December 10, 2021

Subject: SH 119 Boulder to Longmont Traffic Analysis

Dear State Highway 119 Project Team:

The enclosed materials document the traffic analysis performed in support of the State Highway (SH) 119 Boulder to Longmont Project. This project was initiated to assist decision-making about the future configuration of the SH 119 corridor. This planning process included a safety assessment and comprehensive travel demand modeling exercise using the CDOT Statewide Model, with an independent review of the socioeconomic forecasts for the study corridor influence area, and microscopic simulation of the study alternatives using VISSIM to produce summary statistics.

This evaluation follows the SH 119 Multi-Modal Planning and Environmental Linkages (PEL) Study, dated September 24, 2019, prepared for RTD, which was conducted to identify multi-modal infrastructure along the corridor. The final recommendations from this plan identified Bus Rapid Transit (BRT) along the corridor, a separated bikeway corridor, Coffman Street dedicated BRT lanes, Boulder BAT lanes. This plan moved forward the concept of managed lanes along SH 119 to serve the proposed BRT service and to provide HOV3+ tolled lanes along the corridor.

To move this vision forward, this study completed detailed analysis for several alternatives to understand how the operations along the corridor could improve person throughput along the corridor if mainline and intersection improvements are completed along SH 119 between Foothills Pkwy and Hover Street. **The decision-making process for which alternative should move forward was subsequently completed through separate conversations and documentation by HPTE and CDOT Region 4 Staff with input from the Stakeholders along the corridor.**

This technical analysis process is documented in a series of reports which detail the different study components. Contained within each of the documents are the assumptions used to conduct the analysis. Given the importance of these assumptions in the modeling processes and their impact on the final results, several key assumptions are summarized below for emphasis.

Study includes:

- All signalized intersections along SH 119 between, and including, Foothills Parkway and Hover Street.
- New planned RTD BRT along SH 119 - with stations within the median where applicable (2045 Baseline includes existing bus configuration, all others include BRT).

- PEL transit ridership forecasts have been included to generate person metrics calculations.
- Operations have been optimized to focus on progression of through traffic along SH 119 to maximize person throughput along the corridor.
- The 2045 Baseline model (and all future modeling) includes three fiscally committed improvements:
    - SH 119/SH 52 Split Signalized Intersections
    - Northbound SH 119/Airport Road Intersection Signalization
    - Southbound SH 119/Hover Street Tunnel (Grade-Separation)

The study did not include the following elements:

- Unsignalized intersections were not included in the VISSIM modeling, while few exist, those that do likely cause some segment turbulence as vehicles join the highway.
- Off-system side street signals impact along corridor was not included; meaning that vehicles destined for the study corridor arrived unmetered resulting in somewhat of an overestimation of diminishing side street performance.
- No side-street facility improvements have been assumed in the model study area as none are currently identified in the fiscally-constrained regional plan (beyond those defined above for in the 2045 Baseline Model) resulting in increased volumes along SH 119 (with widening) but no improvement to system access points along the intersection street system.

Greater detail about the assumptions and the results of the technical evaluation can be found in each technical report. Each of these deliverables presents the technical analysis completed along with the results.

- Attachment 1: **Socioeconomic Projections for State Highway 119**

  This report details an independent evaluation of the socioeconomic inputs for the CDOT Statewide Travel Demand Model. The process undertaken for this evaluation included the impacts of COVID-19 in the forecasting process and a thorough review of the long-term population and employment projections within the influence area surrounding the study corridor. The resulting socioeconomic data was input into the CDOT Statewide Travel Demand Model along with the corridor improvements for each alternative to develop traffic forecasts for the microsimulation process.

- Attachment 2: **SH 119 Traffic Analysis Technical Report**

  This memorandum defines the microsimulation process undertaken to evaluate the alternatives. This includes the model assumptions, details of the existing model calibration, development of the 2045 base year model, and evaluation of the study alternatives.

  The modeling effort was split into two main processes: first, an evaluation of the SH 52/SH 119 intersection to determine the fiscally committed project improvements, and second, the consideration of each of the six mainline SH 119 improvement concepts.

  1. 2045 Baseline – Fiscally Committed Improvements
  2. 2045 Transit Slip Lanes
  3. 2045 Three General-Purpose Lanes
  4. 2045 Tolled Express Lanes (TEL) and At-Grade Crossings (Add Lane)
  5. 2045 TEL and At-Grade Crossings (Lane Conversion)
  6. 2045 TEL and Grade-Separated Crossings (Add Lane)

  The results of this evaluation process were documented and presented to the stakeholders at a series of meetings throughout the project, culminating in the results detailed in this report and the accompanying attachments.

- Attachment 3: **SH 119 Life-Cycle Cost Analysis Technical Memo**

  This memorandum considers a 25-year horizon life cycle-cost analysis to understand the costs and benefits associated with each of the proposed SH 119 alternatives. This process included costs associated with the capital construction of each alternative, maintenance and operations costs over the planning horizon, and user-delay costs associated with commuters and trucks traveling the corridor. The total costs have been divided into the total system users served by each of the alternatives to provide a representative comparison of the benefits.

Final Report

Socioeconomic Projections for State Highway 119

The Economics of Land Use

Prepared for:
CDM Smith
Colorado Department of Transportation

Prepared by:
Economic & Planning Systems, Inc.

EPS #193095

September 14, 2021

Economic & Planning Systems, Inc.
730 17th Street, Suite 630
Denver, CO 80202-3511
303 623 3557 tel
303 623 9049 fax

Denver
Los Angeles
Oakland
Sacramento

www.epsys.com

Table of Contents

List of Tables

List of Tables (continued)

List of Figures

List of Figures (continued)

List of Figures (continued)

List of Figures (continued)

List of Figures (continued)

1. Executive Summary

Organization of Content

This report is organized with the following chapters.

- Executive Summary: a brief overview of EPS's three scenarios of independent forecasts and a comparison of these forecasts to third-party documentation.
- Trends: a historical analysis of economic and demographic variables used in the development of the short- and long-term independent forecasts and the selection of dependent and independent variables in the short-term econometric model.
- Major Development Plans: an analysis of conceptual, planned, or proposed land use projects (i.e., special generators) within each of the seven (7) counties that may not have been integrated into CDOT's calibration of baseline TAZ data.
- Independent Forecasts: provides details of EPS's methodology, assumptions, and model specifications for the short- and long-term model components. It also details the assumptions and parameters used to define the three (3) scenario profiles.

The content of the report is structured to answer questions related to the development of EPS's independent socioeconomic forecasts:

- Which data sources and trends were used to establish underlying factors and assumptions used in the forecasting models?
- What methodologies were used to develop the independent forecasts?
- How were different scenarios defined?
- What assumptions were used in defining the scenarios and why were they chosen?
- How do the resulting forecasts differ from previous or contemporary third-party forecasts?

Summary of Projections

Employment

Independent Forecasts. **Table 1** illustrate EPS's three scenarios of employment between 2020 and 2045.

- Low: this scenario reflects average annual growth of approximately 14,200 jobs. The compounded annual average rate of growth is 0.7 percent.
- Mid: this scenario reflects average annual growth of approximately 26,600 jobs. The compounded annual average rate of growth is 1.2 percent.
- High: this scenario reflects average annual growth of approximately 37,300 jobs. The compounded annual average rate of growth is 1.6 percent.

Table 1 Summary of Employment Projections

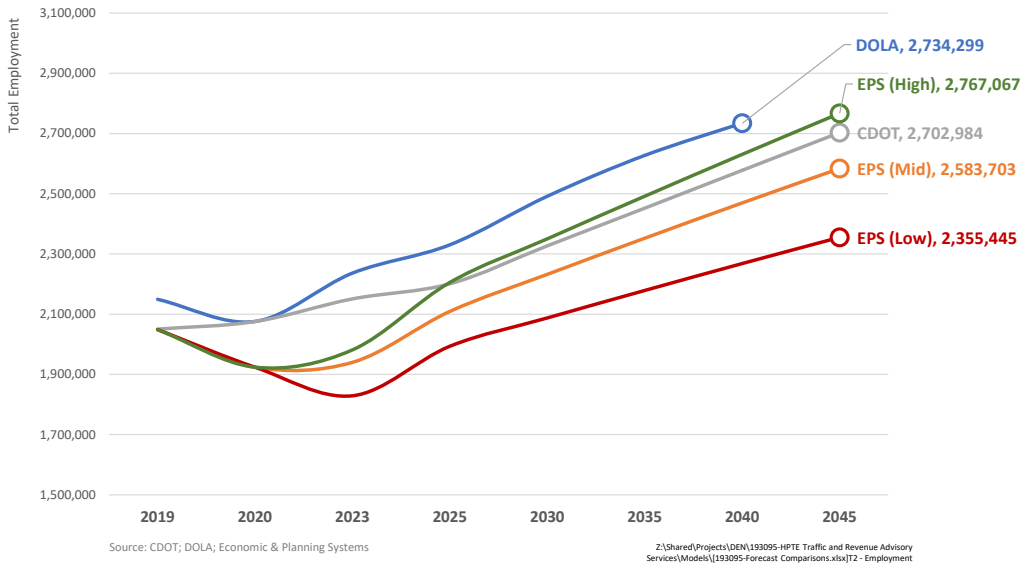
								2020-2045		
	2020	2023	2025	2030	2035	2040	2045	Total	Ann. #	Ann. %
Scenarios										
Low Scenario	1,982,684	1,837,827	1,995,452	2,085,180	2,171,638	2,255,293	2,336,386	353,702	14,148	0.66%
Mid Scenario	1,982,714	1,998,253	2,171,894	2,296,151	2,416,474	2,533,417	2,647,241	664,527	26,581	1.16%
High Scenario	1,982,717	2,072,663	2,329,367	2,481,000	2,628,700	2,773,044	2,914,261	931,545	37,262	1.55%

Source: Economic & Planning Systems

Comparisons. **Figure 1** illustrates EPS's three employment forecast scenarios in the context of CDOT's socioeconomic projections, as well as the Department of Local Affairs (DOLA) projections. The following points of comparison are made for year 2040, because DOLA's projections of employment do not incorporate 2045.

- Low: EPS's adjusted 2040 employment forecast is 12 percent below CDOT's forecast and 17 percent below DOLA's forecast.
- Mid: EPS's adjusted 2040 employment forecast is 4 percent below CDOT's forecast and 10 percent below DOLA's forecast.
- High: EPS's adjusted 2040 employment forecast is 2 percent above CDOT's forecast and 4 percent below DOLA's forecast.

Figure 1 Comparison of Employment Forecasts



Population

Independent Forecasts. **Table 2** illustrate EPS's three scenarios of population between 2020 and 2045.

- Low: this scenario reflects average annual growth of approximately 39,500 residents. The compounded annual average rate of growth is 0.9 percent.
- Mid: this scenario reflects average annual growth of approximately 48,800 residents. The compounded annual average rate of growth is 1.0 percent.
- High: this scenario reflects average annual growth of approximately 57,300 residents. The compounded annual average rate of growth is 1.2 percent.

Table 2 Summary of Population Projections

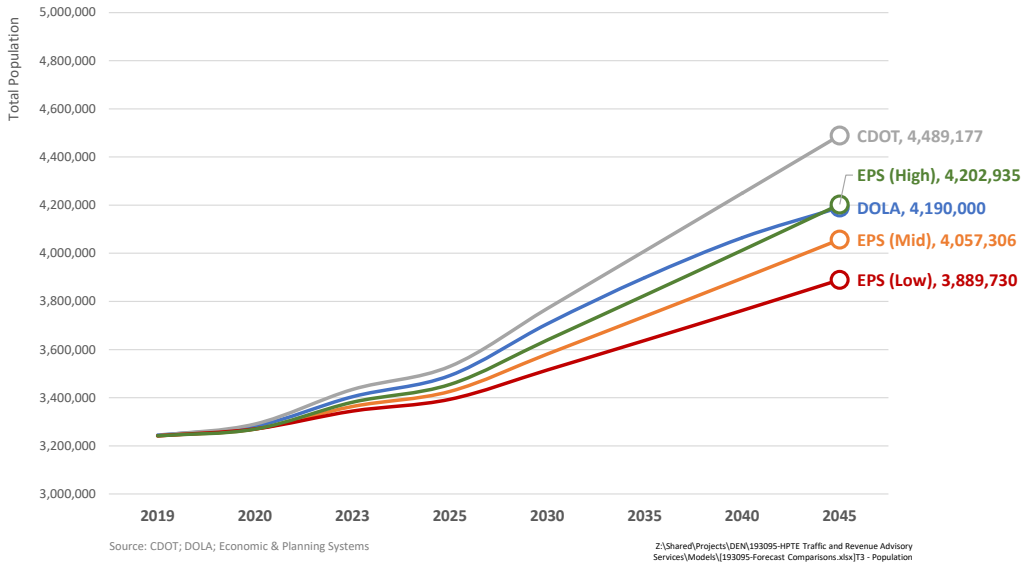
	2020	2023	2025	2030	2035	2040	2045	2020-2045 Total	2020-2045 Ann. #	2020-2045 Ann. %
Scenarios										
Low Scenario	4,146,936	4,263,944	4,341,246	4,534,925	4,730,679	4,929,869	5,133,744	986,808	39,472	0.86%
Mid Scenario	4,146,333	4,291,191	4,387,058	4,627,153	4,869,322	5,114,927	5,365,218	1,218,885	48,755	1.04%
High Scenario	4,146,213	4,316,673	4,429,609	4,712,374	4,997,213	5,285,488	5,578,449	1,432,236	57,289	1.19%

Source: Economic & Planning Systems

Comparisons. **Figure 2** illustrates EPS's three population forecast scenarios in the context of CDOT's socioeconomic projections, as well as the Department of Local Affairs (DOLA) projections.

- Low: EPS's adjusted 2045 population forecast is 13 percent below CDOT's forecast and 7 percent below DOLA's forecast.
- Mid: EPS's adjusted 2045 population forecast is 10 percent below CDOT's forecast and 3 percent below DOLA's forecast.
- High: EPS's adjusted 2045 population forecast is 6 percent below CDOT's forecast and less than 1 percent above DOLA's forecast.

Figure 2 Comparison of Population Forecasts



Methodology Overview

Forecast Model Structure

The independent forecast is structured to accommodate inputs about the current economic situation, possible recovery scenarios from the COVID-19 pandemic and subsequent recession, as well as longer-term structural economic patterns. As such, EPS's model is structured with dual components:

- Short-Term Forecast (through 2025): This model component forecasts current conditions through the end of 2025 on a monthly basis, creating a linkage between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county by industry supersector. This two-stage regression model replicates the clear relationship that personal consumer spending has on the overall economy and thus employment levels. Moreover, the short-term model allows for a quantification of the relationship between the COVID-19 pandemic and impacts to the employment market.
- Long-Term Forecast (2025-2045): This model component forecasts employment, population, and households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national level industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, as well as shifts in average household size.

Scenarios

After initial review of historical data and consideration for the incorporation of COVID-19 data into the modeling parameters, EPS identified three (3) scenarios that contain separate but intertwined assumptions and profiles regarding the current downturn, recovery, and longer-term economic and demographic outlook.

Short-Term Forecast. In the short-term model, scenario narratives are driven largely by three eventualities related to the remainder of the COVID-19 pandemic. In this narrative, assumptions regarding public health outcomes drive outcomes in consumer confidence, consumer spending, and employment levels. Assumptions for each of these variables are described in greater detail in the following sections.

- Low. A vaccine is not widely available until late 2021, and recovery patterns in consumer confidence, consumer spending, and employment are slightly slower because of the length of the disruption caused by more lasting personal income impacts.
- Mid. A vaccine becomes available in early 2021, but immunization and the eradication of cases persist longer into 2021, such that recovery patterns in consumer confidence, consumer spending, and employment levels occur within the year.
- High. A vaccine becomes available in early 2021, and immunization and the eradication of cases occur relatively quickly, allowing quick recovery of consumer confidence, consumer spending, and employment levels, reflecting little deterioration of underlying consumer demand.

Table 3 Short-Term Model Scenarios

	Low	Mid	High
Public Health			
Peaks in confirmed COVID-19 cases	Peaks occur at 7-month intervals through 4th quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021
Availability of COVID-19 vaccine	4th quarter 2021	1st quarter 2021	1st quarter 2021
Sufficient immunization reached to accommodate "business as usual"	1st quarter 2022	4th quarter 2021	3rd quarter 2021
Spending and Prices			
Consumer confidence (low point)	Middle of 3rd quarter 2021	End of 2nd quarter 2021	1st quarter 2021
Consumer prices	Rises at historic rates	Rises at historic rates	Rises at historic rates
Employment			
Low point	Middle of 2nd quarter 2021	Middle of 3rd quarter 2021	Middle of 4th quarter 2021
Recovery of 2019 levels	Approx. 1st quarter 2025	Approx. 2nd quarter 2024	Approx. 3rd quarter 2023

Source: Economic & Planning Systems

Long-Term Forecast. In the long-term model, scenario narratives are driven by 1) annual employment levels for 2025 from the short-term model; and 2) the performance of each regional industry relative to the anticipated national structural growth by industry, as defined by the Bureau of Labor Statistics (BLS). Details of these assumptions are provided in the following sections.

- Low. This scenario is characterized by slower than anticipated long-term growth rates following the recovery from the pandemic and over the subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect relatively lower local labor force participation rates over time.
- Mid. This scenario is characterized by anticipated long-term growth rates by industry, which materialize following the recovery from the COVID-19 pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect slightly higher local labor force participation rates over time.
- High. This scenario is characterized by higher-than-anticipated rates of industry-level employment growth rates following the pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment does not persist and commuting patterns reflect high labor force participation rates.

Table 4 Long-Term Model Scenarios

	Low	Mid	High
Employment			
Long-term growth relative to national structural growth	Lower than anticipated regional-to-national industry-level outcomes	Anticipated regional-to-national industry-level outcomes	Higher than anticipated regional-to-national industry-level outcomes
Unemployment	Relatively high rates persist through 2023	Relatively high rates persist through 2023	Relatively high rates persist through 2021
Demographics			
In-commuting	Moderate increase of in-commuting patterns	Moderate increase of in-commuting patterns	Relatively high increase of in-commuting patterns
Out-commuting	Relatively low increase of out-commuting	Moderate increase of out-commuting	Relatively high increase of out-commuting
Self-employed	Moderate increase of self-employed persons	Moderate increase of self-employed persons	Moderate increase of self-employed persons
Non-working population (<16 years)	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth
Non-working population (over 65)	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth

Source: Economic & Planning Systems

THIS PAGE INTENTIONALLY LEFT BLANK

2. Trends

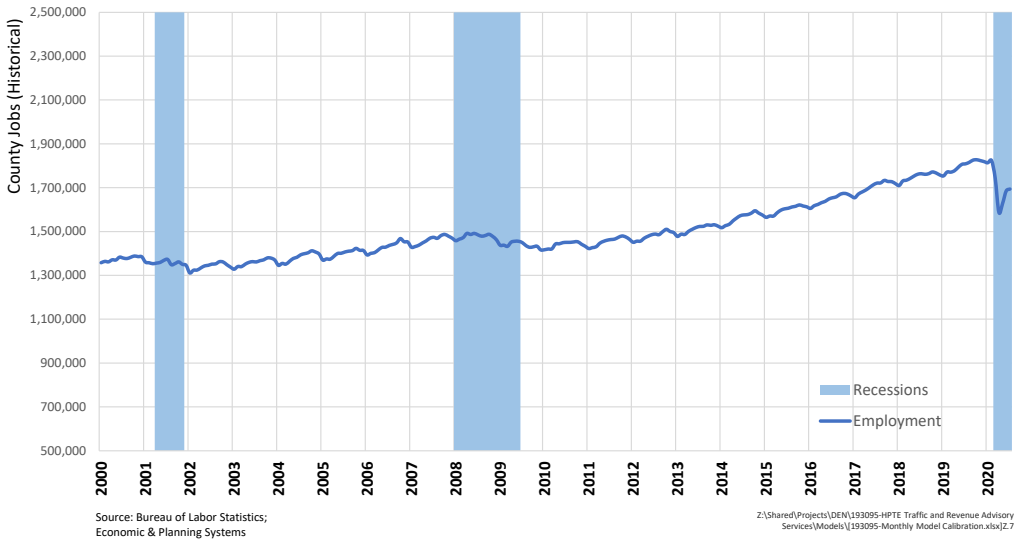
This chapter presents an analysis of historical trends in economic and demographic variables used in the calibration of dependent and independent variables within the short-term econometric model, as well as the long-term employment-based population forecasting model.

Employment and Commuting

This section details historical trends in Wage & Salary employment as well as commuting patterns. Wage & Salary employment data are sourced from the Bureau of Labor Statistics (BLS) and Colorado Department of Labor and Employment (CDLE), and commuting data are sourced from the U.S. Census Longitudinal Employer Household Dynamics (LEHD). The methodology for the short-term independent forecast incorporates employment as one of the primary dependent variables (explained in greater detail beginning with **Table 17**). **Figure 3** shows trends in employment for the seven (7) counties that comprise the SH119 analysis area. Individual county employment trends are reported in **Figure 29** through **Figure 35** beginning on page 68. Using historic information, including economic cycles preceding this timeframe, the following are rates of recovery during subsequent (recovery) time periods:

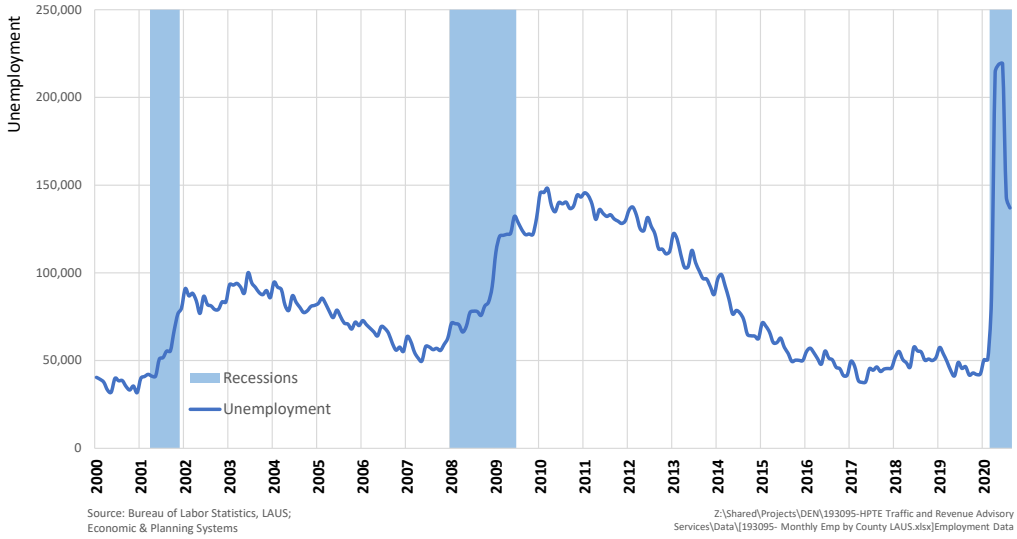
- 2001-2008: jobs rose at 1.2 percent per year, increasing 17,300 jobs per year
- 2009-2020: jobs rose at 2.3 percent per year, increasing 36,100 jobs per year

Figure 3 Historic 7-County Area Employment



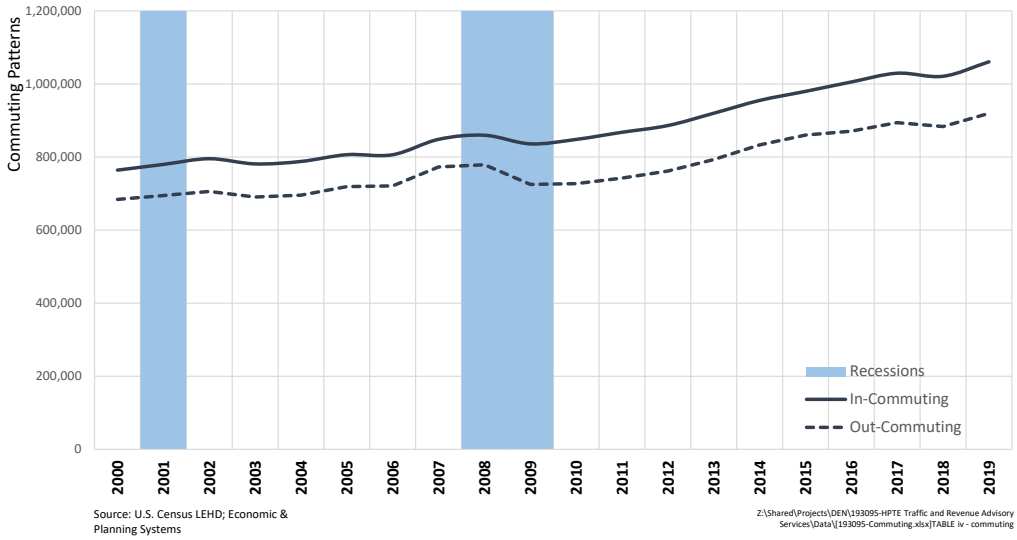
Unemployment. **Figure 4** shows monthly unemployment levels for the seven (7) county analysis area. The scale of unemployment during the Great Recession (2007 through 2009) peaked at 50 percent higher than the 2001 recession. By contrast, the scale of unemployment reached at the onset of the COVID-19 pandemic was 50 percent higher than the Great Recession, although monthly data through late 2020 indicates the unemployment levels may not remain so high as long. Individual county unemployment levels are reported in **Figure 36** through **Figure 42** beginning on page 71.

Figure 4 7-County Area Unemployment



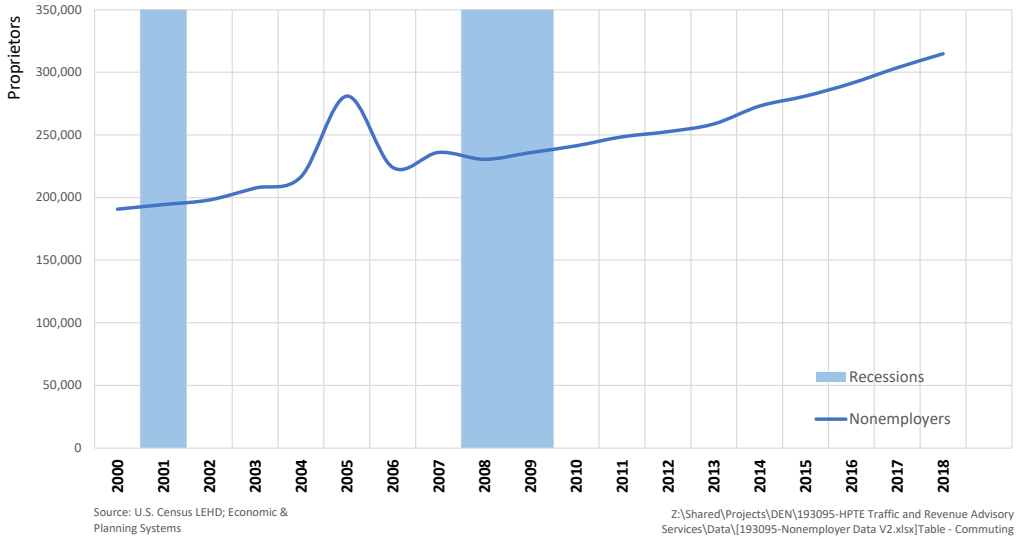
Commuting Patterns. Shown in **Figure 5** are aggregated in- and out-commuting patterns for the seven (7) county analysis area (individual county information is reported in **Figure 43** through **Figure 49** beginning on page 75). These data reflect the magnitude of cross-commuting that occurs within the region, and that these patterns have been relatively unaffected by the recessions.

Figure 5 7-County Commuting Patterns



Proprietors. Historical trends in self-employed persons (also characterized as sole proprietors) are shown in **Figure 6**. Individual county proprietor trends are reported in **Figure 50** through **Figure 56** beginning on page 78. Overall, the number of proprietors has increased at approximately 6,900 per year. In other terms, growth has averaged approximately 2.8 percent per year since 2000.

Figure 6 7-County Proprietor Employment



Demographics

The following historical context to the demographic variables is sourced from the U.S. Census American Community Survey (ACS) and Colorado State Demographer.

Group Quarters. A small component of the overall population is contained in Group Quarters, defined as populations in correctional institutions, nursing homes, or other institutions. **Table 5** illustrates the magnitude of group quarters in each of the seven (7) counties in the SH119 analysis area.

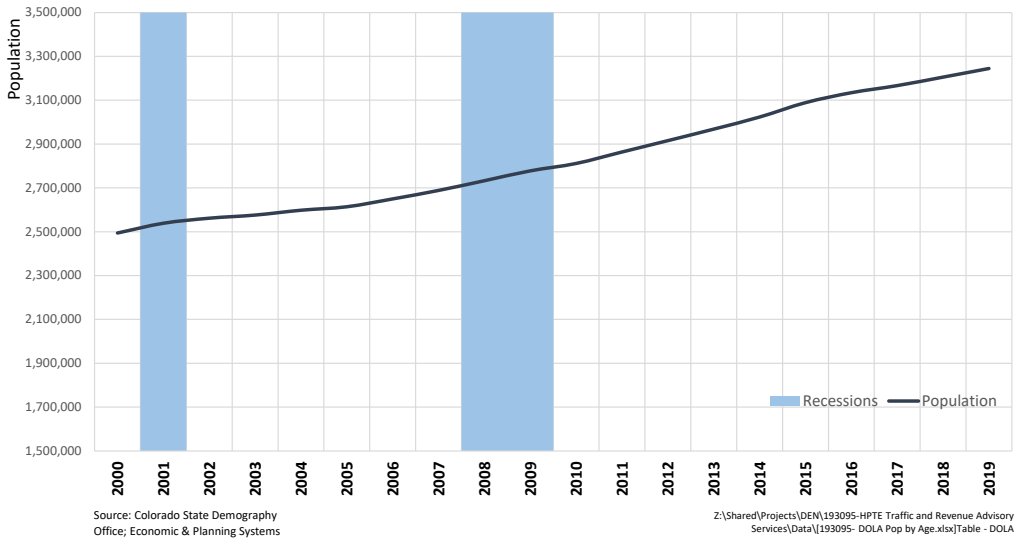
Table 5 Historic Group Quarters Population

	2000	2005	2010	2015	2019	2000-2019 Total	2000-2019 Ann. #	2000-2019 Ann. %
Adams	3,414	3,721	4,027	4,035	4,071	657	35	0.93%
Arapahoe	4,847	4,884	4,920	5,241	5,895	1,048	55	1.04%
Boulder	8,513	8,731	8,949	10,616	11,722	3,209	169	1.70%
Broomfield	0	0	282	291	311	311	16	n/a
Denver	12,719	14,350	15,981	15,317	14,603	1,884	99	0.73%
Jefferson	7,730	7,579	7,427	8,272	9,004	1,274	67	0.81%
Larimer	7,120	7,825	8,530	9,194	9,448	2,328	123	1.50%

Source: U.S. Census; Economic & Planning Systems

Population. Since 2000, the population in the seven (7) county analysis area has grown at an average rate of 1.4 percent per year, illustrated in **Figure 7**. Between 2000 and 2019, the population grew from approximately 2.5 million to more than 3.2 million. On an annual basis, that equates to average growth of 39,500 persons per year. Individual county population trends are shown in **Figure 57** through **Figure 63** beginning on page 82.

Figure 7 7-County Population Trends

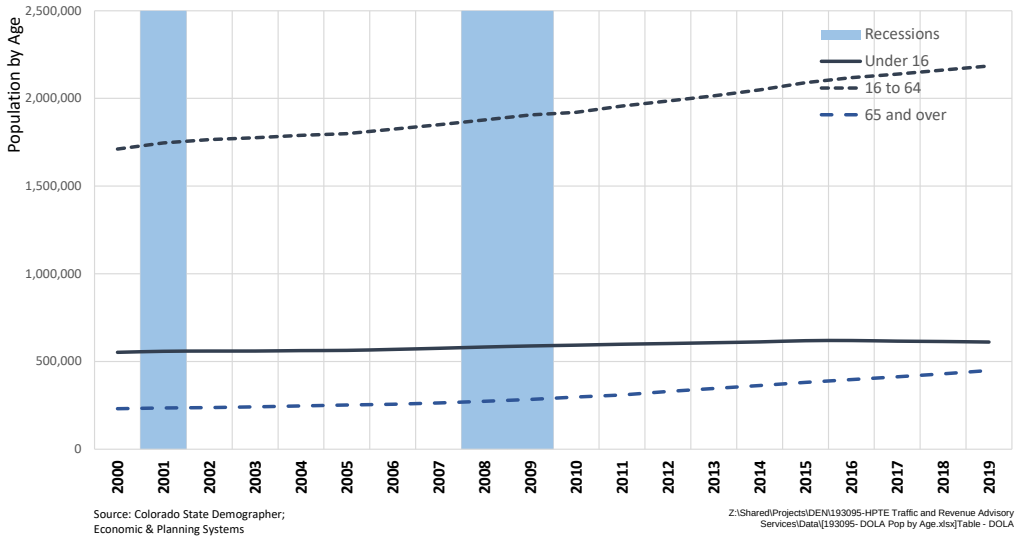


Source: Colorado State Demography Office; Economic & Planning Systems

Z:\Shared\Projects\DEN\193095-HPTE Traffic and Revenue Advisory Services\Data\[193095- DOLA Pop by Age.xlsx]Table - DOLA

Population by Age. Looking beneath the surface of overall population shifts, **Figure 8** illustrates how differently population groups by age have grown over time. In this SH119 analysis area, the population of persons under 16 years of age has increased by 3,100 per year, whereas the population of persons aged 16 to 64 years has increased by approximately 25,000 per year and the population of those 65 years and older has increased by 11,500 per year. Individual county graphs are shown in **Figure 64** through **Figure 70** beginning on page 85.

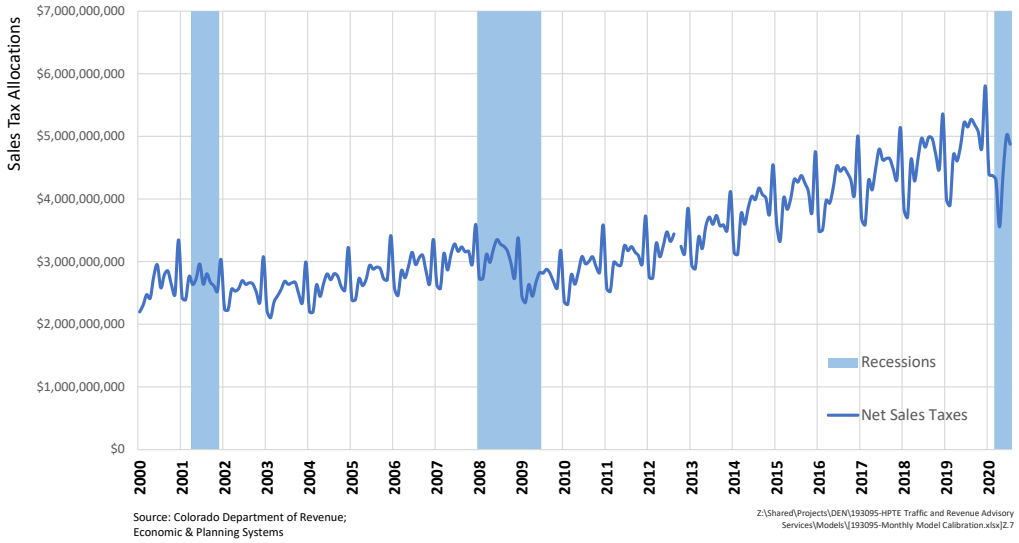
Figure 8 7-County Population by Age



Consumer Spending

A second dependent variable in the short-term forecast is consumer spending, represented by sales tax allocations. Historical data were collected from the Colorado Department of Revenue (DOR). Shown in **Figure 9** are aggregate sales tax allocations for all seven (7) counties of the SH119 analysis area. Individual county trends are reported in **Figure 71** through **Figure 77** beginning on page 89.

Figure 9 7-County Sales Tax Revenues



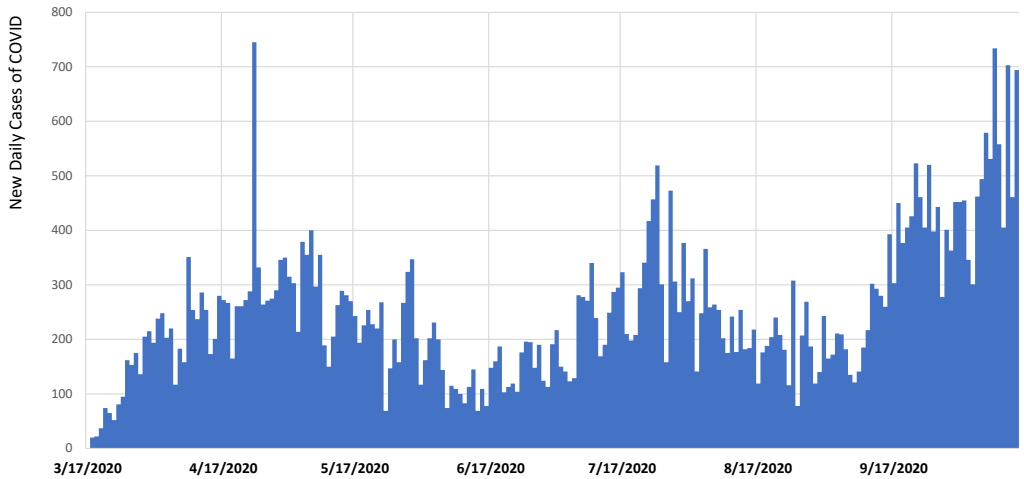
Source: Colorado Department of Revenue; Economic & Planning Systems

Z:\Shared\Projects\DEN\193095-HPTE Traffic and Revenue Advisory Services\Models\[193095-Monthly Model Calibration.xlsx]Z.7

Public Health

Data on new COVID-19 cases are sourced from the Colorado Department of Public Health and Environment (CDPHE). **Figure 10** illustrates the sum of daily confirmed cases for the seven (7) county SH119 analysis area. Individual county trends are shown in **Figure 78** through **Figure 84** beginning on page 92. Data were integrated into the short-term forecasting model as described in the following Independent Forecast chapter.

Figure 10 New Daily Cases of COVID-19 in 7-County Area



Source: Colorado Department of Public Health & Environment; Economic & Planning Systems

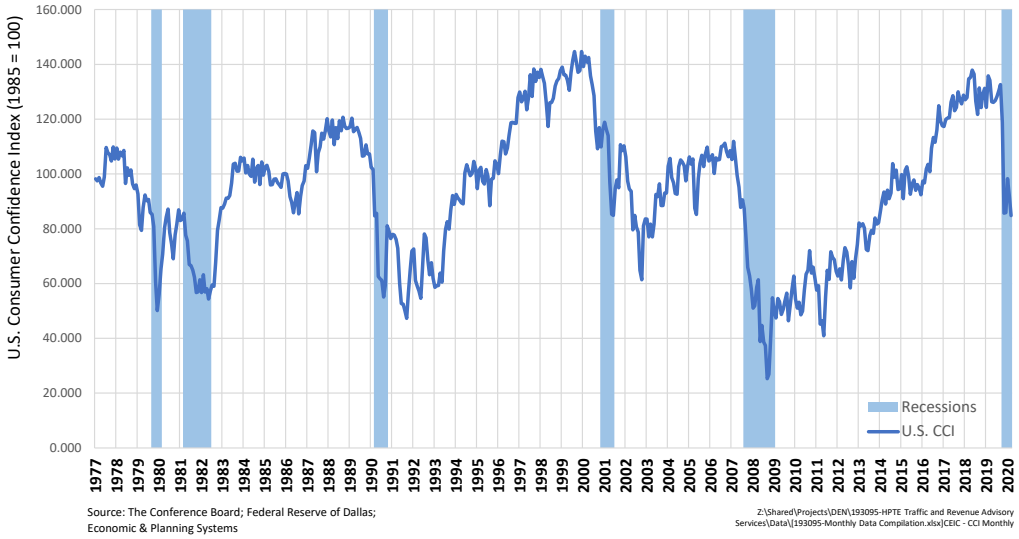
Z:\Shared\Projects\DEN\193095-HPTE Traffic and Revenue Advisory Services\Data\[193095-CO COVID Data.xlsx]CO Data

Consumer Confidence

In the absence of monthly or even quarterly data, the Conference Board's Consumer Confidence Index (CCI) is used as proxy for consumer spending and/or consumer sentiment regarding personal expenditure. Historic monthly data were obtained as shown back to 1977. The index is calibrated to 1985 as equaling 100. Recessions, as designated by the National Bureau of Economic Research, are highlighted as well. The trend reveals steep declines in the CCI during recessions with relatively similar rates of recovery between. Specifically, the rates of recovery were noted for the following economic cycles:

- 1982-1990: during the recession, the index declined at a rate of 2.4 points per month; during recovery, it increased by 0.5 points per month.
- 1991-2001: during the recession, the index declined at a rate of 3.9 points per month; during recovery, it increased by 0.5 points per month.
- 2001-2007: during the recession, the index declined at a rate of 2.5 points per month; during recovery, it increased by 0.1 points per month.
- 2009-2020: during the recession, the index declined at a rate of 2.3 points per month; during recovery, it increased by 0.7 points per month.

Figure 11 Consumer Confidence Index

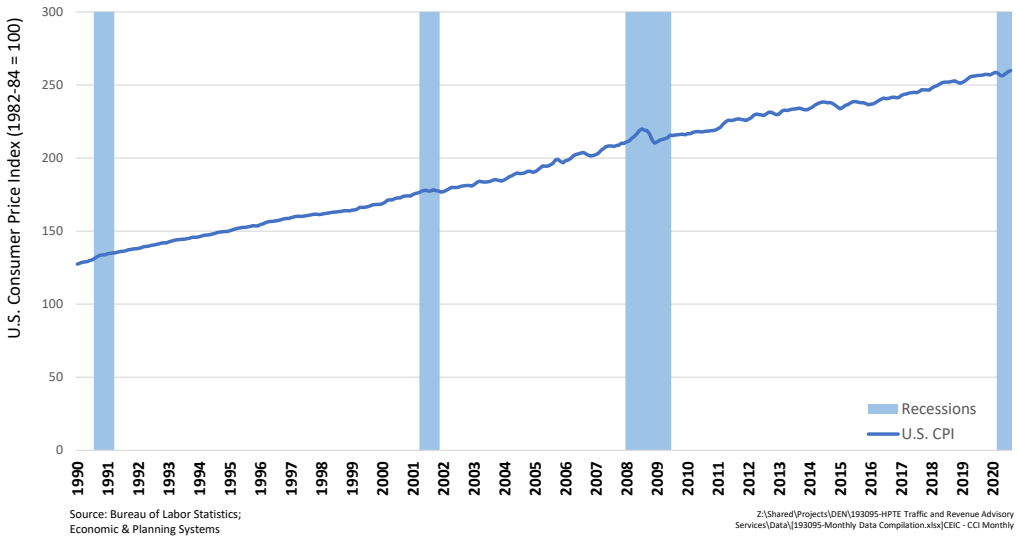


Consumer Prices

The Consumer Price Index (CPI) from the Bureau of Labor Statistics was integrated as a standard component of model specifications for consumer spending. Historic data, which are shown below, back to 1990 reveal trends during a few of the previous economic cycles as well. Apart from slight increases in the rate of CPI escalation (noted visually in the chart below), data show the following patterns during the past three economic cycles:

- 1991-2001: index rose at 2.7 percent per year, increasing 4.1 points per year
- 2001-2007: index rose at 2.7 percent per year, increasing 5.2 point per year
- 2009-2020: index rose at 1.7 percent per year, increasing 4.1 points per year

Figure 12 Consumer Price Index



3. Major Development Plans

EPS researched and evaluated the growth potentials of 80 projects whose site plan boundaries are illustrated in **Figure 13**. Planners and city staff from each jurisdiction were interviewed to identify all projects in the area that are under construction, permitted, platted, planned, or conceptual. For each project, EPS made determinations based on market research and discussions with city staff as to the scale, timing, and likelihood of completion.

Application of Data

It is generally understood that an analysis of projections at a subarea or TAZ level produces results with a generally high degree of specificity and uncertainty. Users are often cautioned against placing great reliance on TAZ level totals, as forecasting growth in such small geographic areas is difficult. As such, EPS's approach to making adjustments at the TAZ level is to do so only when market information and research provides a clear basis for such adjustments. In general, however, EPS adjusted TAZ-level data when the difference between what was likely to materialize in terms of land use developments and what was reported at the TAZ level were significantly different from each other (e.g., more than a 10 percent difference in magnitude). The following factors concerning market information and research were used to make these decisions with a clear basis.

- Development Plans
- Entitlement Process and Municipal Growth Policies
- Physical Area Attributes
- Existing Market Studies
- Development Pressure
- Proximity to Transportation Facilities
- Proximity to Employment Clusters
- Capital Improvements
- Ownership Patterns

As a result, when upward adjustments to TAZ-level data are made, which is generally the case for population and household data, population and household counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed. On the other hand, when downward adjustments to TAZ-level data are made, which is frequently the case for employment data in the Influence Area, employment counts in TAZs in the respective municipality are reduced proportionally to ensure that control totals remain fixed.

Figure 13 Major Development Plans North

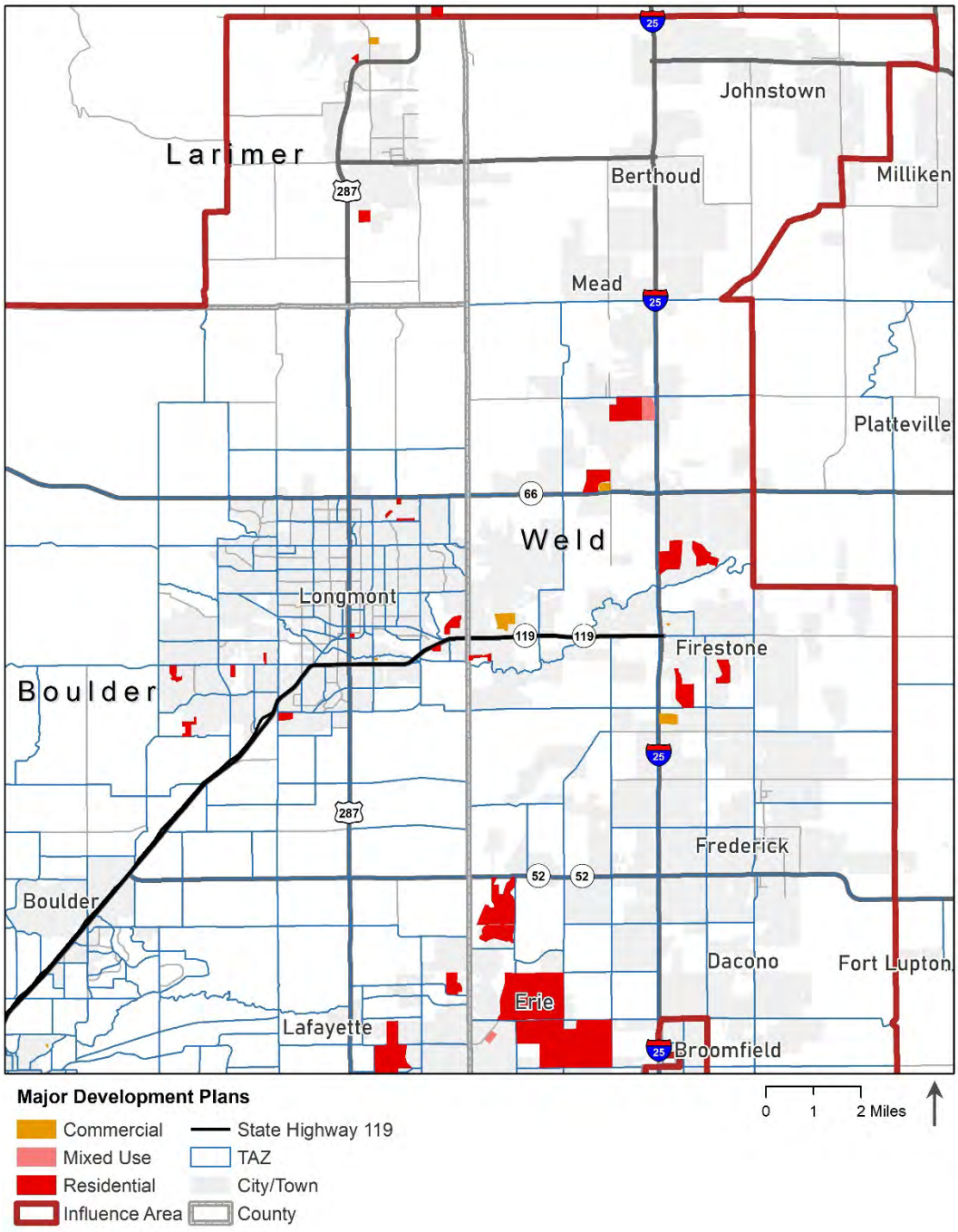
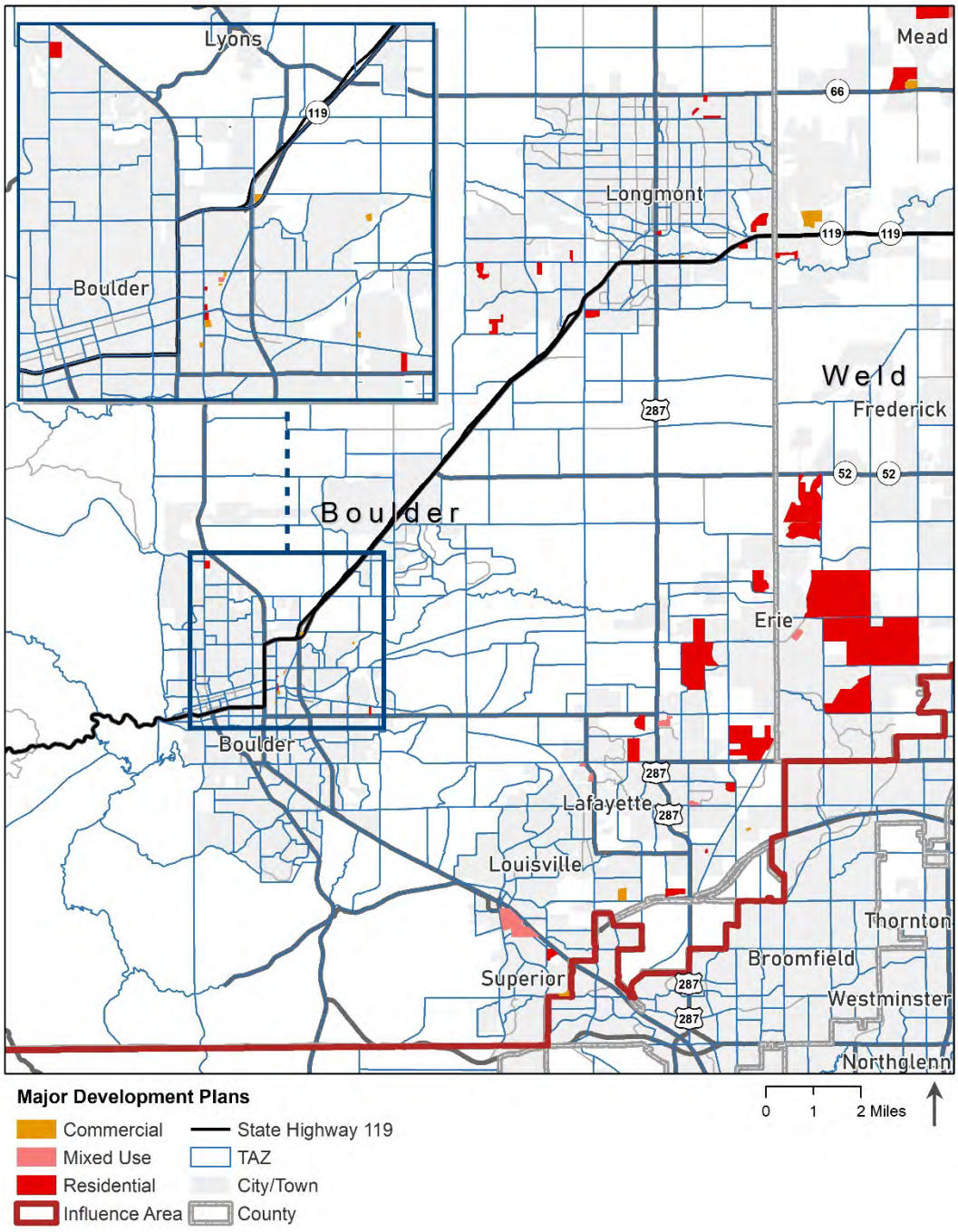


Figure 14 Major Development Plans South



Land Use Development Research

The following are descriptions of each major development project evaluated and the conclusions drawn from our research and interviews regarding the scale, timing, and probability of development during the 2023 to 2045 timeframe.

Berthoud

- Harvest Ridge South – A proposed residential development with plans for 66 single family detached units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Heron Lakes – A proposed residential development with plans for 105 single family detached units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Boulder

- 30 Pearl – A residential development currently under construction and will include 120 units. No adjustments were made. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 30th & Pearl – A proposed residential development with 177 units planned. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 3200 Bluff – A commercial development currently under construction that will include 52,000 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 5505 Central Ave – A proposed commercial development that will include approximately 56,000 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 5606 Airport – A proposed commercial development with plans of approximately 112,000 square feet of office space. EPS adjusted the TAZ-level employment projection up to reflect this project.
- Boulder Armory – A residential development that is currently under construction with 201 units. EPS adjusted the TAZ-level household projection up to reflect the completion of this project.
- Cambria Hotel – A proposed commercial development for a hotel with approximately 60 hotel rooms and 68,000 square feet. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

- Holiday Inn Express – A proposed commercial development with plans for 109,000 square feet and an estimated 120 hotel rooms. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- REVE Boulder – A commercial development that is currently under construction and will include 148,500 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- REVE Boulder MF – A residential development that is currently under construction that will consist of 244 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- S'Park – Railyards – A commercial development that is currently under construction and will include approximately 70,000 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- S'Park-Timber – A proposed mixed use development that plans to include 150 residential units and 20,000 square feet of retail space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Waterview – A proposed residential development that plans to include 340 units. EPS adjusted the TAZ-level household projection up to reflect the inclusion of this project.

Erie

- Bridgewater PUD Amend. 5 – A residential development that is currently under construction. The project will include a total of 775 units at buildout. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Erie Commons – A mixed use development that is currently under construction and will include 160 units and 100,000 square feet of retail space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Erie Highlands – A proposed residential development that will include 114 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Flatiron Meadows – A residential development near the intersection of Erie Parkway and 119th Street. The project has 70 percent of the 875 units complete. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Morgan Hill – A proposed residential development that will include 338 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

- Nine Mile – A mixed use development currently under construction at the southeast corner of Arapahoe Road and Highway 287. Lowe's will be the anchor tenant of the 128,000 square feet of retail. Additionally, the development will include 290 residential units. EPS adjusted the TAZ-level household projection up to reflect the completion of this project.
- Parkdale – A proposed residential development that is planning 800 housing units. EPS adjusted the TAZ-level household projection up to reflect the completion of this project.
- Red Trail Ranch (Pratt) – A residential development at the intersection of County Road 4 and County Road 5. The 590-unit project has yet to start construction. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Spring Hill – A proposed residential development that is planning 632 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Sunset – A proposed residential development that is planning 257 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Swink – A residential development located near the intersection of County Road 5 and Erie Parkway. The project is currently under construction and will include a total of 251 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Westerly (Dearmin) – A proposed residential development located near the intersection of County Road 5 and Erie Parkway. The project plans for a total of 946 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Wildrose – An approved residential development that will include 118 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Firestone

- Brookfield Residential – A proposed residential development with 1,000 single family detached units planned. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Cottonwood Hollow – A proposed residential development with 179 single family detached units planned. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Holiday Inn Express Hotel – A hotel development that is currently under construction. The hotel is estimated to include 40,000 square feet and 75 hotel rooms. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

- Neighbor's Point – A residential development currently under construction to include 80 single family detached units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Frederick

- Distribution Frederick – A proposed commercial development that will include approximately 120,000 square feet of industrial space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Johnstown

- Endeavor Dr – A commercial development that is currently under construction and will include 75,000 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- SE Frontage – A proposed commercial development with plans for 67,000 square feet of office space. EPS adjusted the TAZ-level employment projection up to reflect the development of this project.

Lafayette

- 40 North – A residential development located along Baseline Road west of Highway 287. The project was recently approved for 420 residential units. EPS adjusted DRCOG's household projection up to reflect the development of this project.
- City Center: A mixed use development currently under construction located at the northeast corner of City Center Circle and South Public Road. The development plans include a 200-unit apartment building and 16,000 square feet of retail space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Indian Peaks Filing 17 – A proposed mixed use development that will include 64 residential units and 56,000 square feet of retail space. EPS adjusted the TAZ-level household projection up to reflect the completion of this project.
- Silo Subdivision – A proposed residential development that will include 453 units. EPS adjusted the TAZ-level household projection slightly up to reflect the completion of this project.
- Sundar Apartments – A proposed residential apartment complex at the northwest corner of Northwest Parkway and Highway 287. The project proposes a total of 684 residential units. EPS adjusted the TAZ-level household projection to reflect the completion of this project.

- Traditions at SoLa – A residential development that is currently under construction and will include 133 units. EPS adjusted the TAZ-level household projection up to reflect the completion of this project.
- Vista Business Park – A light industrial/flex project currently under construction along Horizon Avenue. The project will include 50,000 square feet of space within 8 commercial units. Additionally, a 30,000 square foot facility for the sport of curling is proposed on the adjacent site. EPS adjusted the TAZ-level employment projection up slightly to reflect the completion of this development.
- Willoughby Center – A residential project recently approved located at the southwest corner of Emma Street and 120th Street. The project will include about 400 affordable residential units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Longmont

- Balfour at Creekside – A residential development that is currently under construction and will include 100 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Brickstone Apartments – A residential development that is currently under construction and will include 280 multifamily units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Creekside Silo Apartments – A residential development currently under construction with 208 total units planned. The site is located at 1855 Lefthand Creek Lane and approximately half of the planned units have delivered. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Northstar – 64 single family homes proposed on a 39-acre parcel located at the northeast corner of 79th Street and Plateau Road. The project is still under review with City Planning. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Nova Dry Creek – A proposed 264-unit multifamily rental community with five four-story buildings planned located at 9183 Nelson Road. The project is still under review with City Planning. EPS adjusted the TAZ-level household data by forecast year to reflect the growth and development patterns identified through research. These adjustments resulted in 254 more households by 2045 than the original CDOT numbers.
- Pleasant Valley 5th Filing – A residential development currently under construction consisting of 54 single family detached units located at 2090 Larimer Court. Approximately 50 percent of the project has delivered. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

- Prairie Village – A 126-unit apartment complex within six, three-story buildings that is currently under construction. The project is located northwest of Alpine Road and southeast of Canadian Crossing. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Smuckers Plant – A 229,000 square foot addition to the existing Smuckers manufacturing facility at 2900 Peak Avenue. This phase is currently under construction and includes a new bakery and sandwich-making and packaging facility that is expected to be completed within the next five years. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- South Main Station – A recently completed residential development with 253 units. EPS adjusted the TAZ-level household projection up to reflect the completion of this development.
- Springs at Longmont Expansion – A proposed 212-unit multifamily community, "Springs at Longmont" proposed on the 25.7-acre parcel south of the existing Springs at Sandstone Ranch. The project is currently under its final review with City Planning. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- The Highlands – A proposed 53-acre development, northwest of County Line Road and Highway 119 of the Ludlow Master Development. A total of 375 units are planned, with 42 single family units, 67 townhomes, and a 266-unit multifamily apartment complex. The project is currently under review with City Planning. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- The Parks at Stonebridge – A residential development consisting of 92 planned townhomes at 8756 Nelson Road. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Village Cooperative – A residential development under construction at the southeast corner of Alpine and Highway 66. A total of 52 residential units are planned and approximately 50 percent of the project has already delivered. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- West Grange – A residential development under construction along Nelson Road and 75th Street. A total of 234 residential units are planned, with 132 multifamily units and the remainder dedicated to single family developments. Approximately 50 percent of the project is complete. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Louisville

- Louisville Corporate Campus: A commercial development currently under construction near the intersection of Dillon Road and 104th Avenue. The project will include approximately 400,000 square feet of flex and light industrial development. The project is about 35 percent complete. EPS adjusted the TAZ-level employment projection up to reflect the project's completion.

Loveland

- 3324 W Eisenhower – A commercial development that is currently under construction and will include 100,000 square feet of industrial space. EPS adjusted the TAZ-level employment projection up to reflect the completion of this project.
- 4710 S Sunshine – A proposed commercial development with plans for approximately 134,000 square feet of retail space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 4875 Byrd – A proposed commercial development with plans for approximately 86,000 square feet of office space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- 5950 Stallion – A proposed residential development that will include 100 units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Anderson 1st – A residential development currently under review for 120 units. EPS adjusted the TAZ-level household projection up to reflect the development of this project.
- Aspen Knolls – A proposed residential development for 507 units. EPS adjusted the TAZ-level household projection up to reflect the development of this project.
- Axis 25 – A proposed commercial development that will include approximately 196,000 square feet of industrial space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Building 6 – A commercial development that is currently under construction and will include 123,000 square feet of industrial space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- High Plains Neighborhood Center – A proposed commercial development with plans for approximately 104,000 square feet of retail space. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

- Hilton Garden Inn – A proposed hotel that will include 80,000 square feet and approximately 100 hotel rooms. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Hunters Run – A residential development under review for 450 units. EPS adjusted the TAZ-level household projection up to reflect the development of this project.
- Millennium – A residential development under review for 168 units. EPS adjusted the TAZ-level household projection up to reflect the development of this project.
- Vantage – A residential development under review for 288 units. EPS adjusted the TAZ-level household projection slightly down to reflect the development of this project.
- Water's Edge – A proposed residential development that will include 138 units. EPS adjusted the TAZ-level household projection slightly down to reflect the development of this project.

Mead

- Mead Place Subdivision and Mead Place Commercial – A proposed mixed-use development, located at the corner of Highway 66 and County Road 7, consisting of 170,000 square feet of planned commercial space and 548 residential units. Of the 548 units, 306 will be single family homes, and the remainder are designated multifamily units. The Town of Mead has approved both project components. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- St. Acacius Subdivision – A proposed single family residential development (also known as Lakeside Canyon) located at the southwest corner of the intersection of County Road 28 and County Road 9.5. Approximately 222 residential lots are planned, and the site has been approved by the Town. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Westridge – A proposed residential development located at the corner of Welker Avenue and I-25. A total of 100 units are planned across 282 acres and the project has been approved by the Town of Mead. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Westridge Commercial – A proposed mixed-use commercial development planned south of the corner of County Road 34 and I-25. The site has been approved and approximately 50,000 square feet of office and retail space are planned at the site. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Superior

- Rock Creek Commercial – A proposed commercial development that will include approximately 220,000 square feet of office, retail, and a 135-room hotel. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Rock Creek Zaharias Apartments: A proposed residential apartment complex located along 88th street near US-36. The development will have 258 multifamily units. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.
- Superior Town Center: A mixed use development under construction along US-36. The development will include 1,400 residential units and 450,000 square feet of retail space, both of which are about halfway complete. EPS confirmed that the CDOT data adequately reflected the anticipated growth and development patterns based on research.

Open Space Adjustment

Boulder County's open space and TAZ boundaries are illustrated in **Figure 15**. The county owns or oversees over 100,000 acres with a mission to conserve natural, cultural, and agricultural resources. In modeling growth potential at a TAZ level, EPS used this information to limit residential and non-residential growth where open space limitations exist. No adjustments were made for 31 TAZs in Boulder County that have a significant amount of designated open space.

Figure 15 Boulder County Open Space

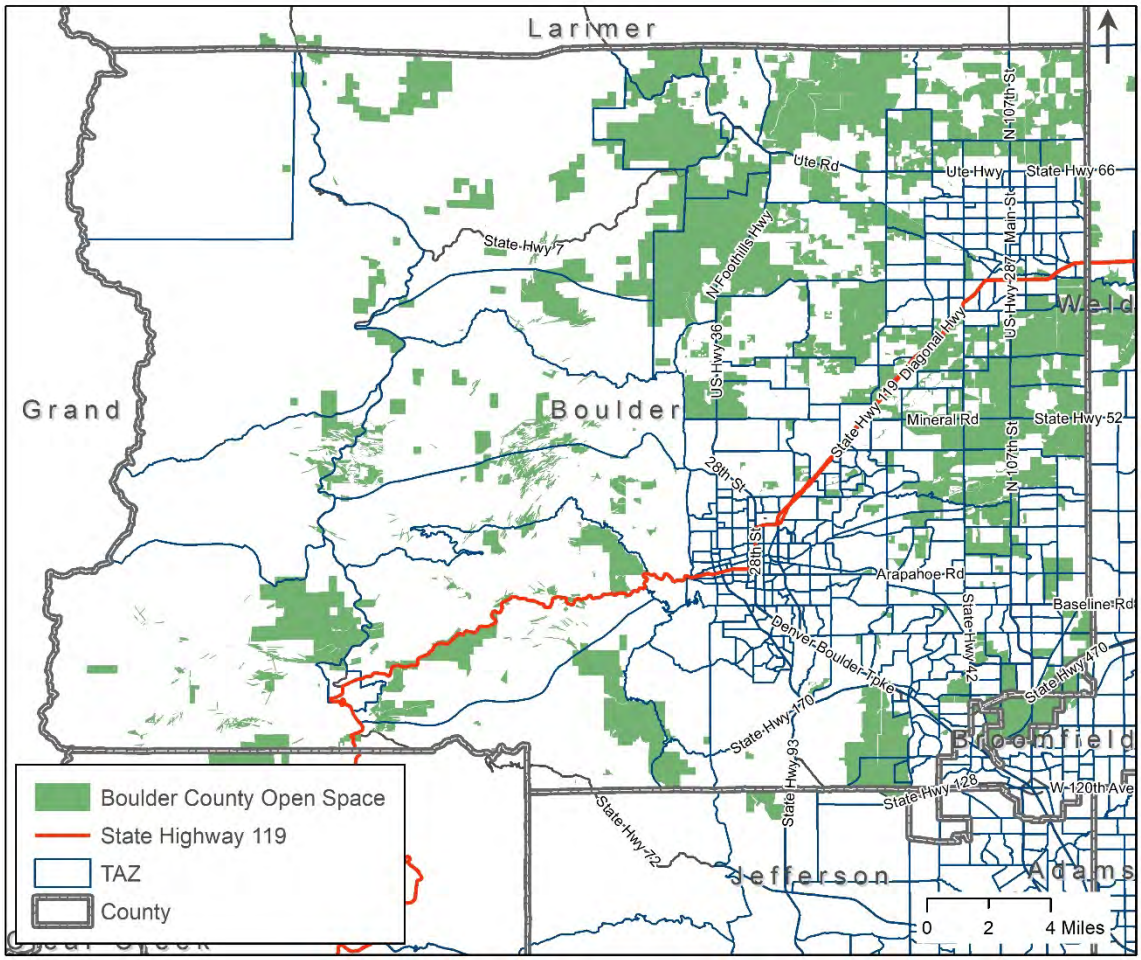


Table 6 Household Adjustments by TAZ, 2019-2045

		Households (CDOT)			Households (EPS Adj.)			
	TAZ	2019	2045	Total Δ	2019	2045	Total Δ	Diff.
Eldora Ski Lodge	10	175	180	5	175	180	5	0
Wildose	43	690	1,248	558	690	1,248	558	0
Flatiron Meadows	69	378	953	575	378	953	575	0
Holiday Inn Express	76	0	0	0	0	0	0	0
5606 Airport	80	422	607	185	422	607	185	0
Flatiron Meadows	89	379	945	566	379	945	566	0
Flatiron Meadows	91	38	248	210	38	248	210	0
Flatiron Meadows	92	673	1,243	570	673	1,243	570	0
5505 Central Ave	100	0	0	0	0	0	0	0
Waterview	101	0	1	1	0	340	340	339
Pleasant Valley 5th Filing; Prairie Village; Village Cooperative	110	611	1,153	542	611	1,153	542	0
The Highlands	131	704	727	23	704	727	23	0
Brickstone Apartments	133	75	133	58	75	133	58	0
Hilton Garden Inn Longmont	135	0	0	0	0	0	0	0
South Main Station	137	88	111	23	88	341	253	230
Balfour at Creekside; Creekside Silo Apartments	145	731	754	23	731	754	23	0
Nova Dry Creek	180	90	118	28	90	354	264	236
The Parks at Stonebridge	194	538	558	20	538	558	20	0
West Grange	195	2,237	2,971	734	2,237	2,971	734	0
Northstar	196	988	1,675	687	988	1,675	687	0
Northstar	199	64	636	572	64	636	572	0
Silo Subdivision	210	151	584	433	151	604	453	20
40 North	211	744	846	102	744	1,019	275	173
40 North	212	207	223	16	207	397	190	174
Nine Mile	213	467	567	100	467	757	290	190
Parkdale	216	116	650	534	116	916	800	266
City Center; Willoughby Corner	220	2,115	2,452	337	2,115	2,452	337	0
Indian Peaks Filing 17	226	134	140	6	134	198	64	58
Vista Business Park	249	0	0	0	0	0	0	0
Traditions at SoLa	252	36	240	204	36	169	133	-71
Sundar Apartments	255	594	1,317	723	594	1,215	621	-102
Sundar Apartments	256	4	4	0	4	67	63	63
Louisville Corporate Campus	258	33	74	41	33	74	41	0
Superior Town Center	267	145	1,261	1,116	145	1,261	1,116	0
Superior Town Center	275	0	0	0	0	0	0	0
Superior Town Center	278	526	1,183	657	526	1,183	657	0
Rock Creek Commercial; Rock Creek Zaharias Apartments	281	1,963	2,308	345	1,963	2,308	345	0
Boulder Armory	335	760	1,237	477	760	1,237	477	0
Boulder Armory	336	1,009	1,127	118	1,009	1,209	200	82
30 Pearl; 3200 Bluff; REVE Boulder MF; S'Park Railyards; S'Park Timber	363	101	257	156	101	257	156	0
Cambria Hotel	383	37	303	266	37	303	266	0
30th & Pearl; REVE Boulder	384	16	134	118	16	134	118	0
Mead Place Commercial; Mead Place Subdivision; Westridge; Westridge Comm	2723	167	426	259	167	426	259	0
Smuckers Plant; Springs at Longmont Expansion	2725	643	1,739	1,096	643	1,739	1,096	0

Holiday Inn Express Hotel	2728	74	749	675	74	749	675	0
Springs at Longmont Expansion	2729	252	1,329	1,077	252	1,329	1,077	0
Cottonwood Hollow	2735	433	1,028	595	433	1,028	595	0
Cottonwood Hollow; Distribution Frederick	2737	380	1,354	974	380	1,354	974	0
Morgan Hill; Spring Hill	2741	146	624	478	146	624	478	0
Bridgewater PUD Amend. 5	2742	754	926	172	754	926	172	0
Bridgewater PUD Amend. 5; Erie Highlands	2744	137	973	836	137	973	836	0
Bridgewater PUD Amend. 5; Swink	2747	100	423	323	100	423	323	0
Erie Commons; Erie Highlands	2754	1,398	1,552	154	1,398	1,552	154	0
Erie Highlands; Sunset	2756	190	1,411	1,221	190	1,411	1,221	0
Red Trail Ranch (Pratt)	2757	202	1,332	1,130	202	1,332	1,130	0
Erie Highlands; Swink; Westerly (Dearmin)	2759	57	470	413	57	470	413	0
Swink	2760	83	245	162	83	245	162	0
Red Trail Ranch (Pratt); Swink	2761	288	1,609	1,321	288	1,609	1,321	0
Westridge	2786	787	1,685	898	787	1,685	898	0
Brookfield Residential; St. Acacius Subdivision	2790	117	884	767	117	884	767	0
Neighbor's Point	2793	558	1,201	643	558	1,201	643	0
Aspen Knolls; Vantage; Waters Edge	2862	489	513	24	489	513	24	0
Waters Edge	2863	85	88	3	85	86	1	-2
Aspen Knolls	2864	932	1,081	149	932	1,081	149	0
Aspen Knolls	2865	74	168	94	74	572	498	404
Anderson 1st	2870	47	64	17	47	94	47	30
Anderson 1st	2871	37	40	3	37	110	73	70
Heron Lakes	2927	93	581	488	93	581	488	0
Harvest Ridge South	2947	2	21	19	2	21	19	0
Harvest Ridge South	2951	3	3	0	3	3	0	0
4710 S Sunshine	2958	441	1,451	1,010	441	1,451	1,010	0
Hunters Run	3049	210	218	8	210	216	6	-2
Hunters Run	3050	215	296	81	215	568	353	272
Hunters Run	3051	389	348	-41	389	402	13	54
Hunters Run	3054	12	82	70	12	38	26	-44
3324 W Eisenhower	3056	27	72	45	27	72	45	0
Hunters Run	3073	16	117	101	16	64	48	-53
Hunters Run	3074	100	96	-4	100	104	4	8
5950 Stallion	3149	117	828	711	117	828	711	0
4875 Byrd; Axis 25	3151	9	65	56	9	65	56	0
Hilton Garden Inn Loveland	3159	118	826	708	118	826	708	0
Endeavor Dr	3163	51	358	307	51	358	307	0
SE Frontage	3169	7	20	13	7	20	13	0
Building 6	3210	106	753	647	106	753	647	0
Millenium	3224	509	594	85	509	677	168	83
Vantage	3248	631	654	23	631	631	0	-23
High Plains Neighborhood Center	3288	673	1,043	370	673	1,043	370	0
4875 Byrd	3324	5	41	36	5	41	36	0
Argo Mill Gondola	2628	400	554	154	400	554	154	0
Argo Mill Gondola	2635	348	494	146	348	494	146	0
Roam	5593	340	414	74	340	1,416	1,076	1,002
Ski & Snowboard Club Vail Replacement-Golden Peak	5992	354	436	82	354	436	82	0
Edwards RiverPark	6023	197	257	60	197	791	594	534
East Peak 8 Hotel (Breckenridge Ski Resort)	6078	338	436	98	338	436	98	0
South Gondola Public Parking Structure (Breckenridge Ski Resort)	6082	339	437	98	339	437	98	0
Millenium	3224	509	594	85	509	677	168	83
Vantage	3248	631	654	23	631	631	0	-23
Total		**33,659**	**63,825**	**30,166**	**33,659**	**67,877**	**34,218**	**4,052**

Source: CDOT; Economic & Planning Systems

Table 7 Employment Adjustments by TAZ, 2019-2045

	TAZ	Employment (CDOT) 2019	2045	Total Δ	Employment (EPS Adj.) 2019	2045	Total Δ	Diff.
Eldora Ski Lodge	10	697	664	-33	697	764	67	100
Wildrose	43	233	285	52	233	285	52	0
Flatiron Meadows	69	78	74	-4	78	74	-4	0
Holiday Inn Express	76	73	272	199	73	272	199	0
5606 Airport	80	2,429	2,554	125	2,429	2,801	372	247
Flatiron Meadows	89	56	55	-1	56	55	-1	0
Flatiron Meadows	91	13	12	-1	13	12	-1	0
Flatiron Meadows	92	151	139	-12	151	139	-12	0
5505 Central Ave	100	6,032	7,784	1,752	6,032	7,784	1,752	0
Waterview	101	2,168	2,886	718	2,168	2,886	718	0
Pleasant Valley 5th Filing; Prairie Village; Village Cooperative	110	96	89	-7	96	89	-7	0
The Highlands	131	97	87	-10	97	87	-10	0
Brickstone Apartments	133	117	150	33	117	150	33	0
Hilton Garden Inn Longmont	135	2	2	0	2	2	0	0
South Main Station	137	1,508	1,568	60	1,508	1,568	60	0
Balfour at Creekside; Creekside Silo Apartments	145	861	807	-54	861	807	-54	0
Nova Dry Creek	180	677	663	-14	677	663	-14	0
The Parks at Stonebridge	194	485	464	-21	485	464	-21	0
West Grange	195	606	823	217	606	823	217	0
Northstar	196	138	124	-14	138	124	-14	0
Northstar	199	120	289	169	120	289	169	0
Silo Subdivision	210	1,011	1,391	380	1,011	1,391	380	0
40 North	211	268	245	-23	268	245	-23	0
40 North	212	778	1,213	435	778	1,213	435	0
Nine Mile	213	700	762	62	700	984	284	222
Parkdale	216	87	133	46	87	133	46	0
City Center; Willoughby Corner	220	745	761	16	745	761	16	0
Indian Peaks Filing 17	226	274	377	103	274	398	124	21
Vista Business Park	249	532	580	48	532	582	50	2
Traditions at SoLa	252	3,955	4,585	630	3,955	4,585	630	0
Sundar Apartments	255	281	292	11	281	292	11	0
Sundar Apartments	256	34	32	-2	34	32	-2	0
Louisville Corporate Campus	258	1,666	1,630	-36	1,666	2,116	450	486
Superior Town Center	267	440	456	16	440	1,291	851	835
Superior Town Center	275	1,343	1,474	131	1,343	1,474	131	0
Superior Town Center	278	136	123	-13	136	284	148	161
Rock Creek Commercial; Rock Creek Zaharias Apartments	281	134	193	59	134	193	59	0
Boulder Armory	335	762	874	112	762	874	112	0
Boulder Armory	336	922	981	59	922	981	59	0
30 Pearl; 3200 Bluff; REVE Boulder MF; S'Park Railyards; S'Park Timber	363	1,070	1,488	418	1,070	1,488	418	0
Cambria Hotel	383	2,273	2,852	579	2,273	2,852	579	0
30th & Pearl; REVE Boulder	384	872	1,378	506	872	1,378	506	0
Mead Place Commercial; Mead Place Subdivision; Westridge; Westridge Comi	2723	139	348	209	139	348	209	0
Smuckers Plant; Springs at Longmont Expansion	2725	1,175	1,358	183	1,175	1,358	183	0

Holiday Inn Express Hotel	2728	305	473	168	305	473	168	0
Springs at Longmont Expansion	2729	38	142	104	38	142	104	0
Cottonwood Hollow	2735	1,365	1,509	144	1,365	1,509	144	0
Cottonwood Hollow; Distribution Frederick	2737	1,178	1,935	757	1,178	1,935	757	0
Morgan Hill; Spring Hill	2741	35	121	86	35	121	86	0
Bridgewater PUD Amend. 5	2742	607	691	84	607	691	84	0
Bridgewater PUD Amend. 5; Erie Highlands	2744	1	0	-1	1	0	-1	0
Bridgewater PUD Amend. 5; Swink	2747	25	129	104	25	129	104	0
Erie Commons; Erie Highlands	2754	581	726	145	581	726	145	0
Erie Highlands; Sunset	2756	9	50	41	9	50	41	0
Red Trail Ranch (Pratt)	2757	14	111	97	14	111	97	0
Erie Highlands; Swink; Westerly (Dearmin)	2759	4	36	32	4	36	32	0
Swink	2760	62	162	100	62	162	100	0
Red Trail Ranch (Pratt); Swink	2761	46	15	-31	46	15	-31	0
Westridge	2786	385	436	51	385	436	51	0
Brookfield Residential; St. Acacius Subdivision	2790	343	355	12	343	355	12	0
Neighbor's Point	2793	126	153	27	126	153	27	0
Aspen Knolls; Vantage; Waters Edge	2862	111	313	202	111	313	202	0
Waters Edge	2863	154	58	-96	154	58	-96	0
Aspen Knolls	2864	292	339	47	292	339	47	0
Aspen Knolls	2865	14	89	75	14	89	75	0
Anderson 1st	2870	142	542	400	142	542	400	0
Anderson 1st	2871	55	361	306	55	361	306	0
Heron Lakes	2927	17	123	106	17	123	106	0
Harvest Ridge South	2947	157	979	822	157	979	822	0
Harvest Ridge South	2951	7	52	45	7	52	45	0
4710 S Sunshine	2958	114	484	370	114	484	370	0
Hunters Run	3049	68	250	182	68	250	182	0
Hunters Run	3050	66	492	426	66	492	426	0
Hunters Run	3051	64	261	197	64	261	197	0
Hunters Run	3054	28	202	174	28	202	174	0
3324 W Eisenhower	3056	48	91	43	48	148	100	57
Hunters Run	3073	40	297	257	40	297	257	0
Hunters Run	3074	118	193	75	118	193	75	0
5950 Stallion	3149	963	1,428	465	963	1,428	465	0
4875 Byrd; Axis 25	3151	1,146	1,391	245	1,146	1,391	245	0
Hilton Garden Inn Loveland	3159	1,125	2,608	1,483	1,125	2,608	1,483	0
Endeavor Dr	3163	490	1,478	988	490	1,478	988	0
SE Frontage	3169	13	96	83	13	237	224	141
Building 6	3210	367	2,880	2,513	367	2,880	2,513	0
Millenium	3224	83	437	354	83	437	354	0
Vantage	3248	607	989	382	607	989	382	0
High Plains Neighborhood Center	3288	653	3,424	2,771	653	3,424	2,771	0
4875 Byrd	3324	807	1,263	456	807	1,263	456	0
Argo Mill Gondola	2628	486	850	364	486	850	364	0
Argo Mill Gondola	2635	685	776	91	685	776	91	0
Roam	5593	1,099	1,299	200	1,099	1,339	240	40
Ski & Snowboard Club Vail Replacement-Golden Peak	5992	7,427	9,638	2,211	7,427	9,638	2,211	0
Edwards RiverPark	6023	449	622	173	449	622	173	0
East Peak 8 Hotel (Breckenridge Ski Resort)	6078	3,350	4,118	768	3,350	4,118	768	0
South Gondola Public Parking Structure (Breckenridge Ski Resort)	6082	1,519	1,929	410	1,519	1,929	410	0
Total		**64,122**	**90,713**	**26,591**	**64,122**	**93,026**	**28,904**	**2,313**

Source: CDOT; Economic & Planning Systems

THIS PAGE INTENTIONALLY LEFT BLANK

4. Independent Forecast

This chapter details the methodology, assumptions, and results of EPS's independent forecasts. The entirety of EPS's underlying assumptions and outputs are detailed in this chapter, but some of the more granular aspects are presented in the Appendix.

Methodology Overview

This section outlines the component structures and scenarios used to define the independent forecast.

Forecast Model Structure

The forecast model is structured for inputs and assumptions regarding both the current economic situation, possible recovery scenarios, and outcomes, as well as longer-term structural economic patterns. This dual modeling approach accommodates and merges granular specificity, i.e., monthly metrics and rates, in the short-term with macroeconomic and demographic shifts occurring over the long-term, i.e., annual metrics and rates.

- Short-Term Forecast (through 2025): This model component forecasts current conditions through the end of 2025 on a monthly basis, creating a linkage between the base year (2018) and the initial year of the long-term forecast component. This forecast is built on two series of ordinary least squares (OLS) regressions: 1) sales taxes by county, and 2) employment by county by industry supersector. The reasoning for this two-stage regression model is to replicate the clear relationship that personal consumer spending has on the overall economy and thus employment levels. Moreover, the short-term model responds to an interest in quantifying the relationship between the COVIDF-19 pandemic and subsequent recession. The model parameters are also calibrated to meet specific criteria in which outputs are statistically significant.
- Long-Term Forecast (2025-2045): This model component forecasts employment, population, and households with an employment-based population forecast methodology. It aggregates the short-term model employment outputs at an annual level and applies additional macroeconomic and demographic assumptions to arrive at longer-term forecasts of employment, population, and households. The layers of macroeconomic assumptions incorporate regional industry-level location quotients and national level industry-level employment projections. Demographic assumptions include shifts related to in- and out-commuting patterns, unemployment, self-employed persons, group quarters, non-working populations, as well as shifts in average household size.

Scenarios

Overall, the short- and long-term model components integrate a series of high-level narrative assumptions that define EPS's three (3) scenarios.

Short-Term Forecast. In the short-term model, scenario narratives are driven largely by three eventualities related to the remainder of the COVID-19 pandemic. In this narrative, assumptions regarding public health outcomes drive outcomes in consumer confidence, consumer spending, and employment levels. Assumptions for each of these variables are described in greater detail in the following sections.

- Low. A vaccine is not widely available until late 2021, and recovery patterns in consumer confidence, consumer spending, and employment are slightly slower because of the length of the disruption caused by more lasting personal income impacts.
- Mid. A vaccine becomes available in early 2021, but immunization and the eradication of cases persist longer into 2021, such that recovery patterns in consumer confidence, consumer spending, and employment levels occur within the year.
- High. A vaccine becomes available in early 2021, and immunization and the eradication of cases occur relatively quickly, allowing quick recovery of consumer confidence, consumer spending, and employment levels, reflecting little deterioration of underlying consumer demand.

Table 8 Short-Term Model Scenarios

	Low	Mid	High
Public Health			
Peaks in confirmed COVID-19 cases	Peaks occur at 7-month intervals through 4th quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021	Peaks occur at 7-month intervals through 2nd quarter 2021
Availability of COVID-19 vaccine	4th quarter 2021	1st quarter 2021	1st quarter 2021
Sufficient immunization reached to accommodate "business as usual"	1st quarter 2022	4th quarter 2021	3rd quarter 2021
Spending and Prices			
Consumer confidence (low point)	Middle of 3rd quarter 2021	End of 2nd quarter 2021	1st quarter 2021
Consumer prices	Rises at historic rates	Rises at historic rates	Rises at historic rates
Employment			
Low point	Middle of 2nd quarter 2021	Middle of 3rd quarter 2021	Middle of 4th quarter 2021
Recovery of 2019 levels	Approx. 1st quarter 2025	Approx. 2nd quarter 2024	Approx. 3rd quarter 2023

Source: Economic & Planning Systems

Long-Term Forecast. In the long-term model, scenario narratives are driven by 1) annual employment levels for 2025 from the short-term model; and 2) the performance of each regional industry relative to the anticipated national structural growth by industry, as defined by the Bureau of Labor Statistics (BLS). Details of these assumptions are provided in the following sections.

- Low. This scenario is characterized by slower than anticipated long-term growth rates following the recovery from the pandemic and over the subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect relatively lower local labor force participation rates over time.
- Mid. This scenario is characterized by anticipated long-term growth rates by industry, which materialize following the recovery from the COVID-19 pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment persists longer and commuting patterns reflect slightly higher local lower labor force participation rates over time.
- High. This scenario is characterized by higher-than-anticipated rates of industry-level employment growth rates following the pandemic and subsequent 20 years. Underlying demographic patterns reflect conditions in which unemployment does not persist and commuting patterns reflect high labor force participation rates.

Table 9 Long-Term Model Scenarios

	Low	Mid	High
Employment			
Long-term growth relative to national structural growth	Lower than anticipated regional-to-national industry-level outcomes	Anticipated regional-to-national industry-level outcomes	Higher than anticipated regional-to-national industry-level outcomes
Unemployment	Relatively high rates persist through 2023	Relatively high rates persist through 2023	Relatively high rates persist through 2021
Demographics			
In-commuting	Moderate increase of in-commuting patterns	Moderate increase of in-commuting patterns	Relatively high increase of in-commuting patterns
Out-commuting	Relatively low increase of out-commuting	Moderate increase of out-commuting	Relatively high increase of out-commuting
Self-employed	Moderate increase of self-employed persons	Moderate increase of self-employed persons	Moderate increase of self-employed persons
Non-working population (<16 years)	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth	Lower than historic rate of cohort growth
Non-working population (over 65)	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth	Slightly higher than historic rate of cohort growth

Source: Economic & Planning Systems

Short-Term Model

This section provides detailed descriptions of the model parameters and assumptions used in the short-term model component.

Model Parameters

The short-term model includes two regression models that sequentially project the following dependent variables: 1) sales tax allocations by county; and 2) employment by county. The predictive relationships between each independent variable and the dependent variable are discussed.

Parameter Estimates. Numerous iterations of the sales tax allocation model were made before arriving on an optimal structure, as shown below. The model parameters were established to: a) maximize the adjusted R-squared; and b) identify the most statistically significant coefficients, i.e., minimize the p-values at the 99 percent or at least 95 percent confidence levels. In brief, the independent variables selected were as follows:

- COVID-19 cases: monthly cases were modeled as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending – i.e., it was theorized (and confirmed through iterations of modeling) that coefficients for this variable in the month in which cases are at their maximum were neither statistically significant nor predictive of the adverse impact of spending in the current or following months. The (very small) coefficient is negative, as theorized, and it is significant at the 99 percent confidence level.
- CPI: inflation serves two purposes: 1) as a counter-proxy to the Consumer Confidence Index, which fluctuates much more considerably; and 2) as a proxy for the general escalation of personal income. The coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Month: consumer spending is seasonal; the inclusion of this variable controls for seasonality. The coefficients are a mix of positive and negative, as theorized, and they are all significant at the 99 percent confidence level.
- Consumer Confidence Index: as noted in the presentation of historical data, consumer confidence rises during improving economic conditions, and falls with declines in the market. The overlay of recession periods confirms that it is useful as a proxy for market (i.e., consumer) spending behavior. The (very small) coefficient is significant at the 95 percent confidence level but is negative. EPS believes that the pattern of international spending is having a counter-intuitive impact here.

Table 10 Adams County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.3903079	0.170531	43.34	<.0001
CCI	0.0012621	0.00036	3.51	0.0007
CPI	0.0054622	0.000839	6.51	<.0001
Month 1	-0.062887	0.013769	-4.57	<.0001
Month 2	-0.071754	0.013784	-5.21	<.0001
Month 3	-0.001326	0.013693	-0.1	0.923
Month 4	-0.023024	0.013739	-1.68	0.0966
Month 5	0.0037111	0.013771	0.27	0.7881
Month 6	0.0284023	0.013765	2.06	0.0414
Month 7	0.0123432	0.013765	0.9	0.3718
Month 8	0.0139218	0.014299	0.97	0.3323
Month 9	0.063275	0.014299	4.43	<.0001
Month 10	0.0003736	0.014299	0.03	0.9792
Month 11	-0.016633	0.014322	-1.16	0.248
Month 12	0.053596154	0	0	0

Source: Economic & Planning Systems

Table 11 Arapahoe County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.5372496	0.141264	53.36	<.0001
CCI	0.0005352	0.000298	1.8	0.0753
CPI	0.0043017	0.000695	6.19	<.0001
Month 1	-0.059475	0.011406	-5.21	<.0001
Month 2	-0.082764	0.011418	-7.25	<.0001
Month 3	-0.018537	0.011343	-1.63	0.105
Month 4	-0.03733	0.011381	-3.28	0.0014
Month 5	-0.000771	0.011408	-0.07	0.9462
Month 6	0.0246293	0.011402	2.16	0.0329
Month 7	0.0107891	0.011402	0.95	0.3461
Month 8	0.0313887	0.011845	2.65	0.0092
Month 9	0.0575298	0.011845	4.86	<.0001
Month 10	0.0089541	0.011845	0.76	0.4513
Month 11	-0.014585	0.011864	-1.23	0.2215
Month 12	0.080171069	0	0	0

Source: Economic & Planning Systems

Table 12 Boulder County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.5372496	0.141264	53.36	<.0001
CCI	0.0005352	0.000298	1.8	0.0753
CPI	0.0043017	0.000695	6.19	<.0001
Month 1	-0.059475	0.011406	-5.21	<.0001
Month 2	-0.082764	0.011418	-7.25	<.0001
Month 3	-0.018537	0.011343	-1.63	0.105
Month 4	-0.03733	0.011381	-3.28	0.0014
Month 5	-0.000771	0.011408	-0.07	0.9462
Month 6	0.0246293	0.011402	2.16	0.0329
Month 7	0.0107891	0.011402	0.95	0.3461
Month 8	0.0313887	0.011845	2.65	0.0092
Month 9	0.0575298	0.011845	4.86	<.0001
Month 10	0.0089541	0.011845	0.76	0.4513
Month 11	-0.014585	0.011864	-1.23	0.2215
Month 12	0.080171069	0	0	0

Source: Economic & Planning Systems

Table 13 Broomfield County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	6.774784	0.137906	49.13	<.0001
CCI	-0.000121	0.000291	-0.41	0.6791
CPI	0.0051252	0.000679	7.55	<.0001
Month 1	-0.063914	0.011135	-5.74	<.0001
Month 2	-0.078223	0.011147	-7.02	<.0001
Month 3	-0.000217	0.011074	-0.02	0.9844
Month 4	-0.041731	0.011111	-3.76	0.0003
Month 5	0.0042537	0.011137	0.38	0.7032
Month 6	0.0133898	0.011131	1.2	0.2315
Month 7	-0.000675	0.011131	-0.06	0.9517
Month 8	0.0136828	0.011563	1.18	0.2392
Month 9	0.0143358	0.011564	1.24	0.2176
Month 10	-0.016387	0.011563	-1.42	0.1592
Month 11	0.0057406	0.011582	0.5	0.6211
Month 12	0.14974514	0	0	0

Source: Economic & Planning Systems

Table 14 Denver County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	8.7015635	0.133004	65.42	<.0001
CCI	0.0021621	0.000281	7.7	<.0001
CPI	0.0007685	0.000655	1.17	0.2428
Month 1	-0.050761	0.010739	-4.73	<.0001
Month 2	-0.071965	0.010751	-6.69	<.0001
Month 3	-0.005684	0.01068	-0.53	0.5956
Month 4	-0.029594	0.010716	-2.76	0.0067
Month 5	-0.010311	0.010741	-0.96	0.3391
Month 6	0.0274563	0.010736	2.56	0.0119
Month 7	0.0182347	0.010736	1.7	0.0922
Month 8	0.0260288	0.011152	2.33	0.0214
Month 9	0.0562557	0.011153	5.04	<.0001
Month 10	0.0143854	0.011152	1.29	0.1997
Month 11	-0.022758	0.011171	-2.04	0.044
Month 12	0.048712015	0	0	0

Source: Economic & Planning Systems

Table 15 Jefferson County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.7572222	0.132364	58.61	<.0001
CCI	0.0005649	0.000279	2.02	0.0455
CPI	0.0042294	0.000651	6.49	<.0001
Month 1	-0.068251	0.010687	-6.39	<.0001
Month 2	-0.072479	0.010699	-6.77	<.0001
Month 3	-0.002745	0.010629	-0.26	0.7967
Month 4	-0.029302	0.010664	-2.75	0.007
Month 5	0.0047891	0.010689	0.45	0.655
Month 6	0.0296484	0.010684	2.78	0.0065
Month 7	0.0143723	0.010684	1.35	0.1812
Month 8	0.0119954	0.011099	1.08	0.2821
Month 9	0.0411725	0.011099	3.71	0.0003
Month 10	-0.010253	0.011099	-0.92	0.3576
Month 11	-0.013093	0.011117	-1.18	0.2414
Month 12	0.094145645	0	0	0

Source: Economic & Planning Systems

Table 16 Larimer County Sales Tax Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	7.2137963	0.114155	63.19	<.0001
CCI	0.0008577	0.000241	3.56	0.0005
CPI	0.005589	0.000562	9.95	<.0001
Month 1	-0.076402	0.009217	-8.29	<.0001
Month 2	-0.095524	0.009227	-10.35	<.0001
Month 3	-0.018955	0.009166	-2.07	0.0409
Month 4	-0.043782	0.009197	-4.76	<.0001
Month 5	0.003773	0.009219	0.41	0.6831
Month 6	0.0416883	0.009214	4.52	<.0001
Month 7	0.0378002	0.009214	4.1	<.0001
Month 8	0.04445	0.009572	4.64	<.0001
Month 9	0.0556787	0.009572	5.82	<.0001
Month 10	-0.001874	0.009572	-0.2	0.8452
Month 11	-0.02112	0.009587	-2.2	0.0296
Month 12	0.074266714	0	0	0

Source: Economic & Planning Systems

Numerous iterations of the employment model were also made before arriving on an optimal structure, as shown below. As with the model described above, the model parameters were established to achieve desired statistical results. The independent variables selected were as follows:

- Consumer Confidence Index: in this model, the CCI is used also to calibrate the model for behavioral spending inclinations, as well as to counteract the more subtle (resulting) shifts in sales tax allocations because of actual spending. The (very small) coefficient is positive, as theorized, and it is significant at the 99 percent confidence level.
- Sales Tax Allocations: a one-month lag of sales tax allocations is used in the model to replicate the delayed impact that fluctuations in spending have on business hiring and layoff decisions. The coefficient is very small, but positive, and is significant at the 95 percent confidence level. (Note: The variable is modeling in quadratic form for the purpose of improving the model's specifications and significance.)
- COVID-19 Cases: monthly cases were modeled again as a forward-lagged variable, replicating the impact that knowledge of increasing cases has on consumer spending. The (very small) coefficient is significant at the 99 percent confidence level but is positive. EPS believes that the observation that spending patterns have maintained and recovered despite COVID cases may be impacting the variable.

Table 17 Adams County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.2515898	0.003103	1692.3	<.0001
CCI	0.0011558	0.00004246	27.22	<.0001
SalesTax	2.046E-11	6.41E-12	3.19	0.0018
COVID	6.9093E-06	0.00000307	2.25	0.0262

Source: Economic & Planning Systems

Table 18 Arapahoe County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.3946533	0.003451	1563.1	<.0001
CCI	0.0010343	0.00003354	30.84	<.0001
SalesTax	3.614E-11	1.05E-11	3.46	0.0008
COVID	3.9343E-06	0.000002354	1.67	0.0973

Source: Economic & Planning Systems

Table 19 Boulder County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.1416021	0.003539	1452.9	<.0001
CCI	0.0009128	0.00003441	26.53	<.0001
SalesTax	2.683E-11	1.07E-11	2.5	0.0137
COVID	0.000029987	0.000009322	3.22	0.0017

Source: Economic & Planning Systems

Table 20 Broomfield County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.3664202	0.005177	843.38	<.0001
CCI	0.0016159	0.00004482	36.05	<.0001
SalesTax	1.258E-10	6.21E-11	2.03	0.0449
COVID	0.0002046	0.00005979	3.42	0.0008

Source: Economic & Planning Systems

Table 21 Denver County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.419009	0.004301	1259.9	<.0001
CCI	0.001218	0.000047	25.93	<.0001
SalesTax	1.859E-11	5.35E-12	3.47	0.0007
COVID	7.3949E-06	0.000001962	3.77	0.0003

Source: Economic & Planning Systems

Table 22 Jefferson County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.3842995	0.003526	1527.2	<.0001
CCI	0.0008369	0.00003389	24.69	<.0001
SalesTax	2.104E-11	6.93E-12	3.03	0.003
COVID	2.4801E-06	0.000004257	0.58	0.5612

Source: Economic & Planning Systems

Table 23 Larimer County Jobs Model Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.1095506	0.004253	1201.3	<.0001
CCI	0.0011232	0.00005649	19.88	<.0001
SalesTax	7.165E-11	1.53E-11	4.7	<.0001
COVID	0.000044537	0.00001529	2.91	0.0043

Source: Economic & Planning Systems

Model Assumptions

This section provides context and rationale for what assumptions were used in the short-term forecasting model, including two critical factors: public health and consumer confidence.

Projection of Public Health Conditions. The motivation for integrating public health metric in the model specifications is the impact that the number of cases, and subsequent business closures and layoffs, had on the economy and jobs market.[1]

Identifying reasonable forecast assumptions for the public health outlook required assembling various pieces of historical and project expert guidance and perspectives. In addition to the research and analysis of historical confirmed COVID-19 cases, EPS researched Institute of Health Metrics and Evaluation's (IHME) 4-month projection scenarios of COVID-19 cases, public health expert opinions regarding the timing and availability of a vaccine, and perspectives on timing for its distribution.[2]

Shown in **Figure 16** are IHME's forecasts of COVID-19 cases in the entire state of Colorado. It should be noted that these data reflect IHME's calculation of "estimated" not confirmed cases, as well as scenarios to reflect different eventualities of public adoption of mask-wearing mandates.

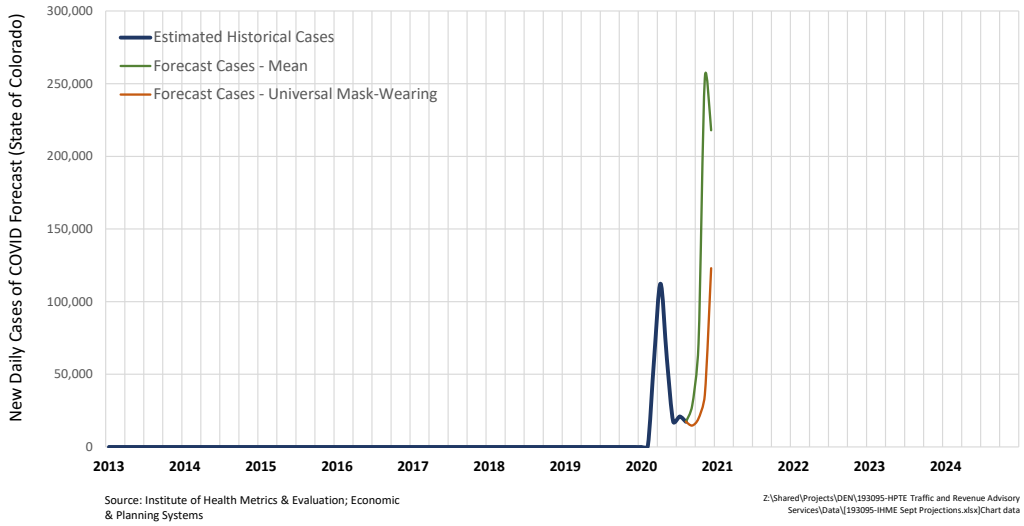
- Historic cases: data show that cases peaked in April 2020.
- Mean Forecast: IHME estimates that cases will peak at the end of November 2020, approximately 7 months following the previous peak.
- Universal Mask Forecast: IHME estimates that cases under this scenario will peak at the beginning of January 2021.

The conclusions from this analysis were the peak-to-peak periodicity of cases, which are approximately 7 to 8 months. This assumption is built into the econometric modeling.

[1] Initial thinking on independent variables for the model specifications included dummy variables for beginning and end dates for lockdowns, specified industry business closures, etc. After a few months of observing trends in employment and spending, however, it was determined that those variables no longer carried predictive power for either consumer spending patterns or employment levels.

[2] EPS had not anticipated incorporating such a variable in its scoped work plan for producing independent socioeconomic forecasts; however, given the importance of integrating this element into the econometric modeling, EPS collected information on high-level public-facing documentation from public health experts on COVID-19 and its outlook. As such, this was neither a comprehensive review of the literature, nor a summary of a panel of all public health expert perspectives.

Figure 16 IHME 4-Month Forecast of COVID-19 Cases in Colorado



Modeled Public Health Assumptions. Reflecting the information discussed above, EPS identified the following as reasonable assumptions for projecting COVID-19 cases for integration with the short-term independent forecast.

- Vaccine Availability and Delivery: expert opinions regarding these critical elements were relied upon. The "best case" assumptions were modeled with the convergence of current opinion (as of September 2020) from statements by 1) Dr. Fauci, Director of the National Institute of Allergy and Infectious Diseases; 2) Moncef Slaoui, Operation Warp Speed Chief Advisor; and 3) Stephane Bancel, Chief Executive Officer of Moderna. Respectively, these experts have made public statement that the vaccine will be available and delivered for large-scale immunization in the 3rd quarter 2021, 2nd quarter 2021, and 1st quarter 2021.
- Immunization Timing: expert opinion was also used to further calibrate the forecast assumption of the diminution of cases following the availability and delivery of an effective vaccine. That is, it is theorized that the delivery of a vaccine in the 2nd quarter of 2021, for example, would not imply that cases will immediately disappear; rather that any spike in cases would diminish over the next few months. Dr. Francis Collins, Director of the National Institute of Health (NIH) has stated publicly that distribution of a vaccine will take approximately three (3) months for 300 million doses.

- Third-Party Forecast of COVID-19 Cases and Periodicity Assumption: the Institute of Health Metrics and Evaluation (IHME) began producing state-level forecasts of new COVID-19 cases, deaths, rates of hospitalization, and hospital bed capacity in late March 2020. According to its website, the IHME uses a hybrid modeling approach, incorporating elements of statistical and disease transmission models. The IHME regularly updates its model to respond to new data and new information. The current 4-month forecast (September 4, 2020 version) was utilized for understanding the implied periodicity of new case peaks and magnitudes. These forecasts are described in greater detail below.

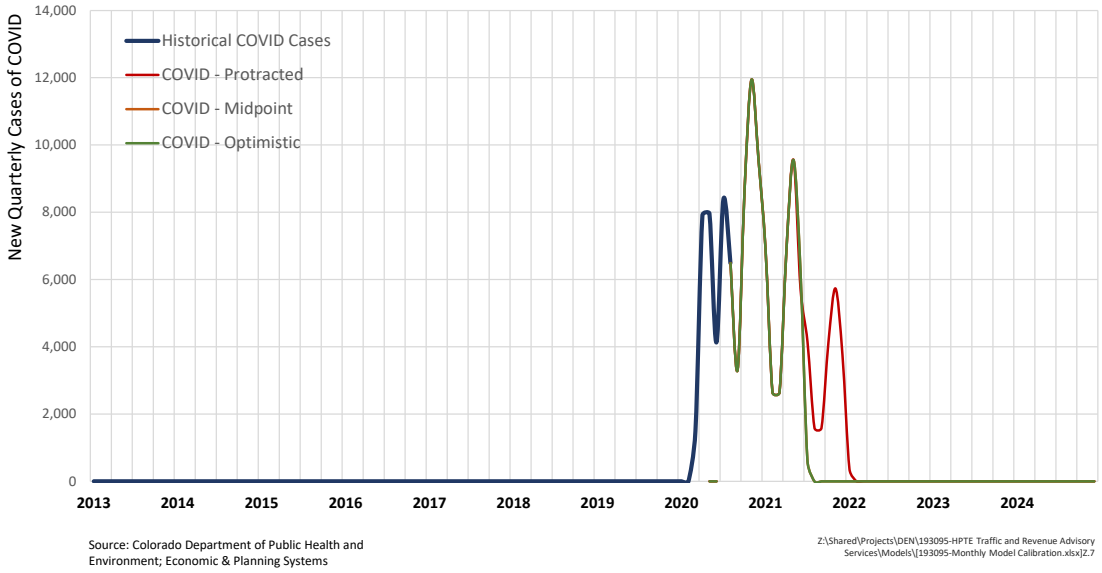
Projection of COVID-19 Cases. EPS has applied the general contours and timing of the periodicity and magnitude of the second wave (as estimated by IHME) using both the U.S. and Colorado-specific data.

- Periodicity: EPS assumes that the peak-to-peak cases occur every 7 months, and, critically, that they occur every 7 months until a vaccine has been delivered. This is important. EPS's observation of previous iterations of forecasts is that models are consistently forecasting subsequent waves of cases following a decline. There is no evidence to suggest that cases will disappear following the next forecast peak in cases.
- Magnitude: EPS assumes that the magnitude of cases in the next (i.e., October to December time frame) wave of cases is larger than the first, as projected by both IHME scenarios. Subsequent waves, however, are assumed to be milder.

The calibration of this projection is shown in **Figure 17**. Individual county forecasts are illustrated in **Figure 85** through **Figure 91** beginning on page 96. By scenario, these projections reflect the following additional assumptions:

- Low: this scenario assumes a delay in the availability, delivery, and immunization of a COVID-19 vaccine, implying that there are projected to be two (2) additional peaks of cases, not including the peak in November 2020.
- Mid: this scenario assumes a delay in the availability, delivery, and immunization of a COVID-19 vaccine, implying that there are projected to be one (1) additional peak of cases, not including the peak in November 2020, followed by a protracted decline in the number of cases through the second half of 2021.
- High: this scenario assumes one (1) additional peak of cases, not including the peak in November 2020, followed by a more optimistic decline in the number of cases, diminishing effectively by July 2021.

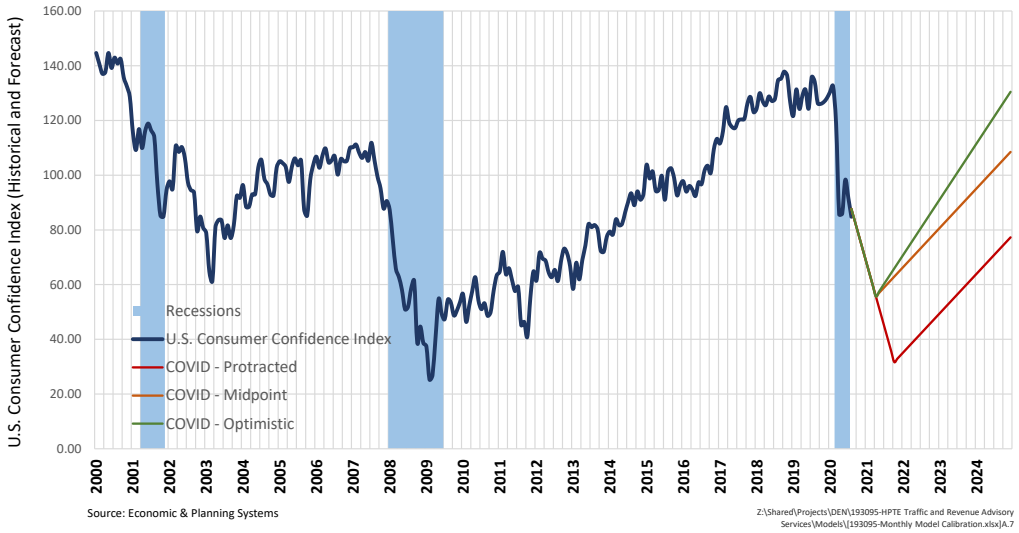
Figure 17 Applied Forecast of New COVID-19 Cases in 7-County Area



Consumer Confidence. Using the preceding scenarios of COVID-19 cases, EPS assumes that consumer confidence will respond to the public health conditions, specifically to the distribution of a vaccine. **Figure 18** illustrates this projection as applied to the entire region and individual counties.

- Pre-Vaccine Delivery: each scenario assumes that the CCI drops by three (3) points per month until it is broadly announced that a vaccine will be delivered (assumed to be three months from elimination of cases).
- Recovery: for the Mid and High scenarios, EPS assumes that consumer confidence rebounds at a recovery pace of two (2) points per month, whereas the Low scenario recovers at slightly less than two (2) points per month.

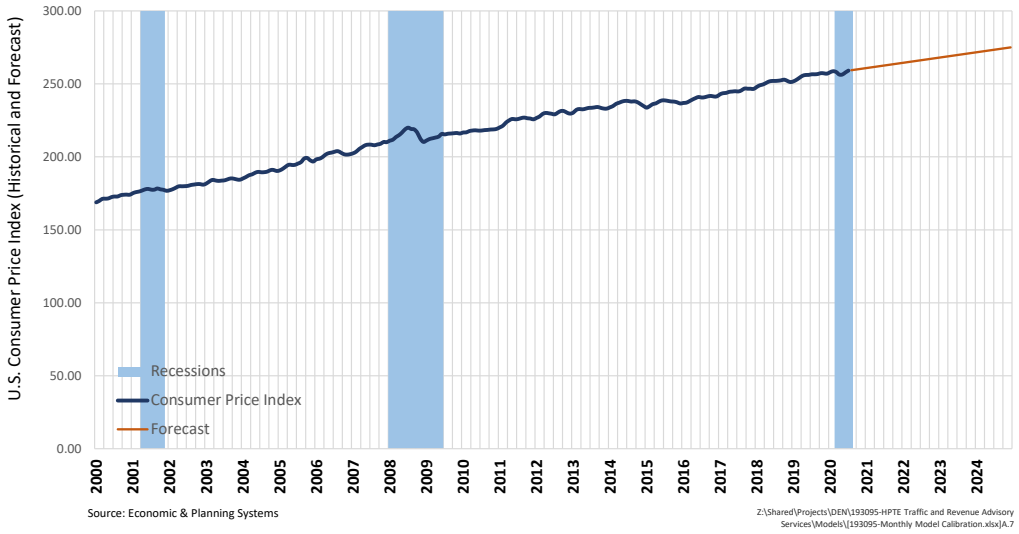
Figure 18 Forecast Assumptions of Consumer Confidence Index



Consumer Prices

EPS assumes that inflation, illustrated in **Figure 19**, which has increased steadily and without much fluctuation for the last few decades, will continue to increase at a constant rate of 4.2 points per year.

Figure 19 Forecast Assumption of Consumer Price Index



Other Critical Supporting Factors

Third-party sources that provide economic outlooks and forecasts in the near and long term for COVID-19 impacts and recovery in the U.S. were reviewed by EPS. These sources were used to determine and support the short- and long-term forecast assumptions and scenarios in EPS's independent forecasts.

Moody's Analytics. Moody's Analytics provided a presentation in March 2020, "COVID-19: Gauging the Pandemic" as well as an updated presentation in June 2020, "Handicapping the Paths for the Pandemic Economy." Both presentations provided a baseline scenario and multiple additional scenarios to forecast the economic recovery in the United States each with an estimated probability rate. Real GDP was the tracking factor to predict when the economy would recover. Each scenario included epidemiological assumptions of the total number of infections, when peak infections would occur, fatality rate, and when infections would abate. The June presentation included the forecasted shape of recovery of Real GDP from the start of recession with various scenarios all in the shape of a swoosh recovery with varying slopes.

McKinsey & Company. In March 2020, McKinsey published an article, "Safeguarding our lives and our livelihoods: The imperative of our time," that analyzed the uncertainty of the pandemic, impacts of lockdown on consumption and economic activity, and forecasted possible scenarios of recovery. McKinsey created a matrix to predict different scenarios of the shape of GDP recovery with public-health response on the y-axis and economic policies on the x-axis resulting in nine scenarios. In April and May, McKinsey surveyed over 2,000 global executives of what scenario within the matrix they believed was most likely to occur. The results of the survey were published in McKinsey's May article, "Crushing coronavirus uncertainty: The big 'unlock' for our economies" and updated with new survey results in a June article. Each scenario and shape of GDP recovery was determined by when the virus spread will be contained (or failure of containment), the depth of GDP decline, pace of GDP recovery, and unemployment rate. The most likely scenario, according to the global executives surveyed, was a u-shaped GDP recovery with virus recurrence, slow long-term growth, and muted world recovery. This is one of the more optimistic scenarios in which public health and economic policy interventions are partially effective, and the return to precrisis levels of GDP, income, and corporate earnings will take time. The scenarios with the highest probabilities of occurring by the global executives were used to influence EPS's independent forecast scenarios.

Deloitte. Deloitte publishes quarterly US economic forecasts with insights from Deloitte economists on trends and events shaping the economy. The second quarter 2020 US Economic Forecast and the August update were especially valuable in determining forecast assumptions and building scenarios to reflect the impacts of COVID-19. Deloitte provided a detailed forecast of three scenarios (baseline, optimistic, and pessimistic) for 2020 through 2025. Each scenario includes forecasts for GDP and components, consumer price index, labor markets, income and wealth, housing, foreign trade, federal funds, and federal budget balance. The baseline scenario with a 70 percent probability by Deloitte has a u-shaped recovery. In this scenario, a second decline in GDP occurs in the fourth quarter of 2020 followed by slow growth in the first and second quarter of 2021. Deloitte forecasts GDP growth to return to the pre-COVID level by the end of 2023, with the economy reaching full employment by the first quarter of 2025.

Long-Term Model

This section provides detailed descriptions of the model parameters and assumptions used in the long-term model component.

Parameters

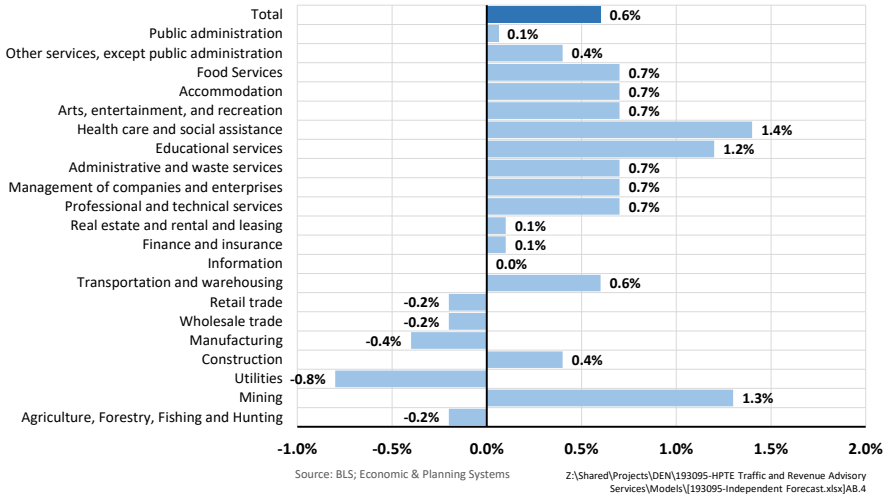
National Economic Growth. The Bureau of Labor Statistics publishes projections every two years of the U.S. labor force, industry employment, and occupational employment. The most recently published projections, available from its website and in the journal *Monthly Labor Review*, cover the 10-year period 2019 through 2029. These projections are made with a few key assumptions about the characteristics of the economy, such as:

- Labor market equilibrium where labor supply meets labor demand
- Projections focus on long-term structural change as opposed to market cycles, e.g., recessions[3]

The percentages shown in **Figure 20** are the BLS's projection of industry growth rates for 2019 through 2029. Overall, the BLS forecasts U.S. employment to grow an average of 0.6 percent annually over the next 10 years. Industries projected to expand at above-average rates include Accommodations and Food Service; Arts, Entertainment, and Recreation; Health Care and Social Assistance; Educational Services; Administrative Services; Management; Professional and Technical Services; and Construction. Some industries are projected to lose jobs, including Retail Trade; Wholesale Trade; Manufacturing; and Utilities. Other industries are projected to neither expand nor contract, including Public Administration; Information; and Agriculture.

[3] The 2019–29 projections do not include impacts of the COVID-19 pandemic and response efforts. The BLS Employment Projections are developed using models based on historical data, which in this set of projections cover the period through 2019; all input data therefore precede the pandemic. In addition, the 2019–29 projections were finalized in the spring of 2020 when there was still significant uncertainty about the duration and impacts of the pandemic. The BLS Employment Projections are long-term projections intended to capture structural change in the economy, not cyclical fluctuations. As such, they are not intended to capture the impacts of the recession that began in February 2020. However, besides the immediate recessionary impacts, the pandemic may cause new structural changes to the economy. BLS releases new employment projections annually, and subsequent projections will incorporate new information on economic structural changes as it becomes available. To provide more information about potential impacts before the release of the 2020–30 projections, BLS is developing alternate scenarios for the 2019–29 projection period that encompass possible impacts from the pandemic. Comparison of these alternate scenarios with the baseline projections released here will demonstrate how changes in consumer behavior caused by the pandemic may alter the projections for detailed occupations and industries. An analysis of these scenarios will be released in a Monthly Labor Review article later in 2020.

Figure 20 Bureau of Labor Statistics 10-Year Employment Projection



National-to-Regional Economic Relationships. Using the BLS national forecasts as a benchmark for underlying trajectories of employment by industry, the long-term methodology is calibrated by analyzing and projecting the national to regional economic relationships, i.e., location quotients, against the national forecasts over 10 years, and extrapolating continuing trends through the final projection year, as described below:

- Development of historical relationships: Using historical national and regional data by industry by year since 2000, shifts in the quantitative relationships between regional and national employment distributions were identified and applied over time to the regional forecasts by industry.
- Application to the national forecast: Applying these regional-to-national relationships to the national employment forecast results in overall regional employment captures. This set of calculations establishes a baseline set of underlying growth trends and rates through 2029, which are further calibrated (up or down) to align with the short-term modeling outputs.
- Horizon year (2045) growth constraints: Historical analysis also shows that as an employment base grows, the year-over-year (or periodic) percent rates of growth by industry bear logarithmic, not linear relationships to one another. As such, long-term growth rates are calibrated to a logarithmic relationship between a given year and its previous rate of growth. Although this type of a growth pattern yields similar annual growth magnitudes year over year, EPS is estimating that external economic factors, such as increases in productivity, will increasingly cause employment growth to taper in actual numbers, not just in growth rates.

Demographic Relationship Factors. As illustrated in the series of **Table 31** through **Table 37** below, this provides a platform to apply a methodology commonly used by demographers to examine the relationships between wage and salary employment, un-/under-employment, group quarters, population by age, households, and housing inventory. It also provides points at which population and household counts may be vetted against observed data points for the purpose of calibrating appropriate shifts over time.

Each step is described in the tables and charts that follow (**Figure 92** through **Figure 126** beginning on page 109). Although EPS does not apply the findings of the housing inventory section of the following methodology, it is shown for the sake of completeness. Each component and their sources are as follows:

- Wage & salary employment: employment by industry is sourced from the Bureau of Labor Statistics[4], as well as from the Colorado Department of Labor & Employment[5].
- Commuting patterns: commuting patterns have been sourced from the U.S. Census Longitudinal Employer-Household Dynamics data series.[6]
- Unemployment: unemployment data are sourced from the BLS Local Area Unemployment Statistics U-3 "total unemployed" series[7], which nets those employed or "actively seeking employment".
- Proprietors: data are sourced from the U.S. Census Nonemployer Statistics data series.[8]
- Group quarters and "underemployed persons", age 16 to 65: this nets the total population of non-institutionalized persons aged 16 to 65, adding institutionalized persons 16 to 65 and those ages 16 to 65 that would be considered in the U-4, U-5, and U-6 measures of labor utilization.[9]
- Persons aged under 16 and over 65: this adds the total population under 16 and over 65, including group quarters, resulting in total population.

The following few steps trace population to households and housing inventory:

- Group quarters: this addition results in population in households.
- Average household size: using the weighted average household size from U.S. Census data for the geography, total households are derived.
- Vacancy rate: using occupancy and vacancy status data from the U.S. Census, total inventory of housing is determined.

[4] https://www.bls.gov/cew/datatoc.htm
[5] https://www.colmigateway.com/vosnet/lmi/default.aspx
[6] https://onthemap.ces.census.gov/
[7] https://www.bls.gov/lau/
[8] https://www.census.gov/econ/nonemployer/
[9] https://www.bls.gov/lau/stalt.htm

Table 24 Long-Term Forecasting Calibration Factors for 7-County Area

		Factors / Assumptions			Totals		
		2000	2019	2040	2000	2019	2045
Jobs to Population							
Step 1							
Wage & Salary Jobs	*Row A*				1,407,588	1,725,648	2,154,545
Step 2							
Less: In-Commuting [2]	*Row B*	54%	61%	65%	763,914	1,060,668	1,404,486
Subtotal (W & S Jobs Residing in Geo.)	*Row C*				**643,674**	**664,979**	**750,059**
Step 3							
Plus: Out-Commuting [2]	*Row D*	49%	53%	47%	683,592	919,227	1,023,381
Subtotal (W & S Jobs Held by Residents)	*Row E*				**1,327,266**	**1,584,207**	**1,773,441**
Step 4							
Plus: Proprietors [3]	*Row F*	13%	17%	19%	190,664	321,665	429,353
Subtotal (Non-Institutionalized Job Holders)	*Row G*				**1,517,930**	**1,905,871**	**2,202,794**
Step 5							
Plus: Unemployment	*Row H*	2%	2%	4%	36,769	48,432	95,070
Subtotal (Laborforce)	*Row I*				**1,554,699**	**1,954,303**	**2,297,863**
Step 6							
Plus: Group Quarters Age 16-65 / Underemployed Persons 16-65	*Row J*	9%	11%	12%	156,421	230,869	292,178
Subtotal (All Persons, Age 16-65)	*Row K*				**1,711,120**	**2,185,172**	**2,494,972**
Step 7							
Plus: Persons <16 and >65	*Row L*	31%	33%	36%	782,678	1,059,575	1,466,932
Subtotal (Total Population)	*Row M*				**2,493,798**	**3,244,747**	**4,056,973**
as %	*Row N*				100%	100%	*n/a*
Row O should be equal to this number from the U.S. Census.	*Row O*				*2,493,798*	*3,244,747*	*n/a*
Population to Housing							
Step 8							
Less: Total Group Quarters	*Row P*	1.8%	1.7%	1.7%	44,343	55,250	292,178
Total Population in Households	*Row Q*				**2,449,455**	**3,189,497**	**3,764,795**
Step 9							
Total Households	*Row R*	2.49	2.47		984,357	1,292,391	*n/a*
Row T should be equal to this number from the U.S. Census.	*Row S*				*984,056*	*1,292,059*	*n/a*

[1] Factors are extrapolated from trends for in- and out-commuting available between 2002 and 2018.

[2] Adds known proprietors using U.S. Census Nonemployer Statistics

Source: BLS; BEA; CDLE; US Census; Economic & Planning Systems

Forecast Assumptions

Downturn and Recovery Rates

The rates reported in the following two table are the outputs, not inputs or assumptions, of the short- and long-term econometric modeling. The rates are displayed as annual averages for EPS's Low, Mid, and High scenarios in context with historic rates (reflecting quarterly data from 2000 through 1st quarter 2020).

Short-Term Modeling. The rates shown in **Table 25** reflect the short-term model employment outputs for the period 2020 through 2025 (individual county rates are shown in **Table 38** on page 107). Underlying these outputs are the inputs and assumptions outlined and described in the previous methodology section (e.g., COVID-19 cases, vaccine availability, consumer confidence, and spending).

The results as shown reflect the various degrees to which each supersector industry recovers from the pandemic and recession. Specifically, the rates reflect inputs of downturn and recovery rates by industry by county, based in an analysis of recession and recovery patterns since 2000. Most notable in the outputs is the relatively quick recover of retail jobs in the Mid and High scenarios.

Table 25 Annual 7-County Downturn and Recovery Rates, 2020-2025

		Annual Employment Change, 2020-2025		
	Historic	High	Mid	Low
Employment Sector				
Production	50	474	93	-378
Service	932	2,661	1,453	287
Education	200	406	231	61
Entertainment	53	107	69	31
Restaurant	194	496	308	126
Retail	71	414	198	-9

Source: Economic & Planning Systems

Long-Term Modeling. The rates shown in **Table 26** (individual county rates are shown in **Table 39** on page 108) reflect the long-term model employment outputs for the period 2020 through 2045. Underlying these outputs are the inputs and assumptions outlined and described in the previous methodology section (e.g., national-to-regional 2-digit NAICS sector industry performance and shifts in underlying commuting and demographic patterns, described in greater detail in the following section).

In general, the results of the long-term modeling reflect somewhat lower annual industry-level growth. In most industry supersectors, the rates of growth in EPS's Mid scenario are more like the historic averages (though this is not intentional).

Table 26 Annual 7-County Long-Term Employment Rates, 2020-2045

		Annual Employment Change, 2020-2045		
	Historic	High	Mid	Low
Employment Sector				
Production	50	213	102	-41
Service	932	1,465	1,087	600
Education	200	308	237	166
Entertainment	53	46	33	21
Restaurant	194	187	121	55
Retail	71	142	81	15

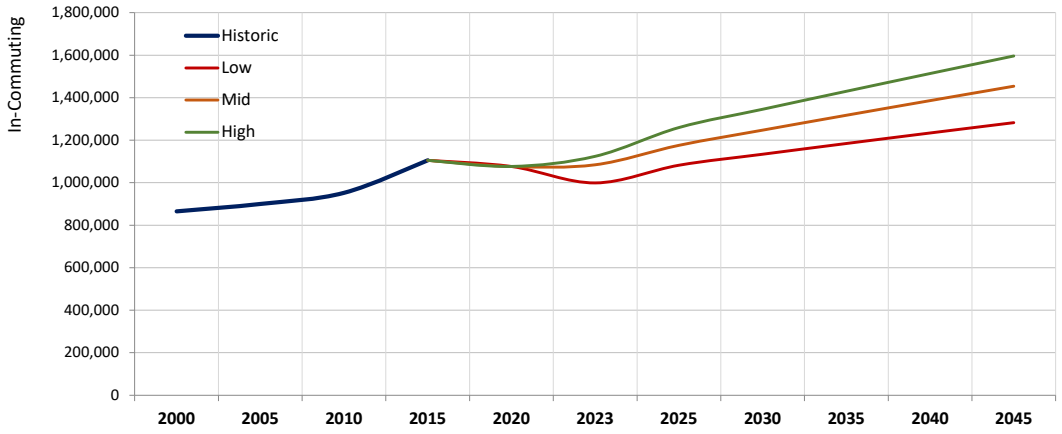
Source: Economic & Planning Systems

Demographic Patterns

This section details the underlying commuting and demographic shifts, which are used to construct the population and household forecasts. As noted before, the long-term model component is rooted in an employment-based population forecast methodology.

In-Commuting. In-commuting patterns are shown in **Figure 21**, and individual county projections are reported in **Figure 92** through **Figure 98** beginning on page 109. In general, in-commuting patterns increase when employment opportunities are greater (for example, under the higher growth scenarios).

Figure 21 7-County Projection of In-Commuting

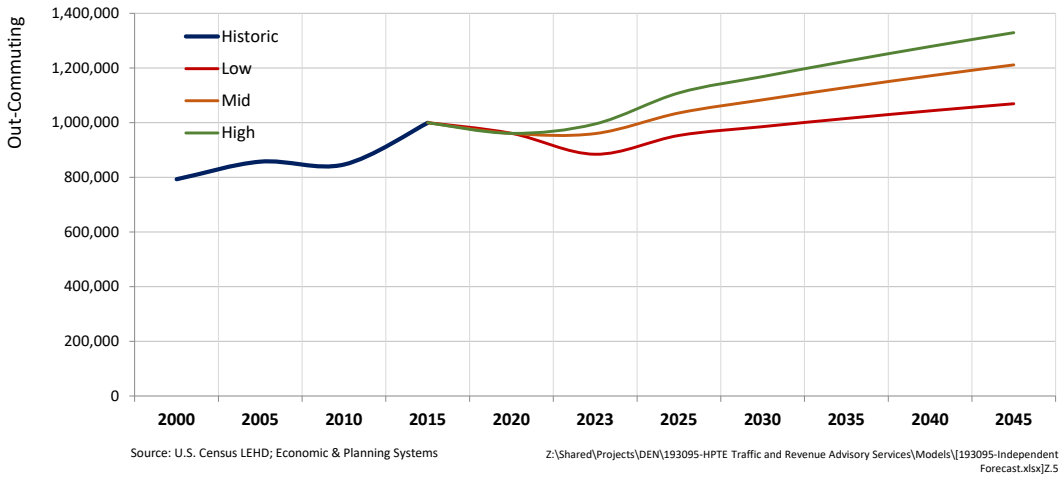


Source: U.S. Census LEHD; Economic & Planning Systems

Z:\Shared\Projects\DEN\193095-HPTE Traffic and Revenue Advisory Services\Models\[193095-Independent Forecast.xlsx]Z.5

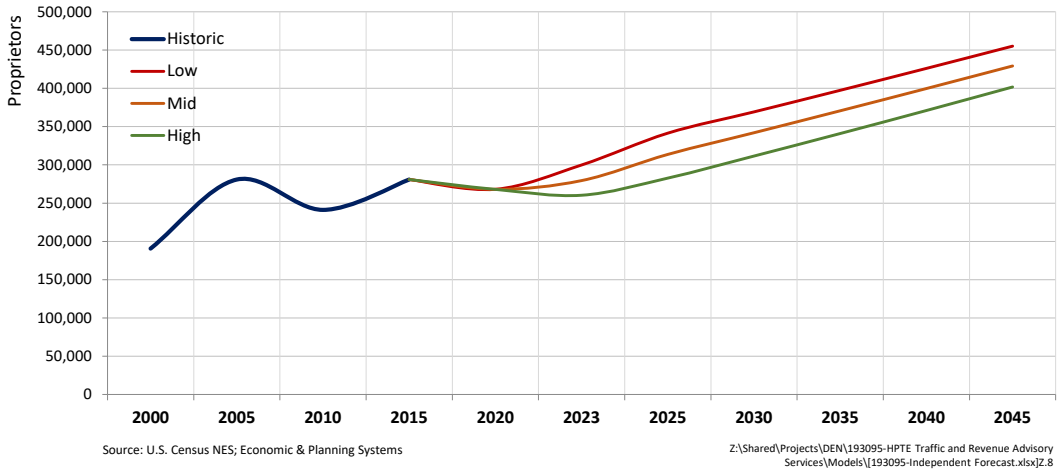
Out-Commuting. Out-commuting patterns are shown in **Figure 22**, and individual county out-commuting projections are illustrated in **Figure 99** through **Figure 105** beginning on page 112. As noted above, out-commuting patterns increase when employment options are greater.

Figure 22 7-County Projection of Out-Commuting



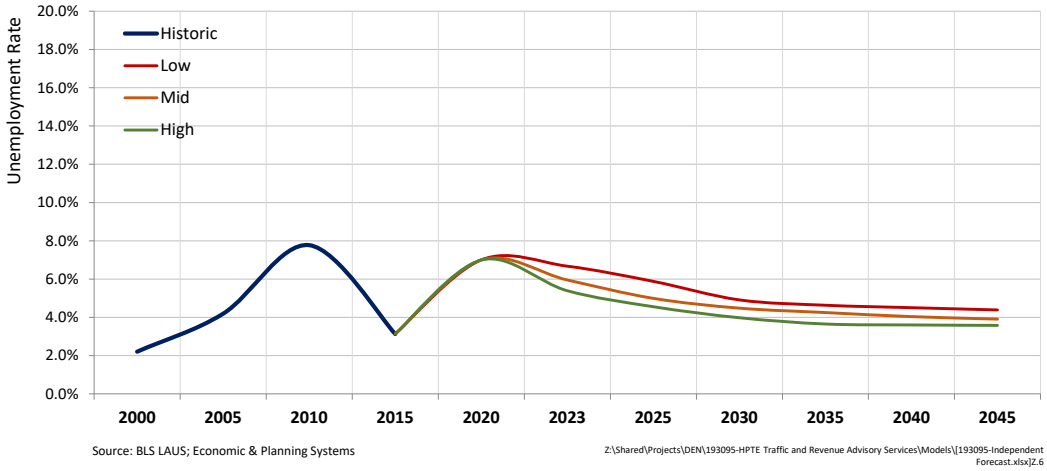
Self-Employed. The forecast of proprietors is shown in **Figure 23**, and individual county projections are shown in **Figure 106** through **Figure 112** beginning on page 116. In general, this projection illustrates the modeling assumption that the number of proprietorships increases when fewer wage and salary jobs are available.

Figure 23 7-County Projection of Self-Employment



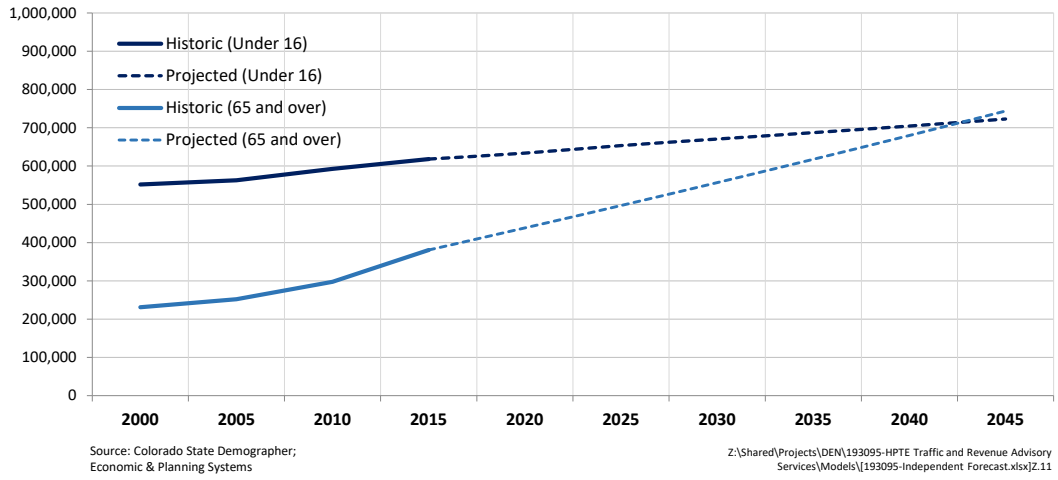
Unemployment. The projected unemployment rates is shown in **Figure 24**, and individual county projections are illustrated in **Figure 113** through **Figure 119** beginning on page 119. In general, these trends reflect more persistent, longer-term structural unemployment in the lower growth scenarios (specifically the Low scenario). Even under this assumption, the Low scenario converges on each county's respective long-term historic unemployment rates.

Figure 24 7-County Projection of Unemployment



Non-Working Population. As ilustrated in **Figure 25**, in addition to group quarters populations for both counties, non-working populations include those persons under 16 years of age and those over 65 years of age. These projections have been calibrated to blend long-term historic averages with DOLA's projections of county projections by age. Individual county projections are shown in **Figure 120** through **Figure 126** beginning on page 123.

Figure 25 7-County Projection of Non-Working Population



Other. It should be noted that this blend of short- and long-term modeling methodology was developed in the context of the COVID-19 pandemic, in which it became necessary to identify critical current variables that have had an observable and significant impact on employment levels. Other variables were discussed through early phases of this study but were not ultimately incorporated into the econometric model.

- Paycheck Protection Program (PPP): The PPP was a loan program originating from the Coronavirus Aid, Relief, and Economic Security (CARES) Act in March 2020. Administered by the Small Business Administration (SBA), the program allocated more than $500 billion to more than 5 million businesses for the purpose of helping business maintain then-current employment levels through what was foreseen as a temporary disruption of demand. Consideration was made for including this in the econometric model parameters, but ultimately dismissed because data were not available to quantify the extent to which businesses in either county had benefitted from the PPP.
- Federal Unemployment Benefits: The Families First Coronavirus Response Act (FFCRA) was authorized in March 2020, which provided additional flexibility for state unemployment insurance agencies and additional administrative funding to respond to the COVID-19 pandemic. In conjunction with the CARES Act, it expanded states' ability to provide unemployment insurance for many workers impacted by the pandemic, including for workers who are not ordinarily eligible for unemployment benefits.[10] Consideration was given for incorporating this as a set of dichotomous (dummy) variables but ultimately dismissed because some research demonstrated only fleeting impact on personal consumer expenditure and demand.[11]

[10] https://www.dol.gov/coronavirus/unemployment-insurance
[11] https://opportunityinsights.org/wp-content/uploads/2020/05/tracker_paper.pdf

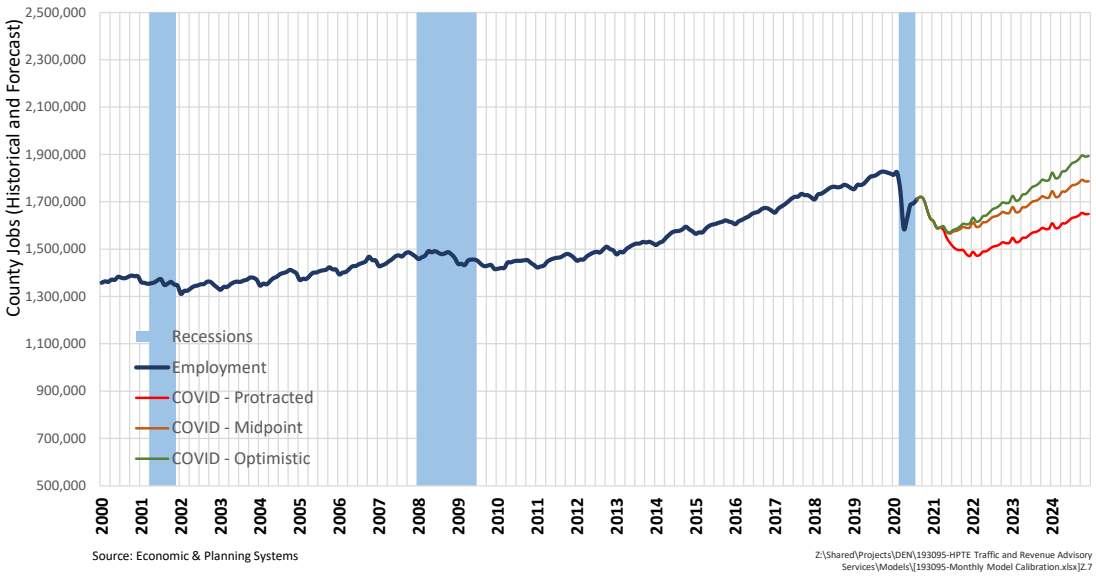
Independent Forecasts

This section contains detailed outputs of the short- and long-term employment and population projections. The projections of combined employment and population are also compared to third-party providers for context.

Short-Term Employment

The outcome of applying the preceding assumptions to both levels of the forecast model specifications is illustrated below in **Figure 26**, and individual county short-term job forecasts are shown in **Figure 127** through **Figure 133** beginning on page 126.

Figure 26 7-County Short-Term Jobs Forecast



Summarized and aggregated to the annual level, **Table 27** illustrates how the forecasts differ among each other, and by comparison to the peak-to-trough and recovery of jobs following the Great Recession. Individual county short-term job forecasts are shown also in **Table 40** through **Table 46** beginning on page 130. By comparison, each of the forecast scenarios shows a swifter decline in jobs, characteristic of observed impacts of the pandemic to observed employment data.

- Low: this scenario results in a similarly protracted recovery of jobs by comparison to the Great Recession, where employment levels remain below pre-pandemic levels by 2025 (compared to 3 percent below pre-peak levels following the Great Recession's initial downturn).
- Mid: this scenario reflects a baseline scenario in which pre-pandemic employment levels are reached and surpassed by 0.1 percent in 2024.
- High: this scenario reflects the underlying assumptions regarding vaccine availability, immunization, and the quick return of consumer confidence, where pre-pandemic employment levels are reached and surpassed by 5.3 percent in 2024.

Table 27 7-County Short-Term Jobs Forecast

	2019	2020	2021	2022	2023	2024	2025
Jobs							
COVID - Optimistic	1,758,868	1,691,026	1,593,832	1,660,270	1,752,920	1,851,618	1,956,889
COVID - Midpoint	1,758,868	1,691,026	1,586,888	1,628,386	1,692,653	1,759,966	1,830,524
COVID - Protracted	1,758,868	1,691,026	1,533,890	1,503,436	1,562,232	1,623,758	1,688,187
as % of 2019							
COVID - Optimistic	0.0%	-3.9%	-9.4%	-5.6%	-0.3%	5.3%	11.3%
COVID - Midpoint	0.0%	-3.9%	-9.8%	-7.4%	-3.8%	0.1%	4.1%
COVID - Protracted	0.0%	-3.9%	-12.8%	-14.5%	-11.2%	-7.7%	-4.0%
Peak-to-Trough and Recovery of Jobs (as % of Peak)							
Great Recession	0.0%	-1.0%	-5.0%	-7.0%	-6.0%	-4.0%	-3.0%

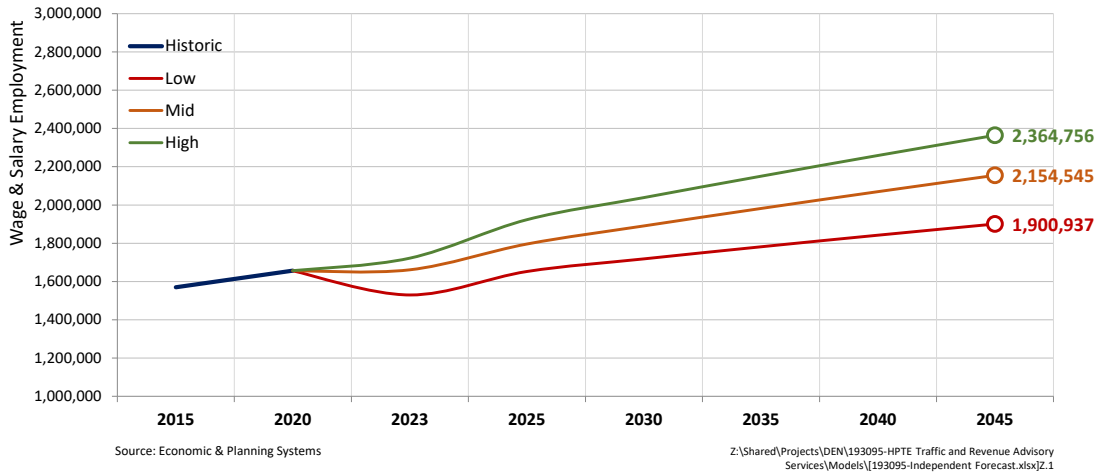
Source: Economic & Planning Systems

Long-Term Employment

It should be noted that the following employment projection represents only Wage & Salary employment and does not include self-employed persons. Individual county long-term forecasts are provided in **Figure 134** through **Figure 140** beginning on page 132.

- Low: Employment is projected to grow by approximately 9,800 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 0.6 percent per year over this period.
- Mid: Employment is projected to grow by approximately 20,000 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.1 percent per year over this period.
- High: Employment is projected to grow by approximately 28,300 jobs per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.4 percent per year over this period.

Figure 27 7-County Long-Term Jobs Forecast



Forecasts by Industry. **Table 28** provides a summary of Wage & Salary employment forecasts by scenario by supersector (see **Table 47** on page 138 for a crosswalk between NAICS codes and industry supersector).

Table 28 Summary of Long-Term Employment Forecasts by Industry

	2020	2023	2025	2030	2035	2040	2045	2020-2045 Total	2020-2045 Ann. #	2020-2045 Ann. %
Low Scenario										
Production	304,655	262,989	279,884	283,374	286,582	289,555	292,323	-12,332	-493	-0.17%
Service	894,712	837,201	906,311	951,280	994,159	1,035,243	1,074,705	179,993	7,200	0.74%
Education	128,884	121,127	131,609	143,554	155,390	167,140	178,802	49,918	1,997	1.32%
Entertainment	27,541	26,495	29,173	30,403	31,566	32,671	33,725	6,184	247	0.81%
Restaurant	134,756	128,823	141,299	144,044	146,585	148,955	151,175	16,419	657	0.46%
Retail	165,724	153,397	164,370	166,000	167,503	168,901	170,206	4,482	179	0.11%
Total	**1,656,272**	**1,530,031**	**1,652,645**	**1,718,654**	**1,781,786**	**1,842,466**	**1,900,937**	**244,665**	**9,787**	**0.55%**
Mid Scenario										
Production	304,655	291,248	310,208	317,183	323,617	329,598	335,185	30,529	1,221	0.38%
Service	894,712	905,331	980,933	1,044,230	1,105,137	1,163,964	1,220,872	326,161	13,046	1.25%
Education	128,884	130,978	142,434	156,836	171,235	185,647	200,060	71,177	2,847	1.77%
Entertainment	27,541	28,642	31,571	33,162	34,676	36,125	37,513	9,972	399	1.24%
Restaurant	134,756	139,272	152,915	157,891	162,531	166,886	170,990	36,234	1,449	0.96%
Retail	165,724	165,659	177,694	181,111	184,262	187,190	189,925	24,201	968	0.55%
Total	**1,656,272**	**1,661,129**	**1,795,755**	**1,890,413**	**1,981,459**	**2,069,411**	**2,154,545**	**498,273**	**19,931**	**1.06%**
High Scenario										
Production	304,655	301,859	332,204	342,290	351,664	360,436	368,678	64,023	2,561	0.77%
Service	894,712	938,413	1,050,588	1,124,807	1,196,644	1,266,408	1,334,236	439,524	17,581	1.61%
Education	128,884	135,751	152,518	169,498	186,598	203,823	221,150	92,266	3,691	2.18%
Entertainment	27,541	29,682	33,806	35,828	37,770	39,641	41,449	13,908	556	1.65%
Restaurant	134,756	144,343	163,748	171,088	178,013	184,581	190,829	56,073	2,243	1.40%
Retail	165,724	171,623	190,127	195,197	199,899	204,292	208,414	42,690	1,708	0.92%
Total	**1,656,272**	**1,721,671**	**1,922,991**	**2,038,708**	**2,150,588**	**2,259,181**	**2,364,756**	**708,484**	**28,339**	**1.43%**

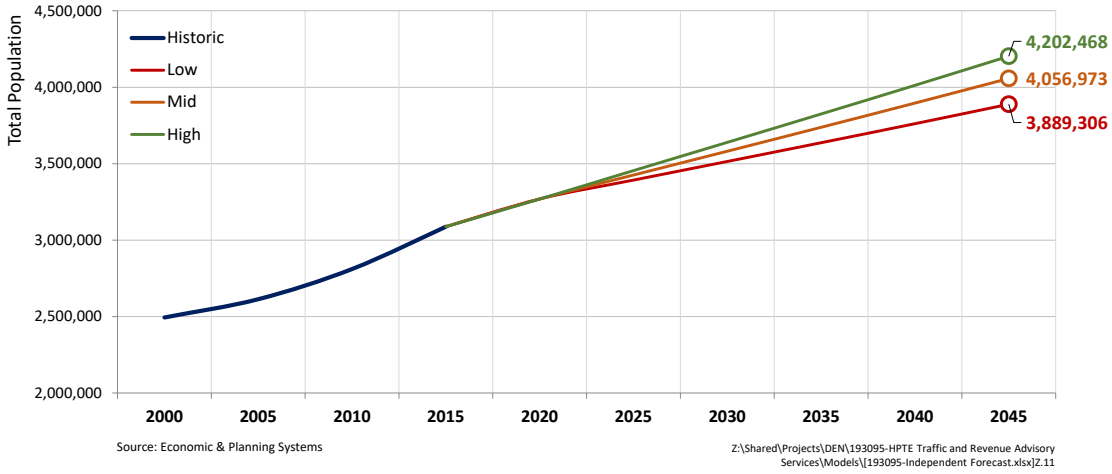
Source: Economic & Planning Systems

Long-Term Population

Figure 141 illustrates the independent forecast modeling output for total population, and individual county long-term population forecasts are provided in **Figure 141** through **Figure 147** beginning on page 135.

- Low: Population is projected to grow by approximately 24,800 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 0.7 percent per year over this period.
- Mid: Population is projected to grow by approximately 31,500 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 0.9 percent per year over this period.
- High: Population is projected to grow by approximately 37,300 persons per year between 2020 and 2045. The compounded annual average growth rate is approximately 1.0 percent per year over this period.

Figure 28 7-County Projection of Population



Forecast Comparisons

Table 29 and **Table 30** illustrate EPS's mid scenarios against both CDOT and DOLA projections of employment, population, and households.

Employment. These employment comparisons represent wage and salary employment as well as proprietors.

- Low: this scenario reflects average annual growth of approximately 17,300 jobs. The compounded annual average rate of growth is 0.8 percent. This scenario results in 2045 employment approximately 13 percent less than CDOT's and 2040 employment approximately 17 percent lower than DOLA's.
- Mid: this scenario reflects average annual growth of approximately 26,400 jobs. The compounded annual average rate of growth is 1.2 percent. This scenario results in 2045 employment approximately 4 percent less than CDOT's and 2040 employment approximately 10 percent lower than DOLA's.
- High: this scenario reflects average annual growth of approximately 33,700 jobs. The compounded annual average rate of growth is 1.5 percent. This scenario results in 2045 employment approximately 2 percent higher than CDOT's and 2040 employment approximately 4 percent lower than DOLA's.

Population.

- Low: this scenario reflects average annual growth of approximately 24,800 persons. The compounded annual average rate of growth is 0.7 percent. This scenario results in a 2045 population approximately 13 percent lower than CDOT's and 7 percent lower than DOLA's.
- Mid: this scenario reflects average annual growth of approximately 31,500 persons. The compounded annual average rate of growth is 0.9 percent. This scenario results in a 2045 population approximately 10 percent lower than CDOT's and 3 percent lower than DOLA's.
- High: this scenario reflects average annual growth of approximately 37,300 persons. The compounded annual average rate of growth is 1.0 percent. This scenario results in a 2045 population approximately 6 percent lower than CDOT's and less than 1 percent higher than DOLA's.

Table 29 Comparison of EPS Adjusted Mid Forecast and CDOT Forecast, 2019-2045

	Adjusted		CDOT		Adjusted vs. CDOT	
	2019	2045	2019	2045	2019	2045
Total Employment (W&S + Proprietors)						
Adams County	263,458	396,730	258,707	400,254	1.84%	-0.88%
Arapahoe County	398,726	512,785	413,909	570,411	-3.67%	-10.10%
Boulder County	229,985	255,830	229,873	260,572	0.05%	-1.82%
Broomfield County	47,080	79,502	49,002	87,950	-3.92%	-9.61%
Denver County	606,241	720,422	589,911	726,547	2.77%	-0.84%
Jefferson County	302,941	345,740	303,623	357,755	-0.22%	-3.36%
Larimer County	200,502	272,694	205,032	299,495	-2.21%	-8.95%
Total	**2,048,933**	**2,583,703**	**2,050,057**	**2,702,984**	**-0.05%**	**-4.41%**
Statewide	3,259,991	4,244,638	3,334,344	4,463,682	-2.23%	-4.91%
Population						
Adams County	517,888	783,495	541,756	871,045	-4.41%	-10.05%
Arapahoe County	656,814	827,744	667,979	919,425	-1.67%	-9.97%
Boulder County	327,167	388,414	333,671	432,265	-1.95%	-10.14%
Broomfield County	70,761	95,788	67,250	97,497	5.22%	-1.75%
Denver County	729,246	840,072	684,938	864,834	6.47%	-2.86%
Jefferson County	583,075	629,972	588,507	720,753	-0.92%	-12.60%
Larimer County	356,941	491,821	358,888	583,358	-0.54%	-15.69%
Total	**3,241,892**	**4,057,306**	**3,242,989**	**4,489,177**	**-0.03%**	**-9.62%**
Statewide	5,770,110	7,671,082	5,763,976	7,658,682	0.11%	0.16%
Households						
Adams County	176,424	277,858	199,015	323,009	-11.35%	-13.98%
Arapahoe County	255,182	329,925	274,418	381,249	-7.01%	-13.46%
Boulder County	131,639	161,841	147,195	192,901	-10.57%	-16.10%
Broomfield County	27,149	37,988	27,115	40,023	0.13%	-5.08%
Denver County	320,939	376,789	330,214	417,022	-2.81%	-9.65%
Jefferson County	237,779	262,632	252,664	313,107	-5.89%	-16.12%
Larimer County	142,891	201,259	155,203	250,328	-7.93%	-19.60%
Total	**1,292,003**	**1,648,292**	**1,385,824**	**1,917,639**	**-6.77%**	**-14.05%**
Statewide	2,333,635	3,135,675	2,254,405	3,162,836	3.51%	-0.86%

Source: Economic & Planning Systems

Table 30 Comparison of EPS Adjusted Mid Forecast and DOLA Forecast, 2019-2045

	Adjusted		DOLA		Adjusted vs. CDOT	
	2019	2045	2019	2045	2019	2045
Total Employment (W&S + Proprietors)						
Adams County	263,458	396,730	277,528	n/a	-5.07%	n/a
Arapahoe County	398,726	512,785	416,901	n/a	-4.36%	n/a
Boulder County	229,985	255,830	245,156	n/a	-6.19%	n/a
Broomfield County	47,080	79,502	48,736	n/a	-3.40%	n/a
Denver County	606,241	720,422	630,953	n/a	-3.92%	n/a
Jefferson County	302,941	345,740	315,947	n/a	-4.12%	n/a
Larimer County	200,502	272,694	213,782	n/a	-6.21%	n/a
Total	**2,048,933**	**2,583,703**	**2,149,003**	**n/a**	**-4.66%**	**n/a**
Statewide	3,259,991	4,244,638	3,334,344	n/a	-2.23%	n/a
Population						
Adams County	517,888	783,495	519,877	800,563	-0.38%	-2.13%
Arapahoe County	656,814	827,744	658,058	828,409	-0.19%	-0.08%
Boulder County	327,167	388,414	328,508	408,588	-0.41%	-4.94%
Broomfield County	70,761	95,788	71,138	98,171	-0.53%	-2.43%
Denver County	729,246	840,072	728,943	890,447	0.04%	-5.66%
Jefferson County	583,075	629,972	583,106	657,218	-0.01%	-4.15%
Larimer County	356,941	491,821	355,117	506,604	0.51%	-2.92%
Total	**3,241,892**	**4,057,306**	**3,244,747**	**4,190,000**	**-0.09%**	**-3.17%**
Statewide	5,770,110	7,671,082	5,763,976	7,658,682	0.11%	0.16%
Households						
Adams County	176,424	277,858	182,107	300,094	-3.12%	-7.41%
Arapahoe County	255,182	329,925	256,992	340,465	-0.70%	-3.10%
Boulder County	131,639	161,841	132,763	168,447	-0.85%	-3.92%
Broomfield County	27,149	37,988	27,731	40,576	-2.10%	-6.38%
Denver County	320,939	376,789	323,485	422,447	-0.79%	-10.81%
Jefferson County	237,779	262,632	239,062	276,968	-0.54%	-5.18%
Larimer County	142,891	201,259	140,945	204,732	1.38%	-1.70%
Total	**1,292,003**	**1,648,292**	**1,303,085**	**1,753,729**	**-0.85%**	**-6.01%**
Statewide	2,333,635	3,135,675	2,254,405	3,162,836	3.51%	-0.86%

Source: Economic & Planning Systems