corridor Study did not have the land use forecasts that are outlined in this study for the Redtail Ridge project.

While this study suggests that Dillon Road will operate acceptably in Year 2040 as a two-lane roadway, it also notes that there is more vehicle demand that wants to be on Dillon Road but due to the very limited capacity available today during peak periods, that traffic is currently using alternative routes until Dillon Road is expanded to a four-lane. The study also notes the poor lane utilization for through movement at the Dillon Road/S. 96th Street intersection, due to the short segment of expanding from one-through lane to two-through lanes through the intersection. If/when Dillon Road is expanded to a four-lane roadway, this would resolve the poor lane utilization at this intersection.

96th and Dillon Commercial Development

In November 2019, LSC Transportation Consultants prepared the *96th & Dillon Trip Generation Comparison Letter* for the current proposed land uses for the development area north of Dillon Road and east of S. 96th Street. This is an update to the *St. Louis Parish Traffic Impact Analysis* study completed in September 2001. The development proposes two access on S. 96th Street. The area is currently owned by three property owners and the area is the process of updating the General Development Plan (GDP).

The project proposes to construct an indoor tennis center in "Zone A", a 10-fueling station gas station with a car wash, approximately 85,000 square feet of light industrial space, and a 3,000 square foot fast casual restaurant in "Zone B", and a 20,000 square foot church, approximately 100,000 square feet of light industrial, a 10,000 square foot day cay center, and a 600 student school in "Zone C". Based on discussions with the developer, the industrial/commercial areas in Zone B and potentially Zone C are anticipated to be constructed in Year 2021. The tennis center, church and school are not expected to be developed until after Year 2030.

The November 2019 letter provided trip generation estimates for each of the proposed uses. Under full build-out the total development is anticipated to generate 6,294 daily, 958 AM peak hour, and 649 PM peak hour net new trips to the study network. An updated traffic study for the currently proposed land uses has not yet been completed for the project.

Key Considerations for Redtail Ridge: This development is located near the Dillon Road/S. 96th Street study intersection. The project is anticipated to generate traffic that will be added to the study intersections at a rate higher than the general background growth. Therefore, the traffic generated by this development was accounted for in the background traffic growth assumed for the Redtail Ridge analysis.

Morgan Ranch – Downtown Superior Traffic Impact Analysis

A traffic impact analysis was prepared for the proposed Morgan Ranch – DTS mixed-use development; the study is dated November 2019. The site is located east of McCaslin Boulevard in the center of Downtown Superior. The project includes approximately 352 apartment units, 64 townhome units, 33,900 square feet of restaurant, 39,430 square feet of retail space and 7,564 square feet of civic center. As part of the development, a new roadway connection is proposed to connect with S. 88th Street just south of the US 36 overpass bridge via Promenade Boulevard. The study found that the S. 88th Street / Promenade Boulevard intersection will likely require a traffic signal or roundabout in the future.

Key Considerations for Redtail Ridge: This development is proposing to construct a new access onto S. 88th Street. The traffic generated by this development was accounted for in the background traffic growth assumed for the Redtail Ridge analysis.

Level 1 Traffic and Revenue Study Jefferson Parkway

http://www.jppha.org/wp-content/uploads/2019/08/Level-1-Traffic-and-Revenue-Study-Jefferson-Parkway.pdf

This study was completed for the Jefferson Parkway Public Highway Authority (JPPHA) and finalized in April 2018. The purpose of the study was to provide forecasts of traffic and revenue for the proposed Jefferson Parkway. The proposed Jefferson Parkway is a 9.2-mile toll road running along the northwestern perimeter of the Denver Metro area. The future roadway will be a limited access expressway with two lanes of travel in each direction from SH 128 (south of US 36) to SH 93 (south of SH 72).

One of the scenarios considered was the “Northwest Parkway Extension” due to the project’s proximity to the study corridor. The assumed roadway configuration for this scenario was described on page 4-8 in the study and is provided below:

> *The assumed configuration was based on the latest project information provided by the Northwest Parkway Toll Authority. The Northwest Parkway Extension will be a two-lane limited-access facility constructed between S. 96th Street and SH 128. Access to US 36 from S. 96th Street and Flatiron Crossing Drive will be provided via free local frontage roadways. Additional interchanges will be constructed at S. 96th Street, Interlocken Boulevard and El Dorado Boulevard. Local access to Flatiron Boulevard and Environmental Way will be retained. Due to the relative importance of the project, traffic assignments with and without*

the proposed Northwest Parkway Extension were conducted in order to estimate the potential traffic and revenue impact to the Jefferson Parkway.

Key Considerations for Redtail Ridge: The Northwest Parkway Extension segment in the Jefferson Parkway study, includes four of the study intersections along Northwest Parkway for the Redtail Ridge traffic Study (S. 96th Street/Via Varra, Tape Drive/Via Varra, US 36 North Ramps, and US 36 South Ramps). As noted above, the Northwest Parkway Extension would impact the study corridor with proposed "local frontage roadways" to maintain free local access and an interchange at S. 96th Street. No concepts were provided to illustrate the proposed frontage road or interchange configuration. The *Level 1 Study* indicated that the revenues generated from the Jefferson Parkway project would cover the cost of the frontage road and interchange improvements.

City of Louisville Transportation Master Plan (Adopted October 2019)

https://www.engagelouisvilleco.org/transportation-master-plan

The City of Louisville Transportation Master Plan (TMP) is the first effort conducted by the City to look comprehensively at transportation conditions and options throughout Louisville and the region for all modes of transportation. The TMP represents a long-range planning effort that describes baseline conditions of the City's transportation network, establishes eight overarching transportation Goals, and specific transportation Policies, Programs and Projects. The City developed the plan with extensive community outreach, input from the City's advisory boards and commissions, regional partners, and City staff. It is important to note that the plan reflects a moment in time. The TMP provides guidance, but City priorities may change over time and transportation decisions will need to reflect these updated community needs, opportunities and priorities.

Key Considerations for Redtail Ridge: The TMP acknowledges that the development of the former Storage Tek campus provides additional opportunity to leverage transit (page 4-11, 4-31) with a potential new local route to connect the Redtail Ridge project area with other development areas and regional transportation stations in the study area. The TMP notes future corridor improvements including expanding SH 42/S. 96th Street to a four or five lane cross-section (page 4-14) and increasing capacity at the Dillon Road/S. 96th Street intersection (page 4-16). The City will need to partner with landowners (CTC, BNSF and BVSD) on the planned improvements; and as the former Storage Tek site develops and connects into the existing transportation network. The City will need to evaluate the capacity constraints of the surrounding road and trail network and ensure adequate improvements are made (page 4-16). The TMP recommends transit route connections from the former Storage Tek site to destinations within Louisville (page 4-31) and bike share stations that would be connected to other stations at McCaslin Station, Avista Hospital, the Colorado Technology Center (CTC), Downtown, DELO, and Kestrel (page 4-38).

Boulder County Transportation Master Plan

https://www.bouldercounty.org/transportation/plans-and-projects/transportation-master-plan/

The Boulder County TMP establishes a vision for a sustainable and inclusive transportation network by working together to prioritize transportation investments, explore new funding options, and plan for the future. The county's TMP provides a blueprint for Boulder County's transportation system for the next 25 years. The TMP provides a clear direction to the Boulder County Transportation Department to secure funding as it becomes available for transportation projects in the coming decades.

Key Considerations for Redtail Ridge: The Boulder County TMP identified the S. 96th Street/ Highway 42 as a key regional corridor (see Figure 2). The key regional corridors will expand and enhance affordable and equitable mobility options for older adults, people with disabilities, individuals with low income, and others living with mobility limitations while also increasing bike-to-transit programs to provide transportation options and make bus travel more accessible. S. 96th Street/Highway 42 is also identified as a conceptual corridor for Bus Rapid Transit (BRT) service in the TMP (see Figure 5). The BRT service would connect to a county-wide system of BRT routes that connect to regional destinations. The BRT system would include infrastructure investments and programs to reduce vehicle miles traveled and provide service to underserved communities. A component of the BRT vision is to expand and supplement existing Boulder County Eco Pass programs with the goal of a countywide community pass for all county residents and employees. See **Section 9** for possible future scenario if this and other mobility plans in this section are completed in the future.

DRCOG Active Transportation Plan

https://drcog.org/programs/transportation-planning/bicycle-and-pedestrian-planning/active-transportation-plan

In 2017, the Denver Regional Council of Governments (DRCOG) initiated the development of the Denver region's first active transportation plan. The purpose of the plan is to establish a common vision for bicycling and walking in the region and to provide inspiration and tools for local agencies to implement projects in their respective jurisdictions. The Denver Regional Active Transportation Plan (ATP) supports DRCOG's Metro Vision plan and will foster collaboration among local agencies across boundaries. DRCOG worked with partners throughout the region to develop a regional active transportation vision, tools and products to support the development of a robust active transportation network in the Denver region. The ATP envisions a safe, comfortable and connected network and highlights opportunities and implementation strategies to improve active transportation across the Denver region.

Key Considerations for Redtail Ridge: The ATP identified regional active transportation corridors to allow safe and comfortable access to existing and future regional destinations for people of all ages, incomes and abilities. Development of these corridors supports Metro Vision outcomes related to creating a connected multimodal region and a vibrant regional economy. The regional

network can facilitate cross-jurisdictional collaboration toward a common vision for a regional active transportation network. Local facilities that connect to the regional network are critical to connect residents to the regional network and are an important component of the network as well. The S. 96th Street/State Highway 42 corridor from Broomfield to Longmont is identified as a regional active transportation corridor. This plan will be implemented over the next two decades as part of DRCOG's regional Transportation Improvement Plan (TIP). See **Section 9** for possible future scenario if this and other mobility plans in this section are completed in the future.

Mobility Choice Blueprint

http://www.mobilitychoiceblueprintstudy.com/assets/docs/MCB_Final_Report_.pdf

The way we travel in the Denver metro area is rapidly changing. Advanced technology and internet connectivity are providing new options every day. To maintain the economic competitiveness and livability of our communities, we must identify and anticipate how technological advances like driverless vehicles, mobility apps and streamlined fare payment could dramatically change our transportation systems. The region's major multi-modal agencies have agreed to develop a Mobility Choice Blueprint (MCB). This is a coordinated strategy for how we enable more accessible and effective transportation mobility choices to enhance the quality of our social, cultural, and economic life now and in the future. The metropolitan agencies are collaborating, in partnership with community, nonprofit, and private sector leaders, to carefully consider a range of effective and efficient solutions to the challenges and opportunities presented by emerging mobility technologies.

Key Considerations for Redtail Ridge: The MCB recommended implementation of transit priority on all major bus corridors, implementation of smart traffic signal control technology on all major regional arterial corridors, developing incentives to improve ride hailing and ridesharing operations, and encouraging shared use of driverless automated vehicles.

RTD First and Last Mile Strategic Plan

http://www.rtd-denver.com/firstmile-lastmile.shtml

Transit is only effective when riders can access it. First and Last Mile (FLM) is the problem of getting to transit (first mile) and getting to your final destination (last mile). Not all trips are the same, and first mile trips often differ from last mile trips in length, mode of travel, and purpose. Similarly, trips to access transit are not necessarily limited by a one-mile radius but can differ depending on the mode of travel used to access the transit service. RTD First and Last Mile Strategic Plan (FFM Plan) covers FLM strategies for multiple types of transit stations and stops in a variety of settings. This Plan is not intended to be a prescriptive guide to implementing FLM strategies and recommendations. It provides a framework from which to select a tailored set of FLM strategies to improve transit access. The FFM Plan aims to improve transit accessibility by empowering local jurisdictions, transportation management associations (TMAs), and other

partners to understand the range of FLM solutions that are available and then apply those solutions to specific station areas. As FLM strategies and recommendations often span across jurisdictional boundaries, partnerships are identified as key toward implementation.

Key Considerations for Redtail Ridge: The FFM Plan identifies strategies for reusing existing infrastructure, building new connections, transportation demand management and new transportation services on the Redtail Ridge project site (Figure 4.1). It also identified how the strategies could be applicable to different transit rider groups who will want to access local and regional transit services in and near Redtail Ridge (Figure 4.1). The strategies in this plan can be implemented over the next two decades as part of the Transportation Demand Management (TDM) program for the project.

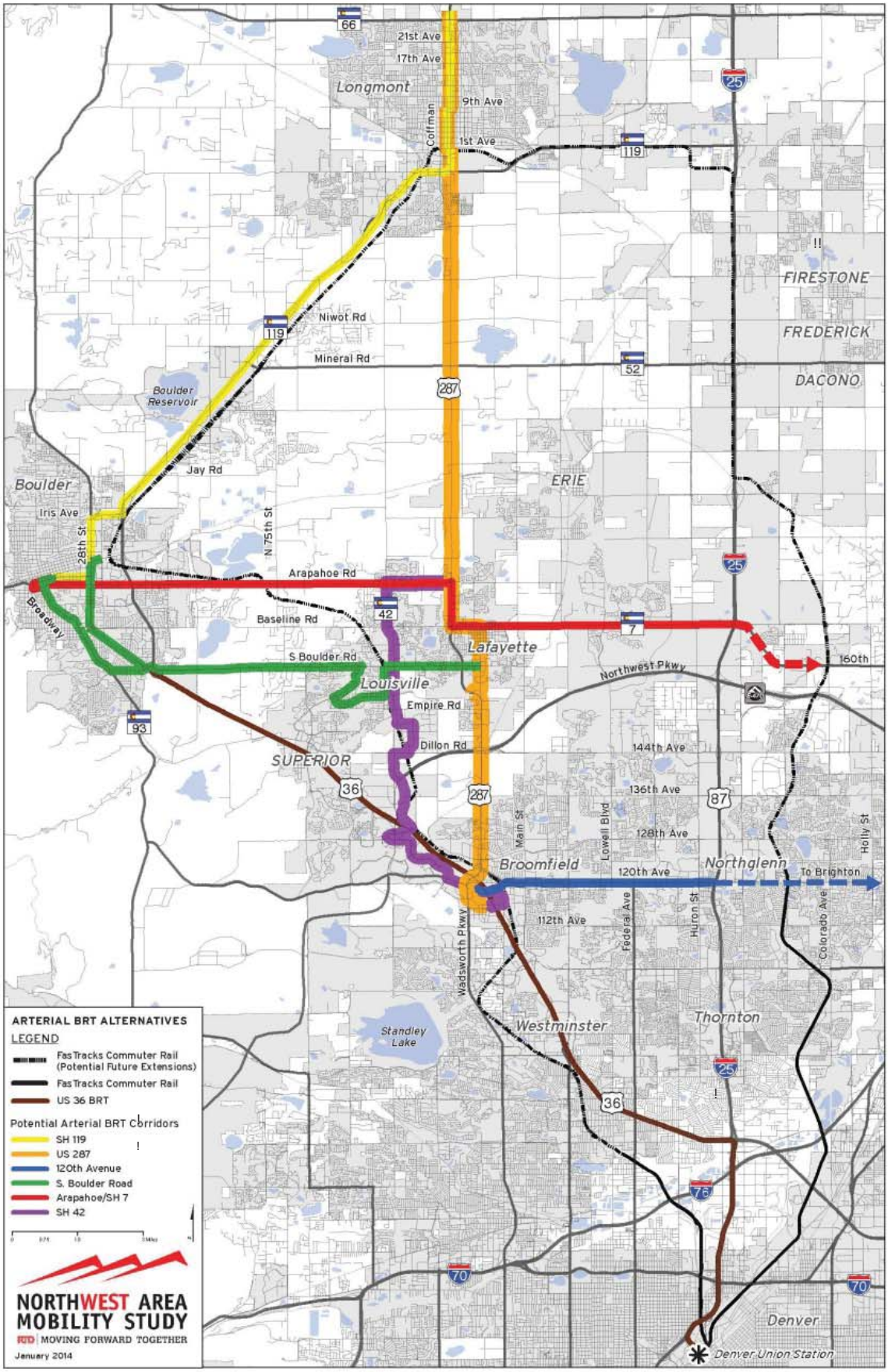
RTD Northwest Area Mobility Study

http://www.rtd-fastracks.com/nams_1

The Northwest Area Mobility Study (NAMS) was a 13-month effort to develop a prioritized list of mobility improvements for the Northwest area of the Regional Transportation District's (RTD) service area. The study focused on five key areas: Phased Construction of Northwest Rail, Feasibility of Extending North Metro Rail Line to Longmont, Finalizing the US 36 Bus Rapid Transit (BRT) Commitments identified for Year 2035, Feasibility of New Arterial BRT Lines, and Analysis of the Reverse-Commute between Denver Union Station (DUS) and US 36. RTD staff and Board of Directors initiated the study in response to the significant cost increases associated with building and operating commuter rail in the 41-mile Northwest corridor. The goal of the study was to collaborate with corridor stakeholders to determine if there is a more cost-effective way to approach improving mobility in the area that could be implemented sooner. The result was multi-agency consensus on a prioritized list of agreed-upon mobility improvements for the Northwest RTD region.

The SH 42 corridor was recently identified as a Priority 3 corridor in the RTD Regional Bus Rapid Transit Study, the Metro Mayors Caucus is reviewing a ballot initiative to fund this corridor as part of regional ballot initiative, and the City of Louisville has applied for a grant to further study this service as part of a revised Highway 42 corridor study (see below). A Year 2040 scenario is provided in this study that assumes this service is in place.

Key Considerations for Redtail Ridge: NAMS identified the S. 96th Street/Highway 42 as one of the six candidate Arterial Bus Rapid Transit corridor (see Figure 6.1 in the study and **Figure 5** below). All corridors were evaluated, and recommendations were made for transit priority elements such as transit signal priority, queue jump lanes and headway-based scheduling. Operations and maintenance costs for the corridors were also prepared. The NAMS Policy Advisory Committee (PAC) recommended that all six arterial BRT projects be implemented with system-wide service improvements.



FOX TUTTLE
TRANSPORTATION GROUP

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

ARTERIAL BRT CORRIDOR CANDIDATES (RTD NAMS)

FT Project #	19055	Original Scale	NTS	Date	1/24/20	Drawn by	EJK	Figure #	5

RTD Transportation Transformation (T2) Comprehensive Plan

http://www.rtd-denver.com/documents/projects/T2-Summit-091018.pdf

The RTD Transportation Transformations Comprehensive Plan (T2 Plan) is currently underway. The T2 Plan is a wholesale evaluation of RTD's current and anticipated resources in order to chart a roadmap for RTD's future as a Mobility Integrator and public transit provider for the Denver metro region. The study is an essential component of RTD's Transportation Transformation initiative as the District moves from a transit agency to a mobility integrator.

The T2 Plan will be completed in coordination with the RTD Board of Directors, DRCOG, CDOT, local governments, and stakeholders/citizens. The T2 Plan is anticipated to answer the question of "what's next" to complement FasTracks, charting a course that optimizes existing and future FasTracks infrastructure first before determining what other future investments are needed. Rather than "competing" with FasTracks, instead the idea is to provide incremental value to the existing program rather than a series of random projects that may have no relationship to each other or the overall regional system.

Key Considerations for Redtail Ridge: The T2 Plan will likely outline funding and timeline options for Bus Rapid Transit (BRT) projects in the S. 96th Street/Highway 42 corridor. Also, the future of how local RTD bus routes and shared ride mobility providers will be further defined.

4.0 STUDY CONSIDERATIONS

4.1 Data Collection

Intersection turning movement and daily traffic volumes were collected in August 2019 in the study area when school was in session on the Monarch school campus. The existing traffic volumes are illustrated on **Figure 6.** The existing intersection geometry and traffic control are also shown on this figure. Signal-related information for the existing intersections were provided by the City of Louisville and Broomfield and updated based on video observations to reflect current field operations. Count data sheets are provided in the **Appendix**.

4.2 Evaluation Methodology

The traffic operations analysis addressed the signalized and unsignalized intersection operations using the procedures and methodologies set forth by the *Highway Capacity Manual (HCM)*[1]. Existing peak hour factors were applied to the intersections for the existing scenarios. Study intersections were evaluated using Synchro and SimTraffic software.

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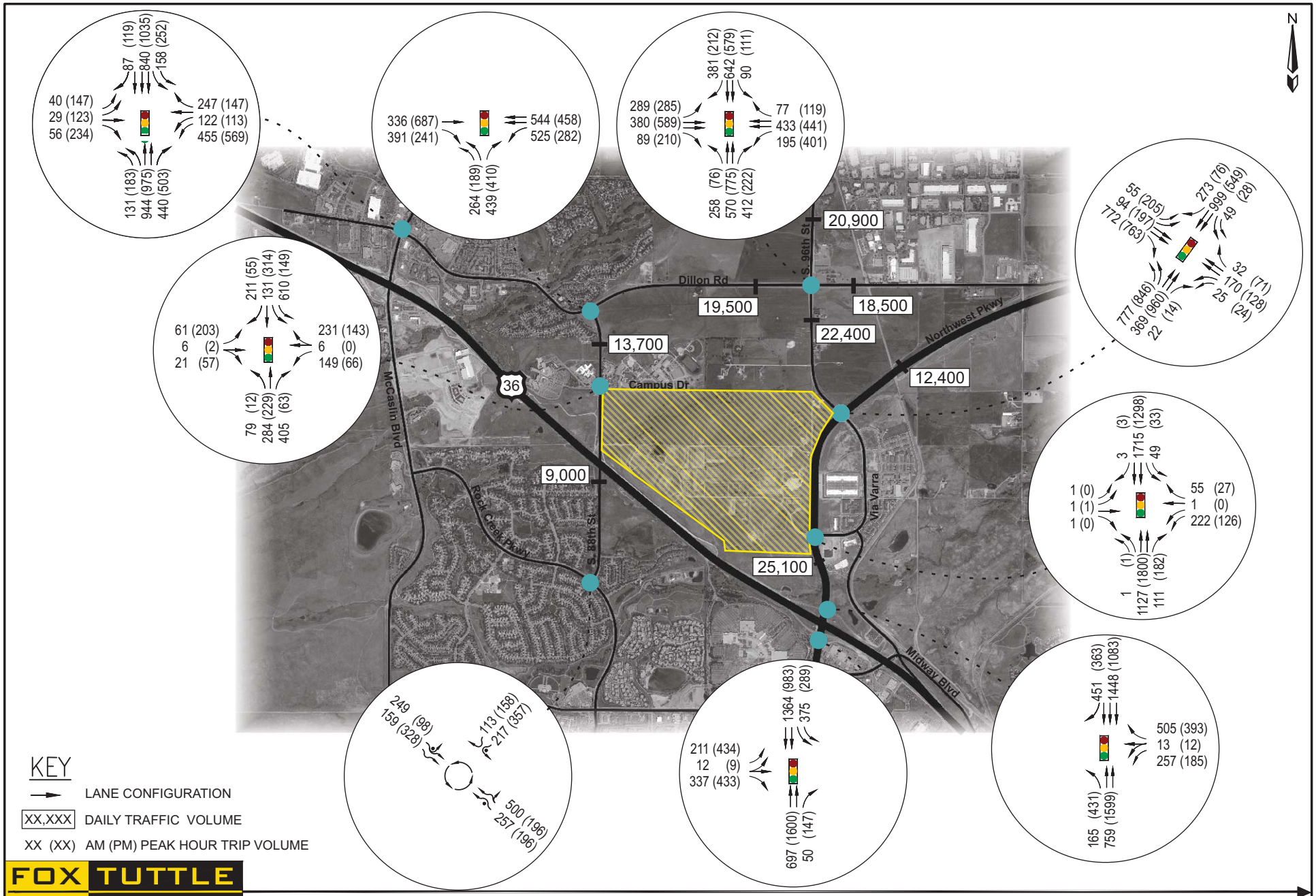
1 Highway Capacity Manual, Highway Research Board Special Report 209, Transportation Research Board, National Research Council, 2010 and 6th Edition (2016).



REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

EXISTING (YEAR 2019) TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	1/21/20	Drawn by	EJK	Figure #	6

4.3 Level of Service Definitions

A Level of Service analysis was conducted to determine the existing and future performance of the study area intersection and to determine the most appropriate traffic control device and need for auxiliary lanes for the study intersections.

To measure and describe the operational status of the study intersections, transportation engineers and planners commonly use a grading system referred to as "Level of Service" (LOS) that is defined by the *HCM*. LOS characterizes the operational conditions of an intersection's traffic flow, ranging from LOS A (indicating very good, free flow operations) and LOS F (indicating congested and sometimes oversaturated conditions). These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with traveling through the intersections. The intersection LOS is represented as a delay in seconds per vehicle for the intersection as a whole and for each turning movement. A more detailed discussion of LOS methodology is contained in the **Appendix** for reference.

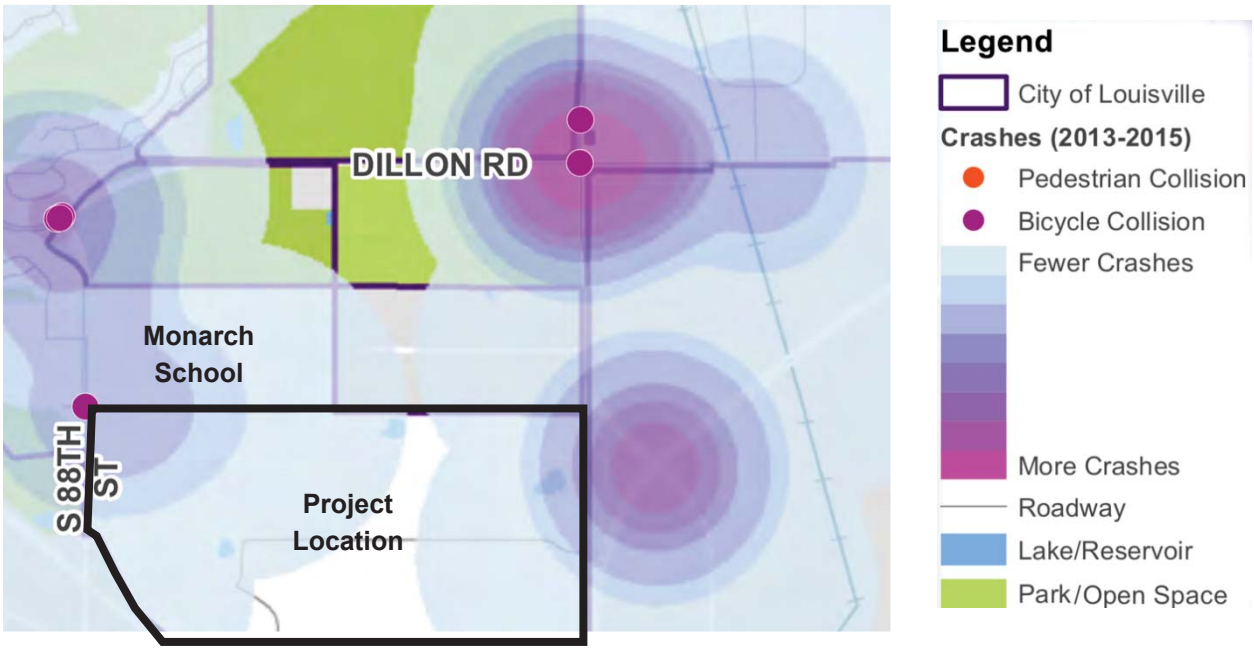
Typically, LOS A through C is considered to be good for the overall intersection operations and the desired standard for overall intersection performance is LOS D or better. Individual movements may be allowed to fall to LOS E or F depending on the circumstances, such as a low-volume, side-street approach to an arterial where signal warrants are not met, or a protected-only, signalized left-turn movement where safety is prioritized over operational efficiency.

4.4 Safety for all Modes of Travel

Safety is an important factor for transportation planning and infrastructure investments. Intersections are key areas where a significant number of conflicts between people and vehicles can occur. The actual and perceived safety of an intersection or a corridor can greatly impact people's desire to utilize certain routes, particularly for those on foot or on bike. Safety in relation to schools is also a key factor in mobility and health. Monarch K-8 and Monarch High School, while accessible with trails and sidewalks, are located along corridors with higher travel speeds and volumes which pose potential risks. The roadways around the site are currently designed to optimize motor vehicle travel during peak times at speeds that present challenges for non-motorized travelers.

Four existing arterial intersections near the Redtail Ridge project were identified as high crash locations in the City of Louisville TMP, including the Dillon Road/S. 88th Street, Dillon Road/S. 96th Street, S. 88th Street/Campus Drive, and Northwest Parkway/S. 96th Street/Via Varra intersections as shown in **Figure 7**. Also, three of the locations have documented bicycle crashes. The Dillon Road/S. 88th Street intersection has the highest number of bicycle crashes in the City of Louisville.

Figure 7. High Crash Locations (City of Louisville Transportation Master Plan)



The City of Louisville's TMP recommends a series of infrastructure, maintenance and training programs designed to reduce crashes for all roadway users. Likewise, the TMP recommends building more Great/Complete streets citywide. Great/Complete Streets include adding treatment such as detached sidewalks, landscaping, protected bikeways, and travel dimensions that support driving speeds at or below the speed limits (see **Figure 8** below, Figure 4.2 in the TMP).

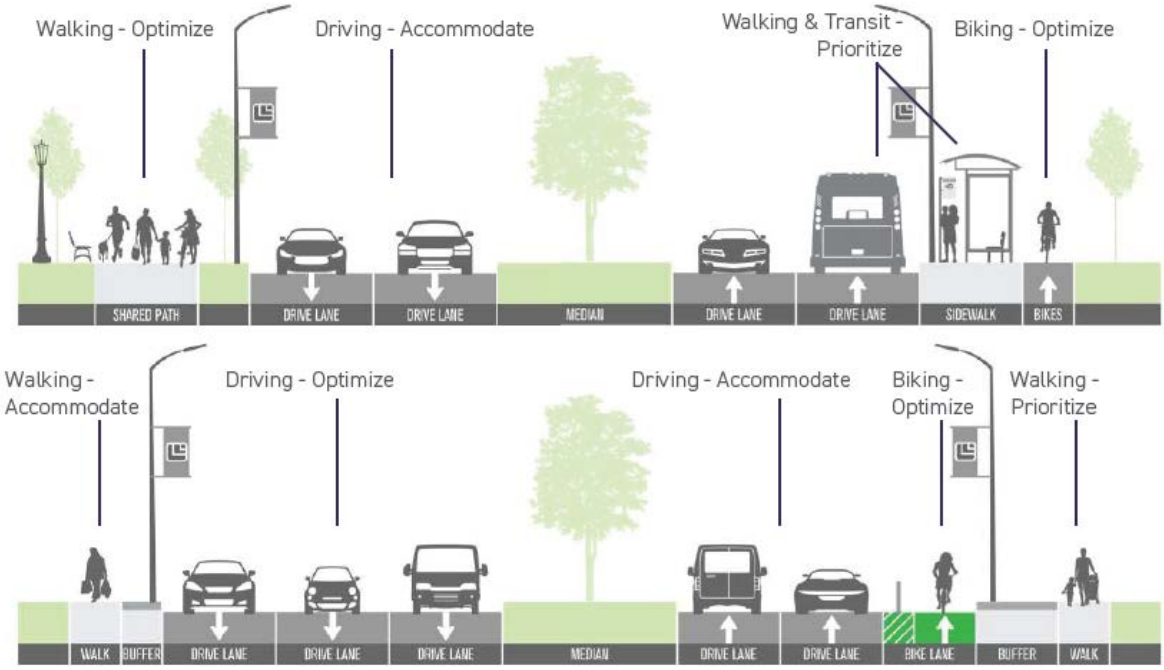
In addition to building Great/Complete street design internal to the project on Campus Drive, Tape Drive, Street A and Street B, the Redtail Ridge project team is recommending to help build Great/Complete street design treatments for the S. 88th Street, Dillon Road, and S. 96th Street corridors and intersections consistent with the TMP's policies. Such streets and intersections will be designed and operated to be safe and accessible for all users, regardless of ability, age, or mode. These corridors and intersections will make Louisville a more livable place, increase comfort and safety for pedestrian and bicyclists, improve first and last mile access to transit, reduce congestion and improve air quality. Most importantly, Great Streets have been shown by the Institute of Transportation Engineers (ITE) and the Federal Highway Administration (FHWA) to reduce conflicts that lead to crashes.

https://www.ite.org/pub/?id=F56B1D96-EFFB-B97B-153B-F217E1B69DD8

https://www.transportation.gov/mission/health/complete-streets

Figure 8. Great Street Graphic from the City of Louisville's TMP

	Walking	Biking	Transit	Driving
Optimize	Wide sidewalks/ trail, roadway buffer, enhanced amenities	Protected or buffered bike lanes, separated trail	Signal timing preference for transit, lane use priority, enhanced stop and shelter amenities	Additional lanes, enhanced signal timing, no shared ROW
Prioritize	Wider sidewalks/trail, roadway buffer	Bike lanes/trail, neighborhood bikeway treatments	Bus stop with shelter, coordinated pedestrian/ bike access	Enhanced signal timing, turn lanes
Accommodate	5' minimum sidewalks with ADA curb ramps	Bike route/shared facility	ADA accessible bus stop	Vehicle access to destinations



5.0 EXISTING CONDITIONS

5.1 Roadways

The study area boundaries were established based on conversations with City staff. The existing study area street network consists of arterial and collector roadways as well as a US Highway. The primary public roadways that serve the project site are discussed in the following text.

> ***US 36*** is a freeway that connects Denver and Boulder from I-25 in Denver to Table Mesa Drive in Boulder. Near the study area, US 36 has two general purpose lanes in both directions and there is an Express Lane in each direction, alongside the general-purpose

lanes. There are three (3) interchange accesses near the project area, at McCaslin Boulevard which was reconstructed to a Diverging Diamond Interchange in Year 2016, at Northwest Parkway/Interlocken Loop, which is diamond interchange, and there are two half diamond interchanges with one on either side of the Northwest Parkway/Interlocken Loop interchange. The RTD's Flatiron Flyer BRT service that connects Denver, Boulder, and other cities operates along the US 36 corridor. US 36 currently serves approximately 88,000 vpd west of the McCaslin Boulevard interchange and approximately 94,000 vpd east of the Northwest Parkway/Interlocken Loop interchange. The posted speed limit along this segment of US 36 is 65 miles per hour (mph).

Northwest Parkway is a four-lane divided highway under the jurisdiction of the City and County of Broomfield south of S. 96th Street. Northeast of S. 96th Street, Northwest Parkway becomes a toll road and freeway section with no at-grade intersection access. The roadway section consists of two travel lanes in each direction with a raised center median. Northwest Parking currently serves approximately 24,400 vpd north of US 36 and 12,200 vpd northeast of S. 96th Street. The posted speed limit is 45 mph within the study area.

Dillon Road is a four-lane divided arterial roadway west of S. 88th Street and transitions to a two-lane undivided rural roadway east of S. 88th Street. Dillon Road is an east-west street that provides a direct connection between McCaslin Boulevard (to the west) and the Northwest Parkway (to the east) where it makes connections via interchange ramp terminals at US 287. While east of S. 88th Street, Dillon Road is a two-lane roadway, at the S. 88th Street and S. 96th Street intersections a second through lane is added in each direction to increase vehicular capacity through the intersections. The extra through lanes merge to one lane as motorists proceed away from these intersections, except that Dillon Road continues to have a second through lane to the west of S. 88th Street. Dillon Road currently serves approximately 18,000 vpd east of S. 96th Street. There are existing on-street bike lanes striped on Dillon Road. The posted speed limit is 35 mph west of S. 88th Street and 45 mph east of S. 88th Street within the study area.

McCaslin Boulevard is a six-lane divided roadway within the study area, but transitions to a four-lane divided roadway to the north at Via Appia Way and to the south, south of the US 36 interchange. McCaslin Boulevard provides north-south connectivity between South Boulder Road and 120th Avenue. Between US 36 and Dillon Road, McCaslin Boulevard serves approximately 33,900 vpd whereas north of Dillon Road McCaslin Boulevard serves approximately 22,300 vpd. There are existing on-street bike lanes striped on McCaslin Boulevard. The posted speed limit is 35 mph.

South 88th Street is a two-lane roadway that provides north-south connectivity between Rock Creek Parkway in the Town of Superior and Dillon Road in the City of Louisville. It provides access opportunities for the Monarch K-8 and High Schools via Campus Drive

and to medical facilities along Health Park Drive. S. 88th Street has a grade-separated bridge crossing of US 36 to the south of Campus Drive. There are existing on-street bike lanes striped on S. 88th Street north of Campus Drive. S. 88th Street currently serves approximately 12,300 vpd between Dillon Road and St Andrews Lane. The posted speed limit along S. 88th Street is 35 mph; however, the speed limit is reduced to 20 mph three times per day during school activity hours.

S. 96th Street is a two-lane undivided roadway through most of the study area. S. 96th Street provides direct access to the Northwest Parkway to the south. To the north, S. 96th street continues past South Boulder Road with access to downtown Louisville before transitioning into N 95th Street and continuing to the City of Longmont. Like the eastbound/westbound directions of Dillon Road, S. 96th Street also widens to two through lanes in each direction at Dillon Road to provide extra capacity through the existing signalized intersection. There are existing on-street bike lanes striped on S. 96th Street within the study area. S. 96th Street currently serves approximately 21,700 vpd south of Dillon Road and approximately 16,500 vpd north of Dillon Road. The posted speed limit is 40 mph within the study area.

5.2 Intersections

The study area includes nine existing intersections that are listed below with the current traffic control. These intersections were analyzed for existing and future years with and without the project trips:

- Dillon Road and McCaslin Boulevard (signal)
- Dillon Road and S. 88th Street (signal)
- Dillon Road and S. 96th Street (signal)
- S. 88th Street and Campus Drive (signal)
- S. 88th Street and Rock Creek Parkway (multi-lane roundabout)
- Northwest Parkway and S. 96th Street/Via Varra (signal)
- Northwest Parkway and Tape Drive/Via Varra (signal)
- Northwest Parkway and US 36 Westbound/North Ramps (signal)
- Northwest Parkway and US 36 Eastbound/South Ramps (signal)

The existing lane configuration at each of the study locations is illustrated on **Figure 6.** Additional site-access intersections were analyzed for the scenarios with the addition of project-added traffic.

5.3 Traffic Changes Since Storage Tek Closure

Many changes have taken place in the Redtail Ridge project area since Storage Tek was an active campus in the late 1990's. The Town of Superior implemented their Comprehensive Plan that included new single-family residential neighborhoods and a mixed-use town center. The City and County of Broomfield constructed a major regional shopping center at Flatiron Crossing and a mix of uses along the eastern side of what is now the Northwest Parkway and Interlocken Loop. The City of Louisville also added new uses to the Colorado Technology Center. Also, over this timeline the number of open enrollment students attending Monarch K-8 and Monarch High School, who are not provided school bus services, has remained consistent at almost 40 percent of the student body at Monarch High School (approximately 700 students) and 25 percent at Monarch K8 (approximately 75 students). All these changes over the past 18 years since the Storage Tek property closed have utilized the vehicle traffic capacity previously used by traffic generated by Storage Tek on the S. 88th Street, Dillon Road, and S. 96th Street corridors.

The historic volumes shown in **Figure 9, Figure 10, and Figure 11** show what occurred in the area since the Storage Tek site was vacated in the early 2000's. When Storage Tek was fully active in the late 1990's it generated approximately 12,400 average daily trips in the study area. When Storage Tek closed, the other developments in Superior, Broomfield, and Louisville utilized the roadway capacity that was vacated by Storage Tek. Over this time there were incremental changes made to add turn lanes and motor vehicle capacity at some intersections. However, the S. 88th Street, Dillon Road, and S. 96th Street corridors are currently reaching capacity.

Figure 9. South 88th Street North of Campus Drive Volume Trends

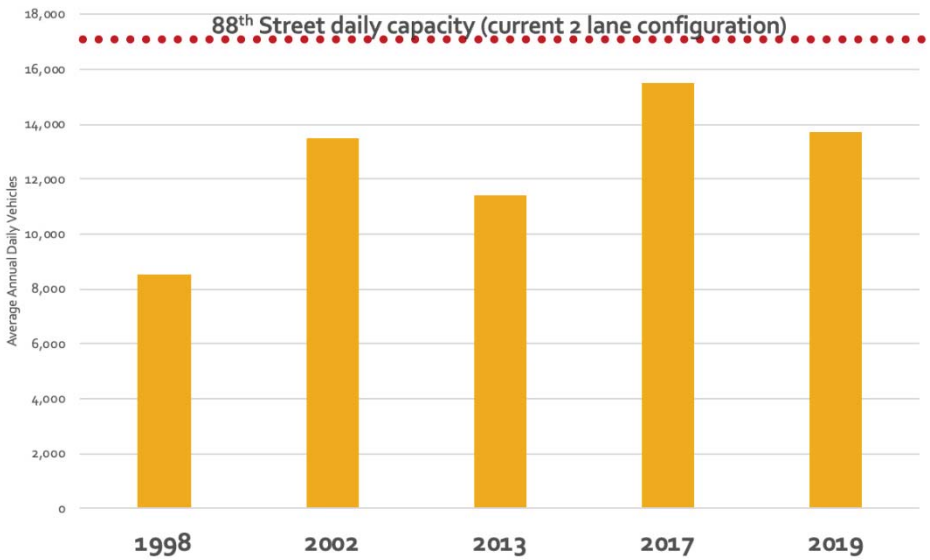


Figure 10. South 96th Street South of Dillon Road Volume Trends

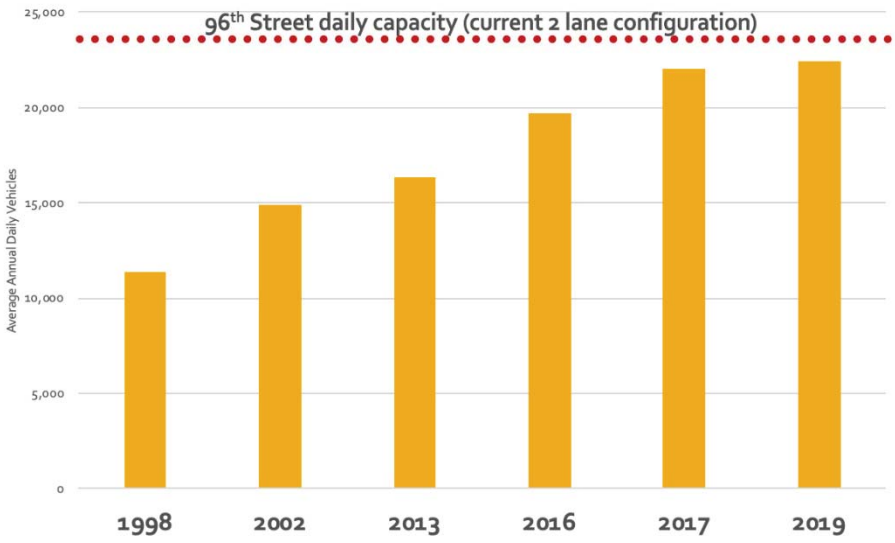
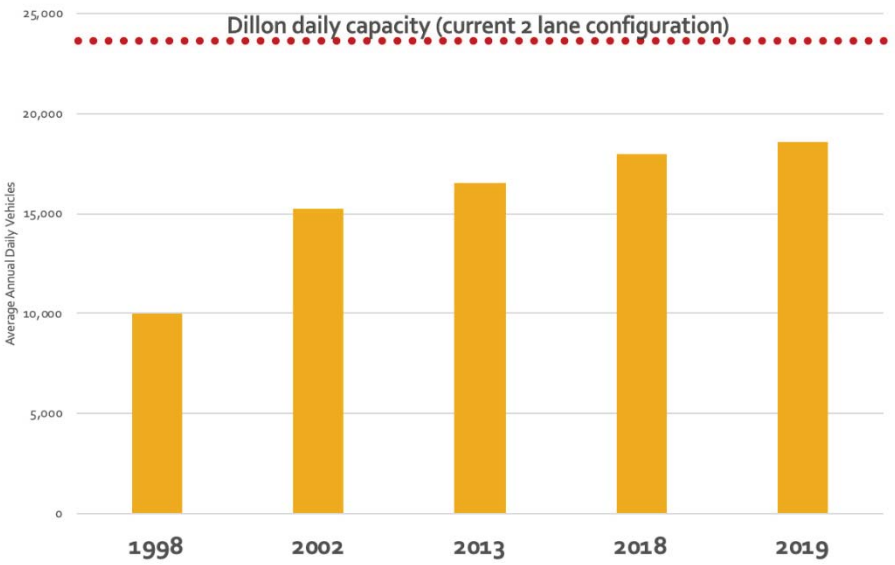


Figure 11. Dillon Road East of S. 96th Street Volume Trends



Planning level daily capacity estimates for two-lane roadways with turn lanes range from 16,000 to 18,000 vpd. However, as shown in **Figure 10** and **Figure 11**, both Dillon Road and S. 96th Street currently exceed the planning level thresholds. The increased capacity at the Dillon Road/ S. 96th Street intersection and the limited number of access locations are two of the reason these corridors have traffic volumes that exceed the planning level daily capacity thresholds. Based on the current operations, it is estimated that between 22,000 and 24,000 vpd could be accommodated on these segments. However, if additional conflict points, intersections, or left-turning traffic is added to the corridors, the capacity will likely decrease.

5.4 Walking in the Project Area

Most of the current sidewalk and multi-use walking network near the Redtail Ridge project is in the S. 88th Street corridor. This is due to the open lands that mostly front Dillon Road and S. 96th Street in the study area. The S. 88th Street sidewalks and multi-use paths connect the Monarch school campus to neighborhoods in Louisville and Superior. There is an existing underpass that transverses under S. 88th Street just south of Dillon Road. This underpass connects the Monarch school campus to the sidewalks on Dillon Road. Although the sidewalk network in the area is missing connections in the S. 88th Street, Dillon Road and S. 96th Street corridors, each intersection has pedestrian crosswalks (an example of a missing sidewalk is shown in **Figure 12** which shows the informal connection on the north side of the Dillon Road/S. 88th Street intersection). It is anticipated that the demand to complete the sidewalk and multi-use path network between the CTC Campus, Redtail Ridge, and Monarch school campus will be increasingly important in the future as the TMP priorities are implemented. Specifically, new sidewalks and pathways will be necessary given future plans for shared ride mobility and BRT near Dillon Road and in the S. 96th Street corridor.

The southeast corner of the Redtail Ridge site has an existing underpass that connects under Northwest Parkway (a photo of the underpass is shown in **Figure 13**). This connects sidewalks and multi-use pathways on the westside of Northwest Parkway to the new Broomfield sidewalk network on the eastside of Northwest Parkway. This underpass is also a critical part of the future walking connections to the Rock Creek and Broomfield Trails.

Figure 12. Coal Creek Regional Trail Informal Connection

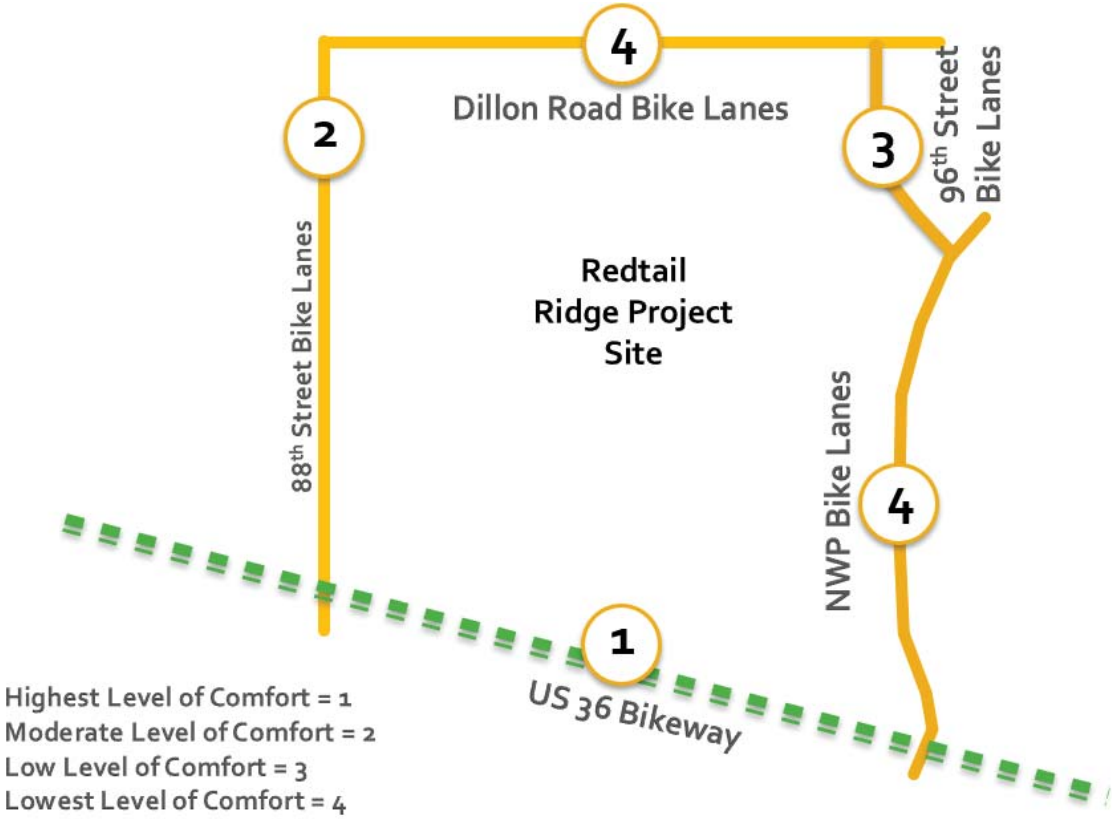
Figure 13. Northwest Parkway Multi-Use Path Underpass

5.5 Bicycling in the Project Area

The Redtail Ridge site is located at the confluence of many off-street trails and on-street bicycle lanes. The Coal Creek Trail, Rock Creek Trail and the US 36 Bikeway are located within a short bike ride (5 minutes or less than one mile) of the project site. S. 88th Street, Dillon Road and S. 96th Street currently have on-street bicycle lanes that provide connections to the Coal/Rock Creek Regional Trails and the US 36 Bikeway. The City of Boulder is located within a 6-mile bike ride on the US 36 Bikeway and the RTD US 36 and East Flatiron Station is located within a one-mile bike ride of the project site. Each intersection in the study area has approaches and departures that have accommodations for people on bicycles. The S. 88th Street underpass provides access to the Monarch school campus from Dillon Road.

The City of Louisville TMP evaluated the S. 88th Street, Dillon Road and S. 96th Street corridors/ intersections for the level of bicycling comfort (a map summarizing the results of the bicycle level of comfort results in illustrated in **Figure 14**). Based on this analysis, the current design of the corridors and intersections have a high level of stress. This appears to be correlated to the high number of crashes that were shown in the prior section. The high posted speed limits in these corridors and significant peak hour traffic volumes also contribute to the low level of comfort people experience. The Redtail Ridge project team is recommending Great/Complete street design treatments for the S. 88th Street, Dillon Road, and S. 96th Street corridors and intersections consistent with the TMP's policies. This would include supporting the City's efforts to install protected bike lanes, multi-use pathways, and intersection treatments that provide greater protection for all skill levels. A later section of this study includes additional details on implementing lower stress bicycle networks in the S. 88th Street, Dillon Road, and S. 96th Street corridors that would connect to the US 36 Bikeway and the Coal/Rock Creek Regional Trails.

Figure 14. Bicycle Level of Comfort City of Louisville Transportation Master Plan



5.6 Transit Access in the Study Area

The Redtail Ridge site is located within one mile of the RTD US 36 and East Flatiron Station. This station is serviced by the Flatiron Flyer (routes FF1 and FF2) and the Sky Ride service to DEN (route AB). The station has an underpass under US 36 and is connected to a network of first and final mile destinations. There are approximately 265 parking spaces and eight (8) bike racks at the station. This station is connected to the project site via the Northwest Parkway underpass described in in the prior sections.

The Flatiron Flyer BRT system provides fast and efficient service between Boulder and Denver. Buses are available at the US 36 and East Flatiron Station every 15 minutes during peak and every 30 minutes off peak (on average). Large air conditioned and air ride over the road coaches can serve approximately 50 passengers per vehicle. There is capacity for six (6) to eight (8) bikes on board depending on luggage and other passenger storage needs. The buses are equipped with charging for mobile devices. The vehicles travel in the High Occupancy Vehicle (HOV) lanes on US 36 and I-25. The trip between the US 36 and East Flatiron Station and Denver Union Station is 28 minutes. The trip between downtown Boulder and the US 36 and East Flatiron Station is 23 minutes. The AB route that provide services to Denver International Airport (DEN) is

available every 30 minutes during most hours of the day. Large air conditioned and air ride over the road coaches can serve approximately 50 passengers per vehicle also service this route. The trip between DEN and the US 36 and East Flatiron Station is 34 minutes via the Northwest Parkway.

Although not public transit, the BVSD operates many school buses in the project area to serve the Monarch school campus. The school buses only have one access point to the Monarch campus via S. 88th Street. The school buses provide transportation to students for school, field trips, and after school activities year-round.

5.7 Transportation Demand Management and Current Mode Share

Communities in the US 36 Corridor (Boulder, Superior, Louisville, Broomfield, and Westminster) have been working together for decades to plan and implement multimodal travel projects in the US 36 corridor. This includes work at the local community level to rebuild local roadways as complete streets and expand walk, bike, and transit connectivity within and across borders.

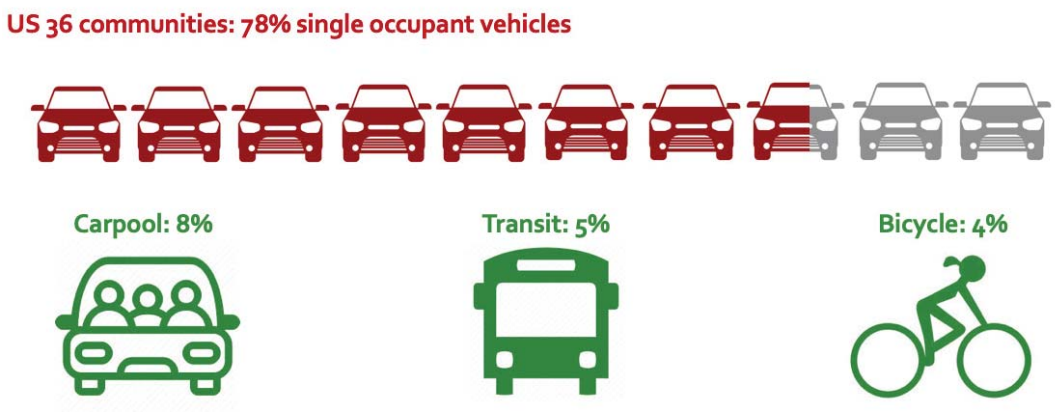
The new City of Louisville TMP documented how commuters in Louisville and nearby communities travel to work. This data is based on US Census American Community Survey (https://www.census.gov/programs-surveys/acs). This data is commonly used by agencies across the Denver region as a baseline for TDM programs. The current data is shown below as year 2012 to 2016 estimates. Based on this data (shown in **Figure 15**), approximately 28 percent of people who work in Louisville travel to work by non-SOV modes.

Figure 15: Louisville and comparison area commute mode share (from TMP)

	Drive Alone	Carpool	Transit	Bike	Walk	Work at Home	Other
City of Louisville	72.3%	4.7%	5.9%	2.3%	1.7%	12.7%	0.5%
City of Boulder	51.3%	4.9%	8.3%	10.3%	11.4%	12.5%	1.2%
Boulder County	65.2%	7.6%	5.0%	4.4%	5.3%	11.3%	1.3%
Denver Region	74.8%	8.5%	4.4%	1.2%	2.5%	7.5%	1.0%

The mode share data shown in **Figure 16** below is based on survey data from the *2016 Northwest Metro Region Mobility Report*, final draft dated July 2018, prepared by Commuting Solutions. This data shows the mode share for communities along the US 36 corridor, including the City of Louisville. The current data is shown below as year 2012 to 2016 estimates. Based on this data, approximately 22 percent of people who work in the US 36 corridor travel to work by non-SOV modes. Note that the data from the 2016 Report was collected between Year 2011 and 2015, which is prior to the opening of the RTD's Flatiron Flyer BRT service (opened in January 2016).

Figure 16: US 36 Communities Year 2016 Estimated Mode Share



https://commutingsolutions.org/wp-content/uploads/2016-Northwest-Region-Mobility-Report.pdf

5.8 Existing Intersection Capacity Analysis

The existing volumes, lane configuration, and traffic control are illustrated on **Figure 6**. The results of the LOS calculations for the intersections are summarized in **Table 2.** A summary table with LOS by movement and 95th percentile queues by lane as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the existing peak hour intersection capacity analysis indicate that Dillon Road/S. 88th Street and S. 88th Street/Campus Drive currently operate at LOS E or worse during the AM peak hour. All other study intersections operate at LOS D or better.**

Table 2. Existing Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	C (31 sec)	C (32 sec)
Dillon Road/S. 88th Street	**E (77 sec)**	D (43 sec)
Dillon Road/S. 96th Street	C (32 sec)	D (52 sec)
S. 88th Street/Campus Drive	**F (99 sec)**	C (30 sec)
Northwest Parkway/S. 96th Street/Via Varra	D (51 sec)	C (24 sec)
Northwest Parkway/Tape Drive/Via Varra	B (14 sec)	B (11 sec)
Northwest Parkway/US 36 North Ramps (WB)	B (12 sec)	B (16 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (15 sec)	C (25 sec)
S. 88th Street/Rock Creek Parkway (1)	A (8 sec)	A (6 sec)

(1) Roundabout controlled intersection

Queuing issues and movements with LOS E or worse during the peak hours are listed below:

Dillon Road and McCaslin Boulevard

- During the AM and PM peak hours, there are several movements that currently operate at LOS E or worse. At this intersection the northbound/southbound through movements are prioritized over the eastbound/westbound approaches and the left-turn movements.
    - During the AM peak hour, the following movements operate at LOS E or worse: eastbound left-, eastbound through, northbound left- and southbound left-turn.
    - During the PM peak hour, the following movements operate at LOS E or worse: eastbound left-, eastbound through, westbound left-, northbound left- and southbound left-turn.
- No significant queuing issues were observed in the field or in the traffic analysis reports.

Dillon Road and S. 88th Street

- The following movements operate at LOS E or worse:
    - During the AM peak hour, westbound left and northbound left.
    - During the PM peak hour, eastbound through and northbound left.
- During the AM peak hour this intersection operates near the LOS E/F border.
    - This intersection is heavily influenced by traffic generated by the Monarch school campus. Queues on S. 88th Street from Campus Drive were observed to extend back to Dillon Road, impacting traffic operations at this intersection.
    - Near the school start time, westbound left-turn queues were observed to extend more than 2,500 feet and northbound queues were observed to extend approximately 1,500 feet
    - When the pedestrian movement across Dillon Road is activated, all controlled movements are required to stop, this increases motorist delay.
- During the PM peak hour, eastbound through queues extend more than 1,000 feet.

Dillon Road and S. 96th Street

- During the AM and PM peak hours, there are several movements that currently operate at LOS E or worse. Both Dillon Road and S. 96th Street are two-lane roadways but expand to provide two through lanes in all directions at the intersection. This results in poor lane utilization and occasionally some inefficiencies when vehicles exit the intersection and merge back down to one-lane. These inefficiencies reduce the capacity of this intersection.
    - During the AM peak hour, the southbound through movement operates at LOS E.

  - During the PM peak hour, the westbound left-, northbound through, and southbound through operate at LOS E or worse.

- During the AM peak hour, northbound left-turn queues were observed to extend more than 700 feet.
- During the PM peak hour, westbound left-turn and northbound through queues extend more than 700 feet.

S. 88th Street and Campus Drive

- During the AM peak hour this intersection operates at LOS F. This intersection is the only access to the Monarch school campus and the adjacent medical campus.
  - The following movements operate at LOS E or worse: eastbound left, eastbound through, westbound through, northbound left, northbound through, northbound right, southbound left, southbound through, and southbound right.
  - Southbound queues on S. 88th Street extend back to Dillon Road, impacting traffic operations at the signal.
  - Northbound through queues extend 1,000 feet and vehicles making a northbound right-turn will utilize the shoulder when the right-turn lane queues extend beyond the available storage.
- It should be noted that the PM peak hour does not coincide with when Monarch schools end (K-8 ends at 3:05 PM and the High School ends at 3:30 PM).
- During the PM peak hour, the eastbound left- and eastbound through movements operate at LOS E or worse. All other movements operate at LOS D or better. No major queuing issues were observed.

Northwest Parkway and S. 96th Street/Via Varra

- During the AM peak hour, the following movements operate at LOS E or worse: eastbound left-, eastbound through, northbound left-, southbound left-, and southbound through.
- During the PM peak hour, all movements operate at LOS D or better.
- The northbound left and eastbound right- are high volume movements during both the AM and PM peak hours. Currently there are existing dual northbound left-turn lanes on Northwest Parkway that turn onto S. 96th Street. Three lanes merge into one northbound through lane on S. 96th Street approximately 600 feet north of the intersection. This merge will occasional queue back and cause inefficiencies at the Northwest Parkway intersection. The southbound right-turn is a free movement and turns into a third through lane (acceleration lane) on S. 96th Street.
- During the AM peak hour, the northbound left-turn queue is approximately 690 feet (700 feet of available storage) and the southbound through queue is approximately 770 feet.

- During the PM peak hour, the northbound left-turn conflicts with a lower southbound through volume and therefore while the northbound left-turn traffic volume is greater during the PM peak hour, the queue is less than the AM peak hour queue.

Northwest Parkway and Tape Drive/Via Varra

- At this intersection the northbound/southbound through movements are prioritized over the eastbound/westbound approaches and the left-turn movements.
    - During the AM peak hour, the eastbound left- and northbound left-turn movements operate at LOS E or worse. Both movements are low volume (one vehicle observed during the peak hour).
    - During the PM peak hour, all movements operate at LOS D or better.
- No significant queuing issues were observed in the field or in the traffic analysis reports.

Northwest Parkway and US 36 Westbound/North Ramps

- At this intersection the northbound/southbound through movements are prioritized over the eastbound/westbound approaches and the left-turn movements.
    - During the AM peak hour, the westbound left- and westbound through movements operate at LOS E.
    - During the PM peak hour, all movements operate at LOS D or better.
- During the PM peak hour, the northbound left-turn queues extend approximately 310 feet, which is beyond the available left-turn lane storage. These queues do not extend to the US 36 South Ramps intersection to the south.

Northwest Parkway and US 36 Eastbound/South Ramps

- At this intersection the northbound/southbound through movements are prioritized over the eastbound/westbound approaches and the left-turn movements.
    - During the AM and PM peak hours, the southbound left-turn operates at LOS E.
- No significant queuing issues were observed in the field or in the traffic analysis reports.

Although the Dillon Road/S. 88th Street and S. 88th Street/Campus Drive study intersections currently operate at LOS E/F, no mitigation is recommended at this time. As previously mentioned, previous studies have recommended the extension of Campus Drive to S. 96th Street to address the existing issues. The Campus Drive extension is evaluated as part of the Year 2025 with project traffic operations. The right-of-way for the Campus Drive extension is located on the Redtail Ridge property. Under background conditions, where the Campus Drive extension is not assumed, mitigation options are provided to address the existing/future background capacity issues without the Campus Drive extension.

6.0 FUTURE BACKGROUND CONDITIONS

6.1 Annual Growth Factor and Future Volume Methodology

In order to forecast the future peak hour traffic volumes, background traffic growth assumptions were estimated based on a review of various resources: historical traffic volumes, DRCOG 2040 regional model projections, and planned development projects in the study area.

Historical traffic volumes along the study roadway network were reviewed, including traffic volumes along S. 88th Street, Dillon Road, S. 96th Street, and Northwest Parkway. This review indicates that traffic volumes in the study area have been steadily increasing with annual growth rates ranging from less than one (1) percent to four (4) percent. As previously mentioned, when Storage Tek closed, other developments in Superior, Broomfield, and Louisville utilized the roadway capacity vacated by Storage Tek, and thus traffic volumes have steadily been increasing.

A comparison of the DRCOG base-year vs. 2040 projections shows annual growth of approximately one-half percent along the study roadways, except along Northwest Parkway, which is anticipated to have an annual growth rate of approximately one and one-half (1.5) percent. A review of the assumed projected socio-economic data within the traffic analysis zones (TAZ) where the project is proposed indicates that DRCOG did not anticipate that this area would redevelop. Therefore, the background growth rates from DRCOG data represent non-project traffic forecast to the study roadway network and the traffic volume generated by the project does not need to be factored out of the DRCOG forecasts.

A higher annual growth rate is likely to occur in the near-term and a lower growth rate is anticipated in the long-term. It is also important to consider that the Dillon Road and S. 96th Street corridors are approaching capacity. As daily traffic volumes increase on these corridors, the increase is likely to occur during non-peak period times where there is more capacity.

There are three planned development projects (bulleted below) in the study area (see section **3.0 Previous Studies** for additional information). Trips generated by these three developments were added to the study intersections in addition to the general background growth rate.

Parkway Circle: Approximately half of the parcels in the Parkway Circle development are currently developed. This area has a mix of residential, retail, and office type uses that generate a high percent of internal capture and trips that can be made walking/biking or taking transit. Under Year 2040 conditions, it is assumed that the Parkway Circle development will be fully developed. To estimate future traffic volumes generated by this development, vehicles currently entering/exiting the east approaches at the Northwest Parkway/S. 96th Street/Via Varra and Northwest Parkway/Tape Drive/Via Varra intersections were increased by a factor of two (2) for year 2040, with approximately a quarter of the development occurring by Year 2025, half by Year 2030 and full build out by Year 2040. The traffic volumes were then proportionally distributed to the study roadway network based on existing travel patterns.

St. Louis Parish: The trip generation estimates from the November 2019 trip generation letter were assumed for the study area. The industrial/commercial uses were assumed to be constructed with the first phase in Year 2021 and were included in the Year 2025 background traffic forecasts. The full buildout of the site, which includes the tennis center, church, and school, was assumed to be constructed after Year 2030 and were included in the Year 2040 background traffic forecasts. Trips generated by the development were distributed to the study network based on the 2001 TIS.

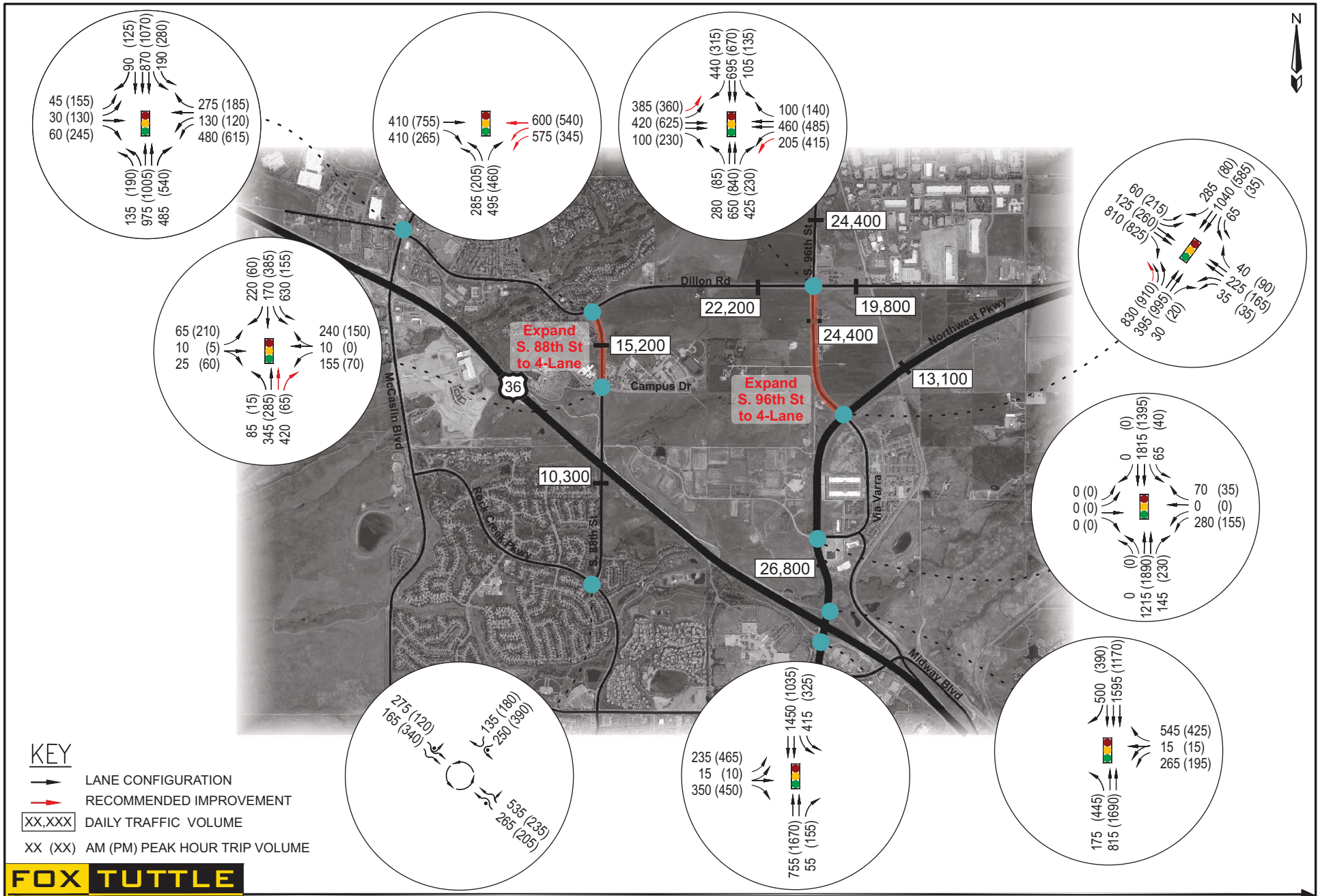
Morgan Ranch: Trips generated by the Morgan Ranch DTS development and anticipated to utilize the new 88th Street / Promenade Boulevard intersection were added to the study intersections and included in the Year 2025 background traffic forecasts.

Based on a review of the historical traffic volume trends, the projected future traffic forecasts, and the known planned developments, the following assumptions were used to develop the background traffic volumes for Year 2025, 2030 and 2040:

- Year 2025 Background: an annual growth rate of one-half percent was applied to the existing traffic volumes at the study intersections; in addition, planned development trips generated by the Parkway Circle, St. Louis Parish, and Morgan Ranch were added to the study network. **The resultant growth rate to the study intersections is approximately two percent per year at the Dillon Road, S. 88th Street, and S. 96th Street intersections and approximately one percent per year at the Northwest Parkway and US 36 intersections.**
- Year 2030 and Year 2040 Background: an annual growth rate of one-quarter (0.25) percent was applied to all study intersections, except for through movements along Northwest Parkway which were grown by one and one-half (1.5) percent; in addition planned development trips generated by the Parkway Circle, St. Louis Parish, and Morgan Ranch were added to the study network. **The resultant growth rate to the study intersections is approximately one percent per year.**

The resultant background traffic volumes for Year 2025, Year 2030, and Year 2040 are provided in **Figure 17, Figure 18**, and **Figure 19**.

It is important to note that while the Year 2040 background traffic forecasts do not assume the Jefferson Parkway extension, if that project is constructed prior to Year 2040 it would increase traffic volumes along Northwest Parkway at the intersections between S. 96th Street and US 36 from what was projected for this study. As noted in the *Level 1 Traffic and Revenue Study Jefferson Parkway* report, with the Jefferson Parkway extension the project would rebuild the Northwest Parkway/Interlocken Loop corridor between S. 96th Street and SH 128. Under the Northwest Parkway Extension scenario, Northwest Parkway would be reconstructed to separate toll and local traffic which would include constructing new interchanges and a frontage road system to accommodate local traffic.



KEY

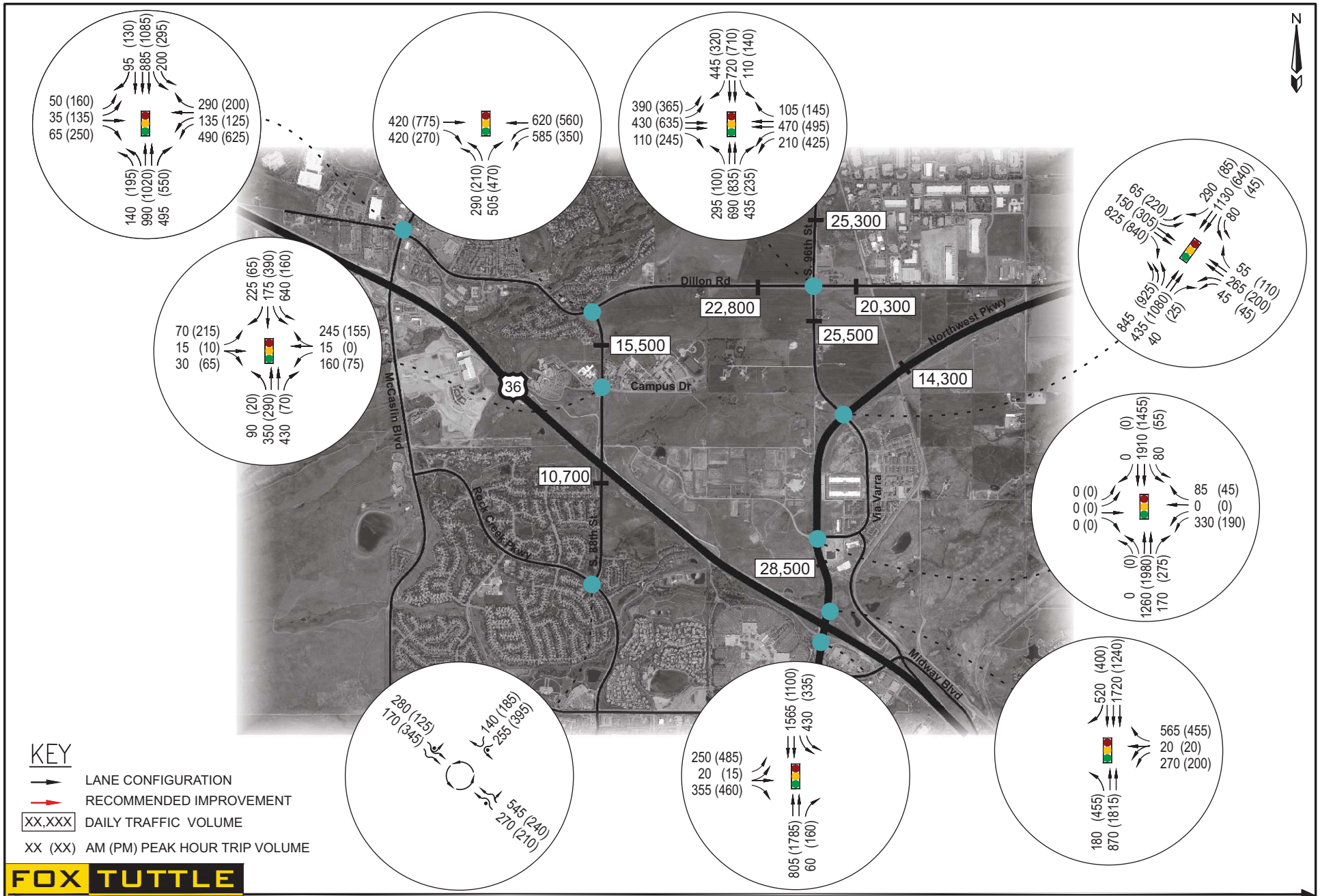
- LANE CONFIGURATION
- RECOMMENDED IMPROVEMENT
- XX,XXX DAILY TRAFFIC VOLUME
- XX (XX) AM (PM) PEAK HOUR TRIP VOLUME

FOX TUTTLE
TRANSPORTATION GROUP

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2025 BACKGROUND TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	1/21/20	Drawn by	EJK	Figure #	17

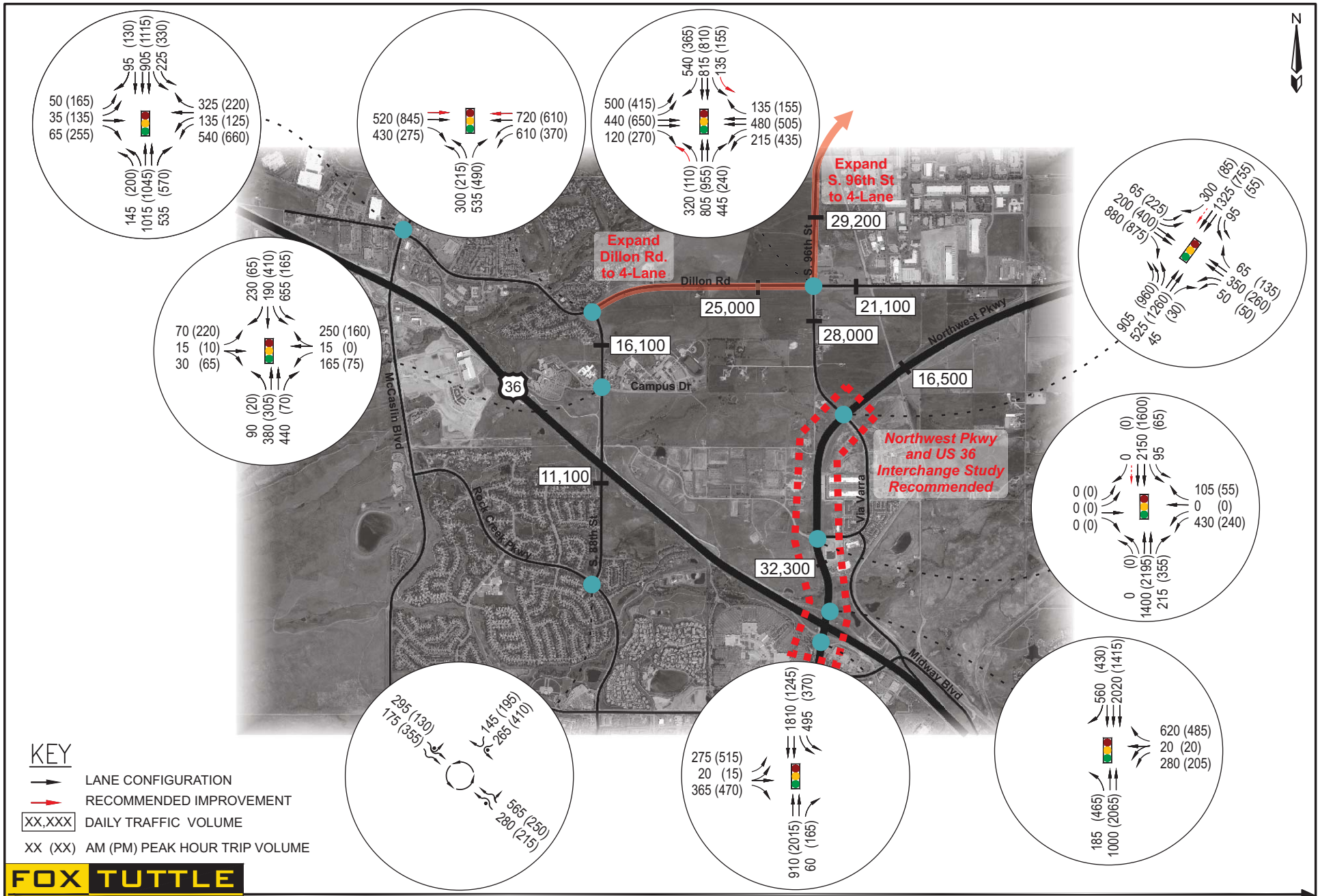


FOX TUTTLE
TRANSPORTATION GROUP

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2030 BACKGROUND TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	1/21/20	Drawn by	EJK	Figure #	18



KEY

- LANE CONFIGURATION
- RECOMMENDED IMPROVEMENT
- XX,XXX DAILY TRAFFIC VOLUME
- XX (XX) AM (PM) PEAK HOUR TRIP VOLUME

FOX TUTTLE
TRANSPORTATION GROUP

REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2040 BACKGROUND TRAFFIC VOLUMES

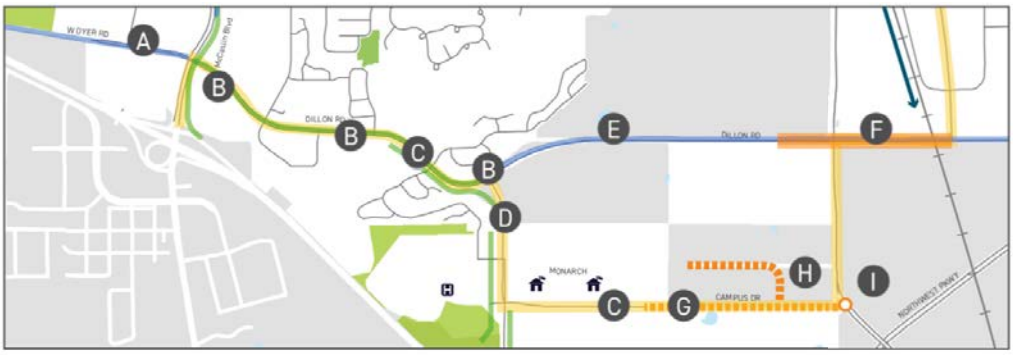
FT Project #	19055	Original Scale	NTS	Date	1/21/20	Drawn by	EJK	Figure #	19

If the Northwest Parkway Extension project is constructed, the future interchanges and frontage road system would provide additional capacity to the Redtail Ridge study network. A collaborative study that includes CDOT, the City of Louisville, City and County of Broomfield, Northwest Parkway Authority, and JPPHA should be conducted to identify how interchanges and frontage roads could be constructed to accommodate future traffic volumes along Northwest Parkway. While the Redtail Ridge project team has met with Northwest Parkway and began preliminary discussions about a future study, at this time, no design or concepts have been completed for this segment of Northwest Parkway. Additional analysis should be completed to better understand projected peak hour traffic to the network as well as to identify what interchange options will provide acceptable operations and can be constructed within the right-of-way.

6.2 Future Multimodal Network Assumptions

The future multimodal network improvements around Redtail Ridge project are outlined in the City of Louisville TMP and shown in **Figure 20.** They include a series of bike lanes, transit stops, underpasses, and multiuse trail connections.

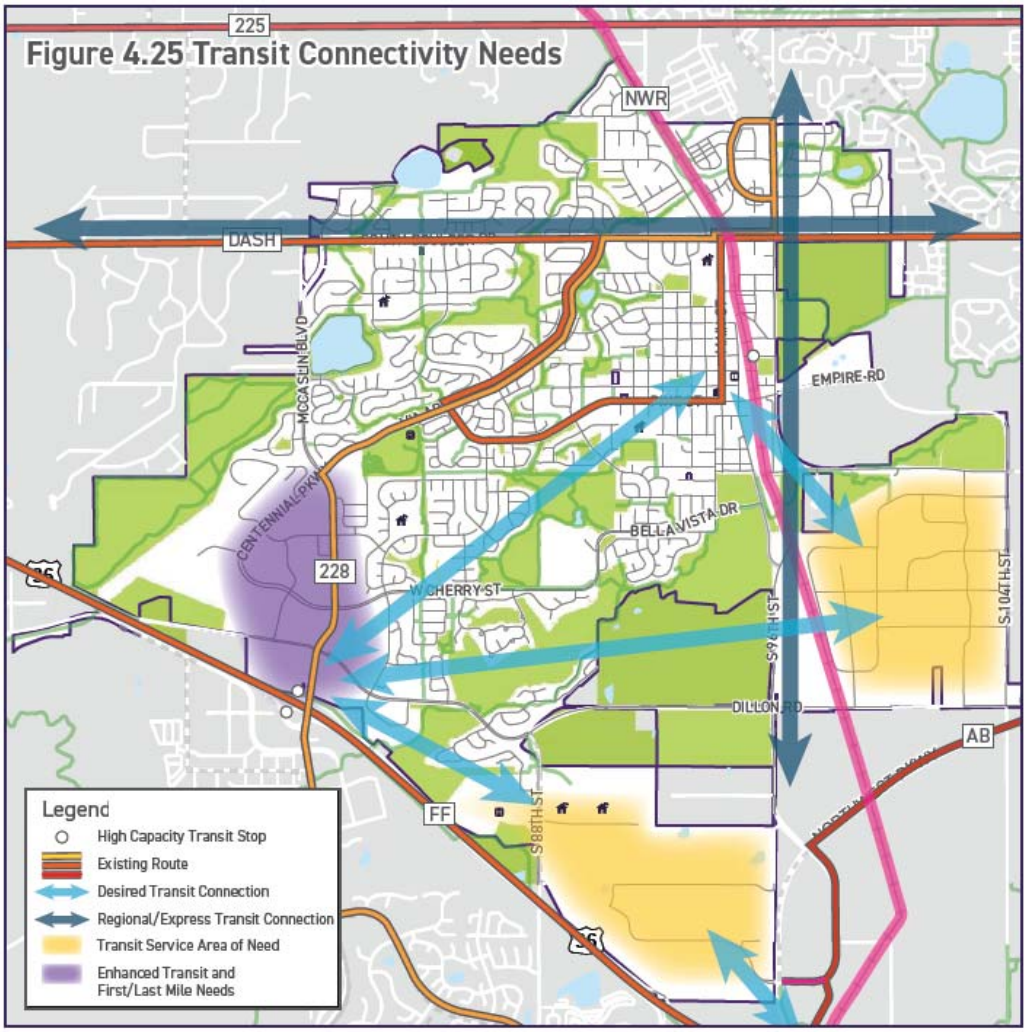
Figure 20. Future Multimodal Network Identified in the City of Louisville TMP



- **A** Bicycle facility connecting Dillon Rd to the US 36 bikeway
- **B** New underpasses at proposed locations along Dillon Road
- **C** Trail connections to provide increased access to the schools and hospital
- **D** Proposed future transit connecting McCaslin Station to the hospital, schools, and CTC
- **E** On-street shoulder bikeway improvements
- **F** Dillon Road capacity improvements to improve intersection operations
- **G** Campus Drive Extension to improve school circulation and improve emergency access
- **H** Paradise Lane realignment to eliminate intersection at S 96th Street. (*Note: Paradise Lane is on County property).
- **I** New signal at Campus Drive and S 96th Street near fire house

The TMP also recommends a partnership with the City and the business community to provide a shuttle circulator that connects employment areas to regional transit, retail, and other destinations. CTC, Centennial Valley, and Redtail Ridge were identified as service areas for the route. The transit network also includes BRT service in the S. 96th street corridor and two Northwest Rail station within a mile of Redtail Ridge (see **Figure 21**). The Northwest Rail stations are planned to be located near the CTC and at the Flatiron and US 36 Park-n-Ride.

Figure 21. Future Transit Network Identified in the City of Louisville TMP



The City is also beginning to have discussions with RTD about a new local route that would serve the project site. The new route would require approval from RTD and grant funding. This project should support the development of that route and promote connections between Redtail Ridge and Downtown Louisville, McCaslin Station, CTC, and the Flatiron and US 36 Park-n-Ride. In addition, the project should work with RTD to determine feasibility of adding a stop for the Flatiron Flyer BRT to the west of Northwest Parkway on the project site.

Table 3 provides a summary of the assumed multimodal network under background conditions. This table only assumes what would occur in the future without additional support from the Redtail Ridge project. The recommendations for an expanded multimodal network and TDM programs with the Redtail Ridge project can be found in **Section 7** of this study.

Table 3. Future Multimodal Network Assumption Summary

Corridor	Bike Lanes	Multi-Use Pathways	Sidewalks	Bus Lanes
S. 88th Street (US 36 to Dillon Road)	unprotected	westside	westside	none
Dillon Road (S. 88th to S. 96th Street)	unprotected	none	none	none
S. 96th Street (Northwest Parkway to Front Street)	unprotected	none	none	yes
Northwest Parkway (S. 96th Street to US 36)	none	eastside	eastside	shoulder running

6.3 Year 2025 Background Intersection Capacity Analysis

The study intersections were evaluated to determine baseline operations and to identify any capacity constraints associated with background traffic in the Phase 1 buildout scenario for development traffic expected to be constructed prior to Year 2025. The background volumes, lane configuration, and traffic control are illustrated on **Figure 17**.

The LOS criteria discussed previously was applied to the study intersections to determine the travel conditions with the Year 2025 background volumes. The results of the LOS calculations for the intersections are summarized in **Table 4**. The intersection LOS and queuing report worksheets are attached in the **Appendix**. Note that signal timing was assumed to be optimized at the study intersections.

The results of the LOS calculations for the intersections are summarized in **Table 4.** Summary tables with LOS and 95th percentile queues by movement are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that the Dillon Road/S. 88th Street and S. 88th Street/Campus Drive intersections are expected to operate at LOS F during the AM peak hour. The Dillon Road/S. 96th Street and Northwest Parkway/S. 96th Street/Via Varra intersections are expected to operate at LOS E during the AM peak hour and the Dillon Road/S. 88th Street intersection is expected to operate at LOS E during the PM peak hour. The other study intersections are expected to operate at an overall LOS D or better.**

Table 4. Year 2025 Background Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	**PM Peak Hour**
Dillon Road/McCaslin Boulevard	C (25 sec)	C (32 sec)
Dillon Road/S. 88th Street	**F (97 sec)**	**E (57 sec)**
Dillon Road/S. 96th Street	**E (62 sec)**	D (55 sec)
S. 88th Street/Campus Drive	**F (113 sec)**	C (33 sec)
Northwest Parkway/S. 96th Street/Via Varra	**E (74 sec)**	C (28 sec)
Northwest Parkway/Tape Drive/Via Varra	B (16 sec)	B (13 sec)
Northwest Parkway/US 36 North Ramps (WB)	B (12 sec)	B (17 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (19 sec)	C (29 sec)
S. 88th Street/Rock Creek Parkway [(1)]	A (9 sec)	A (7 sec)

[(1)] Roundabout controlled intersection

Under Year 2025 Background conditions, there are three intersections that are expected to decrease a LOS grade with the added background traffic during the AM and/or PM peak hour:

- Dillon Road/S. 88th Street – this intersection operates at LOS E during the AM peak hour and LOS D during the PM peak hour under existing conditions and is expected to operate at LOS F during the AM peak hour and LOS E during the PM peak hour under Year 2025 background conditions. As noted under existing conditions, during the AM peak hour, the westbound left-turn currently extends more than 2,500 feet on Dillon Road and the northbound queues extend approximately 1,500 feet. These queues are expected to increase under Year 2025 background conditions. In addition, under Year 2025 conditions, during the AM and PM peak hour, the eastbound through queues are expected to extend more than 1,600 feet, into the adjacent signalized intersection to the west.
- Dillon Road/S. 96th Street – this intersection operates at LOS C during the AM peak hour under existing conditions and is expected to operate at LOS E under Year 2025 background conditions. As noted under existing conditions, the northbound left-turn currently extends more than 700 feet during the AM peak hour and the westbound left-turn currently extends more than 700 feet during the PM peak hour. These queues are expected to increase under Year 2025 background conditions. In addition, the southbound through queues during the AM peak hour are expected to extend approximately 1,500 feet, which is partially due to queues from the merge from two to one though lane south of Dillon Road extending back to the Dillon Road intersection.
- Northwest Parkway/S. 96th Street/Via Varra – during the AM peak hour this intersection operates at LOS D under existing conditions and is expected to operate at LOS E under Year 2025 background conditions. The high volume of northbound left-turn traffic conflicts with the high volume of southbound through traffic during the AM peak hour. The

northbound left-turn and southbound through delay and queues are expected to increase under Year 2025 background conditions.

As noted above, operations at the Dillon Road/S. 88th Street, Dillon Road/S. 96th Street, S. 88th Street/Campus Drive, and Northwest Parkway/S. 96th Street/Via Varra intersections are expected to get worse with the added traffic from the background growth applied. To address the operational issues expected in Year 2025 background conditions, the following is recommended:

- Expand S. 88th Street between Dillon Road and Campus Drive to a four-lane roadway.
- Dillon Road/S. 88th Street modify the westbound approach from one left-turn lane and two through lanes, to dual left-turn lanes and one through lane.
- S. 88th Street/Campus Drive extend the northbound right-turn lane to provide a minimum of 500 feet of storage. Construct a second northbound through lane that begins approximately 500 feet south of Campus Drive.
- Dillon Road/S. 96th Street construct dual eastbound and westbound left-turn lanes.
- Expand S. 96th Street between Dillon Road and Northwest Parkway to a four-lane roadway.
- Northwest Parkway/S. 96th Street/Via Varra construct triple left-turns from northeast bound Northwest Parkway onto northbound S. 96th Street.
    - Construct a third left-turn lane on Northwest Parkway within the existing grass median.
    - Modify the northwest approach on S. 96th Street to allow for three receiving lanes.
    - Modify the free right-turn movement to be controlled for the southwest bound right-turn lane movement on Northwest Parkway to northbound S. 96th Street.

Previous studies have identified the Campus Drive extension as a future improvement to mitigate traffic operational issues at the Dillon Road/S. 88th Street and S. 88th Street/Campus Drive intersections. However, the Campus Drive extension is located on the project property and based on conversations with City staff, this improvement would only be constructed as part of a development project. Therefore, it was not considered to mitigate background conditions.

The study intersections were evaluated with the recommended improvements listed above. The recommended geometric improvements are shown with red arrows on **Figure 17**. The intersection LOS and queuing report worksheets are attached in the **Appendix**. Summary tables with LOS and 95th percentile queues by movement are included in the **Appendix**.

Results of the peak hour intersection capacity analysis shown in Table 5 indicate that with the recommended improvements all study intersections are expected to operate at LOS D or better during the AM and PM peak hours.

Table 5. Year 2025 Background Conditions Level of Service Summary (Improvements)

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	--	--
Dillon Road/S. 88th Street	B (18 sec.)	C (28 sec.)
Dillon Road/S. 96th Street	D (36 sec.)	D (41 sec.)
S. 88th Street/Campus Drive	C (35 sec.)	C (27 sec.)
Northwest Parkway/S. 96th Street/Via Varra	D (41 sec.)	C (24 sec.)
Northwest Parkway/Tape Drive/Via Varra	--	--
Northwest Parkway/US 36 North Ramps (WB)	--	--
Northwest Parkway/US 36 South Ramps (EB)	--	--
S. 88th Street/Rock Creek Parkway	--	--

(1) LOS results only shown for Intersections with recommended improvements

With the recommended improvements the S. 88th Street intersections at Dillon Road and Campus Drive are still anticipated to be congested during the Monarch school campus arrival/departure peak periods. However, these improvements will significantly reduce queues and delay to non-school related traffic traveling through the study network. Generally, it is considered acceptable for queuing/delay issues to occur near intersections adjacent to a school during a school's arrival/departure peak periods, since the congestion occurs for a relatively short period of time.

6.4 Year 2030 Background Intersection Capacity Analysis

The study intersections were evaluated to determine baseline operations and to identify any capacity constraints associated with anticipated Year 2030 background traffic. The background volumes, lane configuration, and traffic control are illustrated on **Figure 18**.

The LOS criteria discussed previously was applied to the study intersections to determine the travel conditions with the Year 2030 background volumes. The results of the LOS calculations for the intersections are summarized in **Table 6**. The intersection LOS and queuing report worksheets are attached in the **Appendix**. Note that signal timing was assumed to be optimized at the study intersections.

The results of the LOS calculations for the intersections are summarized in **Table 6.** Summary tables with LOS and 95th percentile queues by movement are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that the study intersections are expected to operate at an acceptable overall LOS D or better during the AM and PM peak hours, except for the Northwest Parkway/S. 96th Street/Via Varra intersection, which is expected to operate at the LOS D/E border during the AM peak hour.**

Table 6. Year 2030 Background Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	C (27 sec)	D (35 sec)
Dillon Road/S. 88th Street	B (19 sec.)	C (30 sec.)
Dillon Road/S. 96th Street	D (40 sec.)	D (42 sec.)
S. 88th Street/Campus Drive	C (37 sec.)	C (28 sec.)
Northwest Parkway/S. 96th Street/Via Varra	**E (57 sec.)**	C (24 sec.)
Northwest Parkway/Tape Drive/Via Varra	B (19 sec)	B (13 sec)
Northwest Parkway/US 36 North Ramps (WB)	B (12 sec)	B (14 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (17 sec)	C (34 sec)
S. 88th Street/Rock Creek Parkway [(1)]	A (10 sec)	A (7 sec)

[(1)] Roundabout controlled intersection

While the Northwest Parkway/S. 96th Street/Via Varra intersection is expected to operate near the LOS D/E border under Year 2030 background conditions, no queuing issues are anticipated and therefore no mitigation was recommended. Further, while congestion is anticipated to continue to occur near the Monarch school campus near the school arrival/departure peaks, the queues/delays were acceptable for the conditions. Further, no other significant queuing issues are anticipated.

6.5 Year 2040 Background Intersection Capacity Analysis

The study intersections were evaluated to determine baseline operations for the Year 2040 background scenario and to identify any capacity constraints associated with background traffic in a long-term buildout scenario. The background volumes, lane configuration, and traffic control are illustrated on **Figure 19.**

The LOS criteria discussed previously was applied to the study intersections to determine the travel conditions with the near-term background volumes. The results of the LOS calculations for the intersections are summarized in **Table 7.** Summary tables with LOS and 95th percentile queues by movement are included in the **Appendix** The intersection LOS worksheets are attached in the **Appendix**. **Results of the Year 2040 background conditions traffic operations analysis indicate that there are three intersections that are anticipated to operate at an unacceptable LOS E or worse during the AM or PM peak hours, including the Dillon Road/S. 96th Street, Northwest Parkway/S. 96th Street/Via Varra, and Northwest Parkway/US 36 South Ramp intersections.**

Table 7. Year 2040 Background Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	**PM Peak Hour**
Dillon Road/McCaslin Boulevard	C (27 sec)	D (38 sec)
Dillon Road/S. 88th Street	C (27 sec)	D (42 sec)
Dillon Road/S. 96th Street	**E (59 sec)**	D (53 sec)
S. 88th Street/Campus Drive	D (40 sec)	C (30 sec)
Northwest Parkway/S. 96th Street/Via Varra	**F (89 sec)**	D (36 sec)
Northwest Parkway/Tape Drive/Via Varra	C (27 sec)	B (14 sec)
Northwest Parkway/US 36 North Ramps (WB)	B (13 sec)	B (19 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (19 sec)	**E (56 sec)**
S. 88th Street/Rock Creek Parkway [(1)]	B (11 sec)	A (7 sec)

[(1)] *Roundabout controlled intersection*

To address the capacity issues, the following is recommended for Year 2040 background traffic:

- Dillon Road/S. 96th Street – Construct dual northbound and southbound left-turn lanes.
- S. 96th Street- Expand the four-lane roadway to the north of Dillon Road. As noted in **Section 3 "Previous Studies"**, there are other studies that are also analyzing the S. 96th Street corridor. Traffic volume projections indicate the need to expand S. 96th Street to a four-lane roadway to the north, through the SH 42 intersection.
- Northwest Parkway/S. 96th Street/Via Varra – While the Jefferson Parkway project has identified the potential need for a grade separated intersection at this location, there are uncertainties to if/when that project may occur.
    - To address the anticipated capacity issues at this intersection, one option is to construct a third southbound through lane on Northwest Parkway that would begin north of the S. 96th Street/Via Varra intersection and continue to the US 36 interchange.
    - Additional study should be conducted along the Northwest Parkway corridor between S. 96th Street and US 36 to determine how capacity can be increased under future conditions. Key stakeholders include CDOT, Northwest Parkway, the City of Louisville, City and County of Broomfield, and Jefferson Parkway Public Highway Authority.
- Northwest Parkway/US 36 interchange – the South Ramps are at capacity during the PM peak hour with Year 2040 background traffic volumes. The northbound queues are expected to extend more than 1,600 feet into the right-in/right-out access to the south. Additional capacity will be needed to accommodate the projected traffic volumes. The additional capacity will likely require that the bridge be widened. As previously mentioned,

if the Jefferson Parkway project moves forward, that project would likely require modifications to the US 36 interchange as well.

- Due to the unknowns of future project impacts to this area, no specific mitigation is recommended. Additional study/analysis should be conducted at the interchange to determine the optimal design to meet the future needs. With a new design with increased capacity, this interchange should operate acceptably in the future.

In addition, while the Dillon Road/S. 88th Street intersection is expected to operate at an overall LOS D or better during the AM and PM peak hours, the eastbound approach delay and queues are not expected to operate acceptably. The eastbound through queues are expected to extend more than 1,400 feet during the PM peak hour, which impacts the signalized intersection to the west. **To address this and to improve lane utilization at the Dillon Road/S. 96th Street intersection, a four-lane roadway is recommended on Dillon Road between S. 88th Street and S. 96th Street.**

The study intersections were evaluated with the recommended improvements listed above. The recommended geometric improvements are shown with red arrows on **Figure 19**. The intersection LOS and queuing report worksheets are attached in the **Appendix**. Summary tables with LOS and 95th percentile queues by movement are included in the **Appendix**.

Results of the peak hour intersection capacity analysis shown in Table 8 indicate that with the recommended improvements all study intersections are expected to operate at LOS D or better during the AM and PM peak hours. Note that this assumes that a new interchange is constructed at the Northwest Parkway/US 36 interchange to address the anticipated capacity issues under Year 2040 background conditions during the PM peak hour.

Table 8. Year 2040 Background Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	--	--
Dillon Road/S. 88th Street	C (25 sec)	B (15 sec)
Dillon Road/S. 96th Street	D (38 sec)	D (38 sec)
S. 88th Street/Campus Drive	--	--
Northwest Parkway/S. 96th Street/Via Varra	D (52 sec)	D (35 sec)
Northwest Parkway/Tape Drive/Via Varra	B (15 sec.)	B (15 sec.)
Northwest Parkway/US 36 North Ramps (WB)	*N/A*	*N/A*
Northwest Parkway/US 36 South Ramps (EB)	*N/A*	*N/A*
S. 88th Street/Rock Creek Parkway	--	--

(1) LOS results only shown for Intersections with recommended improvements

N/A – Intersection identified to be included in an interchange study.

The *Level 1 Traffic and Revenue Study Jefferson Parkway* study reviewed a scenario that would rebuild the Northwest Parkway corridor between S. 96th Street and SH 128. In this study it was noted that Northwest Parkway would be reconstructed to separate toll and local traffic which would include constructing new interchanges and a frontage road system to accommodate local traffic While no concepts were provided in the study to illustrate the proposed capacity changes to Northwest Parkway between S. 96th Street and US 36, it's important to note that this study is evaluating this section on a regional level.

Additional capacity improvements are needed at the US 36 interchange to accommodate the Year 2040 traffic volumes. However, this would require widening of the Northwest Parkway/Interlocken Loop bridge over US 36. Since concepts to increase capacity and funding has not been allocated to reconstruct the interchange, no capacity improvements were assumed. Further, if the Jefferson Parkway project is authorized, the US 36 interchange would likely be reconstructed as part of that project to accommodate the additional traffic generated by the Jefferson Parkway extension.

7.0 PROPOSED DEVELOPMENT TRAFFIC

7.1 Campus Drive Extension

Construction of the Campus Drive extension is proposed to coincide with the opening of the first vertical developer, which is currently expected to be the corporate office user in Parcel B with an anticipated opening date in Year 2022. Once extended, Campus Drive will connect from where it dead ends (approximately 2,200 feet east of S. 88th Street) to S. 96th Street. This will provide an alternative route for traffic generated by the Monarch school campus; it will also serve as an access to/from the Redtail Ridge development as shown in **Figure 2**.

In addition to serving traffic to/from the Monarch school campus, traffic generated by the Centennial Peaks Hospital/Avista Family Life Center medical facilities and residents living in the Rock Creek subdivision are also expected to use Campus Drive once connected. To estimate the number of vehicles that will change their route to use Campus Drive, existing travel patterns were reviewed, and a travel time analysis was performed. The primary movements that are anticipated to most likely shift from their current route to Campus Drive are the northbound right-turn and westbound left-turn movements at the Dillon Road/S. 88th Street intersection. As noted under existing conditions, these movements experience significant delay during the AM peak hour.

Vehicles that are traveling from south of the S. 88th Street/Campus Drive intersection to Northwest Parkway are anticipated to use the Campus Drive extension once it is constructed, since this is expected to be a faster route than Dillon Road. When looking at travel time to/from the Dillon Road/S. 96th Street intersection to the Monarch school campus, the travel distance for vehicles using the S. 96th Street/Campus Drive intersection versus the S. 88th Street/Campus Drive intersection is approximately 25 percent less. The travel distance for vehicles destined to/from the hospital is approximately the same.

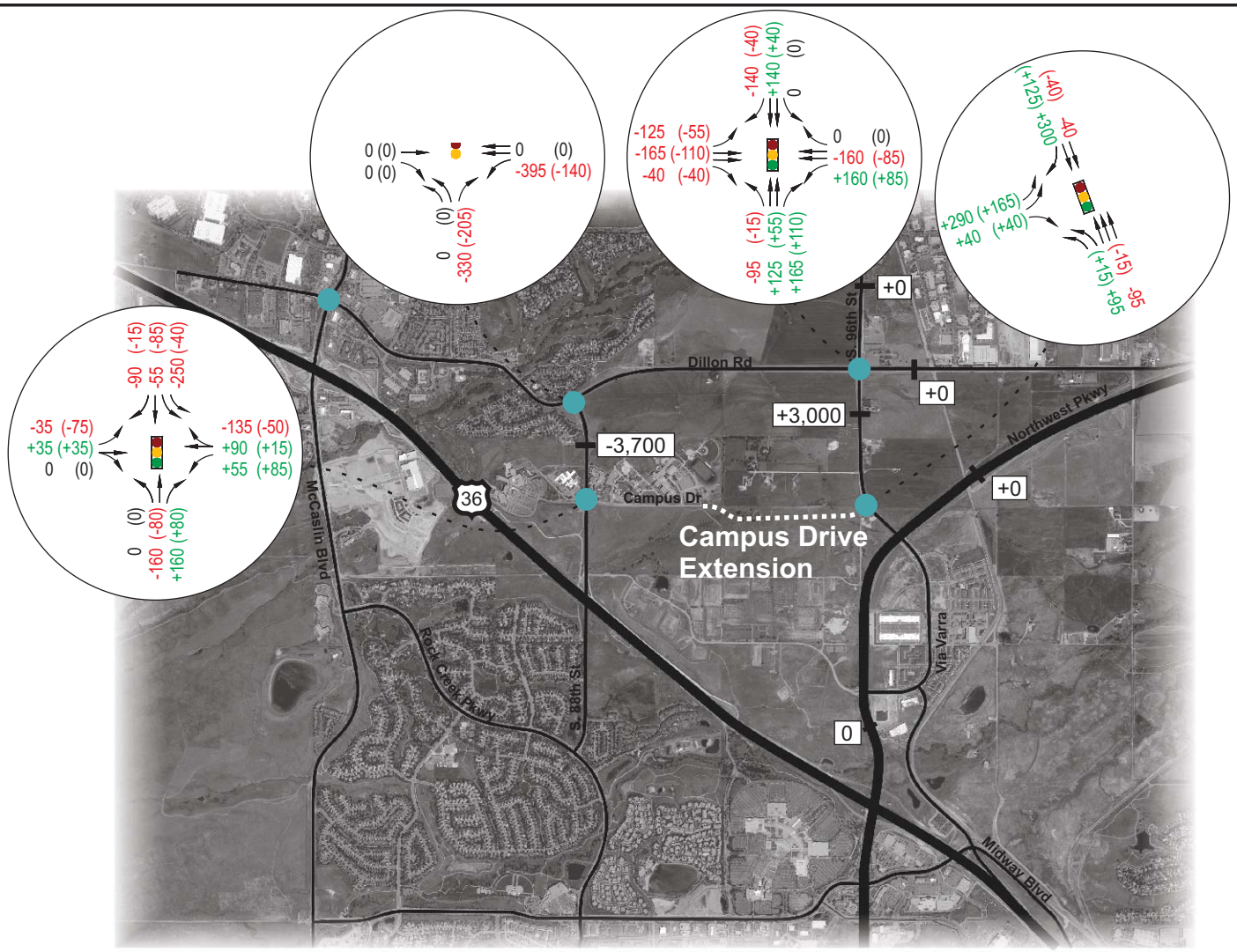
During the AM peak hour, a high percent of the vehicles making a westbound left-turn at the Dillon Road/S. 88th Street intersection are estimated to be destined to the Monarch school campus (65 percent). The existing congestion that is at the Dillon Road/S. 88th Street and S. 88th Street/ Campus Drive intersections during the AM peak hour was also taken into consideration. Based on these factors, it is estimated that approximately 75 percent of vehicles currently making a northbound right-turn and westbound left-turn movements at the Dillon Road/S. 88th Street intersection would reroute to use Campus Drive during the AM peak hour.

During the PM peak hour, a lower percent of vehicles to/from the Dillon Road/S. 88th Street intersection are destined to/from the Monarch school campus (30 percent). Further, the northbound right-turn and westbound left-turn movements at the Dillon Road/S. 88th Street intersection operate acceptably during the PM peak hour. Therefore, it is estimated that 50 percent of vehicles currently making a northbound right-turn and westbound left-turn movements at the Dillon Road/S. 88th Street intersection would reroute to use Campus Drive during the PM peak hour.

The travel conditions of the Campus Drive extension to the existing traffic volumes during the AM and PM peak hours are illustrated on **Figure 22**.

The Campus Drive concept layout near the Monarch school campus is shown in **Figure 23**. Campus Drive is proposed to be a four-lane roadway with roundabouts at the K-8 access, the High School access (peanut roundabout), and Street B. The project team has met with BVSD on three occasions to discuss the proposed roundabout and has received positive feedback on the proposed layout. A follow-up study is planned to evaluate the Campus Drive at the K-8 and High School intersection design in more detail. In addition to studying the AM peak hour which coincides with the school arrival peak period, additional data will need to be collected for the afternoon peak period which coincides with the school departure period. Observations will also be conducted to evaluate the internal operations and current queues so that recommendations can be provided to BVSD to improve the internal operations.

It should be noted that the project is planning to build Tape Drive incrementally and is expected to be fully constructed with the first phase of the development (prior to Year 2025). Like Campus Drive, Tape Drive will also be a new connection between S. 88th Street and Northwest Parkway. Consideration was given to the likelihood of existing/background vehicles rerouting to use Tape Drive from their current route. However, based on this review, few non-project related vehicles are anticipated to use Tape Drive to connect between S. 88th Street and Northwest Parkway.



KEY

→ LANE CONFIGURATION

XX,XXX DAILY TRAFFIC VOLUME

XX (XX) AM (PM) PEAK HOUR TRIP VOLUME CHANGE FROM EXISTING

*** Note: Traffic volume shifts are only shown for the study intersections impacted by the Campus Drive extension*

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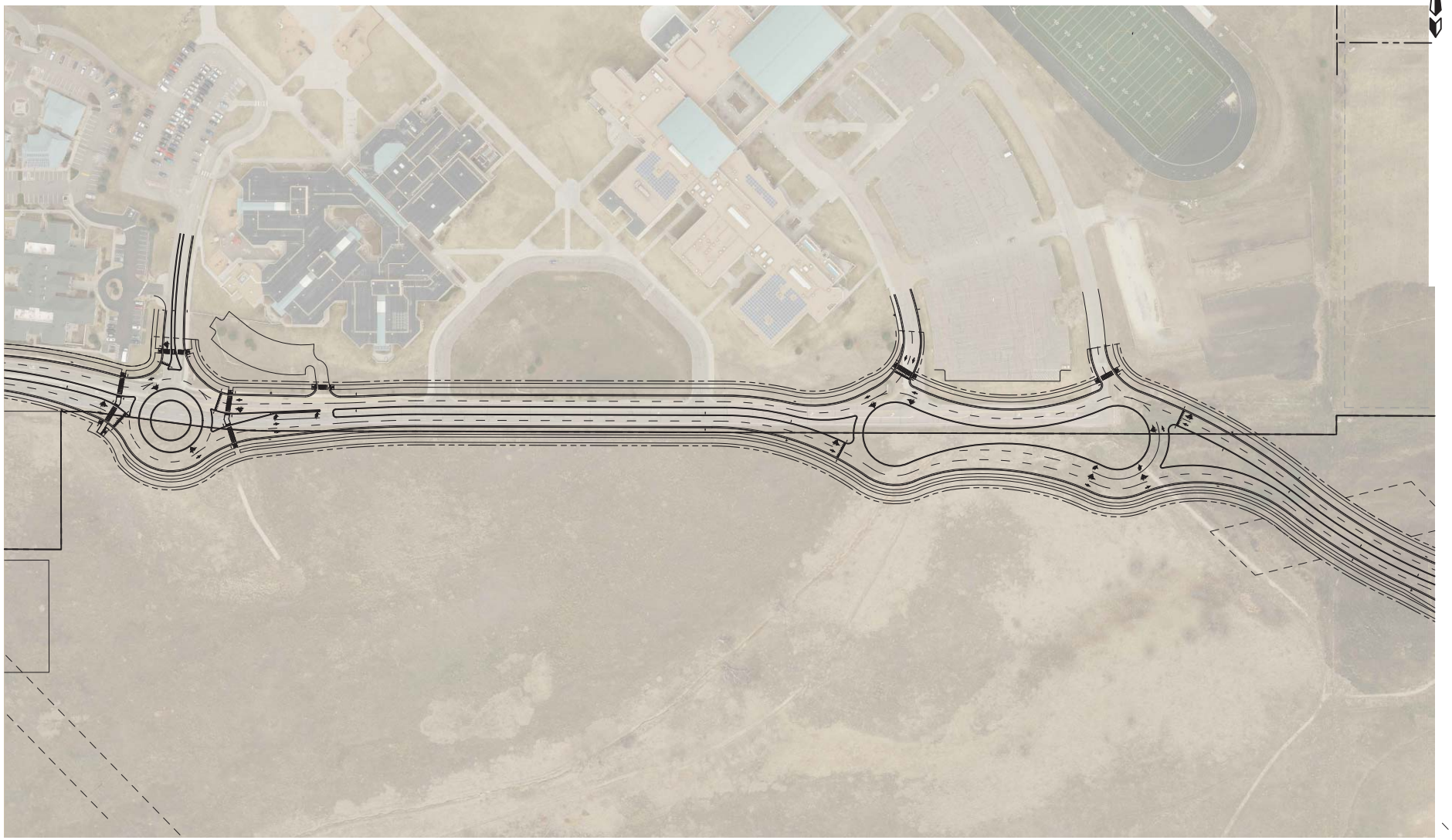
REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

CAMPUS DRIVE EXTENSION TRAFFIC PATTERN CHANGES (EXISTING VOLUMES)

FT Project #	19055	Original Scale	NTS	Date	1/22/20	Drawn by	EJK	Figure #	22



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

CAMPUS DRIVE LAYOUT FOR MONARCH SCHOOL CAMPUS ACCESSES

FT Project #	19055	Original Scale	NTS	Date	1/22/20	Drawn by	EJK	Figure #	23

7.2 Proposed Multimodal Network

The Redtail Ridge project will be built over the next 20 years. During this time major shifts in transportation mobility and regional transportation project completion are expected to take place. Transit projects such Northwest Rail, SH 42 BRT, and the RTD local circulator will potentially be operating before Year 2040. In addition, enhancements/construction of complete streets on S. 88th Street, Dillon Road, and S. 96th Street as well as the new connections within the project on Campus Drive, Tape Drive, Street A, and Street B will be a major part of the multimodal transformation in Louisville. As outlined in the policy documents in the background section of this report, these corridors will serve many more travelers and modes in the future. The transformations will use the current right of way to move more people using safe, reliable, connected and sustainable transportation options.

The enhanced-future multimodal network that is recommended with the Redtail Ridge project is shown in **Table 9**. Additional details regarding at-grade signalized crossings, underpasses, trail connections, transit stops, shared ride mobility, and other multimodal infrastructure will be detailed as this project continues ahead in the PUD process.

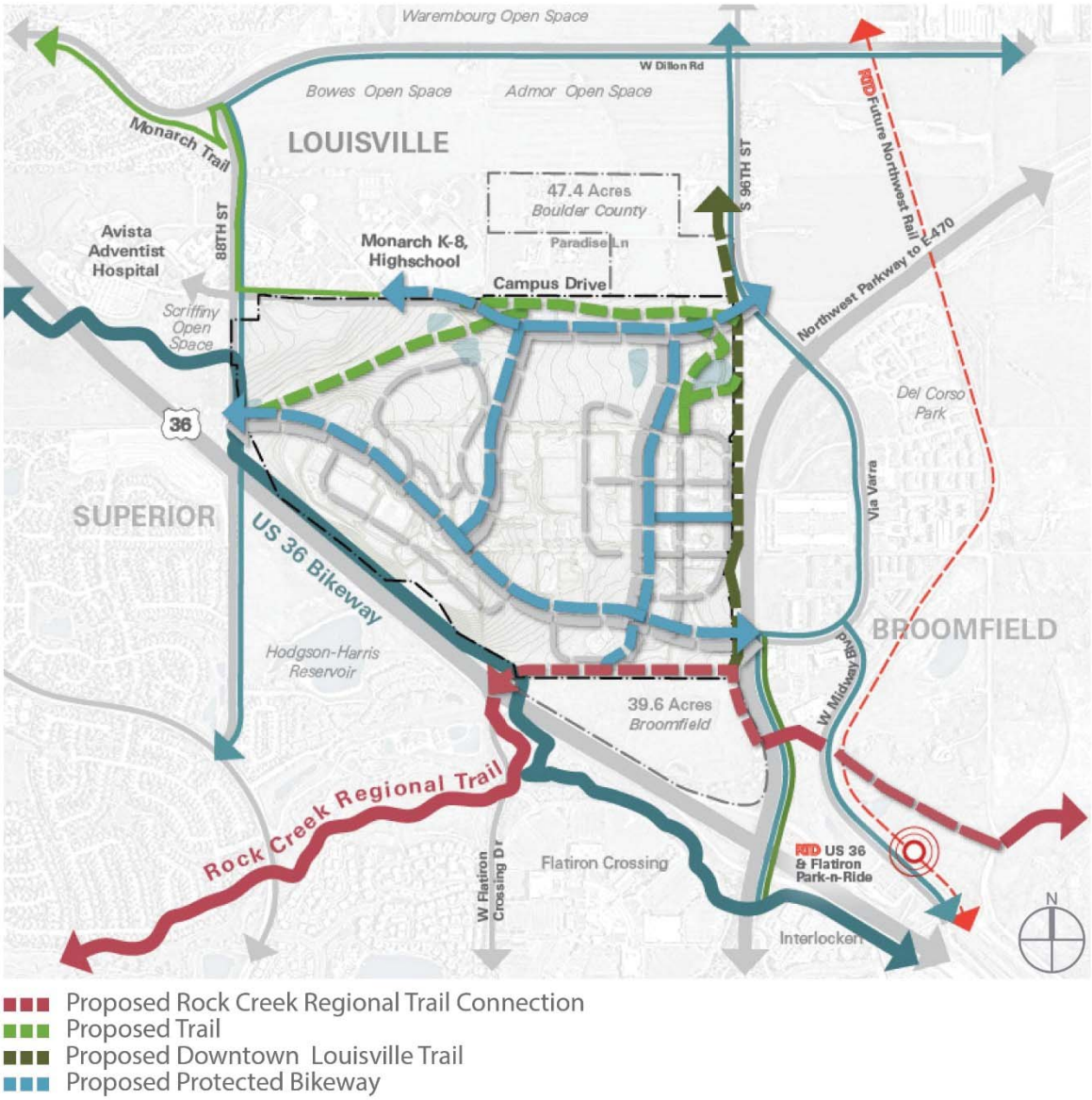
Table 9. Enhanced-Future Multimodal Network Assumption with Redtail Ridge Project

Corridor	Bike Lanes	Multi-use pathways	Sidewalks	Bus Lanes
S. 88th Street (US 36 to Dillon Road)	buffered or protected	westside or eastside	westside and eastside	none
Dillon Road (S. 88th to S. 96th Street)	buffered or protected	northside	northside and southside	none
S. 96th Street (Northwest Parkway to County Road)	buffered or protected	westside	westside and eastside	yes
Northwest Parkway (S. 96th Street to US 36)	None	eastside	eastside	shoulder running
Campus Drive (S. 88th Street to S. 96th Street)	buffered or protected	southside	northside	none
Tape Drive (S. 88th Street to Northwest Parkway)	buffered or protected	southside	northside	none
Street A (Campus Drive to Tape Drive)	buffered or protected	eastside	westside	none
Street B (Campus Drive to Tape Drive)	buffered or protected	westside	eastside	none

** Expanded future multimodal network will include on-site and off-site improvements including connections beyond Louisville that do not exist today but have been identified. See the links to the documents in the "Previous Studies" Section for additional details.*

The proposed regional and local trail network for the Redtail Ridge project area is also illustrated in **Figure 24**. As shown in the graphic, the project proposes to connect the gap in the Rock Creek Regional Trail as well as provide new east/west and north/south connections through the project, giving users more route options to travel through the area.

Figure 24. Proposed Enhanced Redtail Ridge Regional and Local Trail Network



7.3 Travel Demand Management Strategies

Transportation Demand Management (TDM) refers to activities that help people use the transportation system more efficiently, while reducing traffic congestion, vehicle emissions and fuel consumption. TDM activities help get the most out of transportation infrastructure and services by making lower-cost, higher-efficiency transportation options easier to use and more readily available.

TDM activities include such options as eliminating or shortening trips, changing the mode of travel, or changing the time of day a trip is made, as well as actions that increase transportation system

efficiency through carpooling, vanpooling, transit, bicycling and walking. TDM strategies also include employer-based programs such as alternative work schedules, which can shift demand away from peak travel times, and telework, which can reduce the need for trips entirely.

The Redtail Ridge project has developed a draft TDM Plan that is included in the **Appendix** of this study. The programs listed in the TDM Plan are provided at this time as possible tools given where the project stands in the GDP process. Future submittals can provide additional information when additional details on land uses, tenants and funding is known. It is recommended that the Metro District partner with a local expert in transportation management solutions to help facilitate these programs.

Note that all vertical developers in the project will be required to submit a customized TDM for their building identifying what programs will be implemented to meet the non-SOV goals of the project. Periodic surveys will be conducted to evaluate the TDM program effectiveness and adjustments will be made, if needed, to reach the project non-SOV goals.

7.4 External Non-Single Occupant Vehicle (Non-SOV) Trips

Non-single occupant vehicles (non-SOV) trips are trips that originate from outside the site or are being made from the site to external destinations. These trips are made by people who bicycle, carpool, vanpool, used shared ride mobility services and/or ride transit. As previously reference, based on the *American Community Survey US Census Data*, the mixed-use development sites in the US 36 corridor currently have 25 to 30 percent non-SOV trips coming to/from the sites daily. In addition, this project reviewed mode share and trip generation data for other large-scale developments in the Denver Metro area as well as trip generation studies to estimate non-SOV percentages anticipated for this project area. A summary of the findings and references are provided in the **Appendix**.

As reflected in **Table 10** in **Section 7.4**, different non-SOV trips are forecasted and applied to the different land uses (shown as trip reduction percentages) completed prior to Year 2030. The non-SOV goals for this project are to have 25 percent or more non-SOV trips to/from the project site for the office and multifamily residential uses, which is achievable based on the current conditions and proposed TDM programs. However, based on feedback provided by City staff, to provide a more conservative analysis, a lower non-SOV reduction was assumed for the trip generation and traffic analysis for this study. The following non-SOV trips are assumed for development completed prior to Year 2030:

- The multifamily residential housing units are assumed to have 15 percent non-SOV trips. This accounts for residents who walk, bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.

- The continuing care retirement community is expected to have five (5) percent non-SOV trips. This accounts for residents who would ride shuttles and for employees/visitors that walk, bicycle, carpool, vanpool, use shared ride mobility services and/or transit.
- The general offices are assumed to have 15 percent non-SOV trips. This accounts for employees/visitors who walk, bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.
    - Note that based on preliminary site plan information for the corporate office user in Parcel B, the non-SOV trips are estimated to be five (5) percent for the corporate office user.
- The shopping centers are expected to have ten (10) percent non-SOV trips. This accounts for mostly employees and some patrons who bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.
- The business hotel is expected to have five (5) percent non-SOV trips. This accounts for mostly employees and some travelers who carpool, use shared ride mobility services and/or use transit

It is assumed that some of the planned regional mobility plans for this area will be constructed/implemented by the time this project is built-out and that these projects will further reduce the non-SOV trips for the project and background trips to the study area (such as Northwest Rail, NAMS BRT corridors, complete streets in the 88th Street, Dillon Road, and 96th Street corridor). As a result, the following non-SOV trip increases for the Year 2030 and after are outlined below. Like the initial phase, the goal of the project is to have an even greater percentage of non-SOV trips than what is assumed below.

- The continuing care retirement community is expected to remain at the same levels.
- The general offices and residential uses are expected to have an additional five (5) percent or greater non-SOV trip increase. Therefore, the non-SOV trip percentage was increased to 20 percent for general offices and the multifamily residential.
- The shopping centers are expected to remain at the same levels.
- The business hotel is expected to remain at the same level.

7.5 Trip Generation

A trip generation analysis was performed to determine the traffic characteristics for the project. Trip rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*[2] were applied to estimate the traffic for the proposed land uses. ITE trip generation rates for “Multifamily Housing Mid-Rise (#221)”, “Continuing Care Retirement Community” (#255),

[2] Trip Generation 10th Edition, Institute of Transportation Engineers, 2017.

"Business Hotel" (#312), "General Office Building" (#710), and "Shopping Center" (#820) were utilized for the multifamily housing, retirement community, hotel, office, and retail uses, respectively. Specific land uses and tenants for the office and retail spaces are unknown currently. It is anticipated that the retail uses may include shopping, restaurants, and entertainment. For the projected retail land use on the site, the "Shopping Center" (ITE #820) land use category was applied as the data for this land use code is described as follows:

> *Shopping centers, including neighborhood centers, community centers, regional centers, and super regional centers, were surveyed for this land use. Some of these centers contained non-merchandising facilities, such as office buildings, movie theaters, restaurants, post offices, banks, health clubs, and recreational facilities (for example, ice skating rinks or indoor miniature golf courses). Many shopping centers, in addition to the integrated unit of shops in one building or enclosed around a mall, include outparcels (peripheral buildings or pads located on the perimeter of the center adjacent to the streets and major access points). These buildings are typically drive-in banks, retail stores, restaurants, or small offices.*

The ITE *Trip Generation Handbook (Volume 3)* provides recommendations for when to use the average rate versus the equation (fitted curve) when estimated trips for land use codes. Based on this review, land use codes where the equation has a R^2 value of at least 0.75 was used to determine what land use codes the equation was utilized versus the average rate to estimate the trip generation estimates before reductions were applied. Using this criterion, the equation was used to generate trips for all land uses that fall under the "General Office" (ITE #710) category. The other land uses had R^2 values of less than 0.75 and the average rate was therefore utilized.

The trip generation estimates using these rates are summarized in **Table 10**. Note that for purposes of the traffic study, since the office is calculated using the equation rather than the average rate, the office use was further broken down by building or office cluster. This information is subject to change and was just used for purposes of the traffic study.

> Multi-Use (Internal) Trips. These internal trips occur from one land use or building to another within the site boundaries. For example, an office patron may also use a retail store or restaurant in one vehicular visit to the site. Multi-use or multi-purpose trips typically do not affect the exterior site access points, nor add any additional traffic volumes to the adjacent street network. To estimate the multi-use factor, the spreadsheets developed for the National Cooperative Highway Research Program (NCHRP) 684 were utilized. These spreadsheets are included in the **Appendix** for reference. Based on this review, the multi-use factors applied for this project were assumed to be 10 percent**.**
>
> Non-SOV Trips. These trips originate from outside the site that may be completed by walking, bicycling, carpooling, shared ride mobility, or riding transit. The non-SOV trip percentages identified in **Section 7.4** were applied to the trip generation estimates.

As shown in **Table 10**, with the assumptions listed above, the project site is expected to generate approximately 11,392 daily, 993 AM peak hour, and 1,073 PM peak hour trips in Phase 1 by Year 2025. At full build out the project site is expected to generate approximately 27,274 daily, 2,382 AM peak hour, and 2,646 PM peak hour trips.

Table 10. Trip Generation Summary

Land Use	Size	Unit	Non-SOV	Internal Capture	Average Weekday Trips		Weekday AM Peak Hour Trips				Weekday PM Peak Hour Trips			
					Rate	Total	Rate	Total	In	Out	Rate	Total	In	Out
Year 2025 Completion														
#255 Continuing Care Retirement Community	505	units	**5%**	**10%**	2.40	1,036	0.14	60	39	21	0.16	69	27	42
#710 General Office Building - Medtronic	500.0	KSF	**5%**	**10%**	*	4,322	*	424	365	59	*	449	72	377
#221 - Multifamily Housing (Mid-Rise)	600	units	**15%**	**10%**	5.44	2,497	0.36	165	43	122	0.44	202	123	79
#820 Shopping Center	10.0	KSF	**10%**	**10%**	37.75	306	0.94	8	5	3	3.81	31	15	16
#312 Business Hotel	240	rooms	**5%**	**10%**	4.02	825	0.39	80	34	46	0.32	66	36	30
#710 General Office Building	150.0	KSF	**15%**	**10%**	*	1,203	*	128	110	18	*	128	20	108
#710 General Office Building	150.0	KSF	**15%**	**10%**	*	1,203	*	128	110	18	*	128	20	108
				Subtotal		**11,392**		**993**	**706**	**287**		**1,073**	**313**	**760**
Year 2025 to 2030 Completion														
#255 Continuing Care Retirement Community	505	units	**5%**	**10%**	2.40	1,036	0.14	60	39	21	0.16	69	27	42
#221 - Multifamily Housing (Mid-Rise)	300	units	**15%**	**10%**	5.44	1,248	0.36	83	22	61	0.44	101	62	39
#820 Shopping Center	15.0	KSF	**10%**	**10%**	37.75	459	0.94	11	7	4	3.81	46	22	24
#312 Business Hotel	0	rooms	**5%**	**10%**	4.02	0	0.39	0	0	0	0.32	0	0	0
#710 General Office Building	300.0	KSF	**15%**	**10%**	*	2,356	*	236	203	33	*	247	40	207
#710 General Office Building	90.0	KSF	**15%**	**10%**	*	733	*	85	73	12	*	79	13	66
#710 General Office Building	200.0	KSF	**15%**	**10%**	*	1,590	*	164	141	23	*	168	27	141
				Subtotal		**7,422**		**639**	**485**	**154**		**710**	**191**	**519**
Year 2030 to 2035 Completion														
#255 Continuing Care Retirement Community	316	units	**5%**	**10%**	2.40	648	0.14	38	25	13	0.16	43	17	26
#221 - Multifamily Housing (Mid-Rise)	0	units	**20%**	**10%**	5.44	0	0.36	0	0	0	0.44	0	0	0
#820 Shopping Center	20.0	KSF	**10%**	**10%**	37.75	612	0.94	15	9	6	3.81	62	30	32
#710 General Office Building	300.0	KSF	**20%**	**10%**	*	2,218	*	222	191	31	*	233	37	196
#710 General Office Building	90.0	KSF	**20%**	**10%**	*	690	*	80	69	11	*	74	12	62
#710 General Office Building	100.0	KSF	**20%**	**10%**	*	764	*	87	75	12	*	82	13	69
				Subtotal		**4,932**		**442**	**369**	**73**		**494**	**109**	**385**
Year 2035 to Year 2040 Buildout														
#820 Shopping Center	25.0	KSF	**10%**	**10%**	37.75	764	0.94	19	12	7	3.81	77	37	40
#710 General Office Building	280.0	KSF	**20%**	**10%**	*	2,074	*	209	180	29	*	218	35	183
#710 General Office Building	90.0	KSF	**20%**	**10%**	*	690	*	80	69	11	*	74	12	62
				Subtotal		**3,528**		**308**	**261**	**47**		**369**	**84**	**285**
				Full Buildout Total		**27,274**		**2,382**	**1,821**	**561**		**2,646**	**697**	**1,949**

7.6 Trip Distribution and Assignment

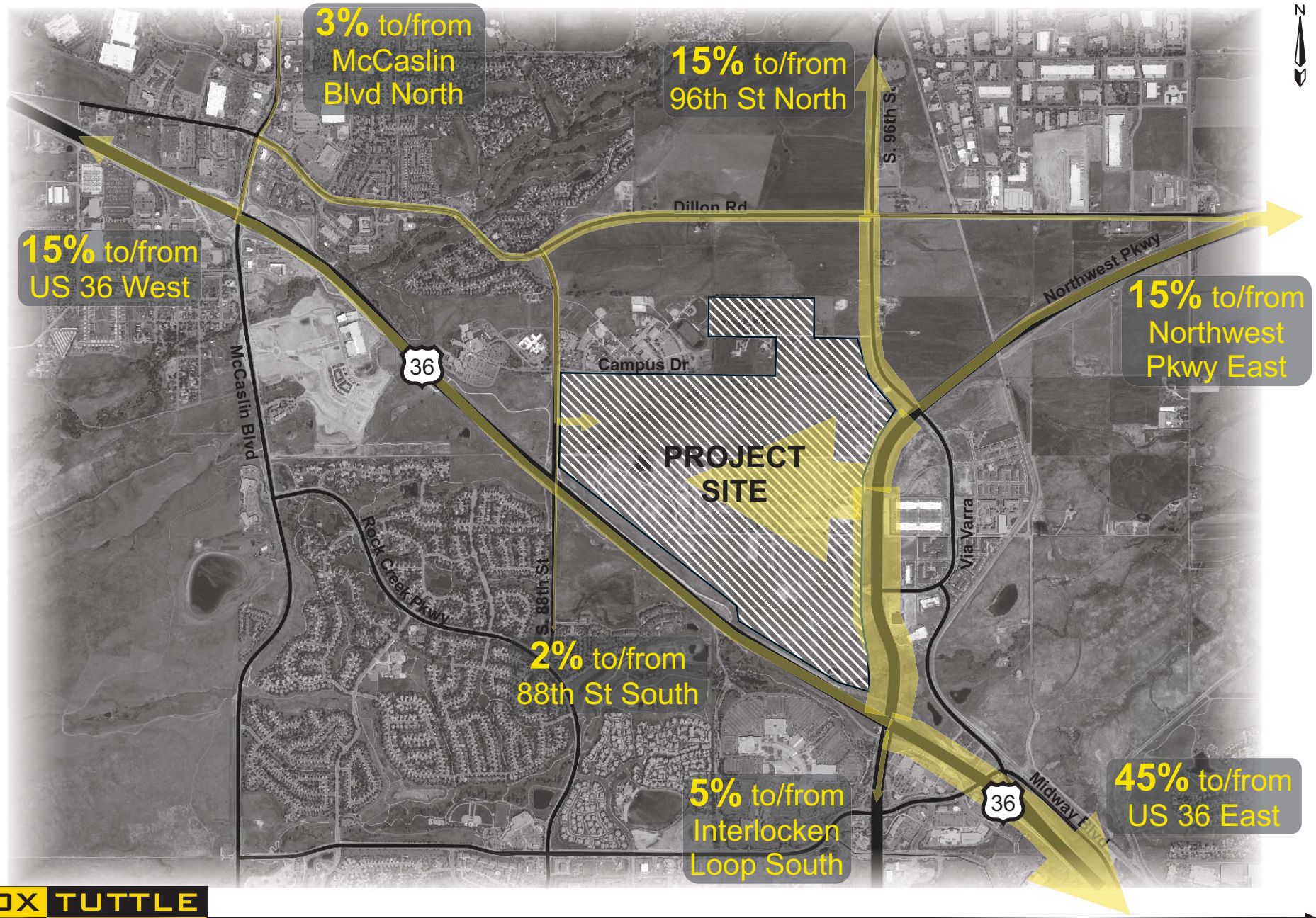
To develop the trip distribution for the proposed development, available traffic count and travel pattern data was reviewed. The proposed land uses for the project site were also taken into consideration which suggests that traffic generated to/from the project site is expected to utilize the regional transportation system, with a smaller percent of the trips generated by the local system. Therefore, most vehicles are expected to use the regional routes (such as US 36, Northwest Parkway, and S. 96th Street to the north) and few vehicles are expected to use local roads Travel routes/patterns were reviewed to determine how vehicles are expected to access the site and what route is likely to be fastest for vehicles to use to get to Boulder and Denver, but also communities to the south such as Arvada, Golden, Wheat Ridge, Westminster, etc.

In addition to available traffic/travel pattern information, data available from the StreetLight Data Company was reviewed for the offices in CTC. StreetLight collects mobility data on vehicle trips that can be used to analyze trip origin-destination, trip travel time/route, and trip purpose; this data was used to determine the trip distribution for existing traffic entering/exiting the offices in CTC. This data provided a baseline for where existing office trips in the study area have origins/destinations.

While the continuing care retirement community encompasses a large percent of the project area, it does not generate a large percent of the peak hour trips (less than 10 percent of the total peak hour trips). The proposed office, multifamily residential, and commercial uses generate most of the AM and PM peak hour trips. Therefore, since the continuing care retirement community is located on the western side of the project site and a majority of the office/residential/commercial is located on the eastern side, a majority of vehicles are expected to access the site via the Northwest Parkway intersection or the intersection on S. 96th Street rather than via S. 88th Street.

Taking into consideration the factors listed above, the trip distribution was developed for the development traffic entering/exiting the project site and is summarized in **Figure 25**. It is important to note that this trip distribution was evaluated by the City as well as their third-party consultant who used the DRCOG Year 2040 travel demand model for comparison purposes. Based on their review, the trip generation estimates shown in **Figure 25** were found to be acceptable.

Using these distribution assumptions, the projected site traffic was assigned to the study area roadway network for the weekday AM and PM peak hours. The site-generated traffic for Year 2025, Year 2030, and the project build out in Year 2040 are shown on **Figure 26, Figure 27,** and **Figure 28**, respectively.



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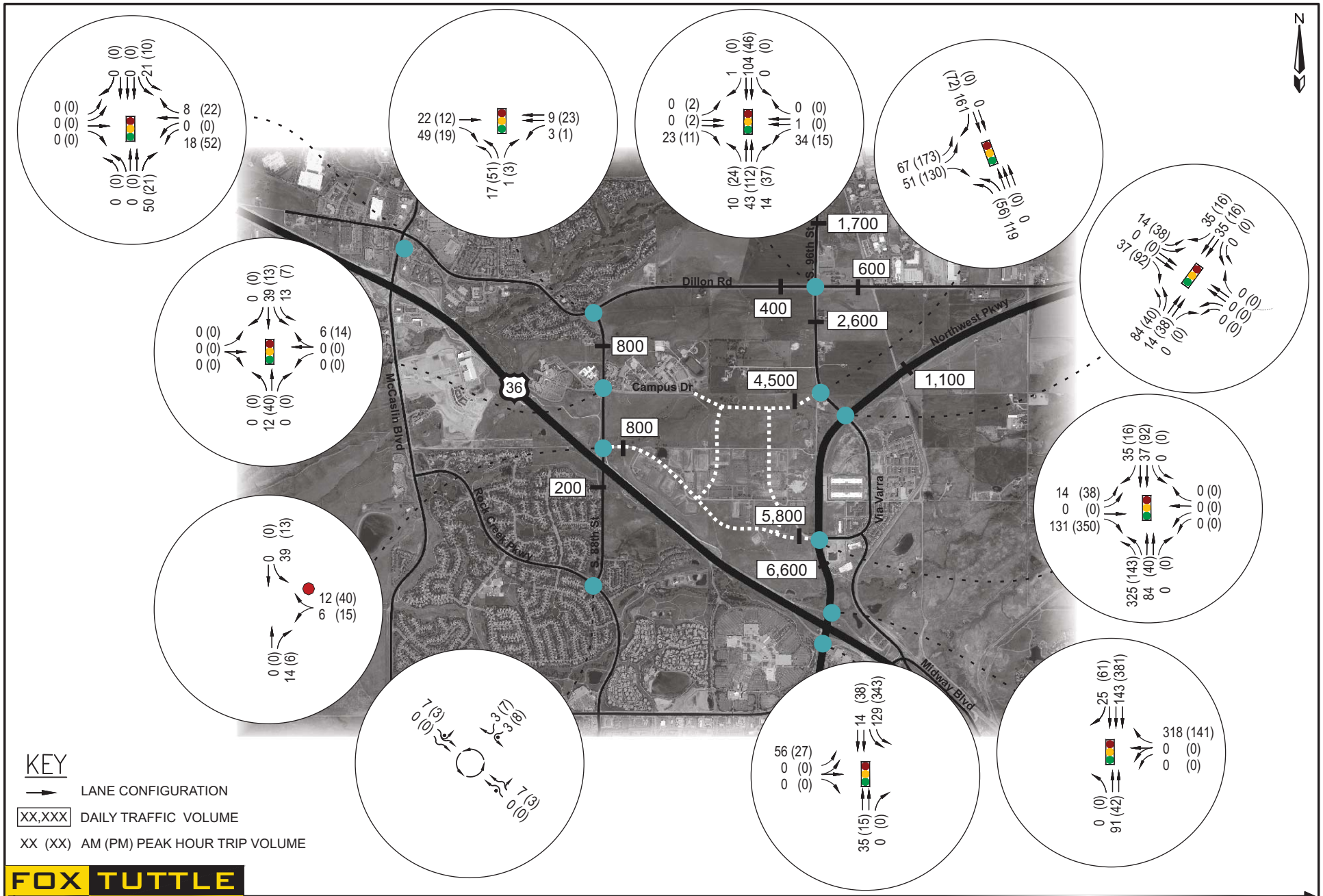
SITE DISTRIBUTION

FT Project #	19055	Original Scale	NTS	Date	1/22/20	Drawn by	EJK	Figure #	25



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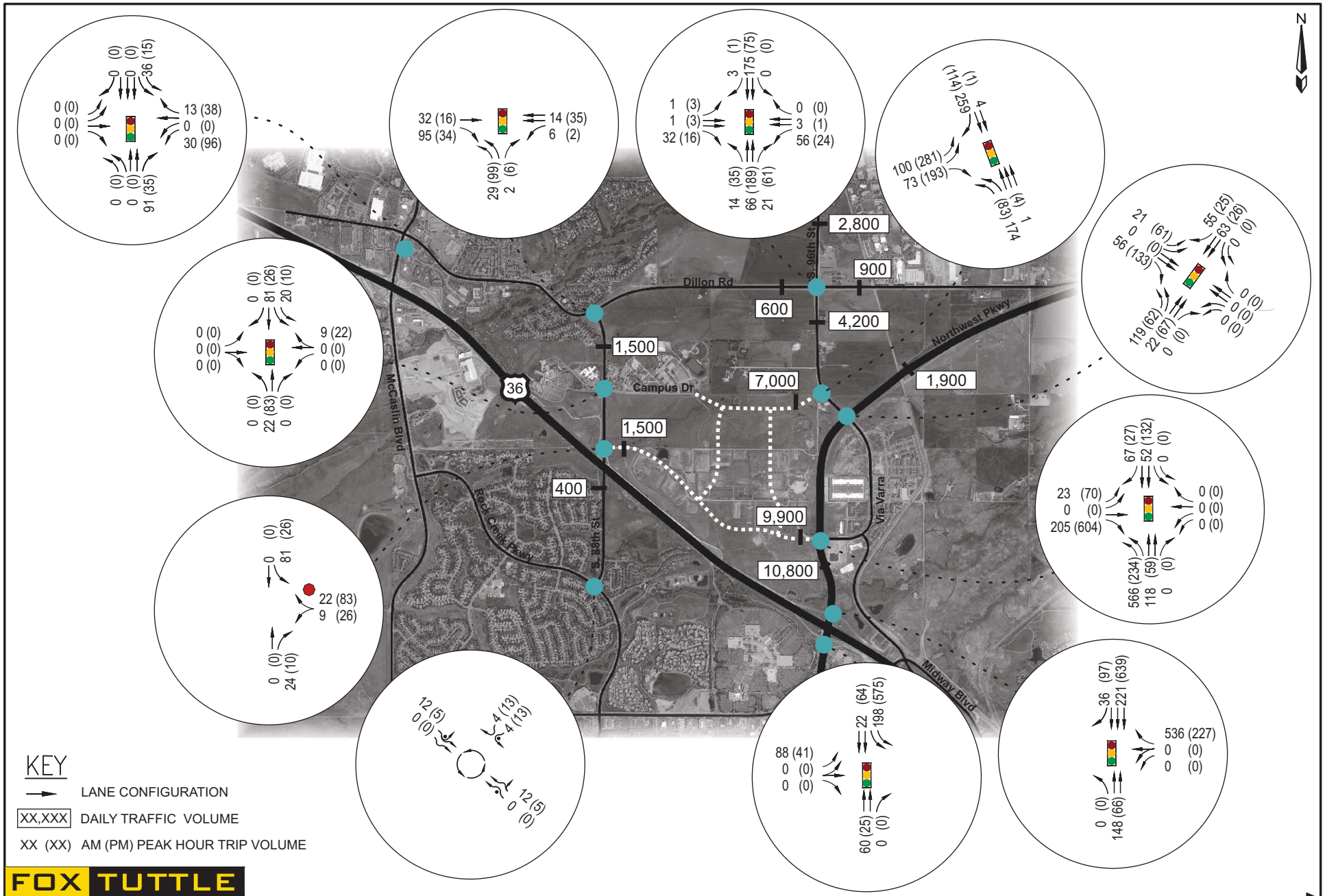
REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

SITE-GENERATED TRAFFIC - PRIOR TO YEAR 2025

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	26



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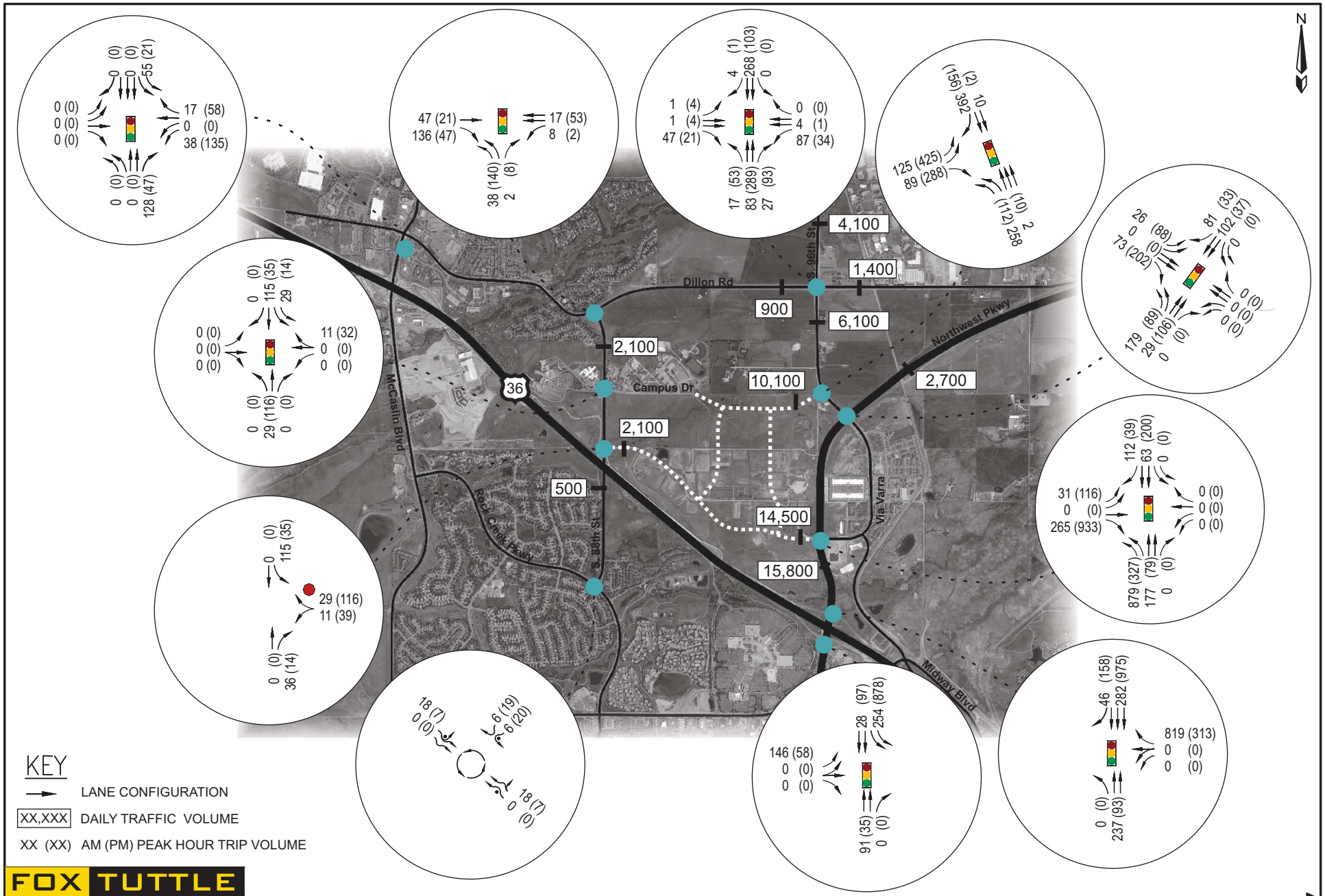
REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

SITE-GENERATED TRAFFIC - PRIOR TO YEAR 2030

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	27



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

SITE-GENERATED TRAFFIC - PRIOR TO YEAR 2040

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	28

7.7 Crash Reduction and Vision Zero

The crash analysis completed in the City of Louisville TMP, also shown in **Section 3** of this study, documents the crash trends in the Redtail Ridge study area. As a result of the high crash locations, the TMP outlined priorities to work toward reducing all crashes in the City. The term "Vision Zero" encapsulates the concept of providing safe and complete roadways for all users with a goal of reducing all crashes, specifically fatal and life threating crashes.

The Redtail Ridge design team is proposing to enhance the TMP Vision Zero recommendations. The intersection and multimodal improvements recommended in this study will accelerate the City's progress toward Vision Zero and provide safe travel as new residents, visitors and employees travel to and from Redtail Ridge. A specific overview of the recommended projects that could work toward Vision Zero are outlined below.

- Extension of Campus Drive east to S. 96th Street would provide a secondary route to/from the Monarch school campus. This would provide redundant access for emergency services and redistribute AM peak traffic to new intersections with enhanced safety features outlined below.
- Each of the intersections in the study area was evaluated in this study with future changes to signal timing and vehicle storage to reduce crashes. Providing safe clearance times and adequate storage will work toward Vision Zero goals in the S. 88th Street, Dillon Road, and S. 96th Street corridors.
- The intersections in this study utilized best practices for pedestrian signal timing at intersections. This includes walk phases that allow adequate time for seniors and children to cross streets. Additional protection is possible if City staff and the community would be willing to accept additional travel time delay during peak AM travel conditions. We look forward to finding the right balance that works toward Vision Zero goals.
- The bicycle network in this study recommends going beyond the TMP recommendations by building a network of buffered and protected bikeways in the S. 88th Street, S. 96th Street, and Dillon Road corridors as well as through the currently inaccessible project site. This would include intersection treatments that protect people on bicycles from turning movements when they are waiting for signals.

The design team will continue to apply Vision Zero best practices as additional site plan details are prepared during the PUD process. This includes the use of traffic calming features, properly sized lane widths, roundabouts, speed limits, and signage that works toward the City of Louisville's TMP safety goals.

8.0 FUTURE CONDITIONS + SITE GENERATED TRAFFIC

This section evaluates the anticipated future traffic operations with the project trips.

8.1 Year 2025 Background + Project Intersection Capacity Analysis

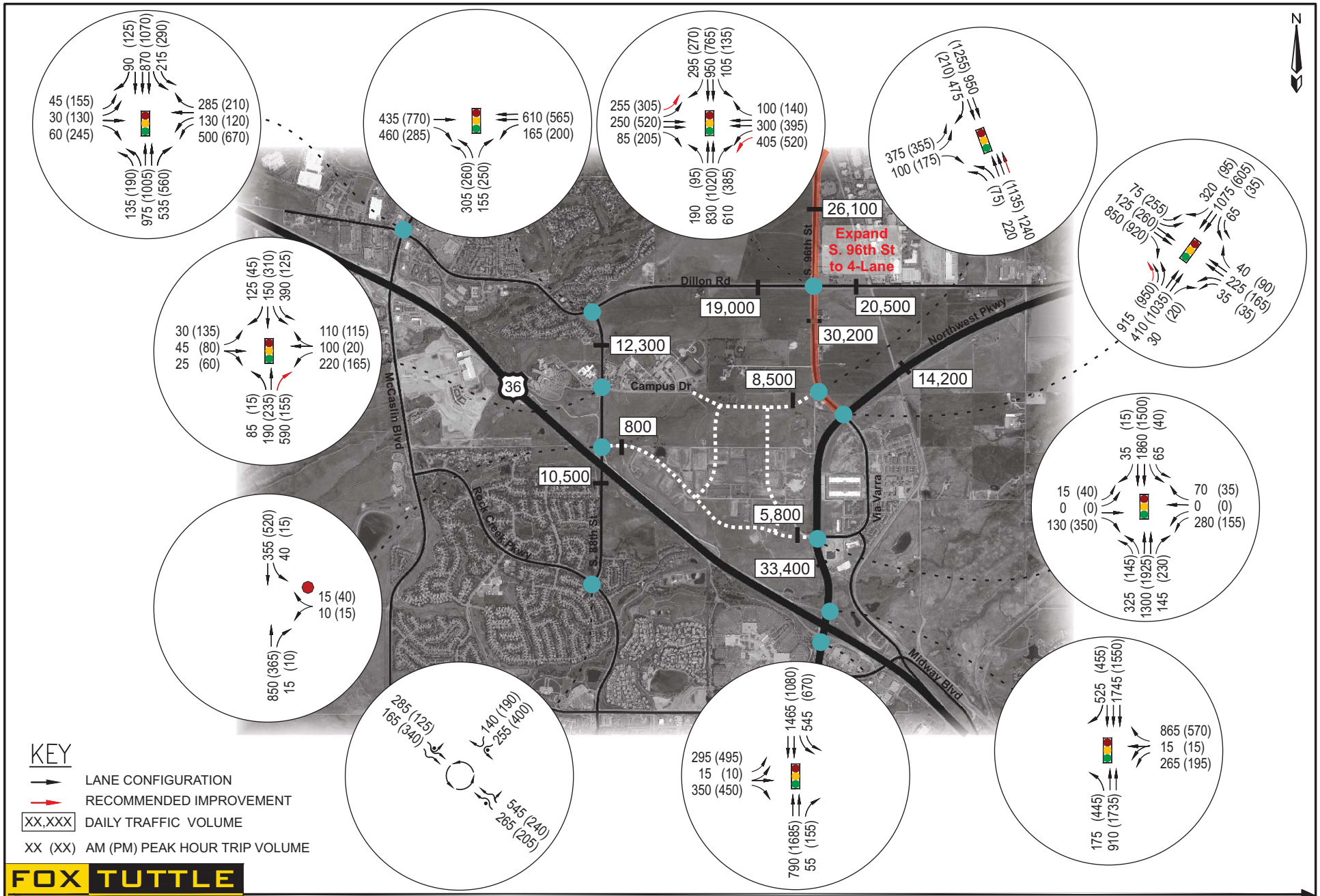
This section discusses travel conditions associated with the addition of development trips to the Year 2025 conditions. Signal timing was assumed to be optimized at all the study intersections. As previously noted, the Campus Drive extension was assumed as part of the initial phase and will be constructed/open to coincide with the opening of the first vertical development opening. The S. 88th Street/Tape Drive access was assumed to remain unsignalized with side-street stop control with southbound left- and northbound right-turn lanes assumed along S. 88th Street. The S. 96th Street/Campus Drive intersection was assumed to be signalized; a southbound right-turn lane, dual northbound left-turn lanes, and dual eastbound left-turn lanes with an eastbound right-turn lane (consistent with previous study recommendations). Since the Northwest Parkway/Tape Drive/Via Varra intersection was designed to accommodate higher traffic volumes from when Storage Tek was operating; only minor modifications (besides signal timing) were assumed under Year 2025 background + project conditions, including replacing the dual eastbound left-turn lanes with a single eastbound left-turn lane to better align with the proposed Tape Drive alignment to the west.

The improvements identified under Year 2025 background conditions were not assumed, since the Campus Drive extension could potentially reduce the need for some of the improvements.

The projected site-generated traffic was added to the Year 2025 background study area traffic volumes, which assumes travel pattern shifts for existing/background traffic due to the Campus Drive extension. The resultant traffic volumes are illustrated on **Figure 29**.

The results of the LOS calculations for the intersections are summarized in **Table 11**. Summary tables with LOS and 95th percentile queues by movement as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that the Dillon Road/S. 96th Street and the Northwest Parkway/S. 96th Street/Via Varra intersections are expected operate at LOS E or worse during the AM or PM peak hour. All the other study intersections are expected to operate at an overall LOS D or better.**

As previous studies have suggested, the Campus Drive extension improves traffic operations at the Dillon Road/S. 88th Street and S. 88th Street/Campus Drive intersections. Both intersections were expected to operate at LOS F during the AM peak hour under Year 2025 background conditions. The Campus Drive extension provides an alternative route for Monarch school campus traffic to enter/exit. This reduces traffic volumes at these two key intersections on S. 88th Street.



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2025 BACKGROUND+SITE GENERATED TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	29

Table 11. Year 2025 + Project Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	**PM Peak Hour**
Dillon Road/McCaslin Boulevard	C (26 sec)	C (34 sec)
Dillon Road/S. 88th Street	C (20 sec)	C (20 sec)
Dillon Road/S. 96th Street	**E (69 sec)**	**F (98 sec)**
S. 88th Street/Campus Drive	D (38 sec)	C (33 sec)
S. 88th Street/Tape Drive [(1)]	A / C (18 sec.)	A / B (10 sec)
S. 96th Street/Campus Drive	D (38 sec)	C (32 sec)
Northwest Parkway/S. 96th Street/Via Varra	**F (99 sec)**	C (33 sec)
Northwest Parkway/Tape Drive/Via Varra	C (30 sec)	B (12 sec)
Northwest Parkway/US 36 North Ramps (WB)	B (11 sec)	B (18 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (19 sec)	D (44 sec)
S. 88th Street/Rock Creek Parkway [(2)]	A (10 sec)	A (7 sec)

[(1)] Unsignalized with side-street stop control. The overall intersection LOS is followed by the worst-movement LOS and delay.
[(2)] Roundabout controlled intersection

Note that the internal intersections were evaluated under Year 2025 background + project conditions and the intersection LOS worksheets are included in the **Appendix**. However, the analysis results, intersection operation discussion, and lane geometry/traffic control recommendations are included in a later section: **Section 10.0 "Internal Intersection Analysis"**.

To address the expected issues at the study intersections, the improvements listed below are recommended (these improvements are also illustrated in **Figure 29)**. Additional information on the anticipated timing for improvements is provided in **Section 12.0 "Improvement Phasing".**

- S. 96th Street/Dillon Road: Construct dual eastbound and westbound left-turn lanes on Dillon – *also recommended under Year 2025 background conditions*
- Widen S. 96th Street to a four-lane section between Dillon Road to Northwest Parkway and to the north of the Dillon Road intersection approximately one-half mile – *S. 96th Street between Dillon Road and Northwest Parkway also recommended to be expanded to a four-lane under Year 2025 background conditions*
- S. 88th Street/Campus Drive: Extend the northbound right-turn lane to provide a minimum of 500 feet of storage – *also recommended under Year 2025 background conditions*
- S. 96th Street/Campus Drive: Construct three northbound through lanes that extend from the Northwest Parkway/S. 96th Street/Via Varra intersection to the Campus Drive intersection. The three northbound through lanes will merge to two through lanes north of Campus Drive.
- Northwest Parkway/S. 96th Street: Construct triple northeast bound left-turn lanes on Northwest Parkway and modify the southwest bound right-turn movement to be controlled on Northwest Parkway – *also recommended under Year 2025 background conditions*

- Northwest Parkway and US 36 Interchange: Intersection is near capacity under Year 2025 with project conditions. However, there is limited space available to make any capacity improvements.

The Year 2025 background + project conditions were evaluated with the improvements listed above. The results of the LOS calculations for the intersections are summarized in **Table 12.** A summary table with LOS and 95th percentile queue by movement as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that with the recommended improvements all study intersections are expected to operate at an overall LOS D or better during the AM and PM peak hours.**

Table 12. Year 2025 Background + Project Conditions Level of Service Summary (Improvements)

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	--	--
Dillon Road/S. 88th Street	--	--
Dillon Road/S. 96th Street	D (37 sec.)	D (38 sec)
S. 88th Street/Campus Drive	D (36 sec.)	C (34 sec.)
S. 88th Street/Tape Drive	--	--
S. 96th Street/Campus Drive	C (24 sec.)	B (20 sec.)
Northwest Parkway/S. 96th Street/Via Varra	D (43 sec.)	C (29 sec.)
Northwest Parkway/Tape Drive/Via Varra	--	--
Northwest Parkway/US 36 North Ramps (WB)	--	--
Northwest Parkway/US 36 South Ramps (EB)	--	--
S. 88th Street/Rock Creek Parkway	--	--

(1) LOS results only shown for intersections with recommended improvements

Although the study intersections are expected to operate at overall acceptable level-of-service, the following movements are expected to operate at LOS E or worse under Year 2025 conditions with the recommended improvements. Any anticipated queuing issues are also noted below.

Dillon Road and McCaslin Boulevard

- During the PM peak hour, the following movements are expected to operate at LOS E: eastbound through-, northbound left-, and southbound left-turn. All movements during the AM peak hour are expected to operate at LOS D or better.
- No significant queuing issues are expected. However, the southbound right-turn queue is expected to extend approximately 120 feet occasionally, which will queue beyond the available 110 feet of storage in the right-turn lane.
- The project-related traffic has minimal impact to operations at this intersection.

Dillon Road and S. 88th Street

- The extension of Campus Drive improves traffic operations at this intersection by removing traffic from a critical movement (westbound left-turn). The Campus Drive extension is expected to address the existing westbound left-turn and northbound queues that this intersection currently experiences during the AM peak hour.
- During the PM peak hour, the eastbound queues are expected to extend approximately 590 feet, (which is less than the 1,000 feet that the eastbound queues currently extend under existing conditions).

Dillon Road and S. 96th Street

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at LOS E: eastbound left, eastbound through, westbound left-, and northbound left-turn.
  - During the PM peak hour, the following movements operate at LOS E: eastbound through and westbound left-turn.
- No significant queuing issues are expected. The westbound left-turn queue during the PM peak hour is expected to extend approximately 320 feet, which is a significant improvement from existing conditions.

S. 88th Street and Campus Drive

- The extension of Campus Drive improves traffic operations at this intersection by removing traffic from a critical movement (southbound left-turn).
- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the eastbound through operates at LOS E.
  - During the PM peak hour, the eastbound and westbound through operates at LOS E.
- No significant queuing issues are expected during the AM or PM peak hours.

S. 96th Street/Campus Drive

- During the AM and PM peak hour, the northbound left-turn movement is expected at operate at LOS E or worse. However, the northbound left-turn queues are expected to be within the available left-turn lane storage (estimated to be 250 feet).

Northwest Parkway and S. 96th Street/Via Varra

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at LOS E: the eastbound left, eastbound through, westbound left, and westbound through on S 96th Street/Via Varra and the northbound left- and southbound left-turn on Northwest Parkway.
  - During the PM peak hour, the following movements operate at LOS E: the eastbound left, eastbound through, westbound left-turn, and westbound through on S 96th Street/Via Varra and the southbound left-turn on Northwest Parkway.
- During the AM peak hour, with the recommended capacity improvements, the northbound left-turn queues on Northwest Parkway are expected to extend approximately 545 feet, which can be accommodated in the available left-turn lane storage of 700 feet. The southbound right-turn queue on Northwest Parkway, which was modified from an uncontrolled to a controlled movement, is expected to extend approximately 265 feet, which can also be accommodated in the available right-turn lane storage of 600 feet.

Northwest Parkway and Tape Drive/Via Varra

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E or worse.
  - During the AM peak hour, the following movements operate at LOS E or worse: the westbound left and southbound left-turn.
  - During the PM peak hour, the following movements operate at LOS E: the eastbound left, westbound left-, northbound left- and southbound left-turn.
- No significant queuing issues are expected.

Northwest Parkway and US 36 Westbound/North Ramps

- During the AM and PM peak hour, the westbound left- and westbound through movements are expected to operate at/near LOS E.
- During the PM peak hour, the northbound left-turn queue is expected to extend approximately 350 feet, which is beyond the available storage. These queues do not extend to the US 36 South Ramps intersection to the south.

Northwest Parkway and US 36 Eastbound/South Ramps

- During the AM and PM peak hours, the eastbound left-, and eastbound through are expected to operate at/near LOS E or worse.
- During the PM peak hour, the eastbound left-turn queues extend approximately 435 feet, northbound through queues extend approximately 735 feet, and the southbound left-turn

queues extend approximately 480 feet. This intersection is near capacity under Year 2025 background + project site-generated trips. If traffic volumes increase at this intersection, it will quickly degrade, and the movement delay and approach queues will increase and begin to impact adjacent intersections.

8.2 Year 2030 Background + Project Intersection Capacity Analysis

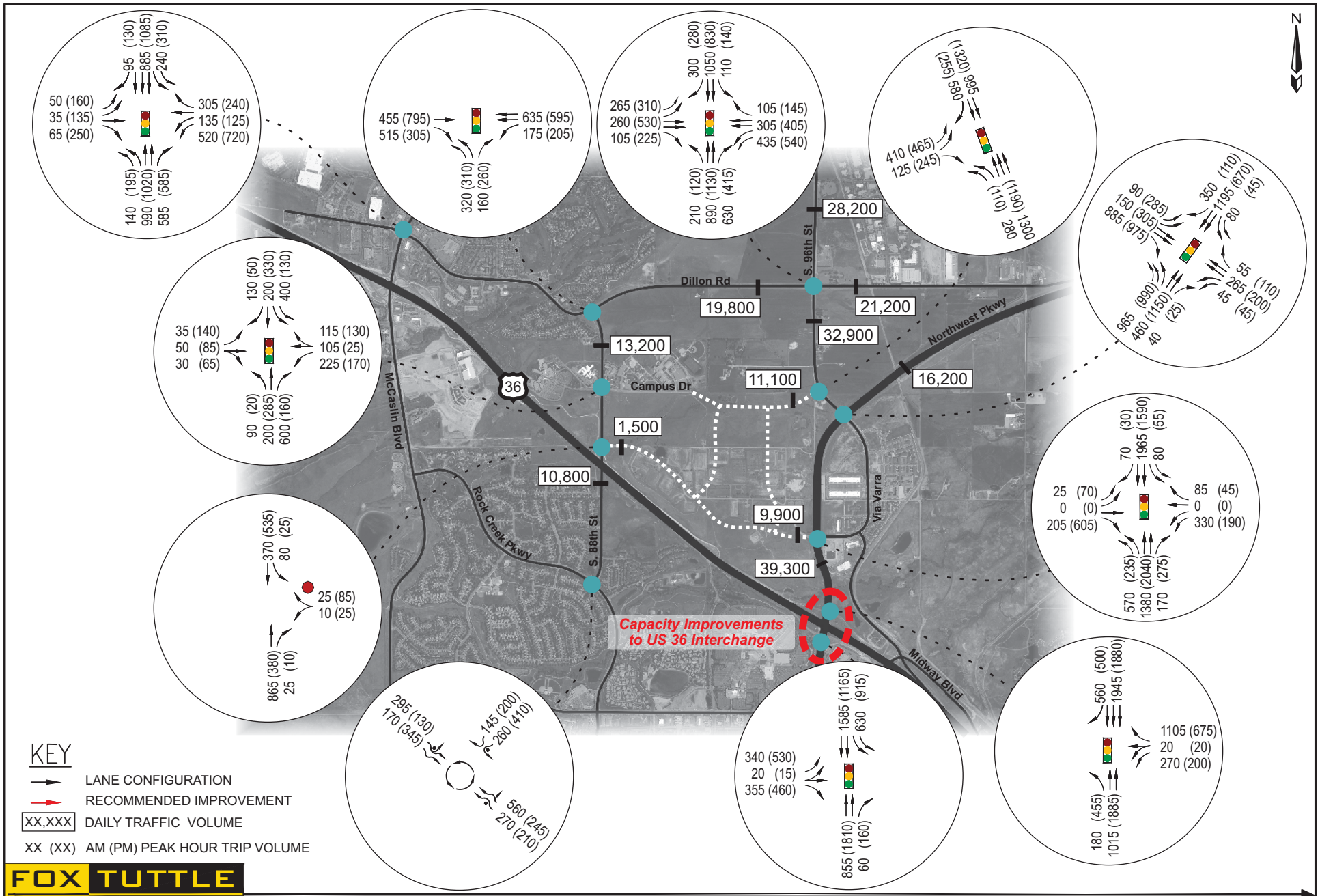
This section discusses travel conditions associated with the addition of development trips to the Year 2030 background conditions. Signal timing was assumed to be optimized at all the study intersections. The improvements identified under Year 2025 background + project conditions were assumed to be in place for Year 2030 conditions. The projected site-generated traffic was added to the Year 2030 background study area traffic volumes. The resultant traffic volumes are illustrated on **Figure 30**.

The results of the LOS calculations for the intersections are summarized in **Table 13**. Summary tables with LOS and 95th percentile queues by movement as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that the Northwest Parkway/US 36 South Ramps intersection is expected operate at LOS F during the PM peak hour. All the other study intersections are expected to operate at an overall LOS D or better.**

Table 13. Year 2030 + Project Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	C (27 sec)	C (34 sec)
Dillon Road/S. 88th Street	C (22 sec)	C (21 sec)
Dillon Road/S. 96th Street	D (39 sec)	D (42 sec)
S. 88th Street/Campus Drive	D (38 sec)	C (25 sec)
S. 88th Street/Tape Drive [(1)]	A / D (25 sec.)	A / B (11 sec)
S. 96th Street/Campus Drive	C (23 sec)	C (23 sec)
Northwest Parkway/S. 96th Street/Via Varra	D (52 sec)	C (30 sec)
Northwest Parkway/Tape Drive/Via Varra	D (47 sec)	B (19 sec)
Northwest Parkway/US 36 North Ramps (WB)	A (13 sec)	C (29 sec)
Northwest Parkway/US 36 South Ramps (EB)	B (19 sec)	**F (110 sec)**
S. 88th Street/Rock Creek Parkway [(2)]	B (10 sec)	A (7 sec)

[(1)] Unsignalized with side-street stop control. The overall intersection LOS is followed by the worst-movement LOS and delay.
[(2)] Roundabout controlled intersection



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2030 BACKGROUND+SITE GENERATED TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	30

Under Year 2030 background + project conditions, the South Ramps at the Northwest Parkway/US 36 interchange are expected to be over capacity during the PM peak hour. The intersection is expected to operate at a LOS F, with multiple movements anticipated to have an average delay of more than two minutes. Further, the eastbound queues are anticipated to extend more than 1,200 feet which is near the US 36 mainline traffic, and the northbound queues are expected to extend more than 1,000 feet.

Additional capacity is needed to accommodate the projected traffic volumes with and without the project site trips at the US 36/Northwest Parkway, which will likely require that the bridge be widened. As noted under the background conditions, due to the unknowns of future project impacts to this area (including both Northwest Parkway Extension and Jefferson Parkway), no specific mitigation is recommended. Additional study/analysis should be conducted at the interchange to determine the optimal design to meet the future needs. With a new design with increased capacity, this interchange should operate acceptably in the future.

Note that the internal intersections were evaluated under Year 2030 background + project conditions and the intersection LOS worksheets are included in the **Appendix**. However, the analysis results, intersection operation discussion, and lane geometry/traffic control recommendations are included in a later section: **Section 10.0 "Internal Intersection Analysis"**.

Although the other study intersections are expected to operate at overall acceptable level-of-service, the following movements are expected to operate at LOS E or worse under Year 2030 background conditions. Any anticipated queuing issues are also noted below.

Dillon Road and McCaslin Boulevard

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E.
  - During the AM peak hour, the southbound left-turn is expected to operate at LOS E.
  - During the PM peak hour, the following movements are expected to operate at LOS E: eastbound left-, eastbound through, westbound left, northbound left-, and southbound left-turn.
- No significant queuing issues are expected. However, the southbound right-turn lane is expected to approximately 120 feet which will occasionally queue beyond the available storage for the right-turn lane of 110 feet.
- The project-related traffic has minimal impact to operations at this intersection.

Dillon Road and S. 88th Street

- During the PM peak hour, the eastbound queues are expected to extend approximately 680 feet. The nearest intersection is the signal located approximately 965 feet to the west.

Dillon Road and S. 96th Street

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at/near LOS E: eastbound left, eastbound through, and westbound left-turn.
  - During the PM peak hour, the following movements operate at LOS E: eastbound through and westbound left-turn.
- No significant queuing issues are expected.

S. 88th Street and Campus Drive

- During the AM peak hour, the eastbound through and southbound left-turn are expected to operate at LOS E or worse.
- During the AM peak hour, the southbound left-turn queues are expected to extend beyond the 400-foot storage turn lane. This is expected to occur near the school arrival peak period for Monarch school campus. Generally, it is acceptable for queuing/delay issues to occur near intersections adjacent to a school during a school's the arrival/departure peak periods, since the congestion occurs for a relatively short period of time.
- No significant queuing issues are expected during the AM or PM peak hours.

S. 96th Street/Campus Drive

- During the AM peak hour, the eastbound left-turn is expected to operate at LOS E.
- During the PM peak hour, the northbound left-turn is expected to operate at LOS F.
- While, no significant queuing issues are expected during the AM or PM peak hours, it should be noted that poor lane utilization is anticipated for the southbound approach and the right-turn queues are expected to extend approximately 450 feet. The poor lane utilization is due to most vehicles positioning into the outside through lane since they are destined to make a right-turn onto Northwest Parkway.

Northwest Parkway and S. 96th Street/Via Varra

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at LOS E: the eastbound left, eastbound through, westbound left- and westbound through on S 96th Street/Via Varra and the northbound left- and southbound left-turn on Northwest Parkway.

- o During the PM peak hour, the following movements operate at/near LOS E: the eastbound left, eastbound through, westbound left-turn, and westbound through on S 96th Street/Via Varra and the southbound left-turn on Northwest Parkway.
- No significant queuing issues are expected during the AM or PM peak hours.

Northwest Parkway and Tape Drive/Via Varra

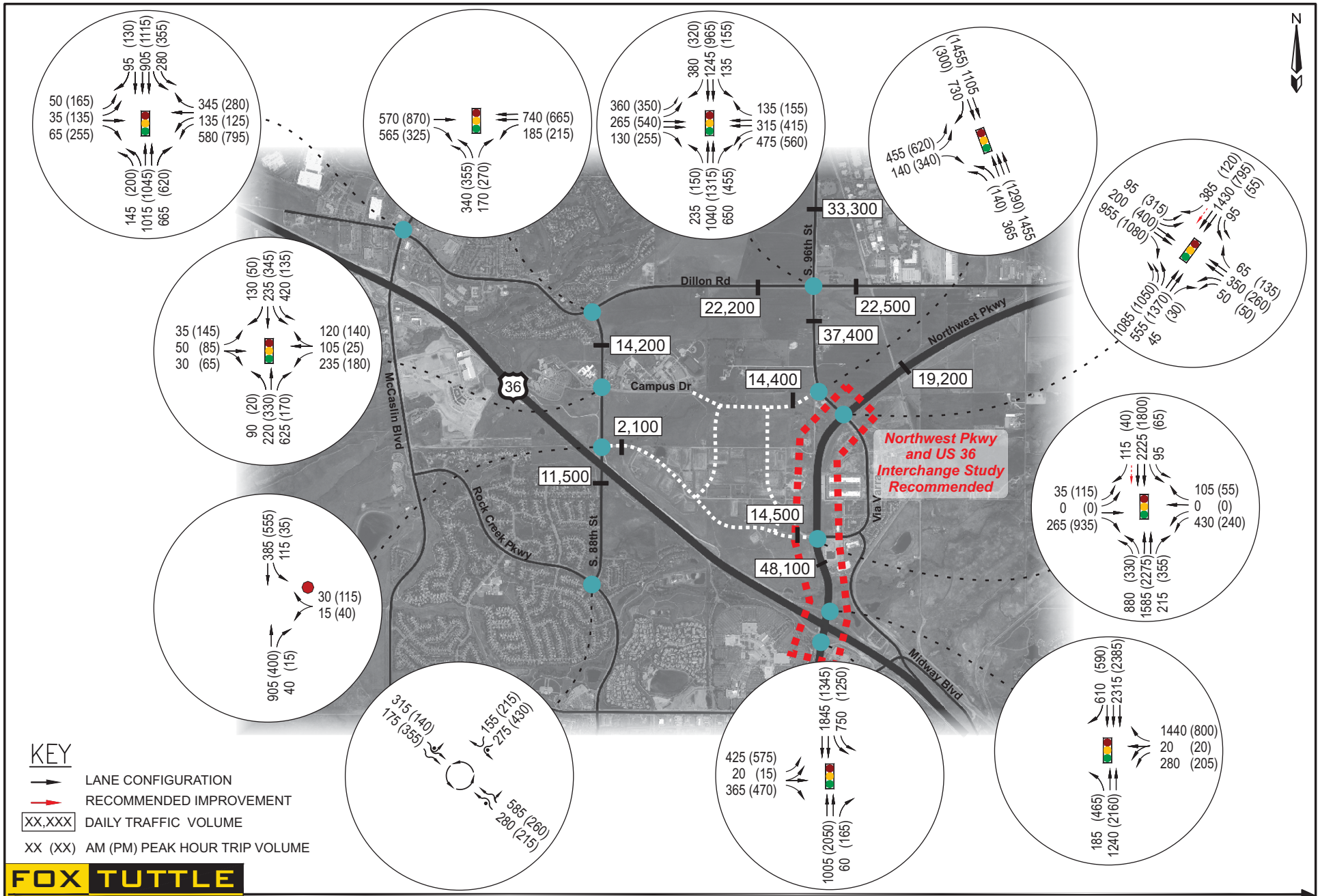
- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E or worse.
  - o During the AM peak hour, the following movements operate at LOS E or worse: the eastbound left, westbound left, northbound left, southbound left and southbound through.
  - o During the PM peak hour, the following movements operate at LOS E: the eastbound left, westbound left-, northbound left- and southbound left-turn.
- While no significant queuing issues are expected, the southbound queues are expected to extend approximately 1,200 feet during the AM peak hour. The southbound traffic volume is approach capacity for two through lanes.

8.3 Year 2040 Background + Project Intersection Capacity Analysis

This section discusses travel conditions associated with the build out of the proposed development in the long-term (Year 2040). The projected site-generated traffic was added to the Year 2040 background study area traffic volumes and are illustrated on **Figure 31**. Consistent with the Year 2040 background condition recommendations, S. 96th Street was assumed to be expanded to a four-lane roadway to the north of Dillon Road by Year 2040. Year 2025 background + project conditions recommended that the four-lane be expanded to the north a minimum of one-half mile, but by Year 2040 it is expected that traffic volumes on S. 96th Avenue will warrant a four-lane through the SH 42 intersection.

Based on the results of the Year 2030 background + project conditions, it was assumed that the US 36/ Northwest Parkway interchange would be reconstructed to add additional capacity that would accommodate future traffic volumes. However, since no concepts have been developed for the interchange, the interchange intersections were not evaluated under Year 2040 background + project conditions.

Once again it is also important to consider that if the Jefferson Parkway extension is constructed, then that project would potentially reconstruct the US 36 interchange as well as grade separate the Northwest Parkway/S. 96th Street/Via Varra intersection and construct a frontage road system to accommodate local traffic. However, no concepts showing the potential reconfiguration of Northwest Parkway have been developed.



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

YEAR 2040 BACKGROUND+SITE GENERATED TRAFFIC VOLUMES

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	31

Recently completed Jefferson Parkway studies have not evaluated the projected peak hour intersection traffic volumes on Northwest Parkway. Due to the regional connectivity that Jefferson Parkway provides, additional analysis should be completed to better understand projected peak hour traffic to the network and to identify what interchange options will provide acceptable operations and can also be constructed within the available right-of-way.

The results of the LOS calculations for the intersections are summarized in **Table 14**. Summary tables with LOS and 95th percentile queues by movement as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that Northwest Parkway intersections at S. 96th Street/Via Varra and Tape Drive/Via Varra are expected to operate at LOS F during the AM peak hour. All other study intersections are expected to operate at LOS D or better during the AM and PM peak hours.**

Table 14. Year 2040 + Project Conditions Level of Service Summary

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	C (29 sec)	D (42 sec)
Dillon Road/S. 88th Street	C (25 sec)	D (36 sec)
Dillon Road/S. 96th Street	D (47 sec)	D (45 sec)
S. 88th Street/Campus Drive	D (46 sec)	C (25 sec)
S. 88th Street/Tape Drive [(1)]	A / D (25 sec.)	A / B (13 sec)
S. 96th Street/Campus Drive	C (31 sec)	C (28 sec)
Northwest Parkway/S. 96th Street/Via Varra	**F (>2min)**	C (34 sec)
Northwest Parkway/Tape Drive/Via Varra	**F (>2min)**	D (35 sec)
Northwest Parkway/US 36 North Ramps (WB)	*N/A*	*N/A*
Northwest Parkway/US 36 South Ramps (EB)	*N/A*	*N/A*
S. 88th Street/Rock Creek Parkway [(2)]	B (12 sec)	A (7 sec)

[(1)] Unsignalized with side-street stop control. The overall intersection LOS is followed by the worst-movement LOS and delay.
[(2)] Roundabout controlled intersection
N/A – Intersection identified to be included in an interchange study.

Note that the internal intersections were evaluated under Year 2040 background + project conditions and the intersection LOS worksheets are included in the **Appendix**. However, the analysis results, intersection operation discussion, and lane geometry/traffic control recommendations are included in a later section: **Section 10.0 "Internal Intersection Analysis"**.

Both Northwest Parkway study intersections at S. 96th Street/Via Varra and Tape Drive/Via Varra are expected to operate at LOS F during the AM peak hour. While the Jefferson Parkway project has identified the potential need for a grade separated intersection at the S. 96th Street/Via Varra intersection, there are uncertainties to if/when that project may occur.

To address the anticipated capacity issues at this intersection, one option is to construct a third southbound through lane on Northwest Parkway that would begin north of the S. 96th Street/Via Varra intersection and continue to the US 36 interchange. While this is not the only option to provide acceptable levels of service on Northwest Parkway, for purposes of this study the third southbound through lane was assumed to address the capacity issues at the S. 96th Street/Via Varra and Tape Drive/Via Varra intersections.

Additional study should be conducted along the Northwest Parkway corridor between S. 96th Street and US 36 in conjunction with the planned improvements at the US 36 interchange to determine how capacity can be increased under future conditions. Key stakeholders include CDOT, Northwest Parkway, the City of Louisville, City and County of Broomfield, and Jefferson Parkway Public Highway Authority.

The Year 2040 background + project conditions were evaluated with the improvements to Northwest Parkway. The results of the LOS calculations for the intersections are summarized in **Table 15.** A summary table with LOS and 95th percentile queue by movement as well as the intersection LOS worksheets are included in the **Appendix**. **Results of the peak hour intersection capacity analysis indicate that with the recommended capacity improvements all study intersections are expected to operate at an overall LOS E or better during the AM and PM peak hours.**

Table 15. Year 2040 + Project Conditions Level of Service Summary (Improvements)

Intersection	Overall Intersection LOS (Delay)	
	AM Peak Hour	PM Peak Hour
Dillon Road/McCaslin Boulevard	--	--
Dillon Road/S. 88th Street	--	--
Dillon Road/S. 96th Street	--	--
S. 88th Street/Campus Drive	--	--
S. 88th Street/Tape Drive [(1)]	--	--
S. 96th Street/Campus Drive	--	--
Northwest Parkway/S. 96th Street/Via Varra	D (52 sec.)	C (32 sec.)
Northwest Parkway/Tape Drive/Via Varra	**E (58 sec.)**	C (35 sec.)
Northwest Parkway/US 36 North Ramps (WB)	--	--
Northwest Parkway/US 36 South Ramps (EB)	--	--
S. 88th Street/Rock Creek Parkway [(2)]	--	--

[(1)] LOS results only shown for intersections with recommended improvements

The following movements are expected to operate at LOS E or worse under Year 2040 background conditions with improvements to Northwest Parkway. Any anticipated queuing issues are also noted below.

Dillon Road and McCaslin Boulevard

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E.
  - During the AM peak hour, the southbound left-turn is expected to operate at LOS E.
  - During the PM peak hour, the following movements are expected to operate at LOS E: eastbound left-, eastbound through, westbound left, northbound left-, and southbound left-turn.
- During the PM peak hour, the southbound left- turn and right-turn queues are expected to occasionally queue beyond the available storage. In addition, the westbound left-turn queue is expected to occasionally extend into the commercial access to the east. However, no mitigation is recommended.
- No other queuing issues are anticipated.
- The project-related traffic has minimal impact to operations at this intersection.

Dillon Road and S. 88th Street

- During the AM peak hour, the westbound left-turn is expected to operate at LOS E.
- During the PM peak hour, the eastbound through and northbound left-turn is expected to operate at LOS E.
- During the PM peak hour, the eastbound queues are expected to extend approximately 1,150 feet, which will occasionally extend into the signal located approximately 965 feet to the west.
- Note that the City has a desire to maintain Dillon Road as a two-lane roadway. Since this intersection is anticipated to operate at an overall LOS C during the AM and PM peak hours with Year 2040 traffic volumes, no mitigation is recommended at this intersection. However, traffic volumes on Dillon Road should continue to be monitored and if traffic volumes increase at a higher rate than anticipated, then a four-lane may be needed on Dillon Road to safely and efficiently accommodate future traffic volumes.

Dillon Road and S. 96th Street

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at/near LOS E: eastbound left, eastbound through, westbound left-turn, westbound through, northbound left, and southbound through.
  - During the PM peak hour, the following movements operate at LOS E: eastbound left, eastbound through, and westbound left.

- No significant queuing issues are expected.
- As noted above, the City has a desire to maintain Dillon Road as a two-lane roadway. Since this intersection is anticipated to operate at a LOS D during the AM and PM peak hours, no mitigation is recommended at this intersection. However, traffic volumes and operations should continue to be monitored at this intersection. If Dillon Road is expanded to a four-lane, this intersection is expected to have more balanced lane utilization for the eastbound and westbound through movements, which would improve the efficiently of the overall intersection operations.

S. 88th Street and Campus Drive

- During the AM peak hour, the eastbound through and southbound left-turn are expected to operate at LOS E or worse.
- During the AM peak hour, the southbound left-turn queues are expected to extend beyond the 400-foot storage turn lane. This is expected to occur near the school arrival peak period for Monarch school campus. As noted under Year 2030 background conditions, it is generally considered acceptable for queuing/delay issues to occur near intersections adjacent to a school during a school's the arrival/departure peak periods, since the congestion occurs for a relatively short period of time.
- No significant queuing issues are expected during the AM or PM peak hours.

S. 96th Street/Campus Drive

- During the AM peak hour, the eastbound left- and northbound left-turn is expected to operate at LOS E or worse.
- During the PM peak hour, the northbound left-turn is expected to operate at LOS F.
- The northbound queues on S. 96th Street are expected to extend 560 feet or less during the AM and PM peak hours. There is approximately 630 feet of space on S. 96th Street between Campus Drive and Northwest Parkway; therefore the S. 96th Street/Campus Drive location is expected to operate acceptably and does not need to be located further to the north.
- During the AM peak hour, the northbound left-turn queues are expected to extend approximately 350 feet.
- While, no significant queuing issues are expected during the AM or PM peak hours, it should be noted that poor lane utilization is anticipated for the southbound approach and the right-turn queues are expected to extend approximately 500 feet. The poor lane utilization is due to most vehicles positioning into the outside through lane since they are destined to make a right-turn onto Northwest Parkway. If the Northwest Parkway/ S. 96th Street/Via Varra intersection were grade separated, there is the potential that the lane utilization could be improved with the grade separation design.

Northwest Parkway and S. 96th Street/Via Varra

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E with the recommended improvements.
  - During the AM peak hour, the following movements operate at LOS E or worse: the eastbound left, eastbound through, westbound left- and westbound through on S 96th Street/Via Varra and the northbound left-, southbound left-turn and southbound through on Northwest Parkway.
  - During the PM peak hour, the following movements operate at LOS E: the eastbound through and westbound through on S 96th Street/Via Varra and the southbound left-turn on Northwest Parkway.
- No significant queuing issues are expected during the AM or PM peak hours with the additional capacity improvements on Northwest Parkway.

Northwest Parkway and Tape Drive/Via Varra

- During the AM and PM peak hours, there are a few movements that are expected to operate at LOS E or worse.
  - During the AM peak hour, the following movements operate at LOS E or worse: the eastbound left, westbound left, northbound left, southbound left and southbound through.
  - During the PM peak hour, the following movements operate at LOS E or worse: the eastbound left, westbound left-, northbound left- and southbound left-turn.
- While this intersection is expected to operate at an overall LOS E, no significant queuing issues are expected.
- As previously mentioned, adding a third southbound through lane is just one option to consider. If Northwest Parkway is grade separated, this intersection would likely operate at a better overall LOS.

9.0 ARTERIAL TRAVEL TIME ANALYSIS

Two corridors were identified for possible expansion from a two-lane to a four-lane roadway with the project site-generated trips: S. 96th Street and Dillon Road.

S. 96th Street was recommended to be expanded from a two-lane to a four-lane between Dillon Road and Northwest Parkway once the Campus Drive extension is open (estimated to occur in year 2022). S. 96th Street was also recommended to be expanded to a four-lane to the north of Dillon Road. However, it is important to note that there are other ongoing projects adjacent/on S. 96th Street that should be further evaluated/considered when determining when and how far north the four-lane on S. 96th Street should continue, including the St. Louis Parish development project and the SH 42 BRT study. Both studies may recommend that a four-lane be constructed to the north to SH 42 sooner than anticipated in this study.

Dillon Road was not recommended to be expanded to a four-lane roadway under the Year 2040 background + project conditions. Based on discussions with City staff, there is a desire to maintain the Dillon Road corridor between S. 88th Street and S. 96th Street as a two-lane roadway. However, under Year 2040 background + project conditions, the corridor is nearing the capacity for a two-lane roadway. Therefore, it was recommended that this corridor continue to be monitored and studied in the future to reassess if/when a four-lane roadway may be needed.

To provide another metric to evaluate the corridor LOS, arterial travel time information is summarized for background and with project conditions for S. 96th Street corridors (between Dillon Road and Northwest Parkway) and Dillon Road (between S. 88th Street and S. 96th Street). A summary of the travel time estimates is illustrated in **Figures 32 to 35** and the key takeaways are bulleted below.

- Under with and without project conditions, S. 96th Street is recommended to be expanded to a four-lane roadway in Year 2025. As shown in **Figure 32**, the travel time notably decreases for southbound traffic once this improvement is constructed. The northbound traffic also is expected to experience a decrease in travel time with that improvement since vehicles making a heavy left-turn movement from Northwest Parkway onto northbound S. 96th Street no longer merge into a single through lane.
- Dillon Road is anticipated to have the highest travel times in Year 2025 background conditions prior to any improvements constructed. As shown in the graphics, the construction of the Campus Drive extension is expected to reduce travel time on Dillon Road.
- The decrease in travel time on Dillon Road under the improved Year 2025 background + project conditions is due to the dual eastbound/westbound left-turn lanes at the Dillon Road/S. 96th Street, which significantly decreases delay for vehicles traveling through that intersection.

- Under Year 2040 background + project conditions, the travel time on Dillon Road is anticipated to be like existing conditions besides the westbound direction during the AM peak hour which is expected to improve due to the Campus Drive extension. Review of this analysis supports the recommendation for Dillon Road to remain as a two-lane roadway through Year 2040.

Figure 32. S. 96th Street (Dillon Rd to Northwest Pkwy) Arterial Travel Time (Northbound)

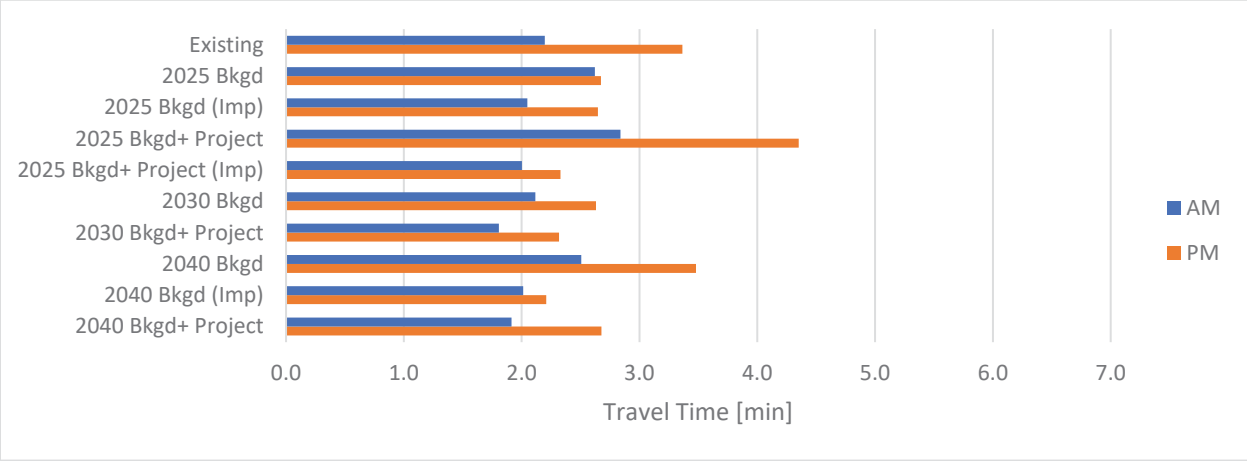


Figure 33. S. 96th Street (Dillon Rd to Northwest Pkwy) Arterial Travel Time (Southbound)

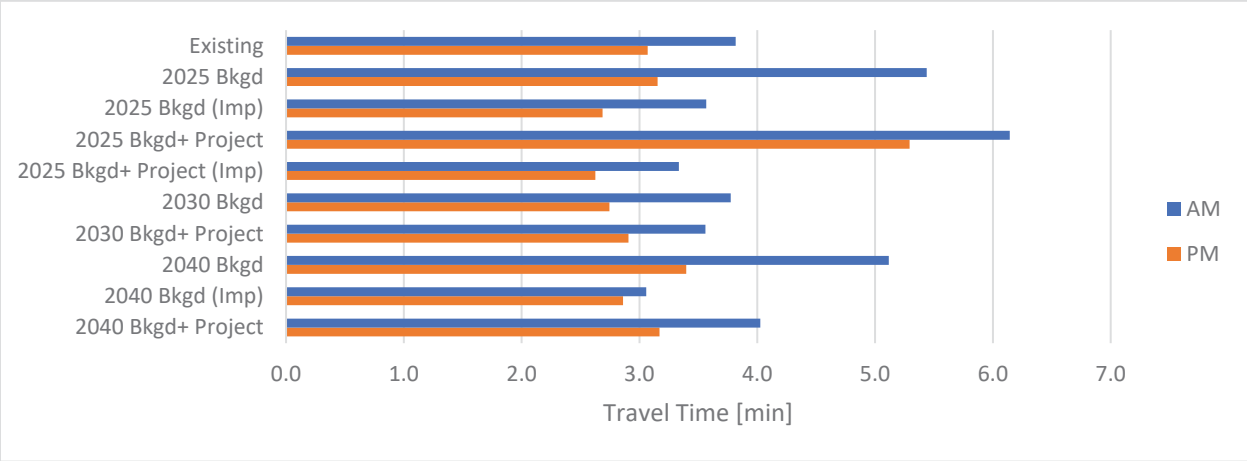


Figure 34. Dillon Road (S. 88th Street to S. 96th Street) Arterial Travel Time (Eastbound)

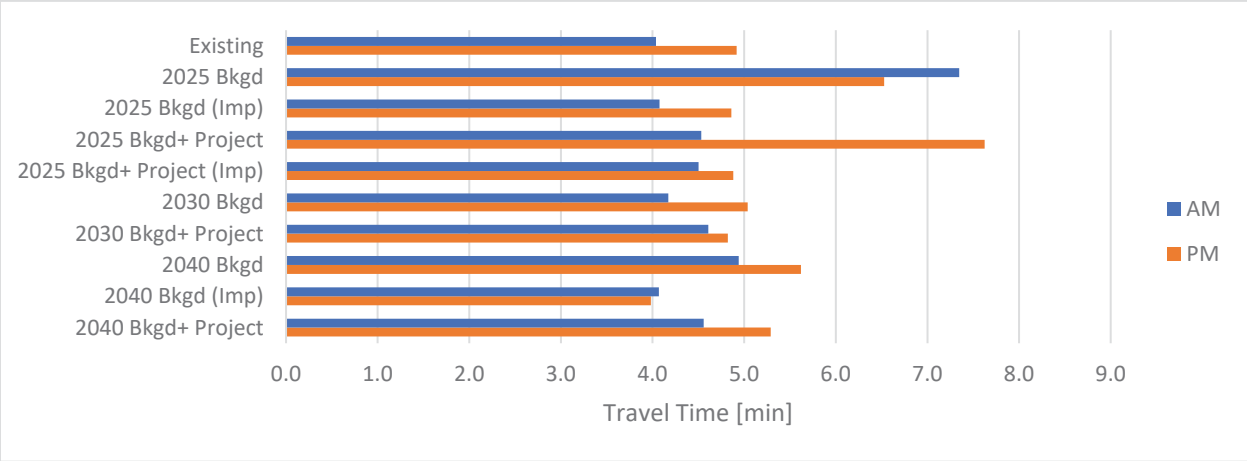
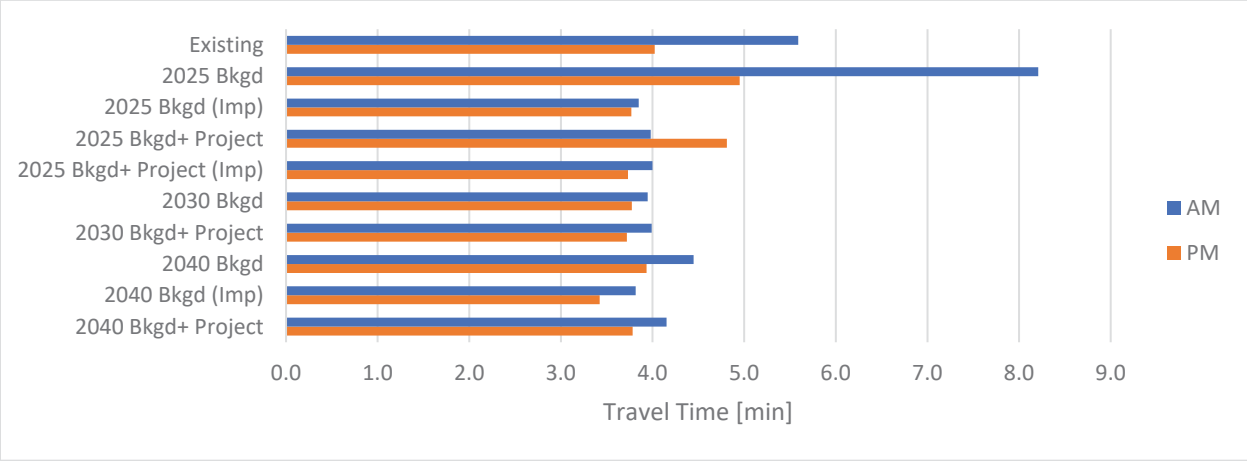


Figure 35. Dillon Road (S. 88th Street to S. 96th Street) Arterial Travel Time (Westbound)



10.0 INTERNAL INTERSECTION ANALSYIS

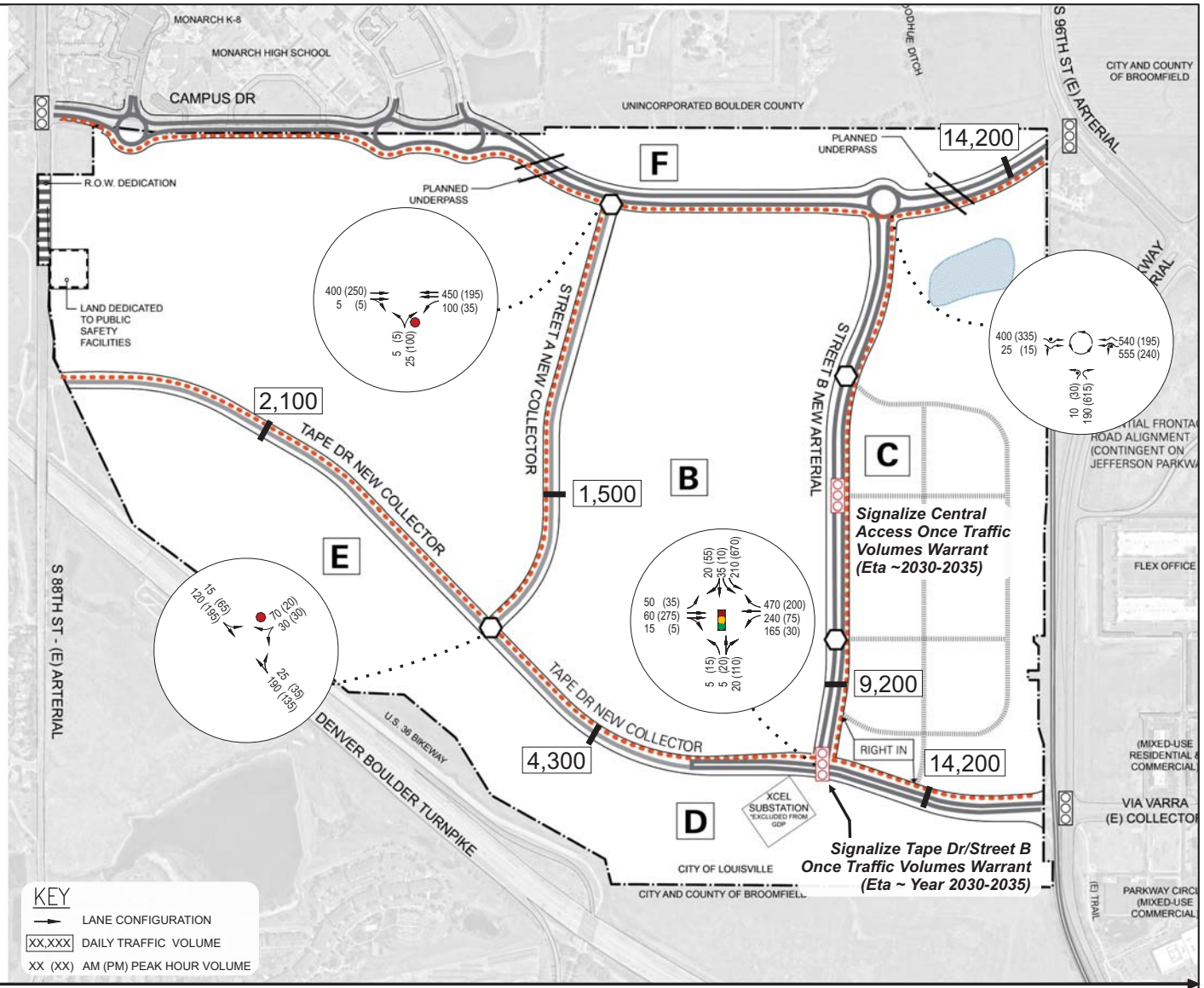
Fox Tuttle Transportation Group has worked with the Redtail Ridge team to design an internal roadway network that can accommodate the full buildout of the project trips safely and efficiently. The internal roadway consists of the Campus Drive extension to S. 96th Street, construction of Tape Drive between S. 88th Street and Northwest Parkway, as well as construction of Street A and Street B between Campus Drive and Tape Drive. It should be noted that portions of the internal roadway network have been recommended as arterial roadways with two through lanes in each direction even when the projected daily traffic is less than what can typically be accommodated by an arterial roadway with single through lanes plus additional turn lanes at intersections. Examples include Tape Drive (Rockcress Drive) between Street B (Sorrel Avenue) and the Northwest Parkway, Campus Drive, and Street B (Sorrel Avenue). This recommendation allows the outside through lanes to function as through/right turn lanes which will help

accommodate peak hour traffic access and ensure good traffic flow through the Redtail Ridge development.

- **Campus Drive**: recommended to be a four-lane roadway between S. 88th Street and S. 96th Street. Roundabout access is recommended at the Monarch school campus to the K-8 and High School accesses as well as at Street B. The Street A access is anticipated to operate acceptably as an unsignalized intersection with side-street stop control.
- **Tape Drive**: recommended to be a four-lane roadway between Street B and Northwest Parkway and to transition to two-lane collector west of Street B. The Street B intersection is anticipated to need to be signalized after Year 2030 to provide acceptable operations; the remaining intersections are expected to operate acceptably as unsignalized.
- **Street A:** recommended to be a two-lane collector
- **Street B**: recommended to be a four-lane roadway with left-turn lanes at all full-movement accesses/intersections. The central intersection is anticipated to need to be signalized after Year 2030 to provide acceptable operations; the remaining intersections are expected to operate acceptably as unsignalized.

Projected Year 2040 background + project (full build out) conditions traffic volumes are shown in **Figure 36** for Campus Drive at Street A and Street B and Tape Drive at Street A and Street B. Also illustrated in the figure are the recommended intersection geometrics and traffic control for full build out conditions**.** All intersections and access locations are anticipated to operate at LOS C or better during the AM and PM peak hours. The intersection capacity reports are provided in the **Appendix**. Note that access locations will continue to be analyzed and refined through the PUD process.

Access will be refined and analyzed in the PUD process (Preliminary Access Plan Below)



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REDTAIL RIDGE TRAFFIC AND MOBILITY STUDY

INTERNAL ROADWAY/INTERSECTION - RECOMMENDED GEOMETRY (YEAR 2040 FULL BUILD OUT)

FT Project #	19055	Original Scale	NTS	Date	5/19/20	Drawn by	EJK	Figure #	36

11.0 PERCENT CONTRIBUTION

The percent of trips generated by the Redtail Ridge development under Year 2025 and Year 2040 with project conditions at each of the study intersections is calculated in Appendix I and summarized below in **Table 16.** The percentages vary from one percent to 15 percent under Year 2025 with project conditions and vary from three percent to 27 percent under Year 2040 with project conditions.

Table 16. Percent Contribution to Intersection Traffic Volumes

Intersection/Segments	Project Percent of Total Entering Traffic			
	Year 2025+ Project (AM Peak)	Year 2025+ Project (PM Peak)	Year 2040+ Project (AM Peak)	Year 2040+ Project (PM Peak)
Dillon Rd/McCaslin Blvd	3%	2%	6%	5%
Dillon Rd /S. 88th St.	5%	5%	10%	10%
Dillon Rd /S. 96th St.	5%	5%	10%	11%
S. 88th St./Campus Dr	3%	5%	8%	12%
S. 88th St./Tape Dr	6%	8%	13%	18%
S. 96th St./Campus Drive	12%	13%	21%	24%
Northwest Pkwy/S. 96th St./Via Varra	5%	5%	9%	10%
Northwest Pkwy /Tape Dr/Via Varra	15%	15%	26%	27%
Northwest Pkwy /US 36 North Ramps	13%	13%	23%	23%
Northwest Pkwy /US 36 South Ramps	7%	9%	12%	18%
S. 88th St./Rock Creek Pkwy	1%	1%	3%	3%
S. 88th St. (Btw Dillon Rd and Campus Dr)	7%	8%	15%	17%
S. 88th St. (Btw Campus Dr and Tape Dr)	4%	6%	10%	14%
S. 88th St. (South of Tape Dr)	2%	2%	4%	5%
Dillon Rd (Btw S. 88th St. and S. 96th St.)	3%	2%	5%	4%
S. 96th St. (North of Dillon Rd)	6%	6%	11%	12%
S. 96th St. (Btw Dillon Road and Northwest Pkwy)	7%	8%	14%	16%
Northwest Pkwy (Northeast of S. 96th St.)	5%	5%	9%	10%
Northwest Pkwy (Btw S. 96th St. and Tape Dr)	5%	5%	9%	10%
Northwest Pkwy (Btw Tape Dr and US 36)	14%	15%	25%	26%
Northwest Pkwy (South of US 36)	2%	2%	4%	3%

12.0 IMPROVEMENT PHASING

A summary of improvements recommended in this report at the study intersections and segments is provided in **Table 17** for both with and without project conditions. The estimated timeline for when the improvement is needed/triggered is also noted in the summary table.

Table 17. Improvement Phasing Summary

Recommendation (Intersection/Segment)	Project Need (Expected Timeline/Year)		Notes
	Background (No Project)	**With Project**	
Campus Drive Extension	(N/A) - located on the Redtail Ridge project property	-Construct with first phase of the development (Opening Year 2022)	
McCaslin Blvd / Dillon Road	--	--	Signal timing should continually be monitored to manage queues.
Dillon Road / S. 88th Street	-Restripe to provide dual WB left-turn lanes (2020) – *assumes Campus Drive is not extended*	--	
Dillon Road (Between S. 88th Street and S. 96th Street)	-Widen to four-lane roadway (shortly after 2030) *assumes Campus Drive is not extended*	-Dillon Road is nearing capacity in Year 2040. Monitor the corridor and if traffic volumes increase at a higher rate than projected, Dillon Road may need to be expanded to a four-lane roadway	The City noted a desire to maintain Dillon Road as a two-lane roadway. Based on projected volumes, a two-lane is expected to operate acceptably with traffic generated by the project. However, without the Campus Drive extension, Dillon Road is expected to need to be a four-lane around 2030.
Dillon Road / S. 96th Street	-Construct dual EB/WB left-turn lanes (2020-2021) -Construct dual NB/SB left-turn lanes (2035-2040) *assumes Campus Drive is not extended*	-Construct dual EB/WB left-turn lanes (2022 with Campus Drive Ext.) -Monitor and if long queues/cycle failure begins to occur construct dual NB/SB left-turn lanes (after 2040)	
S. 96th Street (Between Dillon Road and Northwest Pkwy)	-Widen to four-lane roadway (2025)	-Widen to four-lane roadway (2022 with Campus Drive Ext.)	
S. 96th Street (North of Dillon Road)	-Widen to four-lane roadway between Dillon Road and SH 42 (shortly after 2030)	-Widen to four-lane roadway ~ 1/2 mile to the north (2025) -Widen to four-lane roadway to SH 42 (shortly after 2030)	Coordination with the SH 42 BRT project and other development/studies along S. 96th Street should occur to refine timing needs.
S. 88th Street (Between Dillon Road and Campus Drive)	-Widen to a four-lane roadway (2020) *assumes Campus Drive is not extended*	--	
S. 88th Street (Between Campus Drive and Red Rock Pkwy)	--	--	Expected to operate acceptably as a two-lane with turn lanes at key intersection.
S. 88th Street / Campus Drive	-Construct a second NB thru lane that would begin approx. 500 feet south of Campus Drive (2020) *assumes Campus Drive is not extended* -Extend the NB right-turn lane to provide a minimum of 500 feet of storage (2020)	-Extend the NB right-turn lane to provide a minimum of 500 feet of storage (with Campus Drive extension)	
S. 88th Street / Tape Drive	(N/A)	-Construct a SB left-turn lane and NB right-turn lane on S. 88th Street (with opening of Tape Drive, ~Year 2023).	
S. 88th Street and Rock Creek Pkwy	--	--	No improvements anticipated to be needed
S. 96th Street / Campus Drive	(N/A)	-Construct dual NB left-turn lanes and a SB right-turn lane on S. 96th Street, and dual EB left-turn and an EB right-turn lane on Campus Drive (2022 with Campus Drive Ext.). Signalize the intersection when warranted.	
Northwest Parkway / S. 96th Street / Via Varra	-Construct triple NB left-turn lanes on NWP (2025) -Capacity improvements on NWP – see note (2030-2035)	-Construct triple NB left-turn lanes on NWP (2025); -Capacity improvements on NWP – see note (2030-2035)	Constructing a third SB thru lane from north of S. 96th Street to the US 36 interchange is expected to improve operations. However, this may not be the optimal design for travel time. Previous studies have recommended that this intersection be grade separated in the future. Therefore, a separate corridor study is recommended rather than specific intersection recommendations.
Northwest Parkway / Tape Drive / Via Varra	-Capacity improvements on NWP – see note (2030-2035)	-Capacity improvements on NWP – see note (2030-2035)	See note for Northwest Parkway / 96th Street / Via Varra intersection
Northwest Pkwy / US 36 Interchange	-New interchange needed (2040)	-New interchange needed (2027-2028)	To address the anticipated capacity constraints, the interchange needs to be modified to provide additional capacity or an alternative access to this area needs to be provided via US 36. A follow-up study should be conducted that looks at future grade separation concepts along Northwest Parkway and evaluates all interchange configuration operations for US 36.

Table 17 includes a number of potential improvements to roadway segments and intersections that the City of Louisville should monitor over time as area traffic increases. This includes:

- The need to widen Dillon Road to four lanes between 88th Street and 96th Street;
- The need to widen 96th Street from south of Dillon Road to SH 42:
- Signalization of the Campus Drive/96th Street intersection;
- Signalization of the Tape Drive/Street B (Sorrel Avenue) intersection; and
- Signalization of the Street B (Sorrel Avenue) intersection.

The City will also want to monitor potential improvements to the Northwest Parkway between 96th Street and US 36, and potential implementation of the Jefferson Parkway.

13.0 SENSITIVITY ANALYSIS

A sensitivity analysis was conducted to test if this study assumed lower reductions for non-SOV and/or internal capture percentages if it would trigger additional improvements. This analysis tested impacts to the trip generation and total percent change to study intersection traffic volume assuming that the non-SOV percentage for multifamily residential and general office decreased from 15-20 percent to five (5) percent and the internal capture reduction decreased from 10 to five (5) percent. Results of this test indicate that while the trip generation estimates for the daily, AM peak hour, and PM peak hour are expected to increase approximately 15 percent, the total traffic to the external study intersections increases between less than one (1) percent and 3.75 percent for Year 2025, Year 2030 and Year 2040 conditions. This increase in traffic is not anticipated to trigger any additional improvements beyond what has been recommended.

14.0 NEXT STEPS

The follow traffic and mobility study next steps have been identified for this project:

- Additional study and concept development are needed for the Northwest Parkway corridor and at the US 36 interchange.

- After the GDP submittal, vertical developers will be required to submit PUD documents prior to construction, including traffic conformance letters. The PUD documents will identify if/when traffic signals at the internal intersections are projected to be warranted as well as signal timing modifications/adjustments needed to the study intersections. In addition, the vertical developers will be required to submit building specific Travel Demand Management (TDM) Plans. The projected non-single occupancy vehicle (non-SOV) goals will be evaluated and adjusted as needed to reach goals. The Metro District will monitor the plans effectiveness and make changes as needed to reach goals.

Appendix:

A - Existing Traffic Data

B - Level of Service Definitions

C - Level of Service by Movement and Queuing Summary Tables

D - Travel Demand Management Plan

E - Non-SOV References

F - Internal Capture

G - Intersection Capacity Worksheets (SimTraffic)

H - US 36 6th Edition HCM Reports

I – Percent Contribution

A - Existing Traffic Data

Location: W DILLON RD E/O S 96TH ST
Date Range: 8/28/2019 - 9/3/2019
Site Code: 01

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	8/28/2019			8/29/2019			8/30/2019			8/31/2019			9/1/2019			9/2/2019			9/3/2019			Mid-Week Average		
Time	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total	EB	WB	Total
12:00 AM	-	-	-	23	32	55	28	34	62	-	-	-	-	-	-	-	-	-	-	-	-	23	32	55
1:00 AM	-	-	-	6	21	27	12	16	28	-	-	-	-	-	-	-	-	-	-	-	-	6	21	27
2:00 AM	-	-	-	14	16	30	8	13	21	-	-	-	-	-	-	-	-	-	-	-	-	14	16	30
3:00 AM	-	-	-	25	28	53	22	26	48	-	-	-	-	-	-	-	-	-	-	-	-	25	28	53
4:00 AM	-	-	-	38	43	81	43	45	88	-	-	-	-	-	-	-	-	-	-	-	-	38	43	81
5:00 AM	-	-	-	152	127	279	131	116	247	-	-	-	-	-	-	-	-	-	-	-	-	152	127	279
6:00 AM	-	-	-	402	344	746	354	301	655	-	-	-	-	-	-	-	-	-	-	-	-	402	344	746
7:00 AM	-	-	-	749	614	1,363	645	614	1,259	-	-	-	-	-	-	-	-	-	-	-	-	749	614	1,363
8:00 AM	-	-	-	803	712	1,515	760	644	1,404	-	-	-	-	-	-	-	-	-	-	-	-	803	712	1,515
9:00 AM	-	-	-	520	495	1,015	439	461	900	-	-	-	-	-	-	-	-	-	-	-	-	520	495	1,015
10:00 AM	-	-	-	415	517	932	427	509	936	-	-	-	-	-	-	-	-	-	-	-	-	415	517	932
11:00 AM	-	-	-	496	726	1,222	152	187	339	-	-	-	-	-	-	-	-	-	-	-	-	496	726	1,222
12:00 PM	0	0	0	594	633	1,227	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	297	317	614
1:00 PM	607	501	1,108	617	525	1,142	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	612	513	1,125
2:00 PM	624	626	1,250	676	571	1,247	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	650	599	1,249
3:00 PM	840	608	1,448	823	660	1,483	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	832	634	1,466
4:00 PM	931	770	1,701	890	854	1,744	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	911	812	1,723
5:00 PM	830	825	1,655	843	798	1,641	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	837	812	1,648
6:00 PM	519	548	1,067	516	501	1,017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	518	525	1,042
7:00 PM	347	315	662	357	300	657	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	352	308	660
8:00 PM	266	222	488	233	218	451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	220	470
9:00 PM	207	112	319	206	145	351	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207	129	335
10:00 PM	97	96	193	89	93	182	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93	95	188
11:00 PM	60	25	85	42	45	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	35	86
Total	**5,328**	**4,648**	**9,976**	**9,529**	**9,018**	**18,547**	**3,021**	**2,966**	**5,987**	-	-	-	-	-	-	-	-	-	-	-	-	**9,250**	**8,671**	**17,921**
Percent	**53%**	**47%**	-	**51%**	**49%**	-	**50%**	**50%**	-	-	-	-	-	-	-	-	-	-	-	-	-	**52%**	**48%**	-

1. Mid-week average includes data between Tuesday and Thursday.

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mark.skaggs@idaxdata.com

Location: S 88TH ST N/O ST ANDREWS LN
Date Range: 8/28/2019 - 9/3/2019
Site Code: 02

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	8/28/2019			8/29/2019			8/30/2019			8/31/2019			9/1/2019			9/2/2019			9/3/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	-	-	-	21	16	37	21	10	31	-	-	-	-	-	-	-	-	-	-	-	-	21	16	37
1:00 AM	-	-	-	7	8	15	4	5	9	-	-	-	-	-	-	-	-	-	-	-	-	7	8	15
2:00 AM	-	-	-	9	8	17	7	9	16	-	-	-	-	-	-	-	-	-	-	-	-	9	8	17
3:00 AM	-	-	-	6	10	16	4	3	7	-	-	-	-	-	-	-	-	-	-	-	-	6	10	16
4:00 AM	-	-	-	21	12	33	25	11	36	-	-	-	-	-	-	-	-	-	-	-	-	21	12	33
5:00 AM	-	-	-	42	64	106	39	56	95	-	-	-	-	-	-	-	-	-	-	-	-	42	64	106
6:00 AM	-	-	-	139	225	364	116	197	313	-	-	-	-	-	-	-	-	-	-	-	-	139	225	364
7:00 AM	-	-	-	457	607	1,064	442	616	1,058	-	-	-	-	-	-	-	-	-	-	-	-	457	607	1,064
8:00 AM	-	-	-	598	773	1,371	623	729	1,352	-	-	-	-	-	-	-	-	-	-	-	-	598	773	1,371
9:00 AM	-	-	-	310	419	729	337	411	748	-	-	-	-	-	-	-	-	-	-	-	-	310	419	729
10:00 AM	-	-	-	347	333	680	184	253	437	-	-	-	-	-	-	-	-	-	-	-	-	347	333	680
11:00 AM	-	-	-	418	350	768	1	0	1	-	-	-	-	-	-	-	-	-	-	-	-	418	350	768
12:00 PM	0	0	0	326	360	686	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	163	180	343
1:00 PM	0	0	0	469	421	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235	211	445
2:00 PM	0	1	1	426	455	881	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	213	228	441
3:00 PM	693	553	1,246	790	655	1,445	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	742	604	1,346
4:00 PM	711	491	1,202	657	522	1,179	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	684	507	1,191
5:00 PM	544	580	1,124	551	542	1,093	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	548	561	1,109
6:00 PM	357	430	787	380	485	865	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	369	458	826
7:00 PM	209	266	475	243	305	548	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	226	286	512
8:00 PM	179	237	416	224	213	437	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	202	225	427
9:00 PM	160	107	267	151	123	274	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	156	115	271
10:00 PM	51	71	122	59	74	133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	73	128
11:00 PM	49	32	81	39	22	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	27	71
Total	**2,953**	**2,768**	**5,721**	**6,690**	**7,002**	**13,692**	**1,803**	**2,300**	**4,103**	-	-	-	-	-	-	-	-	-	-	-	-	**6,009**	**6,298**	**12,307**
Percent	**52%**	**48%**	-	**49%**	**51%**	-	**44%**	**56%**	-	-	-	-	-	-	-	-	-	-	-	-	-	**49%**	**51%**	-

1. Mid-week average includes data between Tuesday and Thursday.

Mark Skaggs:425-250-0777
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Location: S 96TH ST S/O W DILLON RD
Date Range: 8/28/2019 - 9/3/2019
Site Code: 03

	Wednesday			Thursday			Friday			Saturday			Sunday			Monday			Tuesday					
	8/28/2019			8/29/2019			8/30/2019			8/31/2019			9/1/2019			9/2/2019			9/3/2019			Mid-Week Average		
Time	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total	NB	SB	Total
12:00 AM	-	-	-	32	42	74	58	53	111	-	-	-	-	-	-	-	-	-	-	-	-	32	42	74
1:00 AM	-	-	-	18	22	40	30	19	49	-	-	-	-	-	-	-	-	-	-	-	-	18	22	40
2:00 AM	-	-	-	23	16	39	19	21	40	-	-	-	-	-	-	-	-	-	-	-	-	23	16	39
3:00 AM	-	-	-	24	36	60	19	29	48	-	-	-	-	-	-	-	-	-	-	-	-	24	36	60
4:00 AM	-	-	-	55	71	126	51	73	124	-	-	-	-	-	-	-	-	-	-	-	-	55	71	126
5:00 AM	-	-	-	168	185	353	154	143	297	-	-	-	-	-	-	-	-	-	-	-	-	168	185	353
6:00 AM	-	-	-	512	487	999	477	384	861	-	-	-	-	-	-	-	-	-	-	-	-	512	487	999
7:00 AM	-	-	-	1,084	794	1,878	886	738	1,624	-	-	-	-	-	-	-	-	-	-	-	-	1,084	794	1,878
8:00 AM	-	-	-	1,108	950	2,058	796	813	1,609	-	-	-	-	-	-	-	-	-	-	-	-	1,108	950	2,058
9:00 AM	-	-	-	616	628	1,244	506	549	1,055	-	-	-	-	-	-	-	-	-	-	-	-	616	628	1,244
10:00 AM	-	-	-	457	585	1,042	482	560	1,042	-	-	-	-	-	-	-	-	-	-	-	-	457	585	1,042
11:00 AM	-	-	-	541	665	1,206	252	309	561	-	-	-	-	-	-	-	-	-	-	-	-	541	665	1,206
12:00 PM	0	0	0	532	621	1,153	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	266	311	577
1:00 PM	352	325	677	647	604	1,251	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500	465	964
2:00 PM	644	655	1,299	628	681	1,309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	636	668	1,304
3:00 PM	733	863	1,596	761	861	1,622	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	747	862	1,609
4:00 PM	978	1,129	2,107	1,021	1,181	2,202	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000	1,155	2,155
5:00 PM	1,077	1,183	2,260	971	1,067	2,038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,024	1,125	2,149
6:00 PM	624	696	1,320	619	690	1,309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	693	1,315
7:00 PM	432	446	878	415	444	859	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	424	445	869
8:00 PM	309	342	651	319	311	630	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	314	327	641
9:00 PM	264	223	487	269	205	474	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	267	214	481
10:00 PM	181	147	328	172	138	310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	177	143	319
11:00 PM	107	54	161	88	73	161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	98	64	161
Total	**5,701**	**6,063**	**11,764**	**11,080**	**11,357**	**22,437**	**3,730**	**3,691**	**7,421**	-	-	-	-	-	-	-	-	-	-	-	-	**10,710**	**10,951**	**21,660**
Percent	**48%**	**52%**	-	**49%**	**51%**	-	**50%**	**50%**	-	-	-	-	-	-	-	-	-	-	-	-	-	**49%**	**51%**	-

1. Mid-week average includes data between Tuesday and Thursday.

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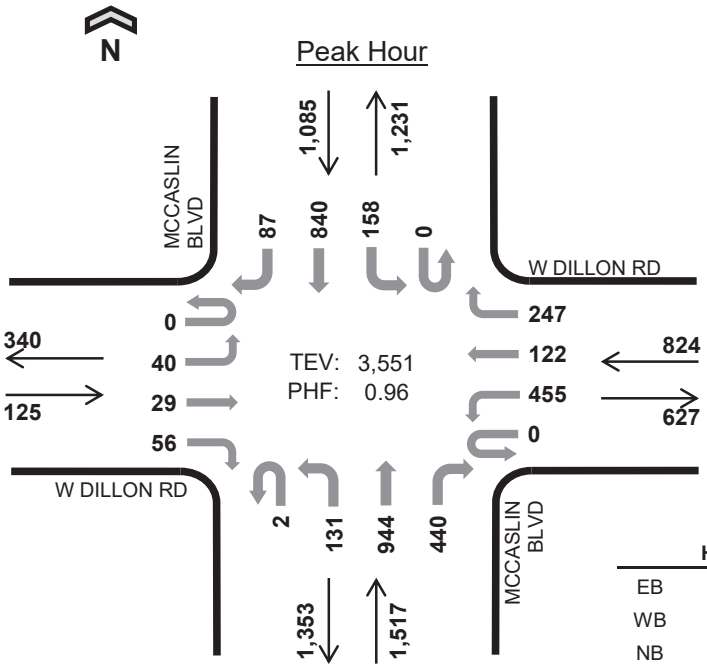
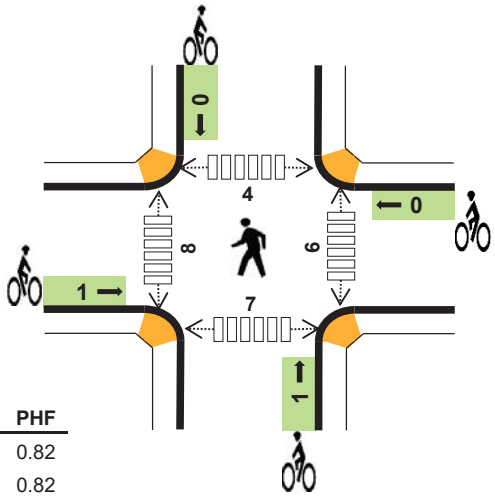
MCCASLIN BLVD
W DILLON RD

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:45 AM to 8:45 AM





	HV %:	PHF
EB	2.4%	0.82
WB	2.4%	0.82
NB	2.3%	0.90
SB	1.8%	0.87
TOTAL	2.2%	0.96

Two-Hour Count Summaries

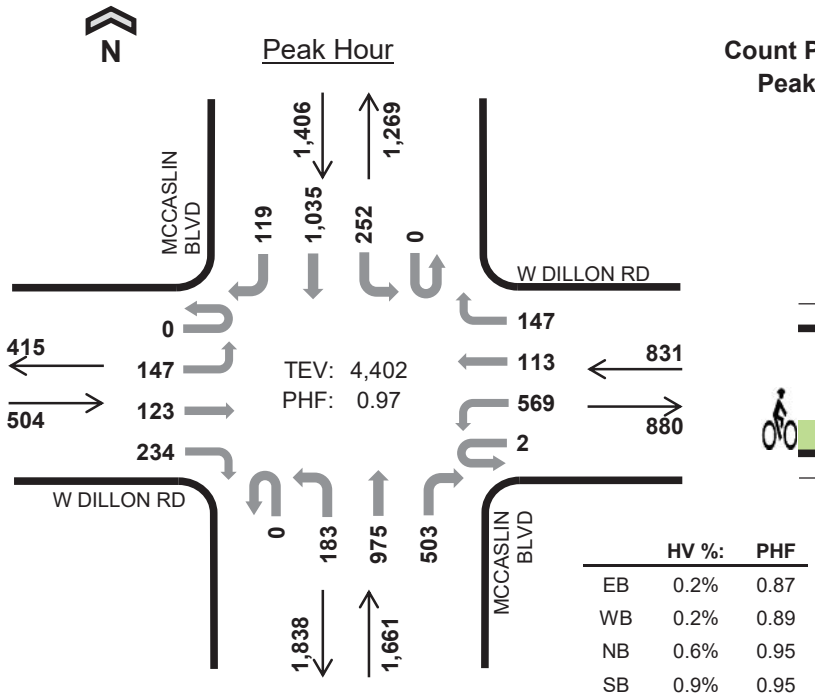
Interval Start	W DILLON RD Eastbound				W DILLON RD Westbound				MCCASLIN BLVD Northbound				MCCASLIN BLVD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	4	14	0	75	18	34	0	20	125	59	0	11	133	24	522	0
7:15 AM	0	5	4	9	0	98	14	30	0	14	161	69	0	18	138	18	578	0
7:30 AM	0	5	5	9	0	98	16	49	0	30	184	98	0	23	149	24	690	0
7:45 AM	**0**	**9**	**5**	**14**	**0**	**120**	**28**	**62**	**1**	**33**	**258**	**130**	**0**	**35**	**214**	**18**	**927**	2,717
8:00 AM	**0**	**14**	**12**	**12**	**0**	**92**	**32**	**54**	**0**	**26**	**200**	**120**	**0**	**64**	**216**	**33**	**875**	3,070
8:15 AM	**0**	**9**	**6**	**12**	**0**	**111**	**22**	**51**	**0**	**36**	**269**	**106**	**0**	**37**	**206**	**16**	**881**	3,373
8:30 AM	**0**	**8**	**6**	**18**	**0**	**132**	**40**	**80**	**1**	**36**	**217**	**84**	**0**	**22**	**204**	**20**	**868**	**3,551**
8:45 AM	0	9	13	18	0	89	36	64	2	53	211	92	0	31	161	24	803	3,427
Count Total	0	64	55	106	0	815	206	424	4	248	1,625	758	0	241	1,421	177	6,144	0
Peak Hour	**0**	**40**	**29**	**56**	**0**	**455**	**122**	**247**	**2**	**131**	**944**	**440**	**0**	**158**	**840**	**87**	**3,551**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

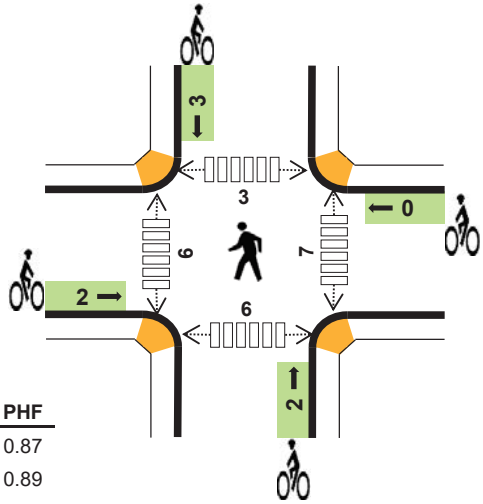
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	8	6	3	*18*	2	0	0	0	*2*	2	2	1	2	*7*
7:15 AM	1	4	8	0	*13*	0	0	2	1	*3*	0	1	0	0	*1*
7:30 AM	1	3	5	7	*16*	0	0	0	0	*0*	0	2	3	2	*7*
7:45 AM	**0**	**4**	**12**	**4**	***20***	**0**	**0**	**1**	**0**	***1***	**0**	**3**	**0**	**2**	*5*
8:00 AM	**1**	**3**	**8**	**6**	***18***	**1**	**0**	**0**	**0**	***1***	**4**	**3**	**2**	**1**	*10*
8:15 AM	**2**	**6**	**6**	**6**	***20***	**0**	**0**	**0**	**0**	***0***	**1**	**2**	**1**	**1**	*5*
8:30 AM	**0**	**7**	**9**	**4**	***20***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**1**	**3**	***5***
8:45 AM	2	1	5	5	*13*	0	0	1	0	*1*	2	2	0	2	*6*
Count Total	8	36	59	35	*138*	3	0	4	1	*8*	10	15	8	13	*46*
Peak Hour	**3**	**20**	**35**	**20**	***78***	**1**	**0**	**1**	**0**	***2***	**6**	**8**	**4**	**7**	***25***

MCCASLIN BLVD
W DILLON RD

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM



	HV %:	PHF
EB	0.2%	0.87
WB	0.2%	0.89
NB	0.6%	0.95
SB	0.9%	0.95
TOTAL	0.6%	0.97



Two-Hour Count Summaries

Interval Start	W DILLON RD Eastbound				W DILLON RD Westbound				MCCASLIN BLVD Northbound				MCCASLIN BLVD Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	27	30	47	0	124	16	28	0	39	199	120	0	46	244	13	933	0
4:15 PM	0	20	25	52	1	125	18	45	1	43	220	148	0	72	277	20	1,067	0
4:30 PM	0	28	24	48	0	161	19	31	0	43	249	110	0	62	241	21	1,037	0
4:45 PM	**0**	**33**	**26**	**53**	**1**	**121**	**24**	**37**	**0**	**48**	**258**	**133**	**0**	**65**	**235**	**29**	**1,063**	4,100
5:00 PM	**0**	**43**	**34**	**68**	**0**	**174**	**25**	**34**	**0**	**42**	**213**	**132**	**0**	**60**	**276**	**33**	**1,134**	4,301
5:15 PM	**0**	**31**	**29**	**53**	**1**	**151**	**34**	**37**	**0**	**44**	**284**	**110**	**0**	**62**	**271**	**23**	**1,130**	4,364
5:30 PM	**0**	**40**	**34**	**60**	**0**	**123**	**30**	**39**	**0**	**49**	**220**	**128**	**0**	**65**	**253**	**34**	**1,075**	**4,402**
5:45 PM	0	34	35	47	2	127	18	25	0	44	240	105	0	45	215	19	956	4,295
Count Total	0	256	237	428	5	1,106	184	276	1	352	1,883	986	0	477	2,012	192	8,395	0
Peak Hour	**0**	**147**	**123**	**234**	**2**	**569**	**113**	**147**	**0**	**183**	**975**	**503**	**0**	**252**	**1,035**	**119**	**4,402**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

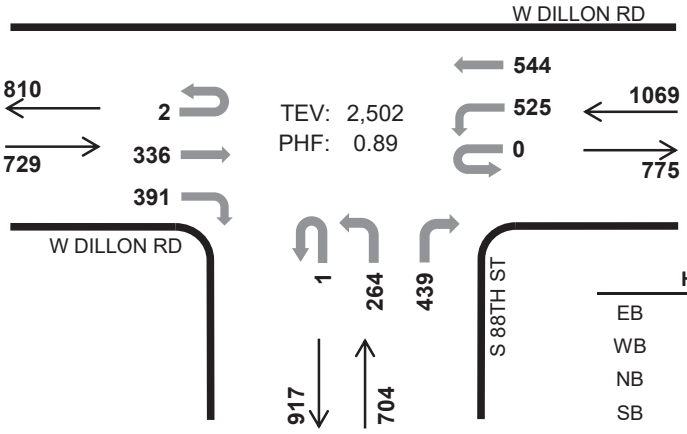
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	2	7	8	*18*	0	0	0	0	*0*	0	2	1	2	*5*
4:15 PM	2	3	4	9	*18*	0	0	0	0	*0*	5	1	0	1	*7*
4:30 PM	1	1	5	4	*11*	1	0	0	1	*2*	1	2	1	1	*5*
4:45 PM	**1**	**1**	**2**	**3**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**1**	*2*
5:00 PM	**0**	**0**	**6**	**3**	***9***	**0**	**0**	**0**	**2**	***2***	**3**	**0**	**0**	**2**	*5*
5:15 PM	**0**	**0**	**1**	**2**	***3***	**1**	**0**	**1**	**1**	***3***	**0**	**3**	**2**	**0**	*5*
5:30 PM	**0**	**1**	**1**	**4**	***6***	**1**	**0**	**1**	**0**	***2***	**4**	**2**	**1**	**3**	***10***
5:45 PM	1	1	0	3	*5*	0	0	0	1	*1*	3	2	1	9	*15*
Count Total	6	9	26	36	*77*	3	0	2	5	*10*	16	13	6	19	*54*
Peak Hour	**1**	**2**	**10**	**12**	***25***	**2**	**0**	**2**	**3**	***7***	**7**	**6**	**3**	**6**	***22***

S 88TH ST
W DILLON RD

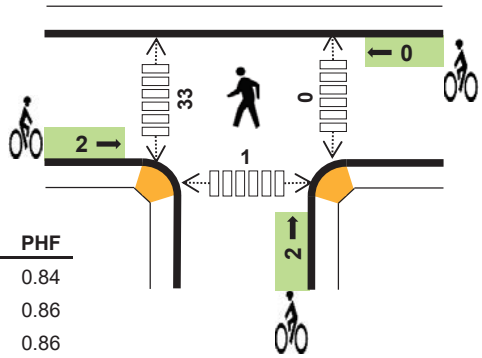
N

Peak Hour

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:45 AM to 8:45 AM



	HV %:	PHF
EB	2.1%	0.84
WB	1.9%	0.86
NB	3.0%	0.86
SB	-	-
TOTAL	2.2%	0.89



Two-Hour Count Summaries

Interval Start	W DILLON RD Eastbound				W DILLON RD Westbound				S 88TH ST Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	49	24	0	54	90	0	0	21	0	40	0	0	0	0	278	0
7:15 AM	0	0	65	24	0	78	90	0	0	21	0	81	0	0	0	0	359	0
7:30 AM	0	0	77	64	0	117	112	0	0	30	0	74	0	0	0	0	474	0
7:45 AM	**0**	**0**	**88**	**100**	**0**	**171**	**140**	**0**	**0**	**74**	**0**	**131**	**0**	**0**	**0**	**0**	**704**	1,815
8:00 AM	**1**	**0**	**77**	**139**	**0**	**139**	**120**	**0**	**0**	**71**	**0**	**113**	**0**	**0**	**0**	**0**	**660**	2,197
8:15 AM	**1**	**0**	**100**	**117**	**0**	**123**	**125**	**0**	**0**	**75**	**0**	**108**	**0**	**0**	**0**	**0**	**649**	2,487
8:30 AM	**0**	**0**	**71**	**35**	**0**	**92**	**159**	**0**	**1**	**44**	**0**	**87**	**0**	**0**	**0**	**0**	**489**	**2,502**
8:45 AM	0	0	91	34	0	73	145	0	0	31	0	59	0	0	0	0	433	2,231
Count Total	2	0	618	537	0	847	981	0	1	367	0	693	0	0	0	0	4,046	0
Peak Hour	**2**	**0**	**336**	**391**	**0**	**525**	**544**	**0**	**1**	**264**	**0**	**439**	**0**	**0**	**0**	**0**	**2,502**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

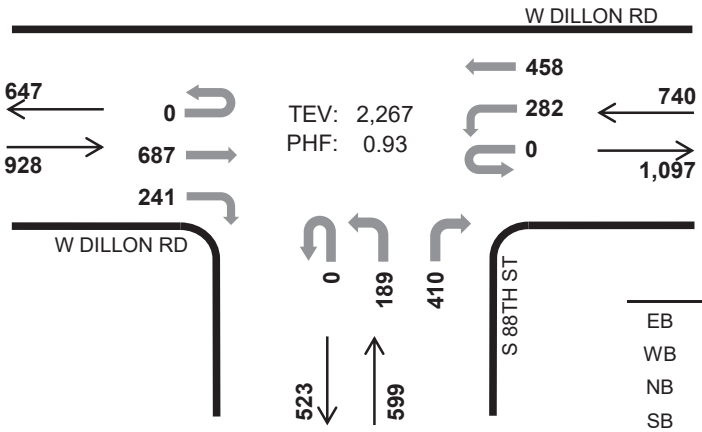
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	2	5	0	0	*7*	1	0	0	0	*1*	0	1	0	0	*1*
7:15 AM	2	7	0	0	*9*	0	0	0	0	*0*	0	1	1	0	*2*
7:30 AM	9	8	2	0	*19*	0	0	0	0	*0*	0	10	9	0	*19*
7:45 AM	**3**	**6**	**5**	**0**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**9**	**4**	**0**	*13*
8:00 AM	**2**	**3**	**2**	**0**	***7***	**1**	**0**	**1**	**0**	***2***	**0**	**9**	**9**	**0**	*18*
8:15 AM	**8**	**7**	**10**	**0**	***25***	**0**	**0**	**0**	**0**	***0***	**0**	**13**	**9**	**1**	*23*
8:30 AM	**2**	**4**	**4**	**0**	***10***	**1**	**0**	**1**	**0**	***2***	**0**	**2**	**0**	**0**	***2***
8:45 AM	12	4	2	0	*18*	0	0	0	0	*0*	0	0	1	0	*1*
Count Total	40	44	25	0	*109*	3	0	2	0	*5*	0	45	33	1	*79*
Peak Hr	**15**	**20**	**21**	**0**	***56***	**2**	**0**	**2**	**0**	***4***	**0**	**33**	**22**	**1**	***56***

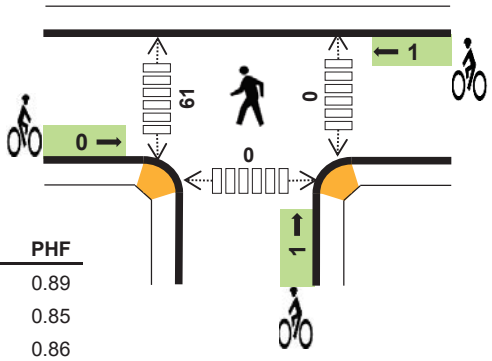
S 88TH ST
W DILLON RD

N

Peak Hour

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM





	HV %:	PHF
EB	1.5%	0.89
WB	0.8%	0.85
NB	2.0%	0.86
SB	-	-
TOTAL	1.4%	0.93

Two-Hour Count Summaries

Interval Start	W DILLON RD Eastbound				W DILLON RD Westbound				S 88TH ST Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	136	86	0	65	106	0	0	71	0	125	0	0	0	0	589	0
4:15 PM	**0**	**0**	**180**	**73**	**0**	**74**	**87**	**0**	**0**	**62**	**0**	**112**	**0**	**0**	**0**	**0**	**588**	0
4:30 PM	**0**	**0**	**151**	**43**	**0**	**55**	**115**	**0**	**0**	**47**	**0**	**109**	**0**	**0**	**0**	**0**	**520**	0
4:45 PM	**0**	**0**	**170**	**50**	**0**	**69**	**122**	**0**	**0**	**41**	**0**	**97**	**0**	**0**	**0**	**0**	**549**	2,246
5:00 PM	**0**	**0**	**186**	**75**	**0**	**84**	**134**	**0**	**0**	**39**	**0**	**92**	**0**	**0**	**0**	**0**	**610**	**2,267**
5:15 PM	0	0	149	48	0	72	129	0	0	47	0	108	0	0	0	0	553	2,232
5:30 PM	0	0	144	63	0	83	106	0	0	61	0	88	0	0	0	0	545	2,257
5:45 PM	0	0	119	49	0	72	100	0	0	44	0	63	0	0	0	0	447	2,155
Count Total	0	0	1,235	487	0	574	899	0	0	412	0	794	0	0	0	0	4,401	0
Peak Hour	**0**	**0**	**687**	**241**	**0**	**282**	**458**	**0**	**0**	**189**	**0**	**410**	**0**	**0**	**0**	**0**	**2,267**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

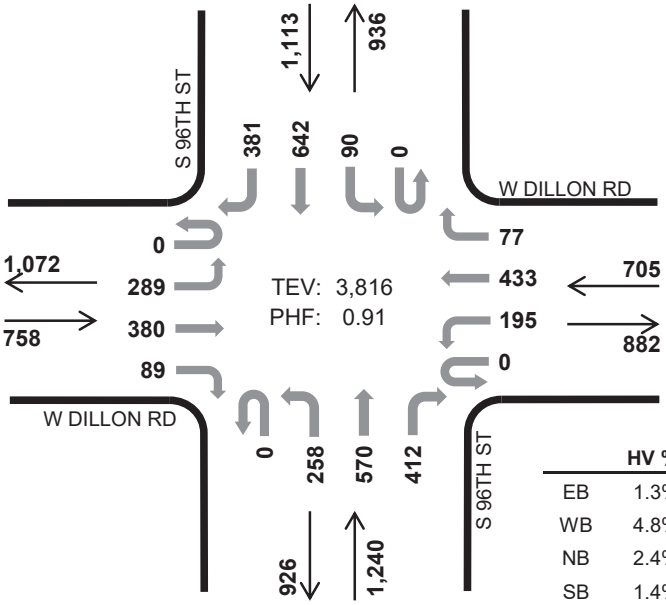
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	5	3	8	0	*16*	0	0	1	0	*1*	0	45	47	0	*92*
4:15 PM	**4**	**1**	**8**	**0**	***13***	**0**	**0**	**0**	**0**	***0***	**0**	**12**	**1**	**0**	*13*
4:30 PM	**2**	**2**	**4**	**0**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**48**	**52**	**0**	*100*
4:45 PM	**4**	**2**	**0**	**0**	***6***	**0**	**1**	**1**	**0**	***2***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**4**	**1**	**0**	**0**	***5***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***
5:15 PM	1	0	0	0	*1*	0	2	0	0	*2*	0	2	0	0	*2*
5:30 PM	0	1	0	0	*1*	0	2	0	0	*2*	0	3	3	0	*6*
5:45 PM	0	0	0	0	*0*	0	0	0	0	*0*	0	2	1	0	*3*
Count Total	20	10	20	0	*50*	0	5	2	0	*7*	0	113	104	0	*217*
Peak Hr	**14**	**6**	**12**	**0**	***32***	**0**	**1**	**1**	**0**	***2***	**0**	**61**	**53**	**0**	***114***

S 96TH ST
W DILLON RD

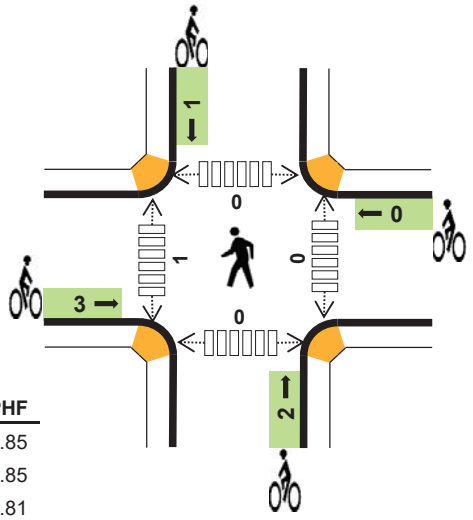
Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM

N

Peak Hour



	HV %:	PHF
EB	1.3%	0.85
WB	4.8%	0.85
NB	2.4%	0.81
SB	1.4%	0.87
TOTAL	2.4%	0.91



Two-Hour Count Summaries

Interval Start	W DILLON RD Eastbound UT	LT	TH	RT	W DILLON RD Westbound UT	LT	TH	RT	S 96TH ST Northbound UT	LT	TH	RT	S 96TH ST Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
7:00 AM	0	24	47	9	0	39	84	13	0	24	106	71	0	20	114	30	581	0
7:15 AM	0	57	64	14	0	48	98	6	0	36	108	75	0	22	139	44	711	0
7:30 AM	**0**	**57**	**89**	**14**	**0**	**42**	**104**	**13**	**0**	**54**	**136**	**107**	**0**	**23**	**138**	**76**	**853**	0
7:45 AM	**0**	**72**	**77**	**27**	**0**	**42**	**118**	**14**	**0**	**82**	**174**	**127**	**0**	**21**	**171**	**128**	**1,053**	3,198
8:00 AM	**0**	**84**	**113**	**25**	**0**	**55**	**126**	**26**	**0**	**64**	**124**	**100**	**0**	**27**	**162**	**122**	**1,028**	3,645
8:15 AM	**0**	**76**	**101**	**23**	**0**	**56**	**85**	**24**	**0**	**58**	**136**	**78**	**0**	**19**	**171**	**55**	**882**	**3,816**
8:30 AM	0	68	71	18	0	61	106	12	0	47	125	76	0	25	178	59	846	3,809
8:45 AM	0	56	94	16	0	56	104	18	0	72	130	74	0	31	111	49	811	3,567
Count Total	0	494	656	146	0	399	825	126	0	437	1,039	708	0	188	1,184	563	6,765	0
Peak Hour	**0**	**289**	**380**	**89**	**0**	**195**	**433**	**77**	**0**	**258**	**570**	**412**	**0**	**90**	**642**	**381**	**3,816**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

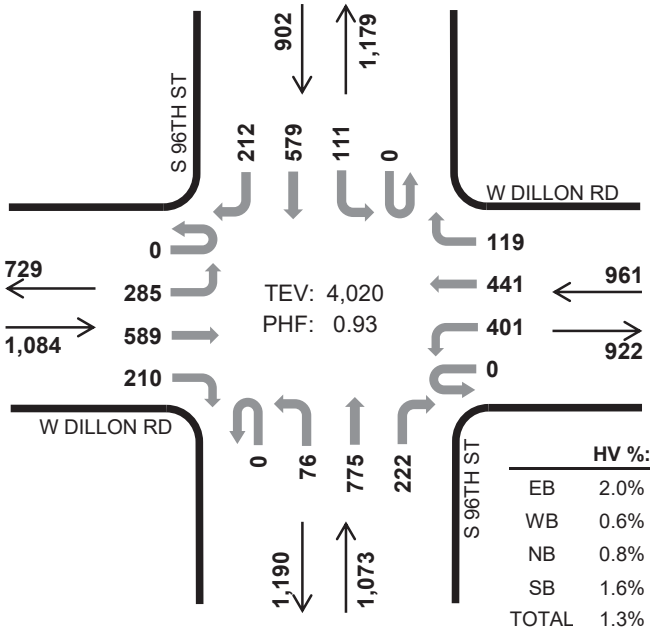
Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
7:00 AM	2	6	3	0	*11*	0	0	0	1	*1*	0	0	0	0	*0*
7:15 AM	1	11	7	4	*23*	1	0	1	2	*4*	0	0	0	0	*0*
7:30 AM	**3**	**8**	**6**	**5**	***22***	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**3**	**10**	**6**	**3**	***22***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**1**	**7**	**9**	**4**	***21***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**3**	**9**	**9**	**4**	***25***	**2**	**0**	**1**	**0**	***3***	**0**	**1**	**0**	**0**	***1***
8:30 AM	10	10	7	4	*31*	1	0	0	0	*1*	0	0	0	0	*0*
8:45 AM	9	8	11	0	*28*	1	0	2	0	*3*	0	0	0	0	*0*
Count Total	32	69	58	24	*183*	6	0	5	4	*15*	0	1	0	0	*1*
Peak Hour	**10**	**34**	**30**	**16**	***90***	**3**	**0**	**2**	**1**	***6***	**0**	**1**	**0**	**0**	***1***

S 96TH ST
W DILLON RD

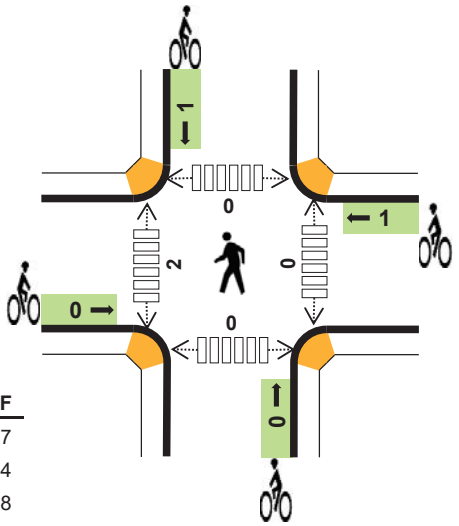
N

Peak Hour

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:15 PM to 5:15 PM



	HV %:	PHF
EB	2.0%	0.87
WB	0.6%	0.84
NB	0.8%	0.98
SB	1.6%	0.93
TOTAL	1.3%	0.93



Two-Hour Count Summaries

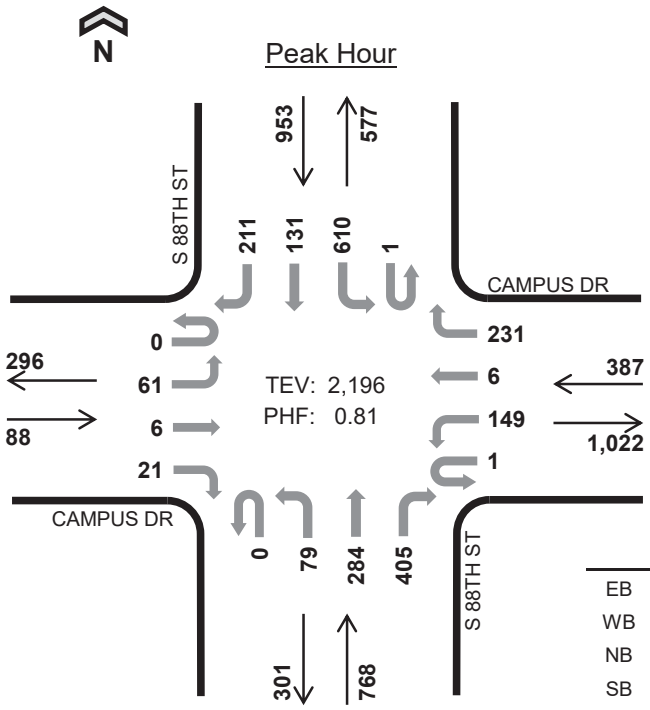
Interval Start	W DILLON RD Eastbound				W DILLON RD Westbound				S 96TH ST Northbound				S 96TH ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	81	138	41	0	107	93	23	0	23	149	55	0	28	129	52	919	0
4:15 PM	**0**	**89**	**162**	**59**	**0**	**86**	**91**	**22**	**0**	**21**	**182**	**62**	**0**	**27**	**150**	**50**	**1,001**	0
4:30 PM	**0**	**62**	**125**	**44**	**0**	**109**	**106**	**29**	**0**	**17**	**200**	**47**	**0**	**24**	**130**	**49**	**942**	0
4:45 PM	**0**	**67**	**137**	**57**	**0**	**106**	**100**	**25**	**0**	**20**	**203**	**52**	**0**	**26**	**140**	**63**	**996**	3,858
5:00 PM	**0**	**67**	**165**	**50**	**0**	**100**	**144**	**43**	**0**	**18**	**190**	**61**	**0**	**34**	**159**	**50**	**1,081**	**4,020**
5:15 PM	1	74	137	54	0	61	130	22	0	12	175	54	0	35	143	70	968	3,987
5:30 PM	0	85	118	35	0	76	95	22	0	23	175	65	0	18	134	58	904	3,949
5:45 PM	0	67	94	35	0	57	76	19	0	16	130	57	0	27	130	74	782	3,735
Count Total	1	592	1,076	375	0	702	835	205	0	150	1,404	453	0	219	1,115	466	7,593	0
Peak Hour	**0**	**285**	**589**	**210**	**0**	**401**	**441**	**119**	**0**	**76**	**775**	**222**	**0**	**111**	**579**	**212**	**4,020**	**0**

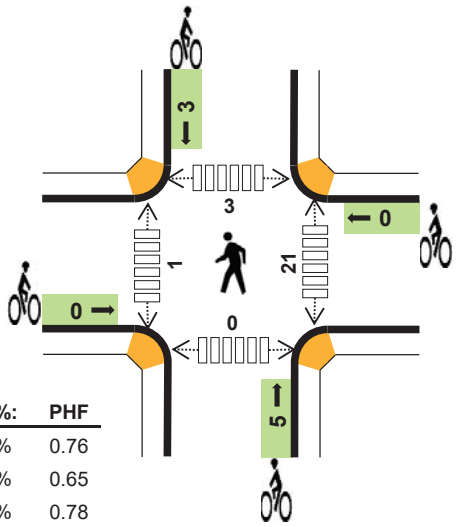
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	8	6	2	7	*23*	0	0	0	1	*1*	0	0	0	0	*0*
4:15 PM	**8**	**3**	**1**	**4**	***16***	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**0**	**0**	*1*
4:30 PM	**6**	**3**	**1**	**2**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**4**	**0**	**4**	**5**	***13***	**0**	**1**	**0**	**0**	***1***	**0**	**1**	**0**	**0**	*1*
5:00 PM	**4**	**0**	**3**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:15 PM	1	2	4	1	*8*	0	4	0	0	*4*	0	0	0	0	*0*
5:30 PM	0	3	3	1	*7*	0	2	2	0	*4*	0	0	0	0	*0*
5:45 PM	0	1	1	4	*6*	0	0	0	1	*1*	0	0	0	0	*0*
Count Total	31	18	19	27	*95*	0	7	2	3	*12*	0	2	0	0	*2*
Peak Hour	**22**	**6**	**9**	**14**	***51***	**0**	**1**	**0**	**1**	***2***	**0**	**2**	**0**	**0**	***2***

S 88TH ST
CAMPUS DR

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	1.1%	0.76
WB	6.5%	0.65
NB	1.7%	0.78
SB	2.8%	0.74
TOTAL	3.0%	0.81

Two-Hour Count Summaries

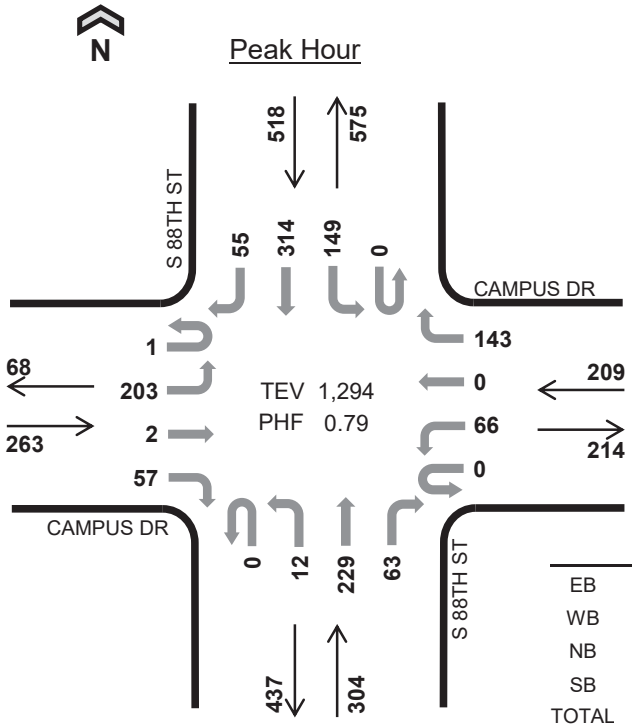
Interval Start	CAMPUS DR Eastbound				CAMPUS DR Westbound				S 88TH ST Northbound				S 88TH ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	6	0	3	0	0	0	2	0	11	51	8	0	15	17	40	153	0
7:15 AM	0	15	0	5	0	1	0	3	0	13	83	16	0	32	24	37	229	0
7:30 AM	**0**	**20**	**0**	**8**	**0**	**3**	**0**	**6**	**0**	**10**	**77**	**50**	**0**	**93**	**30**	**37**	**334**	0
7:45 AM	**0**	**9**	**2**	**2**	**1**	**54**	**1**	**44**	**0**	**23**	**80**	**102**	**0**	**142**	**47**	**68**	**575**	1,291
8:00 AM	**0**	**15**	**1**	**2**	**0**	**45**	**2**	**83**	**0**	**24**	**71**	**152**	**1**	**151**	**29**	**34**	**610**	1,748
8:15 AM	**0**	**17**	**3**	**9**	**0**	**47**	**3**	**98**	**0**	**22**	**56**	**101**	**0**	**224**	**25**	**72**	**677**	**2,196**
8:30 AM	0	21	0	7	0	15	0	42	0	12	73	11	0	20	42	56	299	2,161
8:45 AM	0	15	0	8	0	1	1	7	0	14	57	2	0	14	42	46	207	1,793
Count Total	0	118	6	44	1	166	7	285	0	129	548	442	1	691	256	390	3,084	0
Peak Hour	**0**	**61**	**6**	**21**	**1**	**149**	**6**	**231**	**0**	**79**	**284**	**405**	**1**	**610**	**131**	**211**	**2,196**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

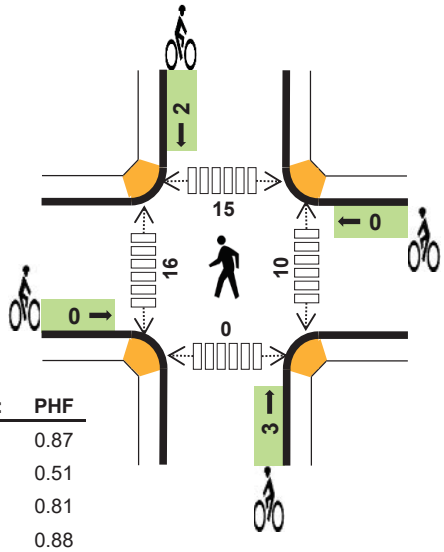
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	0	0	1	*1*	0	0	0	2	*2*	1	0	0	0	*1*
7:15 AM	0	1	0	3	*4*	0	0	1	0	*1*	0	0	0	0	*0*
7:30 AM	**1**	**0**	**6**	**10**	***17***	**0**	**0**	**0**	**1**	***1***	**6**	**0**	**2**	**0**	*8*
7:45 AM	**0**	**14**	**0**	**6**	***20***	**0**	**0**	**1**	**1**	***2***	**4**	**0**	**1**	**0**	*5*
8:00 AM	**0**	**0**	**2**	**1**	***3***	**0**	**0**	**2**	**0**	***2***	**8**	**1**	**0**	**0**	*9*
8:15 AM	**0**	**11**	**5**	**10**	***26***	**0**	**0**	**2**	**1**	***3***	**3**	**0**	**0**	**0**	***3***
8:30 AM	1	4	3	3	*11*	0	0	2	0	*2*	0	0	0	0	*0*
8:45 AM	0	0	2	5	*7*	0	0	0	0	*0*	0	2	0	0	*2*
Count Total	2	30	18	39	*89*	0	0	8	5	*13*	22	3	3	0	*28*
Peak Hour	**1**	**25**	**13**	**27**	***66***	**0**	**0**	**5**	**3**	***8***	**21**	**1**	**3**	**0**	***25***

S 88TH ST
CAMPUS DR

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	1.5%	0.87
WB	6.2%	0.51
NB	2.0%	0.81
SB	1.5%	0.88
TOTAL	2.4%	0.79



Two-Hour Count Summaries

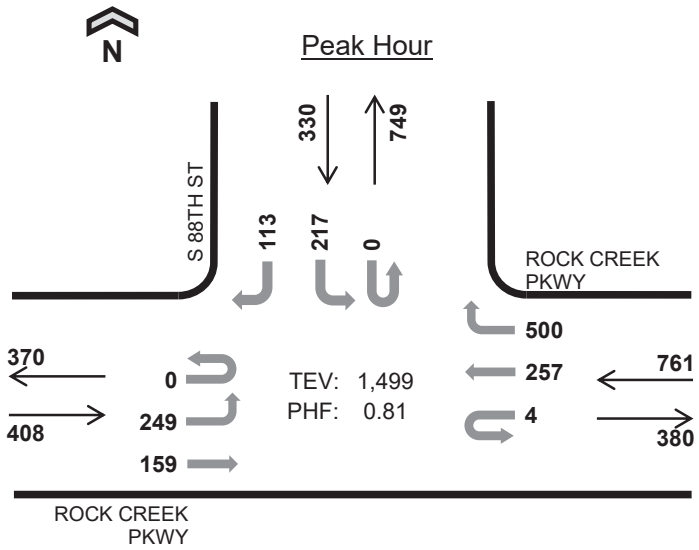
Interval Start	CAMPUS DR Eastbound UT	LT	TH	RT	CAMPUS DR Westbound UT	LT	TH	RT	S 88TH ST Northbound UT	LT	TH	RT	S 88TH ST Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	**0**	**51**	**1**	**14**	**0**	**35**	**0**	**68**	**0**	**6**	**56**	**32**	**0**	**69**	**63**	**16**	**411**	0
4:15 PM	**0**	**49**	**1**	**5**	**0**	**17**	**0**	**35**	**0**	**1**	**55**	**17**	**0**	**40**	**82**	**18**	**320**	0
4:30 PM	**0**	**47**	**0**	**19**	**0**	**8**	**0**	**29**	**0**	**2**	**54**	**7**	**0**	**18**	**64**	**11**	**259**	0
4:45 PM	**1**	**56**	**0**	**19**	**0**	**6**	**0**	**11**	**0**	**3**	**64**	**7**	**0**	**22**	**105**	**10**	**304**	**1,294**
5:00 PM	0	44	0	18	0	14	0	8	0	1	58	9	1	31	106	12	302	1,185
5:15 PM	0	58	0	17	0	33	0	35	0	2	64	9	0	22	96	3	339	1,204
5:30 PM	0	34	1	4	0	12	0	29	0	4	69	9	0	26	102	15	305	1,250
5:45 PM	0	20	1	7	0	9	0	15	0	1	56	11	1	20	80	21	242	1,188
Count Total	1	359	4	103	0	134	0	230	0	20	476	101	2	248	698	106	2,482	0
Peak Hour	**1**	**203**	**2**	**57**	**0**	**66**	**0**	**143**	**0**	**12**	**229**	**63**	**0**	**149**	**314**	**55**	**1,294**	**0**

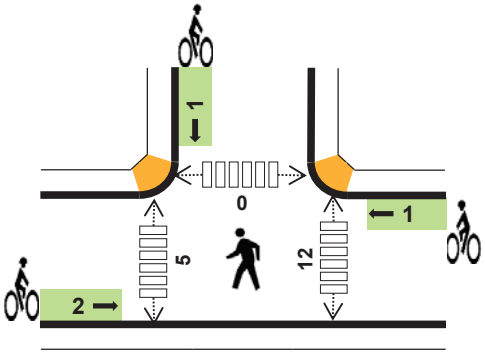
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	**3**	**12**	**2**	**4**	***21***	**0**	**0**	**2**	**1**	***3***	**3**	**15**	**13**	**0**	*31*
4:15 PM	**1**	**0**	**1**	**2**	***4***	**0**	**0**	**0**	**0**	***0***	**2**	**0**	**0**	**0**	*2*
4:30 PM	**0**	**1**	**3**	**1**	***5***	**0**	**0**	**0**	**0**	***0***	**5**	**0**	**2**	**0**	*7*
4:45 PM	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**1**	**1**	***2***	**0**	**1**	**0**	**0**	***1***
5:00 PM	0	1	0	1	*2*	0	0	0	0	*0*	1	0	0	0	*1*
5:15 PM	0	0	0	1	*1*	2	0	0	4	*6*	0	0	0	0	*0*
5:30 PM	0	0	0	2	*2*	0	0	0	1	*1*	1	0	0	0	*1*
5:45 PM	0	0	1	0	*1*	1	0	1	0	*2*	0	0	0	0	*0*
Count Total	4	14	7	12	*37*	3	0	4	7	*14*	12	16	15	0	*43*
Peak Hour	**4**	**13**	**6**	**8**	***31***	**0**	**0**	**3**	**2**	***5***	**10**	**16**	**15**	**0**	***41***

S 88TH ST
ROCK CREEK PKWY

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	4.4%	0.73
WB	1.8%	0.84
NB	-	-
SB	3.9%	0.85
TOTAL	3.0%	0.81

Two-Hour Count Summaries

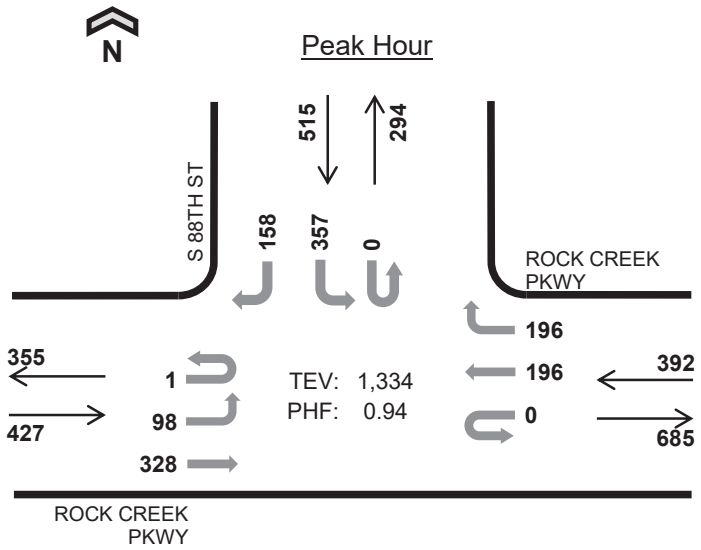
Interval Start	ROCK CREEK PKWY Eastbound				ROCK CREEK PKWY Westbound				0 Northbound				S 88TH ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	13	20	0	0	0	30	47	0	0	0	0	0	16	0	6	132	0
7:15 AM	0	32	25	0	1	0	47	80	0	0	0	0	0	25	0	14	224	0
7:30 AM	**0**	**30**	**23**	**0**	**0**	**0**	**60**	**104**	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**23**	**261**	0
7:45 AM	**0**	**71**	**55**	**0**	**0**	**0**	**78**	**127**	**0**	**0**	**0**	**0**	**0**	**59**	**0**	**34**	**424**	1,041
8:00 AM	**0**	**89**	**51**	**0**	**2**	**0**	**67**	**157**	**0**	**0**	**0**	**0**	**0**	**67**	**0**	**30**	**463**	1,372
8:15 AM	**0**	**59**	**30**	**0**	**2**	**0**	**52**	**112**	**0**	**0**	**0**	**0**	**0**	**70**	**0**	**26**	**351**	**1,499**
8:30 AM	0	22	24	0	0	0	58	69	0	0	0	0	0	53	0	33	259	1,497
8:45 AM	0	18	31	0	0	0	58	58	0	0	0	0	0	32	0	13	210	1,283
Count Total	0	334	259	0	5	0	450	754	0	0	0	0	0	343	0	179	2,324	0
Peak Hour	**0**	**249**	**159**	**0**	**4**	**0**	**257**	**500**	**0**	**0**	**0**	**0**	**0**	**217**	**0**	**113**	**1,499**	**0**

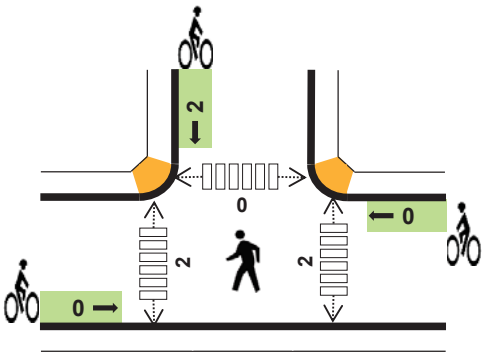
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	1	2	0	1	*4*	0	0	0	1	*1*	1	0	0	1	*2*
7:15 AM	0	4	0	3	*7*	0	0	0	0	*0*	2	0	0	2	*4*
7:30 AM	**6**	**6**	**0**	**3**	***15***	**0**	**0**	**0**	**0**	***0***	**6**	**2**	**0**	**9**	*17*
7:45 AM	**2**	**2**	**0**	**9**	***13***	**0**	**0**	**0**	**1**	***1***	**1**	**2**	**0**	**3**	*6*
8:00 AM	**6**	**1**	**0**	**1**	***8***	**0**	**1**	**0**	**0**	***1***	**4**	**1**	**0**	**5**	*10*
8:15 AM	**4**	**5**	**0**	**0**	***9***	**2**	**0**	**0**	**0**	***2***	**1**	**0**	**0**	**0**	***1***
8:30 AM	3	5	0	5	*13*	0	1	0	0	*1*	1	1	0	2	*4*
8:45 AM	2	5	0	2	*9*	0	0	0	0	*0*	0	1	0	2	*3*
Count Total	24	30	0	24	*78*	2	2	0	2	*6*	16	7	0	24	*47*
Peak Hr	**18**	**14**	**0**	**13**	***45***	**2**	**1**	**0**	**1**	***4***	**12**	**5**	**0**	**17**	***34***

S 88TH ST
ROCK CREEK PKWY

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:45 PM to 5:45 PM





	HV %:	PHF
EB	0.7%	0.88
WB	1.3%	0.84
NB	-	-
SB	1.0%	0.91
TOTAL	1.0%	0.94

Two-Hour Count Summaries

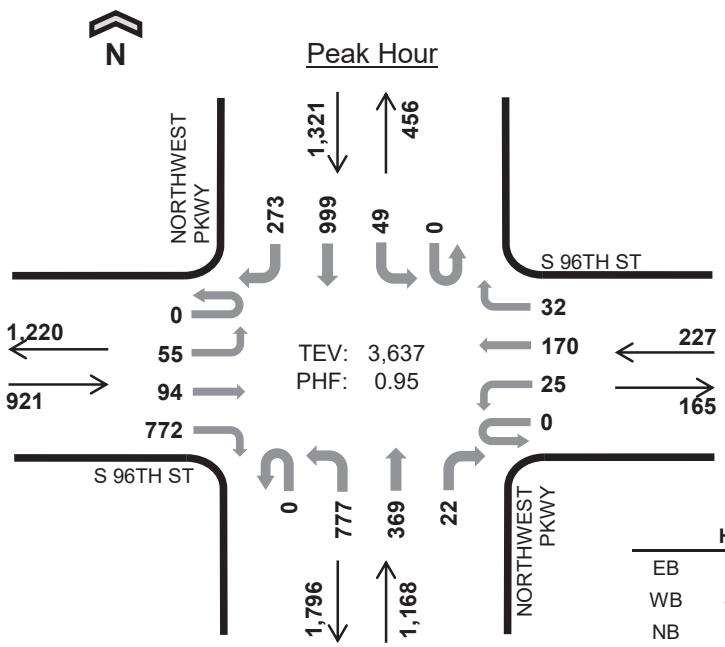
Interval Start	ROCK CREEK PKWY Eastbound				ROCK CREEK PKWY Westbound				0 Northbound				S 88TH ST Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	26	68	0	0	0	42	56	0	0	0	0	0	86	0	37	315	0
4:15 PM	0	27	74	0	0	0	41	47	0	0	0	0	0	96	0	33	318	0
4:30 PM	0	20	56	0	0	0	32	42	0	0	0	0	0	76	0	23	249	0
4:45 PM	**1**	**21**	**79**	**0**	**0**	**0**	**52**	**43**	**0**	**0**	**0**	**0**	**0**	**80**	**0**	**42**	**318**	1,200
5:00 PM	**0**	**22**	**100**	**0**	**0**	**0**	**50**	**44**	**0**	**0**	**0**	**0**	**0**	**87**	**0**	**53**	**356**	1,241
5:15 PM	**0**	**36**	**80**	**0**	**0**	**0**	**43**	**43**	**0**	**0**	**0**	**0**	**0**	**107**	**0**	**34**	**343**	1,266
5:30 PM	**0**	**19**	**69**	**0**	**0**	**0**	**51**	**66**	**0**	**0**	**0**	**0**	**0**	**83**	**0**	**29**	**317**	**1,334**
5:45 PM	0	22	64	0	0	0	44	49	0	0	0	0	0	73	0	29	281	1,297
Count Total	1	193	590	0	0	0	355	390	0	0	0	0	0	688	0	280	2,497	0
Peak Hour	**1**	**98**	**328**	**0**	**0**	**0**	**196**	**196**	**0**	**0**	**0**	**0**	**0**	**357**	**0**	**158**	**1,334**	**0**

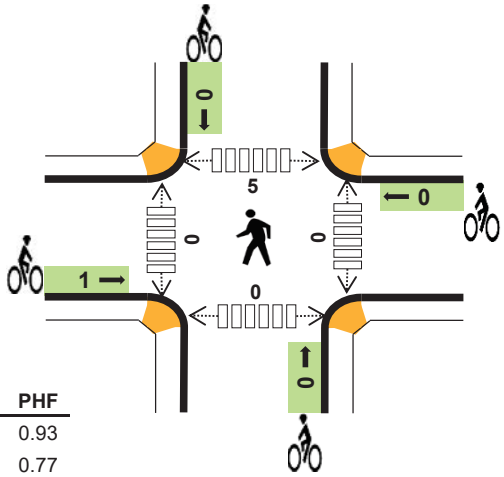
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	3	3	0	2	*8*	0	0	0	1	*1*	0	1	0	0	*1*
4:15 PM	0	1	0	6	*7*	0	0	0	0	*0*	0	0	0	1	*1*
4:30 PM	2	5	0	1	*8*	0	0	0	0	*0*	0	2	0	0	*2*
4:45 PM	**0**	**1**	**0**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**1**	**0**	**0**	**0**	*1*
5:00 PM	**2**	**2**	**0**	**2**	***6***	**0**	**0**	**0**	**1**	***1***	**1**	**1**	**0**	**0**	*2*
5:15 PM	**0**	**0**	**0**	**2**	***2***	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**0**	**1**	*2*
5:30 PM	**1**	**2**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**1**	***1***
5:45 PM	0	1	0	0	*1*	0	0	0	1	*1*	2	0	0	3	*5*
Count Total	8	15	0	14	*37*	0	0	0	4	*4*	4	5	0	6	*15*
Peak Hr	**3**	**5**	**0**	**5**	***13***	**0**	**0**	**0**	**2**	***2***	**2**	**2**	**0**	**2**	***6***

NORTHWEST PKWY
S 96TH ST

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	2.2%	0.93
WB	4.0%	0.77
NB	2.6%	0.91
SB	2.4%	0.91
TOTAL	2.5%	0.95

Two-Hour Count Summaries

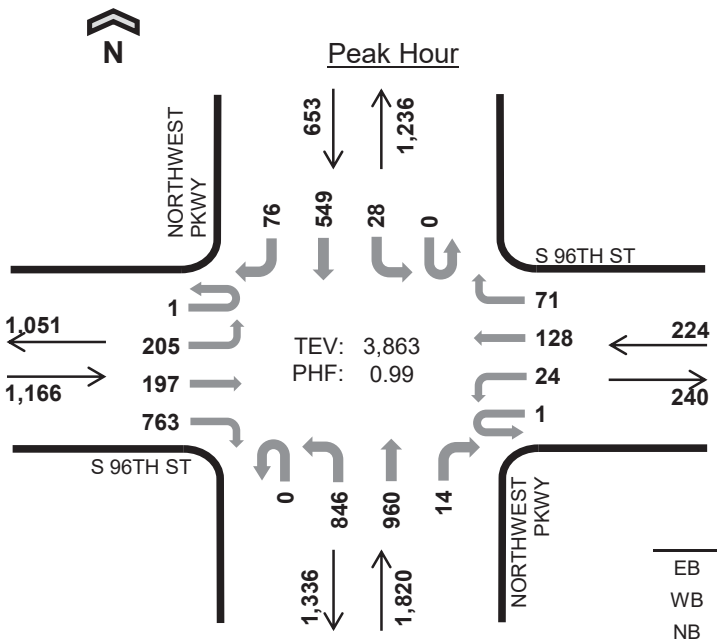
Interval Start	S 96TH ST Eastbound				S 96TH ST Westbound				NORTHWEST PKWY Northbound				NORTHWEST PKWY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	11	7	136	0	4	22	9	0	158	74	9	0	3	182	22	637	0
7:15 AM	0	17	15	178	0	2	44	9	0	163	77	6	0	9	238	38	796	0
7:30 AM	**0**	**17**	**15**	**174**	**0**	**8**	**47**	**5**	**0**	**200**	**108**	**6**	**0**	**9**	**258**	**59**	**906**	0
7:45 AM	**0**	**18**	**21**	**189**	**0**	**5**	**57**	**12**	**0**	**232**	**87**	**3**	**0**	**16**	**245**	**73**	**958**	3,297
8:00 AM	**0**	**11**	**29**	**199**	**0**	**4**	**38**	**5**	**0**	**184**	**87**	**8**	**0**	**9**	**269**	**84**	**927**	3,587
8:15 AM	**0**	**9**	**29**	**210**	**0**	**8**	**28**	**10**	**0**	**161**	**87**	**5**	**0**	**15**	**227**	**57**	**846**	**3,637**
8:30 AM	0	10	36	220	0	7	39	2	0	176	82	3	0	7	219	43	844	3,575
8:45 AM	0	12	27	170	0	10	40	1	0	185	100	5	0	9	150	52	761	3,378
Count Total	0	105	179	1,476	0	48	315	53	0	1,459	702	45	0	77	1,788	428	6,675	0
Peak Hour	**0**	**55**	**94**	**772**	**0**	**25**	**170**	**32**	**0**	**777**	**369**	**22**	**0**	**49**	**999**	**273**	**3,637**	**0**

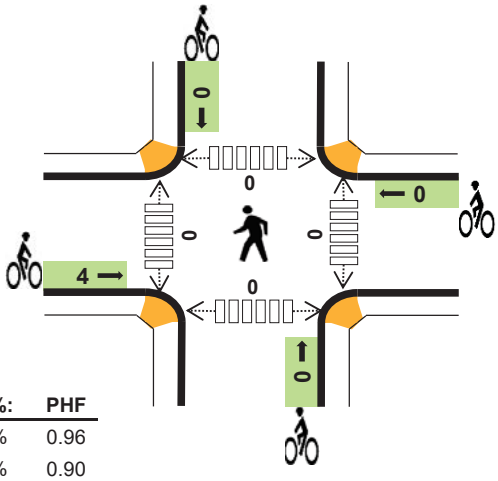
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	0	4	8	*15*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	4	1	10	10	*25*	2	0	0	0	*2*	0	0	2	0	*2*
7:30 AM	**4**	**2**	**8**	**9**	***23***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**1**	**0**	*1*
7:45 AM	**8**	**3**	**7**	**8**	***26***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**2**	**0**	*2*
8:00 AM	**4**	**1**	**9**	**9**	***23***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	*1*
8:15 AM	**4**	**3**	**6**	**6**	***19***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**1**	**0**	***1***
8:30 AM	10	0	8	7	*25*	0	0	0	0	*0*	0	0	1	0	*1*
8:45 AM	7	2	8	8	*25*	0	0	2	0	*2*	0	0	1	0	*1*
Count Total	44	12	60	65	*181*	3	0	2	0	*5*	0	0	9	0	*9*
Peak Hour	**20**	**9**	**30**	**32**	***91***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**5**	**0**	***5***

NORTHWEST PKWY
S 96TH ST

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM





	HV %:	PHF
EB	1.1%	0.96
WB	1.3%	0.90
NB	1.4%	0.97
SB	1.5%	0.92
TOTAL	1.3%	0.99

Two-Hour Count Summaries

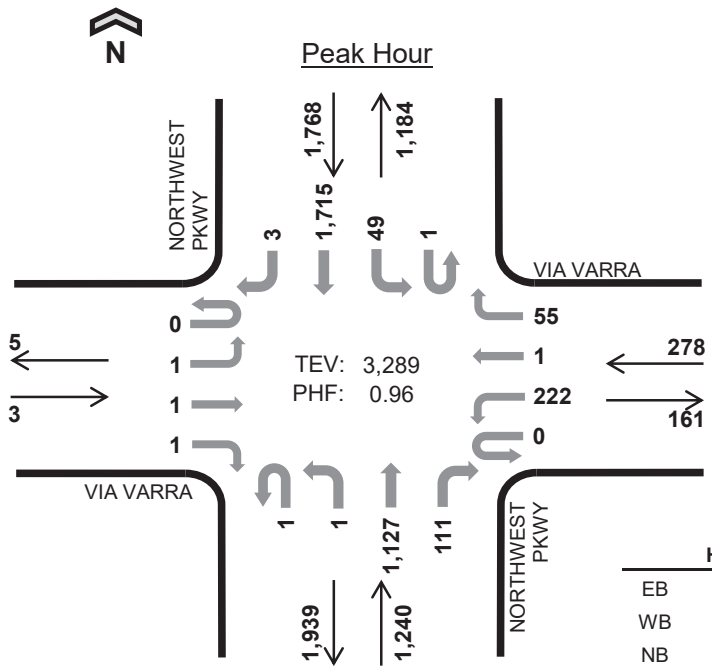
Interval Start	S 96TH ST Eastbound				S 96TH ST Westbound				NORTHWEST PKWY Northbound				NORTHWEST PKWY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	32	39	209	1	6	33	11	0	191	222	4	0	8	119	23	898	0
4:15 PM	0	46	46	198	0	2	30	14	1	221	228	2	0	9	97	20	914	0
4:30 PM	**0**	**49**	**49**	**193**	**1**	**5**	**31**	**15**	**0**	**213**	**249**	**3**	**0**	**4**	**131**	**15**	**958**	0
4:45 PM	**1**	**56**	**54**	**192**	**0**	**9**	**27**	**16**	**0**	**220**	**219**	**7**	**0**	**11**	**145**	**22**	**979**	3,749
5:00 PM	**0**	**58**	**43**	**194**	**0**	**3**	**35**	**20**	**0**	**205**	**261**	**2**	**0**	**6**	**127**	**19**	**973**	3,824
5:15 PM	**0**	**42**	**51**	**184**	**0**	**7**	**35**	**20**	**0**	**208**	**231**	**2**	**0**	**7**	**146**	**20**	**953**	**3,863**
5:30 PM	0	34	43	183	0	5	33	13	0	185	201	6	0	5	118	26	852	3,757
5:45 PM	0	34	32	152	0	6	31	19	1	170	185	4	0	8	107	11	760	3,538
Count Total	1	351	357	1,505	2	43	255	128	2	1,613	1,796	30	0	58	990	156	7,287	0
Peak Hour	**1**	**205**	**197**	**763**	**1**	**24**	**128**	**71**	**0**	**846**	**960**	**14**	**0**	**28**	**549**	**76**	**3,863**	**0**

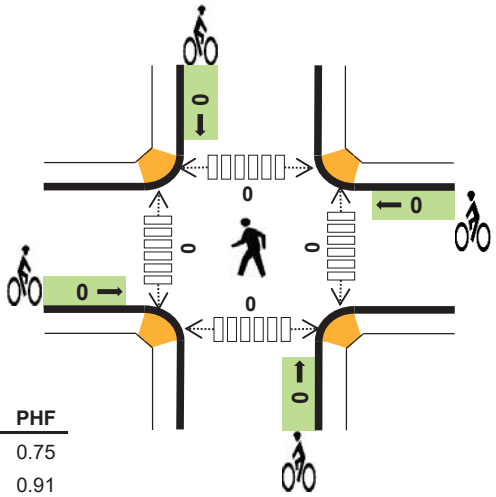
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	13	2	11	9	*35*	1	0	0	0	*1*	0	0	2	0	*2*
4:15 PM	4	2	1	1	*8*	0	0	0	0	*0*	0	0	1	0	*1*
4:30 PM	**2**	**0**	**10**	**3**	***15***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**3**	**1**	**4**	**3**	***11***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**4**	**1**	**7**	**3**	***15***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**4**	**1**	**5**	**1**	***11***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***
5:30 PM	5	1	6	2	*14*	0	0	0	0	*0*	0	0	2	0	*2*
5:45 PM	3	1	6	5	*15*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	38	9	50	27	*124*	5	0	0	0	*5*	0	0	5	0	*5*
Peak Hour	**13**	**3**	**26**	**10**	***52***	**4**	**0**	**0**	**0**	***4***	**0**	**0**	**0**	**0**	***0***

NORTHWEST PKWY
VIA VARRA

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM





	HV %:	PHF
EB	0.0%	0.75
WB	2.5%	0.91
NB	2.7%	0.93
SB	1.7%	0.91
TOTAL	2.1%	0.96

Two-Hour Count Summaries

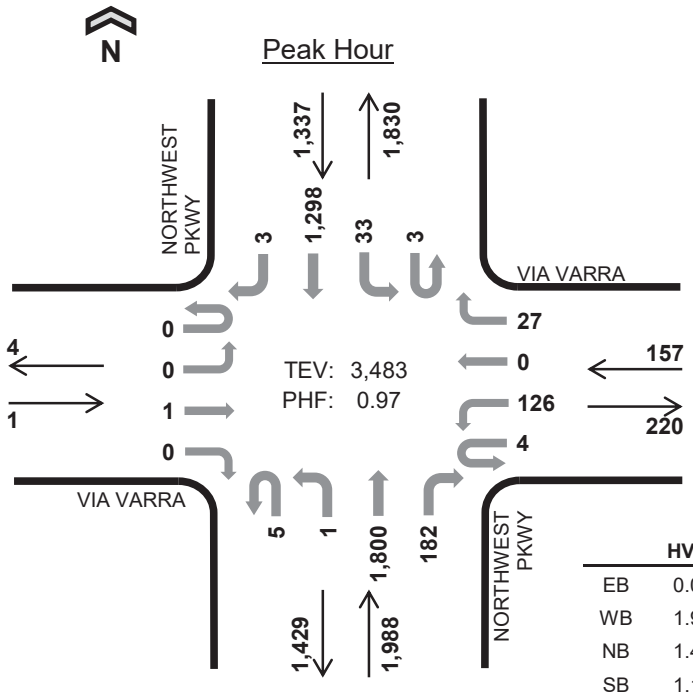
Interval Start	VIA VARRA Eastbound				VIA VARRA Westbound				NORTHWEST PKWY Northbound				NORTHWEST PKWY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	29	0	9	0	0	232	19	0	9	302	0	600	0
7:15 AM	0	0	1	0	0	48	1	9	0	0	266	19	0	9	403	1	757	0
7:30 AM	**0**	**0**	**1**	**0**	**0**	**62**	**1**	**13**	**1**	**0**	**303**	**29**	**0**	**11**	**428**	**0**	**849**	0
7:45 AM	**0**	**1**	**0**	**0**	**0**	**47**	**0**	**15**	**0**	**0**	**299**	**28**	**1**	**14**	**417**	**1**	**823**	3,029
8:00 AM	**0**	**0**	**0**	**1**	**0**	**56**	**0**	**13**	**0**	**1**	**276**	**25**	**0**	**14**	**470**	**1**	**857**	3,286
8:15 AM	**0**	**0**	**0**	**0**	**0**	**57**	**0**	**14**	**0**	**0**	**249**	**29**	**0**	**10**	**400**	**1**	**760**	**3,289**
8:30 AM	0	0	0	0	0	35	0	20	0	1	273	38	0	8	429	1	805	3,245
8:45 AM	0	1	0	0	0	41	0	11	2	0	253	28	0	9	318	1	664	3,086
Count Total	0	2	2	1	0	375	2	104	3	2	2,151	215	1	84	3,167	6	6,115	0
Peak Hour	**0**	**1**	**1**	**1**	**0**	**222**	**1**	**55**	**1**	**1**	**1,127**	**111**	**1**	**49**	**1,715**	**3**	**3,289**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

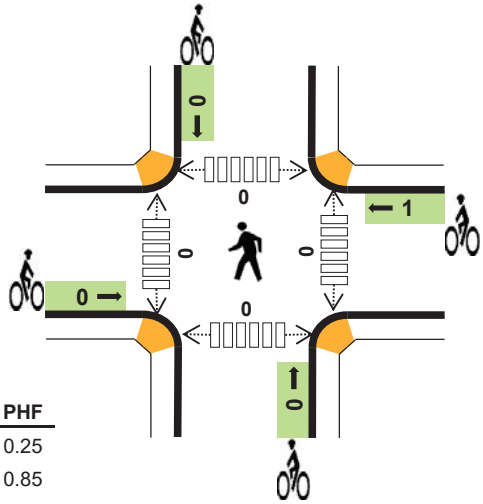
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	1	5	6	*12*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	1	1	15	10	*27*	0	1	0	0	*1*	0	0	0	0	*0*
7:30 AM	**0**	**0**	**8**	**9**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**4**	**7**	**11**	***22***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**1**	**12**	**7**	***20***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**2**	**6**	**3**	***11***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	0	12	9	*21*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	3	6	6	*15*	0	0	2	0	*2*	0	0	0	0	*0*
Count Total	1	12	71	61	*145*	0	1	2	0	*3*	0	0	0	0	*0*
Peak Hour	**0**	**7**	**33**	**30**	***70***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

NORTHWEST PKWY
VIA VARRA

Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM



	HV %:	PHF
EB	0.0%	0.25
WB	1.9%	0.85
NB	1.4%	0.94
SB	1.1%	0.98
TOTAL	1.3%	0.97



Two-Hour Count Summaries

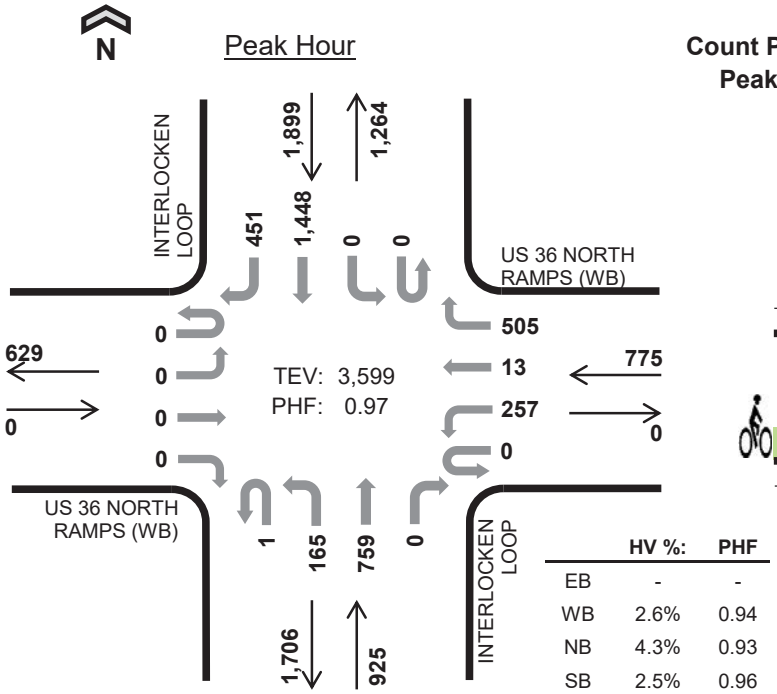
Interval Start	VIA VARRA Eastbound				VIA VARRA Westbound				NORTHWEST PKWY Northbound				NORTHWEST PKWY Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	1	27	0	4	2	0	429	31	0	6	320	0	820	0
4:15 PM	0	0	0	0	0	37	0	11	4	1	427	37	0	7	294	0	818	0
4:30 PM	**0**	**0**	**0**	**0**	**1**	**33**	**0**	**12**	**2**	**0**	**481**	**43**	**1**	**7**	**320**	**0**	**900**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**5**	**0**	**1**	**434**	**39**	**1**	**8**	**332**	**0**	**853**	3,391
5:00 PM	**0**	**0**	**0**	**0**	**0**	**21**	**0**	**7**	**2**	**0**	**457**	**43**	**0**	**8**	**327**	**2**	**867**	3,438
5:15 PM	**0**	**0**	**1**	**0**	**3**	**39**	**0**	**3**	**1**	**0**	**428**	**57**	**1**	**10**	**319**	**1**	**863**	**3,483**
5:30 PM	0	0	0	0	1	25	0	6	0	0	390	48	0	3	311	0	784	3,367
5:45 PM	0	0	0	0	0	29	0	5	1	1	339	38	1	5	251	0	670	3,184
Count Total	0	0	1	0	6	244	0	53	12	3	3,385	336	4	54	2,474	3	6,575	0
Peak Hour	**0**	**0**	**1**	**0**	**4**	**126**	**0**	**27**	**5**	**1**	**1,800**	**182**	**3**	**33**	**1,298**	**3**	**3,483**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

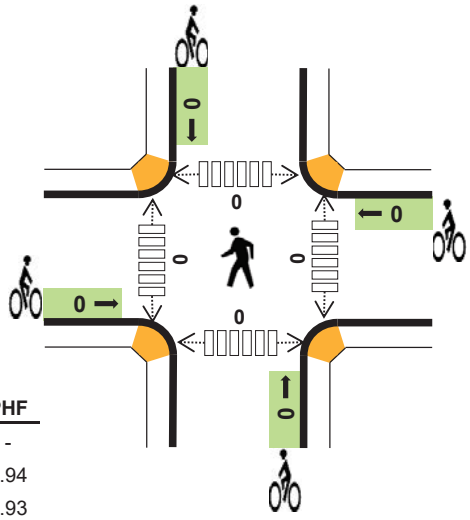
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	0	13	11	*24*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	1	3	2	*6*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	**0**	**2**	**10**	**5**	***17***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**1**	**4**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:00 PM	**0**	**0**	**7**	**5**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**0**	**7**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	1	7	5	*13*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	0	8	5	*13*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	5	59	38	*102*	0	1	0	0	*1*	0	0	0	0	*0*
Peak Hour	**0**	**3**	**28**	**15**	***46***	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***

INTERLOCKEN LOOP
US 36 NORTH RAMPS (WB)

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	-	-
WB	2.6%	0.94
NB	4.3%	0.93
SB	2.5%	0.96
TOTAL	3.0%	0.97



Two-Hour Count Summaries

Interval Start	US 36 NORTH RAMPS (WB) Eastbound				US 36 NORTH RAMPS (WB) Westbound				INTERLOCKEN LOOP Northbound				INTERLOCKEN LOOP Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	44	2	114	0	49	141	0	0	0	262	61	673	0
7:15 AM	0	0	0	0	0	51	3	119	0	47	173	0	0	0	347	101	841	0
7:30 AM	**0**	**0**	**0**	**0**	**0**	**53**	**1**	**133**	**0**	**45**	**204**	**0**	**0**	**0**	**380**	**113**	**929**	0
7:45 AM	**0**	**0**	**0**	**0**	**0**	**58**	**5**	**133**	**0**	**36**	**199**	**0**	**0**	**0**	**344**	**105**	**880**	3,323
8:00 AM	**0**	**0**	**0**	**0**	**0**	**75**	**4**	**127**	**0**	**43**	**183**	**0**	**0**	**0**	**378**	**118**	**928**	3,578
8:15 AM	**0**	**0**	**0**	**0**	**0**	**71**	**3**	**112**	**1**	**41**	**173**	**0**	**0**	**0**	**346**	**115**	**862**	**3,599**
8:30 AM	0	0	0	0	0	59	12	118	1	35	197	0	0	0	371	106	899	3,569
8:45 AM	0	0	0	0	0	72	5	124	0	37	165	0	0	0	315	68	786	3,475
Count Total	0	0	0	0	0	483	35	980	2	333	1,435	0	0	0	2,743	787	6,798	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**257**	**13**	**505**	**1**	**165**	**759**	**0**	**0**	**0**	**1,448**	**451**	**3,599**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

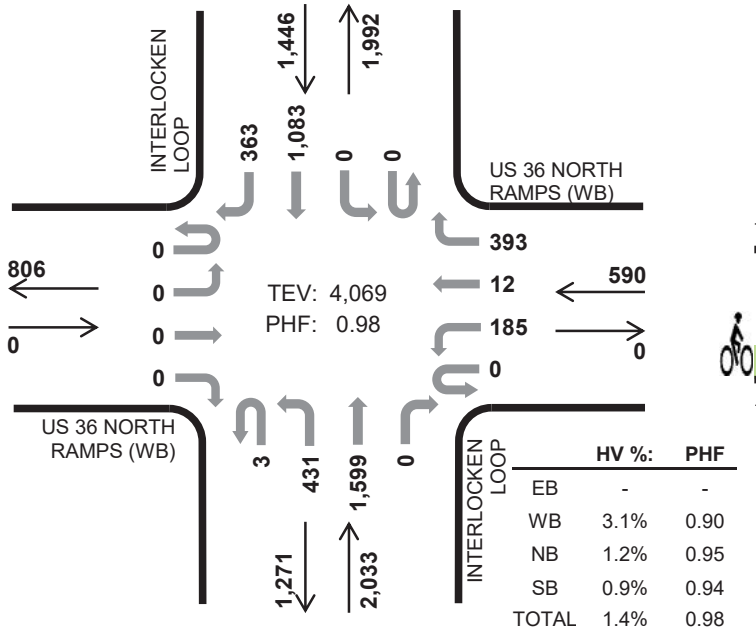
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	6	3	8	*17*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	0	13	7	14	*34*	0	0	0	1	*1*	0	0	0	0	*0*
7:30 AM	**0**	**4**	**6**	**12**	***22***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**0**	**4**	**10**	**14**	***28***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**0**	**8**	**17**	**13**	***38***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:15 AM	**0**	**4**	**7**	**9**	***20***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	0	11	10	12	*33*	0	0	0	0	*0*	0	0	0	0	*0*
8:45 AM	0	8	5	12	*25*	0	0	2	0	*2*	0	0	0	0	*0*
Count Total	0	58	65	94	*217*	0	0	2	1	*3*	0	0	0	0	*0*
Peak Hour	**0**	**20**	**40**	**48**	***108***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

INTERLOCKEN LOOP
US 36 NORTH RAMPS (WB)

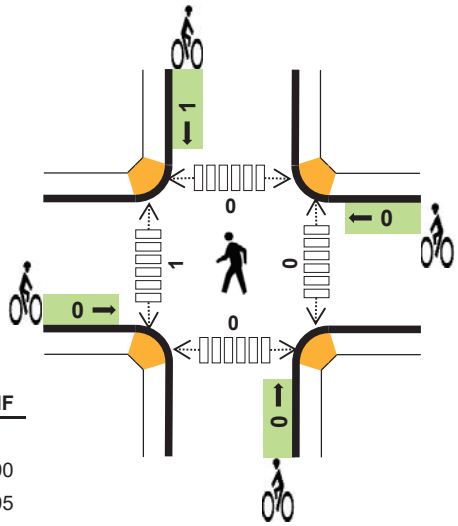
Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	-	-
WB	3.1%	0.90
NB	1.2%	0.95
SB	0.9%	0.94
TOTAL	1.4%	0.98



Two-Hour Count Summaries

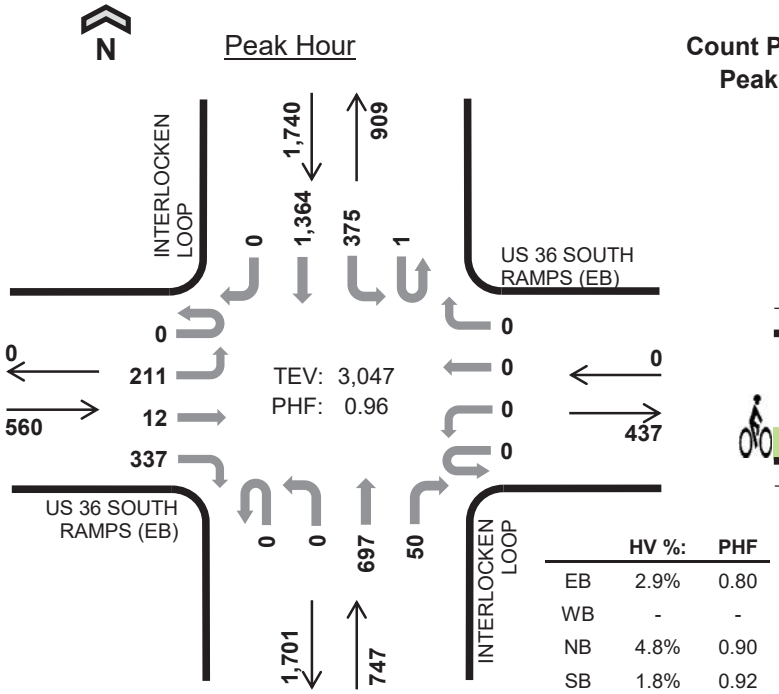
Interval Start	US 36 NORTH RAMPS (WB) Eastbound				US 36 NORTH RAMPS (WB) Westbound				INTERLOCKEN LOOP Northbound				INTERLOCKEN LOOP Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	47	2	66	0	65	395	0	0	0	290	73	938	0
4:15 PM	0	0	0	0	0	40	2	82	0	102	386	0	0	0	265	65	942	0
4:30 PM	**0**	**0**	**0**	**0**	**0**	**36**	**2**	**120**	**1**	**87**	**410**	**0**	**0**	**0**	**270**	**100**	**1,026**	0
4:45 PM	**0**	**0**	**0**	**0**	**0**	**52**	**2**	**110**	**2**	**112**	**367**	**0**	**0**	**0**	**261**	**97**	**1,003**	3,909
5:00 PM	**0**	**0**	**0**	**0**	**0**	**46**	**4**	**77**	**0**	**118**	**418**	**0**	**0**	**0**	**265**	**70**	**998**	3,969
5:15 PM	**0**	**0**	**0**	**0**	**0**	**51**	**4**	**86**	**0**	**114**	**404**	**0**	**0**	**0**	**287**	**96**	**1,042**	**4,069**
5:30 PM	0	0	0	0	0	30	2	81	0	72	356	0	0	0	245	80	866	3,909
5:45 PM	0	0	0	0	0	41	4	82	1	59	304	0	0	0	231	60	782	3,688
Count Total	0	0	0	0	0	343	22	704	4	729	3,040	0	0	0	2,114	641	7,597	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**185**	**12**	**393**	**3**	**431**	**1,599**	**0**	**0**	**0**	**1,083**	**363**	**4,069**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

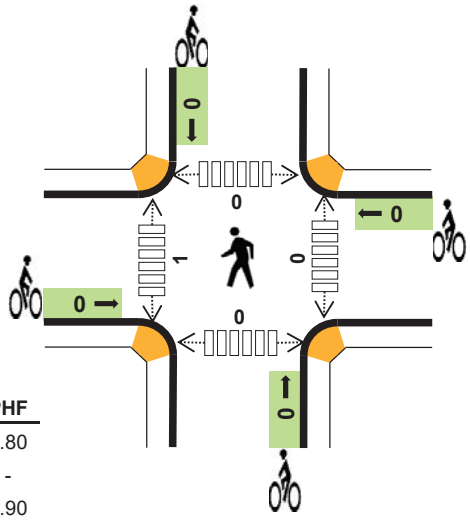
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	5	12	12	*29*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	0	3	4	3	*10*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	**0**	**6**	**9**	**5**	***20***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**0**	**5**	**1**	**3**	***9***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
5:00 PM	**0**	**4**	**7**	**3**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**0**	**3**	**7**	**2**	***12***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	0	4	5	6	*15*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	0	5	7	6	*18*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	0	35	52	40	*127*	0	0	0	1	*1*	0	1	0	0	*1*
Peak Hour	**0**	**18**	**24**	**13**	***55***	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**0**	**0**	***1***

INTERLOCKEN LOOP
US 36 SOUTH RAMPS (EB)

Date: Thu, Aug 29, 2019
Count Period: 7:00 AM to 9:00 AM
Peak Hour: 7:30 AM to 8:30 AM



	HV %:	PHF
EB	2.9%	0.80
WB	-	-
NB	4.8%	0.90
SB	1.8%	0.92
TOTAL	2.8%	0.96



Two-Hour Count Summaries

Interval Start	US 36 SOUTH RAMPS (EB) Eastbound				US 36 SOUTH RAMPS (EB) Westbound				INTERLOCKEN LOOP Northbound				INTERLOCKEN LOOP Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	41	2	34	0	0	0	0	0	0	152	13	0	83	216	0	541	0
7:15 AM	0	51	3	44	0	0	0	0	0	0	168	16	0	109	298	0	689	0
7:30 AM	**0**	**53**	**5**	**75**	**0**	**0**	**0**	**0**	**0**	**0**	**195**	**12**	**0**	**116**	**309**	**0**	**765**	0
7:45 AM	**0**	**52**	**2**	**66**	**0**	**0**	**0**	**0**	**0**	**0**	**174**	**16**	**0**	**76**	**336**	**0**	**722**	2,717
8:00 AM	**0**	**45**	**2**	**86**	**0**	**0**	**0**	**0**	**0**	**0**	**173**	**11**	**0**	**100**	**374**	**0**	**791**	2,967
8:15 AM	**0**	**61**	**3**	**110**	**0**	**0**	**0**	**0**	**0**	**0**	**155**	**11**	**1**	**83**	**345**	**0**	**769**	**3,047**
8:30 AM	0	67	1	90	0	0	0	0	0	0	161	9	0	78	354	0	760	3,042
8:45 AM	0	58	2	104	0	0	0	0	0	0	136	12	0	76	309	0	697	3,017
Count Total	0	428	20	609	0	0	0	0	0	0	1,314	100	1	721	2,541	0	5,734	0
Peak Hour	**0**	**211**	**12**	**337**	**0**	**0**	**0**	**0**	**0**	**0**	**697**	**50**	**1**	**375**	**1,364**	**0**	**3,047**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

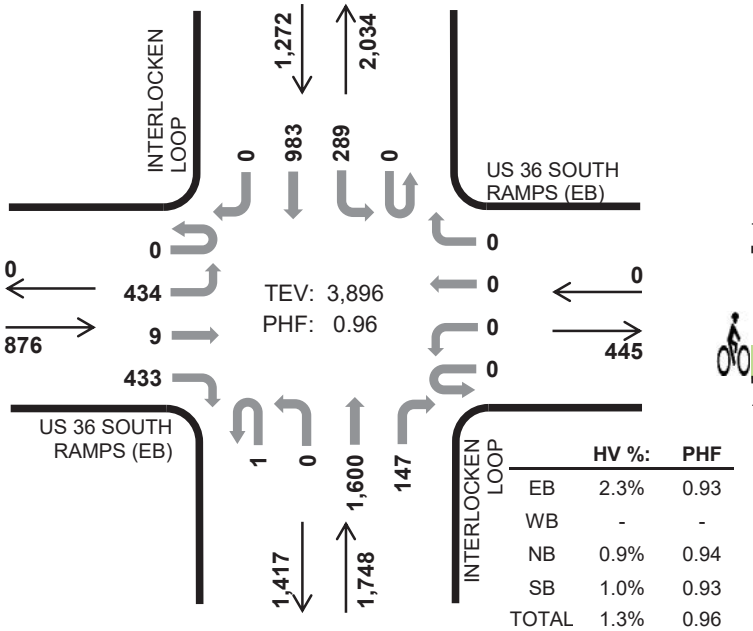
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	3	0	2	10	*15*	0	0	0	0	*0*	0	0	0	0	*0*
7:15 AM	4	0	8	13	*25*	0	0	0	1	*1*	0	2	0	0	*2*
7:30 AM	**6**	**0**	**6**	**5**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
7:45 AM	**2**	**0**	**11**	**10**	***23***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
8:00 AM	**5**	**0**	**12**	**10**	***27***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
8:15 AM	**3**	**0**	**7**	**7**	***17***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
8:30 AM	5	0	6	12	*23*	0	0	0	0	*0*	0	1	0	0	*1*
8:45 AM	6	0	4	11	*21*	0	0	2	0	*2*	0	2	0	0	*2*
Count Total	34	0	56	78	*168*	0	0	2	1	*3*	0	6	0	0	*6*
Peak Hour	**16**	**0**	**36**	**32**	***84***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	***1***

INTERLOCKEN LOOP
US 36 SOUTH RAMPS (EB)

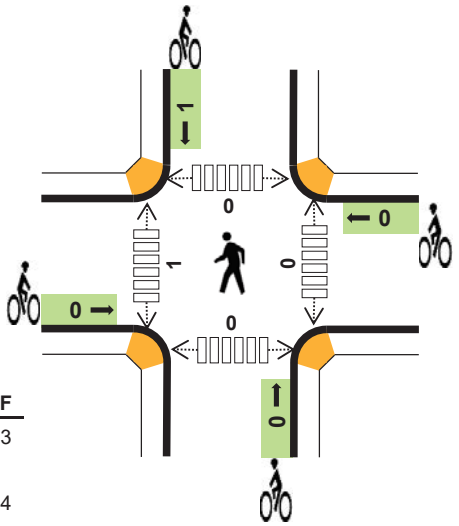
Date: Thu, Aug 29, 2019
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:30 PM to 5:30 PM

N

Peak Hour



	HV %:	PHF
EB	2.3%	0.93
WB	-	-
NB	0.9%	0.94
SB	1.0%	0.93
TOTAL	1.3%	0.96



Two-Hour Count Summaries

Interval Start	US 36 SOUTH RAMPS (EB) Eastbound UT	LT	TH	RT	US 36 SOUTH RAMPS (EB) Westbound UT	LT	TH	RT	INTERLOCKEN LOOP Northbound UT	LT	TH	RT	INTERLOCKEN LOOP Southbound UT	LT	TH	RT	15-min Total	Rolling One Hour
4:00 PM	0	113	3	75	0	0	0	0	0	0	375	46	0	118	221	0	951	0
4:15 PM	0	81	3	98	0	0	0	0	0	0	389	43	0	101	203	0	918	0
4:30 PM	**0**	**108**	**1**	**104**	**0**	**0**	**0**	**0**	**0**	**0**	**398**	**50**	**0**	**81**	**227**	**0**	**969**	0
4:45 PM	**0**	**110**	**4**	**101**	**0**	**0**	**0**	**0**	**1**	**0**	**369**	**34**	**0**	**61**	**248**	**0**	**928**	3,766
5:00 PM	**0**	**108**	**1**	**126**	**0**	**0**	**0**	**0**	**0**	**0**	**432**	**35**	**0**	**75**	**239**	**0**	**1,016**	3,831
5:15 PM	**0**	**108**	**3**	**102**	**0**	**0**	**0**	**0**	**0**	**0**	**401**	**28**	**0**	**72**	**269**	**0**	**983**	**3,896**
5:30 PM	0	118	3	102	0	0	0	0	0	0	310	26	0	64	202	0	825	3,752
5:45 PM	0	78	3	85	0	0	0	0	0	0	277	25	0	58	213	0	739	3,563
Count Total	0	824	21	793	0	0	0	0	1	0	2,951	287	0	630	1,822	0	7,329	0
Peak Hour	**0**	**434**	**9**	**433**	**0**	**0**	**0**	**0**	**1**	**0**	**1,600**	**147**	**0**	**289**	**983**	**0**	**3,896**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals EB	WB	NB	SB	Total	Bicycles EB	WB	NB	SB	Total	Pedestrians (Crossing Leg) East	West	North	South	Total
4:00 PM	7	0	7	12	*26*	0	0	0	0	*0*	0	0	0	0	*0*
4:15 PM	3	0	6	3	*12*	0	0	0	0	*0*	0	0	0	0	*0*
4:30 PM	**7**	**0**	**5**	**5**	***17***	**0**	**0**	**0**	**1**	***1***	**0**	**0**	**0**	**0**	*0*
4:45 PM	**6**	**0**	**1**	**3**	***10***	**0**	**0**	**0**	**0**	***0***	**0**	**1**	**0**	**0**	*1*
5:00 PM	**1**	**0**	**5**	**2**	***8***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
5:15 PM	**6**	**0**	**5**	**3**	***14***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
5:30 PM	5	0	3	5	*13*	0	0	0	0	*0*	0	0	0	0	*0*
5:45 PM	7	0	5	3	*15*	0	0	0	0	*0*	0	0	0	0	*0*
Count Total	42	0	37	36	*115*	0	0	0	1	*1*	0	1	0	0	*1*
Peak Hour	**20**	**0**	**16**	**13**	***49***	**0**	**0**	**0**	**1**	***1***	**0**	**1**	**0**	**0**	***1***

B - Level of Service Definitions

LEVEL OF SERVICE DEFINITIONS

In rating roadway and intersection operating conditions with existing or future traffic volumes, "Levels of Service" (LOS) A through F are used, with LOS A indicating very good operation and LOS F indicating poor operation. Levels of service at signalized and unsignalized intersections are closely associated with vehicle delays experienced in seconds per vehicle. More complete level of service definitions and delay data for signal and stop sign controlled intersections are contained in the following table for reference.

Level of Service Rating	Delay in seconds per vehicle *(a)*		Definition
	Signalized	Unsignalized	
A	0.0 to 10.0	0.0 to 10.0	Low vehicular traffic volumes; primarily free flow operations. Density is low and vehicles can freely maneuver within the traffic stream. Drivers are able to maintain their desired speeds with little or no delay.
B	10.1 to 20.0	10.1 to 15.0	Stable vehicular traffic volume flow with potential for some restriction of operating speeds due to traffic conditions. Vehicle maneuvering is only slightly restricted. The stopped delays are not bothersome and drivers are not subject to appreciable tension.
C	20.1 to 35.0	15.1 to 25.0	Stable traffic operations, however the ability for vehicles to maneuver is more restricted by the increase in traffic volumes. Relatively satisfactory operating speeds prevail, but adverse signal coordination or longer vehicle queues cause delays along the corridor.
D	35.1 to 55.0	25.1 to 35.0	Approaching unstable vehicular traffic flow where small increases in volume could cause substantial delays. Most drivers are restricted in ability to maneuver and selection of travel speeds due to congestion. Driver comfort and convenience are low, but tolerable.
E	55.1 to 80.0	35.1 to 50.0	Traffic operations characterized by significant approach delays and average travel speeds of one-half to one-third the free flow speed. Vehicular flow is unstable and there is potential for stoppages of brief duration. High signal density, extensive vehicle queuing, or corridor signal progression/timing are the typical causes of vehicle delays at signalized corridors.
F	> 80.0	> 50.0	Forced vehicular traffic flow and operations with high approach delays at critical intersections. Vehicle speeds are reduced substantially and stoppages may occur for short or long periods of time because of downstream congestion.

(a) Delay ranges based on 2010 Highway Capacity Manual criteria.

C - Level of Service by Movement and Queuing Summary Tables

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

[Also note: Portions of Tables C.1 – C.4 have been "grayed out". These cells in the tables are blank or gray because they do not apply to the particular intersection (rows) and planning horizon (columns) identified in the table. For example, the intersection of Dillon Road and McCaslin Boulevard have gray cells under the "Year 2025 Bkgrd (With Imp.)" and "Year 2040 Bkgrd (With Imp.)" scenarios because no additional intersection improvements are anticipated in the Year 2025 and 2040 planning horizons. Some intersections may have recommended improvements in the Year 2025 planning horizon but no further improvements in the Year 2040 planning horizon. In this case only the "Year 2040 Bkgrd (With Imp.) would be blank or gray.]

Table C.1 - Peak Hour Intersection Level of Service Summary (Existing and Background Conditions)

Intersection and Lanes Groups	Existing (Year 2019)				Year 2025 Bkgrd				Year 2025 Bkgrd (With Improvements)				Year 2030 Bkgrd				Year 2040 Bkgrd				Year 2040 Bkgrd (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Signalized Control																								
Dillon Road and McCaslin Boulevard	**31**	**C**	**32**	**C**	**25**	**C**	**32**	**C**					**27**	**C**	**35**	**D**	**27**	**C**	**38**	**D**				
Eastbound Left	*84*	F	*51*	*D*	*49*	*D*	*51*	*D*					*53*	*D*	*65*	E	*56*	E	*74*	E				
Eastbound Through	*72*	E	*51*	*D*	*53*	*D*	*54*	*D*					*48*	*D*	*63*	E	*53*	*D*	*75*	E				
Eastbound Right	*2*	*A*	*4*	*A*	*2*	*A*	*4*	*A*					*2*	*A*	*4*	*A*	*2*	*A*	*5*	*A*				
Westbound Left	*74*	E	*51*	*D*	*39*	*D*	*51*	*D*					*43*	*D*	*56*	E	*41*	*D*	*59*	E				
Westbound Through	*53*	*D*	*40*	*D*	*33*	*C*	*41*	*D*					*37*	*D*	*41*	*D*	*36*	*D*	*44*	*D*				
Westbound Right	*3*	*A*	*3*	*A*	*3*	*A*	*3*	*A*					*3*	*A*	*3*	*A*	*4*	*A*	*3*	*A*				
Northbound Left	*72*	E	*66*	E	*47*	*D*	*67*	E					*52*	*D*	*61*	E	*52*	*D*	*65*	E				
Northbound Through	*23*	*C*	*36*	*D*	*29*	*C*	*37*	*D*					*30*	*C*	*41*	*D*	*32*	*C*	*40*	*D*				
Northbound Right	*3*	*A*	*4*	*A*	*4*	*A*	*4*	*A*					*4*	*A*	*5*	*A*	*5*	*A*	*6*	*A*				
Southbound Left	*76*	E	*54*	*D*	*51*	*D*	*54*	*D*					*51*	*D*	*58*	E	*55*	*D*	*67*	E				
Southbound Through	*20*	*C*	*27*	*C*	*24*	*C*	*27*	*C*					*25*	*C*	*31*	*C*	*23*	*C*	*31*	*C*				
Southbound Right	*3*	*A*	*4*	*A*	*3*	*A*	*4*	*A*					*3*	*A*	*5*	*A*	*3*	*A*	*6*	*A*				
Dillon Road and 88th Street	**77**	**E**	**43**	**D**	**97**	**F**	**57**	**E**	**18**	**B**	**28**	**C**	**19**	**B**	**30**	**C**	**27**	**C**	**42**	**D**	**25**	**C**	**15**	**B**
Eastbound Through	*27*	*C*	*86*	F	*>3 min*	F	*>2 min*	F	*27*	*C*	*53*	*D*	*28*	*C*	*60*	E	*66*	E	*94*	F	*42*	*D*	*18*	*B*
Eastbound Right	*3*	*A*	*6*	*A*	*17*	*B*	*14*	*B*	*7*	*A*	*3*	*A*	*8*	*A*	*3*	*A*	*9*	*A*	*6*	*A*	*12*	*B*	*4*	*A*
Westbound Left	*>2 min*	F	*53*	*D*	*>3 min*	F	*42*	*D*	*37*	*D*	*49*	*D*	*34*	*C*	*46*	*D*	*43*	*D*	*56*	E	*47*	*D*	*37*	*D*
Westbound Through	*54*	*D*	*11*	*B*	*74*	E	*8*	*A*	*7*	*A*	*7*	*A*	*7*	*A*	*7*	*A*	*9*	*A*	*7*	*A*	*13*	*B*	*7*	*A*
Northbound Left	*>3 min*	F	*86*	F	*60*	E	*40*	*D*	*39*	*D*	*46*	*D*	*42*	*D*	*44*	*D*	*42*	*D*	*51*	*D*	*45*	*D*	*35*	*C*
Northbound Right	*31*	*C*	*2*	*A*	*3*	*A*	*2*	*A*	*2*	*A*	*2*	*A*	*3*	*A*	*2*	*A*	*3*	*A*	*3*	*A*	*3*	*A*	*2*	*A*
Dillon Road and 96th Street	**32**	**C**	**52**	**D**	**62**	**E**	**55**	**D**	**36**	**D**	**41**	**D**	**40**	**D**	**42**	**D**	**59**	**E**	**53**	**D**	**38**	**D**	**38**	**D**
Eastbound Left	*32*	*C*	*31*	*C*	*95*	F	*58*	E	*82*	F	*61*	E	*63*	E	*57*	E	*105*	F	*85*	F	*67*	E	*49*	*D*
Eastbound Through	*28*	*C*	*42*	*D*	*37*	*D*	*55*	E	*38*	*D*	*50*	*D*	*36*	*D*	*52*	*D*	*45*	*D*	*53*	*D*	*34*	*C*	*41*	*D*
Eastbound Right	*7*	*A*	*8*	*A*	*9*	*A*	*11*	*B*	*12*	*B*	*17*	*B*	*14*	*B*	*20*	*B*	*15*	*B*	*23*	*C*	*15*	*B*	*21*	*C*
Westbound Left	*26*	*C*	*114*	F	*42*	*D*	*>2 min*	F	*58*	E	*62*	E	*64*	E	*61*	E	*71*	E	*73*	E	*51*	*D*	*50*	*D*
Westbound Through	*33*	*C*	*32*	*C*	*77*	E	*48*	*D*	*47*	*D*	*42*	*D*	*51*	*D*	*42*	*D*	*76*	E	*50*	*D*	*39*	*D*	*32*	*C*
Westbound Right	*7*	*A*	*13*	*B*	*9*	*A*	*16*	*B*	*11*	*B*	*15*	*B*	*10*	*B*	*18*	*B*	*18*	*B*	*22*	*C*	*17*	*B*	*18*	*B*
Northbound Left	*48*	*D*	*43*	*D*	*87*	F	*40*	*D*	*52*	*D*	*36*	*D*	*77*	E	*42*	*D*	*>2 min*	F	*50*	*D*	*68*	E	*58*	E
Northbound Through	*35*	*C*	*87*	F	*34*	*C*	*57*	E	*33*	*C*	*57*	E	*37*	*D*	*56*	E	*52*	*D*	*87*	F	*34*	*C*	*49*	*D*
Northbound Right	*2*	*A*	*4*	*A*	*2*	*A*	*2*	*A*	*9*	*A*	*3*	*A*	*10*	*A*	*3*	*A*	*16*	*B*	*7*	*A*	*3*	*A*	*4*	*A*
Southbound Left	*32*	*C*	*43*	*D*	*50*	*D*	*49*	*D*	*26*	*C*	*38*	*D*	*30*	*C*	*43*	*D*	*43*	*D*	*48*	*D*	*56*	E	*59*	E
Southbound Through	*68*	E	*56*	E	*>2 min*	F	*48*	*D*	*36*	*D*	*33*	*C*	*45*	*D*	*34*	*C*	*66*	E	*38*	*D*	*45*	*D*	*35*	*C*
Southbound Right	*12*	*B*	*8*	*A*	*39*	*D*	*9*	*A*	*13*	*B*	*9*	*A*	*14*	*B*	*9*	*A*	*23*	*C*	*11*	*B*	*18*	*B*	*12*	*B*

Table C.1 - Peak Hour Intersection Level of Service Summary (Existing and Background Conditions)

Intersection and Lanes Groups	Existing (Year 2019)				Year 2025 Bkgrd				Year 2025 Bkgrd (With Improvements)				Year 2030 Bkgrd				Year 2040 Bkgrd				Year 2040 Bkgrd (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
88th Street and Campus Drive	**99**	**F**	**30**	**C**	**113**	**F**	**33**	**C**	**35**	**C**	**27**	**C**	**37**	**D**	**28**	**C**	**40**	**D**	**30**	**C**				
Eastbound Left	63	E	57	E	49	D	63	E	55	E	52	D	48	D	46	D	61	E	52	D				
Eastbound Through	65	E	111	F	63	E	84	F	77	E	47	D	74	E	51	D	78	E	53	D				
Eastbound Right	9	A	17	B	14	B	17	B	19	B	16	B	23	C	15	B	27	C	20	B				
Westbound Left	46	D	38	D	59	E	38	D	45	D	36	D	46	D	39	D	51	D	40	D				
Westbound Through	57	E	0	A	78	E	0	A	54	D	0	A	52	D	0	A	42	D	0	A				
Westbound Right	23	C	13	B	40	D	12	B	14	B	9	A	17	B	10	A	16	B	10	A				
Northbound Left	58	E	30	C	88	F	33	C	21	C	22	C	23	C	25	C	27	C	25	C				
Northbound Through	93	F	37	D	118	F	40	D	43	D	30	C	45	D	32	C	48	D	33	C				
Northbound Right	47	D	6	A	76	E	9	A	26	C	5	A	24	C	5	A	34	C	6	A				
Southbound Left	>3 min	F	32	C	>3 min	F	26	C	55	D	21	C	62	E	23	C	61	E	21	C				
Southbound Through	82	F	26	C	81	F	31	C	21	C	25	C	20	B	30	C	22	C	30	C				
Southbound Right	70	E	7	A	56	E	8	A	7	A	8	A	8	A	8	A	8	A	9	A				
Northwest Parkway and 96th Street/Via Varra	**51**	**D**	**24**	**C**	**74**	**E**	**28**	**C**	**41**	**D**	**24**	**C**	**57**	**E**	**24**	**C**	**89**	**F**	**36**	**D**	**52**	**D**	**35**	**D**
Eastbound Left - 96th Street	59	E	46	D	88	F	44	D	77	E	45	D	70	E	43	D	89	F	60	E	71	E	67	E
Eastbound Through - 96th Street	63	E	40	D	103	F	50	D	96	F	47	D	110	F	50	D	>2 min	F	84	F	115	F	87	F
Eastbound Right - 96th Street	4	A	3	A	4	A	3	A	5	A	4	A	6	A	5	A	7	A	6	A	6	A	6	A
Westbound Left - Via Varra	47	D	39	D	59	E	38	D	60	E	39	D	61	E	38	D	91	F	61	E	71	E	65	E
Westbound Through - Via Varra	48	D	41	D	72	E	42	D	78	E	40	D	74	E	39	D	>2 min	F	64	E	91	F	67	E
Westbound Right - Via Varra	1	A	1	A	1	A	1	A	3	A	1	A	3	A	2	A	15	B	2	A	6	A	2	A
Northbound Left - NWP	95	F	50	D	>3 min	F	59	E	78	E	48	D	103	F	44	D	>2 min	F	64	E	109	F	62	E
Northbound Through - NWP	6	A	8	A	11	B	9	A	3	A	8	A	5	A	7	A	5	A	10	A	6	A	9	A
Northbound Right - NWP	1	A	1	A	15	B	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A	1	A
Southbound Left - NWP	58	E	51	D	75	E	45	D	81	F	46	D	77	E	45	D	101	F	70	E	87	F	77	E
Southbound Through - NWP	83	F	29	C	75	E	34	C	49	D	24	C	84	F	28	C	119	F	41	D	53	D	33	C
Southbound Right - NWP	4	A	1	A	4	A	1	A	3	A	1	A	6	A	1	A	14	B	2	A	4	A	8	A
Northwest Parkway and Tape Drive/Via Varra	**14**	**B**	**11**	**B**	**16**	**B**	**13**	**B**					**19**	**B**	**13**	**B**	**27**	**C**	**14**	**B**	**15**	**B**	**15**	**B**
Eastbound Left	63	E	0	A	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A
Eastbound Through	40	D	36	D	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A
Eastbound Right	0	A	0	A	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A
Westbound Left	40	D	42	D	48	D	41	D					43	D	41	D	49	D	58	E	51	D	64	E
Westbound Through	32	C	0	A	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A
Westbound Right	6	A	7	A	7	A	8	A					6	A	7	A	7	A	8	A	7	A	8	A
Northbound Left	60	E	29	C	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A
Northbound Through	10	B	14	B	17	B	16	B					12	B	13	B	16	B	15	B	8	A	16	B
Northbound Right	3	A	6	A	6	A	6	A					4	A	6	A	5	A	7	A	3	A	8	A
Southbound Left	43	D	48	D	59	E	45	D					58	E	43	D	73	E	77	E	66	E	74	E
Southbound Through	13	B	5	A	11	B	6	A					19	B	9	A	29	C	6	A	11	B	6	A
Southbound Right	9	A	5	A	0	A	0	A					0	A	0	A	0	A	0	A	0	A	0	A

Table C.1 - Peak Hour Intersection Level of Service Summary (Existing and Background Conditions)

Intersection and Lanes Groups	Existing (Year 2019)				Year 2025 Bkgrd				Year 2025 Bkgrd (With Improvements)				Year 2030 Bkgrd				Year 2040 Bkgrd				Year 2040 Bkgrd (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northwest Parkway and US 36 North Ramps (WB)	**12**	**B**	**16**	**B**	**12**	**B**	**17**	**B**					**12**	**B**	**14**	**B**	**13**	**B**	**19**	**B**				
Westbound Left	*63*	*E*	*52*	*D*	*58*	*E*	*45*	*D*					*50*	*D*	*44*	*D*	*61*	*E*	*66*	*E*				
Westbound Through	*61*	*E*	*54*	*D*	*62*	*E*	*43*	*D*					*52*	*D*	*45*	*D*	*62*	*E*	*66*	*E*				
Westbound Right	*2*	*A*	*2*	*A*	*2*	*A*	*2*	*A*					*2*	*A*	*2*	*A*	*2*	*A*	*2*	*A*				
Northbound Left	*20*	*C*	*26*	*C*	*22*	*C*	*28*	*C*					*24*	*C*	*34*	*C*	*31*	*C*	*50*	*D*				
Northbound Through	*6*	*A*	*15*	*B*	*8*	*A*	*16*	*B*					*8*	*A*	*10*	*B*	*8*	*A*	*17*	*B*				
Southbound Through	*9*	*A*	*15*	*B*	*11*	*B*	*16*	*B*					*10*	*A*	*13*	*B*	*12*	*B*	*14*	*B*				
Southbound Right	*7*	*A*	*7*	*A*	*8*	*A*	*8*	*A*					*8*	*A*	*10*	*A*	*9*	*A*	*9*	*A*				
Northwest Parkway and US 36 South Ramps (EB)	**15**	**B**	**25**	**C**	**19**	**B**	**29**	**C**					**17**	**B**	**34**	**C**	**19**	**B**	**56**	**E**				
Eastbound Left	*43*	*D*	*45*	*D*	*51*	*D*	*47*	*D*					*51*	*D*	*100*	*F*	*62*	*E*	*74*	*E*				
Eastbound Through	*45*	*D*	*51*	*D*	*50*	*D*	*48*	*D*					*51*	*D*	*116*	*F*	*64*	*E*	*72*	*E*				
Eastbound Right	*2*	*A*	*3*	*A*	*2*	*A*	*3*	*A*					*2*	*A*	*13*	*B*	*2*	*A*	*7*	*A*				
Northbound Through	*12*	*B*	*33*	*C*	*14*	*B*	*39*	*D*					*17*	*B*	*38*	*D*	*18*	*B*	*83*	*F*				
Northbound Right	*3*	*A*	*11*	*B*	*4*	*A*	*12*	*B*					*4*	*A*	*13*	*B*	*4*	*A*	*54*	*D*				
Southbound Left	*56*	*E*	*61*	*E*	*66*	*E*	*62*	*E*					*53*	*D*	*35*	*C*	*61*	*E*	*101*	*F*				
Southbound Through	*5*	*A*	*6*	*A*	*6*	*A*	*6*	*A*					*5*	*A*	*10*	*A*	*6*	*A*	*10*	*A*				
Roundabout Controlled																								
88th Street and Rock Creek Parkway	**8**	**A**	**6**	**A**	**9**	**A**	**7**	**A**					**10**	**A**	**7**	**A**	**11**	**B**	**7**	**A**				
Eastbound Left	*7*	*A*	*7*	*A*	*8*	*A*	*8*	*A*					*8*	*A*	*8*	*A*	*9*	*A*	*8*	*A*				
Eastbound Through	*5*	*A*	*7*	*A*	*6*	*A*	*8*	*A*					*6*	*A*	*8*	*A*	*6*	*A*	*8*	*A*				
Westbound Through	*7*	*A*	*5*	*A*	*8*	*A*	*5*	*A*					*8*	*A*	*5*	*A*	*9*	*A*	*5*	*A*				
Westbound Right	*12*	*B*	*5*	*A*	*15*	*B*	*5*	*A*					*15*	*C*	*6*	*A*	*17*	*C*	*6*	*A*				
Southbound Left	*7*	*A*	*7*	*A*	*7*	*A*	*8*	*A*					*7*	*A*	*8*	*A*	*8*	*A*	*9*	*A*				
Southbound Right	*5*	*A*	*5*	*A*	*5*	*A*	*5*	*A*					*5*	*A*	*5*	*A*	*5*	*A*	*5*	*A*				

Note: Delay represented in average seconds per vehicle.

Note: Under conditions with improvements, level of service results are only provided for intersections with recommended improvements.

Table C.2 - 95th Percentile Queuing Summary (Existing and Background Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Existing (Year 2019)		Year 2025 Bkgrd		Year 2025 Bkgrd (With Imp.)		Year 2030 Bkgrd		Year 2040 Bkgrd		Year 2040 Bkgrd (With Imp.)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Signalized Control													
Dillon Road and McCaslin Boulevard													
Eastbound Left	425'	82'	157'	15'	154'			80'	172'	82'	204'		
Eastbound Through	425'	76'	162'	76'	178'			76'	212'	71'	245'		
Eastbound Right	120'	0'	45'	65'	64'			0'	116'	0'	**158'**		
Westbound Left	500'	453'	342'	268'	342'			279'	402'	276'	411'		
Westbound Through	500'	180'	149'	153'	139'			162'	152'	172'	162'		
Westbound Right	280'	0'	0'	0'	0'			0'	0'	0'	0'		
Northbound Left	540'	170'	179'	138'	187'			149'	193'	110'	149'		
Northbound Through	870'	385'	400'	383'	411'			372'	463'	397'	589'		
Northbound Right	190'	71'	107'	82'	123'			78'	148'	135'	160'		
Southbound Left	240'	199'	188'	172'	204'			186'	228'	175'	235'		
Southbound Through	410'	271'	284'	239'	280'			257'	304'	220'	296'		
Southbound Right	110'	58'	**123'**	45'	104'			64'	**157'**	51'	**196'**		
Dillon Road and 88th Street													
Eastbound Through	965'	304'	**1193'**	**1603'**	**1726'**	344'	825'	331'	939'	825'	**1406'**	297'	245'
Eastbound Right	270'	73'	**499'**	**1022'**	**1571'**	199'	224'	233'	**316'**	**345'**	**863'**	267'	79'
Westbound Left	400'	**593'**	369'	**624'**	346'	323'	212'	292'	198'	374'	228'	399'	195'
Westbound Through	5500'	2333'	199'	5362'	211'	271'	241'	276'	254'	371'	238'	305'	145'
Northbound Left	1250'	**1399'**	196'	220'	126'	157'	139'	179'	135'	178'	145'	179'	128'
Northbound Right	200'	**374'**	23'	60'	0'	0'	0'	0'	0'	0'	0'	0'	0'
Dillon Road and 96th Street													
Eastbound Left	415'	257'	256'	**588'**	429'	296'	233'	264'	219'	**480'**	328'	316'	217'
Eastbound Through	5500'	220'	347'	575'	338'	229'	356'	221'	332'	419'	363'	230'	314'
Eastbound Right	415'	63'	91'	111'	119'	73'	143'	92'	170'	94'	171'	94'	188'
Westbound Left	425'	172'	**658'**	324'	**699'**	171'	265'	180'	279'	199'	329'	158'	235'
Westbound Through	1350'	222'	767'	466'	**2229'**	272'	263'	295'	262'	359'	296'	222'	205'
Westbound Right	425'	62'	88'	242'	103'	92'	104'	80'	118'	122'	130'	105'	121'
Northbound Left	350'	279'	282'	427'	110'	340'	234'	**433'**	204'	**532'**	**460'**	240'	205'
Northbound Through	1900'	297'	544'	1647'	426'	345'	491'	498'	463'	838'	1022'	364'	483'
Northbound Right	325'	0'	**336'**	179'	69'	0'	223'	8'	124'	93'	**508'**	0'	295'
Southbound Left	335'	138'	178'	**527'**	184'	93'	139'	110'	168'	224'	182'	106'	120'
Southbound Through	3100'	405'	368'	1478'	351'	313'	281'	362'	298'	546'	344'	371'	292'
Southbound Right	350'	143'	86'	**554'**	111'	188'	103'	188'	114'	**431'**	140'	278'	132'

Table C.2 - 95th Percentile Queuing Summary (Existing and Background Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Existing (Year 2019)		Year 2025 Bkgrd		Year 2025 Bkgrd (With Imp.)		Year 2030 Bkgrd		Year 2040 Bkgrd		Year 2040 Bkgrd (With Imp.)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
88th Street and Campus Drive													
Eastbound Left	150'	107'	**190'**	105'	**192'**	113'	**195'**	104'	**184'**	119'	**194'**		
Eastbound Through+Right	150'	58'	**269'**	61'	**326'**	74'	**261'**	94'	**208'**	104'	**299'**		
Westbound Left	240'	193'	93'	**264'**	95'	216'	86'	220'	104'	235'	113'		
Westbound Through+Right	415'	227'	111'	521'	87'	196'	74'	257'	85'	234'	86'		
Northbound Left	190'	158'	54'	**239'**	79'	96'	25'	113'	38'	109'	36'		
Northbound Through	1300'	979'	250'	1740'	284'	297'	137'	252'	131'	454'	161'		
Northbound Right	190' (Ex); 500' (2025)	**303'**	101'	**349'**	105'	385'	51'	351'	54'	450'	57'		
Southbound Left	400'	**667'**	140'	**673'**	89'	**677'**	87'	**911'**	120'	**806'**	94'		
Southbound Through	600'	**1905'**	325'	**1968'**	357'	265'	355'	560'	334'	481'	373'		
Southbound Right	215'	80'	130'	**295'**	156'	75'	171'	81'	149'	86'	165'		
Northwest Parkway and 96th Street/Via Varra													
Eastbound Left - 96th Street	370'	69'	119'	87'	119'	70'	115'	68'	117'	82'	146'	71'	195'
Eastbound Through - 96th Street	725'	87'	111'	146'	143'	136'	133'	192'	174'	286'	288'	218'	320'
Eastbound Right - 96th Street	400'	0'	0'	0'	0'	0'	0'	11'	0'	85'	0'	0'	119'
Westbound Left - Via Varra	265'	49'	44'	66'	60'	57'	54'	89'	67'	194'	71'	163'	86'
Westbound Through - Via Varra	485'	168'	111'	230'	136'	206'	118'	256'	140'	**508'**	185'	419'	196'
Westbound Right - Via Varra	250'	0'	0'	0'	0'	0'	0'	0'	0'	196'	0'	129'	0'
Northbound Left - NWP	725'	688'	380'	**1073'**	436'	437'	277'	598'	251'	**909'**	341'	686'	344'
Northbound Through - NWP	1450'	416'	143'	**2837'**	158'	78'	138'	394'	137'	847'	201'	399'	198'
Northbound Right - NWP	320'	0'	0'	0'	0'	0'	0'	0'	0'	4'	0'	0'	0'
Southbound Left - NWP	500'	253'	54'	277'	56'	94'	49'	454'	57'	**834'**	80'	118'	87'
Southbound Through - NWP	7600'	771'	202'	753'	216'	570'	190'	911'	209'	**2020'**	328'	519'	224'
Southbound Right - NWP	500'	474'	0'	397'	0'	78'	31'	598'	28'	**1000'**	35'	97'	62'

Table C.2 - 95th Percentile Queuing Summary (Existing and Background Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Existing (Year 2019)		Year 2025 Bkgrd		Year 2025 Bkgrd (With Imp.)		Year 2030 Bkgrd		Year 2040 Bkgrd		Year 2040 Bkgrd (With Imp.)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Northwest Parkway and Tape Drive/Via Varra													
Eastbound Left	130'	10'	0'	0'	0'			0'	0'	0'	0'	0'	0'
Eastbound Through	240'	12'	8'	0'	0'			0'	0'	0'	0'	0'	0'
Eastbound Right	200'	0'	0'	0'	0'			0'	0'	0'	0'	0'	0'
Westbound Left	520'	170'	125'	212'	127'			239'	148'	297'	204'	298'	232'
Westbound Through	520'	8'	0'	0'	0'			0'	0'	0'	0'	0'	0'
Westbound Right	520'	45'	40'	51'	44'			50'	46'	58'	49'	56'	47'
Northbound Left	450'	8'	4'	0'	0'			0'	0'	0'	0'	0'	0'
Northbound Through	1800'	230'	338'	409'	358'			290'	342'	399'	406'	219'	445'
Northbound Right	250'	50'	135'	143'	90'			58'	163'	120'	197'	96'	218'
Southbound Left	660'	66'	61'	80'	64'			155'	67'	192'	88'	104'	80'
Southbound Through	3000'	294'	139'	259'	165'			494'	214'	709'	150'	278'	165'
Southbound Right	600'	0'	0'	0'	0'			0'	0'	0'	0'	0'	0'
Northwest Parkway and US 36 North Ramps (WB)													
Westbound Left	325'	169'	118'	178'	110'			186'	136'	197'	175'		
Westbound Left+Through	850'	285'	225'	306'	196'			203'	165'	219'	203'		
Westbound Right	1700'	86'	0'	0'	0'			0'	0'	0'	0'		
Northbound Left	200'	135'	**309'**	141'	**326'**			175'	**289'**	184'	**375'**		
Northbound Through	515'	108'	313'	168'	317'			182'	138'	189'	482'		
Southbound Through	1800'	167'	192'	244'	202'			231'	226'	304'	255'		
Southbound Right	250'	172'	142'	175'	167'			184'	194'	228'	190'		
Northwest Parkway and US 36 South Ramps (EB)													
Eastbound Left	370'	121'	210'	150'	227'			167'	**485'**	192'	**419'**		
Eastbound Left+Through	1300'	148'	235'	174'	248'			190'	709'	217'	534'		
Eastbound Right	190'	0'	77'	0'	42'			0'	364'	38'	**351'**		
Northbound Through	570'	195'	**585'**	233'	632'			277'	641'	300'	**1637'**		
Northbound Right	300'	0'	224'	12'	**322'**			14'	**334'**	7'	**501'**		
Southbound Left	515'	187'	164'	241'	172'			235'	165'	285'	383'		
Southbound Through	515'	122'	125'	128'	112'			123'	240'	144'	237'		

Table C.2 - 95th Percentile Queuing Summary (Existing and Background Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Existing (Year 2019)		Year 2025 Bkgrd		Year 2025 Bkgrd (With Imp.)		Year 2030 Bkgrd		Year 2040 Bkgrd		Year 2040 Bkgrd (With Imp.)	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Roundabout Controlled													
88th Street and Rock Creek Parkway													
Eastbound Left+Through	825'	50'	25'	50'	25'			50'	25'	50'	50'		
Eastbound Through	825'	25'	25'	25'	50'			25'	50'	25'	50'		
Westbound Through	400'	25'	25'	50'	25'			50'	25'	50'	25'		
Westbound Through+Right	400'	100'	25'	150'	25'			150'	25'	175'	25'		
Southbound Left	550'	25'	50'	25'	50'			25'	50'	50'	50'		
Southbound Right	60'	0'	25'	25'	25'			25'	25'	25'	25'		

Note: Under conditions with improvements, queues are only provided for intersections with recommended improvements.

Table C.3 - Peak Hour Intersection Level of Service Summary (With Project Conditions)

Intersection and Lanes Groups	Year 2025 Bkgrd+Project				Year 2025 Bkgrd+Project (With Improvements)				Year 2030 Bkgrd+Project				Year 2030 Bkgrd+Project (With Improvements)				Year 2040 Bkgrd+Project				Year 2040 Bkgrd+Project (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Signalized Control																								
Dillon Road and McCaslin Boulevard	**26**	**C**	**34**	**C**					**27**	**C**	**34**	**C**					**29**	**C**	**42**	**D**				
Eastbound Left	52	D	55	D					50	D	58	E					51	D	71	E				
Eastbound Through	51	D	56	E					46	D	57	E					52	D	67	E				
Eastbound Right	2	A	4	A					2	A	4	A					2	A	4	A				
Westbound Left	41	D	50	D					41	D	52	D					47	D	60	E				
Westbound Through	34	C	36	D					34	C	39	D					37	D	42	D				
Westbound Right	3	A	3	A					3	A	3	A					4	A	3	A				
Northbound Left	48	D	72	E					50	D	71	E					54	D	64	E				
Northbound Through	31	C	41	D					33	C	41	D					37	D	53	D				
Northbound Right	4	A	5	A					5	A	5	A					6	A	6	A				
Southbound Left	53	D	58	E					65	E	59	E					56	E	74	E				
Southbound Through	24	C	29	C					24	C	30	C					25	C	39	D				
Southbound Right	3	A	4	A					3	A	4	A					4	A	7	A				
Dillon Road and 88th Street	**20**	**C**	**20**	**C**					**22**	**C**	**21**	**C**					**25**	**C**	**36**	**D**				
Eastbound Through	36	D	27	C					44	D	30	C					37	D	59	E				
Eastbound Right	4	A	2	A					4	A	2	A					5	A	5	A				
Westbound Left	26	C	34	C					32	C	28	C					63	E	42	D				
Westbound Through	16	B	9	A					16	B	8	A					15	B	9	A				
Northbound Left	37	D	54	D					35	D	53	D					54	D	80	E				
Northbound Right	2	A	2	A					2	A	2	A					2	A	3	A				
Dillon Road and 96th Street	**69**	**E**	**98**	**F**	**37**	**D**	**38**	**D**	**39**	**D**	**42**	**D**					**47**	**D**	**45**	**D**				
Eastbound Left	57	E	55	D	67	E	52	D	69	E	52	D					77	E	58	E				
Eastbound Through	59	E	>3min	F	57	E	67	E	55	E	75	E					58	E	72	E				
Eastbound Right	8	A	18	B	23	C	22	C	24	C	24	C					34	C	25	C				
Westbound Left	82	F	>2min	F	77	E	60	E	83	F	68	E					97	F	73	E				
Westbound Through	49	D	45	D	51	D	41	D	50	D	42	D					58	E	43	D				
Westbound Right	10	B	17	B	14	B	18	B	15	B	21	C					23	C	25	C				
Northbound Left	57	E	62	E	58	E	30	C	54	D	40	D					66	E	44	D				
Northbound Through	33	C	106	F	28	C	38	D	29	C	45	D					33	C	54	D				
Northbound Right	2	A	11	B	7	A	8	A	7	A	9	A					8	A	14	B				
Southbound Left	108	F	>2min	F	29	C	34	C	33	C	39	D					45	D	50	D				
Southbound Through	>3min	F	>2min	F	39	D	29	C	42	D	33	C					58	E	33	C				
Southbound Right	40	D	19	B	10	A	9	A	11	B	10	A					13	B	12	B				

Table C.3 - Peak Hour Intersection Level of Service Summary (With Project Conditions)

Intersection and Lanes Groups	Year 2025 Bkgrd+Project				Year 2025 Bkgrd+Project (With Improvements)				Year 2030 Bkgrd+Project				Year 2030 Bkgrd+Project (With Improvements)				Year 2040 Bkgrd+Project				Year 2040 Bkgrd+Project (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
88th Street and Campus Drive	**38**	**D**	**33**	**C**	**36**	**D**	**34**	**C**	**38**	**D**	**25**	**C**					**46**	**D**	**25**	**C**				
Eastbound Left	50	D	45	D	48	D	45	D	48	D	36	D					47	D	36	D				
Eastbound Through	79	E	59	E	63	E	60	E	81	F	48	D					73	E	46	D				
Eastbound Right	39	D	36	D	33	C	35	C	44	D	27	C					37	D	28	C				
Westbound Left	44	D	46	D	49	D	48	D	47	D	38	D					48	D	40	D				
Westbound Through	41	D	55	D	37	D	61	E	39	D	48	D					43	D	47	D				
Westbound Right	31	C	18	B	31	C	22	C	34	C	19	B					36	D	18	B				
Northbound Left	39	D	32	C	33	C	30	C	33	C	21	C					35	C	23	C				
Northbound Through	52	D	39	D	55	D	41	D	48	D	26	C					49	D	27	C				
Northbound Right	20	C	7	A	32	C	6	A	17	B	5	A					21	C	5	A				
Southbound Left	71	E	30	C	46	D	30	C	77	E	20	C					106	F	20	C				
Southbound Through	21	C	32	C	18	B	33	C	26	C	20	C					30	C	20	B				
Southbound Right	8	A	6	A	6	A	6	A	10	B	5	A					14	B	5	A				
96th Street and Campus Drive	**38**	**D**	**32**	**C**	**24**	**C**	**20**	**B**	**23**	**C**	**23**	**C**					**31**	**C**	**28**	**C**				
Eastbound Left	56	E	56	E	49	D	55	D	67	E	51	D					63	E	48	D				
Eastbound Right	14	B	22	C	19	B	29	C	21	C	32	C					27	C	35	D				
Northbound Left	78	E	76	E	64	E	96	F	50	D	94	F					95	F	92	F				
Northbound Through	49	D	40	D	15	B	10	A	10	B	10	B					15	B	13	B				
Southbound Through	24	C	21	C	24	C	15	B	22	C	19	B					28	C	28	C				
Southbound Right	9	A	6	A	10	B	5	A	13	B	7	A					19	B	9	A				
Northwest Parkway and 96th Street/Via Varra	**99**	**F**	**33**	**C**	**43**	**D**	**29**	**C**	**52**	**D**	**30**	**C**					**>2min**	**F**	**34**	**C**	**52**	**D**	**32**	**C**
Eastbound Left - 96th Street	69	E	71	E	73	E	60	E	82	F	60	E					93	F	54	D	88	F	52	D
Eastbound Through - 96th Street	74	E	72	E	85	F	64	E	94	F	63	E					>2min	F	67	E	109	F	70	E
Eastbound Right - 96th Street	8	A	8	A	9	A	7	A	8	A	8	A					99	F	12	B	8	A	11	B
Westbound Left - Via Varra	69	E	56	E	61	E	59	E	77	E	58	E					83	F	55	D	67	E	54	D
Westbound Through - Via Varra	78	E	60	E	65	E	59	E	80	F	61	E					111	F	57	E	74	E	57	E
Westbound Right - Via Varra	3	A	1	A	1	A	1	A	2	A	2	A					4	A	2	A	2	A	2	A
Northbound Left - NWP	>3min	F	55	E	78	E	50	D	107	F	49	D					>3min	F	53	D	89	F	52	D
Northbound Through - NWP	7	A	9	A	9	A	8	A	14	B	10	A					15	B	14	B	21	C	15	B
Northbound Right - NWP	1	A	1	A	1	A	1	A	1	A	1	A					1	A	1	A	1	A	1	A
Southbound Left - NWP	83	F	66	E	71	E	65	E	84	F	65	E					91	F	68	E	83	F	65	E
Southbound Through - NWP	120	F	45	D	51	D	32	C	53	D	36	D					>2min	F	50	D	58	E	38	D
Southbound Right - NWP	9	A	1	A	13	B	8	A	15	B	10	B					31	C	11	B	18	B	11	B

Table C.3 - Peak Hour Intersection Level of Service Summary (With Project Conditions)

Intersection and Lanes Groups	Year 2025 Bkgrd+Project				Year 2025 Bkgrd+Project (With Improvements)				Year 2030 Bkgrd+Project				Year 2030 Bkgrd+Project (With Improvements)				Year 2040 Bkgrd+Project				Year 2040 Bkgrd+Project (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Northwest Parkway and Tape Drive/Via Varra	**30**	**C**	**12**	**B**					**47**	**D**	**19**	**B**					**>2min**	**F**	**35**	**D**	**58**	**E**	**35**	**C**
Eastbound Left	*52*	*D*	*63*	*E*					*66*	*E*	*67*	*E*					*76*	*E*	*80*	*F*	*67*	*E*	*70*	*E*
Eastbound Through	*0*	*A*	*0*	*A*					*0*	*A*	*0*	*A*					*0*	*A*	*0*	*A*	*0*	*A*	*0*	*A*
Eastbound Right	*0*	*A*	*1*	*A*					*1*	*A*	*1*	*A*					*1*	*A*	*2*	*A*	*1*	*A*	*2*	*A*
Westbound Left	*89*	*F*	*70*	*E*					*86*	*F*	*84*	*F*					*>3min*	*F*	*77*	*E*	*80*	*E*	*72*	*E*
Westbound Through	*0*	*A*	*0*	*A*					*0*	*A*	*0*	*A*					*0*	*A*	*0*	*A*	*0*	*A*	*0*	*A*
Westbound Right	*7*	*A*	*9*	*A*					*8*	*A*	*9*	*A*					*64*	*E*	*10*	*A*	*9*	*A*	*10*	*A*
Northbound Left	*53*	*D*	*58*	*E*					*69*	*E*	*72*	*E*					*>2min*	*F*	*94*	*F*	*91*	*F*	*93*	*F*
Northbound Through	*21*	*C*	*7*	*A*					*16*	*B*	*20*	*B*					*108*	*F*	*50*	*D*	*48*	*D*	*52*	*D*
Northbound Right	*6*	*A*	*3*	*A*					*7*	*A*	*13*	*B*					*91*	*F*	*42*	*D*	*34*	*C*	*43*	*D*
Southbound Left	*55*	*E*	*70*	*E*					*77*	*E*	*67*	*E*					*>3min*	*F*	*61*	*E*	*60*	*E*	*70*	*E*
Southbound Through	*27*	*C*	*9*	*A*					*65*	*E*	*7*	*A*					*>3min*	*F*	*13*	*B*	*61*	*E*	*9*	*A*
Southbound Right	*10*	*A*	*4*	*A*					*24*	*C*	*5*	*A*					*>2min*	*F*	*6*	*A*	*12*	*B*	*4*	*A*
Northwest Parkway and US 36 North Ramps (WB)	**11**	**B**	**18**	**B**					**13**	**B**	**29**	**C**					--	--	--	--	--	--	--	--
Westbound Left	*57*	*E*	*64*	*E*					*57*	*E*	*62*	*E*					--	--	--	--	--	--	--	--
Westbound Through	*58*	*E*	*63*	*E*					*60*	*E*	*59*	*E*					--	--	--	--	--	--	--	--
Westbound Right	*9*	*A*	*2*	*A*					*6*	*A*	*3*	*A*					--	--	--	--	--	--	--	--
Northbound Left	*41*	*D*	*50*	*D*					*60*	*E*	*62*	*E*					--	--	--	--	--	--	--	--
Northbound Through	*8*	*A*	*9*	*A*					*7*	*A*	*11*	*B*					--	--	--	--	--	--	--	--
Southbound Through	*5*	*A*	*20*	*C*					*11*	*B*	*53*	*D*					--	--	--	--	--	--	--	--
Southbound Right	*7*	*A*	*10*	*A*					*7*	*A*	*14*	*B*					--	--	--	--	--	--	--	--
Northwest Parkway and US 36 South Ramps (EB)	**19**	**B**	**44**	**D**					**19**	**B**	**110**	**F**					--	--	--	--	--	--	--	--
Eastbound Left	*57*	*E*	*95*	*F*					*56*	*E*	*>2min*	*F*					--	--	--	--	--	--	--	--
Eastbound Through	*55*	*E*	*103*	*F*					*57*	*E*	*>2min*	*F*					--	--	--	--	--	--	--	--
Eastbound Right	*2*	*A*	*13*	*B*					*2*	*A*	*58*	*E*					--	--	--	--	--	--	--	--
Northbound Through	*25*	*C*	*53*	*D*					*28*	*C*	*>2min*	*F*					--	--	--	--	--	--	--	--
Northbound Right	*4*	*A*	*24*	*C*					*5*	*A*	*116*	*F*					--	--	--	--	--	--	--	--
Southbound Left	*37*	*D*	*60*	*E*					*27*	*C*	*98*	*F*					--	--	--	--	--	--	--	--
Southbound Through	*6*	*A*	*11*	*B*					*6*	*A*	*13*	*B*					--	--	--	--	--	--	--	--
Roundabout Controlled																								
88th Street and Rock Creek Parkway	**10**	**A**	**7**	**A**					**10**	**B**	**7**	**A**		**A**		**A**	**12**	**B**	**7**	**A**				
Eastbound Left	*8*	*A*	*8*	*A*					*9*	*A*	*8*	*A*		*A*		*A*	*9*	*A*	*9*	*A*				
Eastbound Through	*6*	*A*	*8*	*A*					*6*	*A*	*8*	*A*		*A*		*A*	*6*	*A*	*8*	*A*				
Westbound Through	*8*	*A*	*5*	*A*					*8*	*A*	*5*	*A*		*A*		*A*	*9*	*A*	*5*	*A*				
Westbound Right	*15*	*C*	*6*	*A*					*17*	*C*	*6*	*A*		*A*		*A*	*20*	*C*	*6*	*A*				
Southbound Left	*7*	*A*	*8*	*A*					*7*	*A*	*8*	*A*		*A*		*A*	*8*	*A*	*9*	*A*				
Southbound Right	*5*	*A*	*5*	*A*					*5*	*A*	*5*	*A*		*A*		*A*	*5*	*A*	*6*	*A*				

Table C.3 - Peak Hour Intersection Level of Service Summary (With Project Conditions)

Intersection and Lanes Groups	Year 2025 Bkgrd+Project				Year 2025 Bkgrd+Project (With Improvements)				Year 2030 Bkgrd+Project				Year 2030 Bkgrd+Project (With Improvements)				Year 2040 Bkgrd+Project				Year 2040 Bkgrd+Project (With Improvements)			
	AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Stop-Controlled																								
88th Street and Tape Drive	**2**	**A**	**3**	**A**					**3**	**A**	**3**	**A**		**A**		**A**	**3**	**A**	**4**	**A**				
Westbound Left	*18*	*C*	*10*	*B*					*25*	*D*	*11*	*B*		*A*		*A*	*25*	*D*	*13*	*B*				
Westbound Right	*6*	*A*	*4*	*A*					*10*	*B*	*5*	*A*		*A*		*A*	*9*	*A*	*7*	*A*				
Northbound Through	*2*	*A*	*2*	*A*					*2*	*A*	*2*	*A*		*A*		*A*	*2*	*A*	*3*	*A*				
Northbound Right	*1*	*A*	*2*	*A*					*1*	*A*	*2*	*A*		*A*		*A*	*2*	*A*	*2*	*A*				
Southbound Left	*9*	*A*	*6*	*A*					*10*	*A*	*5*	*A*		*A*		*A*	*11*	*B*	*6*	*A*				
Southbound Through	*3*	*A*	*3*	*A*					*3*	*A*	*3*	*A*		*A*		*A*	*3*	*A*	*3*	*A*				

Note: Delay represented in average seconds per vehicle.

Note: Under conditions with improvements, level of service results are only provided for intersections with recommended improvements.

Table C.4 - 95th Percentile Queuing Summary (With Project Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Year 2025 Bkgrd+Project		Year 2025 Bkgrd+Project		Year 2030 Bkgrd+Project		Year 2030 Bkgrd (With		Year 2040 Bkgrd+Project		Year 2040 Bkgrd+Project	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Signalized Control													
Dillon Road and McCaslin Boulevard													
Eastbound Left	425'	75'	167'			78'	180'			81'	195'		
Eastbound Through	425'	68'	189'			78'	181'			76'	216'		
Eastbound Right	120'	0'	73'			0'	72'			0'	123'		
Westbound Left	500'	285'	398'			296'	414'			347'	**534'**		
Westbound Through	500'	145'	138'			143'	163'			159'	172'		
Westbound Right	280'	0'	0'			0'	0'			0'	0'		
Northbound Left	540'	137'	197'			146'	191'			153'	292'		
Northbound Through	870'	403'	423'			411'	438'			447'	595'		
Northbound Right	190'	95'	146'			121'	155'			171'	2227'		
Southbound Left	240'	183'	230'			232'	224'			233'	**321'**		
Southbound Through	410'	245'	290'			288'	289'			282'	392'		
Southbound Right	110'	34'	**119'**			31'	**121'**			59'	**212'**		
Dillon Road and 88th Street													
Eastbound Through	965'	439'	591'			488'	682'			571'	**1155'**		
Eastbound Right	270'	148'	58'			83'	182'			183'	**534'**		
Westbound Left	400'	179'	201'			214'	177'			348'	228'		
Westbound Through	5500'	210'	169'			226'	162'			312'	190'		
Northbound Left	1250'	174'	175'			172'	198'			230'	288'		
Northbound Right	200'	0'	0'			0'	33'			48'	101'		
Dillon Road and 96th Street													
Eastbound Left	415'	360'	**610'**	179'	177'	203'	187'			280'	210'		
Eastbound Through	5500'	240'	1931'	196'	342'	191'	377'			179'	348'		
Eastbound Right	415'	67'	**552'**	85'	153'	96'	162'			135'	177'		
Westbound Left	425'	**592'**	**688'**	340'	320'	371'	354'			464'	358'		
Westbound Through	1350'	578'	**2029'**	207'	225'	232'	220'			351'	212'		
Westbound Right	425'	86'	109'	93'	112'	95'	119'			137'	139'		
Northbound Left	350'	244'	**593'**	280'	134'	243'	201'			332'	**368'**		
Northbound Through	1900'	358'	**1905'**	349'	447'	369'	512'			430'	712'		
Northbound Right	325'	21'	**675'**	0'	167'	80'	229'			102'	**533'**		
Southbound Left	335'	**699'**	**653'**	113'	130'	110'	143'			307'	173'		
Southbound Through	3100'	**3674'**	2241'	440'	285'	444'	329'			677'	333'		
Southbound Right	350'	**693'**	**590'**	168'	92'	183'	88'			321'	118'		

Table C.4 - 95th Percentile Queuing Summary (With Project Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Year 2025 Bkgrd+Project		Year 2025 Bkgrd+Project		Year 2030 Bkgrd+Project		Year 2030 Bkgrd (With		Year 2040 Bkgrd+Project		Year 2040 Bkgrd+Project	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
88th Street and Campus Drive													
Eastbound Left	150'	69'	160'	62'	160'	83'	147'			70'	155'		
Eastbound Through+Right	150'	140'	190'	122'	195'	159'	182'			166'	204'		
Westbound Left	240'	255'	217'	274'	198'	265'	192'			290'	213'		
Westbound Through+Right	415'	239'	130'	234'	148'	295'	153'			268'	150'		
Northbound Left	190'	121'	32'	137'	44'	140'	34'			147'	87'		
Northbound Through	1300'	447'	241'	444'	257'	259'	237'			267'	272'		
Northbound Right	190' (Ex); 500' (2025)	296'	122'	497'	71'	351'	69'			379'	75'		
Southbound Left	400'	405'	85'	325'	88'	416'	80'			536'	79'		
Southbound Through	600'	413'	295'	226'	303'	470'	233'			732'	238'		
Southbound Right	215'	77'	102'	64'	80'	103'	61'			120'	46'		
96th Street and Campus Drive													
Eastbound Left	1000'	299'	270'	200'	218'	275'	254'			297'	312'		
Eastbound Right	1000'	68'	136'	76'	174'	99'	228'			120'	298'		
Northbound Left	250'	476'	384'	198'	83'	198'	96'			345'	116'		
Northbound Through	725'	911'	750'	379'	257'	252'	268'			556'	330'		
Southbound Through	630'	472'	469'	534'	468'	557'	540'			593'	536'		
Southbound Right	450'	344'	340'	357'	252'	452'	365'			490'	376'		
Northwest Parkway and 96th Street/Via Varra													
Eastbound Left - 96th Street	370'	88'	169'	85'	168'	95'	188'			140'	185'	102'	185'
Eastbound Through - 96th Street	725'	114'	176'	117'	167'	144'	193'			858'	352'	185'	301'
Eastbound Right - 96th Street	400'	20'	0'	16'	12'	0'	0'			428'	8'	0'	0'
Westbound Left - Via Varra	265'	76'	60'	69'	57'	101'	75'			170'	81'	101'	80'
Westbound Through - Via Varra	485'	238'	176'	191'	139'	261'	156'			412'	184'	304'	192'
Westbound Right - Via Varra	250'	0'	0'	0'	0'	43'	0'			177'	0'	67'	0'
Northbound Left - NWP	725'	1449'	530'	544'	311'	715'	321'			1109'	349'	700'	338'
Northbound Through - NWP	1450'	3174'	228'	162'	190'	499'	213'			3112'	289'	430'	301'
Northbound Right - NWP	320'	0'	0'	0'	0'	0'	0'			0'	0'	0'	0'
Southbound Left - NWP	500'	620'	63'	83'	59'	102'	65'			1039'	73'	162'	73'
Southbound Through - NWP	7600'	1423'	294'	576'	255'	644'	284'			2412'	402'	602'	244'
Southbound Right - NWP	500'	814'	0'	265'	71'	280'	79'			1096'	84'	289'	83'

Table C.4 - 95th Percentile Queuing Summary (With Project Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Year 2025 Bkgrd+Project		Year 2025 Bkgrd+Project		Year 2030 Bkgrd+Project		Year 2030 Bkgrd (With		Year 2040 Bkgrd+Project		Year 2040 Bkgrd+Project	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Northwest Parkway and Tape Drive/Via Varra													
Eastbound Left	130'	42'	83'			56'	113'			67'	176'	75'	173'
Eastbound Through	240'	0'	0'			0'	0'			0'	95'	0'	61'
Eastbound Right	200'	0'	0'			0'	2'			0'	0'	0'	0'
Westbound Left	520'	283'	149'			313'	210'			**817'**	236'	350'	232'
Westbound Through	520'	0'	0'			0'	0'			**725'**	0'	0'	0'
Westbound Right	520'	50'	46'			54'	51'			186'	59'	72'	57'
Northbound Left	450'	355'	129'			330'	172'			**633'**	237'	447'	225'
Northbound Through	1800'	459'	252'			482'	309'			**2605'**	634'	1087'	918'
Northbound Right	200'	174'	55'			56'	108'			**206'**	**210'**	89'	**262'**
Southbound Left	660'	143'	68'			557'	76'			**898'**	83'	273'	86'
Southbound Through	3000'	604'	213'			1192'	152'			**3279'**	283'	770'	182'
Southbound Right	600'	128'	0'			535'	0'			**986'**	0'	322'	0'
Northwest Parkway and US 36 North Ramps (WB)													
Westbound Left	325'	187'	169'			192'	155'						
Westbound Left+Through	850'	480'	185'			211'	270'						
Westbound Right	1700'	399'	0'			159'	0'						
Northbound Left	200'	**217'**	**347'**			228'	**371'**						
Northbound Through	515'	148'	289'			62'	443'						
Southbound Through	1800'	144'	373'			247'	**2015'**						
Southbound Right	250'	170'	207'			164'	**316'**						
Northwest Parkway and US 36 South Ramps (EB)													
Eastbound Left	370'	186'	**433'**			203'	**568'**						
Eastbound Left+Through	1300'	202'	739'			211'	**1238'**						
Eastbound Right	190'	0'	**353'**			0'	**435'**						
Northbound Through	570'	307'	**732'**			347'	**1082'**						
Northbound Right	300'	12'	**444'**			10'	**533'**						
Southbound Left	515'	266'	478'			246'	**672'**						
Southbound Through	515'	175'	265'			183'	323'						

Table C.4 - 95th Percentile Queuing Summary (With Project Conditions)

Intersection and Lane Groups	Storage or Dist. To Adj. Int	Year 2025 Bkgrd+Project		Year 2025 Bkgrd+Project		Year 2030 Bkgrd+Project		Year 2030 Bkgrd (With		Year 2040 Bkgrd+Project		Year 2040 Bkgrd+Project	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Roundabout Controlled													
88th Street and Rock Creek Parkway													
Eastbound Left+Through	825'	50'	25'			50'	50'			75'	50'		
Eastbound Through	825'	25'	50'			25'	50'			25'	50'		
Westbound Through	400'	50'	25'			50'	25'			50'	25'		
Westbound Through+Right	400'	150'	25'			175'	25'			200'	25'		
Southbound Left	550'	25'	50'			50'	50'			50'	75'		
Southbound Right	60'	25'	25'			25'	25'			25'	25'		
Stop-Controlled													
88th Street and Tape Drive													
Westbound Left+Right	1000'	31'	43'			46'	61'			45'	90'		
Northbound Through	1200'	5'	0'			0'	0'			0'	0'		
Northbound Right	150'	3'	0'			3'	0'			7'	0'		
Southbound Left	150'	50'	21'			67'	31'			85'	37'		
Southbound Through	1300'	0'	0'			0'	0'			0'	0'		

Note: Under conditions with improvements, queues are only provided for intersections with recommended improvements.

D - Travel Demand Management Plan

FOX TUTTLE

MEMORANDUM

To: Jordan Swisher
Brue Baukol Capital Partners

From: Bill Fox, PE and Emily Kotz, PE

Date: January 23, 2020

Project: Redtail Ridge

Subject: Transportation Demand Management Plan for GDP Submittal

1. Overview

Brue Baukol Capital Partners (BB) and its development partners are proposing to build a mix of residential, office and commercial buildings on the former StorageTek campus as detailed in the *Nawatny Ridge Traffic and Mobility Study (Study),* original draft dated September 30, 2019 and revised report anticipated in January 2020 (note that since the completion of the draft *Study* the project is no longer named Nawatny Ridge and will hereon be referred to as Redtail Ridge). This Transportation Demand Management (TDM) Plan was requested by City of Louisville staff as a supplemental submittal to the *Study* to outline possible strategies to reduce Single Occupant Vehicle (SOV) traffic generated by the proposed development.

BB and its development partners are planning the site to support employee and resident use of non-SOV transportation to and from the development. They have expressed interest and financial support of TDM programs that are outlined in the City of Louisville's new *Transportation Master Plan (TMP).* To this end, we have prepared a non-SOV year 2040 goals for all trips to and from the project. In the coming years TDM programs, incentives and funding details will be implemented to achieve the goals.

The following text discusses possible TDM measures for the City of Louisville's General Development Plan (GDP) submittal and review. The GDP provides a high-level planning review of the propose development. Future submittals beyond GDP will include additional details on programmed land uses, possible tenants, parking requirements, multimodal access, and Metro District TDM contributions. It is anticipated that the supplemental TDM memo will be revised and resubmitted with additional details at each of the City of Louisville's development review submittals.

2. Current and future non-SOV mode share goals

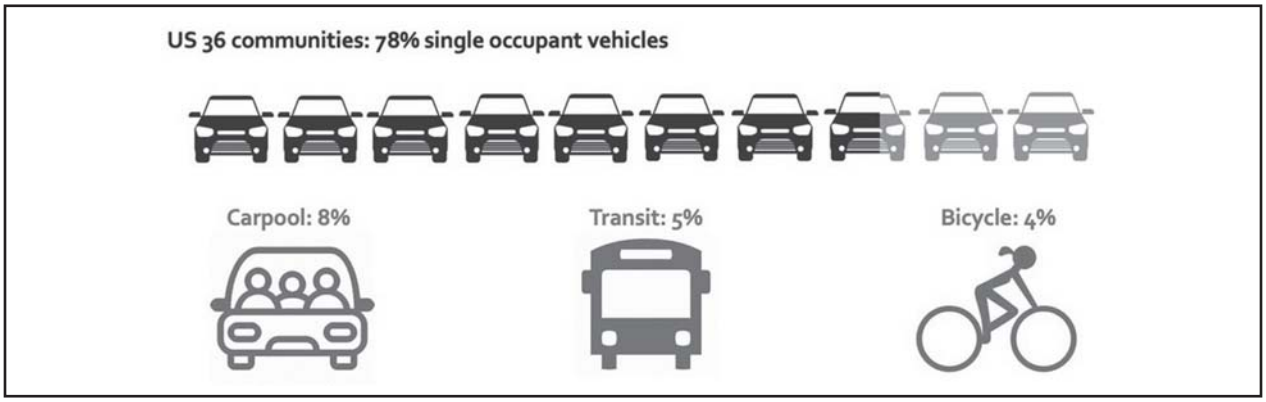
The new *City of Louisville TMP* documented how commuters in Louisville and nearby communities travel to work. This data is based on US Census American Community Survey (https://www.census.gov/programs-surveys/acs). This data is commonly used by agencies across the Denver region as a baseline for TDM programs. The current data is shown below as year 2012 to 2016 estimates. Based on this data, approximately 28% of people who work in Louisville travel to work by non-SOV modes.

Figure 1: Louisville and comparison area commute mode share (from TMP)

	Drive Alone	Carpool	Transit	Bike	Walk	Work at Home	Other
City of Louisville	72.3%	4.7%	5.9%	2.3%	1.7%	12.7%	0.5%
City of Boulder	51.3%	4.9%	8.3%	10.3%	11.4%	12.5%	1.2%
Boulder County	65.2%	7.6%	5.0%	4.4%	5.3%	11.3%	1.3%
Denver Region	74.8%	8.5%	4.4%	1.2%	2.5%	7.5%	1.0%

The mode share data shown in Figure 2 below is based on survey data from the *2016 Northwest Metro Region Mobility Report*, final draft dated July 2018, prepared by Commuting Solutions. This data shows the mode share for communities along the US 36 corridor, including the City of Louisville. The current data is shown below as year 2012 to 2016 estimates. Based on this data, approximately 22% of people who work in the US 36 corridor travel to work by non-SOV modes.

Figure 2: US 36 corridor commute mode shares (from Commuting Solutions)



Additional trip generation and mode share peer data and study references are provided in the **Appendix**.

The mode share goals for the project are broken down by different land use categories to ensure TDM programs are targeted and evaluated based on their direct ability to serve commuters and residents of different types of land uses. For the multifamily housing and general office land uses, the goal of the project is to have 25 percent or more non-SOV trips during the peak periods during the initial phase. These participation levels would be consistent with the current program enrollment in the US 36 corridor and is achievable with the proposed TDM programs that are outlined later in this document. Further, it is anticipated that the non-SOV trip percentages to/from the project site will increase as planned regional mobility studies are implemented.

While the project team has a target goal of 25 percent or more non-SOV trips, for purposes of the trip generation analysis in the *Study*, and based on feedback provided by City staff, a reduced non-SOV percentage was assumed for these and uses. The following non-SOV trips are assumed for Year 2025 (the completion year for the first phase of development).

- The multifamily residential housing units are assumed to have 15 percent non-SOV trips. This accounts for residents who walk, bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.
- The senior and assisted living housing are expected to have five (5) percent non-SOV trips. This accounts for residents who would ride shuttles and for employees/visitors that walk, bicycle, carpool, vanpool, use shared ride mobility services and/or transit.
- The general offices are assumed to have 15 percent non-SOV trips. This accounts for employees/visitors who walk, bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.
    - Note that based on preliminary site plan information for Parcel B, the non-SOV trips are estimated to be five (5) percent for the corporate office user.
- The shopping centers are expected to have ten (10) percent non-SOV trips. This accounts for mostly employees and some patrons who bicycle, carpool, vanpool, use shared ride mobility services and/or use transit.
- The business hotel is expected to have five (5) percent non-SOV trips. This accounts for mostly employees and some travelers who carpool, use shared ride mobility services and/or use transit

It is assumed that some of the planned regional mobility plans for this area will be constructed/implemented by the time this project is built-out and that these projects will further reduce the non-SOV trips for the project and background trips to the study area (such as Northwest Rail, NAMS BRT corridors, complete streets in the 88th Street, Dillon Road, and 96th Street corridor). As a result, the following non-SOV trip increases for the year 2030 and after are outlined below. Similar to the initial phase, the goal of the project is to have an even greater percentage of non-SOV trips than what is assumed below.

- The senior and assisted living housing are expected to remain at the same levels.
- The general offices and residential uses are expected to have an additional five (5) percent or greater non-SOV trip increase. For purposes of the trip generation analysis, the non-SOV trip percentage was increased to 20 percent for general offices and the multifamily residential.
- The shopping centers are expected to remain at the same levels.
- The business hotel is expected to remain at the same level.

3. TDM Program Overview

TDM is an all-encompassing term for activities that help people use the transportation system more efficiently, while reducing traffic congestion, vehicle emissions and fuel consumption. TDM activities help get the most out of transportation infrastructure and services by making lower-cost, higher-efficiency transportation options easier to use and more readily available. TDM activities include such options as eliminating or shortening trips, changing the mode of travel, or changing the time of day a trip is made, as well as actions that increase transportation system efficiency through carpooling, vanpooling, transit, bicycling and walking. TDM strategies also include employer-based programs such as alternative work schedules, which could shift demand away from peak travel times, and telework, which could reduce the need for trips entirely. There are local transportation management solution organizations that coordinate funding and service efforts that the Metro District should considered partnering with to help facilitate and encourage non-SOV travel. Program summaries are outlined below.

Walking Trips

Walking trips are key part of the non-SOV mode share goals. The walking trips would likely occur between neighborhood homes, parks and schools. New walking trips will be made on the Complete Street sidewalk and trail network. The forecasted typical walk trip will be less than 1/4 mile or 5-minute walk from a home/work to a destination. It is likely that

most of the walking trips will be single or multi-purpose trips within the site context. In the future, walking to shared ride mobility and transit services is also likely to increase. This is commonly referred to as the "first and last mile" of a shared ride or transit trips.

Cycling Trip

Cycling trips will increase in the future as the Complete Street and trail network is completed. The future cycling trips will be made by people of all ages and cycling abilities. They will be connecting between neighborhood homes, parks, schools, commercial uses, major entertainment destinations and transit on and off site. Most of the new cycling trips would be a result of new people making a choice to cycle because of the protected cycle network and underpasses. That network is focused on removing conflicts with motor vehicles and providing safe access from neighborhoods to destinations in the adjacent area. The cycling trips will be approximately 4 to 6 miles and up to a 20-minute ride.

Carpool, Vanpool and Shared Ride Trips

Large and small employers will have access to programs that match people to carpool programs and on-demand rideshares. The commute carpools and shared rides are typically less than 30 miles.

Transit Trips

In the future, "High Capacity Transit" services will be available within a 10-minute walk or bike ride as outlined in the City of Louisville and Boulder County Transportation Master Plans. These transit services will be accessible via a 10-minute walk or bike ride using the Complete Streets and underpasses. Local transit shuttles to High Capacity Transit stations will also be provided by partnership with the City of Louisville and private business using the operating models being piloted at the 61st and Pena Station (https://www.fulenwider.com/autonomous-shuttle-launches-in-denver.html) and the Lone Tree Link (http://www.lonetreelink.com).

Parking Management

Implementing new shared parking programs and organizing parking districts are important planning tools that will be utilized in the future TDM updates to this memo to achieve the TDM goals as the area develops. This effort will take advantage of planning tools to manage future parking supplies.

Telecommute/Work From Home

Commuting trips that do not occur during peak travel hours as a result of people who telecommute or work from their residence for part or the entire day are included in the non-SOV goals.

4. TDM Program Tools

Listed below are the TDM programs, tools and funding sources that should be used to achieve the project non-SOV mode share goals. They are provided at this time as possible tools given where the project stands in the GDP process. Future submittals can provide additional information when additional details on land uses, tenants and funding is known. It is recommended that the Metro District partner with a local expert in transportation management solutions to help facilitate these programs.

The TDM programs are organized based on programs that can be supported/funded by the Metro District versus programs that can be supported/funded by the vertical developers. Note that all vertical developers in the project will be required to submit a customized TDM for their building identifying what programs will be implemented to meet the non-SOV goals of the project. Periodic surveys will be conducted to evaluate the TDM program effectiveness and adjustments will be made, if needed, to reach the project non-SOV goals.

Metro District Supported Programs

- *Shuttles to High Capacity Transit*: The Metro District should provide operating funds for shuttle service that connects to the Flatiron Flyer BRT station and downtown Louisville. The shuttle service could be operated with an on-demand app and/or fixed route.

- *TDM Coordinator*: The Metro District should hire a coordinator or work with a local transportation management organization to manage the transportation needs, barriers, incentives, programs, etc. This staff member or support organization should provide employees with important travel information including transit maps and schedules, bicycle maps, local and regional marketing campaigns, and information on the commute benefits provided to employees and residents. They should assist the Metro District in working toward the project's non-SOV mode share goals. In addition, the TDM coordinator would be responsible for coordinating the following programs/tools:

    - *TDM Plan evaluation*: provide periodic surveys of employee and resident travel behavior to evaluate the TDM Plan. The survey is designed to collect anonymous travel information and takes less than 10 minutes to complete.
    - *Employee Carpools and Vanpools*: work with vertical developer/employers to implement this program on-site.
    - *Walk and Bike Month:* actively encourage employees and residents to register and participate in Bike to Work Day (June) or Winter Bike to Work Day (January).

- *Orientation packets*: prepare electronic orientation packets to employers and residents that will include non-SOV program information and incentives. This information will be located on the district website.

- *Bicycle Access*: Bicycle access to the site should be provided via Complete Streets and multi-use trails as shown on the GDP submittal maps.

Vertical Developer Supported Programs

- *Flexible work schedules and telecommuting:* work with employers to encourage this program. This program will also be supported by the TDM Coordinator.

- *Employee EcoPasses*: RTD EcoPasses should be made available to all on-site employees. The Metro District will work with the employers to provide the passes to employees free of charge. Consider also including the *Guaranteed Ride Home Program* as an optional benefit that can be added to the EcoPasses. The Metro District should provide a portion of the funding support for this program.

- *Bicycle Parking:* Future site plans should include outdoor short-term bicycle parking at a ratio of 1 per 1,500 square feet of commercial use and 0.5 spaces per residential dwelling unit. Long-term bicycle parking inside buildings or in covered parking areas should be provided at a rate of at least one secure area per building that is over 30,000 square feet of commercial or residential space. The long-term parking should be a bicycle room with limited access or a caged secure area within a parking area protected from the weather. The secure long-term bicycle parking area should include space for one bicycle per dwelling unit or per 1,000 square feet of floor area.

- *Bicycle Amenities*: In addition to the range of bicycle parking spaces described above and shown on the GDP, bike tool/repair spaces and storage for bike trailers should be provided near the long-term bike parking area and along the Complete Streets within the project area.

- *On-Site bicycle Commuter Amenities*: Buildings over 30,000 square feet should include showers and changing facilities for employees within the building. Future submittals should include detailed designs and access.

- *eGo Carshare*: Office and multifamily residential buildings over 100,000 square feet should allocate parking spaces for eGo Carshare. The utilization of this service should be monitored to determine the appropriate number of spaces to allocate for eGo.

E - Non-SOV References

Appendix: Trip Generation and Mode Share Peer Data

Commuter Travel Survey / Trip Rate Examples:

1. City of Louisville Transportation Master Plan (TMP), October 1, 2019
   https://www.louisvilleco.gov/home/showdocument?id=24728

   The TMP documented how commuters in Louisville and nearby communities travel to work. This data is based on US Census American Community Survey (https://www.census.gov/programs-surveys/acs). This data is commonly used by agencies across the Denver region as a baseline for TDM programs. The current data is shown in Figure 3.12 in the TMP on page 3-18 for year 2012 to 2016 estimates. Based on this data, approximately 28% of people who work in Louisville travel to work by non-SOV modes.

2. Trip Generation for Continuing Care Retirement Communities (CCRC); a Comparison of ITE Rates to Erickson Living Communities, 2007

   The Traffic Group, Inc. conducted trip generation studies in 2007 at four continuing care communities owned by Erickson Living. The trip rates were compared to ITE land use codes and found to generate at a consistent trip rate with the land use code #255 "Continuing Care Retirement Community" trip rate. The report also noted that shuttles to public transit and staggered work hours could further reduce the vehicular traffic generated by the site by up to 10-15%.

3. Commuting Solutions, 2016 Northwest Metro Region Mobility Report, July 2018
   https://commutingsolutions.org/wp-content/uploads/2016-Northwest-Region-Mobility-Report.pdf

   The mode share data bulleted on page 14 is based on employee commute survey data for employees who reside in Boulder, Louisville, Superior, Broomfield, and Westminster. The 2011-2015 five-year estimates indicate that approximately 22% of people who work in the US 36 corridor travel to work by non-SOV modes. Note that these statistics reflect data collected prior to the opening of the US 36 Express Lanes and the Flatiron Flyer BRT. Additional mode share on US 36 data for Louisville is provided in Table 2 on page 16, which indicates that approximately 26% of residents travel by non-SOV modes.

4. Environmental Performance Report 2014, National Renewable Energy Lab (NREL)
   https://www.nrel.gov/docs/fy15osti/64208.pdf

   NREL collected a lab-wide commuter survey and summarized the results in Table 8 on page 79 of the report. The 2014 mode survey found that approximately 29% of employees used non-SOV modes to travel to/from work (the telework employees, which make up 9%, were removed from the calculation).

5. Denver Tech Center (DTC) Trip Generation Summary, Fox Tuttle Transportation Group, January 2020 (attachment)

   Driveway count data collected at a mix of apartment, hotel, and office buildings in the South Denver Metro area were compared to the ITE trip generation estimates. As shown in Table 1 on page 2, in general this area generates trips at a lower rate than the ITE trip generation estimates. It should be noted that is unknown what level of TDM strategies (if any) are currently implemented at the buildings where counts were collected.

Trip Generation Analysis Studies:

The studies listed below indicate that baseline ITE trip rates generally overestimate trip generation estimates for mixed-use developments or developments near transit and/or with TDM programs.

1. National Cooperative Highway Research Program (NCHRP) 08-66: Trip-Generation Rates for Transportation Impact Analyses of Infill Developments

- https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1616

2. National Cooperative Highway Research Program (NCHRP) NCHRP 08-51: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments

- https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=927

3. CDOT Traffic Analysis And Forecasting Guidelines "Locally Calibrated Trip Generation Rates or ITE trip rates"

- https://www.codot.gov/library/traffic/traffic-manuals-and-guidelines/traffic_analysis_forecasting_guidelines/traffic_analysis_forecasting_guidelines

4. Aspen Trip Generation and Methods

- http://www.apacolorado.org/article/nextgen-trip-reduction-mitigating-development-related-trips
- https://www.cityofaspen.com/DocumentCenter/View/2208/TIA-Guidelines

5. Mixed-Use Trip Generation Model, EPA Smart Growth, Fehr and Peers

- https://www.epa.gov/smartgrowth/mixed-use-trip-generation-model
- https://www.epa.gov/sites/production/files/2014-07/mxd_trip_generation_model.xlsx

6. Caltrans Project P359, Trip Generation Rates for Transportation Impact Analyses of Smart Growth Land Use Projects, Texas A&M Transportation Institute The Texas A&M University System, April 2017

- https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2017-3.pdf

MEMORANDUM

To: Redtail Ridge Project Team

From: Bill Fox, PE and Emily Kotz, PE

Date: January 10, 2020

Subject: Denver Technology Center (DTC) Trip Generation Summary

Fox Tuttle Transportation Group collected trip generation data in September 2019 at a mix of office, residential, and hotel sites in the South Denver Metro Area. The sites were located within walking distance of the Belleview Station, Arapahoe at Village Center, or Lincoln Station. AM and PM peak period driveway counts were collected at apartments, hotels, and office buildings. This memorandum summarizes the data collected and was prepared for use in the Redtail Ridge project.

Locations where driveway count data was collected are listed below:

- Belleview Station
  - Extended Stay Hotel (158 rooms)
  - One Belleview Office Building (318,000 square feet) –*first floor retail*
  - Camden Belleview Station Apartments (270 dwelling units)
  - Cielo Apartments (201 dwelling units)
- Arapahoe at Village Center
  - Residence Inn (128 rooms)
  - 6312, 6363, 6399, 6501, 6340, 6360, 6380, and 6400 Fiddlers Green Offices (approximately 2,287,000 square feet of office)
- Lincoln Station
  - Camden Lincoln Station Apartments (267 dwelling units)

The actual observed rate was compared to the trip rates contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual* for land use #221 "Multifamily Housing (Mid-Rise)", #710 "General Office Building" and #312 "Business Hotel". Note that per the recommendations of the *ITE Handbook, 3rd Edition*, the office rate was calculated using the fitted curve for each building ($R^{2°}$value greater than 0.75) and the residential and hotel uses were calculated using the average rate ($R^{2°}$value less than 0.75).

A summary of the driveway counts and ITE trip generation estimates are provided in Table 1. It should be noted that it is unknown what level of Travel Demand Management (TDM) strategies (if any) are implemented at the buildings where driveway counts were collected.

Table 1 – Comparison of Driveway Counts and. ITE Trip Generation Estimates

Location (Land Use)	Size	AM Peak Hour Trips			PM Peak Hour Trips		
		Total (Counts)	Total (ITE)	% Diff.	Total (Counts)	Total (ITE)	% Diff.
Hotel	286 rooms	73	112	-35%	80	92	-13%
Multifamily Apartments	537 DU	182	266	-32%	247	324	-24%
Offices	2,605 KSF	2,650	2,676	-1%	2,443	2,808	-13%

Results of the trip generation comparison in Table 1 indicates that in general this area generates trips at a lower rate than the ITE trip generation estimates. The ITE rates are based primarily on studies that were performed in suburban centers where there is a lack of transit and alternative mode options. Therefore, it was expected that the driveway counts collected near the RTD stations would in general be less than the ITE trip rates, since those areas have access to transit and include a mix of uses within a high-density development.

F - Internal Capture

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Redtail Ridge	**Organization:**	FTH
Project Location:	Louisville	**Performed By:**	E. Gross
Scenario Description:	Full Build	**Date:**	
Analysis Year:	2040	**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		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				2443	2066	377
Retail				66	42	24
Restaurant				0		
Cinema/Entertainment				0		
Residential				470	179	291
Hotel				94	39	55
All Other Land Uses[2]				0		
Total				3073	2326	747

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	10%	5%	1.00	10%	5%
Retail	2.00	5%	5%	2.00	5%	5%
Restaurant						
Cinema/Entertainment						
Residential	1.00	10%	5%	1.00	10%	5%
Hotel	2.00	0%	5%	2.00	0%	5%
All Other Land Uses[2]						

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		27	0	0	0	0
Retail	14		0	0	4	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	6	3	0	0		0
Hotel	62	3	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	3,233	2,407	826
Internal Capture Percentage	7%	5%	14%
External Vehicle-Trips[3]	2,467	1,895	572
External Transit-Trips[4]	284	219	65
External Non-Motorized Trips[4]	151	115	36

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	7%
Retail	39%	38%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	3%
Hotel	0%	59%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Redtail Ridge	**Organization:**	FTH
Project Location:	Louisville	**Performed By:**	E Gross
Scenario Description:	Full Build	**Date:**	
Analysis Year:	2040	**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		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				2451	391	2060
Retail				266	127	139
Restaurant				0		
Cinema/Entertainment				0		
Residential				564	308	256
Hotel				77	42	35
All Other Land Uses[2]				0		
Total				3358	868	2490

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00	10%	5%	1.00	10%	5%
Retail	2.00	5%	5%	2.00	5%	5%
Restaurant						
Cinema/Entertainment						
Residential	1.00	10%	5%	1.00	10%	5%
Hotel	2.00	0%	5%	2.00	0%	5%
All Other Land Uses[2]						

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		20	0	0	12	0
Retail	6		0	0	72	14
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	10	25	0	0		8
Hotel	0	5	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	3,701	1,037	2,664
Internal Capture Percentage	9%	17%	6%
External Vehicle-Trips[3]	2,651	631	2,020
External Transit-Trips[4]	303	70	233
External Non-Motorized Trips[4]	167	43	124

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	2%
Retail	20%	33%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	27%	17%
Hotel	26%	7%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

G - Intersection Capacity Worksheets (SimTraffic)
Existing

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.4	3.9	0.5	0.6	2.9	2.2	0.2	0.3	2.3	0.2	2.2
Total Del/Veh (s)	84.3	72.2	2.3	73.8	53.2	3.1	71.7	22.9	3.3	75.5	20.1	3.2

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	30.7

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	0.2	82.5	43.7	26.3	0.0	23.3	34.2
Total Del/Veh (s)	26.9	3.1	62.4	10.3	221.0	72.4	7.9	43.2

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	31.7	27.7	7.0	25.5	33.1	6.5	48.3	34.7	1.8	31.7	67.5	11.6

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	32.3

20: 88th Street Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.4	0.3	2.2	0.4	0.6	8.5	10.8	10.5	24.4	7.6	16.3
Total Del/Veh (s)	58.6	64.7	9.4	45.5	56.7	23.3	49.5	82.4	36.2	176.9	74.5	53.9

20: 88th Street Performance by movement

Movement	All
Denied Del/Veh (s)	12.8
Total Del/Veh (s)	85.9

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.5	0.1	3.5	3.3	3.5	11.3	0.0	0.0	0.0
Total Del/Veh (s)	58.6	62.7	4.0	47.3	48.2	1.3	95.1	6.0	1.0	58.1	82.5	3.8

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	50.6

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.2	0.1		0.9	0.1	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	62.9	40.3		39.7	31.6	5.9	59.8	10.2	3.3	43.3	12.5	8.8

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	13.7

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	63.4	60.8	2.0	20.4	6.4	8.6	6.8	11.5

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.3	1.1	3.1	0.2	2.5	0.0	0.0	0.5
Total Del/Veh (s)	43.2	44.6	1.5	12.3	2.9	55.7	5.2	15.1

45: 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.2	0.3	0.5	3.6	0.5
Total Del/Veh (s)	4.9	4.8	5.5	4.9	4.9	3.9	4.9

Total Network Performance

Denied Del/Veh (s)	9.8
Total Del/Veh (s)	81.6

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	35	98	108	344	556	220	159	186	436	391	112	196
Average Queue (ft)	4	36	30	206	262	94	38	101	218	195	17	61
95th Queue (ft)	21	82	76	343	453	180	122	170	385	358	71	155
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)		0	1	3	10				0			0
Queuing Penalty (veh)		0	0	7	23				0			1

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	265	322	317	222	150
Average Queue (ft)	107	152	139	87	6
95th Queue (ft)	199	271	254	198	58
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	1	4		6	
Queuing Penalty (veh)	4	6		6	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	NB	NB	NB	B12
Directions Served	T	R	L	T	T	T	T	L	L	R	T
Maximum Queue (ft)	356	126	490	578	507	2190	188	324	417	324	908
Average Queue (ft)	146	23	317	251	115	457	10	231	292	123	280
95th Queue (ft)	304	73	593	649	354	1843	122	347	455	374	1075
Link Distance (ft)	1552	1552		490	490	4320	601		324		1558
Upstream Blk Time (%)			11	13	0			0	21	1	2
Queuing Penalty (veh)			0	74	1			0	121	0	13
Storage Bay Dist (ft)			400					200		200	
Storage Blk Time (%)			29	0				44	53	1	
Queuing Penalty (veh)			82	1				251	303	3	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B9	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	L	T	T
Maximum Queue (ft)	280	257	238	85	502	198	248	237	75	326	303	271
Average Queue (ft)	148	120	81	27	46	95	149	117	33	159	186	135
95th Queue (ft)	257	220	175	63	281	172	222	194	62	279	297	238
Link Distance (ft)		601	601		490		648	648			483	483
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					1							
Storage Bay Dist (ft)	415			415		420			420	330		
Storage Blk Time (%)										0	0	
Queuing Penalty (veh)										1	0	

Intersection: 15: 96th St & Dillon Rd

Movement	B38	B38	B38	SB	SB	SB	SB
Directions Served	T			L	T	T	R
Maximum Queue (ft)	746	700	146	228	425	381	189
Average Queue (ft)	213	113	5	55	274	223	72
95th Queue (ft)	677	512	107	138	405	352	143
Link Distance (ft)	732	732	732		682	682	
Upstream Blk Time (%)	0	0	0				
Queuing Penalty (veh)	1	0	0				
Storage Bay Dist (ft)				335			335
Storage Blk Time (%)					7	1	
Queuing Penalty (veh)					6	4	

Intersection: 20: 88th Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B12
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R	T
Maximum Queue (ft)	142	89	251	322	203	892	270	460	520	1639	96	392
Average Queue (ft)	51	17	99	97	57	356	157	338	379	800	48	91
95th Queue (ft)	107	58	193	227	158	979	303	589	667	1905	80	341
Link Distance (ft)		564		1723		1354				1558		324
Upstream Blk Time (%)						5				12		4
Queuing Penalty (veh)						0				92		15
Storage Bay Dist (ft)	125		210		170		170	400	400		200	
Storage Blk Time (%)	2		1	2		25	5	29	42	0		
Queuing Penalty (veh)	1		3	4		122	20	100	145	1		

Intersection: 20: 88th Street

Movement	B12
Directions Served	
Maximum Queue (ft)	278
Average Queue (ft)	27
95th Queue (ft)	177
Link Distance (ft)	324
Upstream Blk Time (%)	1
Queuing Penalty (veh)	4
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 23: Bend

Movement	NB
Directions Served	T
Maximum Queue (ft)	346
Average Queue (ft)	12
95th Queue (ft)	128
Link Distance (ft)	682
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	B22	B22	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T		L	L	T	T	L	L
Maximum Queue (ft)	56	74	129	122	489	323	38	58	208	181	659	702
Average Queue (ft)	12	36	46	39	87	12	5	18	93	45	377	374
95th Queue (ft)	41	69	87	86	377	123	24	49	168	125	671	688
Link Distance (ft)			732	732	483	483			1056	1056		
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (ft)	280	280					180	180			700	700
Storage Blk Time (%)									1	0	4	5
Queuing Penalty (veh)									0	0	7	9

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	B39	SB	SB	SB	SB	SB	B33	B33	
Directions Served	T	T	T	T	L	L	T	T	R	T	T	
Maximum Queue (ft)	448	209	34	364	70	244	767	769	480	42	42	
Average Queue (ft)	84	36	1	13	12	54	403	403	80	3	2	
95th Queue (ft)	416	79	24	266	43	253	766	771	474	40	37	
Link Distance (ft)	941	941	2050	2050			877	877		1436	1436	
Upstream Blk Time (%)	0					0	1	1				
Queuing Penalty (veh)	1					0	0	0				
Storage Bay Dist (ft)					600	600			600			
Storage Blk Time (%)	0						13	13				
Queuing Penalty (veh)	0						7	35				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	R	L	T	T	R	L
Maximum Queue (ft)	23	5	17	162	179	15	55	18	269	244	57	47
Average Queue (ft)	1	0	1	53	104	1	20	1	128	98	20	9
95th Queue (ft)	10	4	12	119	170	8	45	8	230	189	50	35
Link Distance (ft)			716		680	680			623	623		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125	125		250			500	455			250	550
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	B39	B39	B39
Directions Served	L	T	T	T	T	
Maximum Queue (ft)	72	375	384	954	955	188
Average Queue (ft)	34	144	156	107	133	13
95th Queue (ft)	66	286	294	600	670	197
Link Distance (ft)		2050	2050	941	941	941
Upstream Blk Time (%)				0	0	0
Queuing Penalty (veh)				1	1	0
Storage Bay Dist (ft)	550					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	L	T	T	T	T	T	R
Maximum Queue (ft)	221	316	117	172	128	123	167	186	193	251
Average Queue (ft)	54	183	4	73	62	49	73	95	101	66
95th Queue (ft)	169	285	86	135	108	100	138	158	167	172
Link Distance (ft)		1442	1442		556	556		370	370	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	330			190			300			300
Storage Blk Time (%)		0		0						0
Queuing Penalty (veh)		0		0						0

Intersection: 37: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (ft)	453	204
Average Queue (ft)	24	7
95th Queue (ft)	209	109
Link Distance (ft)	648	648
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	T	T	L	L	T	T
Maximum Queue (ft)	154	169	214	175	202	216	119	127
Average Queue (ft)	65	90	124	82	103	125	64	77
95th Queue (ft)	121	148	195	159	167	187	106	122
Link Distance (ft)		1037	1760	1760		556	556	556
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	330				180			
Storage Blk Time (%)		1			0	3		
Queuing Penalty (veh)		4			1	5		

Intersection: 45: 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	94	12	76	131	80	67
Average Queue (ft)	41	0	32	38	32	10
95th Queue (ft)	78	6	66	98	69	44
Link Distance (ft)	807	807	1051	1051	793	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					2	0
Queuing Penalty (veh)					2	0

Network Summary

Network wide Queuing Penalty: 1489

Intersection	
Intersection Delay, s/veh	8.3
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	577	938	414
Demand Flow Rate, veh/h	588	957	423
Vehicles Circulating, veh/h	284	363	319
Vehicles Exiting, veh/h	458	509	1000
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.990	1.000
Approach Delay, s/veh	6.4	10.6	5.9
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.617	0.383	0.333	0.667	0.671	0.329
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	363	225	319	638	284	139
Cap Entry Lane, veh/h	1039	1115	967	1043	1007	1083
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.979	0.978
Flow Entry, veh/h	356	221	313	625	278	136
Cap Entry, veh/h	1015	1089	939	1012	985	1059
V/C Ratio	0.351	0.203	0.333	0.618	0.282	0.128
Control Delay, s/veh	7.2	5.2	7.4	12.2	6.5	4.5
LOS	A	A	A	B	A	A
95th %tile Queue, veh	2	1	1	4	1	0

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.7	3.4	0.5	0.5	2.8	2.2	0.3	0.3	2.1	0.2	2.0
Total Del/Veh (s)	51.1	51.3	3.5	50.7	39.5	2.9	66.1	35.7	3.8	53.7	27.4	3.8

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	31.8

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	86.1	5.6	53.4	11.2	85.5	2.5	2.3	42.6

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.8	0.6	0.0	0.0	0.0
Total Del/Veh (s)	31.2	42.2	7.9	114.0	31.7	12.5	43.1	87.3	3.5	42.7	55.9	7.7

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	51.5

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.7	1.0	0.7	2.4	0.4	3.3	0.4	3.4	0.4	0.1	0.3	1.1
Total Del/Veh (s)	56.9	110.7	16.6	37.7	13.2	30.4	37.0	6.0	32.2	25.6	6.8	30.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.3	0.1	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	45.7	39.8	3.2	39.1	40.8	1.1	49.8	8.1	1.0	51.1	29.4	1.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	24.3

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBT	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.9	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	35.9	42.0	7.3	29.1	13.7	5.6	47.9	5.3	4.6	11.4

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	51.5	53.7	1.5	26.0	14.5	15.2	6.9	15.8

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.6	1.2	3.0	0.6	1.8	0.0	0.0	0.8
Total Del/Veh (s)	45.2	51.0	2.5	32.6	10.9	61.4	6.3	25.3

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.2	0.7	3.3	0.7
Total Del/Veh (s)	6.1	5.5	3.8	2.9	6.1	4.6	5.0

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	70.7

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	128	164	196	128	331	415	192	165	194	434	431	133
Average Queue (ft)	22	93	96	3	198	239	75	56	113	278	258	37
95th Queue (ft)	80	157	162	45	295	342	149	145	179	400	391	107
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	0	3	8		0	3				0		
Queuing Penalty (veh)	0	2	19		0	9				0		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	167	220	323	300	259	190
Average Queue (ft)	86	123	202	186	150	23
95th Queue (ft)	162	188	284	266	239	123
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	0	0	9		13	
Queuing Penalty (veh)	0	1	23		16	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	NB	NB	NB
Directions Served	T	R	L	T	T	T	T	L	L	R
Maximum Queue (ft)	1302	988	420	257	194	43	249	180	218	31
Average Queue (ft)	634	95	204	74	73	2	9	96	120	1
95th Queue (ft)	1193	499	369	199	165	35	109	168	196	23
Link Distance (ft)	1552	1552		490	490	4320	601		324	
Upstream Blk Time (%)			0	0						
Queuing Penalty (veh)			0	0						
Storage Bay Dist (ft)			400					200		200
Storage Blk Time (%)			1					0	1	
Queuing Penalty (veh)			3					1	7	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	B37	NB
Directions Served	L	T	T	R	T		L	T	T	R	T	L
Maximum Queue (ft)	301	373	305	107	506	290	578	697	574	108	712	381
Average Queue (ft)	145	227	183	48	146	14	393	335	181	47	170	86
95th Queue (ft)	256	347	297	91	515	145	658	767	490	88	779	282
Link Distance (ft)		601	601		490	490		648	648		1613	
Upstream Blk Time (%)					1	0		14	0			0
Queuing Penalty (veh)					5	0		0	0			0
Storage Bay Dist (ft)	415			415			420			420		330
Storage Blk Time (%)							34	0				0
Queuing Penalty (veh)							72	0				0

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	B22	B38	B38	SB	SB	SB	SB
Directions Served	T	T	R	T	T		L	T	T	R
Maximum Queue (ft)	521	519	290	364	580	522	316	425	354	119
Average Queue (ft)	379	350	65	51	78	23	74	241	193	39
95th Queue (ft)	543	544	336	279	381	203	178	368	316	86
Link Distance (ft)	483	483		2061	732	732		682	682	
Upstream Blk Time (%)	5	3	0		0	0				
Queuing Penalty (veh)	24	14	0		0	0				
Storage Bay Dist (ft)			330				335			335
Storage Blk Time (%)	30	19					0	3	0	
Queuing Penalty (veh)	22	42					0	4	1	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B12
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R	T
Maximum Queue (ft)	174	330	136	161	86	299	144	185	192	410	219	70
Average Queue (ft)	124	85	40	51	11	133	27	37	61	161	35	2
95th Queue (ft)	190	269	93	111	54	250	101	123	140	325	130	51
Link Distance (ft)		564		1723		1354				1558		324
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	125		210		170		170	400	400		200	
Storage Blk Time (%)	18	0		0		6				6		
Queuing Penalty (veh)	12	0		0		6				17		

Intersection: 23: Bend

Movement	NB	NB
Directions Served	T	
Maximum Queue (ft)	652	560
Average Queue (ft)	239	68
95th Queue (ft)	683	333
Link Distance (ft)	682	682
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	B22	B22	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T		L	L	T	T	L	L
Maximum Queue (ft)	127	139	113	140	506	437	35	51	132	97	407	408
Average Queue (ft)	65	77	62	66	136	29	4	17	68	22	264	259
95th Queue (ft)	107	119	102	111	480	201	20	44	111	61	380	378
Link Distance (ft)			732	732	483	483			1056	1056		
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					3	0						
Storage Bay Dist (ft)	280	280					180	180			700	700
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T
Maximum Queue (ft)	156	173	32	56	224	228
Average Queue (ft)	71	79	3	23	136	131
95th Queue (ft)	135	143	19	54	200	202
Link Distance (ft)	941	941			877	877
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			600	600		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	B29	B29	SB	SB
Directions Served	T	L	L	R	L	T	T	R	T	T	L	L
Maximum Queue (ft)	16	88	150	49	10	383	406	244	379	378	33	67
Average Queue (ft)	1	26	67	15	0	201	188	36	26	27	4	28
95th Queue (ft)	8	67	125	40	4	338	332	135	184	189	21	61
Link Distance (ft)	716		680			623	623		370	370		
Upstream Blk Time (%)									0	0		
Queuing Penalty (veh)									1	2		
Storage Bay Dist (ft)		250		500	455			250			550	550
Storage Blk Time (%)							2					
Queuing Penalty (veh)							4					

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39
Directions Served	T	T	T
Maximum Queue (ft)	156	177	182
Average Queue (ft)	57	70	6
95th Queue (ft)	122	139	133
Link Distance (ft)	2050	2050	941
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	175	258	332	383	388	185	192	211	184
Average Queue (ft)	33	133	195	181	182	98	113	128	63
95th Queue (ft)	118	225	309	313	312	169	181	192	142
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				0					
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)		0	8	4					
Queuing Penalty (veh)		0	64	18					

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	567	386	124
Average Queue (ft)	94	38	9
95th Queue (ft)	426	266	127
Link Distance (ft)	648	648	648
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	222	273	119	638	613	323	165	178	115	130
Average Queue (ft)	132	157	6	347	314	38	97	110	63	77
95th Queue (ft)	210	235	77	585	552	224	151	164	103	125
Link Distance (ft)		1037		1760	1760			556	556	556
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)		12			7		0	1		
Queuing Penalty (veh)		81			12		0	2		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	127	22	54	28	147	68
Average Queue (ft)	48	1	14	1	42	12
95th Queue (ft)	94	11	44	12	99	51
Link Distance (ft)	807	807	1051	1051	793	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					4	0
Queuing Penalty (veh)					7	1

Network Summary

Network wide Queuing Penalty: 498

Intersection	
Intersection Delay, s/veh	6.2
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	544	474	641
Demand Flow Rate, veh/h	555	483	654
Vehicles Circulating, veh/h	439	147	213
Vehicles Exiting, veh/h	428	847	417
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	7.0	4.8	6.5
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.470	0.530	0.441	0.559	0.671	0.329
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	261	294	213	270	439	215
Cap Entry Lane, veh/h	901	978	1179	1253	1110	1185
Entry HV Adj Factor	0.980	0.981	0.980	0.981	0.979	0.981
Flow Entry, veh/h	256	288	209	265	430	211
Cap Entry, veh/h	882	958	1154	1228	1087	1163
V/C Ratio	0.290	0.301	0.181	0.216	0.396	0.181
Control Delay, s/veh	7.2	6.9	4.7	4.8	7.4	4.7
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	1	1	2	1

G - Intersection Capacity Worksheets (SimTraffic)
Year 2025 Background

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.3	3.9	0.6	0.6	2.8	2.1	0.2	0.4	2.3	0.2	2.2
Total Del/Veh (s)	49.3	53.3	2.1	39.4	32.8	3.0	47.0	28.8	3.7	51.1	23.6	3.1

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	25.2

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	119.4	66.1	1.0	0.0	0.4	39.1
Total Del/Veh (s)	217.3	17.3	75.1	7.8	60.1	4.0	2.5	58.2

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	95.2	37.0	9.0	42.1	76.6	8.8	86.9	34.3	2.2	50.0	132.7	38.6

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	61.8

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.9	0.4	0.3	2.3	0.5	0.6	1.1	0.6	0.8	15.7	5.6	21.8
Total Del/Veh (s)	48.9	62.5	14.0	59.3	77.6	40.0	87.6	117.6	76.3	191.5	81.3	56.4

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	7.1
Total Del/Veh (s)	106.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.4	0.1	3.2	18.1	6.5	14.2	0.0	0.0	0.0
Total Del/Veh (s)	87.8	103.3	4.0	59.0	72.4	1.4	209.0	4.4	1.0	74.7	74.6	3.8

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	4.5
Total Del/Veh (s)	74.4

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.8	3.6	0.1	0.0	0.0	0.0	0.2
Total Del/Veh (s)	48.1	6.7	17.2	5.5	59.1	10.5	16.3

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	58.0	62.0	2.0	22.2	7.9	10.8	8.0	12.4

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.3	1.2	3.4	0.2	2.4	0.0	0.0	0.6
Total Del/Veh (s)	50.9	49.5	1.7	14.4	3.6	65.7	5.5	18.5

Total Zone Performance

Denied Del/Veh (s)	20.0
Total Del/Veh (s)	1544.2

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	32	101	85	256	282	173	132	163	411	390	113	170
Average Queue (ft)	2	35	28	148	192	80	20	81	242	214	21	53
95th Queue (ft)	15	76	68	240	268	153	72	138	383	358	82	135
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)		0		0	0				0			0
Queuing Penalty (veh)		0		0	1				0			0

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	195	267	249	202	101
Average Queue (ft)	98	164	145	97	4
95th Queue (ft)	172	239	223	191	45
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	0	4		6	
Queuing Penalty (veh)	1	7		6	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	B2	B2	WB	WB	WB	B9	B19	B19	NB	NB
Directions Served	T	R	T	T	L	T	T	T	T		L	L
Maximum Queue (ft)	1590	1372	111	72	490	577	520	3976	549	396	224	242
Average Queue (ft)	725	289	8	5	378	343	111	1461	145	111	117	125
95th Queue (ft)	1603	1022	77	67	624	744	347	4406	552	498	208	220
Link Distance (ft)	1529	1529	1895	1895		490	490	4320	601	601		324
Upstream Blk Time (%)	6	1			19	23	0	13	6	4	0	0
Queuing Penalty (veh)	0	0			0	135	1	142	32	22	0	0
Storage Bay Dist (ft)					400						200	
Storage Blk Time (%)					40	0					3	4
Queuing Penalty (veh)					121	0					16	23

Intersection: 10: 88th Street & Dillon Rd

Movement	NB
Directions Served	R
Maximum Queue (ft)	125
Average Queue (ft)	4
95th Queue (ft)	60
Link Distance (ft)	
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	200
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B19	B9	B9	WB	WB	WB	WB	B37
Directions Served	L	T	T	R	T	T		L	T	T	R	T
Maximum Queue (ft)	521	480	345	165	398	505	84	284	414	416	169	275
Average Queue (ft)	347	235	120	33	85	76	3	142	232	209	60	71
95th Queue (ft)	588	575	322	111	570	368	67	324	466	445	242	608
Link Distance (ft)		601	601		4320	490	490		648	648		1613
Upstream Blk Time (%)		7	0			0	0		4	1		3
Queuing Penalty (veh)		33	0			2	0		0	0		0
Storage Bay Dist (ft)	415			415				420			420	
Storage Blk Time (%)	20	0						0	6	6		
Queuing Penalty (veh)	42	0						0	12	5		

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B22	B38	B38	B38	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T			L	T	T	R
Maximum Queue (ft)	410	418	367	161	719	755	757	383	438	672	659	467
Average Queue (ft)	220	237	178	20	198	417	333	27	190	464	441	246
95th Queue (ft)	427	458	369	179	1164	926	877	258	527	738	763	554
Link Distance (ft)		483	483		2061	732	732	732		682	682	
Upstream Blk Time (%)	6	7	0	0	5	2	2	1		5	7	
Queuing Penalty (veh)	0	42	1	0	60	8	7	3		0	0	
Storage Bay Dist (ft)	330			330					335			335
Storage Blk Time (%)	14	0	0						0	52	31	6
Queuing Penalty (veh)	43	0	0						0	54	132	21

Intersection: 15: 96th St & Dillon Rd

Movement	B23
Directions Served	T
Maximum Queue (ft)	623
Average Queue (ft)	146
95th Queue (ft)	796
Link Distance (ft)	2350
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B12
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R	T
Maximum Queue (ft)	132	109	329	671	269	1718	270	460	520	1652	107	381
Average Queue (ft)	50	21	126	162	88	709	209	357	400	902	47	134
95th Queue (ft)	105	61	264	521	239	1740	349	596	673	2043	85	410
Link Distance (ft)		565		1724		3909				1558		324
Upstream Blk Time (%)										19		8
Queuing Penalty (veh)										175		44
Storage Bay Dist (ft)	125		210		170		170	400	400		200	
Storage Blk Time (%)	1	0	3	9	0	44	6	34	48	1		
Queuing Penalty (veh)	0	0	9	17	0	226	26	132	186	3		

Intersection: 20: 88th Street & Campus Dr

Movement	B12
Directions Served	
Maximum Queue (ft)	376
Average Queue (ft)	65
95th Queue (ft)	295
Link Distance (ft)	324
Upstream Blk Time (%)	5
Queuing Penalty (veh)	30
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	B22	B22	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T		L	L	T	T	L	L
Maximum Queue (ft)	86	108	164	169	510	496	40	90	256	238	787	870
Average Queue (ft)	25	43	75	68	185	74	7	26	140	100	615	663
95th Queue (ft)	69	87	146	143	550	340	28	66	230	212	947	1073
Link Distance (ft)			732	732	483	483			1056	1056		
Upstream Blk Time (%)					1	0						
Queuing Penalty (veh)					4	0						
Storage Bay Dist (ft)	280	280					180	180			700	700
Storage Blk Time (%)			0	1					7	1	37	41
Queuing Penalty (veh)			0	6					3	1	71	80

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	B39	B39	SB	SB	SB	SB	SB	B33	B33
Directions Served	T	T	T	T	T	L	L	T	T	R	T	T
Maximum Queue (ft)	972	173	1291	1203	1078	98	488	808	820	533	38	55
Average Queue (ft)	485	34	567	490	345	18	69	414	420	57	2	3
95th Queue (ft)	1298	111	1896	1799	1409	61	277	746	753	397	24	31
Link Distance (ft)	941	941	2050	2050	2050			877	877		1436	1436
Upstream Blk Time (%)	26		4	2	1		0	2	2			
Queuing Penalty (veh)	110		18	7	3		0	0	0			
Storage Bay Dist (ft)						600	600			600		
Storage Blk Time (%)	6							8	8			
Queuing Penalty (veh)	50							6	23			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B41	B41	B29	B29	SB	SB
Directions Served	L	L	R	T	T	R	T	T	T	T	L	L
Maximum Queue (ft)	191	230	65	378	345	161	139	135	45	96	64	86
Average Queue (ft)	82	132	26	153	131	31	30	29	4	6	14	46
95th Queue (ft)	170	212	51	409	387	143	263	262	54	67	44	80
Link Distance (ft)		680		623	623		713	713	370	370		
Upstream Blk Time (%)				4	3		2	2				
Queuing Penalty (veh)				26	21		12	11				
Storage Bay Dist (ft)	250		500			250					550	550
Storage Blk Time (%)		0		5	4							
Queuing Penalty (veh)		0		0	6							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39	B39	B39
Directions Served	T	T	T	T	
Maximum Queue (ft)	324	328	944	957	309
Average Queue (ft)	122	128	112	131	11
95th Queue (ft)	247	259	602	659	177
Link Distance (ft)	2050	2050	941	941	941
Upstream Blk Time (%)			0	0	0
Queuing Penalty (veh)			0	1	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	244	335	180	181	183	250	273	280	227
Average Queue (ft)	52	191	77	87	84	112	135	139	75
95th Queue (ft)	178	306	141	168	166	216	239	244	175
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)						0	0	0	
Queuing Penalty (veh)						0	0	0	
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)	0	2	0	0			0	0	0
Queuing Penalty (veh)	0	2	1	1			0	0	1

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	T	T	R	L	L	T	T
Maximum Queue (ft)	160	187	290	246	26	243	263	129	157
Average Queue (ft)	88	119	147	106	1	148	169	53	69
95th Queue (ft)	150	174	233	205	12	221	241	106	128
Link Distance (ft)		1037	1760	1760			556	556	556
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330				300	180			
Storage Blk Time (%)		3		0		6	14		
Queuing Penalty (veh)		14		0		12	30		

Zone Summary

Zone wide Queuing Penalty: 2344

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	622	992	484
Demand Flow Rate, veh/h	635	1011	493
Vehicles Circulating, veh/h	327	401	329
Vehicles Exiting, veh/h	495	561	1083
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.991	1.000
Approach Delay, s/veh	7.2	12.4	6.3
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.631	0.369	0.325	0.675	0.663	0.337
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	401	234	329	682	327	166
Cap Entry Lane, veh/h	999	1075	933	1010	997	1074
Entry HV Adj Factor	0.980	0.980	0.980	0.981	0.982	0.982
Flow Entry, veh/h	393	229	323	669	321	163
Cap Entry, veh/h	975	1050	907	982	979	1054
V/C Ratio	0.403	0.218	0.356	0.681	0.328	0.155
Control Delay, s/veh	8.2	5.5	7.9	14.5	7.1	4.8
LOS	A	A	A	B	A	A
95th %tile Queue, veh	2	1	2	6	1	1

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.7	3.4	0.5	0.5	2.8	2.1	0.3	0.4	2.1	0.2	2.0
Total Del/Veh (s)	51.2	54.4	3.5	51.3	40.7	2.8	67.0	36.7	4.4	54.0	27.1	3.9

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	32.1

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	2.5	2.2	0.0	0.0	0.0	0.0	0.0	1.0
Total Del/Veh (s)	147.5	13.8	41.8	7.7	40.2	1.2	2.3	56.5

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	58.1	55.2	10.8	177.0	48.2	16.0	39.7	56.8	2.4	49.3	47.9	9.2

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	55.0

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.8	1.1	0.5	2.2	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.7
Total Del/Veh (s)	62.8	84.0	17.4	38.0	11.8	33.1	39.6	8.6	25.7	30.6	7.7	32.6

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.4	0.1	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	43.7	49.9	3.3	38.0	42.4	1.2	58.5	9.1	0.8	44.6	33.6	1.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	28.2

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.8	3.9	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	40.8	8.2	15.6	6.4	45.1	6.1	12.8

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	44.9	42.8	1.6	27.6	16.3	15.9	8.1	16.5

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.6	2.0	3.0	0.6	1.7	0.0	0.0	0.8
Total Del/Veh (s)	46.5	47.5	2.8	39.3	11.7	61.5	6.4	28.6

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	1945.9

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	140	172	217	126	329	386	159	180	204	409	390	154
Average Queue (ft)	30	97	101	6	217	256	75	66	119	284	265	44
95th Queue (ft)	102	154	178	64	310	342	139	162	187	411	387	123
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	0	3	10		0	4				0		
Queuing Penalty (veh)	0	3	26		1	12				0		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	194	230	297	284	234	186
Average Queue (ft)	99	134	208	194	152	17
95th Queue (ft)	181	204	280	266	232	104
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	0	1	10		16	
Queuing Penalty (veh)	1	3	28		19	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	NB	NB
Directions Served	T	R	L	T	T	T	T	L	L
Maximum Queue (ft)	1386	1198	368	264	244	34	394	137	135
Average Queue (ft)	965	502	194	71	66	2	21	62	81
95th Queue (ft)	1726	1571	346	211	164	26	188	116	126
Link Distance (ft)	1552	1552		490	490	4320	601		324
Upstream Blk Time (%)	11	5	1	0	0				
Queuing Penalty (veh)	0	0	0	2	0				
Storage Bay Dist (ft)			400					200	
Storage Blk Time (%)			2	0					
Queuing Penalty (veh)			7	0					

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	B37	NB
Directions Served	L	T	T	R	T		L	T	T	R	T	L
Maximum Queue (ft)	444	371	329	151	508	369	580	739	678	126	1627	157
Average Queue (ft)	255	246	208	60	157	20	506	518	290	52	555	54
95th Queue (ft)	429	338	306	119	534	173	699	926	689	103	1581	110
Link Distance (ft)		601	601		490	490		648	648		1613	
Upstream Blk Time (%)					1	0		33	1		9	
Queuing Penalty (veh)					5	0		0	0		0	
Storage Bay Dist (ft)	415			415			420			420		330
Storage Blk Time (%)	2						63	0				
Queuing Penalty (veh)	6						152	0				

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	B38	B38	SB	SB	SB	SB
Directions Served	T	T	R	T		L	T	T	R
Maximum Queue (ft)	437	428	94	649	658	257	378	359	148
Average Queue (ft)	321	285	3	63	45	94	250	207	56
95th Queue (ft)	426	418	69	352	316	184	351	312	111
Link Distance (ft)	483	483		732	732		682	682	
Upstream Blk Time (%)		0	0	0	0				
Queuing Penalty (veh)		0	0	0	0				
Storage Bay Dist (ft)			330			335			335
Storage Blk Time (%)	11	4				0	1	0	
Queuing Penalty (veh)	10	9				0	2	0	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B12
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R	T
Maximum Queue (ft)	174	371	117	112	130	320	223	87	103	429	270	145
Average Queue (ft)	125	105	46	46	15	168	31	28	54	197	40	5
95th Queue (ft)	192	326	95	87	79	284	105	70	89	357	156	76
Link Distance (ft)		565		1724		3909				1558		324
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	125		210		170		170	400	400		200	
Storage Blk Time (%)	23	0				11				11		
Queuing Penalty (veh)	15	0				9				23		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	B22	B22	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	T		L	L	T	T	L	L
Maximum Queue (ft)	125	139	152	160	500	449	30	84	155	122	477	472
Average Queue (ft)	66	76	84	89	125	39	4	25	83	35	306	294
95th Queue (ft)	112	119	131	143	466	243	20	60	136	81	436	424
Link Distance (ft)			732	732	483	483			1056	1056		
Upstream Blk Time (%)					1	0						
Queuing Penalty (veh)					4	0						
Storage Bay Dist (ft)	280	280					180	180			700	700
Storage Blk Time (%)									0			
Queuing Penalty (veh)									0			

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	SB	SB	SB	SB
Directions Served	T	T	T	L	L	T	T
Maximum Queue (ft)	170	194	407	43	68	234	233
Average Queue (ft)	77	87	15	5	28	144	143
95th Queue (ft)	140	158	297	25	56	211	216
Link Distance (ft)	941	941	2050			877	877
Upstream Blk Time (%)			0				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)				600	600		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	SB	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T	L	L	T	T
Maximum Queue (ft)	113	142	53	386	372	128	303	414	38	72	183	206
Average Queue (ft)	32	74	20	222	207	34	31	44	4	31	75	81
95th Queue (ft)	80	127	44	358	340	90	196	245	23	64	149	165
Link Distance (ft)		680		623	623		370	370			2050	2050
Upstream Blk Time (%)							0	0				
Queuing Penalty (veh)							0	3				
Storage Bay Dist (ft)	250		500			250			550	550		
Storage Blk Time (%)				0	3							
Queuing Penalty (veh)				0	7							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	B39	B39	B39
Directions Served	T	T	
Maximum Queue (ft)	518	366	188
Average Queue (ft)	19	18	7
95th Queue (ft)	226	224	137
Link Distance (ft)	941	941	941
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	184	213	342	406	376	199	208	212	215
Average Queue (ft)	31	121	209	198	205	107	121	134	76
95th Queue (ft)	110	197	326	316	317	184	190	202	167
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)			10	5					
Queuing Penalty (veh)			86	23					

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	244	269	118	718	694	390	191	198	120	114
Average Queue (ft)	148	176	2	403	360	74	104	117	64	75
95th Queue (ft)	227	248	42	632	598	322	161	172	107	112
Link Distance (ft)		1037		1760	1760			556	556	556
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)		19			13		0	2		
Queuing Penalty (veh)		126			20		0	2		

Zone Summary

Zone wide Queuing Penalty: 604

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	591	536	710
Demand Flow Rate, veh/h	603	546	724
Vehicles Circulating, veh/h	479	180	222
Vehicles Exiting, veh/h	467	902	504
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	7.7	5.2	7.0
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.469	0.531	0.407	0.593	0.662	0.338
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	283	320	222	324	479	245
Cap Entry Lane, veh/h	869	945	1144	1219	1101	1176
Entry HV Adj Factor	0.981	0.978	0.980	0.981	0.981	0.980
Flow Entry, veh/h	278	313	218	318	470	240
Cap Entry, veh/h	851	923	1119	1194	1080	1152
V/C Ratio	0.326	0.339	0.194	0.266	0.435	0.208
Control Delay, s/veh	7.9	7.6	5.0	5.4	8.1	5.0
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	2	1	1	2	1

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.1	0.0	0.0	0.2	0.2
Total Del/Veh (s)	27.3	6.8	37.0	6.9	39.4	1.2	2.4	18.2

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	82.2	37.6	11.8	58.2	47.2	11.0	51.7	32.7	8.7	26.1	35.8	12.5

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	36.4

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.3	0.4	2.8	1.3	2.7	0.3	0.1	0.3	0.2	0.0	0.1
Total Del/Veh (s)	55.2	76.8	19.4	45.4	53.6	14.1	20.6	43.0	25.8	54.9	20.7	6.5

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	35.0

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	3.7	0.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	76.5	96.0	5.0	60.4	78.4	3.4	78.2	3.3	0.9	81.4	49.2	3.2

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	41.4

Total Zone Performance

Denied Del/Veh (s)	1.4
Total Del/Veh (s)	1377.3

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	B19	NB	NB
Directions Served	T	R	L	L	T	T	T		L	L
Maximum Queue (ft)	419	283	390	386	352	47	392	111	166	177
Average Queue (ft)	170	74	172	167	122	2	29	4	85	95
95th Queue (ft)	344	199	323	320	271	34	216	81	148	157
Link Distance (ft)	1553	1553			490	4320	602	602		318
Upstream Blk Time (%)				0	0		0			
Queuing Penalty (veh)				0	1		0			
Storage Bay Dist (ft)			400	400					200	
Storage Blk Time (%)			0	1	0				0	0
Queuing Penalty (veh)			1	4	0				0	0

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	316	295	256	218	115	403	201	165	195	294	284	128
Average Queue (ft)	185	163	148	109	32	35	7	82	109	181	150	46
95th Queue (ft)	296	277	229	192	73	246	104	142	171	272	242	92
Link Distance (ft)			602	602		490	490			648	648	
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						1	0					
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	B38	B38	B38	SB	SB	SB	SB
Directions Served	L	T	T	T	T		L	T	T	R
Maximum Queue (ft)	420	376	351	139	365	98	120	289	326	235
Average Queue (ft)	176	202	153	13	34	4	49	166	209	95
95th Queue (ft)	340	345	299	161	261	72	93	270	313	188
Link Distance (ft)		2594	2594	720	720	720		676	676	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	330						335			335
Storage Blk Time (%)	3	1	0					0	0	
Queuing Penalty (veh)	9	2	0					0	2	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	127	121	261	309	76	144	400	374	471	519	1071	561
Average Queue (ft)	54	25	108	53	53	42	116	124	160	193	242	80
95th Queue (ft)	113	74	216	196	87	96	297	278	385	455	677	265
Link Distance (ft)		564		1711			1326				1547	1547
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125		210		50	170		500	500	400		
Storage Blk Time (%)	2	0	2	2	12	0	4	1	1	7	8	0
Queuing Penalty (veh)	0	0	7	12	25	0	27	1	2	23	30	1

Intersection: 20: 88th Street & Campus Dr

Movement	SB
Directions Served	R
Maximum Queue (ft)	98
Average Queue (ft)	37
95th Queue (ft)	75
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	200
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	L	T
Maximum Queue (ft)	69	82	164	163	38	75	243	235	442	482	486	90
Average Queue (ft)	18	36	68	70	6	22	122	101	225	256	256	14
95th Queue (ft)	51	70	132	136	26	57	206	188	394	435	437	56
Link Distance (ft)			720	720			1056	1056				941
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			700	700	700	
Storage Blk Time (%)							5	3				
Queuing Penalty (veh)							2	1				

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	104	75	104	585	584	128
Average Queue (ft)	25	18	48	322	323	24
95th Queue (ft)	78	57	94	570	570	78
Link Distance (ft)	941			864	864	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		600	600			600
Storage Blk Time (%)				3	3	
Queuing Penalty (veh)				2	7	

Zone Summary

Zone wide Queuing Penalty: 163

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	52.8	3.0	49.1	7.1	45.7	0.8	2.3	28.1

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	61.2	50.0	17.3	61.5	41.9	15.2	36.2	56.9	3.3	38.2	33.2	8.7

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	41.3

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.7	0.6	0.7	2.5	0.3	0.2	0.0	0.1	0.0	0.0	0.0	0.7
Total Del/Veh (s)	52.0	47.0	15.8	35.5	9.2	22.4	30.3	4.9	20.5	25.2	8.3	26.5

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.2	0.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	45.4	47.4	4.3	38.5	39.8	1.3	47.7	8.4	0.9	46.1	24.2	1.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	24.0

Total Zone Performance

Denied Del/Veh (s)	1.9
Total Del/Veh (s)	1921.4

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B19	NB	NB	B12
Directions Served	T	R	L	L	T	T	L	L	T
Maximum Queue (ft)	968	441	212	234	285	236	148	165	9
Average Queue (ft)	452	46	124	141	106	6	65	87	0
95th Queue (ft)	825	224	197	212	241	86	116	139	6
Link Distance (ft)	1525	1525			490	602		318	1558
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			400	400			200		
Storage Blk Time (%)								0	
Queuing Penalty (veh)								0	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	255	240	378	329	178	519	198	272	292	279	269	136
Average Queue (ft)	157	135	241	199	80	181	14	165	183	187	163	58
95th Queue (ft)	233	216	356	311	143	574	144	246	265	263	243	104
Link Distance (ft)			602	602		490	490			648	648	
Upstream Blk Time (%)						2	0					
Queuing Penalty (veh)						10	0					
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			1	0								

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B22	B22	B38	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T	T	L	T	T	R
Maximum Queue (ft)	403	528	527	382	100	116	244	159	265	330	127
Average Queue (ft)	74	327	295	31	7	7	9	79	160	190	56
95th Queue (ft)	234	491	471	223	61	65	130	139	237	281	103
Link Distance (ft)		477	477		2061	2061	720		676	676	
Upstream Blk Time (%)	0	2	1	0			0				
Queuing Penalty (veh)	0	14	8	0			0				
Storage Bay Dist (ft)	330			330				335			335
Storage Blk Time (%)		13	6						0	0	
Queuing Penalty (veh)		11	15						0	1	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	L	T	R
Maximum Queue (ft)	174	327	112	114	32	137	147	57	88	101	417	268
Average Queue (ft)	127	86	44	41	7	74	80	22	31	54	179	40
95th Queue (ft)	195	261	86	74	25	124	137	51	73	87	355	171
Link Distance (ft)		564		1711		1326				1558	1558	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125		210		170		500	500	400			200
Storage Blk Time (%)	21	0		0		0					9	
Queuing Penalty (veh)	13	0		0		0					6	

Intersection: 20: 88th Street & Campus Dr

Movement	B12
Directions Served	T
Maximum Queue (ft)	4
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	318
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	L	T
Maximum Queue (ft)	134	136	136	140	34	63	126	100	267	289	287	167
Average Queue (ft)	64	70	67	81	5	23	71	39	181	207	195	71
95th Queue (ft)	112	115	117	133	24	54	118	79	254	277	260	138
Link Distance (ft)			720	720			1056	1056				941
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			700	700	700	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	160	23	66	214	193	44
Average Queue (ft)	79	4	21	124	115	9
95th Queue (ft)	138	16	49	190	176	31
Link Distance (ft)	941			864	864	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		600	600			600
Storage Blk Time (%)						
Queuing Penalty (veh)						

Zone Summary

Zone wide Queuing Penalty: 79

G - Intersection Capacity Worksheets (SimTraffic)
Year 2030 Background

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.3	3.8	0.5	0.6	2.9	2.2	0.3	0.4	2.2	0.2	2.2
Total Del/Veh (s)	53.1	47.9	2.1	42.7	37.3	2.9	52.0	29.9	3.7	50.7	25.2	3.3

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	26.8

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	0.3	0.1	0.0	0.1	0.0	0.2	0.2
Total Del/Veh (s)	28.2	7.5	34.4	7.1	42.4	0.9	2.5	18.5

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	62.5	36.2	14.2	63.7	51.1	10.3	76.5	37.2	9.8	30.0	44.8	14.1

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	39.6

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.4	0.3	2.7	0.8	2.7	0.3	0.2	0.3	1.4	0.6	0.1
Total Del/Veh (s)	47.9	74.3	23.3	46.0	51.8	17.1	22.6	44.5	23.5	62.2	19.8	7.5

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	37.3

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	3.5	0.2	3.5	0.2	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	69.6	110.0	5.6	60.6	73.8	3.0	103.3	4.8	1.0	76.8	84.2	5.5

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	56.6

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.8	3.4	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	43.1	5.9	12.3	3.9	57.5	18.5	18.6

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	49.9	52.3	2.1	23.9	7.8	9.8	7.6	11.5

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.4	1.3	3.4	0.2	2.3	0.0	0.0	0.5
Total Del/Veh (s)	51.3	51.1	1.7	16.6	3.7	53.3	5.0	16.9

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	1365.4

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	30	86	92	250	300	213	148	169	419	390	147	177
Average Queue (ft)	3	37	32	158	204	86	32	89	248	225	22	60
95th Queue (ft)	18	80	76	245	279	162	100	149	372	344	78	144
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)			0	0	1	0						0
Queuing Penalty (veh)			0	0	2	1						0

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	244	291	250	207	109
Average Queue (ft)	104	174	161	110	7
95th Queue (ft)	186	257	238	201	64
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	0	5		7	
Queuing Penalty (veh)	1	11		7	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	B19	NB	NB
Directions Served	T	R	L	L	T	T	T		L	L
Maximum Queue (ft)	410	369	335	357	398	16	515	83	190	215
Average Queue (ft)	181	81	172	165	127	1	67	6	98	108
95th Queue (ft)	331	233	292	287	276	12	341	85	169	179
Link Distance (ft)	1553	1553			490	4320	602	602		318
Upstream Blk Time (%)				0	0		0			
Queuing Penalty (veh)				0	1		0			
Storage Bay Dist (ft)			400	400					200	
Storage Blk Time (%)					0				0	1
Queuing Penalty (veh)					1				0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	281	270	261	218	119	507	272	156	199	319	288	104
Average Queue (ft)	172	151	145	113	42	98	6	82	110	201	175	42
95th Queue (ft)	264	243	221	191	92	421	95	150	180	295	268	80
Link Distance (ft)			602	602		490	490			648	648	
Upstream Blk Time (%)						1						
Queuing Penalty (veh)						4						
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B38	B38	B38	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T		L	T	T	R
Maximum Queue (ft)	458	638	574	11	362	335	94	130	331	411	236
Average Queue (ft)	240	244	192	0	27	31	3	58	206	250	102
95th Queue (ft)	433	498	443	8	218	227	69	110	311	362	188
Link Distance (ft)		2594	2594		720	720	720		676	676	
Upstream Blk Time (%)					0						
Queuing Penalty (veh)					0						
Storage Bay Dist (ft)	330			330				335			335
Storage Blk Time (%)	11	2	0						0	2	
Queuing Penalty (veh)	39	6	1						0	9	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	133	144	256	347	76	170	244	320	450	491	1076	859
Average Queue (ft)	52	28	110	64	53	45	110	123	153	211	307	137
95th Queue (ft)	104	94	220	257	86	113	203	252	351	487	911	560
Link Distance (ft)		564		1711			1326				1547	1547
Upstream Blk Time (%)											1	
Queuing Penalty (veh)											3	
Storage Bay Dist (ft)	125		210		50	170		500	500	400		
Storage Blk Time (%)	1	1	2	2	14		4	0	0	8	11	0
Queuing Penalty (veh)	1	1	9	13	31		28	0	1	34	45	0

Intersection: 20: 88th Street & Campus Dr

Movement	SB	B12	B12
Directions Served	R	T	T
Maximum Queue (ft)	106	45	45
Average Queue (ft)	38	3	2
95th Queue (ft)	81	42	33
Link Distance (ft)		318	318
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	200		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 25: Northwest Pkwy & 96th St

Movement	EB	EB	EB	EB	EB	B38	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	T	L	L	T	T	L	L
Maximum Queue (ft)	68	82	218	224	11	4	71	122	320	288	604	645
Average Queue (ft)	18	33	88	94	1	0	8	37	141	118	274	308
95th Queue (ft)	51	68	188	192	11	3	40	89	256	237	540	588
Link Distance (ft)			720	720		2594			1056	1056		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			250		180	180			700	700
Storage Blk Time (%)			1	1				0	8	8	1	3
Queuing Penalty (veh)			0	11				0	4	6	2	6

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	NB	NB	B39	SB	SB	SB	SB	SB	B33	B33	
Directions Served	L	T	T	T	L	L	T	T	R	T	T	
Maximum Queue (ft)	645	423	135	42	98	714	902	914	663	146	135	
Average Queue (ft)	318	71	32	2	23	107	503	500	139	14	13	
95th Queue (ft)	598	394	97	31	67	454	910	911	598	89	81	
Link Distance (ft)		941	941	2050			864	864		1436	1436	
Upstream Blk Time (%)		1				0	5	5				
Queuing Penalty (veh)		4				0	0	0				
Storage Bay Dist (ft)	700				600	600			600			
Storage Blk Time (%)	3	0					16	16				
Queuing Penalty (veh)	7	1					13	46				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	B29	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T		L	L	T
Maximum Queue (ft)	224	264	63	342	328	62	137	142	69	72	223	575
Average Queue (ft)	113	159	26	161	131	28	2	2	0	20	56	205
95th Queue (ft)	205	239	50	290	253	58	47	47	0	54	155	473
Link Distance (ft)		680		623	623		370	370	370			2050
Upstream Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	250		500			250				550	550	
Storage Blk Time (%)	0	0			1							1
Queuing Penalty (veh)	0	0			1							1

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	B39	B39	B39
Directions Served	T	T	T	
Maximum Queue (ft)	577	963	969	957
Average Queue (ft)	220	169	203	48
95th Queue (ft)	494	753	831	391
Link Distance (ft)	2050	941	941	941
Upstream Blk Time (%)		0	0	0
Queuing Penalty (veh)		1	2	1
Storage Bay Dist (ft)				
Storage Blk Time (%)	1			
Queuing Penalty (veh)	0			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	206	227	205	219	203	244	252	285	272
Average Queue (ft)	99	135	99	85	77	102	135	137	78
95th Queue (ft)	186	203	175	182	173	189	220	231	184
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)									0
Queuing Penalty (veh)									0
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)			1	0			0	0	
Queuing Penalty (veh)			2	1			0	1	

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	T	T	R	L	L	T	T
Maximum Queue (ft)	191	206	306	291	33	276	280	136	173
Average Queue (ft)	94	124	168	131	1	120	142	30	45
95th Queue (ft)	167	190	277	251	14	219	235	101	123
Link Distance (ft)		1037	1760	1760			556	556	556
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330				300	180			
Storage Blk Time (%)		4		0		3	8		
Queuing Penalty (veh)		21		0		8	18		

Zone Summary

Zone wide Queuing Penalty: 408

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	636	1010	496
Demand Flow Rate, veh/h	649	1031	506
Vehicles Circulating, veh/h	334	408	336
Vehicles Exiting, veh/h	508	575	1103
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.991	1.000
Approach Delay, s/veh	7.3	12.9	6.5
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.629	0.371	0.326	0.674	0.660	0.340
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	408	241	336	695	334	172
Cap Entry Lane, veh/h	993	1069	927	1004	991	1067
Entry HV Adj Factor	0.980	0.980	0.980	0.980	0.979	0.983
Flow Entry, veh/h	400	236	329	681	327	169
Cap Entry, veh/h	969	1044	901	975	970	1049
V/C Ratio	0.413	0.226	0.366	0.699	0.337	0.161
Control Delay, s/veh	8.4	5.6	8.1	15.3	7.3	4.9
LOS	A	A	A	C	A	A
95th %tile Queue, veh	2	1	2	6	1	1

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.8	3.3	0.5	0.6	2.7	2.1	0.3	0.4	2.1	0.2	2.0
Total Del/Veh (s)	65.2	62.8	4.3	56.2	41.4	2.7	61.2	41.0	4.8	58.0	31.1	4.6

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	35.3

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	60.1	3.0	46.4	7.2	43.9	0.7	2.4	29.8

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	57.2	52.4	19.6	61.3	41.5	17.8	42.3	55.9	3.0	42.5	33.8	9.3

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	41.5

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.7	0.8	0.7	2.4	0.3	0.1	0.1	0.3	0.0	0.0	0.0	0.7
Total Del/Veh (s)	46.3	50.6	15.1	39.3	9.8	24.7	32.1	5.4	23.4	30.0	8.4	27.5

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.1	0.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	42.9	49.9	4.5	37.9	39.1	1.5	43.9	7.2	0.9	44.7	28.2	1.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	23.8

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.8	3.7	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	41.1	7.3	12.9	5.5	42.6	9.3	12.7

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	43.8	45.2	1.5	33.9	10.4	13.2	9.6	14.2

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.8	1.3	3.1	0.7	1.8	0.0	0.0	0.9
Total Del/Veh (s)	100.4	115.8	13.1	38.0	13.2	34.8	9.9	34.4

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.2	0.1	0.0	0.5	0.2
Total Del/Veh (s)	7.0	6.3	3.9	3.0	9.1	1.4	8.1	6.5

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	72.3

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	153	184	301	215	344	437	180	186	213	488	452	185
Average Queue (ft)	45	112	117	18	239	287	84	76	125	319	302	53
95th Queue (ft)	129	172	212	116	340	402	152	172	193	463	439	148
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	0	7	14		1	9				0		
Queuing Penalty (veh)	0	5	36		3	27				1		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	218	259	341	320	298	190
Average Queue (ft)	115	151	220	207	171	37
95th Queue (ft)	202	228	304	288	266	157
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	0	2	13		18	
Queuing Penalty (veh)	1	7	39		24	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B19	B19	NB	NB
Directions Served	T	R	L	L	T	T		L	L
Maximum Queue (ft)	1070	629	198	229	350	275	70	146	159
Average Queue (ft)	515	58	112	130	101	6	0	69	84
95th Queue (ft)	939	316	180	198	254	81	0	125	135
Link Distance (ft)	1525	1525			490	602	602		318
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			400	400				200	
Storage Blk Time (%)					0				0
Queuing Penalty (veh)					1				0

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	241	225	356	356	198	518	393	275	303	281	265	140
Average Queue (ft)	152	134	245	206	92	239	21	171	189	185	155	64
95th Queue (ft)	219	201	332	305	170	650	181	256	279	262	234	118
Link Distance (ft)			602	602		490	490			648	648	
Upstream Blk Time (%)						2	0					
Queuing Penalty (veh)						15	0					
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B22	B22	B38	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T	T	L	T	T	R
Maximum Queue (ft)	253	485	486	95	13	5	147	204	291	334	135
Average Queue (ft)	73	328	301	10	1	0	5	93	181	211	58
95th Queue (ft)	204	463	448	124	13	5	100	168	265	298	114
Link Distance (ft)		477	477		2061	2061	720		676	676	
Upstream Blk Time (%)	0	0	0	0							
Queuing Penalty (veh)	0	2	2	0							
Storage Bay Dist (ft)	330			330				335			335
Storage Blk Time (%)		14	5						0	0	
Queuing Penalty (veh)		14	12						0	1	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	L	T	R
Maximum Queue (ft)	175	280	126	114	50	149	151	63	126	160	375	266
Average Queue (ft)	117	70	50	45	13	75	78	24	37	65	179	41
95th Queue (ft)	184	208	104	85	38	131	131	54	92	120	334	149
Link Distance (ft)		564		1711		1326				1558	1558	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125		210		170		500	500	400			200
Storage Blk Time (%)	14	0				0					12	
Queuing Penalty (veh)	10	0				0					8	

Intersection: 23: Bend

Movement	NB	NB
Directions Served	T	
Maximum Queue (ft)	677	668
Average Queue (ft)	441	236
95th Queue (ft)	831	665
Link Distance (ft)	676	676
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	1	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	B22	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	T	L	L	T	T	L	L	L
Maximum Queue (ft)	131	140	170	187	108	39	89	159	130	261	288	257
Average Queue (ft)	66	71	91	107	4	6	28	84	57	160	186	172
95th Queue (ft)	115	117	153	174	79	28	67	140	109	227	251	235
Link Distance (ft)			720	720	477			1056	1056			
Upstream Blk Time (%)					0							
Queuing Penalty (veh)					0							
Storage Bay Dist (ft)	280	280				180	180			700	700	700
Storage Blk Time (%)								0				
Queuing Penalty (veh)								0				

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T	R
Maximum Queue (ft)	165	167	40	78	224	224	40
Average Queue (ft)	58	74	7	27	143	136	8
95th Queue (ft)	130	137	26	57	209	204	28
Link Distance (ft)	941	941			864	864	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			600	600			600
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	SB	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T	L	L	T	T
Maximum Queue (ft)	139	183	59	384	379	190	224	299	39	76	237	240
Average Queue (ft)	37	88	21	172	160	44	17	21	6	35	112	122
95th Queue (ft)	94	148	46	342	321	163	143	164	27	67	203	214
Link Distance (ft)		680		623	623		370	370			2050	2050
Upstream Blk Time (%)							0	0				
Queuing Penalty (veh)							0	1				
Storage Bay Dist (ft)	250		500			250			550	550		
Storage Blk Time (%)		0		0	2							
Queuing Penalty (veh)		0		0	6							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	B39	B39
Directions Served	T	T
Maximum Queue (ft)	565	366
Average Queue (ft)	27	13
95th Queue (ft)	284	192
Link Distance (ft)	941	941
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	150	185	310	167	161	216	238	258	247
Average Queue (ft)	67	114	183	65	69	96	108	120	88
95th Queue (ft)	136	165	289	138	129	200	201	226	194
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								0	
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)			10	0			0		0
Queuing Penalty (veh)			90	0			0		1

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	616	590	130
Average Queue (ft)	144	58	5
95th Queue (ft)	542	333	95
Link Distance (ft)	648	648	648
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	0	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	398	681	300	697	682	390	174	186	257	262
Average Queue (ft)	273	352	122	402	373	80	93	109	112	129
95th Queue (ft)	485	709	364	641	617	334	149	165	232	240
Link Distance (ft)		1037		1760	1760			556	556	556
Upstream Blk Time (%)		0								
Queuing Penalty (veh)		0								
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)	8	55			14		0	0		
Queuing Penalty (veh)	56	386			22		0	1		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	138	38	45	45	220	75
Average Queue (ft)	56	1	15	8	70	38
95th Queue (ft)	107	19	43	32	165	96
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					9	0
Queuing Penalty (veh)					16	1

Network Summary

Network wide Queuing Penalty: 791

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	605	547	723
Demand Flow Rate, veh/h	617	557	738
Vehicles Circulating, veh/h	486	188	227
Vehicles Exiting, veh/h	479	915	518
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	7.9	5.3	7.1
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.470	0.530	0.408	0.592	0.659	0.341
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	290	327	227	330	486	252
Cap Entry Lane, veh/h	863	939	1135	1210	1095	1171
Entry HV Adj Factor	0.980	0.980	0.980	0.982	0.979	0.980
Flow Entry, veh/h	284	320	223	324	476	247
Cap Entry, veh/h	845	919	1111	1186	1073	1148
V/C Ratio	0.336	0.349	0.200	0.273	0.444	0.215
Control Delay, s/veh	8.1	7.7	5.1	5.5	8.2	5.1
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	2	1	1	2	1

G - Intersection Capacity Worksheets (SimTraffic)
Year 2040 Background

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.4	3.9	0.5	0.5	2.1	1.2	0.2	0.2	1.4	0.1	1.2
Total Del/Veh (s)	56.1	53.3	2.0	41.4	35.8	3.6	51.9	32.3	4.8	54.8	23.1	3.4

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	26.7

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.7	0.2	0.0	0.0	0.1	0.2
Total Del/Veh (s)	65.6	8.5	43.4	8.5	41.7	1.4	2.8	26.7

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	104.8	44.9	15.4	70.6	75.5	17.6	129.7	52.4	15.7	42.7	65.8	22.9

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	59.0

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.9	0.3	0.4	2.6	0.8	2.7	0.7	0.2	0.5	0.2	0.0	0.1
Total Del/Veh (s)	61.2	77.5	26.6	50.5	41.6	16.4	26.9	47.9	33.7	60.7	22.4	8.2

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	39.9

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.5	0.2	3.2	1.5	0.3	4.9	0.0	0.0	0.0
Total Del/Veh (s)	88.5	154.9	7.1	90.9	129.1	14.8	179.2	4.6	1.1	100.9	119.1	14.4

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	88.7

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.0	3.2	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	49.2	6.5	16.4	5.0	73.0	29.4	26.6

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	61.1	61.8	2.2	30.6	8.3	11.9	8.5	13.2

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.4	1.3	3.3	0.3	2.1	0.0	0.0	0.5
Total Del/Veh (s)	61.5	64.1	1.9	18.4	4.3	61.1	5.6	19.1

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.2	0.3	0.1	0.0	0.4	0.2
Total Del/Veh (s)	6.7	5.9	9.0	9.3	6.9	1.0	5.9	7.7

Total Network Performance

Denied Del/Veh (s)	1.7
Total Del/Veh (s)	105.6

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	25	103	91	308	326	211	107	126	477	465	222	192
Average Queue (ft)	3	37	31	162	185	88	36	67	239	242	35	73
95th Queue (ft)	16	82	71	257	276	172	81	110	397	394	135	154
Link Distance (ft)		750	750		1842	1842			1996	1996	1996	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)		0	0	0	1				0			0
Queuing Penalty (veh)		0	0	1	2				1			1

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	232	262	246	225	63
Average Queue (ft)	96	142	141	113	4
95th Queue (ft)	175	220	220	209	51
Link Distance (ft)		2075	2075	2075	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	1	2		11	
Queuing Penalty (veh)	3	6		11	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	B19	NB	NB
Directions Served	T	R	L	L	T	T	T		L	L
Maximum Queue (ft)	838	590	408	403	447	121	592	573	193	210
Average Queue (ft)	378	108	203	202	173	6	213	51	99	107
95th Queue (ft)	825	345	367	374	371	101	604	297	169	178
Link Distance (ft)	1524	1524			490	4320	602	602		318
Upstream Blk Time (%)				0	0		0	0		
Queuing Penalty (veh)				0	8		2	0		
Storage Bay Dist (ft)			400	400					200	
Storage Blk Time (%)			1	1	0				0	0
Queuing Penalty (veh)			8	12	3				0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B19	B9	B9	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T	T		L	L	T	T
Maximum Queue (ft)	438	469	481	305	119	158	506	354	209	245	400	375
Average Queue (ft)	295	282	203	138	43	16	125	27	97	120	247	226
95th Queue (ft)	454	480	419	243	94	171	478	216	176	199	359	344
Link Distance (ft)			602	602		4320	490	490			648	648
Upstream Blk Time (%)			1	0			1	0				
Queuing Penalty (veh)			7	0			5	1				
Storage Bay Dist (ft)	415	415			415				420	420		
Storage Blk Time (%)	8	7									0	0
Queuing Penalty (veh)	17	15									1	0

Intersection: 15: 96th St & Dillon Rd

Movement	WB	NB	NB	NB	NB	B38	B38	B38	SB	SB	SB	SB
Directions Served	R	L	T	T	R	T	T		L	T	T	R
Maximum Queue (ft)	152	452	792	766	82	580	679	393	352	525	593	494
Average Queue (ft)	64	325	389	341	6	40	72	17	93	308	362	199
95th Queue (ft)	122	532	838	811	93	267	389	176	224	470	546	431
Link Distance (ft)			2594	2594		720	720	720		676	676	
Upstream Blk Time (%)						0	0			0	0	
Queuing Penalty (veh)						0	0			0	0	
Storage Bay Dist (ft)	420	330			330				335			335
Storage Blk Time (%)		28	7	2					0	8	17	1
Queuing Penalty (veh)		115	23	11					0	11	92	6

Intersection: 15: 96th St & Dillon Rd

Movement	B23
Directions Served	T
Maximum Queue (ft)	42
Average Queue (ft)	2
95th Queue (ft)	31
Link Distance (ft)	2350
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	144	138	288	355	76	174	597	455	471	504	1026	761
Average Queue (ft)	56	33	117	64	56	46	163	165	196	215	291	121
95th Queue (ft)	119	104	235	234	87	109	454	377	450	486	806	481
Link Distance (ft)		564		1711			1326				1547	1547
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	125		210		50	170		500	500	400		
Storage Blk Time (%)	3	2	3	1	15	0	5	1	3	8	10	0
Queuing Penalty (veh)	2	1	10	7	34	0	38	2	9	33	43	0

Intersection: 20: 88th Street & Campus Dr

Movement	SB	B12
Directions Served	R	T
Maximum Queue (ft)	117	9
Average Queue (ft)	41	0
95th Queue (ft)	86	7
Link Distance (ft)		318
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	200	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 23: Bend

Movement	NB	NB
Directions Served	T	
Maximum Queue (ft)	687	689
Average Queue (ft)	367	239
95th Queue (ft)	828	680
Link Distance (ft)	676	676
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	3	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: Northwest Pkwy & 96th St

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	L
Maximum Queue (ft)	72	95	296	300	135	78	253	538	525	316	666	725
Average Queue (ft)	23	40	150	154	8	14	59	254	241	29	438	485
95th Queue (ft)	60	82	282	286	85	50	194	508	496	196	785	863
Link Distance (ft)			720	720				1056	1056			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			250	180	180			180	700	700
Storage Blk Time (%)			4	6				36	32		5	16
Queuing Penalty (veh)			2	51				18	22		13	42

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	NB	NB	NB	B39	B39	B39	SB	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T	T	L	L	T	T	R
Maximum Queue (ft)	764	644	349	5	449	334	235	139	860	967	966	800
Average Queue (ft)	499	220	52	0	65	17	11	42	267	706	710	370
95th Queue (ft)	909	847	219	4	399	217	169	109	834	1138	1140	1000
Link Distance (ft)		941	941	941	2050	2050	2050			864	864	
Upstream Blk Time (%)		7							0	25	25	
Queuing Penalty (veh)		32							0	0	0	
Storage Bay Dist (ft)	700							600	600			600
Storage Blk Time (%)	18	3								40	40	
Queuing Penalty (veh)	47	29								38	120	

Intersection: 25: Northwest Pkwy & 96th St

Movement	B33	B33
Directions Served	T	T
Maximum Queue (ft)	1157	1141
Average Queue (ft)	341	340
95th Queue (ft)	1156	1153
Link Distance (ft)	1436	1436
Upstream Blk Time (%)	6	6
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	SB	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T	L	L	T	T
Maximum Queue (ft)	311	348	78	447	420	223	168	254	94	216	739	782
Average Queue (ft)	161	205	32	240	205	40	6	12	31	71	326	340
95th Queue (ft)	260	297	58	399	361	120	80	122	73	192	678	709
Link Distance (ft)		680		623	623		370	370			2050	2050
Upstream Blk Time (%)							0	0				
Queuing Penalty (veh)							0	1				
Storage Bay Dist (ft)	250		500			250			550	550		
Storage Blk Time (%)	0	4		0	4						3	4
Queuing Penalty (veh)	1	8		0	9						3	0

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	B39	B39	B39
Directions Served	T	T	
Maximum Queue (ft)	976	966	820
Average Queue (ft)	308	337	46
95th Queue (ft)	1025	1069	389
Link Distance (ft)	941	941	941
Upstream Blk Time (%)	0	1	0
Queuing Penalty (veh)	3	6	2
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	L	T	T	T	T	T	R
Maximum Queue (ft)	226	258	219	261	228	303	342	338	327
Average Queue (ft)	116	147	103	88	74	148	185	193	94
95th Queue (ft)	197	219	184	189	177	267	304	303	228
Link Distance (ft)		1442		556	556		370	370	
Upstream Blk Time (%)						0	0	0	0
Queuing Penalty (veh)						0	1	1	0
Storage Bay Dist (ft)	330		190			300			300
Storage Blk Time (%)		0	1	1		0	1	1	0
Queuing Penalty (veh)		0	3	2		1	5	4	2

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	645	612	325
Average Queue (ft)	75	36	11
95th Queue (ft)	390	266	152
Link Distance (ft)	648	648	648
Upstream Blk Time (%)	0	0	0
Queuing Penalty (veh)	1	0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	229	243	48	338	316	9	317	374	184	199
Average Queue (ft)	114	141	2	191	160	0	157	180	43	54
95th Queue (ft)	192	217	38	300	277	7	259	285	133	144
Link Distance (ft)		1037		1760	1760			556	556	556
Upstream Blk Time (%)								0		
Queuing Penalty (veh)								0		
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)		9			0		8	15		
Queuing Penalty (veh)		46			0		20	37		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	143	61	177	278	168	75
Average Queue (ft)	56	3	55	70	48	23
95th Queue (ft)	114	36	133	204	115	75
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					4	0
Queuing Penalty (veh)					5	0

Network Summary

Network wide Queuing Penalty: 1121

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	664	1047	515
Demand Flow Rate, veh/h	677	1068	525
Vehicles Circulating, veh/h	347	429	348
Vehicles Exiting, veh/h	526	595	1149
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.991	1.000
Approach Delay, s/veh	7.7	14.3	6.7
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.634	0.366	0.326	0.674	0.661	0.339
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	429	248	348	720	347	178
Cap Entry Lane, veh/h	981	1057	910	986	980	1056
Entry HV Adj Factor	0.981	0.980	0.980	0.981	0.980	0.983
Flow Entry, veh/h	421	243	341	706	340	175
Cap Entry, veh/h	959	1032	884	959	960	1039
V/C Ratio	0.439	0.236	0.386	0.737	0.354	0.168
Control Delay, s/veh	8.9	5.7	8.5	17.1	7.6	5.0
LOS	A	A	A	C	A	A
95th %tile Queue, veh	2	1	2	7	2	1

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.7	3.3	0.4	0.4	1.6	1.2	0.2	0.3	1.5	0.2	1.3
Total Del/Veh (s)	74.1	75.2	4.8	58.7	44.4	3.1	65.0	40.2	5.6	67.4	30.6	5.7

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	37.5

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	93.8	6.3	56.4	6.7	50.6	1.0	2.5	42.3

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	84.8	53.0	22.7	73.0	49.8	21.8	49.9	87.4	6.7	47.8	37.6	10.7

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	53.1

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.7	0.9	0.9	2.3	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.7
Total Del/Veh (s)	52.4	52.8	19.5	40.3	10.3	25.4	32.5	5.9	21.3	30.0	8.8	29.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	60.3	83.7	5.6	60.5	63.5	1.5	64.3	9.7	1.0	70.2	40.8	1.7

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	35.6

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.0	3.6	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	58.4	7.9	14.5	6.5	77.4	6.0	14.1

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.2	0.3	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	66.0	66.4	1.8	50.2	16.5	14.1	9.3	19.0

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	2.0	1.7	3.2	3.1	4.5	0.0	0.0	2.0
Total Del/Veh (s)	73.5	72.4	7.1	82.9	54.0	100.5	9.5	55.9

Total Zone Performance

Denied Del/Veh (s)	1.5
Total Del/Veh (s)	1968.2

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	185	192	311	211	344	455	187	138	158	479	786	210
Average Queue (ft)	74	134	138	33	253	279	88	65	98	313	330	58
95th Queue (ft)	181	204	245	158	357	411	162	126	149	444	589	160
Link Distance (ft)		750	750			2203	2203			2032	2032	2032
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	1	14	23		4	8				0		
Queuing Penalty (veh)	1	12	59		14	27				0		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	234	272	336	331	316	190
Average Queue (ft)	140	159	207	211	188	55
95th Queue (ft)	213	235	289	296	275	196
Link Distance (ft)			1994	1994	1994	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	1	3	11		27	0
Queuing Penalty (veh)	5	13	36		36	0

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	B2	B2	WB	WB	WB	B19	B19	NB	NB
Directions Served	T	R	T	T	L	L	T	T		L	L
Maximum Queue (ft)	1315	979	39	42	241	256	335	467	79	145	155
Average Queue (ft)	768	233	6	4	133	148	106	31	0	78	95
95th Queue (ft)	1406	863	54	46	211	228	238	213	0	133	145
Link Distance (ft)	1525	1525	1592	1592			490	602	602		318
Upstream Blk Time (%)	4	0									
Queuing Penalty (veh)	0	0									
Storage Bay Dist (ft)					400	400				200	
Storage Blk Time (%)							0				0
Queuing Penalty (veh)							0				0

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	352	339	406	333	215	518	521	340	386	337	329	161
Average Queue (ft)	219	196	255	209	96	290	36	195	214	203	177	73
95th Queue (ft)	328	312	363	312	171	692	249	298	329	296	276	130
Link Distance (ft)			602	602		490	490			648	648	
Upstream Blk Time (%)						3	0					
Queuing Penalty (veh)						17	2					
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)	0	0	0					0	0		0	
Queuing Penalty (veh)	0	0	1					0	0		0	

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B22	B22	B38	B38	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T	T	T	L	T	T	R
Maximum Queue (ft)	477	564	558	477	351	368	538	634	221	329	359	191
Average Queue (ft)	166	449	425	146	112	114	17	40	100	208	248	71
95th Queue (ft)	460	608	602	508	530	545	189	299	182	302	344	140
Link Distance (ft)		477	477		2061	2061	720	720		676	676	
Upstream Blk Time (%)	0	18	13	1			0	0				
Queuing Penalty (veh)	0	114	83	0			0	0				
Storage Bay Dist (ft)	330			330					335			335
Storage Blk Time (%)		41	30							0	1	
Queuing Penalty (veh)		45	72							0	4	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	L	T	R
Maximum Queue (ft)	174	356	149	113	45	158	186	77	92	104	436	266
Average Queue (ft)	127	99	52	48	12	85	91	26	35	57	201	44
95th Queue (ft)	194	299	113	86	36	150	161	57	78	94	373	165
Link Distance (ft)		564		1711		1326				1558	1558	
Upstream Blk Time (%)		1										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	125		210		170		500	500	400			200
Storage Blk Time (%)	20	0	0			0					12	
Queuing Penalty (veh)	15	0	0			1					8	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	L	T
Maximum Queue (ft)	151	154	310	294	38	81	205	194	346	373	367	245
Average Queue (ft)	83	91	190	198	9	35	124	103	229	256	247	86
95th Queue (ft)	135	146	288	287	32	71	185	173	315	341	333	189
Link Distance (ft)			720	720			1056	1056				941
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			700	700	700	
Storage Blk Time (%)			2	5			2	1				
Queuing Penalty (veh)			4	41			1	1				

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	240	58	89	352	368	55
Average Queue (ft)	101	12	39	228	225	10
95th Queue (ft)	201	39	80	328	328	35
Link Distance (ft)	941			864	864	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		600	600			600
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	B29	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T		L	L	T
Maximum Queue (ft)	209	228	70	470	492	264	405	436	148	81	95	171
Average Queue (ft)	94	134	22	226	223	58	45	65	10	20	51	70
95th Queue (ft)	179	204	49	406	403	197	248	303	110	59	88	150
Link Distance (ft)		680		623	623		370	370	370			2050
Upstream Blk Time (%)				0	0		0	1	0			
Queuing Penalty (veh)				0	1		2	9	0			
Storage Bay Dist (ft)	250		500			250				550	550	
Storage Blk Time (%)		0		0	4							
Queuing Penalty (veh)		0		0	15							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	B39	B39	B39
Directions Served	T	T	T	
Maximum Queue (ft)	162	939	950	555
Average Queue (ft)	70	86	106	20
95th Queue (ft)	143	528	595	241
Link Distance (ft)	2050	941	941	941
Upstream Blk Time (%)		0	0	0
Queuing Penalty (veh)		1	1	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB	B29
Directions Served	L	LT	L	T	T	T	T	T	R	T
Maximum Queue (ft)	198	230	345	522	540	242	296	306	266	5
Average Queue (ft)	91	135	247	301	307	114	144	154	84	0
95th Queue (ft)	175	203	375	476	482	220	251	255	190	3
Link Distance (ft)		1442		556	556		370	370		713
Upstream Blk Time (%)				0	0		0	0	0	
Queuing Penalty (veh)				3	4		0	1	0	
Storage Bay Dist (ft)	330		190			300			300	
Storage Blk Time (%)			30	9		0	0	0	0	
Queuing Penalty (veh)			306	44		0	2	1	0	

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	445	587	300	1515	1518	390	266	330	273	266
Average Queue (ft)	260	309	113	928	898	183	195	220	128	146
95th Queue (ft)	419	534	351	1637	1623	501	308	383	227	237
Link Distance (ft)		1037		1760	1760			556	556	556
Upstream Blk Time (%)				5	3			1		
Queuing Penalty (veh)				0	0			7		
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)	1	49			32		22	29		
Queuing Penalty (veh)	9	359			52		40	53		

Zone Summary

Zone wide Queuing Penalty: 1524

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	624	567	754
Demand Flow Rate, veh/h	637	579	769
Vehicles Circulating, veh/h	504	195	234
Vehicles Exiting, veh/h	499	946	540
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	8.2	5.5	7.4
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.469	0.531	0.404	0.596	0.655	0.345
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	299	338	234	345	504	265
Cap Entry Lane, veh/h	849	925	1128	1203	1088	1164
Entry HV Adj Factor	0.981	0.979	0.980	0.980	0.980	0.981
Flow Entry, veh/h	293	331	229	338	494	260
Cap Entry, veh/h	832	905	1104	1176	1067	1142
V/C Ratio	0.353	0.366	0.208	0.287	0.463	0.228
Control Delay, s/veh	8.4	8.1	5.2	5.7	8.6	5.2
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	1	1	2	1

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	2.2	1.4	0.5	0.1	0.0	0.2	0.8
Total Del/Veh (s)	42.0	12.0	46.7	12.8	45.4	1.2	2.6	25.3

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	66.6	34.1	15.4	50.5	38.6	16.7	67.5	33.5	2.8	55.6	44.6	17.9

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	37.6

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.1	0.4	0.2	2.7	1.1	2.6	0.3	0.2	0.4	1.3	1.0	1.3
Total Del/Veh (s)	59.6	74.4	18.7	65.3	69.8	16.1	29.6	57.7	30.3	100.1	34.7	13.9

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	53.8

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.3	0.2	3.2	0.2	0.2	0.0	0.0	0.0	0.0
Total Del/Veh (s)	71.4	115.3	5.7	70.6	91.2	5.9	108.8	5.5	1.0	86.8	52.8	4.0

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	51.7

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.6	3.3	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	50.8	6.5	8.2	2.8	65.7	11.2	14.8

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	59.2	54.8	2.3	59.9	8.3	10.8	7.7	13.6

Total Zone Performance

Denied Del/Veh (s)	1.9
Total Del/Veh (s)	1336.5

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	B9	B9	NB	NB
Directions Served	T	T	R	L	L	T	T	T	T	L	L
Maximum Queue (ft)	356	346	400	441	451	381	296	87	31	192	204
Average Queue (ft)	169	155	107	212	210	134	126	7	1	97	110
95th Queue (ft)	297	282	267	393	399	305	239	86	20	164	179
Link Distance (ft)	1555	1555				491	491	4320	4320		307
Upstream Blk Time (%)					1	1					
Queuing Penalty (veh)					0	5					
Storage Bay Dist (ft)			300	400	400					200	
Storage Blk Time (%)		1	1	3	3	0				0	0
Queuing Penalty (veh)		8	3	10	12	1				0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	B9	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T	T		L	L	T	T
Maximum Queue (ft)	345	354	284	230	130	396	306	103	147	170	260	259
Average Queue (ft)	202	209	139	102	43	21	18	4	79	100	145	148
95th Queue (ft)	314	316	230	188	94	182	169	75	140	158	215	222
Link Distance (ft)			594	594		491	491	491			644	644
Upstream Blk Time (%)						0	0	0				
Queuing Penalty (veh)						0	0	0				
Storage Bay Dist (ft)	415	415			415				420	420		
Storage Blk Time (%)	0	0										
Queuing Penalty (veh)	0	0										

Intersection: 15: 96th St & Dillon Rd

Movement	WB	NB	NB	NB	NB	B38	B38	SB	SB	SB	SB	SB
Directions Served	R	L	L	T	T	T	T	L	L	T	T	R
Maximum Queue (ft)	123	251	278	383	379	427	565	123	110	351	413	349
Average Queue (ft)	54	134	142	202	215	33	45	64	47	210	256	146
95th Queue (ft)	105	226	240	360	364	275	311	106	93	319	371	278
Link Distance (ft)				477	477	708	708			2236	2236	
Upstream Blk Time (%)						0	0					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (ft)	420	330	330					335	335			335
Storage Blk Time (%)		0	1	1	1					1	2	0
Queuing Penalty (veh)		1	2	4	7					1	12	1

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	128	112	287	486	195	150	361	435	478	520	1554	1441
Average Queue (ft)	55	28	133	57	73	54	143	157	192	273	478	283
95th Queue (ft)	108	74	262	291	153	131	279	309	410	572	1300	989
Link Distance (ft)		564		1711			1326				1547	1547
Upstream Blk Time (%)											3	1
Queuing Penalty (veh)											13	3
Storage Bay Dist (ft)	125		210		100	170		500	500	400		
Storage Blk Time (%)	1	0	7	0	5	0	7	0	1	16	20	2
Queuing Penalty (veh)	1	0	27	0	12	0	56	0	2	64	79	5

Intersection: 20: 88th Street & Campus Dr

Movement	SB	B12	B12
Directions Served	R	T	T
Maximum Queue (ft)	139	159	130
Average Queue (ft)	48	10	9
95th Queue (ft)	103	98	91
Link Distance (ft)		307	307
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		1	0
Storage Bay Dist (ft)	200		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 25: Northwest Pkwy & 96th St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	L	L
Maximum Queue (ft)	76	84	232	243	53	316	494	503	228	613	684	704
Average Queue (ft)	19	33	117	121	10	50	201	186	13	315	355	356
95th Queue (ft)	57	71	210	218	36	163	419	401	129	599	673	686
Link Distance (ft)			708	708			1056	1056				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			180	700	700	700
Storage Blk Time (%)			0	1			18	16		0	4	5
Queuing Penalty (veh)			0	5			10	12		0	10	13

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	NB	B39	SB	SB	SB	SB	SB	SB
Directions Served	T	T	T	L	L	T	T	T	R
Maximum Queue (ft)	576	213	13	134	150	568	552	521	123
Average Queue (ft)	72	48	1	33	60	308	306	287	37
95th Queue (ft)	399	167	13	89	118	519	506	485	97
Link Distance (ft)	941	941	2050			864	864	864	
Upstream Blk Time (%)	1								
Queuing Penalty (veh)	3								
Storage Bay Dist (ft)				600	600				600
Storage Blk Time (%)	1					1		1	
Queuing Penalty (veh)	12					1		2	

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B29	B29	B29	SB	SB	SB
Directions Served	L	L	R	T	T	R	T	T		L	L	T
Maximum Queue (ft)	304	323	76	279	261	169	303	408	234	90	122	396
Average Queue (ft)	169	214	30	111	93	26	21	33	11	32	62	71
95th Queue (ft)	267	298	56	219	191	96	161	212	119	75	104	205
Link Distance (ft)		680		623	623		370	370	370			2050
Upstream Blk Time (%)							0	1	0			
Queuing Penalty (veh)							1	4	1			
Storage Bay Dist (ft)	250		500			250				550	550	
Storage Blk Time (%)	0	4			0							
Queuing Penalty (veh)	0	8			1							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39	B39	B39	B39
Directions Served	T	T	T	T	T	
Maximum Queue (ft)	455	448	937	974	956	194
Average Queue (ft)	95	124	47	136	126	7
95th Queue (ft)	261	278	384	680	652	142
Link Distance (ft)	2050	2050	941	941	941	941
Upstream Blk Time (%)			0	0	0	0
Queuing Penalty (veh)			0	1	1	0
Storage Bay Dist (ft)						
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B29
Directions Served	L	LT	R	L	T	T	T	T	T	R	T
Maximum Queue (ft)	214	240	68	269	172	153	325	346	353	343	10
Average Queue (ft)	113	147	2	137	63	59	140	184	181	82	0
95th Queue (ft)	195	220	49	233	142	132	286	315	314	206	7
Link Distance (ft)		1442	1442		556	556	370	370	370		713
Upstream Blk Time (%)								0	0	0	
Queuing Penalty (veh)								0	1	0	
Storage Bay Dist (ft)	330			190						300	
Storage Blk Time (%)				7	0				1	0	
Queuing Penalty (veh)				34	0				4	2	

Zone Summary

Zone wide Queuing Penalty: 460

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	1.9	0.0	0.0	0.0	0.0	0.0	0.3
Total Del/Veh (s)	17.8	3.7	36.8	6.6	34.6	1.1	2.3	15.2

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	49.4	41.4	20.7	49.8	31.9	17.5	57.8	49.3	4.3	59.1	35.0	11.8

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	37.5

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.7	0.7	0.7	2.4	2.4	0.1	0.1	0.2	0.0	0.0	0.0	0.9
Total Del/Veh (s)	52.4	49.9	16.1	36.9	9.9	23.9	30.3	5.2	23.2	33.5	8.8	29.2

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.4	0.2	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	67.3	87.4	6.1	65.0	67.2	1.8	61.8	8.8	1.0	76.9	33.0	8.2

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	35.4

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.5	3.6	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	63.5	7.7	16.2	7.8	74.3	6.1	15.2

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	70.9	73.0	1.8	58.7	15.7	12.5	10.7	19.4

Total Zone Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	1820.2

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB
Directions Served	T	T	R	L	L	T	T	L	L
Maximum Queue (ft)	308	287	106	224	234	177	179	128	156
Average Queue (ft)	155	138	28	108	124	62	67	61	79
95th Queue (ft)	245	238	79	183	195	145	144	110	128
Link Distance (ft)	1555	1555				491	491		307
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)			300	400	400			200	
Storage Blk Time (%)		0		0	0				0
Queuing Penalty (veh)		1		0	0				0

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B19	B19	B9	B9	WB	WB	WB
Directions Served	L	L	T	T	R	T	T	T	T	L	L	T
Maximum Queue (ft)	229	243	343	307	211	7	52	246	328	239	275	228
Average Queue (ft)	139	148	212	175	102	0	2	12	17	139	162	133
95th Queue (ft)	208	217	314	283	188	6	41	136	162	209	235	199
Link Distance (ft)			594	594		4320	4320	491	491			644
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	415	415			415					420	420	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 15: 96th St & Dillon Rd

Movement	WB	WB	NB	NB	NB	NB	NB	B22	B22	B38	B38	B38
Directions Served	T	R	L	L	T	T	R	T	T	T	T	
Maximum Queue (ft)	230	153	112	320	502	516	430	28	47	278	308	81
Average Queue (ft)	138	69	39	66	292	306	56	2	3	12	21	3
95th Queue (ft)	205	121	83	205	467	483	295	24	34	143	200	64
Link Distance (ft)	644				477	477		2061	2061	708	708	708
Upstream Blk Time (%)					1	1					0	
Queuing Penalty (veh)					5	9					0	
Storage Bay Dist (ft)		420	330	330			330					
Storage Blk Time (%)					8	10						
Queuing Penalty (veh)					9	24						

Intersection: 15: 96th St & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	R
Maximum Queue (ft)	131	142	300	315	162
Average Queue (ft)	67	58	184	209	69
95th Queue (ft)	120	116	262	292	132
Link Distance (ft)			2546	2546	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	335	335			335
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	R	L	T	T	R	L	L	T	R
Maximum Queue (ft)	223	329	134	114	41	159	158	69	94	157	433	256
Average Queue (ft)	130	81	52	45	14	77	86	24	32	53	212	49
95th Queue (ft)	216	243	106	88	38	134	146	55	75	108	384	201
Link Distance (ft)		564				1326				1547	1547	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125		210	100	170		500	500	400			200
Storage Blk Time (%)	19	0		1		0					15	
Queuing Penalty (veh)	14	1		0		0					9	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	L	L	L
Maximum Queue (ft)	168	224	356	414	175	48	102	208	187	360	387	355
Average Queue (ft)	93	118	196	199	12	8	41	135	116	215	248	235
95th Queue (ft)	150	195	301	320	119	32	86	196	180	316	344	330
Link Distance (ft)			708	708				1056	1056			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			250	180	180			700	700	700
Storage Blk Time (%)			3	5				2	1			
Queuing Penalty (veh)			7	46				1	1			

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T	T	R
Maximum Queue (ft)	242	256	85	114	251	238	218	80
Average Queue (ft)	87	94	16	43	158	152	124	29
95th Queue (ft)	195	198	50	87	224	218	196	62
Link Distance (ft)	941	941			864	864	864	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			600	600				600
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	WB	WB	WB	NB	NB	NB	B41	B41	B29	B29	B29	SB
Directions Served	L	L	R	T	T	R	T	T	T	T		L
Maximum Queue (ft)	211	256	61	523	523	268	54	34	409	411	194	65
Average Queue (ft)	107	155	24	241	241	68	2	2	45	69	9	16
95th Queue (ft)	203	232	47	445	445	218	44	26	249	312	103	52
Link Distance (ft)		680		623	623		713	713	370	370	370	
Upstream Blk Time (%)				0	0				0	1	0	
Queuing Penalty (veh)				4	4				3	9	0	
Storage Bay Dist (ft)	250		500			250						550
Storage Blk Time (%)	0	1		1	6							
Queuing Penalty (veh)	0	1		0	22							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	SB	B39	B39
Directions Served	L	T	T	T	T	T
Maximum Queue (ft)	95	126	177	214	303	157
Average Queue (ft)	46	33	42	75	15	6
95th Queue (ft)	80	96	118	165	205	125
Link Distance (ft)		2050	2050	2050	941	941
Upstream Blk Time (%)					0	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)	550					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB	B29
Directions Served	L	LT	L	T	T	T	T	T	R	T
Maximum Queue (ft)	189	222	290	570	586	220	238	263	279	16
Average Queue (ft)	99	136	257	293	251	93	122	137	88	1
95th Queue (ft)	183	205	336	619	598	179	208	232	199	13
Link Distance (ft)		1442		556	556	370	370	370		713
Upstream Blk Time (%)				1	1			0	0	
Queuing Penalty (veh)				8	7			1	0	
Storage Bay Dist (ft)	330		190						300	
Storage Blk Time (%)			37	0				0	0	
Queuing Penalty (veh)			383	2				1	1	

Zone Summary

Zone wide Queuing Penalty: 574

G - Intersection Capacity Worksheets (SimTraffic)
Year 2025 + Project

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.3	3.9	0.5	0.6	2.8	2.1	0.2	0.4	2.3	0.2	2.1
Total Del/Veh (s)	52.1	51.2	2.1	41.1	33.9	3.2	48.3	30.9	4.0	53.0	23.6	3.2

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	26.1

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	36.1	3.5	25.7	15.9	37.0	1.6	1.7	20.1

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	57.4	59.2	8.3	82.1	49.2	10.4	56.7	32.6	2.4	108.3	183.8	39.5

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	68.6

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.3	0.2	0.0	0.0	0.0	0.1	0.1	0.1	1.9	0.6	1.1
Total Del/Veh (s)	49.5	78.8	38.8	43.5	40.5	30.8	38.7	51.6	20.1	70.6	21.0	7.8

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	37.9

22: 88th Street & Tape Dr Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.6	0.4	0.0	0.1
Total Del/Veh (s)	18.2	6.4	2.0	1.2	8.8	2.5	2.4

23: 96th St & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.0	0.0	1.0	0.3	0.0	0.0	0.2
Total Del/Veh (s)	55.7	0.3	14.3	77.7	48.9	24.1	8.5	38.3

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.2	3.5	3.0	3.4	3.8	0.0	0.0	0.0
Total Del/Veh (s)	68.9	73.9	7.8	68.6	78.0	2.8	247.2	6.7	1.1	82.9	119.5	9.4

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	98.5

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0		0.0	1.1	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	52.0		0.3	89.4	7.1	52.8	21.3	6.1	55.3	27.2	9.6	30.2

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	2.1	3.7	2.0	0.1	0.1	0.0	0.0	0.6
Total Del/Veh (s)	56.8	57.8	8.8	40.6	7.5	5.4	6.6	11.4

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.7	1.4	3.3	0.3	2.2	0.0	0.0	0.6
Total Del/Veh (s)	56.7	55.4	1.7	25.0	4.4	36.9	5.6	18.7

44: 88th Street Performance by movement

Movement	EBR	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.2	0.5	0.0	0.0	0.9	0.1	0.1	0.1
Total Del/Veh (s)	6.2	5.4	6.6	2.9	2.0	3.4	1.2	0.7	2.4

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.2	0.3	0.1	0.4	0.2
Total Del/Veh (s)	6.8	5.7	7.7	6.4	6.9	5.6	6.6

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.9	0.8	3.4	0.6	3.4	2.7	0.9

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Del/Veh (s)	5.2	2.6	4.3	4.4	4.6		3.4	4.5

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.8	0.7	2.5	0.7	4.3	2.5	1.7

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.3	0.2	0.8	0.6	4.5	2.4	0.9

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2
Total Del/Veh (s)	1.7	0.3	0.2	3.1	1.3	0.6	3.7	7.1	2.5	4.0	6.8	3.0

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	1.7

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.3	0.5	0.4

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.5	0.1	0.5	3.0	5.8	0.1	2.4	3.1

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.6	3.3	4.4	2.6

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.6	2.3	2.0	0.5	0.4	0.2	1.1

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	0.2	0.2	0.6	0.5

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.1	4.4	4.3	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Total Del/Veh (s)	7.1	2.9	7.0	2.3	3.4	0.4	0.2	2.2	0.2	0.1	1.1

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.2	4.3	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Total Del/Veh (s)	7.1	2.7	7.8	2.8	2.5	0.4	0.3	2.5	0.3	0.3	2.3

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.3	4.3	4.0	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Total Del/Veh (s)	6.8	2.5	8.0	2.9	2.5	0.2	0.1	3.0	0.4	0.5	1.3

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	0.4	0.3	0.2	0.4

Total Network Performance

Denied Del/Veh (s)	31.6
Total Del/Veh (s)	127.4

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	32	88	93	285	321	172	114	157	448	435	145	190
Average Queue (ft)	3	38	27	154	199	78	20	81	256	227	26	65
95th Queue (ft)	18	75	68	253	285	145	72	137	403	378	95	154
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)			0	0	1				0			0
Queuing Penalty (veh)			0	0	2				0			1

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	211	271	252	211	61
Average Queue (ft)	107	169	152	102	2
95th Queue (ft)	183	245	229	199	34
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	1	4		6	
Queuing Penalty (veh)	2	9		7	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B19	NB	NB
Directions Served	T	R	L	T	T	T	L	L
Maximum Queue (ft)	480	174	241	245	243	53	175	203
Average Queue (ft)	222	32	82	102	109	2	85	109
95th Queue (ft)	439	148	179	203	210	54	152	174
Link Distance (ft)	1552	1552		490	490	601		337
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			400				200	
Storage Blk Time (%)			0	0			0	1
Queuing Penalty (veh)			0	0			0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B19	WB	WB	WB	WB	B37	NB	NB
Directions Served	L	T	T	R	T	L	T	T	R	T	L	T
Maximum Queue (ft)	408	297	232	83	30	548	604	439	111	303	320	377
Average Queue (ft)	182	124	91	29	1	356	226	120	41	53	128	244
95th Queue (ft)	360	240	180	67	31	592	578	290	86	355	244	358
Link Distance (ft)		601	601		4320		648	648		1613		556
Upstream Blk Time (%)		0	0				6	0				
Queuing Penalty (veh)		1	0				0	0				
Storage Bay Dist (ft)	415			415		420			420		330	
Storage Blk Time (%)	3					18	0	0			0	2
Queuing Penalty (veh)	3					27	1	0			2	3

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	B42	B42	SB	SB	SB	SB	B38
Directions Served	T	R	T		L	T	T	R	T
Maximum Queue (ft)	334	21	506	232	495	776	757	495	2406
Average Queue (ft)	188	1	63	8	402	749	701	420	2188
95th Queue (ft)	298	21	328	110	699	783	748	693	2992
Link Distance (ft)	556		449	449		682	682		2350
Upstream Blk Time (%)			0	0		44	16		55
Queuing Penalty (veh)			2	0		0	0		0
Storage Bay Dist (ft)		330			335			335	
Storage Blk Time (%)	0					91	61		
Queuing Penalty (veh)	1					95	177		

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	118	186	321	299	183	583	270	413	466	566	98
Average Queue (ft)	26	56	138	120	53	187	172	155	177	131	38
95th Queue (ft)	69	140	255	239	121	447	296	371	405	413	77
Link Distance (ft)		565	1963	1963		1348				869	
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										2	
Storage Bay Dist (ft)	125				170		170	400	400		200
Storage Blk Time (%)		4			0	8	10	3	7	1	
Queuing Penalty (veh)		2			1	56	28	10	21	4	

Intersection: 22: 88th Street & Tape Dr

Movement	WB	NB	NB	SB
Directions Served	LR	T	R	L
Maximum Queue (ft)	38	5	2	58
Average Queue (ft)	10	0	0	19
95th Queue (ft)	31	5	3	50
Link Distance (ft)	1243	978		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			300	300
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 23: 96th St & Campus Dr

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B42
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	320	274	85	160	350	759	754	741	154	512	400	104
Average Queue (ft)	198	117	30	83	274	575	536	103	60	286	135	5
95th Queue (ft)	299	242	68	144	476	883	911	520	123	472	344	46
Link Distance (ft)		1045	1045			726	726	726	449	449		1467
Upstream Blk Time (%)						2	1	0		1		
Queuing Penalty (veh)						8	7	2		11		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	2	0			0	44				9		
Queuing Penalty (veh)	3	0			0	95				41		

Intersection: 23: 96th St & Campus Dr

Movement	B49	B49
Directions Served	T	
Maximum Queue (ft)	612	528
Average Queue (ft)	140	55
95th Queue (ft)	543	332
Link Distance (ft)	556	556
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	7	2
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: Northwest Pkwy & 96th St

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	L	L	T
Maximum Queue (ft)	83	106	113	132	20	61	116	267	236	800	900	1041
Average Queue (ft)	23	46	57	57	1	7	31	149	102	747	815	782
95th Queue (ft)	66	88	100	114	20	34	76	238	218	961	1112	1449
Link Distance (ft)			726	726				1056	1056			941
Upstream Blk Time (%)												38
Queuing Penalty (veh)												176
Storage Bay Dist (ft)	280	280			250	180	180			700	700	
Storage Blk Time (%)								9	2	70	53	6
Queuing Penalty (veh)								3	1	144	108	54

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	B39	B39	B39	SB	SB	SB	SB	SB	B33	B33
Directions Served	T	T	T	T	L	L	T	T	R	T	T
Maximum Queue (ft)	321	1874	1851	1761	93	790	936	932	720	391	405
Average Queue (ft)	64	902	754	495	22	161	633	634	223	107	109
95th Queue (ft)	212	2233	2124	1644	66	620	1037	1035	814	539	546
Link Distance (ft)	941	2052	2052	2052			877	877		1436	1436
Upstream Blk Time (%)		7	2	0		0	14	14		0	0
Queuing Penalty (veh)		30	10	1		0	0	0		0	0
Storage Bay Dist (ft)					600	600			600		
Storage Blk Time (%)							29	29			
Queuing Penalty (veh)							20	94			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	NB	B41	B41	B29
Directions Served	L	L	L	R	L	L	T	T	R	T	T	T
Maximum Queue (ft)	55	271	302	60	186	299	466	423	183	154	156	372
Average Queue (ft)	14	141	176	26	86	149	199	163	40	45	44	39
95th Queue (ft)	42	252	283	50	157	355	459	434	174	336	334	222
Link Distance (ft)			680				652	652		684	684	370
Upstream Blk Time (%)							5	5		5	4	1
Queuing Penalty (veh)							43	41		43	32	7
Storage Bay Dist (ft)	125	250		500	455	455			250			
Storage Blk Time (%)		1	4				6	5				
Queuing Penalty (veh)		2	6				21	7				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	B29	B29	SB	SB	SB	SB	SB	B39	B39	B39
Directions Served	T		L	L	T	T	R	T	T	
Maximum Queue (ft)	379	270	62	202	694	700	213	965	966	764
Average Queue (ft)	55	30	13	44	264	277	8	230	256	45
95th Queue (ft)	267	204	44	143	589	604	128	888	937	374
Link Distance (ft)	370	370			2052	2052		941	941	941
Upstream Blk Time (%)	2	3						0	1	0
Queuing Penalty (veh)	13	15						2	4	0
Storage Bay Dist (ft)			550	550			550			
Storage Blk Time (%)					2	3				
Queuing Penalty (veh)					1	1				

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B41	B41
Directions Served	L	LT	R	L	T	T	T	T	T	R	T	T
Maximum Queue (ft)	198	356	149	222	120	79	181	177	179	204	64	124
Average Queue (ft)	109	172	36	122	17	13	56	70	71	75	2	4
95th Queue (ft)	187	480	399	217	148	134	139	144	140	170	65	90
Link Distance (ft)		1442	1442		556	556		370	370		652	652
Upstream Blk Time (%)		1	2		0	0					0	0
Queuing Penalty (veh)		0	0		1	1					0	0
Storage Bay Dist (ft)	330			190			300			300		
Storage Blk Time (%)				1	2							
Queuing Penalty (veh)				5	4							

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	400	181	130
Average Queue (ft)	20	8	5
95th Queue (ft)	189	125	95
Link Distance (ft)	648	648	648
Upstream Blk Time (%)	0		0
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 38: Bend

Movement	NB	NB
Directions Served	T	
Maximum Queue (ft)	625	395
Average Queue (ft)	136	18
95th Queue (ft)	508	164
Link Distance (ft)	682	682
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	T	T	R	L	L	T	T
Maximum Queue (ft)	209	225	356	325	24	277	294	207	213
Average Queue (ft)	121	133	214	173	1	162	185	66	90
95th Queue (ft)	186	202	307	274	12	243	266	158	175
Link Distance (ft)		1037	1760	1760			556	556	556
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330				300	180			
Storage Blk Time (%)		6		0		4	10		
Queuing Penalty (veh)		33		0		12	27		

Intersection: 44: 88th Street

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	69	81	28	35	67
Average Queue (ft)	32	42	2	4	4
95th Queue (ft)	57	69	14	22	56
Link Distance (ft)	627	437			617
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			75	75	
Storage Blk Time (%)					0
Queuing Penalty (veh)					0

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	165	38	134	207	153	75
Average Queue (ft)	53	2	46	51	42	16
95th Queue (ft)	121	26	98	142	106	62
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					4	0
Queuing Penalty (veh)					6	1

Intersection: 104: Street A & Campus Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	37	24
Average Queue (ft)	8	6
95th Queue (ft)	31	22
Link Distance (ft)	1300	548
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 105: Street B & Campus Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	LR	R
Maximum Queue (ft)	85	14	79	23	63	44
Average Queue (ft)	35	1	18	1	16	5
95th Queue (ft)	75	10	58	14	47	27
Link Distance (ft)	1300	1300	1045	1045	354	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 106: Parcel E West & Tape Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	32	31
Average Queue (ft)	3	11
95th Queue (ft)	19	35
Link Distance (ft)		656
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 107: Tape Dr & Parcel A

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	9	28
Average Queue (ft)	0	9
95th Queue (ft)	6	30
Link Distance (ft)		287
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	WB	NB	SB	SB
Directions Served	L	LTR	LT	R
Maximum Queue (ft)	18	26	36	35
Average Queue (ft)	1	4	8	13
95th Queue (ft)	9	21	30	37
Link Distance (ft)		520	1706	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300			50
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 109: Parcel D West & Tape Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 110: Street B & Tape Dr

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	TR
Maximum Queue (ft)	32	2	9	70	25
Average Queue (ft)	4	0	1	32	6
95th Queue (ft)	20	2	9	53	22
Link Distance (ft)		412	412	311	311
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300				
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 111: Tape Dr & Parcel C RI

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	30	9
Average Queue (ft)	7	0
95th Queue (ft)	28	6
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	353
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	R	L	R	L	L	TR
Maximum Queue (ft)	25	30	23	29	41	18	5
Average Queue (ft)	5	6	8	12	8	2	0
95th Queue (ft)	22	25	24	35	29	10	5
Link Distance (ft)							309
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200	50	200	50	300	300	
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 115: Street B & Central

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	R	L	R	L	TR	L	TR
Maximum Queue (ft)	35	33	63	54	40	1	40	2
Average Queue (ft)	12	11	29	19	7	0	6	0
95th Queue (ft)	36	34	53	47	28	1	26	2
Link Distance (ft)						631		551
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200	50	200	50	300		300	
Storage Blk Time (%)		0		0				
Queuing Penalty (veh)		0		0				

Intersection: 116: Street B & South Full

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	R	L	R	L	TR	L	TR
Maximum Queue (ft)	29	31	44	33	44	1	26	11
Average Queue (ft)	4	12	14	14	7	0	3	0
95th Queue (ft)	21	36	40	39	28	1	16	6
Link Distance (ft)						275		631
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200	50	200	50	300		300	
Storage Blk Time (%)		0		0				
Queuing Penalty (veh)		0		0				

Intersection: 117: Street B & South RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	8
95th Queue (ft)	30
Link Distance (ft)	290
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1607

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	632	1001	490
Demand Flow Rate, veh/h	645	1021	499
Vehicles Circulating, veh/h	330	411	329
Vehicles Exiting, veh/h	498	564	1103
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.991	1.000
Approach Delay, s/veh	7.3	12.9	6.4
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.637	0.363	0.322	0.678	0.661	0.339
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	411	234	329	692	330	169
Cap Entry Lane, veh/h	996	1073	925	1001	997	1074
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.982	0.982
Flow Entry, veh/h	403	229	323	678	324	166
Cap Entry, veh/h	973	1047	899	972	979	1055
V/C Ratio	0.414	0.219	0.359	0.697	0.331	0.157
Control Delay, s/veh	8.4	5.5	8.0	15.2	7.1	4.8
LOS	A	A	A	C	A	A
95th %tile Queue, veh	2	1	2	6	1	1

Intersection	
Intersection Delay, s/veh	5.6
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	525	907	123
Demand Flow Rate, veh/h	535	925	125
Vehicles Circulating, veh/h	271	5	523
Vehicles Exiting, veh/h	659	643	283
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.7	5.7	4.9
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.469	0.531	0.470	0.530	0.472	0.528
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	251	284	435	490	59	66
Cap Entry Lane, veh/h	1052	1128	1344	1414	834	910
Entry HV Adj Factor	0.983	0.979	0.980	0.981	0.980	0.988
Flow Entry, veh/h	247	278	426	481	58	65
Cap Entry, veh/h	1034	1105	1317	1388	818	899
V/C Ratio	0.239	0.252	0.324	0.347	0.071	0.072
Control Delay, s/veh	5.8	5.6	5.7	5.7	5.1	4.7
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	1	2	0	0

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.7	3.3	0.6	0.6	2.7	2.1	0.3	0.4	2.1	0.2	1.9
Total Del/Veh (s)	55.0	55.7	3.7	50.1	36.3	3.0	71.6	40.6	4.8	58.4	29.4	4.2

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	33.9

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	27.4	1.9	33.6	8.5	53.5	1.5	1.9	20.4

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	1.5	3.7	0.8	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	54.7	214.1	18.2	128.7	45.2	16.8	61.8	106.0	11.4	144.9	136.1	18.9

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	98.2

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.6	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	45.0	59.2	35.5	45.8	54.7	18.0	31.8	38.5	7.3	29.8	32.2	6.1

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	33.2

22: 88th Street Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.4	0.1	0.0	0.0
Total Del/Veh (s)	10.1	3.9	2.2	2.1	5.8	3.3	3.0

23: 96th St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	55.6	22.1	75.8	39.7	20.8	5.5	32.0

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.2	3.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	70.5	72.0	7.9	56.3	60.3	1.3	55.1	9.3	0.9	66.4	44.9	1.2

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	33.1

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	1.4	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	62.8	0.5	69.6	9.4	57.9	6.8	3.1	69.5	8.8	4.0	11.9

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.5	0.3	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	63.6	63.1	1.9	50.3	8.5	20.2	9.9	17.8

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	6.2	2.4	7.1	0.0	0.0	0.0	0.0	1.4
Total Del/Veh (s)	95.1	102.7	12.7	52.9	23.5	60.0	10.8	44.0

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.2	0.1	0.4	0.2
Total Del/Veh (s)	7.1	6.0	3.9	3.1	9.3	7.7	6.4

101: Northwest Pkwy Performance by movement

Movement	EBL	EBT	WBT	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.1	0.1	0.1	3.0	0.4	0.0	0.0	0.0	0.3
Total Del/Veh (s)	69.4	50.8	49.9	25.5	13.1	98.0	5.5	5.2	16.9

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.5	0.7	2.5	0.3	6.6	2.7	0.7

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	2.6	3.3	3.7	3.9	0.3	3.2	3.6

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.1
Total Del/Veh (s)	0.4	0.2	2.0	0.2	4.8	2.9	2.0

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.8	0.3	0.3	0.3	4.5	2.3	0.9

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.0	0.2	0.4	1.8	0.3	0.1	5.2	5.9	2.6	4.8	4.3	2.9

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	1.4

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	WBT	All
Denied Del/Veh (s)	0.0	0.0	0.0
Total Del/Veh (s)	0.4	0.3	0.4

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.5	0.3	1.3	1.3	6.7	0.3	2.0	4.1

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.7	2.2	1.6	1.1

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	2.4	2.3	0.5	0.2	0.2	1.3

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.7	0.2	0.2	0.3	0.3

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.0	4.2	4.1	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Total Del/Veh (s)	6.8	2.8	6.5	2.8	2.5	0.5	0.4	2.7	0.1	0.0	1.6

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.9	4.0	4.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Total Del/Veh (s)	6.8	3.2	6.9	3.0	2.2	0.6	0.4	2.4	0.4	0.2	3.2

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.9	3.9	4.0	4.1	0.0	0.0	0.0	0.1	0.0	0.0	1.4
Total Del/Veh (s)	7.0	3.0	6.3	2.9	2.1	0.4	0.2	2.4	0.5	0.4	1.9

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.7	0.4	0.2	0.3	0.4

Total Network Performance

Denied Del/Veh (s)	2.8
Total Del/Veh (s)	108.1

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	168	193	226	107	342	463	156	180	208	450	419	184
Average Queue (ft)	36	101	105	8	230	276	77	76	130	304	281	56
95th Queue (ft)	117	167	189	73	339	398	138	173	197	423	397	146
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	0	5	10		1	7				0		
Queuing Penalty (veh)	0	4	25		2	25				0		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	214	289	346	326	280	189
Average Queue (ft)	108	149	211	199	160	22
95th Queue (ft)	191	230	290	276	247	119
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	0	1	11		17	
Queuing Penalty (veh)	1	5	32		21	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B19	NB	NB
Directions Served	T	R	L	T	T	T	L	L
Maximum Queue (ft)	673	93	243	194	207	100	182	202
Average Queue (ft)	303	10	103	62	72	4	92	108
95th Queue (ft)	591	58	201	151	169	71	160	175
Link Distance (ft)	1552	1552		490	490	601		324
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			400				200	
Storage Blk Time (%)							0	0
Queuing Penalty (veh)							0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	B19	B9	WB	WB	WB	WB	B37	NB
Directions Served	L	T	T	R	T	T	L	T	T	R	T	L
Maximum Queue (ft)	524	632	612	492	1260	445	580	728	684	136	1312	490
Average Queue (ft)	298	453	421	186	302	38	498	469	251	57	417	244
95th Queue (ft)	610	728	695	552	1330	253	688	923	646	109	1381	593
Link Distance (ft)		601	601		4320	490		648	648		1613	
Upstream Blk Time (%)		14	7			0		27	0		9	
Queuing Penalty (veh)		70	33			1		0	0		0	
Storage Bay Dist (ft)	415			415			420			420		330
Storage Blk Time (%)	0	45	38				54	0				
Queuing Penalty (veh)	1	136	76				106	0				

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	B11	B46	B46	SB	SB	SB	SB	B44
Directions Served	T	T	R	T	T		L	T	T	R	T
Maximum Queue (ft)	700	694	490	1161	550	373	495	705	683	495	1667
Average Queue (ft)	544	522	274	386	142	47	363	558	505	228	461
95th Queue (ft)	771	782	675	1284	519	288	653	796	769	590	1620
Link Distance (ft)	621	621		1348	495	495		621	621		2411
Upstream Blk Time (%)	9	9		5	2	0		18	7		1
Queuing Penalty (veh)	65	70		69	10	1		0	0		0
Storage Bay Dist (ft)			330				335			335	
Storage Blk Time (%)	59	40					3	70	42		
Queuing Penalty (veh)	55	152					12	95	113		

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	173	250	254	181	48	294	217	73	92	348	184
Average Queue (ft)	88	97	118	57	9	136	49	27	50	171	25
95th Queue (ft)	160	190	217	130	32	241	122	63	85	295	102
Link Distance (ft)		565	1963	1963		1346				1558	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125				170		170	400	400		200
Storage Blk Time (%)	5	7				6				7	
Queuing Penalty (veh)	7	9				10				12	

Intersection: 22: 88th Street

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	53	33
Average Queue (ft)	22	4
95th Queue (ft)	43	21
Link Distance (ft)	1255	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 23: 96th St

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B46
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	291	255	177	77	350	721	718	555	261	504	400	11
Average Queue (ft)	180	112	70	35	143	401	339	46	136	328	107	0
95th Queue (ft)	270	221	136	68	384	750	735	328	224	469	340	11
Link Distance (ft)		1054	1054			729	729	729	495	495		1348
Upstream Blk Time (%)						1	0	0		0		
Queuing Penalty (veh)						2	1	0		3		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	1	0				32				11		
Queuing Penalty (veh)	1	0				24				22		

Intersection: 23: 96th St

Movement	B11	B11
Directions Served	T	
Maximum Queue (ft)	669	658
Average Queue (ft)	211	67
95th Queue (ft)	698	389
Link Distance (ft)	621	621
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	10	2
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	T	T
Maximum Queue (ft)	182	201	188	190	53	75	200	176	543	490	284	231
Average Queue (ft)	101	112	110	114	9	25	110	56	349	294	106	123
95th Queue (ft)	160	169	170	176	33	60	176	141	530	484	228	209
Link Distance (ft)			729	729			1056	1056			941	941
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)	280	280			180	180			700	700		
Storage Blk Time (%)							1	0	1	0		
Queuing Penalty (veh)							0	0	4	2		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	SB	SB	SB	SB
Directions Served	L	L	T	T
Maximum Queue (ft)	40	70	333	322
Average Queue (ft)	5	30	200	196
95th Queue (ft)	25	63	294	293
Link Distance (ft)			877	877
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	600	600		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	NB	B29	B29	B29
Directions Served	L	L	L	R	L	L	T	T	R	T	T	
Maximum Queue (ft)	102	146	175	57	115	151	279	254	66	327	384	148
Average Queue (ft)	39	59	86	21	34	77	151	138	23	22	25	5
95th Queue (ft)	83	121	149	46	85	129	252	232	55	162	182	78
Link Distance (ft)			680				722	722		370	370	370
Upstream Blk Time (%)										0	0	0
Queuing Penalty (veh)										1	2	0
Storage Bay Dist (ft)	125	250		500	455	455			250			
Storage Blk Time (%)	0		0					0				
Queuing Penalty (veh)	0		0					0				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	SB	B39	B39	B39
Directions Served	L	L	T	T	T	T	
Maximum Queue (ft)	46	76	223	222	846	759	95
Average Queue (ft)	7	33	103	110	56	55	0
95th Queue (ft)	29	68	203	213	418	416	0
Link Distance (ft)			2041	2041	941	941	941
Upstream Blk Time (%)					0	0	0
Queuing Penalty (veh)					0	1	0
Storage Bay Dist (ft)	550	550					
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB	B29	B29	B41
Directions Served	L	LT	L	T	T	T	T	T	R	T	T	T
Maximum Queue (ft)	177	200	344	464	383	364	412	335	281	37	8	66
Average Queue (ft)	90	125	234	61	37	228	186	166	94	3	0	2
95th Queue (ft)	169	185	347	289	222	373	365	290	207	38	8	68
Link Distance (ft)		1442		556	556		370	370		613	613	722
Upstream Blk Time (%)				0	0	1	2	0	0			
Queuing Penalty (veh)				1	0	0	15	0	0			
Storage Bay Dist (ft)	330		190			300			300			
Storage Blk Time (%)			28	0		7	1	0	0			
Queuing Penalty (veh)			238	0		36	4	1	1			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	B41
Directions Served	T
Maximum Queue (ft)	68
Average Queue (ft)	2
95th Queue (ft)	69
Link Distance (ft)	722
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 37: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (ft)	540	446
Average Queue (ft)	46	31
95th Queue (ft)	298	250
Link Distance (ft)	648	648
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	437	647	300	733	723	390	334	503	332	325
Average Queue (ft)	263	346	114	503	477	143	251	291	119	139
95th Queue (ft)	433	739	353	732	720	444	362	478	260	265
Link Distance (ft)		1036		1843	1843			556	556	556
Upstream Blk Time (%)		3						1	0	
Queuing Penalty (veh)		0						4	0	
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)	7	51			27		20	27		
Queuing Penalty (veh)	46	356			42		68	90		

Intersection: 44: Bend

Movement	NB	NB
Directions Served	T	
Maximum Queue (ft)	650	607
Average Queue (ft)	472	261
95th Queue (ft)	832	653
Link Distance (ft)	621	621
Upstream Blk Time (%)	1	0
Queuing Penalty (veh)	8	1
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	122	3	49	39	234	75
Average Queue (ft)	57	0	15	5	77	40
95th Queue (ft)	100	3	43	26	173	97
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					11	0
Queuing Penalty (veh)					20	2

Intersection: 101: Northwest Pkwy

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	T	T	T	T	R	T	T	L	L	T
Maximum Queue (ft)	66	87	209	185	204	190	47	348	348	29	52	58
Average Queue (ft)	18	29	126	101	120	91	12	174	166	2	14	8
95th Queue (ft)	48	66	190	180	181	172	35	296	291	15	40	34
Link Distance (ft)			1264	1264	1297	1297		2637	2637			1843
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500					500			500	500	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 101: Northwest Pkwy

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	267	284	16
Average Queue (ft)	30	51	1
95th Queue (ft)	214	235	9
Link Distance (ft)	1843	1843	
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			500
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 104: Street A & Campus Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	24	44
Average Queue (ft)	2	16
95th Queue (ft)	12	34
Link Distance (ft)	1300	548
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 105: Street B & Campus Dr

Movement	EB	WB	NB	NB
Directions Served	T	LT	LR	R
Maximum Queue (ft)	65	40	63	47
Average Queue (ft)	16	4	21	10
95th Queue (ft)	50	21	52	37
Link Distance (ft)	1300	1054	354	354
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 106: Parcel E West & Tape Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	9	58
Average Queue (ft)	0	31
95th Queue (ft)	6	49
Link Distance (ft)		656
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 107: Tape Dr & Parcel A

Movement	EB	SB
Directions Served	L	LTR
Maximum Queue (ft)	4	32
Average Queue (ft)	0	14
95th Queue (ft)	3	37
Link Distance (ft)		286
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	LT	R
Maximum Queue (ft)	16	9	45	29	27
Average Queue (ft)	1	0	19	6	6
95th Queue (ft)	9	4	43	26	24
Link Distance (ft)			520	1706	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300	300			50
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 109: Parcel D West & Tape Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 110: Street B & Tape Dr

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	TR	L	R
Maximum Queue (ft)	18	6	6	118	25
Average Queue (ft)	1	0	0	52	12
95th Queue (ft)	8	6	5	88	29
Link Distance (ft)		412	412	311	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300				250
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 111: Tape Dr & Parcel C RI

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	32	3
Average Queue (ft)	13	0
95th Queue (ft)	37	3
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	33
Average Queue (ft)	9
95th Queue (ft)	32
Link Distance (ft)	353
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	R	L	R	L	L
Maximum Queue (ft)	51	48	26	31	12	21
Average Queue (ft)	19	22	10	16	0	3
95th Queue (ft)	41	47	27	39	6	13
Link Distance (ft)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	50	200	50	300	300
Storage Blk Time (%)		0		0		
Queuing Penalty (veh)		0		0		

Intersection: 115: Street B & Central

Movement	EB	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	T	R	L	R	L	TR	L
Maximum Queue (ft)	69	3	62	62	55	28	5	33
Average Queue (ft)	34	0	31	32	23	1	0	5
95th Queue (ft)	55	3	51	53	49	11	3	24
Link Distance (ft)		567					631	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200		50	200	50	300		300
Storage Blk Time (%)			0		0			
Queuing Penalty (veh)			0		0			

Intersection: 116: Street B & South Full

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	R	L	R	L	L
Maximum Queue (ft)	60	62	33	33	16	23
Average Queue (ft)	23	32	15	17	2	1
95th Queue (ft)	49	50	40	42	11	10
Link Distance (ft)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	200	50	200	50	300	300
Storage Blk Time (%)		0		0		
Queuing Penalty (veh)		0		0		

Intersection: 117: Street B & South RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	9
95th Queue (ft)	31
Link Distance (ft)	290
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 2231

Intersection	
Intersection Delay, s/veh	6.8
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	596	540	731
Demand Flow Rate, veh/h	608	550	746
Vehicles Circulating, veh/h	490	185	222
Vehicles Exiting, veh/h	478	913	513
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	7.9	5.3	7.1
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.470	0.530	0.404	0.596	0.657	0.343
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	286	322	222	328	490	256
Cap Entry Lane, veh/h	860	936	1139	1213	1101	1176
Entry HV Adj Factor	0.979	0.981	0.980	0.982	0.980	0.980
Flow Entry, veh/h	280	316	218	322	480	251
Cap Entry, veh/h	841	917	1114	1189	1078	1153
V/C Ratio	0.333	0.344	0.195	0.271	0.445	0.218
Control Delay, s/veh	8.1	7.7	5.0	5.5	8.2	5.1
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	2	1	1	2	1

Intersection	
Intersection Delay, s/veh	4.1
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	282	302	304
Demand Flow Rate, veh/h	288	308	310
Vehicles Circulating, veh/h	130	13	283
Vehicles Exiting, veh/h	191	580	135
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.9	3.6	4.7
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.469	0.531	0.471	0.529	0.471	0.529
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	135	153	145	163	146	164
Cap Entry Lane, veh/h	1198	1272	1334	1405	1040	1116
Entry HV Adj Factor	0.983	0.978	0.977	0.980	0.979	0.982
Flow Entry, veh/h	133	150	142	160	143	161
Cap Entry, veh/h	1178	1244	1304	1377	1018	1097
V/C Ratio	0.113	0.120	0.109	0.116	0.140	0.147
Control Delay, s/veh	4.0	3.9	3.6	3.5	4.8	4.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	1

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0	0.0
Total Del/Veh (s)	66.9	57.3	23.4	76.8	51.2	14.0	58.4	27.6	7.4	28.9	38.7	9.6

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	37.0

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.2	0.2	0.0	0.0	0.0	0.1	0.1	0.1	0.8	0.1	0.5
Total Del/Veh (s)	48.3	63.3	33.2	48.6	36.7	30.8	32.5	54.5	31.7	45.5	18.1	6.4

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	36.2

23: 96th St & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Del/Veh (s)	49.0	0.2	18.9	63.7	14.9	23.7	10.3	23.6

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.2	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	72.5	84.7	8.6	60.5	64.8	1.4	78.3	9.1	1.0	70.7	51.0	13.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	43.0

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0		0.0	1.1	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	63.5		0.4	96.3	7.1	45.7	9.3	3.1	71.3	36.6	10.8	30.7

Total Zone Performance

Denied Del/Veh (s)	1.8
Total Del/Veh (s)	1063.0

Intersection: 15: 96th St & Dillon Rd

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)	190	186	224	189	116	320	353	240	224	126	325	392
Average Queue (ft)	106	117	119	88	39	186	223	137	111	45	142	196
95th Queue (ft)	175	179	196	164	85	295	340	207	187	93	280	347
Link Distance (ft)			600	600				650	650			2004
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	415	415			415	420	420			420	330	
Storage Blk Time (%)							0				2	1
Queuing Penalty (veh)							0				8	2

Intersection: 15: 96th St & Dillon Rd

Movement	NB	B42	B42	B42	SB	SB	SB	SB
Directions Served	T	T	T		L	T	T	R
Maximum Queue (ft)	387	238	447	188	146	402	476	254
Average Queue (ft)	210	15	20	7	54	244	310	51
95th Queue (ft)	349	153	185	102	113	369	440	168
Link Distance (ft)	2004	509	509	509		2607	2607	
Upstream Blk Time (%)		0	0	0				
Queuing Penalty (veh)		0	1	0				
Storage Bay Dist (ft)					335			335
Storage Blk Time (%)	1					1	7	
Queuing Penalty (veh)	9					1	21	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	79	164	329	291	228	564	569	380	412	339	80
Average Queue (ft)	23	52	154	120	50	173	229	125	143	95	35
95th Queue (ft)	62	122	274	234	137	444	497	296	325	226	64
Link Distance (ft)		565	1963	1963		1348				869	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	0	3				11	5	0	2	1	
Queuing Penalty (veh)	0	1				79	15	2	6	4	

Intersection: 23: 96th St & Campus Dr

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B42
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	196	208	92	198	293	474	590	552	261	562	472	48
Average Queue (ft)	110	132	32	95	104	119	154	72	73	339	143	2
95th Queue (ft)	175	200	76	165	198	298	379	275	189	534	357	44
Link Distance (ft)		1045	1045			714	714	714	509	509		2004
Upstream Blk Time (%)						0	0	0	0	1	0	
Queuing Penalty (veh)						0	0	0	1	9	0	
Storage Bay Dist (ft)	300			250	250						450	
Storage Blk Time (%)					0	1				3	0	
Queuing Penalty (veh)					0	1				13	0	

Intersection: 23: 96th St & Campus Dr

Movement	B42
Directions Served	T
Maximum Queue (ft)	176
Average Queue (ft)	14
95th Queue (ft)	143
Link Distance (ft)	2004
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	L	L	L
Maximum Queue (ft)	93	109	140	146	31	43	85	209	204	550	595	575
Average Queue (ft)	24	43	62	58	1	7	28	114	90	295	330	284
95th Queue (ft)	66	85	116	117	16	29	69	191	176	500	544	509
Link Distance (ft)			714	714				1056	1056			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			250	180	180			700	700	700
Storage Blk Time (%)								3	1	0	0	1
Queuing Penalty (veh)								1	1	0	0	1

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	SB	SB	SB	SB	SB
Directions Served	T	T	T	L	L	T	T	R
Maximum Queue (ft)	210	184	260	72	90	586	606	293
Average Queue (ft)	55	68	9	15	41	328	334	104
95th Queue (ft)	162	140	238	50	83	567	576	265
Link Distance (ft)	941	941	2052			864	864	
Upstream Blk Time (%)			0				0	
Queuing Penalty (veh)			0				0	
Storage Bay Dist (ft)				600	600			600
Storage Blk Time (%)	0					2	2	
Queuing Penalty (veh)	1					1	7	

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	NB	B29	B29	B29
Directions Served	L	L	L	R	L	L	T	T	R	T	T	
Maximum Queue (ft)	48	283	324	66	196	229	295	251	60	291	316	226
Average Queue (ft)	14	144	181	27	91	121	167	125	23	21	37	8
95th Queue (ft)	42	265	290	51	161	193	262	216	53	154	212	96
Link Distance (ft)			680				652	652		370	370	370
Upstream Blk Time (%)										0	0	0
Queuing Penalty (veh)										0	1	0
Storage Bay Dist (ft)	125	250		500	455	455			250			
Storage Blk Time (%)		2	5					0				
Queuing Penalty (veh)		3	8					0				

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	SB	SB	B39	B39	B39
Directions Served	L	L	T	T	R	T	T	
Maximum Queue (ft)	67	171	750	754	178	974	977	958
Average Queue (ft)	14	48	409	434	6	352	419	89
95th Queue (ft)	47	130	641	661	117	1085	1179	547
Link Distance (ft)			2052	2052		941	941	941
Upstream Blk Time (%)						0	1	0
Queuing Penalty (veh)						3	6	1
Storage Bay Dist (ft)	550	550			550			
Storage Blk Time (%)			2	3				
Queuing Penalty (veh)			1	1				

Zone Summary

Zone wide Queuing Penalty: 209

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	51.8	66.9	22.0	59.6	41.2	18.0	30.2	38.3	7.9	33.9	29.0	9.0

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	37.6

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.6	0.6	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	44.7	59.6	34.9	48.2	60.5	21.6	29.6	40.6	5.5	30.2	33.2	6.2

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	34.2

23: 96th St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	54.7	28.5	95.8	9.6	15.0	4.5	19.6

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.8	0.2	3.6	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	59.5	64.2	7.0	58.7	59.1	1.4	50.0	7.8	0.9	65.2	32.0	8.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	28.7

Total Zone Performance

Denied Del/Veh (s)	1.5
Total Del/Veh (s)	1717.2

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	192	202	365	315	194	450	91	316	346	248	222	136
Average Queue (ft)	107	117	224	189	79	37	3	189	218	151	123	60
95th Queue (ft)	169	177	342	299	153	251	67	282	320	225	197	112
Link Distance (ft)			600	600		490	490			649	649	
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						1						
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)			0									
Queuing Penalty (veh)			0									

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B46	SB	SB	SB	SB
Directions Served	L	T	T	R	T	L	T	T	R
Maximum Queue (ft)	167	465	481	244	47	153	289	316	118
Average Queue (ft)	55	257	274	17	2	71	160	193	47
95th Queue (ft)	134	434	447	167	48	130	250	285	92
Link Distance (ft)		2019	2019		497		2414	2414	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330			330		335			335
Storage Blk Time (%)		5	6				0	0	
Queuing Penalty (veh)		4	24				0	0	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	174	249	227	208	74	307	84	84	103	347	128
Average Queue (ft)	91	104	113	66	10	146	38	28	52	175	23
95th Queue (ft)	160	195	198	148	44	257	71	66	88	303	80
Link Distance (ft)		565	1963	1963		1346				1558	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	6	7				8				8	
Queuing Penalty (veh)	8	9				14				13	

Intersection: 23: 96th St

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B46
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	224	248	220	92	100	294	534	434	250	529	400	7
Average Queue (ft)	126	146	88	39	42	37	55	18	112	278	68	0
95th Queue (ft)	199	218	174	80	83	166	257	170	214	468	252	5
Link Distance (ft)		1057	1057			716	716	716	497	497		2019
Upstream Blk Time (%)						0	0	0		0		
Queuing Penalty (veh)						0	0	0		3		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)		0								7		
Queuing Penalty (veh)		0								14		

Intersection: 23: 96th St

Movement	B46
Directions Served	T
Maximum Queue (ft)	38
Average Queue (ft)	1
95th Queue (ft)	20
Link Distance (ft)	2019
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	L	L	L
Maximum Queue (ft)	185	195	174	182	12	43	72	159	124	318	343	307
Average Queue (ft)	100	108	103	106	0	7	22	85	57	204	232	193
95th Queue (ft)	160	168	165	167	12	29	57	139	110	288	311	273
Link Distance (ft)			716	716				1056	1056			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			250	180	180			700	700	700
Storage Blk Time (%)								0				
Queuing Penalty (veh)								0				

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T	R
Maximum Queue (ft)	200	217	50	72	272	283	94
Average Queue (ft)	89	105	6	26	164	159	32
95th Queue (ft)	173	190	26	59	252	255	71
Link Distance (ft)	941	941			864	864	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			600	600			600
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 91

G - Intersection Capacity Worksheets (SimTraffic)
Year 2030 + Project

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.3	4.0	0.6	0.7	2.7	2.0	0.2	0.4	2.3	0.2	2.0
Total Del/Veh (s)	49.6	46.1	2.0	41.1	33.8	3.3	50.3	32.5	4.5	65.0	24.0	3.2

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	27.3

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	43.8	4.2	31.6	16.1	35.4	1.3	1.7	21.9

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.3	1.4	0.4	1.4
Total Del/Veh (s)	68.7	55.3	24.4	83.1	50.3	15.3	54.3	28.7	7.3	33.2	42.1	10.8

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	38.6

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.9	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.1	1.8	0.7	1.5
Total Del/Veh (s)	47.7	81.1	43.6	46.7	38.9	33.8	32.7	47.8	17.1	76.5	26.2	10.1

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	38.3

22: 88th Street & Tape Dr Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0		0.0	0.1	0.5	0.3	0.0	0.1
Total Del/Veh (s)	25.3		10.3	2.1	1.4	9.8	2.7	3.0

23: 96th St & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
Total Del/Veh (s)	66.6	0.2	21.0	49.9	10.4	21.6	12.9	23.4

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	3.5	0.2	3.5	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	81.7	93.8	7.5	77.4	80.2	1.8	107.0	13.6	1.1	84.1	53.1	14.6

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	52.2

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.3	3.4	2.2	1.3	2.0	0.0	0.0	0.0	0.8
Total Del/Veh (s)	65.9	0.5	86.4	7.6	69.2	16.3	6.9	76.8	64.7	23.5	46.8

44: 88th Street Performance by movement

Movement	EBR	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.2	0.9	0.0	0.0	1.4	0.2	0.1	0.1
Total Del/Veh (s)	11.8	5.9	6.4	3.0	2.2	5.0	2.3	1.6	3.3

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.2	0.3	0.0	0.2	0.2
Total Del/Veh (s)	6.8	5.7	8.4	7.2	7.2	5.9	7.1

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.9	1.2	4.0	0.8	4.6	0.2	3.3	1.0

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.9	3.1	6.1	4.9	4.3	3.6	5.3

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.3	0.9	3.4	2.0	5.3	2.8	2.5

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.9	0.4	1.5	1.1	5.9	3.2	1.6

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.9	0.4	0.3	3.9	2.4	1.7	5.9	6.4	2.4	7.2	6.9	3.7

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	2.6

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.5	0.8	0.7	3.1	0.7

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.1	4.4	0.0	0.0	0.0
Total Del/Veh (s)	5.4	0.4	0.0	2.5	0.8	3.7	3.5	16.2	3.4	11.1	7.8	3.4

110: Street B & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	4.5

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.7	4.3	4.9	3.4

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.9	2.3	2.6	0.5	0.6	0.4	1.2

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.5	0.3	0.2	1.0	0.8

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.5	4.2	4.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Del/Veh (s)	5.7	3.9	8.8	2.6	4.2	0.5	0.4	2.6	0.2	0.1	1.2

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.2	3.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.9
Total Del/Veh (s)	8.6	3.7	13.4	3.1	2.9	0.7	0.6	3.1	0.4	0.4	3.3

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.1	4.1	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Total Del/Veh (s)	9.5	2.6	11.5	3.3	2.7	0.5	0.3	4.1	0.6	0.5	1.7

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	0.5	0.3	0.2	0.5

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	79.5

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	35	100	97	267	334	181	134	165	455	437	179	215
Average Queue (ft)	4	37	31	167	210	78	25	87	270	241	40	78
95th Queue (ft)	20	78	78	255	296	143	90	146	411	393	121	191
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)			0	0	1				0			3
Queuing Penalty (veh)			0	0	2				0			8

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	278	356	294	250	76
Average Queue (ft)	125	178	154	106	2
95th Queue (ft)	232	288	248	209	31
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	5	4		6	
Queuing Penalty (veh)	15	9		7	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	R	L	T	T	L	L
Maximum Queue (ft)	566	114	266	236	250	183	202
Average Queue (ft)	255	34	99	118	126	90	110
95th Queue (ft)	488	83	214	211	226	153	172
Link Distance (ft)	1552	1552		490	490		337
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			400			200	
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						0	1

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	T	L	L	T	T	R	L
Maximum Queue (ft)	226	231	210	171	123	177	383	400	273	221	126	290
Average Queue (ft)	117	128	120	86	47	4	216	240	142	113	48	139
95th Queue (ft)	194	203	191	156	96	77	349	371	232	185	95	243
Link Distance (ft)			600	600		490			650	650		
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						0						
Storage Bay Dist (ft)	415	415			415		420	420			420	330
Storage Blk Time (%)							0	1				0
Queuing Penalty (veh)							1	2				1

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	R
Maximum Queue (ft)	392	413	122	137	474	506	354
Average Queue (ft)	208	222	4	55	292	325	56
95th Queue (ft)	356	369	80	110	420	444	183
Link Distance (ft)	2073	2073			2635	2635	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			330	335			335
Storage Blk Time (%)	1	1			4	8	
Queuing Penalty (veh)	2	9			5	26	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	127	217	300	352	234	311	427	434	476	586	171
Average Queue (ft)	31	64	154	148	55	145	175	159	182	172	43
95th Queue (ft)	83	159	265	295	140	259	351	377	416	470	103
Link Distance (ft)		565	1963	1963		1348				869	
Upstream Blk Time (%)										1	
Queuing Penalty (veh)										9	
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	0	7			0	9	0	4	7	3	
Queuing Penalty (veh)	0	3			0	62	0	15	25	25	

Intersection: 22: 88th Street & Tape Dr

Movement	WB	NB	SB
Directions Served	LR	R	L
Maximum Queue (ft)	61	10	81
Average Queue (ft)	19	0	32
95th Queue (ft)	46	3	67
Link Distance (ft)	1243		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		300	300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 23: 96th St & Campus Dr

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B42
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	278	297	130	223	219	182	383	187	241	539	400	274
Average Queue (ft)	167	188	46	117	116	64	90	17	79	350	219	19
95th Queue (ft)	251	275	99	198	195	151	252	136	176	557	452	200
Link Distance (ft)		1045	1045			714	714	714	449	449		2073
Upstream Blk Time (%)							0	0		4		
Queuing Penalty (veh)							0	0		30		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	0	0		0	0	0				12	0	
Queuing Penalty (veh)	0	1		1	0	0				70	2	

Intersection: 23: 96th St & Campus Dr

Movement	B42
Directions Served	T
Maximum Queue (ft)	473
Average Queue (ft)	64
95th Queue (ft)	355
Link Distance (ft)	2073
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	L	L
Maximum Queue (ft)	102	119	162	187	62	184	335	293	47	705	764	776
Average Queue (ft)	30	50	71	74	8	39	155	137	2	387	413	369
95th Queue (ft)	77	95	136	144	38	101	261	242	43	667	711	715
Link Distance (ft)			714	714			1056	1056				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			180	700	700	700
Storage Blk Time (%)				0			11	7		2	4	3
Queuing Penalty (veh)				0			5	5		5	9	7

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	B39	SB	SB	SB	SB	SB	B33
Directions Served	T	T	T	T	L	L	T	T	R	T
Maximum Queue (ft)	643	249	222	60	96	123	675	675	399	4
Average Queue (ft)	135	95	15	2	25	55	390	388	113	0
95th Queue (ft)	499	193	170	55	75	102	642	644	280	3
Link Distance (ft)	941	941	2052	2052			864	864		1436
Upstream Blk Time (%)	1						0	0		
Queuing Penalty (veh)	6						0	0		
Storage Bay Dist (ft)					600	600			600	
Storage Blk Time (%)	0						2	2		
Queuing Penalty (veh)	1						2	7		

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	L	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	67	293	334	72	350	360	711	270	71	77	633	1252
Average Queue (ft)	24	170	214	29	209	229	190	134	25	21	156	673
95th Queue (ft)	56	276	313	54	314	330	482	232	56	60	557	1169
Link Distance (ft)			680				1947	1947				2052
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							0					
Storage Bay Dist (ft)	125	250		500	455	455			250	550	550	
Storage Blk Time (%)		0	6				0	0				20
Queuing Penalty (veh)		1	9				0	0				15

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39	B39	B39
Directions Served	T	R	T	T	
Maximum Queue (ft)	1279	708	942	935	118
Average Queue (ft)	687	111	95	86	4
95th Queue (ft)	1192	535	559	526	108
Link Distance (ft)	2052		941	941	941
Upstream Blk Time (%)			0	0	0
Queuing Penalty (veh)			1	1	0
Storage Bay Dist (ft)		550			
Storage Blk Time (%)	23				
Queuing Penalty (veh)	15				

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	407	309	81
Average Queue (ft)	20	16	3
95th Queue (ft)	186	178	74
Link Distance (ft)	650	650	650
Upstream Blk Time (%)		0	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 44: 88th Street

Movement	EB	WB	NB	NB	SB	SB	B12
Directions Served	LTR	LTR	L	TR	L	TR	T
Maximum Queue (ft)	74	91	33	3	45	148	93
Average Queue (ft)	33	43	3	0	5	13	5
95th Queue (ft)	63	72	17	2	28	137	74
Link Distance (ft)	627	437		869		617	337
Upstream Blk Time (%)						0	0
Queuing Penalty (veh)						1	0
Storage Bay Dist (ft)			75		75		
Storage Blk Time (%)						1	
Queuing Penalty (veh)						0	

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	143	68	166	218	163	75
Average Queue (ft)	59	3	47	55	53	27
95th Queue (ft)	118	33	114	149	122	81
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					5	0
Queuing Penalty (veh)					8	1

Intersection: 104: Street A & Campus Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	60	31
Average Queue (ft)	20	11
95th Queue (ft)	51	29
Link Distance (ft)	1300	548
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 105: Street B & Campus Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	LR	R
Maximum Queue (ft)	92	10	133	68	65	44
Average Queue (ft)	46	1	42	4	21	5
95th Queue (ft)	81	11	105	36	53	26
Link Distance (ft)	1300	1300	1045	1045	354	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 106: Parcel E West & Tape Dr

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	5	57	17	44
Average Queue (ft)	0	13	1	18
95th Queue (ft)	4	45	15	43
Link Distance (ft)	1243		665	656
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 107: Tape Dr & Parcel A

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	33	40
Average Queue (ft)	2	15
95th Queue (ft)	17	38
Link Distance (ft)		287
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	L	LTR	LT	R
Maximum Queue (ft)	26	2	29	32	43	57
Average Queue (ft)	2	0	3	10	15	23
95th Queue (ft)	14	2	18	32	40	46
Link Distance (ft)		680		520	1706	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300		300			50
Storage Blk Time (%)					0	0
Queuing Penalty (veh)					0	0

Intersection: 109: Parcel D West & Tape Dr

Movement	NB
Directions Served	R
Maximum Queue (ft)	23
Average Queue (ft)	2
95th Queue (ft)	16
Link Distance (ft)	495
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 110: Street B & Tape Dr

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	R	L	T	R	L	TR
Maximum Queue (ft)	55	35	13	11	16	29	131	29
Average Queue (ft)	8	3	1	1	1	8	52	13
95th Queue (ft)	35	19	9	6	10	28	97	32
Link Distance (ft)			412		422		311	311
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	300	250		100		100		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 111: Tape Dr & Parcel C RI

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	33	23
Average Queue (ft)	13	2
95th Queue (ft)	37	15
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	33
Average Queue (ft)	12
95th Queue (ft)	35
Link Distance (ft)	353
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	R	L	R	L	TR	L
Maximum Queue (ft)	28	30	35	52	39	6	34
Average Queue (ft)	5	5	13	19	10	0	4
95th Queue (ft)	21	24	31	45	33	2	20
Link Distance (ft)						551	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200	50	200	50	300		300
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 115: Street B & Central

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	R	L	R	L	TR	L
Maximum Queue (ft)	33	38	104	65	51	6	56
Average Queue (ft)	12	12	42	28	12	0	15
95th Queue (ft)	36	37	76	54	38	2	45
Link Distance (ft)						631	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200	50	200	50	300		300
Storage Blk Time (%)		0		0			
Queuing Penalty (veh)		0		0			

Intersection: 116: Street B & South Full

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	R	L	R	L	TR	L	T	TR
Maximum Queue (ft)	32	31	55	64	49	2	43	2	2
Average Queue (ft)	6	13	22	22	10	0	10	0	0
95th Queue (ft)	25	37	50	51	34	1	33	2	1
Link Distance (ft)						275		631	631
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	200	50	200	50	300		300		
Storage Blk Time (%)		0		0					
Queuing Penalty (veh)		0		0					

Intersection: 117: Street B & South RIRO

Movement	WB	NB
Directions Served	R	TR
Maximum Queue (ft)	34	2
Average Queue (ft)	11	0
95th Queue (ft)	35	2
Link Distance (ft)	290	311
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 435

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.5	0.4	0.5	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	56.5	59.7	5.9	59.6	6.7	10.7	6.8	12.8

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.9	1.5	3.3	0.3	2.3	0.0	0.0	0.6
Total Del/Veh (s)	55.5	57.4	1.9	28.2	4.5	27.4	5.7	18.6

Total Zone Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	745.0

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB	B41	B41
Directions Served	L	LT	R	L	T	T	T	T	T	R	T	T
Maximum Queue (ft)	198	221	198	245	88	52	275	265	262	205	456	567
Average Queue (ft)	110	144	9	139	9	4	157	156	161	71	25	33
95th Queue (ft)	192	211	159	228	62	30	247	237	240	164	230	261
Link Distance (ft)		1442	1442		556	556		370	370		652	652
Upstream Blk Time (%)			0								0	0
Queuing Penalty (veh)			0								0	0
Storage Bay Dist (ft)	330			190			300			300		
Storage Blk Time (%)				5	0		0	0	0	0		
Queuing Penalty (veh)				27	0		0	1	0	1		

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	B41
Directions Served	
Maximum Queue (ft)	56
Average Queue (ft)	2
95th Queue (ft)	57
Link Distance (ft)	652
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	T	T	R	L	L	T	T
Maximum Queue (ft)	223	222	399	359	22	264	268	206	217
Average Queue (ft)	139	146	241	188	1	151	176	95	111
95th Queue (ft)	203	211	347	312	10	230	246	169	183
Link Distance (ft)		1037	1760	1760			556	556	556
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	330				300	180			
Storage Blk Time (%)		10		0		2	7		
Queuing Penalty (veh)		54		0		8	22		

Zone Summary

Zone wide Queuing Penalty: 114

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	653	1025	505
Demand Flow Rate, veh/h	666	1046	515
Vehicles Circulating, veh/h	339	425	336
Vehicles Exiting, veh/h	512	580	1135
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.991	1.000
Approach Delay, s/veh	7.6	13.9	6.5
Approach LOS	A	B	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.638	0.362	0.321	0.679	0.658	0.342
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	425	241	336	710	339	176
Cap Entry Lane, veh/h	988	1065	913	989	991	1067
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.979	0.983
Flow Entry, veh/h	417	236	329	696	332	173
Cap Entry, veh/h	966	1039	887	962	970	1049
V/C Ratio	0.432	0.227	0.371	0.724	0.342	0.165
Control Delay, s/veh	8.7	5.6	8.3	16.5	7.3	4.9
LOS	A	A	A	C	A	A
95th %tile Queue, veh	2	1	2	7	2	1

Intersection	
Intersection Delay, s/veh	5.7
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	424	934	175
Demand Flow Rate, veh/h	432	953	178
Vehicles Circulating, veh/h	397	8	415
Vehicles Exiting, veh/h	564	585	414
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	5.9	5.8	4.7
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.470	0.530	0.470	0.530	0.472	0.528
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	203	229	448	505	84	94
Cap Entry Lane, veh/h	937	1013	1340	1410	921	998
Entry HV Adj Factor	0.981	0.981	0.980	0.980	0.979	0.987
Flow Entry, veh/h	199	225	439	495	82	93
Cap Entry, veh/h	919	994	1313	1383	902	985
V/C Ratio	0.217	0.226	0.334	0.358	0.091	0.094
Control Delay, s/veh	6.1	5.8	5.8	5.8	4.8	4.5
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	1	2	0	0

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.7	3.3	0.6	0.6	2.7	2.0	0.3	0.4	2.1	0.2	2.0
Total Del/Veh (s)	57.8	57.0	3.8	52.0	39.1	3.0	70.8	41.0	5.0	58.8	29.6	4.4

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	34.4

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	30.1	2.1	27.6	7.7	52.8	1.8	2.0	20.9

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.4	1.4
Total Del/Veh (s)	52.2	74.7	23.6	68.0	41.6	20.8	39.5	44.8	9.1	38.8	33.1	9.7

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	42.1

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.6	0.6	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	36.0	47.5	27.2	38.3	47.7	19.2	20.6	26.4	5.0	20.4	20.1	4.8

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	24.8

22: 88th Street Performance by movement

Movement	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.3	0.4	5.3	2.4	1.9	5.4	2.9	3.1

23: 96th St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	51.2	32.3	94.0	10.4	18.6	6.5	22.5

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.6	0.2	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	60.0	63.0	7.5	58.3	61.4	1.5	49.4	9.7	0.9	64.8	35.5	10.4

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	29.8

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	3.7	1.9	1.3	1.8	0.0	0.0	0.0	0.7
Total Del/Veh (s)	67.0	0.0	0.9	84.3	9.3	72.4	20.0	12.5	67.4	6.6	4.6	18.7

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.2	0.1	0.4	0.2
Total Del/Veh (s)	7.7	6.3	4.0	3.1	8.5	7.4	6.3

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.5	0.5	2.8	0.4	6.9	0.1	3.2	0.9

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	2.6	3.8	3.8	4.6	0.3	3.8	4.0

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	0.5	0.4	2.2	0.5	5.7	3.6	2.8

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	2.4	0.4	0.7	0.4	5.6	3.0	1.2

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	2.2	0.4	0.3	3.0	0.8	0.6	5.9	7.6	3.2	6.0	7.6	3.1

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	1.9

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.7	0.4	0.4	3.2	0.7

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.2	4.1	0.0	0.0	0.0
Total Del/Veh (s)	2.7	0.7	0.2	2.5	0.4	1.8	6.0	10.8	6.6	17.2	6.2	2.3

110: Street B & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	9.1

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.8	2.8	3.8	1.4

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.8	2.5	2.5	0.8	0.4	0.2	1.5

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.9	0.3	0.3	0.5	0.5

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.1	4.1	4.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Total Del/Veh (s)	8.6	3.1	10.9	3.3	2.9	0.6	0.5	3.2	0.1	0.0	2.1

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.9	3.9	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	1.9
Total Del/Veh (s)	9.0	3.7	10.7	3.9	2.5	0.7	0.5	3.2	0.5	0.2	4.4

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.0	3.9	4.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Total Del/Veh (s)	9.1	3.3	9.8	3.5	3.2	0.5	0.3	3.2	0.8	0.6	2.3

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.0	0.6	0.4	0.7	0.8

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	63.0

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	161	188	211	148	344	506	207	179	202	475	438	193
Average Queue (ft)	48	111	107	8	250	300	88	74	128	312	287	64
95th Queue (ft)	139	180	181	72	349	414	163	172	191	438	409	155
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	0	7	12		1	10				0		
Queuing Penalty (veh)	0	6	30		5	37				0		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	206	264	317	298	278	189
Average Queue (ft)	114	150	214	202	163	23
95th Queue (ft)	195	224	289	277	255	121
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	0	1	12		18	0
Queuing Penalty (veh)	1	5	38		23	0

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B19	B19	NB	NB	NB
Directions Served	T	R	L	T	T	T		L	L	R
Maximum Queue (ft)	792	314	204	181	203	5	6	194	229	32
Average Queue (ft)	346	23	99	65	74	0	0	109	128	1
95th Queue (ft)	682	182	177	143	162	5	6	173	198	33
Link Distance (ft)	1552	1552		490	490	600	600		324	
Upstream Blk Time (%)										0
Queuing Penalty (veh)										0
Storage Bay Dist (ft)			400					200		200
Storage Blk Time (%)								0	1	
Queuing Penalty (veh)								0	4	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	B9	WB	WB	WB	WB	WB
Directions Served	L	L	T	T	R	T		L	L	T	T	R
Maximum Queue (ft)	194	210	373	354	218	400	89	346	371	238	223	139
Average Queue (ft)	109	122	252	216	85	42	3	214	242	150	125	64
95th Queue (ft)	175	187	377	347	162	269	65	322	354	220	199	119
Link Distance (ft)			600	600		490	490			649	649	
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						1						
Storage Bay Dist (ft)	415	415			415			420	420			420
Storage Blk Time (%)			1	1				0	0			
Queuing Penalty (veh)			4	2				0	0			

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	T	R	L	T	T	R
Maximum Queue (ft)	322	520	557	439	179	328	353	113
Average Queue (ft)	82	319	335	31	80	193	231	46
95th Queue (ft)	201	495	512	229	143	288	329	88
Link Distance (ft)		2019	2019			2442	2442	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	330			330	335			335
Storage Blk Time (%)		9	12			0	1	
Queuing Penalty (veh)		11	50			0	2	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	174	249	233	225	43	273	86	70	95	287	85
Average Queue (ft)	80	95	104	69	11	130	35	22	45	123	19
95th Queue (ft)	147	182	192	153	34	237	69	58	80	233	61
Link Distance (ft)		565	1963	1963		1346				1558	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	3	5				5				3	
Queuing Penalty (veh)	4	7				9				5	

Intersection: 22: 88th Street

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	76	41
Average Queue (ft)	34	8
95th Queue (ft)	61	31
Link Distance (ft)	1255	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 23: 96th St

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B46
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	276	298	258	107	110	337	482	129	357	561	400	122
Average Queue (ft)	157	179	127	52	54	54	73	11	156	336	122	6
95th Queue (ft)	234	254	228	95	96	185	268	85	287	540	365	63
Link Distance (ft)		1057	1057			716	716	716	497	497		2019
Upstream Blk Time (%)							0	0		2		
Queuing Penalty (veh)							0	0		12		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	0	1								11		
Queuing Penalty (veh)	0	1								27		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	L	T
Maximum Queue (ft)	203	212	227	216	38	87	168	154	325	341	320	220
Average Queue (ft)	112	121	121	121	7	35	101	77	206	233	198	110
95th Queue (ft)	177	188	193	191	27	75	156	140	300	321	289	201
Link Distance (ft)			716	716			1056	1056				941
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			700	700	700	
Storage Blk Time (%)	0			0			0	0				
Queuing Penalty (veh)	0			1			0	0				

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	R
Maximum Queue (ft)	233	43	74	321	324	93
Average Queue (ft)	128	7	30	190	186	40
95th Queue (ft)	213	27	65	282	284	79
Link Distance (ft)	941			864	864	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		600	600			600
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	R	L	L	R	L	L	T	T	R	L	L
Maximum Queue (ft)	137	2	193	221	62	174	195	347	332	159	61	83
Average Queue (ft)	61	0	89	143	25	72	104	195	174	32	12	42
95th Queue (ft)	113	2	193	210	51	143	172	309	297	108	41	76
Link Distance (ft)		713		683				2496	2496			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	125		250		500	455	455			250	550	550
Storage Blk Time (%)	1			0					1			
Queuing Penalty (veh)	0			0					3			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39	B39	B39
Directions Served	T	T	T	T	
Maximum Queue (ft)	179	188	938	829	282
Average Queue (ft)	69	74	83	91	17
95th Queue (ft)	148	152	511	537	222
Link Distance (ft)	2052	2052	941	941	941
Upstream Blk Time (%)			0	0	0
Queuing Penalty (veh)			0	1	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 37: Bend

Movement	EB	EB	EB
Directions Served	T		
Maximum Queue (ft)	627	534	60
Average Queue (ft)	139	52	0
95th Queue (ft)	529	320	0
Link Distance (ft)	649	649	649
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	137	76	57	43	202	75
Average Queue (ft)	61	3	19	7	72	39
95th Queue (ft)	110	36	48	30	156	96
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					9	0
Queuing Penalty (veh)					18	2

Intersection: 104: Street A & Campus Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	38	58
Average Queue (ft)	4	24
95th Queue (ft)	23	44
Link Distance (ft)	1300	548
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 105: Street B & Campus Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	LR	R
Maximum Queue (ft)	78	6	64	9	90	60
Average Queue (ft)	25	0	11	0	37	16
95th Queue (ft)	61	5	42	9	74	49
Link Distance (ft)	1300	1300	1057	1057	354	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 106: Parcel E West & Tape Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	18	74
Average Queue (ft)	1	40
95th Queue (ft)	10	62
Link Distance (ft)		656
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 107: Tape Dr & Parcel A

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	18	66
Average Queue (ft)	1	25
95th Queue (ft)	9	50
Link Distance (ft)		287
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	EB	WB	NB	SB	SB
Directions Served	L	L	LTR	LT	R
Maximum Queue (ft)	26	12	54	37	34
Average Queue (ft)	3	1	28	15	10
95th Queue (ft)	18	8	47	39	32
Link Distance (ft)			520	1706	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	300	300			50
Storage Blk Time (%)				0	0
Queuing Penalty (veh)				0	0

Intersection: 109: Parcel D West & Tape Dr

Movement	NB
Directions Served	R
Maximum Queue (ft)	35
Average Queue (ft)	12
95th Queue (ft)	37
Link Distance (ft)	495
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 110: Street B & Tape Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	R	L	T	R	L	TR
Maximum Queue (ft)	26	2	19	11	23	27	59	300	42
Average Queue (ft)	2	0	1	0	4	6	24	119	16
95th Queue (ft)	13	2	9	7	18	24	51	232	37
Link Distance (ft)		526		412		422		311	311
Upstream Blk Time (%)								0	
Queuing Penalty (veh)								1	
Storage Bay Dist (ft)	300		250		100		100		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 111: Tape Dr & Parcel C RI

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	37	9
Average Queue (ft)	20	0
95th Queue (ft)	43	6
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB	NB
Directions Served	R	T
Maximum Queue (ft)	51	4
Average Queue (ft)	17	0
95th Queue (ft)	44	4
Link Distance (ft)	353	309
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	R	L	T	R	L	TR	L
Maximum Queue (ft)	53	58	46	6	62	20	1	34
Average Queue (ft)	20	22	18	0	25	1	0	6
95th Queue (ft)	43	49	38	6	49	9	2	22
Link Distance (ft)				577			551	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200	50	200		50	300		300
Storage Blk Time (%)		0			0			
Queuing Penalty (veh)		0			0			

Intersection: 115: Street B & Central

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L
Maximum Queue (ft)	83	17	66	111	28	62	20	1	1	57
Average Queue (ft)	39	1	33	51	1	31	2	0	0	15
95th Queue (ft)	67	10	54	89	16	52	14	1	0	43
Link Distance (ft)		567			575			631	631	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		50	200		50	300			300
Storage Blk Time (%)			1		0	1				
Queuing Penalty (veh)			1		0	1				

Intersection: 116: Street B & South Full

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	R	L	TR	L	T
Maximum Queue (ft)	52	17	63	65	56	29	1	34	2
Average Queue (ft)	23	1	32	29	26	4	0	4	0
95th Queue (ft)	46	10	51	56	52	19	1	20	2
Link Distance (ft)		528					275		631
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	200		50	200	50	300		300	
Storage Blk Time (%)			1		0				
Queuing Penalty (veh)			0		0				

Intersection: 117: Street B & South RIRO

Movement	WB	SB
Directions Served	R	T
Maximum Queue (ft)	54	51
Average Queue (ft)	20	2
95th Queue (ft)	47	25
Link Distance (ft)	290	275
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 317

35: Northwest Pkwy & US 36 WB (North Ramps) Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	61.9	59.1	2.6	62.2	11.1	53.1	13.7	29.2

40: Northwest Pkwy & US 36 EB (South Ramps) Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	15.4	11.0	17.0	63.0	65.5	0.0	0.0	30.4
Total Del/Veh (s)	152.0	146.6	40.9	97.6	50.5	98.0	12.8	79.2

Total Zone Performance

Denied Del/Veh (s)	37.3
Total Del/Veh (s)	2622.9

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	WB	WB	NB	NB	NB	SB	SB	SB	SB	B29	B29	B41
Directions Served	L	LT	L	T	T	T	T	T	R	T	T	T
Maximum Queue (ft)	169	327	345	560	577	370	464	434	364	723	718	772
Average Queue (ft)	79	125	263	120	73	367	440	219	147	647	609	655
95th Queue (ft)	155	270	371	443	356	376	480	384	316	893	927	1032
Link Distance (ft)		1442		556	556		370	370		613	613	722
Upstream Blk Time (%)		0		1	0	43	56	1	0	59	26	26
Queuing Penalty (veh)		0		6	4	0	669	10	0	707	310	210
Storage Bay Dist (ft)	330		190			300			300			
Storage Blk Time (%)			38	0		69	5	2	1			
Queuing Penalty (veh)			353	0		434	30	9	5			

Intersection: 35: Northwest Pkwy & US 36 WB (North Ramps)

Movement	B41	B41
Directions Served	T	
Maximum Queue (ft)	776	896
Average Queue (ft)	666	633
95th Queue (ft)	1051	1183
Link Distance (ft)	722	722
Upstream Blk Time (%)	41	33
Queuing Penalty (veh)	327	261
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: Northwest Pkwy & US 36 EB (South Ramps)

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	T	T	R	L	L	T	T
Maximum Queue (ft)	480	1006	300	1002	993	390	335	585	435	408
Average Queue (ft)	393	695	244	927	898	218	327	524	138	153
95th Queue (ft)	568	1238	435	1072	1082	533	362	672	320	323
Link Distance (ft)		1036		1843	1843			556	556	556
Upstream Blk Time (%)		14						11	0	
Queuing Penalty (veh)		0						76	0	
Storage Bay Dist (ft)	330		150			300	180			
Storage Blk Time (%)	28	73			42		36	50		
Queuing Penalty (veh)	206	525			67		165	229		

Zone Summary

Zone wide Queuing Penalty: 4606

Intersection	
Intersection Delay, s/veh	7.0
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	612	554	756
Demand Flow Rate, veh/h	624	565	771
Vehicles Circulating, veh/h	502	195	227
Vehicles Exiting, veh/h	496	931	533
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	8.1	5.4	7.3
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.470	0.530	0.402	0.598	0.651	0.349
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	293	331	227	338	502	269
Cap Entry Lane, veh/h	851	927	1128	1203	1095	1171
Entry HV Adj Factor	0.981	0.979	0.980	0.979	0.980	0.981
Flow Entry, veh/h	287	324	223	331	492	264
Cap Entry, veh/h	833	906	1104	1176	1074	1149
V/C Ratio	0.345	0.358	0.202	0.281	0.458	0.230
Control Delay, s/veh	8.3	8.0	5.1	5.7	8.4	5.2
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	1	1	2	1

Intersection	
Intersection Delay, s/veh	4.7
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	337	382	452
Demand Flow Rate, veh/h	344	390	461
Vehicles Circulating, veh/h	193	20	335
Vehicles Exiting, veh/h	217	776	202
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.4	3.9	5.7
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.471	0.529	0.469	0.531	0.471	0.529
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	162	182	183	207	217	244
Cap Entry Lane, veh/h	1130	1205	1325	1396	992	1068
Entry HV Adj Factor	0.979	0.983	0.981	0.978	0.979	0.982
Flow Entry, veh/h	159	179	180	203	212	240
Cap Entry, veh/h	1106	1184	1301	1366	971	1049
V/C Ratio	0.143	0.151	0.138	0.148	0.219	0.228
Control Delay, s/veh	4.5	4.3	3.9	3.8	5.8	5.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	0	1	0	1	1	1

G - Intersection Capacity Worksheets (SimTraffic)
Year 2040 + Project

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.3	3.8	0.6	0.7	2.7	2.1	0.3	0.4	2.2	0.2	2.1
Total Del/Veh (s)	51.3	51.7	2.2	46.8	37.2	3.6	53.5	36.6	5.6	56.1	24.6	3.5

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	29.0

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.3
Total Del/Veh (s)	37.1	4.9	62.9	15.0	53.8	3.2	1.9	25.3

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.3	1.4	0.5	1.3
Total Del/Veh (s)	76.9	57.9	33.6	96.7	57.8	23.2	66.1	32.7	8.2	44.9	58.4	12.9

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	46.9

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.0	0.3	0.3	0.0	0.0	0.0	0.2	0.0	0.1	6.3	3.3	5.3
Total Del/Veh (s)	47.2	73.1	36.5	48.4	42.7	36.1	35.0	48.8	20.8	106.4	29.9	14.3

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	2.0
Total Del/Veh (s)	45.9

22: 88th Street & Tape Dr Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.4	0.3	0.0	0.1
Total Del/Veh (s)	19.6	8.7	2.2	1.6	11.1	2.7	3.2

23: 96th St & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.1
Total Del/Veh (s)	63.0	0.4	26.5	95.1	14.6	27.7	19.1	31.1

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	3.3	0.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	87.8	108.6	8.4	66.7	73.8	1.8	88.5	21.3	1.0	82.7	58.2	18.0

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	51.5

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0		0.0	0.3	2.0	6.0	5.7	5.9	0.0	0.0	0.0	2.7
Total Del/Veh (s)	66.9		0.7	79.8	9.0	91.2	47.7	33.9	59.7	60.7	11.9	57.9

44: 88th Street Performance by movement

Movement	EBR	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.2	0.5	0.0	0.0	2.4	1.1	1.7	0.7
Total Del/Veh (s)	54.7	6.3	8.8	3.1	2.8	10.9	8.4	8.3	8.8

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.2	0.3	0.0	0.2	0.2
Total Del/Veh (s)	9.2	6.6	10.0	9.7	7.6	6.1	8.7

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.9	1.4	4.4	0.9	7.7	0.1	3.3	1.2

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.9	3.0	9.9	5.8	5.1	0.0	4.0	7.3

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	1.5	1.0	3.9	1.3	6.2	2.9	2.7

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	3.4	0.6	1.8	1.1	7.0	3.0	1.8

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	2.9	0.6	0.5	4.4	2.7	2.6	7.4	7.6	2.9	5.4	7.2	4.2

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	2.8

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.7	0.6	2.2	2.5	1.7

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.2	4.1	0.0	0.0	0.0
Total Del/Veh (s)	33.7	15.7	5.8	23.6	18.2	13.7	14.2	17.3	3.7	20.9	20.7	3.7

110: Street B & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	17.6

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	1.4	4.9	5.7	4.1

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	2.9	2.5	0.8	0.6	0.5	1.2

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.4	0.4	0.4	1.7	1.3

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.6	4.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Del/Veh (s)	14.8	4.7	14.2	2.9	6.7	1.6	1.6	3.4	0.2	0.1	1.9

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.2	4.0	3.9	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Total Del/Veh (s)	13.8	3.3	15.1	3.3	13.0	8.1	5.0	18.7	7.8	3.9	10.8

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.1	4.2	4.1	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Total Del/Veh (s)	12.1	3.5	17.4	3.8	3.1	0.6	0.3	5.4	1.3	1.2	2.3

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.9	0.7	0.6	0.3	0.7

Total Network Performance

Denied Del/Veh (s)	1.9
Total Del/Veh (s)	93.0

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB
Directions Served	L	L	T	L	L	T	L	L	T	T	R	L
Maximum Queue (ft)	37	99	92	332	401	198	144	165	509	495	246	226
Average Queue (ft)	4	39	34	191	233	84	31	91	285	257	64	97
95th Queue (ft)	24	81	76	298	347	159	103	153	447	426	171	204
Link Distance (ft)		750	750		1028	1028			893	893	893	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	135			285			510	510				190
Storage Blk Time (%)	0	0	0	0	3				1			1
Queuing Penalty (veh)	0	0	0	1	11				1			4

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R
Maximum Queue (ft)	286	321	285	233	112
Average Queue (ft)	137	182	164	114	7
95th Queue (ft)	233	282	253	209	59
Link Distance (ft)		1296	1296	1296	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	190				100
Storage Blk Time (%)	3	5		8	
Queuing Penalty (veh)	11	13		8	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	WB	WB	WB	B9	B19	B19	NB	NB	NB
Directions Served	T	R	L	T	T	T	T		L	L	R
Maximum Queue (ft)	670	234	420	379	347	41	180	52	246	274	66
Average Queue (ft)	299	49	142	144	145	2	13	2	124	143	2
95th Queue (ft)	571	183	348	312	284	34	106	30	208	230	48
Link Distance (ft)	1552	1552		490	490	4320	600	600		337	
Upstream Blk Time (%)			0	0						0	0
Queuing Penalty (veh)			0	1						0	0
Storage Bay Dist (ft)			400						200		200
Storage Blk Time (%)			4	0					1	3	
Queuing Penalty (veh)			14	0					3	9	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	WB	WB	WB	WB	WB	B37
Directions Served	L	L	T	T	R	T	L	L	T	T	R	T
Maximum Queue (ft)	303	316	188	204	166	136	426	472	459	293	192	32
Average Queue (ft)	166	177	100	106	68	5	262	280	161	143	67	2
95th Queue (ft)	269	280	168	179	135	82	434	464	351	235	137	33
Link Distance (ft)			600	600		490			650	650		1613
Upstream Blk Time (%)									1			
Queuing Penalty (veh)									0			
Storage Bay Dist (ft)	415	415			415		420	420			420	
Storage Blk Time (%)		0					3	5	0	0		
Queuing Penalty (veh)		0					5	8	0	0		

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	NB	B42	B42	SB	SB	SB	SB
Directions Served	L	T	T	R	T	T	L	T	T	R
Maximum Queue (ft)	397	477	464	146	42	47	396	726	748	440
Average Queue (ft)	183	260	272	7	2	2	107	421	434	94
95th Queue (ft)	332	430	428	102	43	48	307	670	677	321
Link Distance (ft)		2073	2073		449	449		2635	2635	
Upstream Blk Time (%)						0				
Queuing Penalty (veh)						0				
Storage Bay Dist (ft)	330			330			450			600
Storage Blk Time (%)	2	4	5					10	3	
Queuing Penalty (veh)	13	11	37					13	13	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	108	239	337	334	220	306	482	457	517	826	210
Average Queue (ft)	26	68	173	131	60	153	202	211	238	280	44
95th Queue (ft)	70	166	290	268	147	267	379	482	536	732	120
Link Distance (ft)		565	1963	1963		1348				869	
Upstream Blk Time (%)										4	
Queuing Penalty (veh)										35	
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	0	5			0	10	0	8	17	4	
Queuing Penalty (veh)	0	2			1	71	1	34	71	30	

Intersection: 22: 88th Street & Tape Dr

Movement	WB	NB	SB
Directions Served	LR	R	L
Maximum Queue (ft)	58	15	112
Average Queue (ft)	20	1	43
95th Queue (ft)	45	7	85
Link Distance (ft)	1243		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		300	300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 23: 96th St & Campus Dr

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B42
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	318	341	153	288	331	560	626	515	504	535	400	562
Average Queue (ft)	181	199	57	188	198	203	217	85	257	404	313	75
95th Queue (ft)	277	297	120	306	345	521	556	381	475	593	490	377
Link Distance (ft)		1045	1045			702	702	702	449	449		2073
Upstream Blk Time (%)						1	0	0	1	8		
Queuing Penalty (veh)						3	1	1	12	76		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	1	1		6	9	6				18	3	
Queuing Penalty (veh)	2	3		28	42	20				130	18	

Intersection: 23: 96th St & Campus Dr

Movement	B42
Directions Served	T
Maximum Queue (ft)	827
Average Queue (ft)	150
95th Queue (ft)	563
Link Distance (ft)	2073
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	R	L	L	L
Maximum Queue (ft)	110	120	208	203	64	139	355	324	112	661	713	720
Average Queue (ft)	30	50	95	101	10	42	186	160	4	370	396	351
95th Queue (ft)	82	102	177	185	40	101	304	279	67	659	700	692
Link Distance (ft)			702	702			1056	1056				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	280	280			180	180			180	700	700	700
Storage Blk Time (%)			0	0			16	11		2	3	3
Queuing Penalty (veh)			0	4			8	7		5	8	7

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	B39	B39	SB	SB	SB	SB	SB	SB
Directions Served	T	T	T	T	L	L	T	T	T	R
Maximum Queue (ft)	578	276	307	205	117	204	563	543	519	346
Average Queue (ft)	159	141	14	7	36	67	353	347	316	136
95th Queue (ft)	430	248	233	209	95	162	602	593	559	289
Link Distance (ft)	941	941	2051	2051			864	864	864	
Upstream Blk Time (%)	0		0	0		0	0	0	0	
Queuing Penalty (veh)	3		0	0		0	0	0	0	
Storage Bay Dist (ft)					600	600				600
Storage Blk Time (%)	0						3		2	
Queuing Penalty (veh)	3						2		7	

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	L	R	L	L	T	T	R	L	L	T
Maximum Queue (ft)	93	341	382	95	458	491	2211	1579	99	90	410	805
Average Queue (ft)	34	203	224	42	309	332	319	257	31	30	80	437
95th Queue (ft)	75	321	350	72	418	447	1087	918	89	72	273	725
Link Distance (ft)			1738				3202	3202				2051
Upstream Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				
Storage Bay Dist (ft)	125	250		500	455	455			250	550	550	
Storage Blk Time (%)	0	6	10		0	0		2				5
Queuing Penalty (veh)	0	14	22		2	3		4				5

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	B39	B39	B39
Directions Served	T	T	R	T	T	T
Maximum Queue (ft)	843	850	638	544	869	953
Average Queue (ft)	488	497	43	41	106	79
95th Queue (ft)	762	770	322	352	595	504
Link Distance (ft)	2051	2051		941	941	941
Upstream Blk Time (%)				0	0	0
Queuing Penalty (veh)				0	1	1
Storage Bay Dist (ft)			550			
Storage Blk Time (%)		10				
Queuing Penalty (veh)		11				

Intersection: 37: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (ft)	374	156
Average Queue (ft)	25	9
95th Queue (ft)	170	106
Link Distance (ft)	650	650
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 44: 88th Street

Movement	EB	WB	NB	NB	SB	SB	B12	B12
Directions Served	LTR	LTR	L	TR	L	TR	T	
Maximum Queue (ft)	182	92	30	2	89	485	247	190
Average Queue (ft)	52	45	2	0	9	59	23	13
95th Queue (ft)	165	74	16	2	43	352	162	127
Link Distance (ft)	627	437		869		617	337	337
Upstream Blk Time (%)						3	1	1
Queuing Penalty (veh)						21	3	3
Storage Bay Dist (ft)			75		75			
Storage Blk Time (%)					0	6		
Queuing Penalty (veh)					0	1		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	204	134	219	345	164	75
Average Queue (ft)	72	9	58	77	54	27
95th Queue (ft)	159	71	152	240	123	81
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					6	0
Queuing Penalty (veh)					9	1

Intersection: 104: Street A & Campus Dr

Movement	EB	WB	NB
Directions Served	T	LT	LR
Maximum Queue (ft)	3	74	36
Average Queue (ft)	0	24	13
95th Queue (ft)	4	56	31
Link Distance (ft)	948	1300	548
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 105: Street B & Campus Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	LR	R
Maximum Queue (ft)	132	76	204	118	75	51
Average Queue (ft)	63	5	91	7	30	10
95th Queue (ft)	107	38	179	52	62	37
Link Distance (ft)	1300	1300	1045	1045	354	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 106: Parcel E West & Tape Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	10	88	55
Average Queue (ft)	0	25	25
95th Queue (ft)	6	66	49
Link Distance (ft)	1243		656
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 107: Tape Dr & Parcel A

Movement	EB	EB	WB	SB
Directions Served	L	LT	TR	LR
Maximum Queue (ft)	6	46	6	44
Average Queue (ft)	0	5	0	20
95th Queue (ft)	5	25	5	42
Link Distance (ft)		665	667	288
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	LTR	LT	R
Maximum Queue (ft)	22	2	40	2	32	54	57
Average Queue (ft)	2	0	6	0	11	20	28
95th Queue (ft)	14	2	28	2	35	46	50
Link Distance (ft)		667		1356	520	1706	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300		300				50
Storage Blk Time (%)						0	0
Queuing Penalty (veh)						0	0

Intersection: 109: Parcel D West & Tape Dr

Movement	NB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	8
95th Queue (ft)	29
Link Distance (ft)	495
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 110: Street B & Tape Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	L	T	R
Maximum Queue (ft)	85	83	217	262	335	23	23	38	92	143	64	30
Average Queue (ft)	32	30	91	108	162	1	2	12	32	65	18	8
95th Queue (ft)	66	66	175	216	292	10	14	36	72	110	48	26
Link Distance (ft)		509		407	407		422		312	312	312	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300		250			100		100				250
Storage Blk Time (%)			0	0								
Queuing Penalty (veh)			0	1								

Intersection: 111: Tape Dr & Parcel C RI

Movement	WB
Directions Served	T
Maximum Queue (ft)	9
Average Queue (ft)	0
95th Queue (ft)	7
Link Distance (ft)	700
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	35	27
Average Queue (ft)	16	2
95th Queue (ft)	41	13
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	16
95th Queue (ft)	40
Link Distance (ft)	353
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	L	R	L	R	L	TR	L
Maximum Queue (ft)	29	30	47	61	56	11	52
Average Queue (ft)	5	4	17	22	12	0	13
95th Queue (ft)	22	20	38	47	36	6	37
Link Distance (ft)						551	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	200	50	200	50	300		300
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 115: Street B & Central

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	38	31	114	11	53	93	76	102	177	72	83
Average Queue (ft)	10	8	51	0	24	35	24	44	83	26	37
95th Queue (ft)	33	30	94	8	50	73	58	88	146	58	70
Link Distance (ft)				575			631	631		551	551
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	200	50	200		50	300			300		
Storage Blk Time (%)		0			0						
Queuing Penalty (veh)		0			0						

Intersection: 116: Street B & South Full

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	R	L	T	R	L	T	TR	L	TR
Maximum Queue (ft)	38	31	72	3	58	41	1	6	51	4
Average Queue (ft)	6	11	26	0	23	12	0	0	19	0
95th Queue (ft)	27	35	57	3	51	34	1	2	45	3
Link Distance (ft)				540			275	275		631
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200	50	200		50	300			300	
Storage Blk Time (%)		0			0					
Queuing Penalty (veh)		0			0					

Intersection: 117: Street B & South RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	13
95th Queue (ft)	37
Link Distance (ft)	290
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 917

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.1	3.4	0.2	3.2	1.2	1.7	0.8	0.0	0.0	0.0
Total Del/Veh (s)	93.2	134.0	99.3	82.8	110.8	4.2	242.4	15.1	1.1	90.5	130.3	30.8

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.6
Total Del/Veh (s)	122.6

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0		0.0	60.1	50.5	27.0	26.4	26.4	4.2	7.4	8.9	21.4
Total Del/Veh (s)	75.8		0.6	243.3	13.9	148.3	81.3	65.0	195.6	226.9	161.2	150.8

Total Zone Performance

Denied Del/Veh (s)	32.2
Total Del/Veh (s)	2558.6

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

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	L
Maximum Queue (ft)	76	286	746	738	400	83	277	456	439	189	766	830
Average Queue (ft)	20	40	249	686	397	14	54	232	215	24	627	679
95th Queue (ft)	56	140	686	858	428	49	170	412	396	177	924	1003
Link Distance (ft)			713	713				1056	1056			
Upstream Blk Time (%)			2	18								
Queuing Penalty (veh)			14	112								
Storage Bay Dist (ft)	280	280			250	180	180			180	700	700
Storage Blk Time (%)				1	68			32	27		30	42
Queuing Penalty (veh)				6	68			16	18		82	115

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	NB	B39	B39	B39	SB	SB	SB	SB	SB	B33
Directions Served	L	T	T	T	T	T	L	L	T	T	R	T
Maximum Queue (ft)	886	966	405	1887	1860	1571	133	860	958	963	800	1209
Average Queue (ft)	699	585	111	752	653	422	33	387	789	785	530	535
95th Queue (ft)	1109	1328	241	2171	2050	1608	93	1039	1168	1175	1096	1531
Link Distance (ft)		941	941	2052	2052	2052			864	864		1436
Upstream Blk Time (%)		24		5	1	1		0	33	33		12
Queuing Penalty (veh)		139		28	6	3		0	0	0		0
Storage Bay Dist (ft)	700						600	600			600	
Storage Blk Time (%)	37	3							52	52		
Queuing Penalty (veh)	101	35							49	196		

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	B33
Directions Served	T
Maximum Queue (ft)	1211
Average Queue (ft)	542
95th Queue (ft)	1548
Link Distance (ft)	1436
Upstream Blk Time (%)	15
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	WB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	L	L	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	82	410	623	425	282	540	623	2969	2706	283	77	710
Average Queue (ft)	31	351	499	206	55	407	455	801	741	51	18	350
95th Queue (ft)	67	502	817	725	186	570	633	2605	2536	206	54	898
Link Distance (ft)			686	686				3201	3201			
Upstream Blk Time (%)			33	11				4	2			
Queuing Penalty (veh)			0	0				0	0			
Storage Bay Dist (ft)	125	250			500	455	455			250	550	550
Storage Blk Time (%)	0	52	67			7	10	6	7			
Queuing Penalty (veh)	0	112	144			54	79	55	14			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	B39	B39
Directions Served	T	T	R	T	T
Maximum Queue (ft)	2162	2157	710	956	1007
Average Queue (ft)	1995	2001	408	566	589
95th Queue (ft)	2501	2488	986	1175	1227
Link Distance (ft)	2052	2052		941	941
Upstream Blk Time (%)	52	58		1	12
Queuing Penalty (veh)	635	707		14	139
Storage Bay Dist (ft)			550		
Storage Blk Time (%)	50	54			
Queuing Penalty (veh)	48	61			

Zone Summary

Zone wide Queuing Penalty: 3050

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	690	1070	529
Demand Flow Rate, veh/h	704	1092	540
Vehicles Circulating, veh/h	354	456	348
Vehicles Exiting, veh/h	534	602	1200
Ped Vol Crossing Leg, #/h	5	12	0
Ped Cap Adj	0.996	0.992	1.000
Approach Delay, s/veh	8.1	16.3	6.8
Approach LOS	A	C	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.648	0.352	0.319	0.681	0.656	0.344
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	456	248	348	744	354	186
Cap Entry Lane, veh/h	975	1051	887	964	980	1056
Entry HV Adj Factor	0.980	0.980	0.980	0.980	0.980	0.978
Flow Entry, veh/h	447	243	341	729	347	182
Cap Entry, veh/h	952	1026	863	936	961	1034
V/C Ratio	0.470	0.237	0.395	0.778	0.361	0.176
Control Delay, s/veh	9.4	5.8	8.9	19.8	7.7	5.1
LOS	A	A	A	C	A	A
95th %tile Queue, veh	3	1	2	8	2	1

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	597	1369	214
Demand Flow Rate, veh/h	609	1396	218
Vehicles Circulating, veh/h	611	9	582
Vehicles Exiting, veh/h	794	791	638
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.2	7.9	5.8
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.470	0.530	0.470	0.530	0.468	0.532
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	286	323	656	740	102	116
Cap Entry Lane, veh/h	769	845	1339	1409	790	866
Entry HV Adj Factor	0.980	0.979	0.981	0.980	0.986	0.978
Flow Entry, veh/h	280	316	643	725	101	113
Cap Entry, veh/h	754	827	1313	1381	779	847
V/C Ratio	0.372	0.382	0.490	0.525	0.129	0.134
Control Delay, s/veh	9.4	8.9	7.8	8.1	5.9	5.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	3	3	0	0

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.4	0.9	3.3	0.7	0.7	2.6	2.1	0.4	0.5	2.0	0.2	1.9
Total Del/Veh (s)	71.0	67.3	4.4	59.6	42.1	3.0	63.7	53.4	5.5	73.7	39.3	6.8

5: McCaslin Blvd & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	41.7

10: 88th Street & Dillon Rd Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	58.7	4.5	42.0	8.8	79.8	6.9	2.6	35.9

15: 96th St & Dillon Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.4	1.3
Total Del/Veh (s)	57.6	71.9	25.0	73.1	43.3	24.8	44.4	53.9	13.8	50.0	33.1	12.4

15: 96th St & Dillon Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	45.4

20: 88th Street & Campus Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.6	0.7	0.7	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	36.0	46.3	27.6	39.5	47.0	18.2	23.0	27.0	5.1	20.4	19.7	4.9

20: 88th Street & Campus Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	24.7

22: 88th Street Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	13.3	7.2	2.7	2.2	5.7	3.1	3.8

23: 96th St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	48.4	35.1	92.1	12.8	28.1	8.7	27.8

25: Northwest Pkwy & 96th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.3	0.2	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	51.6	70.1	10.5	54.2	57.2	2.3	51.7	15.0	1.0	64.7	37.8	10.9

25: Northwest Pkwy & 96th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	32.4

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.3	3.6	4.4	4.5	4.6	0.0	0.0	0.0	2.2
Total Del/Veh (s)	70.0	2.1	72.4	9.8	93.0	51.6	42.8	69.7	8.9	4.4	34.5

45: Rock Creek Pkwy & 88th Street Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.2	0.1	0.4	0.2
Total Del/Veh (s)	7.9	6.9	4.1	3.1	9.1	7.5	6.7

104: Street A & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.6	1.0	3.2	0.5	5.8	3.2	1.1

105: Street B & Campus Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.8	3.1	4.6	4.1	7.6	5.1	4.8

106: Parcel E West & Tape Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	0.6	0.4	2.4	0.5	6.7	4.4	3.1

107: Tape Dr & Parcel A Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	2.9	0.4	1.0	0.6	6.7	3.3	1.5

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	4.0	0.0	0.0	0.0
Total Del/Veh (s)	2.6	0.5	0.2	3.0	1.2	0.8	7.0	8.3	3.6	7.6	9.6	3.9

108: Parcel E/Street A & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	2.2

109: Parcel D West & Tape Dr Performance by movement

Movement	EBT	EBR	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.9	0.4	1.3	3.6	1.3

110: Street B & Tape Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.4	4.0	0.0	0.0	0.0
Total Del/Veh (s)	22.8	21.9	14.4	30.6	19.8	7.5	19.4	21.2	12.0	20.4	14.8	3.0

110: Street B & Tape Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	18.0

111: Tape Dr & Parcel C RI Performance by movement

Movement	EBT	WBT	WBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.7	2.9	4.2	2.8

112: Street A & Parcel A Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.7	2.5	2.8	1.0	0.4	0.3	1.7

113: Street B & North RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.7	0.5	0.3	0.7	0.7

114: Street B & North Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	4.1	3.9	3.8	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Total Del/Veh (s)	12.1	3.9	17.8	4.6	3.6	1.5	1.3	4.6	0.2	0.0	3.7

115: Street B & Central Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	3.9	3.9	3.5	3.6	0.0	0.0	0.0	0.0	0.0	0.0	1.8
Total Del/Veh (s)	13.1	3.6	16.3	4.2	16.8	11.6	6.9	20.3	9.4	5.8	11.9

116: Street B & South Full Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	4.0	3.9	3.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	1.1
Total Del/Veh (s)	13.1	6.8	16.4	4.2	4.1	0.5	0.3	3.8	1.1	1.3	3.5

117: Street B & South RIRO Performance by movement

Movement	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	0.9	0.7	0.5	0.7

Total Network Performance

Denied Del/Veh (s)	1.6
Total Del/Veh (s)	78.5

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB
Directions Served	L	L	T	R	L	L	T	L	L	T	T	R
Maximum Queue (ft)	177	218	292	215	345	618	233	172	339	641	620	364
Average Queue (ft)	58	121	122	20	296	369	88	81	143	401	370	75
95th Queue (ft)	158	195	216	123	389	534	172	175	292	595	559	227
Link Distance (ft)		750	750			1028	1028			893	893	893
Upstream Blk Time (%)										0	0	0
Queuing Penalty (veh)										0	0	0
Storage Bay Dist (ft)	135			120	285			510	510			
Storage Blk Time (%)	1	10	18		6	21				4		
Queuing Penalty (veh)	1	8	45		24	85				7		

Intersection: 5: McCaslin Blvd & Dillon Rd

Movement	SB	SB	SB	SB	SB	SB
Directions Served	L	L	T	T	T	R
Maximum Queue (ft)	249	310	426	414	353	190
Average Queue (ft)	158	207	273	259	223	65
95th Queue (ft)	245	321	392	369	327	212
Link Distance (ft)			1296	1296	1296	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	190	190				100
Storage Blk Time (%)	3	10	24		30	
Queuing Penalty (veh)	11	38	83		39	

Intersection: 10: 88th Street & Dillon Rd

Movement	EB	EB	B2	B2	WB	WB	WB	B19	B19	NB	NB	NB
Directions Served	T	R	T	T	L	T	T	T		L	L	R
Maximum Queue (ft)	1264	829	38	37	257	217	234	114	146	280	308	182
Average Queue (ft)	578	105	2	0	130	78	87	6	6	165	188	10
95th Queue (ft)	1155	534	22	0	228	175	190	55	67	257	288	101
Link Distance (ft)	1524	1524	2222	2222		490	490	600	600		324	
Upstream Blk Time (%)	1	0								0	0	0
Queuing Penalty (veh)	0	0								0	3	0
Storage Bay Dist (ft)					400					200		200
Storage Blk Time (%)										7	11	
Queuing Penalty (veh)										30	51	

Intersection: 10: 88th Street & Dillon Rd

Movement	B12
Directions Served	T
Maximum Queue (ft)	24
Average Queue (ft)	1
95th Queue (ft)	23
Link Distance (ft)	1558
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: 96th St & Dillon Rd

Movement	EB	EB	EB	EB	EB	B9	WB	WB	WB	WB	WB	NB
Directions Served	L	L	T	T	R	T	L	L	T	T	R	L
Maximum Queue (ft)	220	222	362	370	217	503	379	394	222	230	167	445
Average Queue (ft)	129	140	212	226	99	60	233	251	135	141	77	138
95th Queue (ft)	204	210	336	348	177	325	337	358	200	212	139	368
Link Distance (ft)			600	600		490			649	649		
Upstream Blk Time (%)						0						
Queuing Penalty (veh)						2						
Storage Bay Dist (ft)	415	415			415		420	420			420	330
Storage Blk Time (%)			0	0			0	0				
Queuing Penalty (veh)			1	1			0	0				

Intersection: 15: 96th St & Dillon Rd

Movement	NB	NB	NB	B46	B46	SB	SB	SB	SB
Directions Served	T	T	R	T	T	L	T	T	R
Maximum Queue (ft)	732	799	490	137	323	199	354	358	145
Average Queue (ft)	417	439	157	7	12	94	226	237	65
95th Queue (ft)	677	712	533	106	133	173	322	333	118
Link Distance (ft)	2019	2019		497	497		2442	2442	
Upstream Blk Time (%)				0	0				
Queuing Penalty (veh)				0	0				
Storage Bay Dist (ft)			330			335			335
Storage Blk Time (%)	20	23					0	1	
Queuing Penalty (veh)	29	103					1	2	

Intersection: 20: 88th Street & Campus Dr

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	L	T	R
Maximum Queue (ft)	175	274	262	198	202	340	94	93	94	305	54
Average Queue (ft)	84	98	112	72	16	145	36	24	46	128	18
95th Queue (ft)	155	204	213	150	87	272	75	62	79	238	46
Link Distance (ft)		565	1963	1963		1346				1558	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	125				170		500	400	400		200
Storage Blk Time (%)	3	6				7				3	
Queuing Penalty (veh)	5	8				13				5	

Intersection: 22: 88th Street

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	119	45
Average Queue (ft)	47	11
95th Queue (ft)	90	37
Link Distance (ft)	1255	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 23: 96th St

Movement	EB	EB	EB	NB	NB	NB	NB	NB	SB	SB	SB	B46
Directions Served	L	L	R	L	L	T	T	T	T	T	R	T
Maximum Queue (ft)	324	332	322	130	131	242	485	372	541	573	400	52
Average Queue (ft)	206	226	184	66	67	82	118	34	315	359	135	3
95th Queue (ft)	293	312	298	110	116	188	330	191	490	536	376	42
Link Distance (ft)		1057	1057			704	704	704	497	497		2019
Upstream Blk Time (%)						0	0	0	1	2		
Queuing Penalty (veh)						0	0	0	9	21		
Storage Bay Dist (ft)	300			250	250						300	
Storage Blk Time (%)	1	1								15		
Queuing Penalty (veh)	2	4								44		

Intersection: 23: 96th St

Movement	B46
Directions Served	T
Maximum Queue (ft)	115
Average Queue (ft)	7
95th Queue (ft)	63
Link Distance (ft)	2019
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 25: Northwest Pkwy & 96th St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	L	T	T	L	L	T	T	L	L	L	T
Maximum Queue (ft)	199	209	397	399	43	86	207	190	339	384	317	314
Average Queue (ft)	110	121	182	177	7	39	127	98	227	252	214	171
95th Queue (ft)	176	185	301	298	28	80	192	168	315	338	297	288
Link Distance (ft)			704	704			1056	1056				941
Upstream Blk Time (%)			0	0								
Queuing Penalty (veh)			0	0								
Storage Bay Dist (ft)	280	280			180	180			700	700	700	
Storage Blk Time (%)			1	1			2	1				
Queuing Penalty (veh)			2	13			1	1				

Intersection: 25: Northwest Pkwy & 96th St

Movement	NB	SB	SB	SB	SB	SB	SB
Directions Served	T	L	L	T	T	T	R
Maximum Queue (ft)	318	53	82	256	266	233	98
Average Queue (ft)	189	11	34	179	172	136	45
95th Queue (ft)	301	39	73	244	242	210	83
Link Distance (ft)	941			864	864	864	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)		600	600				600
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	L	L	R	L	L	T	T	R	L	L
Maximum Queue (ft)	191	141	210	251	66	243	260	1426	979	375	69	98
Average Queue (ft)	103	5	114	160	29	113	143	326	296	77	14	46
95th Queue (ft)	173	61	215	232	57	201	225	918	732	262	47	86
Link Distance (ft)		700		687				3719	3719			
Upstream Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			
Storage Bay Dist (ft)	125		250		500	455	455			250	550	550
Storage Blk Time (%)	10		0	0				1	7			
Queuing Penalty (veh)	0		0	0				3	26			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	SB	B39	B39	B39
Directions Served	T	T	T	T	T	T
Maximum Queue (ft)	161	191	216	265	390	392
Average Queue (ft)	48	88	116	9	18	14
95th Queue (ft)	119	161	182	159	229	199
Link Distance (ft)	2052	2052	2052	941	941	941
Upstream Blk Time (%)				0	0	
Queuing Penalty (veh)				0	0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 37: Bend

Movement	EB	EB
Directions Served	T	
Maximum Queue (ft)	560	402
Average Queue (ft)	93	37
95th Queue (ft)	376	233
Link Distance (ft)	649	649
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 45: Rock Creek Pkwy & 88th Street

Movement	EB	EB	WB	WB	SB	SB
Directions Served	LT	T	T	TR	L	R
Maximum Queue (ft)	148	54	55	50	231	76
Average Queue (ft)	65	2	19	9	80	43
95th Queue (ft)	117	29	48	35	178	100
Link Distance (ft)	807	807	1051	1051	764	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						50
Storage Blk Time (%)					10	0
Queuing Penalty (veh)					22	2

Intersection: 104: Street A & Campus Dr

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	43	55
Average Queue (ft)	8	26
95th Queue (ft)	31	45
Link Distance (ft)	1300	548
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 105: Street B & Campus Dr

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	LT	T	LR	R
Maximum Queue (ft)	81	12	83	23	132	96
Average Queue (ft)	30	0	18	1	60	32
95th Queue (ft)	65	10	62	14	107	72
Link Distance (ft)	1300	1300	1057	1057	354	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 106: Parcel E West & Tape Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	31	93
Average Queue (ft)	1	49
95th Queue (ft)	11	76
Link Distance (ft)		656
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 107: Tape Dr & Parcel A

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	26	58
Average Queue (ft)	2	29
95th Queue (ft)	16	51
Link Distance (ft)		287
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 108: Parcel E/Street A & Tape Dr

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	TR	LT	R	LT	R
Maximum Queue (ft)	37	22	2	50	62	41	35
Average Queue (ft)	6	1	0	23	25	16	13
95th Queue (ft)	25	11	2	48	50	40	35
Link Distance (ft)			1346	520		1706	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	300	300			50		50
Storage Blk Time (%)				0	0	0	0
Queuing Penalty (veh)				0	0	0	0

Intersection: 109: Parcel D West & Tape Dr

Movement	NB
Directions Served	R
Maximum Queue (ft)	54
Average Queue (ft)	25
95th Queue (ft)	48
Link Distance (ft)	495
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 110: Street B & Tape Dr

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	R	L	L	TR
Maximum Queue (ft)	72	228	77	112	162	35	45	101	231	266	52
Average Queue (ft)	20	119	25	37	62	7	12	43	102	156	18
95th Queue (ft)	54	194	61	95	133	26	37	78	178	238	43
Link Distance (ft)		521		407	407		422		312	312	312
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)	300		250			100		100			
Storage Blk Time (%)		0						0			
Queuing Penalty (veh)		0						0			

Intersection: 111: Tape Dr & Parcel C RI

Movement	EB
Directions Served	T
Maximum Queue (ft)	62
Average Queue (ft)	2
95th Queue (ft)	53
Link Distance (ft)	407
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 112: Street A & Parcel A

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	47	20
Average Queue (ft)	24	1
95th Queue (ft)	46	13
Link Distance (ft)	372	1706
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 113: Street B & North RIRO

Movement	WB
Directions Served	R
Maximum Queue (ft)	54
Average Queue (ft)	25
95th Queue (ft)	49
Link Distance (ft)	353
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 114: Street B & North Full

Movement	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	R	L	T	R	L	TR	L
Maximum Queue (ft)	58	49	86	39	66	22	3	41
Average Queue (ft)	23	21	35	1	35	1	0	11
95th Queue (ft)	45	47	67	16	55	9	2	31
Link Distance (ft)				577			551	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	200	50	200		50	300		300
Storage Blk Time (%)		0		0	1			
Queuing Penalty (veh)		0		0	1			

Intersection: 115: Street B & Central

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	100	8	66	206	66	71	40	104	121	116	67	83
Average Queue (ft)	39	0	29	112	5	38	10	41	51	56	27	35
95th Queue (ft)	79	8	56	180	36	65	32	83	97	99	57	70
Link Distance (ft)		567			575			631	631		551	551
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200		50	200		50	300			300		
Storage Blk Time (%)			1	0	0	2						
Queuing Penalty (veh)			1	1	0	6						

Intersection: 116: Street B & South Full

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)	56	24	65	93	39	63	25	2	38	2
Average Queue (ft)	22	1	37	45	2	35	5	0	9	0
95th Queue (ft)	48	14	59	78	17	54	20	1	32	2
Link Distance (ft)		528			540			275		631
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		50	200		50	300		300	
Storage Blk Time (%)		0	2		0	1				
Queuing Penalty (veh)		0	1		0	1				

Intersection: 117: Street B & South RIRO

Movement	WB	SB
Directions Served	R	T
Maximum Queue (ft)	48	10
Average Queue (ft)	24	0
95th Queue (ft)	49	9
Link Distance (ft)	290	275
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 756

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	3.4	0.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	54.3	66.8	11.5	54.5	57.3	1.5	53.0	14.3	1.0	67.6	50.4	10.8

25: Northwest Pkwy & 96th St/Via Varra Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	34.4

30: Northwest Pkwy & Tape Drive/Via Varra Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.3	3.6	5.7	5.4	5.5	0.0	0.0	0.0	2.7
Total Del/Veh (s)	80.4	2.0	76.7	9.9	93.8	49.7	42.2	61.4	13.4	6.0	35.2

Total Zone Performance

Denied Del/Veh (s)	4.6
Total Del/Veh (s)	1724.7

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	L	L	L
Maximum Queue (ft)	192	206	287	551	10	48	103	210	184	348	373	339
Average Queue (ft)	112	121	165	176	0	7	39	122	99	233	258	217
95th Queue (ft)	173	185	250	352	8	31	81	184	170	321	349	307
Link Distance (ft)			716	716				1056	1056			
Upstream Blk Time (%)				0								
Queuing Penalty (veh)				1								
Storage Bay Dist (ft)	280	280			250	180	180			700	700	700
Storage Blk Time (%)			0	1				1	1			
Queuing Penalty (veh)			2	10				1	1			

Intersection: 25: Northwest Pkwy & 96th St/Via Varra

Movement	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	L	L	T	T	R
Maximum Queue (ft)	302	312	67	91	426	405	114
Average Queue (ft)	165	182	11	36	268	261	41
95th Queue (ft)	277	289	40	73	402	396	84
Link Distance (ft)	941	941			864	864	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			600	600			600
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	L	L	R	L	L	T	T	R	L	L
Maximum Queue (ft)	190	155	216	251	67	240	306	459	755	283	76	88
Average Queue (ft)	106	11	118	165	30	113	147	268	261	61	18	45
95th Queue (ft)	176	95	218	236	59	198	237	413	634	210	55	83
Link Distance (ft)		712		687				3719	3719			
Upstream Blk Time (%)									0			
Queuing Penalty (veh)									0			
Storage Bay Dist (ft)	125		250		500	455	455			250	550	550
Storage Blk Time (%)	11		0	1				0	5			
Queuing Penalty (veh)	0		0	1				1	17			

Intersection: 30: Northwest Pkwy & Tape Drive/Via Varra

Movement	SB	SB	B39	B39	B39
Directions Served	T	T	T	T	
Maximum Queue (ft)	316	332	936	954	464
Average Queue (ft)	155	167	126	176	34
95th Queue (ft)	266	283	637	767	322
Link Distance (ft)	2052	2052	941	941	941
Upstream Blk Time (%)			0	0	0
Queuing Penalty (veh)			1	1	0
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 35

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	SB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	634	576	802
Demand Flow Rate, veh/h	647	588	818
Vehicles Circulating, veh/h	527	205	234
Vehicles Exiting, veh/h	525	969	559
Ped Vol Crossing Leg, #/h	2	2	0
Ped Cap Adj	0.999	0.998	1.000
Approach Delay, s/veh	8.6	5.6	7.7
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR
Assumed Moves	LT	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.470	0.530	0.398	0.602	0.644	0.356
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	304	343	234	354	527	291
Cap Entry Lane, veh/h	831	907	1118	1193	1088	1164
Entry HV Adj Factor	0.981	0.980	0.980	0.980	0.981	0.979
Flow Entry, veh/h	298	336	229	347	517	285
Cap Entry, veh/h	814	888	1094	1167	1068	1140
V/C Ratio	0.366	0.379	0.210	0.297	0.484	0.250
Control Delay, s/veh	8.8	8.4	5.2	5.9	8.9	5.5
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	1	1	3	1

Intersection	
Intersection Delay, s/veh	5.9
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	374	471	696
Demand Flow Rate, veh/h	381	480	710
Vehicles Circulating, veh/h	264	30	369
Vehicles Exiting, veh/h	246	1049	276
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.9	4.2	7.5
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	L	TR	LTR	R
RT Channelized						
Lane Util	0.470	0.530	0.550	0.450	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	179	202	264	216	334	376
Cap Entry Lane, veh/h	1059	1135	1313	1384	961	1038
Entry HV Adj Factor	0.981	0.981	0.981	0.980	0.979	0.981
Flow Entry, veh/h	176	198	259	212	327	369
Cap Entry, veh/h	1039	1113	1288	1357	942	1018
V/C Ratio	0.169	0.178	0.201	0.156	0.347	0.362
Control Delay, s/veh	5.0	4.8	4.5	3.9	7.6	7.3
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	1	1	2	2

G - Intersection Capacity Worksheets (SimTraffic)
Year 2040 + Project – Final Internal Intersection Analysis

[Note: The attached Queuing and Blocking reports contain a number of columns where the heading lists a "B" and then a number. These "B" columns indicate nodes in the roadway network where there is a "Bend". These "Bend" nodes were entered into the network model to accurately indicate the alignment of the roadways in the network, or where a roadway lane begins or ends midblock. The analysis software generates queuing distances at all nodes (usually intersections) in the network, including the "Bend" nodes. The reader should ignore these "Bend" nodes when reviewing the queuing and blocking reports.]

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	597	1369	214
Demand Flow Rate, veh/h	609	1396	218
Vehicles Circulating, veh/h	611	9	582
Vehicles Exiting, veh/h	794	791	638
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	9.2	7.9	5.8
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	R
RT Channelized						
Lane Util	0.470	0.530	0.470	0.530	0.468	0.532
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	286	323	656	740	102	116
Cap Entry Lane, veh/h	769	845	1339	1409	790	866
Entry HV Adj Factor	0.980	0.979	0.981	0.980	0.986	0.978
Flow Entry, veh/h	280	316	643	725	101	113
Cap Entry, veh/h	754	827	1313	1381	779	847
V/C Ratio	0.372	0.382	0.490	0.525	0.129	0.134
Control Delay, s/veh	9.4	8.9	7.8	8.1	5.9	5.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	3	3	0	0

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	96	52	186	30	8	30
Future Vol, veh/h	96	52	186	30	8	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	57	202	33	9	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	161	0	570	133
Stage 1	-	-	-	-	133	-
Stage 2	-	-	-	-	437	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1418	-	483	916
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1418	-	413	916
Mov Cap-2 Maneuver	-	-	-	-	413	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	6.9	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	729	-	-	1418	-
HCM Lane V/C Ratio	0.057	-	-	0.143	-
HCM Control Delay (s)	10.2	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.5	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	18	108	207	46	25	9
Future Vol, veh/h	18	108	207	46	25	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	117	225	50	27	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	275	0	-	0	407	250
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1288	-	-	-	600	789
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1288	-	-	-	590	789
Mov Cap-2 Maneuver	-	-	-	-	590	-
Stage 1	-	-	-	-	779	-
Stage 2	-	-	-	-	871	-

Approach	EB	WB	SB
HCM Control Delay, s	1.1	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1288	-	-	-	632
HCM Lane V/C Ratio	0.015	-	-	-	0.058
HCM Control Delay (s)	7.8	0	-	-	11.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	118	186	23	30	66
Future Vol, veh/h	15	118	186	23	30	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	128	202	25	33	72

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	227	0	-	0	375	215
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	160	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1341	-	-	-	626	825
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	869	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1341	-	-	-	618	825
Mov Cap-2 Maneuver	-	-	-	-	618	-
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	869	-

Approach	EB	WB	SB
HCM Control Delay, s	0.9	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1341	-	-	-	747
HCM Lane V/C Ratio	0.012	-	-	-	0.14
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	111	8	0	255	0	9
Future Vol, veh/h	111	8	0	255	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	121	9	0	277	0	10

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	126
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	924
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	924
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	924	-	-	-
HCM Lane V/C Ratio	0.011	-	-	-
HCM Control Delay (s)	8.9	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	60	11	165	236	468	2	3	20	210	32	17
Future Volume (veh/h)	49	60	11	165	236	468	2	3	20	210	32	17
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	53	65	12	179	257	509	2	3	22	228	35	18
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	310	571	105	574	695	589	295	32	235	571	309	262
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	702	1536	284	1322	1870	1585	1781	194	1421	3456	1870	1585
Grp Volume(v), veh/h	53	0	77	179	257	509	2	0	25	228	35	18
Grp Sat Flow(s),veh/h/ln	702	0	1819	1322	1870	1585	1781	0	1615	1728	1870	1585
Q Serve(g_s), s	3.6	0.0	1.7	6.2	6.1	18.0	0.1	0.0	0.8	3.6	1.0	0.6
Cycle Q Clear(g_c), s	9.7	0.0	1.7	7.9	6.1	18.0	0.1	0.0	0.8	3.6	1.0	0.6
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.88	1.00		1.00
Lane Grp Cap(c), veh/h	310	0	676	574	695	589	295	0	267	571	309	262
V/C Ratio(X)	0.17	0.00	0.11	0.31	0.37	0.86	0.01	0.00	0.09	0.40	0.11	0.07
Avail Cap(c_a), veh/h	362	0	812	673	835	708	825	0	747	1543	835	708
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)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.4	0.0	12.5	15.1	13.8	17.6	21.1	0.0	21.4	22.6	21.5	21.3
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.3	0.3	9.4	0.0	0.0	0.2	0.5	0.2	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	0.6	0.0	0.6	1.7	2.3	7.3	0.0	0.0	0.3	1.4	0.4	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	0.0	12.5	15.4	14.2	27.0	21.1	0.0	21.5	23.0	21.6	21.4
LnGrp LOS	B	A	B	B	B	C	C	A	C	C	C	C
Approach Vol, veh/h		130			945			27			281	
Approach Delay, s/veh		14.6			21.3			21.5			22.7	
Approach LOS		B			C			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		16.0		28.5		16.0		28.5				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		28.0		27.0		27.0		27.0				
Max Q Clear Time (g_c+I1), s		2.8		11.7		5.6		20.0				
Green Ext Time (p_c), s		0.1		0.6		1.0		2.5				

Intersection Summary			
HCM 6th Ctrl Delay			21.0
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	289	869	122	0	0
Future Vol, veh/h	0	289	869	122	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	314	945	133	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	473
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	538
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	538
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	11	21	18	85	19
Future Vol, veh/h	10	11	21	18	85	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	12	23	20	92	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	169	103	113	0	-	0
Stage 1	103	-	-	-	-	-
Stage 2	66	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	821	952	1476	-	-	-
Stage 1	921	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	808	952	1476	-	-	-
Mov Cap-2 Maneuver	808	-	-	-	-	-
Stage 1	906	-	-	-	-	-
Stage 2	957	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1476	-	878	-	-
HCM Lane V/C Ratio	0.015	-	0.026	-	-
HCM Control Delay (s)	7.5	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	18	180	41	0	575
Future Vol, veh/h	0	18	180	41	0	575
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	20	196	45	0	625

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	121	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	908	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	908	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	908	-
HCM Lane V/C Ratio	-	-	0.022	-
HCM Control Delay (s)	-	-	9.1	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	5	36	0	36	33	179	82	82	413	80
Future Vol, veh/h	6	0	5	36	0	36	33	179	82	82	413	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	50	200	-	50	300	-	-	300	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	5	39	0	39	36	195	89	89	449	87

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	841	1027	268	715	1026	142	536	0	0	284	0	0
Stage 1	671	671	-	312	312	-	-	-	-	-	-	-
Stage 2	170	356	-	403	714	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	258	233	730	318	233	880	1028	-	-	1275	-	-
Stage 1	412	453	-	673	656	-	-	-	-	-	-	-
Stage 2	815	628	-	595	433	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	227	209	730	291	209	880	1028	-	-	1275	-	-
Mov Cap-2 Maneuver	227	209	-	291	209	-	-	-	-	-	-	-
Stage 1	398	421	-	649	633	-	-	-	-	-	-	-
Stage 2	751	606	-	549	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.2	14.3	1	1.1
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1028	-	-	227	-	730	291	-	880	1275	-	-
HCM Lane V/C Ratio	0.035	-	-	0.029	-	0.007	0.134	-	0.044	0.07	-	-
HCM Control Delay (s)	8.6	-	-	21.3	0	10	19.3	0	9.3	8	-	-
HCM Lane LOS	A	-	-	C	A	B	C	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	0	0.5	-	0.1	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	0	12	122	0	58	91	220	73	212	198	44
Future Volume (veh/h)	15	0	12	122	0	58	91	220	73	212	198	44
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	16	0	13	133	0	63	99	239	79	230	215	48
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	562	487	412	578	487	412	586	1016	328	555	1115	244
Arrive On Green	0.26	0.00	0.26	0.26	0.00	0.26	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1339	1870	1585	1401	1870	1585	1116	2642	852	1062	2899	634
Grp Volume(v), veh/h	16	0	13	133	0	63	99	159	159	230	130	133
Grp Sat Flow(s),veh/h/ln	1339	1870	1585	1401	1870	1585	1116	1777	1717	1062	1777	1756
Q Serve(g_s), s	0.3	0.0	0.2	2.6	0.0	1.0	2.2	2.0	2.1	6.3	1.6	1.7
Cycle Q Clear(g_c), s	0.3	0.0	0.2	2.6	0.0	1.0	3.9	2.0	2.1	8.5	1.6	1.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.50	1.00		0.36
Lane Grp Cap(c), veh/h	562	487	412	578	487	412	586	683	660	555	683	675
V/C Ratio(X)	0.03	0.00	0.03	0.23	0.00	0.15	0.17	0.23	0.24	0.41	0.19	0.20
Avail Cap(c_a), veh/h	1283	1495	1267	1333	1495	1267	1181	1631	1576	1121	1631	1612
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)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.4	0.0	9.3	10.2	0.0	9.6	8.2	7.0	7.1	9.9	6.9	6.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	0.2	0.1	0.2	0.2	0.5	0.1	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	0.0	0.1	0.6	0.0	0.3	0.4	0.5	0.5	1.1	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.4	0.0	9.4	10.4	0.0	9.8	8.4	7.2	7.2	10.4	7.0	7.1
LnGrp LOS	A	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		29			196			417			493	
Approach Delay, s/veh		9.4			10.2			7.5			8.6	
Approach LOS		A			B			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		19.0		14.8		19.0		14.8				
Change Period (Y+Rc), s		6.0		6.0		6.0		6.0				
Max Green Setting (Gmax), s		31.0		27.0		31.0		27.0				
Max Q Clear Time (g_c+I1), s		5.9		2.3		10.5		4.6				
Green Ext Time (p_c), s		2.3		0.0		2.5		0.5				

Intersection Summary												
HCM 6th Ctrl Delay			8.5									
HCM 6th LOS			A									

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	0	15	36	0	36	73	343	82	82	207	44
Future Vol, veh/h	6	0	15	36	0	36	73	343	82	82	207	44
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	50	200	-	50	300	-	-	300	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	16	39	0	39	79	373	89	89	225	48

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	772	1047	137	867	1027	231	273	0	0	462	0	0
Stage 1	427	427	-	576	576	-	-	-	-	-	-	-
Stage 2	345	620	-	291	451	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	289	227	886	247	233	771	1287	-	-	1095	-	-
Stage 1	576	584	-	470	500	-	-	-	-	-	-	-
Stage 2	644	478	-	693	569	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	245	196	886	217	201	771	1287	-	-	1095	-	-
Mov Cap-2 Maneuver	245	196	-	217	201	-	-	-	-	-	-	-
Stage 1	541	537	-	441	470	-	-	-	-	-	-	-
Stage 2	574	449	-	625	523	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	17.6	1.2	2.1
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1287	-	-	245	-	886	217	-	771	1095	-	-
HCM Lane V/C Ratio	0.062	-	-	0.027	-	0.018	0.18	-	0.051	0.081	-	-
HCM Control Delay (s)	8	-	-	20.1	0	9.1	25.2	0	9.9	8.6	-	-
HCM Lane LOS	A	-	-	C	A	A	D	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	0.1	0.6	-	0.2	0.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↳			↑↑
Traffic Vol, veh/h	0	18	480	41	0	258
Future Vol, veh/h	0	18	480	41	0	258
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	20	522	45	0	280

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	284	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	713	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	713	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	713	-
HCM Lane V/C Ratio	-	-	0.027	-
HCM Control Delay (s)	-	-	10.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	5.9
Intersection LOS	A

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	374	471	696
Demand Flow Rate, veh/h	381	480	710
Vehicles Circulating, veh/h	264	30	369
Vehicles Exiting, veh/h	246	1049	276
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.9	4.2	7.5
Approach LOS	A	A	A

Lane	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	R
Assumed Moves	LT	TR	L	TR	LTR	R
RT Channelized						
Lane Util	0.470	0.530	0.550	0.450	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	179	202	264	216	334	376
Cap Entry Lane, veh/h	1059	1135	1313	1384	961	1038
Entry HV Adj Factor	0.981	0.981	0.981	0.980	0.979	0.981
Flow Entry, veh/h	176	198	259	212	327	369
Cap Entry, veh/h	1039	1113	1288	1357	942	1018
V/C Ratio	0.169	0.178	0.201	0.156	0.347	0.362
Control Delay, s/veh	5.0	4.8	4.5	3.9	7.6	7.3
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	1	1	1	2	2

Intersection	
Int Delay, s/veh	6.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	39	10	34	104	51	181
Future Vol, veh/h	39	10	34	104	51	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	42	11	37	113	55	197

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	53	0	235	48
Stage 1	-	-	-	-	48	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1553	-	753	1021
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	845	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1553	-	734	1021
Mov Cap-2 Maneuver	-	-	-	-	734	-
Stage 1	-	-	-	-	974	-
Stage 2	-	-	-	-	824	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.8	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	940	-	-	1553	-
HCM Lane V/C Ratio	0.268	-	-	0.024	-
HCM Control Delay (s)	10.2	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	209	120	32	50	19
Future Vol, veh/h	12	209	120	32	50	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	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	227	130	35	54	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	165	0	-	0	401	148
Stage 1	-	-	-	-	148	-
Stage 2	-	-	-	-	253	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1413	-	-	-	605	899
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	789	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1413	-	-	-	598	899
Mov Cap-2 Maneuver	-	-	-	-	598	-
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	789	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1413	-	-	-	659
HCM Lane V/C Ratio	0.009	-	-	-	0.114
HCM Control Delay (s)	7.6	0	-	-	11.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	65	194	135	33	26	17
Future Vol, veh/h	65	194	135	33	26	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	71	211	147	36	28	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	183	0	-	0	518	165
Stage 1	-	-	-	-	165	-
Stage 2	-	-	-	-	353	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1392	-	-	-	518	879
Stage 1	-	-	-	-	864	-
Stage 2	-	-	-	-	711	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1392	-	-	-	488	879
Mov Cap-2 Maneuver	-	-	-	-	488	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	711	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1392	-	-	-	592
HCM Lane V/C Ratio	0.051	-	-	-	0.079
HCM Control Delay (s)	7.7	0	-	-	11.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	258	1	0	139	0	48
Future Vol, veh/h	258	1	0	139	0	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	280	1	0	151	0	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	281
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	-	-	0	-	0	758
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	758
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	758	-	-	-
HCM Lane V/C Ratio	0.069	-	-	-
HCM Control Delay (s)	10.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	273	2	29	72	196	13	19	110	666	6	53
Future Volume (veh/h)	31	273	2	29	72	196	13	19	110	666	6	53
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	34	297	2	32	78	213	14	21	120	724	7	58
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	367	439	3	244	442	375	360	49	279	999	50	415
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.20	0.20	0.20	0.29	0.29	0.29
Sat Flow, veh/h	1088	1856	12	1080	1870	1585	1781	242	1380	3456	174	1438
Grp Volume(v), veh/h	34	0	299	32	78	213	14	0	141	724	0	65
Grp Sat Flow(s),veh/h/ln	1088	0	1868	1080	1870	1585	1781	0	1622	1728	0	1612
Q Serve(g_s), s	1.3	0.0	7.2	1.4	1.6	5.9	0.3	0.0	3.8	9.3	0.0	1.5
Cycle Q Clear(g_c), s	2.9	0.0	7.2	8.6	1.6	5.9	0.3	0.0	3.8	9.3	0.0	1.5
Prop In Lane	1.00		0.01	1.00		1.00	1.00		0.85	1.00		0.89
Lane Grp Cap(c), veh/h	367	0	442	244	442	375	360	0	328	999	0	466
V/C Ratio(X)	0.09	0.00	0.68	0.13	0.18	0.57	0.04	0.00	0.43	0.73	0.00	0.14
Avail Cap(c_a), veh/h	703	0	1019	577	1020	864	971	0	884	1919	0	895
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)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.2	0.0	17.2	21.1	15.1	16.7	15.9	0.0	17.3	15.8	0.0	13.0
Incr Delay (d2), s/veh	0.1	0.0	1.8	0.2	0.2	1.4	0.0	0.0	0.9	1.0	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	0.3	0.0	2.9	0.3	0.6	2.0	0.1	0.0	1.3	3.3	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	0.0	19.0	21.3	15.2	18.0	15.9	0.0	18.2	16.9	0.0	13.2
LnGrp LOS	B	A	B	C	B	B	B	A	B	B	A	B
Approach Vol, veh/h		333			323			155			789	
Approach Delay, s/veh		18.7			17.7			18.0			16.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	14.5	16.2	18.8	16.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	27.0	27.0	27.5	27.0
Max Q Clear Time (g_c+I1), s	5.8	9.2	11.3	10.6
Green Ext Time (p_c), s	0.8	1.7	3.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Traffic Vol, veh/h	0	1049	297	69	0	0
Future Vol, veh/h	0	1049	297	69	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1140	323	75	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	162
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	0	-	-	-	0	854
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	854
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	22	14	84	21	13
Future Vol, veh/h	20	22	14	84	21	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	24	15	91	23	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	151	30	37	0	-	0
Stage 1	30	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	841	1044	1574	-	-	-
Stage 1	993	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	833	1044	1574	-	-	-
Mov Cap-2 Maneuver	833	-	-	-	-	-
Stage 1	983	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	1	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1574	-	932	-	-
HCM Lane V/C Ratio	0.01	-	0.049	-	-
HCM Control Delay (s)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	48	593	23	0	249
Future Vol, veh/h	0	48	593	23	0	249
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	52	645	25	0	271

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	335	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	661	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	661	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	661	-
HCM Lane V/C Ratio	-	-	0.079	-
HCM Control Delay (s)	-	-	10.9	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	0	34	95	0	95	6	483	46	46	187	16
Future Vol, veh/h	38	0	34	95	0	95	6	483	46	46	187	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	50	200	-	50	300	-	-	300	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	0	37	103	0	103	7	525	50	50	203	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	589	901	110	766	884	288	220	0	0	575	0	0
Stage 1	312	312	-	564	564	-	-	-	-	-	-	-
Stage 2	277	589	-	202	320	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	392	276	922	292	283	709	1346	-	-	994	-	-
Stage 1	673	656	-	478	507	-	-	-	-	-	-	-
Stage 2	706	494	-	781	651	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	321	261	922	268	267	709	1346	-	-	994	-	-
Mov Cap-2 Maneuver	321	261	-	268	267	-	-	-	-	-	-	-
Stage 1	670	623	-	476	504	-	-	-	-	-	-	-
Stage 2	600	492	-	712	618	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.7	18.8	0.1	1.6
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	1346	-	-	321	-	922	268	-	709	994	-	-
HCM Lane V/C Ratio	0.005	-	-	0.129	-	0.04	0.385	-	0.146	0.05	-	-
HCM Control Delay (s)	7.7	-	-	17.9	0	9.1	26.6	0	10.9	8.8	-	-
HCM Lane LOS	A	-	-	C	A	A	D	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	0.1	1.7	-	0.5	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	0	75	324	0	153	18	284	41	119	189	9
Future Volume (veh/h)	98	0	75	324	0	153	18	284	41	119	189	9
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	107	0	82	352	0	166	20	309	45	129	205	10
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	635	648	549	668	648	549	510	934	135	440	1034	50
Arrive On Green	0.35	0.00	0.35	0.35	0.00	0.35	0.30	0.30	0.30	0.30	0.30	0.30
Sat Flow, veh/h	1220	1870	1585	1316	1870	1585	1166	3117	449	1027	3450	167
Grp Volume(v), veh/h	107	0	82	352	0	166	20	175	179	129	105	110
Grp Sat Flow(s),veh/h/ln	1220	1870	1585	1316	1870	1585	1166	1777	1789	1027	1777	1840
Q Serve(g_s), s	2.1	0.0	1.2	8.1	0.0	2.6	0.4	2.6	2.6	3.8	1.5	1.5
Cycle Q Clear(g_c), s	2.1	0.0	1.2	8.1	0.0	2.6	2.0	2.6	2.6	6.4	1.5	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.25	1.00		0.09
Lane Grp Cap(c), veh/h	635	648	549	668	648	549	510	533	536	440	533	552
V/C Ratio(X)	0.17	0.00	0.15	0.53	0.00	0.30	0.04	0.33	0.33	0.29	0.20	0.20
Avail Cap(c_a), veh/h	1254	1598	1355	1337	1598	1355	1157	1519	1529	1010	1519	1573
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)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	7.9	0.0	7.6	9.9	0.0	8.1	9.6	9.2	9.2	11.7	8.8	8.8
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.6	0.0	0.3	0.0	0.4	0.4	0.4	0.2	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	0.4	0.0	0.3	1.7	0.0	0.7	0.1	0.8	0.8	0.7	0.4	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.1	0.0	7.8	10.5	0.0	8.4	9.6	9.6	9.6	12.1	9.0	9.0
LnGrp LOS	A	A	A	B	A	A	A	A	A	B	A	A
Approach Vol, veh/h		189			518			374			344	
Approach Delay, s/veh		7.9			9.8			9.6			10.2	
Approach LOS		A			A			A			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	16.2	17.8	16.2	17.8
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	29.0	29.0	29.0	29.0
Max Q Clear Time (g_c+I1), s	4.6	4.1	8.4	10.1
Green Ext Time (p_c), s	2.2	0.6	1.7	1.7

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	0	94	95	0	95	14	210	46	46	535	9
Future Vol, veh/h	38	0	94	95	0	95	14	210	46	46	535	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	50	200	-	50	300	-	-	300	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	0	102	103	0	103	15	228	50	50	582	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	831	995	296	674	975	139	592	0	0	278	0	0
Stage 1	687	687	-	283	283	-	-	-	-	-	-	-
Stage 2	144	308	-	391	692	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	262	243	700	340	250	884	980	-	-	1282	-	-
Stage 1	403	446	-	700	676	-	-	-	-	-	-	-
Stage 2	844	659	-	605	443	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	230	700	278	237	884	980	-	-	1282	-	-
Mov Cap-2 Maneuver	222	230	-	278	237	-	-	-	-	-	-	-
Stage 1	397	429	-	690	666	-	-	-	-	-	-	-
Stage 2	734	649	-	497	426	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	17.5	0.5	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBL	SBT	SBR
Capacity (veh/h)	980	-	-	222	-	700	278	-	884	1282	-	-
HCM Lane V/C Ratio	0.016	-	-	0.186	-	0.146	0.371	-	0.117	0.039	-	-
HCM Control Delay (s)	8.7	-	-	24.9	0	11	25.4	0	9.6	7.9	-	-
HCM Lane LOS	A	-	-	C	A	B	D	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	-	0.5	1.6	-	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	48	223	23	0	724
Future Vol, veh/h	0	48	223	23	0	724
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	52	242	25	0	787

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	134	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	890	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	890	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	890	-
HCM Lane V/C Ratio	-	-	0.059	-
HCM Control Delay (s)	-	-	9.3	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	212	8	9	130	38	48
Future Vol, veh/h	212	8	9	130	38	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	230	9	10	141	41	52

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	239	0	396	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1328	-	609	804
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	868	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1328	-	604	804
Mov Cap-2 Maneuver	-	-	-	-	604	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	861	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	10.9
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	701	-	-	1328	-
HCM Lane V/C Ratio	0.133	-	-	0.007	-
HCM Control Delay (s)	10.9	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0	-

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	257	13	505	165	759	0	0	1448	451
Future Volume (veh/h)	0	0	0	257	13	505	165	759	0	0	1448	451
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				313	0	0	179	816	0	0	1524	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				390	0		340	2692	0	0	3381	
Arrive On Green				0.11	0.00	0.00	0.10	1.00	0.00	0.00	0.67	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				313	0	0	179	816	0	0	1524	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				8.6	0.0	0.0	3.2	0.0	0.0	0.0	14.3	0.0
Cycle Q Clear(g_c), s				8.6	0.0	0.0	3.2	0.0	0.0	0.0	14.3	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				390	0		340	2692	0	0	3381	
V/C Ratio(X)				0.80	0.00		0.53	0.30	0.00	0.00	0.45	
Avail Cap(c_a), veh/h				636	0		441	2692	0	0	3381	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.89	0.89	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				43.4	0.0	0.0	6.1	0.0	0.0	0.0	7.9	0.0
Incr Delay (d2), s/veh				1.5	0.0	0.0	0.4	0.3	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.8	0.0	0.0	0.7	0.1	0.0	0.0	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				44.9	0.0	0.0	6.5	0.3	0.0	0.0	8.3	0.0
LnGrp LOS				D	A		A	A	A	A	A	
Approach Vol, veh/h					313	A		995			1524	A
Approach Delay, s/veh					44.9			1.4			8.3	
Approach LOS					D			A			A	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	83.0	10.2	72.7	17.0
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	70.0	11.0	54.0	18.0
Max Q Clear Time (g_c+I1), s	2.0	5.2	16.3	10.6
Green Ext Time (p_c), s	6.1	0.1	13.8	0.4

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	211	12	337	0	0	0	0	697	50	375	1364	0
Future Volume (veh/h)	211	12	337	0	0	0	0	697	50	375	1364	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	259	0	0				0	783	0	463	1499	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	336	0					0	2011		537	2790	0
Arrive On Green	0.09	0.00	0.00				0.00	0.58	0.00	0.16	0.79	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	259	0	0				0	783	0	463	1499	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	7.2	0.0	0.0				0.0	12.3	0.0	13.1	15.7	0.0
Cycle Q Clear(g_c), s	7.2	0.0	0.0				0.0	12.3	0.0	13.1	15.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	336	0					0	2011		537	2790	0
V/C Ratio(X)	0.77	0.00					0.00	0.39		0.86	0.54	0.00
Avail Cap(c_a), veh/h	672	0					0	2011		691	2790	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.85	0.85	0.00
Uniform Delay (d), s/veh	44.2	0.0	0.0				0.0	11.4	0.0	41.2	4.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	0.0				0.0	0.6	0.0	6.4	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0				0.0	4.3	0.0	5.8	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.6	0.0	0.0				0.0	12.0	0.0	47.6	4.6	0.0
LnGrp LOS	D	A					A	B		D	A	A
Approach Vol, veh/h		259	A					783	A		1962	
Approach Delay, s/veh		45.6						12.0			14.8	
Approach LOS		D						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	20.5	64.0		15.5		84.5
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	44.0		19.0		69.0
Max Q Clear Time (g_c+I1), s	15.1	14.3		9.2		17.7
Green Ext Time (p_c), s	0.5	5.4		0.3		15.6

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	185	12	393	431	1599	0	0	1083	363
Future Volume (veh/h)	0	0	0	185	12	393	431	1599	0	0	1083	363
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				219	0	0	474	1666	0	0	1152	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				295	0		558	2831	0	0	3111	
Arrive On Green				0.08	0.00	0.00	0.27	1.00	0.00	0.00	0.61	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				219	0	0	474	1666	0	0	1152	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				6.1	0.0	0.0	11.2	0.0	0.0	0.0	11.4	0.0
Cycle Q Clear(g_c), s				6.1	0.0	0.0	11.2	0.0	0.0	0.0	11.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				295	0		558	2831	0	0	3111	
V/C Ratio(X)				0.74	0.00		0.85	0.59	0.00	0.00	0.37	
Avail Cap(c_a), veh/h				672	0		759	2831	0	0	3111	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.29	0.29	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				44.8	0.0	0.0	7.4	0.0	0.0	0.0	9.9	0.0
Incr Delay (d2), s/veh				1.4	0.0	0.0	1.6	0.3	0.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.7	0.0	0.0	1.7	0.1	0.0	0.0	3.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				46.2	0.0	0.0	9.0	0.3	0.0	0.0	10.2	0.0
LnGrp LOS				D	A		A	A	A	A	B	
Approach Vol, veh/h					219	A		2140			1152	A
Approach Delay, s/veh					46.2			2.2			10.2	
Approach LOS					D			A			B	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	85.7	18.7	66.9	14.3
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	69.0	25.0	39.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	13.2	13.4	8.1
Green Ext Time (p_c), s	20.2	0.6	8.3	0.3

Intersection Summary	
HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	434	9	433	0	0	0	0	1600	147	289	983	0
Future Volume (veh/h)	434	9	433	0	0	0	0	1600	147	289	983	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	449	0	0				0	1720	0	325	1080	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	526	0					0	2011		403	2603	0
Arrive On Green	0.15	0.00	0.00				0.00	0.57	0.00	0.08	0.49	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	449	0	0				0	1720	0	325	1080	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	12.3	0.0	0.0				0.0	40.7	0.0	9.3	19.4	0.0
Cycle Q Clear(g_c), s	12.3	0.0	0.0				0.0	40.7	0.0	9.3	19.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	526	0					0	2011		403	2603	0
V/C Ratio(X)	0.85	0.00					0.00	0.86		0.81	0.41	0.00
Avail Cap(c_a), veh/h	677	0					0	2011		691	2603	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.88	0.88	0.00
Uniform Delay (d), s/veh	41.6	0.0	0.0				0.0	18.3	0.0	45.0	11.8	0.0
Incr Delay (d2), s/veh	6.9	0.0	0.0				0.0	4.9	0.0	1.3	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	0.0				0.0	15.6	0.0	4.0	8.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	0.0	0.0				0.0	23.2	0.0	46.3	12.2	0.0
LnGrp LOS	D	A					A	C		D	B	A
Approach Vol, veh/h		449	A					1720	A		1405	
Approach Delay, s/veh		48.5						23.2			20.1	
Approach LOS		D						C			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	16.7	62.6		20.8		79.2
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	44.0		19.0		69.0
Max Q Clear Time (g_c+I1), s	11.3	42.7		14.3		21.4
Green Ext Time (p_c), s	0.4	1.1		0.5		9.0

Intersection Summary	
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	265	15	545	175	815	0	0	1595	500
Future Volume (veh/h)	0	0	0	265	15	545	175	815	0	0	1595	500
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				324	0	0	190	876	0	0	1679	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				391	0		305	2761	0	0	3538	
Arrive On Green				0.11	0.00	0.00	0.10	1.00	0.00	0.00	0.70	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				324	0	0	190	876	0	0	1679	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				10.8	0.0	0.0	3.7	0.0	0.0	0.0	17.9	0.0
Cycle Q Clear(g_c), s				10.8	0.0	0.0	3.7	0.0	0.0	0.0	17.9	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				391	0		305	2761	0	0	3538	
V/C Ratio(X)				0.83	0.00		0.62	0.32	0.00	0.00	0.47	
Avail Cap(c_a), veh/h				736	0		511	2761	0	0	3538	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.87	0.87	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.2	0.0	0.0	7.7	0.0	0.0	0.0	8.2	0.0
Incr Delay (d2), s/veh				1.7	0.0	0.0	0.7	0.3	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.9	0.0	0.0	1.0	0.1	0.0	0.0	5.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				54.0	0.0	0.0	8.4	0.3	0.0	0.0	8.6	0.0
LnGrp LOS				D	A		A	A	A	A	A	
Approach Vol, veh/h					324	A		1066			1679	A
Approach Delay, s/veh					54.0			1.7			8.6	
Approach LOS					D			A			A	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	100.7	10.9	89.8	19.3
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	83.0	20.0	58.0	25.0
Max Q Clear Time (g_c+I1), s	2.0	5.7	19.9	12.8
Green Ext Time (p_c), s	6.8	0.2	16.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	235	15	350	0	0	0	0	755	55	415	1450	0
Future Volume (veh/h)	235	15	350	0	0	0	0	755	55	415	1450	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	291	0	0				0	848	0	512	1593	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	357	0					0	2057		568	2839	0
Arrive On Green	0.10	0.00	0.00				0.00	0.59	0.00	0.33	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	291	0	0				0	848	0	512	1593	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	9.7	0.0	0.0				0.0	15.8	0.0	17.0	0.0	0.0
Cycle Q Clear(g_c), s	9.7	0.0	0.0				0.0	15.8	0.0	17.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	357	0					0	2057		568	2839	0
V/C Ratio(X)	0.81	0.00					0.00	0.41		0.90	0.56	0.00
Avail Cap(c_a), veh/h	707	0					0	2057		864	2839	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.82	0.82	0.00
Uniform Delay (d), s/veh	52.8	0.0	0.0				0.0	13.2	0.0	39.3	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	0.0				0.0	0.6	0.0	5.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.0				0.0	5.8	0.0	6.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.6	0.0	0.0				0.0	13.8	0.0	44.6	0.7	0.0
LnGrp LOS	D	A					A	B		D	A	A
Approach Vol, veh/h		291	A					848	A		2105	
Approach Delay, s/veh		54.6						13.8			11.4	
Approach LOS		D						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	24.7	77.1		18.1		101.9
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	30.0	49.0		24.0		84.0
Max Q Clear Time (g_c+I1), s	19.0	17.8		11.7		2.0
Green Ext Time (p_c), s	0.8	6.1		0.4		18.9

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	15	425	445	1690	0	0	1170	390
Future Volume (veh/h)	0	0	0	195	15	425	445	1690	0	0	1170	390
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				233	0	0	489	1760	0	0	1245	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				309	0		540	2817	0	0	3047	
Arrive On Green				0.09	0.00	0.00	0.29	1.00	0.00	0.00	0.60	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				233	0	0	489	1760	0	0	1245	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				6.4	0.0	0.0	12.0	0.0	0.0	0.0	13.0	0.0
Cycle Q Clear(g_c), s				6.4	0.0	0.0	12.0	0.0	0.0	0.0	13.0	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				309	0		540	2817	0	0	3047	
V/C Ratio(X)				0.75	0.00		0.91	0.62	0.00	0.00	0.41	
Avail Cap(c_a), veh/h				672	0		726	2817	0	0	3047	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.14	0.14	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				44.6	0.0	0.0	9.3	0.0	0.0	0.0	10.8	0.0
Incr Delay (d2), s/veh				1.4	0.0	0.0	1.7	0.1	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.9	0.0	0.0	3.1	0.1	0.0	0.0	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				46.0	0.0	0.0	11.1	0.1	0.0	0.0	11.2	0.0
LnGrp LOS				D	A		B	A	A	A	B	
Approach Vol, veh/h					233	A		2249			1245	A
Approach Delay, s/veh					46.0			2.5			11.2	
Approach LOS					D			A			B	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	85.3	19.6	65.7	14.7
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	69.0	25.0	39.0	19.0
Max Q Clear Time (g_c+I1), s	2.0	14.0	15.0	8.4
Green Ext Time (p_c), s	22.6	0.6	9.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	465	10	450	0	0	0	0	1670	155	325	1035	0
Future Volume (veh/h)	465	10	450	0	0	0	0	1670	155	325	1035	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	483	0	0				0	1796	0	365	1137	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	558	0					0	1937		443	2571	0
Arrive On Green	0.16	0.00	0.00				0.00	0.55	0.00	0.09	0.48	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	483	0	0				0	1796	0	365	1137	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	13.2	0.0	0.0				0.0	46.5	0.0	10.4	21.0	0.0
Cycle Q Clear(g_c), s	13.2	0.0	0.0				0.0	46.5	0.0	10.4	21.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	558	0					0	1937		443	2571	0
V/C Ratio(X)	0.87	0.00					0.00	0.93		0.82	0.44	0.00
Avail Cap(c_a), veh/h	677	0					0	1937		691	2571	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	0.67	0.67	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.83	0.83	0.00
Uniform Delay (d), s/veh	41.1	0.0	0.0				0.0	20.9	0.0	44.6	12.5	0.0
Incr Delay (d2), s/veh	8.6	0.0	0.0				0.0	9.2	0.0	2.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	0.0				0.0	18.9	0.0	4.6	8.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	0.0	0.0				0.0	30.1	0.0	46.6	13.0	0.0
LnGrp LOS	D	A					A	C		D	B	A
Approach Vol, veh/h		483	A					1796	A		1502	
Approach Delay, s/veh		49.8						30.1			21.2	
Approach LOS		D						C			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.8	60.5		21.7		78.3
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	20.0	44.0		19.0		69.0
Max Q Clear Time (g_c+I1), s	12.4	48.5		15.2		23.0
Green Ext Time (p_c), s	0.4	0.0		0.4		9.7

Intersection Summary	
HCM 6th Ctrl Delay	29.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	270	20	565	180	870	0	0	1720	520
Future Volume (veh/h)	0	0	0	270	20	565	180	870	0	0	1720	520
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				335	0	0	196	935	0	0	1811	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				393	0		276	2809	0	0	3656	
Arrive On Green				0.11	0.00	0.00	0.09	1.00	0.00	0.00	0.72	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				335	0	0	196	935	0	0	1811	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				13.0	0.0	0.0	4.2	0.0	0.0	0.0	21.7	0.0
Cycle Q Clear(g_c), s				13.0	0.0	0.0	4.2	0.0	0.0	0.0	21.7	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				393	0		276	2809	0	0	3656	
V/C Ratio(X)				0.85	0.00		0.71	0.33	0.00	0.00	0.50	
Avail Cap(c_a), veh/h				682	0		496	2809	0	0	3656	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.85	0.85	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				61.1	0.0	0.0	10.7	0.0	0.0	0.0	8.4	0.0
Incr Delay (d2), s/veh				2.1	0.0	0.0	1.1	0.3	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.0	0.0	0.0	2.2	0.1	0.0	0.0	7.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				63.2	0.0	0.0	11.8	0.3	0.0	0.0	8.9	0.0
LnGrp LOS				E	A		B	A	A	A	A	
Approach Vol, veh/h					335	A		1131			1811	A
Approach Delay, s/veh					63.2			2.3			8.9	
Approach LOS					E			A			A	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	118.4	11.4	107.0	21.6
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	101.0	24.0	72.0	27.0
Max Q Clear Time (g_c+I1), s	2.0	6.2	23.7	15.0
Green Ext Time (p_c), s	7.5	0.2	19.8	0.5

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	250	20	355	0	0	0	0	805	60	430	1565	0
Future Volume (veh/h)	250	20	355	0	0	0	0	805	60	430	1565	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	315	0	0				0	904	0	531	1720	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	372	0					0	2100		580	2875	0
Arrive On Green	0.11	0.00	0.00				0.00	0.61	0.00	0.34	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	315	0	0				0	904	0	531	1720	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	12.3	0.0	0.0				0.0	19.5	0.0	20.6	0.0	0.0
Cycle Q Clear(g_c), s	12.3	0.0	0.0				0.0	19.5	0.0	20.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	372	0					0	2100		580	2875	0
V/C Ratio(X)	0.85	0.00					0.00	0.43		0.92	0.60	0.00
Avail Cap(c_a), veh/h	682	0					0	2100		913	2875	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	61.5	0.0	0.0				0.0	14.8	0.0	45.5	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.0				0.0	0.6	0.0	5.3	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	0.0				0.0	7.4	0.0	7.6	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.6	0.0	0.0				0.0	15.4	0.0	50.9	0.7	0.0
LnGrp LOS	E	A					A	B		D	A	A
Approach Vol, veh/h		315	A					904	A		2251	
Approach Delay, s/veh		63.6						15.4			12.6	
Approach LOS		E						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	28.5	90.7		20.8		119.2
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	37.0	59.0		27.0		101.0
Max Q Clear Time (g_c+I1), s	22.6	21.5		14.3		2.0
Green Ext Time (p_c), s	0.9	6.8		0.5		22.8

Intersection Summary	
HCM 6th Ctrl Delay	17.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	200	20	445	455	1815	0	0	1240	400
Future Volume (veh/h)	0	0	0	200	20	445	455	1815	0	0	1240	400
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				244	0	0	500	1891	0	0	1319	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				320	0		529	2805	0	0	2993	
Arrive On Green				0.09	0.00	0.00	0.20	1.00	0.00	0.00	0.59	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				244	0	0	500	1891	0	0	1319	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				6.7	0.0	0.0	12.7	0.0	0.0	0.0	14.4	0.0
Cycle Q Clear(g_c), s				6.7	0.0	0.0	12.7	0.0	0.0	0.0	14.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				320	0		529	2805	0	0	2993	
V/C Ratio(X)				0.76	0.00		0.95	0.67	0.00	0.00	0.44	
Avail Cap(c_a), veh/h				672	0		701	2805	0	0	2993	
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				44.4	0.0	0.0	15.1	0.0	0.0	0.0	11.5	0.0
Incr Delay (d2), s/veh				1.4	0.0	0.0	2.3	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.0	0.0	0.0	6.6	0.0	0.0	0.0	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				45.8	0.0	0.0	17.4	0.1	0.0	0.0	12.0	0.0
LnGrp LOS				D	A		B	A	A	A	B	
Approach Vol, veh/h					244	A		2391			1319	A
Approach Delay, s/veh					45.8			3.7			12.0	
Approach LOS					D			A			B	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	84.9		20.3	64.6		15.1
Change Period (Y+Rc), s	6.0		5.0	6.0		6.0
Max Green Setting (Gmax), s	69.0		25.0	39.0		19.0
Max Q Clear Time (g_c+I1), s	2.0		14.7	16.4		8.7
Green Ext Time (p_c), s	26.3		0.6	9.4		0.3

Intersection Summary	
HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	485	15	460	0	0	0	0	1785	160	335	1100	0
Future Volume (veh/h)	485	15	460	0	0	0	0	1785	160	335	1100	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	509	0	0				0	1919	0	376	1209	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	534	0					0	1968		436	2594	0
Arrive On Green	0.15	0.00	0.00				0.00	0.55	0.00	0.25	1.00	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	509	0	0				0	1919	0	376	1209	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	14.2	0.0	0.0				0.0	52.4	0.0	10.4	0.0	0.0
Cycle Q Clear(g_c), s	14.2	0.0	0.0				0.0	52.4	0.0	10.4	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	534	0					0	1968		436	2594	0
V/C Ratio(X)	0.95	0.00					0.00	0.98		0.86	0.47	0.00
Avail Cap(c_a), veh/h	534	0					0	1968		518	2594	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	42.1	0.0	0.0				0.0	21.6	0.0	36.6	0.0	0.0
Incr Delay (d2), s/veh	27.1	0.0	0.0				0.0	15.2	0.0	8.8	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.0	0.0				0.0	22.6	0.0	4.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.3	0.0	0.0				0.0	36.8	0.0	45.3	0.5	0.0
LnGrp LOS	E	A					A	D		D	A	A
Approach Vol, veh/h		509	A					1919	A		1585	
Approach Delay, s/veh		69.3						36.8			11.1	
Approach LOS		E						D			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	17.6	61.4		21.0		79.0
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	15.0	53.0		15.0		73.0
Max Q Clear Time (g_c+I1), s	12.4	54.4		16.2		2.0
Green Ext Time (p_c), s	0.2	0.0		0.0		11.1

Intersection Summary	
HCM 6th Ctrl Delay	30.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
User approved volume balancing among the lanes for turning movement.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	280	20	620	185	1000	0	0	2020	560
Future Volume (veh/h)	0	0	0	280	20	620	185	1000	0	0	2020	560
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				347	0	0	201	1075	0	0	2126	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				405	0		230	2797	0	0	3631	
Arrive On Green				0.11	0.00	0.00	0.09	1.00	0.00	0.00	0.72	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				347	0	0	201	1075	0	0	2126	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				13.5	0.0	0.0	4.4	0.0	0.0	0.0	28.7	0.0
Cycle Q Clear(g_c), s				13.5	0.0	0.0	4.4	0.0	0.0	0.0	28.7	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				405	0		230	2797	0	0	3631	
V/C Ratio(X)				0.86	0.00		0.87	0.38	0.00	0.00	0.59	
Avail Cap(c_a), veh/h				682	0		448	2797	0	0	3631	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.78	0.78	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				60.9	0.0	0.0	22.2	0.0	0.0	0.0	9.7	0.0
Incr Delay (d2), s/veh				2.5	0.0	0.0	3.2	0.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.2	0.0	0.0	5.0	0.1	0.0	0.0	9.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				63.3	0.0	0.0	25.4	0.3	0.0	0.0	10.4	0.0
LnGrp LOS				E	A		C	A	A	A	B	
Approach Vol, veh/h					347	A		1276			2126	A
Approach Delay, s/veh					63.3			4.3			10.4	
Approach LOS					E			A			B	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	118.0		11.6	106.4		22.0
Change Period (Y+Rc), s	6.0		5.0	6.0		6.0
Max Green Setting (Gmax), s	101.0		24.0	72.0		27.0
Max Q Clear Time (g_c+I1), s	2.0		6.4	30.7		15.5
Green Ext Time (p_c), s	9.2		0.2	23.8		0.5

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	275	20	365	0	0	0	0	910	60	495	1810	0
Future Volume (veh/h)	275	20	365	0	0	0	0	910	60	495	1810	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	344	0	0				0	1022	0	611	1989	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	402	0					0	1993		658	2845	0
Arrive On Green	0.11	0.00	0.00				0.00	0.57	0.00	0.38	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	344	0	0				0	1022	0	611	1989	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	13.4	0.0	0.0				0.0	24.9	0.0	23.7	0.0	0.0
Cycle Q Clear(g_c), s	13.4	0.0	0.0				0.0	24.9	0.0	23.7	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	402	0					0	1993		658	2845	0
V/C Ratio(X)	0.86	0.00					0.00	0.51		0.93	0.70	0.00
Avail Cap(c_a), veh/h	682	0					0	1993		913	2845	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.68	0.68	0.00
Uniform Delay (d), s/veh	60.9	0.0	0.0				0.0	18.0	0.0	42.4	0.0	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.0				0.0	0.9	0.0	7.6	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	0.0				0.0	9.7	0.0	8.7	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	0.0	0.0				0.0	18.9	0.0	50.0	1.0	0.0
LnGrp LOS	E	A					A	B		D	A	A
Approach Vol, veh/h		344	A					1022	A		2600	
Approach Delay, s/veh		63.2						18.9			12.5	
Approach LOS		E						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	31.7	86.4		21.9		118.1
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	37.0	59.0		27.0		101.0
Max Q Clear Time (g_c+I1), s	25.7	26.9		15.4		2.0
Green Ext Time (p_c), s	1.0	7.8		0.5		32.7

Intersection Summary	
HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	205	20	485	465	2065	0	0	1415	430
Future Volume (veh/h)	0	0	0	205	20	485	465	2065	0	0	1415	430
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				249	0	0	511	2151	0	0	1505	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				299	0		525	2969	0	0	3198	
Arrive On Green				0.08	0.00	0.00	0.35	1.00	0.00	0.00	0.63	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				249	0	0	511	2151	0	0	1505	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				10.4	0.0	0.0	23.6	0.0	0.0	0.0	23.4	0.0
Cycle Q Clear(g_c), s				10.4	0.0	0.0	23.6	0.0	0.0	0.0	23.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				299	0		525	2969	0	0	3198	
V/C Ratio(X)				0.83	0.00		0.97	0.72	0.00	0.00	0.47	
Avail Cap(c_a), veh/h				471	0		853	2969	0	0	3198	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				67.6	0.0	0.0	20.1	0.0	0.0	0.0	14.9	0.0
Incr Delay (d2), s/veh				3.8	0.0	0.0	2.5	0.1	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.9	0.0	0.0	13.8	0.1	0.0	0.0	8.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				71.4	0.0	0.0	22.6	0.1	0.0	0.0	15.3	0.0
LnGrp LOS				E	A		C	A	A	A	B	
Approach Vol, veh/h					249	A		2662			1505	A
Approach Delay, s/veh					71.4			4.4			15.3	
Approach LOS					E			A			B	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	131.3		31.4	99.9	18.7
Change Period (Y+Rc), s	6.0		5.0	6.0	6.0
Max Green Setting (Gmax), s	118.0		54.0	59.0	20.0
Max Q Clear Time (g_c+I1), s	2.0		25.6	25.4	12.4
Green Ext Time (p_c), s	41.7		0.7	13.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	515	15	470	0	0	0	0	2015	165	370	1245	0
Future Volume (veh/h)	515	15	470	0	0	0	0	2015	165	370	1245	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	539	0	0				0	2167	0	416	1368	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	591	0					0	2182		369	2680	0
Arrive On Green	0.17	0.00	0.00				0.00	0.61	0.00	0.21	1.00	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	539	0	0				0	2167	0	416	1368	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	22.3	0.0	0.0				0.0	90.5	0.0	16.0	0.0	0.0
Cycle Q Clear(g_c), s	22.3	0.0	0.0				0.0	90.5	0.0	16.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	591	0					0	2182		369	2680	0
V/C Ratio(X)	0.91	0.00					0.00	0.99		1.13	0.51	0.00
Avail Cap(c_a), veh/h	689	0					0	2182		369	2680	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.77	0.77	0.00
Uniform Delay (d), s/veh	61.5	0.0	0.0				0.0	28.6	0.0	59.0	0.0	0.0
Incr Delay (d2), s/veh	14.0	0.0	0.0				0.0	17.7	0.0	81.3	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	0.0	0.0				0.0	40.1	0.0	10.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.5	0.0	0.0				0.0	46.3	0.0	140.3	0.5	0.0
LnGrp LOS	E	A					A	D		F	A	A
Approach Vol, veh/h		539	A					2167	A		1784	
Approach Delay, s/veh		75.5						46.3			33.1	
Approach LOS		E						D			C	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	21.0	98.1		30.9		119.1
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	16.0	88.0		29.0		109.0
Max Q Clear Time (g_c+I1), s	18.0	92.5		24.3		2.0
Green Ext Time (p_c), s	0.0	0.0		0.6		14.0

Intersection Summary	
HCM 6th Ctrl Delay	44.6
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	265	15	863	175	906	0	0	1743	525
Future Volume (veh/h)	0	0	0	265	15	863	175	906	0	0	1743	525
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				324	0	0	190	974	0	0	1835	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				385	0		274	2793	0	0	3616	
Arrive On Green				0.11	0.00	0.00	0.09	1.00	0.00	0.00	0.71	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				324	0	0	190	974	0	0	1835	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				11.7	0.0	0.0	3.8	0.0	0.0	0.0	21.1	0.0
Cycle Q Clear(g_c), s				11.7	0.0	0.0	3.8	0.0	0.0	0.0	21.1	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				385	0		274	2793	0	0	3616	
V/C Ratio(X)				0.84	0.00		0.69	0.35	0.00	0.00	0.51	
Avail Cap(c_a), veh/h				652	0		476	2793	0	0	3616	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.75	0.75	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				56.8	0.0	0.0	10.7	0.0	0.0	0.0	8.3	0.0
Incr Delay (d2), s/veh				1.9	0.0	0.0	0.9	0.3	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.3	0.0	0.0	2.0	0.1	0.0	0.0	6.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				58.8	0.0	0.0	11.6	0.3	0.0	0.0	8.9	0.0
LnGrp LOS				E	A		B	A	A	A	A	
Approach Vol, veh/h					324	A		1164			1835	A
Approach Delay, s/veh					58.8			2.1			8.9	
Approach LOS					E			A			A	

Timer - Assigned Phs	2		5	6		8				
Phs Duration (G+Y+Rc), s	109.8		11.0	98.8		20.2				
Change Period (Y+Rc), s	6.0		5.0	6.0		6.0				
Max Green Setting (Gmax), s	94.0		21.0	68.0		24.0				
Max Q Clear Time (g_c+I1), s	2.0		5.8	23.1		13.7				
Green Ext Time (p_c), s	7.9		0.2	19.7		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	291	15	350	0	0	0	0	790	55	544	1464	0
Future Volume (veh/h)	291	15	350	0	0	0	0	790	55	544	1464	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	356	0	0				0	888	0	672	1609	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	418	0					0	1334		1239	2805	0
Arrive On Green	0.12	0.00	0.00				0.00	0.38	0.00	0.72	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	356	0	0				0	888	0	672	1609	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	12.8	0.0	0.0				0.0	27.5	0.0	11.7	0.0	0.0
Cycle Q Clear(g_c), s	12.8	0.0	0.0				0.0	27.5	0.0	11.7	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	418	0					0	1334		1239	2805	0
V/C Ratio(X)	0.85	0.00					0.00	0.67		0.54	0.57	0.00
Avail Cap(c_a), veh/h	707	0					0	1334		1239	2805	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.78	0.78	0.00
Uniform Delay (d), s/veh	56.2	0.0	0.0				0.0	33.1	0.0	13.4	0.0	0.0
Incr Delay (d2), s/veh	2.1	0.0	0.0				0.0	2.6	0.0	0.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	0.0				0.0	11.6	0.0	3.2	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.3	0.0	0.0				0.0	35.7	0.0	13.7	0.7	0.0
LnGrp LOS	E	A					A	D		B	A	A
Approach Vol, veh/h		356	A					888	A		2281	
Approach Delay, s/veh		58.3						35.7			4.5	
Approach LOS		E						D			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	52.6	56.0		21.4		108.6
Change Period (Y+Rc), s	6.0	* 6		6.0		6.0
Max Green Setting (Gmax), s	37.0	* 50		26.0		92.0
Max Q Clear Time (g_c+I1), s	13.7	29.5		14.8		2.0
Green Ext Time (p_c), s	1.2	5.7		0.6		19.5

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	195	15	566	445	1732	0	0	1550	451
Future Volume (veh/h)	0	0	0	195	15	566	445	1732	0	0	1550	451
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				233	0	0	489	1804	0	0	1649	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				286	0		510	2972	0	0	3152	
Arrive On Green				0.08	0.00	0.00	0.25	1.00	0.00	0.00	0.62	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				233	0	0	489	1804	0	0	1649	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				9.4	0.0	0.0	24.1	0.0	0.0	0.0	26.5	0.0
Cycle Q Clear(g_c), s				9.4	0.0	0.0	24.1	0.0	0.0	0.0	26.5	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				286	0		510	2972	0	0	3152	
V/C Ratio(X)				0.81	0.00		0.96	0.61	0.00	0.00	0.52	
Avail Cap(c_a), veh/h				585	0		796	2972	0	0	3152	
HCM Platoon Ratio				1.00	1.00	1.00	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.17	0.17	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				65.6	0.0	0.0	30.8	0.0	0.0	0.0	15.7	0.0
Incr Delay (d2), s/veh				2.1	0.0	0.0	3.4	0.2	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.3	0.0	0.0	16.0	0.1	0.0	0.0	9.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				67.7	0.0	0.0	34.3	0.2	0.0	0.0	16.3	0.0
LnGrp LOS				E	A		C	A	A	A	B	
Approach Vol, veh/h					233	A		2293			1649	A
Approach Delay, s/veh					67.7			7.4			16.3	
Approach LOS					E			A			B	

Timer - Assigned Phs	2		5	6	8
Phs Duration (G+Y+Rc), s	127.3		31.7	95.5	17.7
Change Period (Y+Rc), s	6.0		5.0	6.0	6.0
Max Green Setting (Gmax), s	109.0		50.0	54.0	24.0
Max Q Clear Time (g_c+I1), s	2.0		26.1	28.5	11.4
Green Ext Time (p_c), s	25.8		0.7	13.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	492	10	450	0	0	0	0	1685	155	667	1078	0
Future Volume (veh/h)	492	10	450	0	0	0	0	1685	155	667	1078	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	510	0	0				0	1812	0	749	1185	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	554	0					0	1898		667	2707	0
Arrive On Green	0.16	0.00	0.00				0.00	0.53	0.00	0.26	1.00	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	510	0	0				0	1812	0	749	1185	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	20.5	0.0	0.0				0.0	70.3	0.0	28.0	0.0	0.0
Cycle Q Clear(g_c), s	20.5	0.0	0.0				0.0	70.3	0.0	28.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	554	0					0	1898		667	2707	0
V/C Ratio(X)	0.92	0.00					0.00	0.95		1.12	0.44	0.00
Avail Cap(c_a), veh/h	565	0					0	1898		667	2707	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.73	0.73	0.00
Uniform Delay (d), s/veh	60.3	0.0	0.0				0.0	32.1	0.0	53.9	0.0	0.0
Incr Delay (d2), s/veh	19.9	0.0	0.0				0.0	12.4	0.0	69.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	0.0	0.0				0.0	31.4	0.0	17.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.2	0.0	0.0				0.0	44.5	0.0	123.3	0.4	0.0
LnGrp LOS	F	A					A	D		F	A	A
Approach Vol, veh/h		510	A					1812	A		1934	
Approach Delay, s/veh		80.2						44.5			48.0	
Approach LOS		F						D			D	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	33.0	83.5		28.5		116.5
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	28.0	77.0		23.0		110.0
Max Q Clear Time (g_c+I1), s	30.0	72.3		22.5		2.0
Green Ext Time (p_c), s	0.0	4.0		0.1		10.8

Intersection Summary	
HCM 6th Ctrl Delay	50.4
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	270	20	1101	180	1013	0	0	1941	556
Future Volume (veh/h)	0	0	0	270	20	1101	180	1013	0	0	1941	556
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				335	0	0	196	1089	0	0	2043	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				396	0		244	2783	0	0	3592	
Arrive On Green				0.11	0.00	0.00	0.10	1.00	0.00	0.00	0.71	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				335	0	0	196	1089	0	0	2043	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				12.1	0.0	0.0	4.0	0.0	0.0	0.0	25.6	0.0
Cycle Q Clear(g_c), s				12.1	0.0	0.0	4.0	0.0	0.0	0.0	25.6	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				396	0		244	2783	0	0	3592	
V/C Ratio(X)				0.85	0.00		0.80	0.39	0.00	0.00	0.57	
Avail Cap(c_a), veh/h				652	0		443	2783	0	0	3592	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.67	0.67	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				56.6	0.0	0.0	18.3	0.0	0.0	0.0	9.2	0.0
Incr Delay (d2), s/veh				2.5	0.0	0.0	1.6	0.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.5	0.0	0.0	4.3	0.1	0.0	0.0	8.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.1	0.0	0.0	19.9	0.3	0.0	0.0	9.9	0.0
LnGrp LOS				E	A		B	A	A	A	A	
Approach Vol, veh/h					335	A		1285			2043	A
Approach Delay, s/veh					59.1			3.3			9.9	
Approach LOS					E			A			A	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	109.4	11.2	98.2	20.6
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	94.0	21.0	68.0	24.0
Max Q Clear Time (g_c+I1), s	2.0	6.0	27.6	14.1
Green Ext Time (p_c), s	9.4	0.2	22.2	0.5

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	338	20	355	0	0	0	0	855	60	628	1583	0
Future Volume (veh/h)	338	20	355	0	0	0	0	855	60	628	1583	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	417	0	0				0	961	0	775	1740	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	480	0					0	1334		1179	2743	0
Arrive On Green	0.14	0.00	0.00				0.00	0.38	0.00	0.68	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	417	0	0				0	961	0	775	1740	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	15.0	0.0	0.0				0.0	30.7	0.0	16.8	0.0	0.0
Cycle Q Clear(g_c), s	15.0	0.0	0.0				0.0	30.7	0.0	16.8	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	480	0					0	1334		1179	2743	0
V/C Ratio(X)	0.87	0.00					0.00	0.72		0.66	0.63	0.00
Avail Cap(c_a), veh/h	707	0					0	1334		1179	2743	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.71	0.71	0.00
Uniform Delay (d), s/veh	55.1	0.0	0.0				0.0	34.0	0.0	16.3	0.0	0.0
Incr Delay (d2), s/veh	5.6	0.0	0.0				0.0	3.4	0.0	0.8	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	0.0				0.0	13.0	0.0	4.4	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	0.0	0.0				0.0	37.4	0.0	17.0	0.8	0.0
LnGrp LOS	E	A					A	D		B	A	A
Approach Vol, veh/h		417	A					961	A		2515	
Approach Delay, s/veh		60.7						37.4			5.8	
Approach LOS		E						D			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	50.4	56.0		23.6		106.4
Change Period (Y+Rc), s	6.0	* 6		6.0		6.0
Max Green Setting (Gmax), s	37.0	* 50		26.0		92.0
Max Q Clear Time (g_c+I1), s	18.8	32.7		17.0		2.0
Green Ext Time (p_c), s	1.4	5.9		0.6		23.2

Intersection Summary	
HCM 6th Ctrl Delay	19.5
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	200	20	672	455	1881	0	0	1880	497
Future Volume (veh/h)	0	0	0	200	20	672	455	1881	0	0	1880	497
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				244	0	0	500	1959	0	0	2000	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				297	0		524	2960	0	0	2897	
Arrive On Green				0.08	0.00	0.00	0.23	0.83	0.00	0.00	0.57	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				244	0	0	500	1959	0	0	2000	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				9.8	0.0	0.0	30.8	29.7	0.0	0.0	40.4	0.0
Cycle Q Clear(g_c), s				9.8	0.0	0.0	30.8	29.7	0.0	0.0	40.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				297	0		524	2960	0	0	2897	
V/C Ratio(X)				0.82	0.00		0.95	0.66	0.00	0.00	0.69	
Avail Cap(c_a), veh/h				585	0		726	2960	0	0	2897	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				65.3	0.0	0.0	42.6	4.5	0.0	0.0	22.3	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.0	2.5	0.1	0.0	0.0	1.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.5	0.0	0.0	17.7	7.0	0.0	0.0	15.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				67.5	0.0	0.0	45.1	4.6	0.0	0.0	23.7	0.0
LnGrp LOS				E	A		D	A	A	A	C	
Approach Vol, veh/h					244	A		2459			2000	A
Approach Delay, s/veh					67.5			12.8			23.7	
Approach LOS					E			B			C	

Timer - Assigned Phs	2	5	6	8
Phs Duration (G+Y+Rc), s	126.8	38.5	88.3	18.2
Change Period (Y+Rc), s	6.0	5.0	6.0	6.0
Max Green Setting (Gmax), s	109.0	50.0	54.0	24.0
Max Q Clear Time (g_c+I1), s	31.7	32.8	42.4	11.8
Green Ext Time (p_c), s	29.6	0.7	9.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	526	15	460	0	0	0	0	1810	160	911	1164	0
Future Volume (veh/h)	526	15	460	0	0	0	0	1810	160	911	1164	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	550	0	0				0	1946	0	1024	1279	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	565	0					0	1887		667	2696	0
Arrive On Green	0.16	0.00	0.00				0.00	0.53	0.00	0.26	1.00	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	550	0	0				0	1946	0	1024	1279	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	22.3	0.0	0.0				0.0	77.0	0.0	28.0	0.0	0.0
Cycle Q Clear(g_c), s	22.3	0.0	0.0				0.0	77.0	0.0	28.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	565	0					0	1887		667	2696	0
V/C Ratio(X)	0.97	0.00					0.00	1.03		1.53	0.47	0.00
Avail Cap(c_a), veh/h	565	0					0	1887		667	2696	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.54	0.54	0.00
Uniform Delay (d), s/veh	60.7	0.0	0.0				0.0	34.0	0.0	53.9	0.0	0.0
Incr Delay (d2), s/veh	30.9	0.0	0.0				0.0	29.2	0.0	244.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.5	0.0	0.0				0.0	38.5	0.0	34.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.6	0.0	0.0				0.0	63.2	0.0	298.5	0.3	0.0
LnGrp LOS	F	A					A	F		F	A	A
Approach Vol, veh/h		550	A					1946	A		2303	
Approach Delay, s/veh		91.6						63.2			132.9	
Approach LOS		F						E			F	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	33.0	83.0		29.0		116.0
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	28.0	77.0		23.0		110.0
Max Q Clear Time (g_c+I1), s	30.0	79.0		24.3		2.0
Green Ext Time (p_c), s	0.0	0.0		0.0		12.3

Intersection Summary	
HCM 6th Ctrl Delay	99.9
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	280	20	1439	185	1237	0	0	2311	606
Future Volume (veh/h)	0	0	0	280	20	1439	185	1237	0	0	2311	606
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1841	1841	0	0	1856	1856
Adj Flow Rate, veh/h				347	0	0	201	1330	0	0	2433	0
Peak Hour Factor				0.86	0.68	0.95	0.92	0.93	0.92	0.92	0.95	0.96
Percent Heavy Veh, %				3	3	3	4	4	0	0	3	3
Cap, veh/h				403	0		221	2819	0	0	3591	
Arrive On Green				0.11	0.00	0.00	0.13	1.00	0.00	0.00	0.71	0.00
Sat Flow, veh/h				3534	0	1572	1753	3589	0	0	5233	1572
Grp Volume(v), veh/h				347	0	0	201	1330	0	0	2433	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1753	1749	0	0	1689	1572
Q Serve(g_s), s				14.5	0.0	0.0	7.4	0.0	0.0	0.0	40.4	0.0
Cycle Q Clear(g_c), s				14.5	0.0	0.0	7.4	0.0	0.0	0.0	40.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				403	0		221	2819	0	0	3591	
V/C Ratio(X)				0.86	0.00		0.91	0.47	0.00	0.00	0.68	
Avail Cap(c_a), veh/h				801	0		378	2819	0	0	3591	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.46	0.46	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				65.3	0.0	0.0	35.1	0.0	0.0	0.0	12.2	0.0
Incr Delay (d2), s/veh				2.2	0.0	0.0	4.7	0.3	0.0	0.0	1.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.7	0.0	0.0	7.2	0.1	0.0	0.0	13.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				67.5	0.0	0.0	39.9	0.3	0.0	0.0	13.3	0.0
LnGrp LOS				E	A		D	A	A	A	B	
Approach Vol, veh/h					347	A		1531			2433	A
Approach Delay, s/veh					67.5			5.5			13.3	
Approach LOS					E			A			B	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	126.9		14.6	112.3		23.1
Change Period (Y+Rc), s	6.0		5.0	6.0		6.0
Max Green Setting (Gmax), s	104.0		23.0	76.0		34.0
Max Q Clear Time (g_c+I1), s	2.0		9.4	42.4		16.5
Green Ext Time (p_c), s	13.3		0.2	24.7		0.6

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	421	20	365	0	0	0	0	1001	60	747	1844	0
Future Volume (veh/h)	421	20	365	0	0	0	0	1001	60	747	1844	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1856	1856	1856				0	1826	1826	1870	1870	0
Adj Flow Rate, veh/h	514	0	0				0	1125	0	922	2026	0
Peak Hour Factor	0.86	0.60	0.77				0.92	0.89	0.78	0.81	0.91	0.92
Percent Heavy Veh, %	3	3	3				0	5	5	2	2	0
Cap, veh/h	568	0					0	1318		1173	2698	0
Arrive On Green	0.16	0.00	0.00				0.00	0.38	0.00	0.68	1.00	0.00
Sat Flow, veh/h	3534	0	1572				0	3561	1547	3456	3647	0
Grp Volume(v), veh/h	514	0	0				0	1125	0	922	2026	0
Grp Sat Flow(s),veh/h/ln	1767	0	1572				0	1735	1547	1728	1777	0
Q Serve(g_s), s	21.4	0.0	0.0				0.0	44.6	0.0	27.6	0.0	0.0
Cycle Q Clear(g_c), s	21.4	0.0	0.0				0.0	44.6	0.0	27.6	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	568	0					0	1318		1173	2698	0
V/C Ratio(X)	0.91	0.00					0.00	0.85		0.79	0.75	0.00
Avail Cap(c_a), veh/h	707	0					0	1318		1173	2698	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.57	0.57	0.00
Uniform Delay (d), s/veh	61.8	0.0	0.0				0.0	42.7	0.0	20.4	0.0	0.0
Incr Delay (d2), s/veh	11.8	0.0	0.0				0.0	7.2	0.0	1.9	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	0.0	0.0				0.0	19.8	0.0	6.5	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.6	0.0	0.0				0.0	49.8	0.0	22.3	1.1	0.0
LnGrp LOS	E	A					A	D		C	A	A
Approach Vol, veh/h		514	A					1125	A		2948	
Approach Delay, s/veh		73.6						49.8			7.7	
Approach LOS		E						D			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	56.9	63.0		30.1		119.9
Change Period (Y+Rc), s	6.0	* 6		6.0		6.0
Max Green Setting (Gmax), s	46.0	* 57		30.0		108.0
Max Q Clear Time (g_c+I1), s	29.6	46.6		23.4		2.0
Green Ext Time (p_c), s	1.7	5.2		0.7		34.8

Intersection Summary	
HCM 6th Ctrl Delay	25.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	205	20	799	465	2158	0	0	2385	588
Future Volume (veh/h)	0	0	0	205	20	799	465	2158	0	0	2385	588
Initial Q (Qb), veh				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
Parking Bus, Adj				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	
Adj Sat Flow, veh/h/ln				1856	1856	1856	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				249	0	0	511	2248	0	0	2537	0
Peak Hour Factor				0.89	0.75	0.82	0.91	0.96	0.92	0.92	0.94	0.91
Percent Heavy Veh, %				3	3	3	2	2	0	0	2	2
Cap, veh/h				299	0		516	2959	0	0	2772	
Arrive On Green				0.08	0.00	0.00	0.26	0.83	0.00	0.00	0.54	0.00
Sat Flow, veh/h				3534	0	1572	1781	3647	0	0	5274	1585
Grp Volume(v), veh/h				249	0	0	511	2248	0	0	2537	0
Grp Sat Flow(s),veh/h/ln				1767	0	1572	1781	1777	0	0	1702	1585
Q Serve(g_s), s				10.1	0.0	0.0	36.5	41.8	0.0	0.0	65.4	0.0
Cycle Q Clear(g_c), s				10.1	0.0	0.0	36.5	41.8	0.0	0.0	65.4	0.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				299	0		516	2959	0	0	2772	
V/C Ratio(X)				0.83	0.00		0.99	0.76	0.00	0.00	0.92	
Avail Cap(c_a), veh/h				414	0		516	2959	0	0	2772	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	0.09	0.09	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				65.3	0.0	0.0	48.2	5.5	0.0	0.0	30.1	0.0
Incr Delay (d2), s/veh				7.2	0.0	0.0	9.8	0.2	0.0	0.0	6.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.9	0.0	0.0	19.4	9.8	0.0	0.0	26.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				72.6	0.0	0.0	58.0	5.7	0.0	0.0	36.1	0.0
LnGrp LOS				E	A		E	A	A	A	D	
Approach Vol, veh/h					249	A		2759			2537	A
Approach Delay, s/veh					72.6			15.4			36.1	
Approach LOS					E			B			D	

Timer - Assigned Phs	2		5	6		8
Phs Duration (G+Y+Rc), s	126.7		42.0	84.7		18.3
Change Period (Y+Rc), s	6.0		5.0	6.0		6.0
Max Green Setting (Gmax), s	116.0		37.0	74.0		17.0
Max Q Clear Time (g_c+I1), s	43.8		38.5	67.4		12.1
Green Ext Time (p_c), s	39.0		0.0	6.1		0.2

Intersection Summary	
HCM 6th Ctrl Delay	27.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	573	15	470	0	0	0	0	2050	165	1247	1343	0
Future Volume (veh/h)	573	15	470	0	0	0	0	2050	165	1247	1343	0
Initial Q (Qb), veh	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
Parking Bus, Adj	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	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	598	0	0				0	2204	0	1401	1476	0
Peak Hour Factor	0.99	0.56	0.86				0.92	0.93	0.74	0.89	0.91	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	491	0					0	1642		977	2769	0
Arrive On Green	0.14	0.00	0.00				0.00	0.46	0.00	0.38	1.00	0.00
Sat Flow, veh/h	3563	0	1585				0	3647	1585	3456	3647	0
Grp Volume(v), veh/h	598	0	0				0	2204	0	1401	1476	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1728	1777	0
Q Serve(g_s), s	20.0	0.0	0.0				0.0	67.0	0.0	41.0	0.0	0.0
Cycle Q Clear(g_c), s	20.0	0.0	0.0				0.0	67.0	0.0	41.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	491	0					0	1642		977	2769	0
V/C Ratio(X)	1.22	0.00					0.00	1.34		1.43	0.53	0.00
Avail Cap(c_a), veh/h	491	0					0	1642		977	2769	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	1.00	0.00	0.17	0.17	0.00
Uniform Delay (d), s/veh	62.5	0.0	0.0				0.0	39.0	0.0	45.2	0.0	0.0
Incr Delay (d2), s/veh	115.1	0.0	0.0				0.0	158.2	0.0	196.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.9	0.0	0.0				0.0	63.7	0.0	42.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	177.6	0.0	0.0				0.0	197.2	0.0	241.5	0.1	0.0
LnGrp LOS	F	A					A	F		F	A	A
Approach Vol, veh/h		598	A					2204	A		2877	
Approach Delay, s/veh		177.6						197.2			117.7	
Approach LOS		F						F			F	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	46.0	73.0		26.0		119.0
Change Period (Y+Rc), s	5.0	6.0		6.0		6.0
Max Green Setting (Gmax), s	41.0	67.0		20.0		113.0
Max Q Clear Time (g_c+I1), s	43.0	69.0		22.0		2.0
Green Ext Time (p_c), s	0.0	0.0		0.0		16.3

Intersection Summary	
HCM 6th Ctrl Delay	154.8
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

I – Percent Contribution

Appendix I: Redtail Ridge Percent of Total Entering Traffic to the Intersection/Segment

Intersection/Segments	Year 2025 + Phase 1 (AM Peak)							Year 2025 + Phase 1 (PM Peak)							Year 2040 + Project (AM Peak)							Year 2040 + Project (PM Peak)						
	Ex	Bkgd	Redtail	Total	Redtail %	Bkgd + Redtail	Redtail % of Bkgd + Redtail	Ex	Bkgd	Redtail	Total	Redtail %	Bkgd + Redtail	Redtail % of Bkgd + Redtail	Ex	Bkgd	Redtail	Total	Redtail %	Bkgd + Redtail	Redtail % of Bkgd + Redtail	Ex	Bkgd	Redtail	Total	Redtail %	Bkgd + Redtail	Redtail % of Bkgd + Redtail
Dillon Road/McCaslin Boulevard	3549	216	98	3863	3%	314	31%	4400	260	105	4765	2%	365	29%	3549	521	238	4308	6%	759	31%	4400	550	261	5211	5%	811	32%
Dillon Road/88th Street	1777	238	102	2117	5%	340	30%	1922	283	109	2314	5%	392	28%	1777	533	248	2558	10%	781	32%	1922	493	273	2688	10%	766	36%
Dillon Road/96th Street	3698	432	229	4359	5%	661	35%	3989	496	250	4735	5%	746	34%	3698	1102	540	5340	10%	1642	33%	3989	1021	602	5612	11%	1623	37%
88th Street/Campus Drive	1809	171	70	2050	3%	241	29%	1203	177	74	1454	5%	251	29%	1809	296	184	2289	8%	480	38%	1203	282	197	1682	12%	479	41%
88th Street/Tape Drive	1069	126	71	1266	6%	197	36%	741	134	74	949	8%	208	36%	1069	206	191	1466	13%	397	48%	741	189	204	1134	18%	393	52%
96th Street/Campus Drive	2731	209	399	3339	12%	608	66%	2537	233	431	3201	13%	664	65%	2731	604	877	4212	21%	1481	59%	2537	603	993	4133	24%	1596	62%
Northwest Parkway/96th Street/Via Varra	3637	303	219	4159	5%	522	42%	3904	311	240	4455	5%	551	44%	3637	1168	491	5296	9%	1659	30%	3904	1186	556	5646	10%	1742	32%
Northwest Parkway/Tape Drive/Via Varra	3341	249	626	4216	15%	875	72%	3510	235	679	4424	15%	914	74%	3341	1054	1526	5921	26%	2580	59%	3510	1000	1694	6204	27%	2694	63%
Northwest Parkway/US 36 North Ramps (WB)	3666	244	578	4488	13%	822	70%	4074	256	624	4954	13%	880	71%	3666	1019	1383	6068	23%	2402	58%	4074	1011	1540	6625	23%	2551	60%
Northwest Parkway/US 36 South Ramps (EB)	3084	191	234	3509	7%	425	55%	3895	215	423	4533	9%	638	66%	3084	851	517	4452	12%	1368	38%	3895	900	1067	5862	18%	1967	54%
88th Street/Rock Creek Parkway	1495	130	20	1645	1%	150	13%	1333	137	22	1492	1%	159	14%	1495	230	48	1773	3%	278	17%	1333	222	52	1607	3%	274	19%
S. 88th St. (Btw Dillon Rd and Campus Dr)	894	111	70	1075	7%	181	39%	777	133	74	984	8%	207	36%	894	176	184	1254	15%	360	51%	777	183	199	1159	17%	382	52%
S. 88th St. (Btw Campus Dr and Tape Dr)	1069	136	51	1256	4%	187	27%	741	144	53	938	6%	197	27%	1069	221	144	1434	10%	365	39%	741	214	151	1106	14%	365	41%
S. 88th St. (South of Tape Dr)	1069	126	20	1215	2%	146	14%	741	134	21	896	2%	155	14%	1069	206	47	1322	4%	253	19%	741	189	53	983	5%	242	22%
Dillon Rd (Btw S. 88th St. and S. 96th St.)	1122	198	36	1356	3%	234	15%	1492	243	39	1774	2%	282	14%	1122	458	75	1655	5%	533	14%	1492	433	86	2011	4%	519	17%
S. 96th St. (North of Dillon Rd)	2055	325	148	2528	6%	473	31%	2087	378	161	2626	6%	539	30%	2055	875	357	3287	11%	1232	29%	2087	768	396	3251	12%	1164	34%
S. 96th St. (Btw Dillon Road and Northwest Pkwy)	2623	212	227	3062	7%	439	52%	2502	228	246	2976	8%	474	52%	2623	607	530	3760	14%	1137	47%	2502	593	592	3687	16%	1185	50%
Northwest Pkwy (Northeast of S. 96th St.)	1777	108	98	1983	5%	206	48%	1899	101	108	2108	5%	209	52%	1777	598	239	2614	9%	837	29%	1899	616	265	2780	10%	881	30%
Northwest Pkwy (Btw S. 96th St. and Tape Dr)	2964	176	170	3310	5%	346	49%	3199	171	186	3556	5%	357	52%	2964	766	384	4114	9%	1150	33%	3199	731	435	4365	10%	1166	37%
Northwest Pkwy (Btw Tape Dr and US 36)	3231	224	577	4032	14%	801	72%	3446	224	625	4295	15%	849	74%	3231	964	1383	5578	25%	2347	59%	3446	944	1539	5929	26%	2483	62%
Northwest Pkwy (South of US 36)	2478	132	49	2659	2%	181	27%	3163	147	54	3364	2%	201	27%	2478	667	119	3264	4%	786	15%	3163	732	132	4027	3%	864	15%

Dewberry

TECHNICAL MEMORANDUM 1

Date: April 17, 2020

To: City of Louisville

From: Patrick Radabaugh, PE, Sam Franzen, PE - Dewberry Engineers Inc.

Subject: City of Louisville and Redtail Ridge Development Flows and Loads - Updated April 2020

BACKGROUND

The City of Louisville is located in southern Boulder along the Front Range in central Colorado. A general location map for the planning area is shown on **Figure 1**. The City of Louisville was founded in 1878 and incorporated in 1882. During its early days, Louisville was a coal mining town that was composed of many immigrant neighborhoods. The City is named after Louis Nawatny, a landowner during the City's early mining days, who platted a portion of his farmland and named it after himself. The City was a mining town until the closure of the last mine during the 1950s. Since that time, the City has transitioned to a suburban residential community.

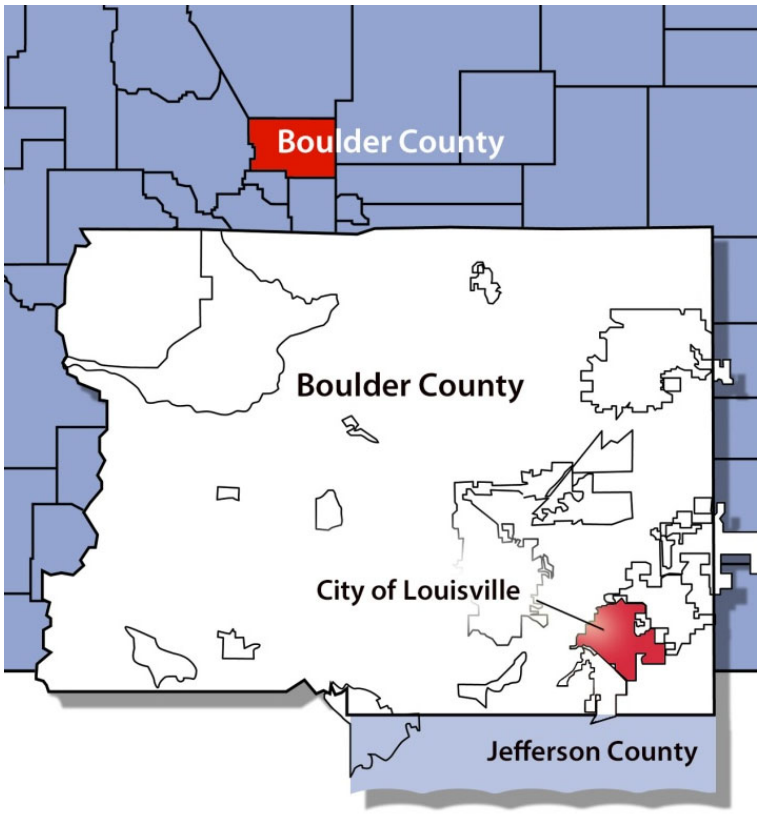

Figure 1 - City of Louisville Location Map

INTRODUCTION

The City of Louisville owns and operates its own wastewater treatment plant (WWTP) and secures water rights for its residents. The City also provides non-potable (wastewater reuse) to the Coal Creek Golf Course, Louisville Sports Complex, Miner's field, and Louisville Community Park.

SERVICE AREA AND POPULATION

The service area is the City of Louisville's border. It encompasses 8.6 square miles and in addition to residences and commercial space, contains 26 parks and approximately 1,700 acres open space. **Figure 1** shows the City boundary and the service area. The City's Boundaries are US 36 to the south, the City of Broomfield to the southeast, City of Lafayette to the north, the Davidson Mesa Open Space/Unincorporated Boulder County to the west, and Broomfield County to the east. The City is

comprised of primarily residential (single family and multifamily homes) with some industrial, commercial and retail space.

POPULATION

The City of Louisville has a current population of approximately 21,363. The City experienced rapid growth during the 1980s and 1990s, but growth slowed in the 2000s. In 1980, the population was 5,550. By Year 1990, the population had more than doubled to 12,870. By Year 2000, the population grew by approximately 50 percent to 19,051. Since Year 2000, the population of the City of Louisville has slowly grown to over 21,000 residents. Historical population from the US Census Bureau and estimated populations from recent years is given in **Table 1**.

Table 1 - City of Louisville Historical Populations

Year	Population
1980	5,550
1990	12,870
1998	18,177
1999	18,062
2000	19,051
2001	19,088
2002	18,747
2003	18,419
2004	18,574
2005	18,427
2006	18,723
2007	18,989
2008	19,461
2009	19,656
2010	18,376
2011	18,410
2012	19,014
2013	19,499
2014	19,993
2015	20,264
2016	20,719
2017	21,128
2018	21,205
2019	21,363

Notes:
1. Population from Years 2000, 2010 from U.S. Census Bureau.
2. Population from years 1980 and 1990 from www.Citydata.com which sites the US Census Bureau.
3. Population from years 2001-2009, 2011 from PRJCTNS spreadsheet from City of Louisville.

4. Population from years 2012-2019 from https://www.google.com/publicdata/explore?ds=kf7tgg1uo9ude_&met_y=population&idim=sub_county:0846355:0841835&hl=en&dl=en

WASTEWATER INFRASTRUCTURE

The WWTP is located at 1555 Empire Road in Louisville; approximately 0.6 mile east of downtown Louisville. The WWTP is shown in **Figure 2**. The plant currently treats an average of approximately 1.8 million gallons per day (mgd) and 4,334 pounds per day (ppd) of five-day biological oxygen demand (BOD_5). The plant is rated for 2.53 mgd and 5,515 ppd of BOD_5. The plant is currently operating at about 71 percent its rated hydraulic capacity and 79 percent of its rated organic capacity.

Figure 2 - City of Louisville Wastewater Treatment Plant

The headworks has two mechanical screens, one manual bar screen, a grit removal system, and flow measurement. The lift station has five sewage lift pumps, four of which are normally in operation. The secondary treatment process is a Johannesburg process consisting of three aeration basins, three secondary clarifiers, and the associated process equipment (pumps and blowers). UV units provide disinfection in two channels prior to all flow exiting the effluent flume. The solids handling process consists of a solids holding tank, a rotary drum thickener, an aerobic digester, and one dewatering centrifuge.

PLANNED FUTURE GROWTH

The City of Louisville has planned for growth in the future. New forecasted growth will be infill within the City limits. In the near term, growth contemplated master plan buildout by 2025 in the City; the forecasted growth is expected to come from infill development including the Foundry, Caledonia Place, Delo Lofts and North End Developments. Planned commercial developments are primarily on the south end of town.

Table 2 - City of Louisville Population Projection

Year	Population	Reference
2019	21,163	U.S. Census Bureau
2020	21,649	Projected Growth at 1.013%
2021	21,938	Projected Growth at 1.013%
2022	22,231	Projected Growth at 1.013%
2023	22,529	Projected Growth at 1.013%
2024	22,830	Projected Growth at 1.013%
2025	23,000	Buildout per Master Plan

POPULATION PROJECTIONS

The current population of the City of Louisville is about 21,163 people per the most recent U.S. Census Bureau website. The town has planned for a population build-out of 23,000 people. Based on available data and trends, the current population growth Population projections for the City of Louisville are given in **Table 2**.

Table 3 - Projected Commercial Connection Growth

Year	Connections
2019	559
2020	570
2025	576
2030	604

Commercial and industrial connections to the City wastewater system typically increase by one tap per year. Growth in commercial/industrial connections is projected to increase between Year 2019 and Year 2030 to a total number of connections of 604 in Year 2030. Projected commercial/industrial connections are provided in **Table 3**.

FLOW SUMMARY

The City of Louisville provided wastewater flow data from 2015 through July 2019. Trends in data were reviewed from 2015 through 2019. **Figure 3** is a summary of data from late 2014 to mid-2019.

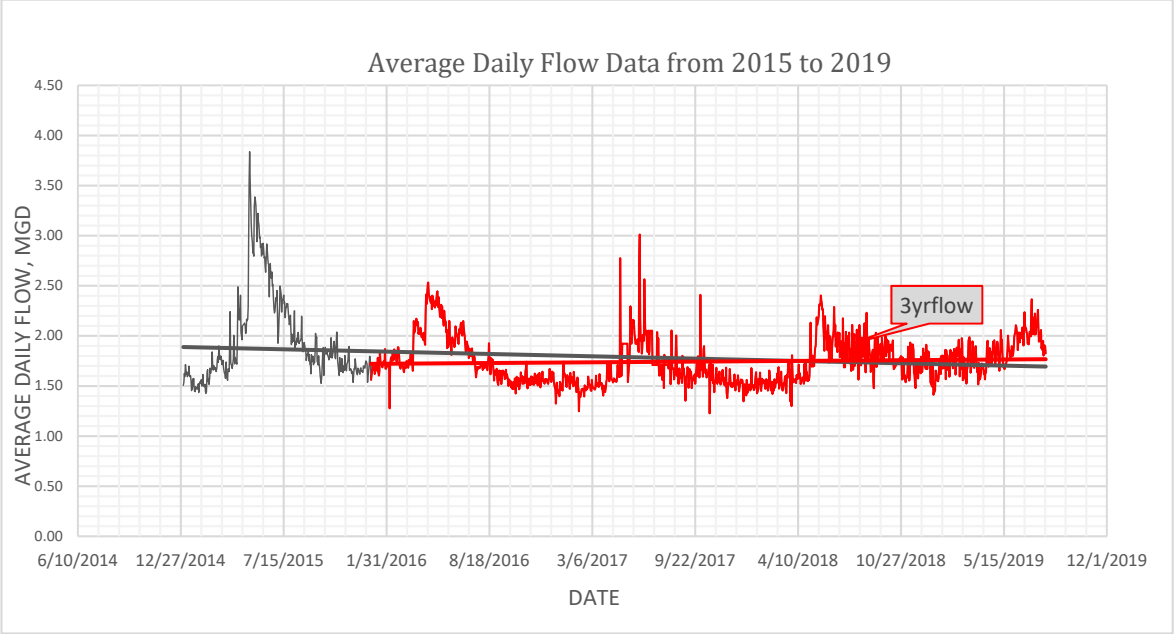

Figure 3 - Flow Data for City of Louisville WWTP from January 2015 through August 2019

Wastewater practitioners typically examine 3 to 5 years of flow data to make recommendations for flow capacity. Data from year 2015 was more variable than the remaining years considered. These initial irregularities may be a result of the construction project that ended in 2015. Dewberry considered the high variability of flow data in 2015 by comparing its effect to the trendline for four years and 8 months of total data. Including 2015 results in a downward overall flow trend. If 2015 is left out of the data and three years and 8 months of data are examined, the data shows a slightly positive trend. A gradually

increasing trend is what a typical wastewater treatment facility sees in a municipality with a population increase of about 1.1 percent per year. If a downward trend were to be believable a downward trend in gallons per person would need to decrease accordingly. Historically the City of Louisville has seen a gallons per capita (gpcd) flow rate of about 90.1 gpcd. The most recent data supports this historical consumptive use, thus the corresponding logic is for flow to continue to increase. The trend line from January 2016 through August 2019 confirms this logic and it has been used to support flow projection calculations.

LOAD SUMMARY

Load projections are based on five-day BOD (BOD_5) historical loading data, population projections, and flow projections. The historical data includes observed average annual BOD_5 from which maximum monthly averages can be calculated. The Colorado Department of Public Health and Environment (CDPHE) determines a treatment plant's maximum loading capacity based on the highest maximum monthly load the facility can treat while still meeting in-stream standards and state regulations. The plant's treatment process is considered as well as historical loading data. The following figure (Figure 4) shows the historical (2014 through mid-2019) and projected maximum month loading for the Louisville WWTP.

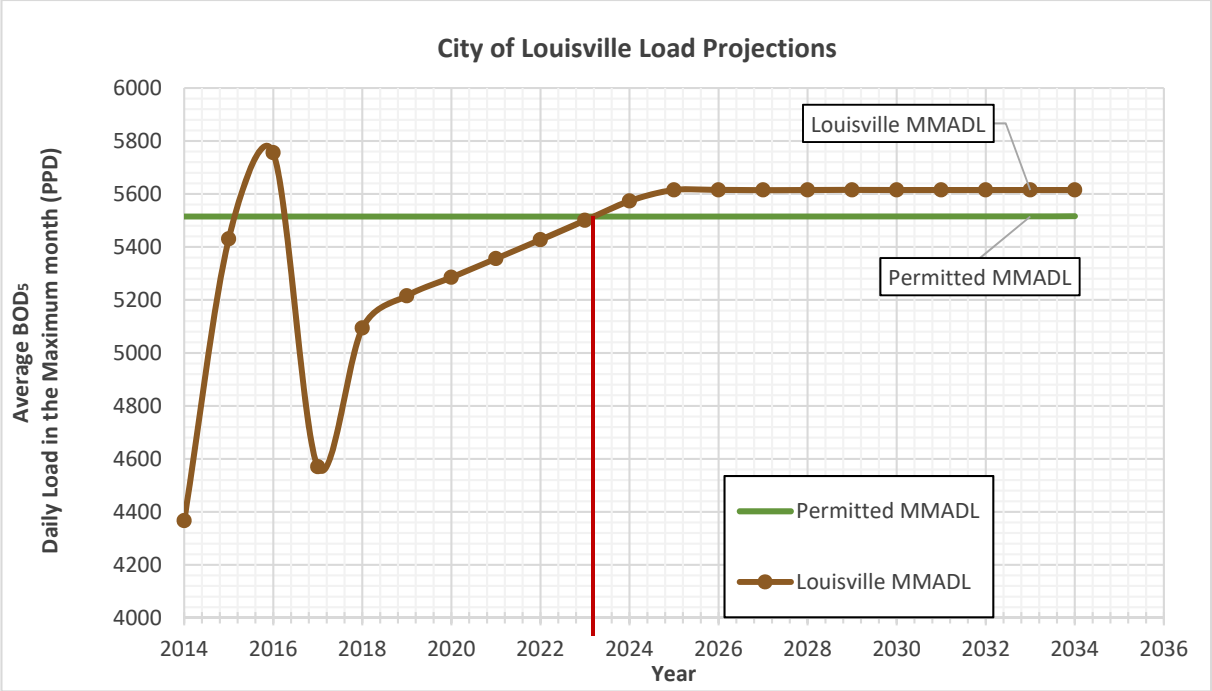

Figure 4 - Flow Data for City of Louisville WWTP from January 2015 through August 2019

Figure 4 shows a major swing in loading data in 2015 and 2016. This correlates with the discussion on flow changes and the commissioning of the expanded wastewater treatment plant. The average per capita BOD_5 loading per person for a municipality typically ranges between 0.18 and 0.22 pounds per

day. The historical BOD_5 loading at the City of Louisville is 0.207 pounds per day. This value was used in conjunction with population projections to calculate the max month BOD_5 load projections in **Figure 4**.

REDTAIL RIDGE DEVELOPMENT SUMMARY

Redtail Ridge is a multiuse development broken out into five parcels that are projected to be developed over four phases. Maps showing the respective parcels and their relative locations have been provided in other reports. **Table 4** provides a summary of the development by parcel, development type, and phase. In summary, Parcel A is senior living; Parcels B, D, and E are office space, and Parcel C is mixed use with office space, retail, hotels, and multifamily residences.

Table 4 – Redtail Ridge Development Summary by Parcel, Phase, and Type

Parcel	Type	Units	Phase 1	Phase 2	Phase 3	Phase 4	Total
A	Senior Living	Units	400	400	250		1,050
B	Office	square feet	500,000				500,000
C	Office	square feet		590,000	440,000		1,030,000
	Retail	square feet	10,000	15,000	20,000	25,000	70,000
	Hotel	Rooms	240				240
	Multifamily	Units	600	300			900
D	Office	square feet				390,000	390,000
E	Office	square feet	300,000		30,000		330,000

Note: Table 4 is an estimated phase and parcel breakdown based upon current data.

REDTAIL FLOW AND LOADS

Dewberry was hired to provide an existing capacity evaluation and evaluate the feasibility of adding flows and loads from the proposed Redtail Ridge Development. Four phases of development are planned. The timing of these developments is unknown at this time and are likely contingent on a number of factors.

Dewberry used the historical City of Louisville per capita wastewater flow and load values to estimate the flows and loads for the Redtail Ridge proposed development. HKS Engineering also provided a traffic planning study which included details of the proposed four phases of developments. Each phase of development includes residential and commercial zoning. Residential is comprised of continuing care retirement communities and commercial is comprised of general office buildings, business hotels, and shopping centers.

Dewberry developed a range of projections anticipating low, mid, and high level growth. These projections were developed from several commonly accepted literature sources, historical population and flow and load data in Louisville, and state and county regulations. **Table 5** summarizes our engineering assumptions:

Table 5 – Flow and Loading per Capita Contribution Assumptions

Commercial or Residential Units	Flow per Unit per Day	BOD^5 per Unit per Day
Residences or Continuing Care Retirement Community[1], flow per capita, BOD per capita	90	0.207
Shopping Center, gal/ft^2, lb BOD/ft^2	0.38	0.001
Business Hotel, gal per day person, lb BOD per person	45	0.15
General Office, gal/day-person, lb BOD/day-person	20	0.05

[1]*City of Louisville Historical Data*

Table 5 above includes the assumptions for per capita contributions for commercial and residential units. The 90 gallons per capita day flow per unit (gpcd) and 0.207 pounds per unit (PPD) is based on historical wastewater flows and loads.

Table 6 provides projection assumptions for low, medium, and high flow contributions. These projections assumptions were adjusted based on U.S. Census Bureau Data and typical office space per person in the Denver metropolitan area.

Table 6 – Flow and Loading per Capita Contribution Assumptions

Commercial or Residential Unit Assumptions	Low	Medium	High
Residents per Unit[1]	2	2.5	3
Hotel Occupants per Unit	1	1.5	2
Office Space sq ft/person	350	300	250

Table 6 above is instrumental for development of low, medium, and high flow and load projections. The assumptions relate to population density. The City of Louisville has an average of 2.45 residents per dwelling per the U.S. Census Bureau. Typical hotel rooms generally have 1 to 2 occupants per night per room. Office space per person is based on the assumption of a 15 foot wide by 15 foot long office with accounting for common space use such as conference room space, hallways, restrooms, stairwells, breakrooms, kitchens, and shipping and receiving areas.

The results of this flow and load are included in the following tables. **Tables 7 and 8** provide low, medium, and high flow and load estimated projections associated with the Redtail Ridge Development.

Table 7 Redtail Ridge Flow Projections

Flow	ADF, GPD			MMF, GPD		
	LOW	MID	HIGH	LOW	MID	HIGH
Phase 1	240,314	298,333	359,400	302,796	375,900	452,844
Phase 2	165,414	202,533	241,900	208,422	255,192	304,794
Phase 3	80,600	96,517	114,300	101,556	121,611	144,018
Phase 4	30,643	34,167	39,100	38,610	43,050	49,266
SUM	**516,971**	**631,550**	**754,700**	**651,384**	**795,753**	**950,922**

Note: ADF = average day flow, MMF = average day in max month flow, gpd = gallons per day

Table 8 Redtail Ridge Load (BOD_5) Projections

LOAD	ADL, PPD			MML, PPD		
	LOW	MID	HIGH	LOW	MID	HIGH
Phase 1	623	771	931	747	925	1,117
Phase 2	389	476	568	467	571	681
Phase 3	194	231	273	232	277	328
Phase 4	78	87	99	93	104	119
SUM	**1,283**	**1,564**	**1,870**	**1,540**	**1,877**	**2,245**

Note: ADL = average day load, MMF = average day in max month load, ppd = pounds per day

Tables 7 and 8 includes estimated flow projections from Redtail Ridge ranging from 0.51 to 0.95 mgd for the maximum month. The maximum month organic loading from Redtail Ridge ranges from 1,540 to 2,245 ppd. The Louisville WWTP is currently rated for 2.53 MGD maximum month flow and 5,515 ppd of BOD_5. Four phases of development would consume approximately 26 percent to 38 percent of rated hydraulic capacity and 28 percent to 41 percent of rated biological capacity, both on a maximum month basis. Additionally, the projected mid range flows for each parcel by phase are shown in **Table 9**.

Table 9 Redtail Ridge Mid Projection

Parcel	Type	Phase 1	Phase 2	Phase 3	Phase 4	Total
A	Senior Living	90,000	90,000	56,250	0	**236,250**
B	Office	33,333	0	0	0	**33,333**
C	Office	0	39,333	29,333	0	68,667
	Retail	3,800	5,700	7,600	9,500	26600
	Hotel	16,200	0	0	0	16,200
	Multifamily	135,000	67,500	0	0	202,500
	Parcel S Subtotal	155,000	112,533	36,933	9,500	**313,967**
D	Office	0	0	0	26,000	**26,000**
E	Office	20,000	0	2,000	0	**22,000**
Mid Projected Average Day Flow, gpd						**631,550**

The facility has a current flow and load on an annual average basis of 1.8 mgd and 4,334 pounds per day (ppd) BOD_5 with a max month flow and load of 2.0 mgd and 4,850 ppd, or 80 percent and 88 percent, respectively. The Louisville WTTP periodically exceeds the CDPHE 80 percent capacity planning criteria threshold, but previous planning was for infill only and included only the previous contribution from the area now known as the Redtail Ridge development. The projected wastewater flows and loads from the Redtail Ridge development will exceed the City of Louisville's current rated wastewater treatment capacity and will require improvements to increase the capacity of the WWTP. The infrastructure improvements required are discussed in Technical Memorandum 2.

Dewberry

TECHNICAL MEMORANDUM 2

Date: April 17, 2020

To: City of Louisville, Brue Baukol

From: Patrick Radabaugh, PE - Dewberry Engineers Inc.

Sam Franzen, PE – Dewberry Engineers, Inc.

Subject: City of Louisville and Redtail Ridge Wastewater Pumping and Treatment Infrastructure – Subject to Revision

INTRODUCTION

Redtail Ridge, a proposed development in southeastern Louisville, will produce a projected 631,550 gallons per day (annual average) at a projected peak hour flow of 2 million gallons per day at completion of their four phase buildout plan. A breakdown of the projected flows and loads by Phase is provided in the "City of Louisville and Redtail Ridge Development Flows and Loads" Technical Memorandum 1.

The intent of this technical memorandum (TM) is to identify the pumping and treatment infrastructure needed for the Redtail Ridge development to (1) lift the wastewater produced in the development into the City's collection system and (2) the treatment infrastructure needed at the City's Wastewater Treatment Plant (WWTP) to treat the developments wastewater. This TM includes the following:

- Capacity evaluation of existing WWTP
- Proposed list of wastewater pumping and infrastructure needs
- Preliminary opinion of probable construction costs
- List of regulatory requirements including duration of effort
- Preliminary project design and construction schedule (including regulatory requirements)

WWTP Capacity

The City of Louisville recently upgraded their WWTP to a biological nutrient removal (BNR) facility that is rated for 2.53 million gallons per day (mgd) and 5,515 pounds per day (ppd) of BOD_5. The improvements at the WWTP included several items to improve resiliency at the WWTP by providing redundancy for key pieces of process equipment. This allows Plant Operations staff the flexibility to address maintenance needs while still providing full treatment and allows the Staff to perform proactive preventative maintenance to reduce the potential of emergency repairs.

The WWTP consists of a headworks, secondary treatment, tertiary (reuse) filtration, ultraviolet (UV) disinfection, and solids handling. The headworks includes mechanical and manual bar screens, grit removal, grit washing, and influent flow measurement. After the headworks, the wastewater enters the influent lift station that pumps the wastewater up into the secondary process. The secondary process includes Johannesburg treatment trains, a pump station [with return activated sludge (RAS), waste activated sludge (WAS), internal mixed liquor return (IMLR), and scum pumps), blowers, secondary clarifiers, and a backup alum system. Solids handling processes consist of a rotary drum thickener (for

WAS thickening), aerobic digestion, and centrifuge dewatering. A process flow diagram for the WWTP is provided in **Figure 1**.

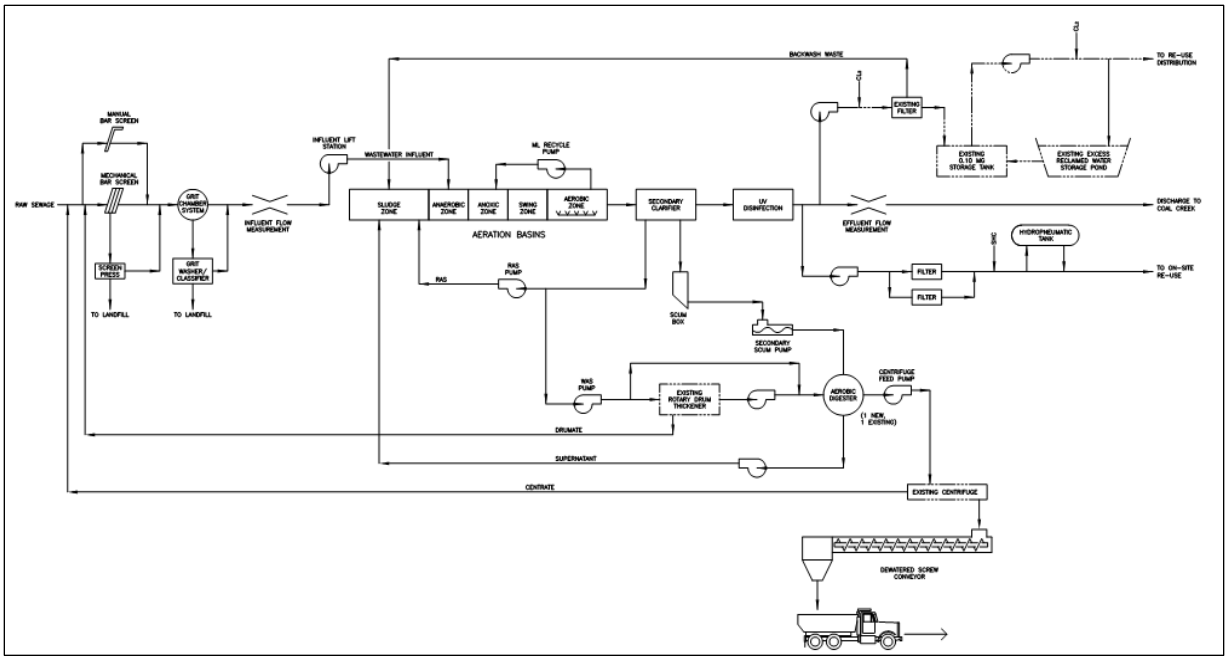

Figure 1 - City of Louisville WWTP Process Flow Diagram

The results of the capacity analysis are provided in the attached **Table 1**. **Table 1** is broken down into the various unit processes at the WWTP: headworks, influent lift station, secondary process, disinfection, solids handling, and reuse. A brief summary of the information in **Table 1** by unit process is in the bullet list below.

- **Headworks.** The headworks consists of screens, grit removal and handling, and influent flow measurement. All installed equipment has sufficient capacity to handle the projected flows and additional flows and loads from the Redtail Ridge development.
- **Influent Lift Station.** The influent lift station was designed to accommodate only the projected flows and loads listed in the 2014 Facility Plan. The additional flows from the Redtail Ridge development exceed the projected flows and loads for all future City development and will require construction of a new lift station.
- **Secondary Process.** This unit process consists of Johannesburg treatment process, secondary clarifier, and process equipment. The existing facility was designed to require the operation of all three treatment trains at the projected City of Louisville buildout conditions (2014 WWTP Facility Plan). The projected additional flows and loads from Redtail Ridge will exceed the current capacity of the secondary process and City's desired level of redundancy.

- **Disinfection.** The WWTP currently utilizes ultraviolet (UV) disinfection. This unit process currently has double redundancy; it has redundancy in each channel (one redundant module per channel) and a redundant channel. If this desired level of redundancy is desired to be maintained, the system will need to be upgraded.
- **Solids Handling.** Solids handling includes WAS thickening with a rotary drum thickener (RDT), aerobic digestion, and biosolids dewatering via centrifuge. The current thickening and dewatering processes do not utilize all of their respective capacity but have no redundancy. With the additional flows and loads from Redtail Ridge, additional burden will be placed on operations staff due to the lack of redundancy and these processes should be expanded to improve redundancy. The aerobic digester only has capacity for the current projected buildout flows; the sludge storage tank provides additional biosolids storage prior to dewatering. The additional wastewater flow and load from Redtail Ridge exceed the projected flows and loads for all future City development and would require construction of additional digester space.
- **Reuse.** The reuse system consists of feed pumps, filters, and distribution pumps. The current system is maxed out during the summer irrigation season and will require additional pumping and filtration infrastructure if Redtail Ridge desires to reuse water for irrigation.

Wastewater Pumping and Treatment Infrastructure Needs

The following wastewater pumping and treatment infrastructure will be needed to pump and treat the projected wastewater flows and loads from Redtail Ridge into the City's collection system and WWTP.

- Lift station at the development capable of pumping a peak hour capacity of 2 mgd.
- Lift station at the WWTP (downstream of the headworks and upstream of secondary process) with a peak hour capacity of 6.6 mgd (existing peak hour flow of 4.58 mgd + 2 mgd from Redtail Ridge)
- Johannesburg process basin matching existing to be located adjacent to train 3.
- Secondary clarifier matching existing.
- Process equipment including one RAS pump, one WAS pump, scum pumps, one IMLR pump, diffusers, and instrumentation to match existing. No additional structures will be needed; all equipment will be in existing structures or in the new process basin.
- Aerobic digester to match existing. New digester will provide capacity and storage to match the current operations of digestion and storage. Projected flows and loads from Redtail Ridge will account for approximately 1/3 of the volume of the new digester. The remaining volume will serve as "storage volume" or as additional capacity.

The following infrastructure is needed to address redundancy concerns that arise of the additional wastewater flow and load from the proposed Redtail Ridge development.

- **UV Disinfection.** The existing system has double redundancy (modules and channels). If the regulatory required redundancy is followed (redundant channel), no upgrades are required. If the

current level of redundancy is desired, channel modifications and new UV equipment will be required. Per discussion on February 5, 2020, the regulatory redundancy requirement is sufficient and the City will not require the double redundancy requirement on UV disinfection.

- **WAS Thickening.** The increase in flows and loads will place increased demands on operations staff and will increase the need for redundancy in WAS thickening. WAS thickening is required to minimize aerobic digester size, e.g. lower concentration of WAS solids requires an increased digester volume. To address this need, it is recommended a redundant RDT and TWAS pump be installed at the WWTP. Alternatively, the digester contents could be thickened in the digester via settling and decanting off the supernatant. Infrastructure for settling and decanting will require less capital cost, but would be significantly more costly to operate due to the additional man power required.
- **Biosolids Dewatering**. Like WAS thickening, the WWTP lacks redundancy in the dewatering process. With an increased load coming into the WWTP from Redtail Ridge, there will be an increased burden on Plant Staff to maintain the current level of operations which will reduce the maintenance opportunities. Due to the importance of this process on plant operations, it is recommended that a redundant dewatering unit be installed at the WWTP. This will require a new structure. The new structure would contain two new centrifuges, outdoor truck discharge, and conveyor system. This dewatering will be similar to the City's existing dewatering process.
- **Reuse.** The existing Reuse system (pumping and filtration) is maxed out at the City's current projected reuse demands. If Redtail Ridge desires to utilize reuse water for irrigation, the current reuse pumping and filtration systems will need to be upgraded as well as the extension of the system to Redtail Ridge (reuse distribution is beyond the scope of this memo). Redtail Ridge will not be utilizing reuse water for irrigation and no infrastructure improvements will be required as a result of the Redtail Ridge development.

Preliminary Opinion of Probable Construction Costs

Table 2 below presents planning level preliminary opinion of probable construction cost for the improvements listed in the previous section. Our construction cost opinions are based on the quantities of raw materials, construction labor, major equipment, supplies, excavation, and contractor's markup for overhead and profit. Dewberry developed opinions of probable construction from recently completed projects, published literature, and equipment manufacturer's quotations.

The itemized opinion of probable construction cost contain contingencies to allow for unknown or uncertain conditions. At present, many project components and details cannot be determined. The contingency factor accounts for hidden or unknown physical conditions such as conflicting utilities and construction details which cannot be identified, predicted, or accurately estimated but are likely to occur based on experience with similar projects. Contingencies vary with the level of detail associated with the planning, budgeting, or design process. As a project becomes more defined, unknowns are identified and contingency factors decrease. The construction cost estimates represent Class IV estimate as defined by the American Association of Cost Engineers (AACE) with a relative accuracy of minus 30 percent to plus 50 percent. The level of accuracy will improve as the project progresses from planning into design.

Based on the current level of uncertainty associated with this project, a contingency factor of 25 percent of estimated construction costs has been assumed. Cost factors given in **Table 2** have been added to the materials and equipment costs to develop total project costs for each alternative.

Table 2 Cost Factors Used to Develop Preliminary Opinion of Probable Construction Cost

Cost Factor	Percent of Construction	Description
Mobilization/ demobilization	3	Contractor cost
Contractor overhead & profit	15	Markup on subcontracts, materials, & labor
Bonding and insurance	2	Contractor cost
Contingencies	25	Unknown conditions & conflicting utilities
Planning, Engineering, and Administration	18	Planning, design, survey, geotechnical investigation, construction observation, training, O&M manual, startup services

A summary of preliminary estimate of probable construction costs by unit process is provided in **Table 3**. As shown in **Table 3**, the preliminary estimate of probable construction costs for all the infrastructure improvements listed in this TM is $20.1 million while the estimated total project cost is $23.8 million. Total project costs include planning, design engineering, geotechnical, regulatory review costs, construction oversight and engineering services, startup, training, and operation and maintenance manual preparation.

Table 3 Preliminary Opinion of Probable Construction Cost and Total Project Costs

Item	Preliminary Opinion of Probable Construction Cost	Total Project Cost
Required Infrastructure		
Offsite Lift Station	$3,083,000	$3,638,000
WWTP - Lift Station	$1,978,000	$2,334,000
WWTP - Johannesburg Process	$3,965,000	$4,679,000
WWTP - SPPS	$679,000	$801,000
WWTP - Secondary Clarifier	$1,979,000	$2,335,000
WWTP - Aerobic Digester	$3,370,000	$3,997,000
Subtotal	**$15,054,000**	**$17,764,000**
Infrastructure That Addresses Redundancy Or Other Needs		
WWTP - RDT	$795,000	$938,000
WWTP - Dewatering	$4,288,000	$5,060,000
Subtotal	**$5,083,000**	**$5,998,000**
Infrastructure Required WWTP Infrastructure	**$20,137,000**	**$23,762,000**

Table 3 Clarifications and Notes

Table 3 lists planning level construction and total project costs for the offsite lift station (no conveyance costs included) and additional treatment infrastructure required at the WWTP to accommodate the projected wastewater flows and loads from Redtail Ridge (see TM1). Below are additional notes to clarify the infrastructure improvements.

- The required improvements in Table 3 will increase the capacity of the WWTP to 3.53 mgd and 8,968 ppd (5,515 ppd current, 1,211 ppd from train 3 currently not included in permitted capacity, and 2,242 ppd from new train 4 for Redtail Ridge) of BOD_5. Final permitted capacity may vary slightly and will be determined prior to submission of the site application.
- BOD_5 capacity is based upon information presented in the Process Design Report for the original improvements. New data (influent and operational) will be incorporated into the process model during design to determine if BOD_5 capacity per train can be increased.
- With the improvements, the WWTP would have approximately 0.2 mgd and 365 ppd BOD_5 in excess capacity in the secondary process (aeration basins, secondary clarifiers, and SPPS equipment) that will go unused by Redtail Ridge. Under max month conditions, the Redtail Ridge development is projected to produce 0.8 mgd and 1,877 ppd BOD_5 while the capacity of a secondary treatment train is 1 mgd and 2,242 ppd BOD_5.
- The new digester will match size and dimensions of the existing for ease of operations. The size of the new aerobic digester will exceed the volume required to accommodate projected Redtail Ridge flow and loads. The additional volume will replace the existing sludge storage tank volume (0.56 million gallons) and will provide an additional volume (e.g. excess capacity) of 0.3 million gallons.
- The UV system currently has double redundancy; it has redundancy in the number of modules per channel and the number of channels. Even with the projected flows from Redtail Ridge, no expansion or modification of this system would be required to meet regulatory redundancy requirements.
- WAS Thickening with RDTs is recommended for inclusion. Incorporation of an RDT has a higher capital cost than manual digester decanting, but significantly lower operation and maintenance cost.
- The proposed dewatering system includes two new centrifuges, polymer system, conveyors, and an outdoor truck bay. If an indoor truck back for loading biosolids is desire, the construction cost will increase by $1 million.

List of Regulatory Requirements Including Duration of Effort

The infrastructure improvements will require two separate regulatory review processes: (1) for the offsite lift station and force main, and (2) for the WWTP improvements. The offsite lift station and WWTP improvements have similar regulatory review processes with a couple of minor differences. The two differences are that (1) the WWTP will require a preliminary effluent limit (PEL) request prior to submitting the site application and (2) the WWTP requires a process design report (PDR) while the lift station will required a basis of design (BDR) report. The WWTP site application (with the PEL request) can be a

long duration item and can impact the project schedule. **Table 4** provides a summary of preparation and review time for each regulatory submittal.

Table 4 Regulatory Review Periods for Offsite Lift Station and the WWTP Improvements

Item	Preparation Time, days	Regulatory Review, days	Total Estimated Time, months
Request Preliminary Effluent Limits	7	60	2.5
Site Application (22.5 for WWTP and 22.7 for Lift Station)	21	60 - local agency review 67 - CDPHE	5
Basis of Design Report (Offsite Lift Station)	30	60	3
Process Design Report (WWTP Improvements)	60	60	4

Note: Dewberry will either perform a streamlined review of the final design documents or will self-certify the design. This steps eliminates a 60 day regulatory review period of the final design documents.

Preliminary Project Design and Construction Schedule

A preliminary project schedule is summarized in **Table 5**. As shown in **Table 5**, the total project duration for the offsite lift station is 25 months while the total project duration for the WWTP improvements is four years (48 months). This project duration could be reduced if alternative delivery is incorporated.

Table 5 Preliminary Project Schedule

Item	Duration, Months
Offsite Lift Station	
Site Application (prep and CDPHE review)	(5) Five Months
30 Percent Design	(2) Two Months
Basis of Design Report	(3) Three Months
Remainder of Design	(6) Six Months
Total Design (Site App, Design, BDR)	(10) Ten Months (requires sequencing of regulatory deliverables)
Bidding	(3) Three Months
Construction	(12) Twelve Months
Total Project Duration	(25) Twenty Five Months
WWTP Infrastructure	
PEL	(2.5) Two and one-half months
Site Application	(5) Five Months
30 Percent Design	(4) Four Months
PDR (prep and regulatory review)	(4) Four Months

Remainder of Design	(12) Twelve Months
Total Design (PEL, Site App, PDR, Design)	(20) Twenty Months (requires sequencing of regulatory deliverables)
Bidding	(4) Four Months
Construction	(24) Twenty Four Months
Total Project Duration	(48) Forty Eight Months

The offsite lift station will need to be the first new piece of infrastructure constructed. It will need to be constructed and operational prior to completion of any occupied structures in Redtail Ridge.

The Redtail Ridge development currently includes four phases. The development for each phase was recently revised and it impacted the flow and load projections (see Tables 6 and 7 of TM1). The revised development plan increased the projected flows in Phase 1 to 0.38 mgd (up from 0.17 mgd). The projected wastewater flow from Phase 1 would result push the WWTP to operating near capacity. Therefore, it is recommended that the improvements at the WWTP be designed and constructed concurrently with the Redtail Ridge Phase 1 development improvements.

Summary

Dewberry has provided this memorandum to inform the City and the Developer about the existing capacity of the City's WWTP and its ability to accommodate future wastewater flow and loads from the proposed Redtail Ridge development. This memorandum covered the following topics:

- Capacity evaluation of existing WWTP
- Proposed list of wastewater pumping and infrastructure needs
- Preliminary opinion of probable construction and total project costs
- List of regulatory requirements including duration of effort
- Preliminary project design and construction schedule (including regulatory requirements)
- All WWTP improvements will need to be designed and constructed concurrently with the Redtail Ridge Phase 1 development improvements.
- Additional input is needed in regards to the desired dewatering improvements.

The total time of regulatory reviews is nearly 14.5 months and reviews are sequenced in the order of completion. The estimated construction cost for a new lift station and for additional infrastructure required is approximately $23.8 million dollars. The schedule includes 25 months for the offsite lift station and 48 months for the WWTP expansion.

Table 1 City of Louisville WWTP Capacity Analysis by Unit Process

Unit Process	Total No. of Units	Units in Operation	Capacity per Unit	Firm Capacity	City Desired Redundancy	Regulatory Required Redundancy	Total Capacity	Units	Permitted Capacity	Current Average Use (see Units)	Percent Permitted Capacity Currently Utilized	At Buildout, percent permitted capacity utilized	Comments
HEADWORKS													
Screens													
Mechanical Screens	2	1	4.6	9.20	4.6		9.2	MGD					
Manual Bar Screen	1	1	10	10			10	MGD					Manual bar screen is the redundancy for the mechanical bar screen
Screens Total	3	1	see above	9.2	9.2	4.6	9.2	MGD	4.58	1.8	42%	50%	Screens are sized based upon peak hour flows.
Grit System	2	1	4.6	4.6	4.6	N/A	9.2	MGD	4.58	1.8	42%	50%	Not required by CDPHE, but recommended.
Flow Measurement - Flume	1	1	10.41	10.41	0	Effluent Flume	10.41	MGD	4.58	1.8	38%	44%	Flow measurement is sized based upon peak hour flows
INFLUENT LIFT STATION													
Sewage Lift Pumps	5	4	795	3,180	795		3,975	gpm		1.8	85%	100%	Peak hour flow
SECONDARY PROCESS													
Aeration Basins	3	2	1.27	2.54	1.27		2.53	MGD	2.53	0	0%	100%	
	3	2	2,242	5,515	1,211		5,515	ppd BOD	5,515	4,502	82%	100%	
Secondary Clarifiers	3	2	1.27	2.54	1.27		2.53	MGD	2.53	1.8	71%	100%	
Alum System	3	3	2.28	4.56	2.28	Bio P removal	6.84	MGD	4.58	3.91	86%	67%	
DISINFECTION													
Modules	3	2	2.3	4.6	2.3	4.56	6.9	MGD	4.56	3.91	86%	100%	Peak hour flow
Channels	2	1	6.9	6.9	6.9	4.56	6.9	MGD	4.56	3.91	86%	100%	Peak hour flow
UV Total	2 channels	1	6.9	6.9	6.9	4.56	6.9	MGD	4.56	3.91	86%	100%	Peak hour flow
Flow Measurement - Flume	1	1	10.41	10.41	0	Influent flume	10.41	MGD	4.56	1.8	38%	44%	Peak hour flow
SOLIDS HANDLING													
Aeration Digester													
Aerobic Digester 1 (Flow Equivalent)	1	1	2.53	2.53	1.2	Dewater and landfill	2.53	MGD	2.53	1.8	71%	100%	Flow equivalent basis. Current Digester has capacity to handle current permitted capacity.
Sludge Holding Basin (Aerobic Digester 2 Flow Equivalent)	1	1	1.2		SHB is digester City Desired Digester Redundancy		1.2	MGD	1.2	1.8			Flow equivalent basis.
Thickening and Dewatering													
Rotary Drum Thickener	1	1	200	0	200	Not Required	200	gpm	200	50	25%	50%	Units are gpm. There is no backup unit. City desires redundancy
Centrifuge	1	1	100	0	110	Not Required	110	gpm	110	110	50%	75%	Units are hours per day. Currently dewater 3 days per week. There is no backup unit. City desires redundancy.
REUSE													
Filter	1	1	1,400	0	200	Not. Required	1	gpm	1,400	700	50%	100%	Operating capacity of filter is truly only about 1 MGD.
Pumps	2	2	1,400	700	700	Not. Required	110	gpm	700	700	100%	100%	

Note: Buildout as defined in the 2014 Facility Plan.

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