Benefits

Investing in Chico's active transportation network with new bicycle and pedestrian projects, programs, and policies recommended in this Plan should provide both qualitative and quantitative benefits for residents and visitors alike.

This section provides the methodological approach and results of the various benefit analyses conducted to assess the expected benefits associated with the implementation of the projects proposed as part of this Active Transportation Plan. The evaluated benefits include:

- **Safety Benefits**: collision reduction benefits, particularly at locations with a history of fatal and severe collisions.
- **Induced Demand/Mode Shift Benefits**: mobility, health, recreation, and reduced auto use benefits associated with implementation of new bicycle facilities.
- **Multimodal Connectivity Benefits**: improved connectivity benefits to the active transportation network associated with proposed projects.

Each of the sections below describe the methodology used and results of the analysis of the benefit types listed above. Monetized benefits are also included, where applicable.

Safety Countermeasures

Jurisdictions should take a safe systems approach when implementing infrastructure improvements intended to improve safety on their roadways. A safe systems approach to roadway design focuses on minimizing the risk of fatality or injury for all road users, considering the possibility and likelihood of human error that often cause collisions, examining likely collision types and severity, and emphasizing the importance of considering the safety of vulnerable road users. A component of this approach is to anticipate future safety challenges before they occur based on evaluation of recent historical collision data and known safety countermeasures proven to reduce the likelihood of future collisions. This type of forward thinking about improving safety is vital to ensuring

jurisdictions have the best chance at proactively managing future crashes.

Methodology

Safety benefits were approximated by calculating the expected crash reduction for each project proposed in the Plan at locations with higher-than-average collisions involving bicycles and pedestrians. Projects with the highest calculated collision reductions were grouped into the following categories:

- Top 15 hot spot intersection locations
- Top 10 hot spot roadway segment locations

Collision Reduction

The safety countermeasures proposed at the top 15 intersection collision locations are expected to result in a reduction of:

- 3 collisions resulting in fatalities
- 9 severe injury collisions
- 21 non-severe injury collisions, 3 PDO collisions

The safety countermeasures proposed at the top 10 segment collision locations are expected to result in a reduction of:

- 5 collisions resulting in fatalities
- 6 severe injury collisions
- 21 non-severe injury collisions
- 1 PDO collision

Monetized Safety Benefits

The monetized safety benefits reflect the cost benefit provided by the estimated reduction in collisions associated with safety countermeasures at intersections and roadway segment collision hotspot locations, over a five-year period. The monetized benefit from all intersection locations is upwards of $44 million, while the benefit for all roadway segments is almost $74 million.

Induced Demand & Bicycle Mode Shift

Based on the research cited in National Cooperative Highway Research Program (NCHRP) Report 552, Guidelines for Analysis of Investment in Bicycle Facilities,[43] some bicycle facilities proposed in the Plan may result in induced bicycling demand for the new facilities among both existing and new bicyclists. The methodology describes an approach for estimating the induced demand associated with a given bicycle facility improvement and translates the projected increase in demand to monetized benefits related to mobility, health, recreation, and decreased auto use.

Methodology

The NCHRP 552 methodology is centered on three assumptions:

1. Existing bicyclists near a new facility will shift from the existing nearby facility to the new facility.
2. The new facility will result in induced number of bicyclists as a function of the number of existing bicyclists, relative to the attractiveness of the proposed facility (i.e., Class I shared-use path vs. Class II bicycle lanes).
3. People are more likely to ride a bicycle if they live within 1.5 miles of a facility than if they live outside that distance.

[43] Methodology utilized here in based on National Cooperative Highway Research Program (NCHRP) Report 552, Guidelines for Analysis of Investments in Bicycle Facilities, Transportation Research Board of the National Academies (2006), as well as the supplemental White Paper titled "Translating Demand and Benefits Research into Guidelines," available here, which was adapted from the demands and benefits outlined in the original NCHRP 552 report. The methodology described in the White Paper was used in the development of an online tool (no longer supported) created by the NCHRP 552 research authors.

Monetized Bicycle Mode Shift Benefits

The benefit cost analysis for bicycle facility investments influenced by the NCHRP 552 methodology includes the annual monetized benefits associated with mobility, health, recreation, and decreased auto use.

MOBILITY BENEFITS

Mobility benefits represent the time cost associated with the shift to a given bicycle facility type for the total number of commute trips over a commute year for new and existing bicyclist commuters.

The estimated mobility benefits associated with the top 10 benefits-producing bicycle projects proposed in the Plan are reported separately for separated and on-street facilities in Appendix D.

HEALTH BENEFITS

Health benefits represent the cost savings from physical activity benefits associated with induced demand anticipated to result from the proposed bicycle facilities. The annual health benefit is calculated by multiplying the annual per capita cost savings of $128 by the total number of new bicyclists anticipated with the proposed bicycle facilities.

Annual health benefits for the top 10 benefits-producing projects are presented in Appendix D.

RECREATION BENEFITS

Recreation benefits represent the cost savings related to recreational activity for new bicyclists induced by the new bicycle facilities. To calculate annualized recreation benefits, the number of new commuters is subtracted from the number of new bicyclists, then multiplied by the typical recreation day cost of $10 for 1 hour of recreation activity.

Anticipated recreation benefits associated with induced demand resulting from the top 10 benefits-producing bicycle projects are shown in Appendix D.

DECREASED AUTO USE BENEFITS

Decreased auto use benefits include the benefits associated with user cost savings, reduced congestion, and reduced air pollution.

These benefits, as well as the total monetized benefits anticipated to be associated with the proposed bicycle projects, are presented in Appendix D.

Multimodal Connectivity

The bicycle and pedestrian improvement projects recommended in this Plan are intended to facilitate an active transportation network that is low stress, making it comfortable for people of all ages and abilities. Constructing new sidewalks, implementing safe crossings, as well as providing new and upgraded off- and on-street facilities, like Class I Multi-Use Paths and Class II Buffered Bicycle Lanes respectively, will enhance user comfort throughout the active transportation network, further encouraging its use.

Qualitative benefits of bicycle and pedestrian improvements can be analyzed by examining improvements to multimodal connectivity throughout the corridor. Connectivity benefits associated with the improvements recommended in this plan are assessed through the lens of Bicycle Level of Traffic Stress (LTS), which considers separation from vehicular traffic, street width, prevailing speed limit, bike lane blockage, and presence of different lane types, including bike lanes and turn lanes, to determine how stressful it is to ride a bicycle on a given roadway.

For a detailed description of the Bicycle LTS methodology as well as a presentation of the improved LTS scores for the planned bicycling network, differentiated by segments, approaches, crossings, and overall, see Appendix D.