Attachment A

Castle Rock Transportation Master Plan Update

Prepared for:

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Executive Summary

This report is intended to provide an update to the roadway element of the 2017 Castle Rock Transportation Master Plan (TMP). The Town of Castle Rock and surrounding communities have continued to grow rapidly since the development of the 2017 TMP. After the completion of the 2017 TMP, the Denver Regional Council of Governments' (DRCOG) new regional travel model was updated to a 2050 horizon year with updated land use forecasts. The regional roadway and transit networks were updated to reflect the 2050 Metro Vision Regional Transportation Plan. Vehicle trip generation rates were also updated to reflect observed changes in behavior due to COVID-19 and other factors.

Given the continued development and changes in travel demand that have occurred and are continuing to occur in Castle Rock and surrounding areas, this evaluation is needed to help the Town plan, prioritize, and obtain funding for needed roadway improvements. The study identifies priorities to aid the Town in developing the annual Capital Improvement Program (CIP). Broader community outreach was not conducted because this was a technical update with oversight by Castle Rock town staff.

Similar to the 2017 TMP, there are three primary goals of the traffic forecast update study:

- Maintain adequate capacity along existing transportation corridors
- Ensure efficient road network connections for future development
- Fill existing network gaps with new road facilities

Together these three goals aim to ensure that there is roadway capacity and mobility with the projected full buildout of the town. Based on projected growth within the town and surrounding communities, significant roadway improvements are necessary. All previously identified widening projects were confirmed with this effort, along with new widening projects and intersection improvement projects.

Figure ES-1 depicts two general improvement types:

- **Intersection projects** include new intersection configurations, turn lanes, signalization changes, and other geometric and operational improvements. Included are improvements at eight intersections, including four intersections on Plum Creek Parkway, that were analyzed in detail as part of this Road System Evaluation.
- **Road capacity improvements** represent projects that would add capacity to existing roads. In most cases improvements would provide additional through lanes. In some cases, improvements would consist of upgrades to meet higher road classification standards without additional through lanes. This category also includes several **new roads** that are predominantly new connections or extensions of existing roads. It also includes some road connections that fully or partially run through unincorporated Douglas County, such as the Woodlands Boulevard connection and the Macanta Boulevard extension.

Table ES-1 lists 34 roadway improvement recommendations. **Figure ES-2** shows the location of the recommended improvements with numbers corresponding to the first column in **Table ES-1**.

In addition to the road, location, and improvement type listed in **Table ES-1**, the table summarizes other aspects of each recommendation including:

- **Existing TMP:** This column identifies projects included in the current Castle Rock TMP and indicates whether they are new projects or proposed for an amendment to the existing TMP.
- **When Needed:** This column defines the estimated time frame when improvements would be needed, including short-range needs by 2030, mid-range needs from 2030 to 2040, and long-range

needs from 2040 to 2050 or beyond. In many cases, the "When Needed" column does not list a time frame but rather a development trigger. The first 24 projects are recommended for the short-range, mid-range, or long-range and are listed in rough order of priority. Projects 25 through 34 are listed as being development driven. Because specific time frame and priority are not determined, these projects are listed alphabetically.

The final recommendation category in **Table ES-1** is Feasibility Studies**.** These major investments have potential benefits but require more detailed analysis to fully develop and evaluate alternatives and determine whether they should be added to Castle Rock's transportation plans:

- **New road connection across I-25** would be an extension of the Perry Street extension listed as Project #19. This extension would provide connectivity across I-25 for the developing area on both sides of the interstate and would provide some relief to the Plum Creek and Crystal Valley interchanges.
- **I-25/Plum Creek Parkway interchange reconstruction** has been identified as a potential long-range project to improve traffic signal spacing and traffic flow as Plum Creek Parkway traffic grows. This project would potentially reconstruct the existing interchange to a single point urban interchange.
- **Meadows Parkway (US 85) safety and intersection improvements** between I-25 and US 85 (Santa Fe Drive) have been identified as a need, but a detailed study is required to define and evaluate specific improvements.
- **Founders Parkway (SH 86) safety and intersection improvements** between I-25 and Fifth Street has similarly been identified as a need, but a detailed study is required to define and evaluate specific improvements.

Figure ES-2 presents the master street plan, showing the planned Castle Rock roadway network in 2050 with all recommendations implemented.

Figure ES-1. Recommended Improvements

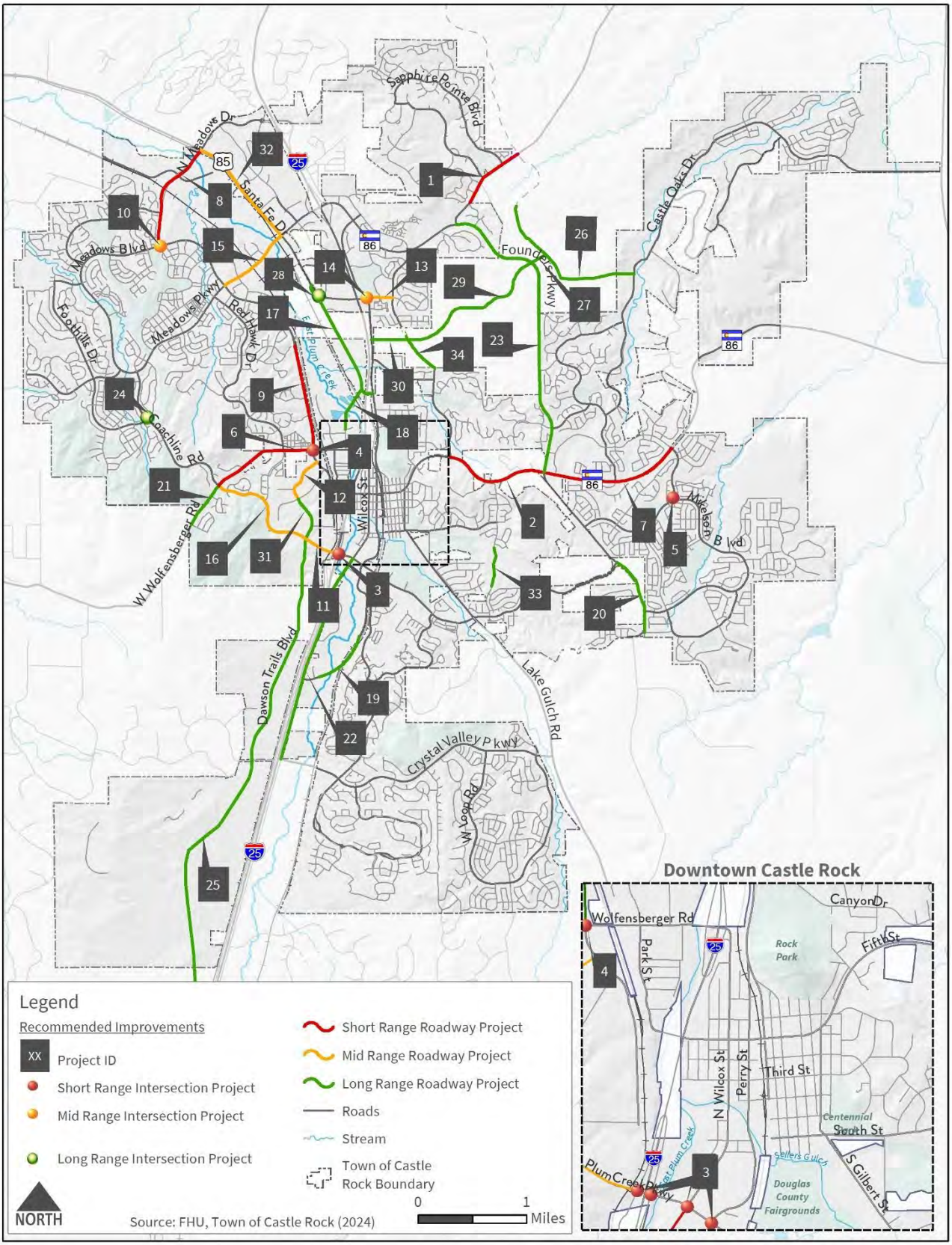


Table ES-1. Roadway Improvement Recommendations List

Short Range (2030)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Cost Estimate	Notes
1	1	Crowfoot Valley Rd.	Founders Pkwy. to Sapphire Pointe Blvd.	Widen to four lanes	Yes	Short Range	$8.8M	Planned for construction in 2025
2	2	Fifth St.	Woodlands Blvd. to Ridge Rd./Founders Pkwy.	Widen to four lanes	Yes	Short Range	$27M	Planned for construction in 2026 and 2028
3	3	Plum Creek Pkwy.	Southbound I-25 Ramp to Perry St.	Intersection turn lanes & sidewalk conversions	No	Short Range	Phase I – $3.3M Phase II – $1.5M Phase III – $4.5M Phase IV-$12.3M	Roadway slightly over capacity, intersections queue into adjacent intersections, Existing AM westbound through and right turn failing at Perry St. Improvements needed even with Crystal Valley Interchange completed, Phased improvements – Ph.I: I-25 SB ramp add SB free right turn, Ph. II: Perry St. intersection, Ph. III: add WB right turn lane at NB ramp, Ph. IV: add 2nd EB left turn at NB ramp, ped bridge over creek and add queuing capacity
4	4	Prairie Hawk Dr.	Wolfensberger Rd. Intersection	Intersection turn lane & signal improvements	Yes (Amended)	Short Range	$5.4M	Currently Level of Service E in the AM, new improvements shown in study
5	5	Enderud Blvd.	Mikelson Blvd. Intersection	"Florida T" intersection or roundabout	No	Short Range	$800K	Westbound left currently fails in AM; Florida T may be best short-range option
6	6	Wolfensberger Rd.	Coachline Rd. to Prairie Hawk Dr.	Widen to four lanes	Yes	Short Range/ Development	$22.3M	Widening includes roundabout at Red Hawk Dr.
7	7	SH 86	Ridge Rd. to Enerud Rd.	Widen to four lanes	Yes	Short Range	$21.1M	Existing roadway volumes at or slightly above capacity
8	8	N. Meadows Dr.	Meadows Blvd. to Santa Fe Dr. (Hwy 85)	Widen to four lanes (bridge expansion)	Yes	Short Range	$33.5M	Existing volumes approaching capacity
9	9	Prairie Hawk Dr.	Melting Snow to Wolfensberger Rd.	Widen to four lanes	Yes	Short Range	$8.9M	Currently shown in TMP with construction by 2030

Mid Range (2030–2040)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Cost Estimate	Notes
10	10	N. Meadows Dr.	Meadows Blvd. Intersection	Intersection turn lane & signal improvements	No	Mid Range	TBD	Improvements identified in study
11	11	Plum Creek Pkwy.	I-25 to Dawson Trails Blvd.	Widen to six lanes	No	Mid Range/ Development	$3.1M	Widen to three lanes in each direction with continuous acceleration/deceleration lanes Some developer responsibilities
12	12	Prairie Hawk Dr. (realignment)	Topeka Way to Prairie Hawk Dr.	Widen to four lanes	Yes	Mid Range/ Development	$9.9M	Realign along Atchinson Way Private development could trigger earlier need for improvements
13	13	Blackfeather Trail	Front St. to Woodlands Blvd.	Widen to four lanes	No	Mid Range/ Development	$2.5M	Woodlands Blvd. connection could trigger earlier need for improvements Some development responsibilities
14	14	Front St.	Black Feather Trl. Intersection	Intersection improvements	Yes (Amended)	Mid Range/ Development	$3.9M	Currently Level of Service F in the PM Improvements constrained by I-25 bridge width Some development responsibilities
15	15	Meadows Pkwy.	Meadows Blvd. to Santa Fe Dr. (Hwy. 85)	Widen to six lanes (bridge expansion)	Yes	Mid Range	$39M	Existing volumes approaching capacity Widening N. Meadows Dr. (Project #8) first should provide relief
16	16	Plum Creek Pkwy.	Prairie Hawk Drive to Coachline	Widen to four lanes	Yes	Mid Range	$14.9M	Four lanes to the MAC may be needed sooner

Long Range (2040 to 2050+)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Cost Estimate	Notes
17	17	Liggett Rd.	Hwy 85 to Front St.	Widen from two to four lanes (collector to arterial)	Yes	Long Range/ Development	$14.2M	Splits at bridge: two lanes over I-25 bridge, two lanes from bridge to Caprice Some developer responsibilities
18	18	Caprice Dr. North Extension	Liggett Rd. to Caprice Dr. (bridge)	New two lane Collector (bridge) across East Plum Creek	Yes	Long Range/ Development	$22M	Connection relieves Front St. and reduces traffic cutting through downtown
19	19	Perry St. South Extension	Perry St. to Wilcox St./Frontage Rd.	New two lane road (bridge) across East Plum Creek (river)	Yes	Long Range	$11.2M	Relieves Wilcox and Plum Creek Pkwy. intersection
20	20	Ridge Rd.	Plum Creek Pkwy. to Appleton Way	Improve to two lane Minor Arterial standards	Yes	Long Range	$4M	Complete two lane Minor Arterial improvements between Appleton Way and Plum Creek Pkwy.
21	21	Wolfensberger Rd.	Coachline Rd. to Midnight St.	Improve to two lane minor arterial standards	Yes (Amended)	Long Range/ Development	$6M	Currently shown as four lane Major Arterial in TMP Amend to 2-lane Minor Arterial per 2050 projected volumes
22	22	Wilcox St. (E. Frontage St.)	Plum Creek Pkwy. to Crystal Valley Pkwy.	Construct to two lane Minor Arterial with turn lane improvements	Yes	Long Range/ Development	$8.3M	Turn lane improvements are implemented as development occurs
23	23	Founders Pkwy. (SH 86)	Crowfoot Valley Rd. to Fifth St.	Turn lane improvements between Crimson Sky Drive and Rising Moon Drive	Yes (Amended)	Long Range/ Development	$4.4M	Potential long-range six lanes to Fifth St.
24	24	Coachline Rd.	Foothills Dr. intersection	Convert to roundabout	Yes	Long Range	$2.5M	Monitor level of service to determine if needed sooner

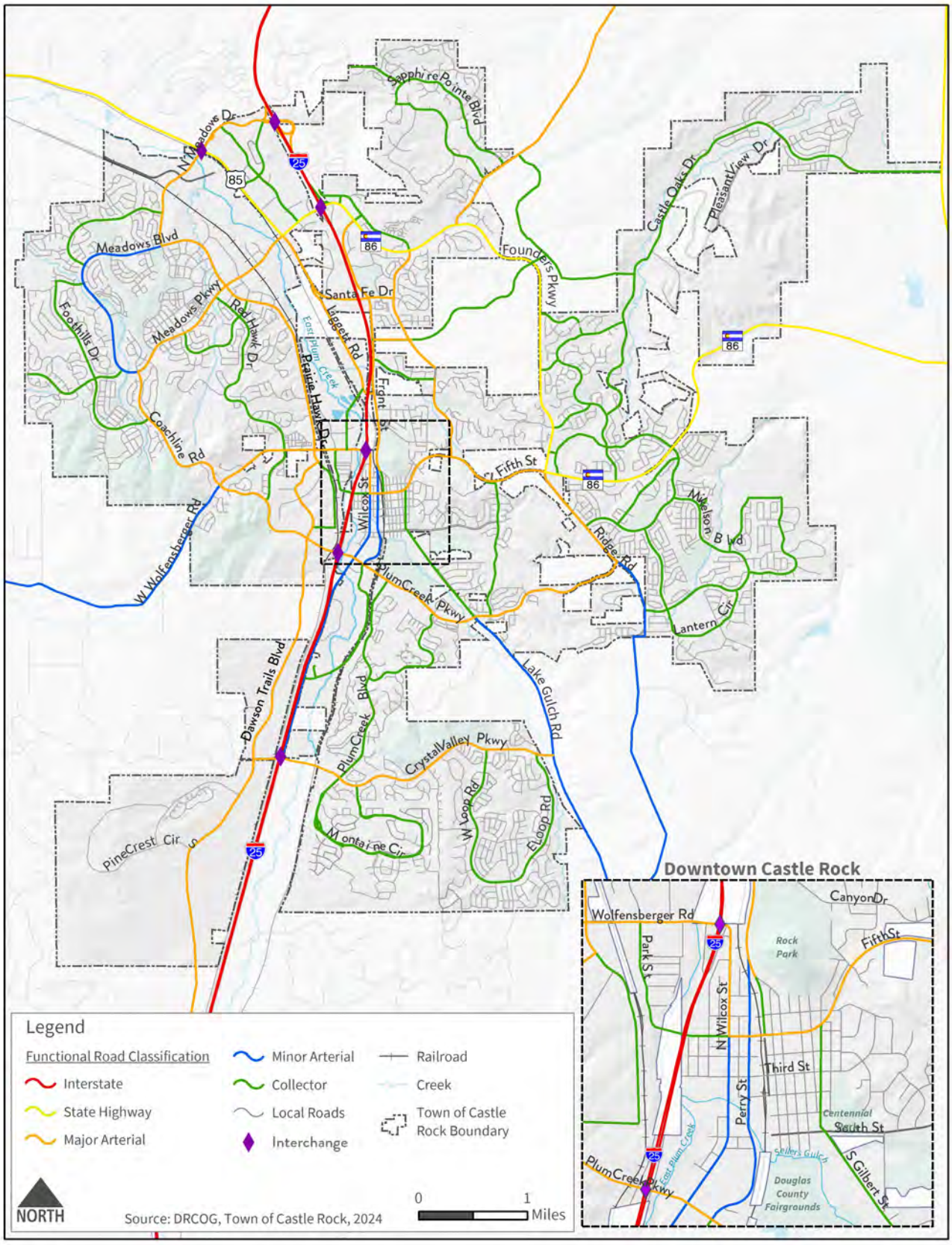
Development Driven

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Cost Estimate	Notes
25	NA	Dawson Trails Blvd.	Plum Creek Pkwy. to Town limits	New four to six lane major arterial (frontage road relocation)	Yes	Development Driven	$6M	Private development responsible for widening project
26	NA	Macanta Blvd. south extension	Town limits to Castle Oaks Dr.	New two lane road connecting Crowfoot Valley Rd. to Castle Oaks Dr.	No	Development Driven	$6.5M	Road to be built by private development
27	NA	New road connection	Founders Pkwy. to Macanta (Castle Oaks/Crowfoot)	New two lane road (Founders Pkwy. to Macanta extension)	No	Development Driven	$5.5M	Road to be built by private development
28	NA	Liggett Rd.	Santa Fe Dr. (Hwy. 85) intersection	Convert to roundabout	Yes	Development Driven	$4.3M	Roundabout to be built by private development
29	NA	New road connection	Founders Pkwy. to Woodlands Blvd.	New two lane Collector	Yes	Development Driven	$7M	Noted in previous TMP as Pine Canyon Development
30	NA	New road connection	Woodlands Blvd. to Front St.	New four lane major arterial	Yes	Development Driven	$5M	Noted in previous TMP as Pine Canyon/Pioneer Ranch Developments
31	NA	Prairie Hawk Dr. extension	Plum Creek Pkwy. to Topeka Way	New four lane major arterial	Yes	Development Driven	$9.7M	Private development could trigger earlier need for improvements
32	NA	US 85	Meadows Pkwy. to town limits	Part of larger US 85 improvement project	Yes	CDOT Project	$17M	Project is in CDOT's 10-year plan to construct (not a town project)
33	NA	Valley Dr. south extension	Hover Dr. to Hudson Ln.	New two lane Collector	Yes	Development Driven	$3.5M	Private development responsible for project
34	NA	Woodlands Blvd.	Tippen Pl/Dale Pony Dr. to Scott Blvd.	New four lane major arterial	Yes	Development Driven	$5.2M	Woodlands Blvd. connection to be made by private development (Pine Canyon & Pioneer Ranch)

Feasibility Studies

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
	NA	Extend Perry St. across I-25	Wilcox St. to Dawson Trails Blvd.	New two lane road (bridge) across I-25	No	Feasibility Study	Relieves both Plum Creek Pkwy. and Crystal Valley Pkwy. interchanges
	NA	I-25 Interchange	Plum Creek Pkwy.	Feasibility Study	No	Feasibility Study	Examine long-term interchange improvements, including a single point urban interchange
	NA	Meadows Pkwy. (Hwy 85)	I-25 to Santa Fe Dr.	Corridor Improvements	Yes	Traffic and Safety Study	Part of SH 86 / US 85 traffic and safety study
	NA	Founders Pkwy. (SH 86)	I-25 to Crowfoot Valley Rd.	Corridor Improvements	Yes	Traffic and Safety Study	Part of SH 86 / US 85 traffic and safety study

Figure ES-2. Master Street Plan



1. Introduction

Purpose of Study

This report is intended to provide an update to the roadway element of the 2017 Castle Rock Transportation Master Plan (TMP). The Town and surrounding communities have continued to grow rapidly since the development of the 2017 TMP. The Colorado State Demographer reports Castle Rock's population at 79,084 in 2022, representing a 42 percent increase compared with the 2015 population of 55,591 cited in the TMP.

After the completion of the 2017 TMP, the Denver Regional Council of Governments' (DRCOG) regional travel model was updated to a 2050 horizon year with updated land use forecasts. The regional roadway and transit networks were updated to reflect the 2050 Metro Vision Regional Transportation Plan. Additionally, vehicle trip generation rates were also updated to reflect observed changes in behavior due to COVID-19 and other factors.

Given the continued development and changes in travel demand that have occurred and are continuing to occur in Castle Rock and surrounding areas, this evaluation is needed to help the Town plan, prioritize, and obtain funding for needed roadway improvements. The study identifies priorities to aid the Town in developing the annual Capital Improvement Program (CIP). Broader community outreach was not conducted because this was a technical update with oversight by Castle Rock staff.

Report Contents

Following the Introduction, this report is presented in five Chapters as follows:

- **Chapter 2 – Existing Roadway Network** presents information on the existing roadway system including traffic counts and evaluation of existing congestion levels.
- **Chapter 3 – Traffic Forecasting Model** describes the refinement and use of the DRCOG regional travel model to develop traffic forecasting for the long-range horizon year 2050.
- **Chapter 4 – Traffic Forecasts and Analysis** presents the evaluation of forecasted 2050 operations and congestion on the road network and the improvements needed to accommodate projected demand.
- **Chapter 5 – Intersection Analysis** presents detailed analysis and recommendations for eight intersections selected as ones needing improvements to accommodate growing demand.
- **Chapter 6 – Road System Improvement Recommendations** provides a prioritized set of roadway system improvements, including road capacity (widening), new roads, intersection improvements, and recommended feasibility studies to evaluate potential major improvement projects.

2. Existing Road Network

Functional Classification

The road network in Castle Rock was established with a hierarchy of road classifications designed to provide efficient and safe travel. Due to the Town's unique topography, the network substantially deviates from the grid system that is more prevalent in many other Colorado Front Range communities.

Interstate 25 is Castle Rock's only freeway serving uninterrupted, long-distance travel between Colorado communities and neighboring states.

Major Arterials include State Highways (SH) 85 and 86 and several Town arterials. These roads serve longer distance regional trips at relatively high speeds. Major Arterials generally have four to six through lanes or are currently two lane roads with the potential to expand to four lanes. This category is equivalent to the principal arterial designation by DRCOG and several other jurisdictions.

Minor Arterials serve medium length trips and deliver traffic from Collector and local roads to the Major Arterials and freeways. They may have two or four through lanes but generally have the potential to be widened to four lanes.

Collectors are typically two-lane roads that serve short to medium length trips between Local Streets and the arterial road system.

Local Streets provide direct access to adjacent land uses.

Figure 1 shows existing Castle Rock roadways and functional classifications. The Major Arterial, Minor Arterial, and Collector roadways constitute the Town's major roadway system and are the primary focus of this analysis. **Figure 2** shows the existing numbers of through lanes.

Traffic Volumes

Figure 3 shows the existing daily traffic volumes on major roadways based on the latest available traffic counts. The Town has taken most counts over the past four years, between 2021 and 2024. In cases where these more recent counts were not available, counts from 2017 to 2019 are shown; 2020 counts were not considered representative due to the influence of COVID-19 and are not shown.

Figure 1. Existing Roadways and Classification

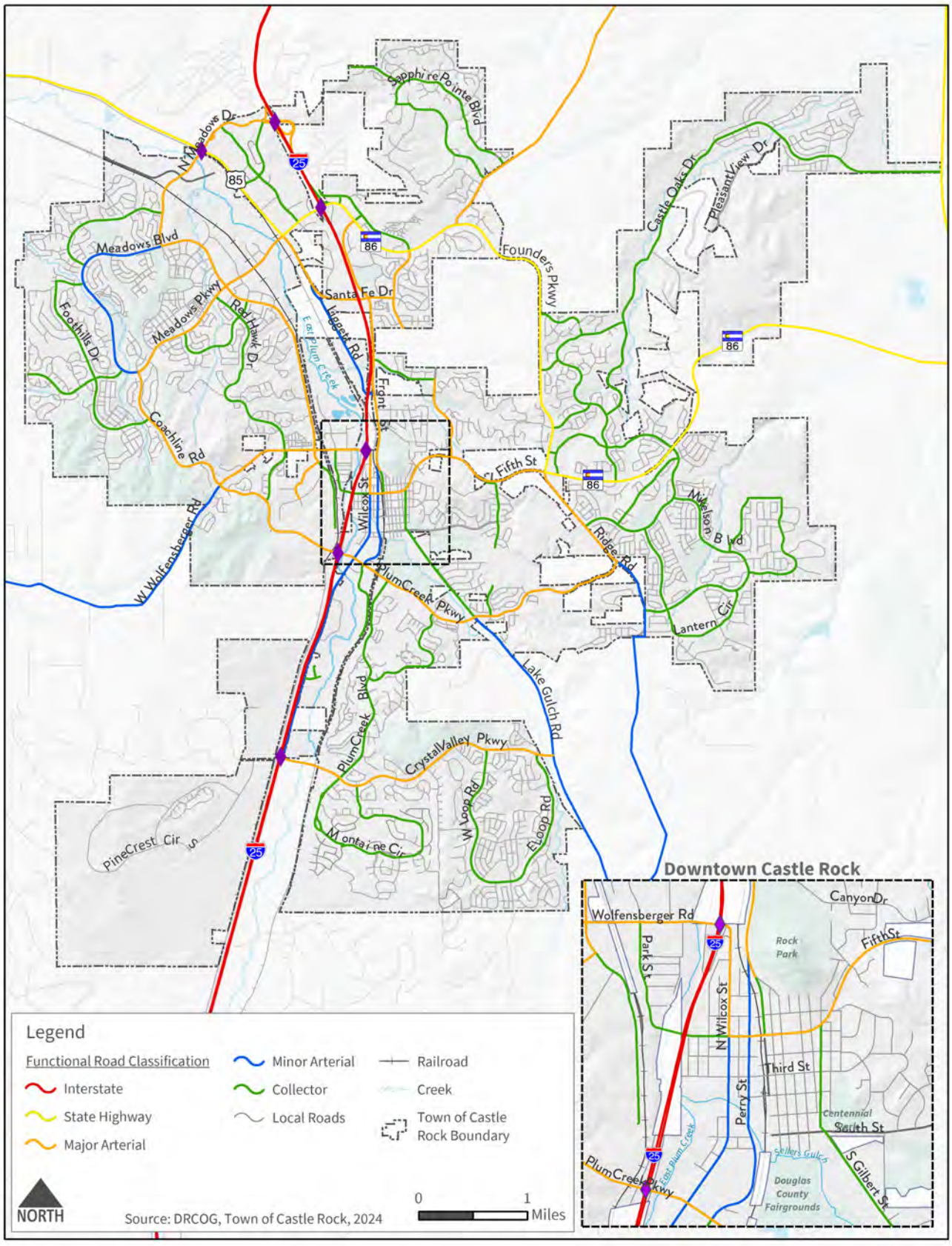


Figure 2. Existing Number of Lanes

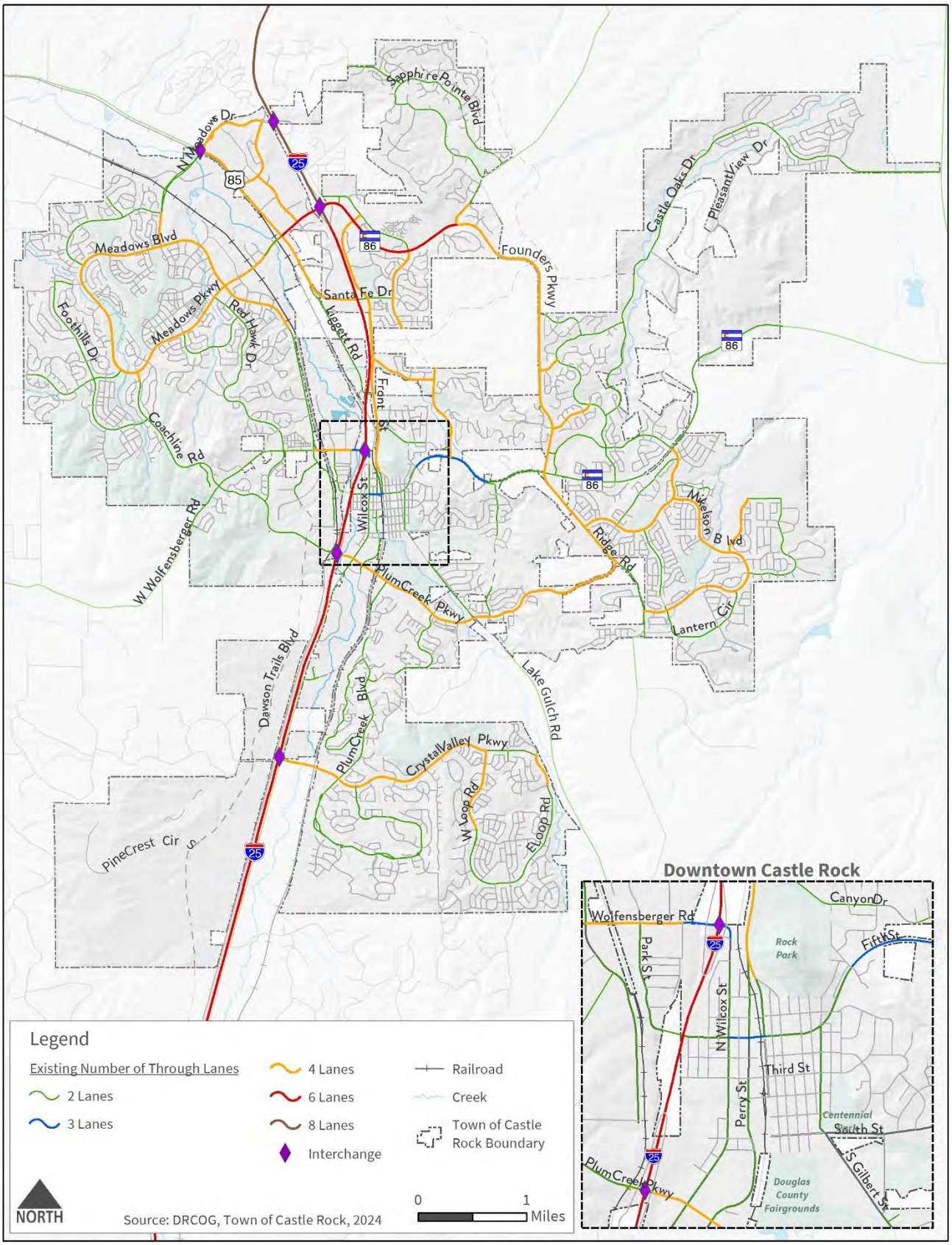
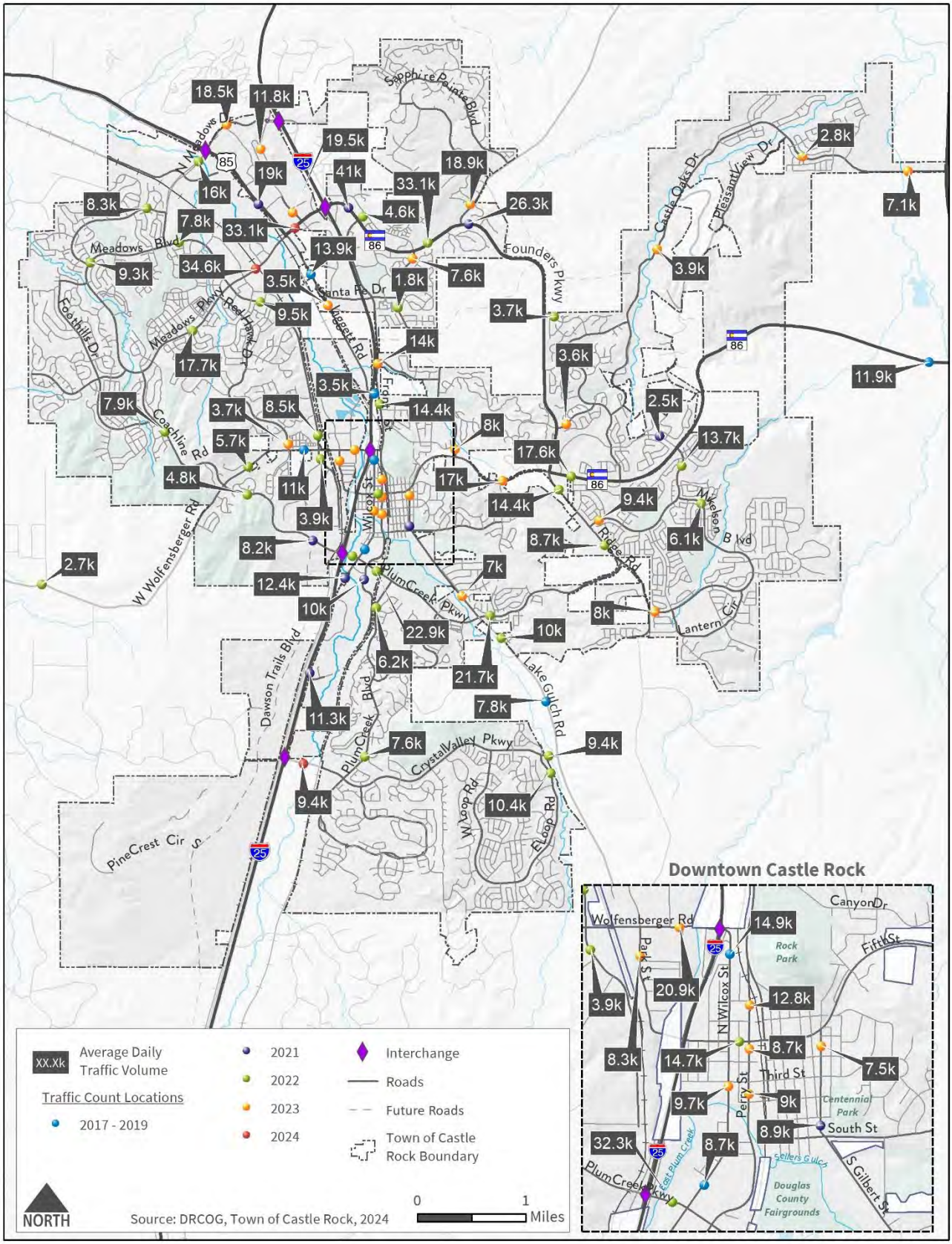


Figure 3. Daily Traffic Counts



Capacity Analysis

Traffic volumes can be compared against generalized capacities to determine road deficiencies and the need to consider road system improvements. Although each road has different characteristics and specific capacities may vary, generalized capacities can be assigned to different roadway classifications as a tool to evaluate operations and plan for improvement needs. **Table 1** provides planning level capacities per through lane for the different major road classifications. These are the same capacities developed and used in the 2017 TMP.

The bottom half of **Table 1** provides thresholds for the relationship between daily traffic volumes and capacities on roadways. Roads with volume/capacity ratios (v/c) greater than 1.2 are listed as over capacity and roads with v/c between 1.0 and 1.2 are listed as slightly over capacity. Those roads are expected to be highly congested during peak periods and warrant consideration of improvements.

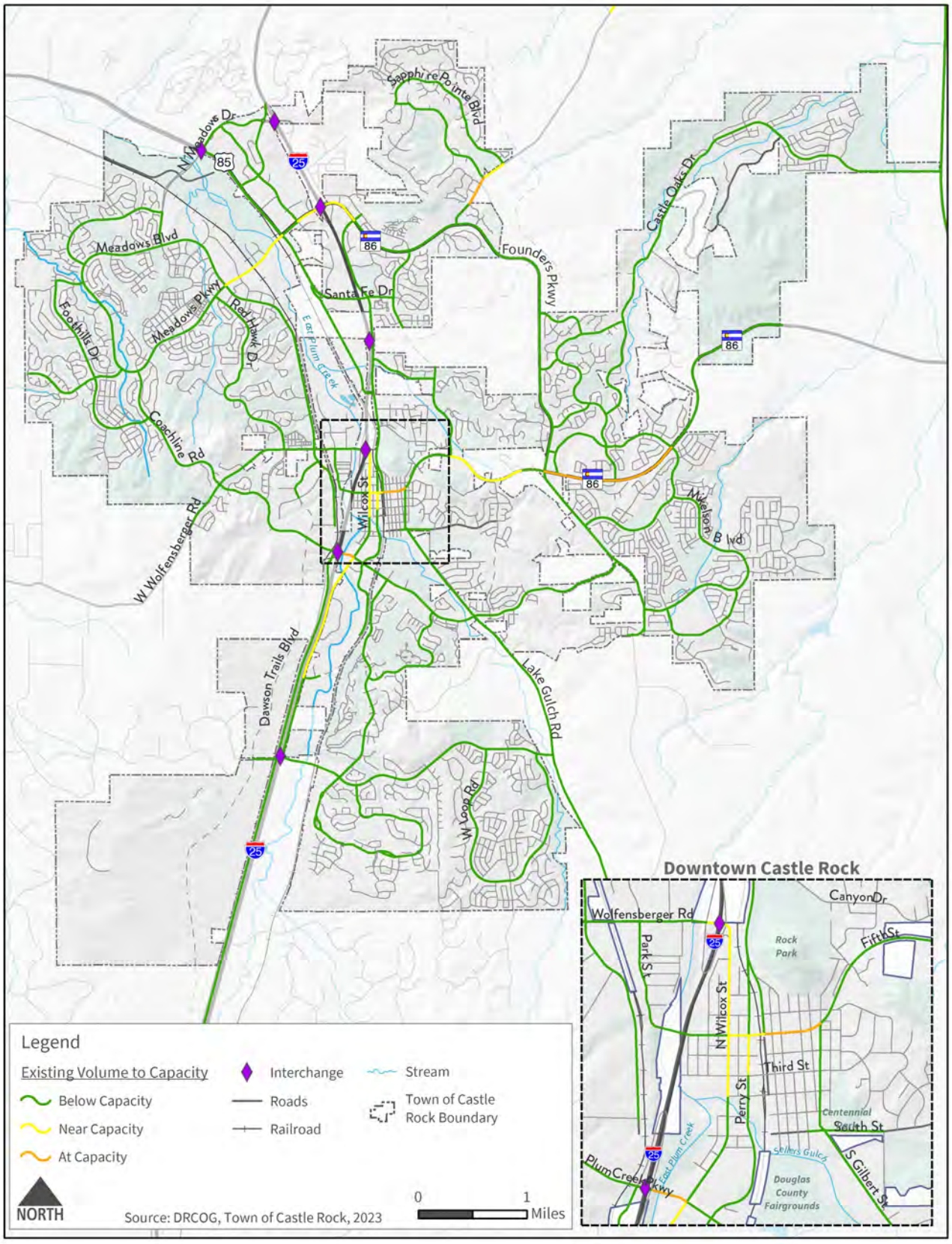
Table 1. Planning Level Capacities

Functional Classification	Daily Traffic Volume Capacity (per through lane)
Freeway	20,000
Major Arterial / State Highway	8.750
Minor Arterial	7,500
Collector	6,000

Volume/Capacity Ratio	Capacity Category
< 0.8	**Below Capacity**
0.8 – 1.0	**Near Capacity**
1.0 – 1.2	**Slightly Over Capacity**
>1.2	**Over Capacity**

Figure 4 shows existing v/c ratios on Castle Rock roads. No roads currently exceed the 1.2 v/c threshold. Roads with v/c measured as greater than 1.0 are shown in orange and include segments of SH 86, Fifth Street, Plum Creek Parkway, and Crowfoot Valley Road.

Figure 4. Existing Volume/Capacity Ratios



3. Traffic Forecasting Model

Model Overview

The most current DRCOG regional travel model, FOCUS Version 2.3.1, was used to develop traffic forecasts for the planning horizon year 2050. This model updates demographic forecasts, road and transit networks, trip generation rates, and other model parameters used in the 2017 TMP. For this Castle Rock road system analysis, refinements to the DRCOG 2050 model were made to the Castle Rock area demographic forecasts and roadway networks as described in the following sections.

Demographic Forecasts

Demographic forecasts, including households and employment, are a primary building block of travel models. Forecasts are developed for designated areas of the Denver model region referred to as Transportation Analysis Zones (TAZs). Castle Rock planners carefully review DRCOG's 2050 household and employment forecasts for TAZs in and around the town to determine how well regional forecasts reflect the latest development plans and expectations.

Updates were made to DRCOG forecasts in an attempt to represent an essentially full buildout of the town, along with growth expectations for major developments surrounding the town. Forecasts were reviewed and updated at the TAZ level, and those detailed forecasts, along with a TAZ map, are provided in **Appendix A**.

To illustrate the compared growth patterns, TAZs in the town and surrounding area were aggregated into seven subareas, as shown on **Figure 5** and **Figure 6**. Subareas 1 through 4 represent the four quadrants of Castle Rock divided by I-25 and SH 86/Wolfensberger Road Subareas 5, 6, and 7 represent surrounding areas to the northeast, northwest, and southeast that most affect Castle Rock roads.

Table 2 shows DRCOG's households and employment data and forecasts by subarea for 2023 and 2050. Employment refers to all jobs that are based on the illustrated parts of Castle Rock or surrounding areas.

The "2050 Updated" columns show the adjustments to 2050 forecasts made by Castle Rock planners. In reflecting most current growth expectations, the adjusted forecasts added more than 10,000 households (64,491 versus 54,355) and more than 7,000 employment (47,496 versus 40,268) to DRCOG forecasts. Most of the added households and all of the added employment are in Subarea 4, reflecting accelerated development expectations in the southwest part of the town, including the Dawson Trails and surrounding developments.

The right columns of **Table 2** show the 2017 TMP's 2040 forecasts for comparison. The comparison shows that DRCOG 2050 forecasts are substantially higher than the previous 2040 forecasts, particularly for households in Subarea 6 north of Castle Rock, including new development expectations in Castle Pines and unincorporated Douglas County.

Figure 5. Household Growth by Subarea

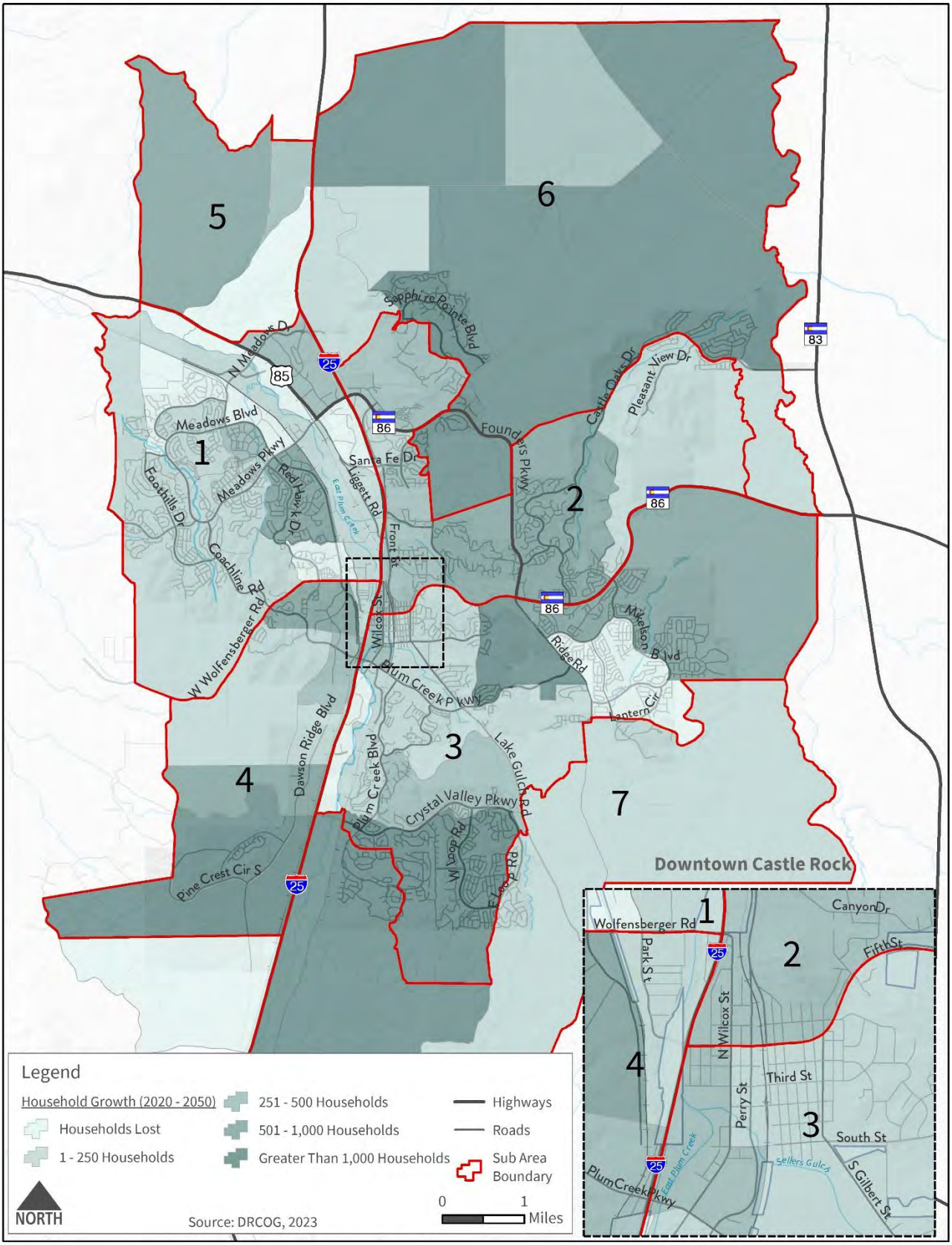


Figure 6. Employment Growth by Subarea

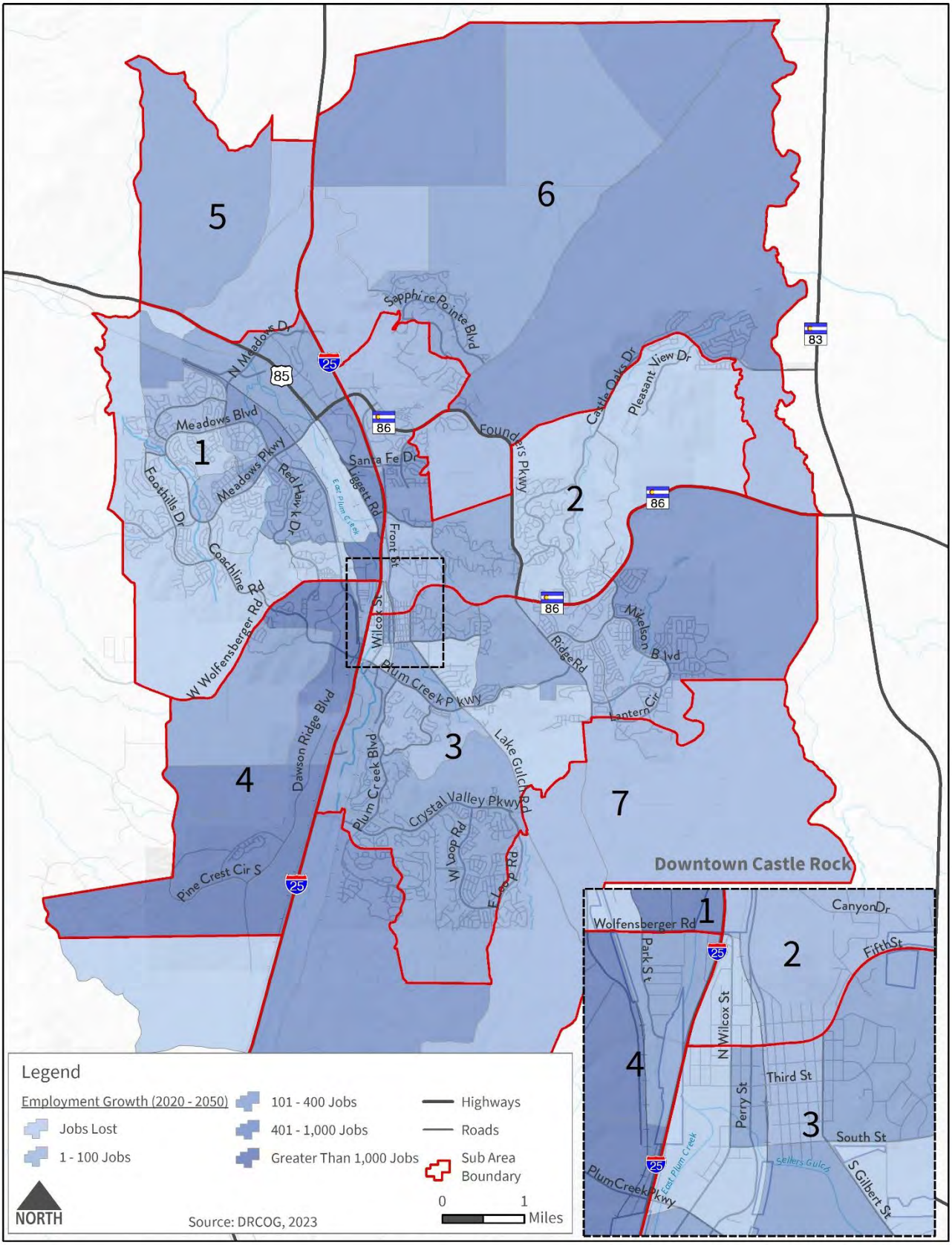


Table 2. Demographic Forecasts by Subarea

Subareas	2023		2050 DRCOG		2050 Updated		2040 (2017 TMP)	
	HH	EMP	HH	EMP	HH	EMP	HH	EMP
1	9,906	7,902	10,943	11,154	11,404	11,348	9,453	13,954
2	4,317	6,569	5,363	7,330	7,013	5,679	6,485	5,614
3	12,002	8,569	16,725	11,554	16,380	9,203	12,508	7,743
4	973	1,903	1,241	3,239	7,737	14,195	7,101	8,565
CR Subtotal	**27,198**	**24,943**	**34,272**	**33,277**	**42,534**	**40,425**	**35,547**	**35,876**
5	2,116	1,033	2,745	1,228	3,194	1,228	2,547	1,122
6	4,711	2,252	14,767	4,579	16,192	4,659	6,439	948
7	956	407	2,571	1,184	2,571	1,184	2,102	228
TOTAL	**34,981**	**28,635**	**54,355**	**40,268**	**64,491**	**47,496**	**46,635**	**38,174**

HH = households
EMP = employment

Roadway Networks

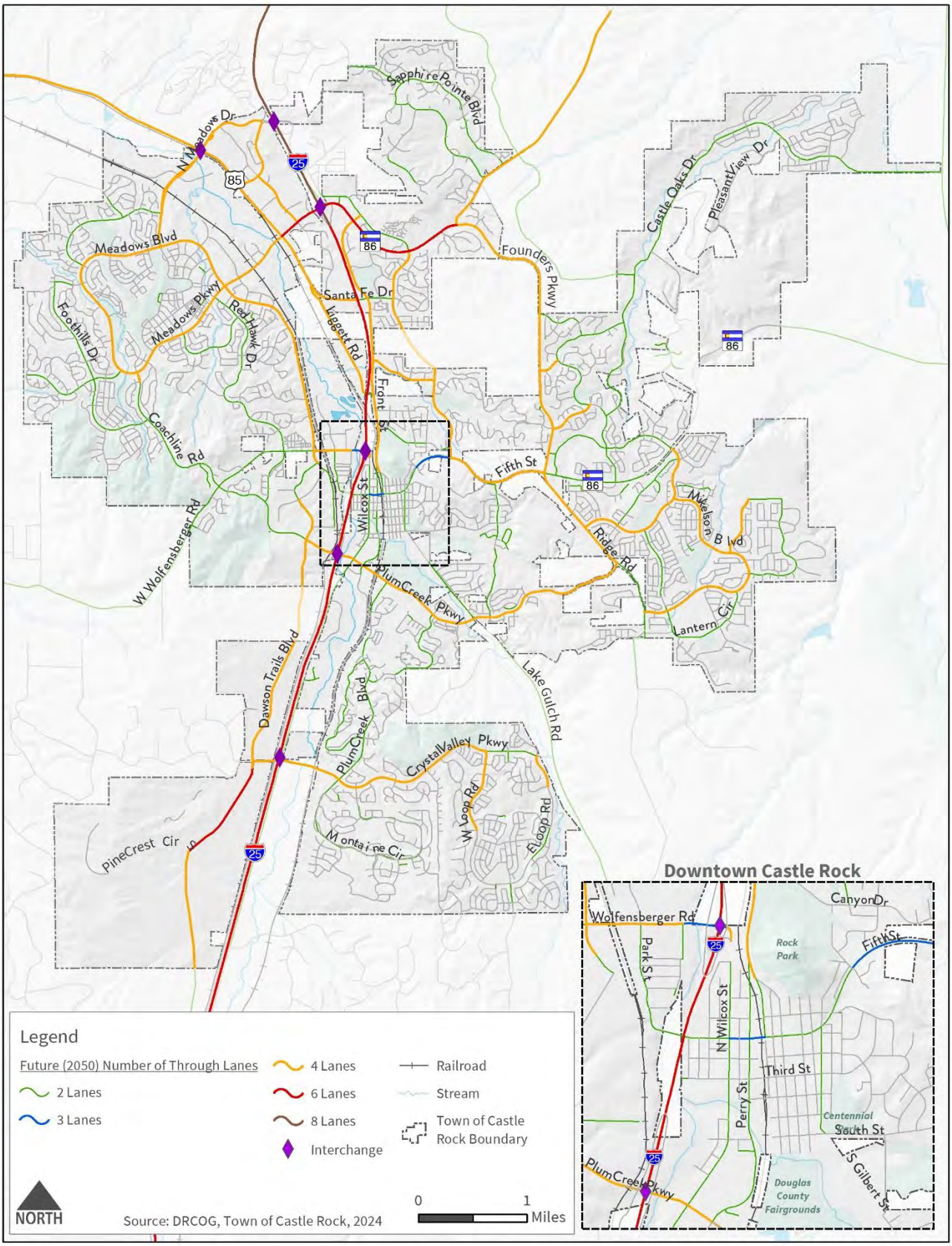
The study team also carefully reviewed the existing and future roadway networks in Castle Rock to refine those networks to better reflect the Castle Rock road system that is the focus of this analysis. Adjustments included the addition of some road connections planned by the Town of Castle Rock or private development and refinements to functional classifications, lanes, and zone connectors, to better match Castle Rock's conditions and plans.

Table 3 lists the improvement projects included in the 2050 baseline. These projects are currently in the five-year CIP, are short/mid-term priorities, or are the responsibility of developers or other agencies. However, some projects (e.g., Plum Creek Parkway) have multiple responsible parties to construct the improvements. **Table 3** projects are also included in the prioritized **Roadway Improvement Recommendations List**. **Figure 7** shows the road system and number of through lanes in the network used for the baseline 2050 forecasting model.

Table 3. Road Improvements Included in 2050 Baseline Road Network

Road	Location	Improvement
Crowfoot Valley Rd.	Founders Pkwy. to Sapphire Pointe Blvd.	Widen to four lanes
Fifth St.	Woodlands Blvd. to Ridge Rd./Founders Pkwy.	Widen to four lanes
N. Meadows Dr.	Meadows Blvd. to Santa Fe Dr. (Hwy 85)	Widen to four lanes
Plum Creek Pkwy.	I-25 to Dawson Trail Blvd.	Widen to four lanes
Crystal Valley Interchange	I-25/Crystal Valley Pkwy. interchange	New interchange
Dawson Trails Blvd.	Plum Creek Pkwy. to town limits	New four to six lane road
Macanta Blvd. and new road	New road and extension of Macanta Blvd. to Castle Oaks Dr. with connection to Founders Pkwy.	New two lane road
Woodland Blvd.	Extension from Tippen Pl./Dale Pony Dr. to Scott Blvd.	New four lane road
Prairie Hawk Dr. (realigned)	Plum Creek Pkwy. to Prairie Hawk Dr.	New two to four lane road
Valley Dr.	Hover Dr. to Hudson Ln.	New two lane road
US 85	Meadows Pkwy. to town limits	Widen to four lanes

Figure 7. Future Lanes Baseline 2050



4. Traffic Forecasts and Analysis

This chapter describes the results of three 2050 traffic forecast models conducted for this road system analysis. Each forecast uses the adjusted DRCOG model as described in **Chapter 3**. Model forecasts were adjusted based on a comparison of the current year model with actual traffic counts using the methodology prescribed by DRCOG and documented in National Cooperative Highway Research Program Report 765. All three 2050 forecasts include the same 2050 demographic growth projects and other model parameters. They differ in the assumed roadway network as follows:

1. **2050 baseline forecasts** include the existing roadway network, plus the projects identified in **Table 3**.
2. **2050 forecasts with potential connections** include a set of roadway upgrades and new connections that were developed to address v/c issues and improve overall mobility based on analysis of the baseline forecasts.

2050 Baseline Forecasts

Figure 8 shows the daily traffic forecasts for the 2050 baseline forecast scenario. Forecasts are shown in thousands and are compared with existing daily traffic volumes. The assumed new connections are shown with dashed lines.

Figure 9 shows the v/c relationships using the capacity thresholds described previously. Roads that are projected to be over capacity (shown in red with v/c greater than 1.2) or at capacity (shown in orange with v/c between 1.0 and 1.2) are found throughout the network, including segments of Meadows Parkway, Santa Fe Drive, Blackfeather Trail, Crowfoot Valley Road, Wolfensberger Road, Prairie Hawk Drive, SH 86, Fifth Street, Perry Street, Wilcox Street, Plum Creek Parkway, and Crystal Valley Parkway.

Figure 8. Baseline 2050 Traffic Forecasts

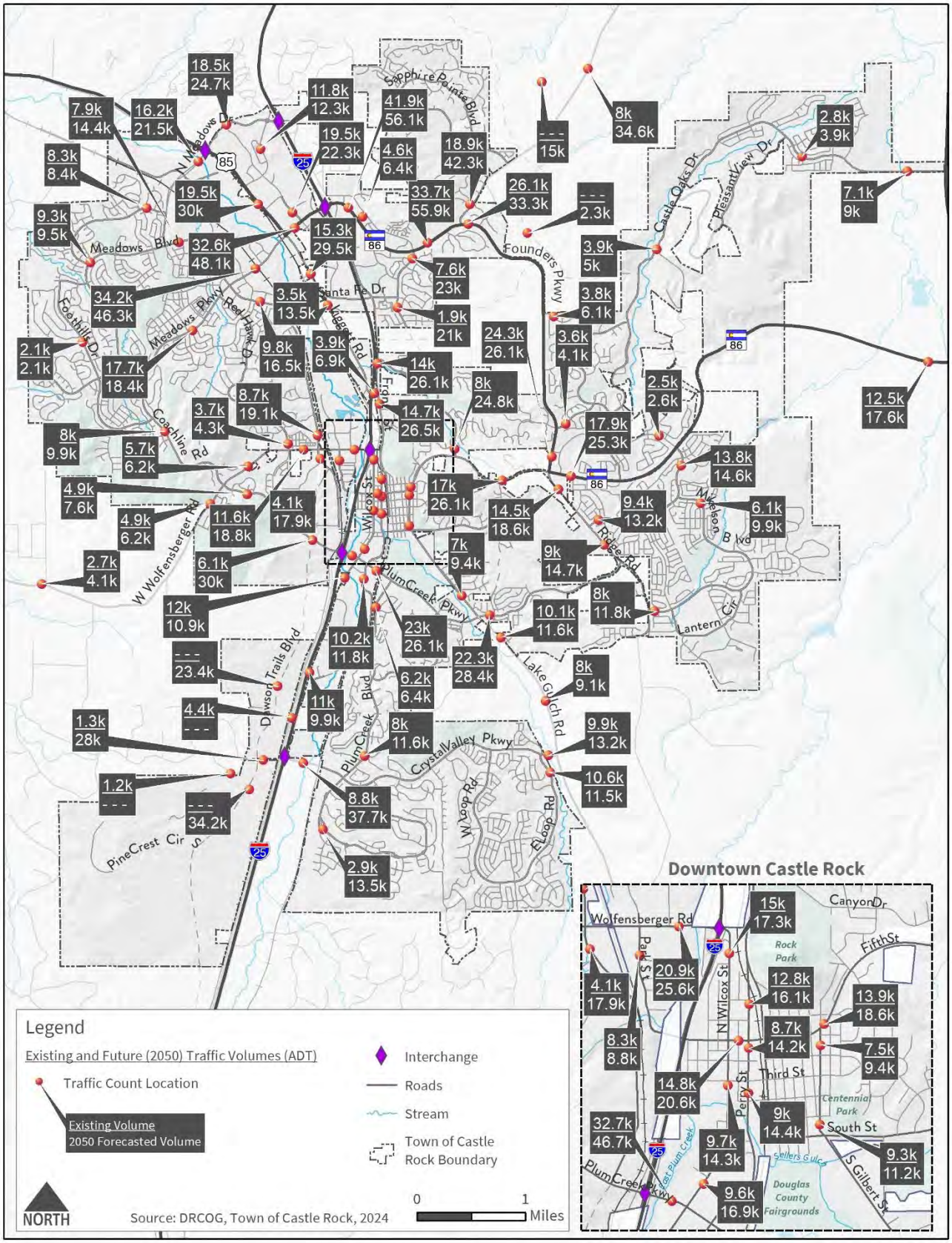
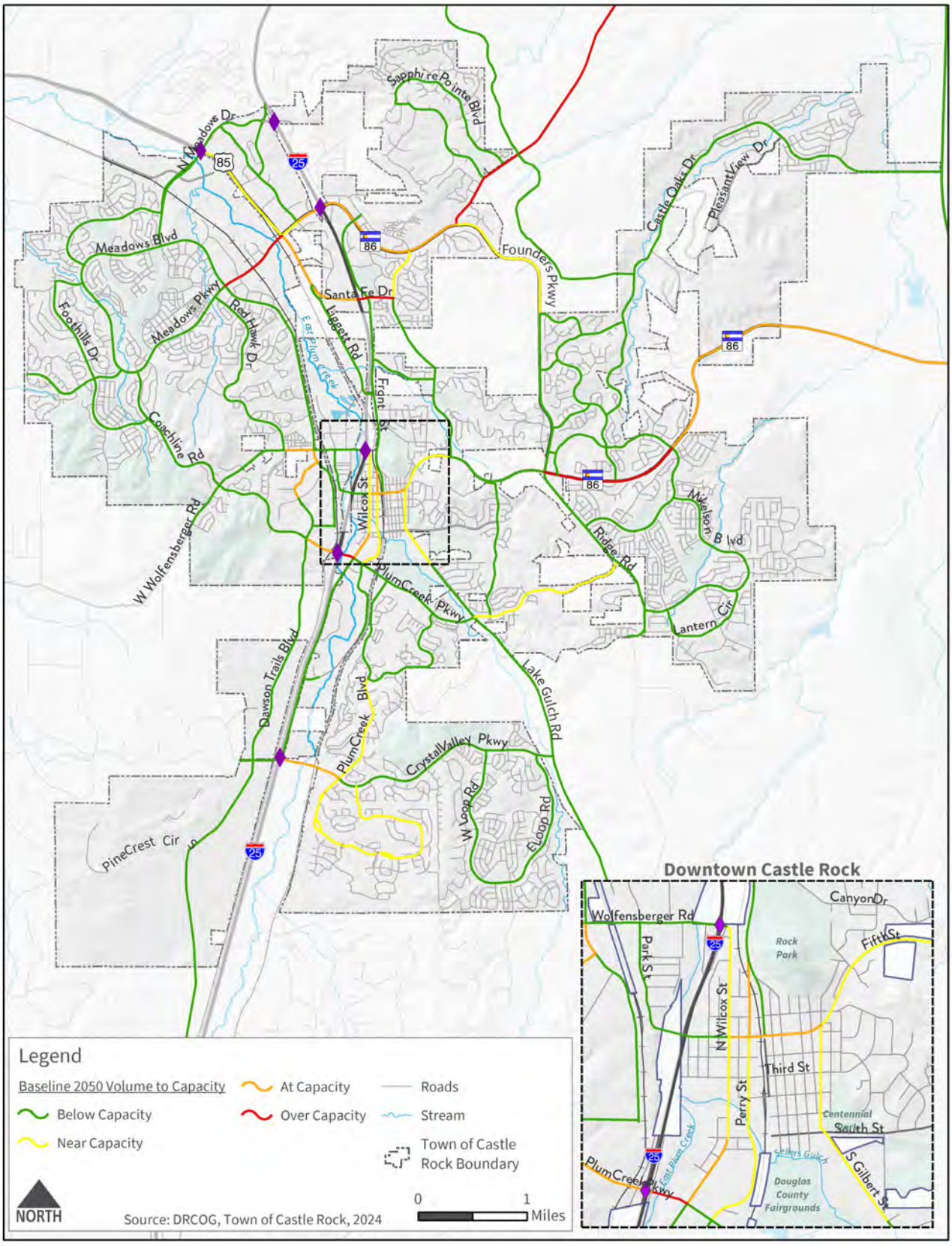


Figure 9. Baseline 2050 Volume to Capacity



2050 Forecasts with All Needed Improvements

Figure 10 shows 2050 forecasts with all improvements in the model. This includes improvement projects in the baseline forecasts, listed in **Table 3,** and the projects listed in **Table ES-1**.

Figure 11 shows that the recommended improvements alleviate most of the at capacity or over capacity segments. However, a few streets are still projected to be at capacity or over capacity in 2050 with recommended improvements. Some congested areas, including segments of Founders Parkway, Meadows Parkway, and Plum Creek Parkway, could be alleviated with the results of the intersection improvements or feasibility studies discussed in **Chapter 5**.

With all proposed improvements applied, 2050 models indicate that some streets have segments that would still be at or above capacity. These streets include:

- Wilcox Street
- Perry Street
- Fifth Street
- Crowfoot Valley Road
- Crystal Valley Parkway

The Downtown streets (Wilcox, Perry, and Fifth streets) are not proposed to be widened given the context and location of the streets. Those streets are expected to be at capacity upon full buildout of the town. Refer to the Downtown Mobility Master Plan for other recommendations. Dedicated turn lanes, such as the free right turn at Crowfoot Valley Road/Founders Parkway will help keep traffic flowing on Crowfoot Valley Road. Limiting access and constructing continuous acceleration/deceleration lanes on Crystal Valley Parkway as part of the interchange project will help keep traffic flowing on Crystal Valley Parkway.

Figure 10. 2050 Forecasts with Improvements

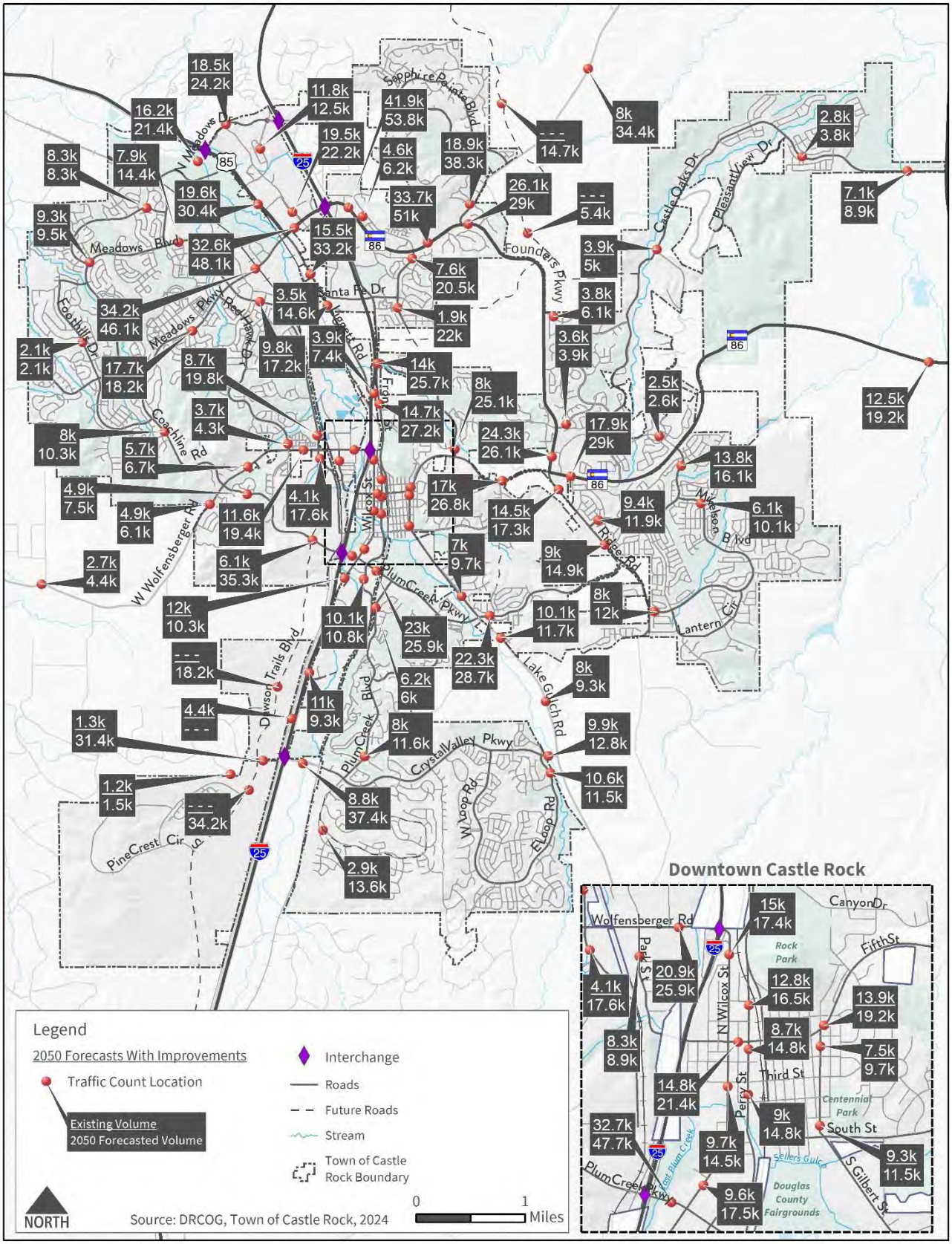
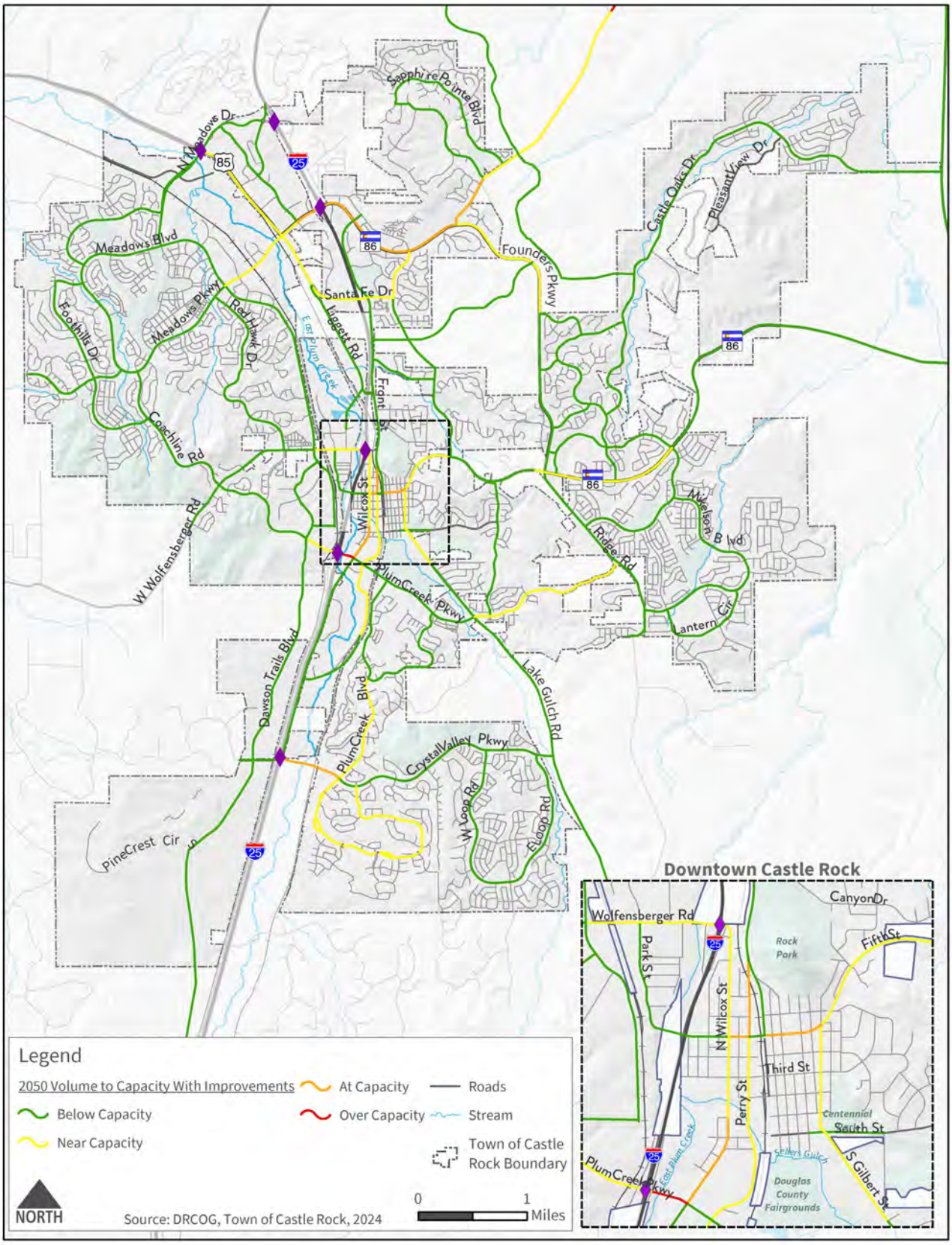


Figure 11. 2050 Volume to Capacity with Improvements



5. Intersection Analysis

The Town of Castle Rock has identified eight critical intersections as locations where there are significant existing or predicted operational problems based on traffic forecasting. Traffic counts were obtained at these intersections, 2050 turning movement projections were developed based on the forecasting described in this report, operational analyses were conducted, and improvement recommendations were developed for the following intersections:

1. North Meadows Drive and Meadows Boulevard
2. Front Street and Black Feather Trail
3. Prairie Hawk Drive and Wolfensberger Road
4. Plum Creek Parkway andI-25 southbound ramps
5. Plum Creek Parkway and I-25 northbound ramps
6. Plum Creek Parkway and Wilcox Street
7. Plum Creek Parkway and Perry Street
8. Enderud Boulevard and Mikelson Boulevard

Intersection Traffic Forecasts

Vehicle turning movements were recorded on January 24, 2024, at the eight intersections listed above from 7:00 to 9:00 AM and 4:00 to 6:00 PM. Forecasted volumes were developed using the 2050 forecasts presented in this report. The forecasts used in developing intersection turning movement forecasts represent the baseline 2050 model, including the existing roadway system and improvement projects currently programmed by the Town of Castle Rock or other entities.

Felsburg Holt & Ullevig (FHU) used these volume projections to develop yearly growth rates for individual legs at the selected eight intersections using the National Cooperative Highway Research Program (NCHRP) 765 methodology. The NCHRP 765 methodology was then applied to each individual intersection given the existing traffic counts and growth rates to develop 2050 turning movement forecasts. The Town of Castle Rock provided FHU with various traffic studies for developments around the Plum Creek Parkway corridor to further refine specific turning movements. These studies include the *Millers Landing TIA*, *Brickyard TIA*, and *the Crystal Valley Interchange Traffic Analysis*. Existing traffic and 2050 projections are illustrated on **Figure 12** and **Figure 13**.

Figure 12. Existing (2024) Traffic Volumes

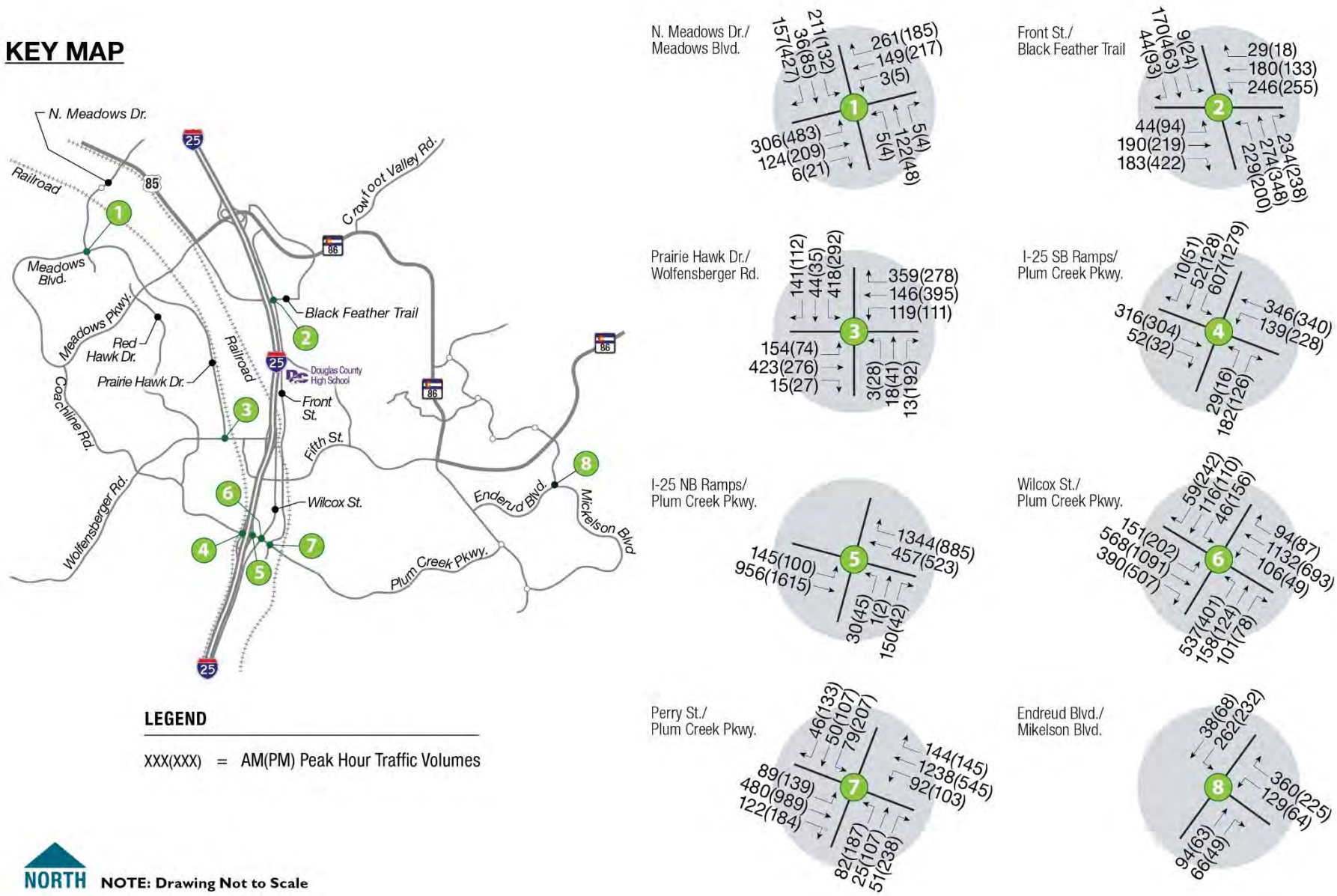
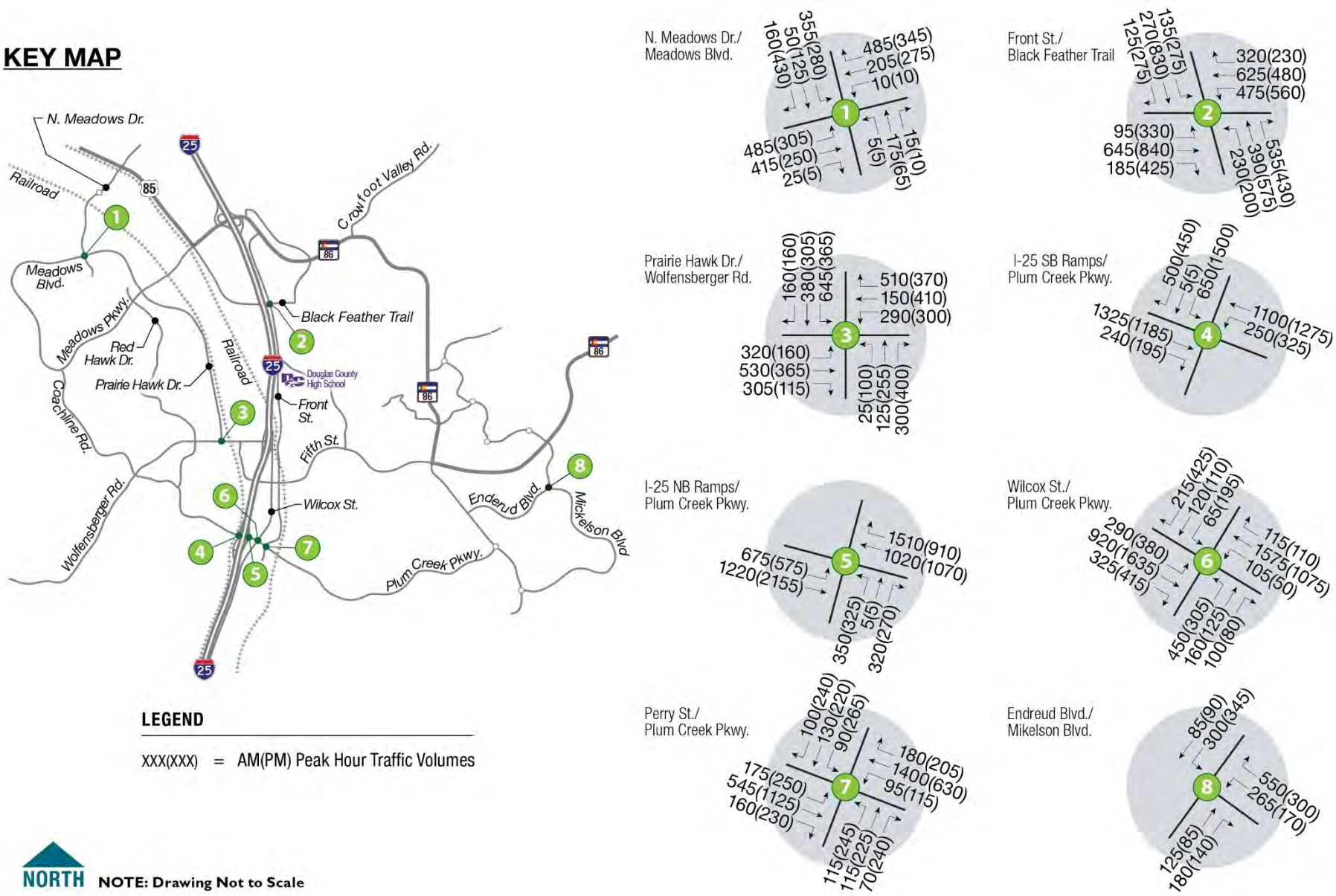


Figure 13. Year 2050 Traffic Volumes



Traffic Operations

Traffic operations were evaluated according to techniques documented in the *Highway Capacity Manual* (HCM), 6th Edition (Transportation Research Board, 2016). However, current HCM methodology does not support exclusive pedestrian phases. Thus, the intersection of Plum Creek Parkway and I-25 northbound ramps was evaluated using Synchro software level of service (LOS) results.

Existing

Traffic operations were evaluated using the existing traffic volumes, intersection geometry, traffic control, and signal timings. Town of Castle Rock staff provided signal timings for the seven signalized intersections. **Figure 14** summarizes the results of the LOS analyses for existing conditions. **Table 4** provides existing LOS results.

Table 4. Level of Service Results for Existing and 2050 No Build

Intersection		LOS (Average Delay)			
		Existing		2050 No Build	
		AM	PM	AM	PM
1. N. Meadows Dr. and Meadows Blvd.		C (31.5)	D (36.0)	F (85.5)	F (83.9)
2. Front St. and Black Feather Trl. (Signal)		C (33.3)	D (40.5)	F (300+)	F (300+)
3. Prairie Hawk Dr. and Wolfenberger Rd.		E (55.2)	D (35.3)	F (276.7)	F (168.5)
4. Plum Creek Pkwy. and I-25 SB ramps		C (20.8)	C (31.9)	E (70.4)	E (71.0)
5. Plum Creek Pkwy. and I-25 NB ramps[1]		A (5.3)	A (6.0)	F (164.0)	E (74.5)
6. Plum Creek Pkwy. and Wilcox St.		D (43.3)	D (44.9)	F (83.2)	F (87.7)
7. Plum Creek Pkwy. and Perry St.		D (44.7)	C (23.0)	E (70.0)	C (30.6)
8. Enderud Blvd and Mikelson Blvd (TWSC)	Westbound Left	F (141.4)	C (22.5)	F (300+)	F (205.1)
	Westbound Right	B (14.1)	B (10.0)	F (63.3)	B (11.7)
	Southbound Left	A (8.9)	A (8.1)	B (11.2)	A (9.0)

[1]Results are Synchro methodology as HCM methodology does not support the exclusive pedestrian phase.

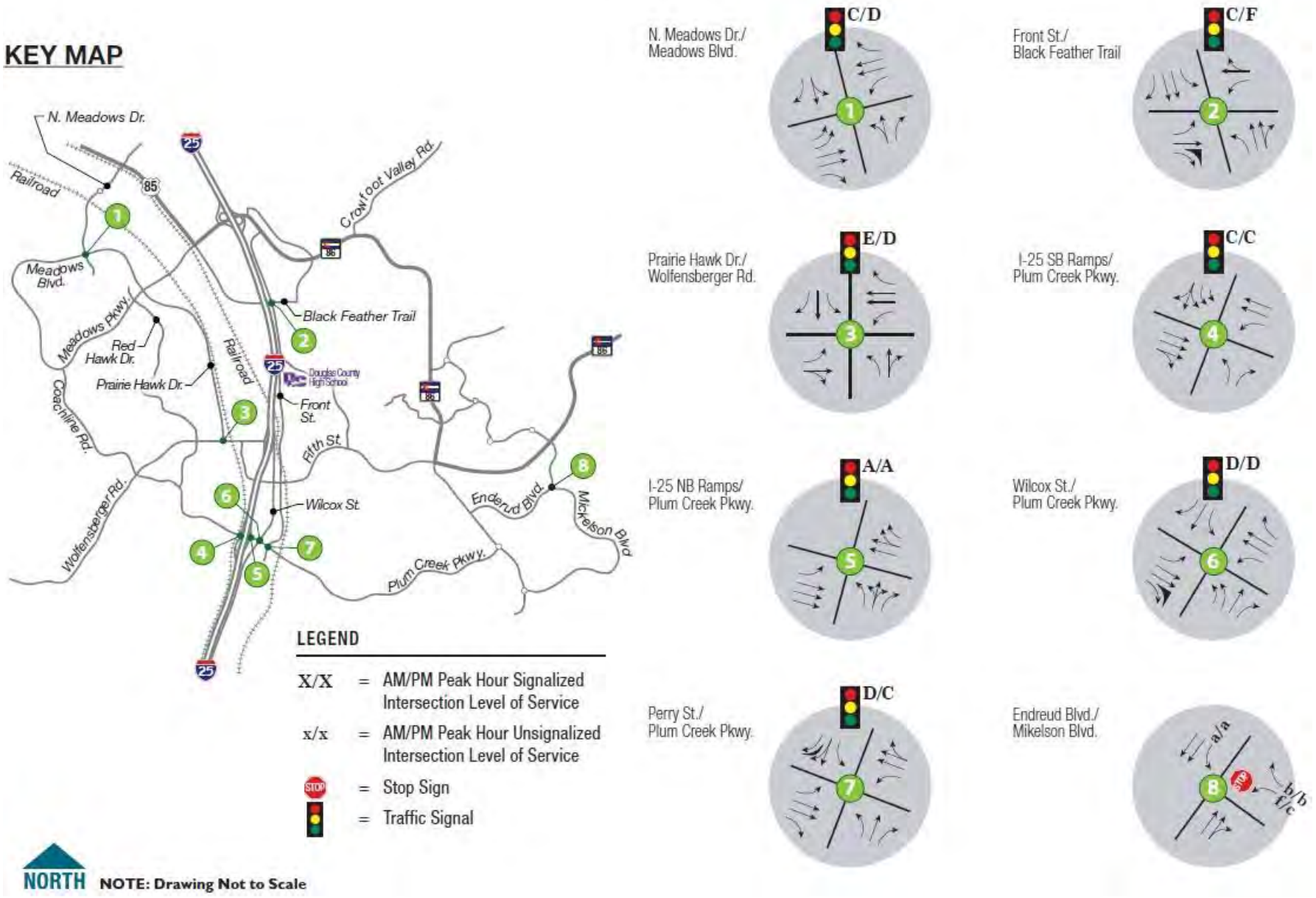
Key observations are as follows. For intersection numbers 1, 2, 3, 6, and 7, potential short-range improvements considered to alleviate existing operational issues prior to more major improvements discussed in the future operations section are listed below:

1. **North Meadows Drive and Meadows Boulevard** operates acceptably at LOS C/D during the AM/PM peak hours under signalized control, with all individual movements operating at LOS E or better.
    - **Potential short-range improvement:** LOS C can be achieved in the PM peak hour by operating the signal as coordinated with right turn overlap phases for every right turn.
2. **Front Street and Black Feather Trail** operates acceptably at LOS C/D during the AM/PM peak hours under signalized control. All individual movements operate at LOS E or better, with the exception of the westbound left, which operates at LOS F during the PM peak hour.
    - **Potential short-range** improvement**:** During the PM peak hour, allocating extra time to the westbound left turn phase will allow this movement to operate at LOS D, with the overall intersection operations improving to LOS C.

3. **Prairie Hawk Drive and Wolfensberger Road** unacceptably under signalized control at LOS E during the AM peak hour, with the southbound left operating at LOS F. During the PM peak hour, this intersection operates acceptably at LOS D under signalized control, with all individual movements operating at LOS E or better.
    - **Potential short-range improvement:** Optimizing signal timings in the AM peak hour will allow the intersection to operate at LOS D, with all individual movements at LOS E or better.
4. **Plum Creek Parkway and I-25 southbound ramps** operates acceptably at LOS C during both peak hours under signalized control, with all individual movements operating at LOS D or better.
5. **Plum Creek Parkway and I-25 northbound ramps** operates acceptably at LOS A/B during the AM/PM peak hours under signalized control during both peak hours, with all individual movements operating at LOS E or better.
6. **Plum Creek Parkway and Wilcox Street** operates acceptably at LOS D under signalized control during both peak hours. All individual movements operate at LOS E or better, with the exception of the northbound left, which operates at LOS F during the AM peak hour, and the southbound right, which operates at LOS F during the PM peak hour.
    - **Potential short-range improvement:** Optimizing signal timings and overlapping the southbound right turn phase with the eastbound left turn will allow this intersection to operate at LOS C during both peak hours, with all individual movements operating at LOS E or better.
7. **Plum Creek Parkway and Perry Street** operates acceptably at LOS D/C during the AM/PM peak hours under signalized control. All individual movements operate at LOS E or better, with the exception of the westbound through and westbound right turn movements, which both operate at LOS F during the AM peak hour.
    - **Potential short-range improvement:** Optimizing signal timings during the AM peak hour can improve these two movements to LOS D.
8. **Endreud Boulevard and Mikelson Boulevard** individual movements operate acceptably at LOS B/D during the AM/PM peak hours as a Two-Way Stop-Controlled (TWSC) intersection, with the exception of the westbound left turn movement, which operates at LOS F in the AM peak hour.

As indicated, operational conditions can be improved at several of the intersections by optimizing signal timings and minor signal rebuilds with the addition of right turn overlaps. Doing so would allow improvements using low-cost interim measures before the larger-scale capital improvements recommended for the 2050 timeframe, as detailed later in this chapter.

Figure 14. Existing (2024) Traffic Conditions



2050 No Build

The 2050 forecasted traffic volumes were applied to a no build scenario. This scenario analyzes the intersections with the 2050 volumes on **Figure 15**, with the existing intersection geometry, traffic control, and signal timings. This scenario analyzes operational conditions in 2050 assuming no alterations or improvements were made to the geometry, control, or signal timings. **Figure 15** summarizes the results of the LOS analyses for this scenario. Key observations regarding the existing conditions are as follows:

1. **North Meadows Drive and Meadows Boulevard** is projected to operate unacceptably at LOS F under signalized control during both peak hours. The following movements are projected to operate at LOS F:
    a. Eastbound Left (AM Peak hour)
    b. Westbound Right (AM and PM Peak Hours)
    c. Northbound Left (AM Peak Hour)
    d. Northbound Through (AM Peak Hour)

2. **Front Street and Black Feather Trail** is projected to operate unacceptably at LOS F under signalized control during both peak hours. The following movements are projected to operate at LOS F:
    a. Eastbound Left (PM Peak Hour)
    b. Eastbound Through (AM and PM Peak Hours)
    c. Westbound Left (AM and PM Peak Hours)
    d. Westbound Through (AM and PM Peak Hours)
    e. Westbound Right (AM and PM Peak Hours)
    f. Northbound Through (PM Peak Hour)
    g. Northbound Right (AM and PM Peak Hours)

3. **Prairie Hawk Drive and Wolfensberger Road** is projected to operate unacceptably at LOS F under signalized control during both peak hours. The following movements are projected to operate at LOS F:
    a. Eastbound Through/Right (AM Peak Hour)
    b. Westbound Left (AM Peak Hour)
    c. Westbound Right (AM Peak Hour)
    d. Northbound Through (AM and PM Peak Hours)
    e. Northbound Right (AM and PM Peak Hours)
    f. Southbound Left (AM and PM Peak Hours)

4. **Plum Creek Parkway and I-25 Southbound ramps** is projected to operate unacceptably at LOS E during both peak hours under signalized control. This analysis accounts for the new interchange at I-25/Crystal Valley Parkway and the modification to this intersection. The following movements are projected to operate at LOS F:
    a. Eastbound Through (AM Peak Hour)
    b. Eastbound Right (AM Peak Hour)
    c. Westbound Left (AM and PM Peak Hours)

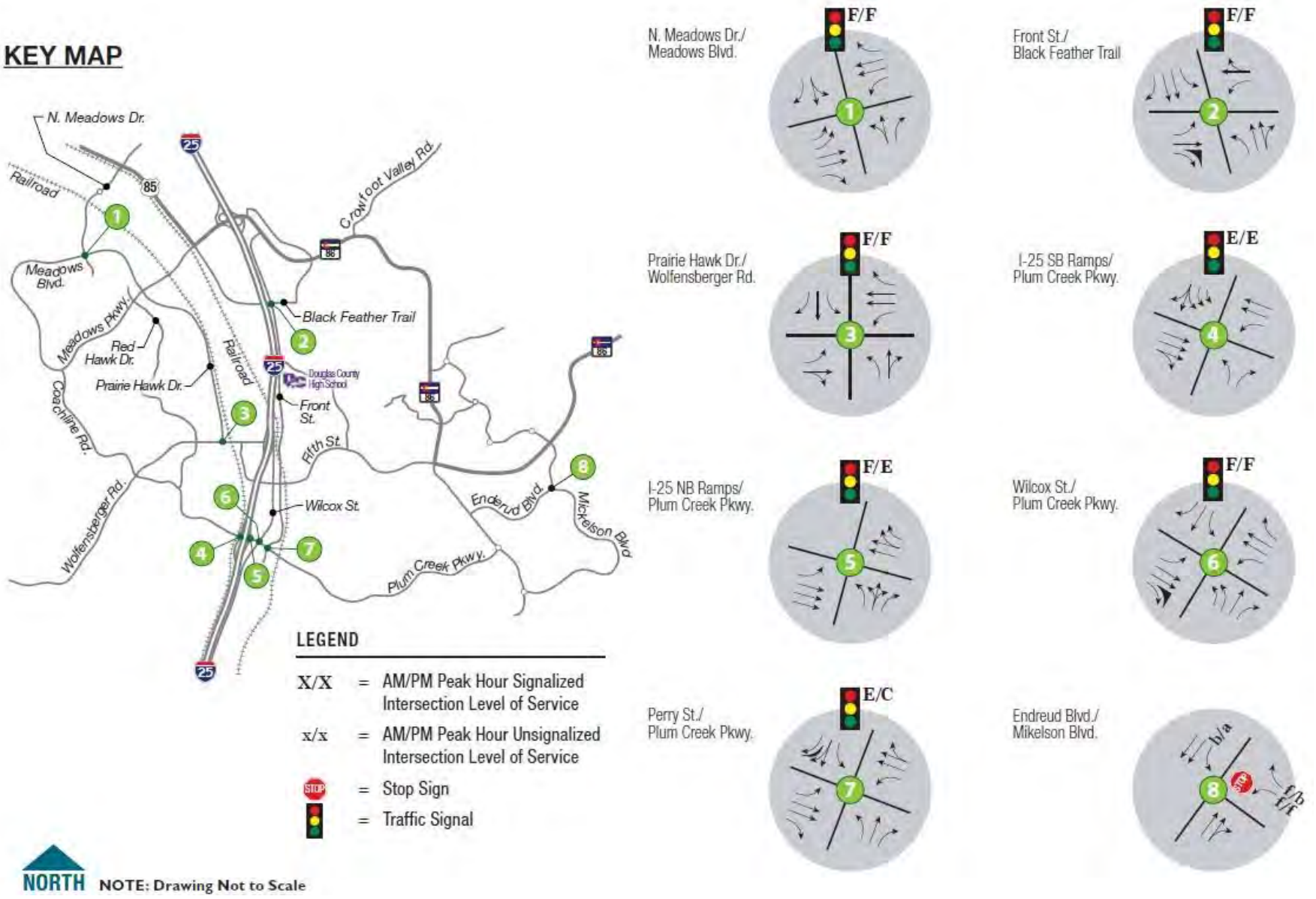
5. **Plum Creek Parkway and I-25 northbound ramps** is projected to operate unacceptably at LOS F during the AM peak hour, and at LOS E during the PM peak hour. The following movements are projected to operate at LOS F:
   a. Eastbound Left (AM Peak Hour)
   b. Westbound Through (AM and PM Peak Hours)

6. **Plum Creek Parkway and Wilcox Street** is projected to operate unacceptably at LOS F during both peak hours under signalized control. The following movements are projected to operate at LOS F:
   a. Eastbound Left: (AM and PM Peak Hours)
   b. Westbound Through (AM Peak Hour)
   c. Southbound Right (AM and PM Peak Hours)

7. **Plum Creek Parkway and Perry Street** is projected to operate unacceptably at LOS E under signalized control during the AM peak hour, while operating at LOS C during the PM peak hour. The following movements are projected to operate at LOS F:
   a. Westbound Through (AM Peak Hour)
   b. Westbound Right (AM Peak Hour)

8. **Enderud Boulevard at Mikelson Boulevard** is projected to operate unacceptably at LOS F under TWSC during both peak hours. The following movements are projected to operate at LOS F:
   a. Westbound Left (AM and PM Peak Hours)
   b. Westbound Right (AM Peak Hour)

Figure 15. 2050 No Build Traffic Conditions



2050 with Improvements

Based on the analysis results of the 2050 no build scenario, improvements were identified and applied to achieve more acceptable operational results. Proposed improvements are consistent with planned roadway widenings by the year 2050. Castle Rock staff provided insight into planned improvements and assisted in developing the recommended improvements.

1. **North Meadows Drive and Meadows Boulevard:** Given the unacceptable LOS with the no build scenario (LOS F during both peak hours), the following improvements are recommended at this intersection:
    a. Convert the shared through/left turn lanes in the northbound and southbound directions into left turn only lanes, while converting the right turn lanes into shared through/right turn lanes
    b. Operate the westbound right as permitted + overlap, overlapping with the protected southbound left movement

    Town of Castle Rock staff also provided insight into operating the eastbound left at this intersection as a protected turn for safety reasons. Given these proposed improvements, the intersection is expected to operate acceptably at LOS D/C during the AM/PM peak hours under signalized control. All individual movements are expected to operate at LOS E or better.

2. **Front Street and Black Feather Trail:** Given the unacceptable LOS during the no build scenario (LOS F during both peak hours), two alternatives were analyzed to determine the optimal future improvements. Alternative A analyzes this intersection under its current signalized control. Alternative B analyzes this intersection as a two-lane roundabout with bypass lanes.
    a. **Alternative A:** The following improvements are recommended for this intersection under signalized control:
        i. Add a second eastbound left turn lane
        ii. Add a second eastbound through lane
        iii. Add a second northbound through lane
        iv. Convert the northbound shared through/right turn lane into a right turn only lane
        v. Add a second westbound left turn lane
        vi. Add a second Westbound through lane
        vii. Convert the westbound shared through/right turn lane into a right turn only lane

        Given these proposed improvements, the intersection is projected to operate at LOS D during the AM peak hour and at LOS E during the PM peak hour. Most individual movements are projected to operate at LOS E or better, with the exception of the eastbound through, westbound left, northbound left, and southbound through, which are all projected to operate at LOS F during the PM peak hour. The functional anticipated service life of the bridge west of the intersection over I-25 would likely require its replacement by 2050 and present opportunities to widen the road over the bridge and alleviate operational issues at the intersection.

    b. **Alternative B:** As a two-lane roundabout with right turn bypass lanes, this intersection is projected to operate at LOS C during the AM peak hour and at LOS F during the PM peak hour. All approaches are projected to operate at LOS F during the PM peak hour, with the exception of the northbound approach.

    Based on this analysis, Alternative A, the improved signalized intersection, is recommended.

3. **Prairie Hawk Drive and Wolfensberger Road:** Given the unacceptable LOS during the no build scenario (LOS F during both peak hours), the following improvements are recommended at this intersection:
   a. Add a second southbound left turn lane
   b. Convert the southbound right turn lane into a shared through/right turn lane
   c. Add a second eastbound through lane
   d. Add an eastbound right turn only lane
   e. Add a second northbound through lane
   f. Convert the northbound shared through/right lane into a right turn only lane
   g. Operate the westbound and northbound right turns as permitted + overlap

   Given these proposed improvements, the intersection is projected to operate acceptably at LOS D/C dur
   roadway w ad are already planned as committe

4. **Plum Creek Parkway and I-25 southbound ramps:** Given the unacceptable LOS during the no build scenario (LOS E during both peak hours), the following improvements were applied at this intersection:
   a. Converted the southbound shared left/through/right turn lane into a through lane and added an exclusive free right turn
   b. Added a southbound shared through/left turn lane
   c. Added two eastbound through lanes to serve as additional storage for the eastbound left turns at the I-25 northbound ramp.

   Given these applied improvements, the intersection is projected to operate acceptably at LOS C during both peak hours, with all individual movements operating at LOS E or better.

5. **Plum Creek Parkway and I-25 northbound ramps:** Given the unacceptable LOS during the no build scenario (LOS F during the AM LOS E during the PM), the following improvements were applied at this intersection:
   a. Added a second eastbound left turn lane
   b. Added a second westbound through lane

   Given these applied improvements, the intersection is projected to operate acceptably at LOS D/C dur

   Although the individual Plum Creek Parkway intersections at the I-25 ramps are projected to operate acceptab
   between the intersections. The current distance between the intersections is approximately 275 feet, with 175 feet of queue storage. Given the previously identified improvements, the longest queue for th
   turn during the AM peak hour. The longest queue length for the southbound ramp between the inte

   It is recommended that the Town of Castle Rock explore alternative interchange configurations at this location, such as a Single Point Urban Interchange to help mitigate the effects of these queue lengths.

Additionally, the improvements recommended for the Plum Creek Parkway intersections with the I-25 ramps would require modifications to the sidewalks and lanes underneath the I-25 bridge on the north side of Plum Creek Parkway and to the sidewalks on the bridge over Plum Creek.

6. **Plum Creek Parkway and Wilcox Street:** Given the unacceptable LOS during the no build scenario (LOS f during both peak hours), the following improvements were applied at this intersection:
   a. Converted the westbound right turn lane into a shared through/right turn lane
   b. Operate the eastbound, northbound, and southbound right turns as permitted + overlap

   Given these applied improvements, the intersection is projected to operate acceptably at LOS C during both peak hours, with all individual movements operating at LOS E or better.

7. **Plum Creek Parkway and Perry Street:** Given the unacceptable LOS during the no build scenario (LOS E during the PM peak hour), the following improvements were applied at this intersection:
   a. Added a second southbound left turn lane
   b. Added an exclusive westbound right turn lane
   c. Operated all right turns as permitted + overlap

   Given these applied improvements, the intersection is projected to operate acceptably at LOS C during both peak hours, with all individual movements operating at LOS E or better.

8. **Enderud Boulevard and Mikelson Boulevard:** Given the unacceptable LOS during the no build scenario at this intersection, two alternatives were analyzed to determine the proper future improvements. Alternative A analyzed this intersection as a "Florida T" intersection. Alternative B analyzed this intersection as a one-lane roundabout.
   a. **Alternative A:** This alternative analyzed this intersection as a "Florida T" intersection, keeping the existing TWSC. This would allow the westbound right movement to operate without conflicting with the southbound through movement, improving safety and operational conditions. This alternative was also analyzed with a channelized free flow westbound right turn. Under this control, all movements would operate at LOS B or better during both peak hours.
   b. **Alternative B**: As a one-lane roundabout, this intersection is projected to operate acceptably at LOS B/A during the AM/PM peak hours, with all individual approaches operating at LOS C or better.

   Both Alternatives A and B would substantially improve operations and should be considered. **Figure 16** graphically depicts Alternative A at the intersection of Enderud Boulevard and Mikelson Boulevard.

Analyses results for the 2050 with improvement scenario are illustrated on **Figure 17** and summarized in **Table 5**.

Figure 16. Alternative A at Intersection of Enderud Boulevard and Mikelson Boulevard

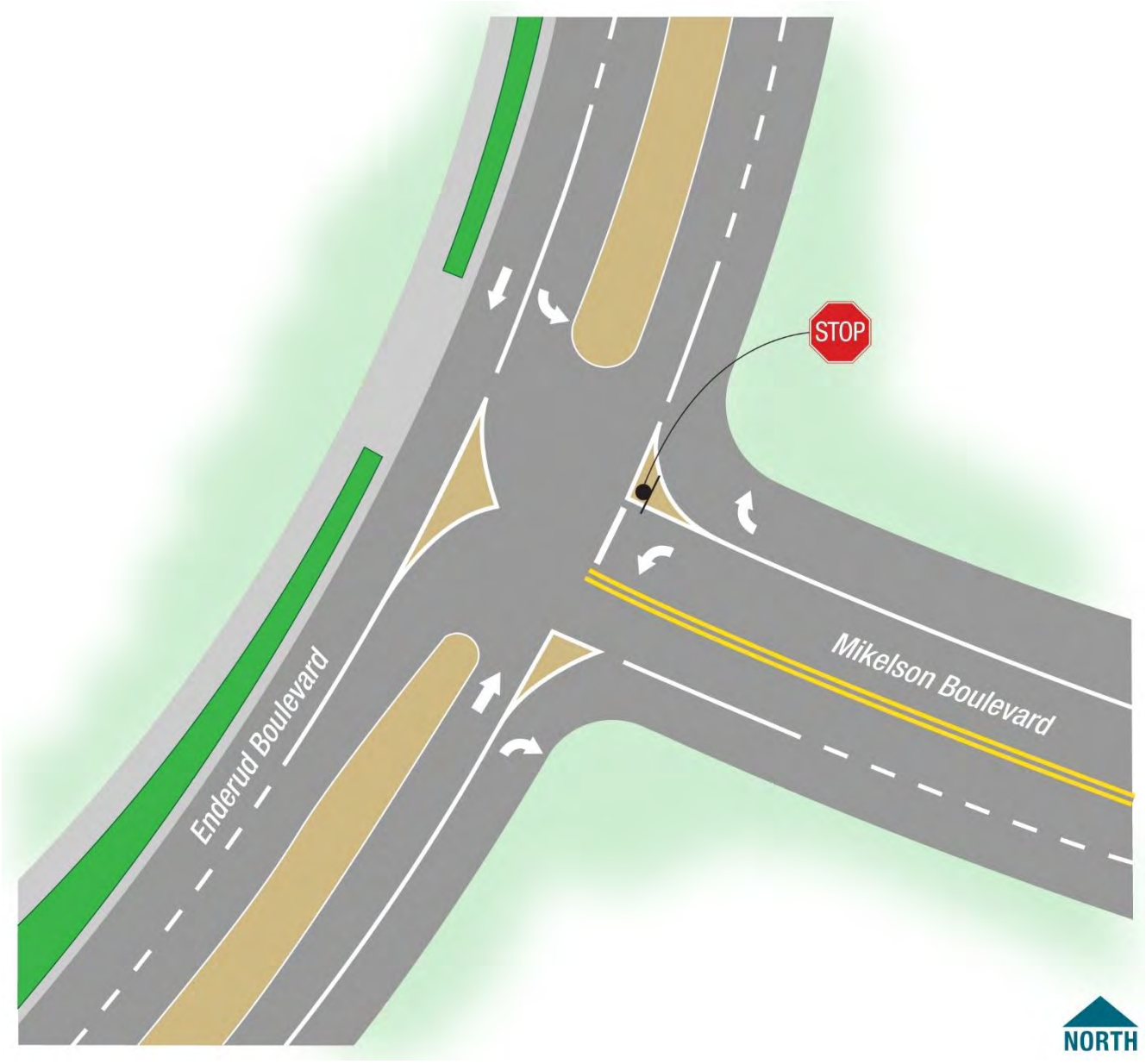
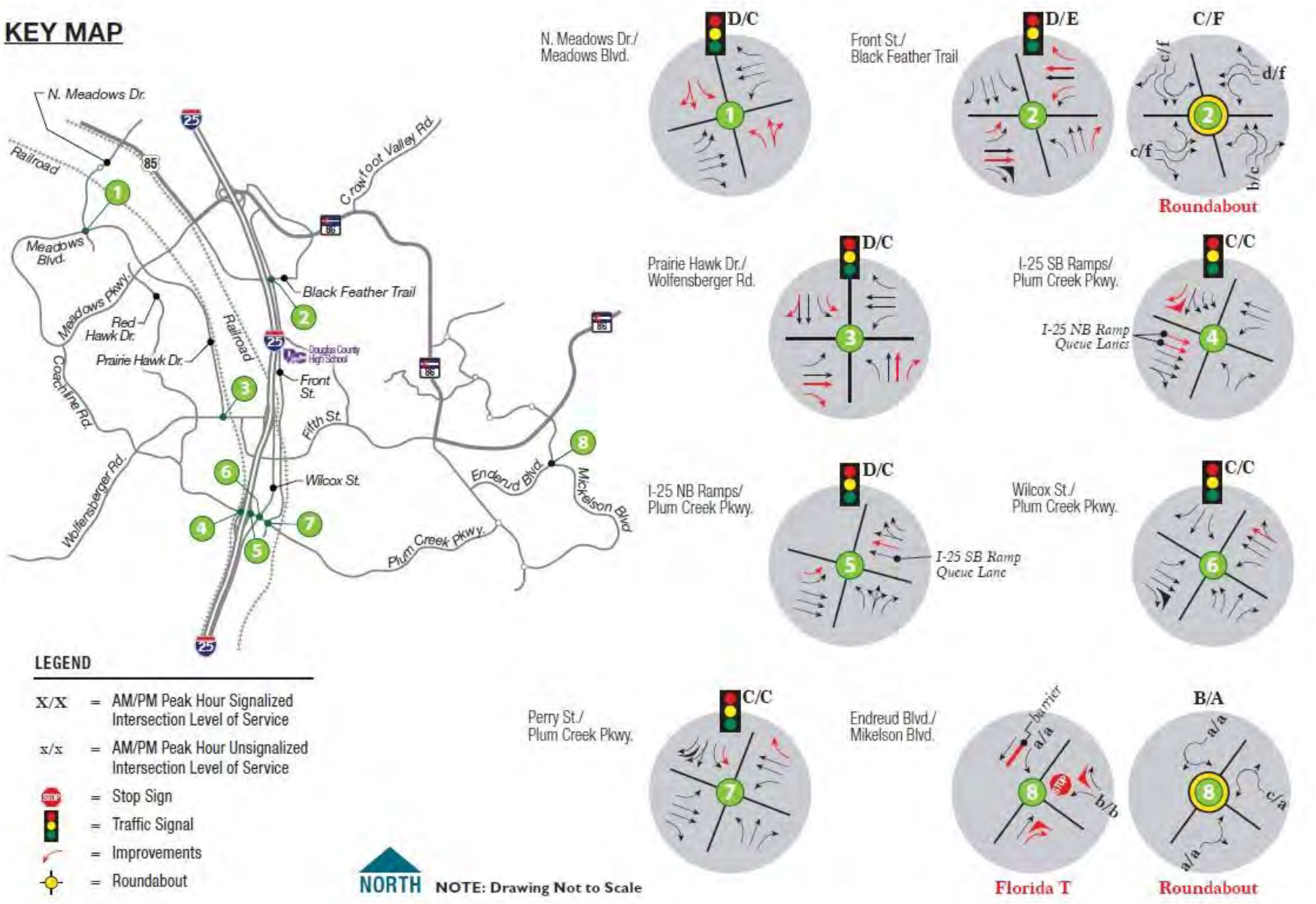


Table 5. Level of Service Results for 2050 No Build and 2050 with Improvement

Intersection		LOS (Average Delay)			
		2050 No Build		2050 with Improvements	
		AM	PM	AM	PM
1. N. Meadows Dr. and Meadows Blvd.		F (85.5)	F (83.9)	D (44.5)	C (31.1)
2. Front St. and Black Feather Trl. (Signal)		F (300+)	F (300+)	D (37.3)	E (71.1)
3. Prairie Hawk Dr. and Wolfenberger Rd.		F (276.7)	F (168.5)	D (43.0)	C (32.8)
4. Plum Creek Pkwy. and I-25 SB ramps		E (70.4)	E (71.0)	C (22.2)	C (29.7)
5. Plum Creek Pkwy. and I-25 NB ramps[1]		F (164.0)	E (74.5)	D (47.1)	C (32.9)
6. Plum Creek Pkwy. and Wilcox St.		F (83.2)	R (87.7)	C (25.8)	C (23.1)
7. Plum Creek Pkwy. and Perry St.		E (70.0)	C (30.6)	C (20.3)	C (24.4)
8. Enderud Blvd. and Mikelson Blvd. (TWSC)	Westbound Left	F (300+)	F (205.1)	B (13.6)	B (10.2)
	Westbound Right	F (63.3)	B (11.7)	—	—
	Southbound Left	B (11.2)	A (9.0)	A (9.1)	A (8.3)
Enderud Blvd. and Mikelson Blvd. (Roundabout)	Westbound	-	-	C (16.1)	A (7.2)
	Northbound	-	-	A (7.5)	A (6.8)
	Southbound	-	-	A (8.4)	A (7.8)

[1]Results are Synchro methodology as HCM methodology does not support the exclusive pedestrian phase.

Figure 17. 2050 Traffic Conditions with Improvements



Summary of Intersection Improvement Recommendations

FHU has analyzed eight intersections in Castle Rock to identify potential improvements to better accommodate anticipated traffic. Existing operational conditions can be improved at many of the intersections by optimizing signal timings and adding right turn overlaps as minor signal rebuilds. These changes would allow improvements that use low-cost interim measures before implementation of the larger-scale capital improvements recommended for the 2050 timeframe. Based on the analysis, the following additional signalization and geometric improvements are recommended for each intersection.

1. **North Meadows Drive and Meadows Boulevard**
    a. Convert the shared through/left turn lanes in the northbound and southbound directions into left turn only lanes, while converting the right turn lanes into shared through/right turn lanes
    b. Operate the westbound right turn as permitted + overlap, overlapping with the protected southbound left movement.

2. **Front Street and Black Feather Trail**: This intersection was analyzed under its current signalized control and as a two-lane roundabout with bypass lanes. Based on the analysis, signal control is recommended to be maintained with the following improvements:
    a. Add a second eastbound left turn lane
    b. Add a second eastbound through lane
    c. Add a second northbound through lane
    d. Convert the northbound shared through/right turn lane into a right turn only lane
    e. Add a second westbound left turn lane
    f. Add a second Westbound through lane
    g. Convert the westbound shared through/right turn lane into a right turn only lane

3. **Prairie Hawk Drive and Wolfensberger Road**
    a. Add a second southbound left turn lane
    b. Convert the southbound right turn lane into a shared through/right turn lane
    c. Add an eastbound right turn lane
    d. Add a second northbound through lane
    e. Convert the northbound shared through/right lane into a right turn only lane
    f. Operate the westbound and northbound right turns as permitted + overlap

4. **Plum Creek Parkway and I-25 southbound ramps**
    a. Convert the southbound shared left/through/right turn lane into an exclusive free right turn
    b. Add a southbound shared through/left turn lane
    c. Add two eastbound through lanes to serve as additional storage for the eastbound left turns at the I-25 northbound ramp.

5. **Plum Creek Parkway and I-25 northbound ramps**
    a. Add a second eastbound left turn lane
    b. Add a second westbound through lane

6. **Plum Creek Parkway and Wilcox Street**
    a. Convert the westbound right turn lane into a shared through/right turn lane
    b. Operate the eastbound, northbound, and southbound right turns are permitted + overlap

7. **Plum Creek Parkway and Perry Street**
    a. Add a second southbound left turn lane
    b. Add an exclusive westbound right turn lane
    c. Operate all right turns as permitted + overlap

8. **Enderud Boulevard and Mikelson Boulevard:** This intersection was analyzed as both a "Florida T" intersection and a one-lane roundabout. Both alternatives are projected to operate acceptably. Since the Florida T alternative is expected to be less costly and impactful to construct, the Town of Castle Rock may choose to implement this alternative in the short term and retain the roundabout concept as a future option should conditions warrant reconsideration.

As previously mentioned, the Plum Creek Parkway intersections at the I-25 ramps are projected to operate acceptably as individual intersections. However, the queue lengths between these intersections are projected to exceed the current distance between the intersections. Thus, it is recommended that the Town of Castle Rock staff explore alternative interchange configurations at this location, such as a Single Point Urban Interchange to help mitigate the effects of these queue distances.

Short Range Improvements

In addition to the major intersection improvement projects listed above, three lower cost improvements are recommended for short-range consideration to alleviate congestion issues uncovered with existing traffic volumes:

- **North Meadows Drive and Meadows Boulevard:** Operate the signal as coordinated with right turn overlap phases for every right turn
- **Front Street and Black Feather Trail:** Allocate extra time to the westbound left turn
- **Prairie Hawk Drive and Wolfensberger Road:** Optimize signal timings in the AM peak hour
- **Plum Creek Parkway and Wilcox Street:** Optimize signal timings and overlap the southbound right turn phase with the eastbound left turn
- **Plum Creek Parkway and Perry Street:** Optimize signal timings during the AM peak hour

6. Road System Improvement Recommendations

Similar to the 2017 Transportation Master Plan (TMP), the traffic forecast update study had three primary goals:

- Maintain adequate capacity along existing transportation corridors
- Ensure efficient road network connections for future development
- Fill existing network gaps with new road facilities

These three goals aim to ensure that there is roadway capacity and mobility with the projected full buildout of Castle Rock. Based on projected growth within the town and surrounding communities, significant roadway improvements are necessary. All previously identified widening projects were confirmed with this effort along with new widening projects and intersection improvement projects.

Table 6 lists 34 roadway improvement recommendations. **Figure 18** shows the location of the recommended improvements with numbers corresponding to the first column in **Table 6**.

Figure 18 depicts two general improvement types:

- **Intersection projects** include new intersection configurations, turn lanes, signalization changes, and other geometric and operational improvements. Included are improvements at eight intersections, including four intersections on Plum Creek Parkway, that were analyzed in detail as part of this road system evaluation.
- **Road capacity improvements** are projects that would add capacity to existing roads. In most cases, improvements would provide additional through lanes. In some cases, improvements would consist of upgrades to meet higher road classification standards without additional through lanes. This category also includes several **new roads** that are predominantly new connections or extensions of existing roads. This includes some road connections that fully or partially run through unincorporated Douglas County, such as the Woodlands Boulevard connection and the Macanta Boulevard extension.

In addition to the road, location, and improvement type listed in **Table 6**, the table summarizes other aspects of each recommendation including:

- **Existing TMP:** This column identifies projects included in the current Castle Rock TMP and indicating whether they are new projects or proposed for an amendment to the existing TMP.
- **When Needed:** This column defines the estimated timeframe when improvements would be needed, including short-range needs by 2030, mid-range needs from 2030 to 2040, and long-range needs from 2040 to 2050 or beyond. In many cases, the "When Needed" column does not list a timeframe but rather a development trigger. The first 24 projects are recommended for the short-range, mid-range, or long-range and are listed in rough order of priority. Projects 25 through 34 are listed as being development driven; because specific timeframe and priority are not determined, these projects are listed alphabetically.

The final recommendation category in **Table 6** is **Feasibility Studies**. These major investments have been identified as having potential benefits but require more detailed analysis to fully develop and evaluate alternatives and determine whether they should be added to Castle Rock's transportation plans:

- **New road connection across I-25** would be an extension of the Perry Street extension listed as Project #19. This extension would provide connectivity across I-25 for developing area on either side of the interstate and would provide some relief to the Plum Creek and Crystal Valley interchanges.

- **I-25/Plum Creek Parkway interchange reconstruction** has been identified as a potential long-range project to improve traffic signal spacing and traffic flow as Plum Creek Parkway traffic grows. This project would potentially reconstruct the existing interchange to a single point urban interchange.
- **Meadows Parkway (US 85) safety and intersection improvements** between I-25 and US 85 (Santa Fe Drive) have been identified as a need, but a detailed study is required to define and evaluate specific improvements.
- **Founders Parkway (SH 86) safety and intersection improvements** between I-25 and Fifth Street has similarly been identified as a need, but a detailed study is required to define and evaluate specific improvements.

Table 6. Roadway Improvement Recommendations List

Short Range (2030)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
1	1	Crowfoot Valley Rd.	Founders Pkwy. to Sapphire Pointe Blvd.	Widen to four lanes	Yes	Short Range	Planned for construction in 2025
2	2	Fifth St.	Woodlands Blvd. to Ridge Rd./Founders Pkwy.	Widen to four lanes	Yes	Short Range	Planned for construction in 2026 and 2028
3	3	Plum Creek Pkwy.	Southbound I-25 Ramp to Perry St.	Intersection turn lanes & sidewalk conversions	No	Short Range	Roadway at or slightly over capacity, intersections queue into adjacent intersections, existing AM westbound through and right turn failing at Perry St. Improvements needed even with Crystal Valley Interchange completed Improvements can be built in phases by separating intersections into individual phases
4	4	Prairie Hawk Dr.	Wolfensberger Rd. Intersection	Intersection turn lane & signal improvements	Yes (Amended)	Short Range	Currently Level of Service E in the AM, new improvements shown in study
5	5	Enderud Blvd.	Mikelson Blvd. Intersection	"Florida T" intersection or roundabout	No	Short Range	Westbound left currently fails in AM; Florida T may be best short-range option
6	6	Wolfensberger Rd.	Coachline Rd. to Prairie Hawk Dr.	Widen to four lanes	Yes	Short Range/ Development	Widening includes roundabout at Red Hawk Dr.
7	7	SH 86	Ridge Rd. to Enerud Rd.	Widen to four lanes	Yes	Short Range	Existing roadway volumes at or slightly above capacity
8	8	N. Meadows Dr.	Meadows Blvd. to Santa Fe Dr. (Hwy 85)	Widen to four lanes (bridge expansion)	Yes	Short Range	Existing volumes approaching capacity
9	9	Prairie Hawk Dr.	Melting Snow to Wolfensberger Rd.	Widen to four lanes	Yes	Short Range	Currently shown in TMP with construction by 2030

Mid Range (2030–2040)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
10	10	N. Meadows Dr.	Meadows Blvd. Intersection	Intersection turn lane & signal improvements	No	Mid Range	Improvements identified in study
11	11	Plum Creek Pkwy.	I-25 to Dawson Trails Blvd.	Widen to six lanes	No	Mid Range/ Development	Widen to three lanes in each direction with continuous acceleration/deceleration lanes Some developer responsibilities
12	12	Prairie Hawk Dr. (realignment)	Topeka Way to Prairie Hawk Dr.	Widen to four lanes	No	Mid Range/ Development	Realign along Atchinson Way Private development could trigger earlier need for improvements
13	13	Black Feather Trl.	Front St. to Woodlands Blvd.	Widen to four lanes	No	Mid Range/ Development	Woodlands Blvd. connection could trigger earlier need for improvements
14	14	Front St.	Black Feather Trl. Intersection	Intersection improvements	Yes (Amended)	Mid Range/ Development	Currently Level of Service F in the PM Improvements constrained by I-25 bridge width
15	15	Meadows Pkwy.	Meadows Blvd. to Santa Fe Dr. (Hwy. 85)	Widen to six lanes (bridge expansion)	Yes	Mid Range	Existing volumes approaching capacity Widening N N. Meadows Dr. (Project #8) first should provide relief
16	16	Plum Creek Pkwy.	Prairie Hawk Drive to Coachline	Widen to four lanes	Yes	Mid Range	Four lanes to the MAC may be needed sooner

Long Range (2040 to 2050+)

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
17	17	Liggett Rd.	Hwy 85 to Front St.	Widen from two to four lanes (Collector to arterial)	Yes	Long Range/ Development	Splits at bridge: two lanes over I-25 bridge, two lanes from bridge to Caprice Dr.
18	18	Caprice Dr. North Extension	Liggett Rd. to Caprice Dr. (bridge)	New two lane Collector (bridge) across East Plum Creek	Yes	Long Range/ Development	Connection relieves Front St. and reduces traffic cutting through downtown
19	19	Perry St. South Extension	Perry St. to Wilcox St./Frontage Rd.	New two lane road (bridge) across East Plum Creek (river)	Yes	Long Range	Relieves Wilcox and Plum Creek Pkwy. intersection
20	20	Ridge Rd.	Plum Creek Pkwy. to Appleton Way	Improve to two lane Minor Arterial standards	Yes	Long Range	Complete two lane minor arterial improvements between Appleton Way and Plum Creek Pkwy.
21	21	Wolfensberger Rd.	Coachline Rd. to Midnight St.	Improve to two lane Minor Arterial standards	Yes (Amended)	Long Range/ Development	Currently shown as four lane Major Arterial in TMP Amend to 2-lane minor arterial per 2050 projected volumes
22	22	Wilcox St. (E. Frontage St.)	Plum Creek Pkwy. to Crystal Valley Pkwy.	Construct to two lane Minor Arterial with turn lane improvements	Yes	Long Range/ Development	Turn lane improvements are implemented as development occurs
23	23	Founders Pkwy. (SH 86)	Crowfoot Valley Rd. to Fifth St.	Turn lane improvements	Yes (Amended)	Long Range/ Development	Six lanes through Crowfoot Valley Rd. intersection Potential long-range six lanes to Fifth St.
24	24	Coachline Rd.	Foothills Dr. intersection	Convert to roundabout	Yes	Long Range	Monitor level of service to determine if needed sooner

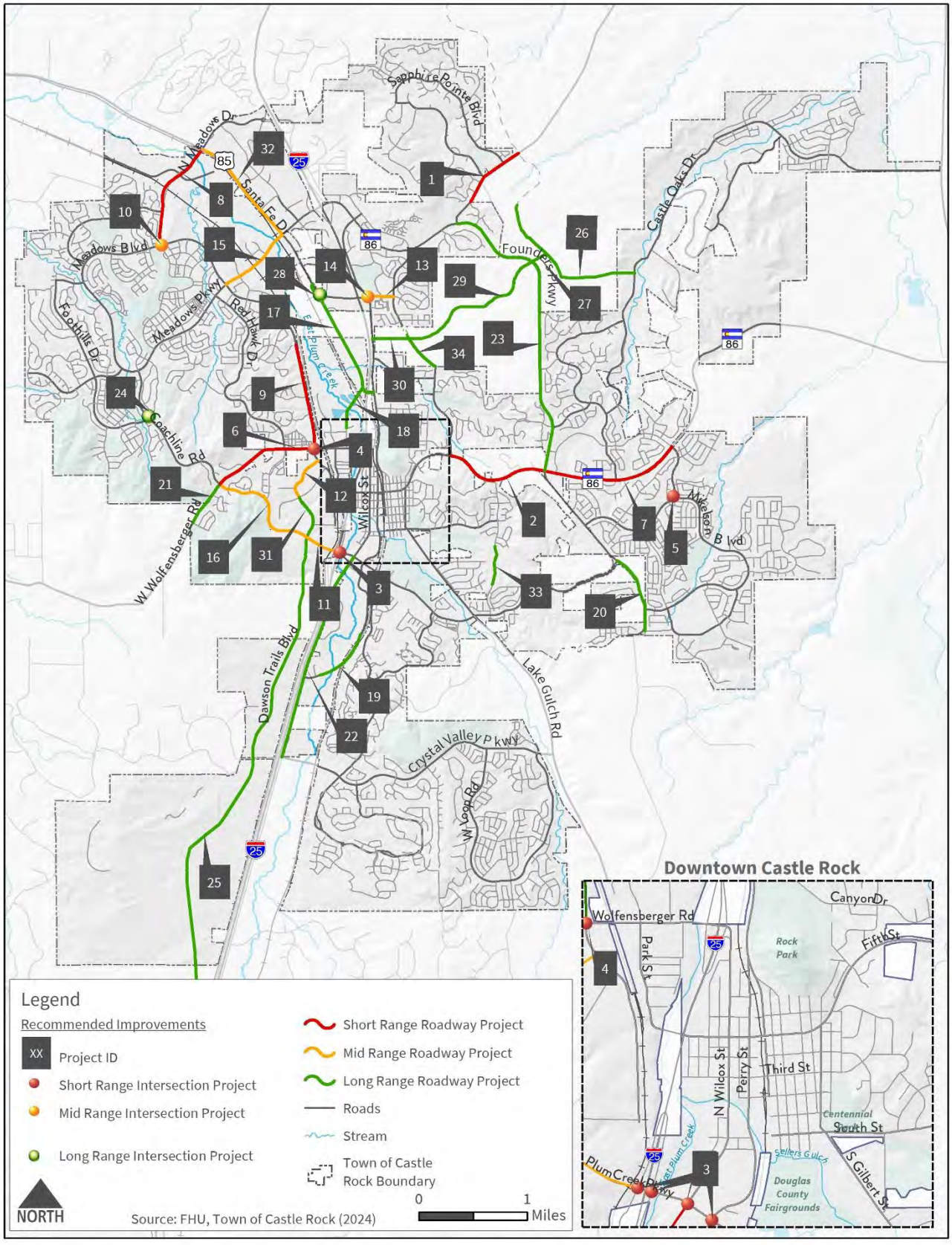
Development Driven

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
25	NA	Dawson Trails Blvd.	Plum Creek Pkwy. to town limits	New four to six lane Major Arterial (frontage road relocation)	Yes	Development Driven	Private development responsible for widening project
26	NA	Macanta Blvd. south extension	Town limits to Castle Oaks Dr.	New two lane road connecting Crowfoot Valley Rd. to Castle Oaks Dr.	No	Development Driven	Road to be built by private development
27	NA	New road connection	Founders Pkwy. to Macanta (Castle Oaks/Crowfoot)	New two lane road (Founders Pkwy. to Macanta extension)	No	Development Driven	Road to be built by private development
28	NA	Liggett Rd.	Santa Fe Dr. (Hwy. 85) intersection	Convert to roundabout	Yes	Development Driven	Roundabout to be built by private development
29	NA	New road connection	Founders Pkwy. to Woodlands Blvd.	New two lane Collector	Yes	Development Driven	Noted in previous TMP as Pine Canyon Development
30	NA	New road connection	Woodlands Blvd. to Front St.	New four lane Major Arterial	Yes	Development Driven	Noted in previous TMP as Pine Canyon/Pioneer Ranch Developments
31	NA	Prairie Hawk Dr. extension	Plum Creek Pkwy. to Topeka Way	New four lane Major Arterial	Yes	Development Driven	Private development could trigger earlier need for improvements
32	NA	US 85	Meadows Pkwy. to town limits	Part of larger US 85 improvement project	Yes	CDOT Project	Project is in CDOT's 10-year plan to construct (not a town project)
33	NA	Valley Dr. south extension	Hover Dr. to Hudson Ln.	New two lane Collector	Yes	Development Driven	Private development responsible for project
34	NA	Woodlands Blvd.	Tippen Pl/Dale Pony Dr. to Scott Blvd.	New four lane Major Arterial	Yes	Development Driven	Woodlands Blvd. connection to be made by private development (Pine Canyon & Pioneer Ranch)

Feasibility Studies

Project ID	Priority	Street / Intersection	Location	Improvement	Existing TMP?	When Needed	Notes
	NA	Extend Perry St. across I-25	Wilcox St. to Dawson Trails Blvd.	New two lane road (bridge) across I-25	No	Feasibility Study	Relieves both Plum Creek Pkwy. and Crystal Valley Pkwy. interchanges
	NA	I-25 Interchange	Plum Creek Pkwy.	Feasibility Study	No	Feasibility Study	Examine long-term interchange improvements, including a single point urban interchange
	NA	Meadows Pkwy. (SH 86)	I-25 to Santa Fe Dr.	Corridor Improvements	Yes	Traffic and Safety Study	Part of SH 86 / US 85 traffic and safety study
	NA	Founders Pkwy. (SH 86)	I-25 to Crowfoot Valley Rd.	Corridor Improvements	Yes	Traffic and Safety Study	Part of SH 86 / US 85 traffic and safety study

Figure 18. Recommended Improvements



Appendix A. Demographic Forecasts by Transportation Analysis Zone

Table A-1 Demographic Forecasts by TAZ

Subarea	Zone ID	2023		2050		2050 Updated	
		HH	EMP	HH	EMP	HH	EMP
1	2530	1,647	515	1,676	521	1,676	200
1	2532	1,270	2,490	1,544	2,666	1,544	2,666
1	2533	63	105	96	196	0	196
1	2534	26	75	42	262	225	262
1	2535	40	55	51	114	0	916
1	2536	654	81	642	99	642	99
1	2537	609	159	606	164	606	164
1	2538	1,093	226	1,107	235	1,107	50
1	2539	862	59	870	60	870	0
1	2540	413	23	456	31	740	31
1	2541	593	70	600	73	600	73
1	2542	210	17	226	9	226	320
1	2543	374	137	405	133	405	50
1	2544	1,177	606	1,514	732	1,514	732
1	2545	0	459	84	933	225	250
1	2546	1	1,618	1	2,067	1	2,067
1	2550	1	534	55	1,762	55	3,081
1	2551	513	528	517	934	517	160
1	2552	360	145	451	163	451	31
2	2481	835	1,871	1,169	1,922	1,169	1,922
2	2482	1,285	446	1,669	485	1,669	150
2	2547	91	1,407	118	1,419	118	1,419
2	2549	785	274	832	420	1,200	713
2	2553	596	322	798	452	1,481	452
2	2554	696	303	719	306	1,026	306
2	2555	29	1,946	58	2,326	350	717
3	2565	19	370	18	663	18	663
3	2566	217	2,665	354	3,463	458	1,569
3	2567	56	1,295	143	1,394	143	1,394
3	2568	158	386	173	435	173	435
3	2569	545	220	680	353	680	353
3	2570	617	345	1,660	546	1,660	546
3	2571	297	188	733	273	733	273

Subarea	Zone ID	2023		2050		2050 Updated	
		HH	EMP	HH	EMP	HH	EMP
3	2572	1,777	219	2,381	587	2,381	587
3	2577	1,517	106	1,523	108	1,523	108
3	2578	300	50	759	147	310	55
3	2579	654	104	792	222	792	31
3	2580	718	216	854	358	854	184
3	2581	230	389	251	487	251	487
3	2582	631	1,512	793	1,597	793	1,597
3	2583	955	187	987	200	987	200
3	2584	547	60	611	103	611	103
3	2585	581	94	779	201	779	201
3	2595	2,183	163	3,234	417	3,234	417
4	2556	68	595	71	928	150	928
4	2557	520	582	582	735	900	2,740
4	2558	210	362	269	481	269	481
4	2561	57	166	63	186	333	2,083
4	2562	2	19	7	81	100	550
4	2563	32	27	31	103	586	2,840
4	2564	22	69	28	206	2,654	1,500
4	2597	62	83	76	261	2,745	3,073
4	2604*	0	0	114	258	0	0
5	2396	3	17	2	17	2	17
5	2426	1,398	331	1,751	436	2,200	436
5	2429	92	128	368	210	368	210
5	2531	623	557	624	565	624	565
6	2473	13	240	1,699	694	3,000	694
6	2474	21	35	298	216	298	216
6	2475	143	63	3,313	261	3,313	520
6	2476	312	107	2,247	579	2,247	579
6	2477	2,075	687	3,206	1,362	3,206	1,362
6	2478	977	516	1,615	649	2,000	649
6	2479	44	93	77	110	77	110
6	2480	257	252	313	290	313	290
6	2483	432	105	811	229	550	50
6	2484	27	10	51	17	51	17
6	2548	410	144	1,137	172	1,137	172
7	2576	214	57	295	137	295	137
7	2586	12	11	17	27	17	27

Subarea	Zone ID	2023		2050		2050 Updated	
		HH	EMP	HH	EMP	HH	EMP
7	2594	306	34	476	97	476	97
7	2596	424	305	1,783	923	1,783	923

*Dawson trails development was included in TAZ Zone ID 2597

Figure A-1 Transportation Analysis Zone Map