8.7
TRAFFIC DATA

This document is designed for double-sided printing to conserve natural resources.

Transportation Studies, Inc.
2640 Walnut Avenue, Suite L
Tustin, CA. 92780

City: ORANGE
N-S Direction: CANNON STREET
E-W Direction: SERRANO AVENUE

File Name : H1701002
Site Code : 00001944
Start Date : 1/18/2017
Page No : 1

Groups Printed- Turning Movements

	CANNON STREET Southbound			SERRANO AVENUE Westbound			CANNON STREET Northbound			DEAD END Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	397	2	22	0	321	33	85	0	0	0	0	860
07:15	0	367	7	37	0	347	44	119	0	0	0	0	921
07:30	0	397	8	45	0	308	60	118	0	0	0	0	936
07:45	0	400	7	33	0	269	58	146	0	0	0	0	913
Total	0	1561	24	137	0	1245	195	468	0	0	0	0	3630
08:00	0	349	11	43	0	273	69	163	0	0	0	0	908
08:15	0	313	17	31	0	231	81	146	0	0	0	0	819
08:30	0	285	9	14	0	219	70	96	0	0	0	0	693
08:45	0	210	9	22	0	212	64	131	0	0	0	0	648
Total	0	1157	46	110	0	935	284	536	0	0	0	0	3068
16:00	0	142	16	14	0	95	305	239	0	0	0	0	811
16:15	0	141	31	12	0	101	293	261	0	0	0	0	839
16:30	0	121	19	17	0	106	340	309	0	0	0	0	912
16:45	0	147	23	17	0	100	339	303	0	0	0	0	929
Total	0	551	89	60	0	402	1277	1112	0	0	0	0	3491
17:00	0	166	22	8	0	94	360	316	0	0	0	0	966
17:15	0	147	15	13	0	125	347	289	0	0	0	0	936
17:30	0	153	25	17	0	86	343	260	0	0	0	0	884
17:45	0	174	21	16	0	122	335	284	0	0	0	0	952
Total	0	640	83	54	0	427	1385	1149	0	0	0	0	3738
Grand Total	0	3909	242	361	0	3009	3141	3265	0	0	0	0	13927
Apprch %	0	94.2	5.8	10.7	0	89.3	49	51	0	0	0	0	
Total %	0	28.1	1.7	2.6	0	21.6	22.6	23.4	0	0	0	0	

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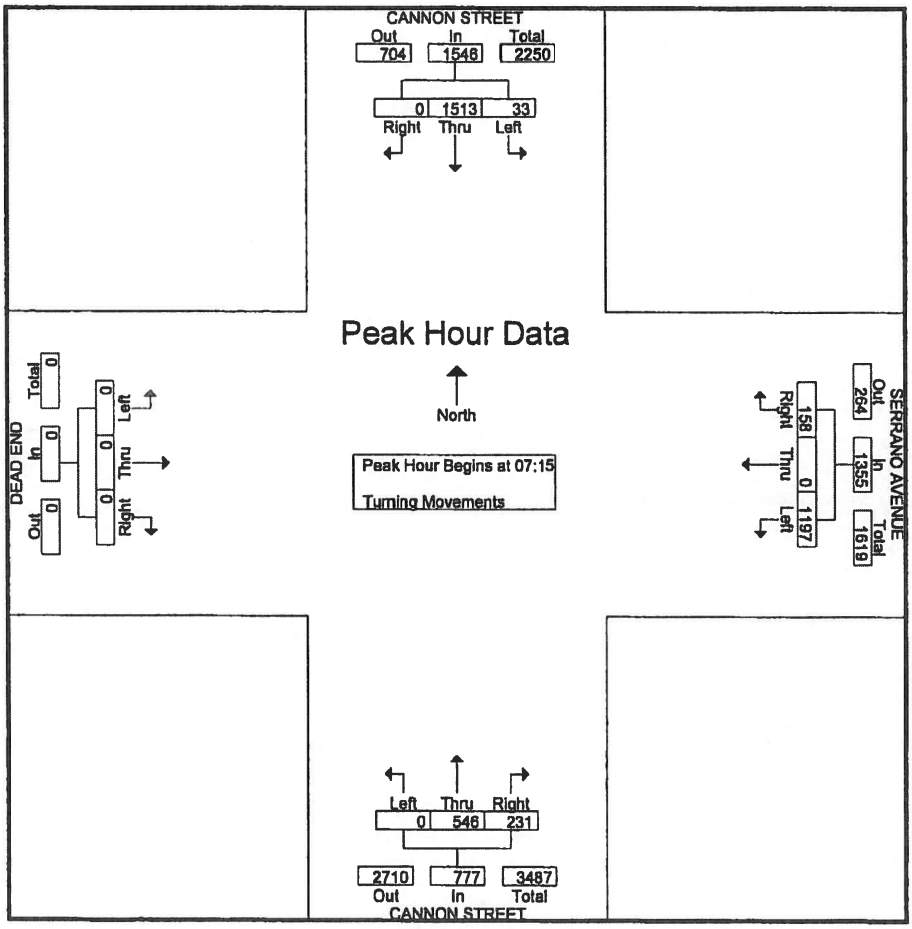
	CANNON STREET Southbound				SERRANO AVENUE Westbound				CANNON STREET Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15																	
07:15	0	367	7	374	37	0	347	384	44	119	0	163	0	0	0	0	921
07:30	0	397	8	405	45	0	308	353	60	118	0	178	0	0	0	0	936
07:45	0	400	7	407	33	0	269	302	58	146	0	204	0	0	0	0	913
08:00	0	349	11	360	43	0	273	316	69	163	0	232	0	0	0	0	908
Total Volume	0	1513	33	1546	158	0	1197	1355	231	546	0	777	0	0	0	0	3678
% App. Total	0	97.9	2.1		11.7	0	88.3		29.7	70.3	0		0	0	0		
PHF	.000	.946	.750	.950	.878	.000	.862	.882	.837	.837	.000	.837	.000	.000	.000	.000	.982



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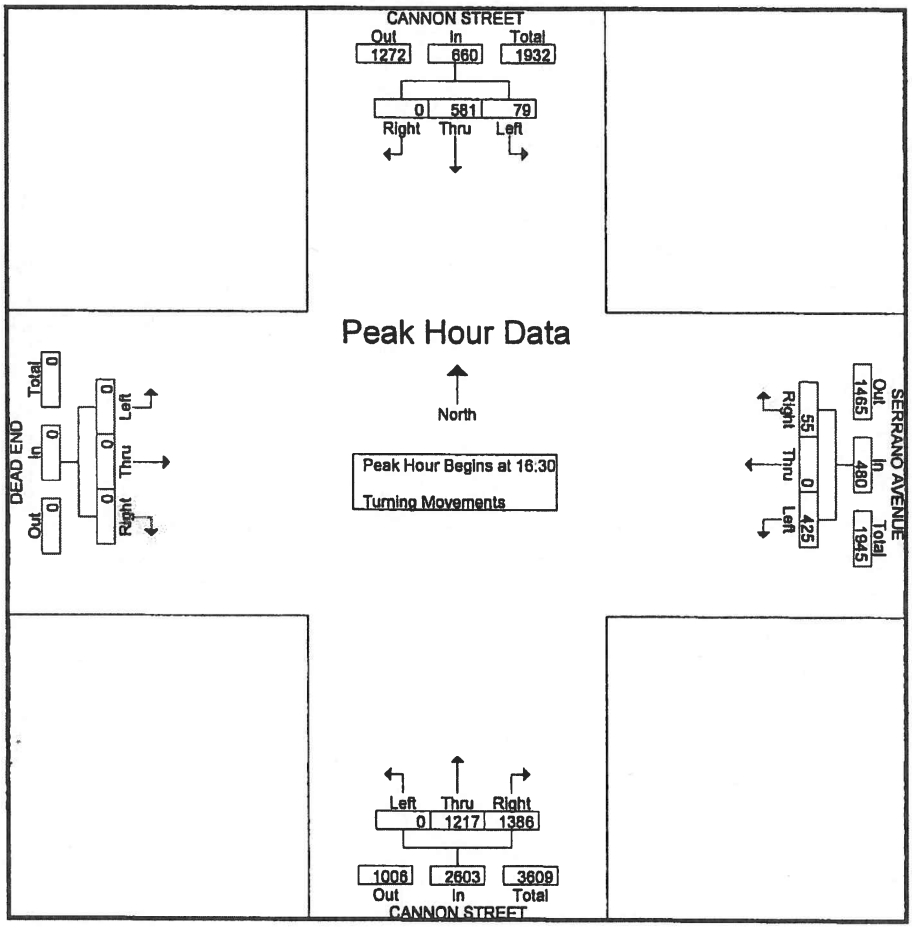
	CANNON STREET Southbound				SERRANO AVENUE Westbound				CANNON STREET Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:30																	
16:30	0	121	19	140	17	0	106	123	340	309	0	649	0	0	0	0	912
16:45	0	147	23	170	17	0	100	117	339	303	0	642	0	0	0	0	929
17:00	0	166	22	188	8	0	94	102	360	316	0	676	0	0	0	0	966
17:15	0	147	15	162	13	0	125	138	347	289	0	636	0	0	0	0	936
Total Volume	0	581	79	660	55	0	425	480	1386	1217	0	2603	0	0	0	0	3743
% App. Total	0	88	12		11.5	0	88.5		53.2	46.8	0		0	0	0		
PHF	.000	.875	.859	.878	.809	.000	.850	.870	.963	.963	.000	.963	.000	.000	.000	.000	.969



INTERSECTION CAPACITY UTILIZATION
CALCULATION WORKSHEET

PROJECT:	Orange
ANALYSIS CONDITION:	Existing Conditions
INTERSECTION:	Serrano Ave. @ Cannon St.

MOVEMENT	LANES	CAPACITY	AM PEAK HOUR VOLUME	AM PEAK HOUR V/C	PM PEAK HOUR VOLUME	PM PEAK HOUR V/C
NBL	0		0	*	0	
NBT	2	3400	546	0.16	1217	0.36 *
NBR	1	1700	231	0.14	1386	0.82 *
SBL	1	1700	33	0.02	79	0.05 *
SBT	2	3400	1513	0.45 *	581	0.17
SBR	0		0		0	
EBL	0		0		0	
EBT	0		0	0.00 *	0	0.00 *
EBR	0		0		0	
WBL	2	3400	1197	0.35 *	425	0.13 *
WBT	0		0		0	0.00
WBR	1	1700	158	0.09 *	55	0.03
		N/S Movements		0.45		0.40
		E/W Movements		0.35		0.13
		Rt. Turn Component		0.07		0.33
		Yellow Clearance		0.05		0.05
TOTAL CAPACITY UTILIZATION				0.92		0.91
LEVEL OF SERVICE (LOS)				E		E

ICU			LOS
0.10	-	0.6	A
0.61	-	0.7	B
0.71	-	0.8	C
0.81	-	0.9	D
0.91	-	1.00	E
1.01	-	UP	F

INTERSECTION CAPACITY UTILIZATION
CALCULATION WORKSHEET

PROJECT:	Orange
ANALYSIS CONDITION:	Existing Conditions plus Improvement
INTERSECTION:	Serrano Ave. @ Cannon St.

			AM PEAK HOUR			PM PEAK HOUR		
MOVEMENT	LANES	CAPACITY	VOLUME	V/C		VOLUME	V/C	
NBL	0		0		*	0		
NBT	2	3400	546	0.16		1217	0.36	*
NBR	2	3400	231	0.07		1386	0.41	
SBL	1	1700	33	0.02		79	0.05	*
SBT	2	3400	1513	0.45	*	581	0.17	
SBR	0		0			0		
EBL	0		0			0		
EBT	0		0	0.00	*	0	0.00	*
EBR	0		0			0		
WBL	2	3400	1197	0.35	*	425	0.13	*
WBT	0		0			0	0.00	
WBR	1	1700	158	0.09	*	55	0.03	
		N/S Movements		0.45			0.40	
		E/W Movements		0.35			0.13	
		Rt. Turn Component		0.07			0.00	
		Yellow Clearance		0.05			0.05	
TOTAL CAPACITY UTILIZATION				0.92			0.58	
LEVEL OF SERVICE (LOS)				E			A	

ICU			LOS
0.10	-	0.6	A
0.61	-	0.7	B
0.71	-	0.8	C
0.81	-	0.9	D
0.91	-	1.00	E
1.01	-	UP	F

APPENDIX B

INTERSECTION CAPACITY UTILIZATION WORKSHEETS

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values. ICU calculations were performed for the intersections shown in Figure B-1. For simplicity, signalization is assumed at each intersection. Precise ICU calculations of existing non-signalized intersections would require a more detailed analysis.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A capacity of 1700 vehicles per hour (VPH) per lane is assumed together with a .05 clearance interval. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both thru and right-turn traffic (typically with a width of 19 feet from curb to outside of thru-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

Example For Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:

RTOG = V/C (NBT)

Otherwise,

RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:

RTOR = V/C (WBL)

Otherwise,

RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR

Where factor = RTOR saturation flow factor (75%)

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/thru, thru/right, left/thru/right), the individual turn volumes are evaluated to