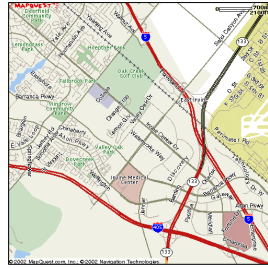

University of California, Irvine
 Student Chapter of the
 Institute of Transportation Engineers

Network Signal Coordination:
 Sand Canyon Avenue (SCA) and Irvine Center Drive (ICD)
 Irvine, California

April 18, 2002


Background

- Arterials:
 - Sand Canyon Avenue
 - Irvine Center Drive
- Location
- Existing travel demand
- Future development




Purpose

- To get the greatest number of vehicles through the network with the fewest stops in a comfortable and safe manner
- Re-evaluate existing conditions



Study Intersections

- Fourteen Signalized
 - ICD at Jeffrey Rd
 - ICD at Valley College
 - ICD at Orange Tree
 - ICD at Valley Oak Dr
 - ICD at SCA
 - ICD at Odyssey
 - ICD at Laguna Canyon Rd
 - ICD at Discovery
 - SCA at Burt
 - SCA at Oak Canyon
 - SCA at Waterworks Pkwy
 - SCA at Barranca Pkwy
 - SCA at Hospital
 - SCA at Alton Pkwy
- Two Unsignalized
 - SCA at I-405 NB On-ramp
 - SCA at I-405 NB Off-ramp



Research

- Obtain as-built plans from City of Irvine
 - Signal timing chart
 - Traffic signal modification plan
- Field verification
 - Intersection geometries
- Traffic Data Collection

Existing Network Conditions

- using Synchro v3.2
- Sand Canyon Avenue

STREET SEGMENT	NORTHBOUND SAND CANYON AVENUE			SOUTHBOUND SAND CANYON AVENUE		
	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS
NB 405 Off-ramp	0	10	A	0	4	A
NB 405 On-ramp	0	4	A	0	6	A
Alton Pkwy	26	32	F	30	40	E
Hospital	11	21	C	4	20	A
Barranca Pkwy	17	33	C	17	36	B
Waterworks	21	40	C	14	28	C
ICD	20	34	C	22	40	C
Oak Canyon	11	29	B	10	31	A
Burt	14	35	B	5	13	B
TOTAL	120	238	C	102	218	B

Existing Network Conditions

- Irvine Center Drive

STREET SEGMENT	WESTBOUND IRVINE CENTER DRIVE			EASTBOUND IRVINE CENTER DRIVE		
	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS
Discovery	13	25	C	14	30	B
Laguna Canyon	11	27	B	12	25	B
Odyssey	2	15	A	10	22	B
SCA	19	31	C	14	29	B
Valley Oak	7	22	A	7	24	A
Orange Tree	22	39	C	20	37	C
Valley College	4	21	A	8	25	A
Jeffrey	40	57	E	39	62	D
TOTAL	118	237	C	124	254	B

Existing Network Conditions

- Coordinatability
 - Travel time and distances
 - Traffic volume
 - Cycle length
 - Result: Synchro recommends coordination on all nodes
- GPS field verification
 - Last year UCI ITE student chapter project

Coordination: SCA Only

STREET SEGMENT	NORTHBOUND SAND CANYON AVENUE			SOUTHBOUND SAND CANYON AVENUE		
	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS
Allon Pkwy	36	42	F	30	40	E
Hospital	2	12	A	1	17	A
Barranca Pkwy	22	38	C	13	32	B
Waterworks	3	22	A	14	28	C
ICD	26	40	D	29	47	D
Oak Canyon	2	20	A	7	28	A
Burt	5	26	A	4	12	B
TOTAL	96	200	B	98	204	B

Coordination: ICD Only

STREET SEGMENT	WESTBOUND IRVINE CENTER DRIVE			EASTBOUND IRVINE CENTER DRIVE		
	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS	SIGNAL DELAY	TRAVEL TIME (S)	ARTERIAL LOS
Discovery	11	23	B	2	18	A
Laguna Canyon	4	20	A	3	16	A
Odyssey	1	14	A	4	16	A
SCA	13	23	B	2	17	A
Valley Oak	9	24	A	1	18	A
Orange Tree	6	23	A	3	20	A
Valley College	21	38	C	13	30	B
Jeffrey	11	28	B	31	54	C
TOTAL	74	193	B	59	189	A

Coordination: Network

- Looking only at total parameters

ARTERIAL SEGMENT	Existing			Network coordination			IMPROVEMENT?
	Signal Delay	Travel Time (s)	Arterial LOS	Signal Delay	Travel Time (s)	Arterial LOS	
NB SCA	120	238	C	89	207	B	Yes
SB SCA	102	218	B	119	235	C	No
WB ICD	118	237	C	83	202	B	Yes
EB ICD	124	254	B	74	204	A	Yes

Results

- Which one of the coordination is better?
 - Depends on purpose
 - Current recommendation: Coordinate Network
- On-going project
 - Compare results from Synchro and GPS travel time data with
 - Highway Capacity Software - Arterial
 - Passer II and TRANSYT Signal Timing Software