



Colorado Springs Wildfire Evacuation Planning

SCREENING ATLAS

Districts 1 - 9

PPACG Travel Model
Simulation Support

*Colorado Springs, Colorado
March, 2010*

Table of Contents

Table of Contents
Key Definitions
Assumptions
Study Steps

i-ii
iii
iv
v

1. Overview of District 1

Inventory of District 1
Evacuation Traffic Annotated with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated
Close-up of Key Exit Portals
Findings for District 1

1-1
1-2
1-3
1-4
1-5
1-6
1-7

2. Overview of District 2

Inventory of District 2
Evacuation Traffic Annotated with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated
Close-up of Key Exit Portals
Findings for District 2

2-1
2-2
2-3
2-4
2-5
2-6
2-7

3. Overview of District 3

Inventory of District 3
Evacuation Traffic Annotated with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated
Close-up of Key Exit Portals
Findings for District 3

3-1
3-2
3-3
3-4
3-5
3-6
3-7

4. Overview of District 4

Inventory of District 4
Evacuation Traffic Annotated with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated
Close-up of Key Exit Portals
Findings for District 4

4-1
4-2
4-3
4-4
4-5
4-6
4-7

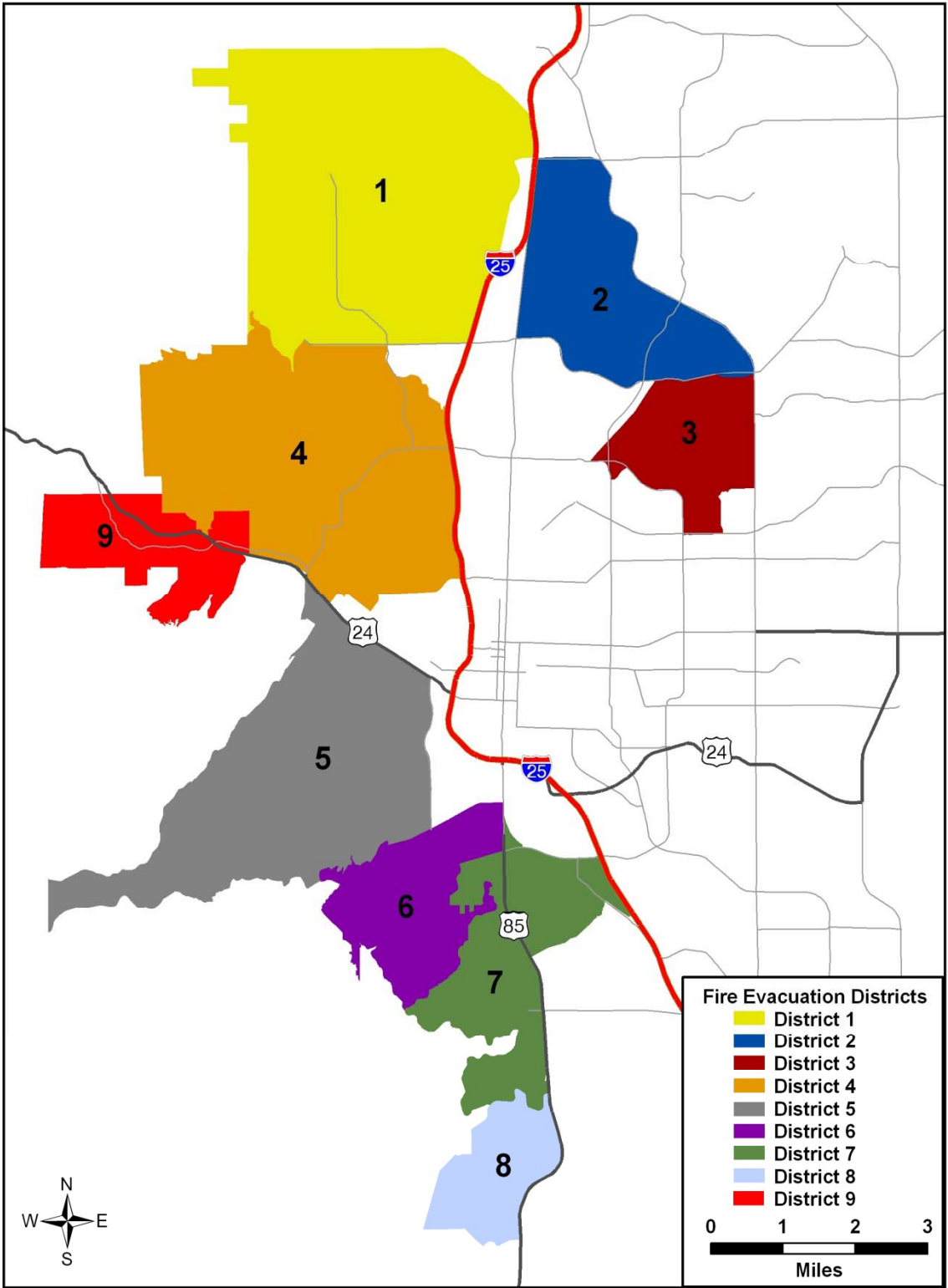
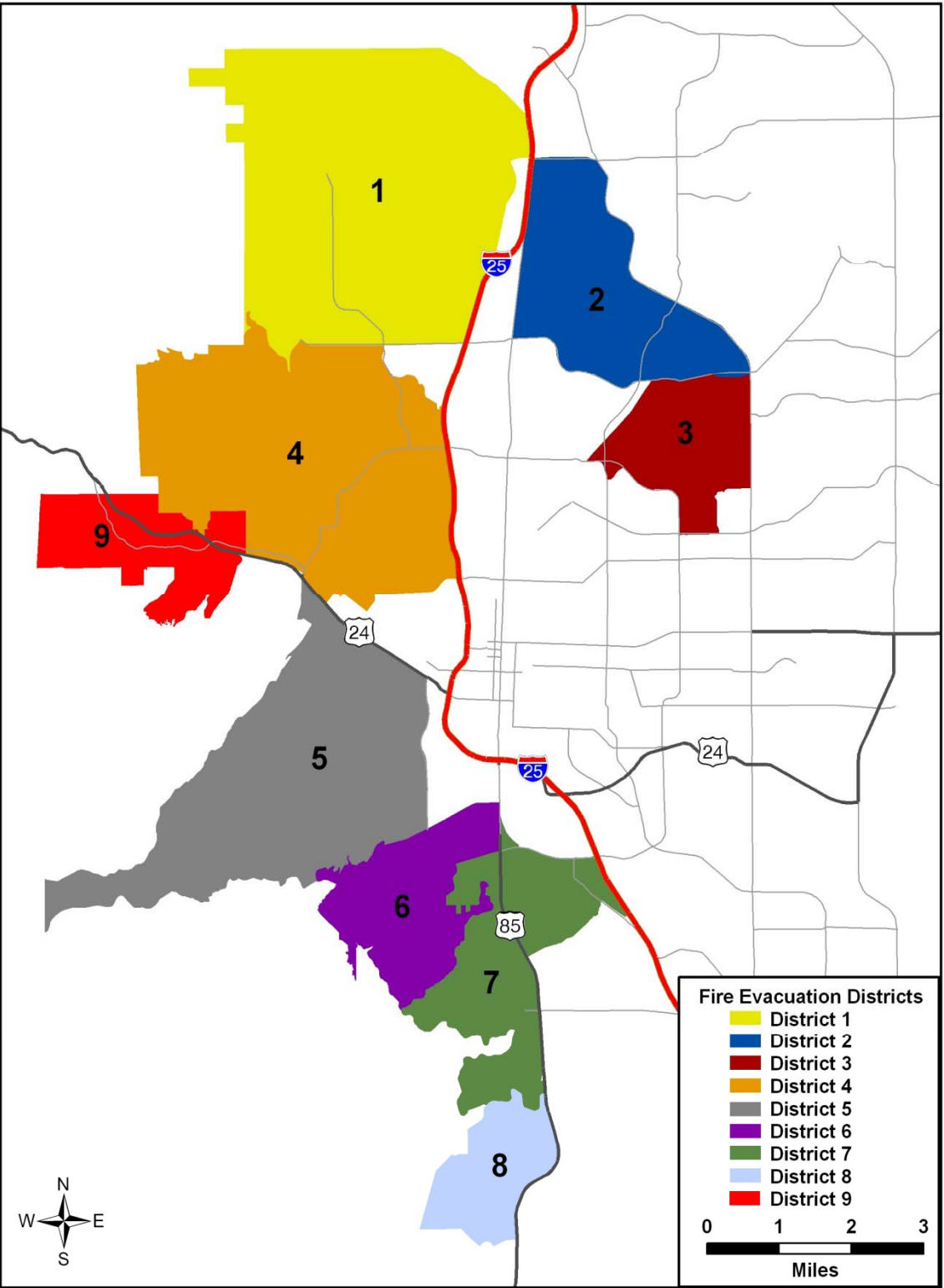


Table of Contents

5. Overview of District 5	
Inventory of District 5	5-1
Evacuation Traffic Annotated with V/C Ratio Color Coded	5-2
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths	5-3
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded	5-4
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated	5-5
Close-up of Key Exit Portals	5-6
Findings for District 5	5-7
6. Overview of District 6	
Inventory of District 6	6-1
Evacuation Traffic Annotated with V/C Ratio Color Coded	6-2
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths	6-3
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded	6-4
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated	6-5
Close-up of Key Exit Portals	6-6
Findings for District 6	6-7
7. Overview of District 7	
Inventory of District 7	7-1
Evacuation Traffic Annotated with V/C Ratio Color Coded	7-2
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths	7-3
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded	7-4
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated	7-5
Close-up of Key Exit Portals	7-6
Findings for District 7	7-7
8. Overview of District 8	
Inventory of District 8	8-1
Evacuation Traffic Annotated with V/C Ratio Color Coded	8-2
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths	8-3
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded	8-4
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated	8-5
Close-up of Key Exit Portals	8-6
Findings for District 8	8-7
9. Overview of District 9	
Inventory of District 9	9-1
Evacuation Traffic Annotated with V/C Ratio Color Coded	9-2
Evacuation and Background (Hourly PM) Labeled Traffic & Bandwidths	9-3
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Color Coded	9-4
Evacuation and Background (Hourly PM) Traffic with V/C Ratio Annotated	9-5
Close-up of Key Exit Portals	9-6
Findings for District 9	9-7



Definitions

Travel Model

The model used in this analysis is the official Pikes Peak Area Council of Governments demand model. It is designed to serve the Metropolitan Planning Organization (MPO) for traffic forecasting up to year 2035 and for air quality requirements. In 2009 the 2010 PPACG scenario was adapted for Fire Evacuation Analysis.

Road Capacity

Capacity is defined as an hourly “carrying capability” of the road segment. It is calculated for each discrete road segment by taking the number of lanes times the capacity of each lane. Capacity per lane is linked to the roadway Functional Classification (freeway, arterial, collector, local street) of the segment. When “bottlenecks” are present, capacity is suddenly reduced by one or more lanes causing traffic to slow down or divert.

Volume/Capacity Ratio

V/C ratio is a measure of congestion on a roadway segment. It is defined as the modeled traffic divided by the carrying capacity of the road. Volume/Capacity (V/C) ratios and color codes in this analysis are established as:

- Green: Volume / Capacity Ratio is less than .85
- Yellow: Volume / Capacity Ratio is between .85 and 1.00
- Red: Volume / Capacity Ratio is greater than 1.00

Assumptions

Study Year and Time of Day

The study year selected from the PPACG model databases is the 2010. The model contains time of day slices representing the AM Peak, PM Peak and Off Peak.

Evacuation Destinations

Traffic evacuating from focus districts is assumed to go to one of four types of destinations: (1) Official Shelters (15%); other households in the area (60%); Motels (15%); or out of the County entirely (Denver area, Pueblo area or other – 10%). Areas west of Colorado Springs (Teller County) are not included as destinations for evacuees.

Number Cars of Permitted to Evacuate

In the Fire Evacuation scenarios, each household in the affected area was permitted to drive up to two vehicles away from the home. Tests performed with three vehicles permitted showed extreme congestion hot spots. It was understood that people would not willingly leave their second car behind if a driver was available to drive it away and thus one vehicle evacuation was not used. Census analysis showed that most households have at least two vehicles.

Background Traffic

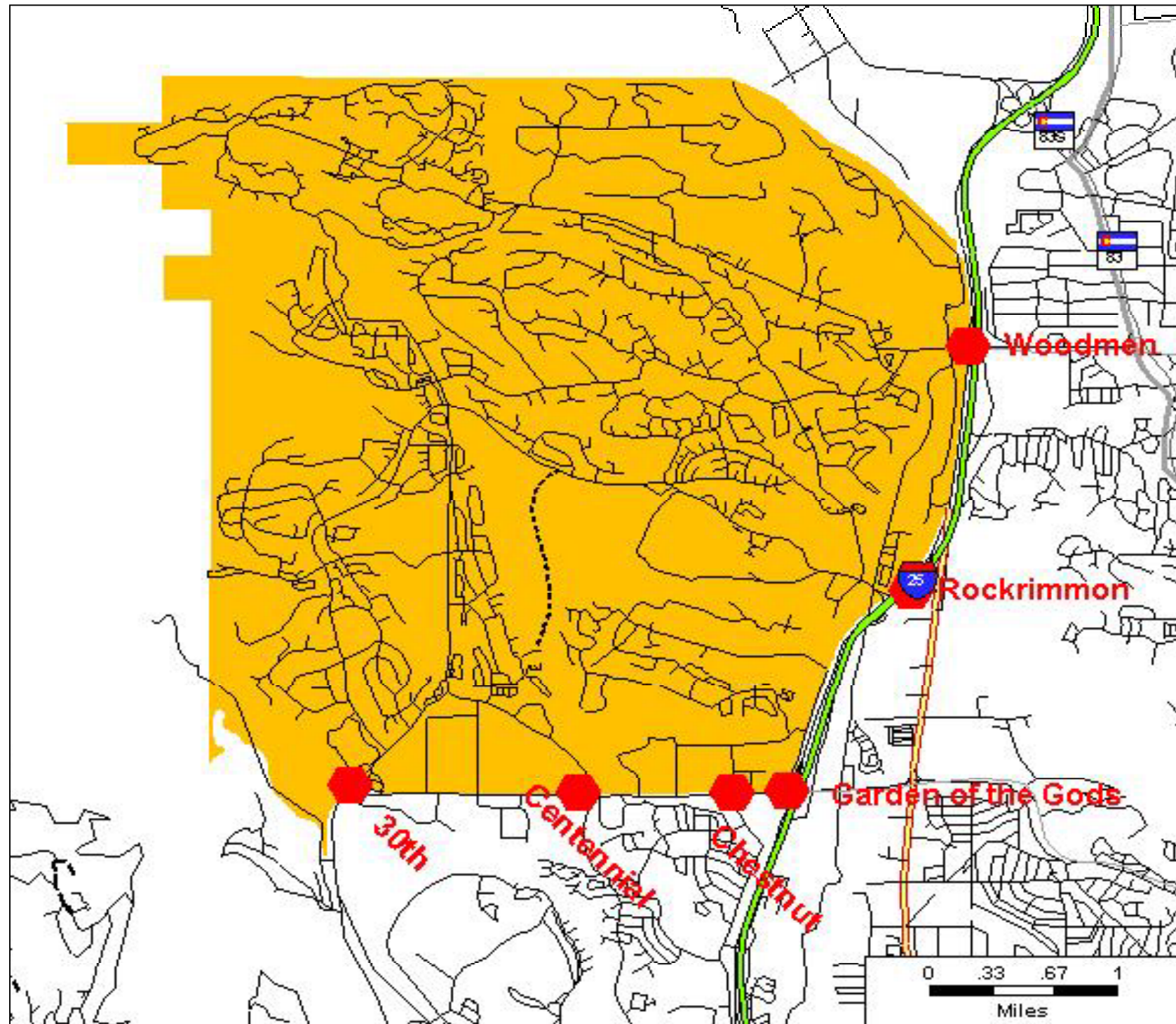
Fire evacuation of affected areas does not take place in a vacuum. The unaffected areas continue about their everyday business. To simulate a representative slice of background traffic, the PM peak was hour was used. It contains the highest level of traffic of any hour of the day and thus provides the “worst case” scenario for Fire Evacuation. The PM drivers are not permitted to enter the affected Fire Evacuation District.

Study Steps

The following steps were followed for the Fire Evacuation Study:

1. The PPACG 2010 Travel Model was obtained and adapted to estimate Fire Evacuation traffic.
2. U.S. Census Auto ownership data was used to estimate household vehicles present for evacuation.
3. Sensitivity tests of one car, two cars and three or more cars were performed. One car was deemed unrealistic since most households have at least two cars and would attempt to get them out if a driver were available.
4. Evacuees are assumed to be destined to: official shelters (15%); the homes of relatives or friends (60%); motels (15%); and out of the county to Denver or Pueblo areas (10%). Once out of the affected area, they are not permitted to return. Most traffic in the affected area is effectively one-way. Only emergency vehicles are permitted into the affected Fire Evacuation District.
5. Evacuation Traffic is not permitted to travel into Teller County or onto any of the military facilities in the region.
6. Background traffic does not disappear when an affected area begins to evacuate. This normal PM traffic is barred from entering the affected Fire Evacuation District but otherwise seeks its normal destination of home, shop, or other purpose for travel.
7. Standard outputs were prepared to show the system under Evacuation Traffic alone, and then with the added burden of the Background PM traffic. The metric of Volume/Capacity Ratio is used to identify road segments under duress. Custom close-up shots of the important egress points were prepared as well.

Inventory of District 1



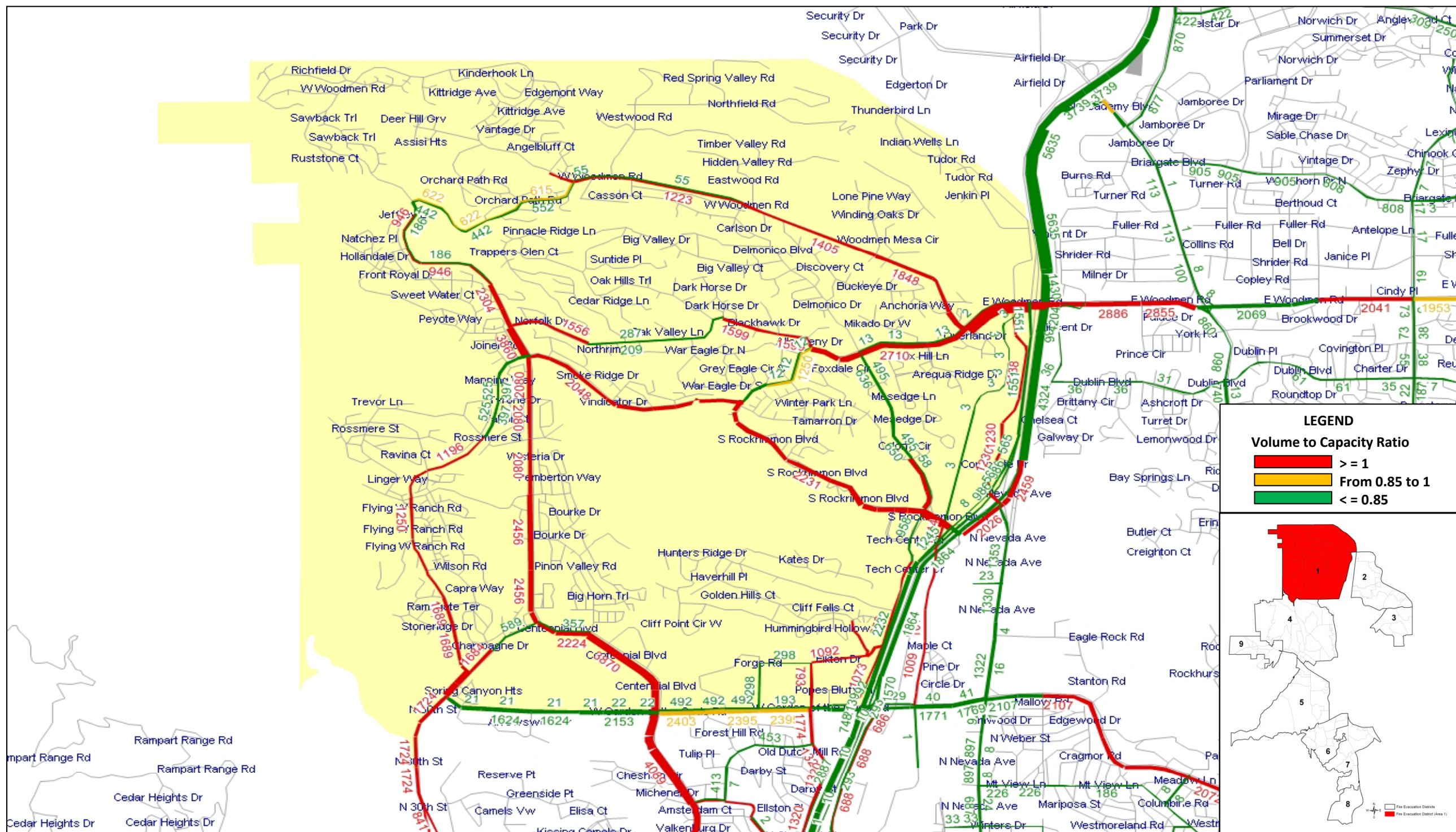
District 1 is bounded by the US Air Force Academy on the north, I-25 on the east, Garden of the Gods Road on the south and the foothills on the west.

The estimated number of households is 12,300.

The distance across the district west-east is about 4 miles; the distance north-south is about 4 miles.

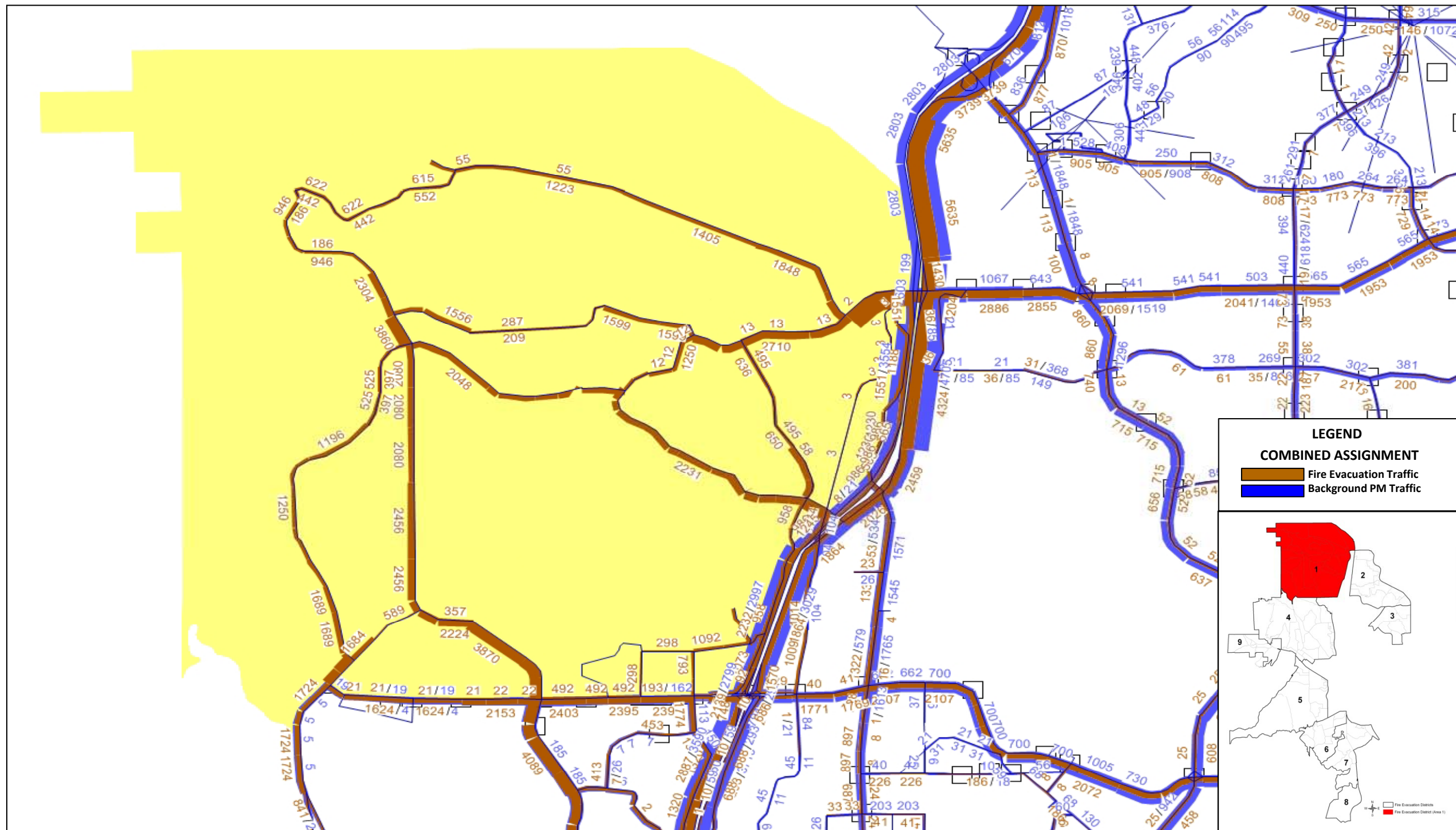
Major portals for egress are 30th, Street, Centennial Boulevard, Chestnut Street, Garden of the Gods Road, the Nevada/Rockrimmon Interchange and Woodmen Road.

I-25 will play a vital role in providing exit routes to the evacuation traffic from District 1.



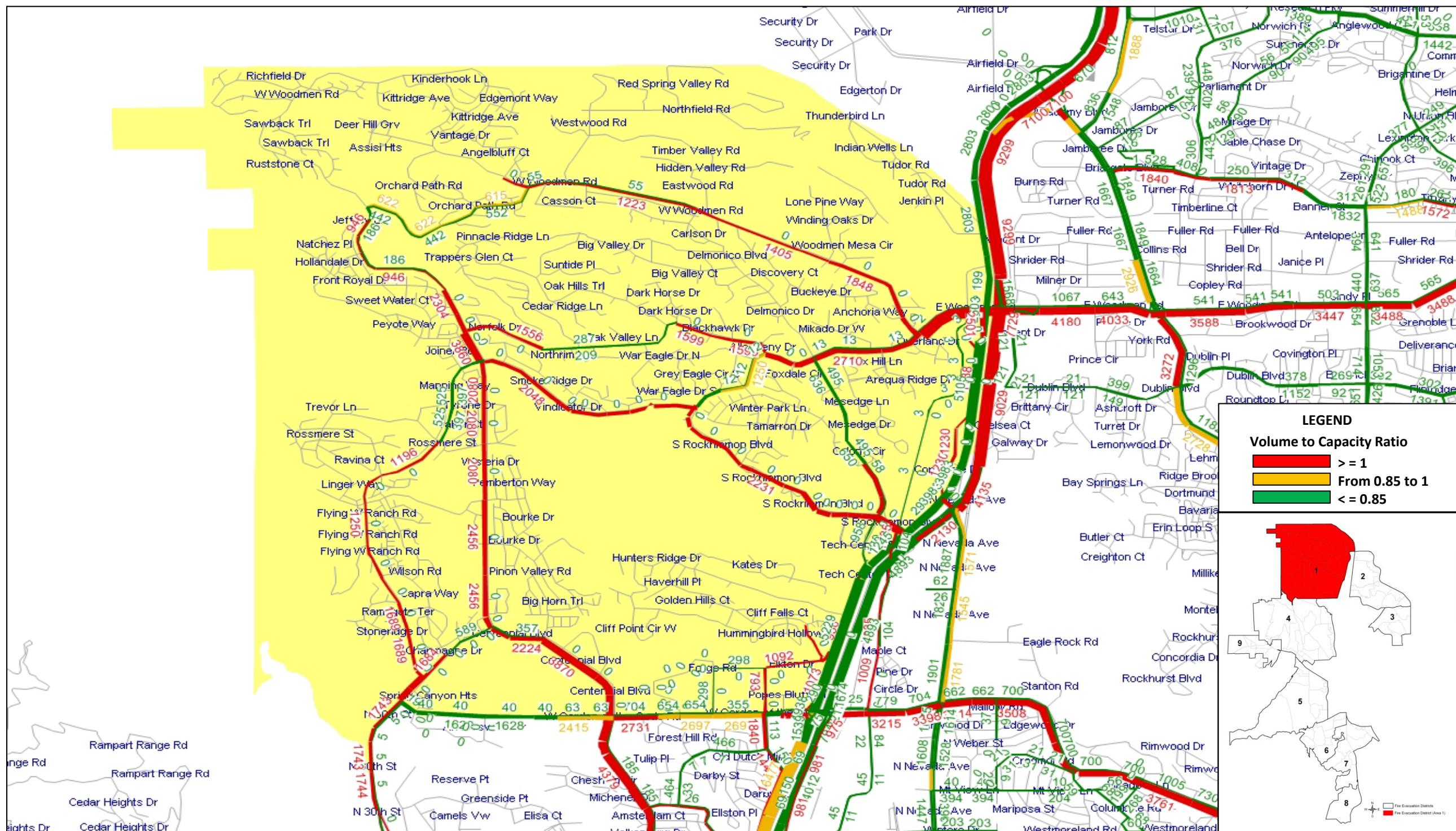
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 1
 EVACUATION TRAFFIC ANNOTATED WITH
 VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





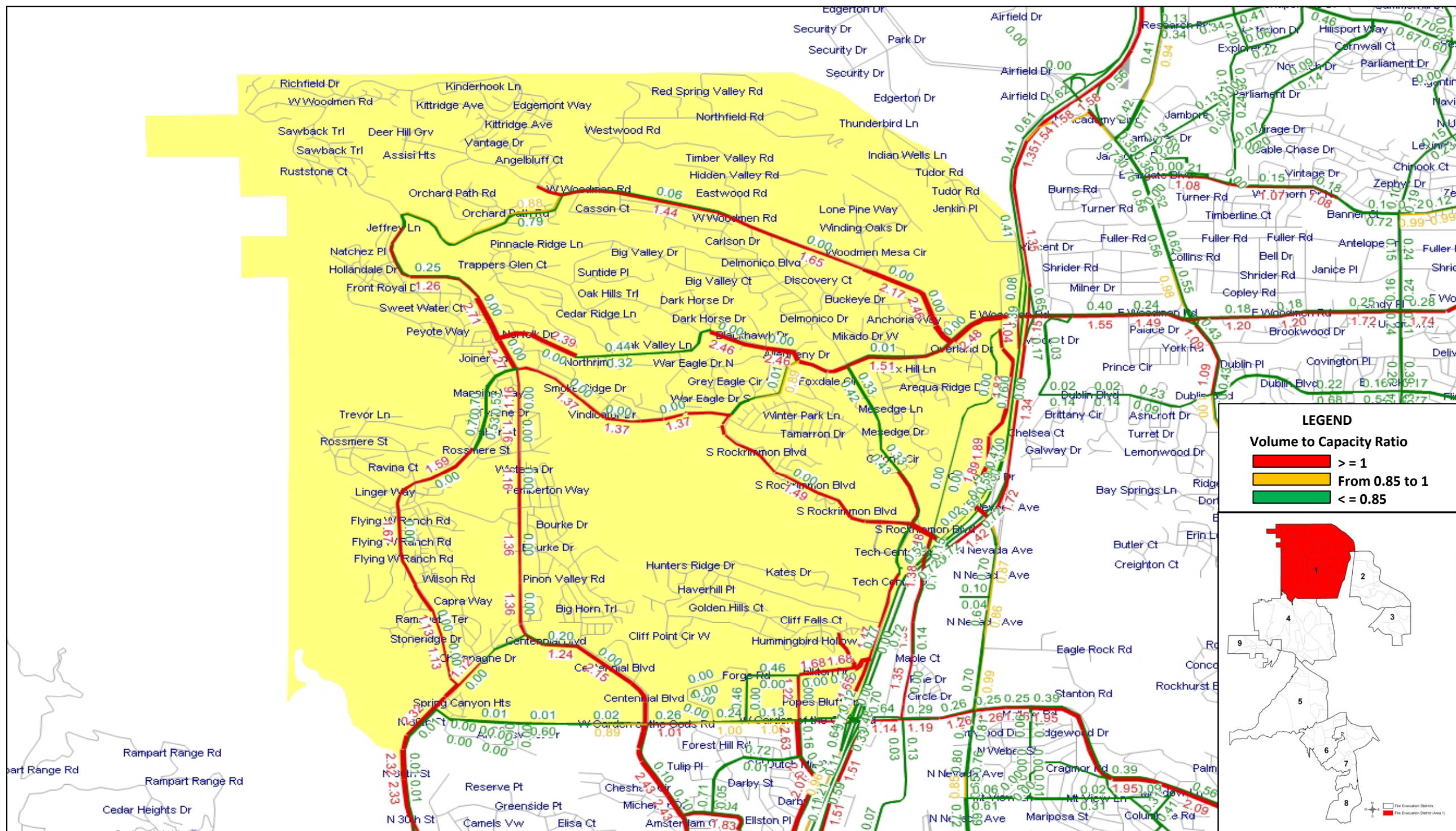
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 1
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 1
 EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
 V/C RATIO COLOR CODED





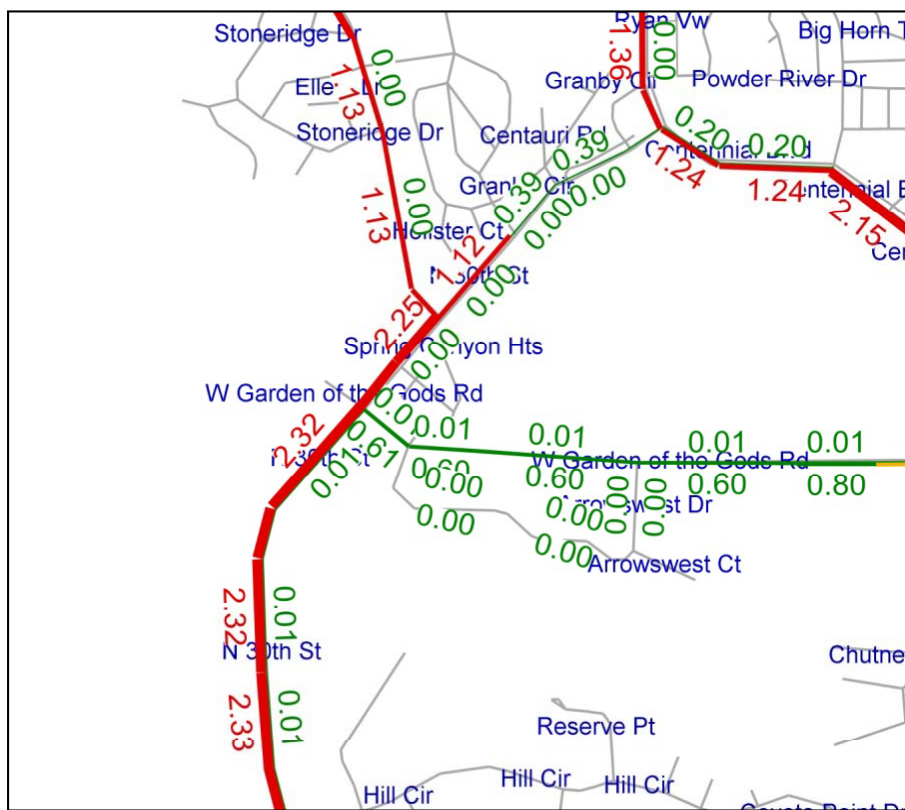
**PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 1
 EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
 WITH V/C RATIO ANNOTATED**



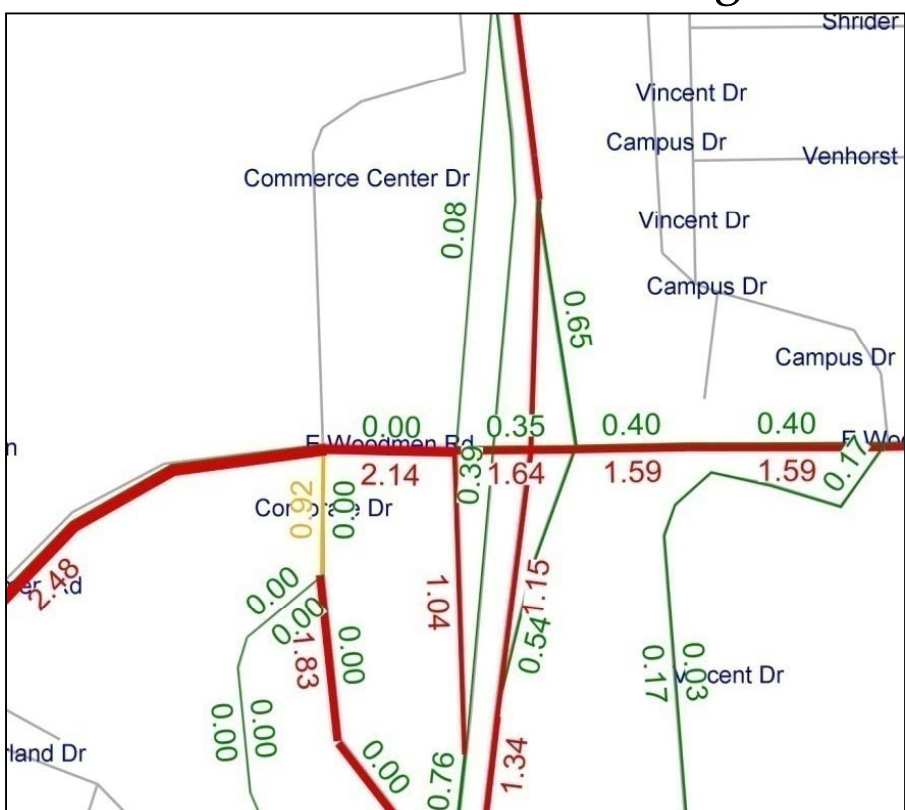
Close-up of Key Exit Portals from District 1

V/C Ratio of Combined Evacuation and Background Traffic

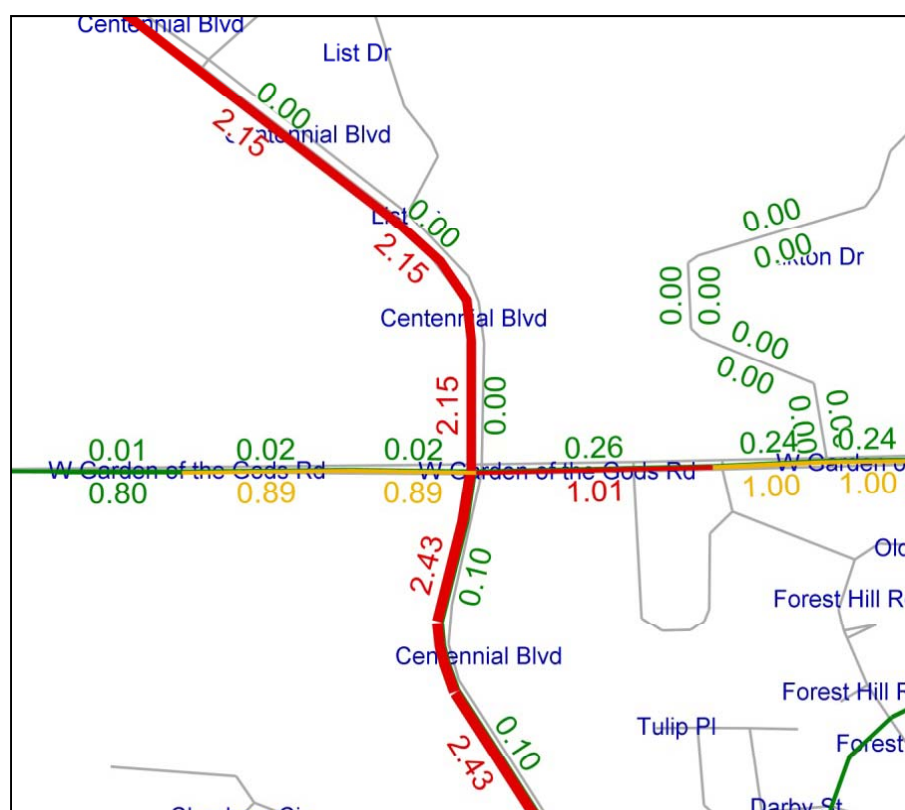
30th St. at Garden of the Gods Rd.



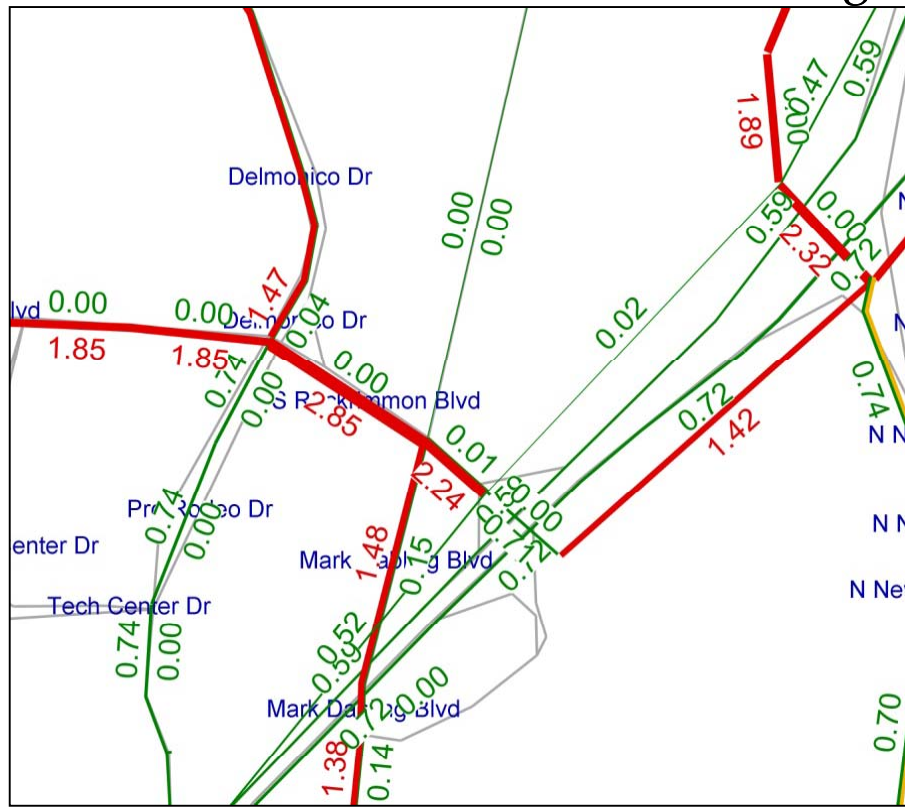
Woodmen Road/I-25 Interchange



Centennial Blvd at Garden of the Gods Rd.






Nevada-Rockrimmon/I-25 Interchange



LEGEND

Volume Capacity (V/C) Ratio

	>= 1
	> .85 and < 1
	<= .85

Findings for District 1

Evacuation Traffic (Page 1-2)

Of the major portals for egress, Woodmen Road, Rockrimmon Road and Centennial Boulevard carry the highest level of evacuation traffic.

The I-25 on-ramps (northbound) at Rockrimmon Road begin to operate with excessive V/C under evacuation traffic alone.

While Garden of the Gods Road serves the exit points of N. 30th Street, Centennial Boulevard and Chestnut Street, it still provides a reasonable level of service for overall egress, never rising above .85 V/C under evacuation traffic alone.

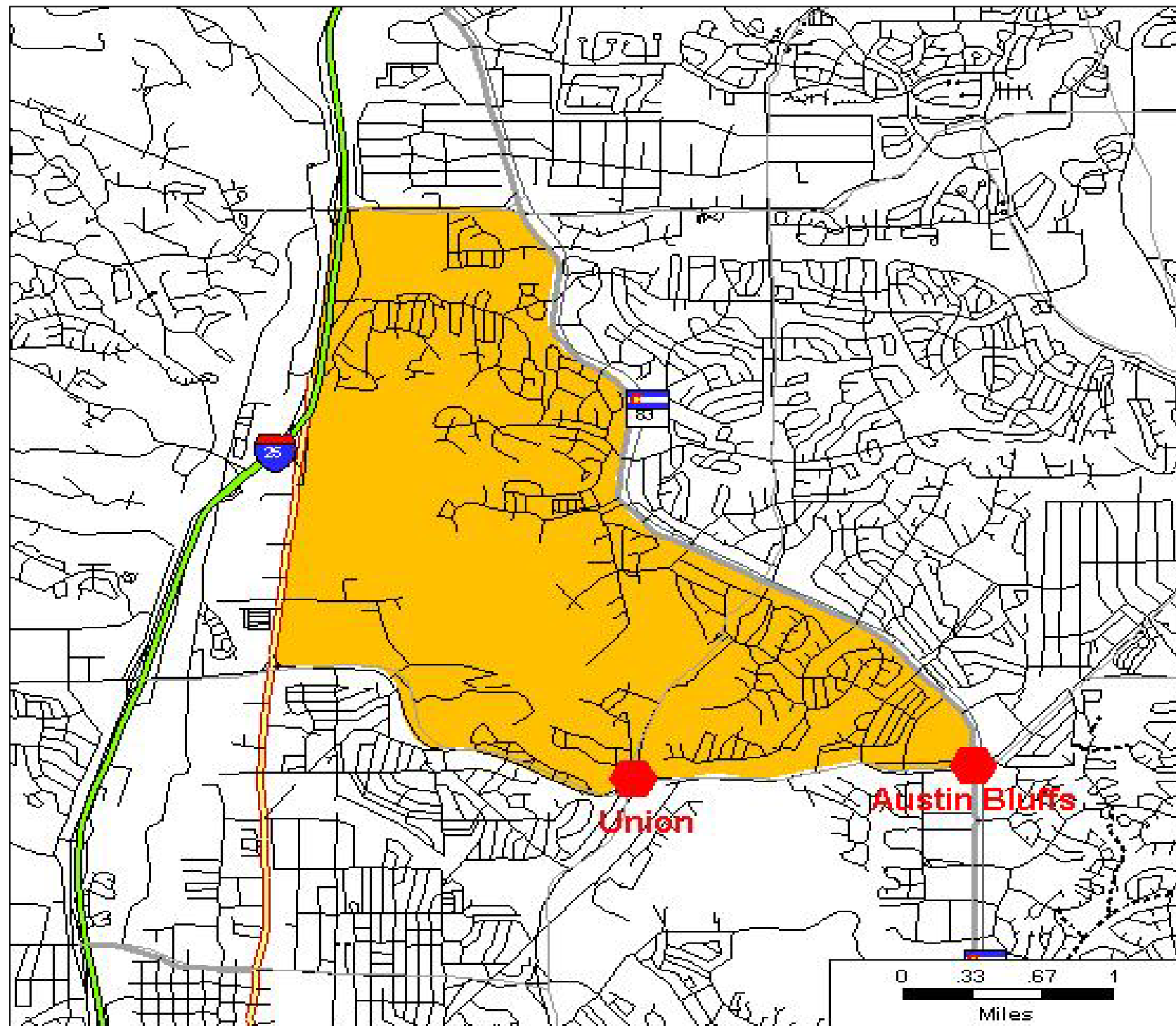
Evacuation + Background Traffic (Pages 1-4 and 1-5)

Regional background traffic uses I-25 in both directions (north and south) to a high degree.

The I-25 northbound mainlines begin to fill up and result in a Level of Service breakdown due to demand from both evacuation and PM background traffic.

The congestion persists well to the east of I-25, particularly on the key throughputs of Woodmen Road, Austin Bluffs Parkway and Fillmore Street.

Inventory of District 2



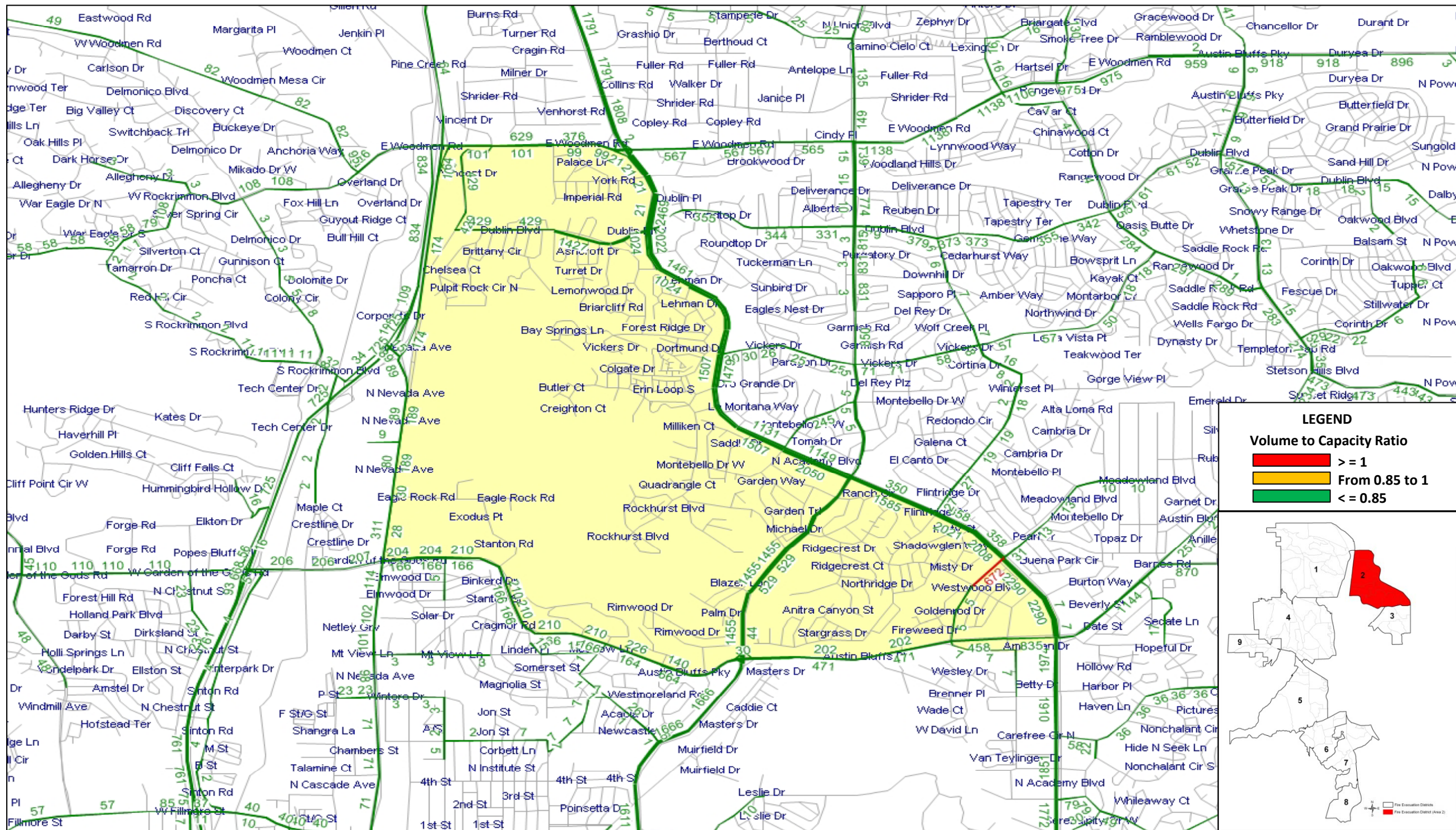
District 2 is bounded by Woodmen Road on the north, Academy Boulevard (SH 83) on the east, Austin Bluffs Parkway on the south, and Nevada Avenue on the west.

The estimated number of households is 6,500.

The district is “shoe-shaped,” with a distance across from west to east of about 2 miles; the distance north-south is about 3 miles. The interior is park land with the households located on the western boundary adjacent to Academy Boulevard.

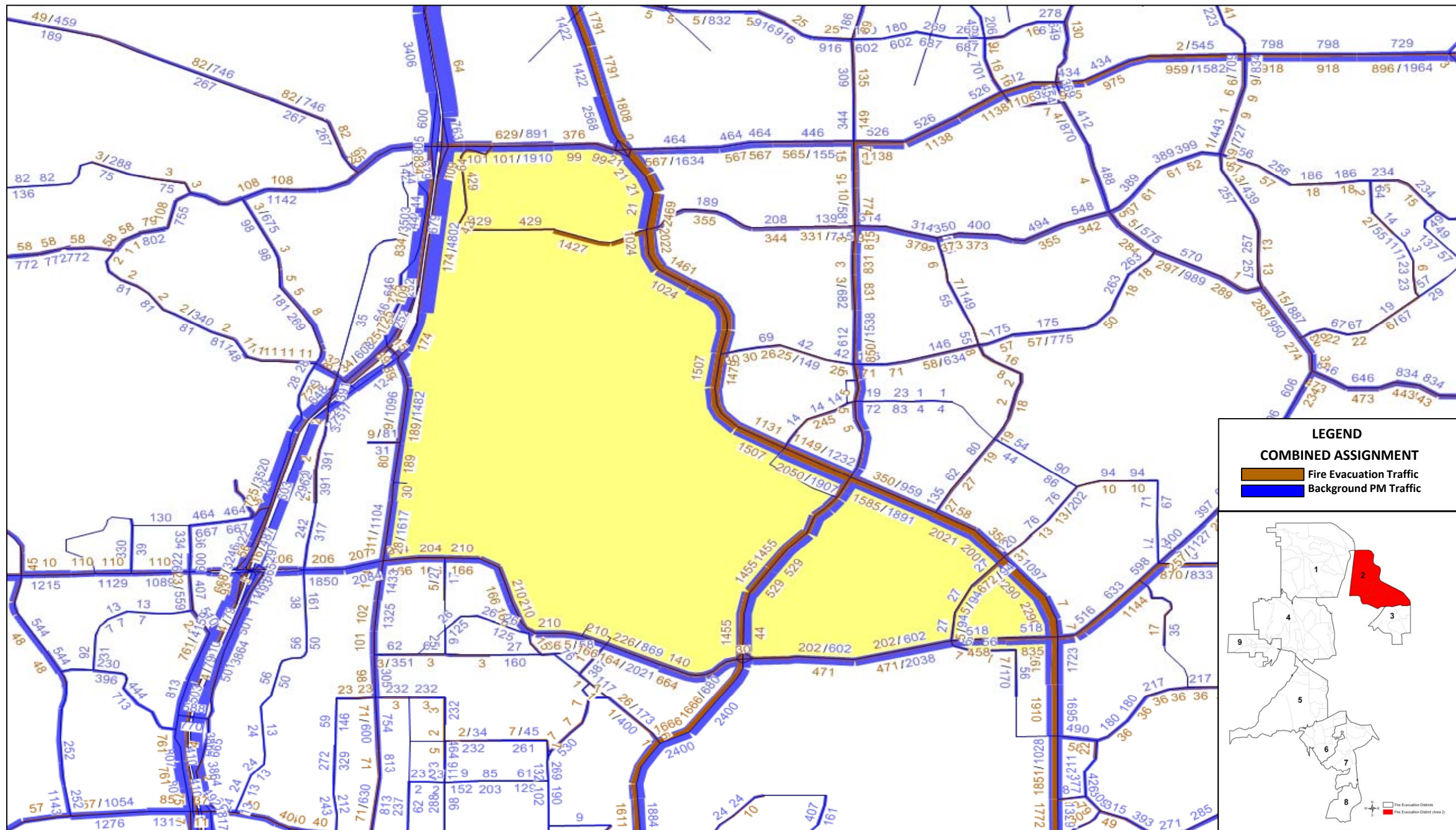
Major portals for egress are Union and Austin Bluffs and all the local streets that feed out on to Academy.

Academy Boulevard will play a vital role in providing exit routes to the evacuation traffic from District 2.



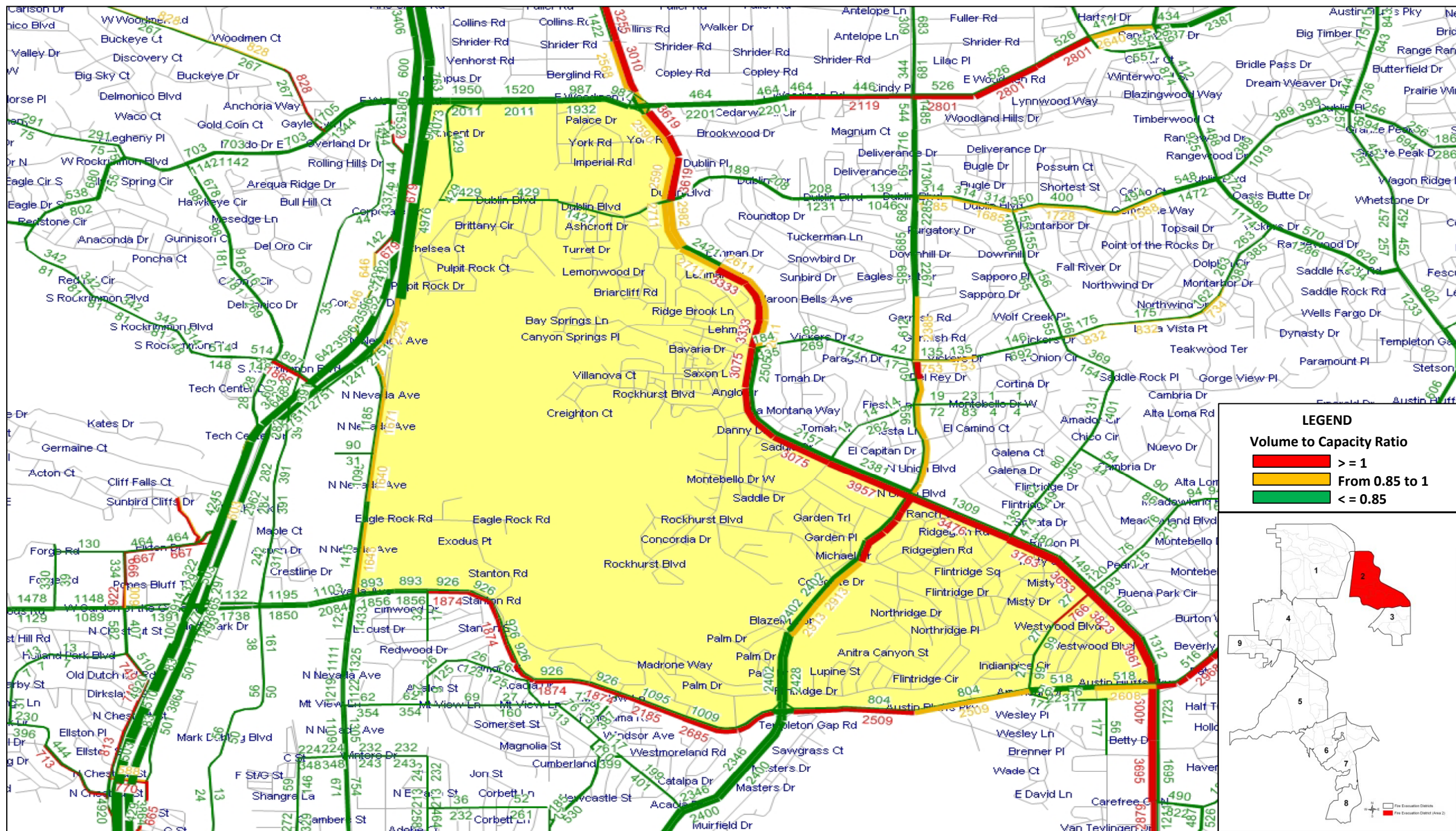
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 2
EVACUATION TRAFFIC ANNOTATED WITH
VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





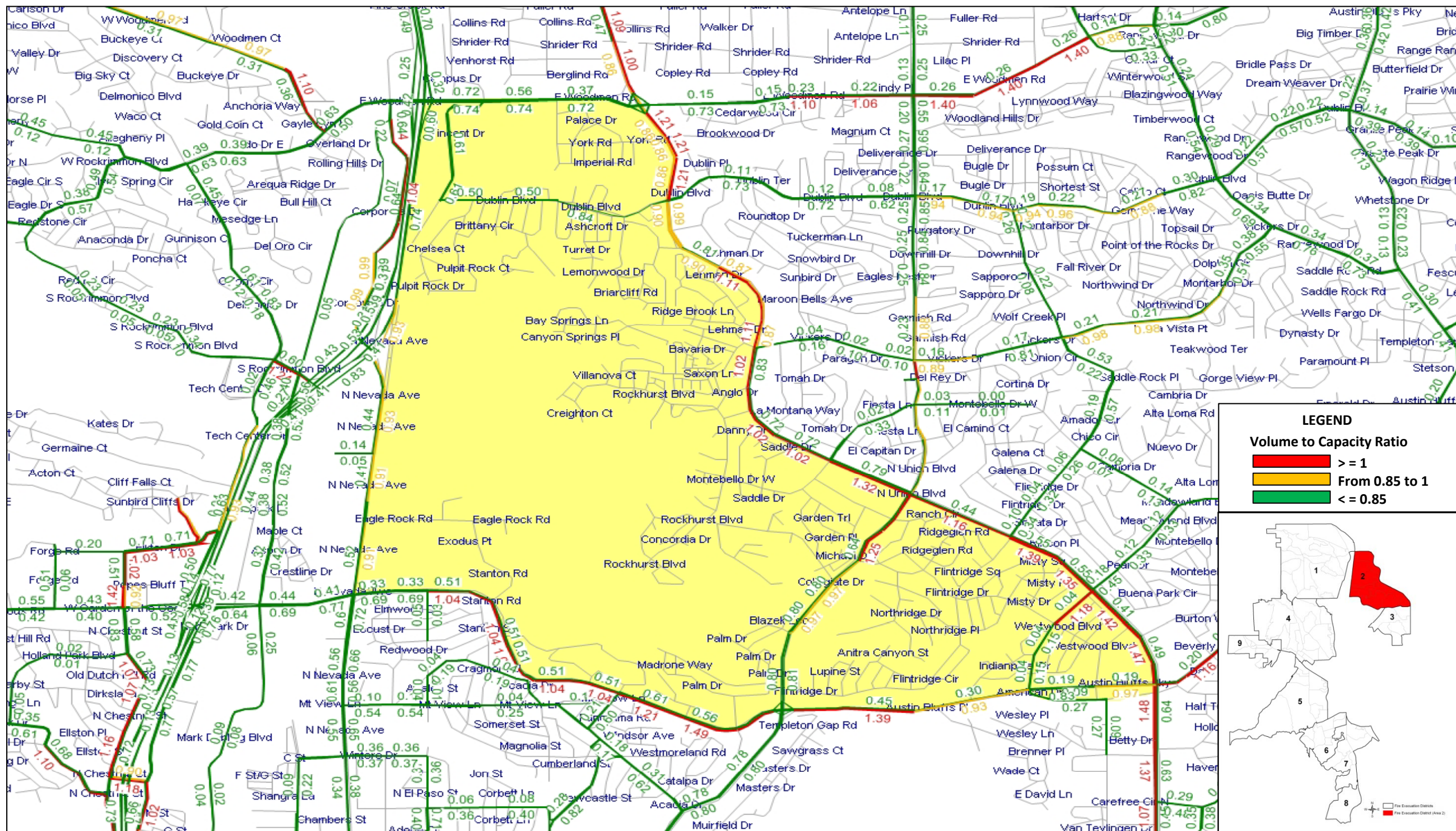
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 2
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 2
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





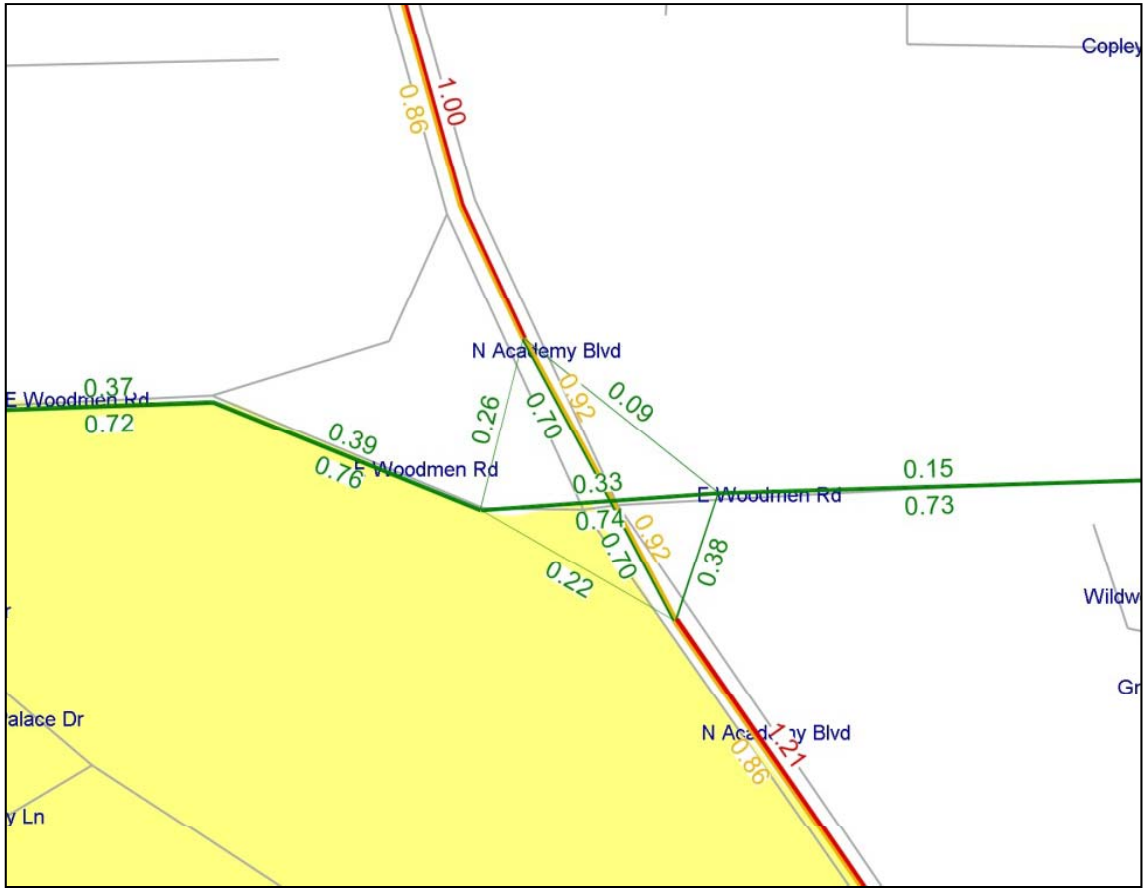
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 2
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



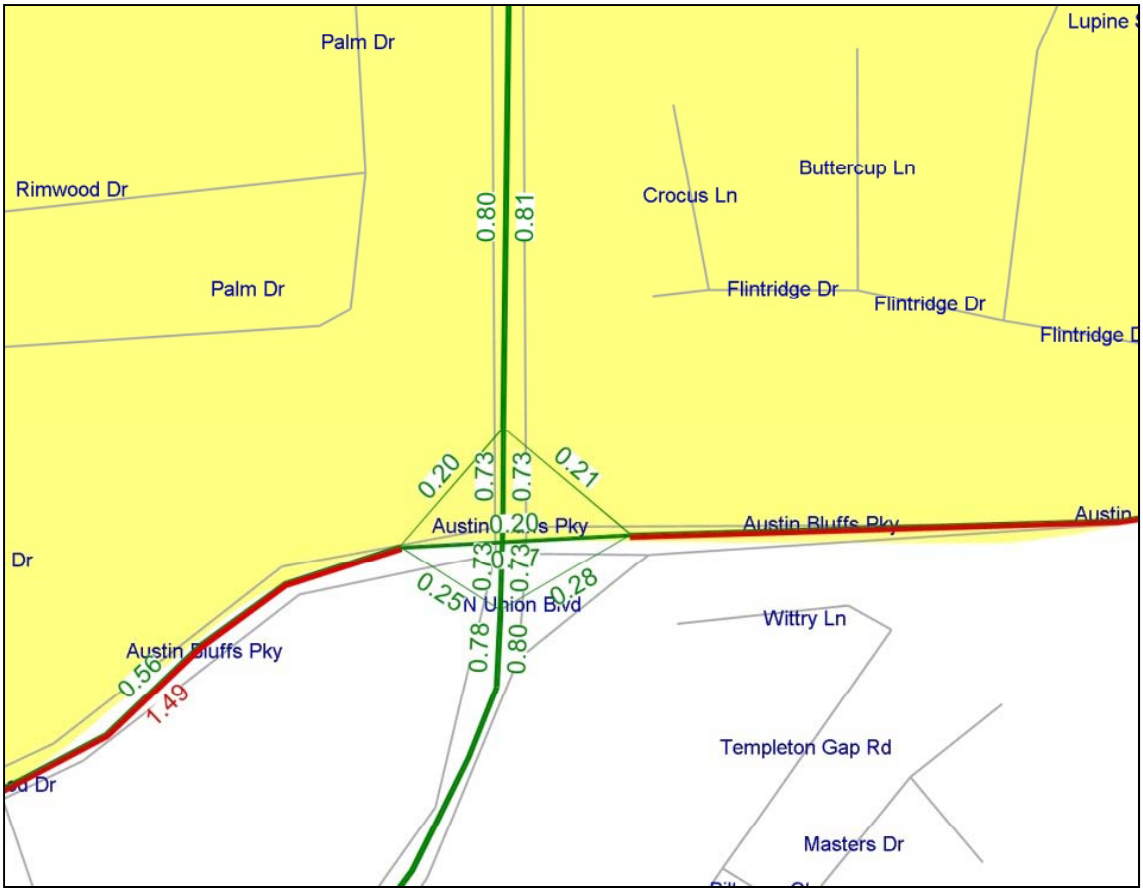
Close-up of Key Exit Portals from District 2

V/C Ratio of Combined Evacuation and Background Traffic

Woodmen Road at Academy Boulevard



Austin Bluffs Parkway at Union Boulevard



LEGEND

Volume Capacity (V/C) Ratio

<div></div>	> = 1
<div></div>	> .85 and < 1
<div></div>	< = .85

Findings for District 2

Evacuation Traffic (Page 2-2)

Of the major portals for egress, Woodmen Road, Austin Bluffs Parkway and Union Boulevard carry the highest level of evacuation traffic, although none of the portals are operating at V/C greater than 1.

If Academy Boulevard is serving evacuation traffic only, conditions are free flow.

Woodmen Road, Nevada Avenue and Union Boulevard have sufficient capacity to serve evacuation only egress traffic, never rising above .85 V/C.

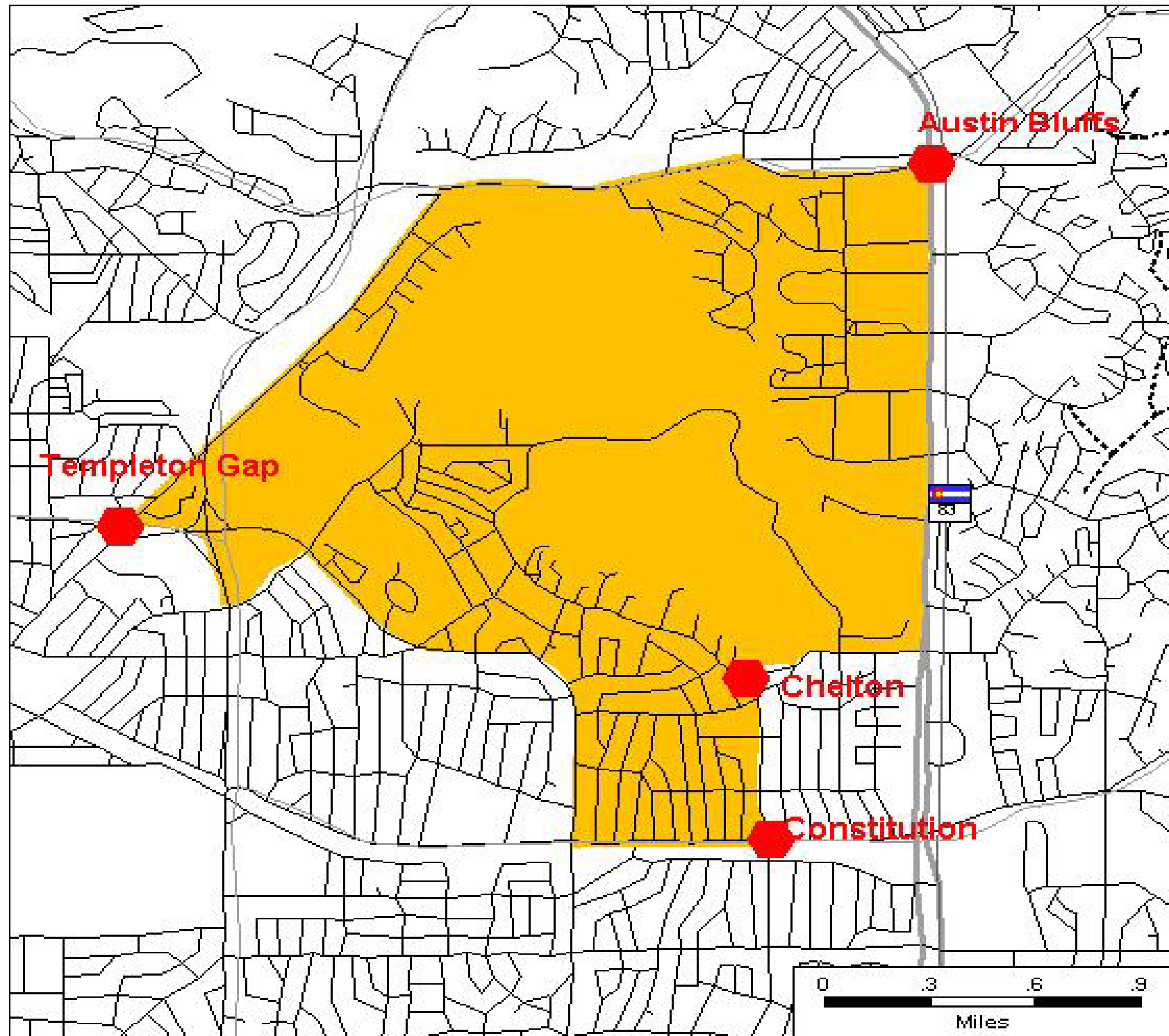
Evacuation + Background Traffic (Pages 2-4 and 2-5)

Regional background traffic uses I-25 and Academy Boulevard in both directions (north and south) to a high degree.

Academy Boulevard begins to fill up in both directions resulting in a Level of Service breakdown due to demand from both evacuation and PM background traffic.

The congestion that persists on Academy and well to the east of Academy is due mainly to PM Background traffic.

Inventory of District 3



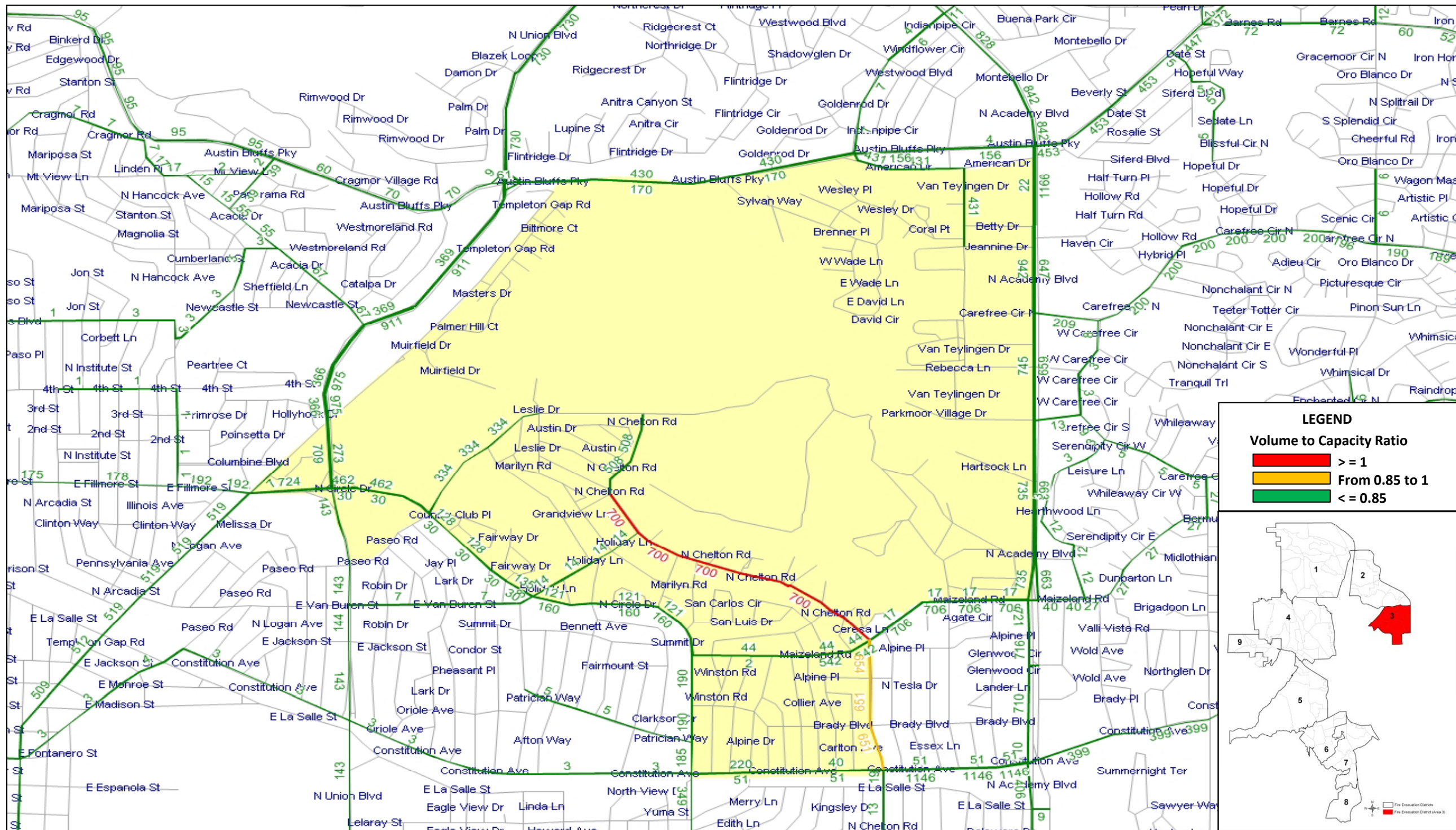
District 3 is bounded by Austin Bluffs Parkway on the north, Academy Boulevard (SH 83) on the east, Constitution Avenue on the south, and Templeton Gap on the west.

The estimated number of households is 3,700.

The district west-east is about 2 miles; the distance north-south is about 2 miles. The interior is park land with the households located on the southern boundary adjacent to Constitution Avenue.

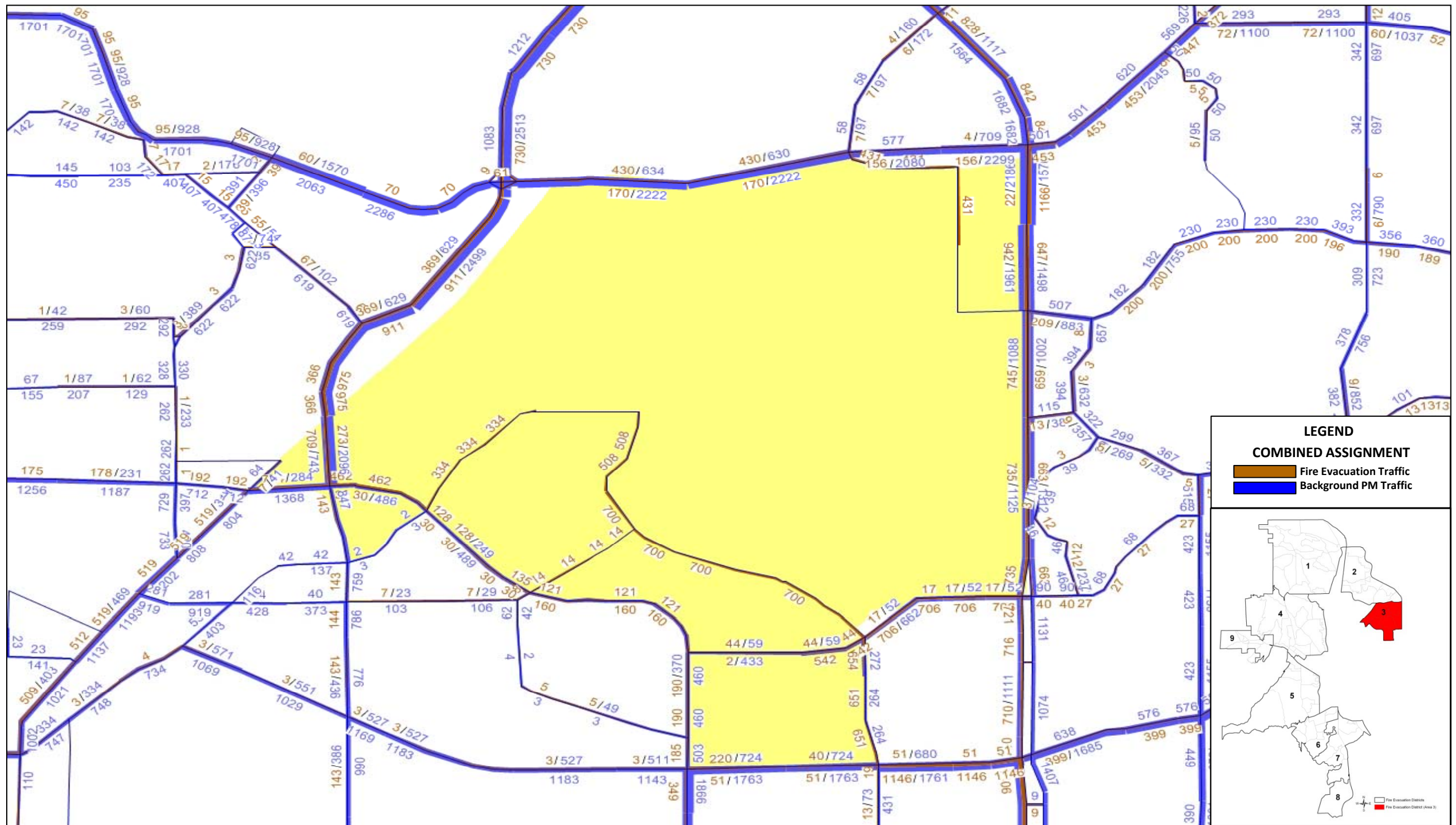
Major portals for egress are Templeton Gap, Constitution Avenue, Chelton Road, and Austin Bluffs Parkway and all the local streets that feed out on to Academy Boulevard.

Templeton Gap will play a vital role in providing exit routes to the evacuation traffic from District 3.



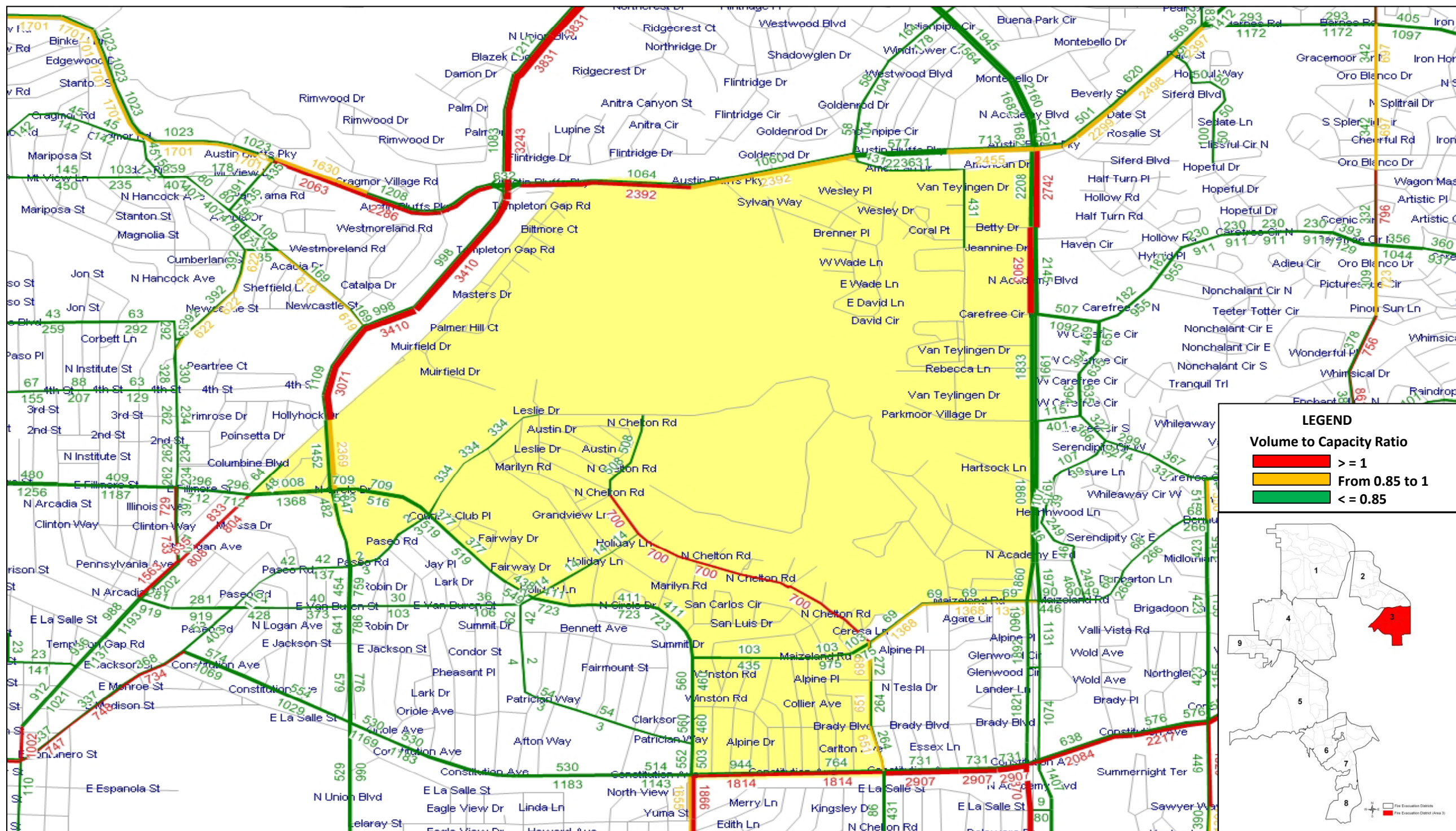
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 3
EVACUATION TRAFFIC ANNOTATED WITH
VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





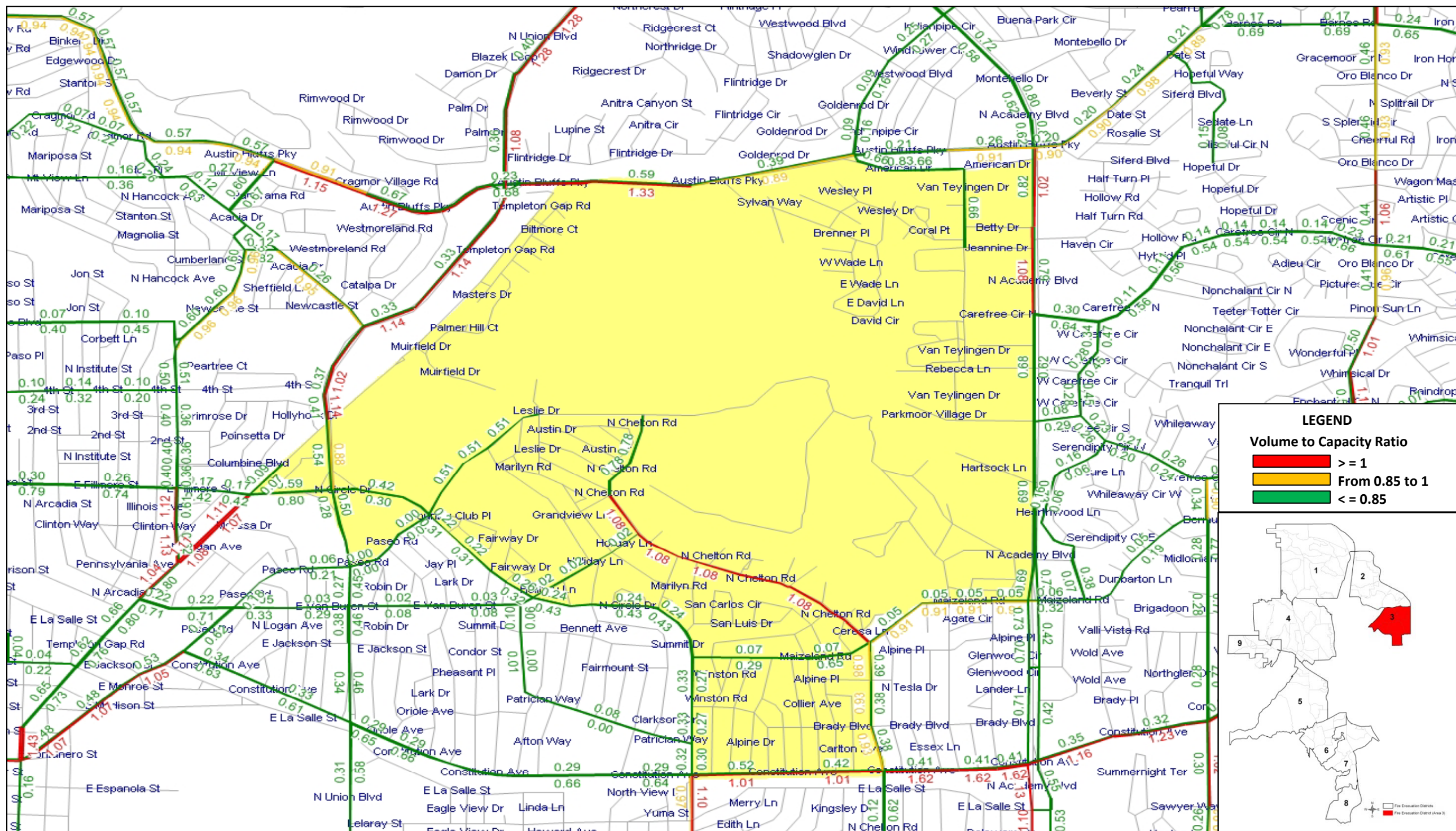
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 3
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 3
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





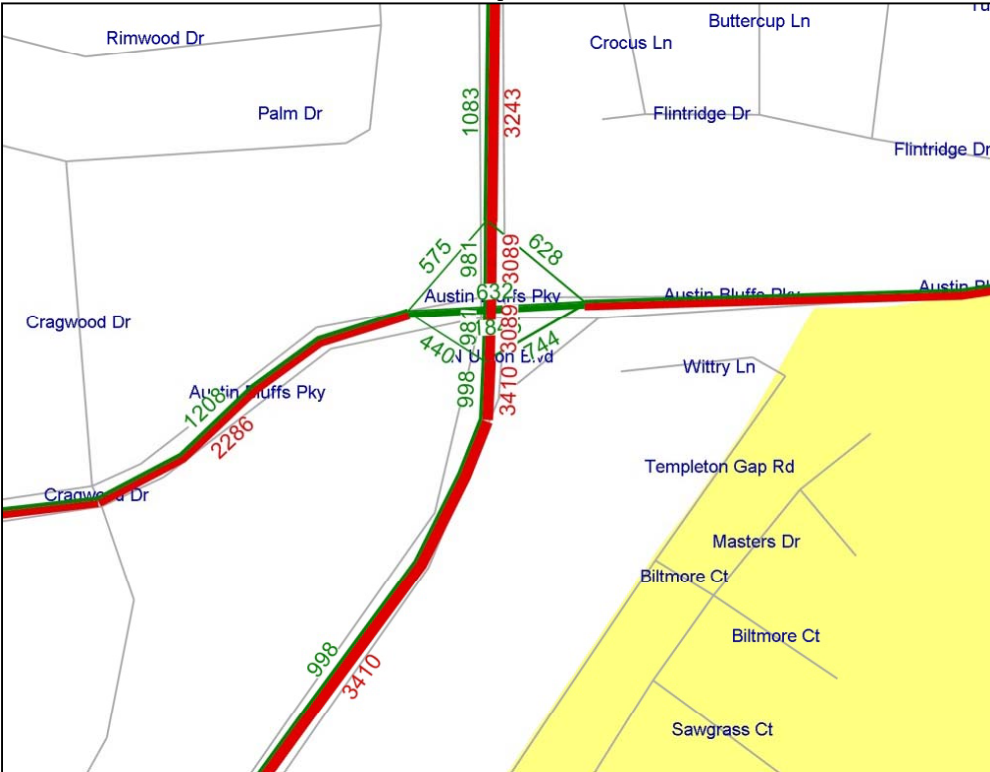
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 3
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



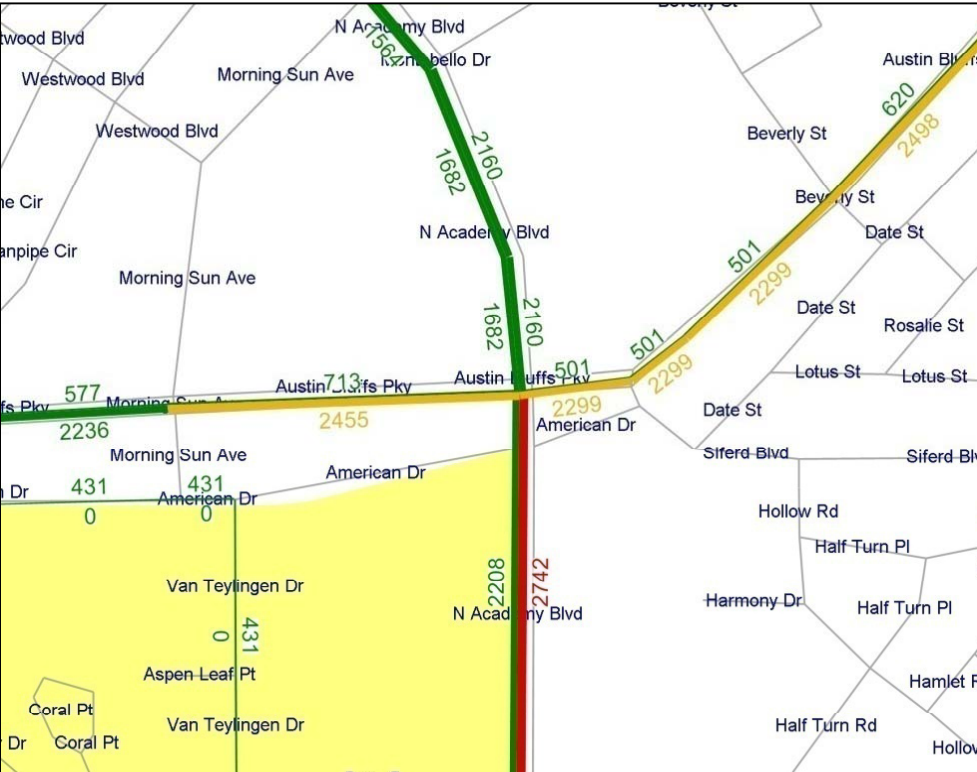
Close-up of Key Exit Portals from District 3

V/C Ratio of Combined Evacuation and Background Traffic

Austin Bluffs Parkway at Union Boulevard



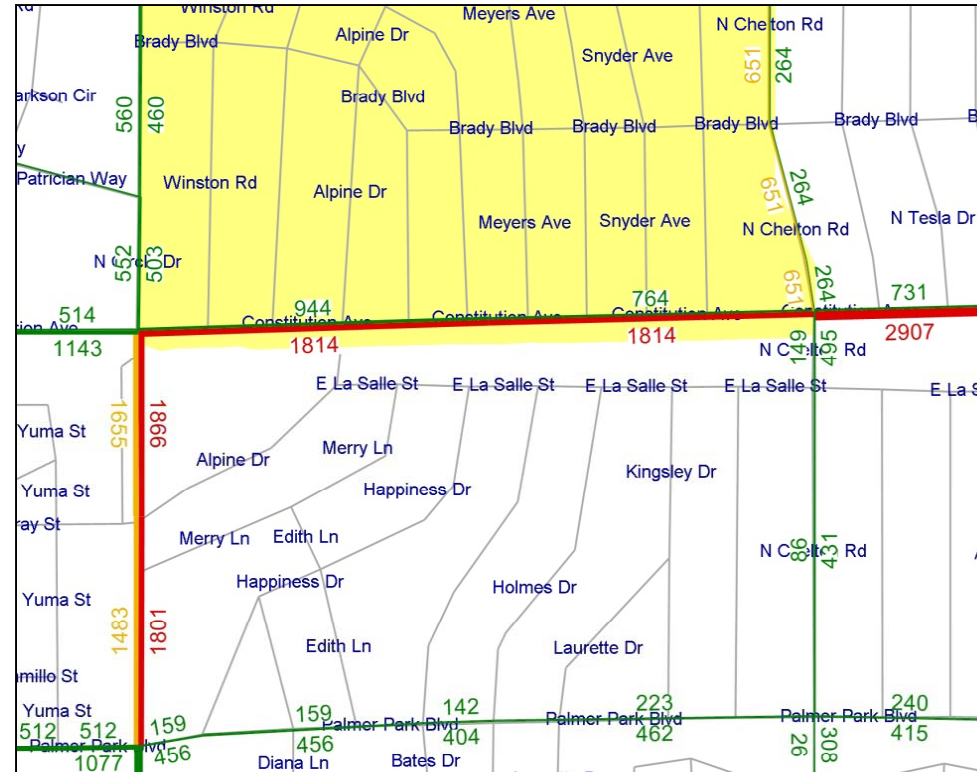
Austin Bluffs Parkway at Academy Boulevard



Chelton Road at Maizeland Road



Constitution Avenue at Circle Drive



LEGEND

Volume Capacity (V/C) Ratio


$$\geq 1$$


$> .85$ and < 1

 $\leq .85$

Findings for District 3

Evacuation Traffic (Page 3-2)

Of the major portals for egress, Chelton Road carries the highest level of evacuation traffic and is operating at a V/C greater 1.

Academy Boulevard (east of District 3) and Austin Bluffs Parkway (north or east exit) (west) serve as conduits to move evacuation traffic out of the district.

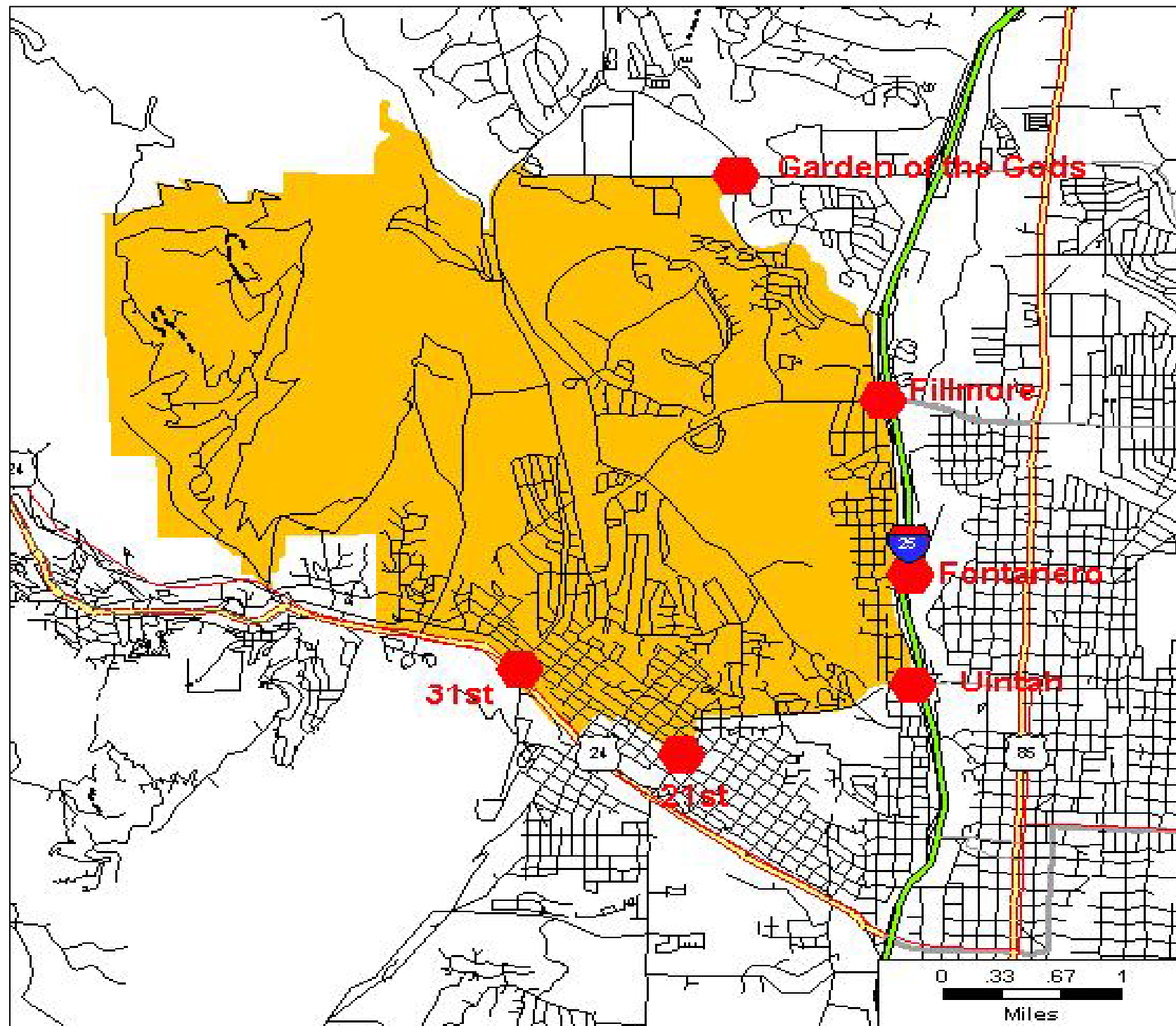
Evacuation + Background Traffic (Pages 3-4 and 3-5)

Regional background traffic uses Academy Boulevard, Union Boulevard and Austin Bluffs Parkway in both directions.

The intersections of Union Boulevard at Austin Bluffs Parkway and Academy Boulevard at Austin Bluffs Parkway experience typical PM hour delays.

Constitution is operating under congested conditions (V/C greater than 1) from Circle Drive through Chelton Road to well east of Academy due mainly to background traffic.

Inventory of District 4



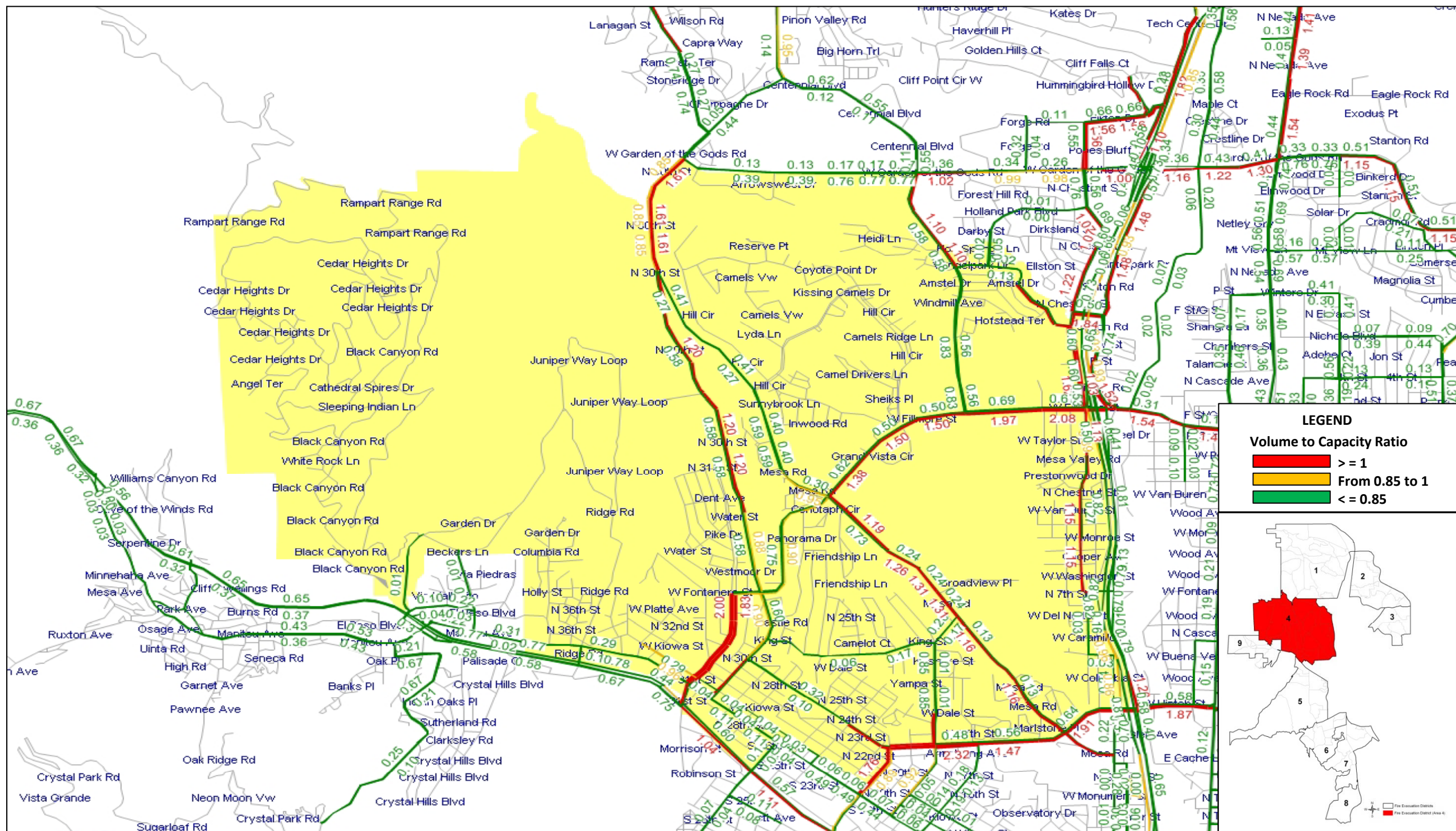
Bounded by Garden of the Gods Road on the north, I-25 on the east, US 24 on the south, and the foothills on the west.

The estimated number of households is 9,800.

The district extent west-east is about 4 miles; the extent north-south is about 3.5 miles. The households are generally located near the southern and eastern boundaries of the district.

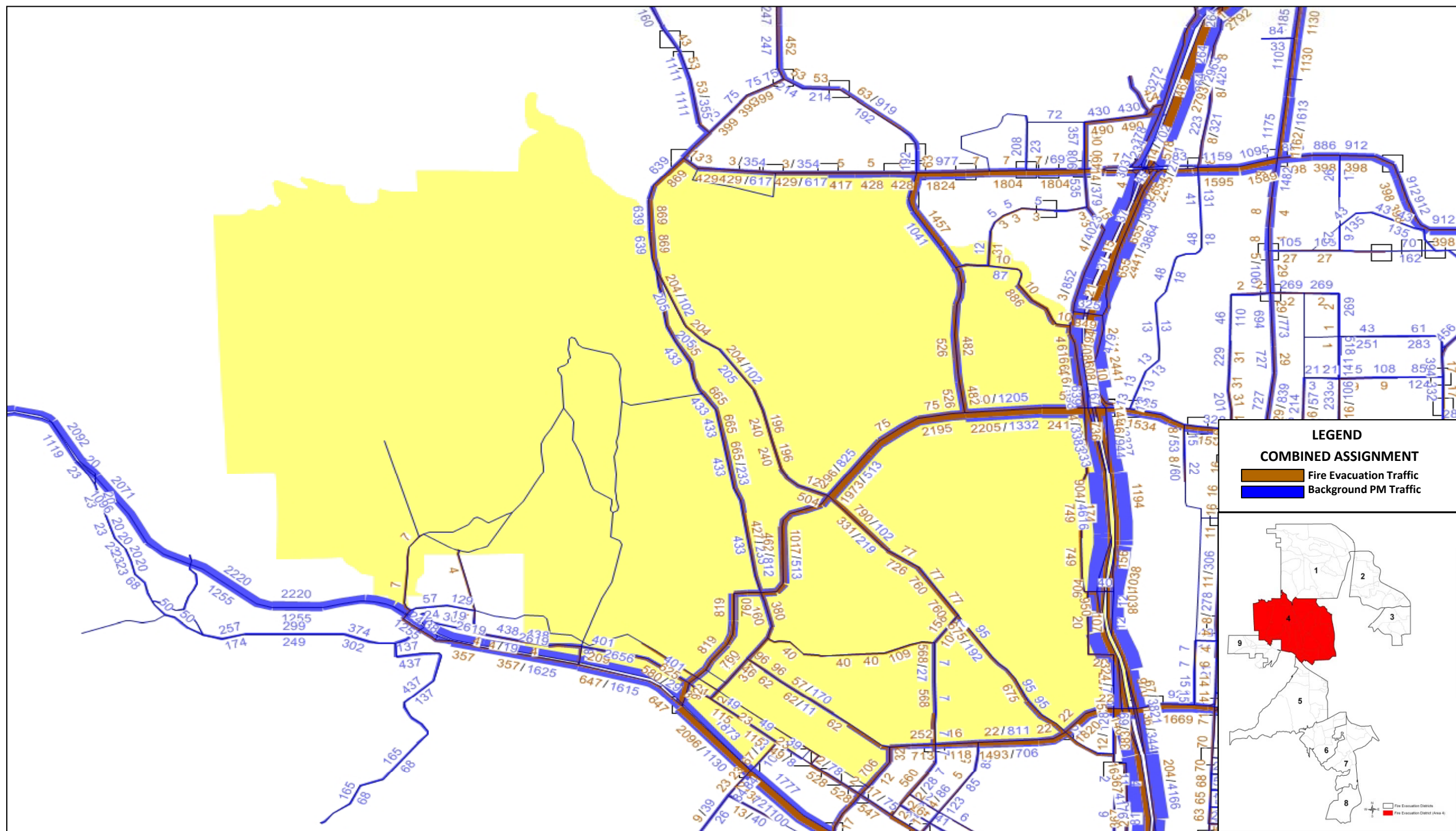
Major portals for egress are Garden of the Gods Road, Fillmore Street, Fontanero Street, Uintah Street, and 21st and 31st Streets.

I-25 will play a vital role in providing exit routes to the evacuation traffic from District 4. Mesa and Fillmore are key internal exit routes.



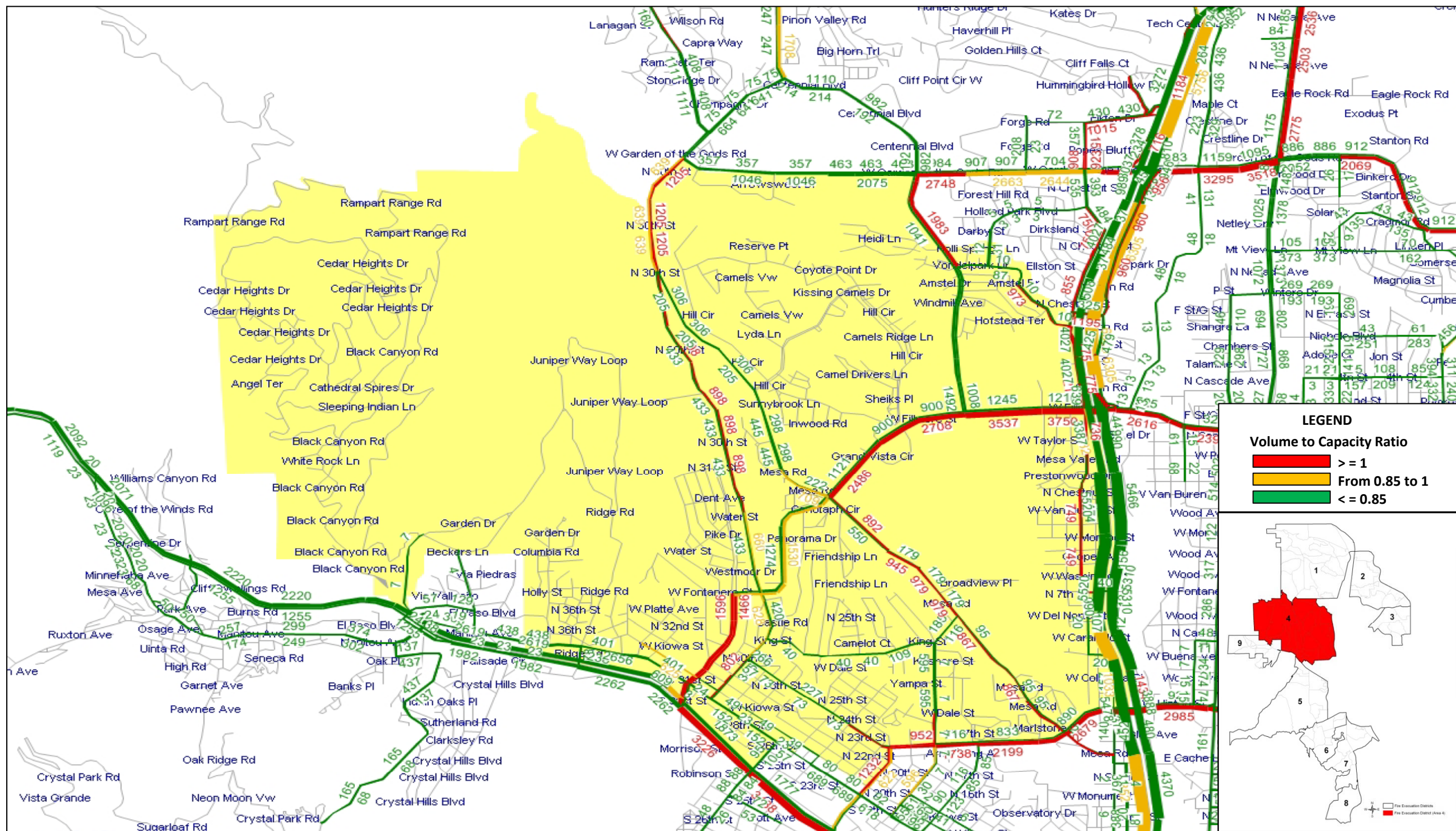
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 4
EVACUATION TRAFFIC ANNOTATED WITH
VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





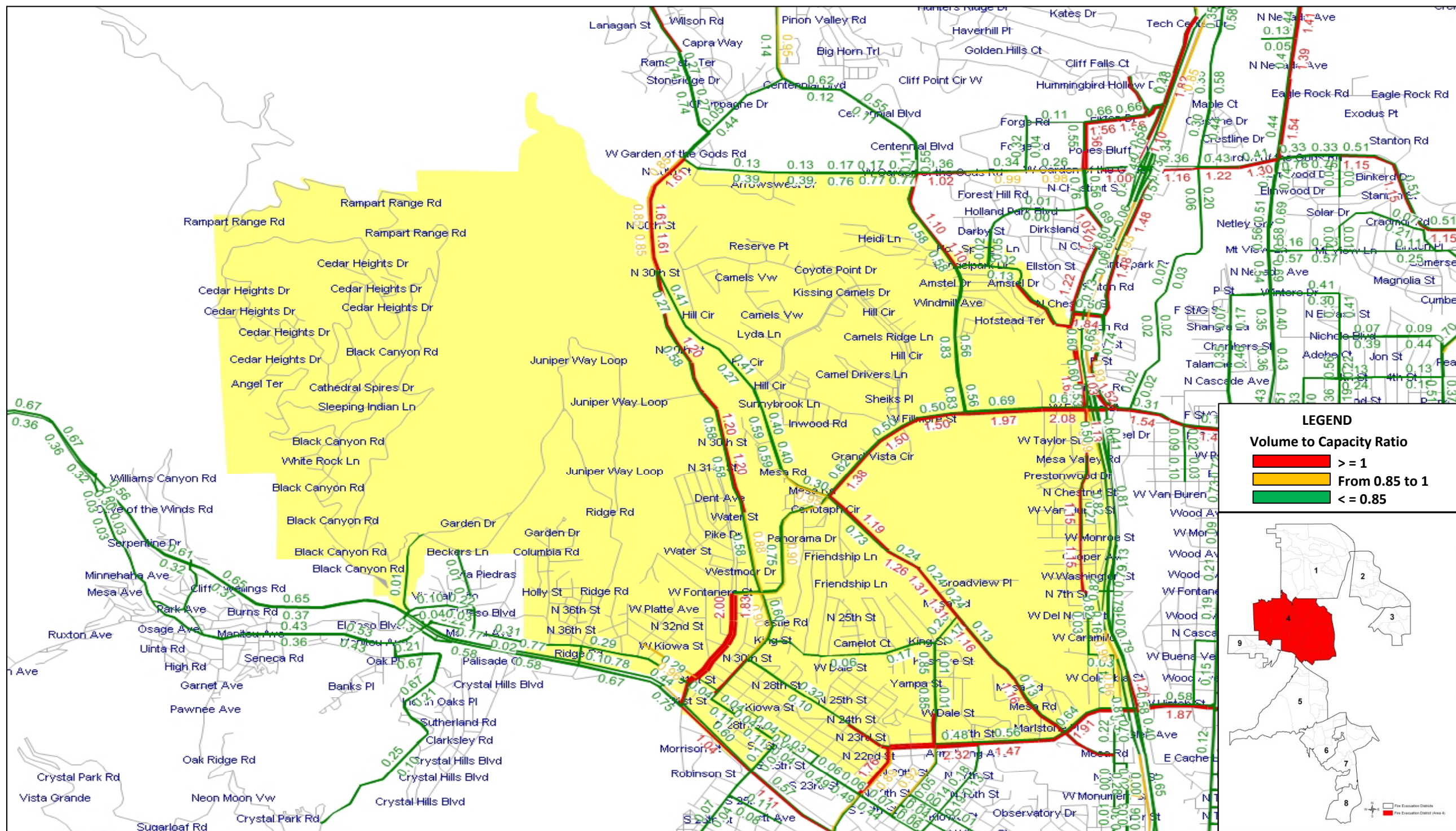
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 4
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 4
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





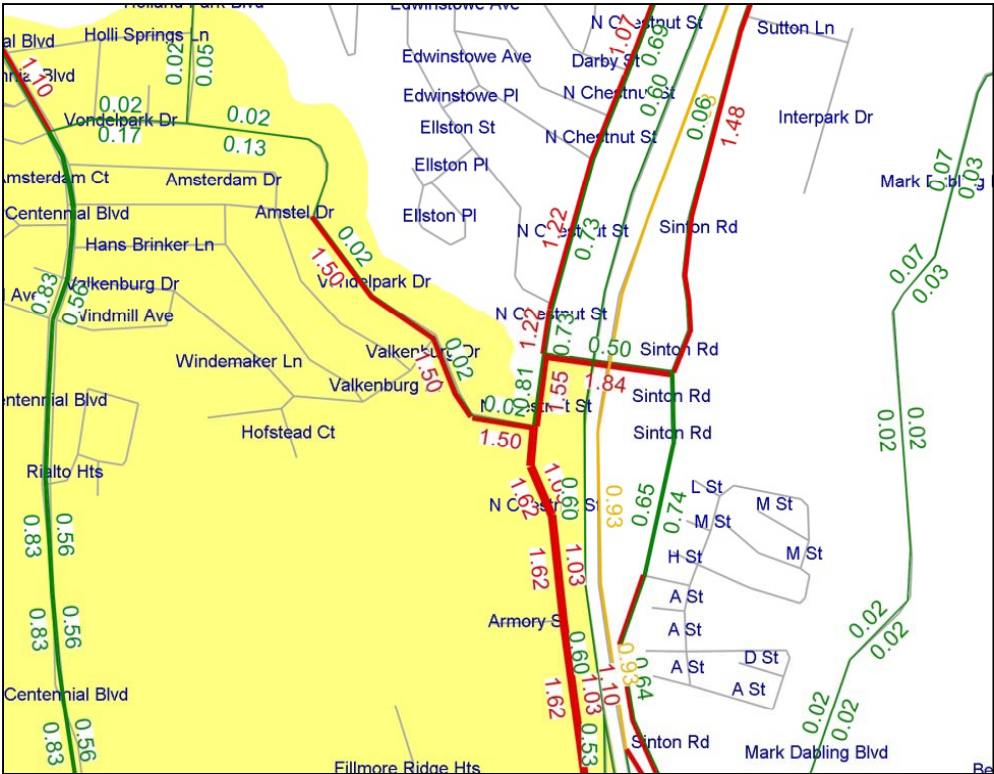
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 4
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



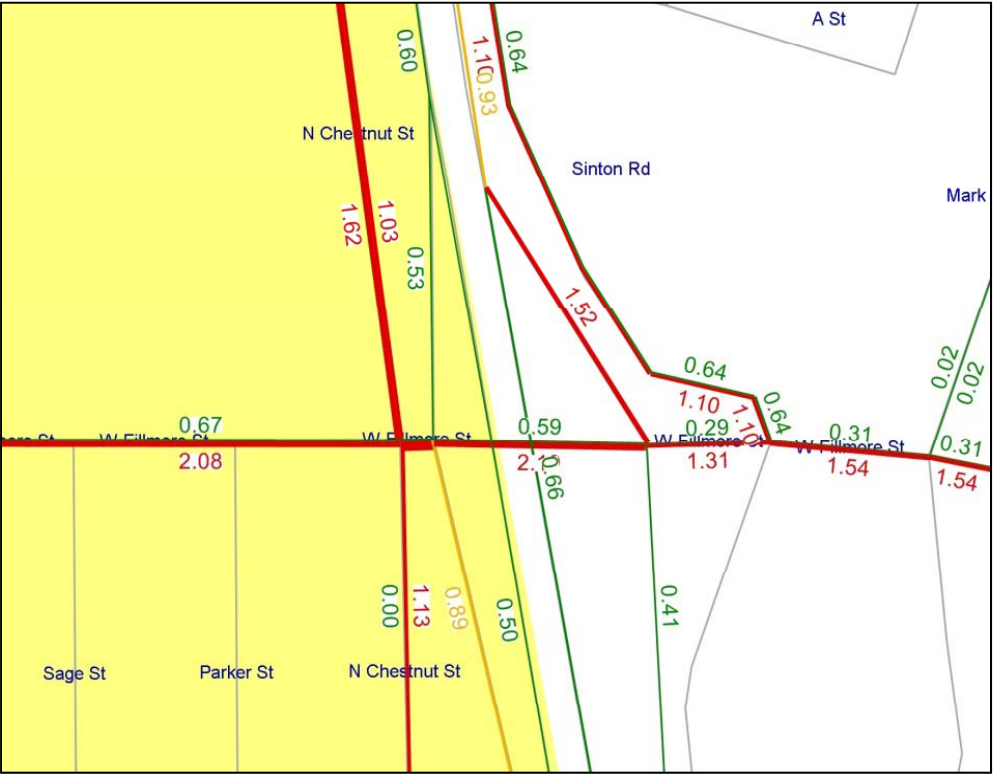
Close-up of Key Exit Portals from District 4

V/C Ratio of Combined Evacuation and Background Traffic

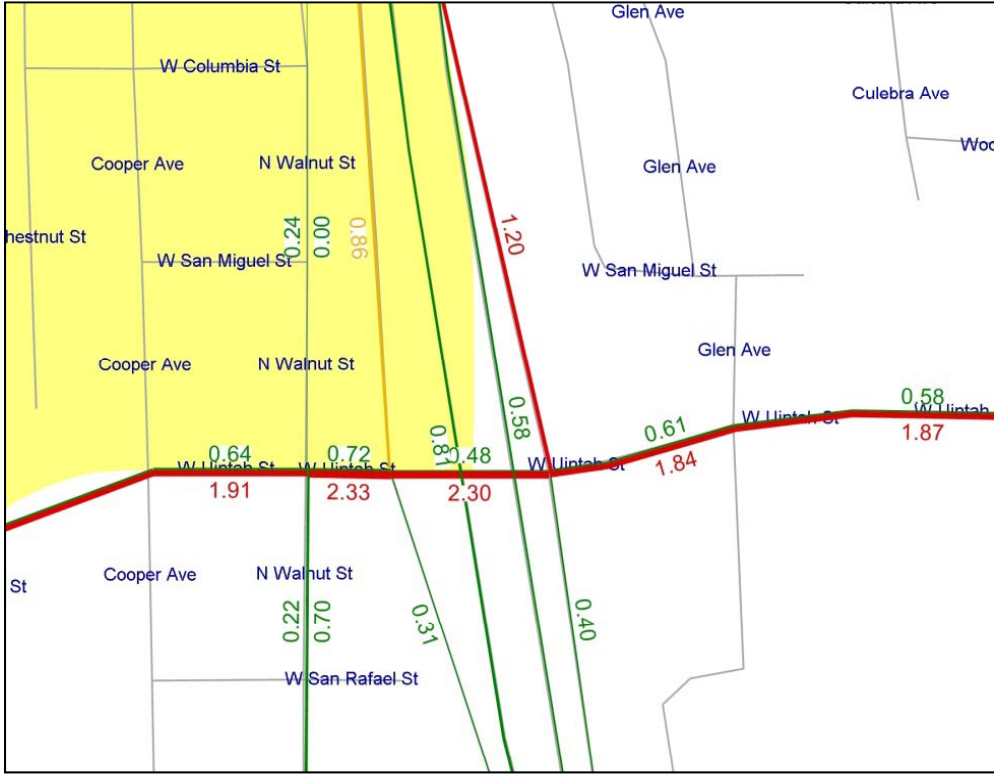
Vondelpark Drive/Ellston Street at I-25



Fillmore Street/I-25 Interchange



Uintah Street/ I-25 Interchange



31st Street at US-24



LEGEND

Volume Capacity (V/C) Ratio

≥ 1

$> .85$ and < 1

$\leq .85$

Findings for District 4

Evacuation Traffic (Page 4-2)

Of the major portals for egress, Fillmore and Uintah Streets carry the highest level of evacuation traffic. The heavy evacuation traffic on Uintah Street continues well east of I-25.

The I-25 on-ramps (northbound) at Ellston and Fillmore Streets begin to operate with excessive V/C under evacuation traffic alone. The southbound onramp US 24 to I-25 also becomes severely congested.

The south portals of District 4 - 31st Street and 21st Street - also begin to suffer congestion under evacuation traffic alone.

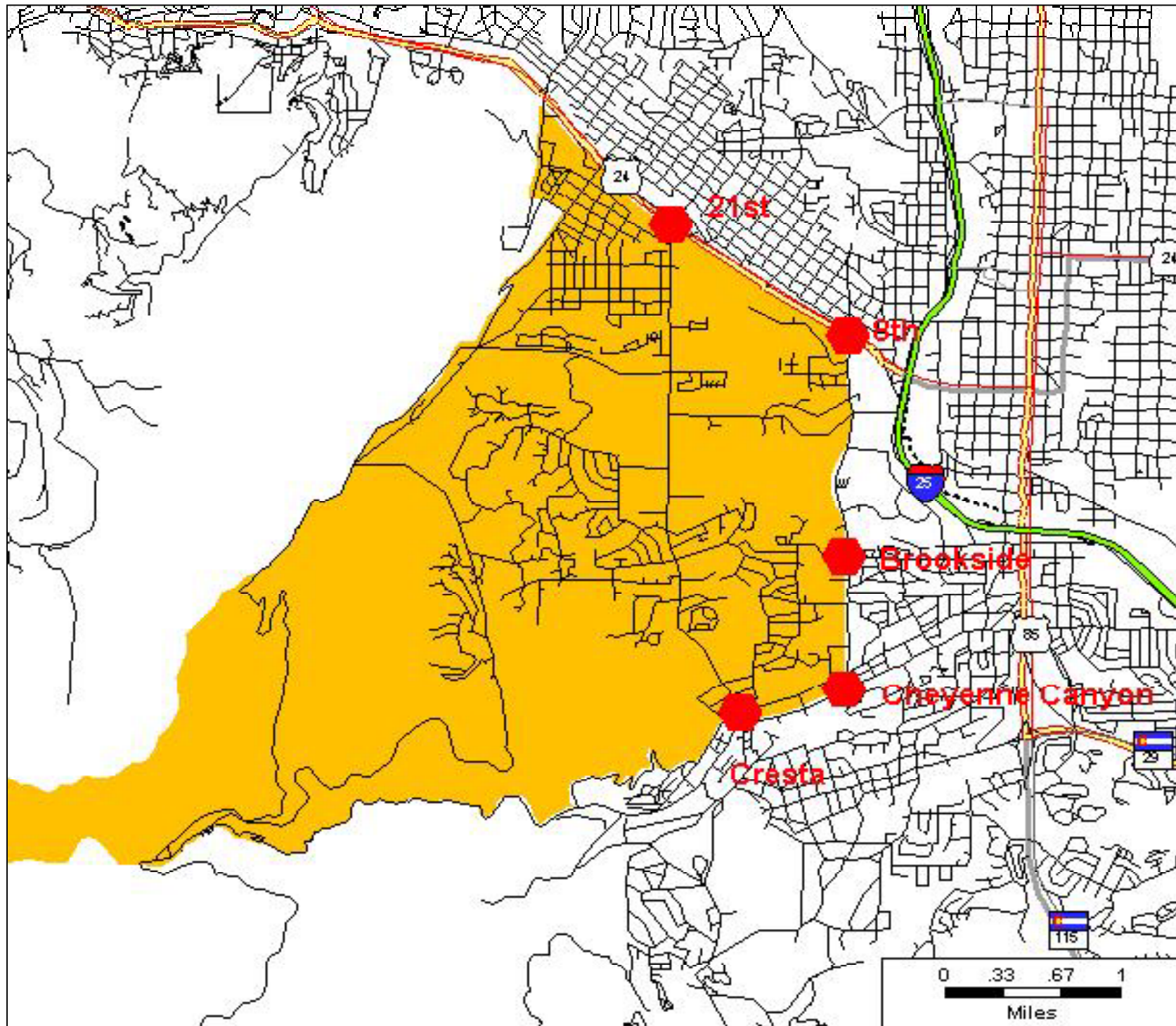
Evacuation + Background Traffic (Pages 4-4 and 4-5)

The I-25 northbound mainlines and on-ramps begin to fill up and result in a Level of Service breakdown due to demand from both evacuation and PM background traffic. The portals of Fillmore, Uintah and US 24 provide service to both evacuation and background traffic.

The congestion persists well to the east of I-25, particularly on the key throughputs of Fillmore, Uintah and US 24.

Cut-through traffic on 30th uses capacity needed for evacuation vehicles (See Page 4-3). About 400 northbound and 200 southbound background traffic are estimated to cut through District 4 during the one hour PM peak.

Inventory of District 5



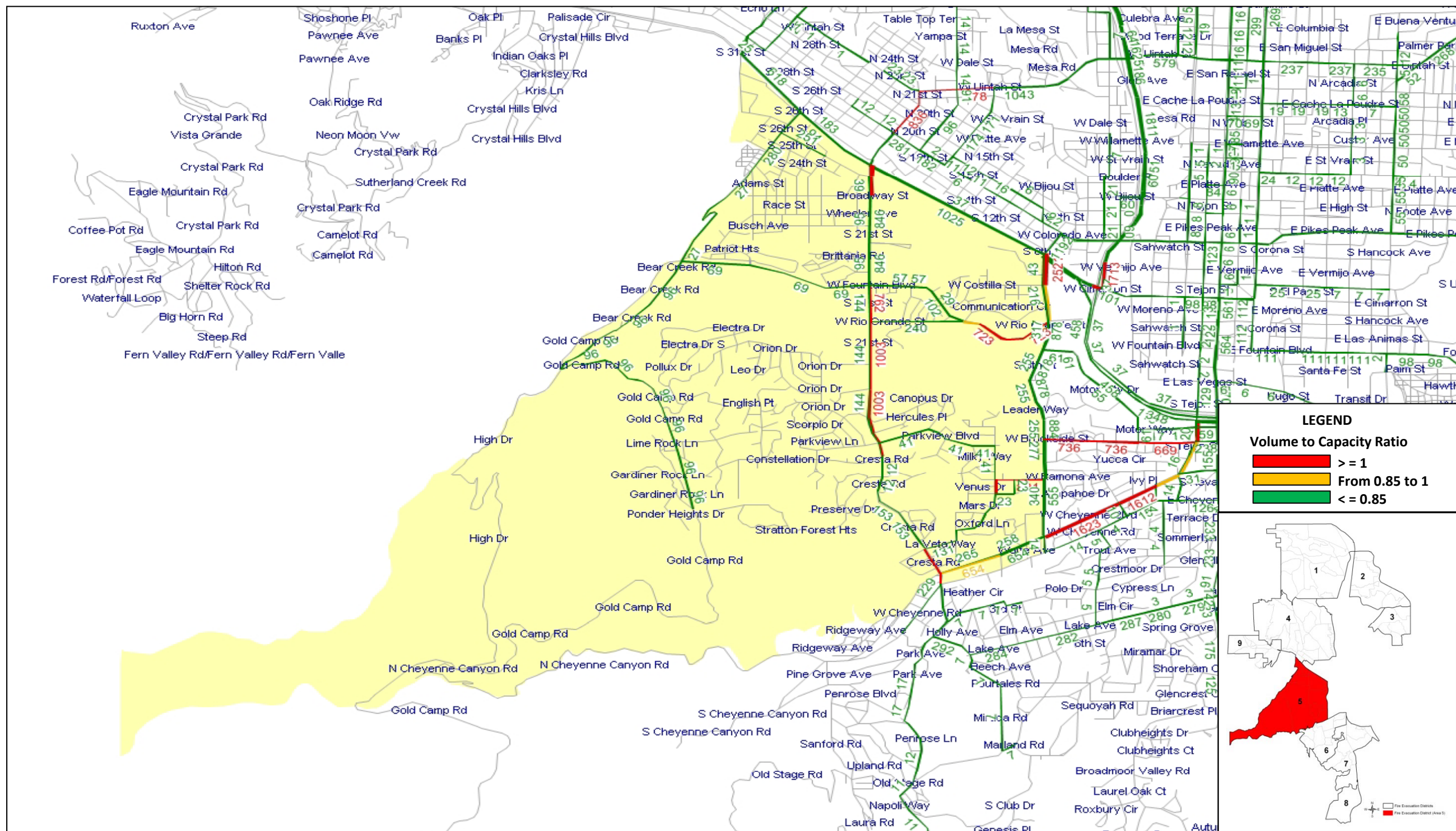
Bounded by US 24 on the north, 8th Street on the east, Cheyenne Canyon Road on the south, and the foothills on the west.

The estimated number of households is 5,900.

The district is “funnel-shaped,” with a west-east distance of about 4 miles; the distance north-south is about 4 miles. The households are located on the western and southern boundaries of the district.

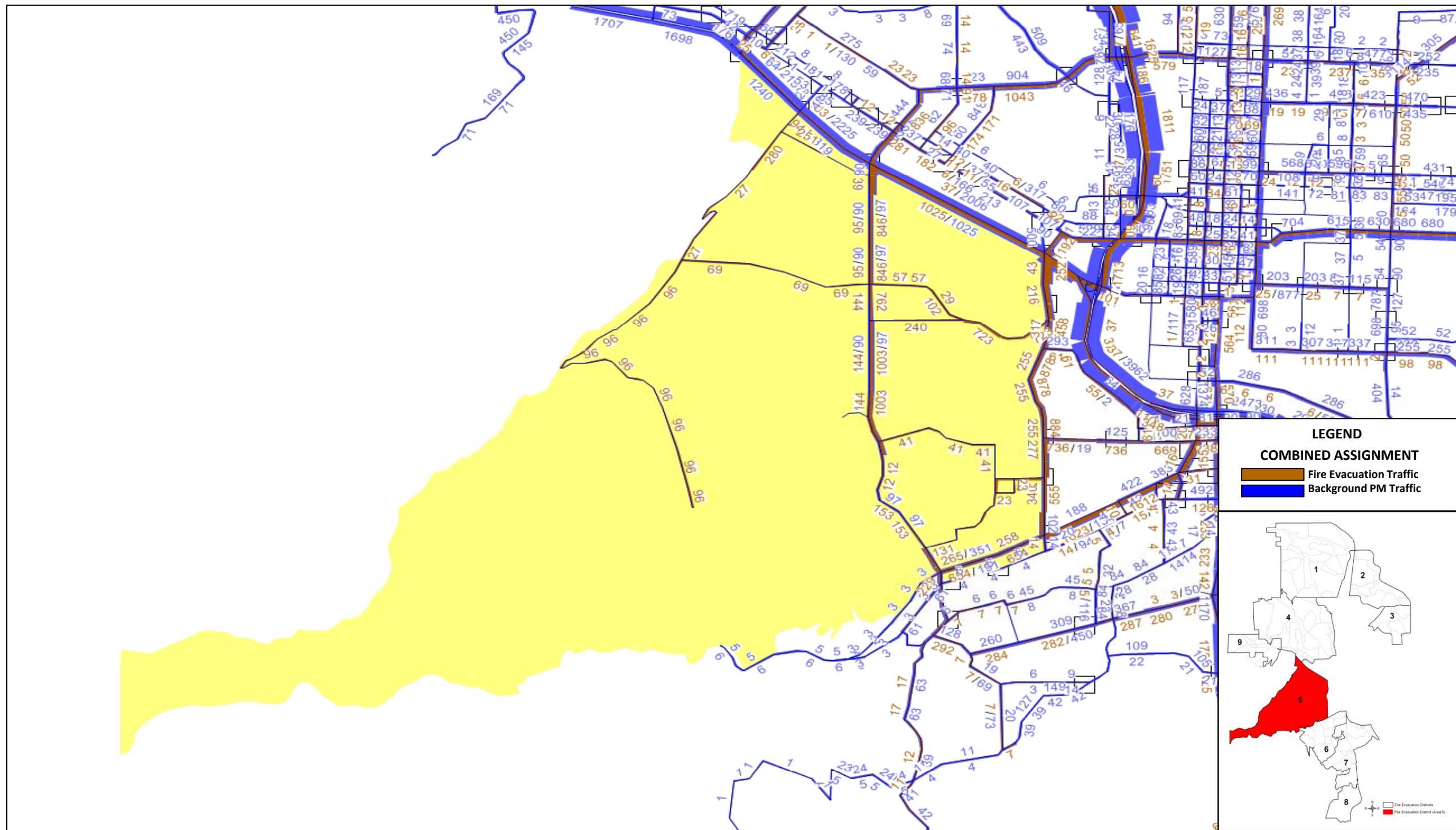
Major portals for egress are US 24, Brookside Street, Cresta Road, and 21st and 8th Streets.

Cheyenne Canyon Road and US 24 will play vital roles in providing exit routes to the evacuation traffic from District 5. The US 24 / I-25 interchange will be an important location as well.



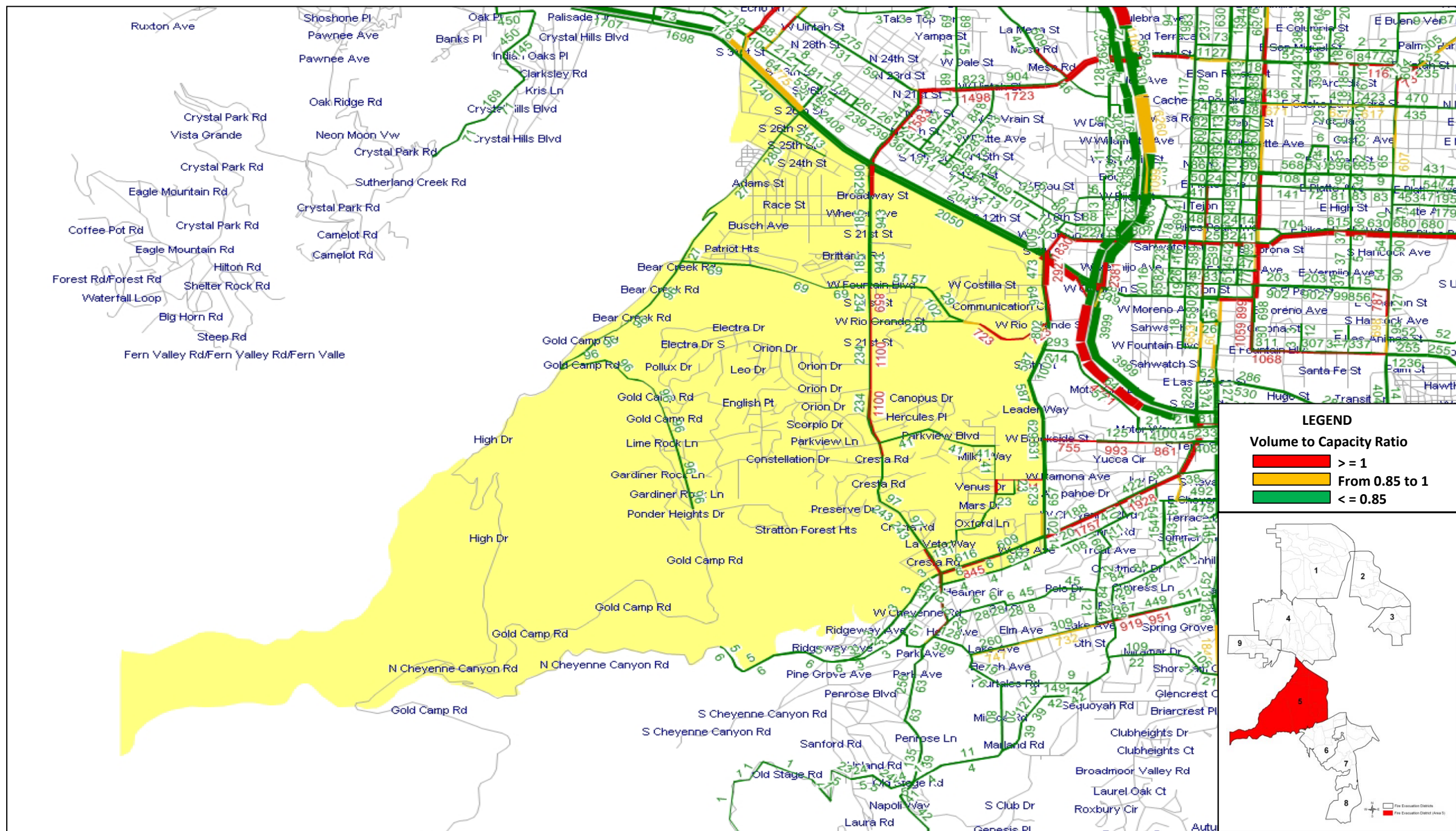
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 5
 EVACUATION TRAFFIC ANNOTATED WITH
 VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





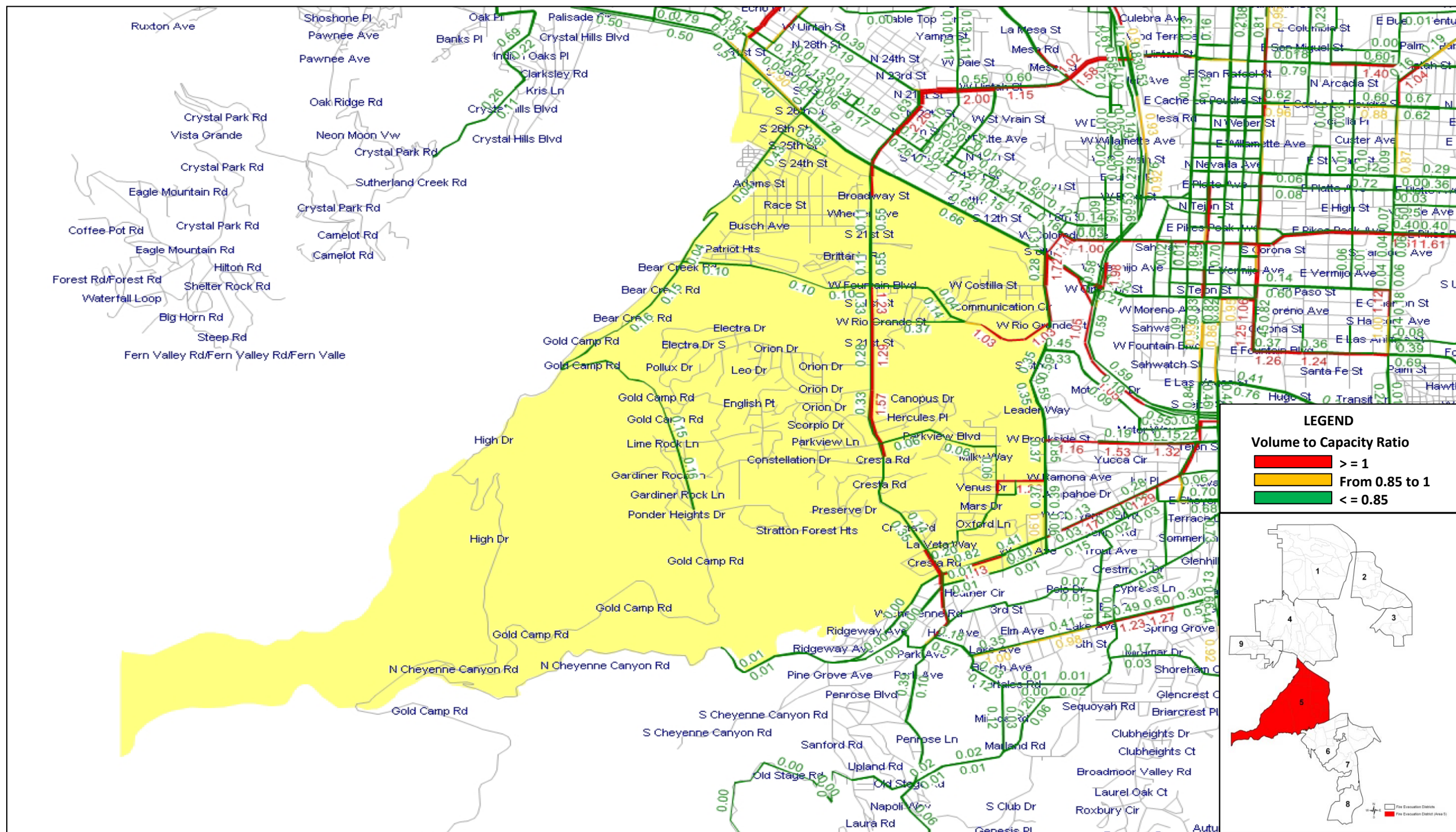
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 5
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 5
 EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
 V/C RATIO COLOR CODED





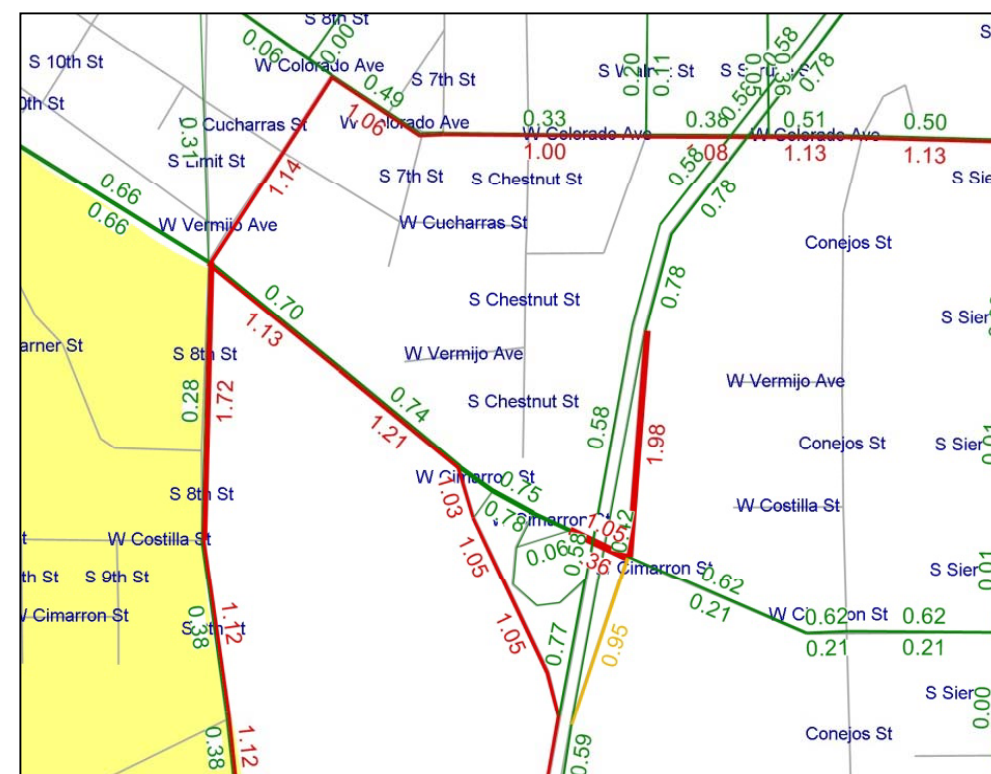
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 5
 EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
 WITH V/C RATIO ANNOTATED



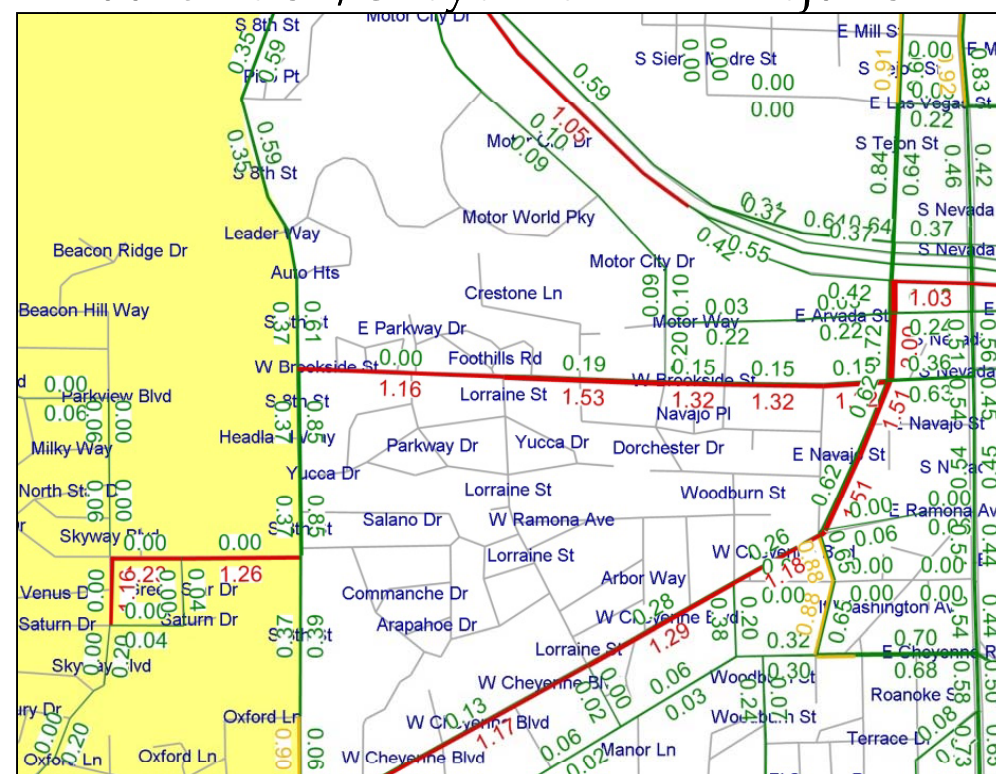
Close-up of Key Exit Portals from District 5

V/C Ratio of Combined Evacuation and Background Traffic

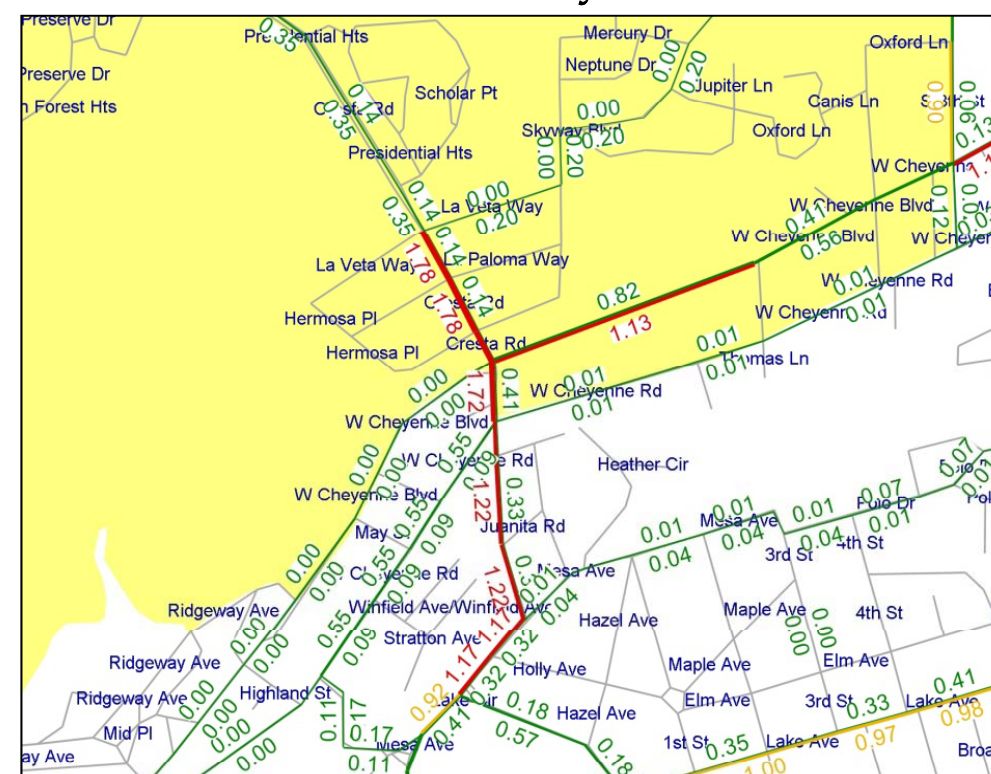
21st Street at US-24

8th Street at US-24

Brookside St./Cheyenne Rd. at Tejon St.



Cresta Road at West Cheyenne Road



LEGEND

Volume Capacity (V/C) Ratio

 ≥ 1 

$> .85$ and < 1

 $\leq .85$

Findings for District 5

Evacuation Traffic (Page 5-2)

Most evacuation traffic goes out to the north and east. Of the major portals for egress, 8th Street, Brookside Street and W. Cheyenne Boulevard carry the highest level of evacuation traffic.

The I-25 on-ramps (northbound) at US 24 begin to operate with excessive V/C under evacuation traffic alone. The congestion carries down I-25 and affects additional on ramps to the south.

Internally, Cresta Road, also known as 21st Street, becomes congested carrying only the evacuation traffic. This important north-south routes serves evacuating vehicle headed out of District 5 to the north or south.

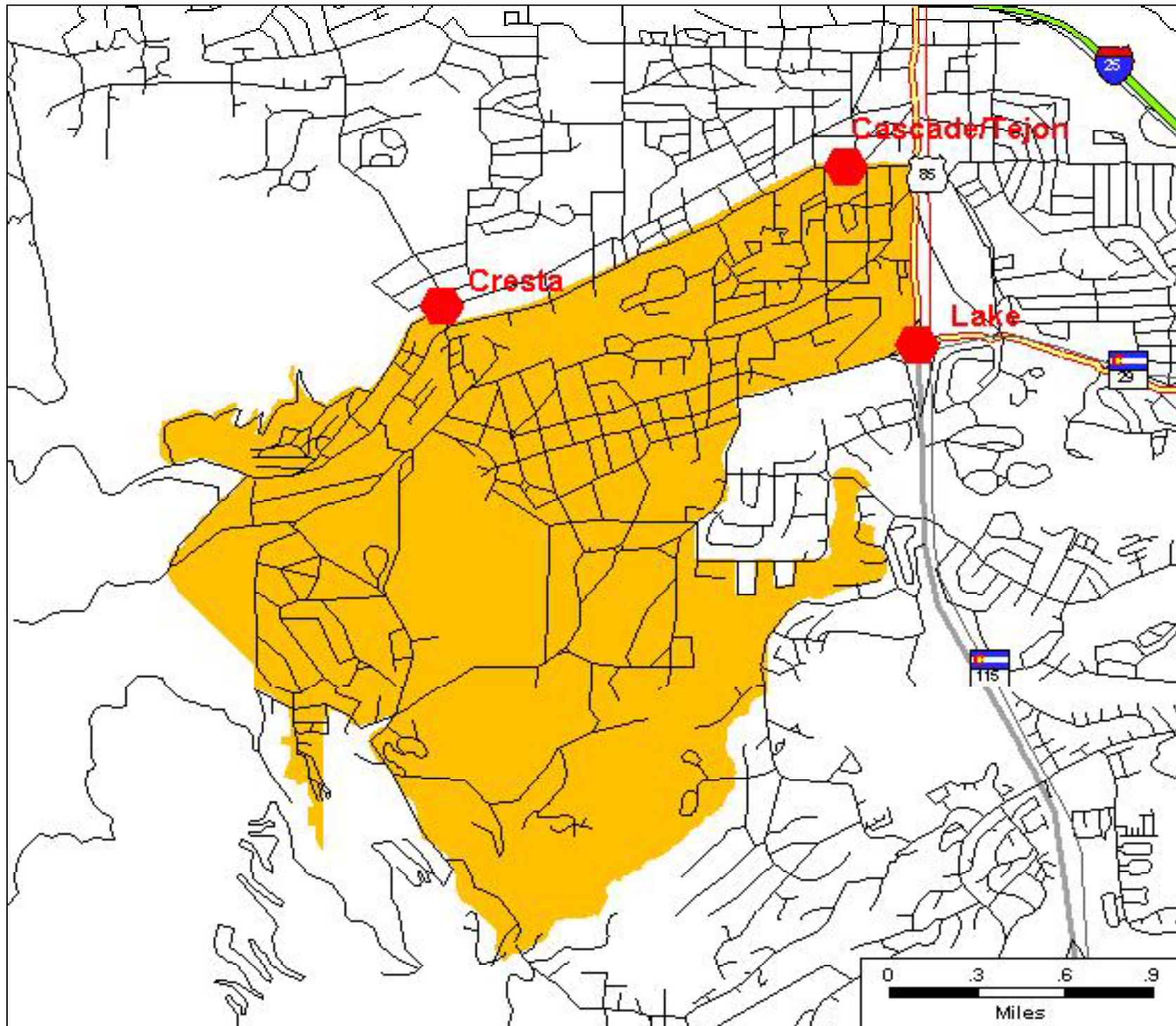
Evacuation + Background Traffic (Pages 5-4 and 5-5)

Regional background traffic uses the path US 24 to I-25 to a high degree. This traffic competes with the evacuation traffic leaving District 5 from the north.

The I-25 and US 24 mainlines begin to fill up and result in a Level of Service breakdown due to demand from both evacuation and PM background traffic.

Cut through traffic (non-evacuation) is about 100 vehicles southbound and reaching 1,000 northbound on Cresta Road/21st Street (See Page 5-3).

Inventory of District 6



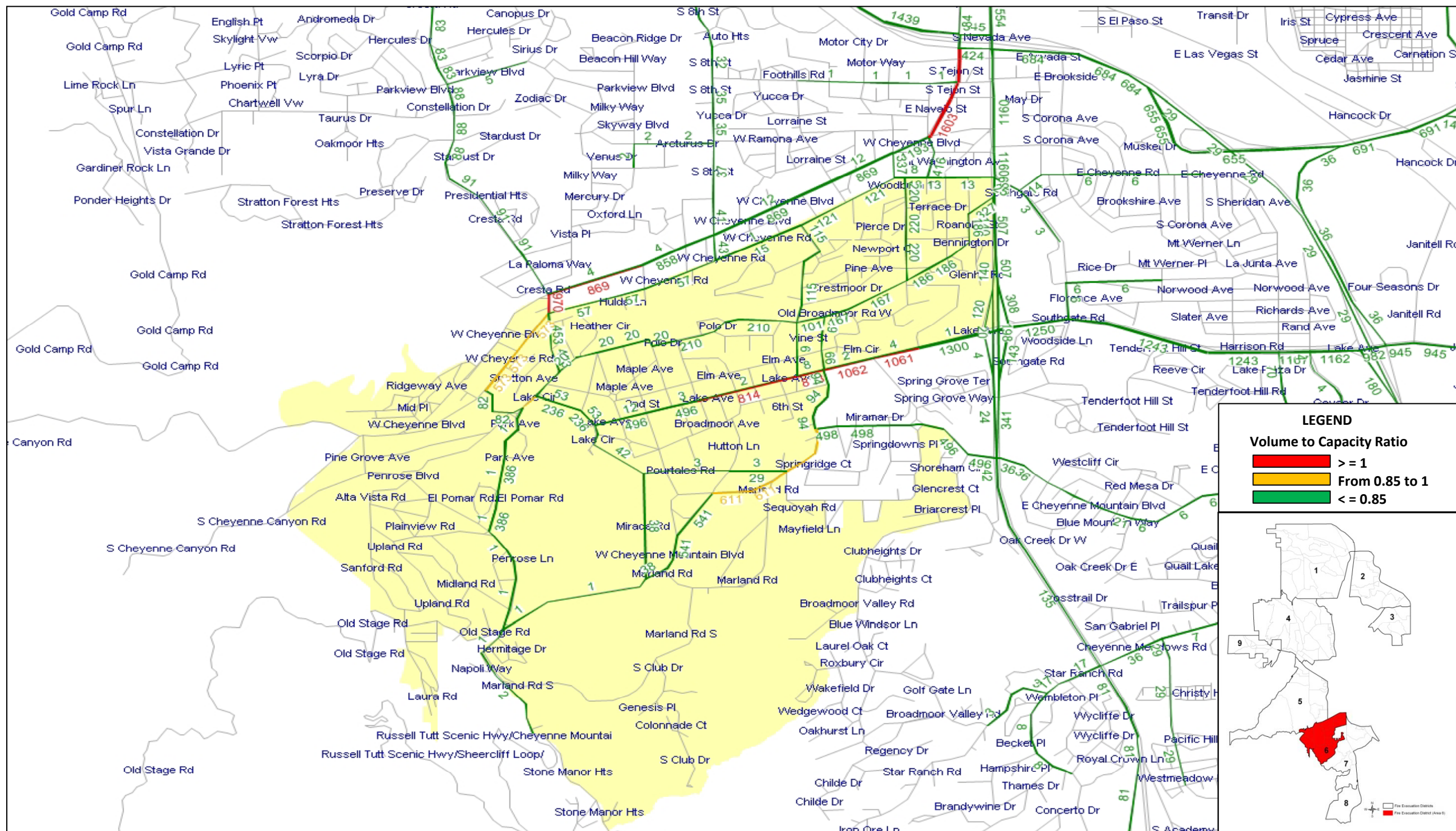
District 6 is bounded by Cheyenne Road on the north, US Highway 85 on the east, Cheyenne Mountain Zoo Road on the south, and the foothills on the west.

The estimated number of households is 2,700.

The district has an east-west distance across of about 2 miles; the distance north-south is about 2 miles. The households are generally located on the northern and eastern boundaries of the district.

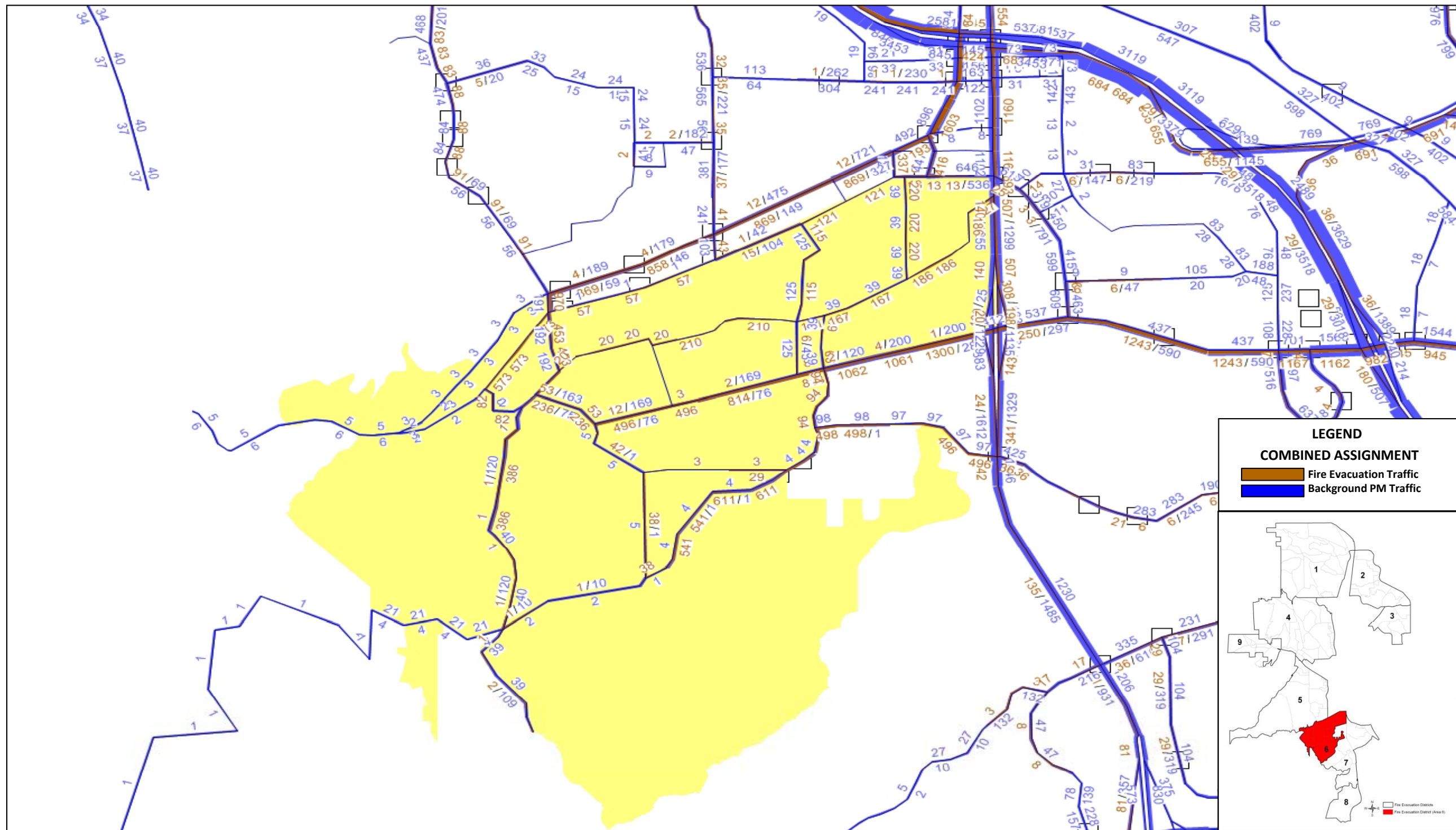
Major portals for egress are Cresta, Lake (Circle) and Cascade/Tejon.

Lake Avenue and Cascade/Tejon will play vital roles in providing exit routes to the evacuation traffic from District 6. The Lake / I-25 interchange will be an important location as well.



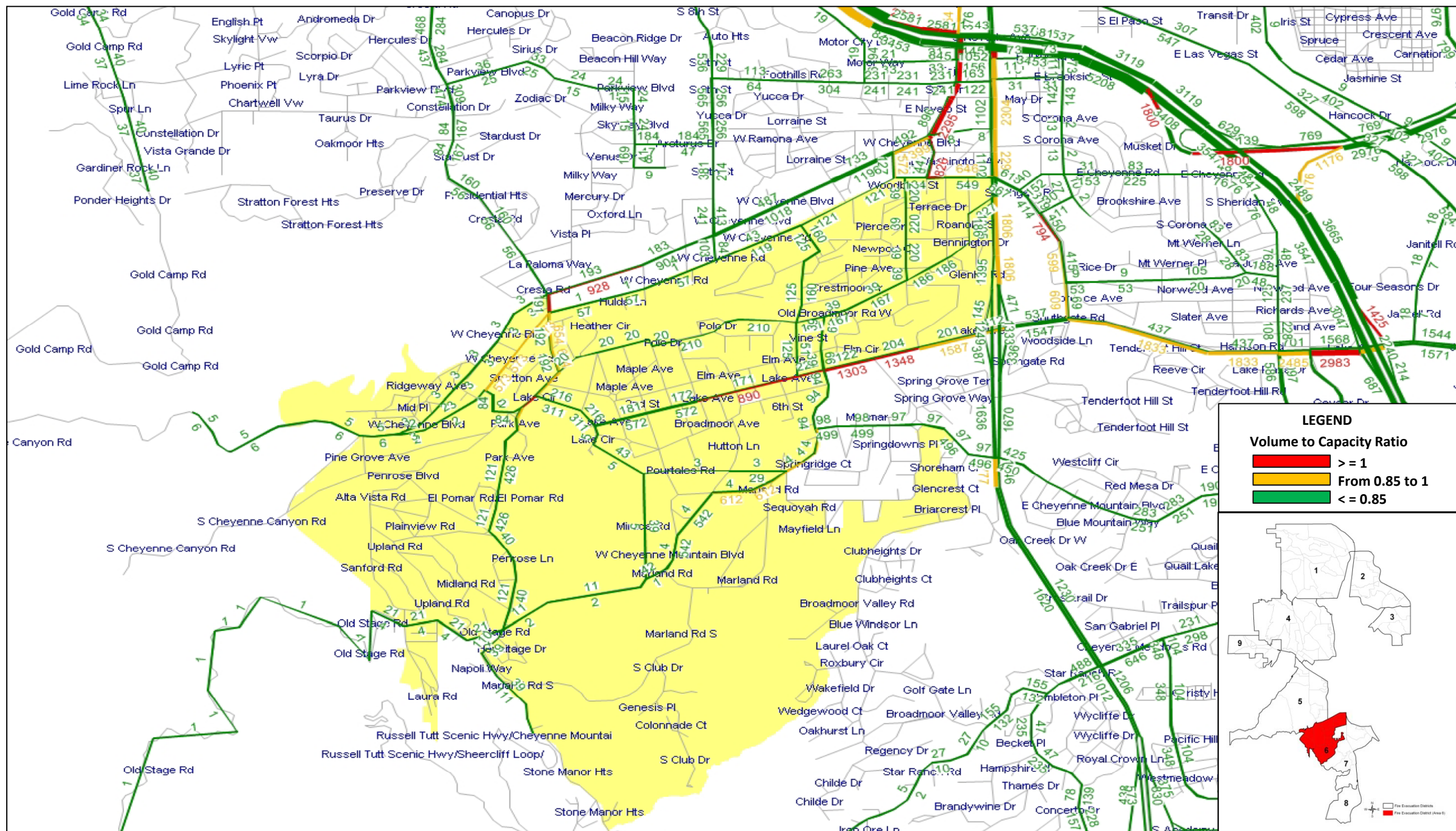
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 6
 EVACUATION TRAFFIC ANNOTATED WITH
 VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





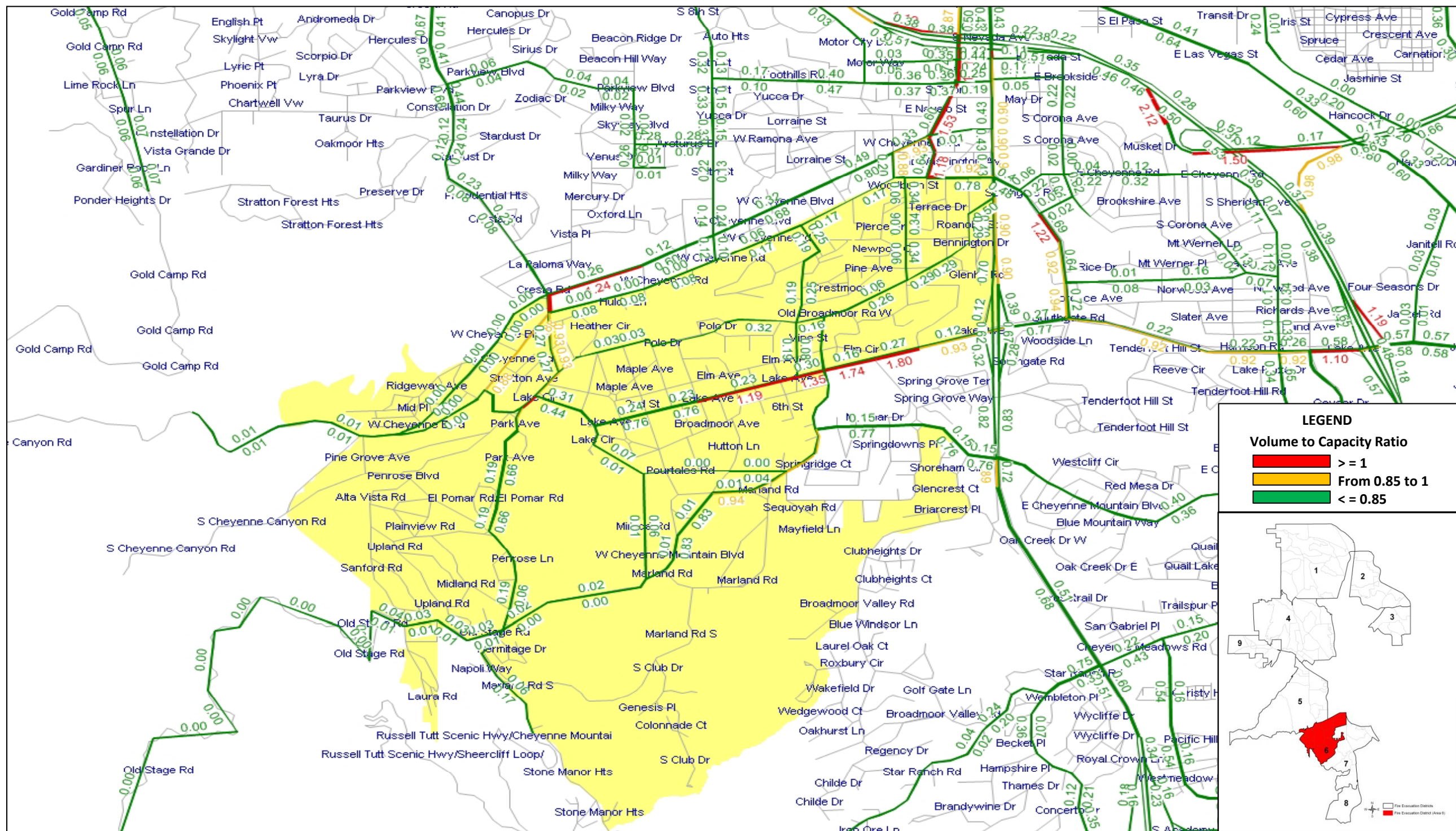
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 6
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 6
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





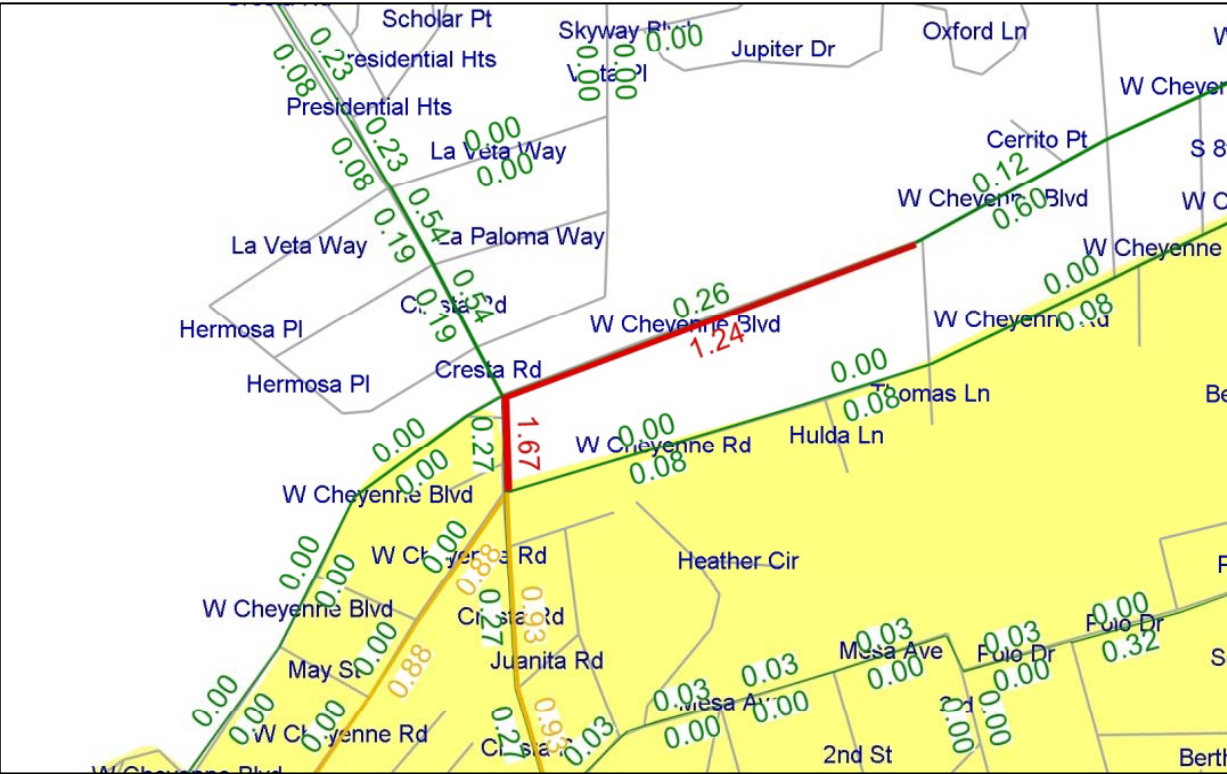
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 6
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



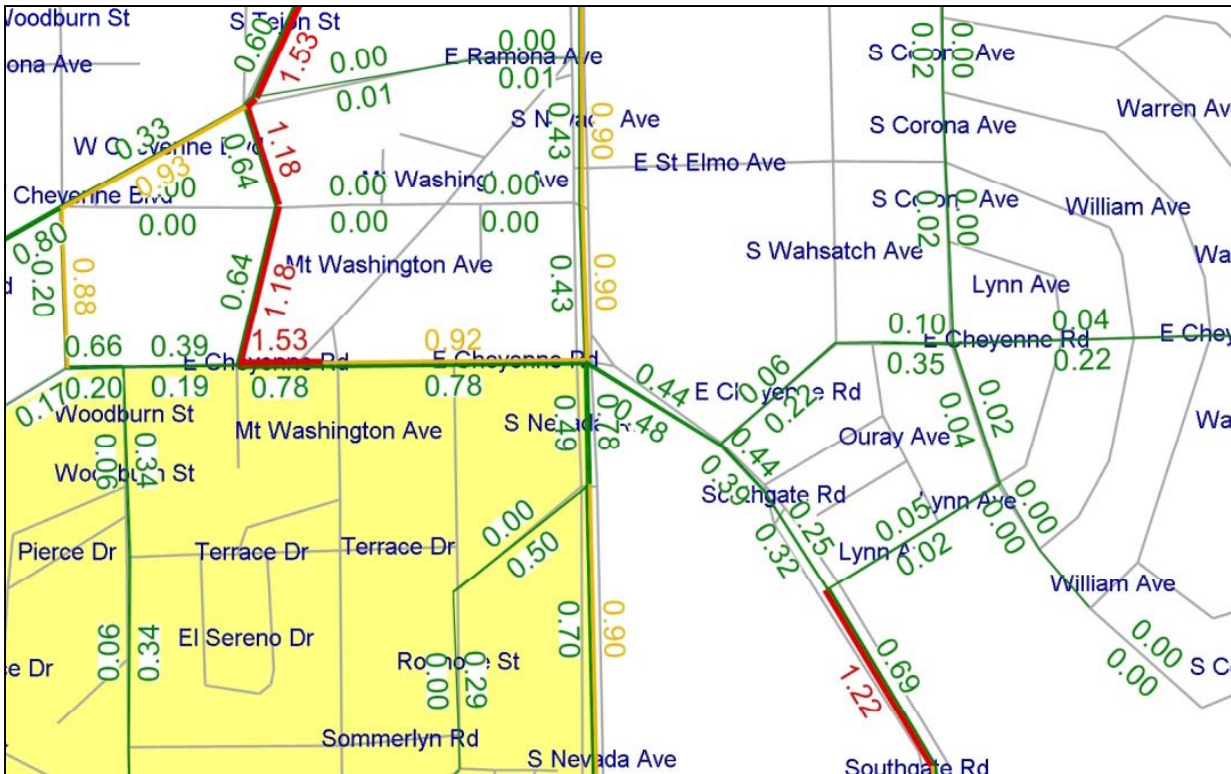
Close-up of Key Exit Portals from District 6

V/C Ratio of Combined Evacuation and Background Traffic

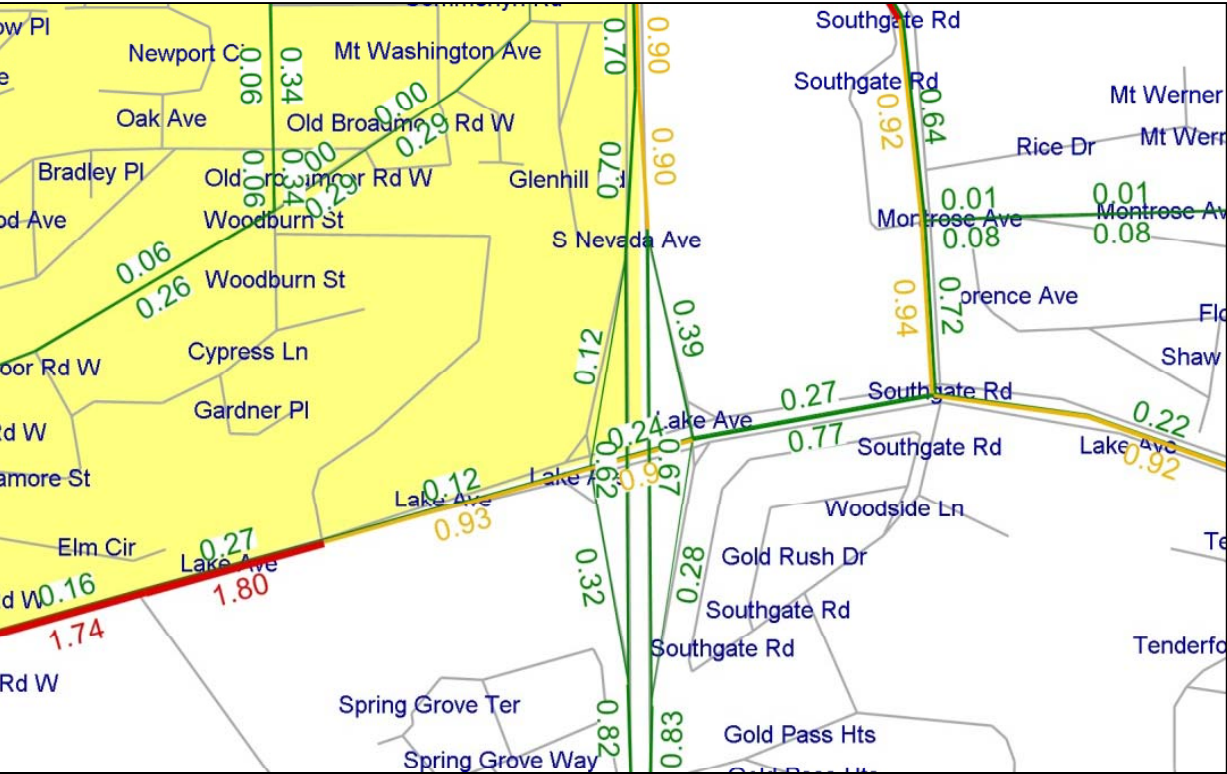
W. Cheyenne Boulevard at Cresta Road



Tejon Street at Cheyenne Road/Cheyenne Boulevard






Lake Avenue at Nevada Avenue



LEGEND

Volume Capacity (V/C) Ratio

	≥ 1
	$> .85$ and < 1
	$\leq .85$

Findings for District 6

Evacuation Traffic (Page 6-2)

Of the major portals for egress, West Cheyenne Boulevard to Tejon Street (north egress) and Lake Avenue (east egress) carry the highest level of evacuation traffic.

I-25 and its on ramps can carry the evacuation traffic with no congestion occurring.

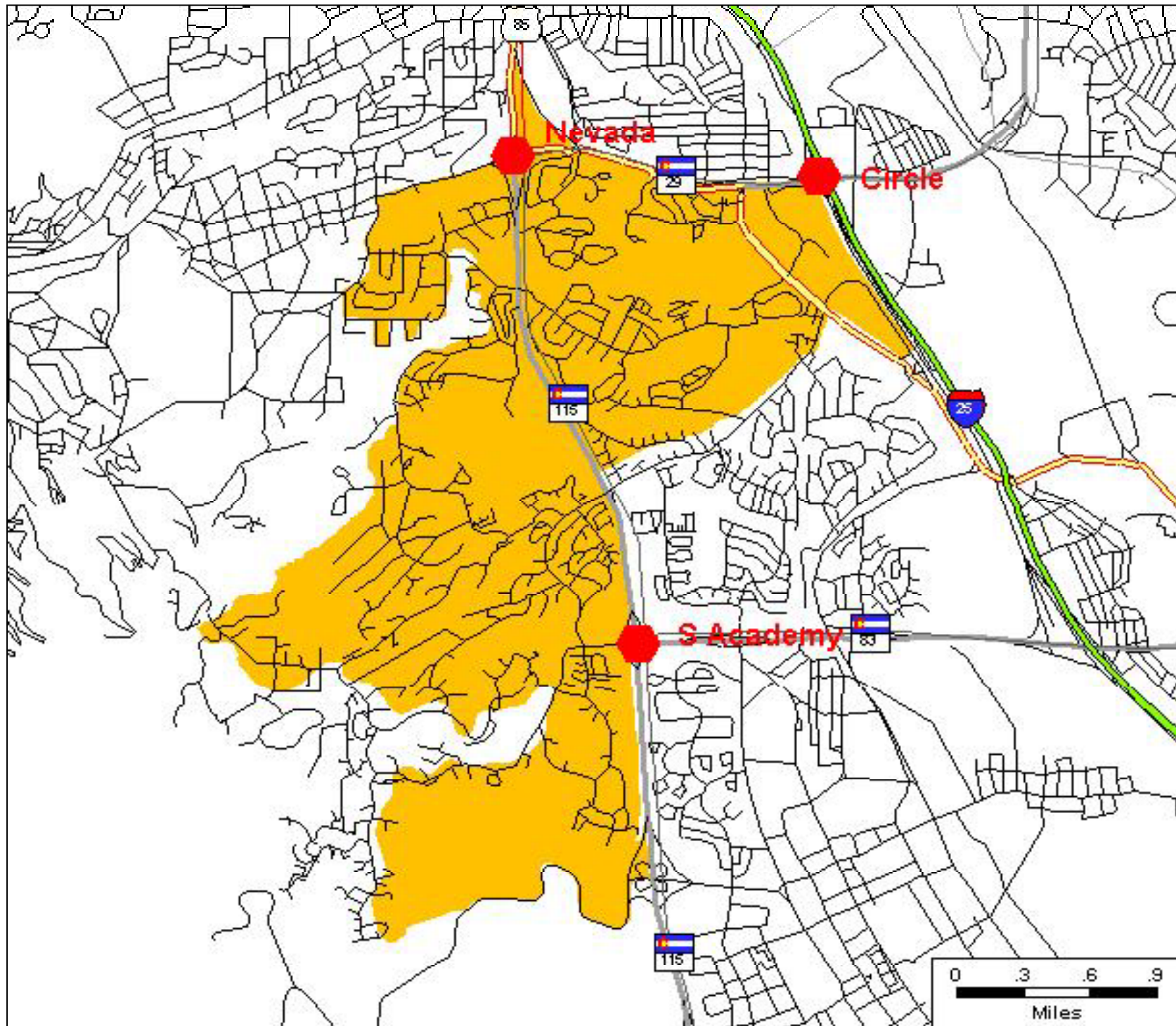
Internally, Cheyenne Mountain Boulevard and Lake cannot support the evacuation traffic, and produce V/C ratios of greater than 1.

Evacuation + Background Traffic (Pages 6-4 and 6-5)

Regional background traffic uses I-25 in both directions (north and south) to a high degree. The interchanges and I-25 approaches used by the evacuation traffic (Tejon Street and Nevada Avenue) are also important for the background traffic.

Circle Drive carries a high level of both evacuation and background PM traffic towards the east.

Inventory of District 7



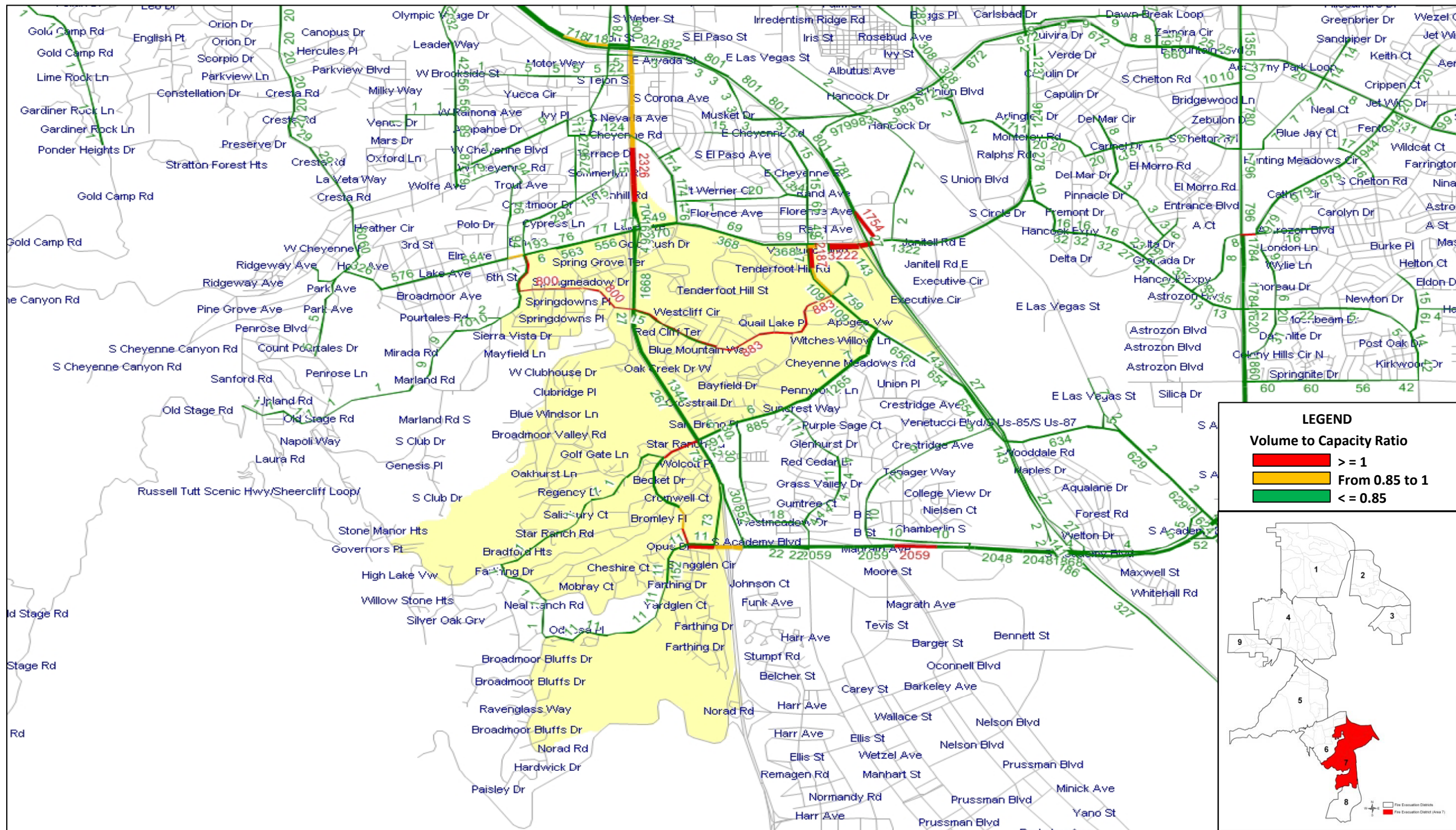
Bounded by Circle Road on the north, I-25 and US Highway 115 on the east, NORAD Road on the south, and generally the Broadmoor Complex on the west.

The estimated number of households is 5,800.

The district has an east-west distance of about 1.5 miles; the distance north-south is about 4 miles. The households are spread throughout this district, interspersed by hills.

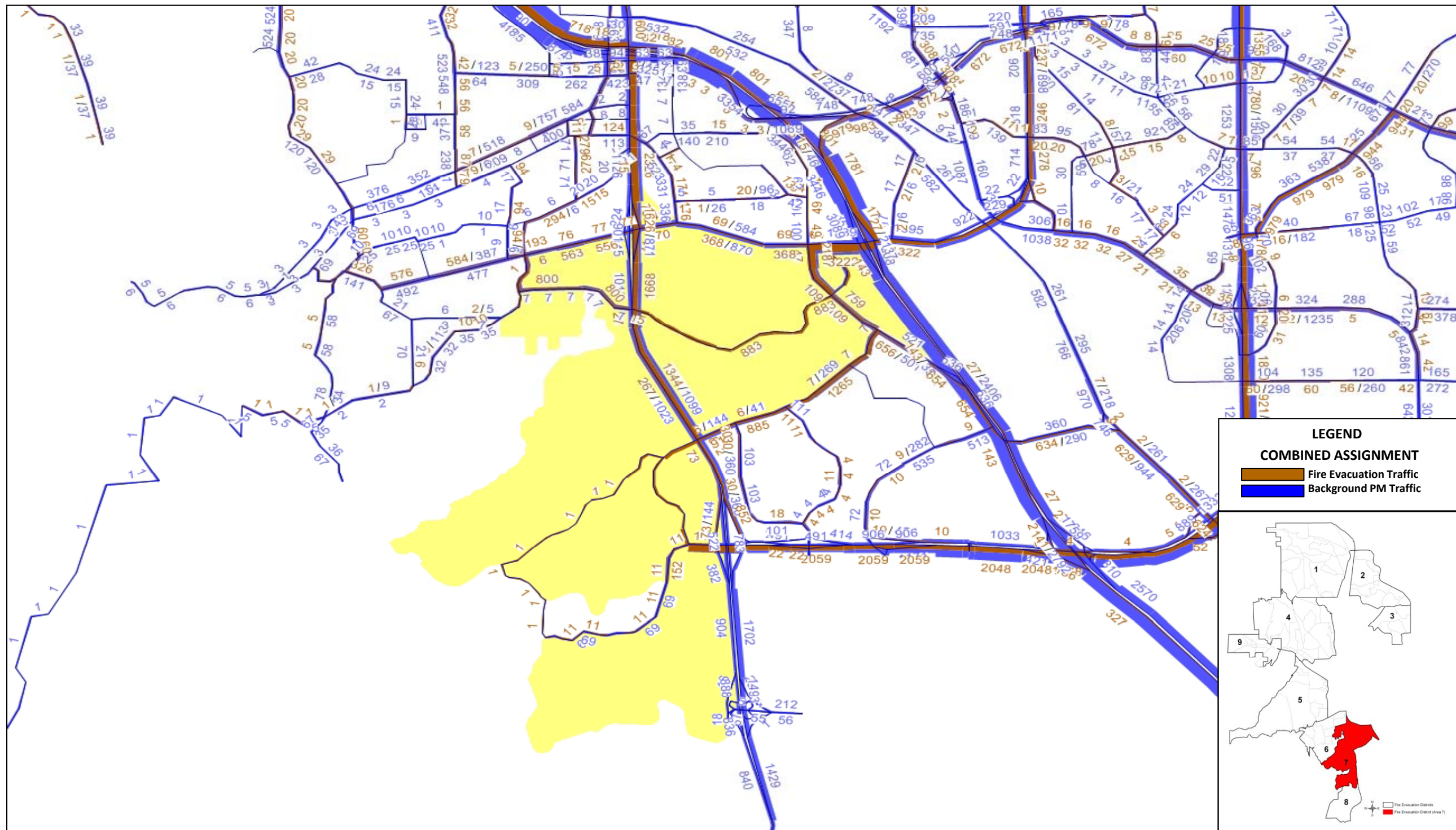
Major portals for egress are Nevada Avenue, Lake Avenue/ Circle Drive, and Academy Boulevard

I-25 will play a vital role in providing exit routes to the evacuation traffic from District 7. The Circle-Lake / I-25 interchange will be an important location as well.



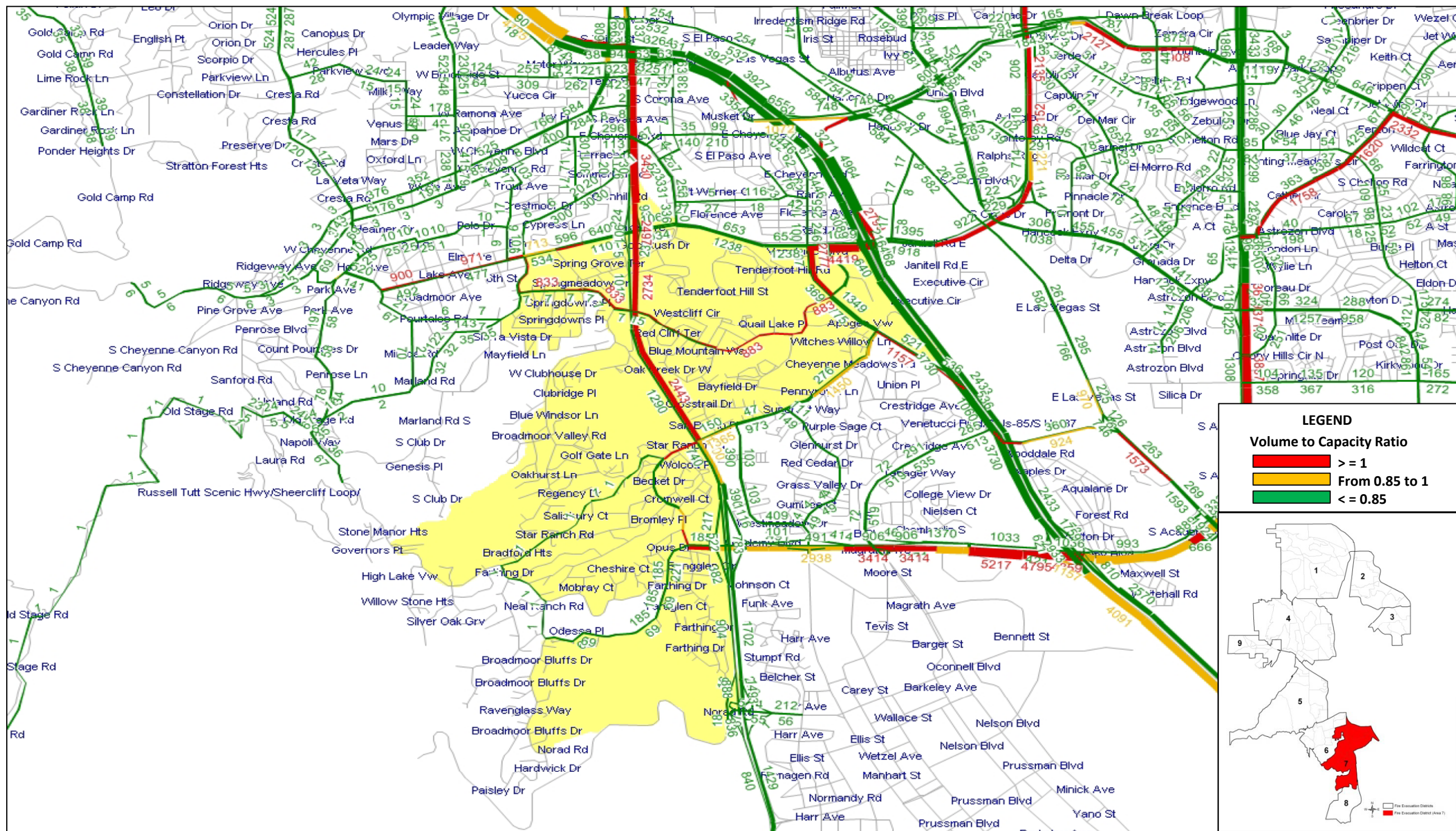
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 7
EVACUATION TRAFFIC ANNOTATED WITH
VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





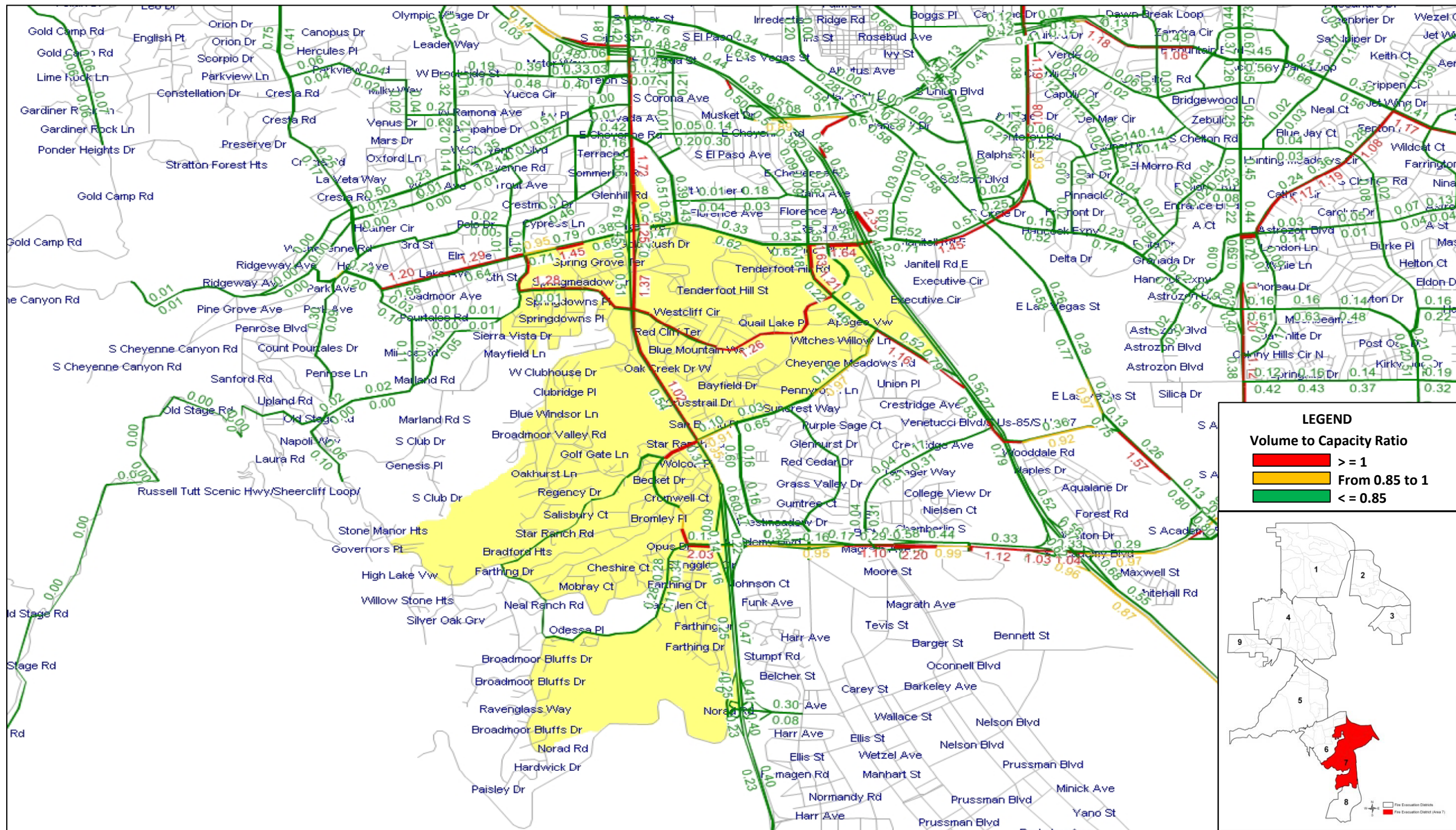
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 7
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 7
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





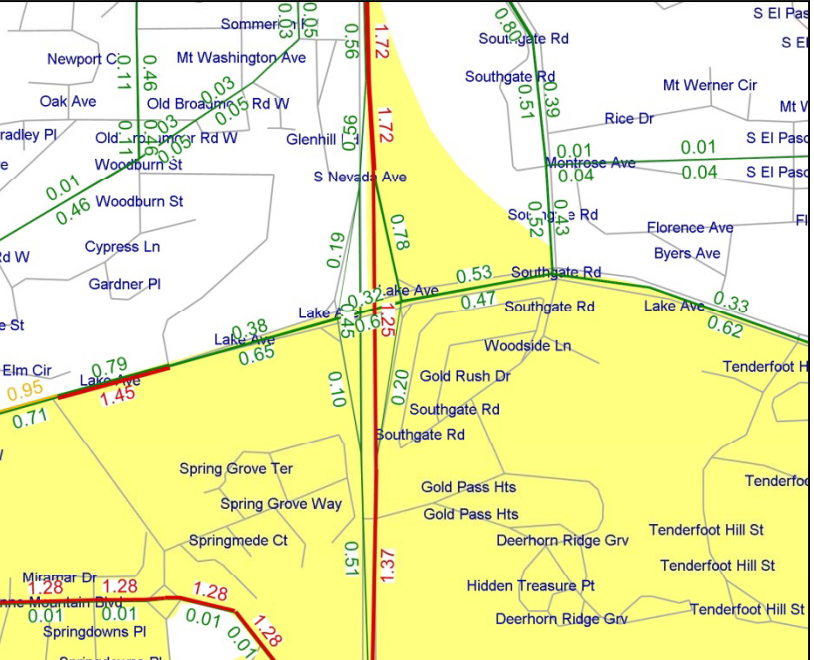
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 7
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



Close-up of Key Exit Portals from District 7

V/C Ratio of Combined Evacuation and Background Traffic

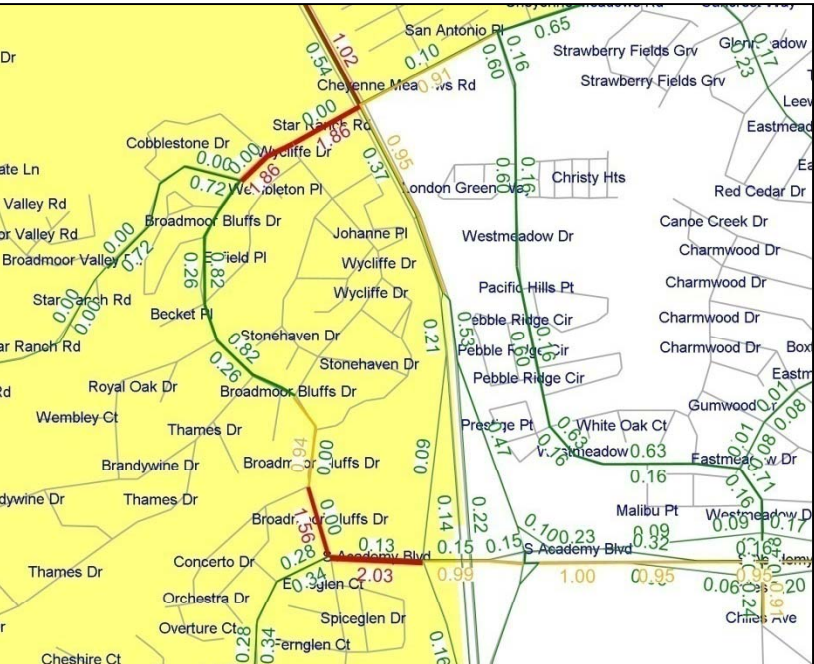
Nevada



Circle Interchange – I-25



Academy at I-25 Area



LEGEND

Volume Capacity (V/C) Ratio

 ≥ 1 $\geq .85$ and < 1  $\leq .85$

Findings for District 7

Evacuation Traffic (Page 7-2)

Of the major portals for egress, Nevada Avenue , Lake Avenue/ Circle Drive and Academy Boulevard carry the highest level of evacuation traffic.

The I-25 northbound on-ramp from Circle Drive becomes congested with evacuation traffic alone.

Internally, Cheyenne Mountain Boulevard and Ventucci Boulevard cannot keep up with the evacuation traffic causing the V/C to exceed 1.

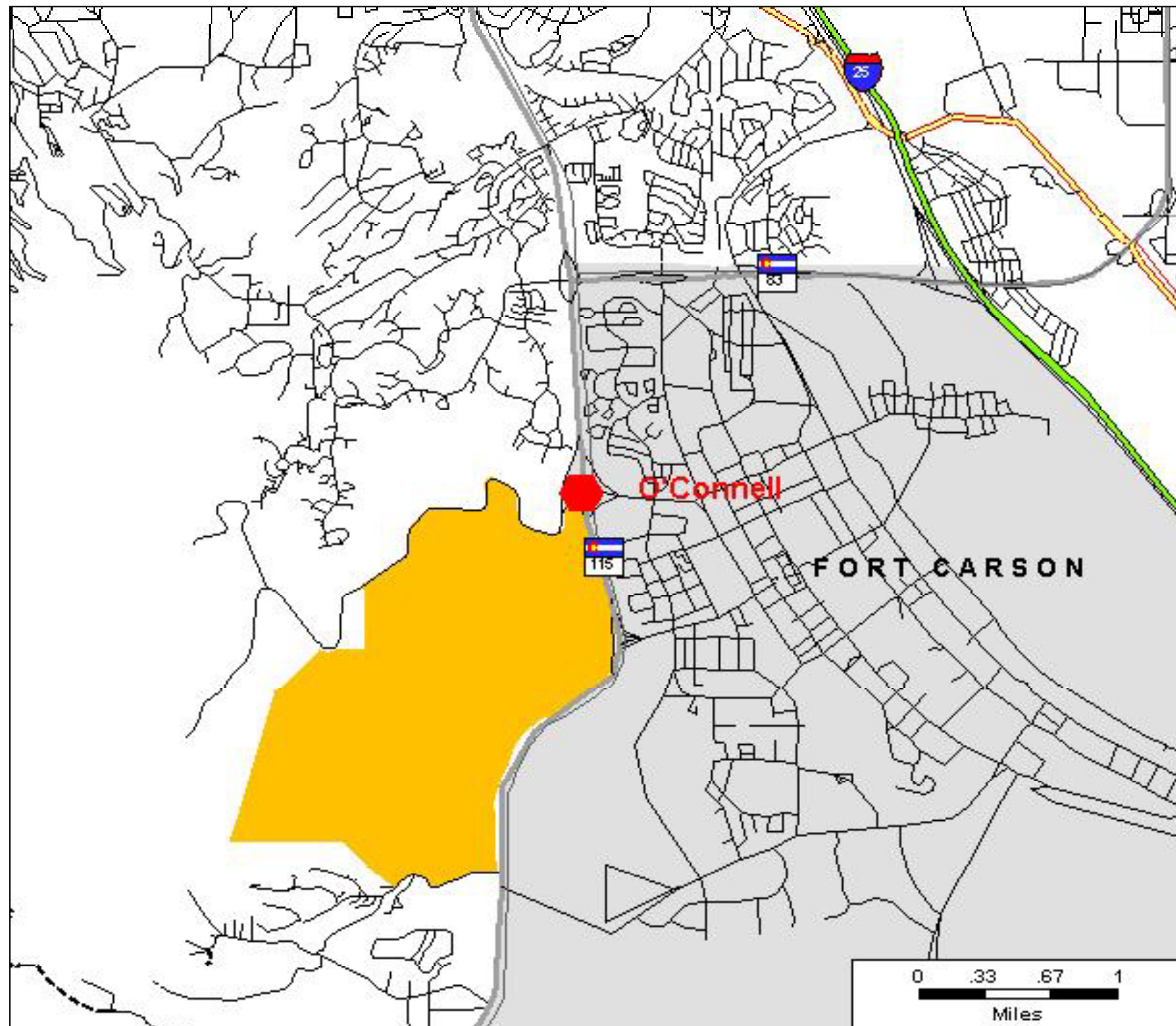
District 7 would profit from being tested in smaller units.

Evacuation + Background Traffic (Pages 7-4 and 7-5)

Regional background traffic uses I-25 in both directions (north and south) to a high degree. Not allowing travel into District 7 and only allowing evacuation traffic out alleviates the typical traffic congestion on I-25 during the PM peak.

Cut through traffic uses Nevada Avenue at over 1,000 vehicles in each direction in some segments.

Inventory of District 8



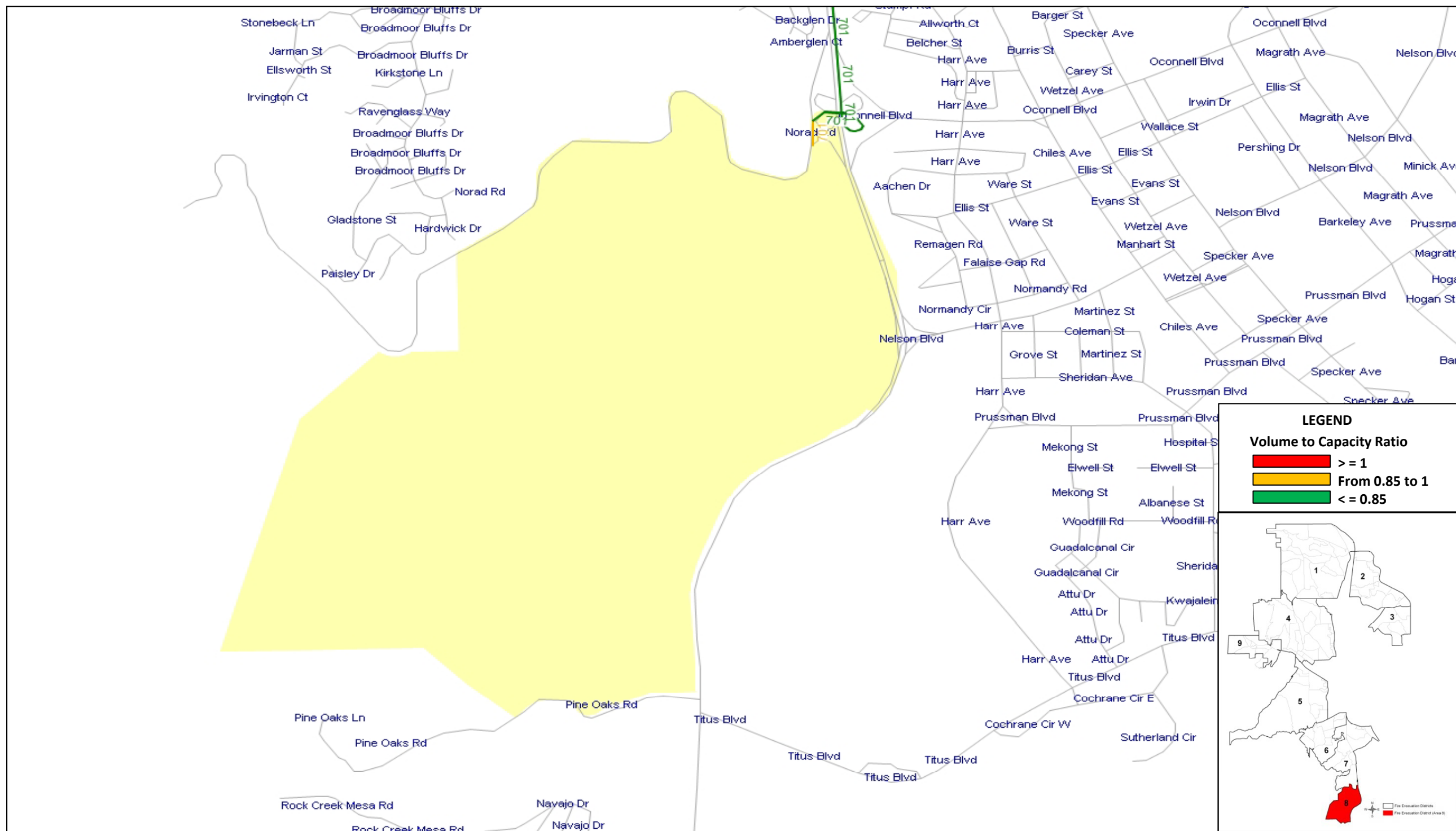
District 8 is bounded by NORAD Road on the north and west, Fort Carson/ SH 115 on the east, and Pine Oaks Road on the south.

The estimated number of military personnel is 700. There are no households in this district.

The district has a east-west distance of about 1.5 miles; the distance north-south is about 1.5 miles. All of this extent is inside Cheyenne Mountain.

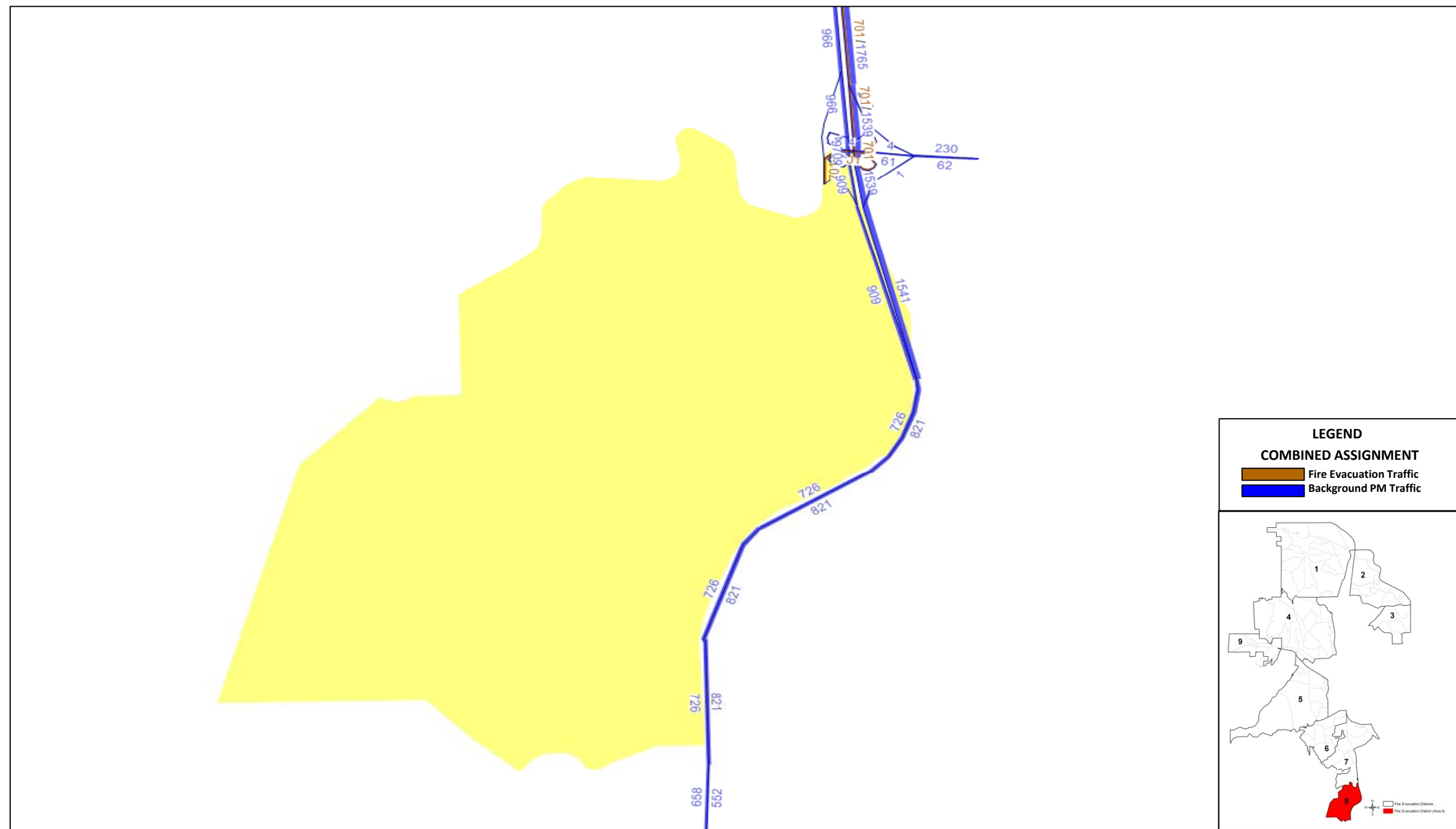
There is one portal for egress into the mountain: NORAD Road.

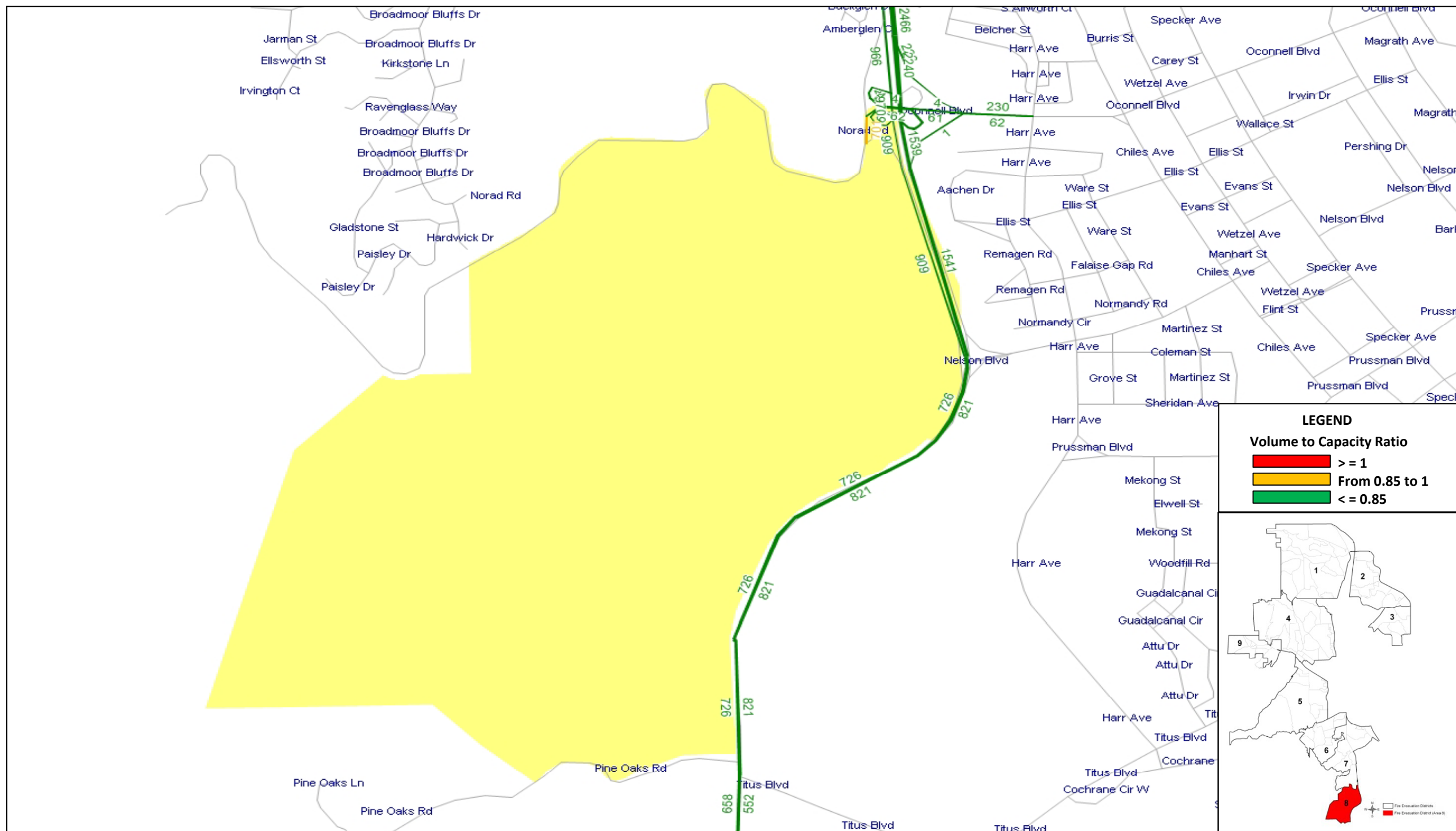
The NORAD / O'Connell interchange is the key location for evacuation of personnel from District 8. Academy Boulevard will be an important conduit as well.



PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
 DISTRICT 8
 EVACUATION TRAFFIC ANNOTATED WITH
 VOLUME TO CAPACITY RATIO (V/C) COLOR CODED

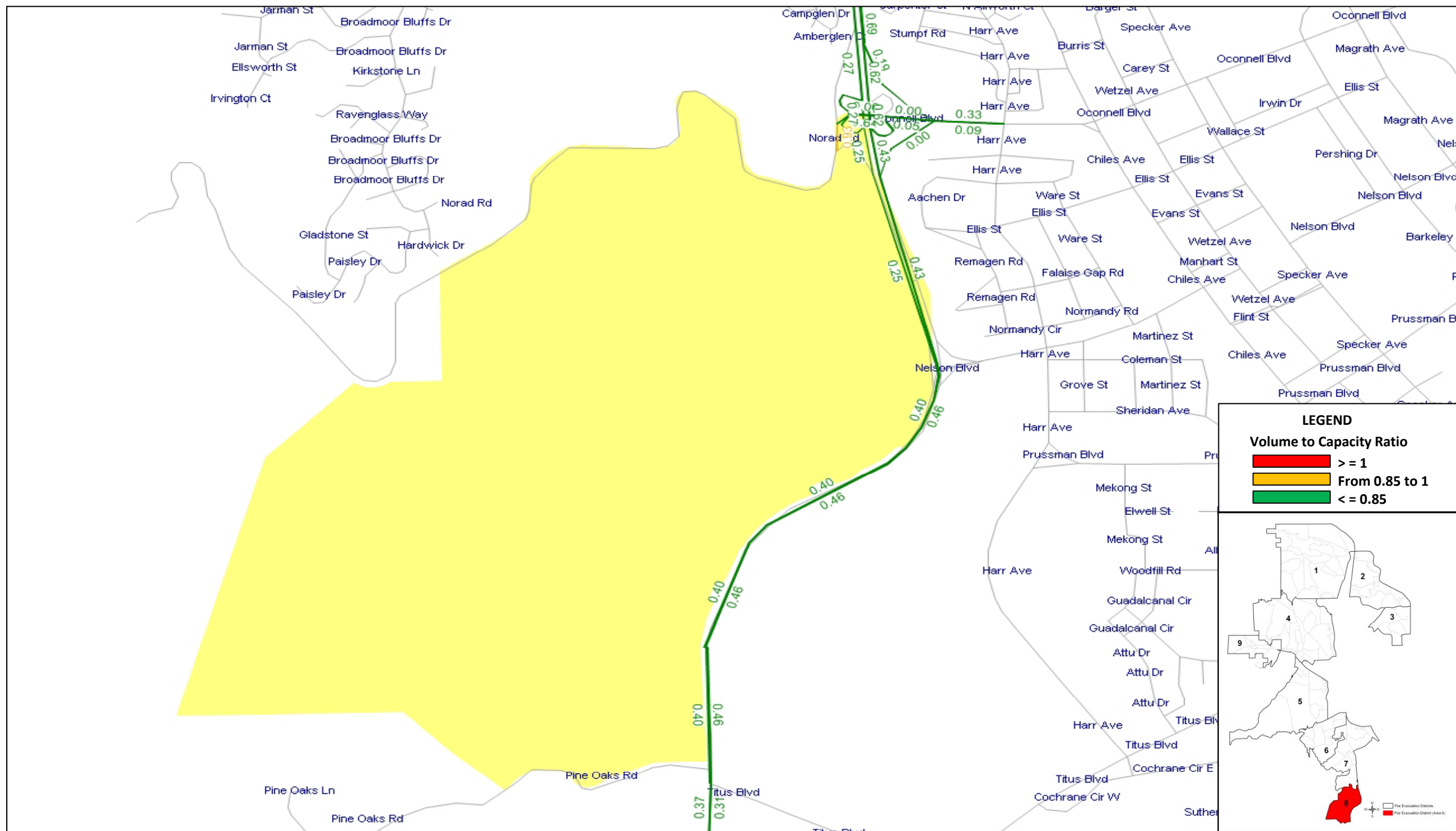






PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 8
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





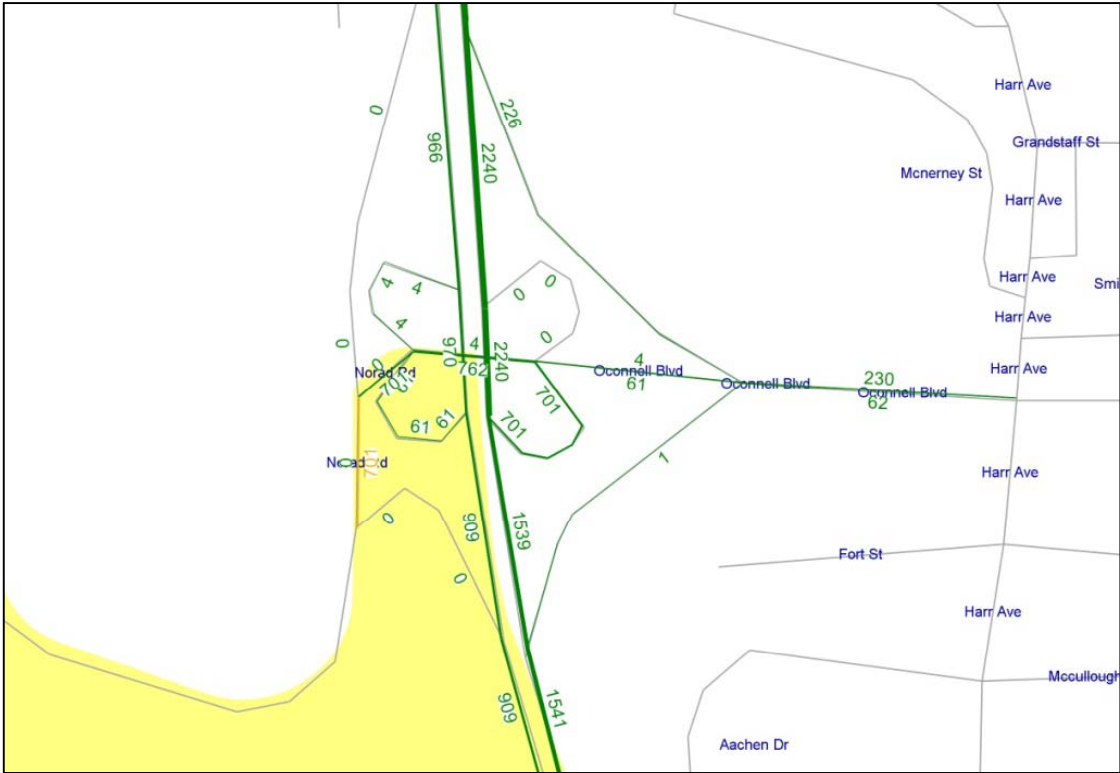
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 8
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



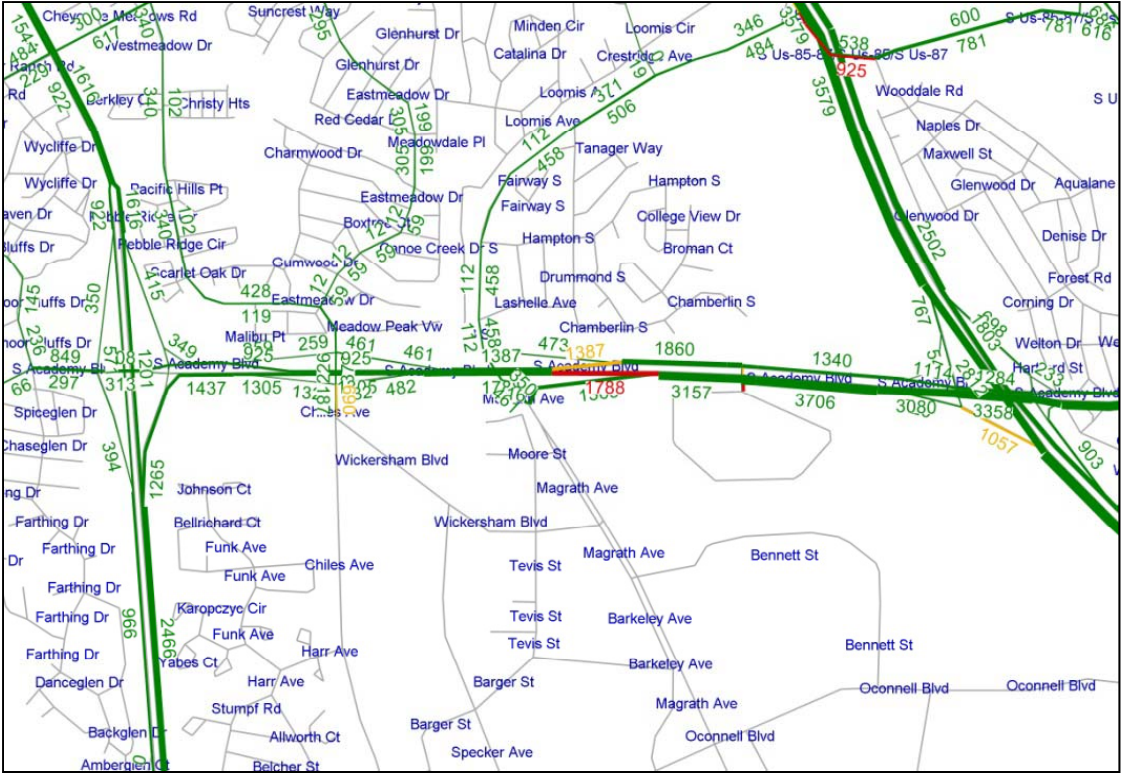
Close-up of Key Exit Portals from District 8

V/C Ratio of Combined Evacuation and Background Traffic

O’Connell Boulevard at SH-115



Academy Boulevard at SH-115



LEGEND
Volume Capacity (V/C) Ratio

<div></div>	> = 1
<div></div>	> .85 and < 1
<div></div>	< = .85

Findings for District 8

Evacuation Traffic (Page 8-2)

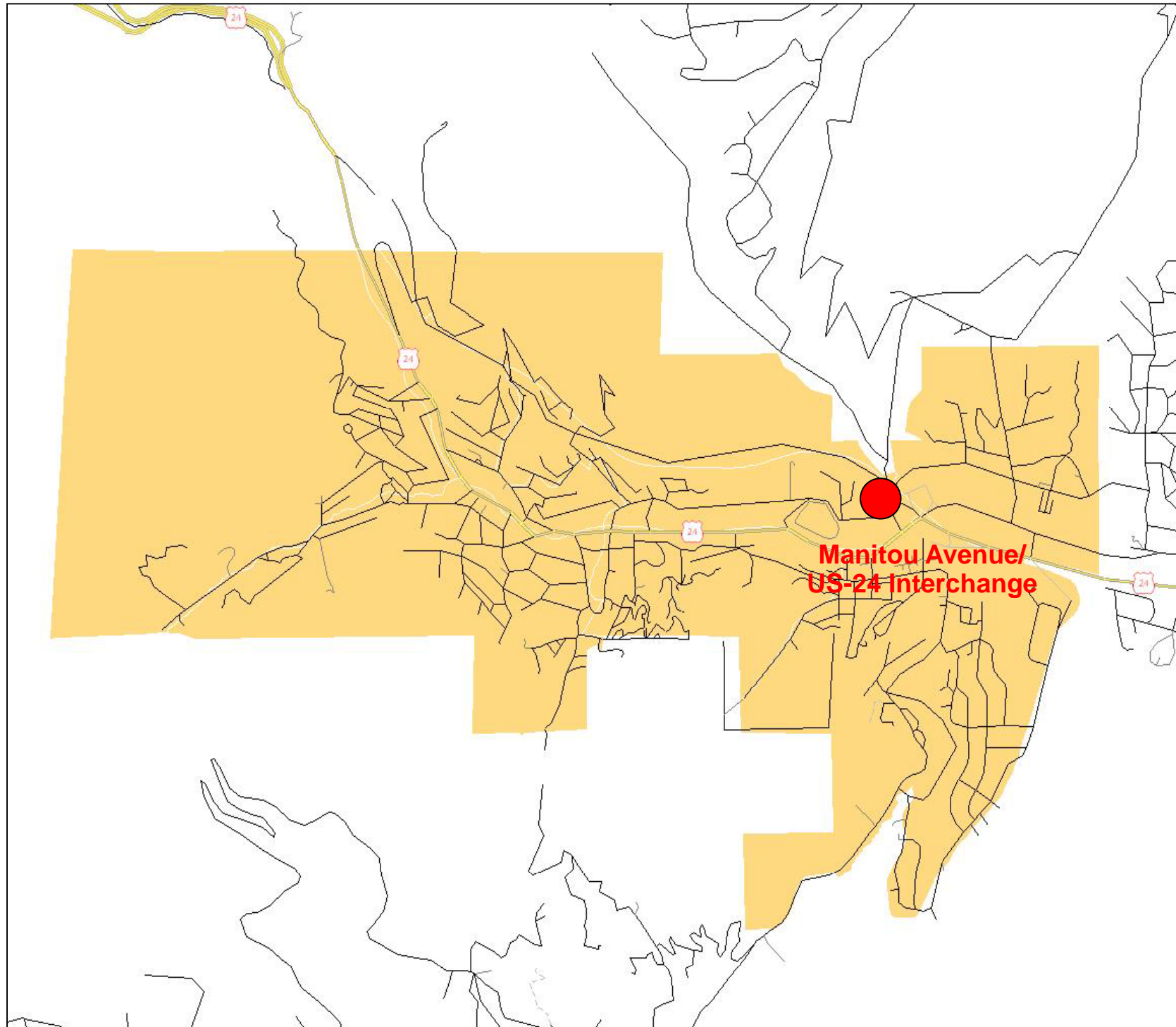
There is one portal for egress from District 8. It is the O'Connell Boulevard interchange with SH 115. The access road to the on-ramp become congested under evacuation conditions.

Evacuation + Background Traffic (Pages 8-4 and 8-5)

Regional background traffic competing with fire evacuation from District 8 consists mainly of travel in and out of Fort Carson. The PPACG travel model loads the PM home to work and work to home trips (civilian and military) through each of the gates using observed data. S. Academy Boulevard becomes congested in spots, as does the southbound on ramp from Academy to I-25.

The I-25 mainlines in the southern part of the region remain operational (V/C of under .85) while carrying both evacuation and PM background traffic.

Inventory of District 9



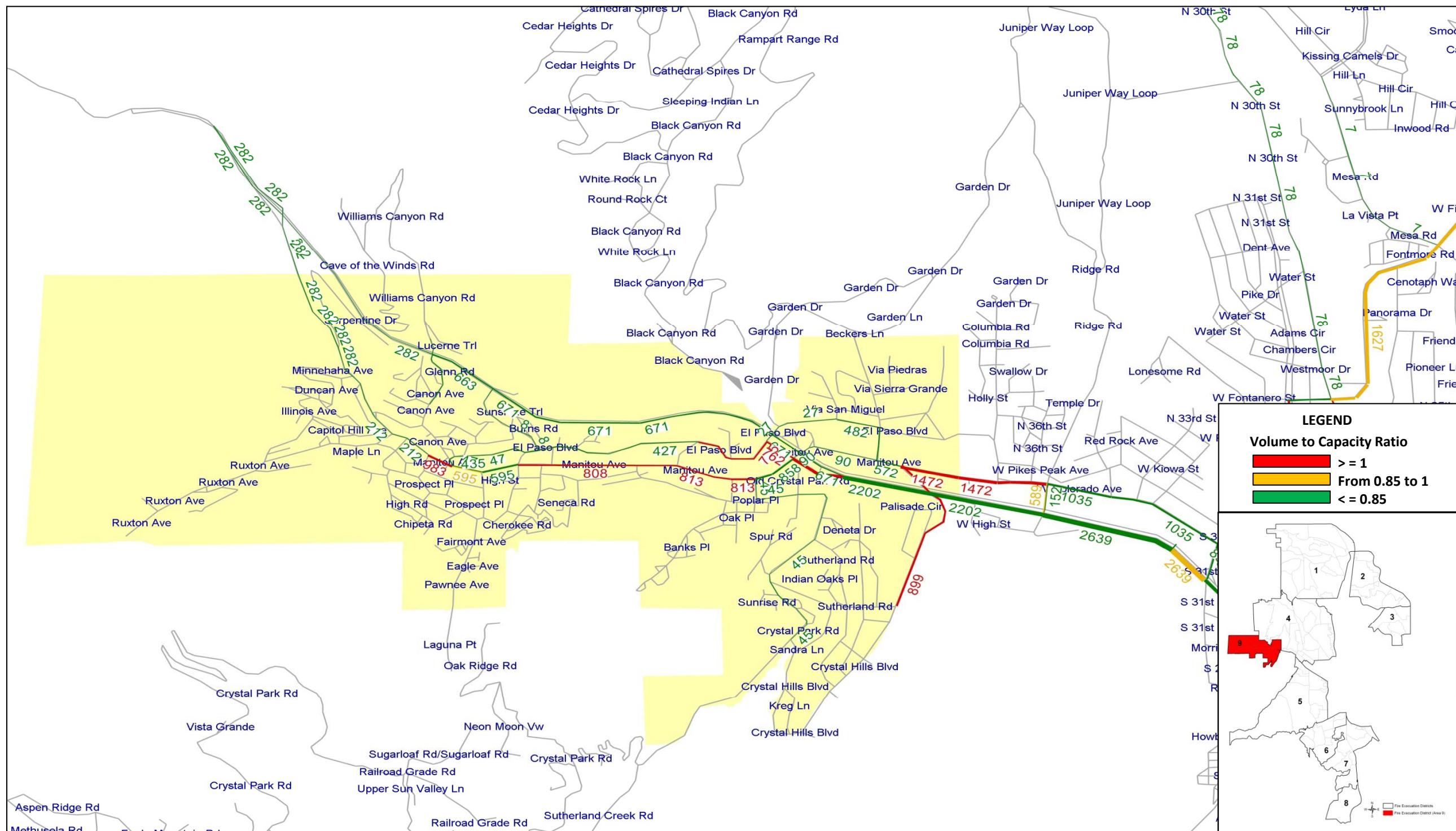
District 9, Manitou Springs, is bounded by Pikes National Forrest on the north and west, Bear Creek Canyon Park on the south and Crystal Hills Boulevard and 31st Street on the east.

The estimated number of households is 2600. The neighborhood has a high school located right at the center.

Manitou Springs extends longitudinally along US 24/Ute Pass; The City is about 3 miles wide (east-west), and extends north-south about 1 mile. Most of the households within Manitou Springs are located on the south of US 24.

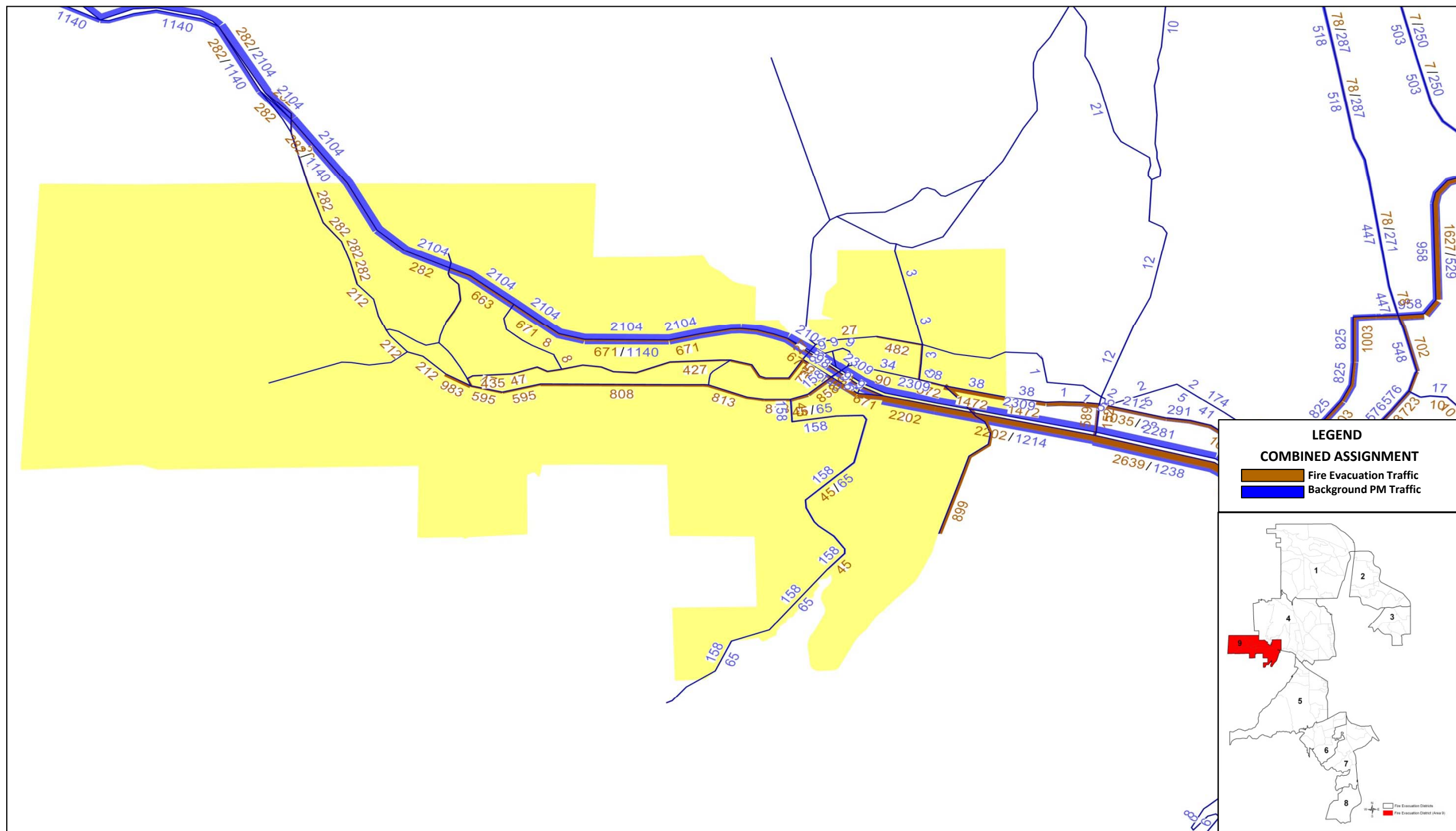
Manitou Avenue/US 24 is the key egress portal for Manitou Springs.

Manitou Avenue provides direct connection to US 24 and plays a key role in emergency egress from Manitou Springs.



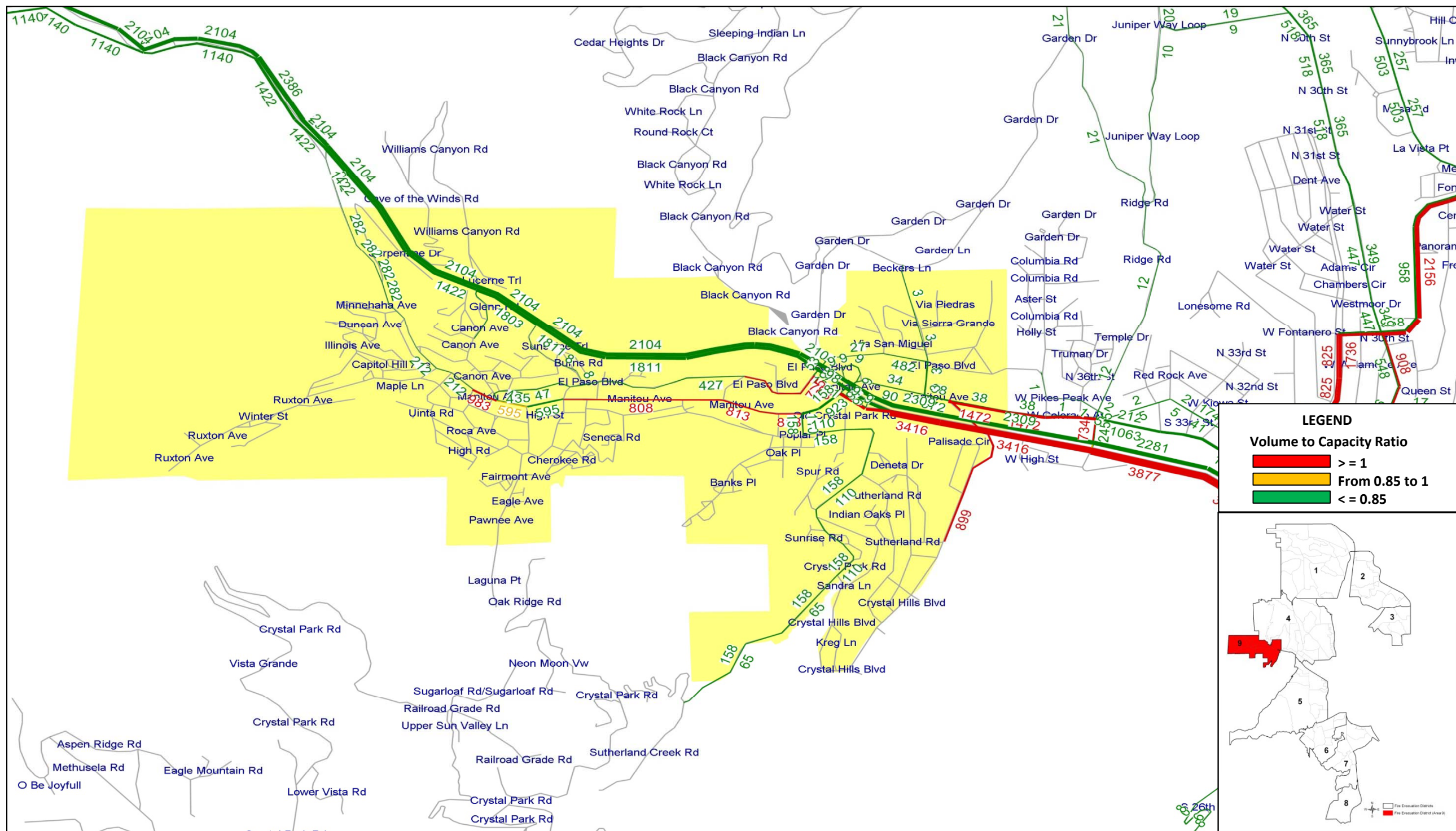
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 9
EVACUATION TRAFFIC ANNOTATED WITH
VOLUME TO CAPACITY RATIO (V/C) COLOR CODED





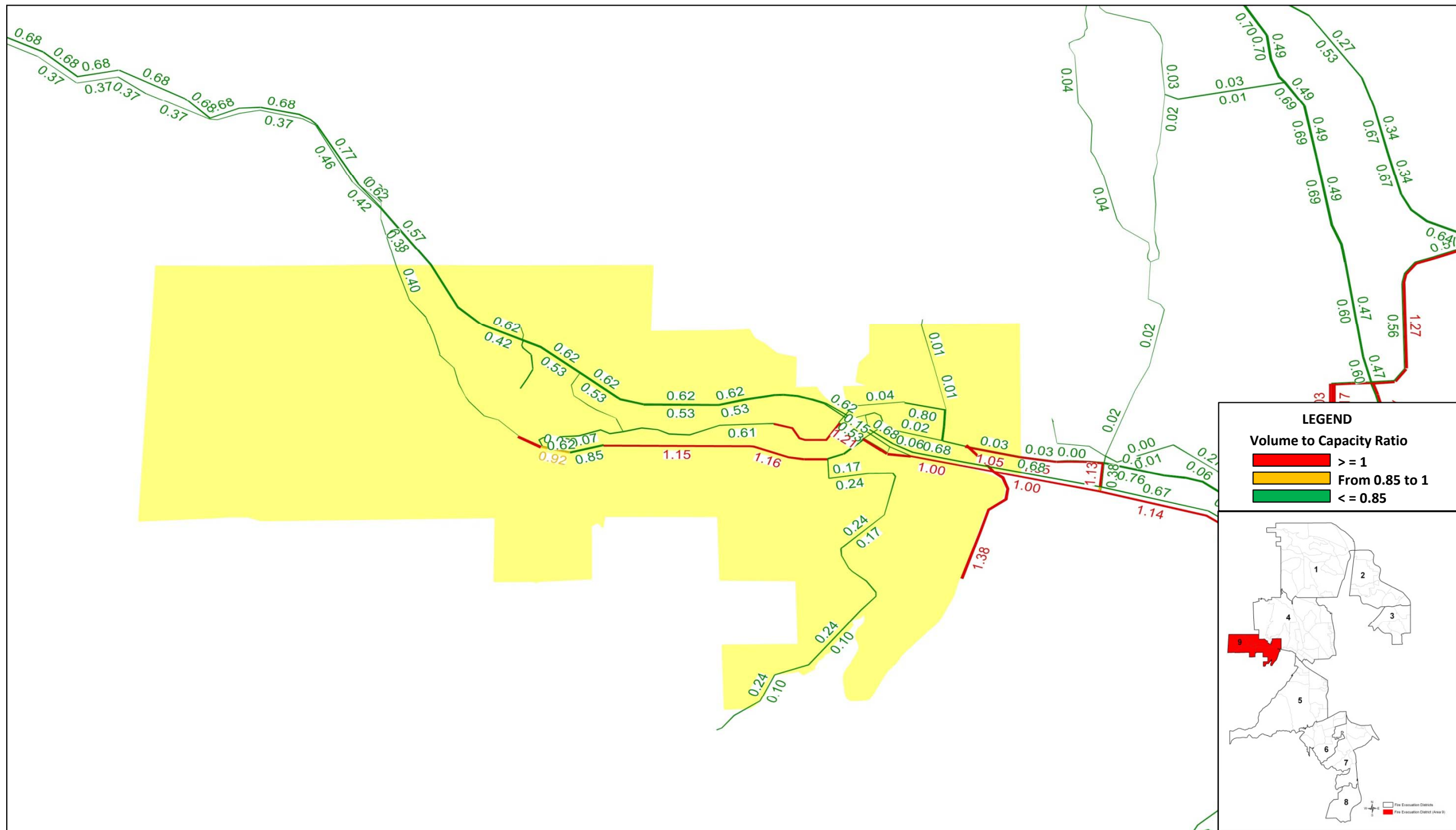
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 9
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
AND BANDWIDTHS





PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 9
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
V/C RATIO COLOR CODED





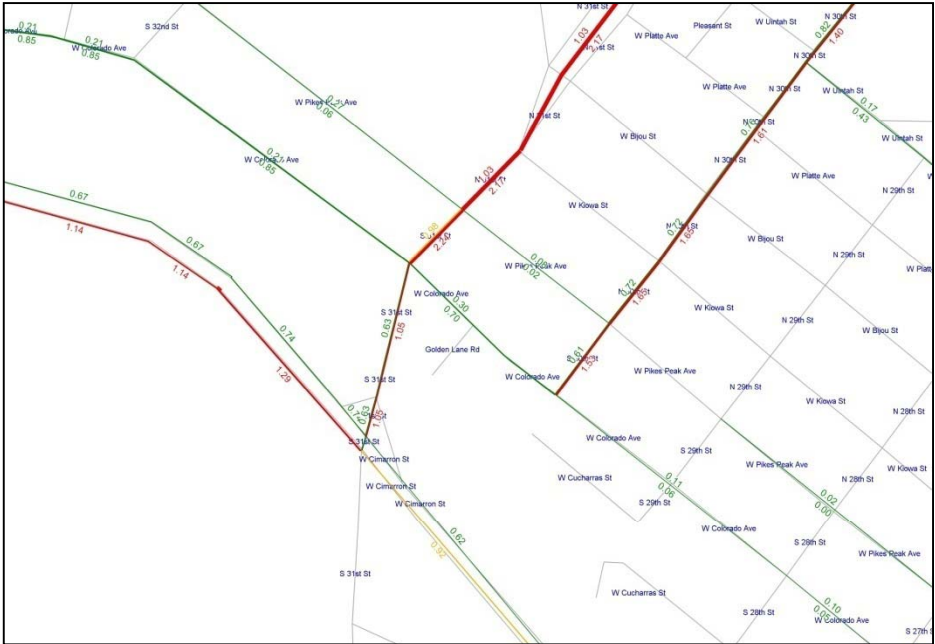
PPACG FIRE EVACUATION MODEL – STUDY YEAR 2010
DISTRICT 9
EVACUATION AND BACKGROUND TRAFFIC (HOURLY PM)
WITH V/C RATIO ANNOTATED



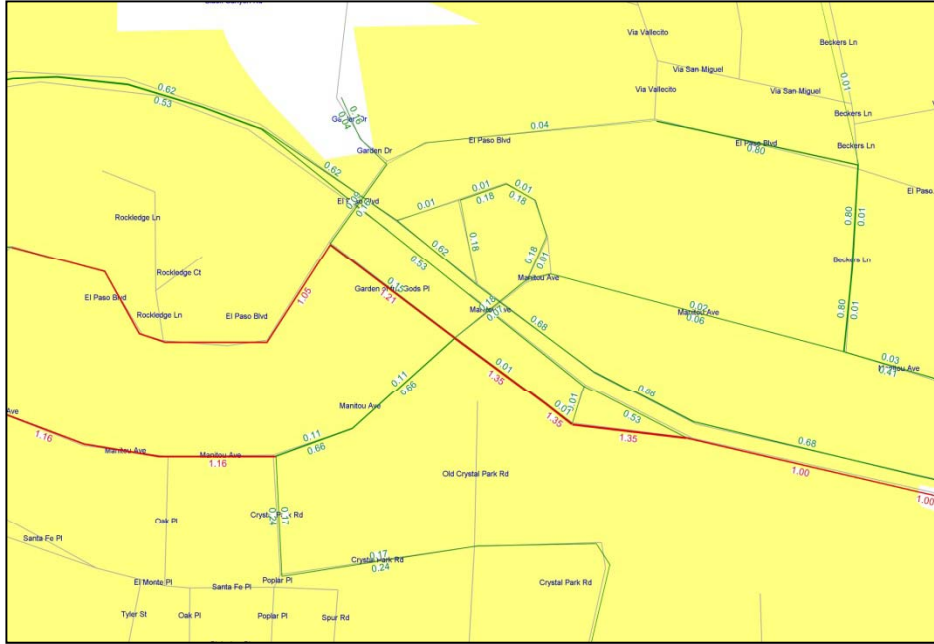
Close-up of Key Exit Portals from District 9

V/C Ratio of Combined Evacuation and Background Traffic

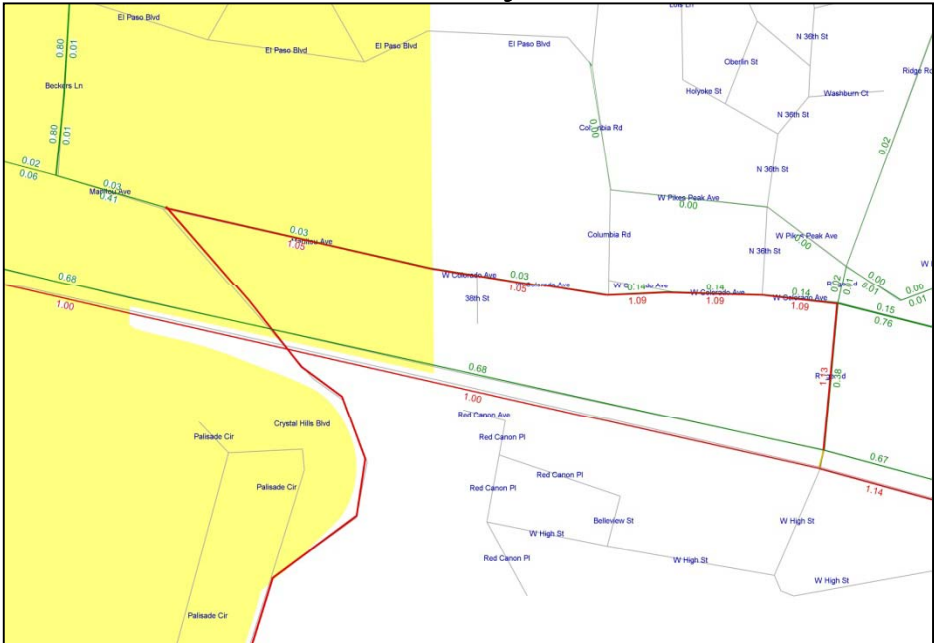
31st Street at US-24



Manitou Avenue El Paso Blvd at US-24

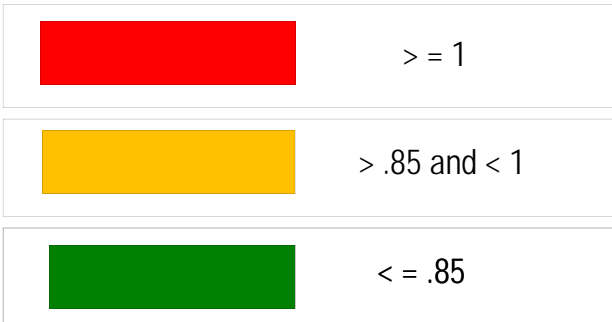


Manitou Avenue at Crystal Hills Blvd



LEGEND

Volume Capacity (V/C) Ratio



Findings for District 9

Evacuation Traffic

The majority of the traffic evacuating Manitou Springs takes US-24 east via Manitou Avenue, some vehicles travel south on Crystal Hills Boulevard and north to US 24 along Canon Avenue.

Manitou Avenue is the key egress portal, carrying the highest level of evacuation traffic. The Manitou Avenue on-ramp at US-24 will operate at a V/C ratio greater than 1.0 with evacuation traffic alone, and can be expected to experience congestion during emergency evacuation.

Internal to Manitou Springs, some parts of Crystal Hills Boulevard, Canon Avenue and Manitou Avenue can be expected to become congested just carrying evacuation traffic.

Evacuation + Background Traffic

The model shows that the majority of the background peak hour commuter traffic on US-24 is north/westbound. The peak hour has less background traffic in south/eastbound direction, which would compete with the emergency evacuation traffic leaving Manitou Springs.

The US-24 south/eastbound and the Manitou Avenue on-ramp experience congestion with the combined evacuation and background commuter traffic. This results in decreased Levels of Service.

With background and evacuating traffic combined, Crystal Hills Boulevard and some parts of Manitou and Canon Avenues become congested, and operate at degraded Levels of Service with V/C ratios of greater than 1.0. Colorado Avenue offers available capacity for rerouting evacuation traffic in lieu of implementing contra-flow options for emergency evacuation.

HDR engineering

www.hdrinc.com

Colorado Springs

2060 Briargate Parkway, Suite 120
Colorado Springs, CO 80920-1045
p. 719.272.8800
f. 719.272.8801

Denver

303 East 17th Avenue, Suite 700
Denver , CO 80203-1256
p. 303.764.1520
f. 303.860.7139

Fort Collins

419 Canyon Boulevard, Suite 316
Fort Collins, CO 80521
p. 970.419.4388
f. 970.419.4389

Wilbur Smith Associates

www.wilbursmith.com

6709 Centurion Drive, Suite 220
Lansing, MI 48917
p. 517.323.0500

