CORVALLIS

TRAFFIC IMPACT STUDY

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City of Fountain, CO

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1.0 Introduction

Corvallis is a 203.4-acre development that is planned in northeast Fountain, CO. The property is comprised of 14 parcels, consisting of:

- 139.6 acres of single family residential
- 16.9 acres of multi-family residential
- 34.6 acres of commercial
- 12.0 acres of school
- 45.5 acres of open space
- 26.4 acres of dedicated right-of-way

The project lies to the south of Fontaine Boulevard and to the west of Marksheffel Road. Figure 1 shows the vicinity of the project location.

The purpose of this study is to assess the effects this proposed development will have on the surrounding transportation system and is organized as follows:

Introduction – Describes the purpose and intent of this study.

Existing Conditions Analysis – Describes the study area land uses as well as the existing and future roadway network.

Project Traffic – Describes the proposed development and its location, as well as the expected number of daily and peak hour trips that will be generated by Corvallis. The expected external trip distribution is also shown.

Traffic Analysis

> *Project Buildout Year (2030) Traffic Analysis* – Will analyze the study area background traffic (no-build scenario) and total traffic (with project scenario) for the projected 2030 buildout year.
>
> *Horizon Year (2040) Traffic Analysis* – Will analyze the study area background and total traffic for the projected 2040 horizon year.

Findings and Conclusions – identifies any deficiencies in the study area roadway network with or without the project and mitigation measures that will alleviate any identified deficiencies.

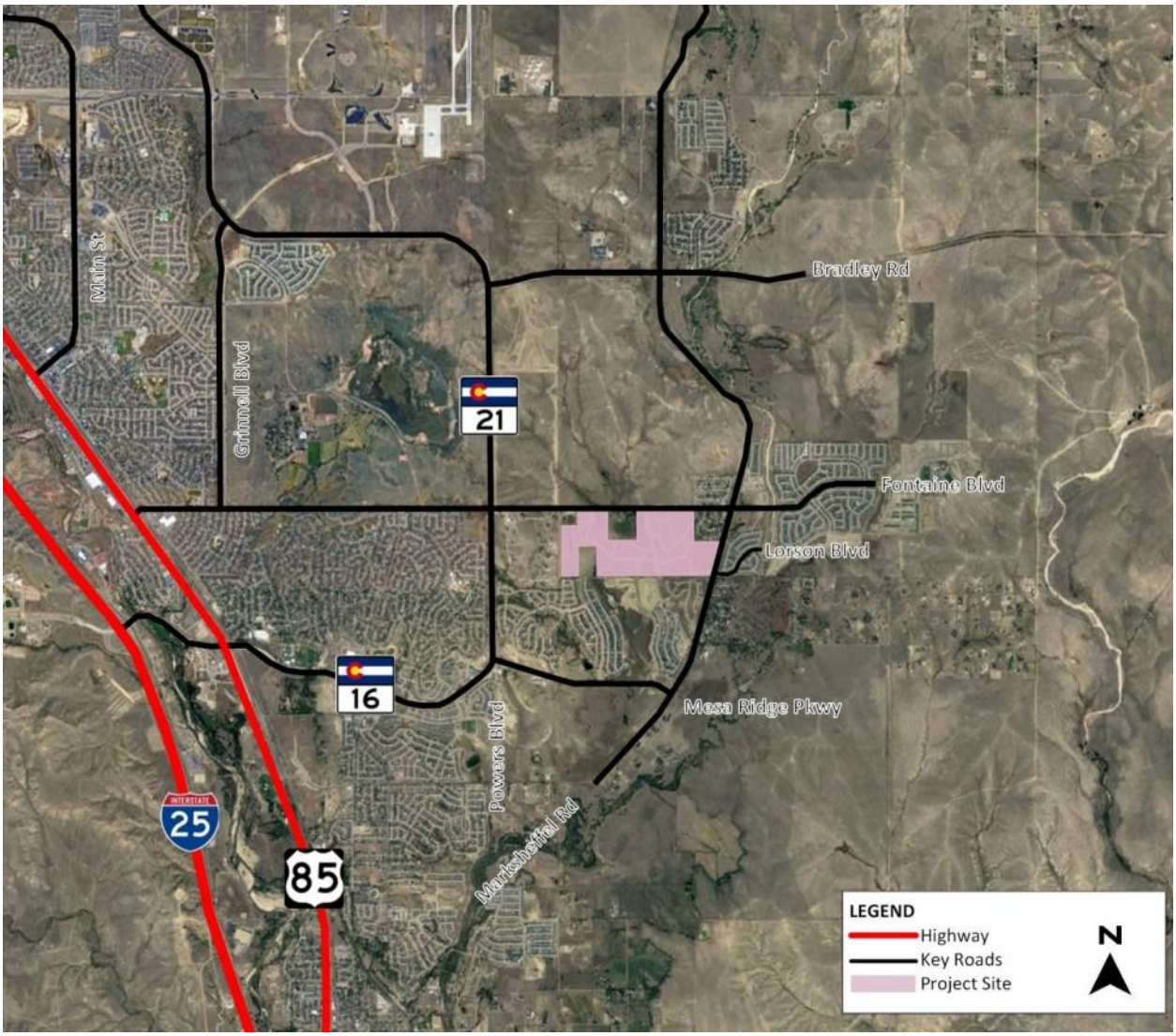
Recommendations – Provides a summary of the study findings.

The following existing intersections are evaluated in this study:

1. Powers Boulevard/Fontaine Boulevard
2. Fontaine Boulevard/Rolling View Drive
3. Fontaine Boulevard/Marksheffel Road
4. Marksheffel Road/Lorson Boulevard
5. Marksheffel Road/Mesa Ridge Parkway
6. Mesa Ridge Parkway/Spring Glen Drive
7. Mesa Ridge Parkway/Autumn Glen Avenue

8. Mesa Ridge Parkway/Wayfarer Drive
9. Powers Boulevard/Mesa Ridge Parkway

Figure 1 - Vicinity Map



2.0 Existing Conditions Analysis

Existing Roadways

Corvallis is located generally to the south of Fontaine Boulevard, to the northwest of Marksheffel Road, approximately one half-mile east of Powers Boulevard (CO-21), and north of the Lorson Boulevard alignment. It is approximately ¾-mile north of Mesa Ridge Parkway and will connect to this roadway via Autumn Glen Avenue and Spring Glen Drive. The following describes the existing conditions of the major study area roadways:

Powers Boulevard (CO-21) – currently a four-lane divided highway running north-south and consisting of a 30’ wide median, 5’ inside shoulder, two 12’ lanes, and a 10’ outside shoulder. There are no

streetlights, sidewalks, posted bicycle lanes (although the shoulder is wide enough to safely accommodate bicycles), or curb and gutter through the study area. It has a posted speed limit of 55 miles-per-hour (MPH). There are traffic signals at the intersections with Fontaine Boulevard and Mesa Ridge Parkway and one right-in/right-out access to the east at Roanfield Lane, approximately halfway between these two intersections. There are northbound acceleration lanes at Mesa Ridge Parkway and Roanfield Lane.

Fontaine Boulevard – currently a two-lane undivided highway running east-west and consisting of 11' lanes with no median, shoulders, streetlights, sidewalks, bicycle lanes, or curb and gutter. It has a posted speed limit of 45 MPH between Powers Boulevard and Weeping Willow Drive and a posted speed limit of 35 MPH between Weeping Willow Drive and Marksheffel Road. There are traffic signals at the intersections with Powers Boulevard and Marksheffel Drive. All other intersections are side-street stop controlled. Guardrail is provided at existing drainage structure locations.

Marksheffel Boulevard – currently a two-lane roadway with continuous two-way left turn lane (TWLTL) running northeast-southwest and consisting of 10' shoulders, 11' lanes, and a 16' TWLTL. There are no streetlights, sidewalks, posted bicycle lanes (although the shoulder is wide enough to safely accommodate bicycles), or curb and gutter through the study area. It has a posted speed limit of 55 MPH. There is a traffic signal at the intersection with Fontaine Boulevard, with all other intersections being side-street stop controlled. There is an acceleration lane to accommodate westbound to southbound left turns at Peaceful Valley Road.

Mesa Ridge Parkway - currently a two-lane undivided roadway running east-west and consisting of 12' lanes and 5' shoulders with no median, streetlights, sidewalks, bicycle lanes, or curb and gutter. It has a posted speed limit of 45 MPH. There is a traffic signal at the intersection with Powers Boulevard, with all other intersections being side-street stop controlled. Approved traffic impact studies for The Glen at Widefield development adjacent to Corvallis show that Mesa Ridge Parkway will have traffic signals with Wayfarer Drive, Autumn Glen Avenue, and Spring Glen Drive.

Adjacent Developments/Land Uses & Future Roadways

Land adjacent to Corvallis within Fountain is generally zoned for single-family residential, multifamily residential, park/open space, and neighborhood commercial, per the City of Fountain Comprehensive Plan Land Use Categories map. Adjacent land located in Colorado Springs is zoned for industrial, medium-density residential, and high-density residential per the Banning Lewis Ranch Master Plan. Adjacent land located within El Paso County is zoned primarily for agricultural (5 acres), Planned Unit Development (PUD), and otherwise rural/suburban residential of various densities.

Immediately to the south of Corvallis, The Glen at Widefield is almost built out, with only a few filings remaining before its anticipated completion. To the east across Marksheffel Road, Lorson Ranch is currently being developed.

As Corvallis reaches buildout, the adjacent roadway network will develop as outlined in the El Paso County 2016 Major Transportation Corridors Plan Update, adopted December 6, 2016. This plan shows the 2040 roadway configurations as such:

Fontaine Blvd from Powers Blvd to western project boundary: 4 lane minor arterial

	from eastern project boundary to Marksheffel Rd: 4 lane principal arterial
Powers Blvd	from Mesa Ridge Pkwy to Fontaine Blvd: 4 lane expressway
Mesa Ridge Pkwy	from Powers Blvd to Marksheffel Rd: 4 lane principal arterial
	east of Marksheffel Rd: 2 lane minor arterial
Marksheffel Rd	from south of project area to north of project area: 4 lane expressway

The portion of Fontaine Blvd that runs along the project site (unclassified in El Paso County's plan) is classified in the City of Fountain Traffic Master Plan as a 4-lane community arterial.

There are future traffic interchanges proposed for the junctions of Powers Blvd/Mesa Ridge Parkway and Powers Blvd/Fontaine Blvd.

Traffic Volumes

Turning movement counts were taken at the study intersections and daily two-way traffic counts were taken at select locations along the roadway segments. These counts were conducted on April 28, 2020. Figure 2 shows the existing turning movement counts and daily tube count locations and volumes. Morning peak hour counts were conducted between 7:00 AM and 9:00 AM, with the peak AM hour mostly occurring at either 7:15 to 8:15 or 7:45 to 8:45. Afternoon peak hour counts were conducted between 4:00 PM and 6:00 PM, with the peak PM hour generally being 4:45 to 5:45. Because these counts were taken during the 2020 COVID-19 pandemic, these counts were compared to historical average daily traffic (ADT) volumes and the peak hour counts were adjusted up if lower, or left as they were if higher. This will ensure that the estimated traffic will be conservative, despite any influences on traffic patterns the pandemic may have caused. The raw traffic counts obtained by the traffic counting consultant are provided in Appendix A. Figure 3 shows the existing lane configurations and traffic control for each intersection.

Figure 2 – Existing (2020) Traffic

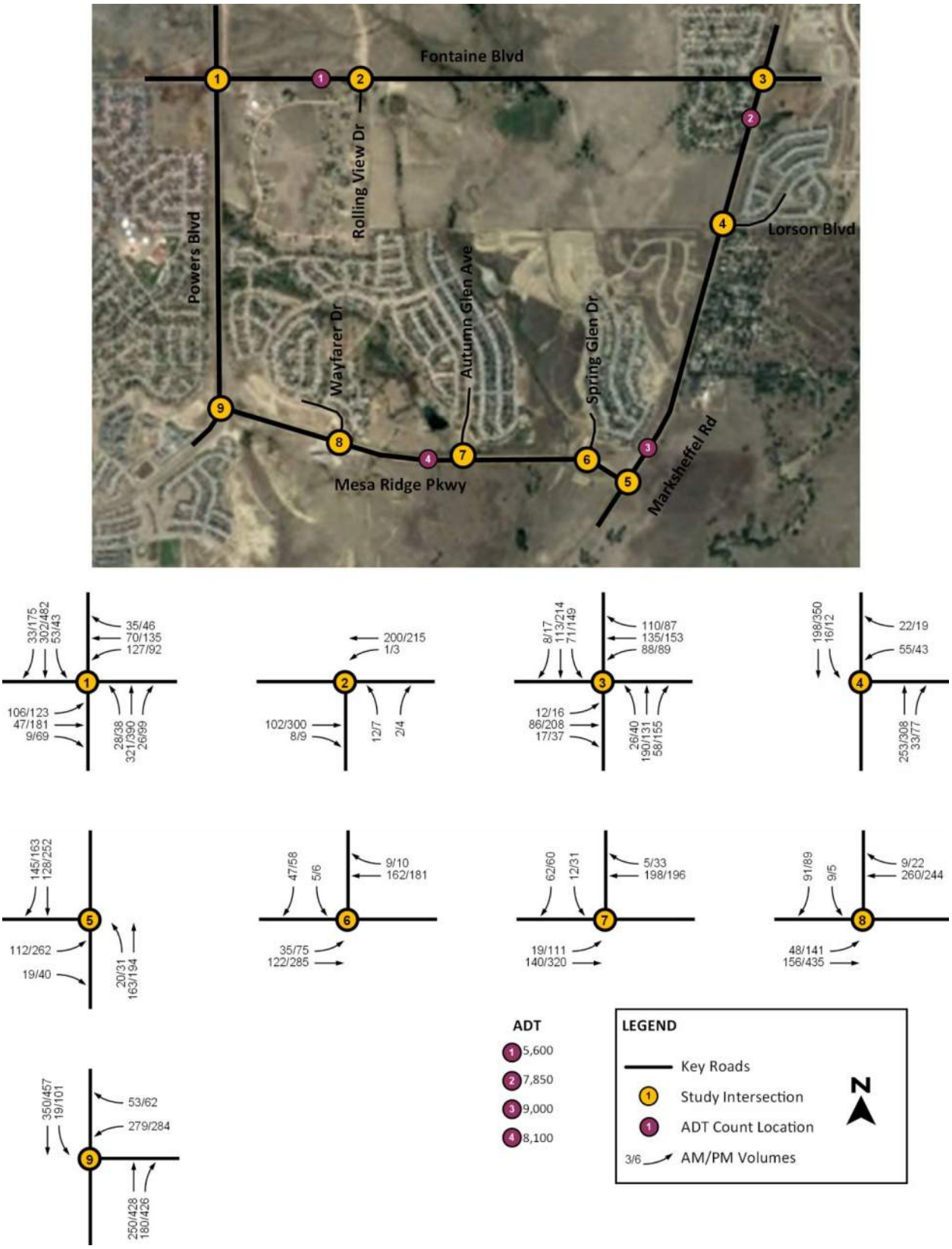


Figure 3 – Existing (2020) Lane Configurations and Traffic Control

Intersection & Roadway Capacity Analysis

To determine how efficiently and effectively the perimeter street system accommodates the existing traffic volumes, the key intersections in the vicinity of the proposed development were analyzed using Synchro 10 software. The results are shown as Levels of Service (LOS). LOS is a qualitative measure used to describe the condition of traffic flow and delay, ranging from excellent conditions at LOS A to very poor conditions at LOS F. In general, agencies try to maintain a minimum of LOS D for intersection and approach operations. This report will show movement LOS for informational and illustrative purposes, but mitigation will only be triggered by an intersection or approach falling below LOS D.

Table 1 provides a description of conditions for each LOS at a signalized intersection.

Table 1 - Signalized Intersection Level of Service Criteria

Level of Service	Average Stopped Delay (seconds per vehicle)	Description
A	≤ 10	Very low delay. Most vehicles do not stop.
B	> 10 to 20	Generally good progression. Slight delays.
C	> 20 to 35	Increased number of stopped vehicles
D	> 35 to 55	Noticeable congestion.
E	> 55 to 80	High delays and frequent cycle failures.
F	> 80	Forced flow. Extensive queuing.

Source: HCM2010 Highway Capacity Manual (Transportation Research Board, 2010)

For unsignalized (side-street stop controlled) intersections, Synchro 10 software was used again. The software applies the Transportation Research Board's Highway Capacity Manual 6th Edition (HCM) methodology for unsignalized intersections to determine average control delay per vehicle (measured in seconds) for each stop-controlled movement. The method incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side street stop-controlled intersections, delay is represented as the average delay per vehicle for the worst approach, not the overall intersection.

Table 2 summarizes the relationship between delay and level of service for an unsignalized intersection.

Table 2 - Unsignalized Intersection Level of Service Criteria

Level of Service	Average Total Delay (seconds per vehicle)	Description
A	≤ 10	Little or no conflicting traffic for minor street approach.
B	> 10 to 15	Minor street begins to notice absence of available gaps.
C	> 15 to 25	Minor street begins experiencing delay for available gaps.
D	> 25 to 35	Minor street starts to experience queuing.
E	> 35 to 50	Extensive minor street queuing due to insufficient gaps.
F	> 50	Insufficient gaps to allow minor street traffic to cross safely through the major street traffic stream.

Source: HCM2010 Highway Capacity Manual (Transportation Research Board, 2010)

Table 3 shows the results of the existing traffic LOS analysis and Table 4 shows the existing storage length and 95th percentile queue lengths. The full analysis software printout is provided in Appendix B.

Table 3 - Existing (2020) AM Intersection LOS

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
1	Powers & Fontaine	Signalized	A	EB	B	EBL	B	A	EB	B	EBL	B
						EBT	B				EBT	B
						EBR	A				EBR	A
				WB	B	WBL	B		WB	B	WBL	B
						WBT	B				WBT	B
						WBR	A				WBR	A
				NB	A	NBL	A		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
						SBR	A				SBR	A
2	Rolling View & Fontaine	TWSC	B	EB	-	EBTR	-	B	EB	-	EBTR	-
				WB	-	WBLT	A		WB	-	WBLT	A
				NB	B	NBLR	B		NB	B	NBLR	B
3	Marksheffel & Fontaine	Signalized	A	EB	B	EBL	B	B	EB	B	EBL	B
						EBT	B				EBT	B
						EBR	A				EBR	A
				WB	B	WBL	B		WB	B	WBL	B
						WBT	B				WBT	B
						WBR	A				WBR	A
				NB	A	NBL	A		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
						SBR	A				SBR	A
4	Marksheffel & Lorson	TWSC	B	WB	B	WBL	B	B	WB	B	WBL	B
						WBR	B				WBR	B
				NB	-	NBT	-		NB	-	NBT	-
						NBR	-				NBR	-
				SB	-	SBL	A		SB	-	SBL	A
						SBT	-				SBT	-
5	Marksheffel & Mesa Ridge	TWSC	B	EB	B	EBL	B	C	EB	C	EBL	C
						EBR	A				EBR	A
				NB	-	NBL	A		NB	-	NBL	A
						NBT	A				NBT	A
				SB	-	SBT	-		SB	-	SBT	-
						SBR	-				SBR	-
6	Mesa Ridge & Spring Glen	TWSC	A	EB	A	EBL	A	B	EB	-	EBL	A
						EBT	-				EBT	-
				WB	-	WBTR	-		WB	-	WBTR	-
				SB	-	SBLR	A		SB	B	SBLR	B
7	Mesa Ridge & Autumn Glen	TWSC	B	EB	-	EBL	A	B	EB	-	EBL	A
						EBT	-				EBT	-
				WB	-	WBT	-		WB	-	WBT	-
						WBR	-				WBR	-
				SB	B	SBL	B		SB	B	SBL	C

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						SBR	A				SBR	A
8	Mesa Ridge & Wayfarer	TWSC	B	EB	-	EBL	A	B	EB	-	EBL	A
						EBT	-				EBT	-
				WB	-	WBT	-		WB	-	WBT	-
						WBR	-				WBR	-
				SB	B	SBL	B		SB	B	SBL	C
						SBR	B				SBR	B
9	Powers & Mesa Ridge	Signalized	A	WB	B	WBL	B	A	WB	C	WBL	C
						WBR	B				WBR	B
				NB	A	NBT	A		NB	A	NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A

Table 4 - Existing (2020) 95th Percentile Queue Lengths

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
1	Powers & Fontaine	EBL	135	49	58
		EBT	-	25	75
		EBR	450	4	19
		WBL	200	557	45
		WBT	-	33	58
		WBR	400	13	14
		NBL	700	13	18
		NBT	-	41	54
		NBR	600	8	18
		SBL	-	20	19
		SBT	-	37	64
		SBR	490	8	23
2	Rolling View & Fontaine	EBTR	-	-	-
		WBLT	-	0	0
		NBLR	-	3	3
3	Marksheffel & Fontaine	EBL	225	13	16
		EBT	-	25	51
		EBR	100	10	16
		WBL	-	55	56
		WBT	-	35	38
		WBR	-	30	22
		NBL	455	12	18
		NBT	-	54	44
		NBR	455	10	21
		SBL	385	26	54
		SBT	-	35	69
		SBR	385	2	6
4	Marksheffel & Lorson	WBL	250	13	8
		WBR	-	3	3
		NBT	-	-	-
		NBR	250	-	-

Int ID	Intersection	Movement	Turn Lane Storage (ft)	AM Peak Hour Queue Length (ft)	PM Peak Hour Queue Length (ft)
		SBL	400	0	0
		SBT	-	-	-
5	Marksheffel & Mesa Ridge	EBL	300	18	65
		EBR	-	3	5
		NBL	-	3	3
		NBT	-	-	-
		SBT	-	-	-
		SBR	500	-	-
6	Mesa Ridge & Spring Glen	EBL	485	3	5
		EBT	-	0	-
		WBTR	-	0	-
		SBLR	-	8	8
7	Mesa Ridge & Autumn Glen	EBL	325	3	8
		EBT	-	-	-
		WBT	-	-	-
		WBR	275	-	-
		SBL	250	3	10
		SBR	-	8	8
8	Mesa Ridge & Wayfarer	EBL	300	3	10
		EBT	-	-	-
		WBT	-	-	-
		WBR	250	-	-
		SBL	-	3	3
		SBR	125	13	13
9	Powers & Mesa Ridge	WBL	325	133	150
		WBR	-	18	22
		NBT	-	40	67
		NBR	150	23	36
		SBL	1000	12	47
		SBT	-	54	75

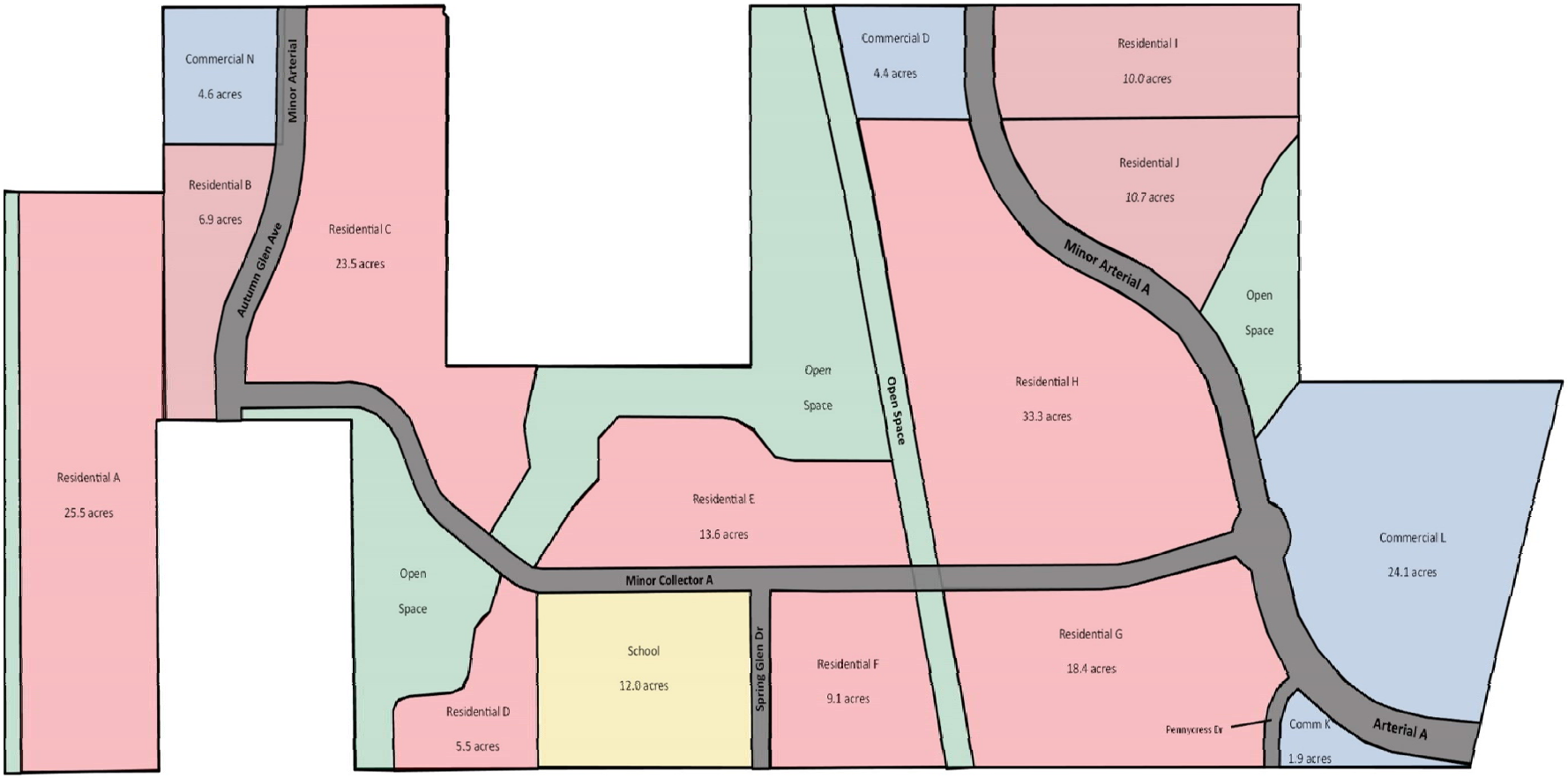
All existing study area intersections for both AM and PM peak hours operate at acceptable levels of service and with no queue lengths exceeding their available storage length.

3.0 Project Traffic

Project Description, Location & Accessibility

Corvallis is located near the southwest corner of Fontaine Boulevard and Marksheffel Road. It is a 275-acre development in total that is comprised of seven single family residential parcels, two multifamily residential parcels, four commercial parcels, and a school parcel. The development will be accessible from Fontaine Boulevard via a community collector (future connection to Autumn Glen Avenue, providing access to Mesa Ridge Parkway to the south) and a community arterial that terminates at and provides access to Marksheffel Road. A residential collector will connect Spring Glen Drive, which provides access to Mesa Ridge Parkway to the south, to an east-west residential collector that serves as the primary circulator within the development. Figure 4 shows the overall development plan, including the general layout of interior roadways and where they access the roadway network, land uses, parcel sizes, and the approximate number of dwelling units per acre.

Figure 4 - Site Plan



Trip Generation

Vehicle trips associated with Corvallis were calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Tenth Edition*. This methodology consists of choosing an independent variable for the land use for a particular time of day (e.g. AM or PM peak hours). The independent variable correlates to the variation in trip ends and is related to the land use. The value of the independent variable is either multiplied by a weighted average or used in a regression equation to calculate the trips generated by the land use. The *ITE Trip Generation Manual* provides guidance on when to use the weighted average versus the regression equation. In most cases, the regression equations are recommended when there are adequate study data points.

To determine the number of dwelling units (DU) for the single-family and multifamily residential, the average number of DU/acre was multiplied by the size of the parcel in acres. ITE land use code 210 was used for "single-family detached housing" and code 220 was used for "multifamily housing (low-rise)." The commercial parcels do not have specific land use types at this stage, so they were assumed to be retail shopping centers and land use code 820 "shopping center" was used. This land use uses "1,000 square foot gross leasable area" (KSF GLA) as its independent variable, which was estimated as 25% of the total area of the parcel. School trip generation is generally calculated using the number of estimated students. Because this isn't known at this time, the independent variable "1,000 square foot gross floor area" (KSF GFA) was used. It was estimated that 15% of the total parcel area would be usable square footage. The school land use code is 520.

Internal trips and pass-by traffic were calculated using standard recommended values from the *ITE Trip Generation Handbook*. In general, the residential and commercial trips will be reduced by a certain percentage due to internal capture within the mixed-use development, while the commercial land uses will draw a certain amount of pass-by traffic from vehicles already on the external roadways. Values in Table 5 show the trips that are expected to be generated by Corvallis at build out, taking into account the influences of internally-generated trips and pass-by traffic. The trip generation tables in Appendix C show the exact percentages and which parcels were affected by these calculations.

Trip Distribution

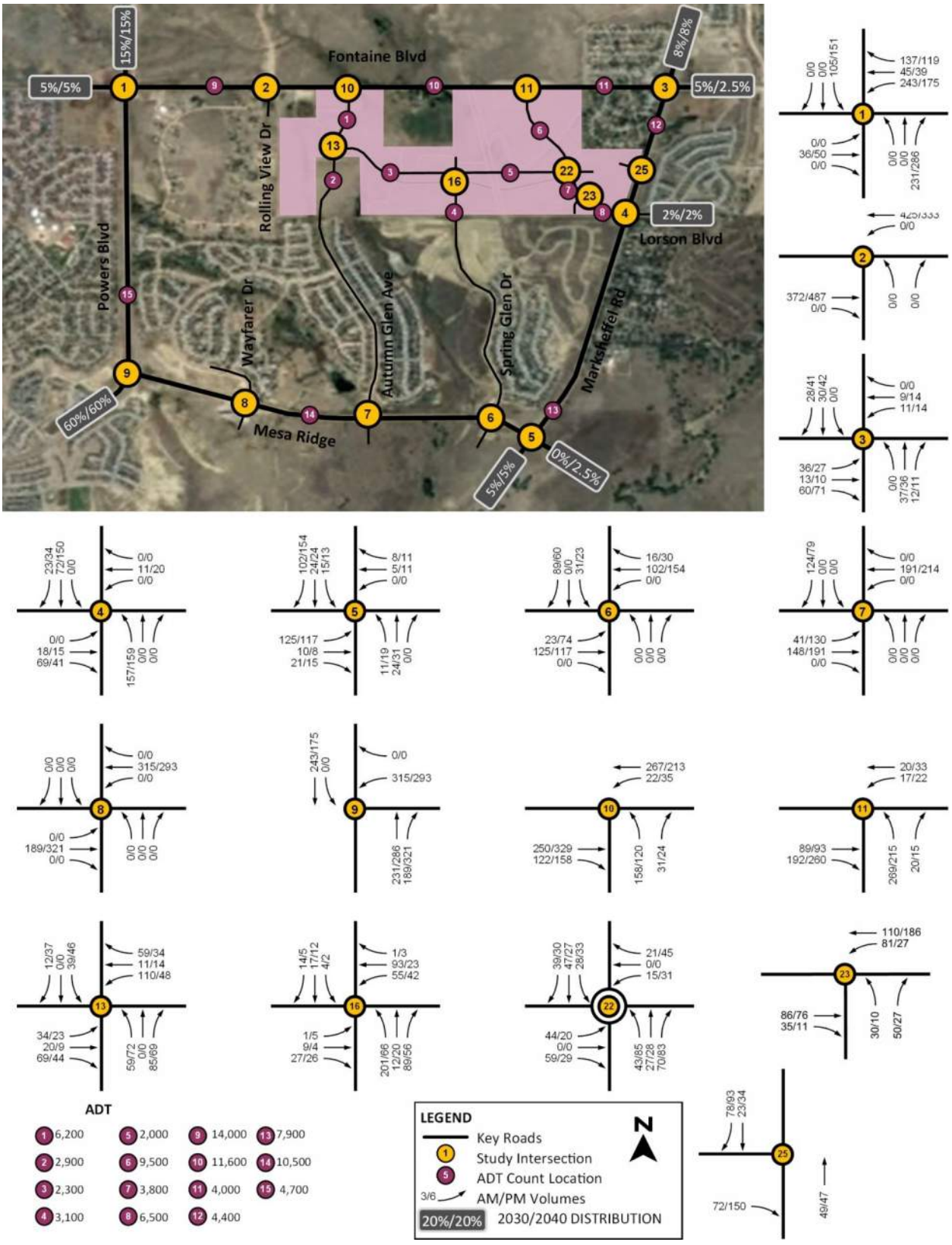
Site trips were distributed along the existing and future roadway network based on current traffic volumes, projected traffic trends/growth, and assumptions made for adjacent similar developments in nearby traffic impact studies. The majority of traffic will travel to/from the southwest. The school traffic will mostly occur from the proposed Corvallis residential parcels as well as The Glen at Widefield development to the south, meaning that most of the trip ends from that parcel will utilize interior roads within the development. The remaining trips are assumed to move throughout the roadway network proportionally to measured traffic counts.

Figure 5 shows the expected external and internal trip distribution of travel for the site-generated trips. The trip distribution is mostly similar between the 2030 and 2040 projections; however some traffic will shift to head east at Mesa Ridge Pkwy once it is constructed to the east of Marksheffel Rd.

Table 5 - Corvallis Trip Generation

Parcel Name	Size (ac)	DU/KSF	% of LU	Land Use Code – Land Use Description	AM VEHICLE TRIPS			PM VEHICLE TRIPS			DAILY VEHICLE TRIPS		
					Entry	Exit	Total	Entry	Exit	Total	Entry	Exit	Total
Single Family Residential													
Res A	25.5	166	15.0%	210 - Single-Family Detached Housing	31	92	123	100	60	160	829	829	1658
Res C	23.5	153	14%	210(1) - Single-Family Detached Housing	28	85	113	92	56	107	769	769	1538
Res D	5.5	36	3.7%	210(2) - Single-Family Detached Housing	8	23	31	24	14	38	203	203	406
Res E	13.6	89	8.2%	210(3) - Single-Family Detached Housing	17	51	68	53	34	87	467	467	934
Res F	9.1	60	5.8%	210(4) - Single-Family Detached Housing	12	36	48	39	23	62	325	325	650
Res G	18.4	120	11.0%	210(5) - Single-Family Detached Housing	22	68	90	72	45	117	615	615	1230
Res H	33.3	217	19.5%	210(6) - Single-Family Detached Housing	40	119	159	130	78	208	1060	1060	2120
Res J	10.7	70	6.8%	210(7) - Single-Family Detached Housing	14	41	55	41	27	68	374	374	748
TOTAL SINGLE-FAMILY DU		**911**	100.0%	**SINGLE-FAMILY RESIDENTIAL TRIPS**	**172**	**515**	**687**	**551**	**337**	**888**	**4642**	**4642**	**9284**
Multifamily Residential													
Res B	6.9	125	40.8%	220 - Multifamily Housing (Low-Rise)	14	45	59	41	27	68	452	452	904
Res I	10	180	59.2%	220(1) - Multifamily Housing (Low-Rise)	19	64	83	59	37	96	660	660	1320
TOTAL MULTIFAMILY DU		**305**	100.0%	**MULTIFAMILY RESIDENTIAL TRIPS**	**33**	**109**	**142**	**100**	**64**	**164**	**1112**	**1112**	**2224**
Commercial – Retail													
Com K	1.9	21	5.5%	820 - Shopping Center	101	62	163	32	32	64	1040	1040	2080
Com L	24.1	263	69.4%	820(1) - Shopping Center	176	108	284	210	225	435	5802	5802	11,604
Com M	4	44	11.6%	820(2) - Shopping Center	108	66	174	56	57	113	1720	1720	3440
Com N	4.6	51	13.5%	820(3) - Shopping Center	110	67	177	62	65	127	1902	1902	3804
TOTAL COMMERCIAL KSF GLA		**379**	100.0%	**COMMERCIAL TRIPS**	**495**	**403**	**798**	**360**	**379**	**739**	**11,743**	**11,743**	**23,486**
School													
School	12.0	79	100.0%	520 - Elementary School	303	248	551	49	60	109	1279	1279	2558
TOTAL SCHOOL KSF GFA		**96**	100.0%	**SCHOOL TRIPS**	**303**	**248**	**551**	**49**	**60**	**109**	**1279**	**1279**	**2558**
				TOTAL PEAK HOUR TRIPS	**1003**	**1175**	**2178**	**1060**	**840**	**1900**	**17,497**	**17,497**	**34,994**

Figure 5 - Corvallis Site Trips & Trip Distribution



4.0 Traffic Analysis

Traffic conditions both with and without the project have been analyzed for the buildout year of 2030 and the horizon year of 2040. It was assumed that adjacent developments scheduled to be constructed prior to 2030 will have been constructed to their buildout volumes. The most consistent analysis period in common between this study and the adjacent developments was the 2040 horizon year. In order to establish consistent background traffic volumes, the traffic volumes were grown from the 2020 counts at a growth rate of 2.3%, which was calculated from volumes from the previous studies. Volumes were grown from 2020 to 2040 and then compared to the 2040 total traffic volumes from the previous studies, as available (not all of the intersections in this study were part of previous studies). The larger of the grown volumes or the total volumes from previous studies were used in order to get a conservative estimate of the Corvallis background traffic volumes. These 2040 volumes were then back calculated to 2030 in order to provide an estimate that considers the adjacent development volumes which were calculated in the previous studies for many different years (no prior study had an analysis for 2030 but all had an analysis for the horizon year of 2040).

2030 Buildout Year Traffic Analysis

The calculated 2030 background volumes were used to analyze the no-build scenario and site trips were added to this background to analyze the "with project" (total traffic) scenario. This analysis also takes into consideration any roadway improvements which are anticipated to be in place during this time.

No-Build (Background Traffic)

Figure 6 shows the background traffic volumes for the no-build scenario. Table 6 shows the LOS analysis and Table 7 shows the available storage and 95th percentile queue lengths for the study intersections. The full analysis software printout is provided in Appendix D.

The Powers Boulevard/Mesa Ridge Parkway intersection experiences an intersection LOS F and approach LOS E for the westbound and LOS F northbound in the PM peak hour. This intersection is designated to become a traffic interchange per the El Paso County 2016 Major Transportation Corridors Plan Update. In the meantime, mitigation measures were tested to see if the intersection LOS could be improved. Reconstructing the northbound right turn to be a free right turn and changing the phasing for the westbound right turn to allow overlap with the southbound left improves the intersection to LOS C, westbound approach to LOS C, and northbound to LOS D in the PM peak hour. These mitigation measures eliminate the excessive queue length for the northbound right turn.

The Marksheffel Road/Fontaine Boulevard intersection experiences some left turn movement LOS that are unacceptable in the PM peak. The southbound shared left/through lane experiences LOS E during the PM, but the approaches and overall intersections are acceptable, so no mitigation is necessary at this time.

Figure 6 - Buildout Year (2030) Background Traffic without Project

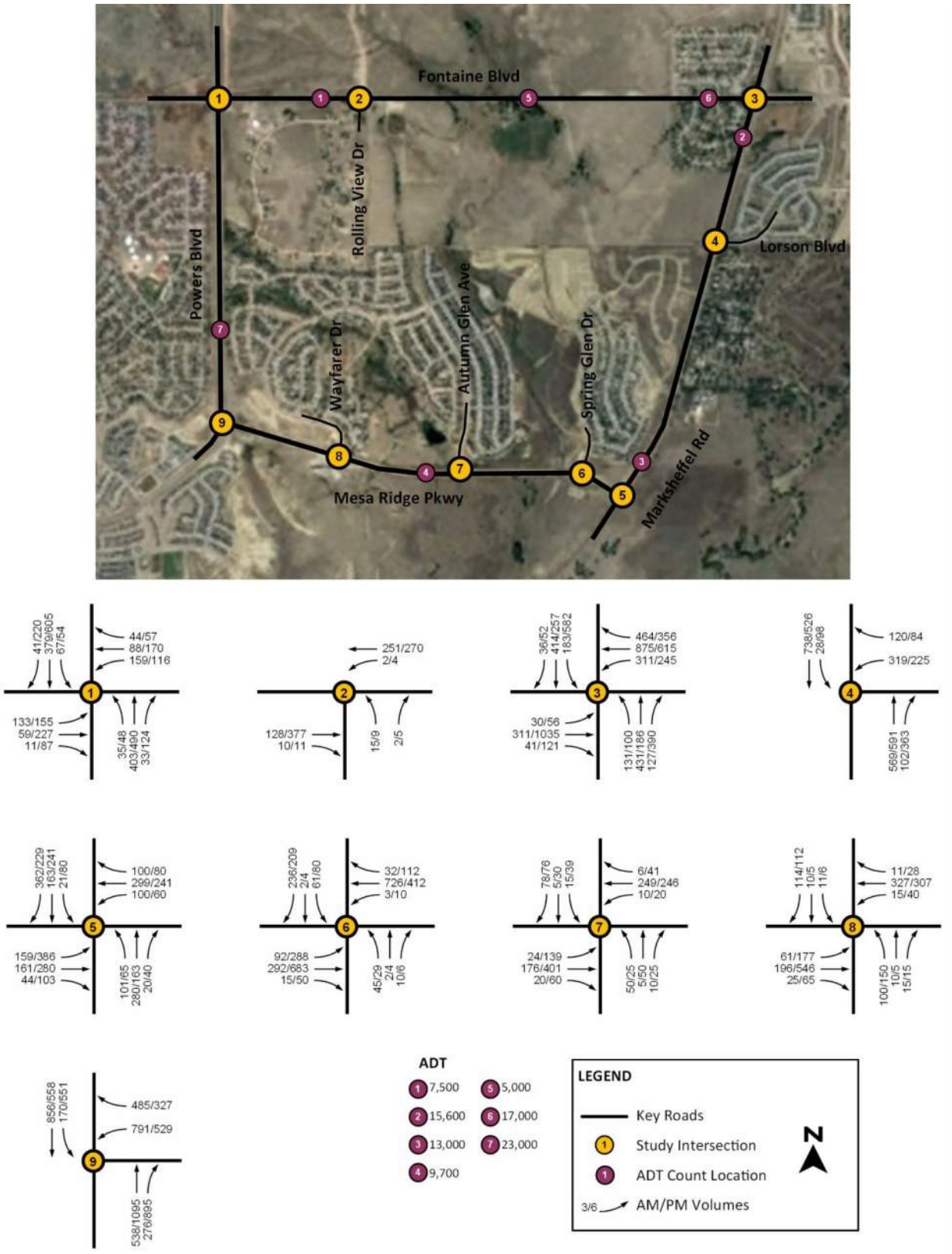


Table 6 - Buildout Year (2030) Background LOS without Project

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
1	Powers & Fontaine	Signalized	B	EB	B	EBL	B	B	EB	C	EBL	B
						EBT	C				EBT	C
						EBR	A				EBR	A
				WB	B	WBL	B		WB	C	WBL	B
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	B	NBL	A		NB	B	NBL	A
						NBT	B				NBT	B
						NBR	A				NBR	A
				SB	B	SBL	A		SB	B	SBL	A
						SBT	B				SBT	B
						SBR	A				SBR	A
2	Rolling View & Fontaine	TWSC	B	EB	-	EBT	-	B	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	B	NBLR	B		NB	B	NBLR	B
3	Marksheffel & Fontaine	Signalized	C	EB	C	EBL	D	D	EB	D	EBL	E
						EBT	C				EBT	D
						EBR	A				EBR	A
				WB	C	WBL	D		WB	D	WBL	F
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	C	NBL	D		NB	D	NBL	E
						NBT	C				NBT	D
						NBR	A				NBR	A
				SB	C	SBL	D		SB	D	SBL	E
						SBT	C				SBT	C
						SBR	A				SBR	A
4	Marksheffel & Lorson	Signalized	A	WB	B	WBL	B	A	WB	B	WBL	B
						WBR	A				WBR	B
				NB	A	NBT	A		NB	A	NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
5	Marksheffel & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	A	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	B				SBR	B
6	Spring Glen & Mesa Ridge	Signalized	B	EB	B	EBL	C	B	EB	B	EBL	C
						EBT	B				EBT	B

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						EBR	B				EBR	B
				WB	B	WBL	B		WB	B	WBL	B
						WBT	B				WBT	B
						WBR	B				WBR	B
				NB	C	NBLT	C		NB	C	NBLT	C
						NBR	A				NBR	B
				SB	B	SBLT	C		SB	C	SBLT	E
						SBR	B				SBR	B
7	Autumn Glen & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
						SBR	A				SBR	A
8	Wayfarer & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
						SBR	A				SBR	A
9	Powers & Mesa Ridge	Signalized	C	WB	D	WBL	C	F	WB	E	WBL	D
						WBR	F				WBR	F
				NB	B	NBT	B		NB	F	NBT	C
						NBR	B				NBR	F
				SB	A	SBL	B		SB	D	SBL	F
						SBT	A				SBT	A
9	Powers & Mesa Ridge Mitigated	Signalized	B	WB	C	WBL	C	C	WB	C	WBL	D
						WBR	C				WBR	B
				NB	B	NBT	B		NB	D	NBT	D
						NBR	A				NBR	A
				SB	A	SBL	A		SB	C	SBL	D
						SBT	A				SBT	A

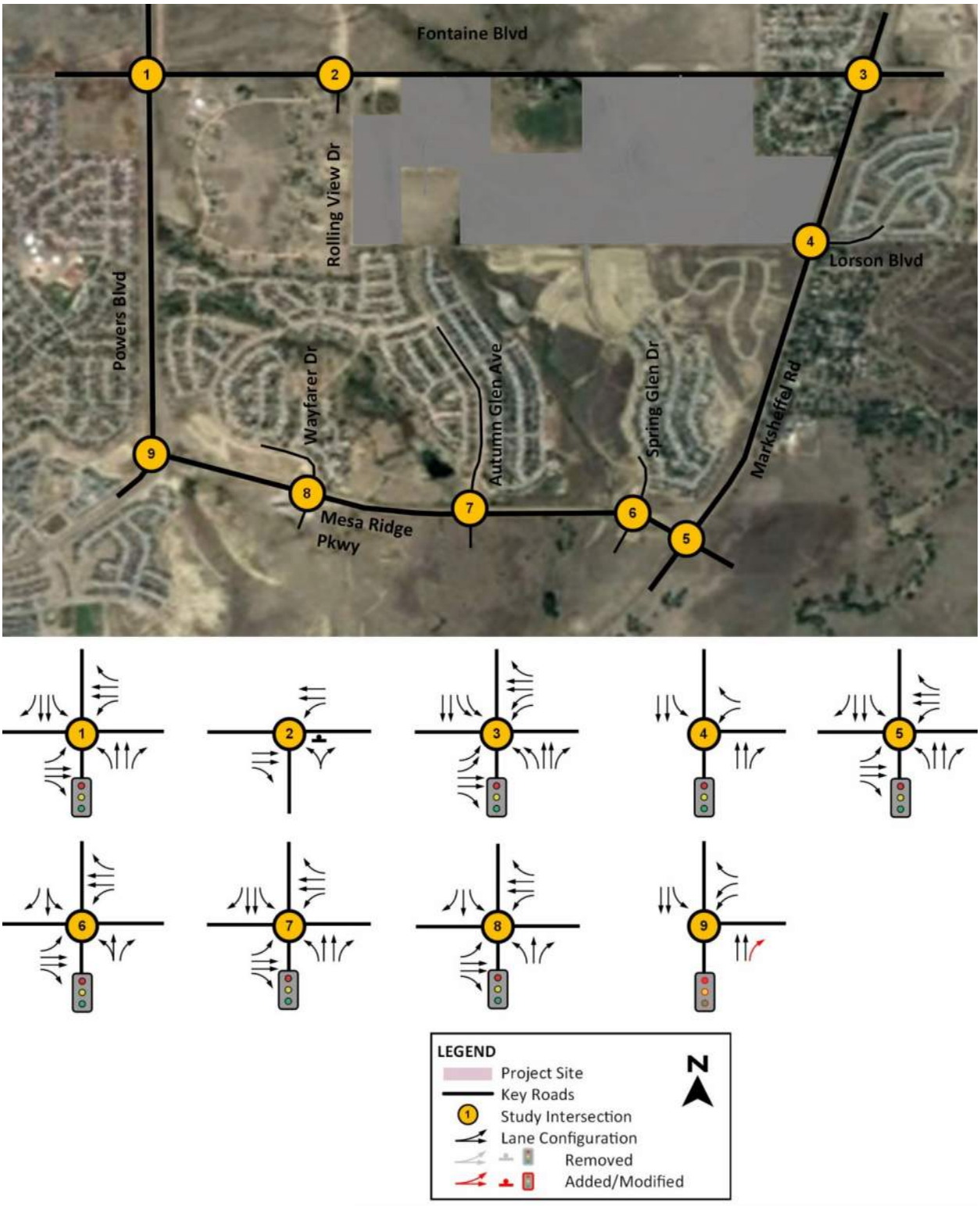
Table 7 - Buildout Year (2030) Background 95th Percentile Queue Length without Project

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
1	Powers & Fontaine	EBL	235	73	83
		EBT		24	71
		EBR	450	0	19
		WBL	200	86	64
		WBT		33	55
		WBR	400	0	3
		NBL	700	17	24
		NBT		90	119
		NBR	600	0	31
		SBL		27	27
		SBT		82	149
		SBR	490	0	40
2	Rolling View & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	0	0
		WBT		-	-
		NBLR		3	3
3	Marksheffel & Fontaine	EBL	235	26	48
		EBT		130	595
		EBR	235	0	36
		WBL		152	190
		WBT		336	270
		WBR		166	59
		NBL	455	76	75
		NBT		176	104
		NBR	455	31	0
		SBL	385	101	365
		SBT		166	113
		SBR	385	0	8
4	Marksheffel & Lorson	WBL	250	154	100
		WBR		26	22
		NBT		105	82
		NBR	250	22	32
		SBL	400	19	43
		SBT		142	72
5	Marksheffel & Mesa Ridge	EBL	300	65	199
		EBT		25	40
		EBR	275	12	17
		WBL	300	39	25
		WBT		43	35
		WBR	275	19	15
		NBL	300	45	47
		NBT		47	44
		NBR	275	9	19
		SBL	300	14	54
		SBT		30	62
		SBR	500	40	44
6	Spring Glen & Mesa Ridge	EBL	485	46	120
		EBT		43	78
		EBR	275	6	10

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
		WBL	235	3	6
		WBT		110	46
		WBR	275	10	15
		NBLT		29	25
		NBR		5	3
		SBLT		37	51
		SBR		85	40
7	Autumn Glen & Mesa Ridge	EBL	325	8	34
		EBT		15	35
		EBR	275	5	9
		WBL	275	5	8
		WBT		21	22
		WBR	275	1	8
		NBL	250	15	15
		NBT		1	11
		NBR	275	3	10
		SBL	250	6	20
		SBT		1	8
		SBR	275	11	18
8	Wayfarer & Mesa Ridge	EBL	300	19	65
		EBT		21	70
		EBR	275	7	13
		WBL	275	7	18
		WBT		33	40
		WBR	250	3	9
		NBL	275	30	70
		NBT		6	6
		NBR	275	5	7
		SBL	275	6	7
		SBT		6	6
		SBR	125	16	25
9	Powers & Mesa Ridge	WBL	325	233	244
		WBR		183	73
		NBT		120	450
		NBR	150	41	649
		SBL	1000	59	542
		SBT		140	76
9	Powers & Mesa Ridge Mitigated	WBL	325	235	244
		WBR		184	175
		NBT		125	470
		NBR	150	0	0
		SBL	1000	58	523
		SBT		138	76

Figure 7 shows the lane configurations and traffic control for the 2030 background traffic scenario.

Figure 7 - 2030 Background Lane Configurations & Traffic Control



With Project (Total Traffic)

Figure 8 shows the total traffic volumes which include the Corvallis site-generated trips added into the previously calculated background volumes. Table 8 shows the LOS results and Table 9 shows the storage and 95th percentile queue lengths for the study intersections. The full analysis software printout is provided in Appendix E. Figure 9 shows the road lane configurations and traffic control for the 2030 background traffic and 2030 total traffic, as well as any required lane/traffic control mitigations.

By 2030, the Marksheffel Road/Fontaine Boulevard intersection is beginning to experience LOS E and LOS F left turn movements during the PM peak hour. The site traffic from Corvallis appears to just barely tip this intersection into an unacceptable LOS condition. Corvallis will have to provide a fair share contribution towards the improvements at this intersection.

The following intersections have unsatisfactory approach or intersection LOS during the PM peak hour, prior to mitigation:

- Marksheffel Road/Fontaine Boulevard
  - All left turn movements are LOS E or LOS F
  - Eastbound and southbound approaches are LOS E
- Spring Glen Drive/Mesa Ridge Parkway
  - The southbound shared left/through lane has an LOS E which causes the southbound leg to be deficient
- Powers Boulevard/Mesa Ridge Parkway
  - Overall intersection and all three approaches are LOS F

The following actions were investigated and found to mitigate the unacceptable LOS condition for each intersection:

- Marksheffel Road/Fontaine Boulevard
  - All right turn movements were coded to overlap with the non-conflicting left-turn phases
  - Converted northbound free right turn to yield to allow for adding an eastbound through lane (this will provide three receiving lanes east of Marksheffel Road)
- Spring Glen Drive/Mesa Ridge Pkwy
  - Existing traffic impact studies for The Glen at Widefield show this intersection as a four-leg with northbound and southbound shared left/through lanes and exclusive right turn lanes. This intersection is currently only an unsignalized three-leg and is not striped for this configuration. Recommend that this intersection be constructed with exclusive left-turn lanes and shared through/right-turn lanes
- The Powers Boulevard/Mesa Ridge Parkway intersection will be improved to a traffic interchange at a future date.

Fair Share Contributions

Corvallis will need to make a fair share contribution towards roadway improvements that are directly or partially the result of the project traffic. It should be noted that these three intersections with deficiencies will all require the same mitigations by the 2040 horizon year due to background growth.

Fair share contributions should be considered based on the proportion of the traffic the development adds to the intersection.

The Corvallis development will contribute about 4% additional traffic to the background Marksheffel Road/Fontaine Boulevard intersection in 2030:

AM Peak Hour: 270 site trips / 3,624 total trips x 100% = 7.5%
PM Peak Hour: 310 site trips / 4,305 total trips x 100% = 7.2%

Average: 7.3%

The Spring Glen Drive/Mesa Ridge Parkway intersection is not constructed to its ultimate four-leg configuration. It is recommended that instead of constructing this intersection with shared left/through lanes and exclusive right turn lanes, it be constructed with exclusive left turn lanes and shared through/right lanes. This modification will add no additional cost to the construction of the intersection.

The Corvallis development will contribute approximately 20% additional traffic to the background traffic at Powers Boulevard/Mesa Ridge Parkway in 2030:

AM Peak Hour: 371 site trips / 1,887 total trips x 100% = 19.7%
PM Peak Hour: 441 site trips / 2,328 total trips x 100% = 18.9%

Average: 19.3%

Site Access Design

Three accesses to the site will be newly constructed; the remainder will tie into existing facilities or will be constructed by others at a future date. The three accesses are

- (Intersection ID 10) Tee intersection at Fontaine Boulevard/Spring Glen Avenue
  - City of Colorado Springs Engineering Criteria Manual applies to this intersection
  - EB right-turn lane and WB left-turn lane on Fontaine Boulevard should be constructed for a 45 mph design speed and have a lane length of 200’ and approach taper of 180’
  - NB left-turn lane on Spring Glen Avenue should be constructed for a 40 mph design speed and have a lane length of 155’ and approach taper of 160’
- (Intersection ID 11) Tee intersection at Fontaine Boulevard/Minor Arterial A
  - City of Colorado Springs Engineering Criteria Manual applies to this intersection
  - EB right-turn lane and WB left-turn lane on Fontaine Boulevard should be constructed for a 45 mph design speed and have a lane length of 200’ and approach taper of 180’
  - NB left-turn lane on Spring Glen Avenue should be constructed for a 40 mph design speed and have a lane length of 155’ and approach taper of 160’
- (Intersection ID 25) Right-in/Right-out access from Marksheffel Road south of Fontaine Boulevard and north of Lorson Boulevard.
  - El Paso County Engineering Criteria Manual applies to this intersection
  - SB right turn lane on Marksheffel Road should be constructed for a 60 mph design speed and have a lane length of 290’ and approach taper of 240’

Figure 8 - Buildout Year (2030) Total Traffic with Project

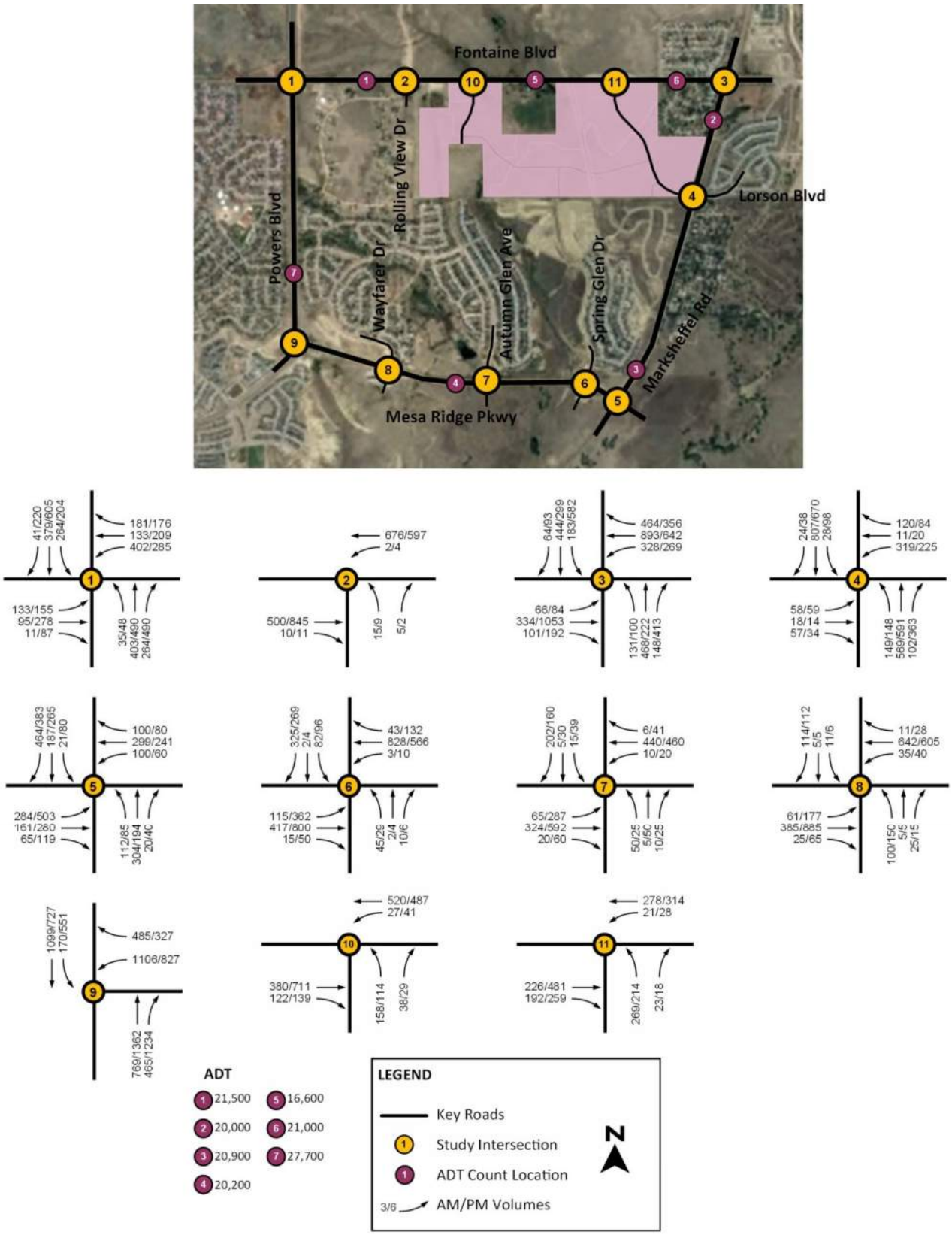


Table 8 - Buildout Year (2030) Total LOS with Project

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
1	Powers & Fontaine	Signalized	C	EB	C	EBL	C	C	EB	C	EBL	C
						EBT	C				EBT	C
						EBR	A				EBR	A
				WB	C	WBL	C		WB	C	WBL	C
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	B	NBL	B		NB	B	NBL	B
						NBT	B				NBT	B
						NBR	A				NBR	A
				SB	B	SBL	B		SB	B	SBL	B
						SBT	B				SBT	B
						SBR	A				SBR	A
2	Rolling View & Fontaine	TWSC	C	EB	-	EBT	-	C	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	C	NBLR	C		NB	C	NBLR	C
3	Marksheffel & Fontaine	Signalized	C	EB	C	EBL	D	D	EB	E	EBL	E
						EBT	C				EBT	E
						EBR	A				EBR	A
				WB	C	WBL	D		WB	D	WBL	F
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	C	NBL	D		NB	D	NBL	E
						NBT	C				NBT	D
						NBR	A				NBR	A
				SB	C	SBL	D		SB	E	SBL	E
						SBT	C				SBT	C
						SBR	A				SBR	A
3	Marksheffel & Fontaine Mitigated	Signalized	D	EB	D	EBL	D	D	EB	D	EBL	E
						EBT	C				EBT	D
						EBR	A				EBR	A
				WB	D	WBL	D		WB	D	WBL	E
						WBT	D				WBT	C
						WBR	A				WBR	A
				NB	C	NBL	D		NB	D	NBL	E
						NBT	C				NBT	C
						NBR	A				NBR	A
				SB	C	SBL	D		SB	D	SBL	D
						SBT	C				SBT	C
						SBR	A				SBR	A
4	Marksheffel & Lorson	Signalized	B	WB	B	EBL	B	A	WB	B	EBL	B
						EBTR	B				EBTR	A
				WB	B	WBL	B		WB	B	WBL	B
						WBTR	A				WBTR	B
				NB	A	NBL	B		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						SBT	A				SBT	A
						SBR	A				SBR	A
5	Marksheffel & Mesa Ridge	Signalized	B	EB	B	EBL	C	B	EB	B	EBL	B
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	B	WBL	B		WB	B	WBL	B
						WBT	B				WBT	B
						WBR	B				WBR	B
				NB	B	NBL	B		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	B	SBL	B		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	B				SBR	B
6	Spring Glen & Mesa Ridge	Signalized	B	EB	B	EBL	C	C	EB	C	EBL	D
						EBT	B				EBT	B
						EBR	B				EBR	A
				WB	B	WBL	B		WB	A	WBL	B
						WBT	B				WBT	A
						WBR	B				WBR	A
				NB	C	NBLT	C		NB	D	NBLT	D
						NBR	B				NBR	C
				SB	C	SBLT	E		SB	F	SBLT	F
						SBR	B				SBR	C
6	Spring Glen & Mesa Ridge Mitigated	Signalized	A	EB	A	EBL	B	B	EB	B	EBL	C
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	B	NBL	B		NB	C	NBLT	C
						NBTR	B				NBR	C
				SB	B	SBL	B		SB	C	SBL	C
						SBTR	B				SBTR	C
7	Autumn Glen & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	A	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	A				SBR	B
8	Wayfarer & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	A	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	A				SBR	B
9	Powers & Mesa Ridge	Signalized	C	WB	C	WBL	C	E	WB	E	WBL	F
						WBR	B				WBR	B
				NB	C	NBT	C		NB	F	NBT	F
						NBR	A				NBR	A
				SB	B	SBL	B		SB	E	SBL	F
						SBT	B				SBT	A
10	Autumn Glen & Fontaine	TWSC	C	EB	A	EBT	-	D	EB	-	EBT	-
						EBR	-				EBR	-
				WB	A	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	C	NBL	C		NB	D	NBL	E
						NBR	A				NBR	B
11	Community Arterial A & Fontaine	TWSC	C	EB	-	EBT	-	D	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	C	NBL	C		NB	D	NBL	D
						NBR	A				NBR	A

Table 9 - Buildout Year (2030) Total Traffic 95th Percentile Queue Lengths with Project

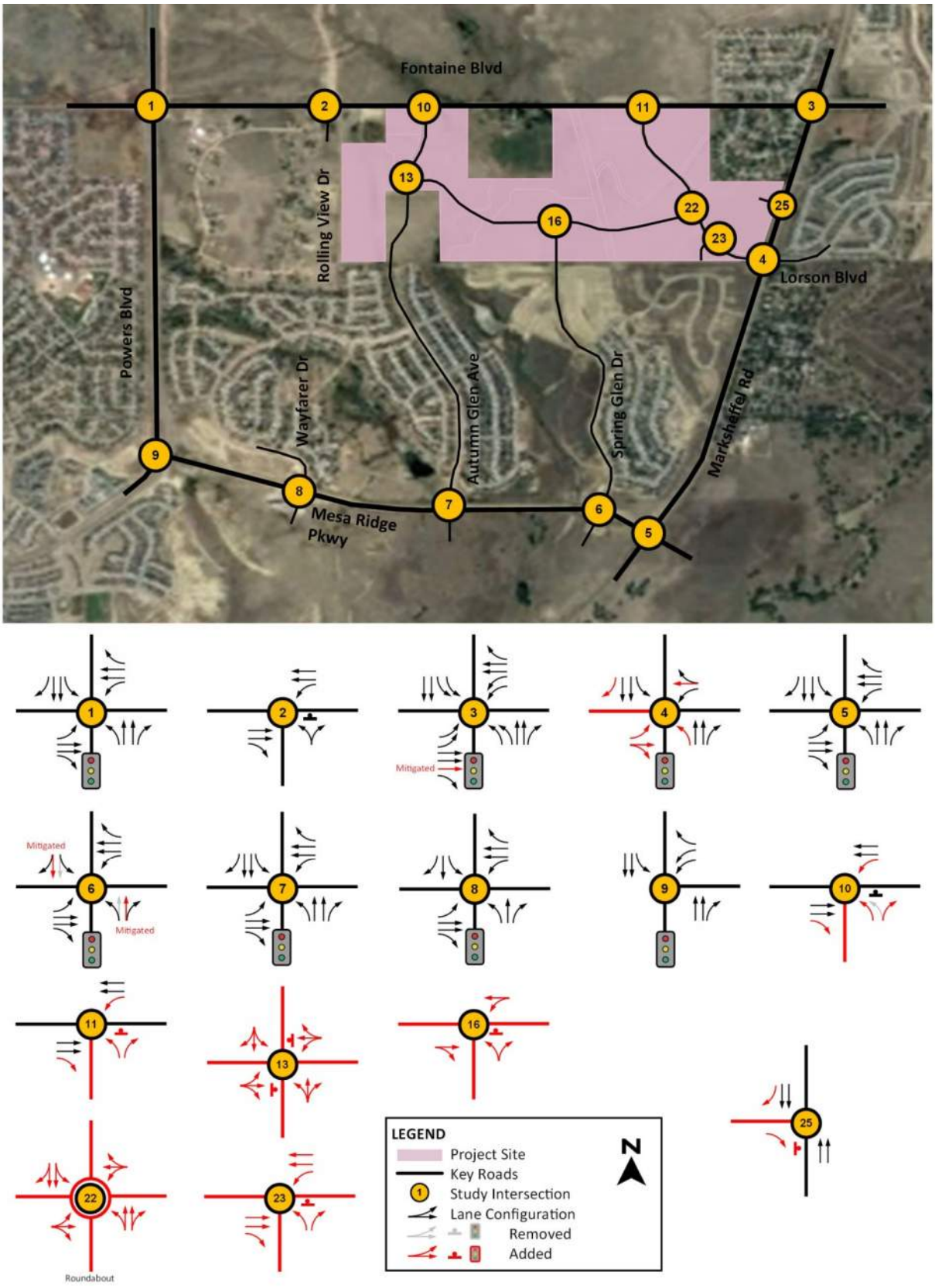
				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
1	Powers & Fontaine	EBL	235	83	99
		EBT		47	107
		EBR	450	0	8
		WBL	200 - **Propose 400**	281	176
		WBT		51	77
		WBR	400	48	49
		NBL	700	24	30
		NBT		136	164
		NBR	600	55	64
		SBL		88	102
		SBT		110	177
		SBR	490	0	43
2	Rolling View & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	0	0
		WBT		-	-
		NBLR		5	5
3	Marksheffel & Fontaine	EBL	235	46	68
		EBT		138	646
		EBR	235	14	86
		WBL		160	208
		WBT		349	300
		WBR		203	64
		NBL	455	76	78
		NBT		192	127
		NBR	455	45	450
		SBL	385	101	387
		SBT		179	137
		SBR	385	0	24
3	Marksheffel & Fontaine Mitigated	EBL	235	53	63
		EBT		113	373
		EBR	235	24	50
		WBL		186	161
		WBT		426	306
		WBR		305	86
		NBL	455	89	72
		NBT		223	116
		NBR	455	35	334
		SBL	385	111	328
		SBT		192	121
		SBR	385	16	31
4	Marksheffel & Lorson	EBL		33	30
		EBTR		24	18
		WBL	250	165	98
		WBTR		29	27
		NBL	250	129	74
		NBT		112	90
		NBR	250	2	36
		SBL	400	20	45
		SBT		166	103

Int ID	Intersection	Movement	Turn Lane Storage (ft)	AM Peak Hour Queue Length (ft)	PM Peak Hour Queue Length (ft)
		SBR	200	11	12
5	Marksheffel & Mesa Ridge	EBL	300	104	148
		EBT		29	46
		EBR	275	16	20
		WBL	300	66	54
		WBT		75	77
		WBR	275	29	31
		NBL	300	68	63
		NBT		70	56
		NBR	275	0	11
		SBL	300	19	59
		SBT		46	74
		SBR	500	59	57
6	Spring Glen & Mesa Ridge	EBL	485	106	303
		EBT		80	114
		EBR	275	7	10
		WBL	235	5	7
		WBT		173	76
		WBR	275	15	16
		NBLT		30	39
		NBR		5	5
		SBLT		47	92
		SBR	235	145	68
6	Spring Glen & Mesa Ridge Mitigated	EBL	485	88	291
		EBT		84	116
		EBR	275	7	11
		WBL	235	4	7
		WBT		181	77
		WBR	275	14	17
		NBL	235	42	32
		NBTR		12	12
		SBL	235	63	76
		SBTR		175	78
7	Autumn Glen & Mesa Ridge	EBL	325	19	110
		EBT		30	58
		EBR	275	5	9
		WBL	275	5	8
		WBT		40	45
		WBR	275	2	8
		NBL	250	17	22
		NBT		2	17
		NBR	275	3	15
		SBL	250	8	31
		SBT		2	12
		SBR	275	23	39
8	Wayfarer & Mesa Ridge	EBL	300	22	79
		EBT		41	121
		EBR	275	7	12
		WBL	275	13	18
		WBT		71	76
		WBR	250	3	8

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
		NBL	275	44	67
		NBT		6	6
		NBR	275	11	7
		SBL	275	10	7
		SBT		6	6
		SBR	125	33	29
9	Powers & Mesa Ridge	WBL	325	378	511
		WBR		226	225
		NBT		224	825
		NBR	150	0	0
		SBL	1000	100	731
		SBT		263	156
10	Autumn Glen & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	3	5
		WBT		-	-
		NBL	200	53	70
		NBR		3	3
11	Community Arterial A & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	3	3
		WBT		-	-
		NBL	200	65	90
		NBR		3	3

Figure 9 shows the lane configurations and traffic control for the 2030 total traffic scenario.

Figure 9 - 2030 Total Lane Configurations & Traffic Control



Horizon Year (2040) Traffic Analysis

The calculated 2040 background volumes were used to analyze the no-build scenario and site trips were added to this background to analyze the with project (total traffic) scenario. This analysis also takes into consideration any roadway improvements which are anticipated to be in place during this time.

No-Build (Background Traffic)

Figure 10 shows the background traffic volumes for the no-build scenario, in other words, with only the volumes grown from the existing counts or taken from the previous studies' total traffic volumes. Table 10 shows the LOS and Table 11 shows the 95th percentile queue lengths for the study intersections. The full analysis software printout is provided in Appendix F.

The specific intersection deficiencies in the 2040 background condition are the same intersections with deficiencies in the 2030 total condition:

- Marksheffel Road/Fontaine Boulevard
  - All left turn movements are LOS E or LOS F
  - Eastbound and southbound approaches are LOS E
- Spring Glen Drive/Mesa Ridge Parkway
  - The southbound shared left/through lane has LOS E which causes the southbound leg to be deficient
- Powers Boulevard/Mesa Ridge Parkway
  - Overall intersection and two of the three approaches are LOS F

The following actions were investigated and found to mitigate the unacceptable LOS condition for each intersection:

- Marksheffel Road/Fontaine Boulevard
  - All right turn movements were coded to overlap with the non-conflicting left-turn phases
  - Converted northbound free right turn to yield to allow for adding an eastbound through lane (this will provide three receiving lanes east of Marksheffel Rd)
  - Re-stripe the northbound and southbound two-way left turn lanes (TWLTL) to allow extending the northbound right and southbound left turn lanes—recommend increasing the northbound right lane to 600 feet from 455 feet and the southbound left turn lane to 500 feet from 385 feet
- Spring Glen Drive/Mesa Ridge Parkway
  - Existing traffic impact studies for The Glen at Widefield show this intersection as a four-leg with northbound and southbound shared left/through lanes and exclusive right turn lanes. This intersection is currently only an unsignalized three-leg and is not striped for this configuration. Recommend that this intersection be constructed with exclusive left-turn lanes and shared through/right-turn lanes
- The Powers Boulevard/Mesa Ridge Parkway intersection will be improved to a traffic interchange at a future date

All other intersections operated with an acceptable LOS.

Figure 10 - Horizon Year (2040) Background Traffic without Project

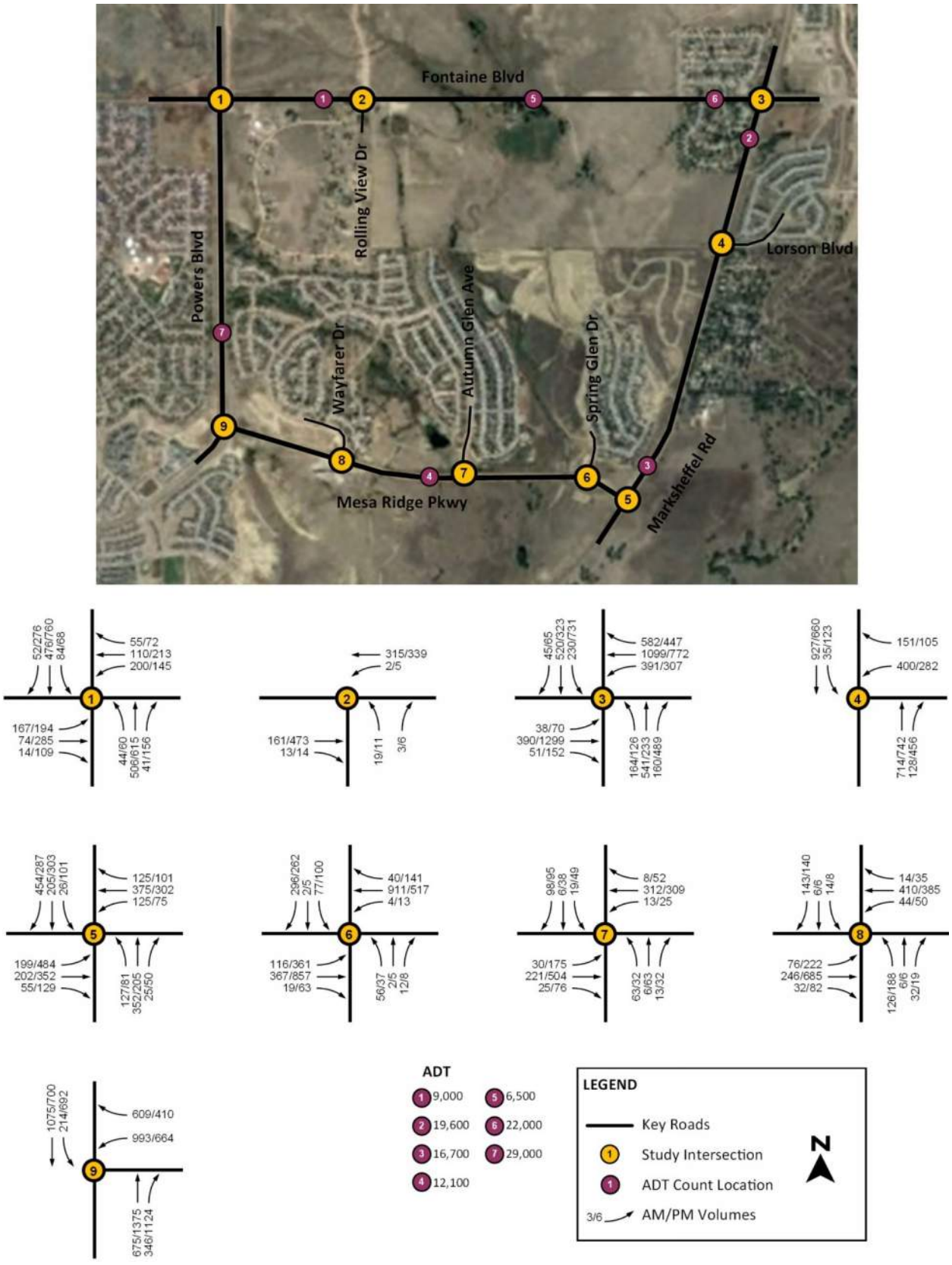


Table 10 - Horizon Year (2040) Background LOS without Project

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
1	Powers & Fontaine	Signalized	B	EB	C	EBL	C	B	EB	C	EBL	C
						EBT	C				EBT	C
						EBR	A				EBR	A
				WB	C	WBL	C		WB	C	WBL	C
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	B	NBL	A		NB	B	NBL	A
						NBT	B				NBT	B
						NBR	A				NBR	A
				SB	B	SBL	A		SB	B	SBL	A
						SBT	B				SBT	B
						SBR	A				SBR	A
2	Rolling View & Fontaine	TWSC	B	EB	-	EBT	-	B	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	B	NBLR	B		NB	B	NBLR	B
3	Marksheffel & Fontaine	Signalized	D	EB	C	EBL	D	F	EB	F	EBL	E
						EBT	C				EBT	F
						EBR	A				EBR	A
				WB	D	WBL	D		WB	E	WBL	F
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	C	NBL	D		NB	E	NBL	E
						NBT	C				NBT	D
						NBR	A				NBR	A
				SB	C	SBL	D		SB	F	SBL	F
						SBT	C				SBT	C
						SBR	A				SBR	A
3	Marksheffel & Fontaine Mitigated	Signalized	D	EB	C	EBL	D	D	EB	D	EBL	E
						EBT	C				EBT	D
						EBR	A				EBR	A
				WB	D	WBL	D		WB	D	WBL	F
						WBT	C				WBT	D
						WBR	A				WBR	A
				NB	C	NBL	D		NB	D	NBL	E
						NBT	C				NBT	D
						NBR	A				NBR	A
				SB	D	SBL	E		SB	D	SBL	E
						SBT	C				SBT	C
						SBR	A				SBR	A
4	Marksheffel & Lorson	Signalized	A	WB	B	WBL	B	A	WB	B	WBL	B
						WBR	B				WBR	B
				NB	A	NBT	A		NB	A	NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
5	Marksheffel & Mesa Ridge	Signalized	B	EB	B	EBL	B	B	EB	B	EBL	B
						EBT	A				EBT	A

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						EBR	A				EBR	A
				WB	A	WBL	B		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	B		NB	C	NBL	C
						NBT	A				NBT	C
						NBR	A				NBR	C
				SB	B	SBL	B		SB	C	SBL	C
						SBT	A				SBT	C
						SBR	B				SBR	C
6	Spring Glen & Mesa Ridge	Signalized	B	EB	B	EBL	C	C	EB	B	EBL	D
						EBT	B				EBT	B
						EBR	B				EBR	A
				WB	B	WBL	B		WB	A	WBL	B
						WBT	B				WBT	A
						WBR	B				WBR	A
				NB	D	NBLT	D		NB	D	NBLT	C
						NBR	B				NBR	C
				SB	C	SBLT	E		SB	F	SBLT	F
						SBR	B				SBR	C
6	Spring Glen & Mesa Ridge Mitigated	Signalized	A	EB	A	EBL	B	B	EB	B	EBL	B
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	B	NBL	B		NB	C	NBL	D
						NBTR	B				NBTR	C
				SB	B	SBL	B		SB	C	SBL	C
						SBTR	B				SBTR	C
7	Autumn Glen & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	A	SBL	A		SB	A	SBL	A
						SBT	A				SBT	A
						SBR	A				SBR	A
8	Wayfarer & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						NBR	A				NBR	B
				SB	A	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	A				SBR	B
9	Powers & Mesa Ridge	Signalized	C	WB	D	WBL	D	F	WB	F	WBL	F
						WBR	D				WBR	C
				NB	C	NBT	C		NB	F	NBT	F
						NBR	A				NBR	A
				SB	B	SBL	B		SB	E	SBL	F
						SBT	B				SBT	A

Table 11 - Horizon Year (2040) Background 95th Percentile Queue Lengths without Project

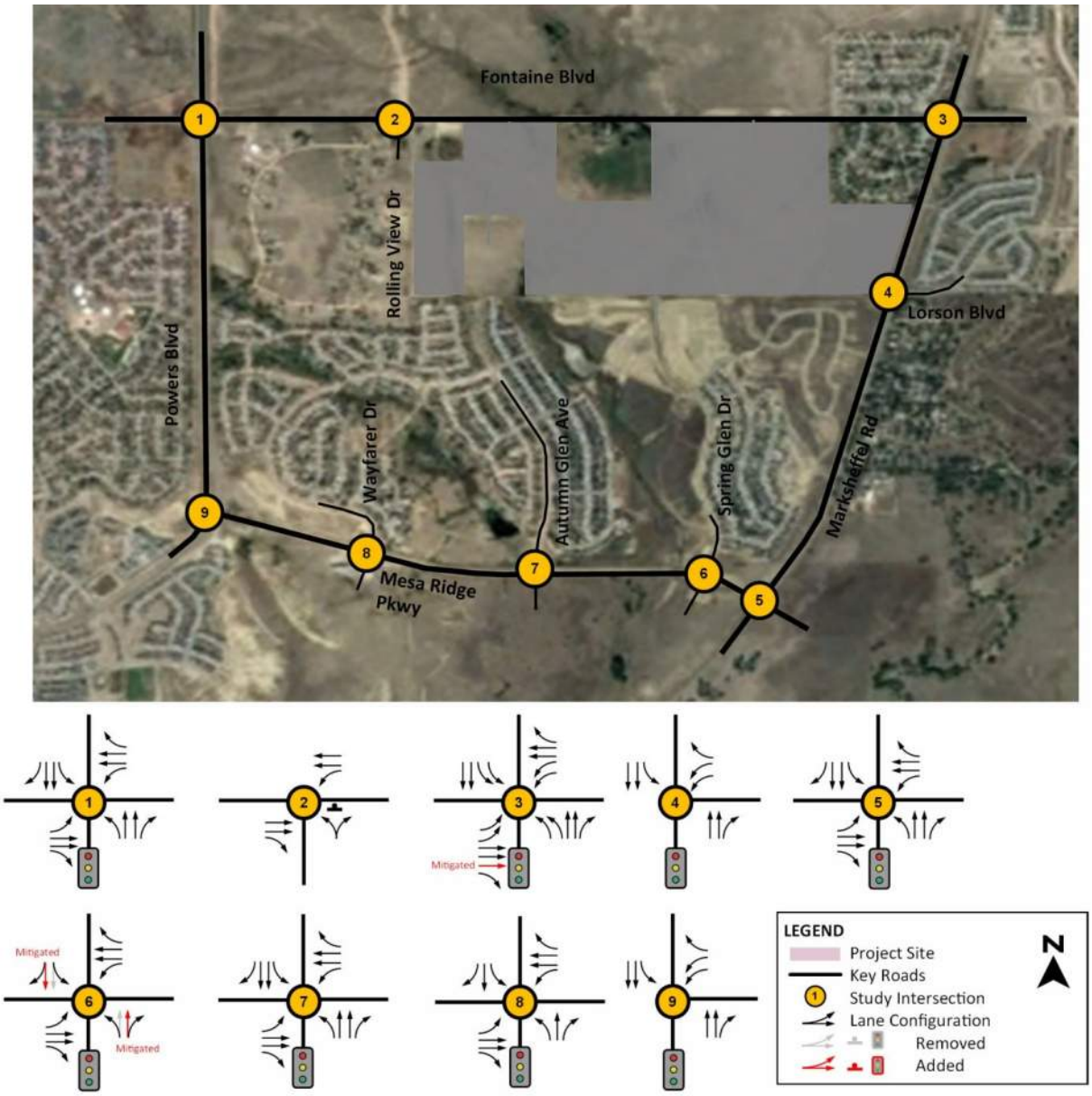
				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
1	Powers & Fontaine	EBL	235	109	125
		EBT		34	102
		EBR	450	0	38
		WBL	400	135	95
		WBT		46	78
		WBR	400	6	15
		NBL	700	20	31
		NBT		116	164
		NBR	600	0	34
		SBL		33	35
		SBT		105	208
		SBR	490	3	44
2	Rolling View & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	0	0
		WBT		-	-
		NBLR		3	3
3	Marksheffel & Fontaine	EBL	235	30	64
		EBT		162	960
		EBR	235	0	63
		WBL	275	204	290
		WBT		468	404
		WBR	455	323	74
		NBL	455	91	102
		NBT		225	144
		NBR	455	49	675
		SBL	385	134	591
		SBT		216	163
		SBR	385	0	8
3	Marksheffel & Fontaine Mitigated	EBL	235	30	61
		EBT		106	500
		EBR	235	0	53
		WBL	275	187	252
		WBT		451	396

Int ID	Intersection	Movement	Turn Lane Storage (ft)	AM Peak Hour Queue Length (ft)	PM Peak Hour Queue Length (ft)
		WBR	455	387	175
		NBL	455	101	96
		NBT		220	142
		NBR	455 - **Propose 600**	51	595
		SBL	385 - **Propose 500**	162	474
		SBT		212	147
		SBR	385	0	21
4	Marksheffel & Lorson	WBL	250	76	56
		WBR		52	37
		NBT		96	83
		NBR	250	19	30
		SBL	400	17	49
		SBT		134	72
5	Marksheffel & Mesa Ridge	EBL	300	123	433
		EBT		45	63
		EBR	275	18	20
		WBL	300	69	37
		WBT		80	54
		WBR	275	27	18
		NBL	300	70	79
		NBT		75	77
		NBR	275	12	26
		SBL	300	20	93
		SBT		46	110
		SBR	500	118	58
6	Spring Glen & Mesa Ridge	EBL	485	113	250
		EBT		69	128
		EBR	275	9	11
		WBL	235	5	8
		WBT		190	71
		WBR	275	14	17
		NBLT		39	45
		NBR		7	8
		SBLT		51	96
		SBR		147	59
6	Spring Glen & Mesa Ridge Mitigated	EBL	485	114	234
		EBT		69	123
		EBR	275	9	11
		WBL	235	5	8
		WBT		191	67
		WBR	275	14	16
		NBL	235	41	45
		NBTR		11	16
		SBL	235	50	92
		SBTR		148	63
7	Autumn Glen & Mesa Ridge	EBL	325	10	49
		EBT		20	48
		EBR	275	6	11
		WBL	275	5	9
		WBT		27	30
		WBR	275	2	9

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
		NBL	250	19	22
		NBT		2	17
		NBR	275	4	15
		SBL	250	8	30
		SBT		2	12
		SBR	275	13	26
8	Wayfarer & Mesa Ridge	EBL	300	26	104
		EBT		28	108
		EBR	275	8	16
		WBL	275	16	26
		WBT		45	58
		WBR	250	4	11
		NBL	275	44	103
		NBT		5	9
		NBR	275	10	10
		SBL	275	9	10
		SBT		5	9
		SBR	125	21	32
9	Powers & Mesa Ridge	WBL	325	385	453
		WBR		348	305
		NBT		218	825
		NBR	150	0	0
		SBL	1000	96	910
		SBT		255	114

Figure 11 shows the lane configurations and traffic control for the 2040 background traffic scenario.

Figure 11 - 2040 Background Lane Configuration & Traffic Control



With Project (Total Traffic)

Figure 12 shows the total traffic volumes which include the Corvallis site-generated trips added into the previously calculated background volumes. Table 13 shows the LOS and Table 14 shows the 95th percentile queue lengths for the study intersections. The full analysis software printout is provided in Appendix G.

Powers Boulevard/Mesa Ridge Parkway has an LOS F, but this intersection is shown to be upgraded to a grade separated interchange by 2040. The only other deficiency is the intersection of Autumn Glen Avenue/Fontaine Boulevard, where the northbound left turning traffic and increase in background traffic combine to cause an LOS F.

- Autumn Glen Avenue/Fontaine Boulevard
    - This site access has a failing northbound left turn; installing a signal eliminates the unacceptable LOS F condition
        - In addition to improving the LOS, a traffic signal is warranted based on proportional hourly volumes compared against the Eight-Hour Vehicular Volume Warrant and the Four-Hour Vehicular Volume Warrant (See Appendix H).
        - The Four-Hour Vehicular Volume Warrant indicates that the signal will be warranted when the site is built out to about 75%, or about 130 site vehicles using the Autumn Glen Ave/Fontaine Blvd intersection. The intersection will not need signalization operationally (LOS E or worse) until sometime between 2030 and 2040, so the signal will not likely be installed until sometime after 2030.

Fair Share Contributions

Intersections

At the point when The Autumn Glen Avenue/Fontaine Boulevard intersection triggers the four-hour traffic signal warrant to be met, it contributes approximately 57.0% of the traffic to the intersection. Similarly, when the Minor Arterial A/Fontaine Boulevard intersection triggers the four-hour traffic signal warrant to be met, it contributes approximately 48.8% of the traffic to the intersection.

Segments

Corvallis will contribute traffic to the adjacent roadway network that surrounds it. The proportion of traffic on each segment that results from this development is shown below in Table 12.

Table 12 - Fair Share Contribution for Roadway Segments

DESCRIPTION	SITE ADT	2040 BKGD	2040 TOT	Site Contribution
Fontaine Blvd east of Powers Blvd intersection	14,000	9,000	23,000	60.9%
Fontaine Blvd between east and west site accesses	11,600	6,500	18,100	64.1%
Fontaine Blvd west of Marksheffel Rd intersection	4,000	22,000	26,000	15.4%
Marksheffel Rd south of Fontaine Blvd intersection	4,400	19,600	24,000	18.3%
Marksheffel Rd north of Mesa Ridge Pkwy intersection	7,900	16,700	24,600	32.1%
Mesa Ridge Pkwy between Spring Glen Ave and Wayfarer Dr	10,500	12,100	22,600	46.5%
Powers Blvd north of Mesa Ridge Pkwy intersection	4,700	29,000	33,700	13.9%

Figure 12 - Horizon Year (2040) Total Traffic with Project

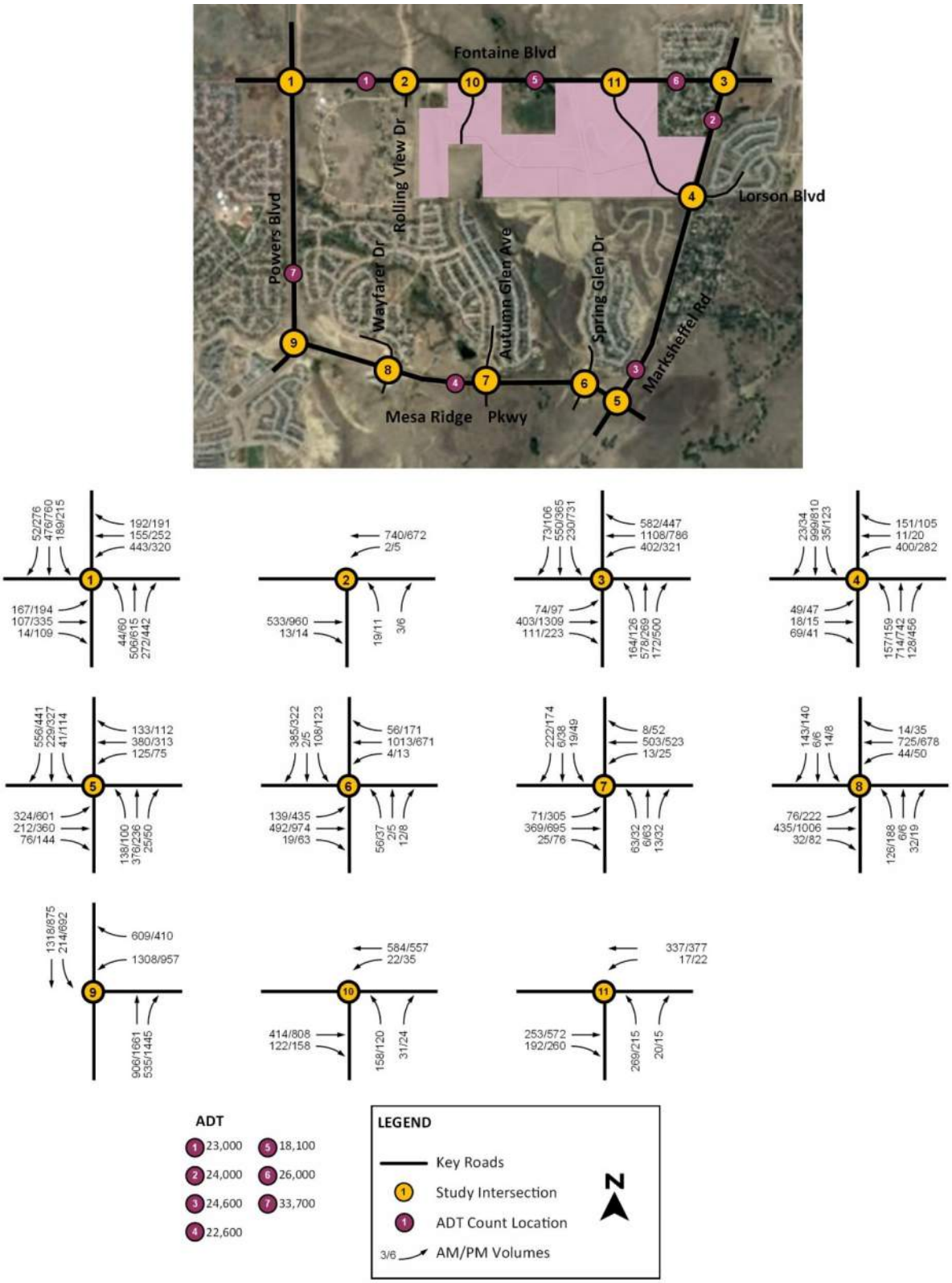


Table 13 - Horizon Year (2040) Total Traffic LOS with Project

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
1	Powers & Fontaine	Signalized	C	EB	D	EBL	C	C	EB	D	EBL	C
						EBT	D				EBT	D
						EBR	A				EBR	A
				WB	D	WBL	D		WB	C	WBL	C
						WBT	C				WBT	C
						WBR	A				WBR	A
				NB	B	NBL	B		NB	C	NBL	B
						NBT	B				NBT	C
						NBR	A				NBR	A
				SB	B	SBL	B		SB	B	SBL	B
						SBT	B				SBT	C
						SBR	A				SBR	A
2	Rolling View & Fontaine	TWSC	C	EB	-	EBT	-	D	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	B
						WBT	-				WBT	-
				NB	C	NBLR	C		NB	D	NBLR	D
3	Marksheffel & Fontaine	Signalized	D	EB	C	EBL	D	D	EB	D	EBL	E
						EBT	C				EBT	D
						EBR	A				EBR	A
				WB	D	WBL	E		WB	D	WBL	F
						WBT	D				WBT	D
						WBR	A				WBR	A
				NB	D	NBL	D		NB	D	NBL	E
						NBT	C				NBT	D
						NBR	A				NBR	A
				SB	D	SBL	D		SB	D	SBL	E
						SBT	C				SBT	C
						SBR	A				SBR	A
4	Marksheffel & Lorson	Signalized	B	WB	C	EBL	C	B	WB	C	EBL	C
						EBTR	C				EBTR	C
				WB	B	WBL	B		WB	B	WBL	B
						WBTR	B				WBTR	B
				NB	A	NBL	B		NB	A	NBL	A
						NBT	A				NBT	A
						NBR	A				NBR	A
				SB	B	SBL	B		SB	B	SBL	B
						SBT	B				SBT	B
						SBR	B				SBR	B
5	Marksheffel & Mesa Ridge	Signalized	B	EB	B	EBL	C	B	EB	B	EBL	C
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	B	WBL	B		WB	B	WBL	B
						WBT	B				WBT	C
						WBR	B				WBR	B
				NB	B	NBL	B		NB	B	NBL	B
						NBT	B				NBT	B
						NBR	A				NBR	B
				SB	B	SBL	B		SB	B	SBL	B

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
						SBT	B				SBT	B
						SBR	B				SBR	A
6	Spring Glen & Mesa Ridge	Signalized	C	EB	B	EBL	C	C	EB	C	EBL	D
						EBT	B				EBT	B
						EBR	B				EBR	A
				WB	C	WBL	B		WB	C	WBL	C
						WBT	C				WBT	C
						WBR	B				WBR	C
				NB	C	NBL	C		NB	C	NBL	C
						NBTR	B				NBT	C
				SB	C	SBL	B		SB	C	SBL	C
						SBTR	D				SBR	C
7	Autumn Glen & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	B	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	B				SBR	C
8	Wayfarer & Mesa Ridge	Signalized	A	EB	A	EBL	A	A	EB	A	EBL	A
						EBT	A				EBT	A
						EBR	A				EBR	A
				WB	A	WBL	A		WB	A	WBL	A
						WBT	A				WBT	A
						WBR	A				WBR	A
				NB	A	NBL	A		NB	B	NBL	B
						NBT	A				NBT	B
						NBR	A				NBR	B
				SB	B	SBL	A		SB	B	SBL	B
						SBT	A				SBT	B
						SBR	B				SBR	B
9	Powers & Mesa Ridge	Signalized	C	WB	C	WBL	D	F	WB	F	WBL	F
						WBR	B				WBR	C
				NB	D	NBT	D		NB	F	NBT	F
						NBR	A				NBR	A
				SB	C	SBL	C		SB	F	SBL	F
						SBT	C				SBT	A
10	Autumn Glen & Fontaine	TWSC	C	EB	A	EBT	-	E	EB	B	EBT	-
						EBR	-				EBR	-
				WB	A	WBL	A		WB	B	WBL	B
						WBT	-				WBT	-
				NB	C	NBL	C		NB	E	NBL	F
						NBR	A				NBR	B
10		Signalized	A	EB	A	EBT	A	A	EB	A	EBT	A
						EBR	A				EBR	A

			AM Peak Hour Results					PM Peak Hour Results				
Int ID	Intersection	Control	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS	Int LOS	Appr	Appr LOS	Mvmt	Mvmt LOS
	Autumn Glen & Fontaine Mitigated			WB	A	WBL	A		WB	A	WBL	B
						WBT	A				WBT	A
				NB	A	NBL	A		NB	A	NBL	A
						NBR	A				NBR	A
11	Community Arterial A & Fontaine	TWSC	C	EB	-	EBT	-	E	EB	-	EBT	-
						EBR	-				EBR	-
				WB	-	WBL	A		WB	-	WBL	A
						WBT	-				WBT	-
				NB	C	NBL	C		NB	E	NBL	E
						NBR	A				NBR	B
11	Community Arterial A & Fontaine	Signalized	A	EB	A	EBT	A	A	EB	A	EBT	A
						EBR	A				EBR	A
				WB	A	WBL	B		WB	A	WBL	A
						WBT	A				WBT	A
				NB	A	NBL	A		NB	A	NBL	A
						NBR	A				NBR	A

Table 14 - Horizon Year (2040) Total Traffic 95th Percentile Queue Lengths with Project

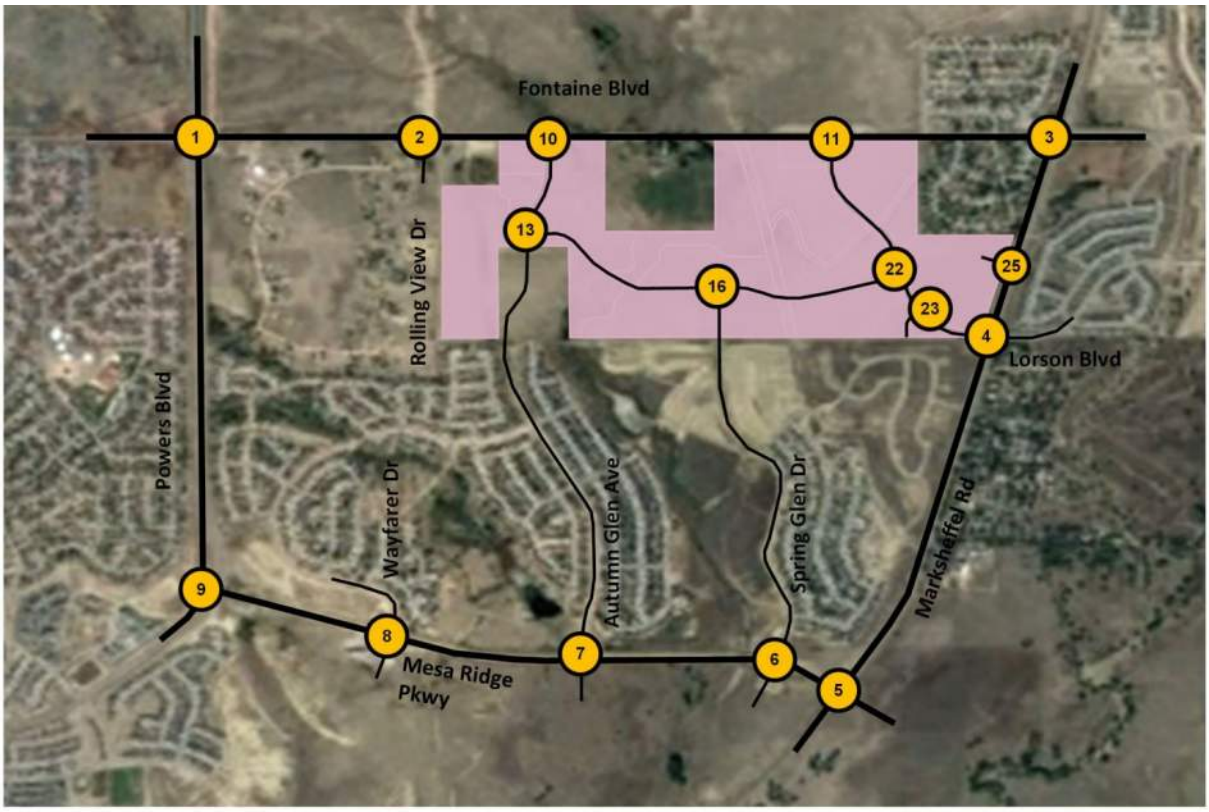
				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
1	Powers & Fontaine	EBL	235	119	150
		EBT		60	162
		EBR	450	0	13
		WBL	400	366	279
		WBT		67	116
		WBR	400	54	56
		NBL	700	30	45
		NBT		17	265
		NBR	600	53	131
		SBL		101	140
		SBT		144	288
		SBR	490	0	51
2	Rolling View & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	0	0
		WBT		-	-
		NBLR		8	10
3	Marksheffel & Fontaine	EBL	235	54	75
		EBT		122	514
		EBR	235	23	134
		WBL	275	230	254
		WBT		550	407
		WBR	455	411	207
		NBL	455	100	92
		NBT		272	157
		NBR	455 - **Propose 600**	67	590
		SBL	385 - **Propose 500**	126	468
		SBT		237	165

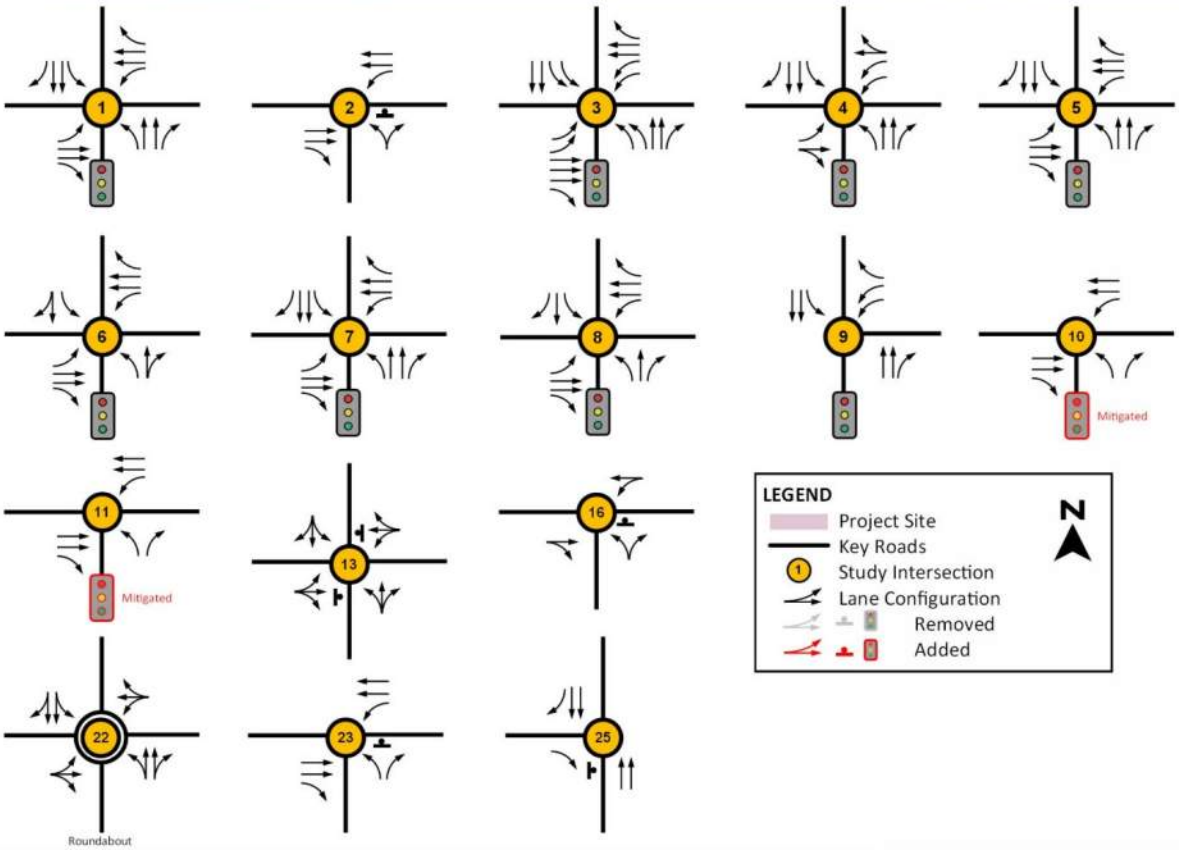
				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
		SBR	385	18	63
4	Marksheffel & Lorson	EBL		50	45
		EBTR		44	33
		WBL	250	112	71
		WBTR		44	48
		NBL	250	57	64
		NBT		109	126
		NBR	250	19	37
		SBL	400	27	100
		SBT		252	200
		SBR	200	0	0
5	Marksheffel & Mesa Ridge	EBL	300	151	204
		EBT		40	60
		EBR	275	18	22
		WBL	300	86	66
		WBT		100	98
		WBR	275	33	36
		NBL	300	93	81
		NBT		97	72
		NBR	275	0	17
		SBL	300	34	89
		SBT		62	98
		SBR	500	194	87
6	Spring Glen & Mesa Ridge	EBL	485	116	366
		EBT		128	208
		EBR	275	0	15
		WBL	235	8	18
		WBT		416	216
		WBR	275	0	41
		NBL	235	40	36
		NBTR		14	17
		SBL	235	68	94
		SBTR	235	173	72
7	Autumn Glen & Mesa Ridge	EBL	325	25	133
		EBT		40	72
		EBR	275	7	10
		WBL	275	7	9
		WBT		55	53
		WBR	275	3	8
		NBL	250	24	31
		NBT		2	24
		NBR	275	5	20
		SBL	250	11	45
		SBT		2	17
		SBR	275	34	46
8	Wayfarer & Mesa Ridge	EBL	300	32	165
		EBT		53	170
		EBR	275	9	15
		WBL	275	17	28
		WBT		92	10
		WBR	250	4	10

				AM Peak Hour	PM Peak Hour
Int ID	Intersection	Movement	Turn Lane Storage (ft)	Queue Length (ft)	Queue Length (ft)
		NBL	275	59	98
		NBT		7	8
		NBR	275	14	10
		SBL	275	12	10
		SBT		7	8
		SBR	125	37	32
9	Powers & Mesa Ridge	WBL	325	483	684
		WBR		320	332
		NBT		359	1156
		NBR	150	0	245
		SBL	1000	165	1080
		SBT		420	206
10	Autumn Glen & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	3	5
		WBT		-	-
		NBL	200	60	98
		NBR		3	3
10	Autumn Glen & Fontaine	EBT		41	72
		EBR	235	16	16
		WBL	235	10	12
		WBT		58	47
		NBL	200	47	51
		NBR		10	12
11	Community Arterial A & Fontaine	EBT		-	-
		EBR	235	-	-
		WBL	235	0	3
		WBT		-	-
		NBL	200	73	120
		NBR		3	3
11	Community Arterial A & Fontaine	EBT		30	65
		EBR	235	23	26
		WBL	235	9	11
		WBT		39	43
		NBL	200	62	73
		NBR		6	8

Figure 13 shows the road lane configurations and traffic control for the 2040 total traffic scenario.

Figure 13 - 2040 Total Lane Configurations & Traffic Control





5.0 Findings and Conclusions

This report finds that some of the surrounding roadway network will have deficiencies in the future, both with and without the addition of traffic from the Corvallis development. However, with the recommendations put forth below, the impacts of this development can be mitigated.

Three intersections, Marksheffel Road/Fontaine Boulevard, Mesa Ridge Parkway/Spring Glen Drive, and Powers Boulevard/Mesa Ridge Parkway will be approaching unsatisfactory LOS in the projected 2030 buildout year. The Corvallis development, while only contributing about 7% of the traffic to the Marksheffel Road/Fontaine Boulevard intersection, would be the tipping point causing it to have an unacceptable LOS.

In the 2040 no-build scenario, these same intersections all have an unacceptable LOS without any contribution from the proposed development. With the recommendations for project buildout in 2030, these LOS conditions can be mitigated both with and without the project.

There are a number of movements where the 95th percentile queue length exceeds the existing turn bay storage length. Many of these locations are not built out to their ultimate typical section and therefore should be able to accommodate the required storage length. Those locations are listed below in the recommendations.

6.0 Recommendations

The following are summaries of the recommendations for each of the analysis periods of this study.

Existing 2020

There are no LOS or queue length deficiencies in the existing condition and therefore no recommendations for this timeframe.

Background 2030 (without Project)

The only intersection requiring mitigation is Powers Boulevard/Mesa Ridge Pkwy, where the following are recommended:

- Reconstruct the northbound right turn to be a free right turn.
- Change the phasing for the westbound right turn to allow overlap with the southbound left turn.

These changes will remove the LOS E and LOS F conditions at this intersection. These conditions exist without the project traffic, therefore the development has no responsibility for this mitigation.

Total Traffic 2030 (with Project)

The following are recommended improvements for this analysis period:

- Marksheffel Road/Fontaine Boulevard
  - Code all right turn movements to overlap with the non-conflicting left-turn phases.
  - Convert northbound free right turn to yield control.
  - Modify northbound right porkchop island to allow for a third eastbound through lane.
  - Adjust signal timing splits to allow for more time to movements that have LOS E or LOS F conditions.

    - Re-stripe the two-way left turn lane on Marksheffel to allow for a 500' northbound right turn lane
    - The Corvallis development will contribute an estimated 7.5% of the total AM volume through the intersection and an estimated 7.2% of the total PM volume, for an average of 7.3% of the total peak volume through the intersection.
- Spring Glen Drive/Mesa Ridge Parkway
    - When this intersection is improved from 3 legs to 4 legs, it should be striped with northbound and southbound exclusive left turn lanes and shared through/right lanes instead of as proposed in The Glen at Widefield impact studies' showing shared left/through lanes and exclusive right turn lanes.
- Powers Boulevard/Mesa Ridge Parkway
    - This intersection is a planned grade separated traffic interchange located on a state highway and should be programmed in the State's construction planning program.

Background 2040 (without Project)

The background condition in 2040 essentially consists of the same improvements that are required with the project in 2030. These are improvements that will need to be constructed anyway, without the construction of the Corvallis development.

- Marksheffel Road/Fontaine Boulevard
    - Code all right turn movements to overlap with the non-conflicting left-turn phases.
    - Convert northbound free right turn to yield control.
    - Modify northbound right porkchop island to allow for a third eastbound through lane.
    - Adjust signal timing splits to allow for more time to movements that have LOS E or LOS F conditions.
    - Re-stripe the two-way left turn lane on Marksheffel to allow for a 500' northbound right turn lane.
- Spring Glen Drive/Mesa Ridge Parkway
    - When this intersection is improved from 3 legs to 4 legs, it should be striped with northbound and southbound exclusive left turn lanes and shared through/right lanes instead of as proposed in The Glen at Widefield impact studies' showing shared left/through lanes and exclusive right turn lanes.
- Powers Boulevard/Mesa Ridge Parkway
    - Evaluate/design the planned traffic interchange.

Total Traffic 2040 (with Project)

- The traffic interchange at Powers Boulevard/Mesa Ridge Parkway should be constructed by this year, as only major reconstruction of the intersection would allow for the changes that would be necessary to attain acceptable levels of service.
- Re-stripe the two-way left turn lane on Marksheffel Road to allow for a 600' northbound right turn lane and 500' southbound left turn lane at Fontaine Boulevard.
- A traffic signal is warranted at the Autumn Glen Avenue/Fontaine Boulevard intersection in the 2040 total traffic condition using the 8-hour and 4-hour MUTCD Traffic Signal Warrants.
- A traffic signal is warranted at the Minor Arterial A/Fontaine Boulevard intersection in the 2040 total traffic condition using the 8-hour and 4-hour MUTCD Traffic Signal Warrants.

- Re-stripe the westbound left turn lane at Powers Boulevard/Fontaine Boulevard to accommodate 400’ of storage.

Appendix A

EXISTING TRAFFIC COUNTS

Appendix B

2020 EXISTING TRAFFIC LEVEL OF SERVICE OUTPUT

Appendix C

TRIP GENERATION

Appendix D

2030 BACKGROUND TRAFFIC LEVEL OF SERVICE OUTPUT

Appendix E

2030 TOTAL TRAFFIC LEVEL OF SERVICE OUTPUT

Appendix F

2040 BACKGROUND TRAFFIC LEVEL OF SERVICE OUTPUT

Appendix G

2040 TOTAL TRAFFIC LEVEL OF SERVICE OUTPUT

Appendix H

SIGNAL WARRANTS

1. AUTUMN GLEN AVE/FONTAINE BLVD

2. MINOR ARTERIAL A/FONTAINE BLVD