Alpine-Balsam Access and Mobility Strategy

Analysis and Supporting Documentation

A range of approaches for access and mobility at Alpine-Balsam have been proposed and discussed in the area planning process. This report provides context and analysis for the proposed approach for an Access District and Transportation Demand Management (TDM) strategy for the Alpine-Balsam area. It also summarizes traffic impact analysis and recommendations provided by consultants. The report is organized by the following:

A. Policy Context
B. Community Feedback
C. Anticipated Traffic Impacts
D. Proposed Access District and TDM Strategy
   a. Parking Supply and TDM Approach
   b. Access District Approach
   c. Boulder Junction Case Study
   d. Multi-modal Access and Mobility
   e. Mobility Hub and Curbside Management
   f. Parking Regulation and Management

A. Policy Context

The city’s policies for Access and Mobility are based on four primary sources, the 2017 Alpine-Balsam Vision Plan, the Transportation Master Plan (TMP), the Access Management and Parking Strategy (AMPS) and the Climate Commitment. The 2017 Alpine-Balsam Vision Plan outlined increased multimodal access and mobility for the area that will be a vibrant multi-generational hub for community life and local government services—a welcoming and inclusive new model for equitable, affordable, and sustainable living. The TMP is the policy document outlining the policies and Action Plan guiding the city’s investment in transportation infrastructure enhancements, operations, maintenance, planning and programs. Pertinent to the Alpine-Balsam redevelopment, the TMP’s Action Plan prioritizes the city’s Vision Zero goal of improving safety and eliminating serious and fatal injuries, the expanded use of Access Districts to manage parking and provide on-going funding for transportation demand management (TDM), and enhancing multimodal access while preparing for the impact of mobility on demand services in our future.

The city’s Climate Commitment outline the strategies, programs and policies that are needed to reduce the greenhouse gas (GHG) emissions by 80 percent by 2050. With transportation-related emission being almost 30 percent of the city’s GHG inventory, it is critical for the city to reduce emissions through travel behavior change and electrification of the fleet.

AMPS is a set of strategies and policies that represent a balanced approach to enhancing access to existing districts and the rest of the community. AMPS is achieved by increasing travel options for residents, employees and visitors to Boulder. The guiding principles of AMPS is to provide access through all transportation modes, develop and use customized programs by area, support the diversity of people at all stages, ages, and mobility needs, seek solutions with co-benefits for economic and
Community well-being, to plan for the present and the future and cultivate local and regional public-private partnerships.

Most relevant to this project are the parking management principles and strategies that AMPS established: Shared, Unbundled, Managed and Paid (SUMP):

- **Shared**: Parking spaces between commercial, residential, and visitor uses at different times of the day to maximize overall use of the infrastructure throughout the day, while decreasing the overall need for newly constructed facilities. All users share parking spaces. Elimination of reserved stalls increases maximization of use of the infrastructure.
- **Unbundled**: Parking spaces are leased separately from the unit and priced at market rates.
- **Managed**: All parking is managed by time and/or cost and enforced regularly.
- **Paid**: No free parking is provided within the management district.

This principles and strategies along with curbside management and the access district approach have proven successful in other areas of the city and are recommended to be a part of the design and redevelopment of Alpine-Balsam.

**B. Community Feedback**

**Small-Group Workshops**

Community members were asked several questions in the Area Plan small group workshops about access and mobility in the Alpine-Balsam area. A more detailed summary of the community feedback is included in Attachment A of the June 4, 2019 City Council Agenda Memo.

Staff shared information about the formation of an access and parking district for the site, and potentially the wider area, describing potential amenities that could be included for the wider area. Generally, participants wanted to understand the impact to the neighborhood and felt that the city needs to consider the relationship between housing and parking/traffic congestion. Many participants expressed concerns about increased traffic congestion with the development of housing in the area. Key themes from the community feedback include:

**Connections**

- Participants suggested many ideas about increased connectivity, especially the importance of an east-west connection from North Boulder Park to Goose Creek for pedestrians and cyclists (especially crossing Broadway) and an east-west transit connection that could also serve to connect the jobs in the area to housing on the west part of Boulder. Suggestions and concerns highlight the perceived lack of safety in certain areas and the desire to improve safety for nearby residents to walk and bike.

**All-Mode Access**

- Residents suggested expansion of the neighborhood ecopass program as a way of reducing vehicle traffic and improving connectivity and safety in the area, especially for the multi-family residents currently in the area.
- Participants responded to various parking and Transportation Demand Management (TDM) strategies by expressing both support for this approach and concern. People were interested and supportive of mobility hub programs (car share, electric car charging, bike storage, shuttles). Others expressed concern about the viability of these programs to truly reduce the need for
parking, the ability of some populations to reasonably travel without a car, and people’s preferences for travel.

Access and Parking

• There was a range of viewpoints about how much parking should be provided on the city-owned site and in the area. There were two main viewpoints: maximize available parking for housing and use TDM strategies to minimize available parking.
• Those who supported increased parking had concerns about spillover parking from the site into the neighborhood, reduced ability to park in front of one’s home, unrealistic expectations of future residents not wanting parking spaces, and current inability to park at commercial center at peak times.
• Many who supported reduced parking were concerned that constructing more parking on the city site would lead to large and unattractive parking lots and less permeability/connectivity in the area. People supported investments in pedestrian and cyclist infrastructure instead of vehicular; using the site as a model for sustainability by designing parking in a progressive way and including amenities like a mobility hub.

C. Anticipated Traffic Impacts

A Traffic impact study was commissioned to evaluate the potential development changes within the Alpine-Balsam area. The purpose of the study was to identify potential traffic impacts and multi-modal access improvement needs within the study area.

The analysis conducted by Fox, Tuttle Hernandez looked at both existing conditions and a projected future 2040 analysis to study the impact of redevelopment on the level of service (LOS) of the transportation system and its infrastructure. Level of Service (LOS) characterizes the operational conditions of an intersections traffic flow, ranging from LOS A (indicating very good, free flow operations) and LOS F (indicating congested and sometimes oversaturated conditions). Typically, an acceptable level-of-service is LOS D or better in the peak hours. Findings from this analysis is included as an Appendix below.

The traffic impact study evaluated several land use options including:

Alpine-Balsam Site only:
1A: Civic Service Center focus that would include both city and county service centers and minimal housing
1B: “Maximum” residential (up to 300 dwelling units) with the city service center

Alpine-Balsam Site and Land Use Changes in the Plan Area
2A: Civic Service Center focus on the site with additional housing in the wider area
2B: “Maximum” residential for the site with additional units in the wider area (up to 670 units total)

Trip Generation Analysis
The analysis of trip generation and traffic impact concluded that:
• All the study intersection operate overall at LOS C or better and perform similarly to the existing conditions for all options.
• The trip generated after re-development of the site will not exceed the trips that were generated in the past when the site was a fully functioning hospital.
• On-going Transportation Demand Management (TDM) programs and services and parking management are essential for the site to function effectively after re-development.

According to the analysis, land uses within the Alpine Balsam site will generate approximately 2,900 automobile trips per day in the Maximum Office Options, and the Maximum Residential Options will generate approximately 2,600 trips per day. Both land use options will generate trips at a level that is less than half of the traffic that is estimated to have been generated by the site when it was a fully occupied and active hospital. In this context the traffic generated by the proposed new land uses should be easily accommodated by the existing roadway network in the area.

Currently, all nine intersections in the study area operate well overall in the LOS A – C range during AM and PM peak hours on weekdays. In the near term (existing plus site and area plan land uses) all nine intersections will continue to operate in the LOS A-C range. The only noticeable increase in delay is projected to occur on Alpine Avenue approaching 9th Street, and on Balsam Avenue approaching Broadway. Restriping to add separate left and right turn lanes on Alpine at 9th and extending the length of the eastbound left turn lane on Balsam approaching Broadway.

The addition of the Area Plan land uses to the Alpine Balsam site uses adds very little congestion or delay to area intersections. Year 2040 traffic projections have incorporated the assumption that all existing traffic movements at all intersections will increase by 10%. This 10% increase is based on the historic growth in traffic along the Broadway corridor through the area. This is conservative given that most land uses surrounding the area are built out and will not likely increase traffic on the side streets approaching Broadway. In this context, the Year 2040 traffic projections are likely to be conservatively high. In the Year 2040 horizon, with the addition of site and area plan land uses, eight of the nine intersections continue to operate in the LOS A-C range, and the Alpine/9th intersection drops into the LOS D range.

D. Proposed Access District and TDM Strategy

Parking Supply and TDM Approach

Land uses desired on the site can be supported by a range of options for access, mobility and parking. There are different levels of parking and Transportation Demand Management (TDM) investments that can be designed to support the desired mix of uses. The transportation analysis for the Alpine-Balsam site considered a broad spectrum of access and parking approaches based upon local and national examples:
• National Average level – On the high end of the parking supply spectrum, the analysis used national average ratios for residential and non-residential uses based on Institute of Transportation Engineers (ITE) trip generation and parking utilization rates. This level of analysis does not factor in any TDM programs to manage parking demand.
• Boulder Citywide Level – To consider a more modest parking supply ratio for both residential and non-residential uses and a minimal investment in TDM programs and services, the next level of analysis is based on a parking supply rate based on the average parking supply rate
throughout the Boulder community. This parking supply rate is lower than ITE estimates and is based on local examples and considers Boulder’s long history of investing in multimodal infrastructure and the Community Transit Network (CTN).

- **Boulder “District” Level** – To consider parking supply rates comparable to other Boulder mixed use districts such as downtown Boulder and Boulder Junction, the next level of analysis considered lower parking supply ratios and higher investment in TDM transportation options.

- **Boulder TMP Goal Level** – This level of analysis represents the parking supply rates, parking pricing and policies, and TDM program investment that would be needed for the Alpine Balsam site to meet the city’s TMP mode share objectives. For this level to be functional, increased investments in on-going TDM programs and transit service would be needed along with increased parking costs.

Transportation Demand Management (TDM) measures will be important to reduce the demand for parking by the new land uses on the Alpine Balsam site and help minimize automobile access. Parking projections have considered “Enhanced Mobility/TDM” levels of parking supply, consistent with the City of Boulder Transportation Master Plan and the on-going efforts in the Boulder Junction area.

### Mobility Scale

<table>
<thead>
<tr>
<th>TDM/AMPS Level</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Family</td>
<td>1.4</td>
<td>1.2</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Attached</td>
<td></td>
<td>Parking</td>
<td>Parking</td>
<td>Parking</td>
</tr>
<tr>
<td>Townhomes</td>
<td></td>
<td>spaces per unit</td>
<td>Reduction</td>
<td>Reduction</td>
</tr>
<tr>
<td>Multi-Family</td>
<td>1.4</td>
<td>1.2</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>(Flats)</td>
<td></td>
<td>Parking</td>
<td>Parking</td>
<td>Parking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>spaces per unit</td>
<td>Reduction</td>
<td>Reduction</td>
</tr>
<tr>
<td><strong>Commercial</strong></td>
<td>4.15</td>
<td>3.2</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Office</td>
<td></td>
<td>spaces per 1,000 sq. ft.</td>
<td>Parking Reduction</td>
<td>Parking Reduction</td>
</tr>
<tr>
<td><strong>Retail</strong></td>
<td>4.7</td>
<td>3.9</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Mixed-Use</td>
<td></td>
<td>spaces per 1,000 sq. ft.</td>
<td>Parking Reduction</td>
<td>Parking Reduction</td>
</tr>
</tbody>
</table>

It is assumed that the **TMP Goal Level** assumptions will be applied to the trip rates and parking rates for these residential focused scenarios on the Alpine-Balsam site. It is also assumed that these same
assumptions will be used for the residential infill in the larger area plan consistent with the district approach to providing on-going services.

**Existing Parking Conditions**

The parking garage at Alpine and Broadway has a total of 407 parking spaces. A goal of the project is to have the site function adequately without having to build additional parking. There are just over 900 parking spaces on-street in the 22 surrounding neighborhood blocks, and approximately 50% of these on-street spaces are unoccupied mid-day on a weekday.

**Access District Approach**

This approach includes the creation of a general improvement district to collect property taxes which can fund on-going transportation demand management (TDM) strategies and programs. Property taxes (or payments in lieu of taxes- PILOT fees) can be collected from both residential and commercial properties to provide funds for capital infrastructure and on-going funds for programs, services, parking management, and operations. This approach is used in the city’s transit-oriented development, Boulder Junction; see case study below.

As the case study below indicates, Boulder Junction’s approach is to have two separate, but overlapping and complimentary access districts. There is one for parking management and another for TDM programs and services. This approach allows property owners to annex into one or the other or both districts based on their need. For example, a property that supplies all its own parking on site may not want to join the parking district, but may want to pay into the TDM district to have access to programs like the RTD EcoPass. In the case of Alpine-Balsam, there is an option to follow the Boulder Junction model with two Access Districts or design a single access district that provides both parking management and on-going TDM programs. While there are some administrative inefficiencies with managing two districts in a single area, the dual district approach does provide additional flexibility for properties that want to annex in at a later time.

If an Access District is implemented, staff recommends that the tax revenue would be used to fund on-going TDM incentive programs and parking management and maintenance. This could include, RTD EcoPasses for all residents and employees of the Alpine-Balsam District, bike- and carshare memberships, credits to subsidize Transportation Network Company (TNCs) like Uber or Lyft, and funding for additional local transit services, micro-transit or micro mobility options.

An Access District can also be managed by a trip generation allowance ordinance that caps the number of vehicle trips the district can generate. This regulatory tool can be used to evaluate the performance of the district and dictate the course of action required to reduce vehicle trips if the district is in non-compliance. One course of action can be to increase the property tax mill rate to increase funding for additional TDM programs or multimodal services.

**Boulder Junction Case Study**

In the Boulder Junction Access District, there are two overlapping general improvement districts. The first district is focused on parking. The Parking Access District provided the ability to construct shared public parking in Boulder Junction and provides the on-going revenue to manage on- and off-street parking for residents, employees and visitors. The overlapping Transportation Demand Management
Access District’s property tax revenue provides all residents and employees with annual Eco Passes, bike share memberships and carshare memberships and credits.

Boulder Junction is also guided by a Trip Generation Allowance, an ordinance, which states that the District as a whole can only produce 45 percent of the trips that would be expected for that mix and sizes of land uses. While Boulder Junction is still developing and transit services is not at the desired level, the District is only producing 58 percent of expected trips after its first evaluation in 2017.

Boulder Junction also incorporated the use of parking maximums instead of minimums and serves as the first parking district managed by the SUMP principles of shared, unbundled, managed and paid. Residential developments are limited to 1 parking space per unit and commercial developments can build little or no parking and rely on district parking. Parking supply and demand analyses have demonstrated that Boulder Junction residential parking demand is 0.9 per unit and that commercial demand is being met by a combination of private and public parking.

Multimodal Access and Mobility

The site is accessible on foot, by bike, or on transit. Sidewalks exist on both sides of all roadways in the area, on-street bicycle lanes and/or neighborhood bikeways connect to the area along 9th Street, 13th Street, and Balsam Avenue, and the area is well served by frequent bus service in the Broadway corridor. The connections plan will address the:

- Low-Stress bicycle and pedestrian access
- ADA requirements
- Safe pedestrian crossings
- B-Cycle Access
- Access to restaurants, retail and downtown Boulder

Mobility Hub and Curbside Management

A mobility hub is a place in which people can access a variety of transportation options in one location. For example, a mobility hub could include a bikeshare station, carshare vehicles, micro-mobility options, like electric scooters, pick-up and drop-off curbside for TNCs or micro-transit, electric vehicle or bicycle charging.

With the growth of TNCs and increased freight delivery, it will be important for the Alpine-Balsam District to manage access to curbs from public right-of-way. Over time, additional short-term loading zone could take the place of a portion of time-limited, on-street parking. In the future, it is possible to manage curbside demand through variable pricing based on demand or time.

Parking Regulation and Management

It is recommended that the SUMP principles be implemented to the maximum extent to reduce the need to build additional parking in the planning area. Not only is parking expensive to build and maintain, it is likely that parking demand will reduce in the future as advanced mobility technology and innovations increase their impact on travel behavior.

Residential parking requirement should be limited to one parking space per unit, and maximums set for commercial parking similar to Boulder Junction and the TMP access and mobility level.
Wherever parking is managed, it is important to consider and mitigate the impact of spill over parking in surrounding commercial and residential areas. To mitigate the impacts, the Alpine-Balsam district will need to work with the surrounding property owners to determine what policies and strategies will need to be implemented to manage spillover into the neighborhoods. In the downtown and University Hill where parking in managed and priced, many neighborhoods worked with the city to implement Neighborhood Parking Permit (NPP) programs to manage parking and limit the number of commuter parking permits per block face and provide parking permits to residents.

See Below for Appendix A: Alpine-Balsam Area Plan Traffic Impact Study
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Existing Parking Summary Memorandum
1.0 INTRODUCTION

The Fox Tuttle Hernandez Transportation Group prepared this traffic impact study in support of the Area Plan to evaluate the potential development changes within the Alpine Balsam area in Boulder, CO. Recently, Boulder Community Health relocated the majority of its services to the new hospital at Arapahoe Road and 48th Street from the property bounded by Broadway to the east, 9th Street to the west, Alpine Avenue to the south, and Balsam Avenue to the north as shown to the right. The 8.8± acre property on Broadway was purchased by the City of Boulder for planned redevelopment to provide civic facilities and/or housing. In addition, to the hospital site, the City purchased additional properties along Alpine Avenue and North Street including the existing Brenton building and medical plaza parking garage.

The project proposes the demolition of the existing 260,000 square foot (sq. ft.) hospital building and construction of a mix of civic facilities for the civic services and residential units to compliment the land uses within the Alpine Balsam area.

The purpose of this study is to assist in identifying potential traffic impacts and multi-modal access improvement needs within the study area to support this project.
2.0 PROJECT DESCRIPTION

The traffic study addresses the potential traffic impacts caused by the redevelopment of the city-owned Alpine Balsam area and then tests the combined impact of the redevelopment of the city-owned site and increased residential density added in the area surrounding the city-owned site. These potential land use changes were evaluated for both the existing and long-term (Year 2040) planning horizons. The study has evaluated peak hour intersection conditions in the study area with and without the project generated traffic and surrounding area plan traffic increases. There are four land use scenarios or options that were evaluated for redevelopment of the Alpine-Balsam area:

Option 1A  Maximum Office on Alpine Balsam site only
- 191,000 sq. ft. of office (including City)
- 120,000 sq. ft. of County office
- 75 apartments
- 1,700 sq. ft. of neighborhood serving retail

Option 1B  Maximum Residential on Alpine Balsam site only
- 111,000 sq. ft. of office (including City)
- 300 apartments
- 8,000 sq. ft. of neighborhood serving retail and co-work space

Option 2A  Maximum Office on Alpine Balsam site plus Area Plan area land uses
- Same as Option 1A plus 370 additional apartments spread through the larger area plan area

Option 2B  Maximum Residential on Alpine Balsam site plus Area Plan area land uses
- Same as Option 1B plus 370 additional apartments spread through the larger area plan area

This study focuses on the weekday AM and PM peak hours which historically have been the periods of highest automobile traffic for the proposed type of land uses. The study area includes the nine existing intersections illustrated on Figure 1. The land uses in this analysis were grouped into the five zones illustrated on Figure 2. The scope of this analysis has been approved by City staff, and this traffic study has been prepared consistent with the City of Boulder’s Design and Construction Standards (November 2000).
The benchmark used for comparing the impacts of the anticipated land uses on the city-owned site and the surrounding area plan area is the existing traffic conditions (Year 2018). It should be noted that traffic in the study area was significantly higher in the past, before the relocation of the hospital to east Boulder, than in 2018 when most of the city-owned site was vacant.

3.0 STUDY CONSIDERATIONS

The traffic analysis addresses the signalized and unsignalized intersection operations using the procedures and methodologies set forth by the *Highway Capacity Manual (HCM)*. Study intersections were evaluated using Synchro (version 10) software for signalized, stop-controlled and roundabout intersections.

3.1 Data Collection

For the study intersections on Broadway, the traffic counts were gathered from the City of Boulder traffic count database. Traffic counts for the unsignalized intersections within the study area were collected in September 2018 for the weekday AM and PM peak hours. The existing traffic volumes are illustrated on Figure 1. The existing intersection geometry and traffic control are also shown on this figure. Signal timing for the intersection on Broadway was provided by the City of Boulder within the Citywide Synchro model. Count data is provided in the Appendix.

[Note that a detailed inventory of existing automobile parking in and adjacent to the Alpine Balsam site (see figure at right) was completed and summarized in a Fox Tuttle Hernandez memorandum dated June 15, 2018. This memo is attached in the Appendix for reference]

3.2 Level-of-Service Criteria

To measure and describe the operational status of the study intersections, transportation engineers and planners commonly use a grading system referred to as “Level-of-Service” (LOS) that is defined by the HCM. LOS characterizes the operational conditions of an intersections traffic flow, ranging from LOS A (indicating very good, free flow operations) and LOS F (indicating congested and sometimes oversaturated conditions). These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with traveling through the intersections. The intersection LOS is represented as a delay in seconds per vehicle for the intersection as a whole and for each turning movement. Criteria contained in the HCM was applied for these analyses in order to determine peak hour LOS. A more detailed discussion of LOS methodology is contained in the Appendix for reference. Typically, an acceptable level-of-service is LOS D or better in the peak hours.

4.0 EXISTING CONDITIONS

4.1 Roadways

The existing study area street network consists of arterials and local streets. The primary public roadways that serve the project site are discussed in the following text. The existing study area roadway network is illustrated on Figure 1.

Broadway is a principal arterial that provides a north-south connection through the study area. It begins at US 36 to the north and travels south through the entire length of Boulder. This roadway serves as access into the heart of downtown Boulder and connecting to many residential communities and retail centers along the way. Broadway currently serves approximately 25,500 vehicles per day (vpd) north of the Alpine-Balsam study area (Year 2018, City of Boulder). The posted speed limit on Broadway is 30 mph within the study area. In this vicinity Broadway is 50-feet wide with 10-foot travel lanes, two per direction and a 10-foot left turn lane at intersections.

9th Street is a north-south minor arterial south of Balsam Avenue and a collector north of Balsam Avenue that travels from Foothills Elementary School in north Boulder to Chautauqua Park in south Boulder. The roadway links residential neighborhoods to downtown, recreational areas,
and retail centers. The posted speed limit changes midway between Alpine Avenue and Balsam Avenue with 25 mph to the north and 20 mph to the south. Adjacent to the Boulder Community Hospital site, 9th Street is 35-feet wide with 11.5-foot travel lanes, one per direction, and 6-foot on-street bike lanes. North of Balsam Avenue, 9th Street continues to be 35-feet; however, the bike lanes are no longer designated with pavement markings, and a parking lane is introduced on the west side of the street adjacent to North Boulder Park.

13th Street is a north-south two-lane local street travels from north of the Alpine-Balsam area to Arapahoe Avenue. The roadway links residential neighborhoods to downtown, recreational areas, Christian Recht Field, Boulder County offices, Casey Middle School and retail centers. Within the study area 13th Street has a posted speed limit of 25 mph and the width ranges from 36 feet to 48 feet. North of Balsam Avenue, 13th Street is the narrowest with one travel lane per direction and parking lanes on both sides of the street. Between Balsam Avenue and Alpine Avenue, 13th Street widens to 40 feet to accommodate 11-foot travel lanes, one per direction; 5- to 6-foot bike lanes, and a 7-foot parking lane on the east side. South of Alpine Avenue, 13th Street widens to 48 feet to include a parking lane on the west side also.

Balsam Avenue is a two-lane minor arterial west of Broadway and a collector east of Broadway. The roadway extends between 9th Street to 19th Street where it changes names to Edgewood Drive and then changes to Valmont Road east of Folsom Street. Balsam Avenue provides connectivity through the Alpine-Balsam area and to nearby neighborhoods, retail centers, and office complexes. The posted speed limit within the study area is 25 mph. Adjacent to the Boulder Community Hospital site, Balsam Avenue is 32-feet wide with 10-foot travel lanes, one per direction, and 6-foot bike lanes.

Alpine Avenue is a local two-lane roadway that serves commercial and residential properties between the foothills and 20th Street. Within the study area, Alpine Avenue ranges in width from 34 feet to 38 feet, including one lane per direction and parking lanes on both sides of the street. The posted speed limit within the study area is 25 mph.

North Street is a local two-lane roadway that serves commercial and residential properties between 6th Street and Alpine Avenue. Within the study area, Alpine Avenue ranges in width from 32 feet to 40 feet, including one lane per direction and parking lanes on both sides of the street. The posted speed limit within the study area is 25 mph.
4.2 Intersections

The study area was developed from discussions with City staff and includes nine existing intersections as listed below with the current traffic control:

1. Broadway at Balsam Avenue (signalized)
2. Broadway at Alpine Avenue (signalized)
3. Broadway at North Street (signalized)
4. 9th Street at Balsam Avenue (all-way stop-controlled)
5. 9th Street at Alpine Avenue (side-street stop-controlled)
6. 9th Street at North Street (side-street stop-controlled)
7. 13th Street at Balsam Avenue (all-way stop-controlled)
8. 13th Street at Alpine Avenue (all-way stop-controlled)
9. 13th Street at North Street (side-street stop-controlled)

The lane configuration at each of the study intersections is illustrated on Figure 1.

4.3 Pedestrian and Bicycle Access

There are sidewalks on both sides of all the study roadways with crosswalks at all of the study intersections. The three signalized intersections on Broadway include pedestrian signal equipment to facilitate crossing the intersecting streets.

There are on-street bike lanes on 9th Street and 13th Street between Pine Street and Balsam Avenue. North of Balsam Avenue, both of these streets are designated bike routes without on-street bike lanes. Balsam Avenue also has on-street bike lanes that lead to the Goose Creek multi-use path. The bike lanes within the Alpine-Balsam area link to other on- and off-street bike facilities throughout the City of Boulder.

4.4 Transit Access

Broadway serves as major transit corridor with the Y, 208, 208F, and SKIP routes served directly adjacent to the site with bus stops in each direction. Each of the transit routes provide connections to shopping centers, the University of Colorado, civic facilities, school campuses, office complexes and business parks, recreational areas, and adjacent communities. The routes are described below:
- **Route Y (Lyons/Boulder)** – This regional route connects Lyons to Boulder via US 36 and Broadway. This route provides access between the Lyons park-n-ride and the Downtown Boulder Station.

- **Route 208 (Iris/Valmont)** – Travels between the Downtown Boulder Station and the Flatiron Business Park. This route utilizes Broadway, Iris Avenue, Valmont Road, and 55th Street to connect the west and east parts of Boulder.

- **Route 208F (Iris/Valmont)** – This route is the same as Route 208 with the addition of circulating the Flatiron Business Park.

- **Route SKIP (Broadway)** – Travels the length of Boulder along Broadway with high frequency service connecting to North Boulder, University of Colorado, Downtown Boulder Station, three park-n-rides, and various community destinations.

There are northbound and southbound bus stops located midway between Alpine Avenue and Balsam Avenue. The southbound stop in this block includes a bus pull out in front of the old hospital building. There is also a southbound stop just north of North Street, and a northbound stop just south of North Street. Each includes a bench, bike racks, and trash receptacle and three of the four stops have shelters.

### 4.5 Existing Intersection Capacity Analysis

The results of the LOS calculations for the intersections are summarized in Table 1. Average and 95th percentile queues are summarized in Table 2. The intersection level-of-service worksheets are attached in the Appendix. All of the study intersections operate overall at acceptable level-of-service, LOS B or better. All of the movements and approaches currently operate at LOS D or better, except at the intersection of 9th Street and Alpine Avenue.

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2 It should be noted that the 95th percentile queue length is a theoretical queue that is 1.65 standard deviations above the average queue length. In theory, the 95th percentile queue would be exceeded 5% of the time based on the average queue length, but it is also possible that a queue this long may not occur.
The intersection of 9th Street at Alpine Avenue has LOS E on the westbound approach during the PM peak hour with a 95th percentile queue of 118 feet (about five vehicles). No mitigation measures are recommended. Side-street volumes are not approaching warrants for a multi-way stop.

5.0 FUTURE BACKGROUND TRAFFIC CONDITIONS

5.1 Annual Growth Factor and Future Volume Methodology

The daily volume of traffic in the Broadway corridor in this area has been relatively stable over the years with only a slight upward trend of \( \frac{3}{5} \) of 1 percent per year. A case could be made that Boulder’s ongoing efforts to shift travel into modes other than the automobile are being successful and may result in no increase in background traffic over the next 20 years. However, to be conservative for this study, City staff has decided to project this slow growth in historic traffic into the future for the next 20 years. This results in a 20-year growth factor of 1.10, which has been utilized to estimate the future background traffic growth in the study area. This growth factor was applied to the existing study area traffic volumes to determine the long-term volumes. The Year 2040 background traffic is summarized on Figure 3.

5.2 Year 2040 Background Intersection Capacity Analysis

The study area intersections were evaluated to determine baseline operations for the Year 2040 background scenario and to identify any capacity constraints associated with background traffic without the redevelopment of the Alpine Balsam site. The level-of-service criteria discussed previously was applied to the study area intersections to determine the impacts with the long-term background volumes.

The results of the LOS calculations for the intersections are summarized in Table 3. Average and 95th percentile queues are summarized in Table 4. The intersection level-of-service worksheets are attached in the Appendix.

All of the study intersections operate overall at LOS C or better and perform similarly to the existing conditions. All of the movements and approaches operate at LOS D or better within the study area, except at the intersection of 9th Street and Alpine Avenue. It is estimated that the eastbound and westbound approaches will operate at LOS E and LOS F, respectively, in the PM peak hour. The 95th percentile queue is estimated to become 75 feet (about three vehicles) for the eastbound approach and 185 feet (about eight vehicles) for the westbound approach. The City may want to consider restriping the westbound
approach to 9th Street on Alpine Avenue to have one left-turn lane and one through+right-turn lane. This will require removing on-street parking on Alpine Avenue for a portion of the block east of 9th Street. This would help mitigate the westbound delay and shorten the westbound queuing at this intersection.

### 6.0 PROPOSED DEVELOPMENT TRAFFIC

The Alpine-Balsam Area Plan was evaluated for four development options in the existing and long-term (Year 2040) future scenarios as described above. The Boulder Community Hospital site that is owned by the City is proposed to be a mix of civic offices and multi-family residential homes. There is also potential for redevelopment of other properties within the Alpine-Balsam area to increase residential apartments in the area plan area to the south and east of the city-owned property. **Figure 2** illustrates the development zones of the Alpine-Balsam area.

- **Zone 1** is city-owned Alpine Balsam site (land uses detailed above for the Maximum Office and Maximum Residential Options);
- **Zone 2** is located in the northeast corner of 9th Street and Alpine Avenue. This zone was evaluated with 70 additional apartments in the “plus area plan” scenarios;
- **Zone 3** is located between Alpine Avenue and North Street, between 9th Street and 11th Street alignment. This zone was evaluated with existing land uses plus 100 additional apartments in the “plus area plan” scenarios;
- **Zone 4** is located east of Broadway between Portland Place and North Street. This zone was evaluated with existing land uses plus 60 additional apartments in the “plus area plan” scenarios;
- **Zone 5** is bounded by Broadway to the west, 13th Street to the east, Balsam Avenue to the north, and North Street to the south. This zone was evaluated with existing land uses plus 140 additional apartments in the “plus area plan” scenarios.

The additional residential density added in the area plan area are illustrated below:
The following options were evaluated:

**Option 1A**  Maximum Office on Alpine Balsam site only
**Option 1B**  Maximum Residential on Alpine Balsam site only
**Option 2A**  Maximum Office on Alpine Balsam site plus Area Plan area land uses
               Same as Option 1A plus 370 additional apartments spread through the larger area
**Option 2B**  Maximum Residential on Alpine Balsam site plus Area Plan area land uses
               Same as Option 1B plus 370 additional apartments spread through the larger area

### 6.1 Trip Generation

To establish the volume of new trips that will be added to the roadway network from the proposed redevelopment in the Alpine Balsam area, trip generation rates were gathered from the *Institute of Transportation Engineers (ITE) Trip Generation Manual*³. A trip generation estimate was performed to determine the traffic increase for each option based on the anticipated land use types. The trip rates contained in the ITE Trip Generation Manual for land uses #221 “Multi-Family Housing (Mid-Rise)”, #710 “General Office”, and #820 “Shopping Center” were applied to the size of building or number of units to

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estimate the proposed traffic for each development option. Table 5 provides the trip generation estimates for the four scenarios.

**Trip Types**

The proposed development will create new trips, also known as ‘primary trips’, as well as non-auto and multi-purpose trips, which are discussed in detail below:

**Primary Trips.** These trips are made specifically to travel to/from the residential community and are considered “new” trips. Primary trips would not have been made if the proposed project did not exist. Therefore, this is the only trip type that increases the total number of trips made on a regional basis.

**Multi-Purpose or Internal Trips.** These internal trips occur from one land use or building to another within the site boundaries and surrounding, connected land uses. For example, a person that works in the new office building may visit the new or existing retail businesses or a patron may visit several stores during one visit. Multi-use or multi-purpose trips typically do not affect the exterior site access points, nor add any additional traffic volumes to the adjacent street network. Multi-use factors were only applied to the retail land use and are shown on Table 5.

**Non-Auto Trips or Multi-Modal Trips.** These trips are those that are completed by walking, bicycling, ride sharing or riding transit. The existing transit, pedestrian, and bicycle amenities in the area coupled with Boulder’s strong transportation demand management (TDM) efforts will encourage residents, employees and customers to make non-auto trips to/from the Alpine-Balsam area. The automobile trip generation estimates were reduced by the multi-modal factors illustrated in Table 5 for each land use to account for the success Boulder has had in encouraging travel by non-auto modes and the continued emphasis on transportation demand management (TDM) in the Alpine Balsam area.
The resultant automobile trips accessing the new land uses in the study area are summarized below in Table 6:

**Table 6: Summary of Trip Generation**

<table>
<thead>
<tr>
<th>Period</th>
<th>Option 1A (Max. Office)</th>
<th>Option 1B (Max. Residential)</th>
<th>Option 2A (Max. Office + Area Development)</th>
<th>Option 2B (Max. Residential + Area Development)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Daily</td>
<td>2,904</td>
<td>2,580</td>
<td>4,780</td>
<td>4,456</td>
</tr>
<tr>
<td>Weekday AM</td>
<td>324</td>
<td>252</td>
<td>455</td>
<td>383</td>
</tr>
<tr>
<td>Weekday PM</td>
<td>330</td>
<td>279</td>
<td>494</td>
<td>443</td>
</tr>
</tbody>
</table>

For comparison, it is estimated that the historic hospital site use generated significantly more traffic (approximately 8,500 vehicle trips per day) than any of the land uses anticipated on the Alpine Balsam site and in the surrounding area plan area (See Table 5). In this context, the transportation impacts associated with the potential new uses in the study area should function well on the existing transportation network since the prior hospital use generated more traffic.

### 6.2 Trip Distribution and Assignment

The trip distribution patterns developed for this study were based on the existing travel patterns illustrated in Figure 1, the location of each land use zone within the study area relative to the nine study area intersections, and an estimate of local and regional trip origin and destination patterns. Overall trip distributions to/from the study area are summarized as follows:

Zones west of Broadway:
- 20% to/from N. on Broadway
- 40% to/from S. on Broadway
- 20% to/from E. on Balsam
- 5% to/from S. on 13th
- 10% to/from S. on 9th
Using these distribution assumptions, the projected site traffic from each zone was assigned to the nine study area intersections for the weekday AM and PM peak hour periods. The site-generated volumes for Option 1A are shown on Figure 4, Option 1B are shown on Figure 5, Option 2A are shown on Figure 6, and Option 2B are shown on Figure 7.

### 6.3 Proposed Access

Traffic that accesses the city-owned Alpine Balsam site is anticipated to take access directly from either Alpine or Balsam. 11th Street will provide a connection between Alpine and Balsam, there will be a mobility hub accessing Alpine at approximately 10th Street, and the existing parking structure will continue to access Alpine Street just west of Broadway as it does today. The figure at the right illustrates a potential access plan for Option 1A.

### 7.0 TRAFFIC CONDITIONS WITH SITE DEVELOPMENT

This section discusses impacts associated with the development of the Alpine Balsam area in the near-term and long-term conditions with each of the four development options.
7.1 Existing + Option 1A Project Intersection Capacity Analysis

The site-generated traffic volumes for Option 1A (maximum office) were added to the Existing volumes to analyze potential site impacts in the near-term condition. The Existing + Option 1A site-generated traffic volumes are illustrated on Figure 8. The level-of-service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 1A site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 1. Average and 95th percentile queues are summarized in Table 2.

The Option 1A project trips do not significantly impact the overall operations of the study intersections in the near-term. The study intersections will operate overall with the same LOS letter grade when compared to the Existing scenario. The following intersections have a movement or an approach that are anticipated to begin to operate at LOS E or F:

- **9th Street at Alpine Avenue**: This side-street stop-controlled intersection will operate overall at LOS B in both peak hours; however, the westbound approach will begin to operate at LOS F during the weekday PM peak hour. The 95th percentile queue for this approach is estimated to be 158 feet (about seven vehicles, two more than existing).

  **Recommendation**: The City may want to consider restriping the westbound approach to 9th Street on Alpine Avenue to have one left-turn lane and one through+right-turn lane. This will require removing on-street parking on Alpine Avenue for a portion of the block east of 9th Street. This improvement will reduce the queue by two vehicles and reduce the approach delay by 30 seconds.

- **Broadway at Balsam Avenue**: This signalized intersection will operate overall at LOS B in both studied peak hours; however, the eastbound left-turn will begin to operate at LOS E in the PM peak hour. The average queue for this movement is estimated to be 165 feet (about seven vehicles) and the 95th percentile queue is estimated to be 247 feet (ten vehicles) during the PM peak hour. Both queues extend beyond the existing storage length of 80 feet, similar to the existing conditions.

  **Recommendation**: Consider adding one second of green time to the eastbound left-turn phase. This will change the eastbound left-turn level of service to LOS D in the PM peak hour. Changes in signal timing will need to be coordinated with progression on Broadway. The left-turn storage
length is limited by the width of Balsam Avenue to the west of the intersection. With the redevelopment of the hospital site, consider lengthening the eastbound left-turn lane.

7.2 Existing + Option 1B Project Intersection Capacity Analysis

The site-generated traffic volumes for Option 1B (maximum residential) were added to the Existing volumes to analyze potential site impacts in the near-term condition. The Existing + Option 1B site-generated traffic volumes are illustrated on Figure 9. The level-of-service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 1B site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 1. Average and 95th percentile queues are summarized in Table 2.

The Option 1B project trips do not significantly impact the overall operations of the study intersections in the near-term. The study intersections will operate overall with the same LOS letter grade when compared to the Existing scenario. Similar to Option 1A, the westbound approach at 9th Street and Alpine Avenue will begin to operate at LOS F without separate approach lanes. The 95th percentile queue is estimated to be 143 feet (about six vehicles, one less than Option 1A). Consider restriping the westbound approach to provide one left-turn lane and one through/right-turn lane.

7.3 Existing + Option 2A Project Intersection Capacity Analysis

The site-generated traffic volumes for Option 2A (maximum office + new area plan area development) were added to the Existing volumes to analyze potential site impacts in the near-term condition. The Existing + Option 2A site-generated traffic volumes are illustrated on Figure 10. The level-of-service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 2A site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 1. Average and 95th percentile queues are summarized in Table 2.

The additional project trips associated with the potential development in the Alpine-Balsam area do not significantly impact the study intersections when compared to Option 1A. The majority of intersection and movement delays are within two seconds of the Option 1A scenario. Similar to Option 2A, the eastbound left-turn at Broadway and Balsam Avenue will operate at LOS E in the PM peak hour. Consider adding one second of green time to the eastbound phase and lengthening the left-turn storage with the redevelopment.
The additional traffic will increase the delay experienced on the westbound approach at 9th Street and Alpine Avenue and the 95th percentile queue will increase to 175 feet (about seven vehicles) with existing lane configuration. Consider restriping the westbound approach to provide one left-turn lane and one through/right-turn lane.

7.4 Existing + Option 2B Project Intersection Capacity Analysis

The site-generated traffic volumes for Option 2B (maximum residential + new development) were added to the Existing volumes to analyze potential site impacts in the near-term condition. The Existing + Option 2B site-generated traffic volumes are illustrated on Figure 11. The level-of-service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 2B site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 1. Average and 95th percentile queues are summarized in Table 2.

The additional project trips associated with the potential development in the Alpine-Balsam area do not significantly impact the study intersections when compared to Option 1B. The majority of intersection and movement delays are within two seconds of the Option 1B scenario. The additional traffic will increase the delay experienced on the westbound approach at 9th Street and Alpine Avenue and the 95th percentile queue will increase to 160 feet (about seven vehicles, one more than Option 1B) with existing lane configuration. Consider restriping the westbound approach to have one left-turn lane and one through/right-turn lane.

7.5 Year 2040 Background + Option 2A Project Intersection Capacity Analysis

[Note when reviewing all Year 2040 traffic evaluations: The 2040 background traffic projections conservatively project that all existing traffic volumes increase by 10%, which is the projected growth along Broadway over the next 20 years. This is extra conservative considering that most side street areas are built-out and not likely to generate additional automobile traffic in the future. This analysis has also used the conservative assumptions that the peak hour traffic does not “spread” to effectively minimize the peak congestion by spreading the peak period traffic over a longer period (which typically does happen as traffic increases). The reader is reminded that these conservative assumptions are built into the analysis.]

The site-generated traffic volumes for Option 2A (maximum office + new development) were added to the Year 2040 Background volumes to analyze potential site impacts in the long-term condition. The Year 2040 Background + Option 2A site-generated traffic volumes are illustrated on Figure 12. The level-of-
service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 2A site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 3. Average and 95th percentile queues are summarized in Table 4.

The Option 2A project trips do not significantly impact the overall operations of the study intersections in the long-term, except at the intersections of 9th Street at Alpine Avenue. The study intersections will operate overall with the same LOS letter grade or within three seconds of average delay when compared to the Year 2040 Background scenario. The following intersections have a movement or an approach that are anticipated to operate at LOS E or F:

- **9th Street at Alpine Avenue**: This side-street stop-controlled intersection will operate overall at LOS A in the AM peak hour and LOS D in the PM peak hour. The eastbound approach will continue to operate at LOS E and the westbound approach will continue to operate at LOS F during the PM peak hour. The 95th percentile queue for the eastbound approach is estimated to be 83 feet (about four vehicles, one more than background). The 95th percentile queue for the westbound approach is estimated to be 268 feet (about 11 vehicles, three more than background).

  **Recommendation**: Consider restriping the eastbound and westbound approaches to provide one left-turn lane and one through/right-turn lane by removing on-street parking. This improvement will reduce the queue on the eastbound approach by one vehicle and reduce the average approach delay by three seconds. The westbound queue will be reduced by six vehicles and the average approach delay by 90 seconds.

- **Broadway at Balsam Avenue**: This signalized intersection will operate overall at LOS B in the AM peak hour and LOS C in the PM peak hour; however, the eastbound left-turn will begin to operate at LOS F during the PM peak hour. The average queue for this movement is estimated to be 208 feet (about eight vehicles, two more than background) and the 95th percentile queue is estimated to be 330 feet (about 13 vehicles, four more than background) during the PM peak hour. Both queues extend beyond the existing storage length of 80 feet, similar to the existing and background conditions.

  **Recommendation**: Consider adding three seconds of green time to the eastbound left-turn phase. This will change the level of service for the eastbound left-turn movement to LOS D in the PM peak hour. Changes in signal timing will need to be coordinated with progression on Broadway.
The left-turn storage length is limited by the width of Balsam Avenue to the west of the intersection. With the redevelopment of the hospital site, consider lengthening the eastbound left-turn lane.

7.6 Year 2040 Background + Option 2B Project Intersection Capacity Analysis

The site-generated traffic volumes for Option 2B (maximum residential + new development) were added to the Year 2040 Background volumes to analyze potential site impacts in the long-term condition. The Year 2040 Background + Option 2B site-generated traffic volumes are illustrated on Figure 13. The level-of-service criteria discussed in prior sections was applied to the study area intersections to determine impacts with the addition of the Option 2B site-build out traffic volumes in the near-term. The results of the LOS calculations for the intersections are summarized in Table 3. Average and 95th percentile queues are summarized in Table 4.

The study intersections will operate similarly to Option 2A in the long-term condition. The majority of intersection and movements experience delays that are less than the Option 2A scenario. The side-street approaches of 9th Street and Alpine Avenue will continue to operate at LOS E and LOS F, respectively, in the PM peak hour. The 95th percentile queue is estimated to be 83 feet (about four vehicles) on the eastbound approach and 245 feet (about 10 vehicles) on the westbound approach. As discussed in Option 2A, consider restriping the eastbound and westbound approaches to provide one left-turn lane and one through/right-turn lane.

The eastbound left-turn at Broadway and Balsam Avenue will continue to operate at LOS F and the westbound through/right-turn will begin to operate at LOS E in the PM peak hour. Queues on the eastbound left-turn are anticipated to extend beyond the existing storage length as experienced in the existing and background conditions. To achieve LOS D on these movements, consider adding three seconds to the eastbound left-turn phase and one second not the westbound through phase. Changes in signal timing will need to be coordinated with progression on Broadway.

8.0 QUEUE ANALYSIS

A queuing analysis was performed to determine if the vehicular queues generated at each study area intersection would be accommodated by the existing storage length of turn lanes or through lane and if any of the queues impact an upstream intersection. Tables 2 and 4 provide the existing storage lengths
or distance to nearest intersection, and the 95th percentile\(^4\) and average queues for the two peak hours within each evaluation scenario.

As shown in tables, the majority of the 95th percentile queues are shorter than the provided storage length or nearest upstream intersection, except those highlighted with \textit{blue bold} font. The 95th percentile queues exceed the existing storage length or extend to the upstream intersection during one or more of the various scenarios at the following intersections and movements:

- **9th Street at Alpine Avenue**
  - Westbound Approach (PM peak; existing, background, and with all project scenarios)

- **Broadway at Balsam Avenue**
  - Eastbound Left-turn (AM and PM peaks; existing, background, and with all project scenarios)
  - Northbound Through/Right-Turn (PM peak; existing, background, and with all project scenarios)

- **Broadway at Alpine Avenue**
  - Eastbound Left-turn (PM peak; with all project scenarios)
  - Northbound Left-turn (AM peak; with Option 2A)

It should be noted that the project trips slightly increase queues at the study intersections. The largest increases related to the trips will be on the westbound approach at 9th Street and Alpine Avenue and the eastbound left-turn at Broadway and Balsam Avenue, as previously discussed.

\(^4\) It should be noted that the 95th percentile queue length is a theoretical queue that is 1.65 standard deviations above the average queue length. In theory, the 95th percentile queue would be exceeded 5\% of the time based on the average queue length, but it is also possible that a queue this long may not occur.
9.0 PARKING AND TRANSPORTATION DEMAND MANAGEMENT (TDM)

Minimizing the need for automobile parking on the Alpine Balsam site has been a critical factor in developing the vision for the project. In this context City staff and the consulting team have developed a set of parking supply rates that reflect an “Advanced Mobility/TDM” scenario that is consistent with Boulder’s Transportation Master Plan and are similar to the parking rates being utilized in the Boulder Junction TDM and Parking Districts. These parking supply rates include 0.8 parking spaces per residential unit and 1.9 spaces per 1,000 sq. ft. of office floor area. These rates have been used in the design of the parking supply for the Alpine Balsam city-owned parcel in the Maximum Residential Options. The Maximum Office Options have assumed a slightly higher parking supply rate for the Boulder County portion of the site. These TDM assumptions support the multi-modal trip reductions that have been incorporated into this evaluation.

The application of the SUMP principals (shared, unbundled, managed, paid) to the parking supply in the area is critical to this goal of Advanced Mobility/TDM. It is anticipated that the Alpine-Balsam area will need to become a TDM and Parking District, similar to the approach currently being taken in the City’s Boulder Junction area. Components of this TDM approach may include:

- Create a parking district to manage area parking.
- Implement paid parking practices building on procedures currently utilized in the downtown civic campus and CAGID parking district.
- Ensure that the parking spaces in the existing parking structure are managed to support shared parking between residents, employees, and short-term parkers in the area.
- Proactively implement a Neighborhood Permit Parking Program (NPP) that extends 2 to 3 blocks into the residential neighborhood surrounding the Alpine-Balsam site.
- Implement programs and facilities for employees and residents of the area, including ECO PASS, employee parking cash out, carpooling and car sharing, B-Cycle stations, etc.
- Provide safe, secure, and convenient bicycle parking facilities consistent with current city code.
- Include mobility hubs within the site to organize and encourage multi-modal access.
• Manage the curb frontage within the TDM district to support efficient transit access and include designated areas for ride sharing service access.

• Create a TDM district to manage the automobile trip generation of individual developments (with a goal of trips less than or equal to 45% of representative Institute of Transportation Engineers trip generation rates – consistent with Boulder Junction approach). Consequences for non-compliance with TDM district trip goals will need to be developed.

• Develop a TDM monitoring program to track compliance with automobile trip targets.

• Consider modifications to existing transit service and/or implementation of new local shuttle services to effectively link the Alpine-Balsam area with other key civic nodes including the downtown (commercial and civic uses), CU, Boulder Junction, 29th Street, etc.

• Consider extending the TDM and parking districts to include adjacent medical, commercial and office uses in the area.

10.0 FACILITIES FOR ACCESS BY TRANSIT, PEDESTRIANS, BICYCLISTS AND RIDE SHARE SERVICES

The project team has discussed the future configuration of the southbound RTD bus stop on the west side of Broadway, just south of Balsam Avenue. Currently this bus stop has a pullout allowing or requiring the buses to move out of the outside of southbound lane of traffic on Broadway. As the Alpine-Balsam site is redeveloped, it is recommended that this bus pullout be removed and replace by a conventional stop against the outside of the southbound through lane. This bus stop reconfiguration will have the following advantages:

• Buses will be able to access the stop and easily reenter the southbound flow of traffic on Broadway without becoming “trapped” in the pullout as can happen today when the traffic signal is green for southbound traffic at the Balsam traffic signal. Note that bus stops without pullouts along Broadway are the norm.

• The lack of a pullout will help discourage ridesharing services (such as UBER and LYFT) from using the transit stop to load and unload passengers. This will improve the transit stop efficiency for buses and encourage ride sharing services to access the Alpine-Balsam site at other designated areas.

• The removal of the bus pullout will provide more space behind the curb for civic uses in this area.
The site design process should provide designated areas for ride sharing services to pick up and drop off passengers at designated areas on Balsam Avenue, Alpine Avenue, or along the north/south connections between Alpine and Balsam Avenues. Ridesharing services may also be encouraged to access the residential areas in the western half of the site at a centrally located mobility hub. Near term and longer-term solutions should be identified. One possibility on Alpine Avenue is to utilize the existing pullout loop on the north side of Alpine, just west of Broadway.

Safely and efficiently accommodating pedestrians across Broadway in the Alpine-Balsam area is an important goal of this process. In this context the topic of a mid-block at-grade pedestrian crossing of Broadway between Alpine Avenue and Balsam Avenue has been discussed. Given the existing signalized intersections (with signalized pedestrian crossings) in the area at Balsam, Alpine and North, a mid-block crossing is not recommended for the following reasons:

- Boulder’s Pedestrian Crossing Treatment Installation Guidelines indicate that an at-grade crossing should not be installed if the crossing location is within 300 feet of a signalized pedestrian crossing.

- The southern crosswalk at Balsam Avenue and the northern crosswalk at Alpine Avenue are separated by approximately 380 feet. In this context, a pedestrian desiring to cross Broadway is always less than 190 feet from the nearest signalized pedestrian crossing where traffic on Broadway is required to stop for pedestrians crossing the street.

- A mid-block pedestrian crossing, even if equipped with rectangular rapid flash beacons, would be a less safe crossing alternative for pedestrians, and would result in increased congestion and less efficient flow for automobiles and transit vehicles moving along Broadway in the area.

Therefore, the design of the Alpine-Balsam site should include on-site facilities and amenities to focus and encourage the crossing of Broadway at one of the signalized intersections.
11.0 CONCLUSIONS

This traffic study addresses the potential traffic impacts caused by the redevelopment of the city-owned Alpine Balsam area and then tests the combined impact of the redevelopment of the city-owned site and increased residential density added in the area surrounding the city-owned site. These potential land use changes were evaluated for both the existing and long-term (Year 2040) planning horizons. The study has evaluated peak hour traffic conditions at 9 intersections in the study area, with and without the project generated traffic and surrounding area plan traffic increases. The four land use scenarios or options that were evaluated for redevelopment of the Alpine-Balsam area include:

Option 1A Maximum Office on Alpine Balsam site only
Option 1B Maximum Residential on Alpine Balsam site only
Option 2A Maximum Office on Alpine Balsam site plus Area Plan area land uses
Option 2B Maximum Residential on Alpine Balsam site plus Area Plan area land uses

This study focuses on the weekday AM and PM peak hours which historically have been the periods of highest automobile traffic for the proposed type of land uses.

Key findings include:

- Land uses within the Alpine Balsam site will generate approximately 2,900 automobile trips per day in the Maximum Office Options, and the Maximum Residential Options will generate approximately 2,600 trips per day (approx. 10% fewer trips).

- Both land use options will generate trips at a level that is less than half of the traffic that is estimated to have been generated by the site when it was a fully occupied and active hospital. In this context the traffic generated by the proposed new land uses should be easily accommodated by the existing roadway network in the area.

- The site is accessible on foot, by bike, or on transit. Sidewalks exist on both sides of all roadways in the area, on-street bicycle lanes and/or neighborhood bikeways connect to the area along 9th Street, 13th Street, and Balsam Avenue, and the area is well served by frequent bus service in the Broadway corridor.
• All nine intersections in the study area currently operate well overall in the LOS A – C range during AM and PM peak hours on weekdays.

• In the near term (existing plus site and area plan land uses) all nine intersections will continue to operate in the LOS A-C range. The only noticeable increase in delay is projected to occur on Alpine Avenue approaching 9th Street, and on Balsam Avenue approaching Broadway. Restriping to add separate left and right turn lanes on Alpine at 9th and adjusting the traffic signal timing at Balsam/Broadway are potential mitigation measures. If Balsam Avenue is reconstructed between 9th and Broadway as part of the site development process, consideration should be given to extending the length of the eastbound left turn lane approaching Broadway.

• The addition of the Area Plan land uses to the Alpine Balsam site uses adds very little congestion or delay to area intersections.

• Year 2040 traffic projections have incorporated the assumption that all existing traffic movements at all intersections will increase by 10%. This 10% increase is based on the historic growth in traffic along the Broadway corridor through the area. This is conservative given that most land uses surrounding the area are built out and will not likely increase traffic on the side streets approaching Broadway. In this context, the Year 2040 traffic projections are likely to be conservatively high.

• In the Year 2040 horizon, with the addition of site and area plan land uses, eight of the nine intersections continue to operate in the LOS A-C range, and the Alpine/9th intersection drops into the LOS D range. The same measures described above will help mitigate the increased congestion at Alpine/9th and Balsam/Broadway intersections. All other intersections continue to operate very well.

• Transportation Demand Management (TDM) measures will be important to reduce the demand for parking by the new land uses on the Alpine Balsam site and help minimize automobile access. Parking projections have considered “Enhanced Mobility/TDM” levels of parking supply, consistent with the City of Boulder Transportation Master Plan and the on-going efforts in the Boulder Junction area. A list of potential TDM measures to help achieve the Enhanced Mobility/TDM goal has been included.