

TRANSPORTATION STUDY

Millennium Parcel B GDP Amendment

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TABLE OF CONTENTS

	Page
I. INTRODUCTION.....	1
II. EXISTING CONDITIONS.....	3
II.A. Land Use.....	3
II.B. Roadway System.....	3
II.C. Traffic Volumes.....	4
III. PROPOSED CONDITIONS	6
III.A. GDP Trip Generation	6
III.B. GDP Trip Distribution.....	8
III.C. Traffic Assignment.....	8
IV. FUTURE CONDITIONS.....	11
IV.A. Buildout Total Traffic Projections.....	11
IV.B. Buildout Roadway Needs.....	15
V. AREA TRANSPORTATION SOLUTIONS	18
V.A. Improvements and Timing.....	18
V.B. Alternative Modes and Transportation Demand Management.....	20
VI. SUMMARY AND RECOMMENDATIONS.....	25

Appendices

- Appendix A. Assumptions Package
- Appendix B. Trip Generation Analysis
- Appendix C. Land Use Maps
- Appendix D. GDP TAZ Group Traffic Assignment Results
- Appendix E. Centerra Trails Map

List of Figures

	Page
Figure 1. GDP Parcel B Amendment Study Area and Vicinity Map	2
Figure 2. Estimated Existing Daily Traffic	5
Figure 3. New Daily Traffic – From Future and Yet-to-Be-Completed GDP Uses.....	10
Figure 4. 2045 Non-GDP (Background) Daily Traffic Projections.....	12
Figure 5. Total Projected Build-Out Daily Traffic.....	14
Figure 6. Recommended Millennium Roadway Classification and Laneage.....	17
Figure 7. Area Multimodal Vision.....	21

List of Tables

	Page
Table 1. Millennium GDP New Development Trip Generation Estimates*.....	7
Table 2. Millennium GDP Trip Distribution.....	8

I. INTRODUCTION

Brownstein Hyatt Schreck, LLP, on behalf of McWhinney Real Estates Services, Inc., is proposing to alter the allowed land use within the Millennium General Development Plan (GDP), specifically for Parcel B. The modification is intended to increase the number of allowed residential units to 3357 (an increase over the currently approved 1080 units per the GDP) for a portion of Parcel B located southwest of the US 34/Rocky Mountain Avenue intersection. The entire GDP extends over a 3,010-acre area, but this amendment request specifically pertains to the one-quarter section of land southwest of US 34 and Rocky Mountain Avenue. **Figure I** depicts the study area.

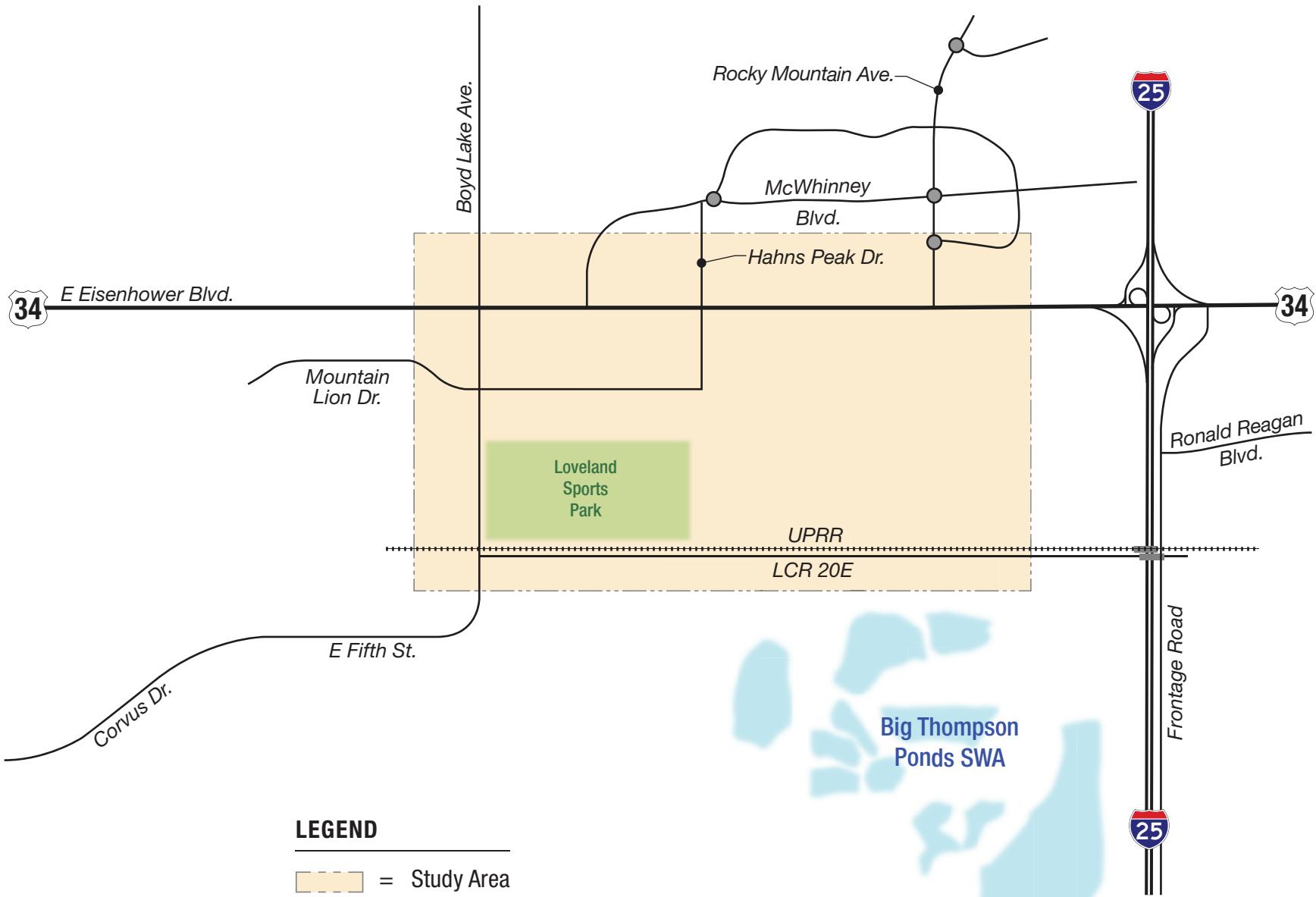
The intent of this study is to assess the transportation needs of the GDP amendment request, including roadway classifications and through-lane needs in light of the existing, yet-to-be-completed, and future land uses. This study draws information from other studies (completed and some that are in progress) including the Millennium GDP Amendment Transportation Study prepared by Felsburg Holt & Ullevig in July 2023. In addition, the 2045 North Front Range Model was leveraged in developing traffic forecasts. Roadway classifications and laneage needs were assessed with respect to daily traffic loadings against Larimer County Urban Area Street Standards (LCUASS) criteria.

This effort entailed the following five major steps:

1. Compile estimated existing daily traffic loadings along study area roadways.
2. Develop additional daily traffic estimates along the study area roadways generated by yet-to-be-completed development (or under construction), as well as all other future development per the proposed GDP, including the amendment request. It is recognized that the GDP is not likely to be built out by 2045, so the forecasts presented in this study may be slightly high for the 2045 timeframe.
3. Sum the results of Tasks 1 and 2 above while making adjustments to account for other growth and for transportation network enhancements such as the Kendall Parkway extension across (passing below) I-25 to Boyd Lake Avenue, Boyd Lake Avenue extension to State Highway (SH) 402, Rocky Mountain Avenue extension south across the Great Western Railroad (GWRR) to Larimer County Road (LCR) 20E, and the Sculptor Drive connection across the GWRR.
4. Assess the appropriateness of the study area roadways based on the final projected daily traffic as compared to criteria in LCUASS. In addition, next steps for improvements and enhancements are presented in this study to accommodate and manage future transportation demands, including a rough estimate of improvement timing and the potential trigger(s) thereof.
5. Identify potential alternative mode opportunities that could be subject to additional analysis to maximize these opportunities. This includes improved conditions for all modes and Transportation Demand Management options.

This study focuses on the arterial and collector roadways within and adjacent to the study area, which is approximately bounded by US 34, LCR 20E, Boyd Lake Avenue, and I-25. Although I-25 is not specifically analyzed in this study, the fact that it is the primary regional facility plays a role in the orientation of GDP-generated traffic since a significant amount of GDP traffic will use this freeway. Generalized trip reduction factors have also been applied to account for mixed-use areas (including trips between zones in close proximity), pass-by traffic (applied to retail and restaurant uses only), and some alternative mode reductions, including the impact of the Centerra Loveland Mobility Hub at I-25 and the network enhancements listed above in item 3.

The parameters and assumptions used in this study were vetted with Loveland staff. **Appendix A** contains the assumptions and some preliminary analyses that were vetted and ultimately approved by the city to guide the preparation of this study. Tweaks have been made based on subsequent dialogue.



II. EXISTING CONDITIONS

II.A. Land Use

The larger Millennium GDP is partially developed. Larger developed areas of the GDP include:

- The Promenade Shops at Centerra
- Medical Center of the Rockies
- Centerra Marketplace
- The Lakes at Centerra and High Plains Village

In addition, an assortment of residential uses, office uses, and other retail/restaurant uses has been completed throughout the GDP area. Approximately 4,700 units have been completed and occupied when this study initiated in 2024, and approximately 5.1 million square feet of non-residential space had been completed as well. A map showing the GDP area is provided in **Appendix C**.

Within this report's study area, some residential uses and commercial pads have been developed or are under construction along Mountain Lion Drive east of Boyd Lake Avenue. Uses include auto dealerships, apartments, and various commercial pads slated to develop before too long. The area east of Hahns Peak Drive (which is part of the GDP) is currently vacant, and development planning is currently underway for much of the property that extends to I-25 (the developments are referred to as Avenue South within the GDP and Schmer Farm, which is outside the GDP).

II.B. Roadway System

The following are key roadways with respect to this study:

- **I-25** runs north-south through the GDP area. This six-lane freeway facility has an interchange at US 34 and Crossroads Boulevard. Both provide regional access to the Millennium GDP. An existing interchange at SH 402 may also serve southern sections of the GDP in the future once a stronger connection is made via the extension of Boyd Lake Avenue south to SH 402 (which is currently a longer-term consideration).
- **US 34** provides major east-west regional access as a six-lane highway (sections of which are not quite complete), classified as an expressway east of I-25 and a major arterial to the west. Access is limited with traffic signals at the major cross-streets. Auxiliary turn lanes are also provided at cross-street locations.
- **Rocky Mountain Avenue**, a four-lane arterial running north-south from US 34 to Crossroads Boulevard, parallels I-25 to its west. Auxiliary lanes are provided at cross-street intersections, many of which have been constructed as roundabout intersections. This road is planned to be extended south of US 34 ultimately connecting to LCR 20E to serve future adjacent development, including Avenue South and Schmer Farm. This connection will require approval from the Public Utilities Commission (PUC) due to crossing the GWRR.
- **Boyd Lake Avenue**, an arterial roadway that runs north-south about 1.5 miles west of I-25, extends south of US 34 and north to SH 392. This road crosses the GWRR at-grade near the LCR 20E intersection and it curves southbound to westbound into 5th Street. Ultimately, this roadway is intended to be extended south to SH 402 as an arterial, and 5th Street would "tee" into this extension.
- **LCR 20E** defines the southern edge of the study area, and this two-lane roadway extends from Boyd Lake Avenue to the east side of I-25 crossing over the interstate. The GWRR line exists along its north side.

- **Hahns Peak Drive**, a north-south collector road, serves the study area and extends north of US 34. The road is multilane near US 34 and narrows as one moves south to a two-lane facility.
- **Mountain Lion Drive** is an east-west collector road that runs through the center of the study area. Its intersection with Boyd Lake Avenue is a roundabout, and a roundabout is also planned at its intersection with Hahns Peak Drive (which is not yet constructed). Ultimate plans include extending this road further south along the Hahns Peak Drive alignment and east through Avenue South to intersect with the Rocky Mountain Avenue extension.

II.C. Traffic Volumes

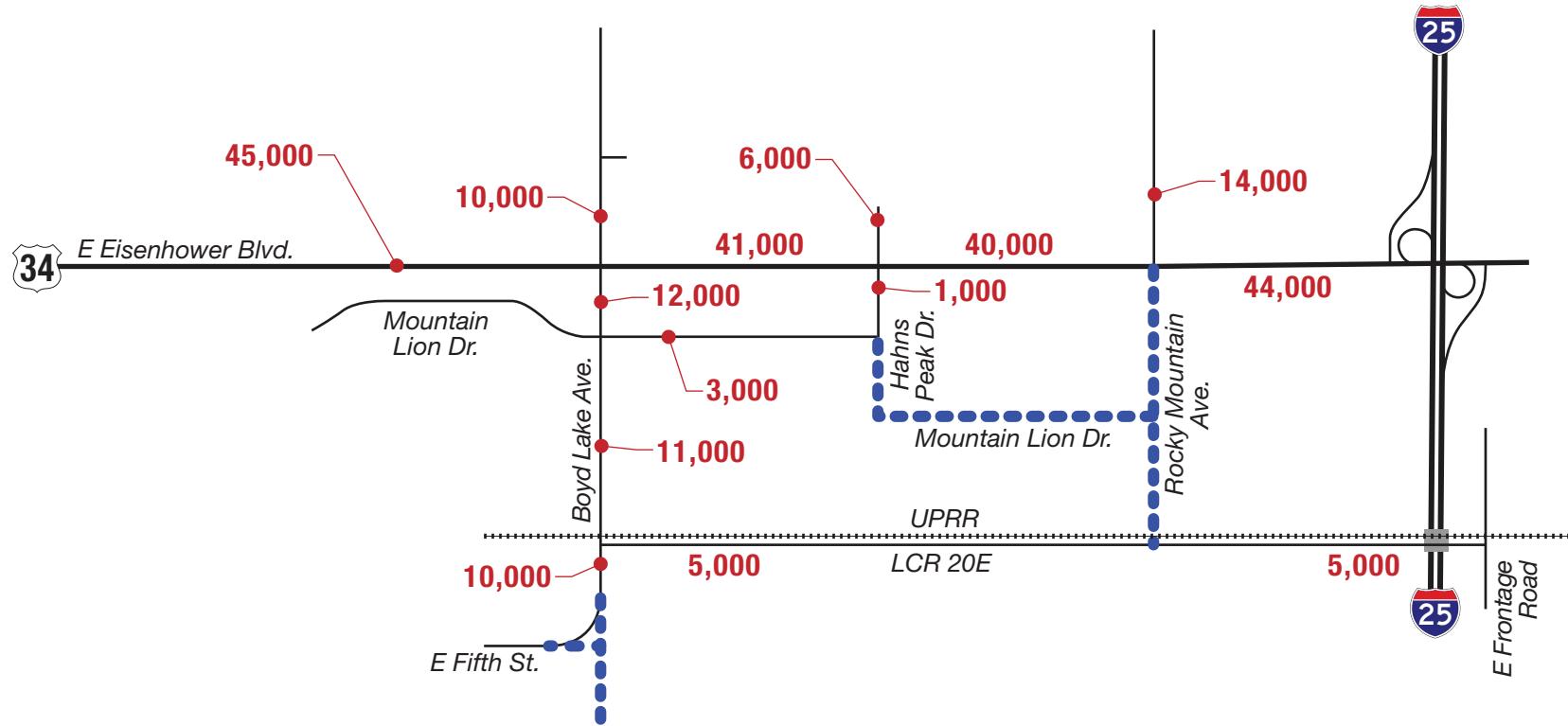
Available information was compiled and used to develop daily traffic estimates along the key roadways within the study area. Intersection analyses are not included in this overarching study, but they will be part of more detailed analyses to be prepared in conjunction with the development of individual parcels. In support of those other efforts, intersection turning movement counts have been collected in the study area. The existing daily traffic was then estimated from these turning movements counts, as well as from CDOT traffic data resources.

Figure 2 shows the estimated daily traffic along study area roadways. The busier roadways within the GDP area include US 34, which serves 44,000 vehicles per day (vpd) just east of Rocky Mountain Avenue. Rocky Mountain Avenue and Boyd Lake Avenue are the busier north-south roadways with each serving 10,000 to 14,000 vpd. LCR 20E serves approximately 5,000 vpd, and the collector roadways of Mountain Lion Drive and Hahns Peak Drive currently serve 3,000 vpd or less.

LEGEND

XXXX = Daily Traffic Volumes

···· = Future Roads



NORTH

FIGURE 2
Estimated Existing
Daily Traffic

III. PROPOSED CONDITIONS

This report section describes the means of estimating additional daily traffic as a result of uncompleted land uses throughout the GDP. In general, the process entailed compiling GDP build out land use quantities (which conservatively assumes the GDP would be completely built out by 2045) and estimating the amount of daily traffic these uses will generate once completed and occupied. This entails conducting a trip generation analysis, followed by a traffic assignment process, given the long-term buildout of the GDP. The trip generation estimates are only for yet-to-be completed development to reach buildout. The traffic impacts of existing GDP development traffic are captured in the existing traffic data shown on **Figure 2**.

Another step entails increasing and adjusting the **existing** traffic to account for all other growth (non-GDP) in the region/area and to account for additional roadway connections that will cause some traffic patterns to shift. The North Front Range (NFR) 2045 model was a critical tool in estimating these shifts. The following subsections describe each step and substep in developing the long-term daily traffic forecasts along study area roadways.

III.A. GDP Trip Generation

The 3,030-acre GDP was broken out into 43 transportation analysis zones (TAZs) toward developing forecasts in the smaller study area. McWhinney provided land uses, future and not yet completed, for each parcel of the GDP, and this map is provided in **Appendix A**. This map directly informed the trip generation process. The process accounts for the GDP development yet to come, but resulting traffic projections are shown for just the study area pertaining to the amendment request, which is a subset of the entire GDP area.

Table I shows the land use types by TAZ where future development would be planned, each of which identifies the specific parcel numbers. A TAZ map created for this analysis is provided in **Appendix B**. Some TAZs are already built out, and these are not listed in **Table I** since they would not generate any new trips. Including the amendment request, a total of approximately 8,200 more residential units are being considered by the time the GDP is completed. Also, 5.7 million square feet of non-residential uses are potentially remaining, spread across the 3,030-acre GDP. **Table I** also presents the daily trip generation for each TAZ. An expanded version of **Table I** is provided in **Appendix B**.

Inherent in **Table I** and detailed in the expanded version presented in **Appendix A** are reduction factors. The Institute of Transportation Engineers' *Trip Generation*, 11th Edition, was used to estimate trips for each land use parcel. Reductions were applied to parcel trip estimates to account for:

- **Pass-by and diverted-link traffic.** Retail and restaurant uses are subject to pass-by trip-making; that is, trips that are already on the roadway, or in the area, for other reasons and stop at the retail or restaurant as a matter of convenience. These are not new trips but simply a diversion of trips already on the roadway network. For this effort, pass-by adjustments were applied to 10 TAZs, ranging from 15 to 30 percent for retail and restaurant uses. A 50 percent pass-by adjustment was applied to gas service stations.
- **Mixed-use environment.** Areas with a complementary mix of uses foster trip interactions between these uses. Also, because adjoining parcels often afford themselves to trip interactions due to the mixed-use nature when considering a cluster of parcels, trips generated by some parcels will also be generated by the attracting parcel and vice versa. For the 23 TAZs in which this adjustment was applied, reductions ranging from 5 to 25 percent were applied to parcels that best lend themselves to this activity.
- **Alternative modes.** One of the major considerations in applying this reduction factor is a parcel's proximity to the Centerra Loveland Mobily Hub. There were 22 TAZs in which this reduction was applied, ranging from 5 to 20 percent.

Again, these reductions are already inherent in **Table I**. The expanded version of **Table I** in **Appendix B** lists each parcel within each TAZ, as well as the reduction in trips for each category. A more detailed analysis will be conducted as individual parcels get planned and engineered.

Table I. Millennium GDP New Development Trip Generation Estimates*

TAZ	Land Use	Daily Trip Generation
1	Light Industrial, Office	3,507
2	Light Industrial, Office	2,062
4	Multi-Family Low Rise, Retail	305
6	Multi-Family Low Rise, Office, Restaurant, Retail, and Hotel	6,003
9	Gas with Convenience Store, Retail	581
11	Office	347
13	Restaurant	984
14	Office, Medical Office Building	4,184
16	Medical Office Building	9,372
17	Office, Hotel	11,622
18	Office	1,217
19	Light Industrial, Shopping Center, and Automobile Sales (new)	4,788
20	Light Industrial and Multi-Family Low Rise	2,624
21	Light Industrial and Multi-Family Low Rise	3,503
26	Kinston Retail	192
27	Kinston Residential	5,103
28	Shopping Center and Office	544
29	Restaurant, Shopping Center, and Multi-Family Low Rise	10,661
31	Shopping Center, Office, and Multi-Family Low Rise	12,507
32	Shopping Center, Office, and Multi-Family Low Rise	19,507
33	Multi-Family Low Rise	10,179
38	Multi-Family Low Rise	3,370
39	Single-Family and Multi-Family Low Rise	1,954
TOTAL		115,116

* See **Appendix B** for a detailed version of this table.

In total, remaining GDP development could generate approximately 115,000 trips per day if built to its upper limit of development. Again, this is scattered over 3,030 acres. The more intense area within the GDP with respect to new development trip-making is along Rocky Mountain Avenue between McWhinney Boulevard and Kendall Parkway, where the collective new development is projected to generate approximately 36,500 vehicle trips per day, which accounts for reductions. This is more than

25 percent of the entire GDP's new development. Another relatively high-generating area is the quarter section of land (Avenue South) southwest of the US 34/Rocky Mountain Avenue intersection in TAZ 32 and TAZ 33 (also known as Avenue South), which is estimated to generate nearly 30,000 vehicle-trips per day given the proposed amendment request.

III.B. GDP Trip Distribution

Trip estimates developed in the previous section of the report were assigned to the roadway network based on patterns observed in the NFR travel demand model. The precise trip routing assignment varied by TAZ based on its location. But overall cardinal distribution percentages used in this study, again based on the NFR travel demand model, have been summarized in **Table 2**.

Table 2. Millennium GDP Trip Distribution

Direction	Residential Uses	Non-Residential Uses
Regional Orientation		
I-25 North	15%	20%
I-25 South	20%	20%
US 34 East	10%	15%
US 34 West	30%	20%
Local Orientation*		
North	10%	10%
South	5%	5%
East	5%	5%
West	5%	5%
Totals	100%	100%

* Some of which may use the regional roadways.

The percentages were slightly varied for residential uses versus non-residential uses. These differences were determined by conducting a select zone analysis of the NFR travel demand model for two zones: one that was heavily residential and one that was heavily employment. Overall, the directionality is fairly balanced with a slightly heavier trip orientation toward the north and the west.

III.C. Traffic Assignment

Trip distribution percentages shown in **Table 2** were applied to the daily trip generation estimates presented in **Table 2**. **Figure 3** shows the daily traffic assignment results for new GDP development traffic. US 34 is fairly congested today, and the first cut at the traffic assignment process suggested that it will become much busier. As such, the traffic assignment process assigned some trips out of direction in avoiding the US 34 congestion, in particular the US 34/Rocky Mountain Avenue intersection. Alternative routes for trips included the Kendall Parkway, Crossroads Boulevard, and LCR 20E. Traffic growth will still occur along US 34, but the revised assignment process reduced this growth at the projected congested segment east of Rocky Mountain Avenue.

The completion of Kendall Parkway, including its underpass of I-25, plays a role and relieves other roadways that would otherwise serve concentrations of traffic, including US 34. Kendall Parkway will also attract existing traffic that would divert to this new connection, the adjustment of which has been captured in the future-conditions projections (with the help of the NFR travel demand model).

Other connections have also been incorporated into formulating the daily traffic projections, as follows:

- **Rocky Mountain Avenue connection to LCR 20E.** This connection will provide an additional means of ingress and egress for the study area, thereby relieving US 34 east of Rocky Mountain Avenue, as well as Boyd Lake Avenue just south of US 34. It will also help facilitate trips crossing I-25 by virtue of increasing the accessibility of the LCR 20E overpass of I-25. This connection will require PUC approval by virtue of crossing the GWRR.
- **Sculptor Drive**, located west of the study area, is planned to connect across the GWRR and provide an alternative north-south connection for the area. The city is currently seeking approval to complete this connection.
- **Boyd Lake Avenue connection down to SH 402.** With this, Boyd Lake Avenue will be able to provide significant north-south continuity through the region and provide the study area with an alternative means of traveling to/from SH 402.

By 2045, the nature of new GDP development's impact on study area roadways are as follows:

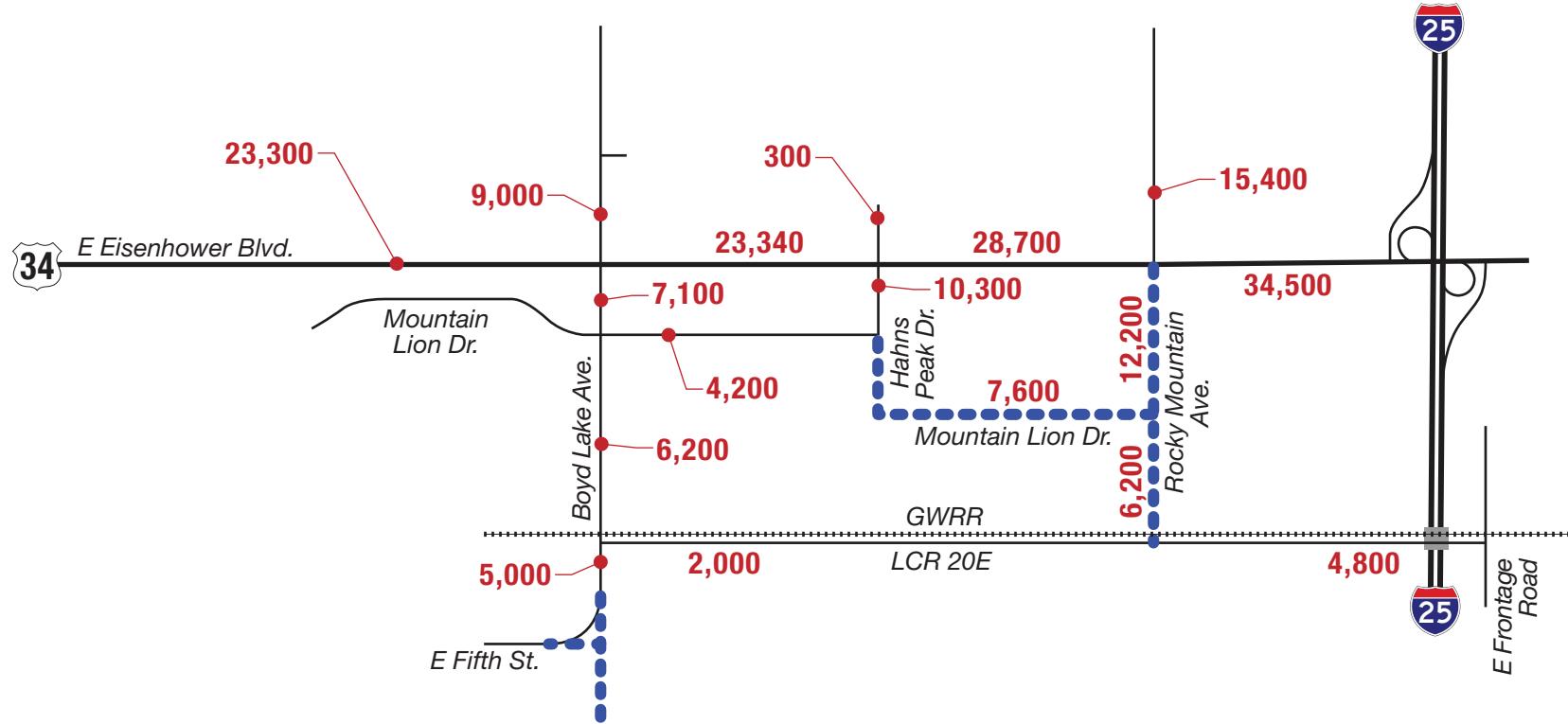
- **US 34** east of Rocky Mountain Avenue is estimated to serve 34,500 vpd of new GDP development traffic (when built out), 28,700 vpd west of Rocky Mountain Avenue, and 23,300 vpd west of Boyd Lake Avenue
- **Rocky Mountain Avenue** near US 34 is estimated to serve 15,400 vpd of new GDP development traffic just north of US 34, and 12,200 vpd just south of US 34. Near LCR 20E (via a future connection across the GWRR), Rocky Mountain Avenue could serve 6,200 vpd of new GDP trips.
- **Boyd Lake Avenue** is estimated to serve 7,100 vpd of new GDP development traffic just south of US 34, with 9,000 vpd just north of US 34.
- **Mountain Lion Drive** is projected to serve 4,200 vpd of new GDP trips west of Hahns Peak Drive, with the segment through the future Avenue South master plan serving an estimated 7,600 vpd near Rocky Mountain Avenue.
- **Hahns Peak Drive** south of US 34 is projected to serve 10,300 vpd of GDP trips.
- **LCR 20E** near Boyd Lake Avenue would serve an estimated 2,000 vpd of GDP traffic, increasing to 4,800 vpd east of the Rocky Mountain Avenue connection.

While **Figure 3** shows the traffic assignment for new GDP development, **Appendix D** shows the traffic assignment for several subset groupings of the GDP TAZs to provide more insight to the traffic assignment process. The groupings focus on the higher generating areas of the GDP. Also included in **Appendix D** also includes a map showing the assumed roadway network in 2045, distinguishing new roadways/connections from existing roads/connections.

LEGEND

XXXX = Daily Traffic Volumes

···· = Future Roads



NORTH

FIGURE 3
New Daily Traffic –
From Future and Yet-To-Be-Completed GDP Uses

IV. FUTURE CONDITIONS

IV.A. *Buildout Total Traffic Projections*

Total daily traffic along study area roadways was developed by summing estimated 2045 background traffic shown on **Figure 4** with the estimated buildout GDP development traffic (realizing that the GDP is not likely to be built out by 2045 rendering the projections high for that time period) presented on **Figure 3**. The 2045 background traffic was estimated in part from the 2045 NFR travel demand model. Several steps were taken in developing background traffic volumes:

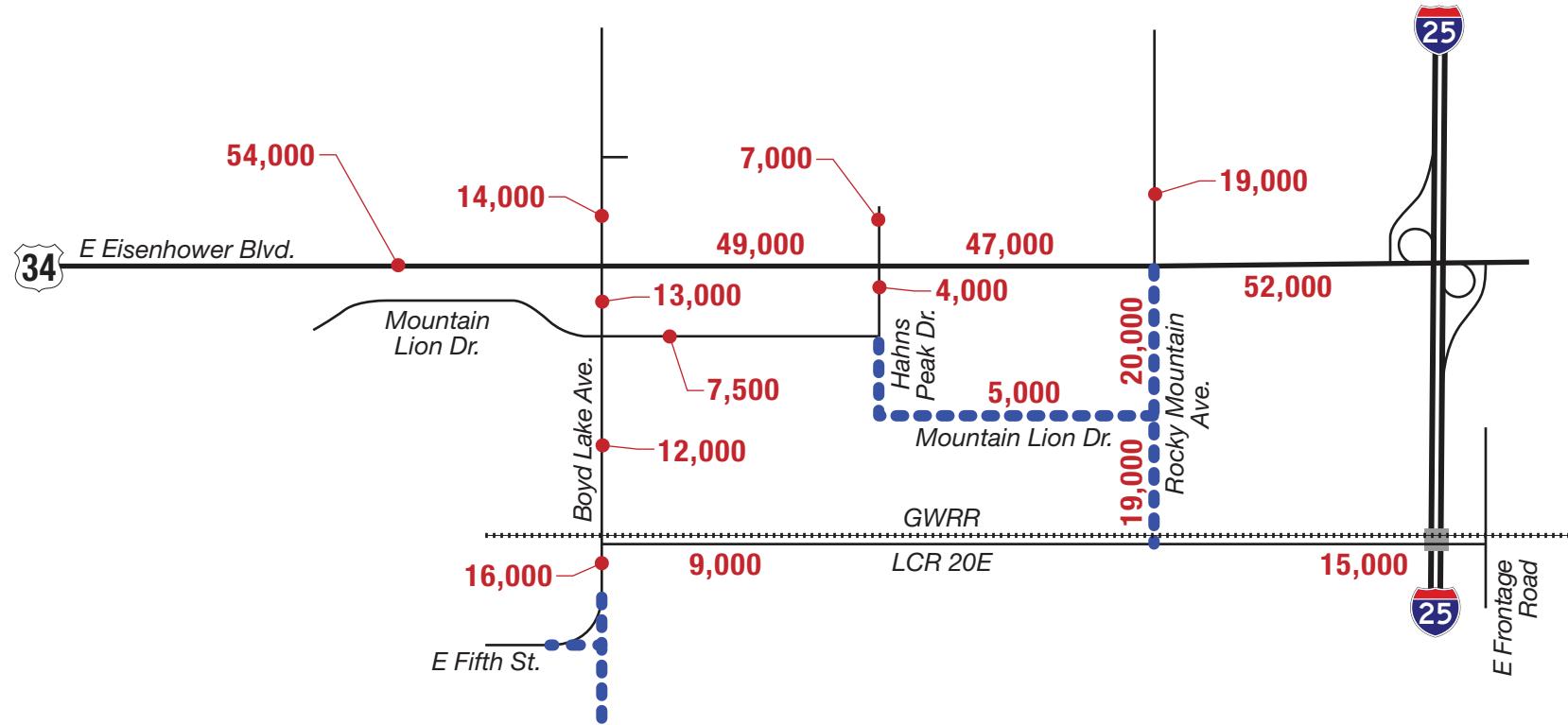
1. Existing daily traffic estimates were increased by 1 percent per year from 2024 to 2045 to account for general regional growth, a portion of which is arguably part of the GDP development to come (which ends up incorporating some double counting into the projections to be conservative).
2. The NFR model was used to estimate shifts in traffic due to the addition of the Rocky Mountain Avenue connection to LCR 20E (which is not included in the **base** NFR model). Traffic shifts were determined for non-GDP trips within the study area (Schmer Farm and Chilson-Stroh) since the trips to be generated by these developments were manually added back into the mix based on a development TISs (see next bullets). In addition, an estimated 11,500 trips per day are projected to use the Rocky Mountain Avenue connection to LCR 20E as a cut-through route based on the 2045 NFR travel demand model. These trips are unassociated with Schmer Farm, Avenue South, and Chilson-Stroh (and any other future GDP development). These are passing through the area opting to use Rocky Mountain Avenue rather than other routes such as US 34 and Boyd Lake Avenue (and to a lesser extent Kendall Parkway).
3. Trips associated with uses (existing and proposed) in the Chilson-Stroh area (bounded by US 34, Hahns Peak Drive, Loveland Sport Park, and Boyd Lake Avenue) were manually added to the study area network as part of the background traffic. An estimated 12,000 external trips per day from this area have been assigned across the network as part of this exercise based on available TISs. Adjustments to those TISs' traffic forecasts were made to account for the Rocky Mountain Avenue connection to LCR 20E that will bleed-off a portion of this area's traffic.
4. Trips associated with proposed uses in the Schmer Farm area (south of US 34, between I-25 and the future Rocky Mountain Avenue extension), plus 200 additional units that could develop adjacent to the Schmer Farm development. An estimated 15,000 external trips per day from this area have been assigned across the network based on the available TIS. Adjustments were also made to that study's project traffic assignment to account for the Rocky Mountain Avenue connection to LCR 20E that would bleed-off traffic from US 34.

Adjustments were made in the process to shift a portion of traffic out of the congested intersection area of US 34 and Rocky Mountain Avenue as some drivers will divert and drive longer distances to avoid delay. **Figure 4** shows that the 2045 background traffic projections (incorporating the steps listed above) along US 34 would reach 52,000 vpd east of Rocky Mountain Avenue. Rocky Mountain Avenue would serve 19,000 vpd north of US 34 and 20,000 vpd to the south of US 34. Boyd Lake Avenue is projected to serve 14,000 vpd of background traffic north of US 34 and 13,000 vpd to the south.

LEGEND

XXXX = Daily Traffic Volumes

···· = Future Roads



NORTH

FIGURE 4
2045 Non-GDP (Background)
Daily Traffic Projections

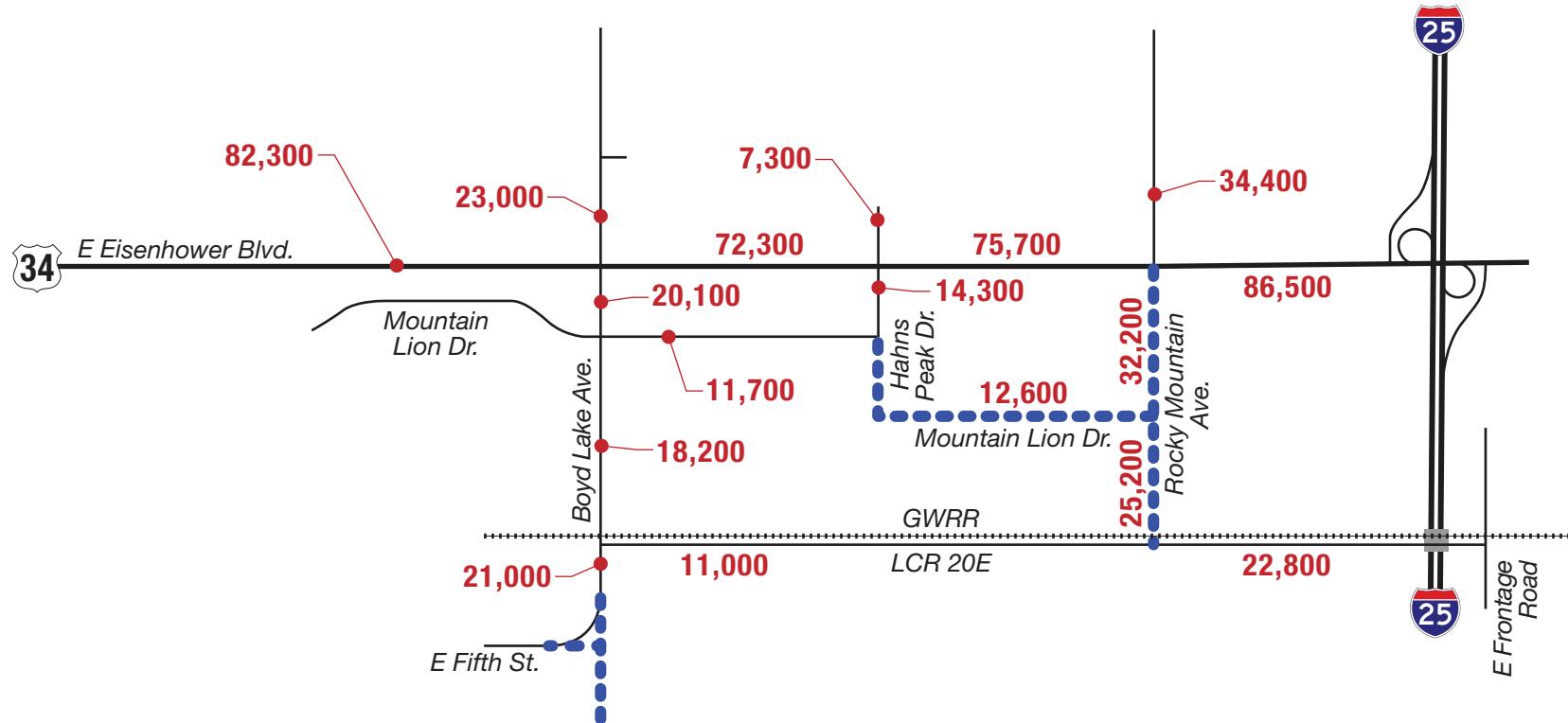
Figure 5 shows the total 2045 daily traffic projections after adding in the new built out GDP development traffic with the background traffic. The following summarize the projections:

- US 34 east of Rocky Mountain Avenue would be the busiest segment in the study area with a long-term projection of 86,5000 vpd, dropping to about 82,300 vpd west of Boyd Lake Avenue. These projections assume that the GDP will be entirely built out by 2045, which is not likely going to be reached by then, so the 2045 projections could be high as a result.
- Rocky Mountain Avenue is projected to reach 34,400 vpd north of US 34 and 32,200 vpd south of US 34, with 25,200 vpd being projected further south just north of LCR 20E.
- Boyd Lake Avenue will increase to 23,000 vpd north of US 34 and over 20,000 vpd south of US 34.
- Mountain Lion Drive west of Avenue South could reach 11,700 vpd, and the segment passing through Avenue South is estimated to reach 12,600 vpd.
- Hahns Peak Drive just south of US 34 could see 14,300 vpd by 2045 given build out of the area, including the residential increase request.
- LCR 20E could reach 11,000 vpd near Boyd Lake Avenue and 22,800 vpd east of Rocky Mountain Avenue. The new Rocky Mountain Avenue connection to LCR 20E will contribute to the notable amount of traffic that LCR 20E could serve, including some traffic that would be deviating around the congested intersection of US 34 and Rocky Mountain Avenue oriented to/from the Johnstown area.

LEGEND

XXXX = Daily Traffic Volumes

···· = Future Roads



NORTH

FIGURE 5
Total Projected Build-Out
Daily Traffic Volumes

Millennium GDP Amendment B 124398-01 12/16P/24

IV.B. Buildout Roadway Needs

Roadway requirements were assessed from the daily traffic projections of **Figure 6**. The assessment used daily traffic criteria as presented in the LCUASS. With respect to classification and laneage, the following summarize this LCUASS daily traffic criteria:

- Major Arterial (four–six lanes): 16,001 to 48,000 vpd
- Minor Arterial (two-lanes): 7,001 to 16,000 vpd
- Major Collector: 3,001 to 7,000 vpd
- Minor Collector: 1,001 to 3,000 vpd

The laneage listed above pertains to through lanes. Auxiliary turn lanes will be needed at intersections, including the possibility of right turn-bypass lanes at roundabouts. Continuous auxiliary lanes add to the capacity of road effectively increasing the planning daily volume threshold.

Base roadway recommendations followed with additional narrative thereafter providing more perspective on select study area roadways.

- **US 34.** Major Arterial with six through lanes and continuous acceleration/deceleration lanes.
- **Rocky Mountain Avenue.** Major Arterial with four lanes with modifications (see below).
- **Boyd Lake Avenue.** Major Arterial road with four lanes.
- **LCR 20E.** Minor Arterial Road with two lanes west of Rocky Mountain Avenue and a major arterial with four lanes to the east.
- **Mountain Lion Drive west of Hahns Peak Drive.** Minor arterial road with two lanes (see below).
- **Mountain Lion Drive through Avenue South.** Minor arterial road with two lanes (see below).
- **Hahns Peak Drive.** Minor arterial road south of US 34 to Mountain Lion Drive. Turn lanes will be needed at US 34.

US 34

US 34 will be the busiest roadway in the study area. Six through-lanes are provided along much of it, and continuous acceleration/deceleration lanes should be incorporated as well (some are already in place). Daily traffic volumes will exceed LCUASS daily traffic thresholds, and the intersections are likely to experience delay during peak hours. The intersection of US 34 and Rocky Mountain Avenue will be the most critical juncture in the study area. This intersection is the first cross-street west of I-25 and will experience heavy turning movements to/from the north and the south. The projected traffic volumes along US 34 and Rocky Mountain Avenue suggest that a conventional signalized at-grade intersection may not adequately accommodate long-term demands during peak hours.

While there have been some conceptual plans of a grade-separated interchange laid out for the long-term at US 34/Rocky Mountain Avenue, it is possible that a different at-grade intersection configuration could suffice. A preliminary assessment has been completed to assess a partial displaced left turn intersection in which the eastbound and westbound left turn movements would cross the opposing through movements along US 34 before reaching Rocky Mountain Avenue. The high-level analysis revealed that a partial displaced left turn configuration might provide 20 percent more capacity than a conventional signalized intersection with westbound triple left turn lanes if it can be built. Additional assessment is needed to determine the feasibility of such a design, but preliminary findings suggest it has potential from a traffic operations standpoint. Additional vetting of a displaced left turn intersection should be conducted, including the feasibility of its design to fully vet the merits of this option.

Another option being considered is the potential for triple left turns at this intersection serving the westbound to southbound movement (similar to what exists eastbound to northbound at the US 34/Centera Parkway intersection). This too should be a serious consideration. The planning of Avenue South development is allowing for this potential with respect to the location of buildings.

Rocky Mountain Avenue

Rocky Mountain Avenue's buildout traffic projections north of US 34 will exceed the limits of a four-lane arterial road and its existing roundabout intersections. Because volume projections tend to be greatest at a point closest to US 34, the roundabout at greatest risk from an operations standpoint is the first one north of US 34 at Foxtrail Drive. Even today, southbound peak hour traffic will occasionally back into this roundabout (mostly left turn movement stopped at US 34). Any improvements at this first intersection should not necessarily be conducted in isolation, and consideration for improvement would be more appropriate within the context of future actions associated with the US 34/Rocky Mountain Avenue intersection. Improvements to Rocky Mountain Avenue may best be deferred to a future date in conjunction with other major US 34 actions. New build-out GDP-specific traffic would make up approximately 45 percent of the long-term traffic along Rocky Mountain Avenue north of US 34.

South of US 34, Rocky Mountain Avenue should be planned as a four-lane arterial road, with the segment immediately south of US 34 also containing turn lanes. A more detailed TIS will provide more information, including its other intersections, some of which are proposed to be roundabouts.

LCR 20E

LCR 20E should suffice as a 2-lane arterial road west of Rocky Mountain Avenue, but a 4-lane arterial should be provided to the east. Also, turn lanes would be appropriate at the intersections. This road is currently a county road (not controlled by the city), and it will serve a fair amount of traffic traveling to/from the Johnstown area, some of which might otherwise use US 34.

Mountain Lion Drive

Mountain Lion Drive west of Avenue South is projected to exceed the LCUASS daily traffic threshold for a two-lane collector road (11,700 vpd projected versus the 7,000 vpd threshold). Ideally, the road should be planned and designed as a minor two-lane arterial road. The road that is currently in-place provides two through lanes, a center left turn lane, and bike lanes along the outside edges. The functionality of the road will likely be defined by the end-point intersections of Boyd Lake Avenue and Hahns Peak Drive, so a key consideration is defining the exact nature of these intersections in the long-term planning horizon to ensure that they operate acceptably. This will be completed as part of a more detailed TIS for Avenue South.

Through the Avenue South development, Mountain Lion Drive will serve volumes that will also exceed the LCUASS collector threshold (12,600 vpd versus the 7,000 vpd threshold). However, this projected volume generally just falls within the capacity of a two-lane roadway, and ideally this too should be planned as a minor two-lane arterial road based on the projected traffic loadings. It too will be governed by the functionality of its end-point intersections at Hahns Peak Drive and at Rocky Mountain Avenue. The Avenue South-specific TIS will provide more detail on the functionality of this roadway.

LEGEND

- = Major Arterial
- = Minor Arterial
- = Collector
- = Future Roadway
- * = See Text

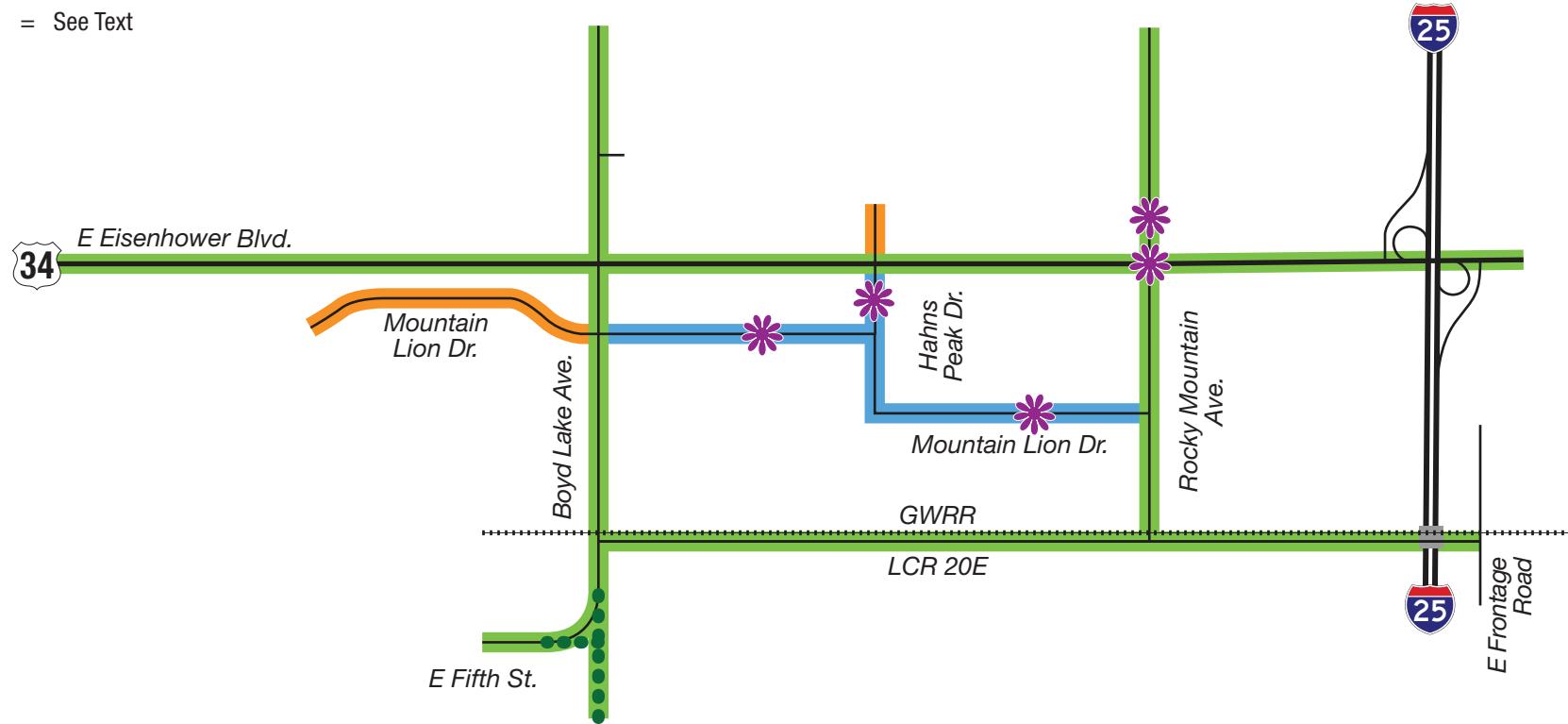
**NORTH**

FIGURE 6
Recommended Millennium
Roadway Classification

V. AREA TRANSPORTATION SOLUTIONS

The GDP Amendment request includes an increase in allowable residential development in the parcel southwest of US 34/Rocky Mountain Avenue. Many of the additional residential units would likely be located on the west end of TAZ 32, thereby affecting the roadways near that area, the most likely being Mountain Lion Drive and Hahns Peak Drive. Based on the information presented in this study, the following are recommended for improved travel in the area and to mitigate existing and future challenges.

V.A. *Improvements and Timing*

Several transportation network improvements have been mentioned, and these will all play a role in serving the collective area and region in providing transportation routing options.

Kendall Parkway

The Kendall Parkway (outside this report's study area to the north) underpass of I-25 is completed. The Centerra Loveland Mobility Hub parking lot is located just west of I-25 near the Kendall Parkway crossing, and the underpass improves the Mobility Hub's accessibility, which should promote alternative mode usage. This underpass also provides an alternative means of crossing I-25, thereby offering relief to US 34, Crossroads Boulevard, Rocky Mountain Avenue, and Centerra Parkway for drivers who are simply crossing the freeway. The COLT transit service is already using this new connection to serve the area. Previous analyses have shown that Kendall Parkway is projected to ultimately serve approximately 14,000 vpd, or more, once the area is built out, which is nearing the capacity of a two-lane road and demonstrates this underpass' potential. Ultimately, it will be fully built from Boyd Lake Avenue to US 34. Currently, there is a missing section between Rocky Mountain Avenue and I-25, but connectivity is provided via LCR 24.

This roadway's underpass of I-25 is complete and is serving traffic. LCR 24 (also known as 29th Street) currently connects to Rocky Mountain Avenue providing east-west continuity with the Kendall Parkway underpass. Ultimately, the extension of Kendall Parkway from the Mobility Hub near I-25 to Rocky Mountain Avenue will take place in conjunction with development along this extension. The exact timing depends on development, but this missing segment would ideally occur with adjacent development.

Barring development, the trigger to build this missing Kendall Parkway segment could be based on the functionality at the intersection of Rocky Mountain Avenue and LCR 24, since LCR 24 serves as the east-west connector today. This intersection is side-street stop controlled, and its functionality could be challenged as traffic volumes increase. Once peak hour traffic movements (either the southbound left or the westbound right) reach a point at which they operate at LOS F, that might be the appropriate time for the missing link of Kendall Parkway to be in place. More analysis, including current traffic counts and a more detailed understanding of the pace of development, is needed to define a specific timeline for this. The Connect Loveland Master Transportation Plan identifies a 5- to 10-year timeframe for this missing link to be constructed.

Sculptor Drive

Also outside this report's study area is Sculptor Drive, a north-south roadway that is mostly constructed west of the study area. From US 34, this road extends south through a commercial area and currently dead ends about 1,500 feet short of the GWRR. South of the GWRR, this road extends north from Corvus Drive and dead ends about 250 feet short of the railroad. The city is currently in the process of acquiring permits for Sculptor Drive to cross the GWRR at-grade, thereby improving north-south connectivity in the area. Completing this connection will directly serve development that abuts the road, much of which is built out, and provide some relief to other roads, including Boyd Lake Avenue. Mountain Lion Drive west of Boyd Lake Avenue may also see slight relief in traffic demand.

The implementation of this improvement is progressing and is subject to relevant permitting, but since the area around this road is mostly developed, its construction/completion should ideally occur as soon as possible, especially given the progress that the city is making in obtaining permits. No specific traffic triggers are identified; the city should explore constructing this as soon as reasonable.

Rocky Mountain Avenue

Given the nature of possible development in and around the US 34/I-25 interchange, there is an intent on the city's behalf to extend Rocky Mountain Avenue far enough south to ultimately connect with LCR 20E (crossing the GWRR, which will require PUC approval). This extension has been incorporated into this analysis with respect to daily traffic projections, and it will serve several purposes including:

- Provide the Avenue South and Schmer Farm developments (and to a lesser extent the Chilson- Stroh area) an additional means of access aside of US 34. This will offer relief to US 34, as well as to Mountain Lion Drive through the Chilson-Stroh area.
- Provide the area with better access to an existing roadway overpass of I-25. LCR 20E passes over I-25, which provides some utility to the area, but the Rocky Mountain Avenue connection will improve this overpass' accessibility and encourage its greater use with respect to crossing the freeway.

This connection will offer some traffic relief to US 34 east of Rocky Mountain Avenue and to Boyd Lake Avenue north of LCR 20E.

Timing-wise, this connection is subject to relevant permits from GWRR and from the Colorado PUC, which will require time. The need for this connection is not immediate, and an initial estimate of its timing suggests that it should ideally be in place in the 2030 to 2035 timeframe. A possible triggering consideration would be the functionality of the US 34/Rocky Mountain Avenue intersection, which is to be analyzed in more detail as part of the Avenue South TIS. Preferably, this connection is in place by the time the US 34/Rocky Mountain Avenue intersection is functioning at LOS F during peak hours.

Boyd Lake Avenue

Long-range plans include the extension of this roadway down to SH 402, thereby establishing a tee intersection with 5th Street (today Boyd Lake Avenue curves into 5th Street heading west). This extension down to SH 402 will provide the area with an alternative means of traveling to south Loveland and provide an option for some area travelers to access I-25 south since SH 402 interchanges with I-25. This extension will provide a significant level of continuity in the area as Boyd Lake Avenue would then extend from SH 392 at its north end down to SH 402 at its south, approximately 5 miles.

Timing-wise, the extension of Boyd Lake Avenue south to SH 402 is not overly critical compared to the other network connections described previously. Sculptor Drive currently connects to SH 402 from Corvus Drive, so the Boyd Lake Avenue connection would be redundant (once the missing segment of Sculptor Drive crossing the GWRR is in place). This connection is likely not going to be needed until the 2035 to 2045 timeframe, which could be phased such that it is initially built as a two-lane facility. Its

widening to four lanes between Mountain Lion Drive and LCR 20E could also wait until that timeframe with adjacent future development contributing to this ultimate cross-section. Trigger-wise, the need for this connection may be tied to the levels of traffic that Sculptor Drive carries, possibly being triggered once the Sculptor Drive traffic volume exceeds the LCUASS threshold. Another possible trigger could be the functionality of the East Frontage Road. The Boyd Lake Avenue connection to SH 402 would serve some of the traffic that would otherwise use the East Frontage Road, so it would be beneficial to explore operational triggers along that roadway (the LCR 20E intersection or the LCR 18 intersection, which is SH 402 extended east). Connect Loveland identifies this connection to be completed in sections with final section occurring in a 10-plus year timeframe.

The combination of the above network enhancements are part of the area's multipronged solution. Local intersection improvements will also be integrated and determined at the time of parcel TISs as development is being proposed. A potential next step for the US 34/Rocky Mountain Avenue intersection has already been presented in this report.

V.B. Alternative Modes and Transportation Demand Management

The potential density that might be achieved within TAZ 32 and TAZ 33 as a result of this amendment request may lend itself to creating a Transportation Demand Management (TDM) program to reduce vehicular trip-making. Reducing the vehicle-trips to/from TAZ's 32 and 33, as well as other nearby development, would reduce the traffic projections along study area roadways, thereby reducing congestion, greenhouse gases, and possibly the level of intersection improvements that might be needed. Numerous nearby destinations could play a role in alternative modes of travel. Given this, in combination with the potential density being considered, a number of TDM measures should be considered.

Nearby destinations in which alternative modes of travel are most possible include:

- Loveland Sports Park
- Boyd Lake and the Loveland Regional Trail via the Centerra Trail
- High Plains K-8 School
- Mountain View High School
- COLT Bus Route service (the nearest stop is currently along Boyd Lake Avenue), which provides service to Downtown Loveland
- Commercial development on the north side of US 34 (Centerra Marketplace)

Another future destination consideration is the planned commercial development at Schmer Farm (across Rocky Mountain Avenue to the east of Avenue South) with respect to and ensuring safe pedestrian accommodation across Rocky Mountain Avenue. **Figure 7** shows the above destinations on a map, along with planned multimodal accommodations according to the Centerra Trails map (included in **Appendix E**). **Figure 7** also shows possible bus service through the area, but future service is subject to the City of Loveland Transit (COLT) planning.



NOTE: Drawing Not to Scale

Figure 7 depicts a vision for multimodal service within the study area. Existing trails are shown, including Centerra Trail along the Loveland and Greeley Canal, which runs east-west along the south end of Boyd Lake and then crosses Boyd Lake Avenue to connect with the trail system that surrounds Houts Reservoir and Equalizer Lake.

Future trails in the area include:

- A regional trail along Big Thompson River referred to as the East Big Thompson Trail, which is recognized in the *Loveland Parks, Recreational, Open Lands, and Trails Master Plan*. This future trail is planned to cross under I-25 adjacent to the Big Thompson River. Further, a trail “stub” is identified to its north along Boyd Lake Avenue to connect to the Loveland Sports Park.
- Another trail stub to the future East Big Thompson Trail shown in the Centerra Trails Plan conceptually extends southeast from Avenue South (possibly crossing the GWRR at the future Rocky Mountain Avenue GWRR crossing). Its exact alignment is yet to be defined.
- An east-west trail along the north side of GWRR is planned. As a “Rails with Trails” program facility, this would share the GWRR right-of-way. This trail is recognized in the Centerra Trails Plan and would extend along the south side of Sports Park, Avenue South, and Schmer Farm, crossing I-25 and ultimately extending further east and north to Eaton, Colorado.
- An east-west trail along the south side of US 34. This separated shared-use path along the north side of the study area would extend west to the Front Range Trail in western Loveland and east to the future South Platte/American Discovery Trail near Garden City (approximately 21.5 miles).
- Within the study area, roadways will provide sidewalks, and a proposed linear park within the Avenue South development would connect to the Loveland Sports Park. Trails/walkways already exist through the Sports Park, thereby providing the Avenue South development bike/ped connectivity to Boyd Lake Avenue.
- Also shown on **Figure 7** is the possible routing of a future COLT bus route through the study area, leveraging Mountain Lion Drive and Rocky Mountain Avenue. The exact route(s) that could serve the study area requires further assessment; it would be ideal to connect the study area to the Mobility Hub, area employment centers, and Mountain View High School. Additional input from COLT is needed, but the study area does provide a roadway system that would allow a bus to circulate through. The additional density in the area would tend to support direct local transit service. In addition, the Connect Loveland Transportation Plan identifies the vision of a Greeley Regional bus route, the details of which are yet to be determined. The plan shows this route using US 34 along the study area’s frontage.
- Encouraging alternative modes of travel such as bicycling and walking requires adequate accommodations for these users. As the most vulnerable road users, bicyclists and pedestrians are highly over-represented in severe/fatal crash data, so designing streets and networks with their safety in mind is paramount to overall transportation safety and encouragement. Their usage is also encouraged where biking and walking connections are provided to transit stops. Many people are interested in walking and biking for transportation purposes, provided that safe and comfortable facilities are provided.

In light of the above, the multimodal accommodation consideration for development in the study area can be considered as follows:

- Incorporating a detached 10-foot shared-use path along the south side of US 34. Adding a similar facility along the north side of US 34 is recommended as well, with path connections across the Farmer's Ditch to Centerra Marketplace.
- Installing ADA-compliant curb ramps at all intersections. Consideration should be made for a pedestrian refuge area in the middle of US 34. Pedestrian and bicycle accommodation to cross US 34 at Rocky Mountain Avenue and Hahns Peak Drive should be made robust. Additional research is recommended to assess the feasibility of a grade-separated pedestrian crossing of US 34.
- Bike lanes should be provided along the entire length of Mountain Lion Drive from Boyd Lake Avenue to Rocky Mountain Avenue that tie into the existing bike lanes further west as a means of connecting to the high school.
- Explore whether area internal roadways lend themselves to narrower (10 to 11 feet) drive lanes through and around the Avenue South site along Mountain Lion Drive to discourage speeding. Other traffic calming features could also be considered along these multimodal roads as a means of naturally reducing vehicular speeds. The measures will need to be balanced with the need to serve through-traffic as well.
- Explore shared mobility programs for the area in which area residents and employees could use scooters or bikes for short-to-medium length trips in lieu of a single-occupant automobile. This typically requires commitment from a service and formal permission by the city.
- As development occurs within the study area, explore adjustments to the COLT transit system for direct service through the study area. Mountain Lion Drive may be appropriate for routing a bus through the area. If the level of density occurs as is being requested, transit service could be heavily used, pending exact routing. Service that ultimately connects the study area to the Centerra Loveland Mobility Hub would be ideal. Any adjustments to the COLT routing through the area should be considered within the context of the overall COLT system, as transit-supporting development occurs.
- Establish a database of individuals interested in carpooling/ridesharing, along with their commute characteristics.
- Encourage a car-sharing agency to serve the Loveland area, thereby allowing residents and employees to possibly shed vehicle ownership and instead check-out a vehicle only at the times they need one. This may discourage vehicle-trip making if drivers need to pay a modest fee every time they make a trip, and they would likely save a significant amount of money related to car ownership.

Some of the ideas listed previously require additional vetting and assessment. Development within the study area can also incorporate certain attributes that would encourage alternative modes of travel, including providing the following:

- Bicycle racks and storage lockers for residents and employees.
- Locker rooms and showers for employees.
- Shuttle service that supplements Loveland's local/regional service, depending on the nature of COLT routing adjustments once study area development occurs.
- A pedestrian connection to the Loveland Sports Park at the southwest corner of the study area (being planned as part of the Avenue South development as a Linear Park).
- An enhanced pedestrian crossing of Rocky Mountain Avenue between Avenue South and Schmer Farm. This will be more important when both developments reach a critical mass AND when Rocky Mountain Avenue connects to LCR 20E. This could ultimately include a high-intensity activated crosswalk beacon (HAWK) pending conditions.
- A reduced parking supply in conjunction with its management, to ensure that drivers are all accommodated off-street.
- Transit passes to employees and/or residents as a perk of working or living in the study area.

Another key aspect to encourage use of alternative modes pertains to providing information to travelers. Once new development is occupied, employers and residential associations should continually provide information and/or pass-on information prepared by others with respect to informing travelers of the alternatives modes and the ease of using them.

Further vetting of each option above is required with the applicant, and the city in assessing those options with the greatest potential given each one's cost and ongoing responsibility.

VI. SUMMARY AND RECOMMENDATIONS

Brownstein Hyatt Schreck, LLP, on behalf of McWhinney Real Estates Services, Inc., is proposing to alter the allowed land use within a southern portion of Parcel B of the Millennium General Development Plan (GDP). The modification is intended to primarily increase the number of allowed residential units, but other non-residential adjustments continue to be included as well. The specific request addressed here pertains to allowing up to 3,357 units to the area southwest of the US 34/Rocky Mountain Avenue intersection from the current allowed 1,080 units.

This study assessed the additional amount of daily traffic that study area roadways could ultimately serve given future and yet-to-be completed GDP. This study assumes that the GDP would be built out by 2045, but build out is likely 10 to 20 years beyond 2045 based on the historic rate of development to date (rendering traffic projections conservatively high for the 2045 planning horizon). In addition, background traffic (all other traffic unrelated to new GDP development) was estimated and then combined with the GDP traffic demands. The traffic projections account for an assignment procedure in which a modest amount of traffic was diverted out-of-direction to avoid the projected congested intersection of US 34 and Rocky Mountain Avenue. The specific study area for this study approximately spans from US 34 to LCR 20E north-south and Boyd Lake Avenue to just beyond Rocky Mountain Avenue east-west, while the GDP area considered in estimating future traffic covers a much more vast area depicted in **Appendix C**.

Based on the preceding analysis, the following roadway network enhancements should be pursued:

- **Kendall Parkway connection from Boyd Lake Avenue to US 34.** This roadway was recently completed across (below) I-25 allowing drivers to cross the freeway without reliance on US 34 or Crossroads Boulevard. While there is the ability to connect to Boyd Lake Avenue via LCR 24 and Rocky Mountain Avenue, Kendall Parkway's completion (there is currently a missing link from I-25 to Rocky Mountain Avenue) will further advance the underpass' attractiveness with a strengthened connection to Boyd Lake Avenue. The need for its completion is tied to development activity near the Rocky Mountain Avenue/Kendall Parkway intersection, and/or the development of parcels that would front along this missing link. Triggers to accelerate this improvement would be tied to the functionality of the Rocky Mountain Avenue/LCR 24 intersection. Connect Loveland shows the construction of this missing link being completed in the five-to-ten-year timeframe.
- **Sculptor Drive connection across the GWRR.** The city is in process of acquiring the permits for this crossing, and its construction should ideally occur when funding is subsequently made available. This connection will relieve traffic demands along Boyd Lake Avenue. Its construction should occur as soon as reasonably possible in light of the progress that has already been made toward obtaining permits thus far.
- **Rocky Mountain Avenue connection south of US 34 to LCR 20E, across the GWRR.** This connection will provide an additional means of access to the study area without the reliance on US 34 for access. This connection will also attract further use of an existing overpass of I-25 via LCR 20E, thereby offering some traffic relief to US 34. Sections of Mountain Lion Drive will also see relief from this connection. Its completion should ideally be in place by the 2030 to 2035 timeframe, triggered in part by the functionality of the US 34/Rocky Mountain Avenue intersection. PUC approval will be needed.

- **Boyd Lake Avenue extension south to SH 402.** This extension down to SH 402 will provide the area with an alternative means of traveling to south Loveland, as well as an option for some area travelers to access I-25 south given the SH 402 interchange with I-25. This extension will provide a significant level of continuity in the area as Boyd Lake Avenue would then extend from SH 392 at its north end down to SH 402 at its south, approximately 5 miles. Timing-wise, this connection and widening are likely not going to be needed until the 2035 to 2045 timeframe. The completion of Sculptor Drive will relieve some of the traffic demand along this road as will the Rocky Mountain Avenue connection to LCR 20E, thereby “buying time” in needing to widen Boyd Lake Avenue. Its triggering may be driven by volumes along Sculptor Drive and/or functionality along the East I-25 Frontage Road. Connect Loveland shows this roadway network addition to be completed in phases with the final segment completed in the ten-plus year timeframe.

Given the network enhancements, buildout daily traffic projections have been developed for the study area roadway, and the findings/recommendations are summarized below:

- US 34 will be the heaviest traveled roadway in 2045 (as it is today) ranging from 72,300 to 86,5000 vpd (based on the assumption that the GDP would be built out). This highway should provide six through lanes, along with continuous acceleration/deceleration lanes through the study area. Signalized intersections should provide robust laneage with respect to turn lanes. More detailed TIS analyses should inform specifics when development plans are prepared. US 34's intersection with Rocky Mountain Avenue will be the most challenging, and the feasibility of a higher capacity configuration, such as displaced left turn design, should be explored. Initial assessment suggests this could provide 20 percent more capacity than a conventional signalized intersection.
- Rocky Mountain Avenue should be constructed as a four-lane arterial roadway for its entire length. The Foxtrail Drive roundabout intersection will need to be further analyzed given its spacing with US 34 and the fact that it is not likely to accommodate future projected traffic demands. The functionality of this segment of roadway largely depends on the functionality of the US 34/Rocky Mountain Avenue intersection. A detailed TIS for study area development will provide more specifics as to laneage needs at the US 34/Rocky Mountain Avenue intersection and along intersections south of US 34.
- Boyd Lake Avenue should be built as a four-lane arterial roadway. The section just north and just south of US 34 is already four-lane plus turn lanes. Widening to four lanes south of Mountain Lion Drive may not be needed until the 2030 to 2035 timeframe provided other network connections are in place, particularly Sculptor Drive, and its connection to SH 402 is not likely needed until the 2035 to 2045 timeframe.
- LCR 20E can remain as a two-lane minor arterial road west of the Rocky Mountain Avenue connection, but it should be widened to a four-lane major arterial section east of Rocky Mountain Avenue.
- Mountain Lion Drive west of Avenue south should be planned as a two-lane arterial road. This road currently exists with two lanes and a center left turn lane, and traffic loadings suggest it should be enhanced to a two-lane arterial per LCUASS. Its functionality will likely be defined by the end-point intersections of Boyd Lake Avenue and Hahns Peak Drive, so a more detailed examination of these intersections will be conducted as part of a TIS for Avenue South. This is also the situation for Mountain Lion Drive through the Avenue South development in which it should be planned to be a two-lane arterial roadway as well.

- Hahns Peak Drive south of US 34 should be built as a two-lane arterial road, but there will be significant turn lane needs. Turn lanes at the US 34 intersection and at the Mountain Lion Drive roundabout intersection will drive the ultimate laneage needs. The exact configuration will be informed by the more detailed Avenue South TIS, but it might be necessary to widen this roadway beyond recent construction to accommodate turn lanes at the US 34 intersection and at the roundabout intersection with Mountain Lion Drive. Much of the density increase being requested for this area would likely be located near Hahn's Peak Drive, so this roadway may need to be widened to accommodate the associated traffic increase.

More details on improvements at study area intersections will be forthcoming as part of a more detailed TIS for Avenue South and for Schmer Farm. But reductions in trip-making for the study area can be further explored through enhancing alternative modes of travel and implementing Transportation Demand Management strategies. This report provides a menu of possible options that should be explored with respect to potential effectiveness and cost to reduce study area trip-making. The options generally entail:

- Enhanced and safe bike and pedestrian facilities
- Traffic calming along shared roadways
- Secure bike racks and storage
- Transit and/or shuttle provisions
- Provision of information to travelers
- Locker/shower facilities
- Mobility share programs

APPENDIX A. ASSUMPTIONS PACKAGE

Attachment A
Transportation Impact Study
Base Assumptions

Project Information			
Project Name			
Project Location			
TIS Assumptions			
Type of Study	Full:	Intermediate:	
Study Area Boundaries	North:	South:	
	East:	West:	
Study Years	Short Range:	Long Range:	
Future Traffic Growth Rate 1% annual			
Study Intersections 2045 NFR Model	1. All access drives	5.	
	2.	6.	
	3.	7.	
	4.	8.	
Time Period for Study	AM: 7:00-9:00	PM: 4:00-6:00	Sat Noon:
Trip Generation Rates			
Trip Adjustment Factors	Passby:	Captive Market:	
Overall Trip Distribution	SEE ATTACHED SKETCH		
Mode Split Assumptions			
Committed Roadway Improvements			
Other Traffic Studies			
Areas Requiring Special Study			

Date: _____

Traffic Engineer: _____ 11.08.2024

Local Entity Engineer: _____

Millennium GDP Area B Amendment TIS Assumptions/Parameters

Key Scope Items

The current site plan is attached. The study will address key roadways:

- US34 from Boyd Lake Ave to I-25
- Rocky Mountain Ave north of US34 south to LCR 20E (a future RMA connection is being assumed as a given)
- LCR20E from Boyd Lake Avenue to the I-25 Frontage Road located east of I-25.
- Hahn's Peak north of US34 south to Mountain Lion Drive
- Mountain Lion Drive from Rocky Mountain Ave to Boyd Lake Ave
- Boyd Lake Ave north of US 34 south to LCR 20E

Along each of these roadway segments, existing (based on available data) and long-term projected daily volumes and LCUASS classification capacity thresholds will be provided (per LCUASS Table 7-2). Segments which show ADT's in excess of LCUASS thresholds (Table 7-2) will be flagged. Solutions toward mitigation will be identified including network improvements, identifying location where improvements are likely to be needed (which will be more fully addressed in the Avenue South TIS), alternative mode accommodation and encouragement (including potential pieces of a TDM strategy as a tool to get travelers out of their car), and the nature of the mixed uses that will encourage internal trip-making. A high-level analysis of an alternative intersection design at US 34/Rocky Mountain Avenue will be assessed as well.

Network improvements that will be incorporated include:

- Rocky Mountain Avenue connecting to LCR 20E (across UPRR)
- Sculpture Drive crossing of UPRR
- The entirety of Kendall Parkway (from US 34 to Boyd Lake Avenue) including the underpass of I-25
- Boyd Lake Avenue extension south to SH 402

A timeframe estimate of network and intersection improvements/enhancements will be assessed, based on judgement using existing traffic, 2045 traffic projections, and our understanding of all potential development in the area. Specific intersection improvements will not be analyzed in this study (they will be for the Avenue South TIS), so judgment based on the projections and based on our understanding of the current conditions of these intersections (from previous studies).

For this study, we plan on updating the Millennium model that FHU built in support of the Millennium GDP amendment study dated July 2023. This model covers the entirety of the GDP, and we'll plan on updating all of the Transportation Analysis Zone land uses and trip data in that model (which makes use of a software called Vistro), but we will plan on showing the daily traffic results just for the roadways identified above.

The analysis will also be used to help inform potential timeframe for improvements assuming a linear growth of the area, likely presented in form of a time range such as "2035 to 2040" or the like. Specific network improvements to be included are:

- Rocky Mountain Avenue connection to CR20E
- Sculptor connection across the RR tracks
- Kendall Pkwy continuous connection from US34 to Rocky Mountain
- Boyd Lake Ave connection down to SH 402

Professional judgement will be used to estimate the appropriate timeframes for these network enhancements.

Trip Distribution has previously been estimated based on the NFR model. It will account for the Rocky Mountain Avenue connection to LCR 20E, Boyd Lake Avenue connecting down to SH 402, Kendall Parkway underpass of I-25, and the Sculpture Drive crossing of the UPRR. The specific trip routing of distribution percentages are varied based on regional travel and local travel, and these are shown below in the table cut out from the Millennium GDP study. Trip routing will be unique for each TAZ.

Table 2. Millennium GDP Trip Distribution

Direction	Residential Uses	Non-Residential Uses
Regional Orientation		
I-25 North	15%	20%
I-25 South	20%	20%
US 34 East	10%	15%
US 34 West	30%	20%
Local Orientation*		
North	10%	10%
South	5%	5%
East	5%	5%
West	5%	5%
Totals	100%	100%

* Some of which may use the regional roadways.

Trip Generation has been detailed such that the entire Millennium has been divided into 43 Transportation Analysis Zones (TAZ), the map of which is attached. TAZ's 31 and 32 are the focus of the amendment request. The yet-to-be developed land use and trip-making for each TAZ is tabulated in the attached table (exact land use quantities are subject to change, but this is the current information we have to work with). Higher-level internal, multi-use, and pass-by percentages have been applied consistent with the previous GDP TIS (with the realization that these will be more specific for each use when a detailed TIS is prepared for an individual parcel). Traffic associated with existing development that is complete and occupied will be captured by the existing traffic volumes that will be compiled.

An analysis has been conducted relative to the pass-by adjustment reductions. These are also tabulated in the trip generation table. They will be varied, but in general a 15 to 30 percent reduction to retail and restaurant uses will be applied. A 50 reduction will be used for fueling stations.

Internal trip-making will also be estimated at a high-level for this analysis. As with pass-by traffic, detailed traffic impact studies for individual parcels will apply more detail based on specific uses and proximity between producing and attracting TAZ's. Depending on the TAZ, a range of 5 to 25 percent reduction will be used when it is applied (not all TAZ will be subject to internal trip-making). This process will consider the mix of uses within an area and assesses potential internal trip activity based on the nature of land use trips being productions and attractions in their nature.

Some of the TAZ trips are also anticipated to be made via an alternative mode. Some TAZ's will better lend themselves to this than others. In the previous GPD study, 22 of the 43 TAZ's were subject to this adjustment which ranged from 5 to 20 percent. We will continue with this same trend for this GPD Amendment study.

Background Traffic Derivation

A series of assumptions will be applied in developing background traffic. The following illustrate the key assumptions:

- Existing Daily traffic will be increased by 1.0 percent per year-to-year 2045.
- Daily trips from the Chilson-Stroh residential development as well as the Chilson-Stroh commercial pad sites will be added in. Chilson Stroh is located west of Avenue South; Mountain Lion Drive will align through the center of Avenue South. We'll assess how much of this development is complete; it may be partially captured in the recent traffic counts from the Schmer TIS and for the study collected.
- Trips from the Schmer master plan as we currently understand it, will be added in as well. Schmer is estimated to ultimately contain 172,000 square feet of commercial development, plus a service station and a car wash. Their study shows a net external trip generation of 14,000 after pass-by and internal trip adjustments. The Schmer study did not specifically analyze scenarios with a connection to LCR 20E, but the study recommended pursuing it. The Avenue South TIS will reassign a portion of their traffic given the long-term connection to LCR 20E. We will also be sure to represent Schmer traffic in a way assuming that that development does not obtain a new access onto US 34; traffic associated with the existing uses southwest of the I-25/US 34 interchange will be assumed to pass through Schmer and exclusively use Rocky Mountain Avenue.
- The Schmer study identifies an additional 200 residential units on acreage south and/or east of their site. We'll incorporate daily trips from 200 units into the background traffic for the long-term scenario.

Given the long-term network scenario in which Rocky Mountain Avenue connects to LCR 20E, adjustments to background daily traffic will be further made to account for:

- Deviations in traffic routing for Schmer traffic
- Deviations in traffic routing for Chilson-Stroh traffic
- Shifts in sub-regional “background” traffic as a result of Rocky Mountain Avenue connecting to LCR 20E. This will include incorporating additional through-traffic along Rocky Mountain Avenue that would cut through the area south of US 34. Previous select link analysis of this connection will be

used to estimate this component of traffic. The 2045 NFR model will be used to estimate this cut-through, and the model is showing that the major patterns that would contribute to this connection's usage will be trips between:

- 1st Street to the west to/from the area served by Rocky Mountain Avenue north of US 34.
- Johnstown (east of I-25) to/from the area served by Rocky Mountain Avenue north of US 34.

To a lesser extent, the model is also showing some cut-through to/from I-25 north and areas along 1st Street to the west and Johnstown to the east.

Other Analyses Considerations

Additional units have been added to Areas C and D so that the total unit count for the master plan is 2250, consistent with a current GDM amendment request.

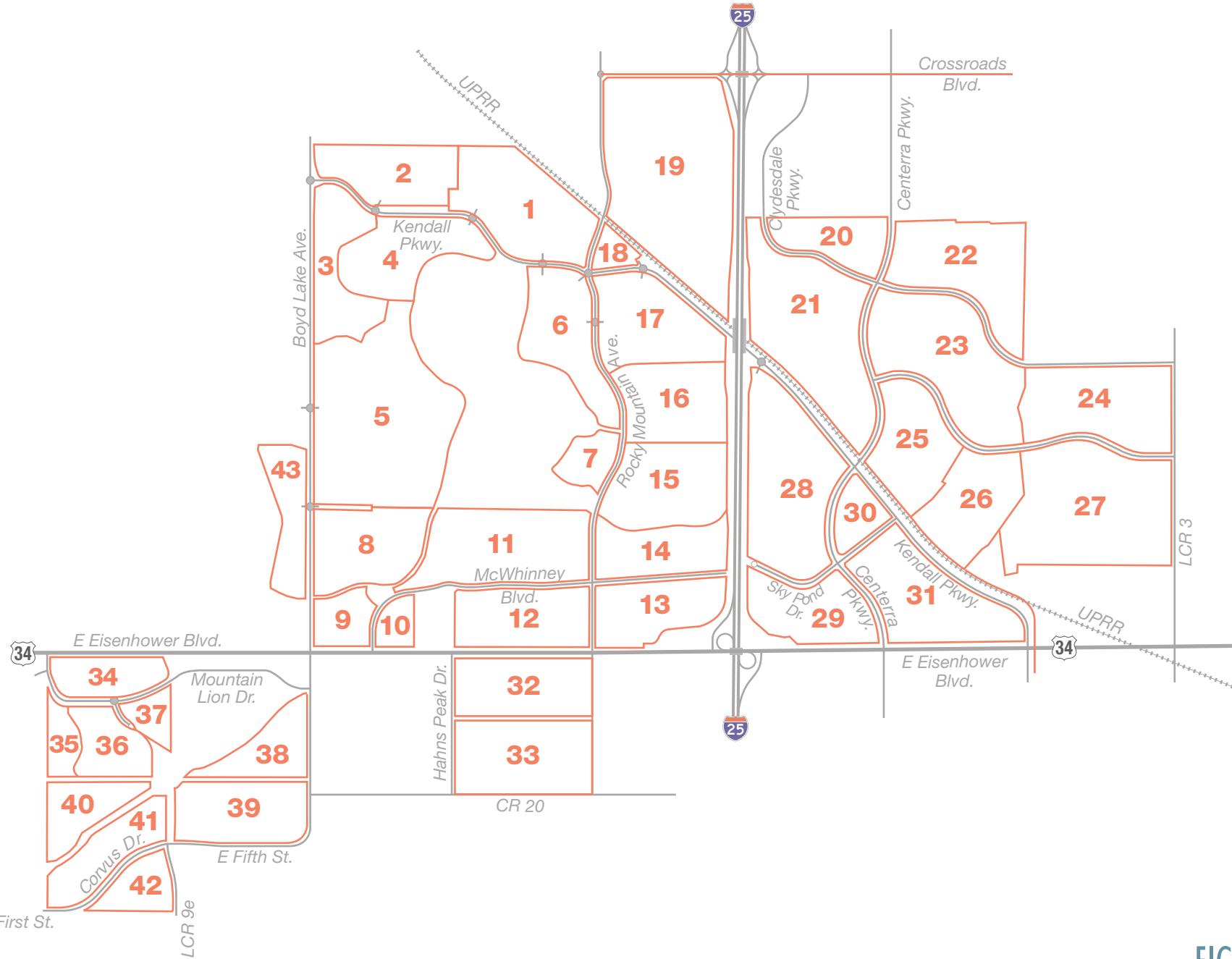
Accommodation for all modes of travel will be considered. Displays will be prepared that show trails and sidewalks through the development. Beyond the master plan boundaries, pedestrian and bicycle routes to/from relative schools will be assessed as they relate to future residents of Avenue South. We will coordinate with the school district in understanding the relevant schools for Avenue South. Means of encouraging alternative mode use will be provided including the foundation for a TDM strategy. This will all entail additional discussions with the applicant and with the city. Transit (regional accommodation and possible local shuttles), pedestrians, bicycles, scooters, and other micro transit modes will be considered including the potential of connecting this development to the Centerra Mobility hub. This aspect will consider recent Green House Gas emission reduction goals established by the state, as appropriate.

Expanded Table 1 - New Development Trip Generation Estimates*

TAZ	Parcel	Land Use	ITE Code	Unit	Quantity	Daily Trip Gen	Multi-use Trip Reduction	Passby Trip Reduction	Alternative Mode Trip Reduction	Total External Trips	External Trips by TAZ
1	202a	Light Industrial	110	KSF	122.807	598	60	0	60	478	
	210	Office	710	KSF	142.2234	1,542	154	0	154	1,234	3,507
	207	Office	710	KSF	206.91	2,243	224	0	224	1,795	
2	201	Light Industrial	110	KSF	348.5889	1,698	170	0	85	1,443	
	203	Office	710	KSF	67.2	728	73	0	36	619	2,062
4	205	Shopping Center	820	KSF	9.697	359	36	0	18	305	
	205	Multi-Family Low Rise	220	DU	312	2,103	210	0	105	1,788	305
6	206	Multi-Family Low Rise	220	DU	500	3,370	0	0	0	3,370	
	206	Restaurant	932	KSF	5.51	591	148	177	59	207	
	206	Office	710	KSF	214.4	2,324	581	0	232	1,511	
	206	Hotel	310	Rooms	45	360	90	0	36	234	
	206	Shopping Center	820	KSF	4.89	181	45	54	18	64	
	206	Shopping Center	820	KSF	43.485	1,609	402	483	161	563	
9	301d	Gas with Convenience Store	945	KSF	4.65	1,233	123	617	0	493	
	301A	Shopping Center	820	KSF	3	111	11	56	0	44	581
	301E	Shopping Center	820	KSF	3	111	11	56	0	44	
11	107	Office	710	KSF	32	347	0	0	0	347	347
13	118	Restaurant	932	KSF	16.7	1,790	179	537	90	984	984
14	112	Office	710	KSF	34.23816	371	0	0	0	371	
	115	Office	710	KSF	62.7264	680	0	0	0	680	4,184
	121	Medical Office Building	720	KSF	87.03288	3,133	0	0	0	3,133	
16	220	Medical Office Building	720	KSF	473.323	17,040	3408	0	4260	9,372	9,372
17	213	Office	710	KSF	661	7,165	358	0	1433	5,374	
	215	Office	710	KSF	658	7,133	357	0	1427	5,349	
	216	Hotel	310	Rooms	150	1,199	60	0	240	899	11,622
18	211	Office	710	KSF	132.1175	1,432	0	0	215	1,217	1,217
19	401	Light Industrial	110	KSF	181.2	882	0	0	0	882	
	403	Shopping Center	820	KSF	11	407	0	0	0	407	
	404	Auto Sales	840	KSF	20	557	0	0	0	557	
	416	Automobile Sales (new)	840	KSF	34	947	0	0	0	947	
	413	Light Industrial	110	KSF	389.64	1,898	0	0	0	1,898	
	409	Light Industrial	110	KSF	20	97	0	0	0	97	
20	601	Light Industrial	110	KSF	396.6138	1,932	193	0	193	1,546	
	601	Multi-Family Low Rise	220	DU	200	1,348	135	0	135	1,078	2,624
21	602	Light Industrial	110	KSF	582.746	2,838	284	0	568	1,986	
	602	Multi-Family Low Rise	220	DU	300	2,022	202	0	303	1,517	3,503
26	Kinston Retail	Shopping Center	220	KSF	30	202	0	0	10	192	192
27	Kinston Residential	Residential	210 & 220	DU	1729	5,372	0	0	269	5,103	5,103
28	501	Shopping Center	820	KSF	18.5	685	69	103	137	376	
	506	Office	710	KSF	22.12848	240	24	0	48	168	544
29	502b	Restaurant	932	KSF	12.71952	1,364	341	409	68	546	
	505	Retail	857	KSF	158	6,709	0	0	0	6,709	
	505	Activity Center	975	KSF	30	1,705	0	0	0	1,705	
	505	Restaurant	934	KSF	3.2	1,496	224	0	0	1,272	
	505	Restaurant	932	KSF	4	429	0	0	0	429	
31	504b	Shopping Center	820	KSF	281.7243	10,427	2607	3128	521	4,171	
	504b	Office	710	KSF	281.7243	3,054	764	0	153	2,137	12,507

	504b	Multi-Family Low Rise	220	DU	1082	7,293	729	0	365	6,199	
32	701	Shopping Center	820	KSF	408.5	15,119	3024	4536	0	7,559	
	701	Office	710	KSF	204	2,211	442	0	0	1,769	19,592
	701	Multi-Family Low Rise	220	DU	1692	11,404	1140	0	0	10,264	
33	702	Multi-Family Low Rise	220	DU	1675	11,290	1129	0	0	10,161	10,161
38	East Pfeiff Farm	Multi-Family Low Rise	220	DU	500	3,370	0	0	0	3,370	3,370
39	Stuart	Multi-Family Low Rise	220	DU	220	1,483	0	0	0	1,483	1,483

* Estimates based on ITE Trip Generation, 11th Edition.



NOTE: Drawing Not to Scale

FIGURE

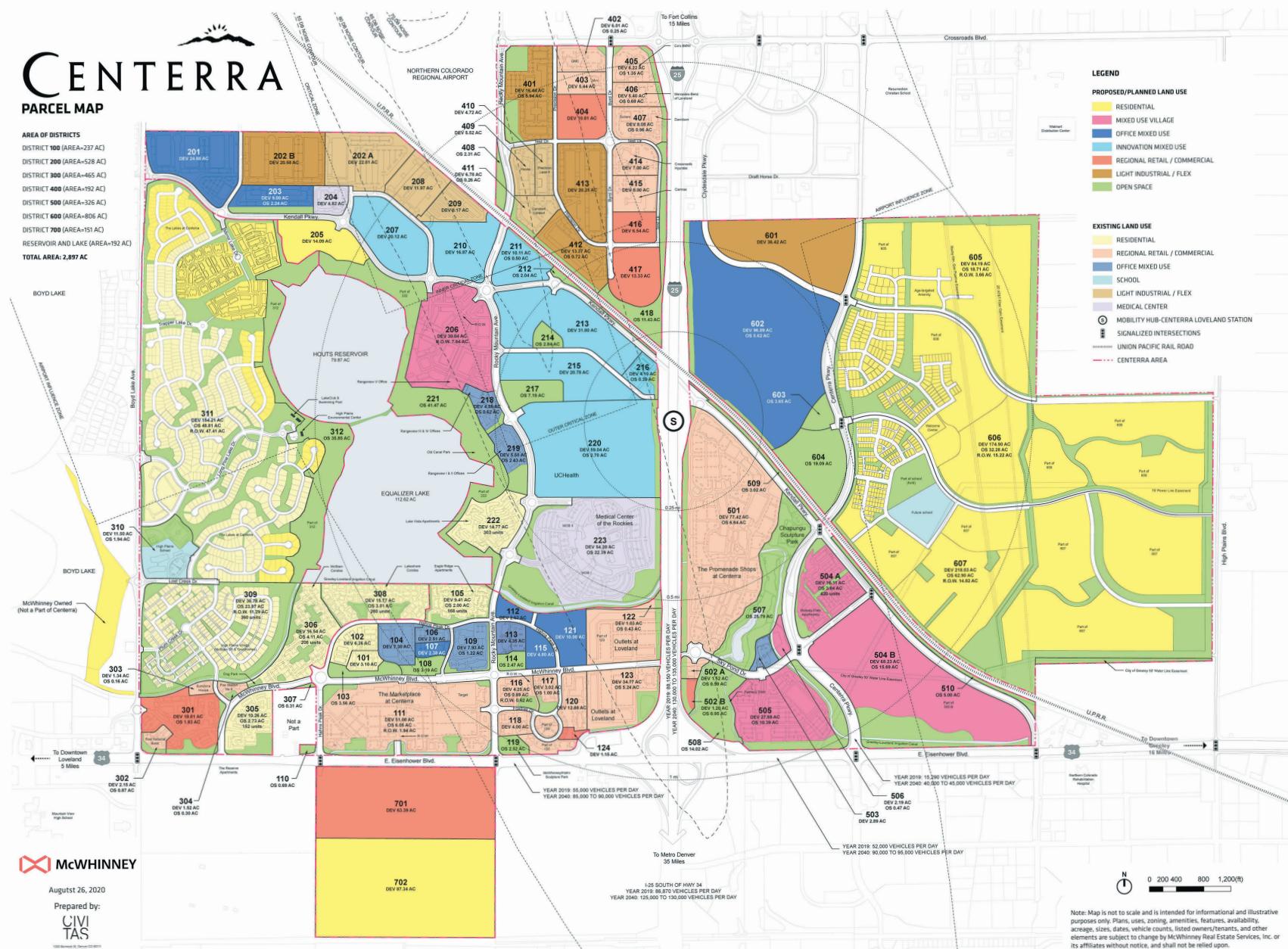
FIGURE

CENTERRA

PARCEL MAP

AREA OF DISTRICTS

DISTRICT 100 (AREA=237 AC)
 DISTRICT 200 (AREA=528 AC)
 DISTRICT 300 (AREA=465 AC)
 DISTRICT 400 (AREA=192 AC)
 DISTRICT 500 (AREA=326 AC)
 DISTRICT 600 (AREA=804 AC)
 DISTRICT 700 (AREA=151 AC)
 RESERVOIR AND LAKE (AREA=192 AC)
TOTAL AREA: 2,897 AC



Note: Map is not to scale and is intended for informational and illustrative purposes only. Plans, uses, zoning, boundaries, features, availability, acreage, sizes, dates, vehicle counts, land owners/tenants, and other elements are subject to change by McWhinney Real Estate Services, Inc. or its affiliates without notice, and shall not be relied upon.

APPENDIX B. TRIP GENERATION ANALYSIS

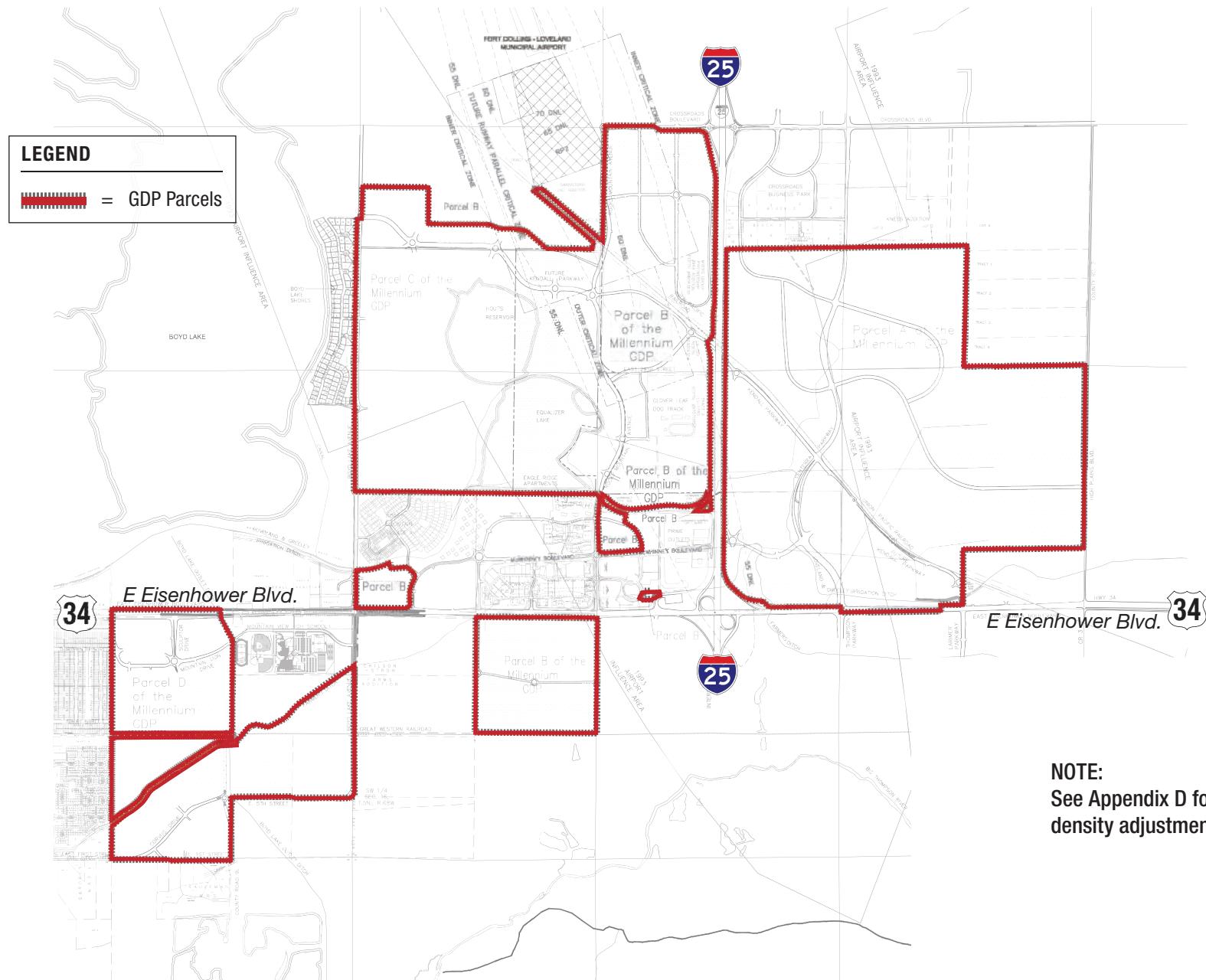
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	206	Hotel	310	Rooms	45	360	90	0	36	234	6,003
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	413	Light Industrial	110	KSF	389.64	1,898	0	0	0	1,898	
	409	Light Industrial	110	KSF	20	97	0	0	0	97	
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	505	Activity Center	975	KSF	30	1,705	0	0	0	1,705	10,661
	505	Restaurant	934	KSF	3.2	1,496	224	0	0	1,272	
	505	Restaurant	932	KSF	4	429	0	0	0	429	
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	701	Multi-Family Low Rise	220	DU	1678	11,310	1131	0	0	10,179	
33	702	Multi-Family Low Rise	220	DU	1678	11,310	1131	0	0	10,179	10,179
38	East Pfeiff Farm	Multi-Family Low Rise	220	DU	500	3,370	0	0	0	3,370	3,370
39	Stuart	Multi-Family Low Rise	220	DU	220	1,954	0	0	0	1,954	1,954

* Estimates based on ITE Trip Generation, 11th Edition.

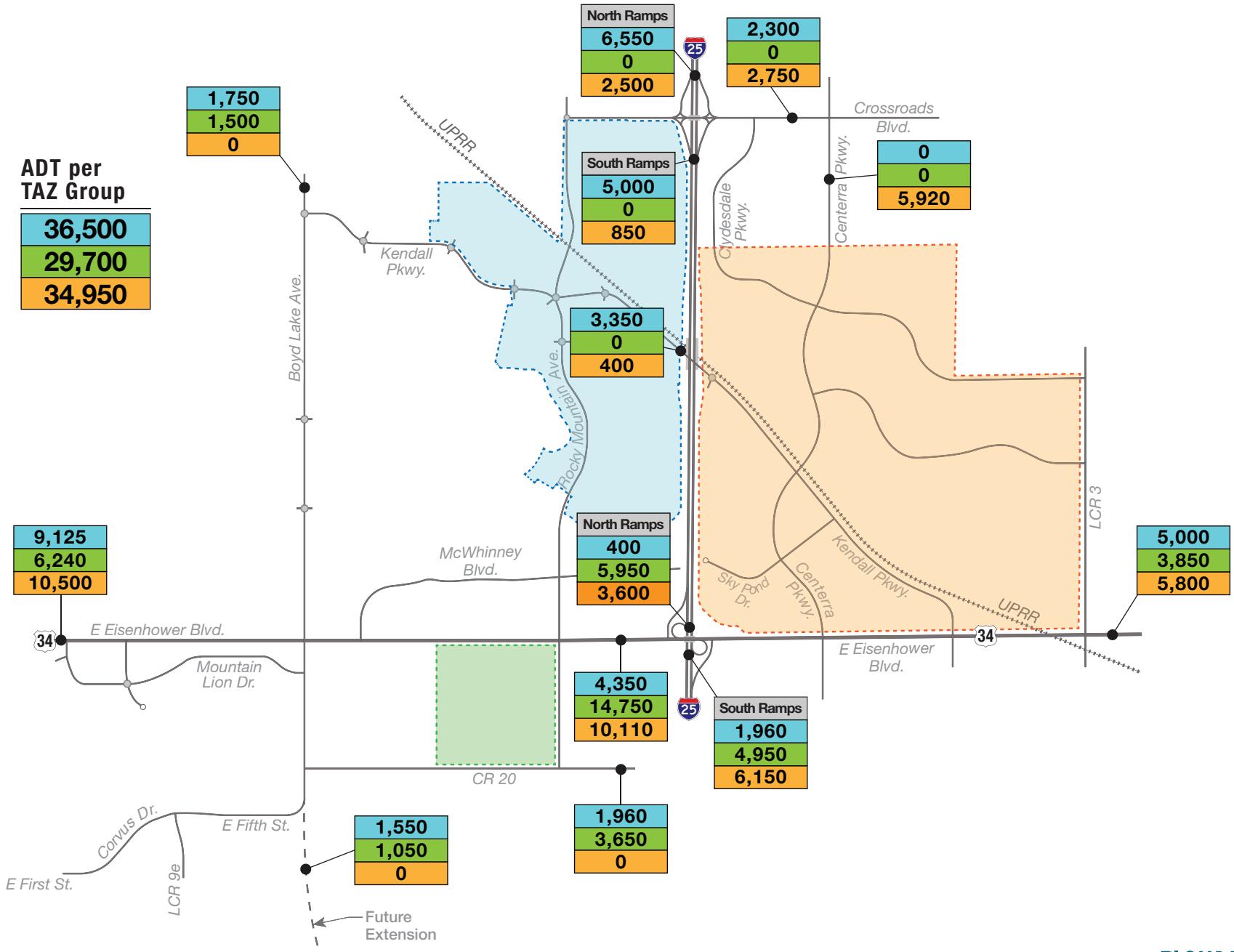
APPENDIX C.

LAND USE MAPS



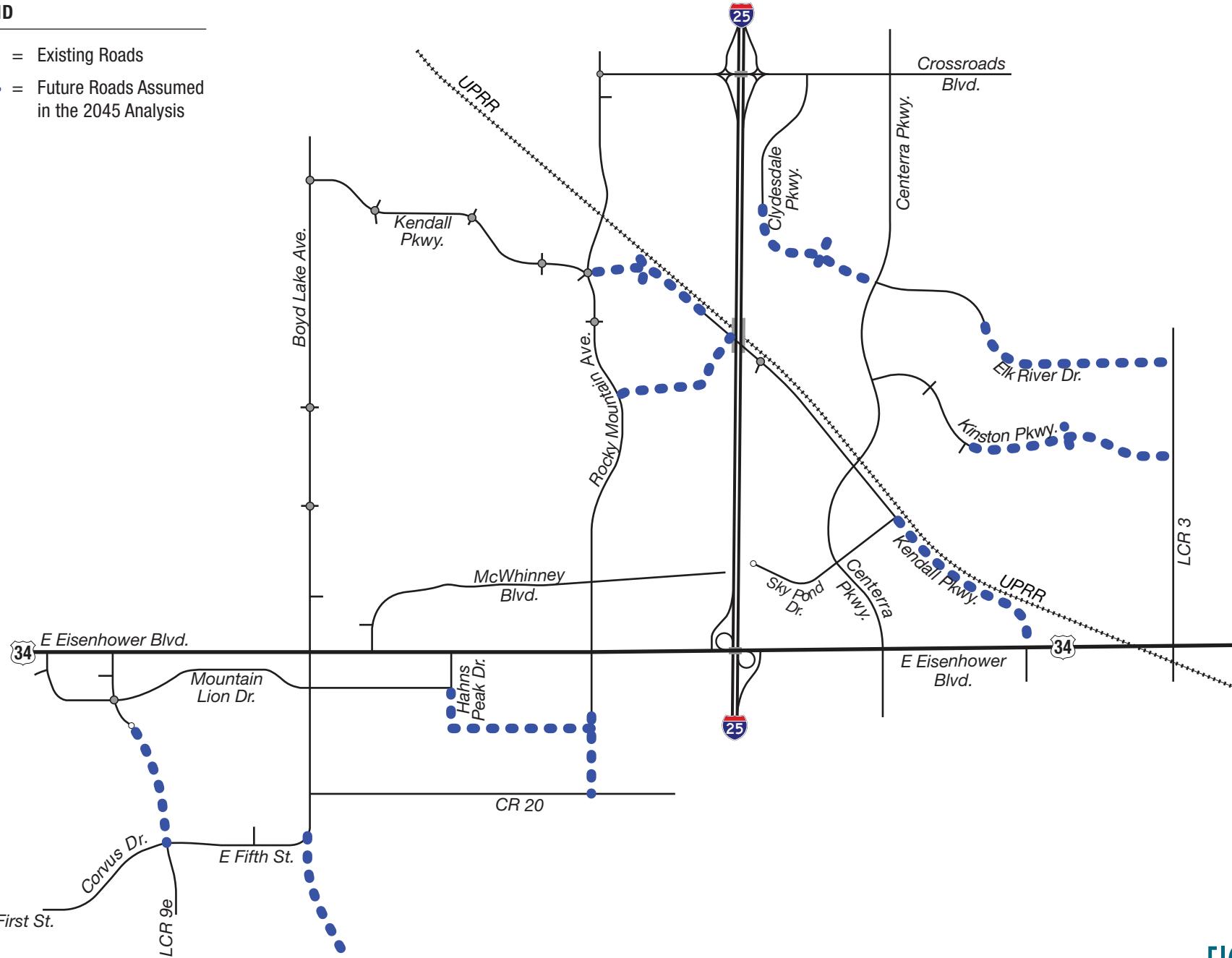
NOTE:
See Appendix D for parcel
density adjustments

APPENDIX D. GDP TAZ GROUP TRAFFIC ASSIGNMENT RESULTS



LEGEND

- = Existing Roads
- = Future Roads Assumed in the 2045 Analysis



APPENDIX E. CENTERRA TRAILS MAP



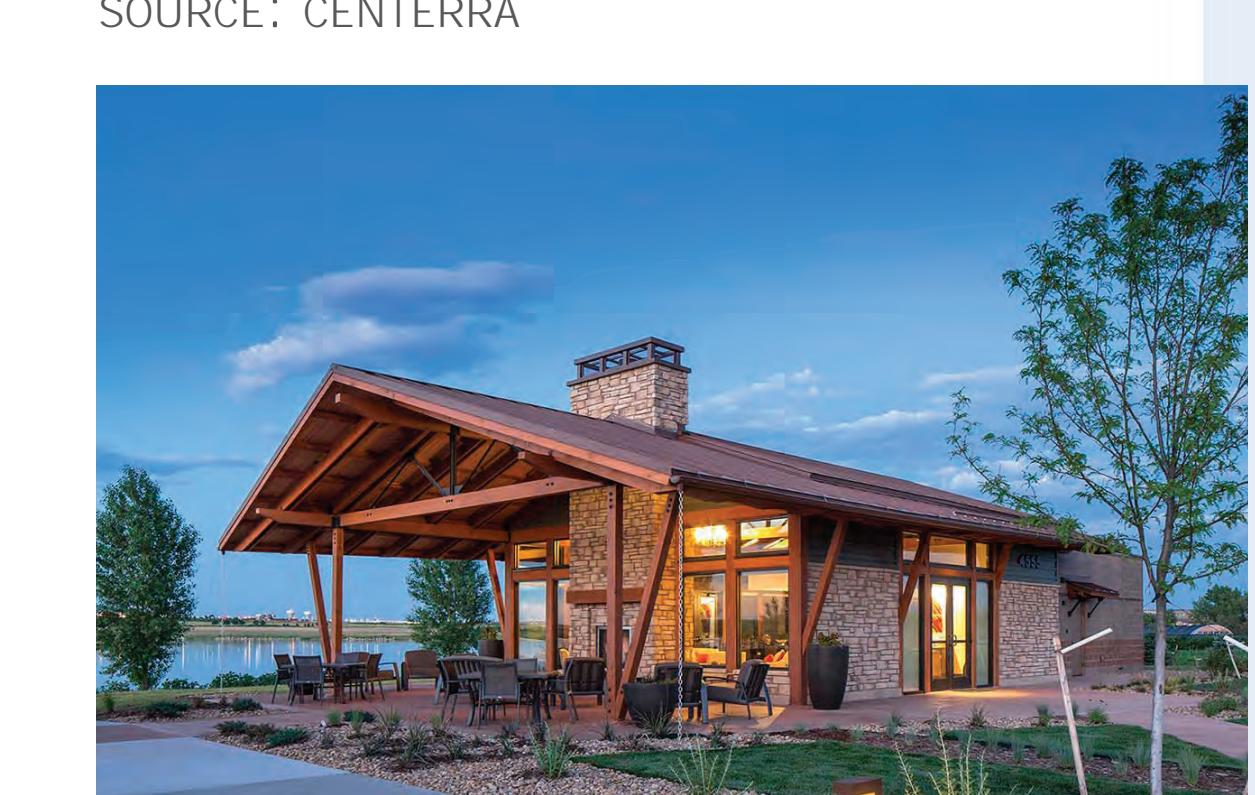
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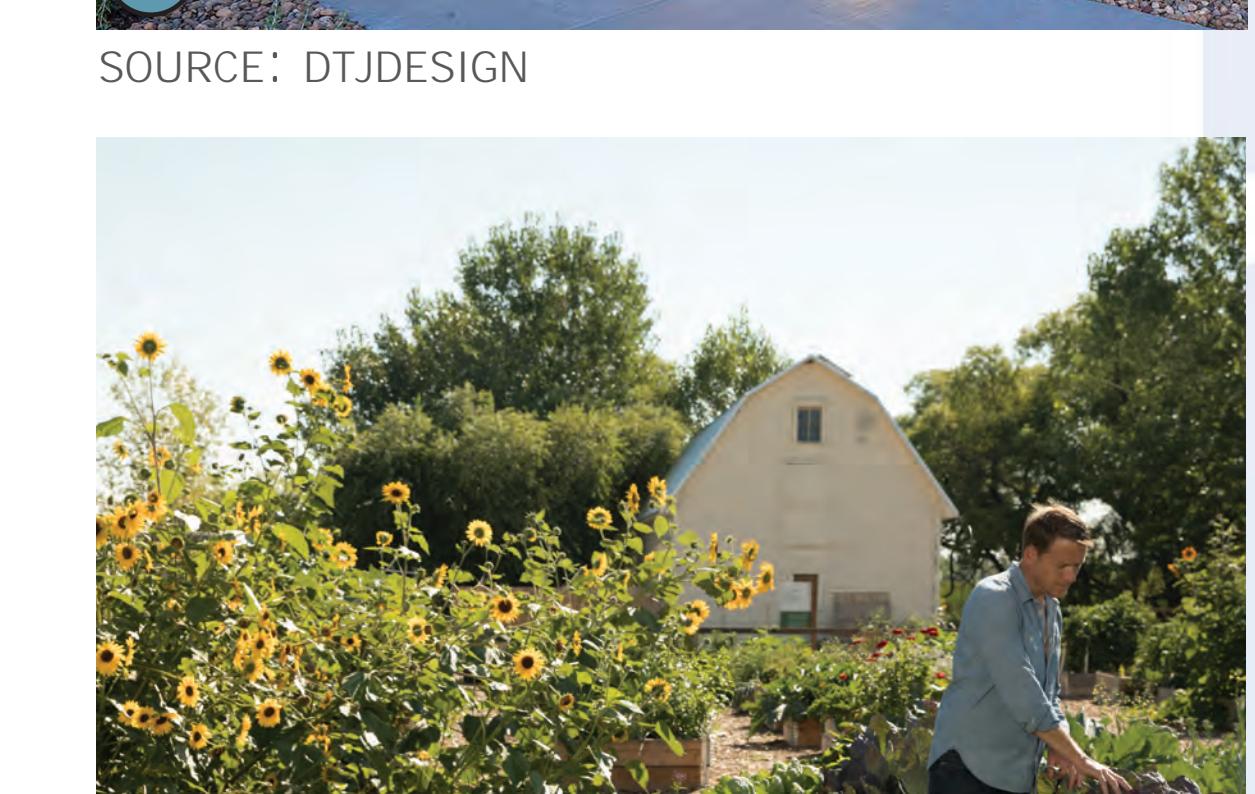
SOURCE: HIGH PLAINS SCHOOL



SOURCE: CENTERRA



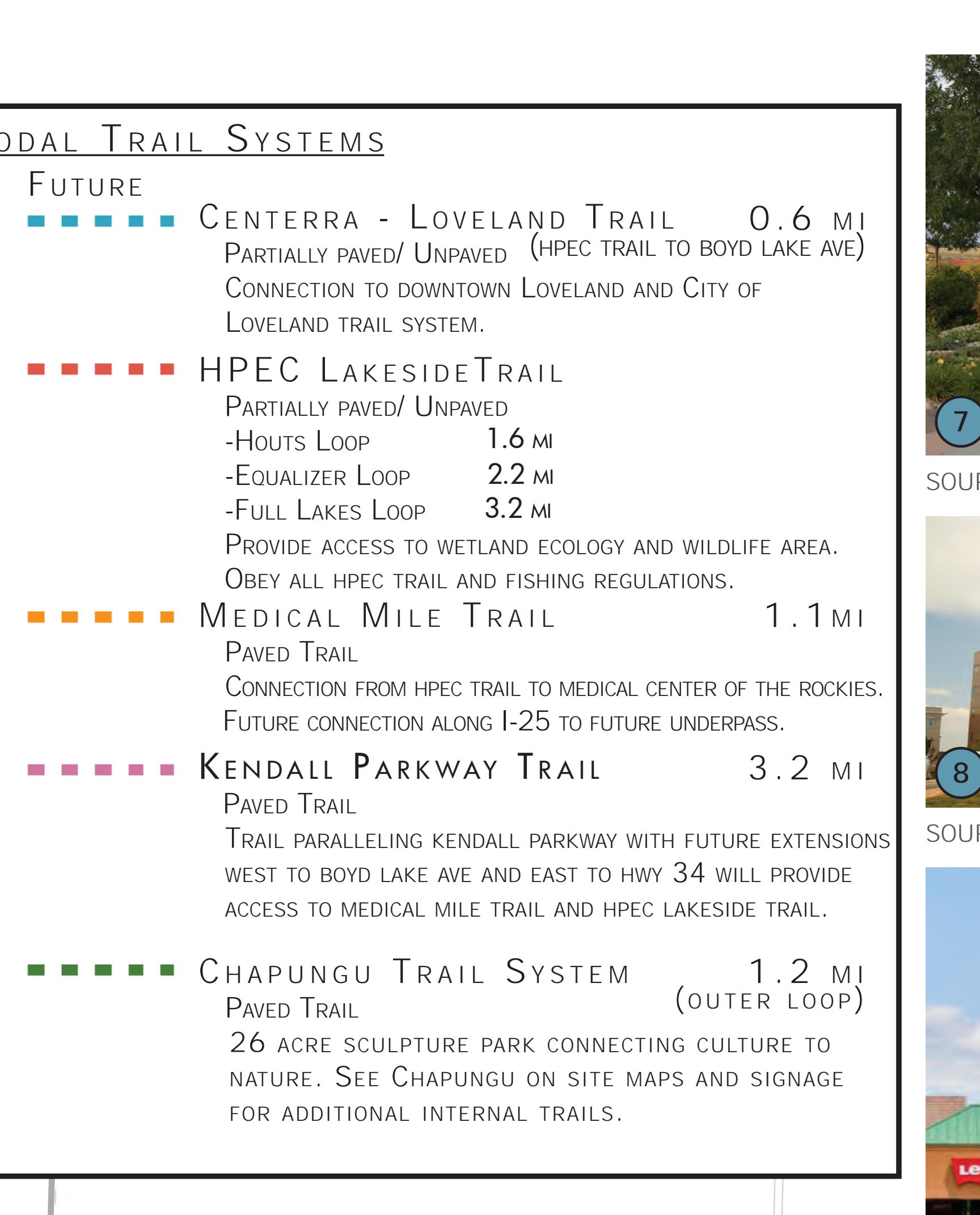
SOURCE: DTJDESIGN



SOURCE: CENTERRA



SOURCE: CENTERRA



SOURCE: CENTERRA



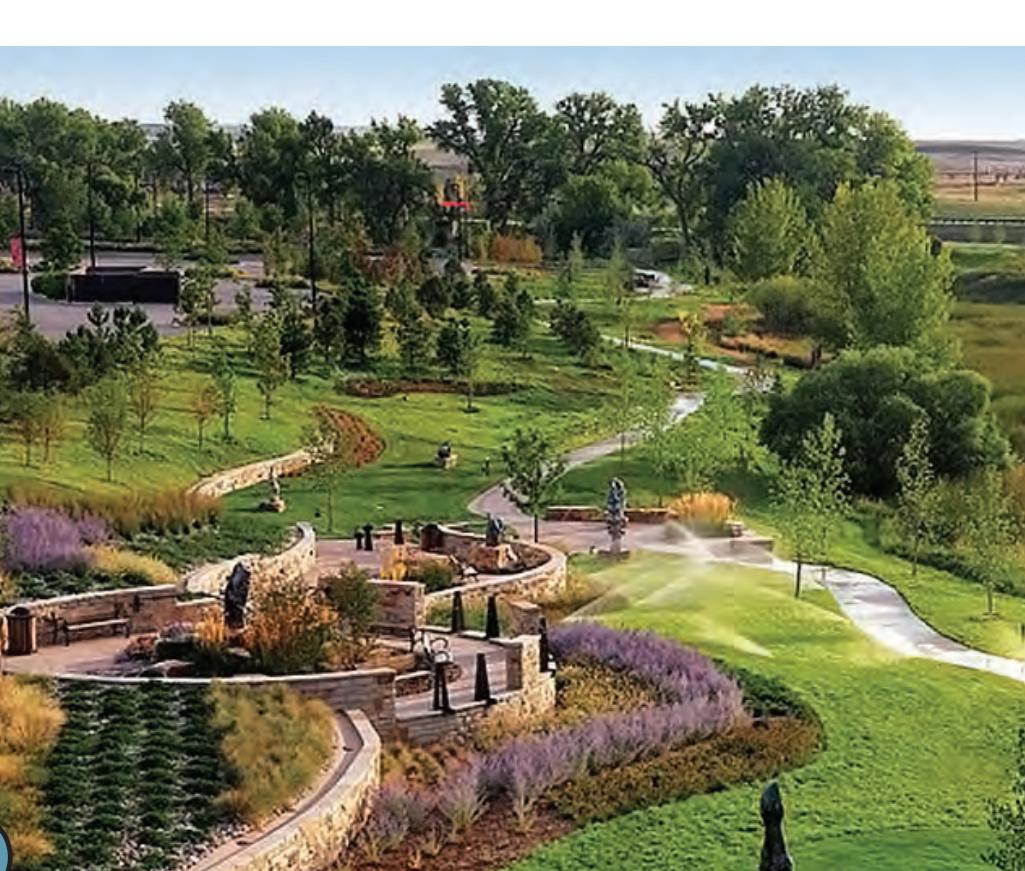
SOURCE: CENTERRA



SOURCE: VISITLOVELANDCO.ORG



SOURCE: CENTERRA



SOURCE: CENTERRA



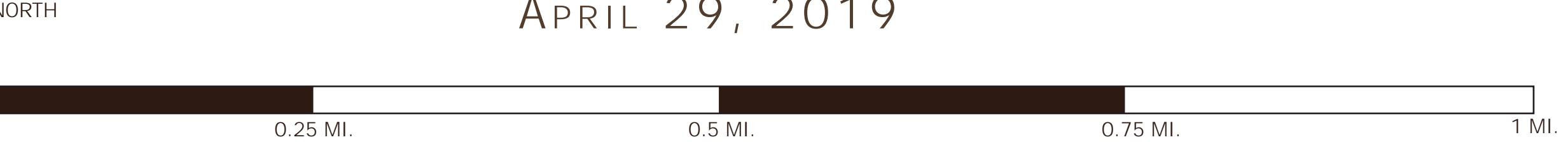
SOURCE: CITYOFLOVELAND.ORG



SOURCE: CENTERRA



CENTERRA
MAJOR TRAIL SYSTEMS
APRIL 29, 2019



Potential Future Regional Connections

