2 Existing Systems Assessment

The basis for planning the concept of the future communication system architecture is laid upon the foundation of the existing traffic signal and communication system infrastructure. This section documents the results of extensive research and inventories of the City's existing traffic systems including: communications, central systems, field elements, operations, and staff. Several sources of information were utilized to obtain information including:

- Geographic Information Systems (GIS).
- Laser fiche as-built records.
- Accounting systems.
- QuicNet and SCATS systems.
- Field reviews.
- Interviews with city staff.

Documentation was obtained from various city departments including: Public Works/Engineering, GIS, Information Technology (IT), Development Services, and Planning. Shapefiles with attribute tables detailing the number and location for existing traffic signals, conduit, and wireless towers was provided by the City's Geographic Information Services (GIS) Department. A digital library comprising 910 researched plans and documents of the City's traffic systems was created. The various information sources were compared and verified with City traffic signal maintenance staff to produce an accurate map of existing traffic systems Citywide. At the time of this report, 267 traffic signals are owned and operated by the City of Chula Vista.

A Geographical Information System (GIS) database and map of the existing systems infrastructure was created and is provided in **Appendix A** and a schematic detailing the existing traffic system communications architecture is provided in **Appendix B**. Detailed review information is presented throughout the remainder of this section.

2.1 Traffic Communications Systems

The City of Chula Vista's traffic communications system is extensive, connecting all the existing traffic signals and traffic data collection systems in the City, and is comprised of numerous media and network devices. Traffic communication system documentation was researched to determine location and status of:

- Single-mode fiber optic network.
- Third-party owned leased line wire based analog network.
- City-owned copper wire based analog network.
- Serial wireless radio communications network.

The communications system includes a combination of twisted pair copper wired based media, fiber optic cable media, and Serial digital wireless radios. Third-party owned and serviced Plain Old Telephone Service (POTS) leased lines provide the primary communication links between traffic systems and the City's existing Traffic Signal Communication Center (TSCC) located at City Hall. The following subsections provide summaries of the existing traffic communications systems and network architecture.

2.1.1 Single-mode Fiber Optic Network

Single-mode fiber optic cable provides communications between the TSCC and 25 traffic signals located along Fourth Avenue, H Street, and Main Street. Fiber strand counts are summarized in **Table 2-1**.

Table 2-1 Existing Single-mode Fiber Optic Strand Counts

STREET	(NORTH/EAST) LIMIT	(SOUTH/WEST) LIMIT	CABLE
Fourth Avenue	(N) Brisbane Street	(S) Main Street	288-strand SMFOC
Main Street	(E) Main Street	(W) Broadway	288-strand SMFOC
Davidson Street	(E) Fourth Avenue	(W) Guava Avenue	288-strand SMFOC
H Street	(E) Hidden Vista Drive	(W) Fourth Avenue	36-strand SMFOC

2.1.2 Leased Line and City-Owned Copper Wire Based Analog Network

Accounting systems that contained information on the City's third-party owned leased line communications for various traffic systems throughout Chula Vista were researched. Billing information identified circuit numbers that corresponded with the City's TSCC and the individual traffic system telephone drop locations. The location information was cross-checked and verified with the System Control Number (SCN) address reference table provided by the City's traffic signal maintenance department and the traffic signal controller list generated by the City's QuicNet 4+ central traffic management system. Billing statements indicate approximately $75,000 is spent annually on leased line communications[1].

Nearly 90% of the City's 267 traffic signals communicate with the TSCC through a third-party owned POTS leased line network. The existing AT&T lease line telephone drops provide communication links between the TSCC and individual traffic signals or groups of traffic signals, interconnected by the City-owned copper wire based analog multi-drop network.

The original leased lines were first installed approximately 30 years ago by Pacific Bell Telephone Company (PacBell) in the western portion of the City. As the City continued to develop, City-owned twisted pair copper interconnect was installed intermittently with developments and capital improvements. The western portion of Chula Vista, between the I-5 and I-805, is the oldest part of the City and contains a minimal amount of City-owned twisted pair interconnect. The areas east of I-805 are newer and contain more City-owned twisted pair interconnect. All the existing copper wire based interconnect links operate on legacy Serial 1,200 bps analog modems and lack direct connections to the City's TSCC, and thus require

utilization of leased line telephone drop communications. The existing network is obsolete and is incapable of supporting modern ITS technologies.

2.1.3 Serial Wireless Radio Communications

Several traffic signal locations in the City utilize Serial wireless radios for communications due to a lack of copper wire or fiber infrastructure to provide direct connection to the TSCC. Wireless radio communication is 900 MHZ Serial (EIA-232) digital, low bandwidth. Existing wireless radio interconnect locations are summarized in **Table 2-2**.

Table 2-2 Existing Serial Wireless Radio Interconnect Locations

STREET	(NORTH/EAST) LIMIT	(SOUTH/WEST) LIMIT
Third Avenue	(N) Moss Street	(S) Naples Street
Fourth Avenue	(N) Anita Street	(S) Montgomery School Crossing
Quintard Street	(E) Second Avenue	(W) Third Avenue
Hilltop Drive	(N) Naples Street	(S) Oxford Street

2.1.4 Cell Towers

There are City-owned and privately-owned cell towers located throughout the City. The number and location were determined from shapefiles provided by the City's GIS Department. The cell towers are not currently used for traffic-related systems.

2.2 Central Systems

The City's central systems are housed in City Hall and include:

- Traffic Signal Communication Center (TSCC)
- Traffic Management Center (TMC)
- QuicNet 4+ Regional Arterial Management System (RAMS)
- Sydney Coordinated Adaptive Traffic System (SCATS)

As-built documentation was unavailable for several of the traffic systems housed within the City's existing TSCC. Limited existing documentation was supplemented with on-site investigations.

2.2.1 Traffic Signal Communications Center and Traffic Management Center

The TSCC was constructed with City Hall in 2004 and quickly became a dual-purpose data center and Traffic Management Center (TMC). At 9 feet by 17 feet, the TSCC was not designed to be used as a TMC and over time, the room became congested and disorganized as new equipment and systems were installed[2]. TSCC equipment includes:

- AT&T telephone service lines termination panel with multiple demarcation points.
- 288-strand single-mode fiber optic cable line.

- Splice enclosure rack mount.
- Traffic signal test cabinet.
- Two equipment racks housing analog modems.
- Two Digi 16-port Serial communications servers.
- QuicNet 4+ Server
- SCATS Server
- Battery back-up system.
- Cisco 10 Base-T/100 Base-Tx Ethernet switch.
- Type I enclosure breaker panel serving the existing TSCC room, IT room, and new TMC room.

The City executed a design-build contract with STC Traffic to remodel the TSCC into a distinct data center and build a new TMC. The project was completed in early 2017. **Figures 2-1** and **2-2** below show the TSCC and TMC before and after construction.

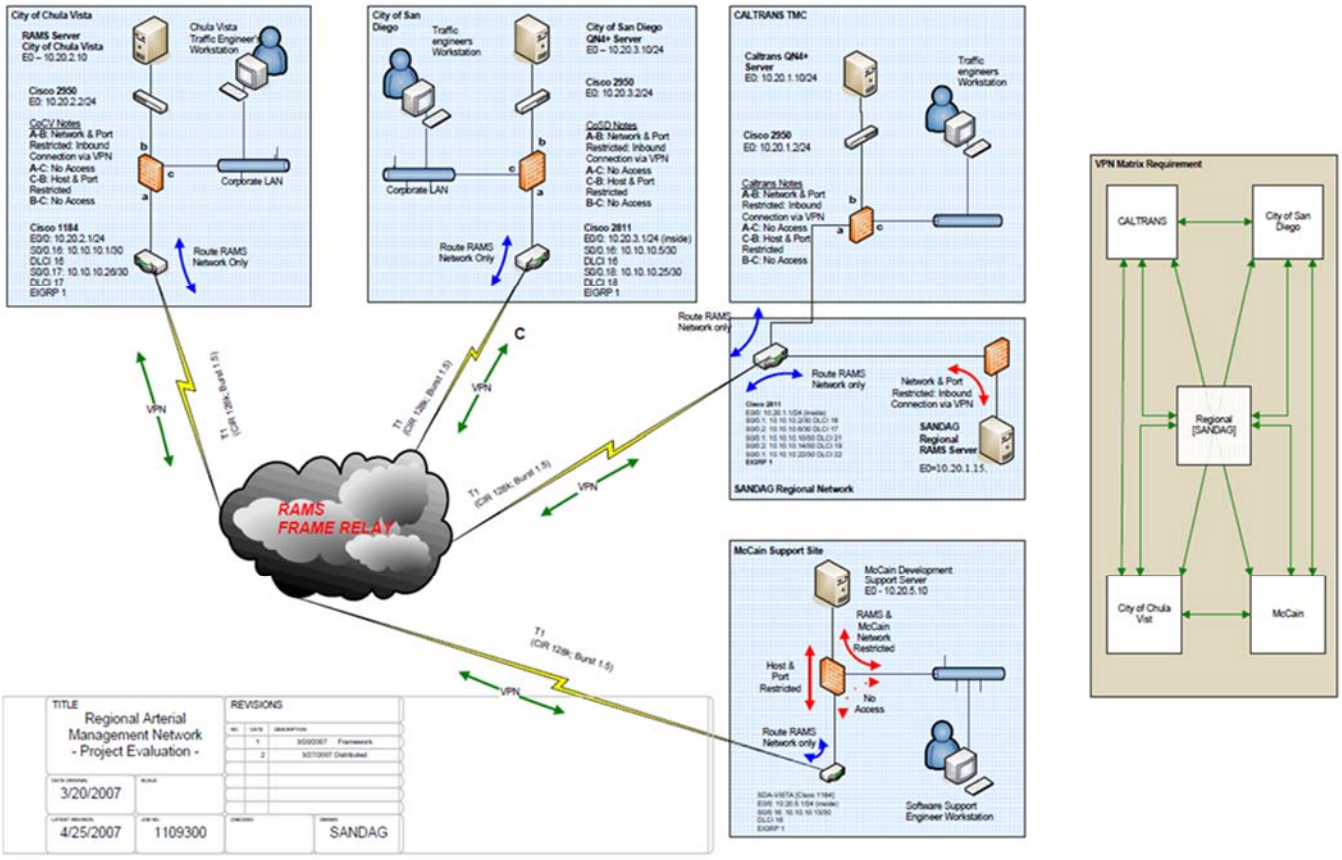
Figure 2-1 TSCC Before and After

Figure 2-2 TMC Before and After

2.2.2 Central Traffic Management System

The City utilizes the QuicNet 4+ Regional Arterial Management Systems (RAMS) central control software for traffic management. Implemented in 2006, RAMS enables sharing of traffic signal operation information across jurisdictions in San Diego County through the QuicNet 4+ software application. Communications between agencies is accomplished over a T1 leased line and connectivity for the City is illustrated in **Figure 2-3**. The RAMS systems are currently being upgraded to Transparity as part of the system maintenance program. A new fiber optic line has been installed at the City's TMC and communications will be 2 Mbps Ethernet over fiber when Transparity is active.

Figure 2-3 RAMS Network



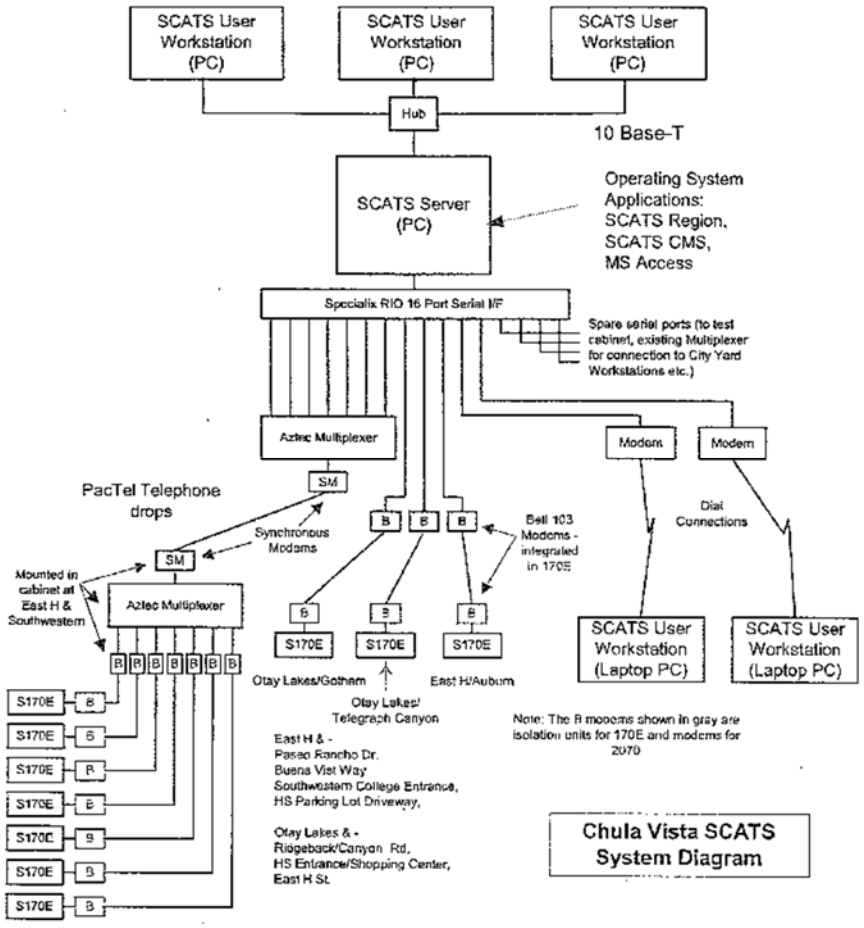
2.2.3 Adaptive Signal Control

The City of Chula Vista installed the Sydney Coordinated Adaptive Traffic System (SCATS) in May 2003. The system objectives include selecting cycle lengths, splits, and offsets to minimize stops during light demand, minimize delays during normal demand, and maximize throughput during heavy demand. The SCATS system includes twelve intersections along portions of East H Street and Otay Lakes Road[3]. The system runs on a dedicated server located in the TSCC. The server and user workstation are connected via a hub and 10/100 Base-T LAN. A 16-channel Serial interface unit communicates with the intersections through

data multiplexers and three low speed modems. Seven low speed channels from the 16-port Serial interface connect to the multiplexer located at Chula Vista City Hall. A composite signal from this multiplexer connects to a modem configured for 2400 bps synchronous operation. The voice frequency side of the modem connects with a changeover switch to the telephone drop cabinet third-party lease line at the East H Street and Southwestern College Entrance intersection and provides a composite signal to a multiplexer. The multiplexer decodes the seven low speed intersection signals and connects to the intersection modems and a changeover switches the communications line connections to the configuration required for SCATS[4].

Field elements include 2070 controllers with TransCore software and the modem and multiplexer equipment. System elements in the TSCC include a Windows NT operating system based PC server, SCATS intersection control software version 5, Serial interface hardware and software, modem and multiplexer equipment, an equipment rack, and a user work station. The SCATS network is shown in **Figure 2-4**. The SCATS system is no longer operational due to the SCATS server failure and a replacement adaptive traffic signal control system is currently being deployed.

Figure 2-4 SCATS Network



2.3 Field Elements and Traffic Operations

The ITS communication and central systems previously described are utilized to manage and operate various connected devices in the field. These include traffic signal cabinets and controllers that operate timing and coordination, emergency vehicle preemption systems, grade crossing preemption, transit signal priority, and data acquisition systems.

2.3.1 Cabinets and Controllers

The most common signal cabinet and current standard installation in the City is the type 332 controller cabinet. Most of the traffic signal controllers in Chula Vista are type 170 or Type 170E running 233 intersection control programs. As previously described in Section 2.2.3 there are 12 traffic signals that have custom-built 2070 controllers that run SCATS intersection control software version 5.

2.3.2 Traffic Signal Timing and Coordination

Many traffic signals throughout the City run Time of Day (TOD) plans with coordination patterns typically scheduled during the morning, midday, and evening peak periods along arterials and secondary roadways. **Table 2-3** contains a list of the 22 coordinated corridors in the City. The corridors are illustrated geographically on **Figure 2-5**.

Table 2-3 Existing Coordinated Corridors

STREET	(NORTH/EAST) LIMIT	(SOUTH/WEST) LIMIT
Bonita Road	(E) Billy Casper Way	(W) Willow Street
Broadway	(N) C Street	(S) H Street
Broadway	(N) H Street	(S) Palomar Street
E Street	(E) Bonita Road	(W) Woodlawn Avenue
East H Street	(E) Otay Lakes Road	(W) Hidden Vista Drive
Fifth Avenue	(N) F Street	(S) G Street
Fourth Avenue	(N) Brisbane St	(S) Main Street
H Street	(E) Hilltop Dr	(W) Broadway
Hilltop Drive	(N) I Street	(S) J Street
L Street	(E) Nacion Avenue	Broadway
Main Street	(E) I-805	(W) Industrial Blvd
Main Street	(E) Nirvana Avenue	(W) I-805
Olympic Parkway	(E) Eastlake Parkway	(W) Heritage Road
Orange Avenue	(E) Max Avenue	(W) Fourth Avenue
Orange Avenue/Olympic Parkway	(E) Brandywine Avenue	(W) Melrose Avenue
Otay Lakes Road	(E) Lane Avenue	(W) La Media Road
Otay Lakes Road	(N) Bonita Vista High School Drwy	(S) East H Street

STREET	(NORTH/EAST) LIMIT	(SOUTH/WEST) LIMIT
Otay Lakes Road	(N) East H Street	(S) Telegraph Canyon Road
Palomar Street	(E) Orange Avenue	(W) Industrial Boulevard
Palomar Street	(E) Hilltop Drive	(W) Fourth Avenue
Telegraph Canyon Road	(E) Otay Lakes Road	(W) Canyon Plaza Driveway
Third Avenue	(N) H Street	(S) Main Street

2.3.3 Grade Crossing Preemption

The Blue Line Trolley route, operated by the San Diego Metropolitan Transit System (MTS) has 3 station stops in Chula Vista: Bayfront/ E Street, H Street, and Palomar Street. The Blue Line runs parallel to Industrial Blvd and there are 7 preempted traffic signals. The grade crossing preemption systems were recently upgraded to operate advance preemption and supervisory circuits. This preemption operation is more complex than traditional preemption operation and requires more complex controller programming and railroad to traffic signal interconnect.

2.3.4 Transit Signal Priority

The South Bay *Rapid* project includes a 21-mile bus route that will run between the Otay Mesa Port of Entry and Downtown San Diego via National City and eastern Chula Vista. Eight stations in eastern Chula Vista and Otay Mesa, a Direct Access Ramp (DAR) on East Palomar Street at I-805, and a nearly six-mile dedicated transit lane in the median of East Palomar Street and along Eastlake Parkway are planned along the route. All phases of the South Bay *Rapid* project are currently in construction including 12 of the 15 total stations, arterial transit-only lanes on East Palomar Street, Transit Signal Priority (TSP), and enhanced customer amenities[5].

2.3.5 Emergency Vehicle Preemption

Emergency Vehicle Preemption (EVP) technology overrides typical traffic signal operations to provide priority for approaching emergency responder vehicles including firetrucks and ambulances. The typical emergency vehicle preemption build throughout Chula Vista includes an infrared-based system with varying models of Opticom phase selectors and infrared system emitters and detectors. Preemption devices throughout the City are typically older and range in age from 5 years to 15 years old.

Document Path: S:\Projects\Chula Vista\0347_Chula Vista Traffic Signal Communications Master Plan\04 Design\GIS\MXD Files\Chula Vista Comm MP (10.3).mxd

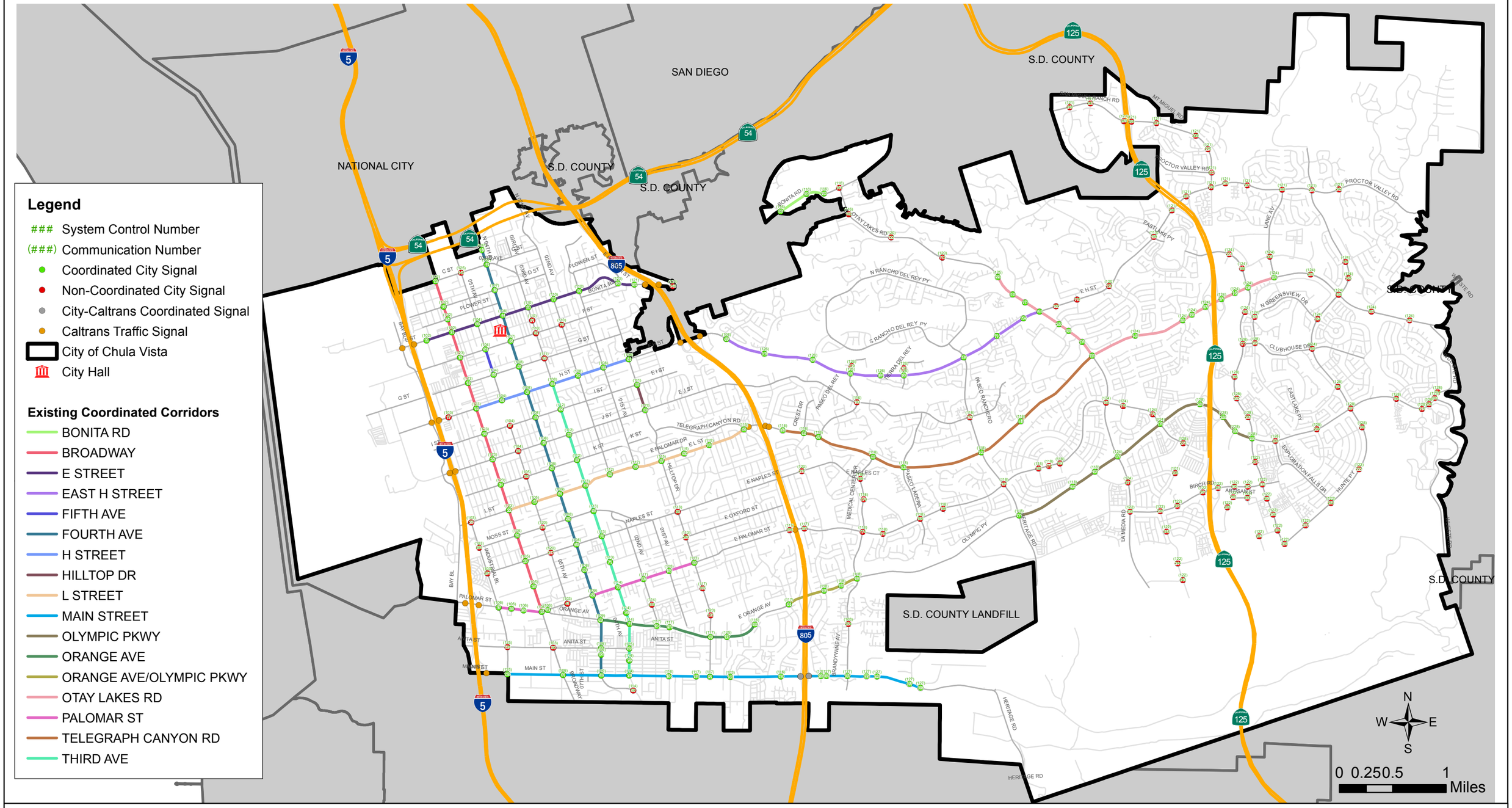


Figure 2-5 Existing Coordinated Corridors

2.3.6 Data Acquisition Systems

Traffic operations are monitored by City staff regularly and assessed annually by the City's Growth Management Oversight Commission (GMOC). Data acquisition systems including a small number of Traffic Measurement Devices and are utilized to provide real-time and historical traffic data. Accurate data is imperative to analyzing operational efficiencies and ensuring traffic threshold standards are met.

2.3.6.1 Traffic Measurement Devices

The City of Chula Vista's Growth Management Program seeks to maintain quality of life by monitoring threshold standards for various public facilities and service through the City's Traffic Monitoring Program (TMP). Traffic thresholds are monitored for Arterial Level of Service (ALOS) and Urban Street Level of Service (ULOS) standards. To acquire necessary traffic data for monitoring and assessment purposes, traffic measurement devices including volume data collection and speed monitoring systems are located throughout Chula Vista. Remote Traffic Microwave Sensors (RTMS) are located at 28 permanent count stations Citywide. 18 in-pavement wireless Sensys detectors are located along Olympic Parkway, East H Street, and Telegraph Canyon Road for arterial travel time (ATT) volume, occupancy, and speed (VOS) data and bicycle activity. **Table 2-4** below summarizes traffic measurement device locations by type. Communications to the City's TSCC is accomplished through a third-party owned cellular network using older 2G technology and data is hosted by an outside party server. Maintenance and operation of the system is increasingly expensive and expansion is cost prohibitive. The system is becoming obsolete and more modern and affordable systems are available on the market.

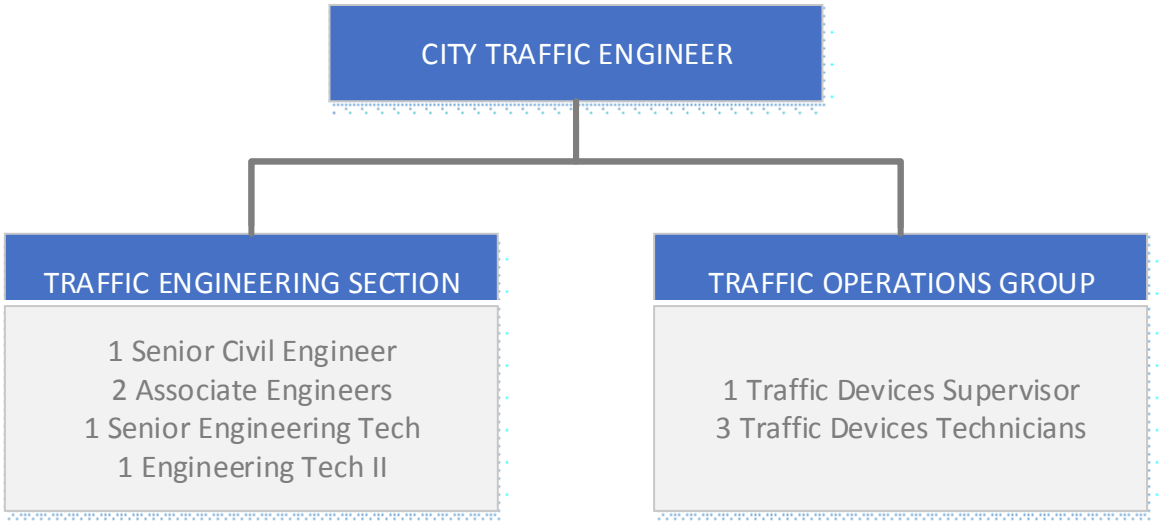
Table 2-4 Traffic Measurement Devices Location Summary

RTMS		SENSYS	
STREET	LOCATION	STREET	LOCATION
Birch Rd	East of Eastlake Pkwy	Birch Rd	Magdalena
Birch Rd	Between Magdalena Ave and SR 125	East H St	Paso Del Rey
Eastlake Pkwy	North of Olympic Pkwy	East H St	Del Rey Blvd
Eastlake Pkwy	Between Olympic Pkwy and Birch Rd	East H St	Terra Nova Dr
Eastlake Pkwy	South of Clubhouse	East H St	Hidden Valley
Eastlake Pkwy	Between Otay Lakes Rd and Greensgate Dr	Olympic Pkwy	Heritage Rd
Exploration Falls	South of Olympic Pkwy	Olympic Pkwy	Brandywine Ave
Hunte Pkwy	North of Otay Lakes Rd	Olympic Pkwy	Concord Wy
Hunte Pkwy	Between Otay Lakes Rd and Greesview	Olympic Pkwy	Oleander Ave
Hunte Pkwy	Between S Greesview and Olympic Pkwy	Otay Lakes Rd	Rutgers Ave
Hunte Pkwy	Between Olympic Pkwy and Evening Star	Telegraph Canyon Rd	La Medina Rd
Hunte Pkwy	East of Eastlake Pkwy	Telegraph Canyon Rd	Buena Vista
La Media Rd	Between Olympic Pkwy and Birch Rd	Telegraph Canyon Rd	Paseo Ranchero
La Media Rd	South of Olympic Pkwy	Telegraph Canyon Rd	Paseo Ladera
Lane Ave	Between Mackenzie Creek and Otay Lakes Rd	Telegraph Canyon Rd	Medical Center
Magdalena Ave	South of Birch Rd	Telegraph Canyon Rd	Paseo Del Rey
Magdalena Ave	North of Birch Rd	Telegraph Canyon Rd	Oleander
Olympic Pkwy	Between Hunte Pkwy and Olympic Vista	Telegraph Canyon Rd	Canyon Plaza Ctr
Olympic Pkwy	West of Hunte Pkwy		
Olympic Pkwy	East of La Media		
Otay Lakes Rd	Between Hunte Pkwy and Woods		
Otay Lakes Rd	Between Woods and Wueste Rd		
Otay Lakes Rd	Between Eastlake Pkwy and Lane Ave		
Otay Lakes Rd	Between Lane Ave and Hunte Pkwy		
East Palomar St	South of Olympic Pkwy		
Proctor Valley Rd	Between Duncan Ranch Rd and Agua Vista		
Winding Walk	Between Olympic Pkwy and Evening Star		
Wueste Rd	Between Otay Lakes Rd and Olympic Pkwy		

2.4 Traffic Operations Staff

The most important resource of the City traffic system are the people who manage, operate, and maintain it. Chula Vista employs staff dedicated to the operation and maintenance of the City's traffic system including the Traffic Engineering Section and Traffic Operations Group. Staffing organization is illustrated in **Figure 2-6** and discussed in the following subsections.

Figure 2-6 Traffic Systems Staff Organization Chart



2.4.1 Traffic Engineering Section

The Traffic Engineering Section is part of the City's Department of Engineering and Capital Projects. Traffic engineering and operations staff report to the City Traffic Engineer. Traffic Engineering section responsibilities include[6]:

- Development, monitoring, and implementation of traffic improvements in the City.
- Assist on all developments and review construction area traffic control plans.
- Perform field surveys of high accident and high congestion locations.
- Investigate requests from the public, City Council, City Manager, Mayor, and/or community groups for traffic improvements, and initiate remedial and corrective traffic improvements.
- Address traffic safety issues in cooperation with the Chula Vista Police Department.
- Serve as communication link between residents, City staff, and City Council via the Safety Commission.
- Involvement in the Neighborhood Traffic and Pedestrian Safety Program to improve safety for pedestrians, bicyclists, and motoring public within Chula Vista.
- Coordinate with regional agencies including SANDAG, MTS, Caltrans, and the Port of San Diego.
- Develop, monitor, and implement traffic signal timing.
- TMC operation.
- Operation and management of the traffic signal communications network.

2.4.2 Traffic Signal Maintenance Group

Traffic systems maintenance is provided by the Traffic Operations Section under the City's Engineering and Capital Projects Department. Traffic device technicians perform annual preventative maintenance and repairs on both emergency and as-needed basis for traffic signal systems and street lights throughout Chula Vista[7]. Traffic operations staff report to the City Traffic Engineer.

2.5 Communications System Topology and Architecture

The traffic systems research and documentation were documented in a Geographic Information System (GIS) database and presented graphically with a corresponding map. ESRI software ArcMap 10.2.2 was utilized and a dynamic layer set with attribute tables were created and include all inventory information researched for inclusion. Shapefiles for traffic signals, conduit, and cellular towers were provided by the City's GIS department. Existing attribute tables for the shapefiles were supplemented with information obtained from digitized improvement plans and additional City-provided documentation. **Table 2-5** summarizes the dynamic layers and inventory information. Examples of the GIS attribute tables that correspond with the dynamic layers are provided in **Figures 2-7** through **2-10**.

Table 2-5 Summary of Inventory Information for Existing Conditions Dynamic Layer Set

DYNAMIC LAYER	INVENTORY INFORMATION
Telephone Drop Traffic Signals	Intersection, SCN, Communication Number, Drop Number
Offline Telephone Drop Traffic Signals	Intersection, SCN, Communication Number, Drop Number
Adaptive Traffic Signals	Intersection, System Type
Existing Traffic Signals	Intersection, Operation, Status, SCN, Communication Number, Drop Number, Drawing Number, Signal Modification Date
Existing Caltrans Traffic Signals	Intersection
Traffic Measurement Device	Street, Location Description, Type, IP Address, Download Date, 7.4.2, AP, Repeater, Cards, TT, VOS, Bike, Controller Location, Bike Lane Designation, Bike Detection Cards, Bike Detection Sensors
City-Owned Wireless Towers	Own Status, CA SENO, Applicant, Project Type, Global ID
Private Wireless Towers	Own Status, CA SENO, Applicant, Project Type, Global ID
Existing Copper	Street, Interconnect Type, Conduit Size, As-Built Date
Existing Wireless Traffic Interconnect	Street, Intersection, Communication Type, Brand, Activity
Existing Fiber	Street, Interconnect Type, Conduit Size, As-Built Date, # of Fibers
Existing Empty Conduit	Street, Conduit Size, As-Built Date
MTS Fiber	Interconnect Type, Conduit Size
Caltrans Fiber	Interconnect Type, Conduit Size

DYNAMIC LAYER	INVENTORY INFORMATION
Port of San Diego Fiber	Interconnect Type, Conduit Size
City of San Diego Fiber	Interconnect Type, Maintenance Date

2.5.1 Existing Traffic Systems Topology

A Geographic Information System (GIS) database and map was created detailing specifics of communication systems build and location. The resulting map illustrates the topology of traffic systems in the City. Existing traffic systems conditions are mapped on **Figure 2-11** and a full size 24x36 fold out plan is provided in **Appendix A**.

2.5.2 Existing Traffic Systems Communications Architecture

The existing traffic systems communications network is based on low speed multi-drop Serial communications technology over various communications mediums and is comprised of:

- Traffic Signal Communications Center located at Chula Vista City Hall.
- Single-mode fiber optic lines based digital multi-drop network.
- City-owned copper wire based analog multi-drop network.
- Leased line analog multi-drop network.
- Serial wireless radio communications network.

The primary communications system, for approximately 90% of the traffic signals in the City of Chula Vista, is based upon 3rd party leased telephone lines. **Table 2-6** provides a summary of the traffic signals by communication type. A schematic detailing the City of Chula Vista's existing traffic systems communications architecture is provided in **Appendix B** as a full size 24x36 fold out plan.

Table 2-6 Existing Traffic Signal Communications Summary

COMMUNICATION TYPE	DESCRIPTION	# OF INTERSECTIONS
Fiber Optic Cable	Single-mode fiber optic cable • *Ring 1: IFS fiber modems* • *Ring 2: VLINK fiber modems* • *Ring 3: VLINK fiber modems*	24 *4* *14* *6*
Leased Copper Lines	Analog modems	91
City-Owned Copper Plant to Leased Copper Lines	Analog multi-drop modems SCATS adaptive traffic signals	123 12
Wireless Interconnect	Serial wireless radio connections	4
Offline	Communications Infrastructure Gap Telephone Drop Repair Needed	11 2

Figure 2-7 Existing Traffic Signals Attribute Table

Table

Traffic Signals

OBJECTID_1 *	Shape *	FID_1	INTERSECTION	STATUS	QN_COMM	SCN	Drop_
205	Point	75	HILLTOP DR&I ST	Existing	(111)	85	5
206	Point	76	THIRD AV&G ST	Existing	(111)	63	1
184	Point	52	THIRD AV&I ST	Existing	(112)	65	2
185	Point	53	THIRD AV&J ST	Existing	(112)	66	3
186	Point	54	THIRD AV&K ST	Existing	(112)	67	4
284	Point	35	SECOND AV&L ST	Existing	(112)	80	5
285	Point	36	FIRST AV&L ST	Existing	(112)	83	6
228	Point	46	THIRD AV&MOSS ST	Existing	(113)	69	2
232	Point	87	HILLTOP DR&NAPLES ST	Existing	(113)	88	5
241	Point	115	THIRD AV&NAPLES ST	Existing	(113)	70	3
246	Point	120	THIRD AV&OXFORD ST	Existing	(113)	71	4
260	Point	134	HILLTOP DR&PALOMAR ST	Existing	(113)	89	6
276	Point	259	HILLTOP DR &OXFORD ST	Existing	(113)	260	7
283	Point	34	THIRD AV&L ST	Existing	(113)	68	1
238	Point	112	FOURTH AV&BEYER WY	Existing	(114)	59	6

226 (0 out of 363 Selected)

Traffic Signals

Figure 2-8 Existing Copper Interconnect Cable Attribute Table

Table

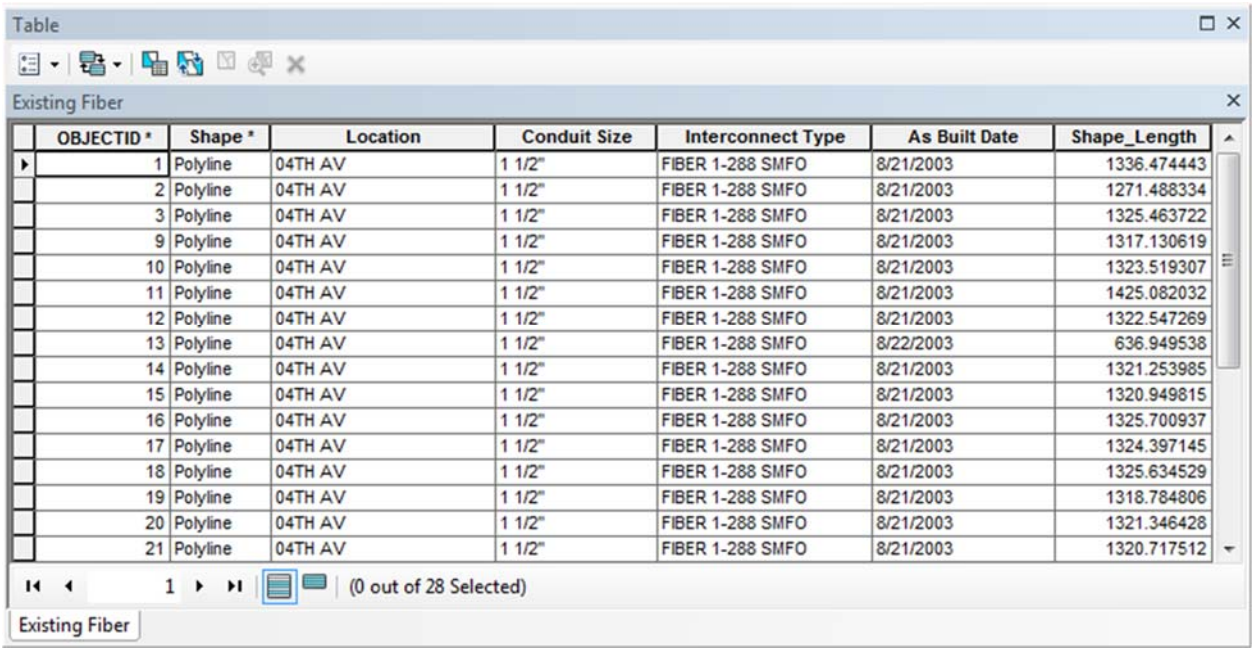
Existing Copper

OBJECTID *	Shape *	Street	Conduit Size	Conduit Size 2	Interconnect Type	As-Built Date
7	Polyline	BROADWAY	1 1/4"		3PR 20	<Null>
8	Polyline	BROADWAY	1 1/4"		3PR 20	<Null>
13	Polyline	EAST H	2"		3PR 20	11/4/1994
14	Polyline	EAST H ST	2"		3PR 20	11/4/1994
15	Polyline	PASEO DEL REY	2"		3PR 20	11/29/1995
16	Polyline	TELEGRAPH CANYON	2"		3PR 20	3/22/2002
17	Polyline	BEYER WAY	2"		6PR20	3/12/2012
18	Polyline	MAIN ST	3"		6PR20	3/13/2012
19	Polyline	OTAY LAKES RD	2"		3PR20	<Null>
20	Polyline	E ST	2"		6PR20	2/12/2013
21	Polyline	TEELGRAPH CANYON RD	2"		3PR20	3/22/2002
22	Polyline	TELEGRAPH CANYON RD	2"		3PR20	3/22/2002
23	Polyline	3RD AV	2"		6PR20	1/28/2010
24	Polyline	3RD AV	2"		6PR20	1/28/2010
29	Polyline	MAIN ST	3"		6PR22	2/21/2004

12 (0 out of 165 Selected)

Existing Copper

Figure 2-9 Existing Fiber Optic Cable Attribute Table



Table

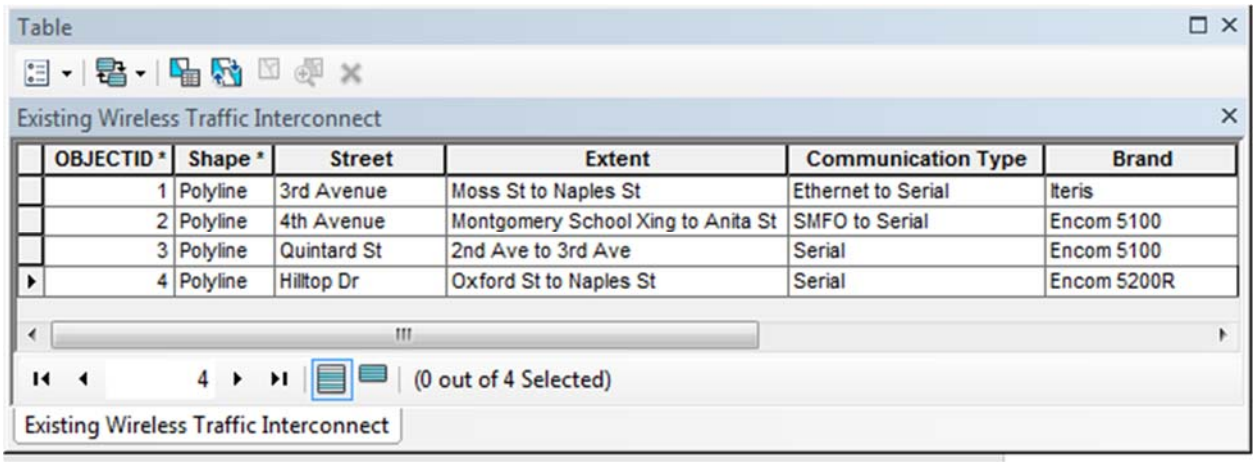
Existing Fiber

OBJECTID *	Shape *	Location	Conduit Size	Interconnect Type	As Built Date	Shape_Length
1	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1336.474443
2	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1271.488334
3	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1325.463722
9	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1317.130619
10	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1323.519307
11	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1425.082032
12	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1322.547269
13	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/22/2003	636.949538
14	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1321.253985
15	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1320.949815
16	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1325.700937
17	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1324.397145
18	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1325.634529
19	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1318.784806
20	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1321.346428
21	Polyline	04TH AV	1 1/2"	FIBER 1-288 SMFO	8/21/2003	1320.717512

1 (0 out of 28 Selected)

Existing Fiber

Figure 2-10 Existing Wireless Traffic Interconnect Attribute Table



Table

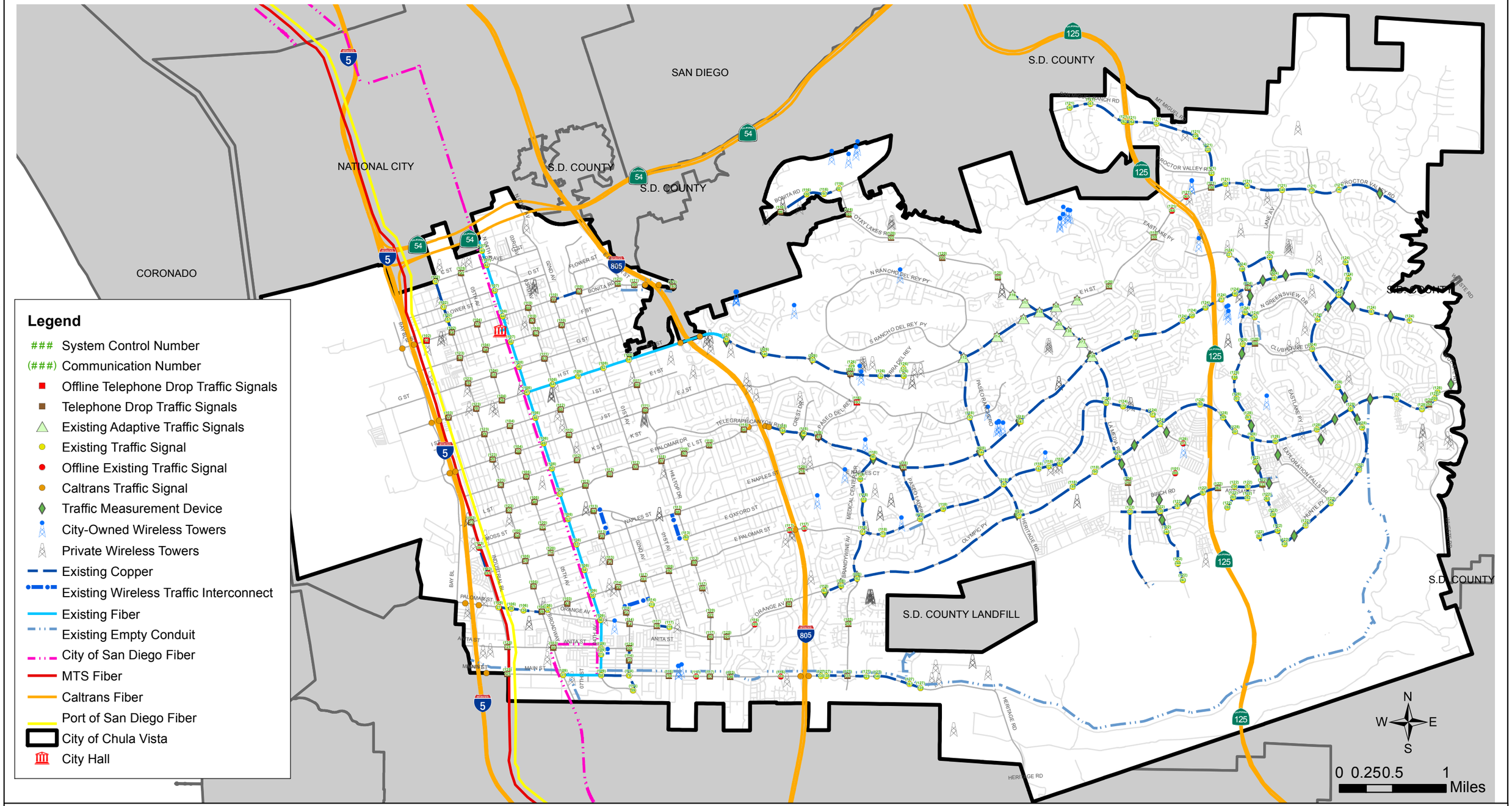
Existing Wireless Traffic Interconnect

OBJECTID *	Shape *	Street	Extent	Communication Type	Brand
1	Polyline	3rd Avenue	Moss St to Naples St	Ethernet to Serial	Iteris
2	Polyline	4th Avenue	Montgomery School Xing to Anita St	SMFO to Serial	Encom 5100
3	Polyline	Quintard St	2nd Ave to 3rd Ave	Serial	Encom 5100
4	Polyline	Hilltop Dr	Oxford St to Naples St	Serial	Encom 5200R

4 (0 out of 4 Selected)

Existing Wireless Traffic Interconnect

Document Path: S:\Projects\Chula Vista\0347_Chula Vista Traffic Signal Communications Master Plan\04 Design\GIS\MXD Files\Chula Vista Comm MP (10.3).mxd



Legend

- ### System Control Number
- (###) Communication Number
- Offline Telephone Drop Traffic Signals
- Telephone Drop Traffic Signals
- Existing Adaptive Traffic Signals
- Existing Traffic Signal
- Offline Existing Traffic Signal
- Caltrans Traffic Signal
- Traffic Measurement Device
- City-Owned Wireless Towers
- Private Wireless Towers
- Existing Copper
- Existing Wireless Traffic Interconnect
- Existing Fiber
- Existing Empty Conduit
- City of San Diego Fiber
- MTS Fiber
- Caltrans Fiber
- Port of San Diego Fiber
- City of Chula Vista
- City Hall

CITY OF CHULA VISTA

Figure 2-11 Existing Traffic Systems Communications Network

TRAFFIC

2.5.3 Regional Communications Infrastructure

Existing communications facilities for regional agencies including the San Diego Association of Governments (SANDAG), San Diego Metropolitan Transit System (MTS), California Department of Transportation (Caltrans) District 11, and the Port of San Diego were obtained from the regional Fiber Working Group (FWG) documentation. Existing and future Port of San Diego fiber locations were researched from the Bayfront Master Plan. The Port of San Diego is currently developing a fiber master plan that will complete a fiber optic ring around the San Diego Bay area. The architecture is built based on a core ring concept that will provide high-speed network entry points for the entire area. SANDAG is upgrading the RAMS system connectivity between each agency in the region to a new fiber optic lease connection with 2 Mbps speed. Fiber optic communications routes for each regional agency is mapped on the Master Plan map and assigned to separate unique dynamic layers within the GIS geodatabase.