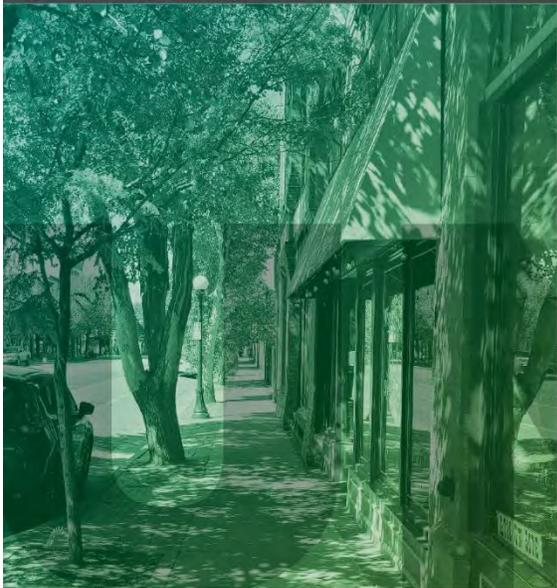
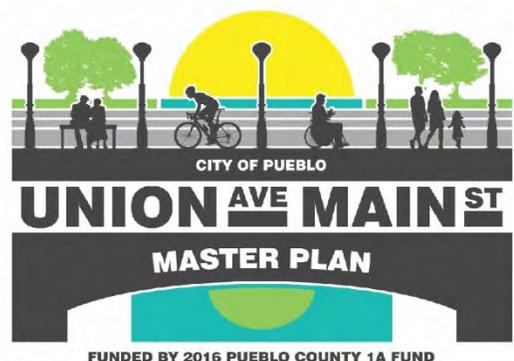


MASTER PLAN DESIGN FOR UNION AVENUE AND MAIN STREET



JUNE 2021





ACKNOWLEDGMENTS

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STAKEHOLDER GROUP

The City would like to express sincere gratitude to those who participated in the stakeholder group for this project, including business owners along Union Avenue and Main Street. The members of the stakeholder group provided invaluable feedback and resources to help create a highly feasible and implementable Master Plan that responded to the needs of the community. Thank you again for your continued support.



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EXECUTIVE SUMMARY

The Master Plan Design for Union Avenue and Main Street (Master Plan) articulates a strong vision for both Union Avenue and Main Street in Pueblo, Colorado. These two separate but integrated corridors are located in Downtown Pueblo. They are considered collectively throughout this Master Plan creating a unified approach to the area, capitalizing on the mutual benefits, and fostering an enhanced experience for locals and tourists. Although this Master Plan was developed highlighting the two corridors as complementary, each one brings their own value and unique character as separate roadways and are fully represented individually throughout this planning document.

This Master Plan contains a creative and transformative vision for the future of Union Avenue and Main Street while simultaneously ensuring the proposed projects are realistic and attainable for the City of Pueblo.

This planning initiative is funded by the **2016 Pueblo County 1A Fund**. The project goals specifically identified in the funding agreement include **pedestrian access, parking options, and streetscape improvements**. The proposed designs presented in this document focus explicitly on these three factors and seek to support economic vitality, strong social connections, and a healthier environment for Pueblo residents.

STUDY AREA

The Study Area includes both corridors, **Union Avenue and Main Street**. The Study Area for Union Avenue spans from City Center Drive to Abriendo Avenue and Main Street stretches from City Center Drive to C Street.

VISION & GOALS

The vision and goals for this Master Plan highlight the significance of prioritizing economic development, placemaking, streetscape, and multiple modes when recommending improvements for the Study Area, collectively developed to create a prosperous and flourishing downtown. These complimentary elements are embedded throughout the Master Plan.



0 0.13 0.25 Miles



UNION AVENUE

OVERVIEW OF CORRIDOR & PRIORITIES

Public and stakeholder engagement efforts provided insight on both the opportunities and challenges for the corridor. Overall, the public expressed the following for Union Avenue:

- A strong desire for enhanced **placemaking** and **walkability**
- Residents use Union Avenue primarily as a place to **shop and dine**
- **Outdoor seating, slower vehicle speeds, and wider sidewalks** were identified as opportunities to make Union Avenue more enjoyable

MASTER PLAN RECOMMENDATIONS

The collection of input throughout the planning process from the public and stakeholders, including business owners along Union Avenue, led to the creation of a Master Plan. The Master Plan aligns with the overall vision and goals, integrating the preferred alternative for Union Avenue which includes a **two-lane roadway with sharrows for bicyclists, parallel parking, expanded sidewalk/café zone area, and enhanced streetscape**. The ultimate vision maximizes parking, improves pedestrian and bicyclist comfort, and provides ample opportunities for more public spaces.





MAIN STREET

OVERVIEW OF CORRIDOR & PRIORITIES

Public and stakeholder engagement efforts provided insight on both the opportunities and challenges for the corridor. Overall, the public expressed the following for Main Street:

- A desire to **improve traffic flow**
- Residents use Main Street primarily as a place to **drive through**
- **Outdoor seating, more landscaping, and more public art** were identified as opportunities to make Main Street more enjoyable

MASTER PLAN RECOMMENDATIONS

The collection of input throughout the planning process from the public and stakeholders, including corridor users along Main Street, led to the creation of a Master Plan. The Master Plan aligns with the overall vision and goals, integrating the preferred alternative for Main Street which includes a **two-lane roadway with a center turn lane, bike lanes in each direction, expanded sidewalk/café zone area, and enhanced streetscape with additional parallel parking options**. The ultimate vision improves pedestrian and bicyclist comfort and provides more opportunities for parking and public spaces.





1 INTRODUCTION



1.1 OVERVIEW AND PLAN PURPOSE

The Master Plan Design for Union Avenue and Main Street (Master Plan) articulates a strong vision for Union Avenue and Main Street in Pueblo, Colorado. These two separate but integrated corridors are located in Downtown Pueblo. They are considered collectively throughout this Master Plan creating a unified approach to the area, capitalizing on the mutual benefits, and fostering an enhanced experience for locals and tourists. Although this Master Plan was developed highlighting the two corridors as complementary, each one brings their own value and unique character as separate roadways. Therefore, this Master Plan document has a full chapter dedicated to both Union Avenue and Main Street identifying the recommended improvements.

KEY ELEMENTS:

- Walkability
- Bikeability
- Economic Development
- Complete Streets
- Streetscape
- Placemaking
- Traffic Flow and Patterns
- Parking

Master Plan recommendations integrate the key elements listed here, and strive to create a transformative vision for the entire Study Area. All while simultaneously ensuring the proposed improvements for both Union Avenue and Main Street are realistic and attainable for the City of Pueblo.

As part of the planning process, sub-projects have been identified for each corridor, with the option for phased implementation as funding becomes available. Whether the proposed improvements are constructed all at once or over time, they are expected to bring lasting value to Downtown Pueblo for years to come.

The Master Plan is funded by the **2016 Pueblo County 1A Fund**. The project goals specifically identified in the funding

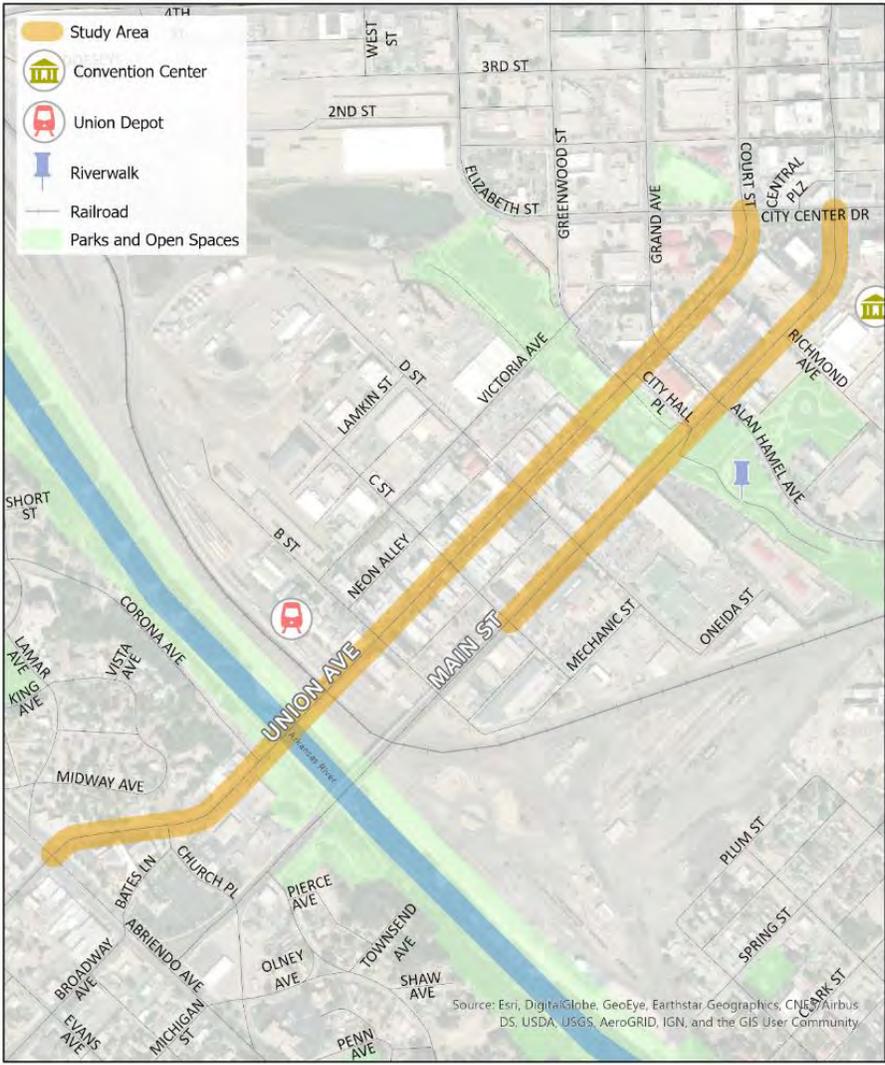
agreement include **pedestrian** access, **parking** options, and **streetscape** improvements. The proposed designs presented in this document focus explicitly on these key factors and seek to support economic vitality, strong social connections, and a healthier environment for Pueblo residents. Ultimately, the Master Plan leverages existing assets, cultivating a greater sense of place and drawing tourists and visitors alike to the area, while ensuring flexibility to respond to the unique circumstances of today and in the future.

STUDY AREA

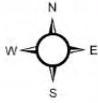
The Study Area includes both corridors, **Union Avenue and Main Street**. The Study Area for Union Avenue spans from City Center Drive to Abriendo Avenue, and Main Street stretches from City Center Drive to C Street. The Union Avenue corridor is within the Union Avenue Historic District, which is listed on the National Register of Historic Places. Both corridors are within the boundaries of the Pueblo Urban Renewal Authority (PURA), and provide connectivity opportunities to the Riverwalk Trail, Arkansas River Trail, and direct access to and from I-25 from City Center Drive.



Some of the key features along Union Avenue include vibrant local restaurants and retail shops, access to museums, Memorial Hall Theater, Neon Alley, and the Union Depot. Along Main Street there is the Pueblo Convention Center, City Hall, Pueblo Municipal Justice Center, as well as restaurants, hotels and parking garages, along with opportunities for future development. Both corridors play an important role in providing access to the Riverwalk.



0 0.13 0.25 Miles

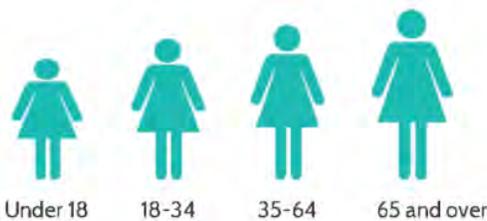




Beyond the physical boundaries of the planning area shown in the Study Area map, a **demographic snapshot** of local residents is presented here. Demographics help paint a picture of who lives in the area and how they are able to interact with Union Avenue and Main Street. Consideration of the area demographics, such as income, disability, vehicle ownership, and age can help build a more appropriate and effective set of recommendations for the corridors. There is also a high percentage of active adults in the area due to the location of the Active Adult Center and Apartments along Union Avenue.

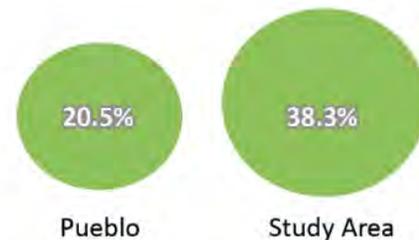
Community Profile

Age in Years



	Under 18	18-34	35-64	65 and over
Study Area	12.6%	21.7%	39.5%	26.3%
Pueblo	22.5%	24.2%	35.9%	17.5%

Percentage of Persons with a Disability



Vehicles Available by Household



Median Household Income



Source: American Community Survey (ACS) 5-Year Estimates (2015)



1.2 PUBLIC & STAKEHOLDER ENGAGEMENT

This project placed the community at the center of its engagement efforts by working with the most valuable resource – the people living, working, and traveling in and around the Study Area. The planning process identified critical needs and helped garner support from the community for this project by deploying a collection of engagement methods to collaboratively and actively engage residents, local businesses, and property owners within and surrounding the Study Area.

Consensus was built among a wide variety of stakeholders for improvements to the Union Avenue and Main Street corridors. Public input activities primarily focused on identifying the overall vision and goals, specifying opportunities and challenges, and prioritizing design elements to inspire transformational change to the two separate corridors, as well as the entire Study Area.

Some of the stakeholders involved throughout the duration of the planning process consisted of:

- Study Area business owners
- Study Area residents
- Corridor users
- General public
- Pueblo Downtown Association
- Pueblo Urban Renewal Authority
- City Administration and Staff
- Pueblo City Council
- Planning and Zoning Commission
- Pueblo County Board of County Commissioners

Due to the **COVID-19** pandemic, several accommodations were made to ensure the overall health and safety for participants including hosting virtual online meetings using the Zoom platform with call-in options. Although only providing online options is not an ideal method for collecting public input, it still provided a genuine experience for the community to be involved in the project and to share their input in a comfortable and safe environment. Public meeting presentation slides and recordings were made available on the Project Website to ensure additional opportunities for input to those who were unable to attend the scheduled events. Spanish translation services were also offered to improve access and reach a wider audience.



PUBLIC AND STAKEHOLDER MEETINGS

A total of two (2) Public Meetings and four (4) formal Stakeholder Sessions were held to share updates on the project, establish vision and goals, gather feedback on overall challenges and opportunities, and present recommended design ideas for the Study Area and the two individual corridors, respectively. The **Public Meetings** were beneficial to engage a wider audience and a more diverse group of people. Both public meetings were well attended, and the public was encouraged to share input and ask questions. Those who participated in the **Stakeholder Group** were integral in providing support, guidance, and oversight of project progress throughout the planning process. Stakeholders served as project champions to help spread the word about the project and share their day-to-day experiences as within the Study Area. During all the public and stakeholder meetings and sessions, participants also engaged in online interactive polling activities which helped energize the discussion and ensure all voices were included.



BUSINESS OWNER OUTREACH

The City of Pueblo also solicited feedback from individual business owners, primarily along Union Avenue, regarding their preference for several alternative layouts prior to finalizing the design recommendations for the corridors. This targeted outreach engaged adjacent business owners in a meaningful way to ensure improvements along Union Avenue and Main Street responded to existing and future needs. This also provided an opportunity to understand their desire for installing parklets in front of their business to expand outdoor seating areas during and following the pandemic. The recommendations specific to Union Avenue that came out of this effort include parallel parking with the idea that parklets could be implemented under these conditions.

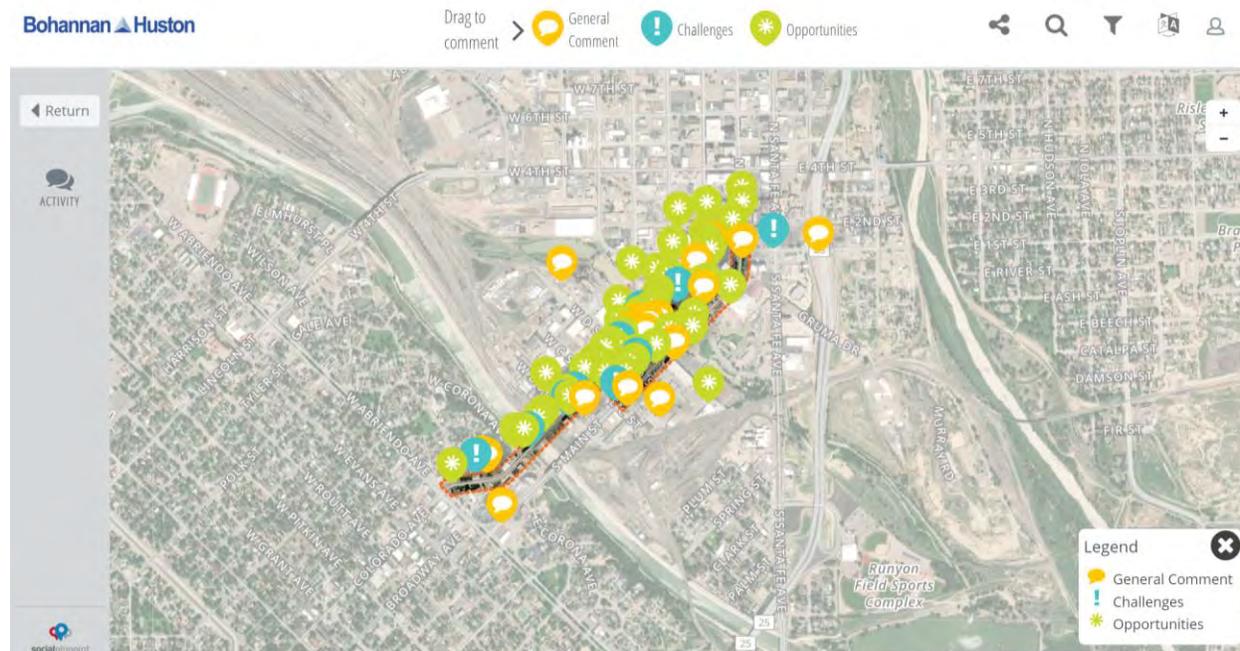
Additional outreach to local business owners throughout the planning process included telephone and in-person conversations as well as email communication.

PROJECT WEBSITE

The Project Website was made publicly available from April 2020 to May 2021 and had approximately 1,500 unique visitors. The website described the project overview, Study Area, funding requirements, materials from previous meetings, and provided opportunities to complete online questionnaires and engage in the online interactive map. Refer to the corresponding sections below for more information on these methods of engagement. The website was updated regularly with meeting invites and materials and input opportunities as the project progressed. All comments collected through this online tool were captured and considered as the Master Plan recommendations were developed.

ONLINE INTERACTIVE MAP

As an integral component of the Project Website, an online interactive map was made available for the public to identify challenges and opportunities at specific locations along the two corridors. The tool asked users to drag and drop icons at specific locations and interact with others who participated, as desired. The interactive map had almost 200 comments from community members.



ONLINE QUESTIONNAIRES

Throughout the planning process, various online questionnaires were provided on the Project Website for the public to share their input. The first questionnaire focused on the overall vision for the Union Avenue and Main Street corridors with questions on how people typically use the corridor, ideas to make their experience more enjoyable, ranking of priorities, and what would make it a great place. The second questionnaire focused on specific design preferences for the two corridors, including choices



between having a separated bike path or shared-use path on Union Avenue and maintaining the center turn lane or widening the sidewalk area along Main Street. This second questionnaire also gave the public the opportunity to select their favorite corridor idea presented during the first public meeting. For further discussion on corridor ideas, refer to Chapters 2: Union Avenue Corridor and Chapter 3: Main Street Corridor.

MARKETING AND SOCIAL MEDIA

In addition to the abundance of activities mentioned previously, a considerable amount of social media and marketing efforts were deployed to promote the study and disseminate information to a wider audience. The City and County Public Information Officer's provided ample support to successfully reach the broader community through the well-established social media platforms for both entities, via community member contact lists, local newspapers, and other regularly-scheduled events.

Marketing and social media efforts for the project consisted of the following:

- Established a project logo
- Applied consistent branding throughout the entirety of the process
- Distributed flyers in person to local businesses
- Posted flyers and information online on the Project Website
- Posted on the City, County, and PACOG's websites throughout the duration of the project
- Announced the study during local organizational events including PURA, Pueblo Greater Chamber of Commerce, Pueblo Active Community Environments (PACE), and more
- Featured in the Pueblo Downtown Association Newsletter in May of 2020
- Public Meeting advertisements placed in the Pueblo Chieftain
- Featured in various news outlets including the Pueblo Chieftain and Colorado Public Radio (CPR)

WE WANT TO HEAR FROM YOU

Visit our project website below to share your input! On the website, you can:

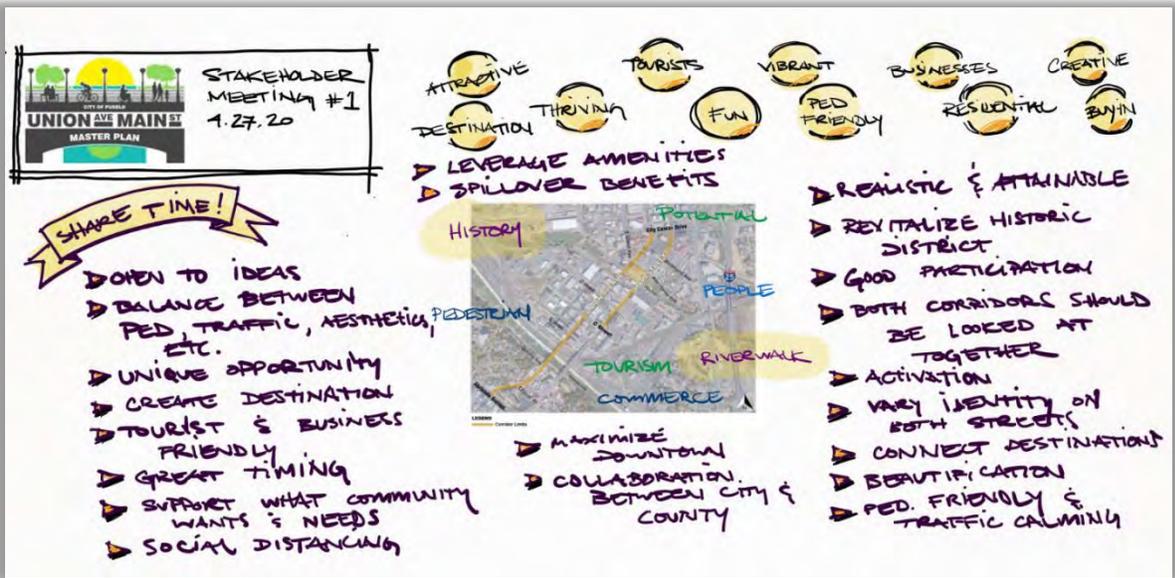
- Complete the new questionnaire on corridor elements and ideas.
- Use the interactive map to identify opportunities and challenges of specific areas along the two corridors.

COMMENTS OR QUESTIONS?
Use the project website or send an email to the email address below at any time to contact the project team!

<https://bhi.mysocialpinpoint.com/union-main> ♦ UnionMain@bhinc.com

PUBLIC & STAKEHOLDER INPUT

Despite being entirely virtual, outreach activities were fun and engaging. It was obvious that the stakeholders and public really care about the future of Union Avenue and Main Street. Initial outreach was focused on establishing the vision and goals, it was an opportunity to really listen and embrace what type of culture and environment the local residents wanted to see within the Study Area. Immediately below is a visual with some great ideas noted from the first Stakeholder Meeting, this type of input supported the planning process going forward.



As ongoing coordination continued, several themes emerged from the feedback gathered through stakeholder meetings, interactive map notations, and email comments. Themes were mentioned in terms of either prioritizing or improving the Study Area. The most mentioned themes are depicted by the larger circles, with economic development receiving the greatest support overall for the entire Study Area. For further discussion on input received, refer to Chapters 2: Union Avenue Corridor and Chapter 3: Main Street Corridor.





1.3 RELEVANT PLANNING DOCUMENTS

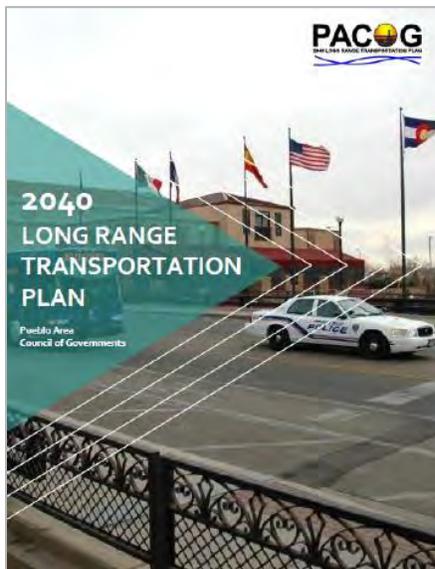
A review of relevant planning documents was completed to better understand the priorities and values of Pueblo residents and to build upon previous efforts and capitalize on past initiatives. This section provides a summary of these efforts and highlights how they relate to transforming the Union Avenue and Main Street corridors into prosperous and thriving places.

EL PUEBLO PAVILION MASTER PLAN (2017)

The plan identifies the northern portion of the intersection of Union Avenue to Court Street from City Center Drive to the Historic Arkansas Riverwalk as an opportunity to strengthen pedestrian connectivity and enhance pedestrian circulation.



2040 LONG-RANGE TRANSPORTATION PLAN (2015)



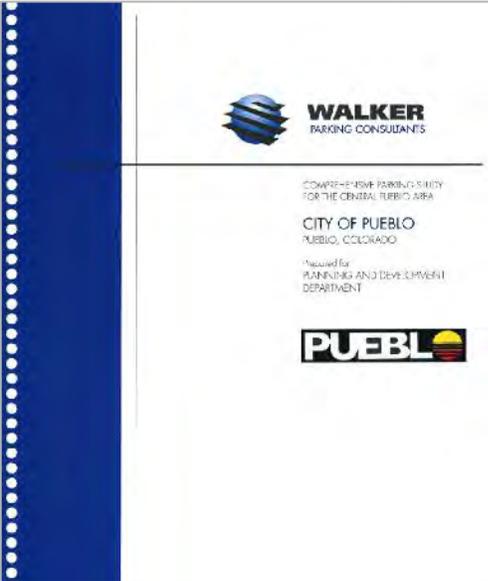
This plan guides the long-term development of the transportation system for the Pueblo Area Council of Governments (PACOG). Key goals identified in the plan focus on increasing safety and mobility, supporting the needs of all ages and abilities, minimizing storm water runoff and transportation-associated pollutants, and supporting a multi-modal network, and increasing biking and walking. The plan also mentions the priority improvement of installing trail bridges across the Arkansas River. North Union Avenue is included as part of this improvement and connects the trail on the levee to the trail along bluff as part of the Levee Trail.

PUEBLO DOWNTOWN STREETS AND PEDESTRIAN MASTERPLAN (2014)

This plan articulates a comprehensive approach to address bicycle, pedestrian, and vehicular traffic in the downtown area. In the plan, Union Avenue is recognized as a model for complete streets and a key location to foster a sense of place. According to the plan, Union Avenue should primarily prioritize bicyclists and then pedestrians and vehicular traffic. On Main Street, it should primarily prioritize vehicular traffic and then accommodate pedestrians.



COMPREHENSIVE PARKING STUDY FOR THE CENTRAL PUEBLO AREA (2011)

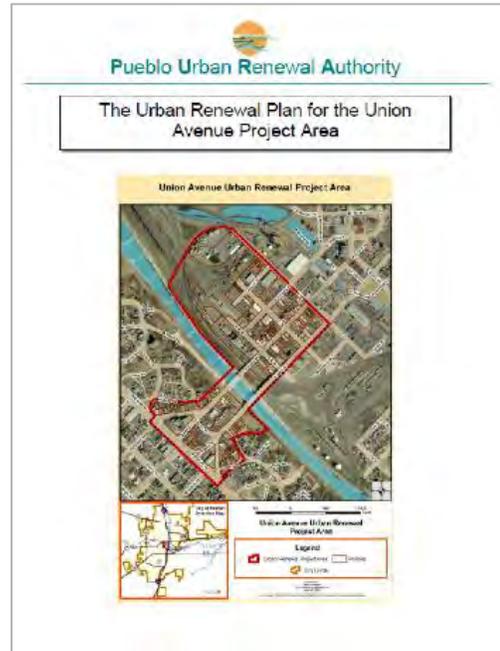


This study quantified current and future parking surpluses or deficits and examined various alternatives to meet parking needs for several districts including the Union Avenue Historic District. According to the findings from the study, several parking deficiencies exist along Union Avenue and Main Street including from Grand Avenue to C Street.

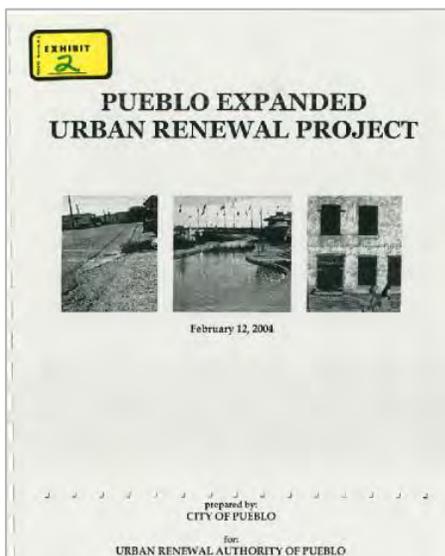


UNION AVENUE URBAN RENEWAL PLAN (2009)

The Union Avenue Urban Renewal Plan sought to further the provisions included in the Comprehensive Plan by providing the necessary public improvements to redevelop and rehabilitate the Union Avenue Urban Renewal area. The plan's primary goal is to eliminate development barriers and working with public and private enterprises to stimulate economic vitality. To further this goal, the plan focuses on enhancing conditions specific to vehicular access, pedestrian/bicycle access, and public amenities.



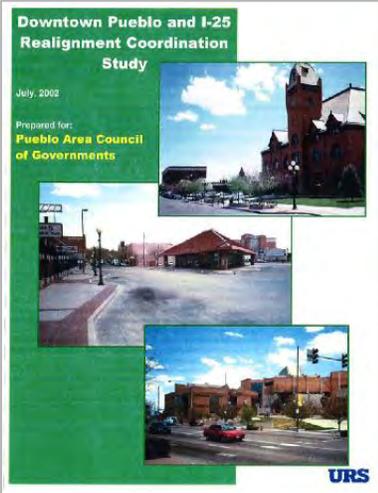
PUEBLO EXPANDED URBAN RENEWAL PROJECT (2004)



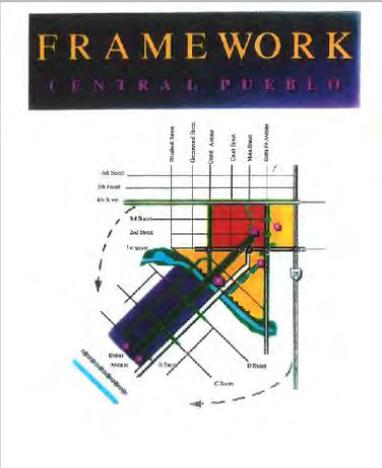
The purpose of the plan was to address urban decay in the downtown area through redevelopment. Union Avenue and Main Street from 3rd Street to D Street are within the urban renewal area boundary.

DOWNTOWN PUEBLO AND I-25 REALIGNMENT COORDINATION STUDY (2002)

The plan envisions Main Street, Grand Avenue, D Street, and Santa Fe Avenue as prime corridors for on-street bike routes. Additionally, the plan outlines the transit routes that existed along both Main Street and Union Avenue in 2002. Moreover, it indicates that there is an opportunity to showcase gateways/wayfinding signs between Union Avenue at Abriendo Avenue or closer to the bridges.



CENTRAL PUEBLO FRAMEWORK



The goal of this plan is to develop an economically viable community business district. Overarching goals comprise of pedestrian-friendly design, safety, leveraging culture, and creating a comfortable and inviting central downtown.

DOWNTOWN TROLLEY PLAN (1995)

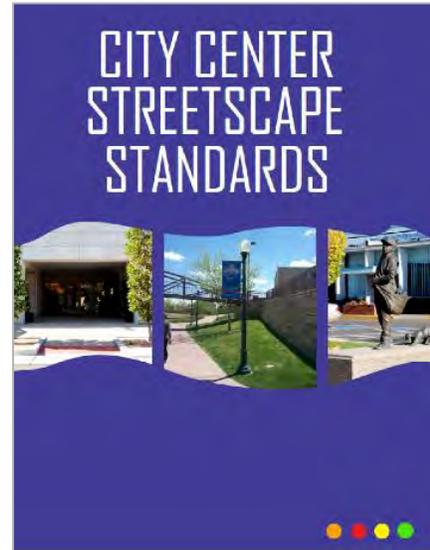
The plan emphasizes the need for a balanced and well-planned transportation system. The ultimate vision is for the Trolley to link the Pueblo Union depart with the Convention Center and provide an additional transportation option for people to access different Districts. The plan identifies potential alternative routes for the Trolley such as Union Avenue to Victoria Avenue, Main Street north to 10th Street and the Court House, or the South Union Avenue Bridge over the river to Mesa Junction.



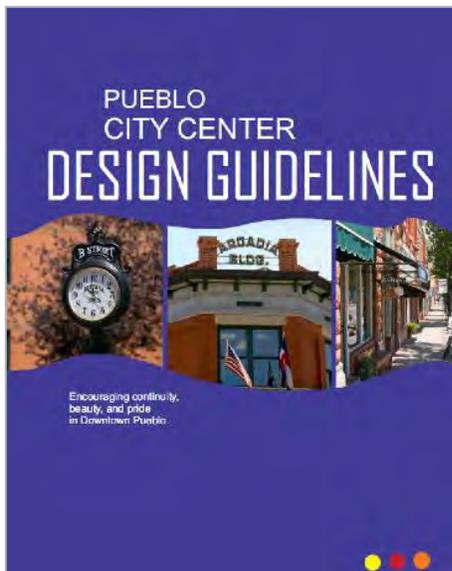
1.4 STANDARDS AND GUIDELINES

CITY STREETScape STANDARDS

These Standards seek to create “complete streets” and support a more pedestrian- and bicycle-friendly environment in Pueblo’s downtown area. According to the Standards, gateway elements are particularly important for Union Avenue. Additionally, Union Avenue and Main Street are included in the *Civic District Standards* and Union Avenue is also part of the *Union Avenue Historic District Standards*. As such, these streets must align with the streetscape standards established in this document.



CITY STREETScape STANDARDS PUEBLO CITY CENTER DESIGN GUIDELINES



These guidelines establish design expectations for property and business owners, designers, and developers to showcase the unique and historic character of each District in downtown Pueblo. According to these *Guidelines*, the Study Area is within the Historic Union and Downtown districts. Outdoor dining areas are strongly encouraged and pedestrian-scale design should be highly prioritized along Union Avenue and Main Street.

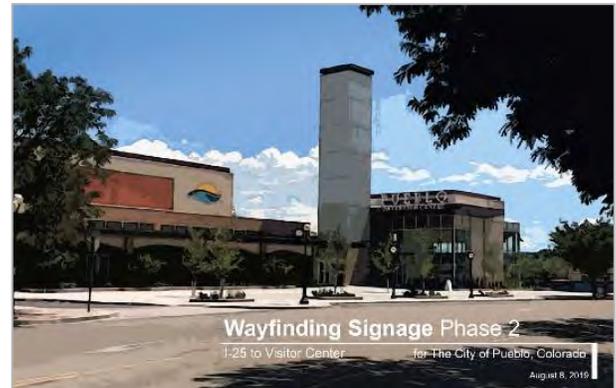
1.5 OTHER PROJECTS

WAYFINDING SIGNAGE PHASE 2: I-25 TO VISITOR CENTER

The Wayfinding Signage Phase 2: I-25 to Visitor Center project builds on the Colorado Department of Transportation's (CDOT) Wayfinding Project. The focus is to develop and construct new/retrofitted signage and wayfinding from the I-25 corridor to the Visitor's Center to encourage residents and visitors to discover and explore downtown Pueblo. The project is funded by the City of Pueblo and CDOT.

The project proposes to update the existing downtown Pueblo signage and kiosks at the following locations within the Study Area:

- Union Avenue and City Center Drive
- Union Avenue at Pueblo Museum
- Union Avenue and B Street
- Union Avenue at City Center Drive Sister City Plaza
- Union Avenue and City Center Drive at Riverwalk
- Main Street and City Center Drive
- Main Street and Alan Hamel Avenue



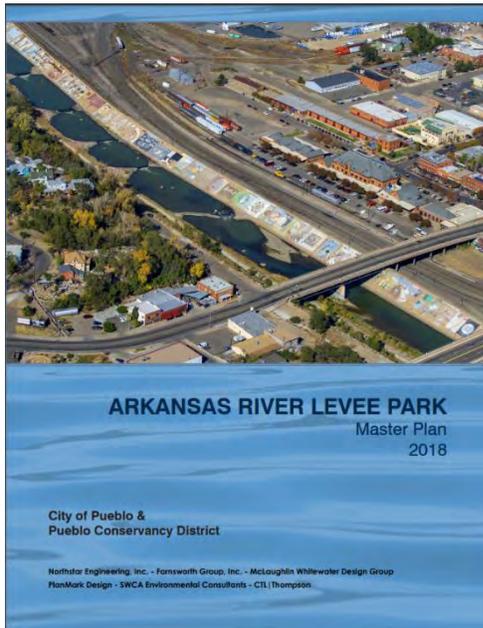
GATEWAY PLAZA PROJECT

The Gateway Plaza Project was completed in 2019 and links the Riverwalk to the new Convention Center Expansion and the PBR Sport Performance Center to create a welcoming access point to the Riverwalk, increase economic development, and support downtown revitalization. The project provides an event space and showcases Pueblo's history.

The project included landscaping and lighting improvements, storm sewer upgrades, a raised circular plaza, play area for children, connectivity to the Veteran's Bridge, a signalized pedestrian crossing at Main Street, and provisions for outdoor events and vendor displays.



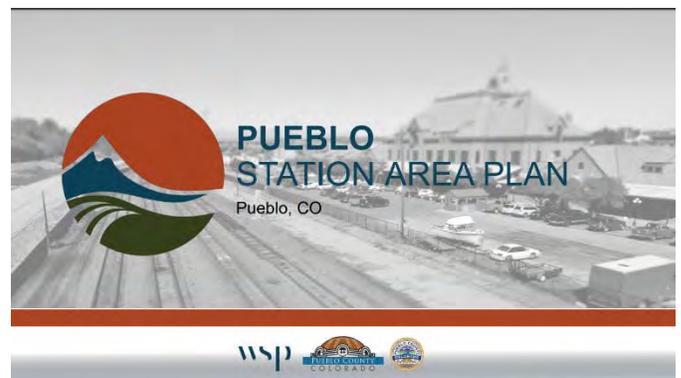
ARKANSAS RIVER LEVEE PARK MASTER PLAN



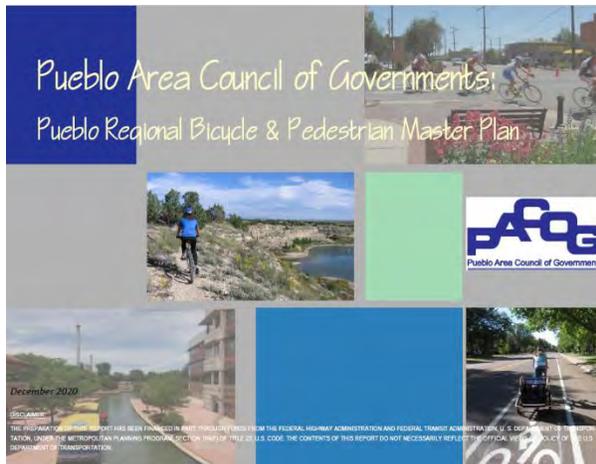
The Arkansas River Levee Park Master Plan was established in 2018 with the intent of developing a vision for the 2.75 mile stretch of the Arkansas River Flood Levee adjacent to Historic Downtown Pueblo. The project intends to develop a vision for the corridor to increase active river recreation, improve connectivity to the river, and increase economic development opportunities. The plan includes an access point from Main Street east of Corona Avenue to the Arkansas River Trail. Access to the river trail from Main Street is considered as part of the recommended projects included in this plan for Main Street. Future planning processes should support connections for pedestrians and bicyclists with this access point.

PUEBLO STATION AREA PLAN

The Pueblo Station Area Plan was approved by Pueblo voters in November 2016. The plan proposes establishing Amtrak passenger rail service to Pueblo as part of the Southwest Chief route connecting the Front Range. The plan narrowed down potential station area to two options, one of which is Union Depot located near B Street and Union Avenue. Coordination occurred between the team working on the Station Area Plan and Master Plan Design for Union Avenue and Main Street, to ensure safe and accessible access to Union Depot by all modes, in the instance that the Union Depot is selected for the passenger rail in the future.



PUEBLO AREA COUNCIL OF GOVERNMENTS (PACOG) REGIONAL BICYCLE & PEDESTRIAN MASTER PLAN (2020-2045)



The Pueblo Area Council of Governments (PACOG) recently updated their long-range Regional Bicycle & Pedestrian Master Plan to identify needs for more pedestrian and bicycle infrastructure and better connectivity to routes within the region due to an increased desire for multiple forms of transportation. The plan assesses existing infrastructure and current usage, identifies goals, and lays the ground work for creating a blueprint for Pueblo to build and sustain a strong active transportation network. Community outreach efforts during the planning process determined the need for more bicycle and pedestrian facilities in the designs for the Study Area to help support the growing interest in active transportation and encourage more people to bike and walk.

FUTURE DEVELOPMENTS & DEVELOPMENT OPPORTUNITIES

There are a variety of future developments and development opportunities along Union Avenue and Main Street which were discussed throughout the planning process. For example, the vacant lot located on Union Avenue between C Street and D Street and those located between D Street and the Riverwalk could be infill development or parking opportunities for the future. There is also a mixed use residential property, the Holmes Hardware Building, at B Street and Union Avenue. On Main Street, there will be a future hotel site between Alan Hamel and Richmond Avenue next to Brues Alehouse. Other potential development sites for the future include the vacant land located immediately adjacent to the Riverwalk near Alan Hamel Avenue, between Alan Hamel and the Richmond Apartments, and an existing parking lot located immediately adjacent to the Richmond Apartments. There are certainly more opportunities being considered along these vital corridors, and the project recommendations were created to encourage future growth and development. Future developers were invited to public and stakeholder meetings and encouraged to participate in outreach activities.



1.6 VISION AND GOALS

Vision elements and goals for the Study Area were established through public and stakeholder input. Focus areas were built on the foundational values identified by Pueblo residents when asked what matters most to them within the Study Area, with their response shown in the word cloud below. Additional influence was taken from the priorities outlined in the previous planning documents, validating the long-term visions of the public. Respecting the funding source, the vision and goals also incorporate the funding requirements established by the County 1-A funds, to include pedestrian, streetscape, and parking opportunities. The four vision elements established for this Master Plan highlight the significance of prioritizing streetscape, economic development, placemaking, and multi-modal options, and were applied in developing designs for the Study Area to create a prosperous and flourishing downtown. These complimentary set of vision elements and associated goals are provided below and are embedded throughout the rest of this Master Plan.





ENHANCE STREETScape

Streetscape refers to the entire system of the streets, sidewalks, landscaping, street furniture and open spaces that combine to form the street’s character. The Study Area should adhere to Pueblo’s City Center Streetscape Standards to create complete streets that will improve the health and safety of the pedestrian environment in Pueblo’s downtown.

VISION

The Study Area will enhance streetscape by prioritizing context-sensitive design and safe and aesthetically pleasing travel environments that support the community’s identity through beautification and high-quality design.

GOALS

- A. Support a pedestrian-oriented and attractive environment
- B. Build meaningful interactions with users and the surrounding physical environment
- C. Serve a wide variety of transportation options and functions that align with local preferences

IMPROVE ECONOMIC DEVELOPMENT

Economic Development is about better jobs, higher household incomes, more innovation, widely shared benefits, and an improved regional economic structure. In Pueblo, the City is committed to helping area businesses, prospective businesses, and residents take advantage of its many opportunities without compromising quality of life. The Urban Renewal Authority of Pueblo and Pueblo Economic Development Corporation (PEDCO) lead economic development efforts in Pueblo.

VISION

The Study Area will improve economic development in the area by capitalizing on the diverse set of City and resident-owned businesses and improving access and connectivity to major destinations such as the Convention Center and Union Depot.

GOALS

- A. Create a tourist and business-friendly destination
- B. Advance economic potential
- C. Enhance visibility and comfortable access for local businesses



SUPPORT PLACEMAKING

Placemaking inspires people to collectively reimagine and reinvent public spaces as the heart of every community. Strengthening the connection between people and the places they share, it refers to a collaborative process by which we can shape our public realm in order to maximize shared value.

VISION

The Study Area will support placemaking using an innovative and creative approach to reinvent Downtown Pueblo into one that strengthens connections between people and place, celebrates the existing character, and creates linkages between surroundings areas.

GOALS

- A. Create inclusive and safe places that support engaging activities
- B. Foster continuity with surrounding attractions and uses
- C. Preserve the existing character yet look toward the future

CREATE MULTI-MODAL OPTIONS

Multi-Modal Options consider a variety ways of getting around, including walking, biking, driving, and taking transit. This also aligns with the Complete Streets approach, which focuses on providing safe, comfortable, and convenient access to community destinations and public places for all ages and abilities.

VISION

The Study Area will be transformed into a set of multi-modal corridors that are attractive, safe, and convenient for all Pueblo residents and visitors, regardless of travel mode, age, ability, or background.

GOALS

- A. Balance transportation needs to accommodate a diverse set of users through Complete Streets
- B. Prioritize design features that respond to the community context
- C. Improve connectivity to community assets such as the Riverwalk and the Historic Business District



2 UNION AVENUE CORRIDOR

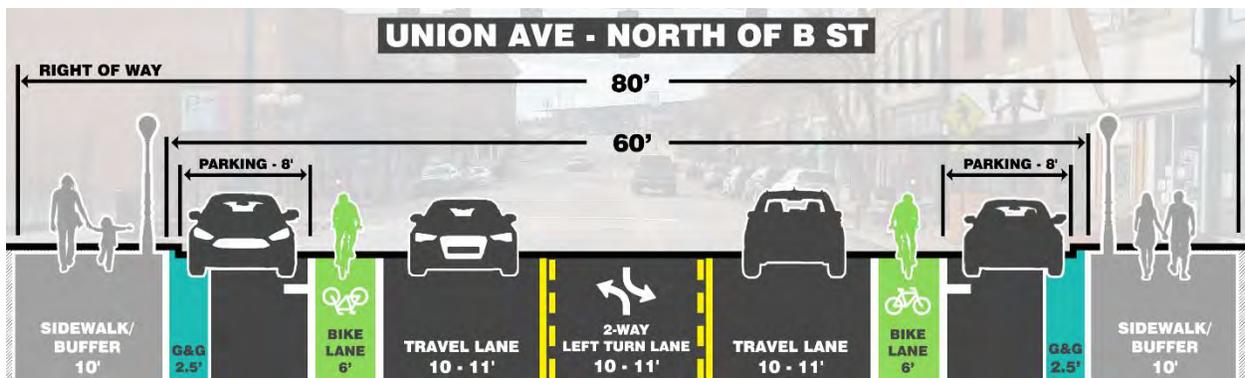


2.1 OVERVIEW

The Union Avenue corridor traverses from City Center Drive to Abriendo Avenue. It travels through a vibrant commercial section and connects to major destinations such as the Union Depot and the Memorial Hall Theater and Riverwalk trail. The corridor is within the boundary of the PURA, the Union Avenue Historic District, and the southern portion connects to the historic Mesa Junction business area.

The typical section along the corridor changes slightly throughout but in general, it is approximately 80 feet wide and consists of two travel lanes, a center turn lane, bike lanes, parallel parking, and six (6) foot sidewalks with four (4) foot tree buffers on both sides of the street. The portion of the corridor between the Riverwalk to C Street is the most developed with local businesses.

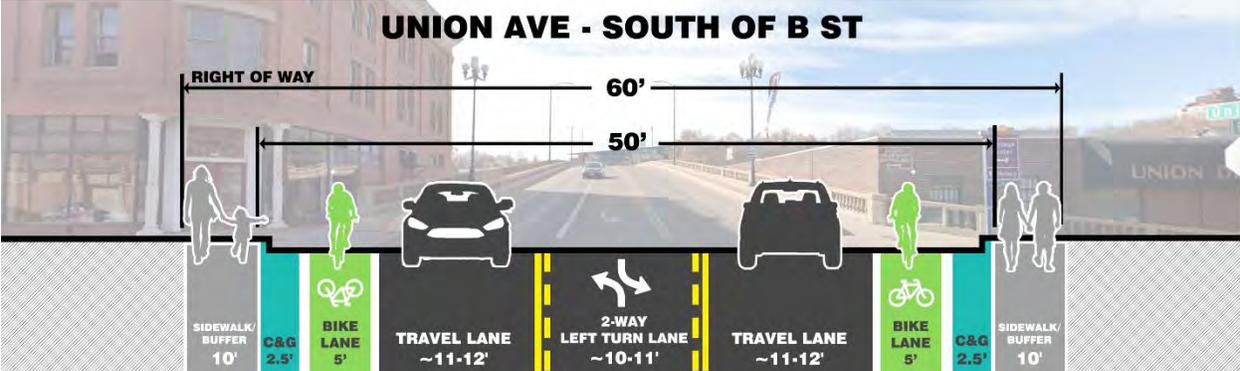
Existing Union Avenue Typical Section – North of B Street*



*Approximate total right-of-way widths

After the corridor crosses the bridge over the Arkansas River south of B Street, the bike lane drops leaving two travel lanes, a center left turn lane, some parallel parking, and a wide sidewalk without a buffer. This area is the least developed compared to the rest of the Union Avenue corridor but does provide access to a public library and some businesses.

Existing Union Avenue Typical Section – South of B Street*



*Approximate total right-of-way widths

2.2 EXISTING CONDITIONS





PARKING

Most of the parking along Union Avenue is clustered from the Alan Hamel Avenue / Grand Avenue to B Street. However, there are not a substantial number of parking spots between Corona Avenue and Abriendo Avenue at the southern portion of the corridor. All of these are parallel parking spots and there is currently no angled (diagonal) parking and limited Americans with Disabilities Act (ADA) accessible parking spots along Union Avenue within the Study Area. There are public parking lots with direct access off of Union Avenue between B Street and C Street and at the Pueblo City-County Library District.

WALKING

Overall, the Union Avenue corridor is relatively walkable and pedestrian friendly. Sidewalks exist throughout the entirety of the corridor's length and are of adequate width (6') and quality. For most of the Union Avenue corridor up to B Street, the sidewalk has a four (4) foot landscaped buffer that helps increase pedestrian comfort levels by providing physical protection from motor vehicles. The parking and bike lanes also provide an extra level of protection for pedestrians with separation from the vehicular travel lanes.

BIKING

Currently, there are striped bike lanes along the Union Avenue corridor from City Center Drive to Abriendo Avenue, although bike lanes are only located on one side of the street from Grand Avenue to City Center Drive. These facilities connect bicyclists to the Riverwalk Trail as well as existing bike routes on Abriendo Avenue, Alan Hamel, and City Center Drive. There are very few bike racks present along the corridor.



PUBLIC TRANSIT

The corridor is not directly served by transit but has a few routes that connect to it. The Berkley-Beulah bus route crosses through the corridor at Alan Hamel / Grand Avenue and the Lake Avenue bus route travels along the southern portion from Church Place to Abriendo Avenue. There are also two bus stops along the corridor – one at Alan Hamel / Grand Avenue and one near Abriendo Avenue. An effort was made to keep bus traffic off of Union Avenue.

STREETSCAPE

The majority of the corridor, located from B Street to City Center Drive, has buffer areas between the sidewalk and roadway with trees and landscaping, pedestrian-scale lighting, and benches. Planters are located at the corners from B Street to D Street. From Abriendo Avenue to B Street, there are only a few trees located across from the library. The condition of the trees are of concern, as they are older and may need to be replaced in the near future.



LAND USE, LOCAL BUSINESSES & COMMUNITY DESTINATIONS

Most of the community centers and restaurants along Union Avenue are located between the Riverwalk and B Street making it a priority area for improvements. Based on observations during the planning process, this area seems to generate high amounts of activity including biking and walking. Local restaurants are also dispersed throughout this section of the corridor with a few providing outdoor



seating areas/cafes for dining and relaxing, including the Senate Bar & Grill, Grind Haus, Papa Jose’s with new parklets, Tsunami Sushi and the Gold Dust Saloon.

The corridor is zoned as multiple districts including B4: Central Business District, HB: Historic Business Zone District, S-1: Governmental Use District, I-3: Heavy Industrial District, and S-3: Floodplain District. The future lane use along the corridor is Urban Mixed Use, Employment Center – Industry, and River Corridor.

TRAFFIC ANALYSIS

A traffic analysis, including level of service and queueing, was completed to summarize existing traffic conditions. The City of Pueblo provided current traffic counts; however, since these counts were taken during the COVID pandemic, when traffic volumes were unusually low, these numbers were calibrated with corridor counts from 2019. The existing conditions analysis showed all of the intersection movements operating at good levels of service (considered as D or better) in the afternoon peak hour.

There was only one area, Union Avenue at City Center Drive, where a poor level of service (E or F) was found due to the relative heavy traffic volumes on City Center Drive and lack of signalization. For queueing, an observed problem, defined as spillover or blockage in more than 10 percent of the cycles observed, was found for the south-west bound approach to the Union Avenue and Grand Avenue / Alan Hamel Avenue intersection where the single through lane appears to occasionally create challenges to accessing the left-turn lane.

Refer to the Recommendations section in this chapter for more information on the expected traffic conditions from the proposed improvements. The full traffic analysis memo can be found in Appendix 1.

2.3 PRIORITIES, CHALLENGES, AND OPPORTUNITIES

Public and stakeholder engagement efforts provided insight on both the opportunities and challenges along Union Avenue and helped guide decision-making around recommendations. **Opportunities** represent existing corridor conditions that can be leveraged to enhance the corridor. **Challenges** consist of existing corridor conditions that could be addressed and improved along the corridor. This section contains a summary of public input received throughout the planning process, which led to defining the project priorities represented in the recommendations ultimately developed for Union Avenue.

As an integral component of the virtual meetings held for both the public and stakeholders, interactive polling was completed to better understand corridor priorities. Several questions were asked about the priorities, challenges, and opportunities along Union Avenue, with the results shown in the exhibits below.

SUPPORTING ENJOYABLE EXPERIENCES

What are your specific goals for Union Avenue (share up to three responses)?

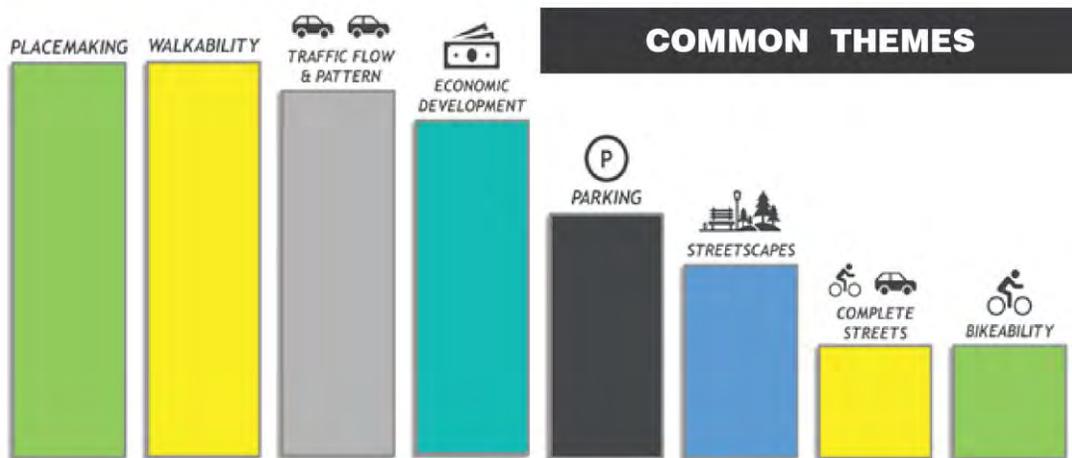


Larger sidewalks	Reduce traffic	Clean safe colorful vibrant
Smooth traffic flow	enhanced marketing of downtown amenities	Attractive and Fun destination
Eliminate center turn lane and widen sidewalks for outdoor seating.	Pedestrian friendly	Wider sidewalks, less volume of vehicles sidewalk cafes
Pedestrian friendly	Housing for young people	Maximize business opportunities, showcase Pueblo!
Pedestrian mail with East and west tragic with turnarounds at each end	Activate Street Fronts	Better parking, inviting for walking and shopping
Outdoor seating for businesses with living quarters above	Attractive area Parking Reduce traffic flow	

Socializing with Friends and Family

Hanging Out/Relaxing

Walking





CAFÉ ZONE AREA

LANDSCAPE BUFFER

2.4 CORRIDOR IDEAS

Several corridor ideas were created to better understand preferences for Union Avenue and to inform the conceptual designs and overall recommendations for improvements. These corridor ideas incorporate elements identified during public and stakeholder engagement activities, such as increasing pedestrian and bicycle comfort levels, expanding public space for cafes, and adding landscape and other features to enhance placemaking. As the stakeholders and the public were engaged, extra time was taken to provide educational opportunities on the potential elements and visual examples to help inform priorities and preferences.



The **proposed corridor ideas** are illustrated in the following pages through a series of visuals. The visuals represent *corridor ideas* and are shared with key elements including sketches, comparison charts, and relative cost.

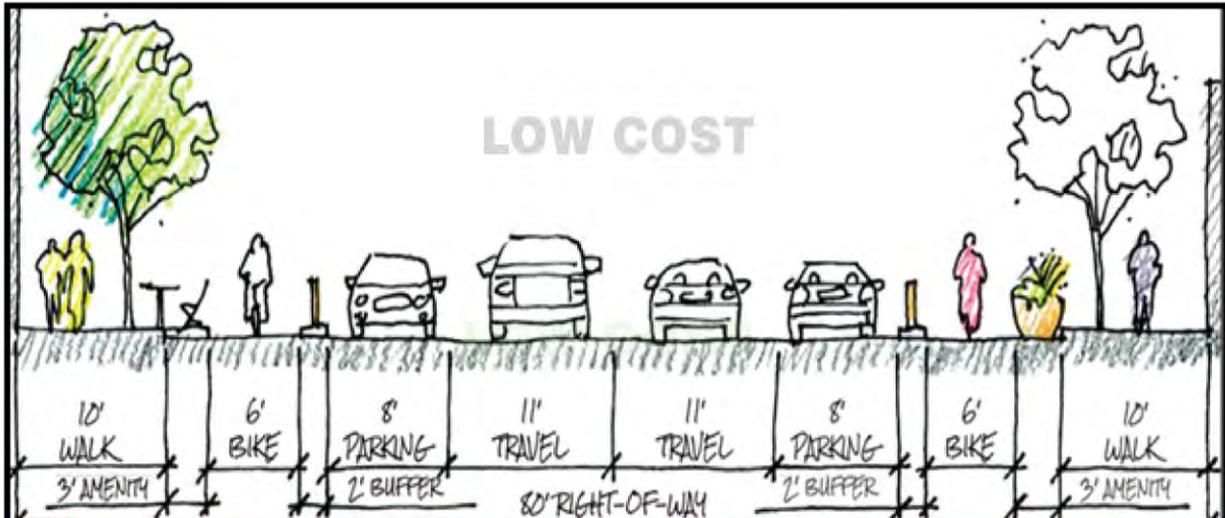
The set of four corridor ideas created specifically for Union Avenue were presented during public and stakeholder meetings and through an online questionnaire. Feedback was solicited on preferences for various parking, streetscape, and pedestrian and bicycle design elements. Feedback received on elements indicated preferences for the following along Union Avenue:

- Interest in expanding the sidewalk area
- Comfort with a shared travel lane for bicyclists and drivers
- Interest in angled or parallel parking

Preferences among the four Union Avenue corridor ideas reinforced the desire for public space, pedestrian comfort, slowing down traffic, and encouraging economic development opportunities. The preferences identified through the engagement activities associated with the corridor ideas informed the development of more refined alternatives along the corridor, as presented in the subsequent section. As a result of the online polling (at the virtual meeting and on the website), there was a strong preference for Idea #4: Pedestrian Only/Emergency Vehicle Access, emphasizing the public's desire for more public space.

The following graphic represents the existing conditions for Union Avenue. Subsequent visuals include similar graphics for the four corridor ideas created and representing the space allocated for potential corridor features along Union Avenue.





UNION AVE IDEA #1 | NO TURN LANE / SEPARATED BIKE LANES

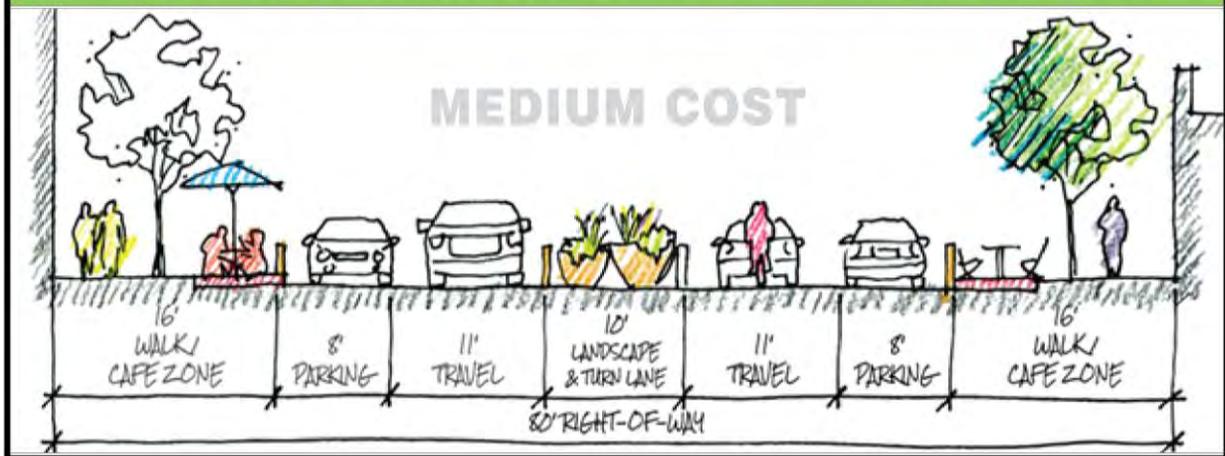
IDEA #1 ELEMENTS

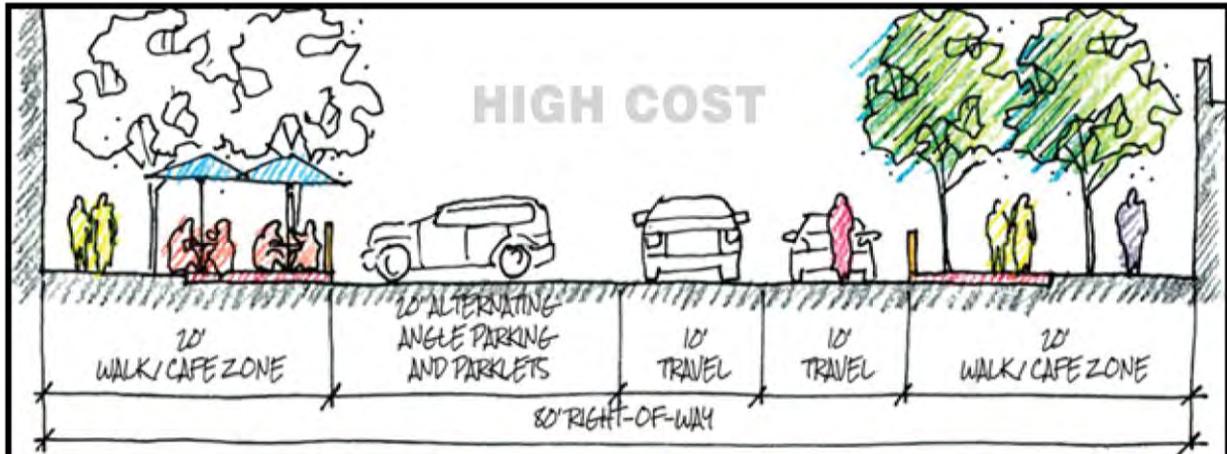
Two Travel Lanes	X
Turn Lane and Landscape	
On-Street Angled Parking	
On-Street Parallel Parking	X
Sharrows for Bicyclists	
Separated Bike Lanes	X
Shared-Use Path	
10-foot sidewalk	X
Café Zone/Amenity Zone: sidewalk wider than 10-feet	
Parklets	

IDEA #2 ELEMENTS

Two Travel Lanes	X
Turn Lane and Landscape	X
On-Street Angled Parking	
On-Street Parallel Parking	X
Sharrows for Bicyclists	X
Separated Bike Lanes	
Shared-Use Path	
10-foot sidewalk	
Café Zone/Amenity Zone: sidewalk wider than 10-feet	X
Parklets	X

UNION AVE IDEA #2 | CENTER TURN LANE AND LANDSCAPING / SHARROWS





UNION AVE IDEA #3 | NO TURN LANE / SHARROWS

IDEA #3 ELEMENTS

Two Travel Lanes	X
Turn Lane and Landscape	
On-Street Angled Parking	X
On-Street Parallel Parking	
Sharrows for Bicyclists	X
Separated Bike Lanes	
Shared-Use Path	
10-foot sidewalk	
Café Zone/Amenity Zone: sidewalk wider than 10-feet	X
Parklets	X

IDEA #4 ELEMENTS

Two Travel Lanes	
Turn Lane and Landscape	
On-Street Angled Parking	
On-Street Parallel Parking	
Sharrows for Bicyclists	
Separated Bike Lanes	
Shared-Use Path	X
10-foot sidewalk	
Café Zone/Amenity Zone: sidewalk wider than 10-feet	X
Parklets	X

UNION AVE IDEA #4 | PEDESTRIAN ONLY / EMERGENCY VEHICLE ACCESS





2.5 PREFERRED ALTERNATIVE

Based on initial feedback received from the public and stakeholders regarding corridor elements and the above-referenced corridor ideas, the following three alternatives were developed. The three alternatives were then vetted with business owners and other stakeholders along Union Avenue to determine a **preferred alternative**.

All three proposed alternatives integrated the following elements, with a more detailed list of improvements for the preferred alternative provided under the Recommendations section of this chapter:

- Two travel lanes
- Sharrows to accommodate bicyclists
- Removal of center turn-lane
- Transition from traffic signals to four-way stop signs at C Street and D Street
- Wider sidewalks
- Various parking options
- Various streetscape elements

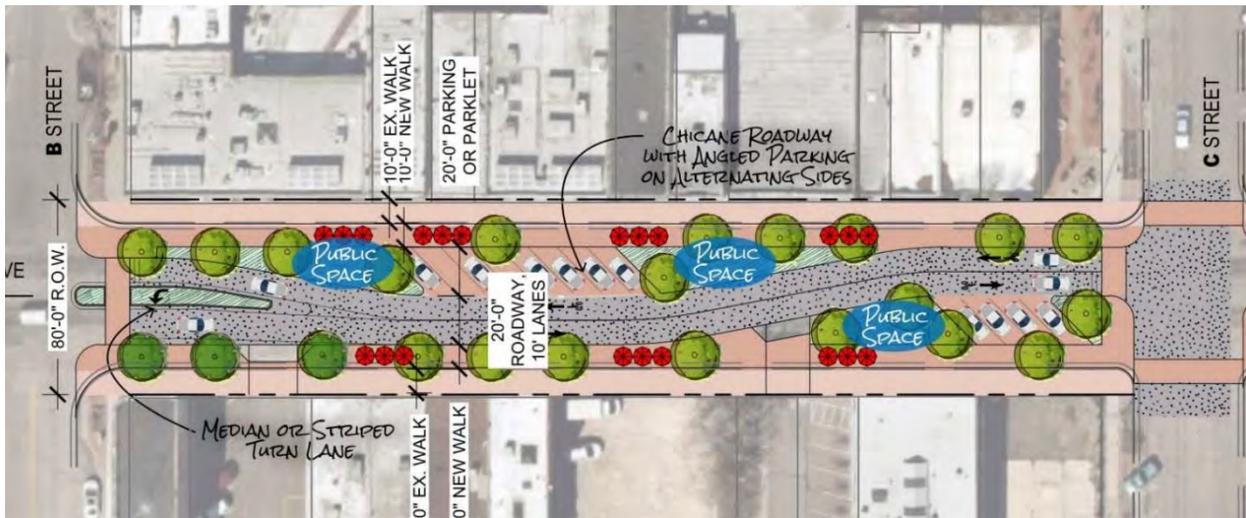
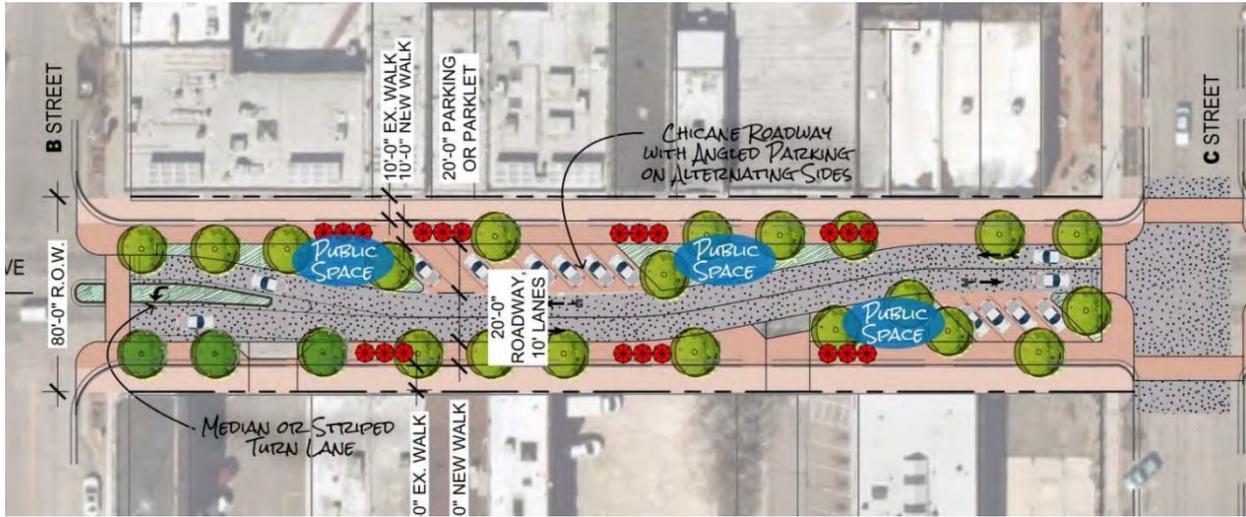
The **preferred alternative** for Union Avenue that resulted from this targeted outreach is a straight corridor with parallel parking and wider sidewalks. This alternative aligns with public priorities identified through the various outreach methods and provides expanded sidewalk / café zone area, traffic calming, improves pedestrian comfort, and maximizes parking. The subsequent two alternatives are shown for comparison purposes and to illustrate the planning process.

PREFERRED Alternative: Straight Along Corridor with Parallel Parking





Alternative: Weave Along Corridor with Angled Parking and Public Space



Alternative: Weave Along Corridor with Maximized Parking (Angled and Parallel)





TRAFFIC ANALYSIS

Traffic was considered throughout the planning process but once the preferred alternative was established a more focused analysis of potential traffic impacts along Union Avenue was completed. The results of this analysis indicated that traffic operations are likely to continue to operate at acceptable levels of service and queueing may generally improve. For the full traffic memo, refer to Appendix 1.

A summary of findings from the traffic analysis includes the following for Union Avenue:

- All intersection approaches generally still operate at acceptable levels of service (D or better) with all-way stops at Union Avenue and C Street and Union Avenue and D Street. The exception is Union Avenue and City Center Drive, a location that already operated at poor levels of service (E or F) from findings for the existing conditions analysis.
- Improvements to the queueing issue at Union Avenue and Grand Avenue / Alan Hamel Avenue due to a reduction in through vehicles

2.6 RECOMMENDATIONS

The Master Plan recommends the implementation of the preferred alternative for Union Avenue which includes a **two-lane roadway with sharrows for bicyclists, parallel parking, stop signs, expanded sidewalk/café zone area, and enhanced streetscape**. The ultimate vision maximizes parking, improves pedestrian and bicyclist comfort, and provides ample opportunities for additional public areas and community gathering spaces as desired.

The cost of the full build-out of the preferred alternative along Union Avenue may require a phased approach with multiple funding sources. The Master Plan has been developed to support funding requests as well as provide short-term and long-term options for implementation. More information on costs can be found in Chapter 4: Implementation.

The Master Plan recommendations for Union Avenue were shared with the public and stakeholders at the second public meeting in February 2021, and at regularly-schedule meetings during the spring of 2021 with Pueblo Downtown Association, PACE, PURA, City Council, and Board of County Commissioners. All parties provided feedback and support for the Master Plan and the preferred alternative for Union Avenue.

A larger visual of the Master Plan recommendations can be found in Chapter 4: Implementation, with more detailed visuals and renderings provided below.



MASTER PLAN RECOMMENDATIONS

The Master Plan for Union Avenue is broken up into corridor sections to showcase the proposed improvements. A summary of the recommended improvements for each corridor section is provided in the table below with associated visuals (in plan view) to show more detail. Renderings were also created to provide a visual comparison of the existing conditions and proposed recommendations. The renderings (shown at the end of this Chapter) represent one section of Union Avenue, from B Street to C Street, but exemplify the character of the entire corridor after implementation of the Master Plan recommendations. These renderings were also shared with the public and the stakeholders, as visuals of this style often provide a more tangible view of how the future could look along Union Avenue, and helped to engage the public and build consensus around the preferred alternative.

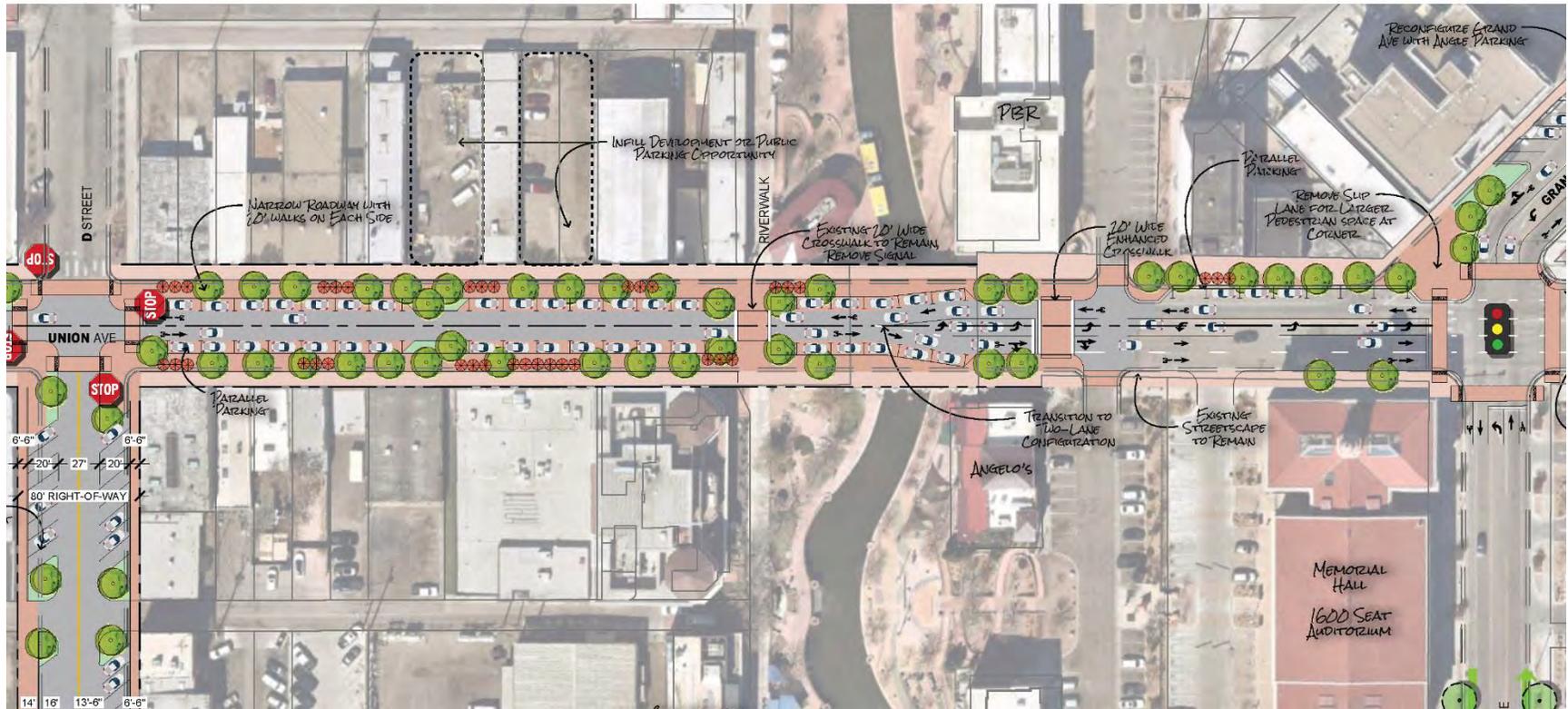
Location	Proposed Improvements	
Abriendo Avenue to B Street	<ul style="list-style-type: none"> • Maintain existing travel lanes and streetscape • Enhance bike lanes 	<ul style="list-style-type: none"> • Right turn lane at Church Place • Bulb outs and improve crosswalk at Corona Ave • Gateway element at B Street
B Street to D Street	<ul style="list-style-type: none"> • Two-lane roadway with sharrows • Enhance intersection at B Street • Remove mid-block crossing • Streetscape elements 	<ul style="list-style-type: none"> • Expand sidewalks (approx. 20') • Four way stop signs at intersections • Bulb-outs at intersections • Landscaping
D Street to Grand Avenue	<ul style="list-style-type: none"> • Two-lane roadway with sharrows • Lane transition from two to three lanes 	<ul style="list-style-type: none"> • Expand sidewalks (approx. 20') • Enhance crosswalk near Angelo's and PBR • Expand pedestrian space on the corner of Grand Ave
Grand Avenue to City Center Drive	<ul style="list-style-type: none"> • Gateway element at Grand Ave • Existing bike lane and streetscape to remain 	<ul style="list-style-type: none"> • Add curb bulb outs • Add raised pedestrian refuge at City Center Dr • Improve crosswalks at City Center Dr

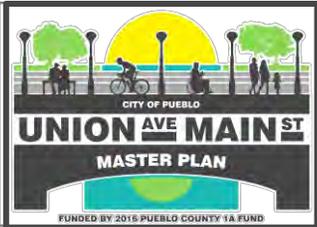


UNION AVE. D STREET TO GRAND AVE.

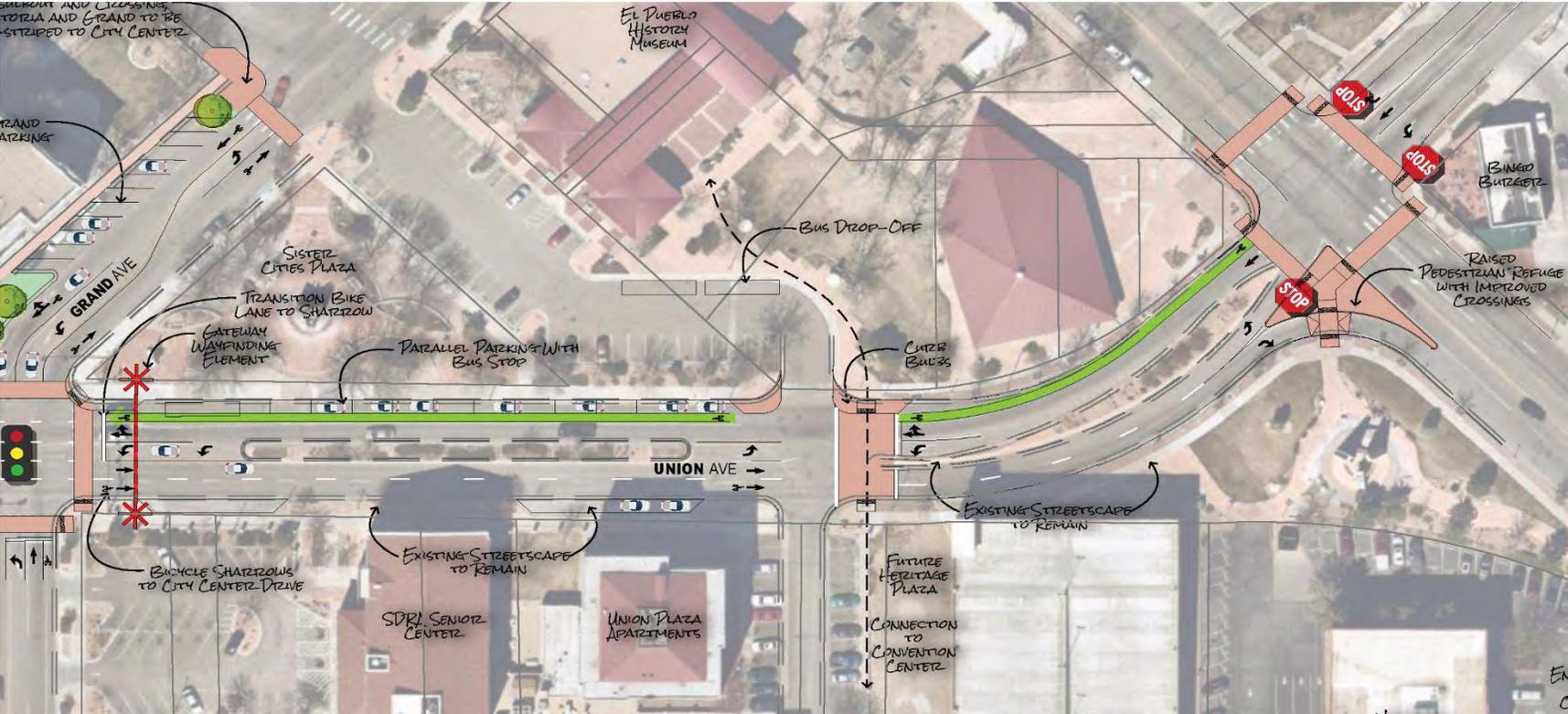


LEGEND - Union Section C





UNION AVE. GRAND AVE. TO CITY CENTER





UNION AVE. (FROM B ST. TO C ST.) – EXISTING CONDITION



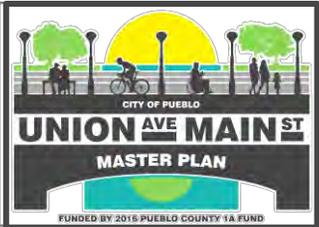
UNION AVE. (FROM B ST. TO C ST.) – FULL BUILDOUT





UNION AVE. (FROM B ST. TO C ST.) - EXISTING CONDITON





UNION AVE. (FROM B ST. TO C ST.) - FULL BUILDOUT





POTENTIAL SUB-PROJECTS FOR UNION AVENUE

As stated previously, the overall cost associated with the full buildout of the Master Plan may be daunting. Therefore, several potential sub-projects have been identified to help advance the build-out of the Master Plan for Union Avenue over time. The primary set of sub-projects align with the County 1-A funding requirements and range from striping and landscaping to roadway reconstruction. A list of other potential projects were also identified for supplemental funding sources, as they expand beyond the scope of the County 1-A funds but were determined to bring value to the overall Master Plan for Union Avenue. Sub-projects can be implemented as appropriate funds become available.

The list below provides a general overview of potential sub-projects for Union Avenue, with more detail including preliminary costs, found in Chapter 4: Implementation and Appendix 2.

Union Avenue Potential Sub-Projects	Location
Master Plan Improvements from B Street to Grand Avenue	
Four way stops at intersections	C Street and D Street
Bulb outs at intersections	B Street, D Street, C Street, Grand Avenue
Reconstruct curb-Line	B Street to Grand Avenue
Stripe roadway to two lanes with sharrows	B Street to Grand Avenue
Streetscape elements	B Street to Grand Avenue
Redesign of the corner slip lane and pork chop and remove right turn lane	Grand Avenue - SW corner
Mid-block crossings (2)	Riverwalk
Gateways	One at B Street and one at Grand Avenue
Master Plan Improvements from Abriendo Avenue to B Street	
Striping of Bicycle Lanes	Abriendo to B Steet
Master Plan Improvements from Grand Avenue to City Center Drive	
Pedestrian improvements - pork chop crosswalk	Southside of City Center/Union Intersection
Other Potential Projects	
Add diagonal parking on C & D Street	C Street and D Street between Union & Main
Add diagonal parking on Grand Avenue	Union Ave to Victoria
Encourage use of alleys	B Street to Riverwalk



3 MAIN STREET CORRIDOR

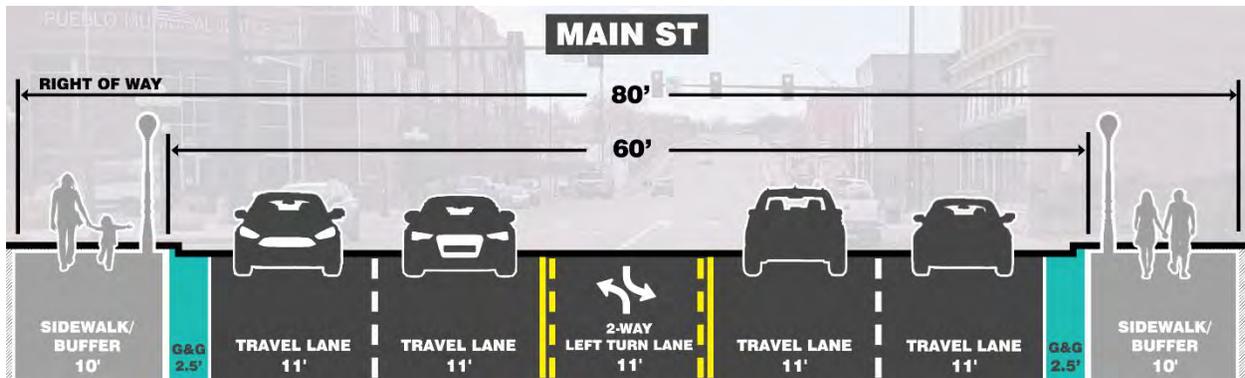


3.1 OVERVIEW

The Main Street corridor spans from City Center Drive to C Street and connects to major destinations such as the Convention Center, Memorial Hall and Riverwalk, the Pueblo Municipal Justice Center, and local businesses. It also exists within the boundaries of the PURA and provides access to the Arkansas River Trail and Riverwalk Trail.

Roadway conditions along the corridor change slightly throughout; but in general, it is approximately 80 feet wide and consists of four travel lanes, a center turn lane, and buffered sidewalks on both sides of the street. The typical section below generally represents the existing conditions, although the sidewalk and buffer at Convention Center are planned with a six (6) foot buffer and nine (9) foot sidewalk, as the new standard.

Existing Main Street Typical Section



**Approximate right-of-way widths*

3.2 EXISTING CONDITIONS



PARKING

The majority of parking along Main Street is parallel parking and relatively well distributed to both sides of the street; however, there is no on-street parking between City Center, Richmond Avenue, and the Riverwalk. There are also no designated on-street American's with Disabilities Act (ADA) accessible parking spots. There are two large parking garages on Main Street – one is located across from the Convention Center near Richmond Avenue and the other is the Main Street Parking Garage located between Alan Hamel Avenue and D Street.



WALKING

Overall, the Main Street corridor is somewhat walkable and pedestrian-friendly. Sidewalks exist throughout the corridor segment and are of adequate six (6) foot width and quality. Some sections have two (2) to three (3) foot buffers adjacent to the sidewalk and other sections have six (6) foot sidewalks with a four (4) foot buffer.

BIKING

Main Street does not have any bicycle facilities at present. Opportunities exist to utilize the large right-of-way width to accommodate bicyclists and increase connectivity to the Riverwalk Trail within the project corridor as well as the Arkansas River Trail just outside the project corridor. Several bike racks are located at D Street.

PUBLIC TRANSIT

The corridor supports the Bessemer bus route which travels down Main Street from City Center Drive to Abriendo Avenue. Supporting this route there are a few bus stops along the corridor, located at Richmond Avenue and D Street.

STREETSCAPE

The side of the roadway closest to Union Avenue from C Street to the Riverwalk has some pedestrian-scale lighting but lacks trees, landscaping, as well as buffer areas and streetscape elements between the sidewalk and roadway. Portions of the corridor have recently been improved with enhanced sidewalks and landscaping, this includes the side of Main Street furthest from Union Avenue along the entire stretch from C Street to City Center and on both sides from the Riverwalk to Alan Hamel. These recent improvements include pedestrian-scale lights, buffer areas between the sidewalk and roadway with trees, landscaping, and benches throughout.

LAND USE, LOCAL BUSINESSES & COMMUNITY DESTINATIONS

There are a variety of businesses and community destinations on Main Street between City Center Drive and C Street. The Pueblo Convention Center, located near City Center Drive and Main Street, is a vital asset to the area that helps support economic development and bring visitors to downtown. Main Street has a few restaurants and some city buildings including the Memorial Hall Theater, Pueblo Municipal Justice Center and Pueblo City building. Restaurants with outdoor seating areas including Brues Alehouse, Twenty One Steak, and 1129 Spirits & Eatery, are located along the Riverwalk.

There are also several proposed development projects towards the northern end of Main Street, including a mixed-use development and hotel.

The corridor is zoned as multiple districts including B4: Central Business District, HB: Historic Business Zone District, S-1: Governmental Use District, HARP2: Historic Arkansas Riverwalk of Pueblo Zone District – Two, and I-2: Industrial District. The future land use along the corridor is Urban Mixed Use.



TRAFFIC ANALYSIS

A traffic analysis, including level of service and queueing, was completed to summarize existing traffic conditions. The City of Pueblo provided current traffic counts; however, since these counts were taken during the COVID pandemic, when traffic volumes were unusually low, these numbers were calibrated with corridor counts from 2019. The existing conditions analysis showed all of the intersection movements operating at good levels of service (considered as D or better) in the afternoon peak hour.

For queueing, an observed problem, defined as spillover or blockage in more than 10 percent of the cycle observed, was found for the south-east bound approach to the Main Street and Alan Hamel Avenue intersection where the shared through / right turn lane appears to occasionally create challenges to accessing the left-turn lane.

Refer to the Recommendations section of this Chapter for more information on the expected traffic conditions from the proposed improvements along Main Street. The full traffic analysis memo can be found in Appendix 1.

3.3 PRIORITIES, OPPORTUNITIES, AND CHALLENGES

Priorities, opportunities, and challenges for the Main Street corridor were identified through public and stakeholder engagement activities. **Opportunities** represent existing corridor conditions that can be leveraged to enhance the corridor. **Challenges** consist of existing corridor conditions that could be addressed and improved. This section contains a summary of public input received throughout the planning process, which led to defining the project priorities represented in the recommendations ultimately developed for Main Street.

As an integral component of the virtual meetings held for both the public and stakeholders, interactive polling was completed to better understand corridor priorities. Several questions were asked about the priorities, challenges, and opportunities along Main Street, with the results shown in the exhibits below.

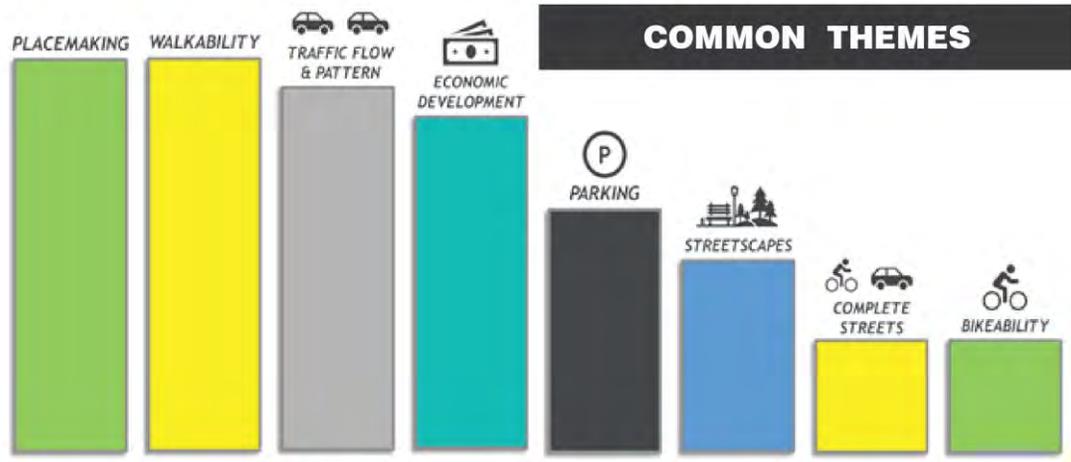


SUPPORTING ENJOYABLE EXPERIENCES



EXISTING CORRIDOR USE

Driving *Traveling Through* *Biking*
Shopping & Dining
Socializing with Friends and Family *Hanging Out/Relaxing* *Walking*



What are your specific goals for Main Street (share up to three responses)?

Mentimeter

Traffic flow	Bike lanes	Make it more attractive and pedestrian friendly
traffic calming	Walkable	Narrow the roadway more pedestrian friendly
streetscape beautification	Parking for Union access.	Enhance beauty and streetscape while maintaining traffic flow
Provide adequate access to union area	Trees and flowers	Traffic flow Destination signage
Nice street flow for downtown and Union access alternate parking	encourage use of parking garages	Pedestrian friendly: safety, outdoor eating, benches, fountains, etc
more traffic calming	Slow traffic down	Additional Businesses and Restaurants

3.4 CORRIDOR IDEAS

Several corridor ideas were created to better understand preferences for Main Street and to inform the conceptual designs and overall recommendations for the corridor. These corridor ideas incorporate elements identified during public and stakeholder engagement activities, such as increasing pedestrian and bicycle comfort levels, expanding public space for cafes, and adding landscape and other features to enhance placemaking. As the stakeholders and the public were engaged, extra time was taken to provide educational opportunities on the potential elements and visual examples to help inform priorities and preferences.



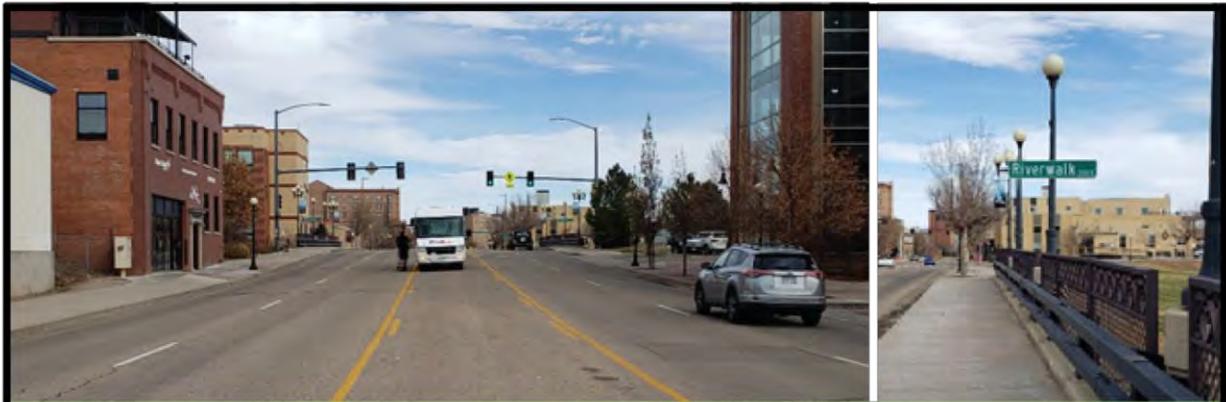
The **proposed corridor ideas** are illustrated in the following pages through a series of visuals. The visuals represent *corridor ideas* and are shared with key elements including sketches, comparison charts, and relative cost.

The set of three corridor ideas created specifically for Main Street were presented during public and stakeholder meetings and through an online questionnaire. Feedback was solicited on preferences for various parking, streetscape, and pedestrian and bicycle design elements. Feedback received on elements indicated preferences for the following along Union Avenue:

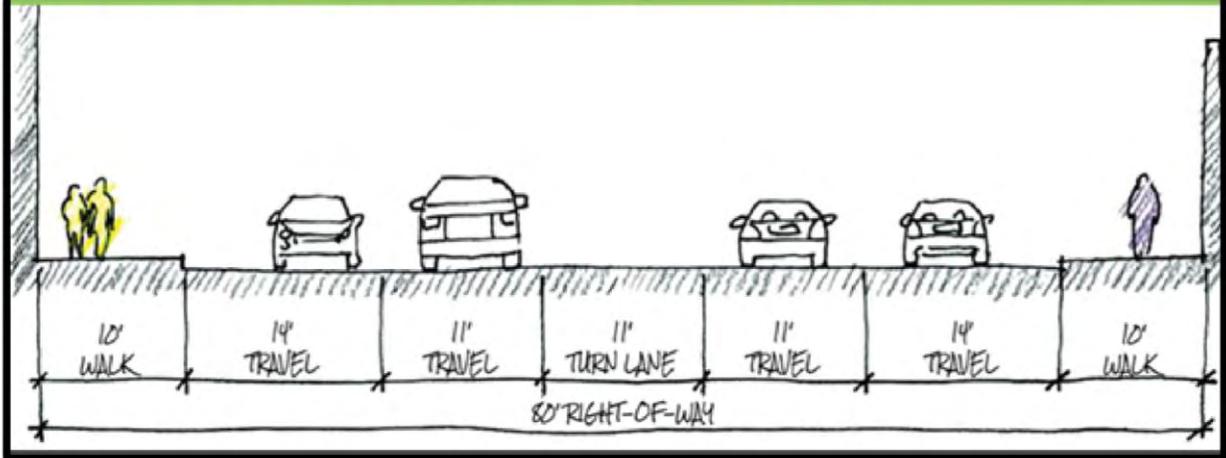
- Preference for angled parking
- Preference for bicyclists and pedestrians being separated from one another

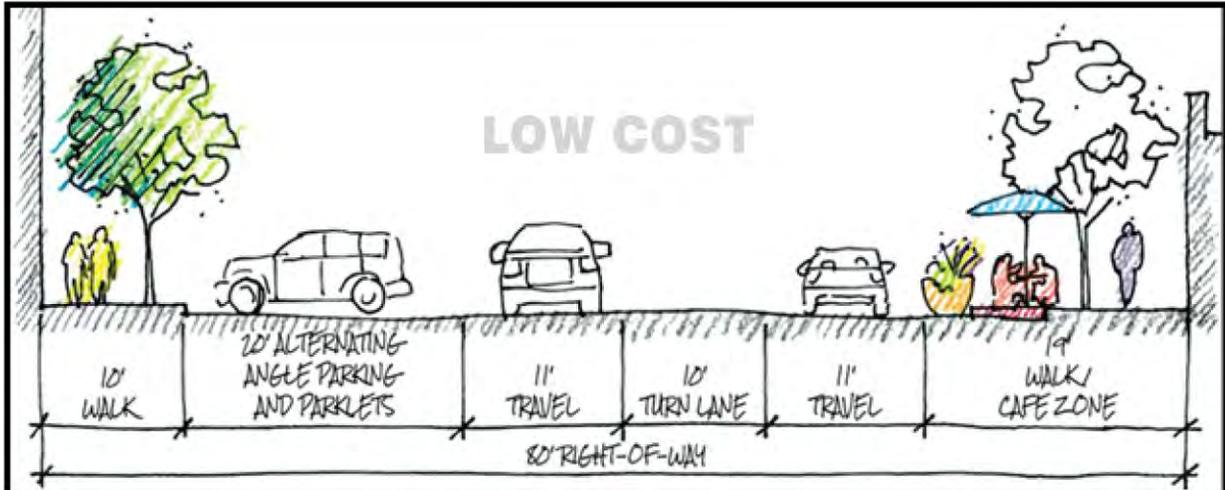
Preferences among these three corridor ideas specifically created for Main Street reinforced the desire for public space, pedestrian comfort, bicycle facilities, and additional parking options. The preferences identified through the engagement activities associated with the corridor ideas informed the development of more refined alternatives along the corridor, as presented in the subsequent section. As a result of the online polling (at the virtual meeting and on the website), there was a strong preference for Idea #2: Two Travel Lanes / Separated Bike Path, emphasizing the desire for traffic calming and the integration of bicycle facilities along Main Street.

The following graphic represents the existing conditions for Main Street. Subsequent visuals include similar graphics for the three corridor ideas created and representing the space allocated for potential corridor features along Main Street.



EXISTING CONDITIONS ALONG MAIN STREET

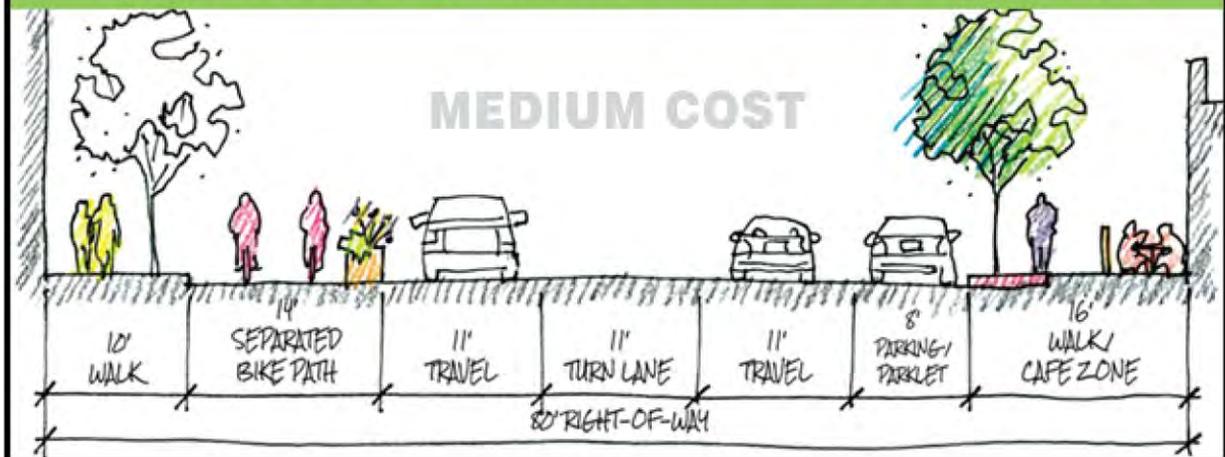


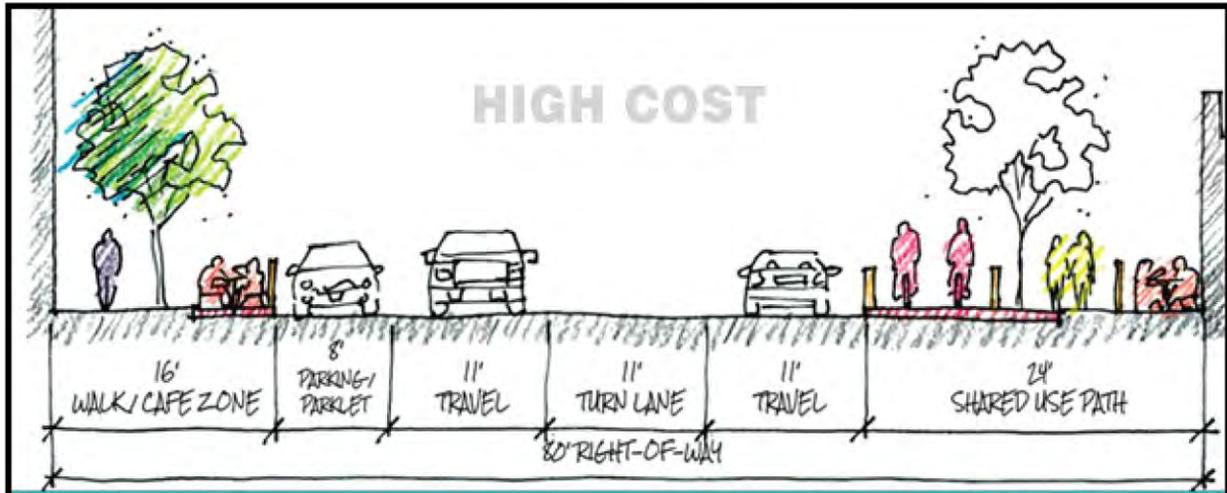


MAIN STREET IDEA #1 | TWO TRAVEL LANES / ANGLED PARKING

IDEA #1 ELEMENTS		IDEA #2 ELEMENTS	
Two Travel Lanes	X	Two Travel Lanes	X
Turn Lane and Landscape	X	Turn Lane and Landscape	X
On-Street Angled Parking	X	On-Street Angled Parking	
On-Street Parallel Parking		On-Street Parallel Parking	X
Sharrows for Bicyclists		Sharrows for Bicyclists	
Separated Bike Lanes		Separated Bike Lanes	X
Shared-Use Path		Shared-Use Path	
10-foot sidewalk	X	10-foot sidewalk	
Caf� Zone/Amenity Zone: sidewalk wider than 10-feet	X	Caf� Zone/Amenity Zone: sidewalk wider than 10-feet	X
Parklets	X	Parklets	X

MAIN STREET IDEA #2 | TWO TRAVEL LANES / SEPARATED BIKE PATH





MAIN STREET IDEA #3 | TWO TRAVEL LANES / SHARED-USE PATH

IDEA #3 ELEMENTS	
Two Travel Lanes	X
Turn Lane and Landscape	X
On-Street Angled Parking	
On-Street Parallel Parking	X
Sharrows for Bicyclists	
Separated Bike Lanes	
Shared-Use Path	X
10-foot sidewalk	
Café Zone/Amenity Zone: sidewalk wider than 10-feet	X
Parklets	X

IDEA 2



3.5 PREFERRED ALTERNATIVE

Based on initial feedback received from the public and stakeholders regarding corridor elements and the above-referenced corridor ideas, the following two alternatives were developed. Each of the alternatives were then vetted with City staff, stakeholders, and the bicycling community to determine a **preferred alternative**.

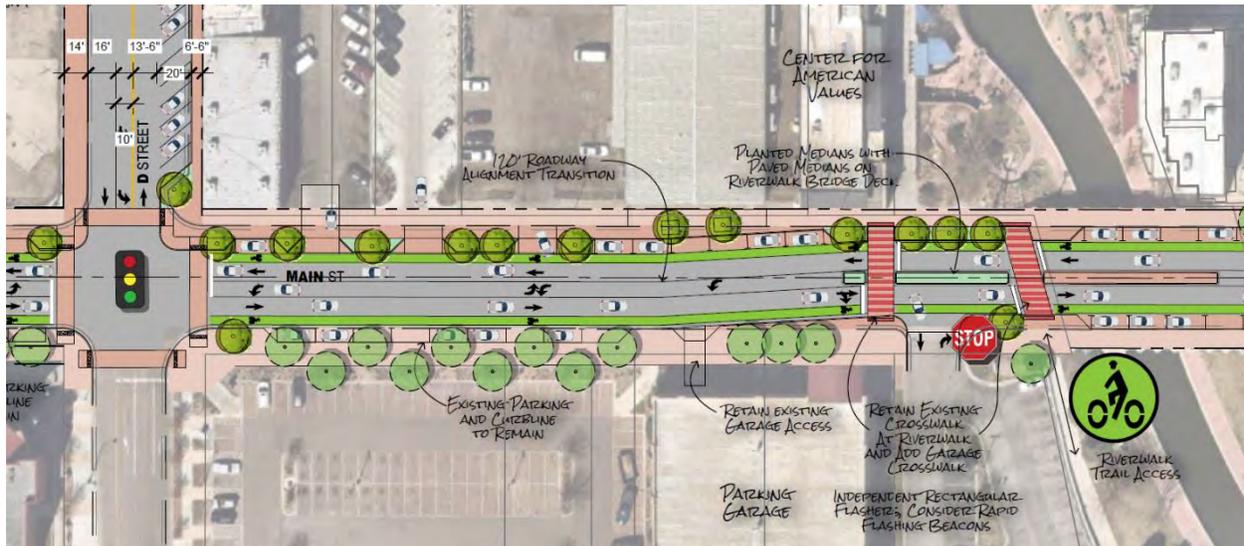
Both proposed alternatives integrated the following elements, with the primary difference related to the type of bicycle facilities and sidewalk expansion. A more detailed list of improvements for the preferred alternative along Main Street is provided under the Recommendations section of this chapter:

- Two travel lanes
- Center turn-lane
- Improved crosswalk at the AT&T / Riverwalk area
- Wider sidewalks
- Expanded parking options
- Various streetscape elements

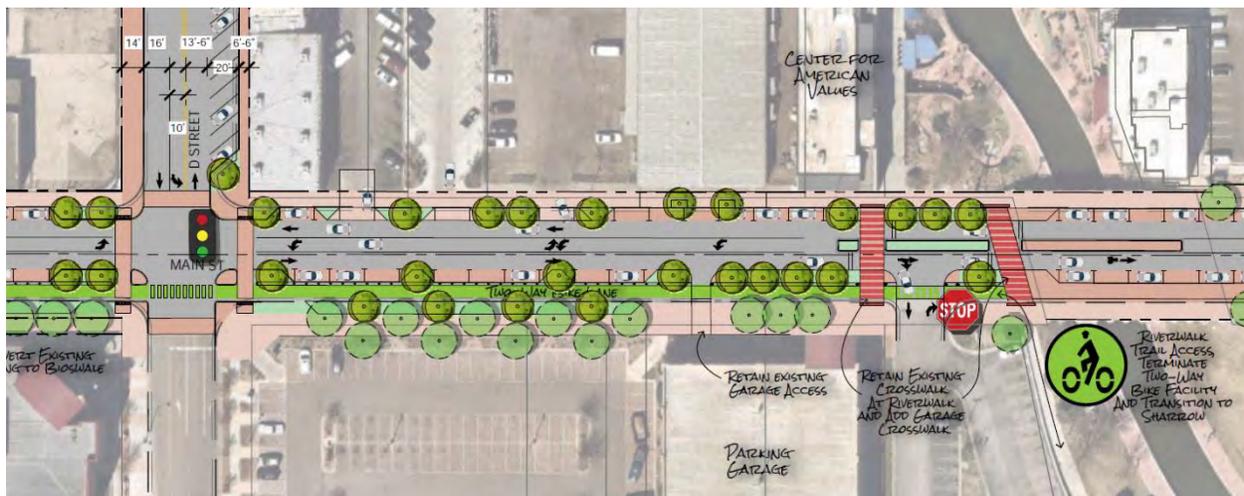
The **preferred alternative** for Main Street that resulted from this targeted outreach includes directional bicycle lanes adjacent to the travel lanes versus the two-way bicycle on one side. The other feature includes a shift in the roadway to allow for expansion of the sidewalk and curb line reconstruction on the side of Main Street closest to Union Avenue. This approach minimized costs and avoided reconstruction of the relatively new improvements along Main Street.

The preferred alternative aligns with the public priorities identified through the various outreach methods and provides bicycle facilities with separation from the pedestrian facilities along with other improvements as noted above. A snapshot of the preferred alternative from C Street to the Riverwalk is shown below, with the additional alternative considered also shown for comparison purposes and to illustrate the planning process.

PREFERRED Alternative: Directional Bicycle Lanes



Alternative: Two-Way Bicycle Facility





TRAFFIC ANALYSIS

To understand the potential traffic impacts under the proposed alternatives, a traffic analysis was completed. Traffic operations are likely to continue to operate at acceptable levels of service and queueing appears to experience the same level of issues as the existing conditions, with the exception of an additional but only occasional extended wait time at Alan Hamel. For the full traffic memo, refer to Appendix 1.

A summary of findings from the traffic analysis include the following for Main Street:

- All intersection approaches generally still operate at acceptable levels of service (D or better). The exception is Main Street and C Street, which has failing levels of service (E or F) for the stop-controlled minor street approaches during peak hours.
- Queueing issue at Main Street and Alan Hamel Avenue from findings for the existing conditions analysis remains. An additional queueing issue observed for the northeast-bound through / right turn lane that may create occasional challenges to accessing the left-turn lane onto Alan Hamel during peak hours.

3.6 RECOMMENDATIONS

The collection of input throughout the planning process, from the public, stakeholders, and roadway users, led to the creation of a Master Plan for the Main Street corridor. The Master Plan aligns with the vision and goals for the Study Area and includes a **two-lane roadway with a center turn lane, bike lanes in each direction, expanded sidewalk/café zones, and enhanced streetscape**. The ultimate vision for Main Street improves pedestrian and bicyclist comfort, increased parking options, provides more opportunities for public spaces, and encourages economic development.

The cost of the full build-out of the preferred alternative along Main Street may require a phased approach with multiple funding sources. The Master Plan has been developed to support funding requests as well as provide short-term and long-term options for implementation. More information on costs and implementation can be found in Chapter 4: Implementation.

The Master Plan recommendations for Main Street were also shared with the public at the second public meeting in February of 2021, and at regularly-scheduled meetings during the spring of 2021 with Pueblo Downtown Association, PACE, PURA, City Council, and Board of County Commissioners. All parties provided feedback and support for the Master Plan and the preferred alternative for Main Street.

A larger visual of the Master Plan recommendations can be found in the Chapter 4: Implementation, with more detailed visuals and renderings provided below.



MASTER PLAN RECOMMENDATIONS

The Master Plan for Main Street is broken up into corridor sections to showcase the proposed improvements. A summary of the recommended improvements for each corridor section is provided in the table below with associated exhibits, in plan view, for more detail. The connection from the Arkansas Trail to C Street, although outside of the Study Area, is also included to indicate the need to consider connections to existing trail facilities. Lastly, renderings were created to provide a visual comparison of the existing conditions and proposed recommendations. The renderings shared here represent one section of Main Street, from C Street to D Street, but exemplify the character of the entire corridor after implementation of the Master Plan recommendations. These renderings were shared with the public and the stakeholders, as visuals of this style often provide a more tangible view of how the future could look along Main Street, and helped to engage the public and build consensus around the preferred alternative.

Location	Proposed Improvements
Arkansas Trail to C Street (outside of Study Area)	<ul style="list-style-type: none"> Enhance bike lanes Trail connection from roadway
C Street to Parking Garage	<ul style="list-style-type: none"> Transition to two-lane roadway with center turn lane Install bike lanes Enhance crosswalk at C Street Expand sidewalk closest to Union (approx. 18') Maintain existing curb line furthest from Union
Parking Garage to Alan Hamel	<ul style="list-style-type: none"> AT&T parking lot Add additional crossing from parking garage Add stop sign Enhance crosswalk to access Riverwalk Remove existing pedestrian signal – add flashing beacon Add medians - no left turns Connect bike lanes to existing facilities along Alan Hamel Add bulb outs at Alan Hamel
Alan Hamel to City Center	<ul style="list-style-type: none"> Sharrows for bicyclists Add landscape medians Additional parallel parking Transition from two lanes to three lanes at Richmond Ave Bulb outs at Richmond Ave Improve parking garage and Vectra Bank entry/exit Lane reduction at City Center Enhance crosswalks at City Center



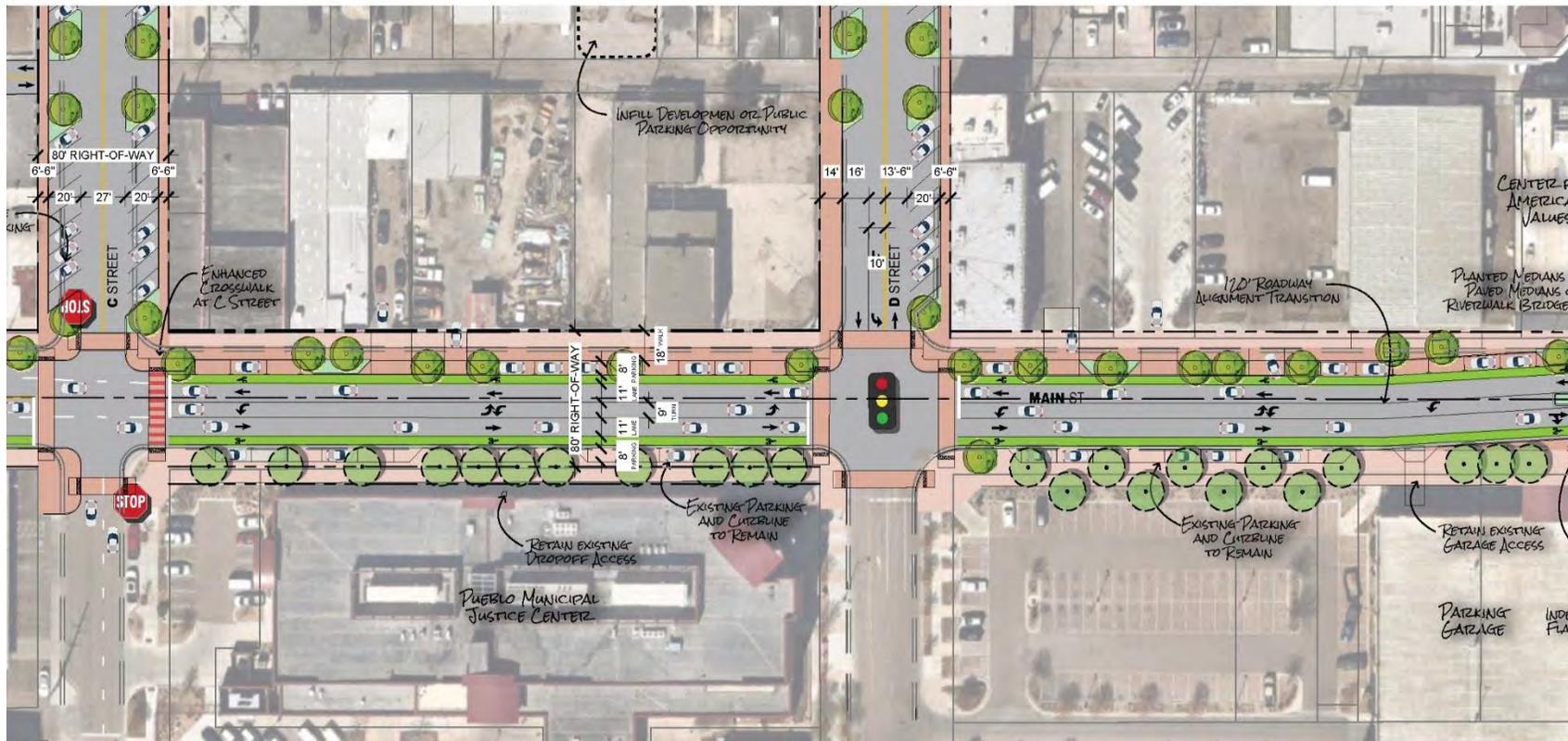
MAIN STREET

ARKANSAS TRAIL TO C STREET



MAIN STREET

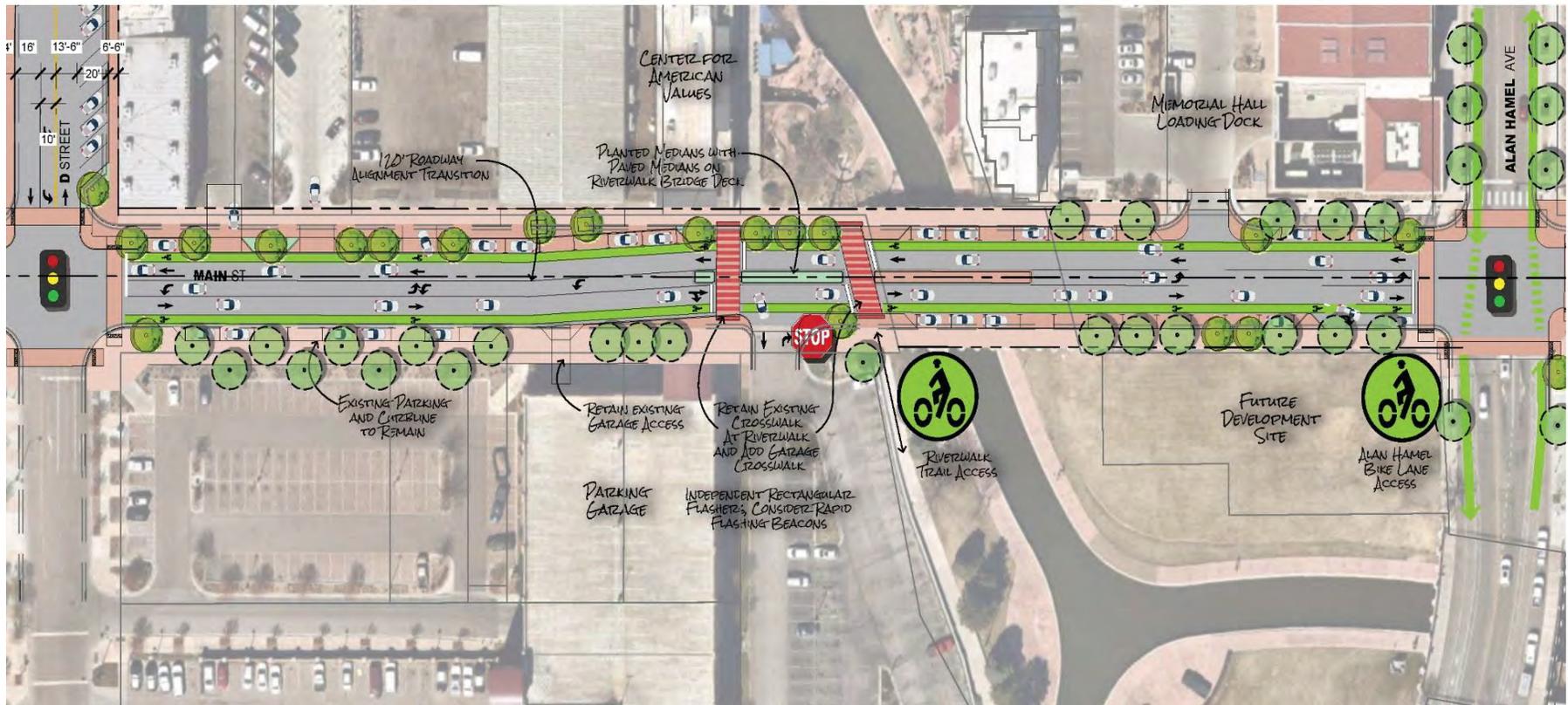
C STREET TO PARKING GARAGE





MAIN STREET

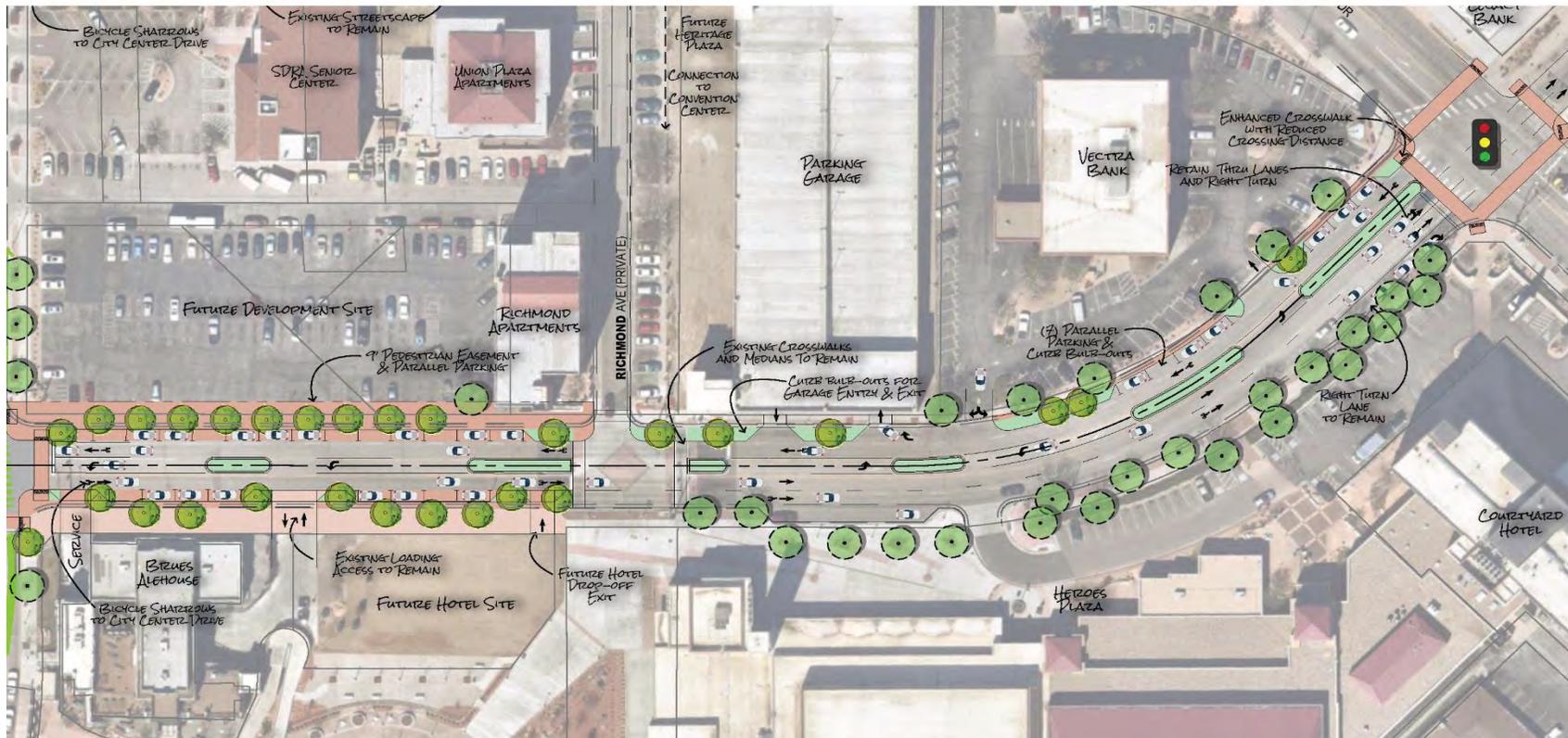
PARKING GARAGE TO ALAN HAMEL





MAIN STREET

ALAN HAMEL TO CITY CENTER





MAIN ST. (FROM C ST. TO D ST.) - EXISTING CONDITION





MAIN ST. (FROM C ST. TO D ST.) - FULL BUILDOUT





POTENTIAL SUB-PROJECTS FOR MAIN STREET

As stated previously, the overall cost associated with the full buildout of the Master Plan may be daunting. Therefore, several potential sub-projects have been identified to help advance the build-out of the Master Plan for Main Street over time. The primary set of sub-projects align with the County 1-A funding requirements and range from crosswalks and landscaping to curblin reconstruction. A list of other potential projects was also identified for supplemental funding sources, as they expand beyond the scope of the County 1-A funds but were determined to bring value to the overall Master Plan for Main Street. Any and all sub-projects can be implemented as appropriate funds become available.

The list below provides a general overview of potential sub-projects for Main Street, with more detail including preliminary costs, found in Chapter 4: Implementation and Appendix 3.

Main Street Potential Sub-Projects	Location
Riverwalk (AT&T) Crosswalk	
Crosswalk improvements	Riverwalk crossing / AT&T parking lot
Signal modification	Riverwalk crossing / AT&T parking lot
Patterned concrete crosswalk (optional)	Riverwalk crossing / AT&T parking lot
Corridor Improvements from Richmond to City Center	
Parking (on-street striping)	Richmond to City Center
Adjust lanes at City Center	City Center
Bulb outs at intersections	Richmond to City Center
Landscape medians	Richmond to City Center (as noted on Plan)
Other Potential Projects	
Corridor Improvements from C Street to Richmond	
Bulb-outs	C Street to Richmond
Alan Hamel crosswalk	Alan Hamel
Stripe directional bicycle lanes	Arkansas River Trail to Alan Hamel
Stripe roadway to two lanes with a center turn lane	C Street to City Center



4 IMPLEMENTATION



4.1 COST ESTIMATES

Preliminary costs were estimated for the potential sub-projects identified for both Union Avenue and Main Street previously presented in Chapters 2 and 3, respectively. An overview of potential sub-projects and associated costs is provided below.

Cost estimates were developed for planning purposes only but can help establish funding needs and support decision-making around the implementation of the Master Plan. The preliminary estimates help establish the order of magnitude for the total funds required or full build-out, as well as for individual corridor sections. All costs provided are preliminary and may fluctuate based on final design and construction needs. For more details on the cost estimates, please refer to a more detailed spreadsheet in Appendix 2 & 3.

Location	Preliminary Cost Estimates
Union Avenue Potential Master Plan Sub-Projects	
Master Plan Improvements from B Street to Grand Avenue	\$4.7M
Master Plan Improvements from Abriendo Avenue to B Street	\$205,000
Master Plan Improvements from Grand Avenue to City Center Drive	\$67,000
TOTAL (APPROX.)	\$5M
Main Street Potential Master Plan Sub-Projects	
Riverwalk (AT&T) crosswalk	\$360,000
Corridor improvement from Richmond to City Center Driver	\$420,000
Corridor improvements from C Street to Richmond	\$1M
TOTAL (APPROX.)	\$1.8M
TOTAL (APPROX.) FOR UNION AVENUE AND MAIN STREET MASTER PLAN	\$6.8M



4.2 FUNDING OPTIONS

The City of Pueblo is working diligently to continue the momentum required to fully implement the Master Plan Design for Union Avenue and Main Street. Phasing considerations and future funding opportunities, including the County 1-A funds, should be considered to successfully construct the proposed recommendations included in the Master Plan.

PHASING

The Master Plan includes a grouping of sub-projects, presented in Chapter 2 and Chapter 3, which represents a recommended scenario for phasing the implementation of improvements. The groupings were delineated to create a cost-effective approach to implementing the Master Plan over time, while minimizing any re-work and capitalizing on complementary elements.

Phasing of projects should be strategic in prioritizing connectivity to surrounding areas and amenities, maintaining safety, minimizing construction impacts, and building upon current and future projects along and near the Union Avenue and Main Street corridors. This is particularly important as it will help build support and synergy for the Master Plan for many years to come.

FUNDING

This study has been funded by the County 1-A funds, a voter approved ballot measure. There is additional funds associated with County 1-A funds that have been identified for the implementation of the Master Plan but expenditure of those funds requires approval from the Board of County Commissioners (BOCC). Even if approved by the BOCC, the total amount allocated for projects will only fund a portion of the proposed recommendations. Additional funds will be needed, and creative funding opportunities should be pursued to ensure consistent progress is made towards implementing the entire Master Plan. Several sources the City of Pueblo are currently considering and can continue to consider in the future are provided below.

CDOT State Grants

The Colorado Department of Transportation (CDOT) provides funding opportunities for grant seeking communities, such as Pueblo, to fund transportation-related projects. A recent funding opportunity as part of Colorado's COVID-19 Recovery Plan is the Revitalizing Main Street program. The intent of the program is to help communities across the state implement transportation projects that improve safety and provide long-term benefits to main streets. Funding for the Revitalizing Main Street program was made possible through a \$30 million allocation from the state legislature in March of 2021.

The City of Pueblo has submitted an application for this program to fund proposed recommendations from the Master Plan. The City of Pueblo can continue to monitor future CDOT state grants and seek funding to implement the proposed recommendations along Union Avenue and Main Street.



Public-Private Partnerships

Public-private partnerships can provide mutual benefits and strengthen relationships between government entities and businesses. These relationships can help support improvements within a community.

Union Avenue and Main Street are located within downtown Pueblo and have a wide variety of businesses along the two corridors, especially along Union Avenue and near the Riverwalk. This provides a unique opportunity for the City of Pueblo to build partnerships with local businesses in and surrounding the Study Area to fund proposed recommendations for the two corridors.

A recent partnership has been developed between the City of Pueblo and a local business owner to support the creation of gateway elements that are proposed at B Street and Alan Hamel Avenue and Union Avenue. Although gateway elements are not part of the potential sub-projects for Union Avenue, they are included in the broader long-term vision for the corridor and will help slow traffic and bring a sense of arrival for those traveling into downtown. Potential ideas for this gateway element are presented below.



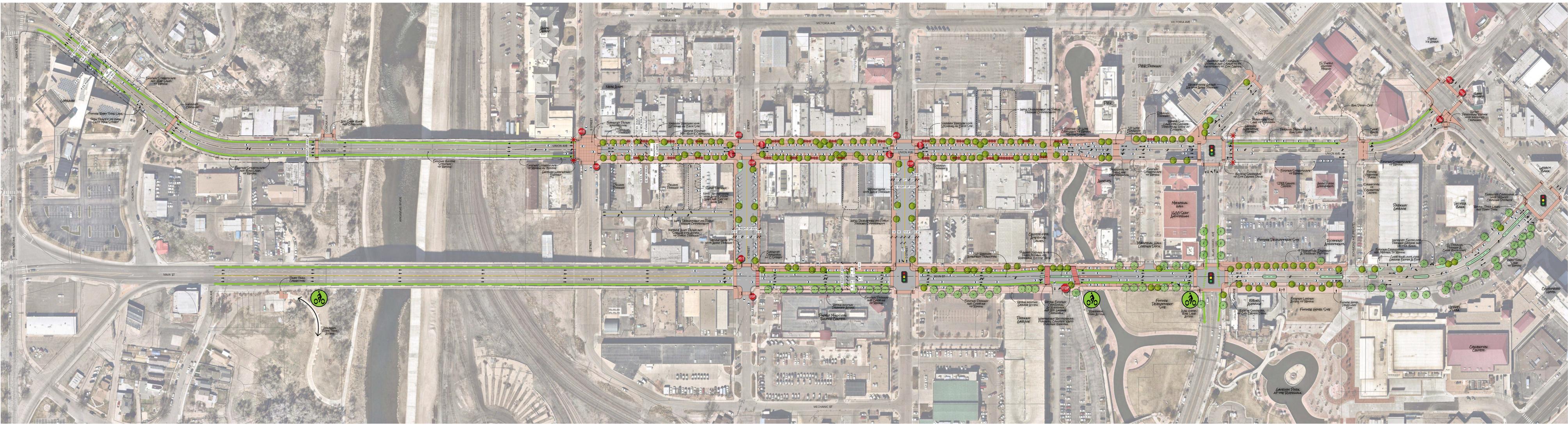
4.3 CONCLUSION

The vision and goals for the Master Plan Design for Union Avenue and Main Street are based on stakeholder and public input and intentionally align with the County 1-A funding requirements for this project. Pueblo leadership, staff, and the community support the overall vision and proposed recommendations in the Master Plan. Solutions developed highlight the need to improve economic development, support placemaking, enhance streetscape, and create multi-modal transportation options within the Study Area today and in the future.

There is ample support from the community for the specific improvements proposed along the two corridors: Union Avenue and Main Street. The Master Plan was presented to the Pueblo City Council (March 22, 2021) and the Board of County Commissioners (BOCC) (April 6, 2021). Both the City Council and the BOCC expressed strong support for moving forward with the Master Plan. The greatest concern among leaders was being able to fund improvements along the entirety of each corridor, in a meaningful and impactful timeframe.

The City of Pueblo is diligently and strategically working to build momentum and identify additional funding sources to implement this Master Plan for Union Avenue and Main Street. The Master Plan components are expected to be adopted by City Council and included in the five (5) year Capital Improvement Program (CIP).

Appendix 2: Master Plan Design for Union Avenue and Main Street



LEGEND

- EXISTING PEDESTRIAN ZONE
- PROPOSED PEDESTRIAN ZONE
- BIKE LANE
- EXISTING TREE TO REMAIN
- PROPOSED TREE
- SHRUB AREA
- UMBRELLA / TABLE & CHAIRS
- CAR (FOR SCALE)
- TRAFFIC SIGNAL INTERSECTION
- STOP SIGN INTERSECTION
- KEY BICYCLE CONNECTION



APPENDIX

APPENDIX 1: TRAFFIC MEMO

MEMORANDUM

DATE: November 30, 2020
TO: Denise Aten
FROM: Karen Aspelin, P.E., P.T.O.E.
SUBJECT: Union Avenue and Main Street, Pueblo, CO – Expected Traffic Conditions
for Proposed Recommendations

This memo is a follow-up to the Existing Traffic Conditions memo dated June 8, 2020, and summarizes the traffic conditions expected by making the recommendations proposed as part of the Union Avenue and Main Street Master Plan in downtown Pueblo, Colorado.

Existing Conditions Traffic Analysis

The City of Pueblo provided afternoon peak hour turning movement counts for the study intersections that were collected in November of 2020. These are provided in Appendix A and summarized in Figure 1. The intersections included in the analysis were:

- Union Avenue/C Street
- Union Avenue/D Street
- Union Avenue/Grand Avenue-Alan Hamel Avenue
- Union Avenue-Court Street/City Center Drive
- Main Street/C Street (no counts taken, turning movement volumes assumed)
- Main Street/D Street
- Main Street/Alan Hamel Avenue
- Main Street/City Center Drive

Because these counts were taken during the COVID pandemic, when traffic volumes were unusually low, a factor of 1.8 was applied to all of the counts to estimate “non-COVID” existing conditions. The 1.8 factor was based on a comparison to hourly counts on Union Avenue and Main Street that were collected in 2019, and was agreed upon by both City staff and MaxGreen. These volumes are shown in Figure 2 and were used to analyze typical existing conditions in the study area.

A capacity analysis of existing conditions was performed using the Synchro 10 software and methodologies of the *Highway Capacity Manual*. The analysis showed all of the intersection movements operating at good levels of service (considered for this study as D or better) in the afternoon peak hour. One exception is the stop-controlled intersection of Union Avenue/City Center Drive, at which the stop-controlled northbound left-turn, southbound left-turn, and southbound through movements operate at a poor level of service (E or F) due to the relatively heavy traffic volumes on City Center Drive and lack of signalization. The existing movement levels of service are shown in Figure 3.

A queueing analysis was run for each scenario using the SimTraffic software and an average of ten one-hour simulations. A queueing “problem” was defined for this study as queue spillover or blockage in more than 10 percent of the cycles observed. Queueing analysis of existing conditions showed two locations where this was observed to be a problem – the first is at the southwest-bound approach to the



Union Avenue/Grand Avenue-Alan Hamel intersection, where the single through lane appears to occasionally queue up to the point that it blocks access into the left-turn lane. The second is at the southeast-bound approach to the Main Street/Alan Hamel intersection, where the shared through/right-turn lane sometimes blocks access to the left-turn lane. This may not actually cause much of a problem because that street has a two-way left-turn lane, and drivers can enter the lane in advance of the gap in the striping for the dedicated left-turn lane onto Main Street.

Phase 1 Traffic Analysis

From the Master Plan, Phase 1 conditions include the following:

- One lane in each direction on Union Avenue southwest of Grand Avenue-Alan Hamel
- Removal of traffic signal at Union Avenue/D Street
- One-lane approach in each direction and all-way stop control at Union Avenue/D Street and Union Avenue/C Street
- Removal of channelized/stop-controlled right-turn lane from Grand Avenue onto Union Avenue

With the Phase 1 modifications it was assumed that about half of the through traffic in both directions would divert from Union Avenue onto Main Street because of the all-way stop control at C and D streets and other features on Union intended to reduce its use as a through-street. Accordingly, approximately half of the hourly through movement volumes were taken from Union Avenue and added to the through movement volumes at the Main Street intersections. Figure 4 shows how the volumes were assumed to be redistributed, and Figure 5 shows the resulting volumes used for the Phase 1 analysis.

The capacity analysis of Phase 1 conditions showed that even with the all-way stop control at Union Avenue/C Street and Union Avenue/D Street, all intersection approaches still operate at acceptable levels of service (D or better). The exception is still the southbound stop-controlled left-turn movement at Union Avenue/City Center Drive. The levels of service for Phase 1 are shown in Figure 6.

A queueing analysis was run for Phase 1 conditions using the SimTraffic software and an average of ten one-hour simulations. Queueing analysis of Phase 1 conditions showed that the reduction in through vehicles on Union Avenue had improved the southwest-bound queueing issue at Union Avenue/Grand Avenue-Alan Hamel. The southeast-bound approach to the Main Street/Alan Hamel intersection still showed some queueing issues in the peak hour.

Phase 2 Traffic Analysis

Phase 2 conditions from the Master Plan include all of the modifications of Phase 1 listed above as well as the following:

- One lane in each direction on Main Street southwest of City Center Drive
- Removal of the pedestrian traffic signal on Main Street at the Riverwalk
- Change of lane geometry on the northbound Main Street approach to City Center Drive to a shared left-turn/through lane and exclusive right-turn lane

The same traffic volumes that were used for analysis of the Phase 1 modifications were also used for the Phase 2 analysis, and are shown in Figure 7.

The levels of service are shown for Phase 2 conditions in Figure 8. The capacity analysis of Phase 2 conditions showed that most intersection approaches still operate at acceptable levels of service (D or better). One exception is the stop-controlled intersection of Main Street/C Street, which has failing levels



of service for the stop-controlled minor street approaches. Additionally, the stop-controlled left-turn movement from Court Street onto City Center Drive is still expected to operate at a level of service E.

A queueing analysis was run for Phase 2 conditions using the SimTraffic software and an average of ten one-hour simulations. Queueing analysis of Phase 2 conditions showed queueing issues at the same location as under existing and Phase 1 conditions -the southeast-bound approach to the Main Street/Alan Hamel intersection. An additional queueing issue was observed under Phase 2 conditions, and is also at the Main Street/Alan Hamel intersection. The northeast-bound through/right-turn lane may during some cycles block access to the left-turn lane onto Alan Hamel Drive.

All of the traffic analysis level of service worksheets and queueing analysis worksheets are included in Appendix B (existing conditions), Appendix C (Phase 1 conditions), and Appendix D (Phase 2 conditions).

Cycle Track Analysis

The Synchro/SimTraffic software does not have the capability of analyzing or simulating a two-way cycle track on one side of Main Street. However, it is not expected that this roadway feature would significantly affect traffic operations for cyclists or vehicles.

Figure 1. Afternoon Peak Hour Traffic Counts from November 2020

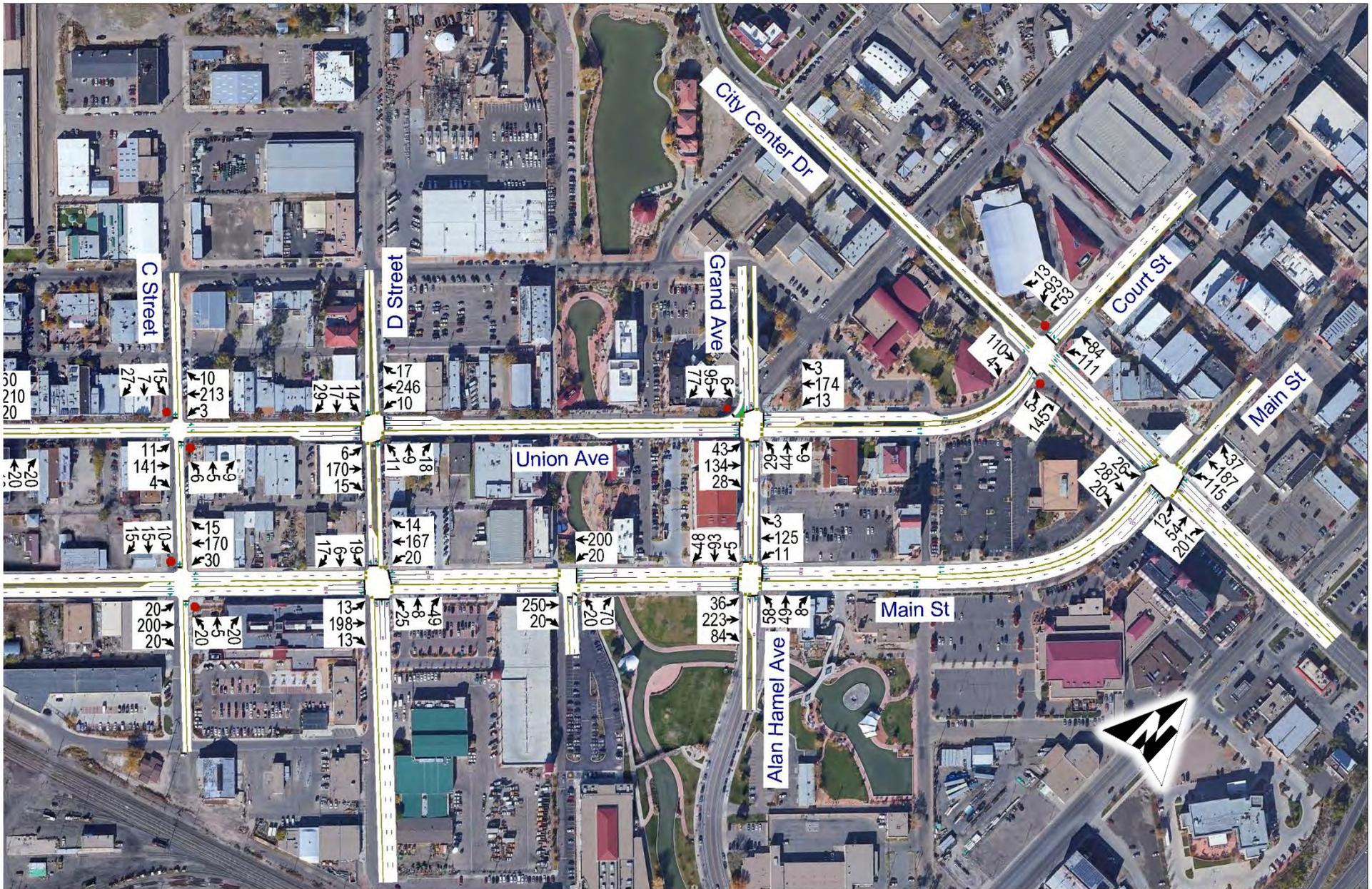




Figure 2. Existing Afternoon Peak Hour Turning Movement Volumes – Adjusted for Non-Covid Conditions





Figure 3. Existing Afternoon Peak Hour Levels of Service





Figure 4. Assumption of Afternoon Peak Hour Volume Shift from Union Avenue to Main Street

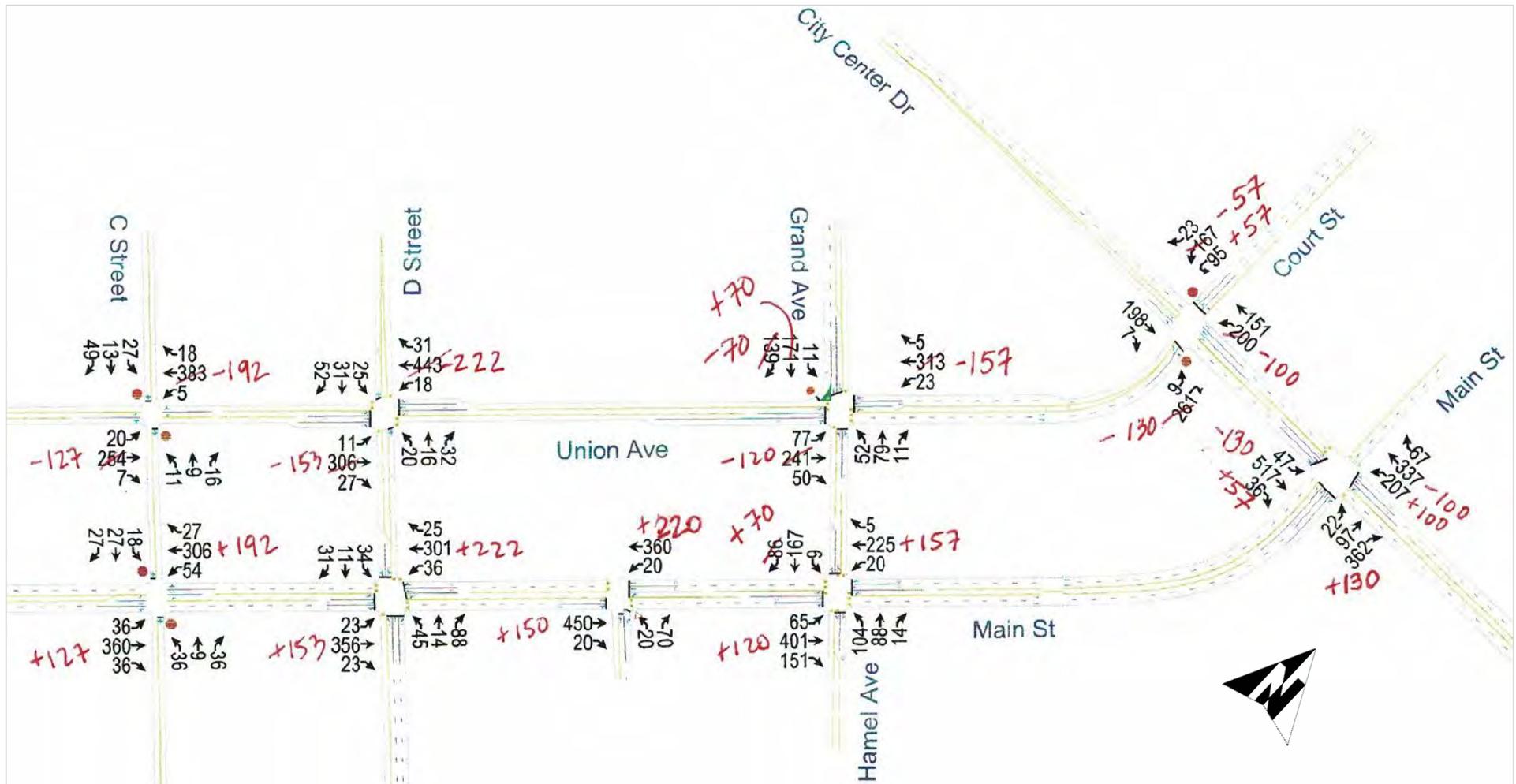




Figure 5. Afternoon Peak Hour Turning Movement Volumes used for Phase 1 Conditions

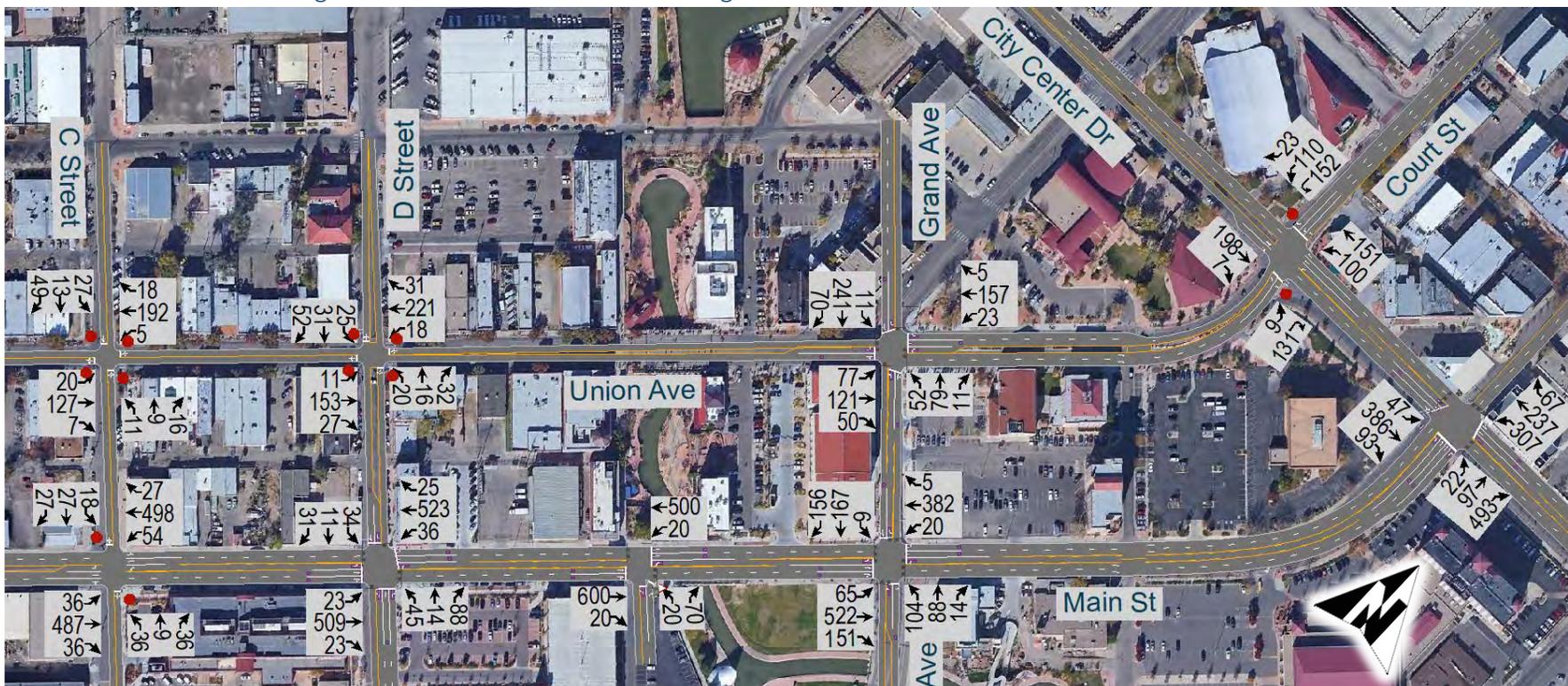




Figure 7. Afternoon Peak Hour Turning Movement Volumes used for Phase 2 Conditions

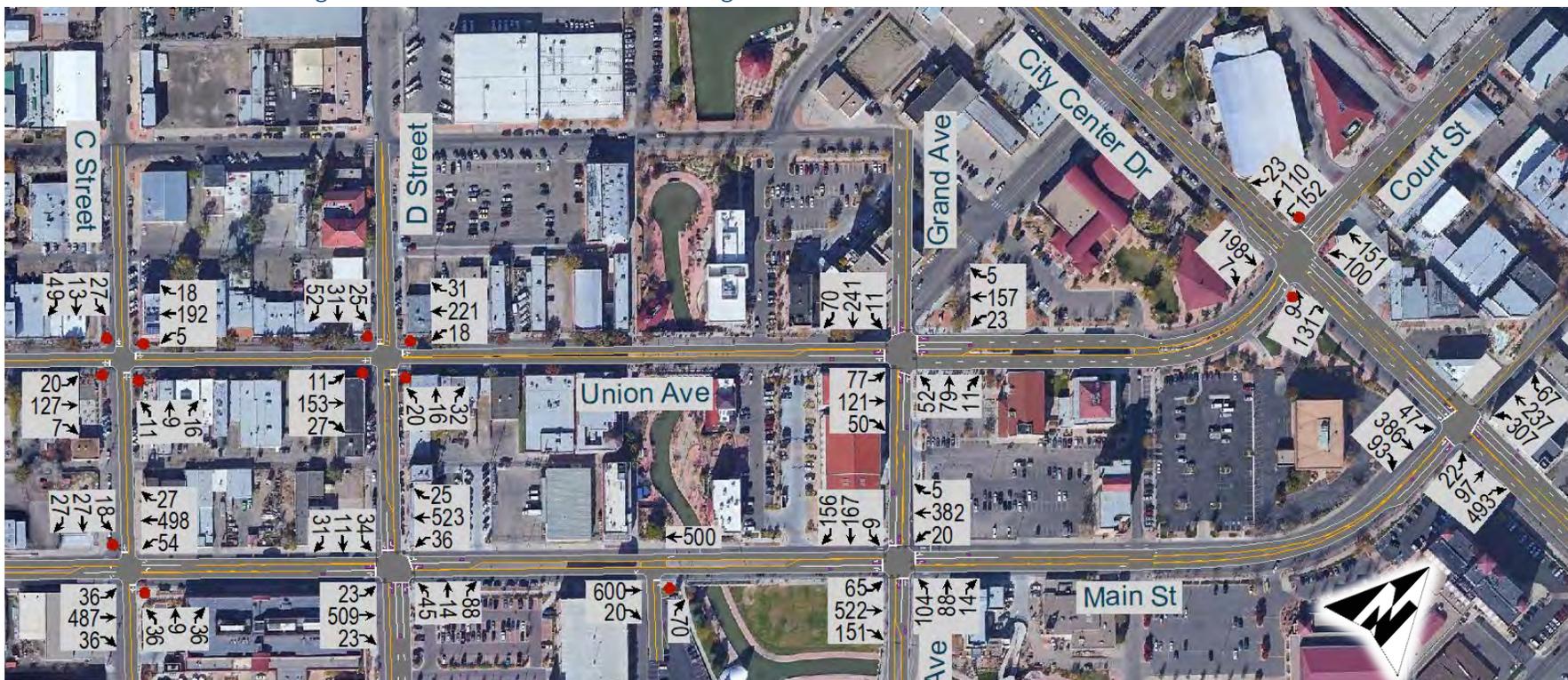
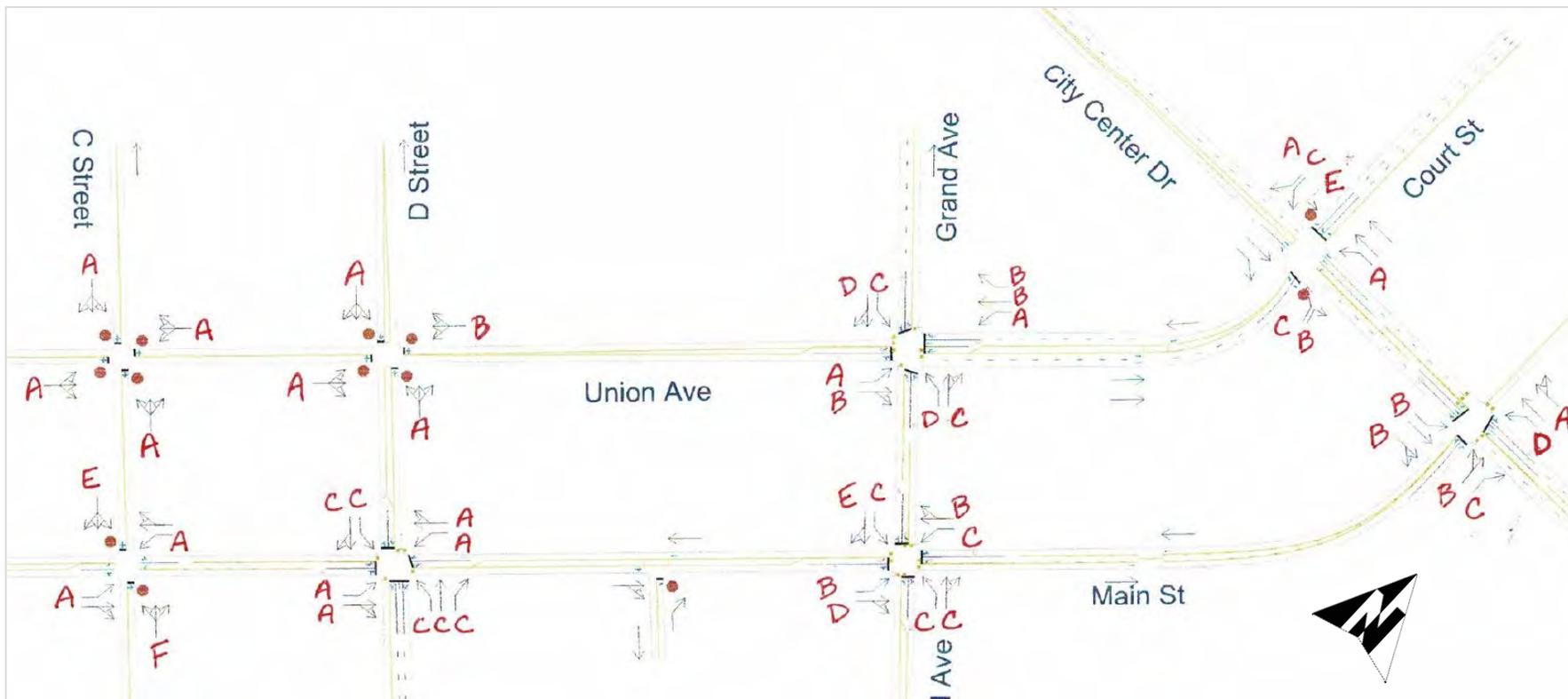




Figure 8. Afternoon Peak Hour Levels of Service for Phase 2 Conditions





Appendix A – Turning Movement Counts from the City

Union Ave & C St - TCM

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 Union Ave & C St 11-11.ppd

Start Date: 11/11/2020

Start Time: 4:00:00 PM

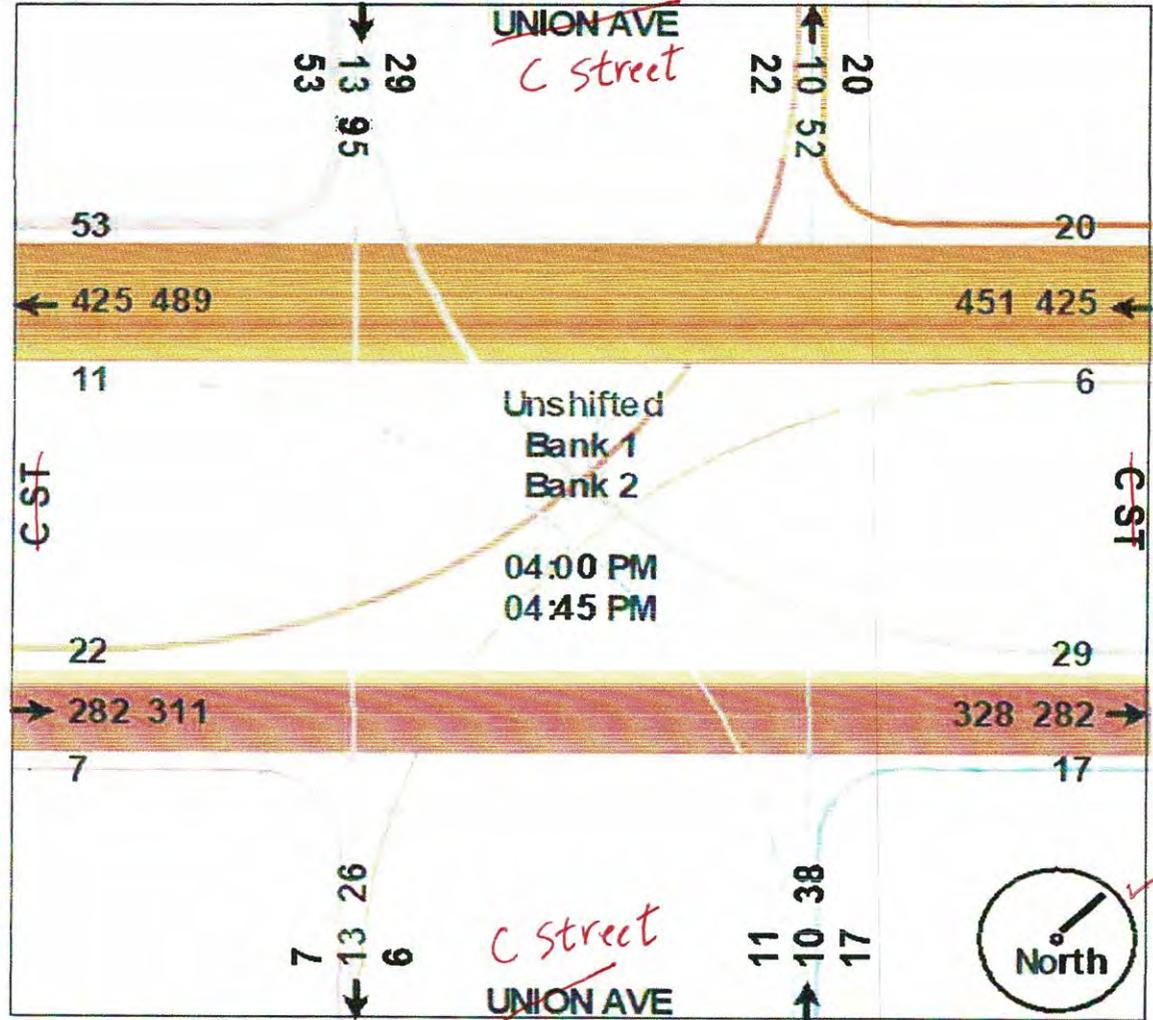
Site Code: 00000000

Comment 1: P.M. Only

Comment 2: Counted By:

Comment 3: HH

Comment 4: This was done in the office 2x the speed



Start Time	UNION AVE <i>C Street SEB</i>				C ST <i>Union Ave SWB</i>				UNION AVE <i>C Street NWB</i>				C ST <i>Union Ave NEB</i>			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	17	3	6	5	5	111	0	3	5	3	3	3	2	86	7	5
04:15 PM	10	2	6	1	9	113	4	11	5	1	2	0	0	75	5	2
04:30 PM	14	7	9	0	2	113	1	0	5	2	2	2	4	63	6	3
04:45 PM	12	1	8	2	4	88	1	2	2	4	4	5	1	58	4	6

D St & Union Ave - TMC

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 D St & Union Ave 11-5.ppd

Start Date: 11/4/2020

Start Time: 4:00:00 PM

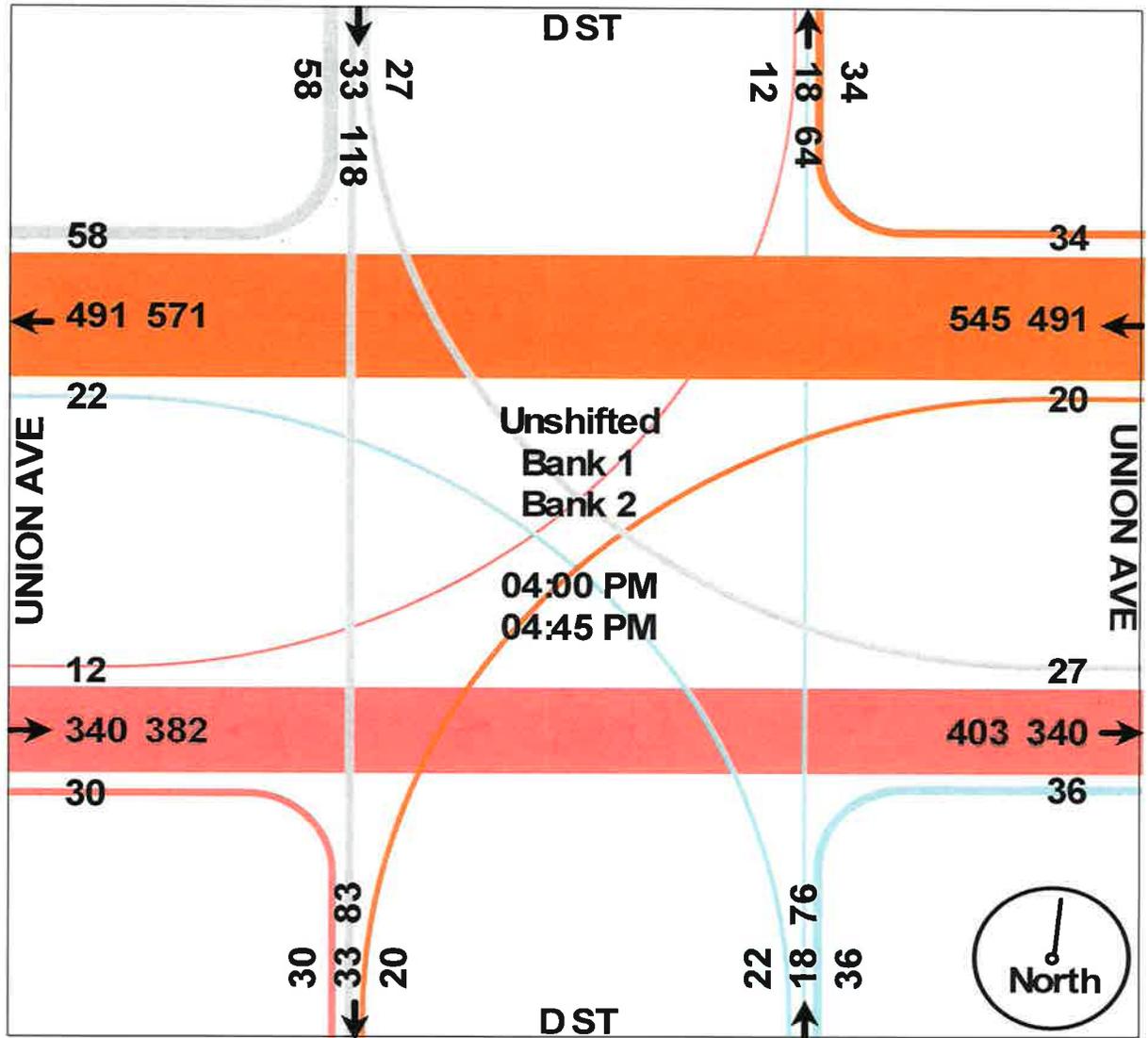
Site Code: 87

Comment 1: P.M. Only

Comment 2: Counted By:

Comment 3: HH

Comment 4: This was done in the office 2x the speed



Start Time	D ST From North				UNION AVE From East				D ST From South				UNION AVE From West			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	20	9	5	10	11	130	5	8	8	3	8	1	9	93	6	6
04:15 PM	15	17	4	4	6	140	7	12	11	6	6	3	7	90	4	5
04:30 PM	13	4	10	5	7	130	5	6	9	5	6	10	9	85	1	13
04:45 PM	10	3	8	4	10	91	3	10	8	4	2	4	5	72	1	6

Alan Hamel Ave & Union Ave - TMC

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 Alan Hamel Ave & Union Ave 11-4.

Start Date: 11/4/2020

Start Time: 4:00:00 PM

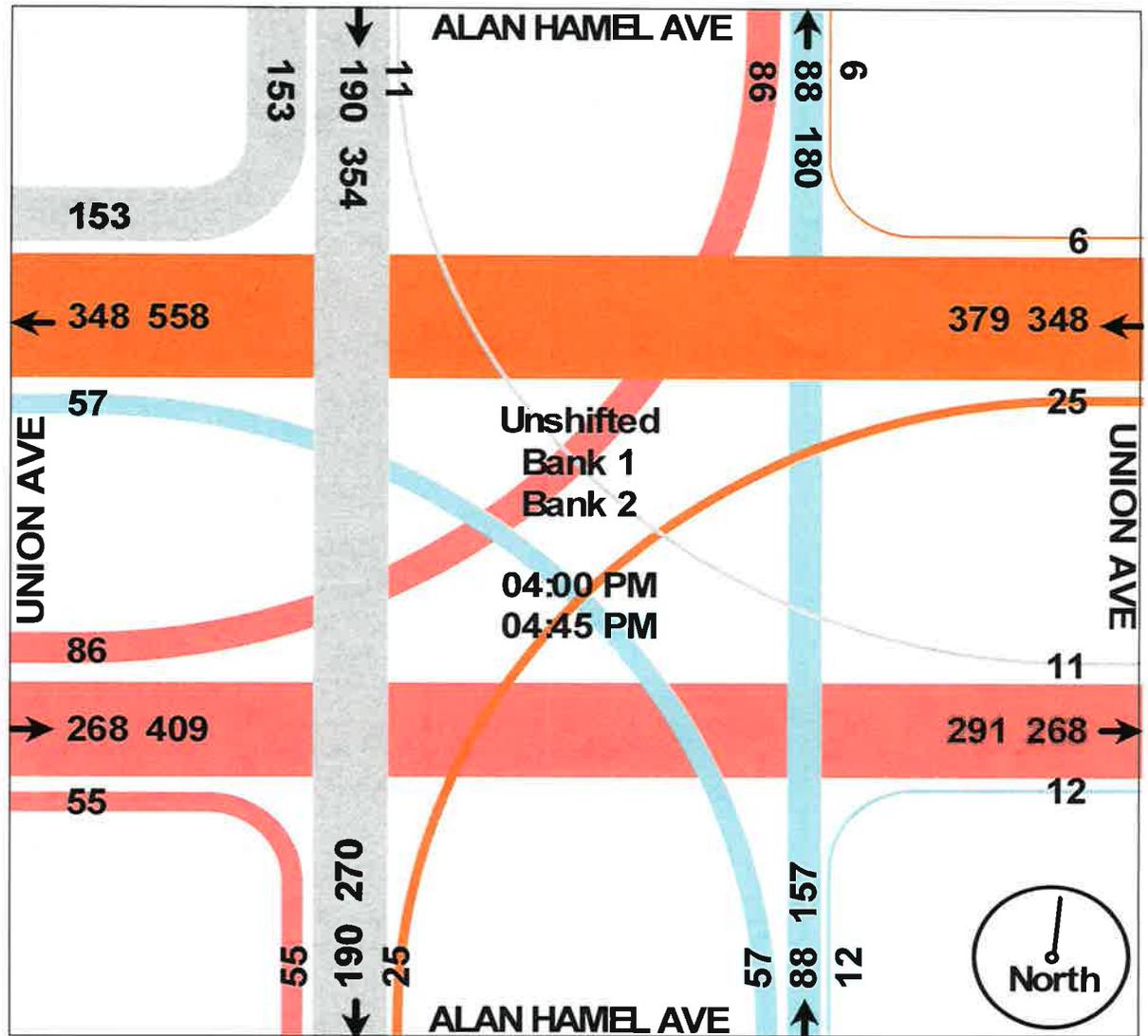
Site Code: 86

Comment 1: P.M. Only

Comment 2: Counted By:

Comment 3: HH

Comment 4: This was done in the office 2x the speed



Start Time	ALAN HAMEL AVE Southbound				UNION AVE Westbound				ALAN HAMEL AVE Northbound				UNION AVE Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	44	41	3	1	2	101	3	3	1	24	14	0	15	75	22	1
04:15 PM	43	47	2	3	2	92	8	1	4	21	14	0	14	61	32	1
04:30 PM	36	67	2	0	2	90	8	0	3	24	17	0	13	72	21	1
04:45 PM	30	35	4	1	0	65	6	1	4	19	12	0	13	60	11	1

City Center Dr & Union Ave - TMC

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 City Center Dr & Union Ave 11-3.pj

Start Date: 11/3/2020

Start Time: 4:00:00 PM

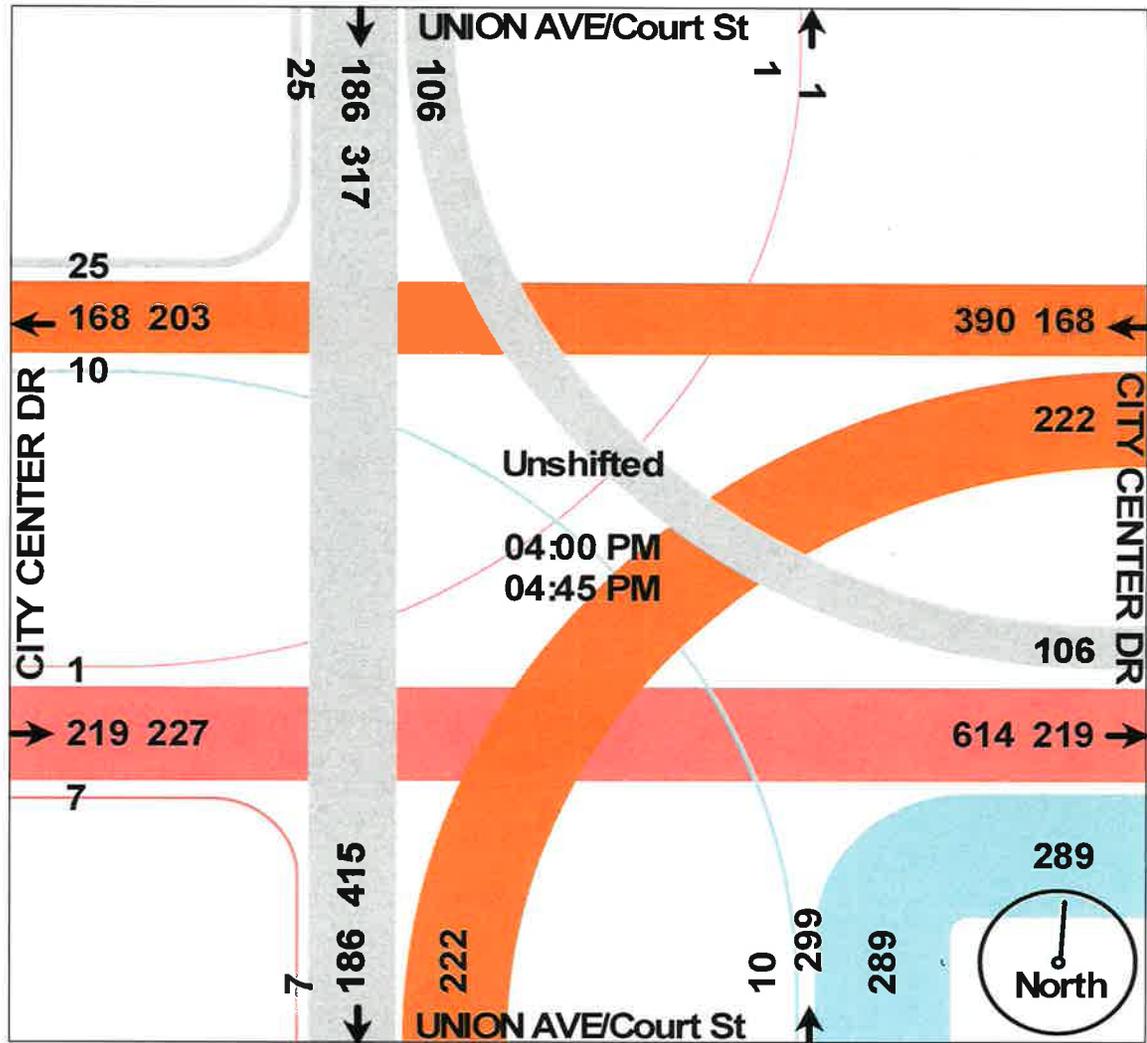
Site Code: 196

Comment 1: P.M. Only

Comment 2: Counted by:

Comment 3: HH

Comment 4: This was done in the office 2x the speed



Start Time	UNION AVE/Court St Southbound				CITY CENTER DR Westbound				UNION AVE/Court St Northbound				CITY CENTER DR Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	4	67	22	1	0	55	52	1	67	0	4	3	1	57	1	2
04:15 PM	7	52	27	1	0	32	64	2	73	0	2	1	0	71	0	6
04:30 PM	7	44	31	1	0	48	60	0	89	0	2	1	4	61	0	1
04:45 PM	7	23	26	0	0	33	46	0	60	0	2	0	2	30	0	2

Main St & D St - TMC

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 Main St & D St 11-3.ppd

Start Date: 11/3/2020

Start Time: 4:00:00 PM

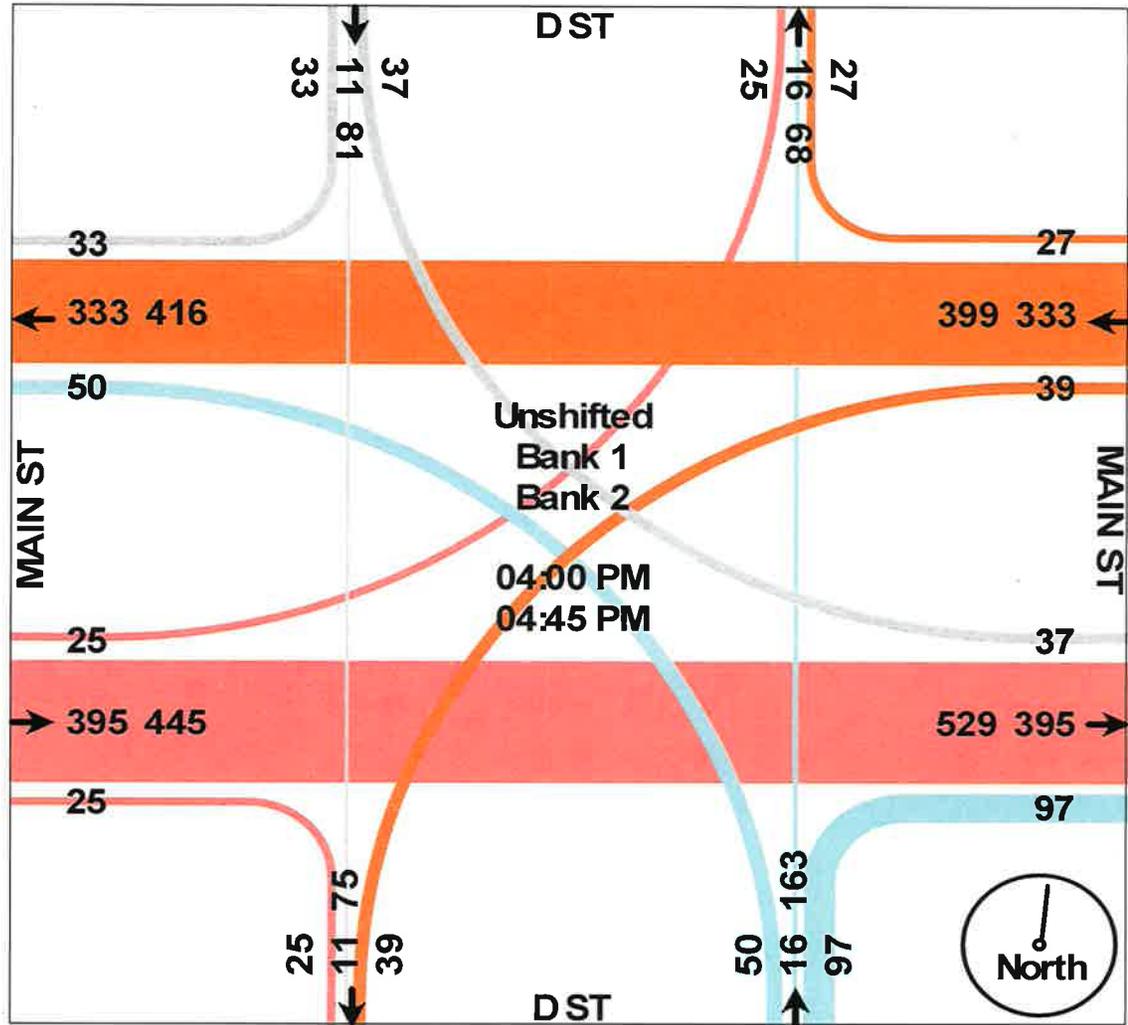
Site Code: 88

Comment 1: P.M. Only

Comment 2: Counted By:

Comment 3: HH

Comment 4: This was done in the office 2x the speed



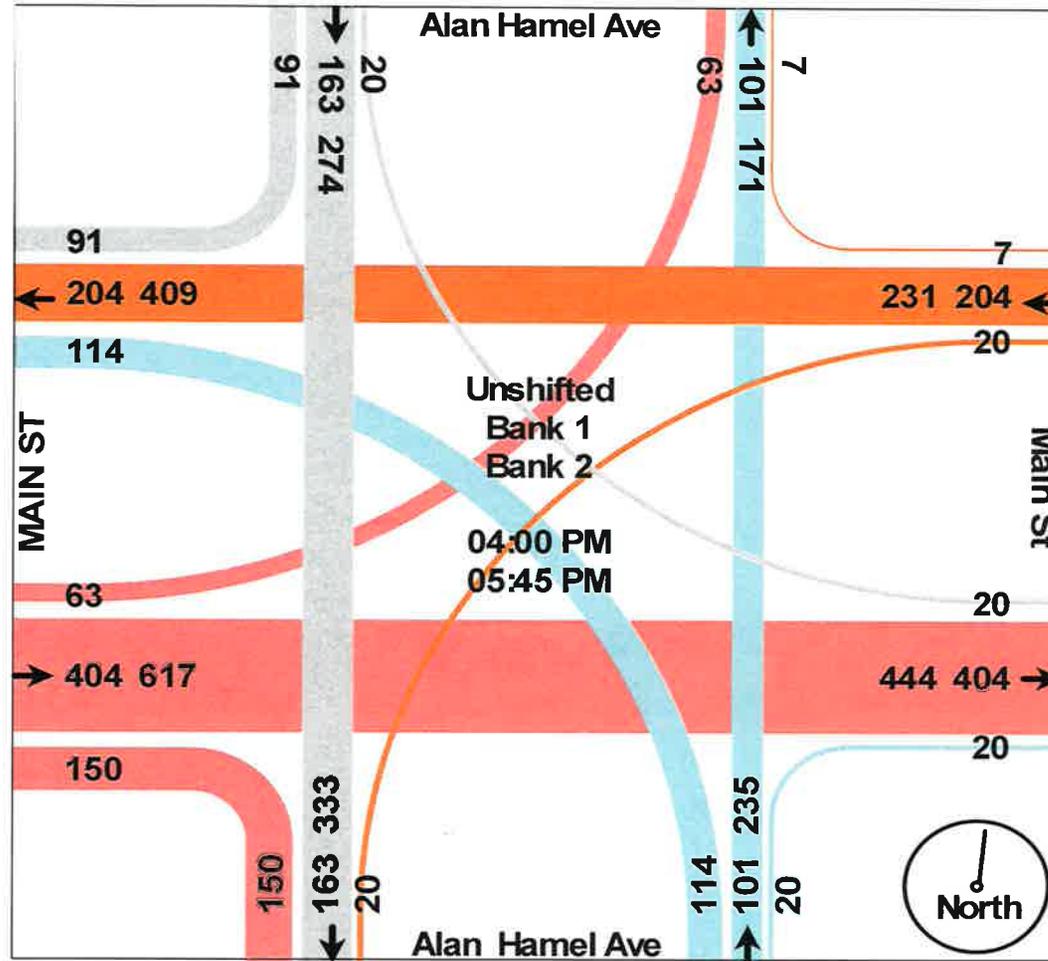
Start Time	D ST Southbound				MAIN ST Westbound				D ST Northbound				MAIN ST Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	13	3	13	0	13	96	12	1	17	3	12	1	9	111	5	3
04:15 PM	6	5	7	0	5	85	10	0	28	8	13	3	10	93	5	4
04:30 PM	9	2	9	0	5	101	9	0	26	5	18	2	3	113	6	2
04:45 PM	5	1	8	0	4	51	8	0	26	0	7	0	3	78	9	1

Alan Hamel Ave & Main St - TMC

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 Alan Hamel Ave & Main St 11-3.pp

Start Date: 11/3/2020
 Start Time: 4:00:00 P.M.
 End Time: 6:00:00 P.M.
 Site Code: 85

Comment 1: A.M. | Noon | P.M.
 Comment 2: P.M. Only
 Comment 3: Counted By:
 Comment 4: HH



Start Time	Alan Hamel Ave Southbound				Main St Westbound				Alan Hamel Ave Northbound				MAIN ST Eastbound			
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
04:00 PM	17	17	4	0	2	25	2	10	2	11	17	3	18	60	12	0
04:15 PM	14	27	1	0	1	34	3	4	3	9	14	1	23	38	9	6
04:30 PM	10	21	1	3	1	23	2	0	1	10	13	2	19	51	10	0
04:45 PM	12	26	2	2	1	36	4	2	1	16	17	3	18	49	5	1
05:00 PM	12	19	1	0	0	32	2	3	3	14	14	9	24	85	12	3
05:15 PM	13	21	6	2	0	17	1	2	2	19	17	0	16	48	6	2
05:30 PM	5	16	4	2	1	24	3	3	5	8	14	5	18	35	6	3
05:45 PM	8	16	1	1	1	13	3	4	3	14	8	0	14	38	3	5

City Center Dr & Main St

File Name: S:\Traffic Related Programs and Info\HDM\2020 Traffic-Ped Counts\Turn Movement Counts\2020 City Center Dr & Main St 11-4.ppd

Start Date: 11/4/2020

Start Time: 4:00:00 PM

End Time: 6:00:00 P.M.

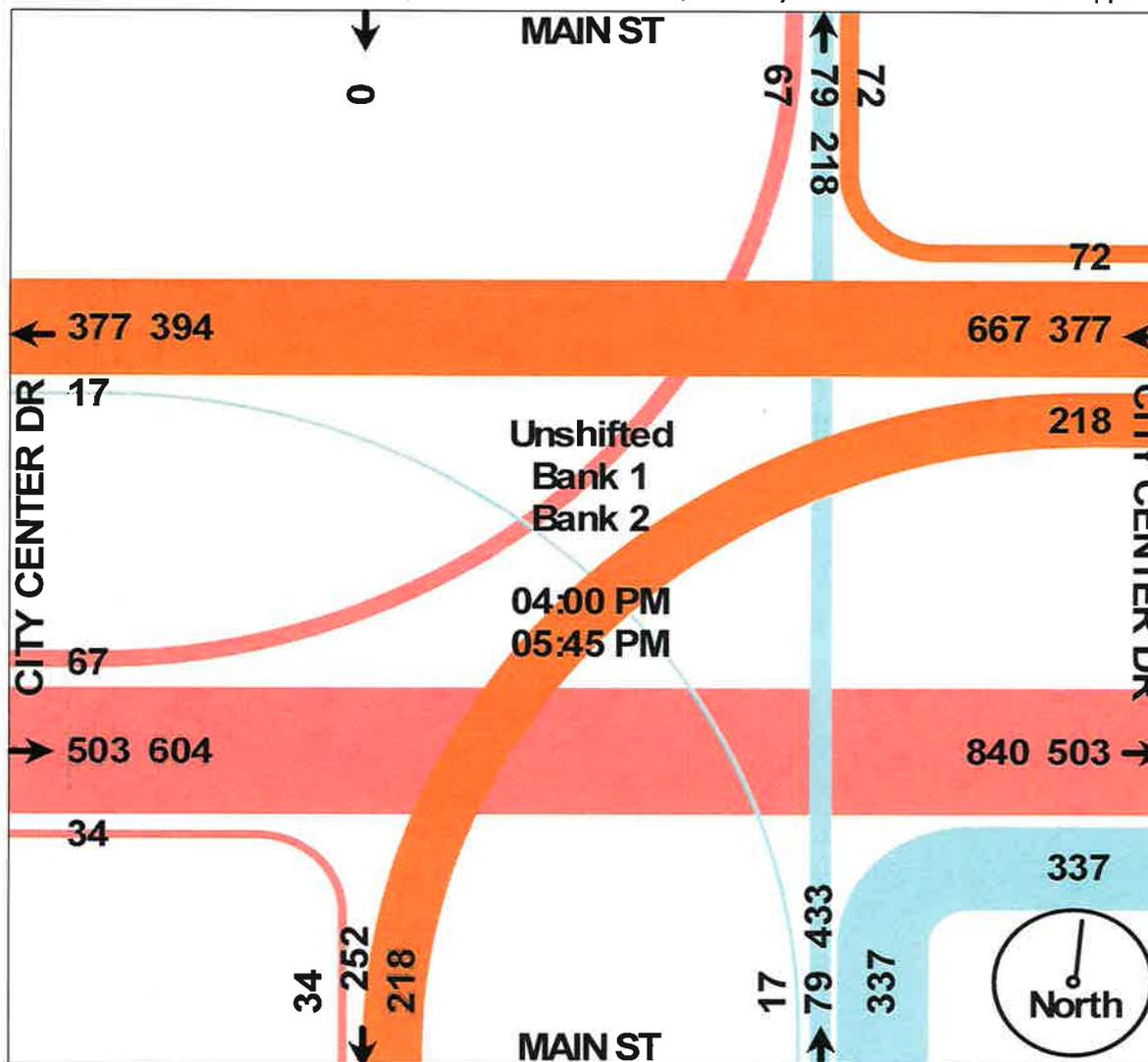
Site Code: 84

Comment 1: A.M. | Noon | P.M.

Comment 2: P.M. Only

Comment 3: Counted By:

Comment 4: HH



Start Time	MAIN ST Southbound					CITY CENTER DR Westbound					MAIN ST Northbound					CITY CENTER DR Eastbound				
	Right	Thru	Left	Peds		Right	Thru	Left	Peds		Right	Thru	Left	Peds		Right	Thru	Left	Peds	
04:00 PM	0	0	0	0	1	11	60	37	0	0	47	8	0	1	0	6	61	17	1	
04:15 PM	0	0	0	0	0	14	37	28	0	0	44	18	4	0	4	71	6	0		
04:30 PM	0	0	0	0	0	8	48	31	0	0	45	8	5	1	12	62	4	2		
04:45 PM	0	0	0	0	0	4	55	28	1	1	44	14	3	1	1	65	6	1		
05:00 PM	0	0	0	1	1	11	47	28	1	1	68	14	0	2	3	89	10	8		
05:15 PM	0	0	0	0	0	10	52	28	1	1	39	5	3	1	4	59	7	0		
05:30 PM	0	0	0	1	1	7	43	22	1	1	27	6	1	1	1	49	14	3		
05:45 PM	0	0	0	1	1	7	35	16	1	1	23	6	1	1	3	47	3	1		



Appendix B – Traffic Analysis Level of Service and Queueing Worksheets

Existing Conditions

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕			↕	
Traffic Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
Future Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	120	-	-	100	-	-	-	-	-	-	-	-
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	22	276	8	6	417	20	12	10	18	29	14	53

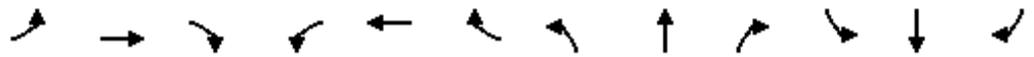
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	437	0	0	284	0	0	797	773	280	777	767	427
Stage 1	-	-	-	-	-	-	324	324	-	439	439	-
Stage 2	-	-	-	-	-	-	473	449	-	338	328	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1123	-	-	1278	-	-	305	330	759	314	332	628
Stage 1	-	-	-	-	-	-	688	650	-	597	578	-
Stage 2	-	-	-	-	-	-	572	572	-	676	647	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1123	-	-	1278	-	-	265	322	759	294	324	628
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	322	-	294	324	-
Stage 1	-	-	-	-	-	-	674	637	-	585	575	-
Stage 2	-	-	-	-	-	-	509	569	-	637	634	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			15			16		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	400	1123	-	-	1278	-	-	424
HCM Lane V/C Ratio	0.098	0.019	-	-	0.005	-	-	0.226
HCM Control Delay (s)	15	8.3	-	-	7.8	-	-	16
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.9



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	170	15	10	246	17	11	9	18	14	17	29
Future Volume (veh/h)	6	170	15	10	246	17	11	9	18	14	17	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	0.99		0.98	0.97		0.96	0.96		0.96
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	12	333	29	20	481	33	22	18	35	27	33	57
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	400	950	787	506	950	787	157	129	199	129	152	213
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	791	1683	1395	907	1683	1395	317	420	645	235	494	693
Grp Volume(v), veh/h	12	333	29	20	481	33	75	0	0	117	0	0
Grp Sat Flow(s),veh/h/ln	791	1683	1395	907	1683	1395	1383	0	0	1422	0	0
Q Serve(g_s), s	0.7	8.4	0.7	1.0	13.6	0.8	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.3	8.4	0.7	9.3	13.6	0.8	2.8	0.0	0.0	4.5	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.29		0.47	0.23		0.49
Lane Grp Cap(c), veh/h	400	950	787	506	950	787	485	0	0	494	0	0
V/C Ratio(X)	0.03	0.35	0.04	0.04	0.51	0.04	0.15	0.00	0.00	0.24	0.00	0.00
Avail Cap(c_a), veh/h	400	950	787	506	950	787	485	0	0	494	0	0
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	14.7	9.2	7.6	11.8	10.4	7.6	19.7	0.0	0.0	20.3	0.0	0.0
Incr Delay (d2), s/veh	0.1	1.0	0.1	0.1	1.9	0.1	0.7	0.0	0.0	1.1	0.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	0.2	0.2	5.1	0.3	1.1	0.0	0.0	1.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.9	10.3	7.7	11.9	12.3	7.7	20.3	0.0	0.0	21.4	0.0	0.0
LnGrp LOS	B	B	A	B	B	A	C	A	A	C	A	A
Approach Vol, veh/h		374			534			75			117	
Approach Delay, s/veh		10.2			12.0			20.3			21.4	
Approach LOS		B			B			C			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.0		29.0		49.0		29.0				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		44.0		24.0		44.0		24.0				
Max Q Clear Time (g_c+I1), s		16.3		4.8		15.6		6.5				
Green Ext Time (p_c), s		2.4		0.3		3.7		0.6				
Intersection Summary												
HCM 6th Ctrl Delay											13.0	
HCM 6th LOS											B	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	↗
Traffic Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	95	77
Future Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	95	77
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		0.99	0.99		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	84	262	55	25	340	6	57	86	12	12	186	0
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	606	1522	314	680	972	820	304	430	60	372	502	
Arrive On Green	0.06	0.52	0.52	0.06	0.52	0.52	0.27	0.27	0.27	0.27	0.27	0.00
Sat Flow, veh/h	1781	2930	605	1781	1870	1577	1193	1604	224	1288	1870	1585
Grp Volume(v), veh/h	84	157	160	25	340	6	57	0	98	12	186	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1758	1781	1870	1577	1193	0	1828	1288	1870	1585
Q Serve(g_s), s	1.9	4.2	4.3	0.5	9.6	0.2	3.6	0.0	3.7	0.7	7.2	0.0
Cycle Q Clear(g_c), s	1.9	4.2	4.3	0.5	9.6	0.2	10.9	0.0	3.7	4.4	7.2	0.0
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.12	1.00		1.00
Lane Grp Cap(c), veh/h	606	923	913	680	972	820	304	0	490	372	502	
V/C Ratio(X)	0.14	0.17	0.18	0.04	0.35	0.01	0.19	0.00	0.20	0.03	0.37	
Avail Cap(c_a), veh/h	618	923	913	689	972	820	304	0	490	372	502	
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.0	11.3	11.4	8.3	12.6	10.4	31.0	0.0	25.3	27.0	26.6	0.0
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.0	1.0	0.0	1.4	0.0	0.9	0.2	2.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.7	1.7	0.2	4.1	0.1	1.2	0.0	1.7	0.2	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.1	11.7	11.8	8.3	13.6	10.4	32.4	0.0	26.2	27.2	28.7	0.0
LnGrp LOS	A	B	B	A	B	B	C	A	C	C	C	
Approach Vol, veh/h		401			371			155			198	A
Approach Delay, s/veh		11.2			13.2			28.5			28.6	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	51.5		29.0	9.0	51.5		29.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	5.5	46.5		24.0	5.6	46.4		24.0				
Max Q Clear Time (g_c+I1), s	2.5	6.3		12.9	3.9	11.6		9.2				
Green Ext Time (p_c), s	0.0	2.1		0.5	0.0	2.4		0.9				

Intersection Summary

HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection										
Int Delay, s/veh	22.2									
Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations	↖			↗	↖	↖	↗		↖	↖
Traffic Vol, veh/h	5	0	0	110	4	111	84	0	93	13
Future Vol, veh/h	5	0	0	110	4	111	84	0	93	13
Conflicting Peds, #/hr	11	0	0	0	11	11	0	0	11	11
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	0	-	-	60	130	-	-	0	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	0	215	8	217	164	0	182	25

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	844	237	0	970
Stage 1	226	-	-	598
Stage 2	618	-	-	372
Critical Hdwy	7.33	6.23	4.13	6.93
Critical Hdwy Stg 1	6.13	-	-	6.53
Critical Hdwy Stg 2	6.53	-	-	6.13
Follow-up Hdwy	3.519	3.319	2.219	3.319
Pot Cap-1 Maneuver	269	801	1332	946
Stage 1	776	0	-	457
Stage 2	444	0	-	648
Platoon blocked, %				
Mov Cap-1 Maneuver	94	784	1318	936
Mov Cap-2 Maneuver	94	-	-	121
Stage 1	776	-	-	457
Stage 2	198	-	-	409

Approach	NB	SE	NW	SW
HCM Control Delay, s	13.4	0	4.7	67.9
HCM LOS	B			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	NWL	NWT	SET	SERSWLn1	SWLn2	SWLn3
Capacity (veh/h)	94	784	1318	-	-	-	121	936
HCM Lane V/C Ratio	0.104	0.362	0.165	-	-	-	0.857	0.027
HCM Control Delay (s)	47.7	12.2	8.3	-	-	-	114.4	9
HCM Lane LOS	E	B	A	-	-	-	F	A
HCM 95th %tile Q(veh)	0.3	1.7	0.6	-	-	-	5.2	0.1

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕↗		↵	↕↗			↕↗			↕↗	
Traffic Vol, veh/h	20	200	20	30	170	15	20	5	20	10	15	15
Future Vol, veh/h	20	200	20	30	170	15	20	5	20	10	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	60	-	-	70	-	-	-	-	-	-	-	-
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	39	391	39	59	333	29	39	10	39	20	29	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	362	0	0	430	0	0	788	969	215	745	974	181
Stage 1	-	-	-	-	-	-	489	489	-	466	466	-
Stage 2	-	-	-	-	-	-	299	480	-	279	508	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1193	-	-	1126	-	-	282	252	790	302	250	831
Stage 1	-	-	-	-	-	-	529	548	-	546	561	-
Stage 2	-	-	-	-	-	-	685	553	-	704	537	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1193	-	-	1126	-	-	230	231	790	260	229	831
Mov Cap-2 Maneuver	-	-	-	-	-	-	230	231	-	260	229	-
Stage 1	-	-	-	-	-	-	512	530	-	528	532	-
Stage 2	-	-	-	-	-	-	592	524	-	635	519	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			1.2			19.5			19.4		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	336	1193	-	-	1126	-	-	328
HCM Lane V/C Ratio	0.262	0.033	-	-	0.052	-	-	0.239
HCM Control Delay (s)	19.5	8.1	-	-	8.4	-	-	19.4
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1	0.1	-	-	0.2	-	-	0.9

14: D Street & Main St
11/25/2020

Existing Conditions
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (veh/h)	13	198	13	20	167	14	25	8	49	19	6	17
Future Volume (veh/h)	13	198	13	20	167	14	25	8	49	19	6	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		0.98	0.98		0.98
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	28	419	28	42	354	30	53	17	104	40	13	36
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	694	2100	140	655	2060	174	261	257	214	275	59	164
Arrive On Green	0.69	0.69	0.69	0.69	0.69	0.69	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	896	3042	203	846	2984	251	1200	1683	1399	1125	388	1076
Grp Volume(v), veh/h	28	220	227	42	189	195	53	17	104	40	0	49
Grp Sat Flow(s),veh/h/ln	896	1599	1645	846	1599	1636	1200	1683	1399	1125	0	1464
Q Serve(g_s), s	0.7	3.1	3.2	1.2	2.6	2.7	2.6	0.6	4.3	2.0	0.0	1.9
Cycle Q Clear(g_c), s	3.4	3.1	3.2	4.4	2.6	2.7	4.5	0.6	4.3	2.6	0.0	1.9
Prop In Lane	1.00		0.12	1.00		0.15	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	694	1104	1136	655	1104	1129	261	257	214	275	0	224
V/C Ratio(X)	0.04	0.20	0.20	0.06	0.17	0.17	0.20	0.07	0.49	0.15	0.00	0.22
Avail Cap(c_a), veh/h	694	1104	1136	655	1104	1129	530	634	527	527	0	551
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	4.1	3.5	3.5	4.3	3.5	3.5	25.6	23.1	24.7	24.2	0.0	23.7
Incr Delay (d2), s/veh	0.1	0.4	0.4	0.2	0.3	0.3	0.4	0.1	1.7	0.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.8	0.9	0.2	0.7	0.7	0.7	0.2	1.5	0.5	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	3.9	3.9	4.5	3.8	3.8	26.0	23.2	26.4	24.4	0.0	24.2
LnGrp LOS	A	A	A	A	A	A	C	C	C	C	A	C
Approach Vol, veh/h		475			426			174				89
Approach Delay, s/veh		4.0			3.9			26.0				24.3
Approach LOS		A			A			C				C
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.0		14.7		49.0		14.7				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		44.0		24.0		44.0		24.0				
Max Q Clear Time (g_c+I1), s		5.4		6.5		6.4		4.6				
Green Ext Time (p_c), s		3.3		0.5		2.9		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				8.8								
HCM 6th LOS				A								



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖		↖	↖	
Traffic Volume (veh/h)	36	223	84	11	125	3	58	49	8	5	93	48
Future Volume (veh/h)	36	223	84	11	125	3	58	49	8	5	93	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.97	0.99		0.98	0.98		0.98
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	76	472	178	23	265	6	123	104	17	11	197	102
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	527	943	353	333	1224	28	344	489	80	451	294	152
Arrive On Green	0.06	0.38	0.38	0.03	0.34	0.34	0.07	0.31	0.31	0.01	0.26	0.26
Sat Flow, veh/h	1781	2509	939	1781	3550	80	1781	1563	255	1781	1151	596
Grp Volume(v), veh/h	76	333	317	23	132	139	123	0	121	11	0	299
Grp Sat Flow(s),veh/h/ln	1781	1777	1671	1781	1777	1853	1781	0	1818	1781	0	1746
Q Serve(g_s), s	1.8	9.5	9.7	0.5	3.5	3.5	3.2	0.0	3.2	0.3	0.0	10.2
Cycle Q Clear(g_c), s	1.8	9.5	9.7	0.5	3.5	3.5	3.2	0.0	3.2	0.3	0.0	10.2
Prop In Lane	1.00		0.56	1.00		0.04	1.00		0.14	1.00		0.34
Lane Grp Cap(c), veh/h	527	668	628	333	613	639	344	0	569	451	0	446
V/C Ratio(X)	0.14	0.50	0.50	0.07	0.22	0.22	0.36	0.00	0.21	0.02	0.00	0.67
Avail Cap(c_a), veh/h	577	1287	1210	421	1271	1325	459	0	782	575	0	659
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	1.00	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	12.5	15.9	15.9	13.7	15.4	15.4	16.1	0.0	16.8	17.8	0.0	22.2
Incr Delay (d2), s/veh	0.1	0.6	0.6	0.1	0.2	0.2	0.6	0.0	0.2	0.0	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	3.7	3.6	0.2	1.4	1.4	1.3	0.0	1.3	0.1	0.0	4.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	16.5	16.6	13.8	15.5	15.5	16.7	0.0	16.9	17.8	0.0	23.9
LnGrp LOS	B	B	B	B	B	B	B	A	B	B	A	C
Approach Vol, veh/h		726			294			244			310	
Approach Delay, s/veh		16.1			15.4			16.8			23.7	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.7	29.9	4.9	25.7	7.8	27.9	8.7	21.9				
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0				
Max Green Setting (Gmax), s	5.0	48.0	5.5	28.5	5.6	47.4	9.0	25.0				
Max Q Clear Time (g_c+1/2), s	12.5	11.7	2.3	5.2	3.8	5.5	5.2	12.2				
Green Ext Time (p_c), s	0.0	5.0	0.0	0.6	0.0	1.8	0.1	1.5				
Intersection Summary												
HCM 6th Ctrl Delay											17.6	
HCM 6th LOS											B	

3: Main St & City Center Dr
11/25/2020

Existing Conditions
Nov 2020 TMCs x 1.8

													
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	
Lane Configurations													
Traffic Volume (veh/h)	26	287	20	115	187	37	12	54	201	0	0	0	
Future Volume (veh/h)	26	287	20	115	187	37	12	54	201	0	0	0	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0				
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		0.98				
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	1683	1683	1683	1683	1683	1683	1683	1683	1683				
Adj Flow Rate, veh/h	54	594	41	238	387	77	25	112	416				
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87				
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2				
Cap, veh/h	422	1112	77	377	1282	252	615	1226	538				
Arrive On Green	0.37	0.37	0.37	0.07	0.48	0.48	0.38	0.38	0.38				
Sat Flow, veh/h	824	3032	209	1603	2653	522	1603	3198	1404				
Grp Volume(v), veh/h	54	313	322	238	232	232	25	112	416				
Grp Sat Flow(s),veh/h/ln	824	1599	1642	1603	1599	1576	1603	1599	1404				
Q Serve(g_s), s	2.7	9.2	9.3	4.0	5.3	5.4	0.6	1.3	15.6				
Cycle Q Clear(g_c), s	2.7	9.2	9.3	4.0	5.3	5.4	0.6	1.3	15.6				
Prop In Lane	1.00		0.13	1.00		0.33	1.00		1.00				
Lane Grp Cap(c), veh/h	422	586	602	377	773	762	615	1226	538				
V/C Ratio(X)	0.13	0.53	0.54	0.63	0.30	0.30	0.04	0.09	0.77				
Avail Cap(c_a), veh/h	422	586	602	377	773	762	615	1226	538				
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Uniform Delay (d), s/veh	12.9	15.0	15.0	14.4	9.4	9.4	11.6	11.8	16.2				
Incr Delay (d2), s/veh	0.6	3.5	3.4	7.8	1.0	1.0	0.1	0.1	10.3				
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
%ile BackOfQ(50%),veh/ln	0.5	3.6	3.7	2.5	1.8	1.8	0.2	0.5	6.0				
Unsig. Movement Delay, s/veh													
LnGrp Delay(d),s/veh	13.5	18.4	18.4	22.2	10.4	10.4	11.7	12.0	26.5				
LnGrp LOS	B	B	B	C	B	B	B	B	C				
Approach Vol, veh/h		689			702			553					
Approach Delay, s/veh		18.0			14.4			22.9					
Approach LOS		B			B			C					
Timer - Assigned Phs	1	2		4		6							
Phs Duration (G+Y+Rc), s	7.0	26.0		27.0		33.0							
Change Period (Y+Rc), s	3.0	4.0		4.0		4.0							
Max Green Setting (Gmax), s	4.0	22.0		23.0		29.0							
Max Q Clear Time (g_c+I1), s	6.0	11.3		17.6		7.4							
Green Ext Time (p_c), s	0.0	3.3		1.2		2.9							
Intersection Summary													
HCM 6th Ctrl Delay				18.1									
HCM 6th LOS				B									

Intersection: 3: Main St & City Center Dr

Movement	SE	SE	SE	NW	NW	NW	NE	NE	NE	NE
Directions Served	L	T	TR	L	T	TR	L	T	T	R
Maximum Queue (ft)	70	149	161	132	166	74	51	59	242	165
Average Queue (ft)	19	86	94	71	74	24	11	23	36	103
95th Queue (ft)	48	130	140	124	143	54	38	52	138	170
Link Distance (ft)		342	342		532	532		601	601	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			120			180			140
Storage Blk Time (%)		2		2	1				0	4
Queuing Penalty (veh)		1		3	2				0	2

Intersection: 9: Union Ave & City Center Dr & Court St

Movement	NB	NB	SE	SE	NW	NW	NW	SW	SW	SW
Directions Served	L	>	T	R	L	T	T	<	L	R
Maximum Queue (ft)	35	180	38	5	104	19	9	85	131	32
Average Queue (ft)	6	80	5	0	36	1	0	40	61	18
95th Queue (ft)	24	140	23	3	81	9	5	72	104	43
Link Distance (ft)	262	262	839			342	342	505	505	505
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				60	130					
Storage Blk Time (%)			0		0					
Queuing Penalty (veh)			0		0					

Intersection: 10: C Street & Main St

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	TR	L	TR	LTR	LTR
Maximum Queue (ft)	39	4	17	56	6	73	67
Average Queue (ft)	9	0	1	15	0	36	33
95th Queue (ft)	33	4	8	44	3	62	58
Link Distance (ft)		2261	2261		425	372	310
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	60			70			
Storage Blk Time (%)	0			0			
Queuing Penalty (veh)	0			0			

Intersection: 11: C Street & Union Ave

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	TR	LTR	LTR
Maximum Queue (ft)	33	21	2	48	78
Average Queue (ft)	6	1	0	23	39
95th Queue (ft)	27	10	2	49	66
Link Distance (ft)			428	310	358
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	120	100			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 14: D Street & Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (ft)	54	109	136	62	103	112	73	44	81	64	66
Average Queue (ft)	13	33	61	15	31	39	27	9	36	22	26
95th Queue (ft)	41	79	112	43	75	86	63	33	66	53	59
Link Distance (ft)		425	425		407	407	698	698	698		299
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	90			100						70	
Storage Blk Time (%)		0		0	0					1	0
Queuing Penalty (veh)		0		0	0					0	0

Intersection: 15: D Street & Union Ave

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	R	L	T	R	LTR	LTR
Maximum Queue (ft)	39	174	40	106	279	144	79	111
Average Queue (ft)	8	81	11	16	130	21	27	40
95th Queue (ft)	30	142	35	63	238	87	61	82
Link Distance (ft)		428			877		299	349
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	130		150	140		120		
Storage Blk Time (%)		1			9	0		
Queuing Penalty (veh)		0			4	0		

Intersection: 18: B Street & Union Ave

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	56	8	38	25	71	124
Average Queue (ft)	20	0	10	2	39	57
95th Queue (ft)	48	4	34	13	65	99
Link Distance (ft)		1136		443	290	354
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	240		100			
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 24: Alan Hamel Ave/Grand Ave & Union Ave

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	R	L	TR	L	T	R
Maximum Queue (ft)	79	115	181	84	220	31	94	146	43	164	75
Average Queue (ft)	32	25	77	18	114	2	37	50	9	75	13
95th Queue (ft)	67	75	143	62	191	15	80	106	31	137	54
Link Distance (ft)		877			396	396		298		350	350
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	140		350	80			100		150		
Storage Blk Time (%)		0		0	15		0	1		1	
Queuing Penalty (veh)		0		0	3		0	1		0	

WB Thru Queue sometimes blocks left turn lane

Intersection: 25: Alan Hamel Ave & Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	85	203	270	43	85	91	98	133	83	236
Average Queue (ft)	30	57	139	15	43	42	49	48	9	125
95th Queue (ft)	67	141	240	40	77	81	89	102	44	211
Link Distance (ft)		400	400		389	389		281		298
Upstream Blk Time (%)										0
Queuing Penalty (veh)										0
Storage Bay Dist (ft)	150			150			80		90	
Storage Blk Time (%)		0					3	2		22
Queuing Penalty (veh)		0					3	2		2

SB Thru Queue sometimes blocks left turn lane



Appendix C – Traffic Analysis Level of Service and Queueing Worksheets

Phase 1 Conditions

Intersection												
Intersection Delay, s/veh	8.8											
Intersection LOS	A											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
Future Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	138	8	6	208	20	12	10	18	29	14	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	9.2	8.1	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	7%	1%	31%
Vol Thru, %	25%	90%	94%	14%
Vol Right, %	45%	3%	4%	55%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	156	226	49
LT Vol	6	11	3	15
Through Vol	5	141	213	7
RT Vol	9	4	10	27
Lane Flow Rate	39	167	234	96
Geometry Grp	1	1	1	1
Degree of Util (X)	0.052	0.209	0.287	0.123
Departure Headway (Hd)	4.753	4.507	4.415	4.618
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	752	796	814	776
Service Time	2.789	2.534	2.44	2.651
HCM Lane V/C Ratio	0.052	0.21	0.287	0.124
HCM Control Delay	8.1	8.7	9.2	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1.2	0.4

Intersection

Intersection Delay, s/veh 9.8

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	170	15	10	246	17	11	9	18	14	17	29
Future Vol, veh/h	6	170	15	10	246	17	11	9	18	14	17	29
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	166	29	20	241	33	22	18	35	27	33	57
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	10.5	8.7	9
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	3%	4%	23%
Vol Thru, %	24%	89%	90%	28%
Vol Right, %	47%	8%	6%	48%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	38	191	273	60
LT Vol	11	6	10	14
Through Vol	9	170	246	17
RT Vol	18	15	17	29
Lane Flow Rate	74	207	293	117
Geometry Grp	1	1	1	1
Degree of Util (X)	0.104	0.271	0.377	0.161
Departure Headway (Hd)	5.027	4.708	4.621	4.946
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	759	775	720
Service Time	3.1	2.764	2.673	3.014
HCM Lane V/C Ratio	0.105	0.273	0.378	0.163
HCM Control Delay	8.7	9.5	10.5	9
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.3	1.1	1.8	0.6

HCM 6th Signalized Intersection Summary
 24: Alan Hamel Ave/Grand Ave & Union Ave

Phase 1
 11/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↖	↖	↗		↖	↗	
Traffic Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	241	70
Future Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	241	70
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		0.99	0.99		0.99
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	84	131	55	25	170	6	57	86	12	12	262	76
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	748	649	272	733	972	820	183	430	60	372	373	108
Arrive On Green	0.06	0.52	0.52	0.06	0.52	0.52	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1249	524	1781	1870	1577	1040	1604	224	1288	1391	404
Grp Volume(v), veh/h	84	0	186	25	170	6	57	0	98	12	0	338
Grp Sat Flow(s),veh/h/ln	1781	0	1773	1781	1870	1577	1040	0	1828	1288	0	1795
Q Serve(g_s), s	1.9	0.0	5.0	0.5	4.3	0.2	4.7	0.0	3.7	0.7	0.0	15.2
Cycle Q Clear(g_c), s	1.9	0.0	5.0	0.5	4.3	0.2	19.9	0.0	3.7	4.4	0.0	15.2
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.12	1.00		0.22
Lane Grp Cap(c), veh/h	748	0	921	733	972	820	183	0	490	372	0	481
V/C Ratio(X)	0.11	0.00	0.20	0.03	0.17	0.01	0.31	0.00	0.20	0.03	0.00	0.70
Avail Cap(c_a), veh/h	760	0	921	743	972	820	183	0	490	372	0	481
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	8.6	0.0	11.5	8.3	11.4	10.4	38.5	0.0	25.3	27.0	0.0	29.5
Incr Delay (d2), s/veh	0.1	0.0	0.5	0.0	0.4	0.0	4.4	0.0	0.9	0.2	0.0	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	2.1	0.2	1.8	0.1	1.4	0.0	1.7	0.2	0.0	7.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.0	12.0	8.3	11.8	10.4	42.9	0.0	26.2	27.2	0.0	37.8
LnGrp LOS	A	A	B	A	B	B	D	A	C	C	A	D
Approach Vol, veh/h		270			201			155			350	
Approach Delay, s/veh		11.0			11.3			32.4			37.5	
Approach LOS		B			B			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	51.5		29.0	9.0	51.5		29.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	5.5	46.5		24.0	5.6	46.4		24.0				
Max Q Clear Time (g_c+I1), s	2.5	7.0		21.9	3.9	6.3		17.2				
Green Ext Time (p_c), s	0.0	1.2		0.1	0.0	1.1		1.2				

Intersection Summary												
HCM 6th Ctrl Delay											23.9	
HCM 6th LOS											C	

Intersection										
Int Delay, s/veh	12									
Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations	↘			↑	↗	↘	↑↑		↘	↗
Traffic Vol, veh/h	5	0	0	110	4	111	84	0	110	13
Future Vol, veh/h	5	0	0	110	4	111	84	0	110	13
Conflicting Peds, #/hr	11	0	0	0	11	11	0	0	11	11
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	0	-	-	60	130	-	-	0	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	0	215	8	109	164	0	120	25

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	597	237	0	93
Stage 1	226	-	-	-
Stage 2	371	-	-	-
Critical Hdwy	7.33	6.23	-	6.93
Critical Hdwy Stg 1	6.13	-	-	-
Critical Hdwy Stg 2	6.53	-	-	-
Follow-up Hdwy	3.519	3.319	-	3.319
Pot Cap-1 Maneuver	400	801	0	946
Stage 1	776	-	-	-
Stage 2	622	-	-	-
Platoon blocked, %				
Mov Cap-1 Maneuver	268	784	-	936
Mov Cap-2 Maneuver	268	-	-	-
Stage 1	776	-	-	-
Stage 2	432	-	-	-

Approach	NB	SE	NW	SW
HCM Control Delay, s	11.1	0	3.2	28.8
HCM LOS	B			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	NWL	NWT	SET	SERSWLn1	SWLn2	SWLn3
Capacity (veh/h)	268	784	1318	-	-	-	265	368
HCM Lane V/C Ratio	0.037	0.181	0.082	-	-	-	0.623	0.325
HCM Control Delay (s)	18.9	10.6	8	-	-	-	38.7	19.4
HCM Lane LOS	C	B	A	-	-	-	E	C
HCM 95th %tile Q(veh)	0.1	0.7	0.3	-	-	-	3.8	1.4

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕		↵	↕			↕			↕	↕
Traffic Vol, veh/h	20	487	20	30	498	15	20	5	20	10	15	15
Future Vol, veh/h	20	487	20	30	498	15	20	5	20	10	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	60	-	-	70	-	-	-	-	-	-	-	-
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	39	529	39	59	541	29	39	10	39	20	29	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	570	0	0	568	0	0	1030	1315	284	1022	1320	285
Stage 1	-	-	-	-	-	-	627	627	-	674	674	-
Stage 2	-	-	-	-	-	-	403	688	-	348	646	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
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	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	999	-	-	1000	-	-	188	157	713	190	156	712
Stage 1	-	-	-	-	-	-	438	474	-	410	452	-
Stage 2	-	-	-	-	-	-	595	445	-	641	465	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	999	-	-	1000	-	-	141	142	713	158	141	712
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	142	-	158	141	-
Stage 1	-	-	-	-	-	-	421	456	-	394	425	-
Stage 2	-	-	-	-	-	-	500	419	-	570	447	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.8			32.1			32		
HCM LOS							D			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	219	999	-	-	1000	-	-	210
HCM Lane V/C Ratio	0.402	0.039	-	-	0.059	-	-	0.373
HCM Control Delay (s)	32.1	8.8	-	-	8.8	-	-	32
HCM Lane LOS	D	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	1.8	0.1	-	-	0.2	-	-	1.6

HCM 6th Signalized Intersection Summary
14: D Street & Main St

Phase 1
11/25/2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	509	13	20	523	14	25	8	49	19	6	17
Future Volume (veh/h)	13	509	13	20	523	14	25	8	49	19	6	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		0.98	0.98		0.98
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	28	599	28	42	615	30	53	17	104	40	13	36
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	545	2147	100	555	2142	104	261	257	214	275	59	164
Arrive On Green	0.69	0.69	0.69	0.69	0.69	0.69	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	705	3110	145	717	3103	151	1200	1683	1399	1125	388	1076
Grp Volume(v), veh/h	28	308	319	42	317	328	53	17	104	40	0	49
Grp Sat Flow(s),veh/h/ln	705	1599	1656	717	1599	1655	1200	1683	1399	1125	0	1464
Q Serve(g_s), s	1.0	4.7	4.7	1.5	4.9	4.9	2.6	0.6	4.3	2.0	0.0	1.9
Cycle Q Clear(g_c), s	5.9	4.7	4.7	6.2	4.9	4.9	4.5	0.6	4.3	2.6	0.0	1.9
Prop In Lane	1.00		0.09	1.00		0.09	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	545	1104	1143	555	1104	1142	261	257	214	275	0	224
V/C Ratio(X)	0.05	0.28	0.28	0.08	0.29	0.29	0.20	0.07	0.49	0.15	0.00	0.22
Avail Cap(c_a), veh/h	545	1104	1143	555	1104	1142	530	634	527	527	0	551
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.0	3.8	3.8	5.0	3.8	3.8	25.6	23.1	24.7	24.2	0.0	23.7
Incr Delay (d2), s/veh	0.2	0.6	0.6	0.3	0.7	0.6	0.4	0.1	1.7	0.2	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.3	1.3	0.2	1.3	1.4	0.7	0.2	1.5	0.5	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	4.4	4.4	5.2	4.5	4.4	26.0	23.2	26.4	24.4	0.0	24.2
LnGrp LOS	A	A	A	A	A	A	C	C	C	C	A	C
Approach Vol, veh/h		655			687			174				89
Approach Delay, s/veh		4.4			4.5			26.0				24.3
Approach LOS		A			A			C				C
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		49.0		14.7		49.0		14.7				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		44.0		24.0		44.0		24.0				
Max Q Clear Time (g_c+I1), s		7.9		6.5		8.2		4.6				
Green Ext Time (p_c), s		4.9		0.5		5.1		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				7.9								
HCM 6th LOS				A								

HCM 6th Signalized Intersection Summary
25: Alan Hamel Ave & Main St

Phase 1
11/25/2020



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖		↖	↖	
Traffic Volume (veh/h)	36	522	84	11	382	3	58	49	8	5	93	156
Future Volume (veh/h)	36	522	84	11	382	3	58	49	8	5	93	156
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.97	0.99		0.97	0.99		0.98	0.98		0.98
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	76	614	178	23	449	6	123	104	17	11	197	184
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	439	1049	303	283	1294	17	287	520	85	467	244	228
Arrive On Green	0.05	0.39	0.39	0.03	0.36	0.36	0.07	0.33	0.33	0.01	0.28	0.28
Sat Flow, veh/h	1781	2701	781	1781	3589	48	1781	1563	256	1781	880	822
Grp Volume(v), veh/h	76	404	388	23	222	233	123	0	121	11	0	381
Grp Sat Flow(s),veh/h/ln	1781	1777	1705	1781	1777	1860	1781	0	1819	1781	0	1701
Q Serve(g_s), s	2.0	13.5	13.5	0.6	6.8	6.9	3.5	0.0	3.6	0.3	0.0	15.6
Cycle Q Clear(g_c), s	2.0	13.5	13.5	0.6	6.8	6.9	3.5	0.0	3.6	0.3	0.0	15.6
Prop In Lane	1.00		0.46	1.00		0.03	1.00		0.14	1.00		0.48
Lane Grp Cap(c), veh/h	439	690	662	283	641	671	287	0	605	467	0	472
V/C Ratio(X)	0.17	0.58	0.59	0.08	0.35	0.35	0.43	0.00	0.20	0.02	0.00	0.81
Avail Cap(c_a), veh/h	478	1138	1092	356	1124	1177	379	0	692	573	0	568
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	1.00	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	13.8	18.1	18.2	15.2	17.5	17.5	18.2	0.0	17.9	18.9	0.0	25.2
Incr Delay (d2), s/veh	0.2	0.8	0.8	0.1	0.3	0.3	1.0	0.0	0.2	0.0	0.0	7.1
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	0.8	5.4	5.2	0.2	2.8	2.9	1.4	0.0	1.5	0.1	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	18.9	19.0	15.3	17.8	17.8	19.2	0.0	18.0	19.0	0.0	32.3
LnGrp LOS	B	B	B	B	B	B	B	A	B	B	A	C
Approach Vol, veh/h		868			478			244			392	
Approach Delay, s/veh		18.5			17.7			18.6			32.0	
Approach LOS		B			B			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.9	34.1	5.0	29.9	8.0	32.0	9.1	25.8				
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0				
Max Green Setting (Gmax), s	5.0	48.0	5.5	28.5	5.6	47.4	9.0	25.0				
Max Q Clear Time (g_c+1), s	12.6	15.5	2.3	5.6	4.0	8.9	5.5	17.6				
Green Ext Time (p_c), s	0.0	6.2	0.0	0.6	0.0	3.1	0.1	1.5				
Intersection Summary												
HCM 6th Ctrl Delay					21.0							
HCM 6th LOS					C							

HCM 6th Signalized Intersection Summary
3: Main St & City Center Dr

Phase 1
11/25/2020

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	26	386	93	307	237	37	12	54	493	0	0	0
Future Volume (veh/h)	26	386	93	307	237	37	12	54	493	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.98		0.98	0.99		0.98	1.00		0.98			
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	1683	1683	1683	1683	1683	1683	1683	1683	1683			
Adj Flow Rate, veh/h	54	444	107	353	272	77	25	112	567			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	455	935	224	405	1190	329	615	1226	633			
Arrive On Green	0.37	0.37	0.37	0.07	0.48	0.48	0.38	0.38	0.38			
Sat Flow, veh/h	913	2551	610	1603	2461	681	1603	3198	1404			
Grp Volume(v), veh/h	54	277	274	353	175	174	25	112	567			
Grp Sat Flow(s),veh/h/ln	913	1599	1562	1603	1599	1544	1603	1599	1404			
Q Serve(g_s), s	2.4	8.0	8.1	4.0	3.8	3.9	0.6	1.3	22.3			
Cycle Q Clear(g_c), s	2.4	8.0	8.1	4.0	3.8	3.9	0.6	1.3	22.3			
Prop In Lane	1.00		0.39	1.00		0.44	1.00		1.00			
Lane Grp Cap(c), veh/h	455	586	573	405	773	746	615	1226	633			
V/C Ratio(X)	0.12	0.47	0.48	0.87	0.23	0.23	0.04	0.09	0.90			
Avail Cap(c_a), veh/h	455	586	573	405	773	746	615	1226	633			
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	12.8	14.6	14.6	18.6	9.0	9.0	11.6	11.8	15.2			
Incr Delay (d2), s/veh	0.5	2.7	2.9	22.0	0.7	0.7	0.1	0.1	17.7			
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	0.5	3.1	3.1	5.6	1.3	1.3	0.2	0.5	17.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	17.3	17.4	40.6	9.7	9.8	11.7	12.0	32.9			
LnGrp LOS	B	B	B	D	A	A	B	B	C			
Approach Vol, veh/h		605			702			704				
Approach Delay, s/veh		17.0			25.2			28.8				
Approach LOS		B			C			C				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.0	26.0		27.0		33.0						
Change Period (Y+Rc), s	3.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	4.0	22.0		23.0		29.0						
Max Q Clear Time (g_c+I1), s	6.0	10.1		24.3		5.9						
Green Ext Time (p_c), s	0.0	3.0		0.0		2.2						
Intersection Summary												
HCM 6th Ctrl Delay				24.0								
HCM 6th LOS				C								

Intersection: 3: Main St & City Center Dr

Movement	SE	SE	SE	NW	NW	NW	NE	NE	NE	NE
Directions Served	L	T	TR	L	T	TR	L	T	T	R
Maximum Queue (ft)	50	121	131	144	274	156	46	78	292	165
Average Queue (ft)	18	72	76	105	75	31	11	23	66	122
95th Queue (ft)	42	109	117	159	208	99	37	58	220	191
Link Distance (ft)		342	342		532	532		601	601	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	110			120			180			140
Storage Blk Time (%)		1		14	0				0	8
Queuing Penalty (veh)		0		16	0				0	4

Intersection: 9: Union Ave & City Center Dr & Court St

Movement	NB	NB	SE	SE	NW	NW	NW	SW	SW	SW
Directions Served	L	>	T	R	L	T	T	<	L	R
Maximum Queue (ft)	28	100	38	4	63	10	14	87	88	39
Average Queue (ft)	6	44	4	0	18	1	1	38	44	18
95th Queue (ft)	23	75	20	3	45	6	7	66	72	44
Link Distance (ft)	262	262	839			342	342	505	505	505
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				60	130					
Storage Blk Time (%)			0							
Queuing Penalty (veh)			0							

Intersection: 10: C Street & Main St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	40	12	51	10	89	84
Average Queue (ft)	11	1	17	0	38	37
95th Queue (ft)	36	7	46	5	67	71
Link Distance (ft)		2261		425	372	316
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	60		70			
Storage Blk Time (%)	0		0			
Queuing Penalty (veh)	0		0			

Intersection: 14: D Street & Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	TR
Maximum Queue (ft)	60	125	169	68	152	166	74	45	72	65	72
Average Queue (ft)	14	45	83	20	56	61	28	10	35	22	25
95th Queue (ft)	43	94	142	52	117	131	63	34	64	53	59
Link Distance (ft)		425	425		407	407	698	698	698		317
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	90			100						70	
Storage Blk Time (%)		1			1					0	0
Queuing Penalty (veh)		0			0					0	0

Intersection: 18: B Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	79	56	70	94
Average Queue (ft)	17	7	36	48
95th Queue (ft)	53	32	60	80
Link Distance (ft)	1136	444	296	360
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 24: Alan Hamel Ave/Grand Ave & Union Ave

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	97	131	60	125	31	110	145	27	301
Average Queue (ft)	29	57	12	60	3	46	53	6	153
95th Queue (ft)	71	111	42	107	17	98	113	24	267
Link Distance (ft)		877		396	396		299	372	372
Upstream Blk Time (%)									0
Queuing Penalty (veh)									0
Storage Bay Dist (ft)	140		80			100			
Storage Blk Time (%)		0	0	4		3	2		
Queuing Penalty (veh)		0	0	1		2	1		

Intersection: 25: Alan Hamel Ave & Main St

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	115	270	340	50	143	138	103	159	91	306
Average Queue (ft)	34	84	189	16	77	74	52	55	11	159
95th Queue (ft)	77	198	306	43	127	124	94	116	53	276
Link Distance (ft)		400	400		389	389		281		299
Upstream Blk Time (%)			0							1
Queuing Penalty (veh)			0							4
Storage Bay Dist (ft)	150			150			80		90	
Storage Blk Time (%)		0			0		4	3		29
Queuing Penalty (veh)		0			0		4	3		3

Intersection: 27: Main St

Movement	EB	EB	WB	WB	WB	NB	NB
Directions Served	T	TR	L	T	T	L	R
Maximum Queue (ft)	138	226	52	138	143	41	55
Average Queue (ft)	51	98	13	57	64	12	25
95th Queue (ft)	112	181	41	109	119	37	44
Link Distance (ft)	407	407		400	400	142	142
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)			150				
Storage Blk Time (%)				0			
Queuing Penalty (veh)				0			

Intersection: 111: C Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	65	65	42	61
Average Queue (ft)	37	37	21	32
95th Queue (ft)	56	55	46	54
Link Distance (ft)	444	428	316	364
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report Baseline

11/23/2020

Intersection: 115: D Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	82	126	67	72
Average Queue (ft)	41	64	30	38
95th Queue (ft)	66	101	56	61
Link Distance (ft)	428	877	317	367
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 40



Appendix D – Traffic Analysis Level of Service and Queueing Worksheets

Phase 2 Conditions

Intersection

Intersection Delay, s/veh 8.8

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
Future Vol, veh/h	11	141	4	3	213	10	6	5	9	15	7	27
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	138	8	6	208	20	12	10	18	29	14	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	9.2	8.1	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	30%	7%	1%	31%
Vol Thru, %	25%	90%	94%	14%
Vol Right, %	45%	3%	4%	55%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	156	226	49
LT Vol	6	11	3	15
Through Vol	5	141	213	7
RT Vol	9	4	10	27
Lane Flow Rate	39	167	234	96
Geometry Grp	1	1	1	1
Degree of Util (X)	0.052	0.209	0.287	0.123
Departure Headway (Hd)	4.753	4.507	4.415	4.618
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	752	796	814	776
Service Time	2.789	2.534	2.44	2.651
HCM Lane V/C Ratio	0.052	0.21	0.287	0.124
HCM Control Delay	8.1	8.7	9.2	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1.2	0.4

Intersection

Intersection Delay, s/veh 9.8

Intersection LOS A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	170	15	10	246	17	11	9	18	14	17	29
Future Vol, veh/h	6	170	15	10	246	17	11	9	18	14	17	29
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	166	29	20	241	33	22	18	35	27	33	57
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	10.5	8.7	9
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	3%	4%	23%
Vol Thru, %	24%	89%	90%	28%
Vol Right, %	47%	8%	6%	48%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	38	191	273	60
LT Vol	11	6	10	14
Through Vol	9	170	246	17
RT Vol	18	15	17	29
Lane Flow Rate	74	207	293	117
Geometry Grp	1	1	1	1
Degree of Util (X)	0.104	0.271	0.377	0.161
Departure Headway (Hd)	5.027	4.708	4.621	4.946
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	707	759	775	720
Service Time	3.1	2.764	2.673	3.014
HCM Lane V/C Ratio	0.105	0.273	0.378	0.163
HCM Control Delay	8.7	9.5	10.5	9
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.3	1.1	1.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	241	70
Future Volume (veh/h)	43	134	28	13	174	3	29	44	6	6	241	70
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		0.99	0.99		0.99
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	84	131	55	25	170	6	57	86	12	12	262	76
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	748	649	272	733	972	820	183	430	60	372	373	108
Arrive On Green	0.06	0.52	0.52	0.06	0.52	0.52	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	1781	1249	524	1781	1870	1577	1040	1604	224	1288	1391	404
Grp Volume(v), veh/h	84	0	186	25	170	6	57	0	98	12	0	338
Grp Sat Flow(s),veh/h/ln	1781	0	1773	1781	1870	1577	1040	0	1828	1288	0	1795
Q Serve(g_s), s	1.9	0.0	5.0	0.5	4.3	0.2	4.7	0.0	3.7	0.7	0.0	15.2
Cycle Q Clear(g_c), s	1.9	0.0	5.0	0.5	4.3	0.2	19.9	0.0	3.7	4.4	0.0	15.2
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.12	1.00		0.22
Lane Grp Cap(c), veh/h	748	0	921	733	972	820	183	0	490	372	0	481
V/C Ratio(X)	0.11	0.00	0.20	0.03	0.17	0.01	0.31	0.00	0.20	0.03	0.00	0.70
Avail Cap(c_a), veh/h	760	0	921	743	972	820	183	0	490	372	0	481
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	8.6	0.0	11.5	8.3	11.4	10.4	38.5	0.0	25.3	27.0	0.0	29.5
Incr Delay (d2), s/veh	0.1	0.0	0.5	0.0	0.4	0.0	4.4	0.0	0.9	0.2	0.0	8.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	2.0	0.2	1.8	0.1	1.4	0.0	1.7	0.2	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.0	12.0	8.3	11.8	10.4	42.9	0.0	26.2	27.2	0.0	37.8
LnGrp LOS	A	A	B	A	B	B	D	A	C	C	A	D
Approach Vol, veh/h		270			201			155			350	
Approach Delay, s/veh		11.0			11.3			32.4			37.5	
Approach LOS		B			B			C			D	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.0	51.5		29.0	9.0	51.5		29.0				
Change Period (Y+Rc), s	4.0	5.0		5.0	4.0	5.0		5.0				
Max Green Setting (Gmax), s	5.5	46.5		24.0	5.6	46.4		24.0				
Max Q Clear Time (g_c+I1), s	2.5	7.0		21.9	3.9	6.3		17.2				
Green Ext Time (p_c), s	0.0	1.2		0.1	0.0	1.0		1.1				
Intersection Summary												
HCM 6th Ctrl Delay			23.9									
HCM 6th LOS			C									

Intersection										
Int Delay, s/veh	12									
Movement	NBL	NBR	SEL	SET	SER	NWL	NWT	NWR	SWL	SWR
Lane Configurations	↘			↑	↗	↘	↑↑		↘	↗
Traffic Vol, veh/h	5	0	0	110	4	111	84	0	110	13
Future Vol, veh/h	5	0	0	110	4	111	84	0	110	13
Conflicting Peds, #/hr	11	0	0	0	11	11	0	0	11	11
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	0	0	-	-	60	130	-	-	0	0
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	0	0	215	8	109	164	0	120	25

Major/Minor	Minor1	Major1	Major2	Minor2
Conflicting Flow All	597	237	0	93
Stage 1	226	-	-	-
Stage 2	371	-	-	-
Critical Hdwy	7.33	6.23	-	6.93
Critical Hdwy Stg 1	6.13	-	-	-
Critical Hdwy Stg 2	6.53	-	-	-
Follow-up Hdwy	3.519	3.319	-	3.319
Pot Cap-1 Maneuver	400	801	0	946
Stage 1	776	-	0	-
Stage 2	622	-	0	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	268	784	-	936
Mov Cap-2 Maneuver	268	-	-	-
Stage 1	776	-	-	-
Stage 2	432	-	-	-

Approach	NB	SE	NW	SW
HCM Control Delay, s	11.1	0	3.2	28.8
HCM LOS	B			D

Minor Lane/Major Mvmt	NBLn1	NBLn2	NWL	NWT	SET	SERSWLn1	SWLn2	SWLn3
Capacity (veh/h)	268	784	1318	-	-	-	265	368
HCM Lane V/C Ratio	0.037	0.181	0.082	-	-	-	0.623	0.325
HCM Control Delay (s)	18.9	10.6	8	-	-	-	38.7	19.4
HCM Lane LOS	C	B	A	-	-	-	E	C
HCM 95th %tile Q(veh)	0.1	0.7	0.3	-	-	-	3.8	1.4

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	20	487	20	30	498	15	20	5	20	10	15	15
Future Vol, veh/h	20	487	20	30	498	15	20	5	20	10	15	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	60	-	-	70	-	-	-	-	-	-	-	-
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	39	529	39	59	541	29	39	10	39	20	29	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	570	0	0	568	0	0	1330	1315	549	1325	1320	556
Stage 1	-	-	-	-	-	-	627	627	-	674	674	-
Stage 2	-	-	-	-	-	-	703	688	-	651	646	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1002	-	-	1004	-	-	132	158	535	133	157	531
Stage 1	-	-	-	-	-	-	471	476	-	444	454	-
Stage 2	-	-	-	-	-	-	428	447	-	457	467	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1002	-	-	1004	-	-	98	143	535	108	142	531
Mov Cap-2 Maneuver	-	-	-	-	-	-	98	143	-	108	142	-
Stage 1	-	-	-	-	-	-	453	457	-	427	427	-
Stage 2	-	-	-	-	-	-	354	421	-	398	449	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.8			50.4			40.5		
HCM LOS							F			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	163	1002	-	-	1004	-	-	177
HCM Lane V/C Ratio	0.54	0.039	-	-	0.058	-	-	0.442
HCM Control Delay (s)	50.4	8.7	-	-	8.8	-	-	40.5
HCM Lane LOS	F	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.7	0.1	-	-	0.2	-	-	2



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	509	13	20	523	14	25	8	49	19	6	17
Future Volume (veh/h)	13	509	13	20	523	14	25	8	49	19	6	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.97		0.96	0.97		0.96
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	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	28	599	28	42	615	30	53	17	104	40	13	36
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	507	1177	55	519	1174	57	225	225	183	241	51	142
Arrive On Green	0.74	0.74	0.74	0.74	0.74	0.74	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	706	1595	75	718	1591	78	1183	1683	1373	1108	383	1061
Grp Volume(v), veh/h	28	0	627	42	0	645	53	17	104	40	0	49
Grp Sat Flow(s),veh/h/ln	706	0	1669	718	0	1669	1183	1683	1373	1108	0	1444
Q Serve(g_s), s	1.2	0.0	11.0	1.8	0.0	11.6	2.9	0.6	5.0	2.3	0.0	2.1
Cycle Q Clear(g_c), s	12.8	0.0	11.0	12.9	0.0	11.6	5.1	0.6	5.0	2.9	0.0	2.1
Prop In Lane	1.00		0.04	1.00		0.05	1.00		1.00	1.00		0.73
Lane Grp Cap(c), veh/h	507	0	1232	519	0	1231	225	225	183	241	0	193
V/C Ratio(X)	0.06	0.00	0.51	0.08	0.00	0.52	0.24	0.08	0.57	0.17	0.00	0.25
Avail Cap(c_a), veh/h	507	0	1232	519	0	1231	379	445	363	386	0	382
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	0.00	1.00
Uniform Delay (d), s/veh	6.7	0.0	3.9	6.6	0.0	3.9	29.5	26.5	28.4	27.8	0.0	27.2
Incr Delay (d2), s/veh	0.2	0.0	1.5	0.3	0.0	1.6	0.5	0.1	2.7	0.3	0.0	0.7
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	0.2	0.0	2.7	0.3	0.0	2.9	0.8	0.2	1.7	0.6	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.9	0.0	5.4	6.9	0.0	5.5	30.0	26.7	31.2	28.1	0.0	27.9
LnGrp LOS	A	A	A	A	A	A	C	C	C	C	A	C
Approach Vol, veh/h		655			687			174				89
Approach Delay, s/veh		5.4			5.6			30.4				28.0
Approach LOS		A			A			C				C
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.1		13.9		56.1		13.9				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		42.5		18.5		42.5		18.5				
Max Q Clear Time (g_c+I1), s		14.8		7.1		14.9		4.9				
Green Ext Time (p_c), s		5.0		0.4		5.3		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				9.5								
HCM 6th LOS				A								



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	522	84	11	382	3	58	49	8	5	93	156
Future Volume (veh/h)	36	522	84	11	382	3	58	49	8	5	93	156
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.98	1.00		0.97	0.97		0.96
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	76	614	178	23	449	6	123	104	17	11	197	184
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	417	663	192	161	841	11	212	461	75	400	216	202
Arrive On Green	0.05	0.48	0.48	0.02	0.46	0.46	0.06	0.30	0.30	0.01	0.25	0.25
Sat Flow, veh/h	1781	1386	402	1781	1841	25	1781	1559	255	1781	871	813
Grp Volume(v), veh/h	76	0	792	23	0	455	123	0	121	11	0	381
Grp Sat Flow(s),veh/h/ln	1781	0	1788	1781	0	1865	1781	0	1814	1781	0	1684
Q Serve(g_s), s	2.1	0.0	39.6	0.6	0.0	16.7	4.7	0.0	4.8	0.4	0.0	21.0
Cycle Q Clear(g_c), s	2.1	0.0	39.6	0.6	0.0	16.7	4.7	0.0	4.8	0.4	0.0	21.0
Prop In Lane	1.00		0.22	1.00		0.01	1.00		0.14	1.00		0.48
Lane Grp Cap(c), veh/h	417	0	855	161	0	852	212	0	537	400	0	418
V/C Ratio(X)	0.18	0.00	0.93	0.14	0.00	0.53	0.58	0.00	0.23	0.03	0.00	0.91
Avail Cap(c_a), veh/h	441	0	960	212	0	990	212	0	537	480	0	441
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	0.0	23.3	20.7	0.0	18.6	26.1	0.0	25.3	26.2	0.0	34.8
Incr Delay (d2), s/veh	0.2	0.0	13.6	0.4	0.0	0.5	3.9	0.0	0.2	0.0	0.0	22.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	18.8	0.3	0.0	7.0	2.2	0.0	2.1	0.2	0.0	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	0.0	36.9	21.1	0.0	19.1	30.0	0.0	25.5	26.2	0.0	57.1
LnGrp LOS	B	A	D	C	A	B	C	A	C	C	A	E
Approach Vol, veh/h		868			478			244			392	
Approach Delay, s/veh		34.9			19.2			27.8			56.3	
Approach LOS		C			B			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.3	50.6	5.3	33.2	8.3	48.6	9.8	28.7				
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0				
Max Green Setting (Gmax), s	5.0	51.2	5.5	25.3	5.6	50.6	5.8	25.0				
Max Q Clear Time (g_c+1), s	12.6	41.6	2.4	6.8	4.1	18.7	6.7	23.0				
Green Ext Time (p_c), s	0.0	4.0	0.0	0.5	0.0	3.1	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay											34.5	
HCM 6th LOS											C	

3: Main St & City Center Dr
11/25/2020

Phase 2 Conditions

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	26	386	93	307	237	37	12	54	493	0	0	0
Future Volume (veh/h)	26	386	93	307	237	37	12	54	493	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	0.98		0.97	0.99		0.98	1.00		0.98			
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	1683	1683	1683	1683	1683	1683	1683	1683	1683			
Adj Flow Rate, veh/h	54	444	107	353	272	77	25	112	567			
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87			
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2			
Cap, veh/h	455	933	223	404	1190	329	117	523	633			
Arrive On Green	0.37	0.37	0.37	0.07	0.48	0.48	0.38	0.38	0.38			
Sat Flow, veh/h	913	2545	608	1603	2461	681	304	1364	1404			
Grp Volume(v), veh/h	54	277	274	353	175	174	137	0	567			
Grp Sat Flow(s),veh/h/ln	913	1599	1554	1603	1599	1544	1668	0	1404			
Q Serve(g_s), s	2.4	8.0	8.1	4.0	3.8	3.9	3.3	0.0	22.3			
Cycle Q Clear(g_c), s	2.4	8.0	8.1	4.0	3.8	3.9	3.3	0.0	22.3			
Prop In Lane	1.00		0.39	1.00		0.44	0.18		1.00			
Lane Grp Cap(c), veh/h	455	586	570	404	773	746	639	0	633			
V/C Ratio(X)	0.12	0.47	0.48	0.87	0.23	0.23	0.21	0.00	0.90			
Avail Cap(c_a), veh/h	455	586	570	404	773	746	639	0	633			
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	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	12.8	14.6	14.6	18.7	9.0	9.0	12.4	0.0	15.2			
Incr Delay (d2), s/veh	0.5	2.7	2.9	22.2	0.7	0.7	0.8	0.0	17.7			
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	0.5	3.0	3.0	5.6	1.3	1.3	1.2	0.0	17.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	17.3	17.5	40.9	9.7	9.8	13.2	0.0	32.9			
LnGrp LOS	B	B	B	D	A	A	B	A	C			
Approach Vol, veh/h		605			702			704				
Approach Delay, s/veh		17.0			25.4			29.1				
Approach LOS		B			C			C				
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	7.0	26.0		27.0		33.0						
Change Period (Y+Rc), s	3.0	4.0		4.0		4.0						
Max Green Setting (Gmax), s	4.0	22.0		23.0		29.0						
Max Q Clear Time (g_c+I1), s	6.0	10.1		24.3		5.9						
Green Ext Time (p_c), s	0.0	2.9		0.0		2.1						
Intersection Summary												
HCM 6th Ctrl Delay				24.2								
HCM 6th LOS				C								

Intersection: 3: Main St & City Center Dr

Movement	SE	SE	SE	NW	NW	NW	NE	NE
Directions Served	L	T	TR	L	T	TR	LT	R
Maximum Queue (ft)	83	136	136	143	241	136	278	165
Average Queue (ft)	26	77	71	97	57	26	74	115
95th Queue (ft)	60	119	117	152	165	81	193	185
Link Distance (ft)		361	361		550	550	602	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	110			120				140
Storage Blk Time (%)	0	1		7	0		0	6
Queuing Penalty (veh)	0	0		8	0		0	7

Intersection: 9: Union Ave & City Center Dr & Court St

Movement	NB	NB	SE	SE	NW	NW	NW	SW	SW	SW
Directions Served	L	>	T	R	L	T	T	<	L	R
Maximum Queue (ft)	30	99	20	2	61	11	8	69	92	31
Average Queue (ft)	6	42	2	0	17	0	0	37	42	16
95th Queue (ft)	23	74	12	2	45	5	5	59	73	40
Link Distance (ft)	262	262	839			361	361	505	505	505
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)				60	130					
Storage Blk Time (%)			0							
Queuing Penalty (veh)			0							

Intersection: 10: C Street & Main St

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	41	17	52	6	79	75
Average Queue (ft)	13	1	17	0	38	35
95th Queue (ft)	39	7	44	4	64	63
Link Distance (ft)		2262		425	384	328
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	60		70			
Storage Blk Time (%)	0		0			
Queuing Penalty (veh)	0		0			

Intersection: 24: Alan Hamel Ave/Grand Ave & Union Ave

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (ft)	81	134	57	140	24	110	140	60	313
Average Queue (ft)	28	59	11	58	1	42	51	8	152
95th Queue (ft)	64	110	41	116	12	92	105	46	265
Link Distance (ft)		877		395	395		311	363	363
Upstream Blk Time (%)								0	0
Queuing Penalty (veh)								0	0
Storage Bay Dist (ft)	140		80			100			
Storage Blk Time (%)		0		3		2	1		
Queuing Penalty (veh)		0		1		2	1		

Intersection: 25: Alan Hamel Ave & Main St

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	174	396	88	235	104	143	105	315
Average Queue (ft)	59	244	18	132	56	52	11	177
95th Queue (ft)	159	380	56	212	96	107	56	292
Link Distance (ft)		394		389		293		311
Upstream Blk Time (%)		0						1
Queuing Penalty (veh)		3						3
Storage Bay Dist (ft)	150		150		80		90	
Storage Blk Time (%)	0	21		4	5	2		35
Queuing Penalty (veh)	0	13		1	5	2		3

Intersection: 111: C Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	71	60	40	57
Average Queue (ft)	36	35	20	33
95th Queue (ft)	56	51	45	51
Link Distance (ft)	444	428	328	364
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 114: D Street & Main St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	TR
Maximum Queue (ft)	75	197	69	196	75	39	81	67	66
Average Queue (ft)	16	88	18	77	31	8	38	23	25
95th Queue (ft)	50	161	49	156	66	30	67	56	56
Link Distance (ft)		425		412	710	710	710		329
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	90		100					70	
Storage Blk Time (%)		4		3				1	0
Queuing Penalty (veh)		1		1				0	0

Intersection: 115: D Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	88	119	60	69
Average Queue (ft)	43	58	31	37
95th Queue (ft)	70	95	51	57
Link Distance (ft)	428	877	329	367
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 118: B Street & Union Ave

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	66	51	75	101
Average Queue (ft)	17	10	36	50
95th Queue (ft)	49	37	61	83
Link Distance (ft)	1136	444	296	360
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

**APPENDIX 2: UNION AVENUE MASTER
PLAN PRELIMINARY COSTS**

UNION AVE PROPOSED PROJECTS	Location	Cost Estimate - Infrastructure	Infrastructure Notes	Cost Estimate - Streetscape	Streetscape Notes
Master Plan	Full Build-Out on Union Avenue	\$3,406,000.00		\$1,524,765.00	\$4,903,985.00
Priority Sub-Projects					
Master Plan Improvements from B Street to Grand Ave		\$3,134,000.00		\$1,524,765.00	
Four way stops at intersections	C Street and D Street	\$17,000.00	*Sign installation, removal of 4 signal poles.		No Landscaping.
Bulb outs at intersections	B Street, D Street, C Street	\$315,000.00	*12 Bulb-outs. ~\$27,000.00 each.	\$94,400.00	(22) Street Trees with Imported Soil, 3,065 Square Feet of Shrub Planting, Irrigation.
Reconstruct Curb-Line	B Street to Grand Avenue	\$720,000.00	12' Sidewalk widening Approx 1900 LF.	\$360,965.00	Decorative Finish Concrete Sidewalk with 7" Clay Brick Amenity Zone.
Repaving	B Street to Grande Avenue	\$1,100,000.00	Repaving to account for extended sidewalks. Assumed 8" HMA over 6" Base Course.		No Landscaping
Drainage Improvements	B Street to Grande Avenue	\$500,000.00	Removal and replacement of 13 inlets, and storm sewer pipe to account for new flowline locations associated with sidewalk widening.		No Landscaping
Stripe roadway to two lanes with sharrows	B Street to Grand Avenue	\$27,000.00	*Striping, and striping removals.		No Landscaping
Mid-Block Streetscape elements	B Street to Grand Avenue	\$60,000.00	400 LF of Landscaping Bulb-Outs, and associated driveway cuts.	\$1,069,400.00	(74) Street Trees in Raised Planters, Imported Soil, Shrub Planting, Irrigation, Site Furniture (Bike Racks, Trash Bins, Benches), Refurbishment and Re-setting of Existing Pedestrian Lights
Mid-block crossings (2)	Riverwalk	\$145,000.00	Includes colored patterned concrete pavement.		No Landscaping
Gateways	One at B Street and one at Grand Avenue	\$250,000.00	Per cost estimate from the City - for 2 gateway features		Included in Gateway Cost
			TOTAL for Priority Sub-Project Bstreet to Grand Ave	\$4,658,765.00	
Master Plan Improvements from Abriendo to B Street		\$205,000.00	1700' Restriping, 6 ramps, 2 bulbouts, Relocation of concrete barrier along bridge.		No Landscaping
			TOTAL for Priority Sub-Project Abriendo to B Street	\$205,000.00	
Master Plan Improvements from Grand Ave to City Center		\$67,000.00	750' restriping, 2 bulbouts		No Landscaping
			TOTAL for Priority Sub-Project Grand Ave to City Center	\$67,000.00	
Master Plan			TOTAL for Master Plan Projects along the entire Union Ave corridor		\$4,930,765.00
Additional Projects Beyond the Scope of the County 1A Funds					
Pedestrian improvements - pork chop crosswalk	Southside of City Center/Union Intersection	\$125,000.00			No Landscaping
Add diagonal parking on C & D Street	C Street and D Street between Union & Main	\$193,000.00	C Street: \$113,000.00 (130 LF, 13' Widening, 4' gutter pans to maintain existing flowlines, 2 Bulb-outs) / D Street: \$80,000.00 (130 LF, 5' Widening, 4' gutter pan to maintain existing flowline, 2 Bulb-outs)	\$180,400.00	Per Block Estimate, (8) Street Trees in 300 Square Foot Shrub Planters, Imported Soil, Irrigation, and Pedestrian Lighting at 60' On Center Spacing
Encourage use of alleys (minor improvements, restripe public lots, signage for parking)	B Street to Riverwalk	\$20,000.00	Restriping and signage		No Landscaping

* Infrastructure costs do not include landscaping, lighting, signal improvements, utility relocations/adjustments, design costs. All costs include a contingency.

**APPENDIX 3: MAIN STREET MASTER
PLAN PRELIMINARY COSTS**

MAIN ST PROPOSED PROJECTS	Location	Cost Estimate - Infrastructure	Infrastructure Notes	Cost Estimate - Streetscape	Streetscape Notes
Master Plan	Full Build-Out on Main Street	\$1,335,000.00		\$458,485.00	\$1,793,485.00
Priority Sub-Projects					
Riverwalk (AT&T) crosswalk		\$323,000.00		\$31,290.00	
Crosswalk Improvements	Riverwalk crossing /AT&T parking lot	\$156,000.00	*4 Bulb outs on each side, restripe 2 cross walk, signs. 175 LF Median installation	\$31,290.00	(4) Street Trees in 1333 Square Feet of Shrub Planting with Imported Soil, Irrigation
Signal modification	Riverwalk crossing /AT&T parking lot	\$95,000.00	*Replace current signal with Rapid Flashing Beacon signal for crosswalk (confirm cost)		No Landscaping
Patterned Concrete Crosswalk	Riverwalk crossing /AT&T parking lot	\$72,000.00	*Asphalt removal and patterned concrete only.		No Landscaping
				TOTAL for Priority Sub-Project Riverwalk (AT&T Crosswalk)	\$354,290.00
Corridor Improvements from Richmond to City Center		\$312,000.00		\$100,135.00	
Parking (on-street striping)	Richmond to City Center	\$11,000.00			No Landscaping
Adjust lanes at City Center	City Center	\$20,000.00	*Restriping, signal head removal/modification		No Landscaping
Bulb outs at intersections	Richmond to City Center	\$157,000.00	*6 Bulb-outs	\$63,030.00	(10) Street Trees in 2,665 Square Feet of Shrub Planting with Imported Soil, Irrigation
Landscape medians	Richmond to City Center (as noted on layout)	\$124,000.00	*375 LF of median installation	\$37,105.00	1,885 Square Feet of Shrub Planting with Imported Soil, Irrigation
				TOTAL for Priority Sub-Project Richmond To City Center	\$412,135.00
Corridor Improvements from C Street to Richmond		\$630,000.00		\$327,060.00	
Corridor improvements	C Street to Richmond	\$505,000.00	13 Bulb outs, 1900' restriping. Landscape bulb-outs, adjust driveway cuts on north/west side, 110' of Landscaped Median.	\$312,640.00	(20) Street Trees in 3,335 Square Feet of Shrub Planting with Imported Soil, Irrigation, decorative concrete sidewalk expansion and parking lanes (Does not include Alan Hamel Xwalk)
Alan Hamel crosswalk	Alan Hamel	\$98,000.00	*4 Bulb-outs. Does not include potential signal modifications	\$14,420.00	(4) Street Trees in 480 Square Feet of Shrub Planting with Imported Soil, Irrigation
Stripe roadway to two lanes with a center turn lane	C Street to City Center	\$27,000.00	*Striping, and striping removals		No Landscaping
				TOTAL for Priority Sub-Project C Street to Richmond	\$957,060.00
Stripe directional bicycle lanes	C Street to Alan Hamel	\$70,000.00	Restriping		No Landscaping
				TOTAL for Priority Sub-Project Bicycle Lanes	\$70,000.00
Master Plan			TOTAL for Master Plan Projects along the entire Main St corridor		\$1,793,485.00
Additional Projects Beyond the Scope of the County 1A Funds					
Stripe directional bicycle lanes	Arkansas River to C Street	\$50,000.00	Restriping		No Landscaping

*Infrastructure costs do not include landscaping, lighting, signal improvements, full roadway reconstruction, drainage modifications, utility relocations/adjustments, design costs. All costs include contingency.