

Traffic Feasibility Study Avon Park North Master Plan

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Avon, Connecticut

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146 Hartford Road
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1 Introduction

Fuss & O'Neill has conducted a Traffic Feasibility Study to review the potential traffic impact to State highways and local roads from the proposed full build out of the Avon Park North Mixed Use Development site, shown in the attached *Figure 1*. The analysis and assumptions included in this study were based on the "Avon, CT Master Plan" prepared by The Carpionato Group and dated June 16, 2015. Based on the findings of this feasibility review, Fuss & O'Neill has recommended a number of off-site and internal site roadway improvements to mitigate the impacts of the proposed development build-out and provide for safe and efficient movement of vehicular, pedestrian, and bicycle traffic in the future. This report has been prepared to document our findings.

2 Existing Condition

2.1 Existing Roadway Network and Site Access

Primary access to Avon Park North is provided by U.S. Route 44 which runs east/west along the south side of the site, and State Route 10, which runs north/south to the east of the site.

Route 44 generally provides two lanes of travel in each direction in the vicinity of the site, but widens to provide additional turn lanes at the signalized intersections. Route 44 provides regional access to Avon Park North from the Towns of Canton and New Hartford to the west and the greater Hartford area to the east. The posted speed limit on Route 44 adjacent to the site is 35 miles per hour.

Route 10 generally provides one lane of travel in each direction but widens to provide additional turn lanes at key signalized intersections. Route 10 provides access from the Towns of Simsbury and Granby to the north and the Towns of Farmington and Plainville to the south. The posted speed limit on Route 10 in the vicinity of Fisher Drive is 40 miles per hour in the northbound direction and 35 miles per hour in the southbound direction.

The internal roadway network of Avon Park North is comprised of the following collector roadways:

- Ensign Drive
- Fisher Drive
- Bickford Drive
- Climax Road

Each roadway provides one travel lane in each direction and has a posted speed limit of 30 miles per hour.

Ensign Drive is aligned in a generally north/south direction through the Avon Park North site and provides primary access to the site and the various Town offices from Route 44. Ensign Drive begins on Route 44 at the southern boundary of the site at a signalized intersection. Ensign Drive then winds

its way to the northern portion of the site and terminates on Fisher Drive at a three-way unsignalized intersection.

Fisher Drive is oriented in an east/west direction in the northern portion of the site and provides the primary access to Avon Park North from Route 10. Fisher Drive begins at a signalized intersection with Route 10 to the east and terminates at a cul-de-sac within Avon Park North to the west.

Climax Road runs in a north-south direction along the westerly portion of the Avon Park North site. Climax Road begins at a three-way signalized intersection on Route 44 to the south and continues northerly into adjacent residential areas to the north of Avon Park North.

Bickford Drive runs in an east-west direction through the center of the Avon Park North site, terminating on Ensign Drive to the east at an unsignalized intersection. To the west, Bickford Drive intersects with Climax Road at a two-way stop controlled intersection. West of this intersection, Bickford Drive provides access to the Forest Mews adult housing complex and an assisted living facility.

Avon Park North also has bicycle and transit accessibility within walking distance. The Farmington Canal Greenway, an extensive multi-use trail network that runs from Suffield to Farmington, travels through the Avon Park North Site. The trail passes over Route 10/202 at the Fisher Drive intersection via an exclusive crossing phase at the signal, travels along Fisher Drive and Ensign Drive before passing under Route 44/202 near the Darling Drive intersection. Express transit service from Avon to Hartford is provided by the Route 1 line of the CT Transit Hartford Express Bus Service. The service runs on weekdays and stops in the travel lane of Route 44/202 on the corner of the western leg of the Route 44/10/202 at Route 10/202 and Old Farms Road intersection.

2.2 Existing Traffic Conditions and Field Observations

A field visit was conducted to the Avon Park North site and the adjacent roadway network to observe traffic operations and determine any existing operational deficiencies. Considerable queuing was observed during both the morning and afternoon peak hours at the intersection of Route 44/202 (East/West Main Street) at Route 10/202 (Simsbury Road) and Old Farms Road. The most significant queuing occurred along the Route 44 eastbound and westbound approaches in the morning and afternoon peak hours with maximum queues extending 30-40 vehicle lengths from the signal. Vehicle queues were observed to extend back to the intersection of Ensign Drive on the Route 44 eastbound approach in the morning peak hour. Significant queuing was also observed on the Route 10 southbound approach, with vehicles extending back to the intersection of Route 10 and Fisher Drive. The Old Farms Road northbound approach to the intersection had less significant queues of 15-20 vehicles. Despite the lengthy queues, vehicles along the eastbound, westbound and northbound approaches cleared when the signal phase turned green and few vehicles were delayed additional cycle lengths. Vehicles in the southbound queue were delayed many cycles. At the Route 10/202 and Fisher Drive intersection, maximum queues of 15-20 vehicles were observed on the northbound and southbound approach in the morning and afternoon peak hours, with minimal queuing on the eastbound and westbound approaches.

Minimal queuing was found at the Route 44 at Ensign Drive and Route 44 at Climax Road intersections. Vehicles traveling eastbound on Route 44 were occasionally impeded by vehicles waiting to turn left into Ensign Road. No queuing was identified along Bickford Drive, Ensign Drive or Fisher Drive within Avon Park North site.

Some pedestrian activity was observed within the Avon Park North development and crossing the Route 10 at Fisher Road intersection. There was minimal pedestrian activity observed during the morning and afternoon peak periods along Route 44.

2.3 Traffic Volumes and Counts

This study utilized existing available traffic count data for the adjacent roadway network from the previous Avon Park North Traffic Feasibility Study conducted by Fuss & O'Neill in October 2011 and the Hillstead Adult Housing Traffic Impact Study, (located in Avon Park South) conducted by Fuss & O'Neill in July 2008.

A review of weekday twenty-four hour daily Fuss & O'Neill and the Connecticut Department of Transportation (CTDOT) traffic volumes on Route 10 in the vicinity of Avon Park North site revealed that daily traffic in the area has decreased over the past 10 years. Therefore, the traffic data from the previous studies were conservatively assumed to be the 2015 existing traffic volumes for the adjacent roadway network. The count data indicates that the weekday morning peak hour of traffic on the adjacent roadway network is approximately 7:30 AM to 8:30 AM while the weekday afternoon peak hour of traffic is approximately 5:00 PM to 6:00 PM. These peak hours were subsequently analyzed for impacts. The 2015 existing traffic volumes for the morning and afternoon peak hours for the adjacent roadway network are shown in Figure 2.

3 Future Traffic Conditions

3.1 Build Year and Growth Rate

The full build out of the Avon Park North Master Plan is assumed to be completed and occupied in 2020. The 2015 existing traffic volumes were projected to the 2020 build year using an ambient growth rate of 6.25% peak hour growth factor to account for normal traffic growth in the study area. The projected 2020 Background traffic volumes are shown in Figure 3 attached.

3.2 Other Developments

Fuss & O'Neill contacted the CT DOT Planning Department regarding the projected 2020 volumes and how they related to other planned or approved developments having site related traffic in the study area. It was determined that the projected Background volumes are large enough to absorb the volumes from proposed developments in the area. Therefore, no other developments need to be included in the Background volumes.

3.3 Trip Generation

The proposed site is located to the northwest of the intersection of Route 44 and Route 10/202. Several internal roadway revisions are planned, including creating a landscaped boulevard connecting Climax Road and Fisher Drive. The project involves significant development along the new boulevard, Ensign Drive, Bickford Drive, Climax Road, and Fisher Drive including residential, retail and office land uses. For the purposes of this study and based on the current Master Plan, we have assumed that the project will have a maximum build out of 1,149,396 square feet of development broken down into the following land uses:

- Apartments – 300 units (468,760 square feet)
- General Office – 67,750 square feet
- Retail – 592,820 square feet
- Cultural/Arts – 20,066 square feet

The expected site generated traffic volumes for this development plan were calculated using empirical data from the Institute of Transportation Engineers (ITE) publication Trip Generation, 9th edition, 2012. Trip generation was calculated using the ITE land use code 220 “Apartment”, code 710 “General Office Building”, code 820 “Shopping Center”, and code 826 “Specialty Retail Center.” It is important to note that the residential trip generation, particularly in the morning peak hour, will likely be lower than the rates used in this report as residential units will be targeted to attract young single adults and retired active adults which typically generate less traffic than general residential developments.

Calculating the trip generation using the ITE rates, the proposed Avon Park North development is expected to generate approximately 637 trips (373 entering, 264 exiting) in the morning peak hour and approximately 1,856 trips (887 entering, 969 exiting) in the afternoon peak hour. An 18% morning and 27% afternoon internal capture credit as well as a 20% pass-by credit were applied to the trip generation values to account for diverted trips generated by the existing traffic stream and internal trips traveling between different uses within the proposed development. The internal capture percentages were based on industry accepted methodology published in the recently released National Cooperative Highway Research Program Report 684 titled “Enhancing Internal Trip Capture Estimation for Mixed-Use Developments”. A 20% pass-by credit is the maximum pass-by credit that is typically accepted by the CTDOT Planning Department.

3.4 Trip Distribution

The distribution of traffic entering and exiting the proposed site was applied to the road network based on the existing regional traffic distributions and the layout of the adjacent roadway network. During the peak hours, the following arrival/departure distributions of traffic are anticipated for retail and office traffic:

- 35% to/from Route 44/202 (West Main Street) west of the site
- 30% to/from Route 44/10 (East Main Street) east of the site
- 20% to/from Route 10/202 (Simsbury Road) north of the site
- 15% to/from Old Farms Road south of the site

During the peak hours, the following arrival/departure distributions of traffic are anticipated for residential traffic:

- 45% to/from Route 44/10 (East Main Street) east of the site
- 20% to/from Route 44/202 (West Main Street) west of the site
- 20% to/from Route 10/202 (Simsbury Road) north of the site
- 15% to/from Old Farms Road south of the site

Regional arrival/departure distributions for the new residential, office, retail, and retail pass-by site generated traffic traveling to and from the project site are shown in *Figures 4, 6, 8, and 10*.

The site generated traffic was distributed to the adjacent roadway network based on the distributions described above with the results shown in Figures 5, 7, 9, and 11. The total site generated peak hour volumes are shown in Figure 12. These volumes were then added to the 2020 Background traffic volumes to yield the 2020 Combined peak hour traffic volumes shown in the attached Figure 13.

4 Analyses

4.1 Internal Circulation and Sight Distances

The Avon Park North concept master plan was reviewed for internal traffic operations, circulation and potential sight distance concerns. The proposed site plan offers good connectivity with the surrounding area with driveways connecting to each of the surrounding collector roadways.

Intersection curb radii and parking lot layouts within the site will need to be designed to facilitate truck and emergency vehicle access. Autoturn analysis should be completed as phases of the develop progress to ensure large vehicles can turn at each site intersection without encroachment on the opposing lanes of vehicle travel.

The alignment of several of the internal site roadways, including the new Boulevard, Ensign Drive, Bickford Drive, and Fisher Drive, consists of a series of horizontal curves. This roadway curvature will serve as a natural traffic calming technique and reduce vehicular speeds through the site. The presence of these curves will also need to be considered when determining the final placement of site access driveways for each developable parcel. The drives will need to be placed along each horizontal curve to maximize the sight distance in each direction. In addition, the edge of each roadway in the vicinity of the proposed access drives will need to be devoid of commercial signage, trees, shrubs and other vegetation to ensure proper sight lines. The extent of the clearing required and any necessary grading will need to be determined as part of the design of the driveways to each parcel.

In accordance with criteria set forth in the 2003 CTDOT Highway Design Manual and for a design speed of 35 miles per hour (current design speed on Ensign Drive and Bickford Drive), 390 feet of intersection sight distance is required for a passenger car looking in both directions from a driveway approach to a two lane roadway. This sight distance is measured from a point 15 feet back from the edge of travel-way at a height of 3.5 feet, the standard height of a driver's eye. The curvature of the internal site roadways, the addition of on-street parking and increased development will encourage lower

travel speeds through Avon Park North. The reduction of the posted speed limit along Ensign Drive and Bickford Drive from 30 miles per hour to 25 miles per hour or slower should be considered for vehicular and pedestrian safety. CTDOT sight line requirements for a passenger car are 335 feet for a design speed of 30 miles per hour and 280 feet for a design speed of 25 miles per hour.

4.2 Parking Analysis

On-site parking was reviewed within each of the Avon Center Design Districts (ACDD) to verify that the amount of parking was consistent with national standard rates from the ITE Parking Generation Manual (4th Edition). A summary of the required and available parking for each of the ACDD's is provided in Table 1. In total, the Avon Park North development will provide 3,370 parking spaces, well above the average peak time period parking demand of 3,070 spaces calculated by ITE parking generation rates. All the individual ACDD's provide parking consistent with the land usage within the district except ACDD's 4 and 5. The usage of these two ACDD's is a mix of retail, office, and apartments; therefore, the parking needs for each use are expected to occur at different hours of the day. In addition, given the overall parking surplus of 300 spaces (over the average ITE peak demand) that will exist in Avon Park North, additional overflow parking for these ACDD's should be available within walking distance in nearby ACDD's.

Table 1
Avon Center Design District Parking Summary

Design District	Usage	Size (sq. ft.)	Parking Required (per ITE)	Parking Provided	Difference
1	Park	0	0	0	0
2	Village Green	95,000	466	505	39
3	The Square (Retail)	237,000	1223	1422	199
4	The Brownstones (Retail) (Office)	139,086 7,100	364 44	374	-34
5	Retail Apartments	118,000 87,000	318 46	270	-94
6	Climax Road (Retail) (Apartments)	28,800 63,600	126 43	171	2
7	Apartments	318,160	263	424	161
8	Simsbury Road (Office)	60,650	177	204	27
Totals			3,070	3,370	300

4.3 Capacity Analyses

Capacity analyses for the signalized and unsignalized intersections within the study area were conducted using Synchro Professional Software, version 8.0.

In discussing intersection capacity analyses results, two terms are used to describe the operating condition of the road or intersection; volume to capacity ratio (v/c) and level of service (LOS). LOS is used to describe the operating condition of the road or intersection. LOS is a measure of the delay experienced by stopped vehicles at an intersection. LOS is rated on a scale from A to F, with A describing a condition of very low delay (less than 10 seconds per vehicle), and F describing a condition where delays will exceed 50 seconds per vehicle for unsignalized intersections and 80 seconds per vehicle for signalized intersections. Delay is described as a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Therefore, intersections with longer delay times are less acceptable to most drivers.

The v/c ratio is a ratio of the volume of traffic using an intersection to the total capacity of the intersection (the maximum number of vehicles that can utilize the intersection during an hour). The v/c ratio can be used to describe the percentage of capacity utilized by a single intersection movement, a combination of movements, an entire intersection approach, or the intersection as a whole.

LOS is generally used to describe the operation (based on delay time) of both signalized and unsignalized intersections, while v/c ratio is applied to signalized intersections only. These definitions for v/c ratio and LOS, as well as the methodology for conducting signalized and unsignalized intersection capacity analyses, are taken from the "2000 Highway Capacity Manual" published by the Transportation Research Board.

Using the above referenced methodologies, preliminary morning and afternoon peak hour capacity analyses were conducted at the following study area intersections:

- Route 44/202 (West Main Street) at Climax Drive
- Route 44/202 (West Main Street) at Ensign Drive and Office Park Driveway
- Route 44/10/202 (East/West Main Street) at Route 10/202 (Simsbury Road) and Old Farms Road
- Route 10/202 (Simsbury Road) at Fisher Drive
- The proposed Boulevard at Fisher Drive
- The proposed Boulevard at Ensign Drive and easterly retail driveway
- The proposed Boulevard at the westerly retail site driveways
- The proposed Boulevard at Climax Road

The determination of the traffic impact from the proposed development is made through a comparison of the 2020 Background Conditions LOS (without the proposed development) versus the 2020 Combined Conditions LOS (with the proposed development).

Traffic operations at the signalized intersections within the study area deteriorate as a result of the addition of the site generated traffic from the proposed Avon Park North development. The afternoon peak hour had considerable increases in delay with all four signalized intersections along Route 44/10/202 and Route 10/202 operating at LOS D or worse. Morning peak hour traffic operated at acceptable levels with the exception of the Route 44/202 at Route 10/202 and Old Farms Road intersection and the Route 10/202 at Fisher Drive intersection with operations of LOS F and LOS E respectively.

The configuration of the existing roadways and unsignalized intersections within Avon Park North will change considerably in the combined condition. New intersections will be formed along the proposed Boulevard at Climax Road, the westerly retail site driveways, Bickford Road/easterly retail site driveways and Fisher Drive. Based on projected traffic volumes, the following forms of traffic control are recommended at each internal site intersection:

- Boulevard at Climax Road and Site Driveway – All-Way Stop Control with a dedicated northbound left turn lane on the Boulevard and a dedicated southeastbound right turn lane on Climax Road.
- Boulevard at westerly retail site driveways – Two-way Stop Control (stop control on the side street approaches)
- Boulevard at Ensign Drive and easterly retail site driveway – Roundabout traffic control
- Boulevard at Fisher Drive – Stop Control on Fisher Drive only

Capacity analysis indicates that all approaches to each of the above reconfigured/unsignalized intersections within Avon Park North will operate efficiently at LOS C or better in the Combined Conditions.

A summary of the 2020 design year Background and Combined condition LOS at each study area intersection is provided in Tables 2 and 3 below.

Table 2
Signalized Intersection Level of Service Summary

Intersection	Weekday AM Peak		Weekday PM Peak	
	2020 Background	2020 Combined	2020 Background	2020 Combined
Route 44/202 at Climax Road	0.58/A	0.68/B	0.74/B	1.00/D
Route 44/202 at Ensign Drive	0.72/A	0.84/B	0.71/B	1.28/E
Route 44/10/202 at Route 10/202 and Old Farms Road	1.04/F	1.18/F	1.26/F	1.41/F
Route 10/202 at Fisher Drive	0.99/C	0.99/E	0.94/D	1.35/F

Table 3
Unsignalized Intersection Level of Service Summary

Intersection		Weekday AM Peak		Weekday PM Peak	
		2020 Background	2020 Combined	2020 Background	2020 Combined
Boulevard at Fisher Drive (side street stop)	Northeastbound Left	N/A	A	N/A	A
	Southeastbound	N/A	B	N/A	C
Boulevard at Ensign Drive/Easterly Retail Drive (roundabout)	Eastbound	N/A	A	N/A	A
	Westbound	N/A	A	N/A	B
	Northbound	N/A	A	N/A	A
	Southbound	N/A	A	N/A	B
Boulevard at Westerly Retail Drives (side street stop)	Eastbound Left	N/A	A	N/A	A
	Westbound Left	N/A	A	N/A	A
	Northbound	N/A	B	N/A	B
	Southbound	N/A	A	N/A	B
Boulevard at Climax Road (all-way stop)	Eastbound	N/A	A	N/A	A
	Westbound	N/A	A	N/A	B
	Northbound	N/A	A	N/A	B
	Southbound	N/A	A	N/A	C

4.4 Queue Analyses

Queue analysis revealed that 95th percentile queue length increases between the Background and Combined Conditions for both peak periods were significant in some locations due to the traffic generated by the proposed development. In the morning peak hour, the eastbound approach to the Route 44/202 at Ensign Drive intersection experiences a ten car length (assuming approximately 25 feet per car length) increase in queue length. In the afternoon peak hour, the Route 44/202 at Climax Road intersection eastbound and southbound approaches experienced queue length increases of four to six car lengths. Also in the afternoon peak hour, the Route 44/202 at Ensign Drive southbound approach experienced 14 car length increase. All approaches to the Route 44/10/202 at Route 10/202 and Old Farms Road intersection experienced afternoon peak hour increases of 10-12 car lengths. At the Route 10/202 intersection with Fisher Drive, the eastbound and southbound afternoon peak hour queues increased 11-14 car lengths. In many of these cases, the approaches provided sufficient storage to accommodate the increased queues. No additional driveways will be temporarily blocked by the increased queues when compared to the Background conditions.

Although a number of the queues did not significantly increase at intersection approaches within the study area due to the addition of the site generated traffic, many Background queue lengths were already significant enough to cause potential traffic operations and safety issues. Queue lengths from the Route 44/10/202 at Route 10/202 and Old Farms Road intersection in the eastbound and southbound

direction have the potential to impact driveways and intersections along Route 44/10/202 and Route 10/202. The site access at Ensign Drive on Route 44/202 would be occasionally blocked during the peak hours due to queuing from the Route 44/10/202 at Route 10/202 and Old Farms Road intersection. As observed during the field review, southbound queues from the Route 44/10/202 at Route 10/202 and Old Farms Road intersection also have the potential to block the Fisher Drive site access.

Recommendations to alleviate the traffic operation impacts of the traffic generated from the Avon Park North development are outlined in the Conclusions and Recommendations Section below, including the construction of additional turning lanes on Route 44/202 at the intersection with Ensign Drive as well as on Route 10/202 at the intersection with Fisher Drive. These turning lanes help to move queues out of the mainline flow of traffic, and distribute them over a greater number of storage lanes.

4.5 Traffic Signal Warrant Analysis

Capacity analysis indicates that traffic operations at each of the new unsignalized intersections within the Avon Park North site will operate efficiently with either stop or roundabout intersection control as discussed above in Section 4.3. Based on projected traffic volumes, none of the proposed intersections within Avon Park North will satisfy MUTCD (Manual on Uniform Traffic Control Devices) volume warrants for traffic signal control in the combined conditions. However, traffic signal warrant analysis should be conducted as future phases of the master plan are designed and permitted to verify that additional traffic control will not be required.

5 Recommendations

The capacity analysis indicated that portions of the study roadway network will experience reductions in traffic operations due to the site generated traffic, primarily during the afternoon peak hour. Based on this preliminary analysis, the following traffic signal improvements and roadway improvements will likely be required to reduce the impact of the full build out of the Avon Park North development on traffic operations in the study area:

- At the Route 44/202 at Ensign Drive intersection, install an eastbound left turn lane on Route 44 and an additional southbound left turn lane on Ensign Drive. The eastbound left turn lane will require a five lane section from approximately 150 feet west of Ensign Drive easterly to Woodford Drive. This will extend the five lane section that already exists from Woodford Drive east to the Route 10/202 intersection. With the appropriate lane taper, the total length of the road widening will be approximately 800 feet, with 400 feet both west and east of Ensign Drive. The widening will allow for the following geometric roadway improvements, shown in Concept Improvement Plan CON-1:
 - Installation of a 150 foot eastbound left turn lane. Provision of this turn lane will require a minimum of 10 feet of road widening on the north side of Route 44 west of Ensign Drive.
 - Installation of a 140 foot westbound left turn lane. The turn lane will require a minimum of 12 feet of roadway widening to the north of Route 44/202.

- Installation of an additional 175 foot southbound left turn lane at the Route 44/202 at Ensign Drive intersection. Signal phasing revisions to provide northbound-southbound split phasing will be required for the double left turns southbound. A minimum of 5.5 feet of widening along the turn bay and a minimum of 10 feet of widening for the one lane to three lane transition to the north of the turn bay, both on the west side of Ensign Drive, will be required for this improvement.
 - Although not a direct improvement required for the development, the new five lane section will allow for two additional left turn lanes one into Woodford Avenue (140 feet) and one for 21 West Main Street (30 feet). The installation of these turn lanes is recommended, as Woodford Avenue has an internal connection to the Avon Park North site and the additional turn lanes will benefit overall traffic operations and safety on the State roadway. No additional roadway widening is required for these improvements.
 - A majority of the widening required by these improvements will occur on Avon Park North and Town of Avon property, which should limit the property acquisition and easement costs. Roadway grading and utility relocations will be required to complete these improvements.
- Construct a 450 foot eastbound right turn lane and 150 foot southbound right turn lane at the intersection of Route 10/202 at Fisher Drive (See Concept Improvement Plan, CON-2). Widening is suggested on the south side of Fisher Drive and the west side of Route 10/202 as the widening can occur completely in the right of way and Avon Park North property. The improvement will require shifting the Farmington Canal Greenway for 530 feet along the south side of Fisher Drive to match the widened edge of the roadway. The eastbound right turn lane will require a minimum of 6.5 feet of roadway widening on the south side of Fisher Drive and the southbound right turn lane will require a minimum of 4.5 feet of roadway widening on the west side of Route 10/202.
 - Optimize signal timings (phase splits and coordination offsets) at the intersections of Route 44/10/202 at Route 10/202 and Old Farms Road and Route 44/202 at Climax Drive to reduce delays below Background levels.
 - Based on projected traffic volumes, the following forms of traffic control are recommended at each internal site intersection:
 - Boulevard at Climax Road and Site Driveway – All-Way Stop Control with a dedicated northbound left turn lane on the Boulevard and a dedicated southeastbound right turn lane on Climax Road.
 - Boulevard at westerly retail site driveways – Two-way Stop Control (stop control on the side street approaches)
 - Boulevard at Ensign Drive and easterly retail site driveway – Roundabout traffic control
 - Boulevard at Fisher Drive – Stop Control on Fisher Drive only
 - As development phases of the site progresses, conduct traffic signal warrant analysis as part of a full Traffic Impact Study for the unsignalized site intersections to verify the preliminary findings that traffic signalization will not be required.
 - Perform detailed sight distance analysis of all existing and proposed site driveways as part of a full Traffic Impact Study during site plan permitting of each major phase of the project. In

addition, the final location of the internal site driveways should carefully consider the horizontal curvature of the site roadways as well as proposed on street parking, as they could limit intersection sight distances. Commercial signs, trees, shrubs and other vegetation will need to be located a safe distance off the edge of each site roadway in the vicinity of the proposed access drives to ensure proper sight lines.

- Design internal roadways, intersection curb radii and parking lot layouts within the site to facilitate delivery truck and emergency vehicle access. Autoturn analysis should be completed as phases of the develop progress to ensure large vehicles can turn at each site intersection without encroachment on the opposing lanes of vehicle travel.
- Reduce the internal roadway speed limit from 30 miles per hour to 25 miles per hour or slower to encourage slower travel speeds and increase vehicular and pedestrian safety.

It is important to note that the traffic improvements detailed above are those expected to be required following the full build-out of Avon Park North Master Plan, the full development of Avon Center South, and five years of background traffic growth. The Avon Park North development is expected to be submitted for approval and built in smaller phases with portions of the development coming online prior to the full build out year. As such, construction of the recommended improvements will likely not be required during the first few development phases of Avon Park North. Traffic studies should be conducted for each subsequent phase of the development to identify which improvements will be required to accommodate current background and site generated traffic.

A summary of the capacity analysis results for the roadway network with the recommended improvements incorporated is included on the following page in Table 4.

Table 4
Improved Signalized Intersection Level of Service Summary

Intersection	Weekday AM Peak			Weekday PM Peak		
	2020 Background	2020 Combined	2020 Combined (Improved)	2020 Background	2020 Combined	2020 Combined (Improved)
Route 44 at Climax Road/The Boulevard	0.58/A	0.68/B	0.64/B	0.74/B	1.00/D	0.98/D
Route 44 at Ensign Drive	0.72/A	0.84/B	0.68/A	0.71/B	1.28/E	0.94/C
Route 44/10/202 at Route 10/202 and Old Farms Road	1.04/F	1.18/F	1.17/F*	1.26/F	1.41/F	1.45/F*
Route 10/202 at Fisher Drive	0.99/C	0.99/E	0.94/D	0.94/D	1.35/F	0.96/D

* Signal timing optimization lowers delay below existing levels. Failing operation is an existing condition. Further improvement in operations cannot be achieved due to right of way constraints at this intersection.

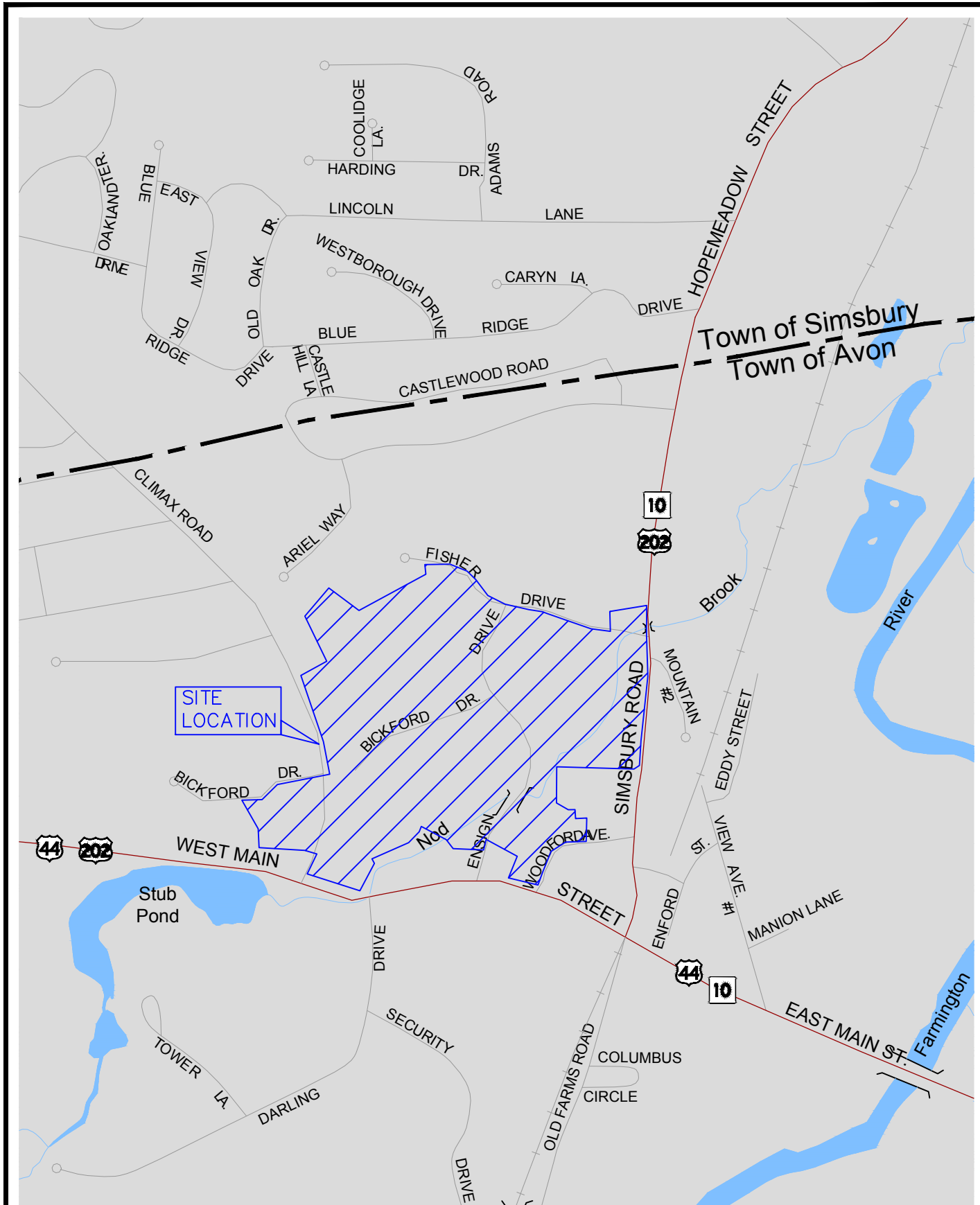
In addition to the proposed roadway and traffic signal improvements, the following Travel Demand Management (TDM) measures should be considered to reduce travel demand to and from the Avon Park North Development, thereby limiting further traffic impact of the proposed development:

- Improve the pedestrian connections with Avon Center South and developments along the east side of Route 10/202 via an internal pedestrian network connecting to the external intersections along Route 44 and Route 10. Route 10/44/202 at Old Farms Road and Route 10/202 at Fisher Drive both provide exclusive signal phasing for pedestrian crossing. Tying pedestrian facilities within Avon Park North to these crossing locations will improve pedestrian access in the area. Sidewalk ramps, crosswalks and pedestrian phasing for crossing Route 44 should be considered at the Route 44/202 at Ensign Drive intersection to improve pedestrian connection to Avon Park South.
- Improved transit access to existing CT Transit lines is recommended. The incorporation of bus pull-offs with bus stop shelters along Route 44 or within the site will promote the use of public transportation and reduce traffic impediment, by removing the existing CT Transit bus stop from the Route 44 travel lanes.
- Additional bike paths and facilities connecting to the Farmington Canal Greenway should be considered to promote bicycle riding within the development and the local area.
- Other TDM strategies such as carpool incentives, vanpool subsidies, telecommuting programs, alternative work schedules and advanced parking management should be encouraged of prospective office tenants to further reduce the traffic demand of the development.

Based on the findings of this preliminary review, it is the opinion of Fuss & O'Neill that traffic from the proposed Avon Park North project of the size currently contemplated can be accommodated safely on the adjacent roadway network upon implementation of the improvements outlined above.

As the planning of this development progresses, a full Traffic Impact Study will be required as part of the OSTA (Office of the State Traffic Administration) Certificate application permitting process to verify and update the preliminary findings of this study. The access alternatives and potential off-site improvements identified herein will need to be closely coordinated with the Town of Avon and CTDOT. Modification and refinement of these plans are possible following a formal review and discussions with CTDOT staff. It is important to note that the majority of the off-site roadway improvements identified in this study impact State roadways and are under CTDOT jurisdiction. As such, CTDOT will ultimately determine which improvements will be required for this project and at which point during the development they should be constructed.

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GRAPHIC SCALE	



FUSS & O'NEILL

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 MANCHESTER, CONNECTICUT 06040
 860.646.2469
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CARPIONATO GROUP, LLC

SITE LOCATION MAP

AVON PARK NORTH MIXED USE DEVELOPMENT

AVON

CONNECTICUT

PROJ. No.: 20140986.A10
 DATE: JULY 2015

FIG. 1

File Path: J:\DWG\IP2014\0986A10\CivilTraffic Figures\20140986A10_TV01.dwg Layout: FIG. 2 EXISTING Plotted: Wed, July 01, 2015 - 10:03 PM User: MATT SKELLY

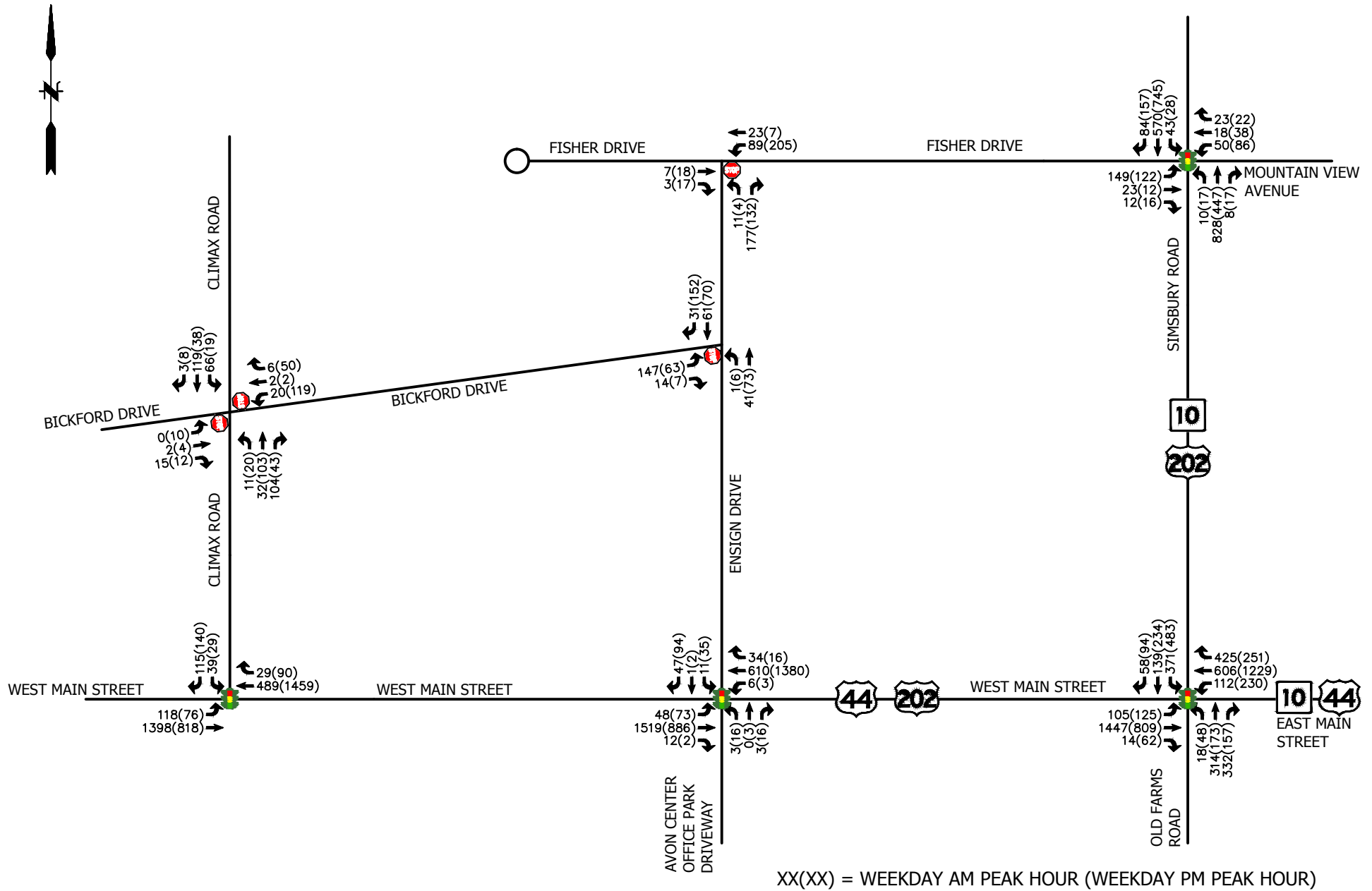


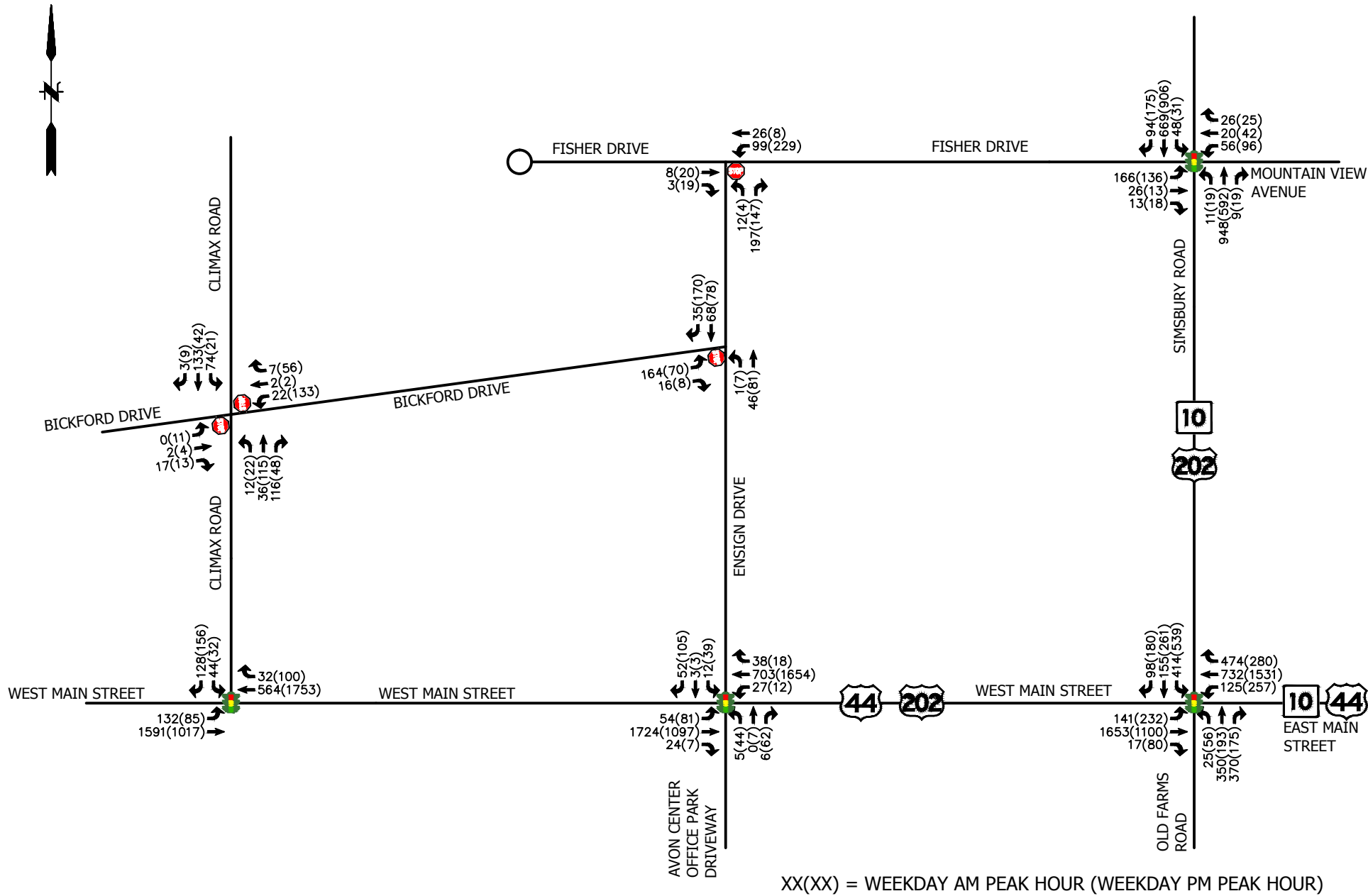
FIGURE 2: EXISTING 2015 VOLUMES

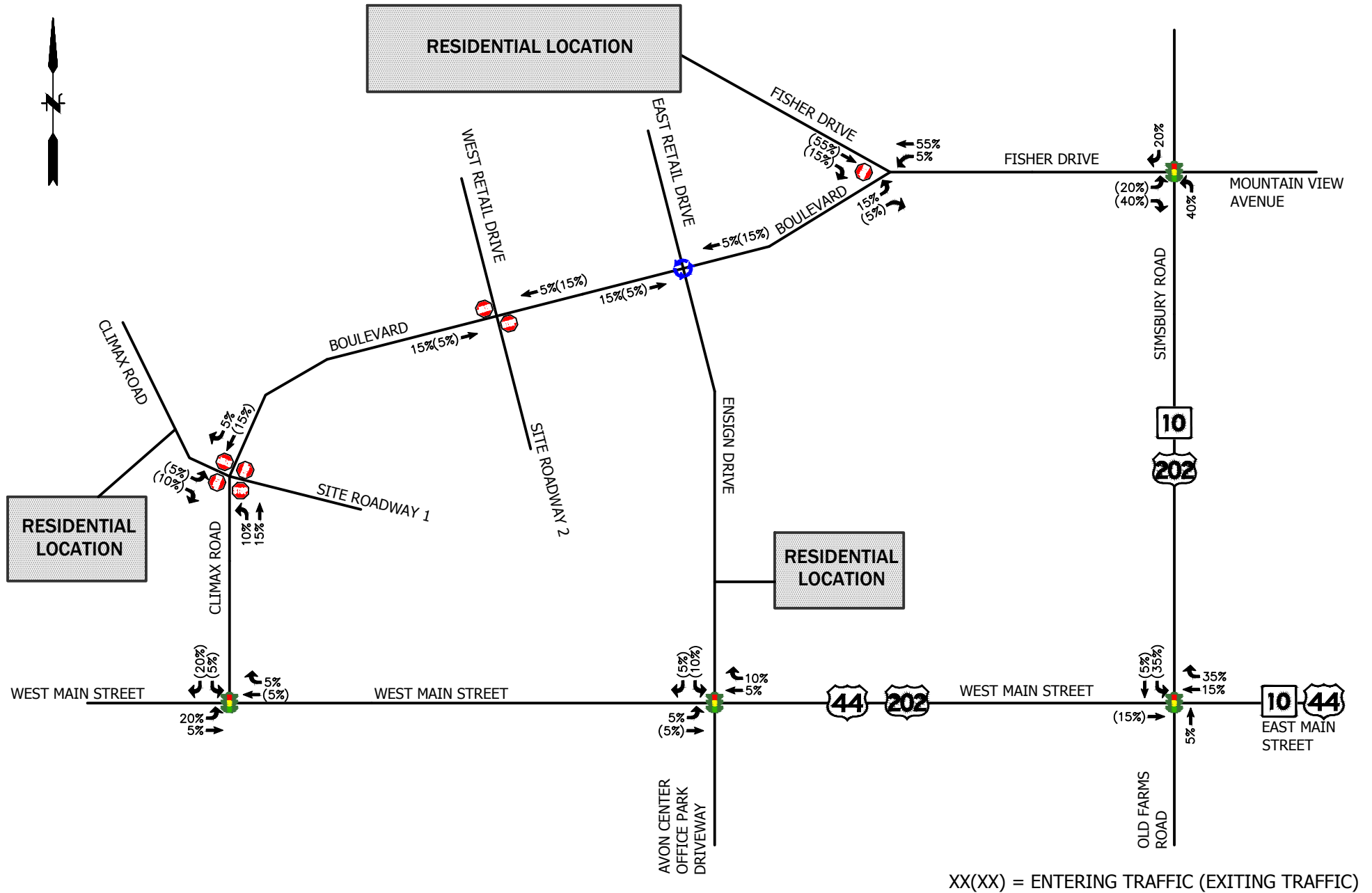
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AVON PARK NORTH

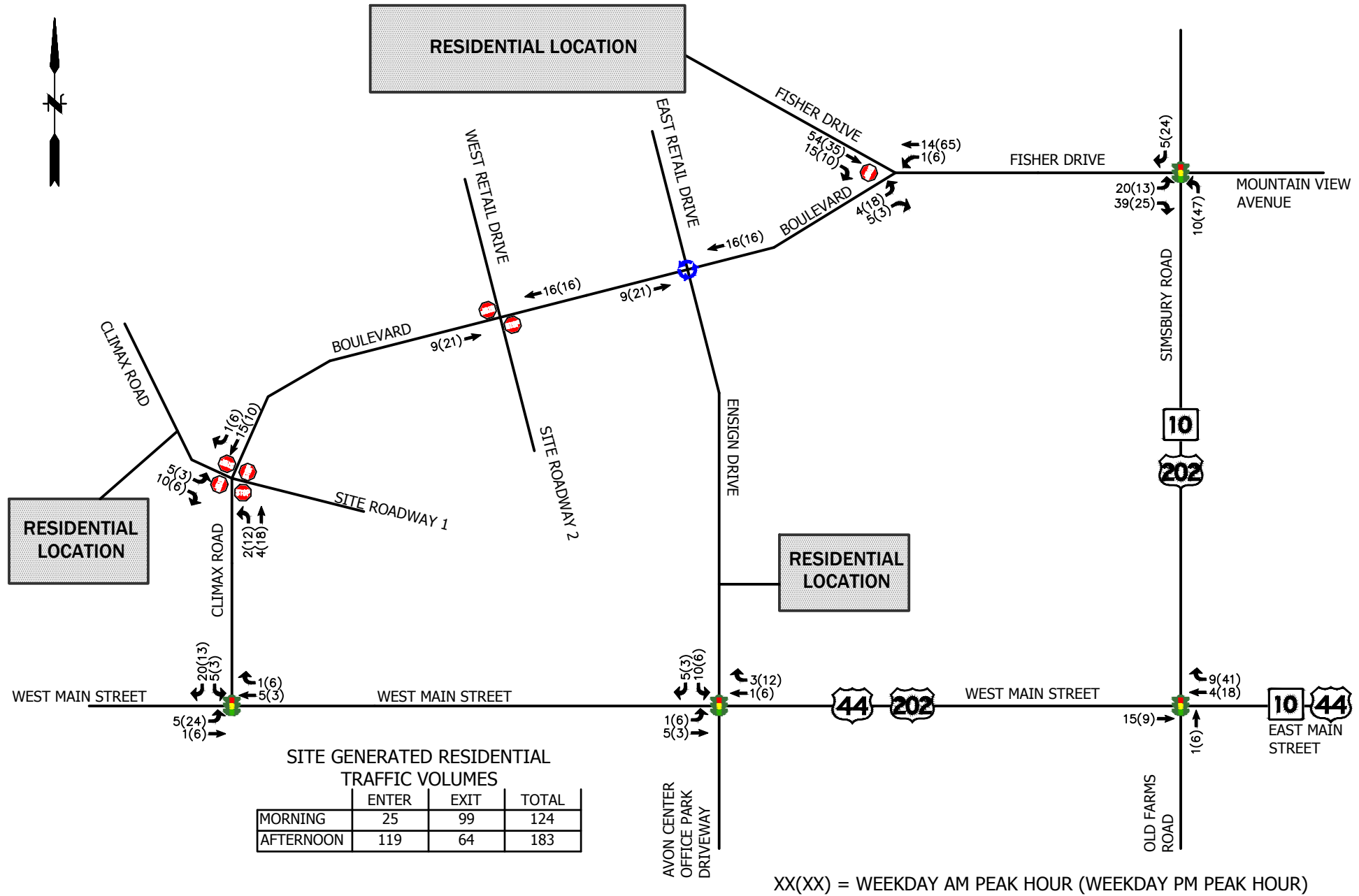
JULY 2015

File Path: J:\DWG\IP20140986A10\CivilTraffic Figures\20140986A10_TV\F01.dwg Layout: FIG. 3 BACKGROUND Plotted: Wed, July 01, 2015 - 10:03 PM User: MATT SKELLY

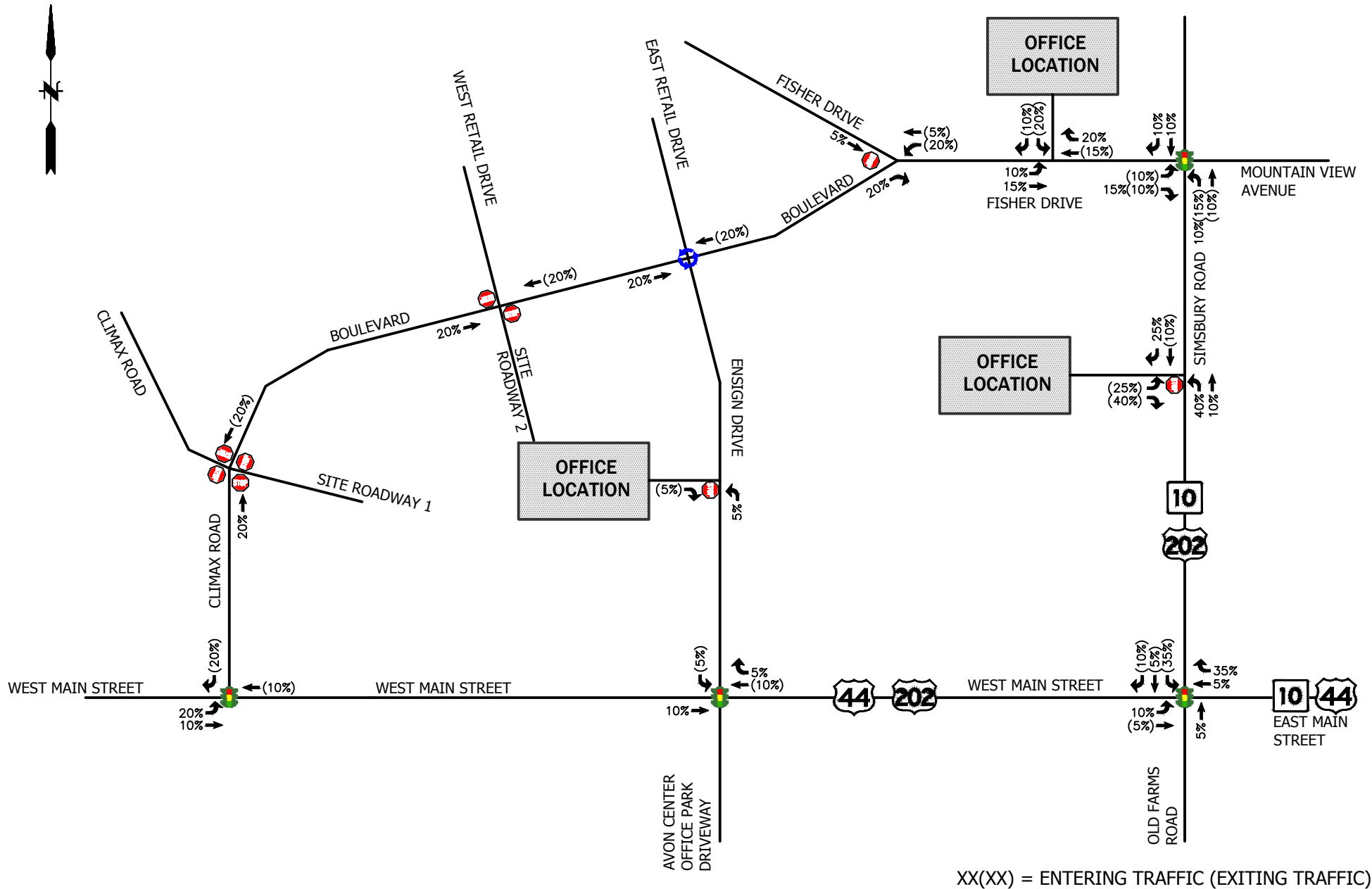


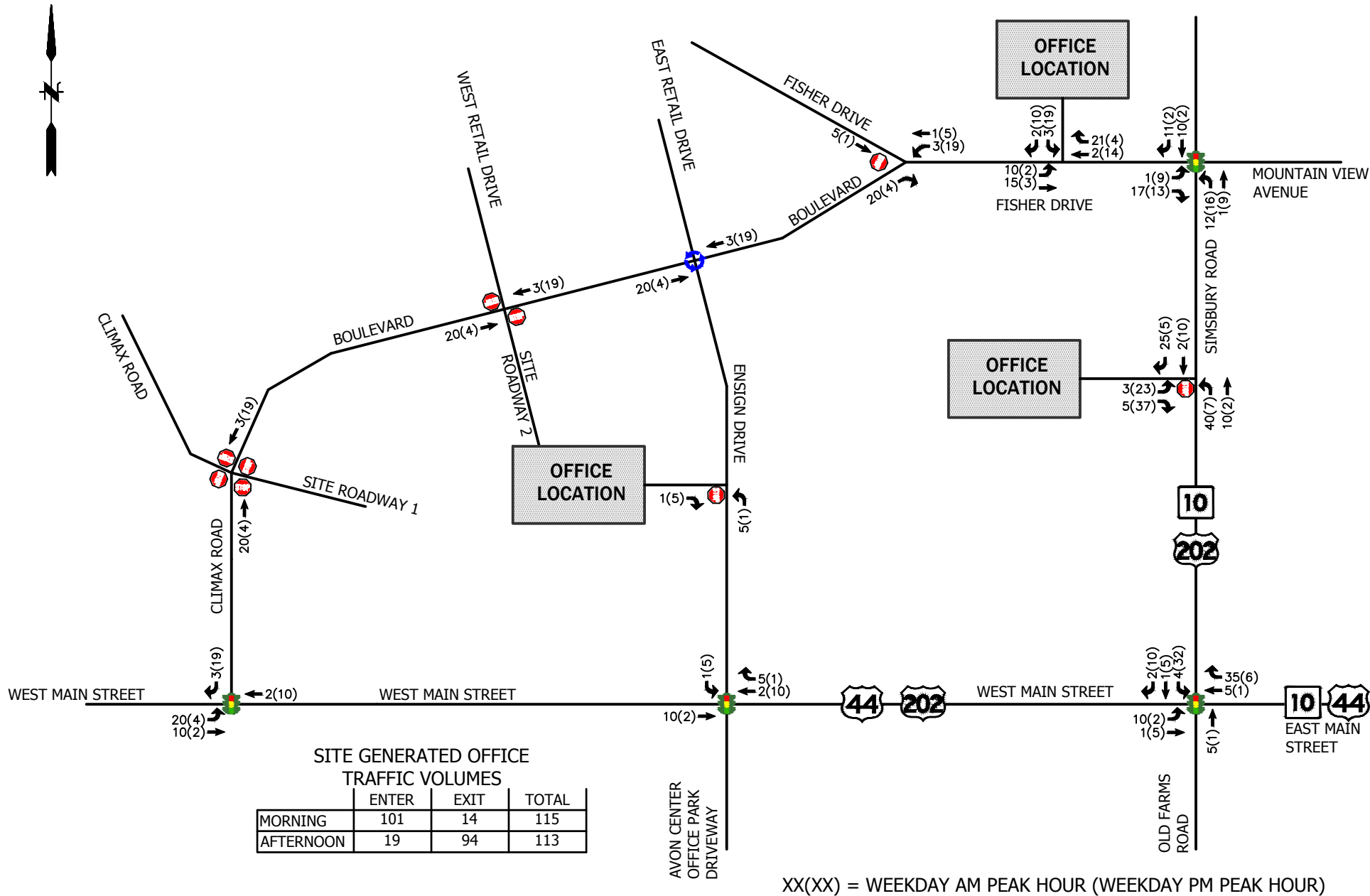


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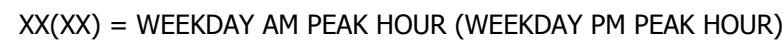


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JULY 2015

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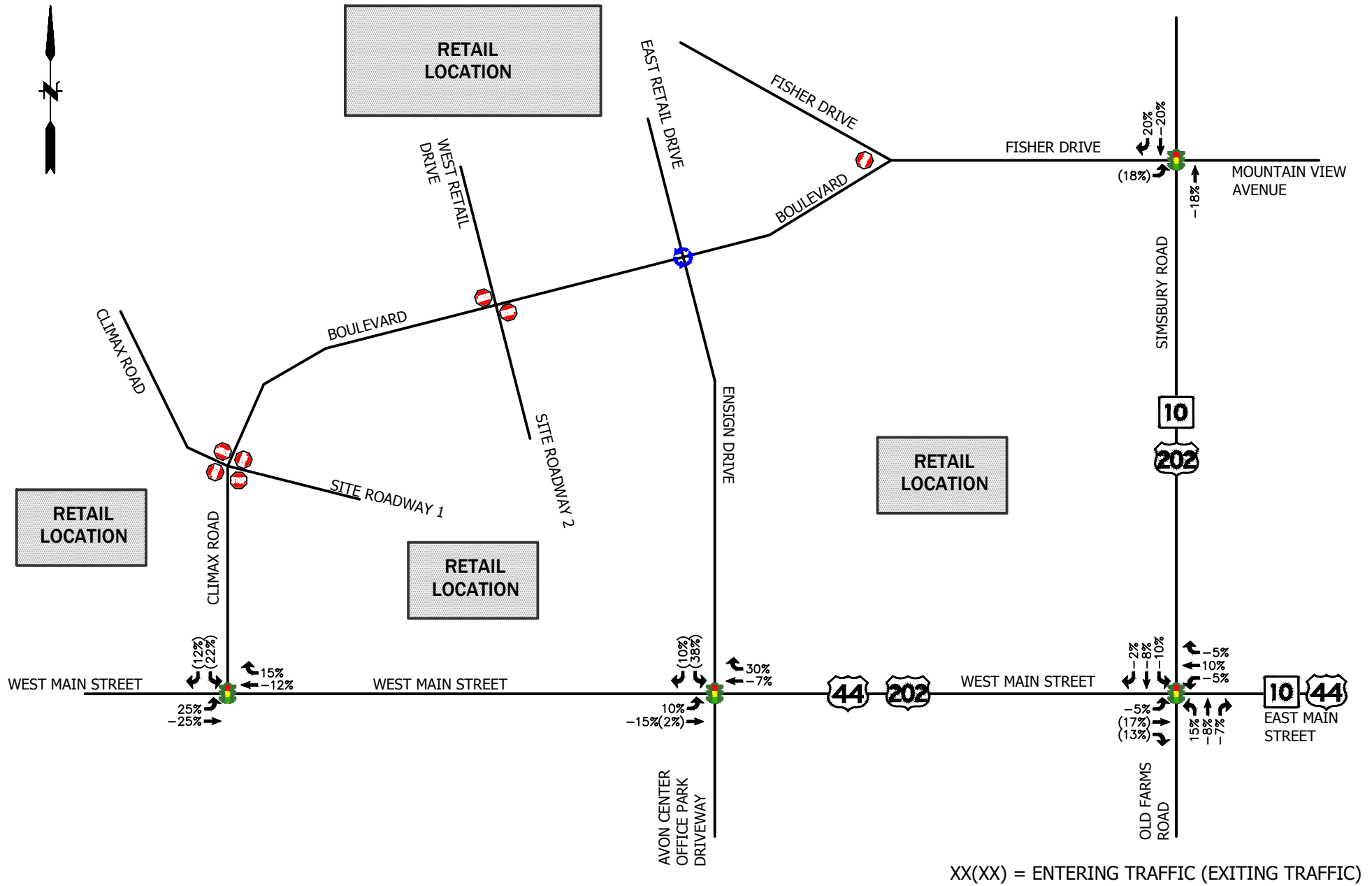
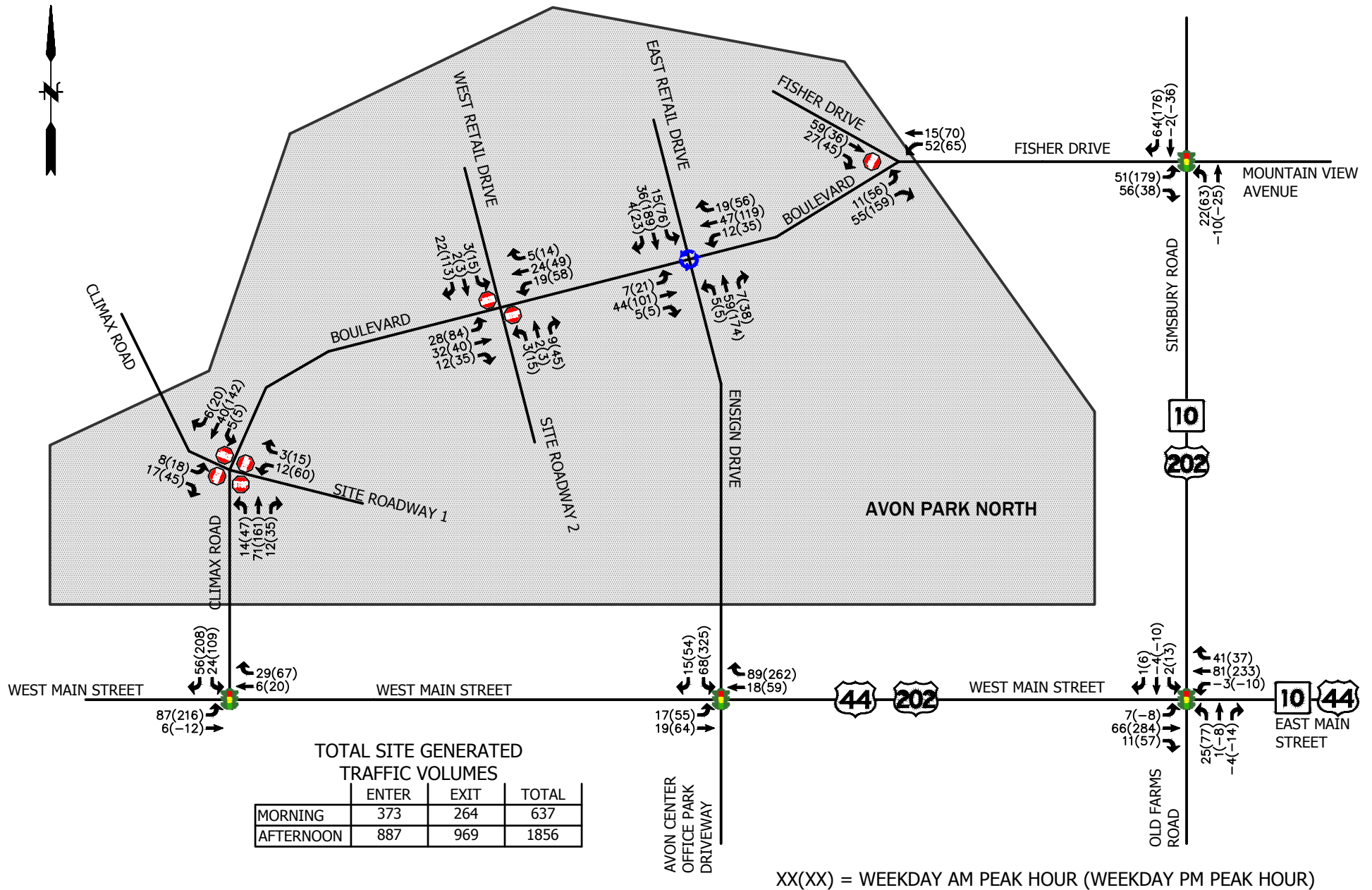


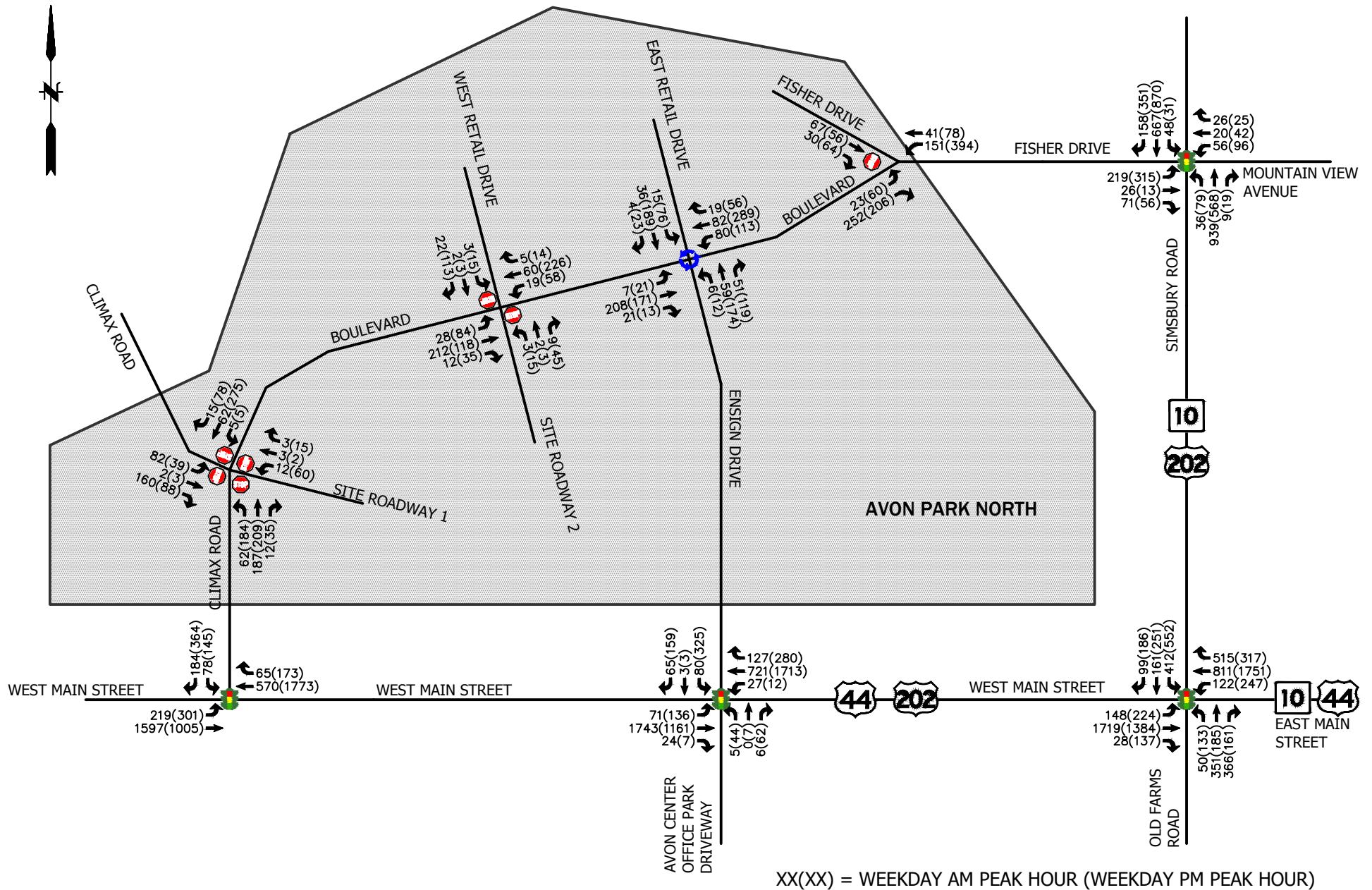
FIGURE 10: RETAIL PASS-BY ARRIVAL/DEPARTURE DISTRIBUTION

PROJ. NO: 20140986.A10

AVON PARK NORTH

JULY 2015





Appendix A

Route 44/202 at Ensign Drive Concept Improvement Plan (CON-1)
Route 10/202 at Fisher Drive Concept Improvement Plan (CON-2)

