



CITY OF COSTA MESA

LOCAL SIGNAL SYNCHRONIZATION PLAN

SECTION ONE
TRAFFIC SIGNAL SYNCHRONIZATION GOALS, POLICIES AND
OBJECTIVES

Introduction

Traffic signal coordination is one of the vital aspects of a traffic circulation system because it ensures that motorists are able to travel through multiple intersections along a corridor with minimal stops and short delays. A well-timed, coordinated system permits continuous movement along an arterial or throughout a network of major streets with minimum stops and delays, which, reduces fuel consumption and improves air quality

Goals, Objectives and Policies

The primary goals, objectives and policies included in the circulation element of the adopted General Plan for the City of Costa Mesa are as follows;

- Goal CIR-1: It is the goal of the City of Costa Mesa to provide for a balanced, uncongested, safe, and energy-efficient transportation system, incorporating all feasible modes of transportation.
 - Objective CIR 1-A: To provide specific programs and policies that address multi-modal transportation, multi-agency coordination, mitigation of traffic impacts and the balancing of land uses with transportation systems.
 - CIR-1A.11: Attempt to maintain or improve mobility within the City to achieve a standard levels of service not worse than Level of Service "D" at all intersection s under the sole control of the City. Intersection level of service analyses for General Plan conditions shall be updated periodically and presented to the City Council.
 - CIR-1A.12: Cooperate with adjacent jurisdictions to maintain or improve mobility within the City to achieve a standard level of service no worse than "D" at all intersections under State or joint control. Intersection level of service analyses for General Plan conditions for locations under State or joint control shall be updated periodically and presented to City Council.
- Goal CIR-2: It is the goal of the City of Costa Mesa to provide for standard services levels at signalized intersections by constructing capacity improvements for all various models of circulation adopting land use intensities commensurate with planned circulation improvements and implementing traffic demand reduction programs, thereby creating a more energy efficient transportation system.
 - Objective CIR-2A: To coordinate efforts with other regional agencies and pursue operational improvements towards enhancing the capacity of the system of freeways and arterial highways in the City.
 - CIR-2A.1: Coordinate with Caltrans for future consideration of the extension of Route 55 (the Costa Mesa Freeway) from 19th Street to the southern City boundary.
 - CIR-2A.2: Coordinate with Orange County Transportation Authority and with adjacent agencies to improve signal timing and coordination along major arterials.

- CIR-2A.3: Continue to work with Caltrans to synchronize and coordinate traffic signals on arterials at intersections controlled by Caltrans.
- CIR-2A.4: Continue to evaluate and pursue design and operational improvements (medians, driveway closures, signal synchronization or phasing, parking or turn restrictions, etc.) to improve the efficiency of intersections.
- Objective CIR 2-C: To invest capital via a rationally phased allocation process for implementing transportation projects and programs.
 - CIR-2C.2: Complete and annually maintain a needs assessment for traffic services levels and traffic safety. Develop and annually update a priority list of improvement projects, with priorities based on 1) correcting identified hazards; 2) improving/maintaining peak hour traffic volumes; 3) improving efficiency of existing infrastructure utilization; and 4) intergovernmental coordination.

Signal Synchronization

The purpose of the Local Signal Synchronization Plan (LSSP) is to identify local and regional travel corridors within the City of Costa Mesa and develop a blue print for implementation of signal coordination along these corridors. The LSSP will include guidelines for synchronizing traffic signals based on equipment limitations, capacity restrictions and funding constraints.

The traffic on arterials and highways in the region continues to increase with minimal change in capacity of the circulation system. This results in increased congestion and delay along important travel corridors in the City. Coordination of traffic signals along the travel corridors will increase the traffic-handling capacity of intersections thus reducing congestion and delay.

Implementation of Signal Coordination along major arterials will provide the following benefits

- Effectively manage the throughput capacity of intersections to improve mobility through the use of appropriate layouts and control measures and regular reviews and updates to the operational parameters; and
- Reduce vehicle stops and delays, thereby:
 - lessening the negative impacts to air quality; and
 - reducing fuel consumption.

Goals for near term and long range implementation

The near term goal for the City is to upgrade the existing traffic signal infrastructure at intersections as well as at the Traffic Operation Center (TOC) and establish communication to all signalized intersections via fiber optic network. Currently, the City is transitioning from an old signal system (equipment and communication) to a new system in which the traffic signal equipment at majority of the intersections will be at par with existing technology. Approximately, 80% of the intersections and the communication network in the City, will be updated in the next three years.

The long term goal for the City is to develop a state-of-the-art TMC and a robust network of Closed Circuit Television (CCTV) cameras. The implementation of these upgrades will provide the City with the necessary tools to identify traffic signal related issues quickly and address

them efficiently. It will also help in maintaining signal coordination along regional and local corridors.

Infrastructure upgrades, modernization, and maintenance needs

The City's signal synchronization plan includes various upgrades to infrastructure to support signal synchronization. The City's primary plan is to migrate from antiquated Multisonics 820 controllers and 330 master system equipment to modern ASC/3 signal controllers necessary to support updated timing plans and coordination. The City's signal controller equipment is no longer supported by the manufacturer so parts and repair are no longer available. Therefore, the City has started upgrading to ASC/3 signal controllers that utilizes the MIST system for master controller software. Additionally, the City has migrated away from utilizing twisted copper pair for communication between field controllers and the master system in City Hall and installed single mode fiber optic (SMFO) cable along major corridors. SMFO provides increased reliability and bandwidth necessary for communication with ASC/3 controllers and relaying CCTV signals. Modern controller equipment requires additional components within the signal cabinet and in the City's TOC, such as Ethernet switches and networking devices. Thus additional maintenance of these components is required to for increased reliability.

Multi-jurisdictional coordination opportunities and initiatives

Given the geographical location of the City of Costa Mesa, the system of highways and arterials in the region and the existing travel patterns create unique challenges for improving the overall mobility of the transportation system. The circulation network (including freeways) in the City carries a considerable amount of regional (through) traffic that does not originate or terminate within the City. As a result, the City has to regularly coordinate with the neighboring cities and other agencies such as Caltrans and Orange County Transportation Authority (OCTA) to maintain a smooth traffic flow on City arterials and highways. In the last three years, the City has partnered with several Cities and applied for Measure M funding for upgrading the traffic infrastructure and coordinating signals along regional corridors for the following projects.

- Fairview Road (Newport Boulevard to SR-22) – City of Santa Ana
- Adams Avenue (Beach Boulevard to Fairview Road) – City of Huntington Beach
- Newport Boulevard (Via Lido to Bristol Street) – City of Newport Beach

Additionally, last year the City partnered with Santa Ana and Newport Beach to prepare Measure M2 funding applications for two regional corridors, Harbor Boulevard (Newport Boulevard to SR-22) and Bristol Street (Newport Boulevard to SR-22). The City continuously monitors the traffic conditions along its arterials and highways to identify issue and develop innovative solutions to address them. Red Hill Avenue is a potential multi-jurisdictional corridor that can be considered for signal synchronization in the future.

Role of local system in regional context including consistency and participation in Project P

The local signal synchronization plan for the City is consistent with the regional synchronization plan developed by OCTA. All the corridors included in the regional plan are part of the local

plan. The regional synchronization plan includes the following corridors in the City of Costa Mesa.

- Harbor Boulevard
- Fairview Road
- Bristol Street
- Red Hill Avenue
- Newport Boulevard
- Baker Street
- Placentia Avenue
- Adams Avenue
- Fair Drive
- Victoria Street
- 17th Street

The local signal synchronization plan includes the corridors listed above and the following additional corridors within the City.

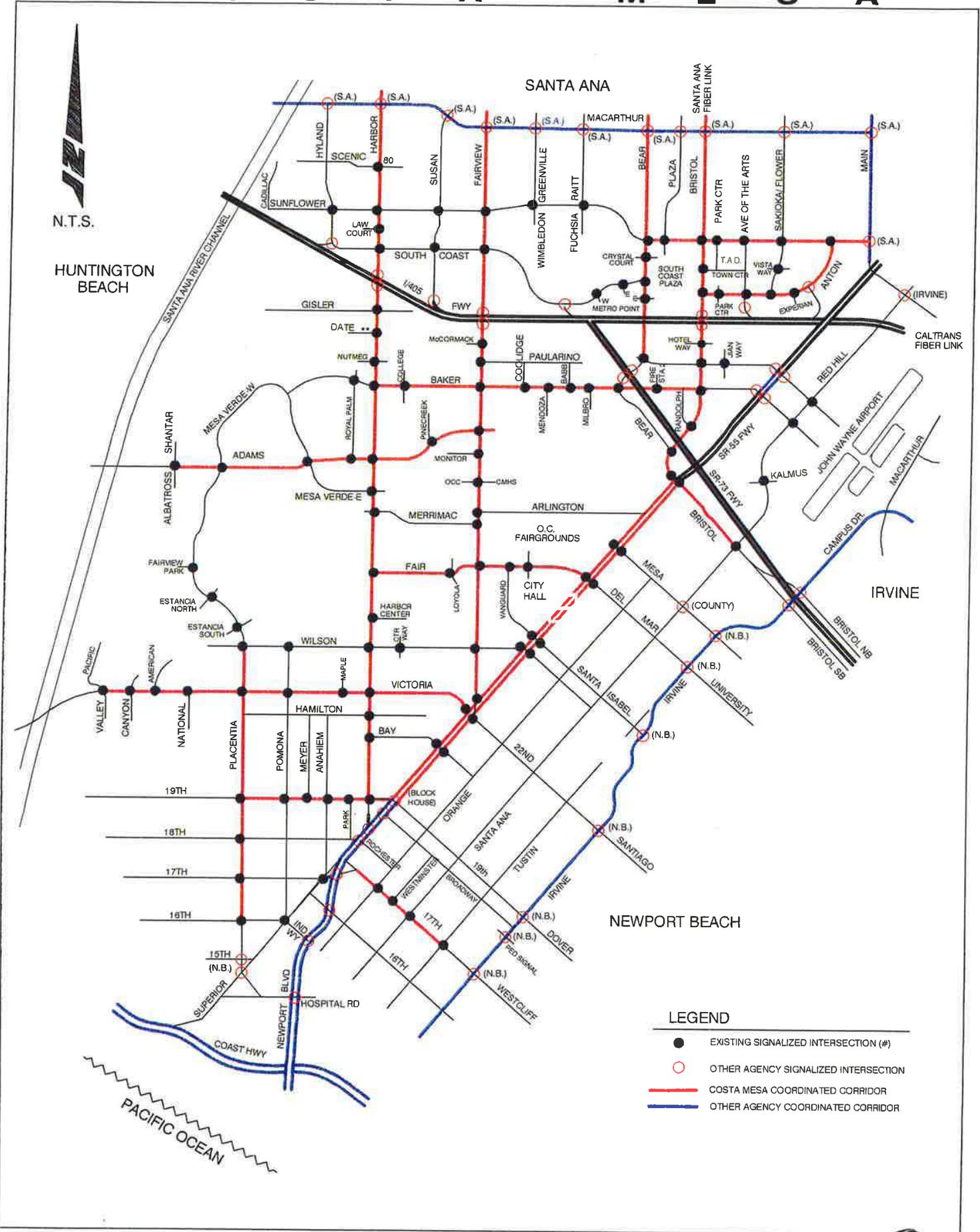
- Bear Street
- 19th Street
- Sunflower Avenue
- Anton Boulevard
- Wilson Street

Policies and strategies for updating signal timing

The City has periodically undertaken updates to signal timing with goals of improving traffic flow and reducing delay. The established minimum timing of phases are derived from standards set forth in the Manual of Uniform Traffic Control Devices (MUTCD). The City has regularly refined and improved timing plans to adapt to current traffic patterns. The City has implemented traffic signal synchronization plans along major arterial corridors such as Harbor Boulevard and Fairview Road. Modern ASC/3 controllers and SMFO were deployed with these projects and existing timing and coordination plans were reviewed and revised to adhere to current standards. ASC/3 controllers also provide advanced timing features not available with 820 controllers. The City has taken advantage of these features to further improve traffic flow and reduce unnecessary delay.

SECTION TWO
TRAFFIC SIGNAL SYNCHRONIZATION STREET ROUTES
(EXISTING AND PLANNED)

C O S T A M E S A



TRAFFIC SYNCHRONIZATION NETWORK
CITY OF COSTA MESA, ORANGE COUNTY, CALIFORNIA

SECTION THREE
TRAFFIC SIGNAL INVENTORY

CITY OF COSTA MESA

SIGNALIZED INTERSECTION EQUIPMENT LIST

No.	Intersection	Cabinet	Controller	CCTV	Switch Type	AM	MD	PM	WK	OP
1	PLACENTIA / 16 th	Type P	ASC 3		Fiber switch	100	FREE	100	90	90
2	PLACENTIA / 17 th	Type P	ASC 3	Cohu	Fiber switch	100	FREE	100	90	90
3	PLACENTIA / 18 th	Type P	ASC 3		Fiber switch	100	FREE	100	90	90
4	PLACENTIA / 19 th	Type P	ASC 3	Cohu	Fiber switch	100	FREE	100	90	90
5	PLACENTIA / VICTORIA	Type P	ASC 3	Cohu	Fiber switch/IP Copper	120	95	130		100
6	PLACENTIA / WILSON	Type P	ASC 3	Cohu	IP Copper	Free	Free	Free	Free	Free
7	PLACENTIA / ESTANCIA SOUTH	Type P	ASC 3		IP Copper	Free	Free	Free	Free	Free
8	PLACENTIA / ESTANCIA NORTH	Type P	ASC 3		IP Copper	Free	Free	Free	Free	Free
9	19 TH / MEYER	Type M	820		NA	100	100	100	100	Free
10	VICTORIA / AMERICAN	Type P	ASC 3		Fiber switch	120	95	130		100
11	SUPERIOR / 16 TH / INDUSTRIAL	Type P	820		NA	Free	Free	Free	Free	Free
12	SUPERIOR / 17 TH	Type P	ASC 3	Cohu Analog	Fiber switch	Caltrans	Caltrans	Caltrans	Caltrans	Caltrans
13	VICTORIA / VALLEY/PACIFIC	Type P	820	Cohu	Fiber switch	120	95	130	Free	100
14	VICTORIA / CANYON	Type P	ASC 3		Fiber switch	120	95	130	Free	100
15	VICTORIA / NATIONAL	Type P	ASC 3		Fiber switch	120	95	130	Free	100
16	VICTORIA / POMONA	Type P	ASC 3		Fiber switch	120	95	130	Free	100
17	W 19 TH / POMONA	Type P	820		NA	100	100	100	100	Free
18	W 19 TH / ANAHEIM	Type P	820		NA	100	100	100	100	Free
19	W 19 TH / PARK	Type P	820		NA	100	100	100	100	Free
20	HARBOR / 19 TH	Type P	ASC 3		IP Copper	130	110	130	110	100
21	HARBOR / BAY	Type P	ASC 3		IP Copper	130	110	130	110	100
22	HARBOR/HAMILTON	Type P	ASC 3		IP Copper	130	110	130	110	100
23	HARBOR / VICTORIA	Type P	ASC 3	Cohu Analog	Gigabit/IP copper	130	110	130	110	100
24	HARBOR / WILSON	Type P	ASC 3		Fiber switch	130	110	130	110	100
25	HARBOR / HARBOR CENTER	Type P	ASC 3		Fiber switch	130	110	130	110	100
26	HARBOR / FAIR DRIVE	Type P	ASC 3		Fiber switch	130	110	130	110	100
27	HARBOR / MERRIMAC	Type P	ASC 3		Fiber switch	130	110	130	110	100
28	HARBOR / MESA VERDE E./PETERSON	Type P	ASC 3		Fiber switch	130	110	130	110	100
29	E 17 TH / ORANGE	Type P	ASC 3	Cohu	Fiber switch	90	90	90	90	NA
30	E 17 TH / SANTA ANA	Type P	ASC 3		Fiber switch	90	90	90	90	NA
31	E 17 TH / TUSTIN	Type P	ASC 3		Fiber switch	90	90	90	90	NA
32	E 17 TH / WESTMINSTER	Type P	ASC 3		Fiber switch	90	90	90	90	NA
33	BRISTOL / SUNFLOWER	Type P	820		Gigabit/IP copper	120	130	130	130	NA
34	BRISTOL / TOWN CENTER	Type P	820		NA	120	130	130	130	NA
35	BRISTOL / ANTON/50 COAST PLAZA	Type P	820		NA	120	130	130	130	NA
36	BRISTOL / 405 NB	Type P	170		NA	Caltrans	Caltrans	Caltrans	Caltrans	Caltrans
37	BRISTOL / 405 SB (CALTRANS)	Type P	170		NA	Caltrans	Caltrans	Caltrans	Caltrans	Caltrans
38	BRISTOL / HOTEL WAY	Type P	820		NA	120	130	130	130	NA
39	BRISTOL / PAULARINO	Type M	820		NA	120	130	130	130	NA
40	BRISTOL / BAKER	Type P	ASC 3		Fiber switch	120	130	130	130	NA
41	BRISTOL / RANDOLPH	Type P	820		NA	80	80	80	80	80
42	BRISTOL / BEAR	Type M	820		NA	80	80	80	80	80
43	ANTON / PARK CENTER	Type P	820		NA	85	FREE	85	FREE	FREE
44	ANTON / AVE OF THE ARTS	Type P	820		NA	85	FREE	85	FREE	FREE
45	BAKER / MENDOZA	Type P	ASC 3		Fiber switch	85	85	85	85	85
46	BAKER / BABB	Type P	ASC 3		Fiber switch	85	85	85	85	85
47	BAKER / MILBRO	Type P	ASC 3		Fiber switch	85	85	85	85	85
48	BAKER / BEAR	Type P	ASC 3		Fiber switch	85	85	85	85	85
49	FAIR / FAIRGROUNDS/CITY HALL	Type P	820		NA	Free	Free	Free	Free	Free
50	FAIR / VANGUARD	Type P	820		NA	Free	Free	Free	Free	Free
51	FAIR / LOYOLA	Type P	820		NA	Free	Free	Free	Free	Free
52	FAIRVIEW / WILSON	Type P	ASC 3	Cohu	Fiber switch	Free	Free	Free	Free	Free
53	FAIRVIEW / FAIR	Type P	ASC 3	Cohu	Gigabit/Fiber switch	110	110	110	110	NA
54	FAIRVIEW / MERRIMAC	Type P	ASC 3		Fiber switch	110	110	110	110	NA
55	FAIRVIEW / ARLINGTON	Type P	ASC 3		Fiber switch	110	110	110	110	NA
56	FAIRVIEW / OCC / CMHS ENTRANCE	Type P	ASC 3		Fiber switch	110	110	110	110	NA
57	FAIRVIEW / MONITOR	Type P	ASC 3		Fiber switch	110	110	110	110	NA
58	FAIRVIEW / ADAMS / EL CAMINO	Type P	ASC 3	Cohu Analog	Fiber switch	130	120	130	120	NA
59	FAIRVIEW / BAKER	Type P	ASC 3	Cohu	Fiber switch	130	120	130	120	NA
60	FAIRVIEW / PAULARINO	Type P	ASC 3		Fiber switch	130	120	130	120	NA
61	SOUTH COAST / SUSAN	Type P	820		NA	Free	Free	Free	Free	Free
62	SUNFLOWER / SUSAN	Type P	820		NA	Free	Free	Free	Free	Free
63	FAIRVIEW / SOUTH COAST	Type P	ASC 3	Cohu	Fiber switch	130	120	130	120	NA
64	FAIRVIEW / SUNFLOWER	Type P	ASC 3	Cohu	Fiber switch	130	120	130	120	NA
65	ADAMS / PINECREEK	Type P	820		NA	130	110	130	110	100

No.	Intersection	Cabinet	Controller	CCTV	Switch Type	AM	MD	PM	WK	OP
66	HARBOR / ADAMS	Type P	ASC 3	Cohu	Fiber switch	130	110	130	110	100
67	ADAMS / ROYAL PALM	Type P	820		NA	130	110	130	110	100
68	ADAMS / MESA VERDE EAST	Type P	820		NA	130	110	130	110	100
69	ADAMS / MESA VERDE W. / PLACENTIA	Type P	820	Cohu Analog	NA	130	110	130	110	100
70	ADAMS / ALBATROSS / SHANTAR	Type P	820		NA	130	110	130	110	100
71	BAKER / COLLEGE	Type P	ASC 3		Fiber switch	130	110	130	110	100
72	HARBOR / BAKER	Type P	ASC 3		Gigabit	130	110	130	110	100
73	HARBOR / NUTMEG / TARGET	Type P	ASC 3		Fiber switch	130	110	130	110	100
74	HARBOR / GISLER	Type P	ASC 3		Fiber switch	130	110	130	110	100
75	BAKER / ROYAL PALM	Type P	ASC 3		Fiber switch	Free	Free	Free	Free	Free
76	PLACENTIA / FAIRVIEW PARK ENT	Type M	ASC 3		IP Copper	Free	Free	Free	Free	Free
77	HARBOR / SOUTH COAST	Type P	ASC 3		Fiber switch/IP Copper	130	110	130	110	100
78	HARBOR / LAW COURT	Type P	ASC 3		IP Copper	130	110	130	110	100
79	HARBOR / SUNFLOWER	Type P	ASC 3		IP Copper	130	110	130	110	100
80	HARBOR / SCENIC	Type P	ASC 3		IP Copper	130	110	130	110	100
81	SUNFLOWER / WIMBLEDON/GREENVILLE	Type P	820		NA	Free	Free	Free	Free	Free
82	SUNFLOWER / FUSCHIA/RAITT	Type P	820		NA	Free	Free	Free	Free	Free
83	SUNFLOWER / BEAR	Type P	820		IP Copper	105	105	105	105	105
84	SUNFLOWER / PLAZA	Type P	820		IP Copper	105	105	105	105	105
85	SUNFLOWER / PARK CENTER	Type P	820		NA	120	130	130	130	NA
86	SUNFLOWER / AVENUE OF THE ARTS	Type P	820		NA	60	65	65	FREE	NA
87	SUNFLOWER / SAKIOKA / FLOWER	Type P	820		NA	120	130	130	130	NA
88	SUNFLOWER / ANTON	Type P	820		NA	120	130	130	130	NA
89	SUNFLOWER / HYLAND	Type P	820		NA	FREE	FREE	Free	FREE	FREE
90	RED HILL / KALMUS	Type P	820		NA	FREE	FREE	Free	FREE	FREE
91	RED HILL / BAKER	Type P	ASC 3		IP Copper	FREE	FREE	Free	FREE	FREE
92	RED HILL / PAULARINO	Type P	820		NA	FREE	FREE	Free	FREE	FREE
93	BAKER / COOLIDGE	Type M	ASC 3		Fiber Switch	85	85	85	85	85
94	FAIRVIEW / MCCORMACK	Type M	ASC 3		Fiber Switch	130	120	130	120	NA
95	BEAR / PAULARINO	Type P	820		NA	Free	Free	Free	Free	Free
96	BEAR / METRO POINT/MAY CO	Type P	820	Cohu	IP Copper	105	105	105	105	105
97	BEAR / SOUTH COAST	Type P	820		IP Copper	105	105	105	105	105
98	BEAR / CRYSTAL COURT / SCP II	Type P	820		IP Copper	105	105	105	105	105
99	SOUTH COAST / METRO WEST	Type P	820		NA	Free	Free	Free	Free	Free
100	SOUTH COAST / METRO EAST	Type M	820		NA	Free	Free	Free	Free	Free
101	ANTON / SAKIOKA	Type P	820		NA	85	FREE	85	FREE	FREE
102	PAULARINO / JIAN WAY	Type M	820		NA	Free	Free	Free	Free	Free
103	ANTON / EXPERIAN	Type P	820		NA	85	FREE	85	FREE	FREE
104	BAKER / FIRE STATION #2	Type M	ASC 3		Fiber Switch	85	85	85	85	85
105	WILSON / POMONA	Type M	820		NA	Free	Free	Free	Free	Free
106	SAKIOKA / ENCLAVE	Type P	820		NA	Free	Free	Free	Free	Free
107	BRISTOL / REDHILL	332	820		NA	Free	Free	Free	Free	Free
108	BRISTOL / SB NEWPORT	332	820		NA	80	60	80	60	60
109	BRISTOL / NB NEWPORT	332	820		NA	80	60	80	60	60
110	NEWPORT SB / MESA	332	820		NA	80	60	80	60	60
111	NEWPORT N/B / MESA	332	820		NA	80	60	80	60	60
112	NEWPORT SB / FAIR	332	820		NA	80	60	80	60	60
113	NEWPORT NB / DEL MAR	332	820		NA	80	60	80	60	60
114	NEWPORT SB / VANGUARD	332	820		NA	60	60	80	60	60
115	NEWPORT NB / SANTA ISABEL	332	820		NA	60	60	80	60	60
116	NEWPORT SB / WILSON	332	820		NA	80	60	80	60	60
117	NEWPORT NB / WILSON	332	820		NA	80	60	80	60	60
118	NEWPORT SB / FAIRVIEW	332	820		NA	100	60	100	60	60
119	NEWPORT NB / 22 ND	Type P	820	Pelco Analog	NA	100	60	100	60	60
120	NEWPORT SB / VICTORIA	Type P	820		NA	100	60	100	60	60
121	NEWPORT NB / BAY	332	820		NA	60	60	80	60	60
122	NEWPORT SB / BAY	332	820		NA	60	60	80	60	60
123	VICTORIA / MAPLE	Type P	ASC 3		Fiber Switch	120	95	130	Free	100
124	WILSON / CENTER WAY	Type P	820		NA	Free	Free	Free	Free	Free
125	HARBOR / DATE	Type P	ASC 3		Fiber Switch	130	110	130	110	100

SECTION FOUR
TRAFFIC SIGNAL SYNCHRONIZATION SYSTEM AND
THREE YEAR PLAN

3-YEAR OUTLOOK TRAFFIC SIGNAL SYNCHRONIZATION

Funding Needs for Synchronized Operation (Constrained)

Reporting Jurisdiction Expenditures: City of Costa Mesa

MAINTENANCE

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Traffic Signal Maintenance	\$355,000	\$355,000	\$360,000	\$1,070,000
Subtotal Maintenance				\$1,070,000

CONSTRUCTION

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Adams Avenue Signal Synchronization	\$364,000			\$364,000
Bristol Street Signal Synchronization	\$581,520			\$581,520
Harbor Boulevard Signal Synchronization	\$922,900			\$922,900
Newport Boulevard Signal Synchronization	\$735,000			\$735,000
Sunflower Avenue Signal Synchronization	\$727,274			\$727,274
Subtotal Construction	\$3,330,694			\$3,330,694

OPERATIONS

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Fairview Road Signal Synchronization	\$14,700	\$14,700		\$29,400
Baker/Placentia Signal Synchronization	\$15,599	\$15,599	\$15,599	\$46,797
Victoria Street Signal Synchronization	\$5,680	\$5,680	\$5,680	\$17,040
17 th Street Signal Synchronization	\$5,710	\$5,710	\$5,710	\$17,130
Subtotal Operations	\$41,689	\$41,689	\$26,989	\$110,367
				\$4,511,061

3-YEAR OUTLOOK TRAFFIC SIGNAL SYNCHRONIZATION

Funding Needs for Synchronized Operation (Unconstrained)

Reporting Jurisdiction Expenditures: City of Costa Mesa

MAINTENANCE

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Traffic Signal Maintenance	\$355,000	\$355,000	\$360,000	\$1,070,000
Subtotal Maintenance				\$1,070,000

CONSTRUCTION

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Bear Street Signal Synchronization		\$261,250		
Citywide Signal Improvements (Hardware)			\$250,000	\$250,000
Citywide ITS Improvements (Central sys. CCTV)		\$250,000	\$250,000	\$250,000
Signal System Upgrade (Paularino)		\$500,000		
Traffic Management Center (Video Server)	\$60,000			
Subtotal Construction	\$60,000	\$1,011,250	\$500,000	\$500,000

OPERATIONS

PROJECT	FY14/15	FY15/16	FY16/17	TOTAL
Citywide Signal Timing Maintenance	\$18,000	\$20,000	\$20,000	\$58,000
Subtotal Operations				\$58,000
				\$1,628,000

LSSP IMPLEMENTATION – CANDIDATE SIGNAL SYNCHORNIZATION PROJECTS WITH ESTIMATED COSTS

Reporting Jurisdiction Expenditures: City of Costa Mesa

CORRIDOR	IMPROVEMENT SUMMARY	ESTIMATED COST
Bear Street	Upgrade timing and replace controllers, cabinets, fiber optic cable and detection.	\$200,000
Anton Boulevard	Upgrade timing and replace controllers, cabinets, fiber optic cable and detection.	\$300,000
Wilson Street	Upgrade timing and replace controllers, cabinets, fiber optic cable and detection.	\$80,000
19 th Street	Signal synchronization	\$50,000
TMC Upgrades	Central system software upgrade, Server, communication upgrades, and monitors	\$500,000
Red Hill Avenue	Upgrade timing and replace controllers, cabinets, fiber optic cable and detection.	\$300,000
Total Estimated Cost		\$1,430,000

SECTION FIVE

**TRAFFIC SIGNAL SYNCHRONIZATION ASSESSMENT
REVIEW AND REVISE, AS MAY BE NECESSARY, THE
TIMING OF TRAFFIC SIGNALS**

**Significant timing plan updates and projects completed FY
2010/2011 through 2013/2014**

Overall performance results.

The completed TSS projects have yielded improvements in traffic flow during AM, midday, PM and weekend peak hours and generally reduced delay. Tangible benefits in the following areas have been documented.

1. **Travel Time Savings** – These savings apply to automobile, truck and transit passengers, who benefit from reduced costs according to their “value of time”.
2. **Fuel Consumption Savings** – These are primarily the reduction in fuel consumption for all types of vehicles as a function of distance and time.
3. **Vehicle Maintenance Savings** – These are savings associated with the reduction in wear and tear on vehicles correlated to the reduction in number of stops.
4. **Greenhouse Gas Emission Reduction** – These are savings in Environmental related Health Costs due to reduction in greenhouse gases (CO2 emissions).

The following corridor projects have been completed or in progress since January 2011

- Harbor Boulevard TSS Implementation Project (completed August 2011)
 - *Upgrade timing, replace controllers, and install fiber optic cable.*
- Fairview Road TSSP (completed October 2013)
 - *Upgrade timing, replace controllers, install fiber optic cable, and install CCTV cameras.*
- Baker Street TSSP (in progress)
 - *Upgrade timing, replace controllers, and install fiber optic cable.*
- Placentia Avenue TSSP (in progress)
 - *Upgrade timing, replace controllers, replace select cabinets, install fiber optic cable, and install CCTV cameras.*
- 17th Street TSSP (in progress)
 - *Upgrade timing, replace controllers, install fiber optic cable, and install CCTV cameras.*
- Victoria Street TSSP (in progress)
 - *Upgrade timing, replace controllers, install fiber optic cable, and install CCTV cameras.*

The performance results of Harbor Boulevard TSS and Fairview Road TSSP projects are attached. Additionally, the before studies for the 17th Street and Victoria Street projects are also attached.

City’s approach and strategy for updating timing plans on a periodic basis.

City staff reviews timing on an annual basis based on observed traffic patterns, traffic counts, and capital improvement projects that involve traffic signal upgrades or roadway widening. Hard copies of timing plans for all traffic signals are printed and archived once every year. Both basic timing parameters and coordination parameters are evaluated for

consistency with timing standards set forth in the Manual of Uniform Traffic Control Devices (MUTCD). The City is currently administering several infrastructure improvement projects where roadway widening is required. Timing plans for the affected intersections are evaluated with these projects since this typically involves roadway alignment changes and certain timing parameters must be revised to meet minimum guidelines. The City has started to implement several traffic signal synchronization projects where signal controllers are upgraded to implement updated timing plans. The City's overall master plan is to migrate away from antiquated equipment and concurrently review and update existing timing parameters. The City's overall plan is to implement revised timing along all major corridors through future cycles of Project P implementation.

5.4 CSPI Index Comparison

OCTA developed Corridor Synchronization Performance Index (CSPI) to compare and prioritize corridors having different characteristics for signal synchronization. The index is obtained from data recorded during 'floating car' runs. A corridor is scored based on recorded travel parameters including average speed, number of greens made vs. number of reds stopped, and stops per mile. The sum of the scores from each of the categories gives the total of the index. A 70 is considered the baseline for good operational performance. CSPI value ranging between 50 to 69 indicates a problem generally fixable with a low cost solutions or signal timing modification. A CSPI below 50 however, indicates a poor corridor performance thereby necessitating larger scale investigation into corridor operations. **Table 5.3** and **Table 5.4** provide direction-wise CSPI for 'Before' and 'After' conditions respectively for AM, Mid-Day, PM and Weekend Peak periods.

Table 5.3 CSPI for 'Before' Study Conditions

Parameters	AM Peak		MD Peak		PM Peak		Weekend Peak	
	NB	SB	NB	SB	NB	SB	NB	SB
Avg Speed (mph) and (CSPI)	23.8 (20.7)	25.1 (22.6)	25.1 (22.7)	25.8 (23.8)	19.4 (14.1)	23.1 (19.7)	23.7 (20.5)	23.7 (20.6)
Greens per Red and (CSPI)	1.6 (12.5)	1.7 (13.8)	2.2 (17.7)	2.1 (16.9)	1.3 (10.4)	1.5 (12.3)	2.0 (15.9)	1.4 (11.5)
Stops per Mile and (CSPI)	1.5 (25.4)	1.5 (25.3)	1.2 (28.4)	1.2 (28.4)	1.9 (21.1)	1.4 (25.6)	1.3 (27.2)	1.5 (25.1)
Total CSPI	58.5	61.7	68.8	69.1	45.6	57.6	63.6	57.2
CSPI Tier	IV	III	III	III	V	IV	III	IV

Table 5.4 CSPI for 'After' Study Conditions

Parameters	AM Peak		MD Peak		PM Peak		Weekend Peak	
	NB	SB	NB	SB	NB	SB	NB	SB
Avg Speed (mph) and (CSPI)	27.4 (26.1)	25.9 (23.9)	29.7 (29.5)	30.4 (30.6)	21.1 (16.7)	25.2 (22.8)	26.6 (24.8)	26.7 (25.1)
Greens per Red and (CSPI)	2.4 (19.2)	2.4 (19.2)	3.7 (29.7)	3.6 (28.8)	1.7 (13.6)	2.4 (19.0)	2.6 (20.6)	2.5 (19.8)
Stops per Mile and (CSPI)	1.1 (28.2)	1.2 (28.2)	0.8 (32.4)	0.8 (31.5)	1.5 (24.6)	1.1 (29.1)	1.1 (29.3)	1.1 (29.3)
Total CSPI	73.9	71.2	91.6	90.8	54.9	71.0	74.7	74.2
CSPI Tier	II	II	I	I	IV	II	II	II

A summary of OCTA CSPI for the “before” field travel time studies along the 17th and Victoria Street corridors are shown in **Table 3.11** and **Table 3.12**.

TABLE 3.11: “BEFORE” STUDY CSPI SUMMARY-17TH STREET CORRIDOR

Parameters	AM Peak				MD Peak				Off Peak				PM Peak				Saturday Peak			
	EB		WB		EB		WB		EB		WB		EB		WB		EB		WB	
	Value	Score																		
Avg Speed	20.99	16.50	16.90	10.70	19.00	13.60	15.56	08.08	17.53	11.50	15.00	08.00	19.32	14.10	15.00	08.00	15.11	08.10	16.06	09.50
Green/Red	01.23	09.90	01.07	08.50	01.17	09.30	01.00	08.00	01.00	08.00	01.00	08.00	01.07	08.50	01.17	09.30	01.00	08.00	01.00	08.00
Stops per Mile	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00	02.30	17.00
CSPI	43.30		36.20		39.90		33.80		36.50		33.00		39.60		34.30		33.10		34.50	
CSPI Tier	Tier 5																			

TABLE 3.12: “BEFORE” STUDY CSPI SUMMARY-VICTORIA STREET CORRIDOR

Parameters	AM Peak				MD Peak				Off Peak				PM Peak				Saturday Peak			
	EB		WB		EB		WB		EB		WB		EB		WB		EB		WB	
	Value	Score																		
Avg Speed	24.25	21.40	30.13	30.20	26.78	25.20	27.17	25.80	26.02	24.00	22.73	19.10	31.96	32.90	20.86	16.30	22.71	19.10	22.32	18.50
Green/Red	01.92	15.30	04.00	32.00	02.06	16.40	02.61	20.90	02.06	16.40	01.06	08.40	05.00	40.00	01.92	15.30	02.00	16.00	01.58	12.70
Stops per Mile	01.59	24.10	00.75	32.50	01.25	27.50	01.12	28.80	01.25	27.50	01.87	21.30	00.75	32.50	01.58	24.20	01.30	27.00	01.58	24.20
CSPI	60.80		94.70		69.10		75.40		68.00		48.80		105.40		55.80		62.00		55.30	
CSPI Grade	Tier 3		Tier 1		Tier 3		Tier 2		Tier 3		Tier 5		Tier 1		Tier 4		Tier 3		Tier 4	

TSS Implementation Project
HARBOR BOULEVARD: AM NORTHBOUND (Before and After)
 Newport Blvd/SR-55 to Scenic Ave/Lake Center Dr

Study Name : Harbor-AM-NB
 Study Date : 6/20/2011
 Page No. : 3

Overall Output Statistics

Node #	Length	Node Name		Travel Time	# of Stops	Avg Speed	Total Delay	Time <=	Time <=	Time <=
								0 MPH	35 MPH	55 MPH
1	0	Newport Blvd/SR-55								
2	861	19th St	Before	41.6	0.6	14.1	26.6	13.0	41.6	41.6
			After	41.2	0.4	14.2	26.2	12.6	40.8	41.2
			Change	-0.4	-0.2	0.1	-0.4	-0.4	-0.8	-0.4
3	1997	Bay St	Before	35.8	0.0	38.0	1.0	0.0	6.8	35.8
			After	46.4	0.4	29.3	12.0	6.0	18.2	46.4
			Change	10.6	0.4	-8.7	11.0	6.0	11.4	10.6
4	677	Hamilton St	Before	25.8	0.6	17.9	14.2	7.6	19.4	25.8
			After	13.0	0.0	35.5	1.4	0.0	5.8	13.0
			Change	-12.8	-0.6	17.6	-12.8	-7.6	-13.6	-12.8
5	639	Victoria St	Before	19.8	0.4	22.0	8.8	0.8	16.8	19.8
			After	46.2	0.6	9.4	34.8	27.6	41.6	46.2
			Change	26.4	0.2	-12.6	26.0	26.8	24.8	26.4
6	1336	Wilson St	Before	24.0	0.0	38.0	1.2	0.0	4.8	24.0
			After	23.2	0.0	39.3	0.6	0.0	2.4	23.2
			Change	-0.8	0.0	1.3	-0.6	0.0	-2.4	-0.8
7	1011	Harbor Ctr	Before	17.0	0.0	40.5	0.0	0.0	0.0	17.0
			After	16.2	0.0	42.6	0.0	0.0	0.0	16.2
			Change	-0.8	0.0	2.0	0.0	0.0	0.0	-0.8
8	1539	Fair Dr	Before	26.4	0.0	39.7	0.4	0.0	4.2	26.4
			After	24.6	0.0	42.7	0.0	0.0	0.0	24.6
			Change	-1.8	0.0	2.9	-0.4	0.0	-4.2	-1.8
9	1868	Merrimac Way	Before	61.0	1.0	20.9	29.0	12.8	43.4	61.0
			After	29.4	0.0	43.3	0.0	0.0	0.0	29.4
			Change	-31.6	-1.0	22.4	-29.0	-12.8	-43.4	-31.6
10	753	Mesa Verde	Before	15.6	0.0	32.9	2.2	0.0	8.8	15.6
			After	12.0	0.0	42.8	0.0	0.0	0.0	12.0
			Change	-3.6	0.0	9.9	-2.2	0.0	-8.8	-3.6
11	1049	Adams Ave	Before	19.2	0.0	37.3	1.0	0.0	3.0	19.2
			After	49.0	0.4	14.6	31.8	27.0	35.2	49.0
			Change	29.8	0.4	-22.7	30.8	27.0	32.2	29.8
12	2448	Baker St	Before	43.6	0.0	38.3	2.6	0.0	6.8	43.6
			After	53.0	0.2	31.5	11.0	5.4	22.6	53.0
			Change	9.4	0.2	-6.8	8.4	5.4	15.8	9.4
13	690	Nutmeg Pl	Before	12.0	0.0	39.2	0.0	0.0	0.0	12.0
			After	16.4	0.2	28.7	4.0	0.0	11.6	16.4
			Change	4.4	0.2	-10.5	4.0	0.0	11.6	4.4
14	1838	Gisler Ave	Before	65.2	1.0	19.2	33.4	19.2	47.0	65.2
			After	64.4	0.8	19.5	33.4	21.6	42.8	64.4
			Change	-0.8	-0.2	0.2	0.0	2.4	-4.2	-0.8
15	374	I-405 SB Ramps	Before	11.2	0.2	22.8	4.6	0.0	9.4	11.2
			After	9.0	0.2	28.3	2.4	0.0	7.8	9.0
			Change	-2.2	0.0	5.6	-2.2	0.0	-1.6	-2.2
16	826	I-405 NB Ramps	Before	15.8	0.0	35.6	1.6	0.0	5.4	15.8
			After	20.8	0.0	27.1	6.8	4.4	10.4	20.8
			Change	5.0	0.0	-8.6	5.2	4.4	5.0	5.0
17	476	South Coast Dr	Before	8.8	0.0	36.9	0.6	0.0	3.6	8.8
			After	8.8	0.0	36.9	0.0	0.0	0.8	8.8
			Change	0.0	0.0	0.0	-0.6	0.0	-2.8	0.0
18	757	Law Crt	Before	13.4	0.0	38.5	0.0	0.0	0.4	13.4
			After	13.2	0.0	39.1	0.4	0.0	1.8	13.2
			Change	-0.2	0.0	0.6	0.4	0.0	1.4	-0.2
19	691	Sunflower Ave	Before	11.4	0.0	41.3	0.0	0.0	0.0	11.4
			After	20.4	0.4	23.1	8.2	2.0	16.0	20.4
			Change	9.0	0.4	-18.2	8.2	2.0	16.0	9.0
20	1305	Scenic Ave/Lake Center	Before	19.8	0.0	44.9	0.0	0.0	0.0	18.8
			After	22.0	0.0	40.4	0.6	0.0	2.0	21.0
			Change	2.2	0.0	-4.5	0.6	0.0	2.0	2.2

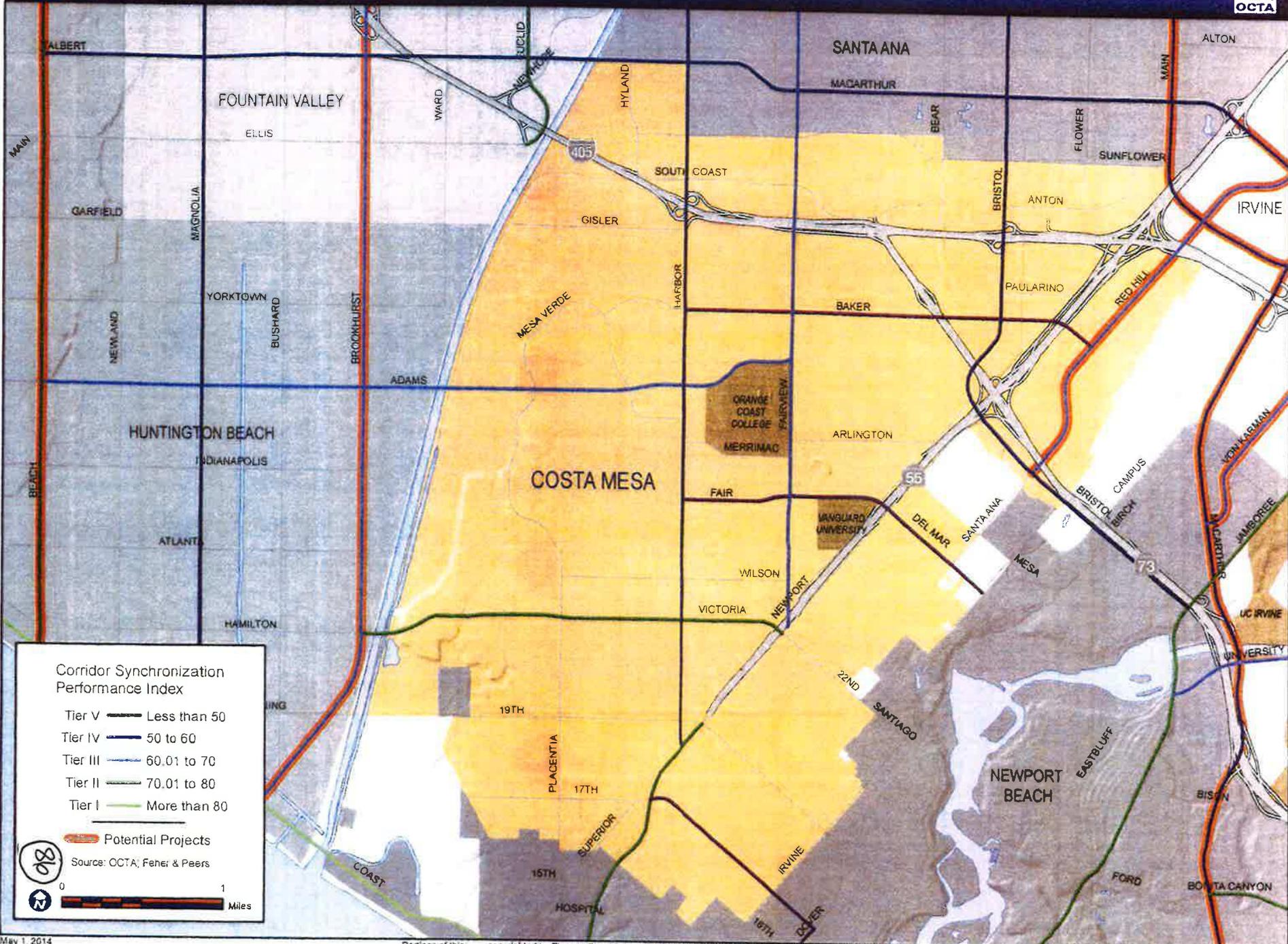
Totals	21,135		Before	487.4	3.8	29.6	127.2	53.4	221.4	486.4
			After	529.2	3.6	27.2	173.6	106.6	259.8	528.2
			Change	41.8	-0.2	-2.3	46.4	53.2	38.4	41.8

Stats based on 5 BEFORE runs & 5 AFTER runs.

Stops based on a Stop Speed of 5 MPH.

Total Delay based on a Normal Speed of 40 MPH.

2013 Corridor Operational Performance Costa Mesa



May 1, 2014

Portions of this map copyrighted by Thomas Bros Maps and reproduced with permission. W:\Requests\PDCSI\SP\PA\Spatial\Coordination\mxd\CSPI_2013_CityMaps\CostaMesaCSPI_Projects_2014-0501.mxd