Appendix H

Traffic Study

KUNZMAN ASSOCIATES, INC.

OVER 30 YEARS OF EXCELLENT SERVICE

December 10, 2009

Ms. Laura Stetson, AICP
HOGLE-IRELAND, INC.
201 South Lake Avenue, Suite 308
Pasadena, CA 91101

Dear Ms. Stetson:

INTRODUCTION

The firm of Kunzman Associates, Inc. is pleased to provide this traffic study for the City of Rancho Cucamonga General Plan Update. The City of Rancho Cucamonga location map is illustrated on Figure 1. The traffic study includes a field inventory of intersection traffic control devices and intersection approach lanes, use of traffic counts provided by the City of Rancho Cucamonga, comparison of 2001 existing General Plan trip generation projections to 2009 proposed General Plan trip generation projections, and intersection Level of Service calculations for existing and Year 2030 traffic conditions.

Based upon discussions with City of Rancho Cucamonga staff, the study area intersections are illustrated on Figure 2. The study area intersections include the SR-210 Freeway and I-15 Freeway interchanges located within the City of Rancho Cucamonga boundary.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided in Appendix A.

EXISTING TRAFFIC VOLUMES

Figure 3 depicts the existing average daily traffic volumes. The existing average daily traffic volumes were obtained from the Year 2007/2008/2009 traffic counts provided by the City of Rancho Cucamonga (see Appendix B) and factored from peak hour counts provided to Kunzman Associates, Inc. using the following formula for each intersection leg:

PM Peak Hour (Approach + Exit Volume) x 11.5 = Daily Leg Volume.

Existing intersection turning movement volumes were established through Year 2007/2008/2009 morning and evening peak hour traffic counts provided by the City of Rancho Cucamonga and shown on Figures 4 and 5, respectively. The morning and evening peak hour traffic volumes were identified by counting the two-hour periods from 7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM. The traffic counts

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included truck classification counts at the study area intersections. The existing percent of trucks was used from the morning and evening peak hour traffic volumes in the conversion to Passenger Car Equivalents. For light duty trucks (such as service vehicles, buses, RV's and dual rear wheels), a Passenger Car Equivalent of 1.5 was used. For medium duty trucks with 3 axles, a Passenger Car Equivalent of 2.0 was used. For heavy duty trucks with 4 axles, a Passenger Car Equivalent of 3.0 was used.

LEVEL OF SERVICE METHODOLOGY

The technique used to assess the capacity needs of an intersection is known as the Intersection Delay Method (see Appendix C) based on the 2000 Highway Capacity Manual – Transportation Research Board Special Report 209. To calculate delay, the volume of traffic using the intersection is compared with the capacity of the intersection.

The Level of Service analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of two seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time for pedestrian crossings has also been considered in the signalized intersection analysis. The following formula has been used to calculate the pedestrian minimum times for all Highway Capacity Manual runs:

(Curb to curb distance) / (4 feet/second) + 7 seconds.

For existing traffic conditions, saturation flow rates of 1,800 vehicles per hour of green for through and right turn lanes and 1,700 vehicles per lane for single left turn lanes, 1,600 vehicles per lane for dual left turn lanes and 1,500 vehicles per lane for triple left turn lanes have been assumed for the capacity analysis.

For Year 2030 traffic conditions, saturation flow rates of 1,900 vehicles per hour of green for through and right turn lanes and 1,800 vehicles per lane for single left turn lanes, 1,700 vehicles per lane for dual left turn lanes and 1,800 vehicles per lane for double right turn lanes have been assumed for the capacity analysis to account for coordinated traffic signal timing/phasing.

The study area intersection Level of Service deficiency definition has been obtained from the City of Rancho Cucamonga General Plan. The General Plan states that peak hour intersection operations of Level of Service D or better are generally acceptable. Therefore, any intersection operating at Level of Service E/F will be considered deficient.

EXISTING LEVEL OF SERVICE ANALYSIS

The existing delay and Level of Service for the study area intersections are shown in Table 1. The existing lane geometrics are depicted on Figure 6. The study area intersections currently operate at Level of Service D or better during the peak hours for existing traffic conditions, except for the following study area intersections that operate at Level of Service E/F during the peak hours (see Table 1):

Etiwanda Avenue (NS) at:
Arrow Route (EW) - #32

East Avenue (NS) at:
Baseline Road (EW) - #33

Existing delay worksheets are provided in Appendix C.

LAND USE COMPARISON

The General Plan land use data has been divided into different categories for the 2001 existing General Plan and the 2009 proposed General Plan (see Table 2).

The traffic associated with buildout pursuant to General Plan land use policy (both current Plan and proposed Plan) is determined by multiplying an appropriate trip generation rate by dwelling units (residential) or square footage (non-residential). Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and our lifestyles remain similar to what we know today. A major change in these variables may affect trip generation rates.

Trip generation rates were determined for daily traffic, morning peak hour inbound and outbound traffic, and evening peak hour inbound and outbound traffic for the proposed land uses. By multiplying the traffic generation rates by the land use assumptions, the traffic volumes are determined. Table 3 exhibits the traffic generation rates, project peak hour volumes, and project daily traffic volumes. The traffic generation rates are from the Institute of Transportation Engineers, Trip Generation, 8th Edition, 2008.

The 2001 existing General Plan was projected to generate a total of approximately 2,091,263 daily vehicle trips, 128,771 of which would occur during the morning peak hour and 209,263 of which would occur during the evening peak hour.

The 2009 proposed General Plan is projected to generate a total of approximately 1,978,384 daily vehicle trips, 127,293 of which would occur during the morning peak hour and 199,585 of which would occur during the evening peak hour.

A traffic generation comparison has been conducted between the 2001 existing General Plan and the 2009 proposed General Plan (see Table 3). The 2001 existing General Plan compared to the 2009 proposed General Plan has the following:

- fewer single-family detached residential dwelling units
- fewer multi-family attached residential dwelling units
- more retail square footage
- more office square footage
- more industrial square footage

- more government acreage
- more schools acreage

Based upon the traffic generation comparison, the 2009 proposed General Plan is projected to generate approximately 112,879 fewer daily vehicle trips, 1,478 fewer of which would occur during the morning peak hour and 9,678 fewer of which would occur during the evening peak hour.

METHOD OF PROJECTION

The average daily traffic volume forecasts have been determined using the growth increment approach on the I-10 HOV Traffic Model Year 2003 and Year 2030 average daily traffic volume forecasts (see Appendix D). This difference defines the growth in traffic over the 27 year period (2003 to 2030). The incremental growth in average daily traffic volume has been factored to reflect the forecast growth between Year 2009 and Year 2030. For this purpose, linear growth between the Year 2003 base condition and the forecast Year 2030 condition was assumed. Since the increment between Year 2009 and Year 2030 is 21 years of the 27 year time frame, a factor of 0.78 (i.e., 21/27) was used.

The Year 2030 daily and peak hour directional roadway segment volume forecasts have been determined using the growth increment approach on the I-10 HOV Traffic Model Year 2003 and Year 2030 peak hour volumes. The growth increment calculation worksheets are shown in Appendix D. Current peak hour intersection approach/departure data is a necessary input to this approach. The existing traffic count data serves as both the starting point for the refinement process, and also provides important insight into current travel patterns and the relationship between peak hour and daily traffic conditions. The initial turning movement proportions are estimated based upon the relationship of each approach leg's forecast traffic volume to the other legs' forecast volumes at the intersection. The initial estimate of turning movement proportions is then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program Report 255. A linear programming algorithm is used to calculate individual turning movements that match the known directional roadway segment volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Quality control checks and forecast adjustments were performed as necessary to ensure that all future traffic volume forecasts reflect a minimum of 10% growth in Year 2030 over existing traffic volumes. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

YEAR 2030 TRAFFIC VOLUMES

The Year 2030 average daily traffic volumes are shown on Figure 7. The Year 2030 morning and evening peak hour intersection turning movement volumes are shown on Figures 8 and 9, respectively.

YEAR 2030 LEVEL OF SERVICE ANALYSIS

The Year 2030 delay and Level of Service for the study area roadway network are shown in Table 4. Table 4 shows delay values based on the geometrics at the study area intersections, without and with improvements.

For Year 2030 traffic conditions, the following study area intersections are projected to operate at Level of Service E/F during the peak hours, without improvements:

Rochester Avenue (NS) at:
- Arrow Route (EW) - #27

Etiwanda Avenue (NS) at:
- Foothill Boulevard (EW) - #31
- Arrow Route (EW) - #32

East Avenue (NS) at:
- Baseline Road (EW) - #33

The Year 2030 delay and Level of Service for the study area roadway network with improvements are shown in Table 4. Year 2030 delay calculation worksheets are provided in Appendix C. As shown in Table 4, all of the study area intersections are projected to operate at Level of Service D or better during the peak hours for Year 2030 traffic conditions, with the following improvements:

Rochester Avenue (NS) at:
- Arrow Route (EW) - #27
  - Northbound Right Turn Overlap
  - Eastbound Additional Left Turn Lane
  - Westbound Right Turn Overlap

Etiwanda Avenue (NS) at:
- Foothill Boulevard (EW) - #31
  - Northbound Additional Through Lane
  - Northbound Right Turn Lane
  - Southbound Right Turn Lane
  - Westbound Additional Through Lane
- Arrow Route (EW) - #32
  - Northbound Additional Through Lane
  - Northbound Right Turn Lane
  - Southbound Additional Through Lane
  - Eastbound Additional Through Lane
  - Westbound Right Turn Lane

East Avenue (NS) at:
Baseline Road (EW) - #33
- Northbound Left Turn Lane
- Northbound Additional Through Lane
- Southbound Additional Through Lane
- Eastbound Additional Through Lane
- Westbound Additional Through Lane

CONCLUSIONS

The study area intersections currently operate at Level of Service D or better during the peak hours for existing traffic conditions, except for the following study area intersections that operate at Level of Service E/F during the peak hours (see Table 1):

Etiwanda Avenue (NS) at:
Arrow Route (EW) - #32

East Avenue (NS) at:
Baseline Road (EW) - #33

A traffic generation comparison has been conducted between the 2001 existing General Plan and the 2009 proposed General Plan (see Table 3). Based upon the traffic generation comparison, the 2009 proposed General Plan is projected to generate approximately 112,879 fewer daily vehicle trips, 1,478 fewer of which would occur during the morning peak hour and 9,678 fewer of which would occur during the evening peak hour.

For Year 2030 traffic conditions, the following study area intersections are projected to operate at Level of Service E/F during the peak hours, without improvements (see Table 4):

Rochester Avenue (NS) at:
Arrow Route (EW) - #27

Etiwanda Avenue (NS) at:
Foothill Boulevard (EW) - #31
Arrow Route (EW) - #32

East Avenue (NS) at:
Baseline Road (EW) - #33

As shown in Table 4, all of the study area intersections are projected to operate at Level of Service D or better during the peak hours for Year 2030 traffic conditions, with the following improvements:

Rochester Avenue (NS) at:
Arrow Route (EW) - #27

- Northbound Right Turn Overlap
- Eastbound Additional Left Turn Lane
- Westbound Right Turn Overlap

Etiwanda Avenue (NS) at:

Foothill Boulevard (EW) - #31

- Northbound Additional Through Lane
- Northbound Right Turn Lane
- Southbound Right Turn Lane
- Westbound Additional Through Lane

Arrow Route (EW) - #32

- Northbound Additional Through Lane
- Northbound Right Turn Lane
- Southbound Additional Through Lane
- Eastbound Additional Through Lane
- Westbound Right Turn Lane

East Avenue (NS) at:

Baseline Road (EW) - #33

- Northbound Left Turn Lane
- Northbound Additional Through Lane
- Southbound Additional Through Lane
- Eastbound Additional Through Lane
- Westbound Additional Through Lane

No further improvements are required beyond those identified in the 2001 General Plan, all of which are included as well in the 2009 General Plan.

It has been a pleasure to service your needs on this project. Should you have any questions or if we can be of further assistance, please do not hesitate to call at (714) 973-8383.

Sincerely,

KUNZMAN ASSOCIATES, INC.

Carl Ballard
Principal Associate

#4586

REGISTERED PROFESSIONAL ENGINEER
WILLIAM A. KUNZMAN
No. TR0056
TRAFFIC
STATE OF CALIFORNIA

KUNZMAN ASSOCIATES, INC.

William Kunzman, P.E.
Principal
Professional Registration
Expiration Date 3-31-2010

Table 1

Existing Intersection Delay and Level of Service[1]

Intersection	Traffic Control[4]	Intersection Approach Lanes[2]												Peak Hour Delay-LOS[3]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Grove Avenue (NS) at:															
Foothill Boulevard (EW) - #1	TS	1	1	1	1	2	1	1	2	1	1	2	0	19.2-B	21.0-C
Arrow Route (EW) - #2	TS	1	1	1	1	1	0	1	1	0	1	1	0	10.3-B	10.7-B
Carnelian Street (NS) at:															
SR-210 Freeway WB Ramps (EW) - #3	TS	2	2	0	0	2	0	0	0	0	1.3	0.3	1.3	17.3-B	16.0-B
SR-210 Freeway EB Ramps (EW) - #4	TS	0	2	0	2	2	0	1.3	0.3	1.3	0	0	0	11.4-B	18.9-B
19th Street (EW) - #5	TS	1	2	0	1	2	0	1	2	0	1	2	0	29.6-C	29.4-C
Baseline Road (EW) - #6	TS	1	2	0	1	2	0	2	2	0	2	2	0	28.2-C	29.7-C
Vineyard Avenue (NS) at:															
Foothill Boulevard (EW) - #7	TS	2	2	1	2	2	1	2	3	1	2	2	1	26.8-C	36.2-D
Arrow Route (EW) - #8	TS	1	2	0	1	2	0	1	2	1	1	2	1	27.1-C	26.3-C
Archibald Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #9	TS	2	2	0	0	2	1	0	0	0	1.3	0.3	1.3	18.0-B	15.2-B
SR-210 Freeway EB Ramps (EW) - #10	TS	0	2	0	2	2	0	1.3	0.3	1.3	0	0	0	12.4-B	15.2-B
19th Street (EW) - #11	TS	1	2	1	1	2	1	1	2	0	1	2	0	26.7-C	27.7-C
Baseline Road (EW) - #12	TS	1	2	1>	1	2	1	1	2	1>	1	2	1	25.9-C	32.1-C
Foothill Boulevard (EW) - #13	TS	1	2	0	1	2	1	2	2	1	2	2	1	25.8-C	31.1-C
Arrow Route (EW) - #14	TS	1	2	1	1	2	0	1	2	1	1	2	1	28.6-C	27.7-C
4th Street (EW) - #15	TS	1	2	0	1	2	1>	2	2	0	2	3	1>	28.3-C	31.5-C
Haven Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #16	TS	2	3	0	0	3	1	0	0	0	1.3	0.3	1.3	15.1-B	16.3-B
SR-210 Freeway EB Ramps (EW) - #17	TS	0	3	1	2	3	0	1.3	0.3	1.3	0	0	0	17.3-B	15.3-B
Baseline Road (EW) - #18	TS	2	3	1	2	3	1>	1	2	1	1	2	1	28.7-C	34.3-C
Foothill Boulevard (EW) - #19	TS	2	4	0	2	3	1	2	3	1	2	3	1	30.2-C	37.3-D
Arrow Route (EW) - #20	TS	2	3	1>	2	3	0	2	2	1>	2	2	0	26.0-C	29.1-C

[1] Source: The existing traffic volumes were obtained from the Year 2007/2008/2009 traffic counts provided by the City of Rancho Cucamonga.

[2] The lane decimals show the striping for shared lanes at the study area intersections. When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right Turn Overlap; >> = Free Right Turn

[3] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
movements sharing a single lane) are shown.

[4] TS = Traffic Signal

Table 1 (Cont'd)

Existing Intersection Delay and Level of Service[1]

Intersection	Traffic Control[4]	Intersection Approach Lanes[2]												Peak Hour Delay-LOS[3]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Milliken Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #21	TS	2	3	0	0	3	0	0	0	0	1.3	0.3	1.3	17.5-B	13.4-B
SR-210 Freeway EB Ramps (EW) - #22	TS	0	3	0	2	3	0	1.3	0.3	1.3	0	0	0	14.9-B	15.7-B
Baseline Road (EW) - #23	TS	2	3	1	2	3	1	2	3	1	2	3	1	27.6-C	31.0-C
Foothill Boulevard (EW) - #24	TS	2	4	1	2	3	1	2	3	1	2	3	1	28.9-C	35.1-D
Arrow Route (EW) - #25	TS	2	3	1	2	3	1	1	2	1	1	2	1	25.9-C	36.4-D
4th Street (EW) - #26	TS	2	4	1>	2	4	0	2	3	1	2	3	1	31.9-C	43.3-D
Rochester Avenue (NS) at:															
Arrow Route (EW) - #27	TS	1	2	1	1	2	1	1	2	0	2	2	1	23.7-C	31.4-C
Day Creek Boulevard (NS) at:															
SR-210 Freeway WB Ramps (EW) - #28	TS	2	3	0	0	3	1	0	0	0	1.3	0.3	1.3	17.4-B	14.8-B
SR-210 Freeway EB Ramps (EW) - #29	TS	0	2.5	1.5	2	3	0	1.3	0.3	1.3	0	0	0	14.2-B	15.9-B
Etiwanda Avenue (NS) at:															
Baseline Road (EW) - #30	TS	2	1	1>	1	2	0	1	3	0	2	2	0	26.3-C	25.4-C
Foothill Boulevard (EW) - #31	TS	1	1	0	1	2	0	2	3	1>	2	2	1	29.0-C	34.0-C
Arrow Route (EW) - #32	TS	1	1	0	1	1	1>	1	1	1	1	2	0	34.5-C	99.9-F[5]
East Avenue (NS) at:															
Baseline Road (EW) - #33	TS	0.5	0.5	1	1	1	1>	1	2	1	1	2	1	63.4-E	46.5-D
I-15 Freeway SB Ramps (NS) at:															
Beech Avenue (EW) - #34	TS	0	0	0	1	0	1	1	2	0	0	2	0	16.1-B	12.0-B
Baseline Road (EW) - #35	TS	0	0	0	0.5	0.5	1	0	2	1	2	2	0	19.1-B	13.7-B
Foothill Boulevard (EW) - #36	TS	0	0	0	1.5	0	1.5	0	3	1>>	0	3	1>>	9.1-A	7.0-A
I-15 Freeway NB Ramps (NS) at:															
Beech Avenue (EW) - #37	TS	0	0	0	1	0	1	1	2	0	0	2	1	12.9-B	15.6-B
Baseline Road (EW) - #38	TS	1.3	0.3	1.3	0	0	0	1	3	0	0	2	1	13.4-B	18.1-B
Foothill Boulevard (EW) - #39	TS	1.5	0	1.5	0	0	0	0	3	1>>	0	3	1>>	11.4-B	13.0-B
Americana Way (NS) at:															
Baseline Road (EW) - #40	TS	1	1	0	1	1	1	1	3	1	1	3	1	21.4-C	22.4-C

[1] Source: The existing traffic volumes were obtained from the Year 2007/2008/2009 traffic counts provided by the City of Rancho Cucamonga.

[2] The lane decimals show the striping for shared lanes at the study area intersections. When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right Turn Overlap; >> = Free Right Turn

[3] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
movements sharing a single lane) are shown.

[4] TS = Traffic Signal

[5] 99.9-F= Delay High, Intersection Unstable, Level of Service F.

Table 2

General Plan Land Use Comparison[1]

Land Use	2001 Existing General Plan			2009 Proposed General Plan		
	Dwelling Units	Square Footage	Acreage	Dwelling Units	Square Footage	Acreage
Single-Family Detached Residential	34,035			39,980		
Multi-Family Attached Residential	21,579			23,280		
Retail		25,215,000			21,605,700	
Office		5,680,000			5,242,000	
Industrial		71,107,000			68,255,000	
Government			166			130
Schools			609			558
Total	55,614	102,002,000	775	63,260	95,102,700	688

[1] Source: Hogle-Ireland, Inc., 2009

Table 3

Traffic Generation Comparison[1]

Land Use	Quantity	Units[2]	Peak Hour						Daily
			Morning			Evening			
			Inbound	Outbound	Total	Inbound	Outbound	Total	
Trip Generation Rates[3]									
Single-Family Detached Residential		DU	0.19	0.56	0.75	0.64	0.37	1.01	9.57
Multi-Family Attached Residential		DU	0.07	0.37	0.44	0.35	0.17	0.52	5.81
Retail		TSF	0.61	0.39	1.00	1.83	1.90	3.73	42.94
Office		TSF	1.36	0.19	1.55	0.25	1.24	1.49	11.01
Industrial		TSF	0.69	0.15	0.84	0.18	0.68	0.86	6.96
2001 Existing General Plan Trips Generated[4]									
Single-Family Detached Residential	34,035	DU	6,467	19,060	25,527	21,782	12,593	34,375	325,715
Multi-Family Attached Residential	21,579	DU	1,511	7,984	9,495	7,553	3,668	11,221	125,374
Retail	25,215.000	TSF	15,381	9,834	25,215	46,143	47,909	94,052	1,082,732
Office	5,680.000	TSF	7,725	1,079	8,804	1,420	7,043	8,463	62,537
Industrial	71,107.000	TSF	49,064	10,666	59,730	12,799	48,353	61,152	494,905
Total			80,148	48,623	128,771	89,697	119,566	209,263	2,091,263
2009 Proposed General Plan Trips Generated[5]									
Single-Family Detached Residential	39,980	DU	7,596	22,389	29,985	25,587	14,793	40,380	382,609
Multi-Family Attached Residential	23,280	DU	1,630	8,614	10,244	8,148	3,958	12,106	135,257
Retail	21,605.700	TSF	13,179	8,426	21,605	39,538	41,051	80,589	927,749
Office	5,242.000	TSF	7,129	996	8,125	1,311	6,500	7,811	57,714
Industrial	68,255.000	TSF	47,096	10,238	57,334	12,286	46,413	58,699	475,055
Total			76,630	50,663	127,293	86,870	112,715	199,585	1,978,384
Difference[6]			-3,518	2,040	-1,478	-2,827	-6,851	-9,678	-112,879

[2] Source: See Table 2

[2] DU = Dwelling Units; TSF = Thousand Square Feet

[3] Source: Institute of Transportation Engineers, Trip Generation, 8th Edition, 2008, Land Use Categories 210, 230, 820, 710, and 130.

[4] The 2001 existing General Plan includes 166 acres of government use and 609 acres of school use.

[5] The 2009 proposed General Plan includes 130 acres of government use and 558 acres of school use.

[6] The difference is "conservative" and does not include the reduction in government and school acreages which would reduce the trip generation due to lower coverage.

Table 4

Year 2030 Intersection Delay and Level of Service

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Grove Avenue (NS) at:															
Foothill Boulevard (EW) - #1	TS	1	1	1	1	2	1	1	2	1	1	2	0	22.1-C	22.2-C
Arrow Route (EW) - #2	TS	1	1	1	1	1	0	1	1	0	1	1	0	10.7-B	11.8-B
Carnelian Street (NS) at:															
SR-210 Freeway WB Ramps (EW) - #3	TS	2	2	0	0	2	0	0	0	0	1.3	0.3	1.3	18.7-B	16.1-B
SR-210 Freeway EB Ramps (EW) - #4	TS	0	2	0	2	2	0	1.3	0.3	1.3	0	0	0	11.6-B	19.5-B
19th Street (EW) - #5	TS	1	2	0	1	2	0	1	2	0	1	2	0	33.6-C	37.1-D
Baseline Road (EW) - #6	TS	1	2	0	1	2	0	2	2	0	2	2	0	31.1-C	55.0-D
Vineyard Avenue (NS) at:															
Foothill Boulevard (EW) - #7	TS	2	2	1	2	2	1	2	3	1	2	2	1	28.3-C	49.7-D
Arrow Route (EW) - #8	TS	1	2	0	1	2	0	1	2	1	1	2	1	30.6-C	35.6-D
Archibald Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #9	TS	2	2	0	0	2	1	0	0	0	1.3	0.3	1.3	18.6-B	15.8-B
SR-210 Freeway EB Ramps (EW) - #10	TS	0	2	0	2	2	0	1.3	0.3	1.3	0	0	0	13.2-B	15.7-B
19th Street (EW) - #11	TS	1	2	1	1	2	1	1	2	0	1	2	0	28.5-C	37.8-D
Baseline Road (EW) - #12	TS	1	2	1>	1	2	1	1	2	1>	1	2	1	27.1-C	53.6-D
Foothill Boulevard (EW) - #13	TS	1	2	0	1	2	1	2	2	1	2	2	1	29.5-C	43.2-D
Arrow Route (EW) - #14	TS	1	2	1	1	2	0	1	2	1	1	2	1	30.9-C	35.1-D
4th Street (EW) - #15	TS	1	2	0	1	2	1>	2	2	0	2	3	1>	34.4-C	37.4-D
Haven Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #16	TS	2	3	0	0	3	1	0	0	0	1.3	0.3	1.3	16.0-B	20.4-C
SR-210 Freeway EB Ramps (EW) - #17	TS	0	3	1	2	3	0	1.3	0.3	1.3	0	0	0	18.0-B	15.8-B
Baseline Road (EW) - #18	TS	2	3	1	2	3	1>	1	2	1	1	2	1	29.3-C	38.9-D
Foothill Boulevard (EW) - #19	TS	2	4	0	2	3	1	2	3	1	2	3	1	36.0-D	49.0-D
Arrow Route (EW) - #20	TS	2	3	1>	2	3	0	2	2	1>	2	2	0	31.0-C	38.1-D

[1] The lane decimals show the striping for shared lanes at the study area intersections. When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right Turn Overlap; >> = Free Right Turn; 1 = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
movements sharing a single lane) are shown.

[3] TS = Traffic Signal

Table 4 (Cont'd)

Year 2030 Intersection Delay and Level of Service

Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour Delay-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Milliken Avenue (NS) at:															
SR-210 Freeway WB Ramps (EW) - #21	TS	2	3	0	0	3	0	0	0	0	1.3	0.3	1.3	18.0-B	13.9-B
SR-210 Freeway EB Ramps (EW) - #22	TS	0	3	0	2	3	0	1.3	0.3	1.3	0	0	0	15.7-B	16.0-B
Baseline Road (EW) - #23	TS	2	3	1	2	3	1	2	3	1	2	3	1	29.4-C	33.2-C
Foothill Boulevard (EW) - #24	TS	2	4	1	2	3	1	2	3	1	2	3	1	33.5-C	40.7-D
Arrow Route (EW) - #25	TS	2	3	1	2	3	1	1	2	1	1	2	1	28.3-C	38.3-D
4th Street (EW) - #26	TS	2	4	1>	2	4	0	2	3	1	2	3	1	34.2-C	47.8-D
Rochester Avenue (NS) at:															
Arrow Route (EW) - #27															
- Without Improvements	TS	1	2	1	1	2	1	1	2	0	2	2	1	48.5-D	99.9-F[4]
- With Improvements	TS	1	2	1>	1	2	1	**2**	2	0	2	2	1>	44.4-D	50.5-D
Day Creek Boulevard (NS) at:															
SR-210 Freeway WB Ramps (EW) - #28	TS	2	3	0	0	3	1	0	0	0	1.3	0.3	1.3	18.4-B	16.8-B
SR-210 Freeway EB Ramps (EW) - #29	TS	0	2.5	1.5	2	3	0	1.3	0.3	1.3	0	0	0	15.1-B	16.2-B
Etiwanda Avenue (NS) at:															
Baseline Road (EW) - #30	TS	2	1	1>	1	2	0	1	3	0	2	2	0	29.9-C	29.9-C
Foothill Boulevard (EW) - #31															
- Without Improvements	TS	1	1	0	1	2	0	2	3	1>	2	2	1	38.8-D	58.2-E
- With Improvements	TS	1	**2**	**1**	1	2	**1**	2	3	1	2	**3**	1	35.5-D	41.8-D
Arrow Route (EW) - #32															
- Without Improvements	TS	1	1	0	1	1	1>	1	1	1	1	2	0	99.9-F	99.9-F
- With Improvements	TS	1	**2**	**1**	1	**2**	1>	1	**2**	1	1	2	**1**	25.9-C	27.6-C
East Avenue (NS) at:															
Baseline Road (EW) - #33															
- Without Improvements	TS	0.5	0.5	1	1	1	1>	1	2	1	1	2	1	77.7-E	64.6-E
- With Improvements	TS	**1**	**2**	0	1	**2**	1	1	**3**	0	1	**3**	1	31.7-C	32.1-C
I-15 Freeway SB Ramps (NS) at:															
Beech Avenue (EW) - #34	TS	0	0	0	1	0	1	1	2	0	0	2	0	19.5-B	20.4-C
Baseline Road (EW) - #35	TS	0	0	0	0.5	0.5	1	0	2	1	2	2	0	22.6-C	14.3-B
Foothill Boulevard (EW) - #36	TS	0	0	0	1.5	0	1.5	0	3	1>>	0	3	1>>	9.7-A	7.5-A
I-15 Freeway NB Ramps (NS) at:															
Beech Avenue (EW) - #37	TS	0	0	0	1	0	1	1	2	0	0	2	1	18.9-B	33.6-C
Baseline Road (EW) - #38	TS	1.3	0.3	1.3	0	0	0	1	3	0	0	2	1	14.3-B	18.9-B
Foothill Boulevard (EW) - #39	TS	1.5	0	1.5	0	0	0	0	3	1>>	0	3	1>>	12.3-B	14.3-B
Americana Way (NS) at:															
Baseline Road (EW) - #40	TS	1	1	0	1	1	1	1	3	1	1	3	1	22.0-C	23.0-C

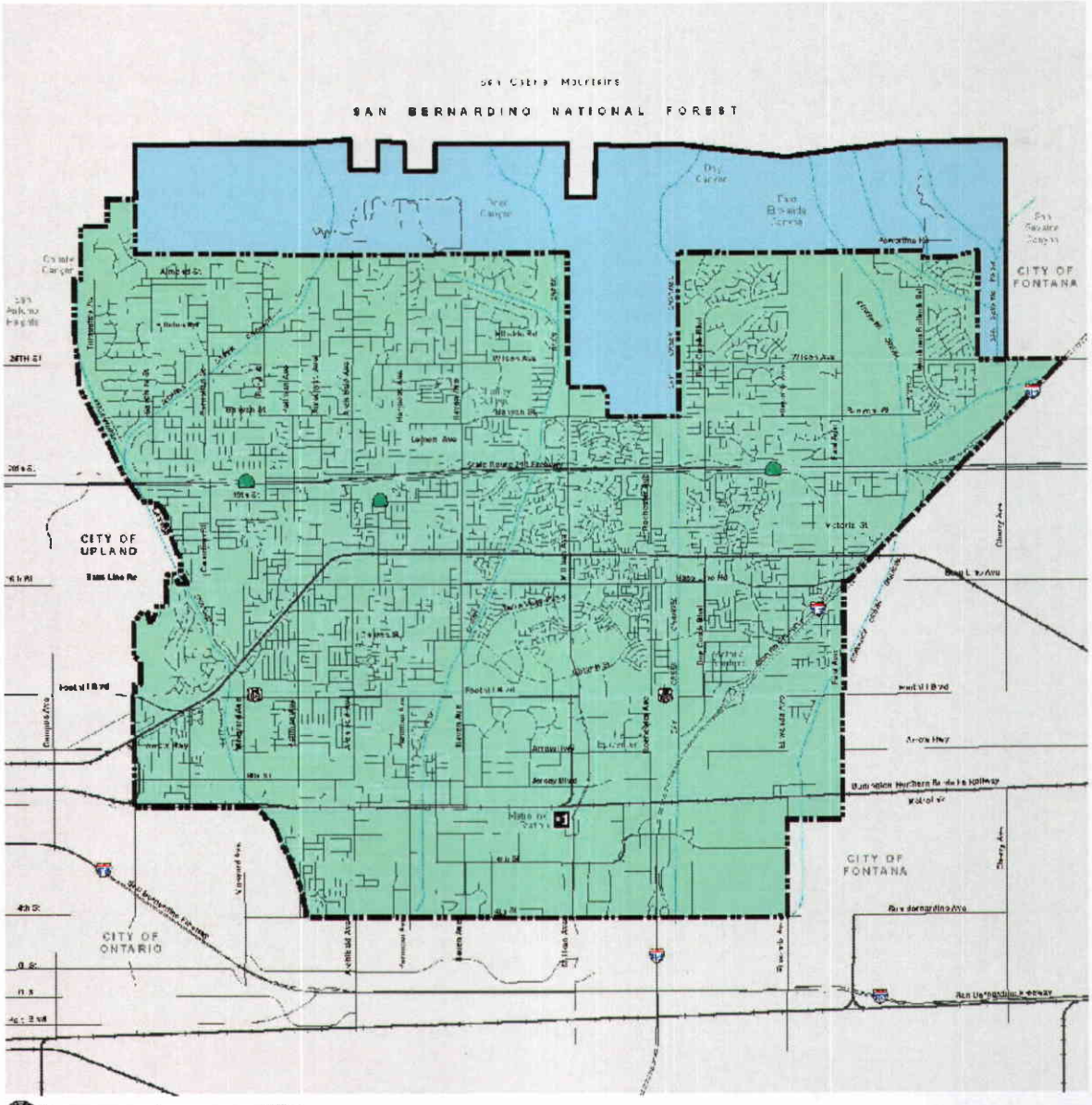
[1] The lane decimals show the striping for shared lanes at the study area intersections. When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right Turn Overlap; >> = Free Right Turn; 1 = Improvement

[2] Delay and level of service has been calculated using the following analysis software: Traffix, Version 7.9.0215 (2008). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] 99.9-F= Delay High, Intersection Unstable, Level of Service F.

Figure 1
Location Map



Legend

Rancho Cucamonga City Boundary

Sphere of Influence

N

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Figure 2
Study Area Intersections

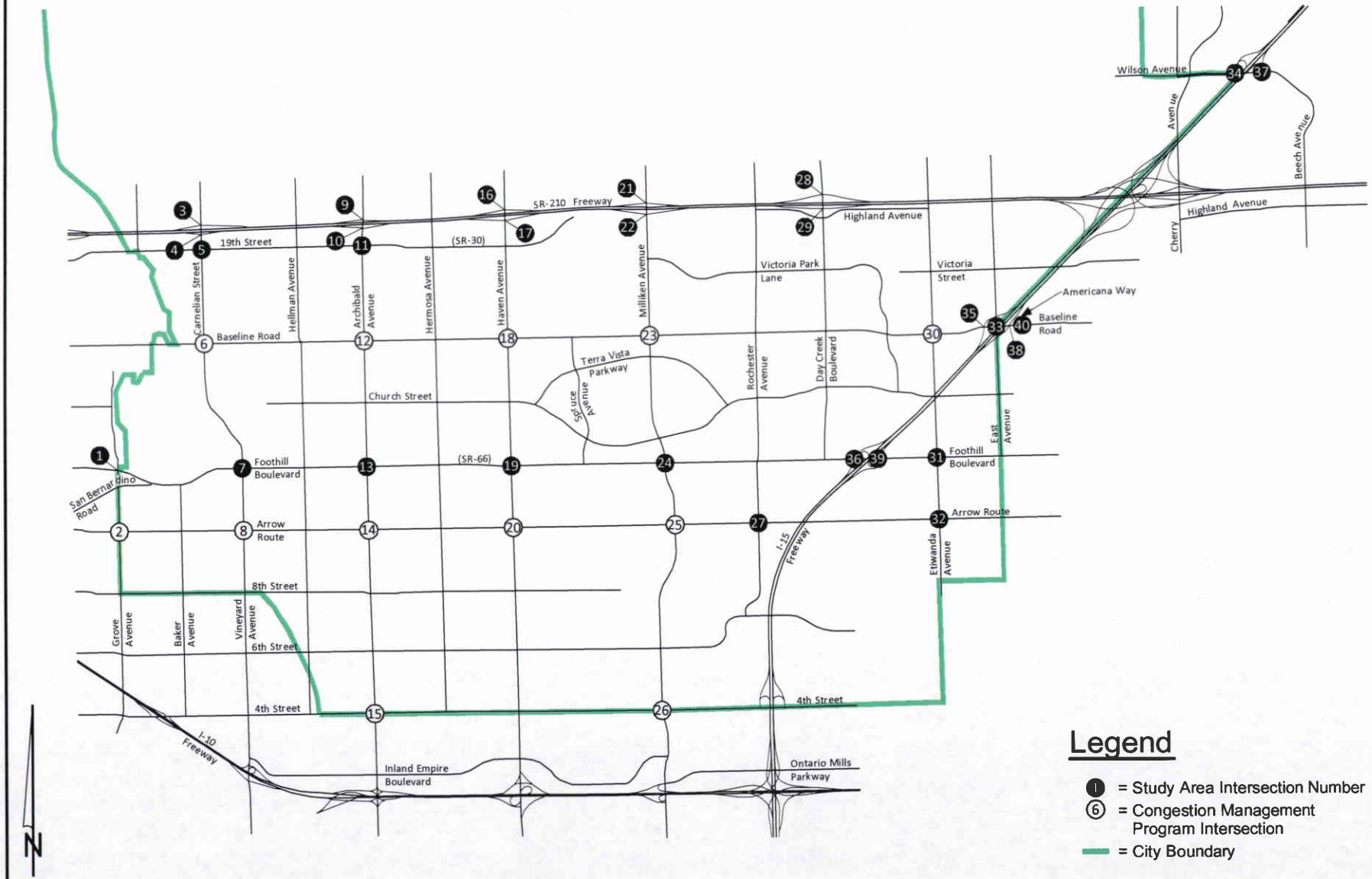

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Figure 3
Existing Average Daily Traffic Volumes

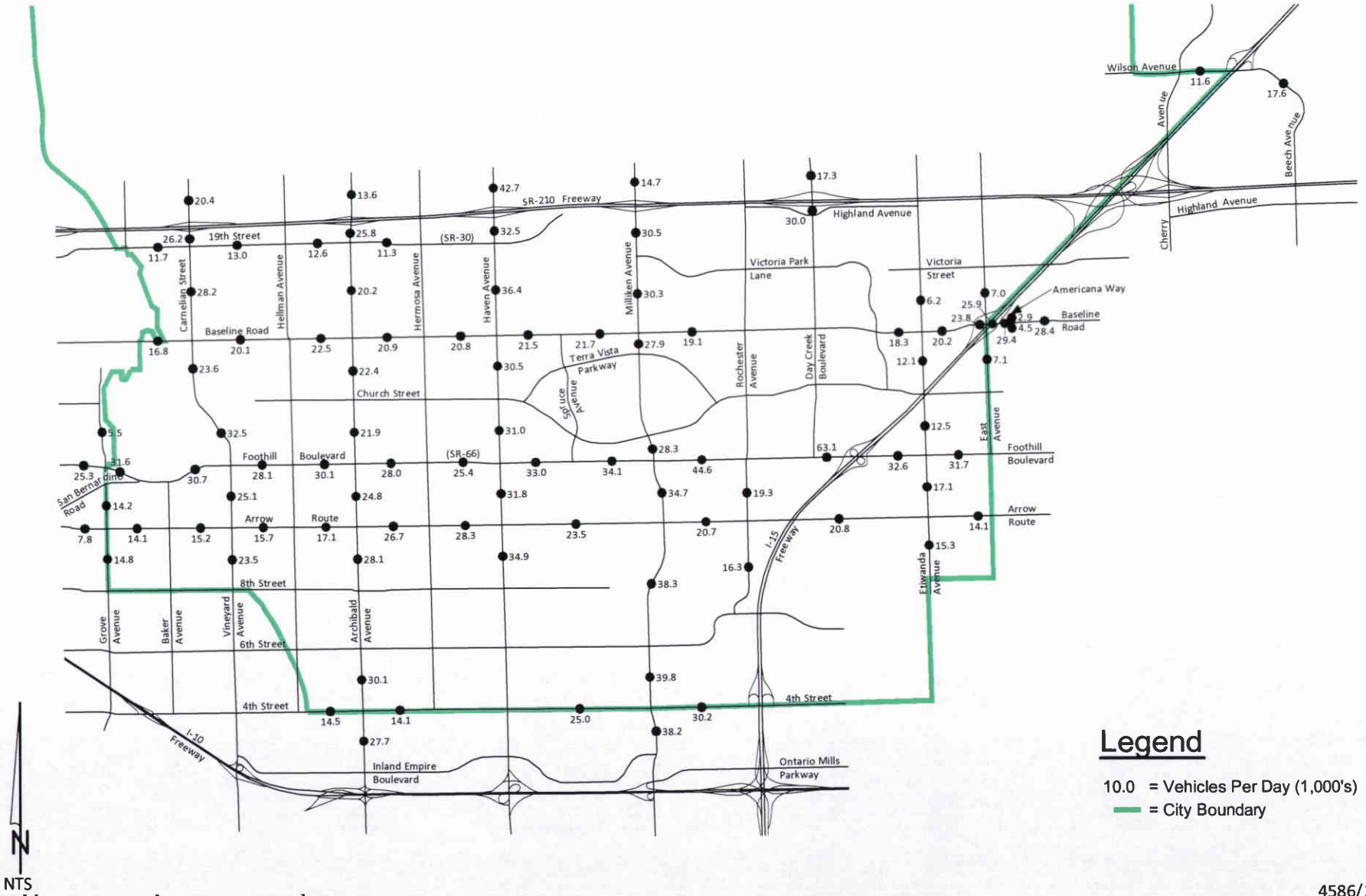

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Figure 4
Existing Morning Peak Hour Intersection Turning Movement Volumes

Intersection reference numbers are in upper left corner of turning movement boxes.

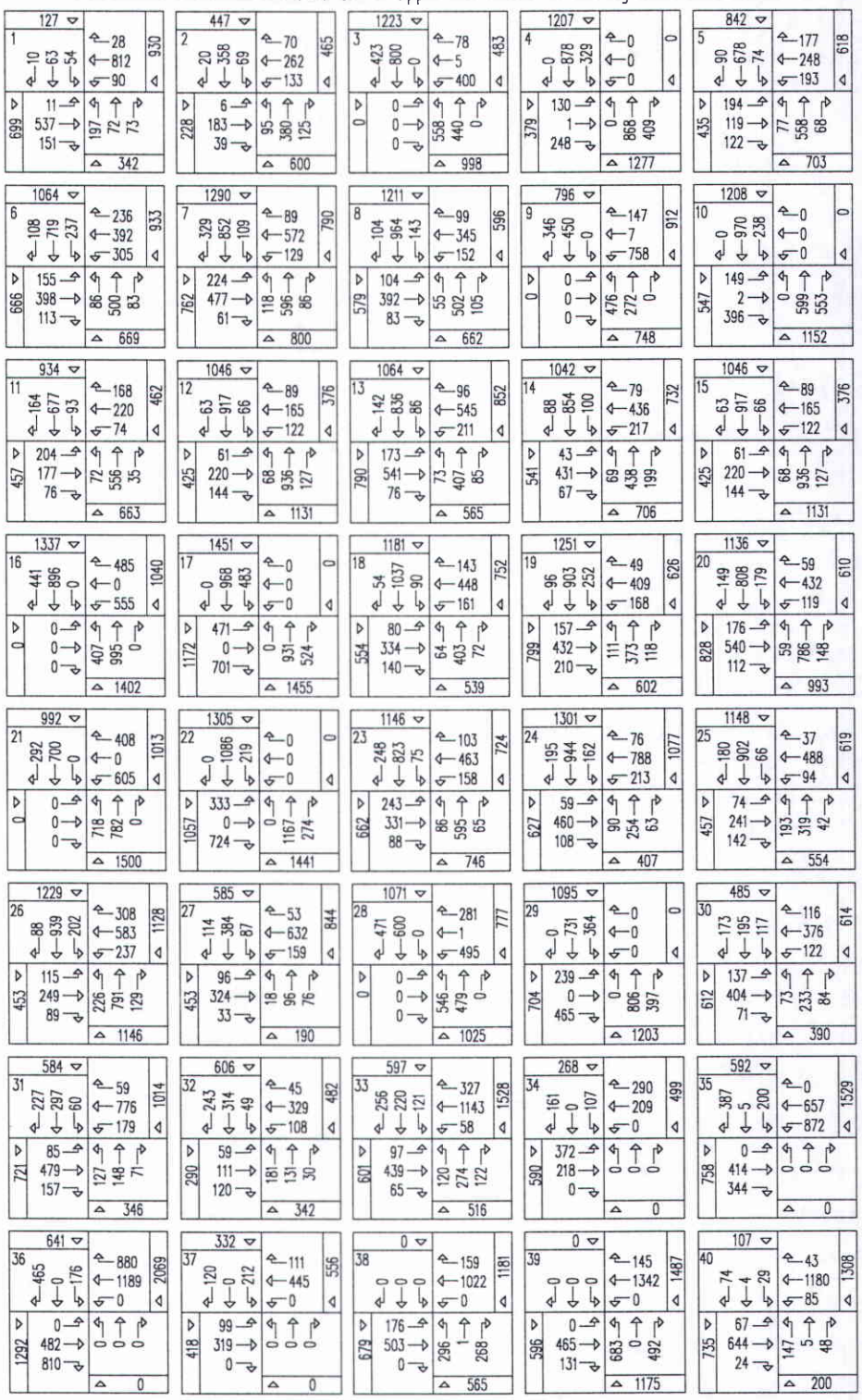

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Figure 5
Existing Evening Peak Hour Intersection Turning Movement Volumes

Intersection reference numbers are in upper left corner of turning movement boxes.

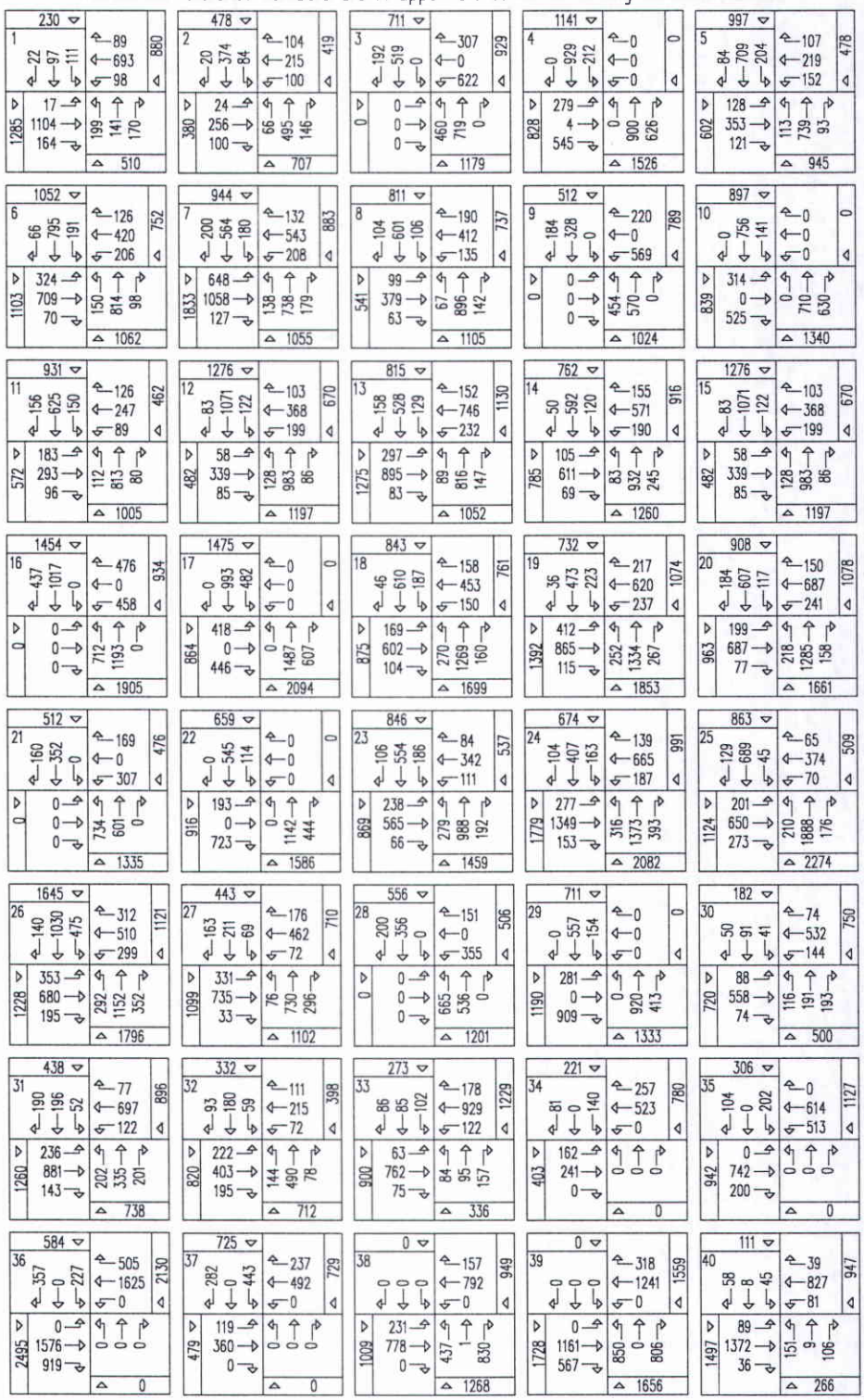

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Figure 6
Existing Lane Geometrics

Intersection reference numbers are in upper left corner of turning movement boxes.

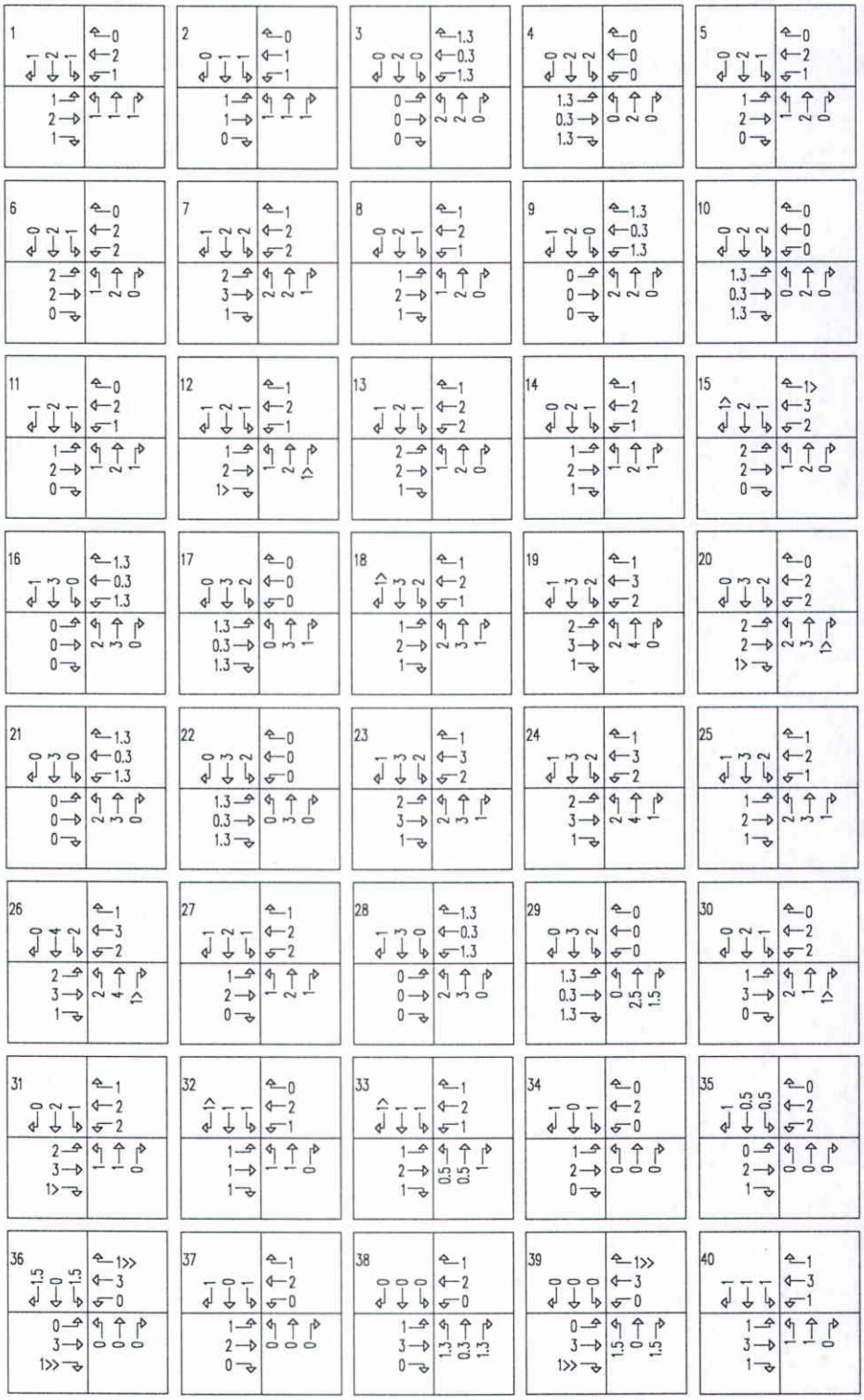

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Figure 7
Year 2030 Average Daily Traffic Volumes

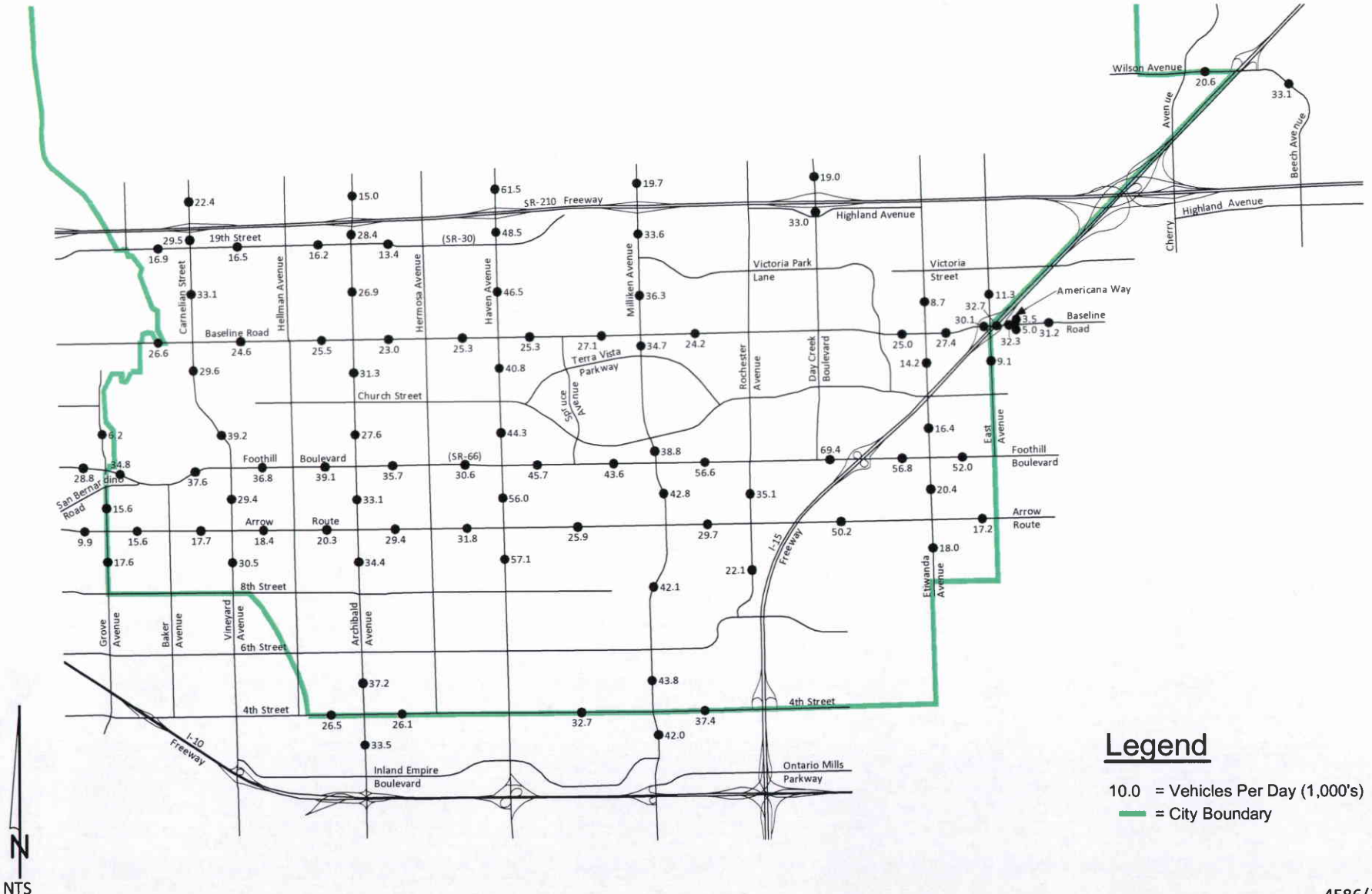

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Figure 8
Year 2030 Morning Peak Hour Intersection Turning Movement Volumes

Intersection reference numbers are in upper left corner of turning movement boxes.

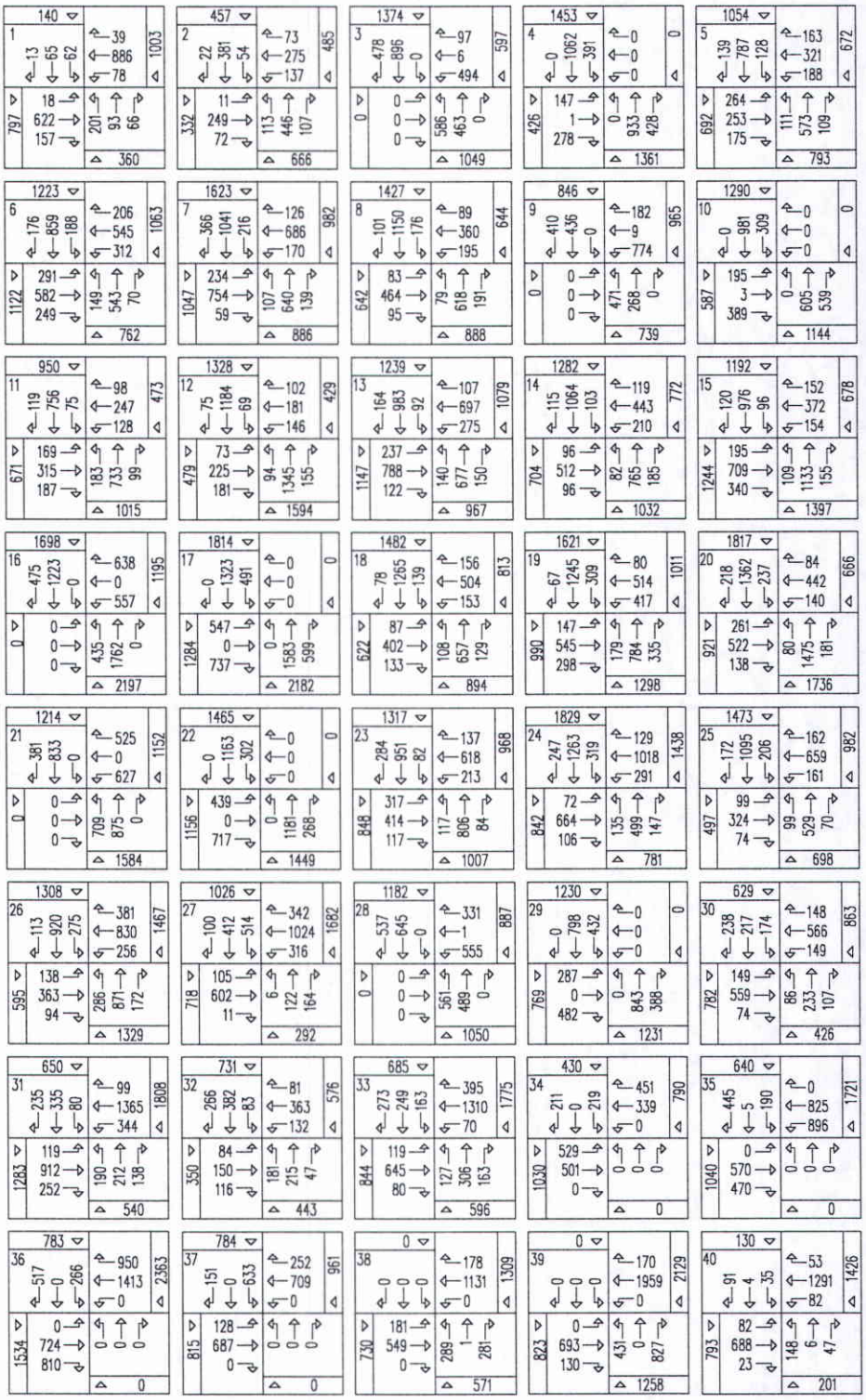

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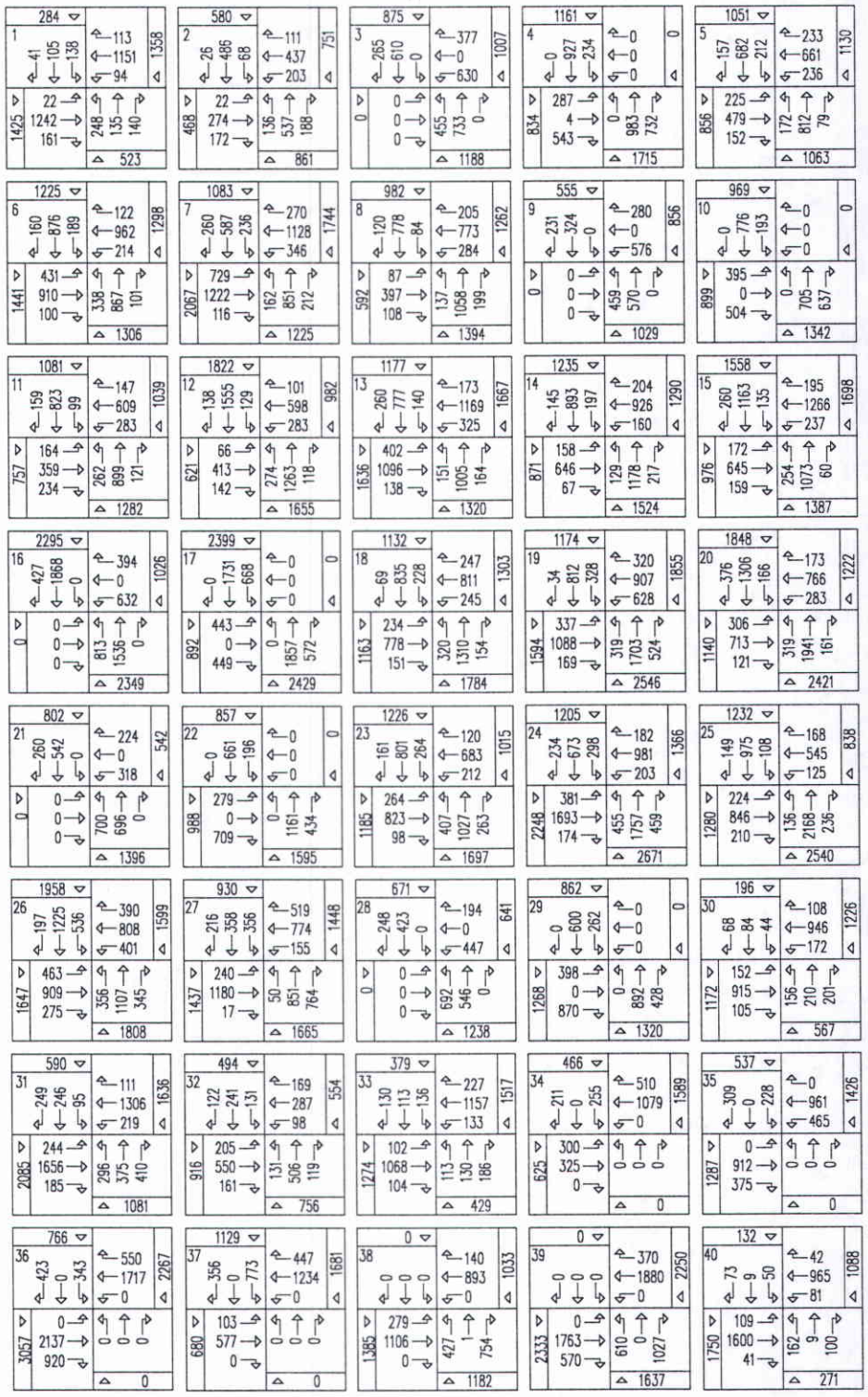
Figure 9
Year 2030 Evening Peak Hour Intersection Turning Movement Volumes

Intersection reference numbers are in upper left corner of turning movement boxes.



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