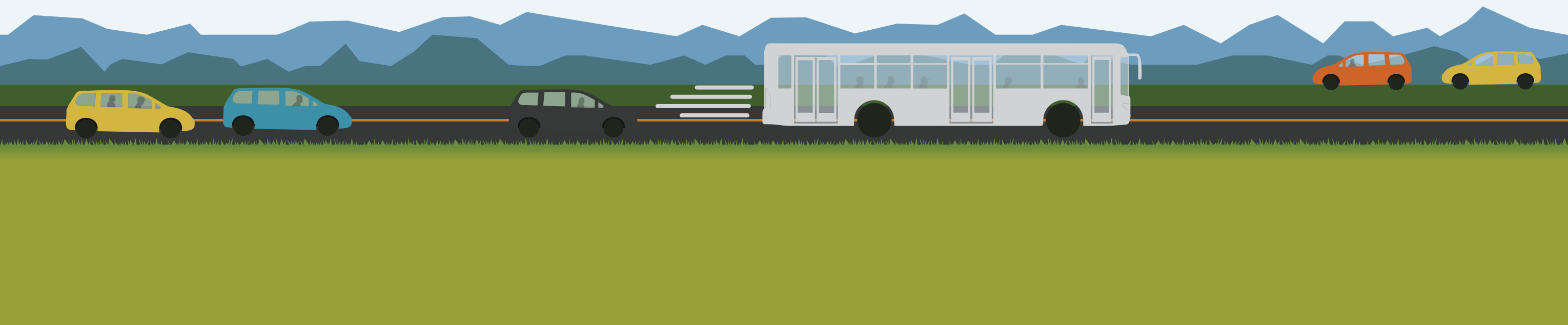




# *Bus Rapid Transit* Feasibility Study



## Participating Partners:



COLORADO  
Department of Transportation



APRIL 2022

**AECOM**





People within Broomfield and Boulder County

# 1. EXECUTIVE SUMMARY

## 1.1 PROJECT INTRODUCTION AND DESCRIPTION

In conjunction with local and regional partners, Boulder County led this study to analyze the feasibility of developing a Bus Rapid Transit (BRT) corridor with a core study area from CO 66 in north Longmont to US 36 in Broomfield and plans for future transit extensions along US 287 from Fort Collins and Denver. A Stations Area Toolkit was developed to help inspire a more comfortable and improved operational experience for people utilizing transit and the traveling public as a whole..

US 287 BRT is central in building a network of transit solutions to allow residents and visitors to get from anywhere to anywhere without the need of a personal vehicle. US 287 serves the northwest Denver region by providing north-south connectivity between many communities and connecting transit along the front range. As a US highway, it carries a large volume of automobile traffic but is also an important freight corridor and is the spine of regional transit. People also walk and bike along the corridor, largely within the communities.

This feasibility study aims to address several of the regional travel needs that were identified in the Northwest Area Mobility Study (NAMS), Boulder County's Transportation Master Plan (TMP), and municipal transportation and corridor plans. NAMS identified BRT on US 287 as a priority for future investment and opportunity. The TMP studied the existing and projected travel patterns of the region and identified several growing transportation needs that need to be addressed within the region. One of the key travel trends that was identified in the TMP is the increase of regional trips. The TMP projected a 74 percent increase in trips between Boulder and Broomfield counties, a 38 percent increase in trips between Boulder and Denver counties, and a 39 percent increase in trips between Boulder and Larimer counties.

Transit improvements on US 287 are one of the transportation investments that Boulder County is exploring to address these growing needs. BRT is premium bus service that is designed to improve capacity and travel time reliability over traditional local and regional bus service by offering more frequent and reliable service, transit priority, additional passenger amenities at stations, and specific branding.

This study explores how a BRT route along US 287 can help the region address the growing transportation needs and opportunities to make the stations more inviting and comfortable for people. As one of the main north-south regional corridors, US 287 has the potential to provide a convenient regional transit connection to several of the communities along the corridor. This process also identified other corridor needs for transit to work, such as pedestrian and bicycle comfort.

***The objective of this US 287 BRT Feasibility Study is to define and understand the north-south mobility needs along US 287 and recommend specific capital and transit service enhancements for the corridor.***



A comprehensive understanding of multimodal needs and desires along the corridor is critical before making specific modal transportation investments. The primary goal of this study is to understand the feasibility of BRT on US 287, but the study also considers other transportation investments.

Public, municipal, agency and elected official engagement were a guiding part of the planning process. To create a plan that reflects the perspectives of people in the study area, Boulder County and partners conducted a robust outreach effort throughout the course of the study in both English and Spanish. The outreach efforts included meeting with agency partners, hosting virtual public meetings, meeting with the community via Community Conversations, conducting public surveys, keeping an up to date website, sending timely email updates, and coalition building among elected officials.

The following four goals were developed with the technical team and public for the US 287 BRT Feasibility Study:

**GOAL 1: INCREASE THE EFFICIENCY, ATTRACTIVENESS, AND UTILIZATION OF TRANSIT THAT BENEFITS ALL USERS**

**GOAL 2: PROVIDE COMPETITIVE TRANSIT TRAVEL TO SERVE INTERCITY AND REGIONAL TRAVEL DEMAND**

**GOAL 3: CONTRIBUTE TO AN EQUITABLE, SOCIALLY, ECONOMICALLY, AND ENVIRONMENTALLY SUSTAINABLE NETWORK**

**GOAL 4: DEVELOP AND SELECT AN IMPLEMENTABLE AND COMMUNITY-SUPPORTED PROJECT**

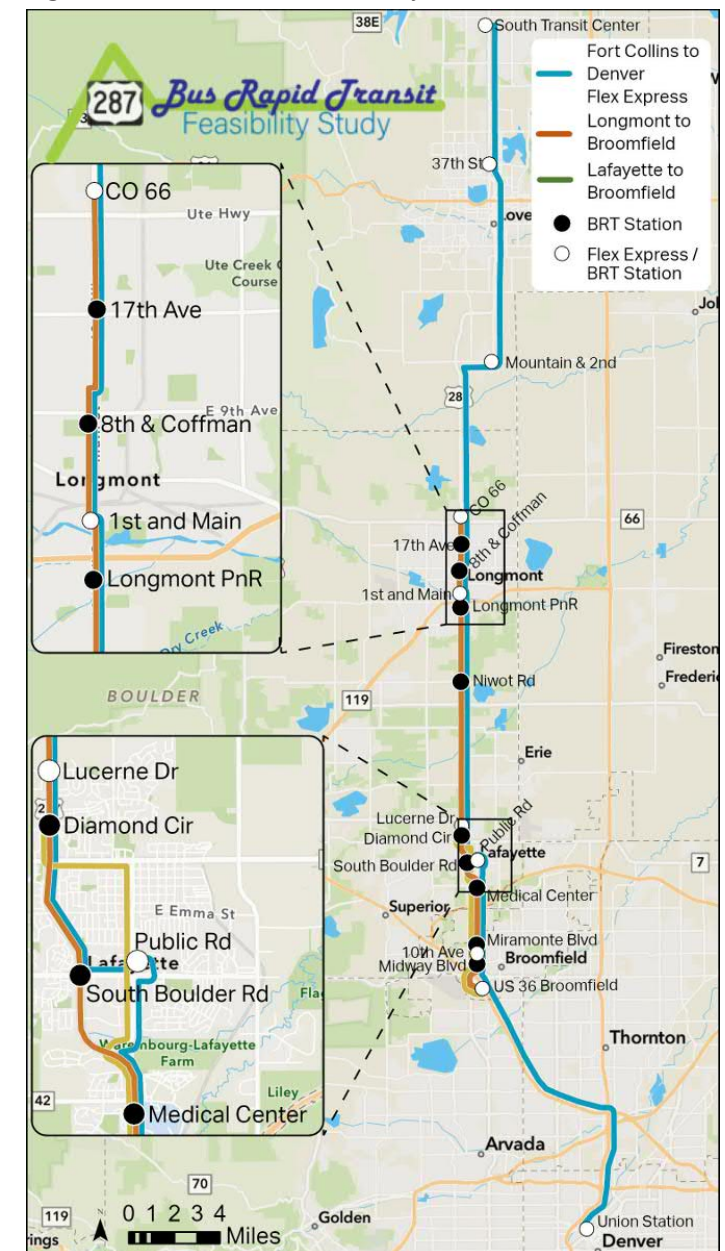
## 1.2 ALTERNATIVES AND SCREENING

To select a recommended alternative, Boulder County and project partners identified several alignment, station, and guideway alternatives for BRT on US 287. The study looked at existing conditions and public preferences to develop a set of BRT service and alignment alternatives. The study identified a set of alternatives and conducted a detailed evaluation to compare potential benefits and impacts of treatments and recommended solutions. The following sections summarize the two-tier evaluation process.

### 1.2.1 TIER 1 EVALUATION SUMMARY

The first tier of the alternatives analysis defined alignment and station alternatives for the corridor. As a more than 20-mile corridor (Broomfield to Longmont), US 287 runs through a variety of roadway and land use contexts. For each community segment in Longmont, rural Boulder County, Lafayette, and Broomfield, the project team developed alignment and station alternatives. The results of this initial screening resulted in three service patterns including a long express route from Fort Collins to Denver, a medium length core route from Longmont to Broomfield, and a shorter route to serve Lafayette to Broomfield. There are 19 total stations, as shown in Figure 1.

Figure 1: Tier 2 Alternatives Analysis



1.3 TIER 2 EVALUATION SUMMARY

The Tier 2 evaluation formed the recommended alignments from the Tier 1 evaluation into end-to-end alternatives. Key metrics that were calculated during this evaluation included capital costs, operations and maintenance (O&M) costs, ridership, and travel times, which are often the factors that are used by communities to select an alignment. Additional factors were considered, including potential impacts to the transportation network, demographics, and land use. The information and results of this evaluation are intended to provide decision makers and the public with information that will help them balance costs and benefits to select an alignment that is financially feasible, aligns with the project goals and has strong local support.

A series of scenarios were developed using varying levels of service and investment along three service patterns. As shown in Table 1, three end-to-end service patterns were identified. For the purposes of this feasibility analysis, it was assumed that existing Transfort Flex service to Boulder would remain, and a determination of which agency or agencies would operate this new service has not yet been determined. Further analysis, collaboration and implementation planning is needed.

Using combinations of these three service patterns and levels of transit investment between Broomfield and Longmont, three scenarios were generated using combinations of capital investments for evaluation in the Tier 2 screening process.

Table 1: End-to-end Service Patterns

Pattern 1: Fort Collins to Denver Flex Express	Provides limited stop service between Fort Collins and Denver Union Station (assumes no capital improvements north of Longmont)	10 Stations
Pattern 2: Longmont to Broomfield	Core BRT service connecting Longmont to Broomfield	14 Stations
Pattern 3: Lafayette to Broomfield	Provides additional service between Lafayette Public PnR and Broomfield/US 36	6 Stations



Table 2: Scenarios

	Scenario	Description
	Baseline	The baseline maintains the same level of transit infrastructure as existing conditions while assuming some expansion of existing transit services for future ridership growth. Existing RTD and Flex ride service is maintained.
1	Operational Improvements Only	No capital investments on US 287, but the number of bus stops is reduced, service patterns are updated, and frequency is increased.
2	Mixed Flow BRT + Intersection Improvements	Substantial changes to stations and technology but operate in mixed traffic in majority of corridor. Transit Signal Priority (TSP) and queue jumps implemented at congested intersections. Queue jumps are a type of roadway geometry used to provide preference to buses at intersections by adding an additional travel lane.
3	Mixed Flow BRT + Intersection Improvements + BAT Lanes	Same as Scenario 2 with addition of continuous BAT lanes where feasible in Broomfield, Lafayette, and Longmont



The Tier 2 evaluation modeled ridership and travel times for each of the end-to-end alternatives to determine which scenario would provide the most efficient service for the region and also evaluated capital costs and operations and maintenance (O&M) costs for each scenario.

The planning-level cost estimate for intersection improvements with queue jumps at key intersections ranges from \$167 Million to \$182 Million. This total reflects improvements at 27 intersections (12 high, 6 medium, 9 low). The planning-level cost estimate for these same intersection improvements with the addition of BAT lanes in high impact areas ranges

from \$198 Million to \$215 Million. Operations and Maintenance costs for each alternative is similar ranging from \$19.6 million to \$21.4 million annually for all three service patterns.

#### LONGMONT TO DENVER: ONE-SEAT-RIDE

- Priority for the community
- Reduces travel time into Denver by eliminating the need for a transfer
- The Fort Collins to Denver route may first start in Longmont to provide express service into Denver, later expanding to Fort Collins.
- A complementary route on I-25 may be a viable option given the right operating conditions

Figure 2: Longmont to Broomfield Travel Time in 2045 (minutes)

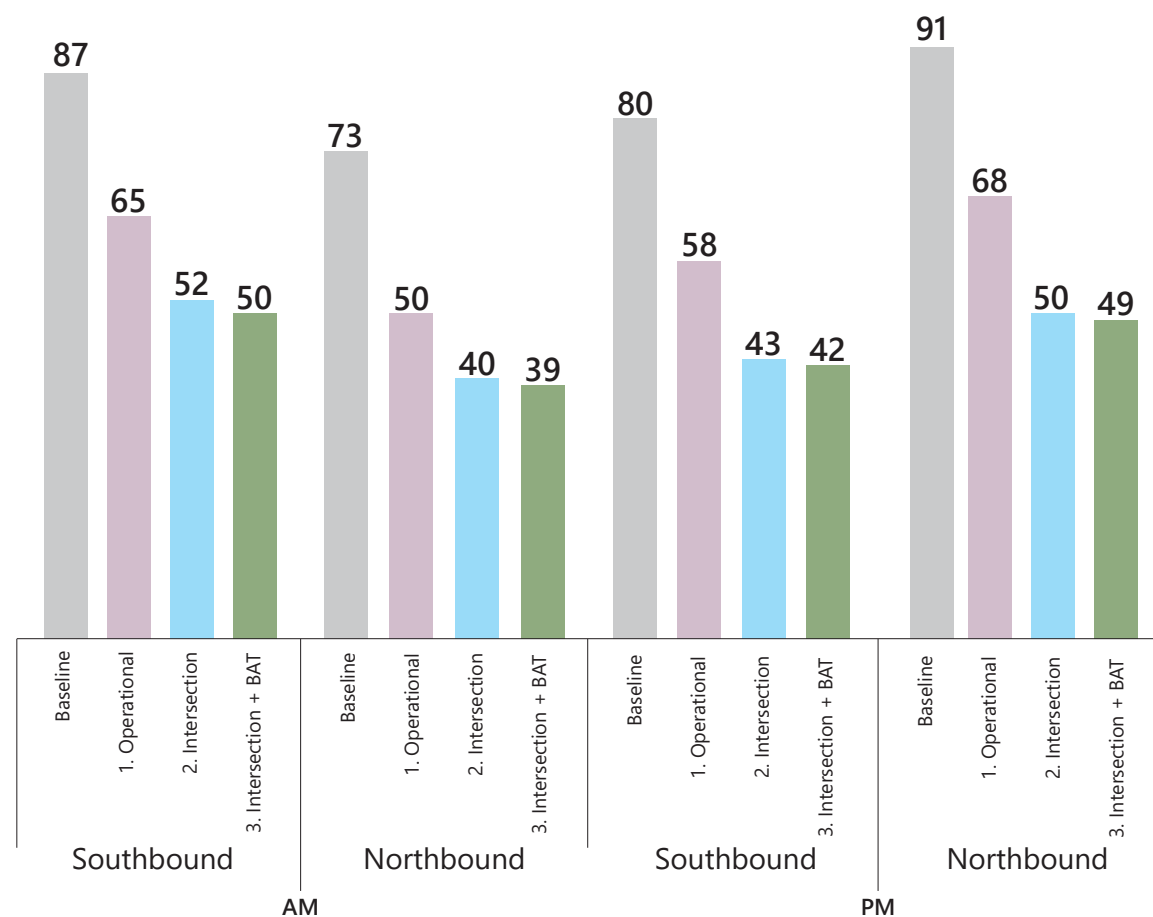
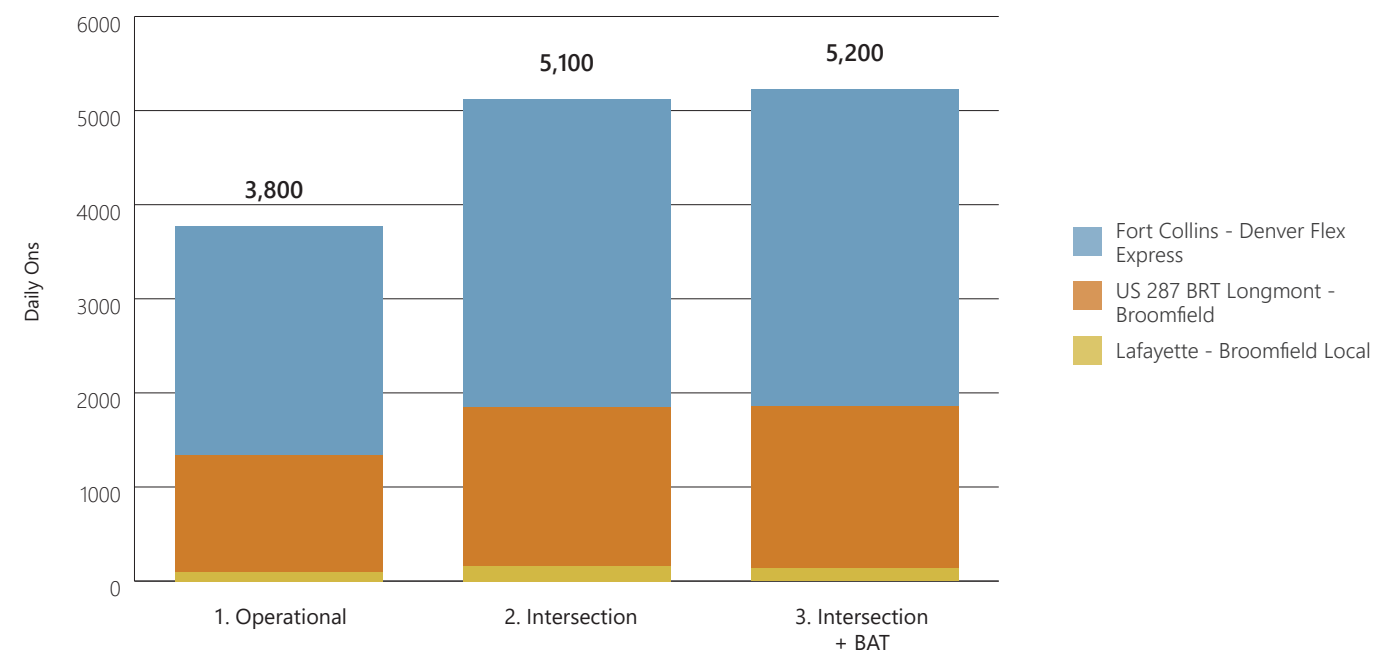


Figure 3: Forecasted Daily Boardings (2045)



## 1.4 BRT RECOMMENDATIONS

The core evaluation of this study was to understand the feasibility of BRT and premium transit on US 287. Through a robust technical analysis and working with stakeholders and the public, a series of investments have been identified that will improve bus travel times and improve stations along the corridor between Broomfield and Longmont. Each of the evaluated scenarios shows that a better bus system and transit network will result from increased transit capital investments at intersections and congested areas of the corridor. A dedicated bus guideway along the full stretch of the corridor is not a recommendation of this study as traffic on much of the corridor does not suffer from high levels of congestion, but future evaluation by individual communities may determine specific sections of roadway would benefit from additional investment. A summary of the improvements evaluated as part of the process is shown in Figure 4.

## 1.5 NEXT STEPS

In future phases of planning, Boulder County will develop implementation plans for individual projects. This may include smaller investments at intersections, investment in station locations, or other parts of the system to improve bus speed, reliability, and provide new service connections.

Boulder County will look at safety, connectivity, and multimodal mobility in a Phase II project planned to start shortly after this feasibility study that will include a high-level environmental review. The county and partners will also investigate funding opportunities, advance to the Preliminary Engineering and NEPA Phase, and continue integrating project development with technical, public, and elected official support.

Figure 4: Intersection Improvements and Park and Ride Locations

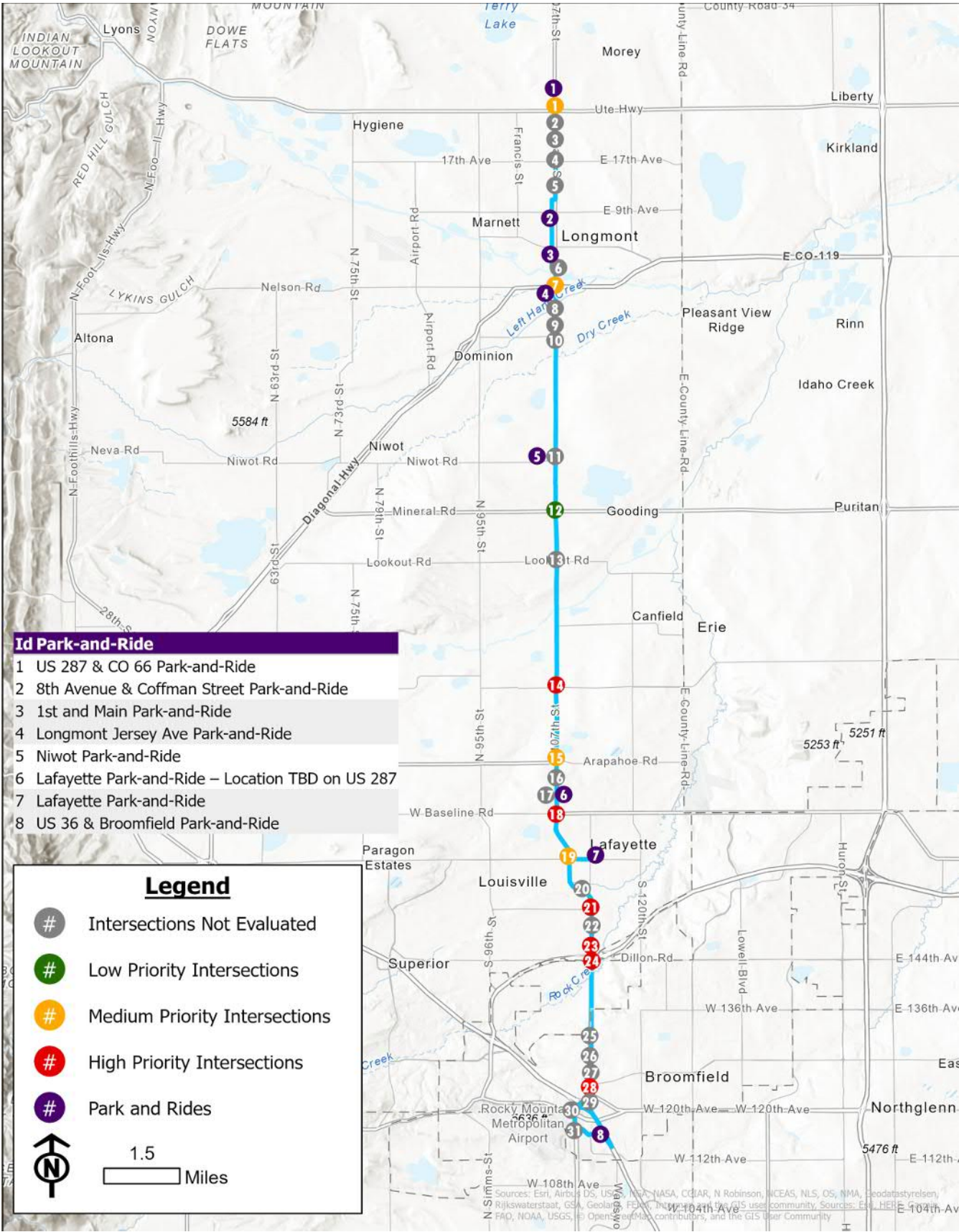


Table 3: US 287 Prioritized Treatments

ID	Intersection	Station Location	Intersection Treatment**	Overall Relative Priority***
1	CO 66	YES	Signal and queue jump - high cost	Medium
2	23rd Ave		Signal and queue jump - medium cost (NB only)	Not Evaluated
3	21st Ave		Signal and queue jump - high cost	Not Evaluated
4	17th Ave	YES	Signal and queue jump - high cost	Not Evaluated
5	Mountain View Ave		Signal and queue jump - high cost	Not Evaluated
6	Boston Ave		Signal and queue jump - low cost (NB left only)	Not Evaluated
7	Ken Pratt Blvd (CO 119)	YES	Signal and queue jump - high cost	Medium
8	Quail Rd		Signal and queue jump - medium cost	Not Evaluated
9	Quebec Ave		Signal and queue jump - medium cost	Not Evaluated
10	Pike Rd		Signal and queue jump - high cost	Not Evaluated
11	Niwot Rd	YES	Signal and queue jump - low cost	Not Evaluated
12	Mineral Rd (CO 52)		Signal and queue jump - low cost	Low
13	Lookout Rd		Signal and queue jump - low cost	Not Evaluated
14	Isabelle Rd		Signal and queue jump - medium cost	High
15	Arapahoe Rd		Signal and queue jump - medium cost	Medium
16	Lucerne Dr	YES	Signal and queue jump	Not Evaluated
17	Diamond Cir	YES	Signal and queue jump - low cost	Not Evaluated
18	Baseline Rd		Signal and queue jump - high cost	High
19	W South Boulder Rd	YES	Signal and queue jump - high cost	Medium
20	Public Rd		Signal and queue jump - high cost	Not Evaluated
21	Exempla Cir (CO 42)	YES	Signal and queue jump - high cost	High
22	Campus DR		Signal and queue jump - medium cost	Not Evaluated
23	Dillon Rd (NW Pkwy WB)		Signal and queue jump - high cost (SB)	High
24	Dillon Rd (NW Pkwy EB)		Signal and queue jump - high cost (NB)	High
25	Miramonte Blvd	YES	Signal and queue jump - low cost	Not Evaluated
26	10th Ave	YES	Signal and queue jump - low cost	Not Evaluated
27	6th Ave		Signal and queue jump - low cost	Not Evaluated
28	Midway Blvd	YES	Signal and queue jump - low cost	High
29	US 36 Off Ramp		Maintain existing - no cost	Not Evaluated
30	Wadsworth & CO 128		Intersection Improvement - cost not evaluated	Not Evaluated
31	Wadsworth & Uptown		Intersection Improvement - cost not evaluated	Not Evaluated

\*Intersections located on Coffman or on alternate alignment not on US 287 are not shown.  
\*\* Cost categories estimated at feasibility level (includes contingency). Low=\$1.4M, Medium=\$2.1M, High=\$2.8M  
\*\*\* Relative priority is worst ranking of LOS or Travel Time in Existing and 2045. Intersections not evaluated at station

When queue jumps are implemented, consider continuing the bus lane past the intersection with BAT Lanes at the following locations to create continuous bus lanes:	
1	<b>Longmont:</b> North of SH66 to 17th Ave; Boston Ave to Pike Rd
2	<b>Lafayette:</b> North of Baseline to South of Public; North of Exempla to South of Campus
3	<b>Broomfield:</b> North of Miramonte to South of Midway