



2015 Avila Circulation Study and Traffic Impact Fee Update

Prepared for:

San Luis Obispo County

Prepared by:



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Chapter 1

Introduction

The County of San Luis Obispo (County) retained Omni-Means to provide an update to the Avila Circulation Study and Traffic Impact Fee (TIF). Included with this Circulation Study was also the creation of a new Avila Travel Demand Model (TDM). The Circulation Study and TIF are updated approximately every five years to fulfill the requirements of Assembly Bill (AB) 1600.

The update of the "2015 Existing Conditions" traffic model has been calibrated and validated based on current land-use information, available transportation facilities, and new traffic count data collected by Omni-Means. The updated existing conditions model formed the basis for the "2035 Build-out Conditions" traffic model that was developed assuming build-out of land uses and construction of planned transportation facilities in the San Luis Obispo General Plan. The build-out conditions model has been developed in order to test alternative land use and/or circulation alternatives that will help assess the need, nature and timing of future circulation improvements within the Avila Planning Area. The new Avila traffic model will also be utilized as a planning analysis tool on a variety of traffic impact and circulation studies to assess land development proposals within the county as well as the continued update of the County's Capital Improvement Program (CIP) and Traffic Impact Fee (TIF).

This Report is technical documentation in support of the Avila Planning Area travel forecasts, resulting Circulation Study, CIP and subsequent TIF update. This report presents the methodology behind the development of the *2015 Existing Conditions*, summarizing the background data and technical components used in the development of the model, including the existing conditions calibration process. The development of the *2035 Build-out Conditions* is also summarized, including traffic projections rendered by the Avila TDM as well as alternative circulation conditions tested in yielding the circulation plan recommendations.

Following the update to the circulation plan recommendations, the transportation impact fees were updated. The transportation impact fees proposed in this report have been calculated pursuant to the Mitigation Fee Act, as set for in Sections 66000 et seq. of the California Government Code (Assembly Bill 1600).

The Mitigation Fee Act was enacted by the California State legislature in 1987 and requires that all public agencies satisfy the following requirements when establishing, increasing, or imposing a fee as a condition of approval for a development project:

1. Identify the purpose of the fee;
2. Identify the use to which the fee will be put;
3. Determine that there is a reasonable relationship between the fee's use and the type of development on which the fee is imposed;
4. Determine how there is a reasonable relationship between the need for the public facility and the type of development on which the fee is imposed; and,
5. Determine how there is a reasonable relationship between the amount of the fee and the cost of the public facility or portion of the public facility attributable to the development on which the fee is imposed.

The "reasonable relationship" test was supplemented by a test of "rough proportionality" in the 1994 United State Supreme Court decision *Dolan v. City of Tigard*. In this decision, the Court opined that, when a public agency requires an exaction from new development, the agency

cannot rely solely on a general, qualitative relationship between a land use and required facility but must make a finding that the exaction is related to the proportional impact of that land use.

The Court specifically stated in its opinion that “no precise mathematical calculation is required, but the city must make some sort of individualized determination that the required dedication is related both in nature and extent to the impact of the proposed development.” This decision effectively added an additional finding that there is a rough proportionality between the amount of the fee and the impact of the development on which the fee is imposed.

As required by Government Code Section 66000 et seq. and subsequent court rulings, this report will show that a reasonable relationship exists between the calculated fee amounts and development land uses on which they are imposed. Additionally, it will be demonstrated that a rough proportionality exists between the impact of a land use on a facility and amount of the fee imposed on it.

Avila Valley Circulation Study Goals

The 2009 Avila Valley Circulation Study contains the goals and objectives that were used by the Land Use Committee of the Avila Valley Advisory Council (AVAC) as a guide in updating the study. The following goals are still applicable in providing an appropriate and efficient inter-modal transportation system to the Avila Beach area.

- Goal 1:** To provide an appropriate and efficient transportation system to serve the present and future needs of the Avila Valley and Port San Luis.
- Goal 2:** To ensure that special events in the Avila Valley provide adequate access management.
- Goal 3:** To expand the use of alternative forms of transportation in the Avila Valley
- Goal 4:** To ensure the transportation system accommodates build-out of the land uses designated by the San Luis Bay Area Plan, both Inland and Coastal portions.
- Goal 5:** To identify a framework for information sharing, coordination and implementation of transportation-related issues among stakeholders.

These goals support maintaining a safe and efficient transportation system serving Avila Valley and Port San Luis residents, and business and recreational users consistent with the built and natural environments, fiscal, and cultural constraints.

This report is organized into the following Chapters:

- Chapter 1 - Introduction
- Chapter 2 - Background Conditions
- Chapter 3 - Travel Demand Model Development and 2015 *Existing Conditions* Calibration
- Chapter 4 - *2035 Build-out Conditions* Traffic Model Development
- Chapter 5 – Transportation Improvement Needs and Circulation Plan Recommendations
- Chapter 6 – Alternative Transportation Modes
- Chapter 7 – Cost Estimates and Funding Mechanisms, Including Transportation Impact Fees

Background Regarding Avila Traffic Evaluation

Until a 1994 ordinance, Avila traffic was evaluated the same as for other County areas. In 1995, the General Plan was amended to reserve road capacity for Harbor District development by enacting traffic evaluation for Avila Beach Drive and San Luis Bay Drive on the second week in May, during afternoon commute time between 3 pm and 6 pm.

In Spring of 2015, the County approved a Coastal Development Permit for a Harbor District camping resort at Harbor Terrace.

A letter dated April 27, 2015, to the County from the Avila Valley Advisory Committee requested that the County evaluate traffic based on the 30th highest annual peak traffic hour.

At a public hearing on October 13, 2015 the Board of Supervisors was notified by members of the Avila community that annual traffic counts indicate that the remaining capacity had declined to 25 percent of LOS "C" and in accordance with the procedures of the Planning Department Resource Management System the Board should consider the allocation of the remaining capacity among coastal-dependent, coastal-related and other development. In response, according to the Department of Planning and Building, Staff was directed by the Board "to investigate the San Luis Bay Area Plan Circulation program entitled 'Resource Capacity-Avila Beach Drive'. This investigation will take place using the Resource Management System..." "The Avila Beach Drive traffic program will investigate: -the current and historical Level of Service on the road, -all language in the Local Coastal Program created as a result of Ordinance 2702 in 1995 (including why the second week in May was selected, to include whether or not it's a feasible/appropriate standard", and -Coastal dependent and Coastal related uses."

The above referenced investigation, anticipated to be completed in 2016, is to involve the Resource Management System (RMS). Avila traffic has been evaluated by the RMS on the second week in May. (Whereas second Week in May data shows Level of Service (LOS) "C", acceptable traffic flow, visitor season data would conclude that the 30th highest hour exceeds LOS "D", the limit of acceptable congestion.

Because of community-wide desire to revert to a conventional method of evaluating traffic in Avila, and for consistency with the 2009 Update of the Avila Circulation Study which includes summer weekend traffic data, this report includes, for reference, data for summer weekends in addition to that for non-summer weekdays.

Community Input

The following text is taken from the *2009 Update - Avila Valley Circulation Study 2007*. These adopted Goals and Objectives continue to be supported by the Land Use Committee.

The *2001 Avila Circulation Study* was greatly assisted by the Transportation Committee of the Avila Valley Advisory Council (AVAC). The citizens group met a number of times during the preparation of the 2001 study, providing valuable insight and guidance in the development of the existing and future conditions evaluations, along with the selection of appropriate improvements options. In this study the Land Use Committee of AVAC met to discuss and update the *2007 Avila Valley Circulation Study*.

The Committee and the process were guided by a series of policy statements. These include the following Mission Statement, Goals and Objectives.

Mission Statement: To promote an appropriate and efficient inter-modal transportation system to serve Avila Valley and Port San Luis area residents, businesses and recreational users consistent with the built and natural environments, fiscal, and cultural constraints.

Goal 1: To provide an appropriate and efficient transportation system to serve the present and future needs of the Avila Valley and Port San Luis.

Objective 1: Using current land use and traffic data, review the list of improvements and corresponding priorities contained in the Avila Circulation Study Capital Improvement Program (CIP) to determine their relevance. Specific areas to be reviewed include, but are not limited to, the following:

The need for, and timing of, improvements to:

- *The Avila Village entrance, including a street sign for Bay Laurel Drive/Avila Beach Drive*
- *The Avila Beach Drive and San Luis Bay Drive interchanges with US 101*
- *The Ontario Road (frontage road) intersection at the San Luis Bay Drive interchange with US 101*
- *Other arterial roads*

Objective 2: Improve safety throughout the transportation system serving the Avila Valley and Port San Luis by identifying traffic controls and other improvements necessary to prevent conflicts among motor vehicles, bicycles, and pedestrians. Review the Avila Circulation Study CIP to identify gaps in planned transportation safety improvements.

Objective 3: Review the adequacy of emergency access and evacuation plans for the Avila Valley.

Goal 2: To ensure that special events in the Avila Valley provide adequate access management.

Objective 1: Obtain relevant information about past and scheduled future events and, upon consultation with pertinent entities, formulate any necessary recommendations for reduced impacts.

Goal 3: To expand the use of alternative forms of transportation in the Avila Valley

Objective 1: Identify transportation options for special events and peak summer weekend visitorship, including park and ride shuttle transportation.

Objective 2: Identify strategies (vehicle pools, public transit, paid parking, etc.) to reduce the number of commuter trips.

Goal 4: To ensure the transportation system accommodates build-out of the land uses designated by the San Luis Bay Area Plan, both Inland and Coastal portions.

Objective 1: Ensure that road capacities are consistent with relevant provisions of the Coastal Act regarding coastal-related and coastal-dependent uses.

Objective 2: Identify potential development allowed by the San Luis Bay Area Plan, both Inland and Coastal portions, and evaluate potential transportation impacts.

Objective 3: The County intends to require a Traffic Impact Study be prepared in conjunction with any proposed amendment to the Area Plan.

Goal 5: To identify a framework for information sharing, coordination and implementation of transportation-related issues among stakeholders.

These Goals and Objectives continue to be applicable for this update.

Chapter 2

Background Conditions

To initiate the 2015 update to the Circulation Study, TIF, and Avila TDM, Omni-Means first needed to ascertain changes to the existing transportation system, land uses, and other background information since the last update was developed in 2009. To this end, Omni-Means reviewed available transportation and land use information useful in obtaining an understanding of existing or “baseline” travel patterns within and through the Avila Planning Area. The 2015 update used available useful information from the previous model update, but then built a new “script file” to achieve an improved Avila TDM. The primary source of input data for the 2015 update came from parcel-based land use data and current traffic counts on critical transportation facilities.

Available sources of transportation and land use information pertinent to the Avila area of San Luis Obispo County that were obtained and reviewed included the following:

- Land Use and Circulation Element (LUCE), Avila Beach Community Plan, 2013.
- GIS database (in *ArcGIS* format) from the County that contained Assessor’s Parcel mapping, General Plan land use designations, current zoning, overlay designations, land use symbols, planning area and urban limit line information, etc., obtained from ParcelQuest in January 2015.
- Recent traffic count data obtained from Caltrans data publications, as well as new traffic counts conducted by Omni-Means in September 2014, as well as County data for 2015.
- Field (windshield) survey of roadway, land development and travel conditions, and photographs of the Avila street system.
- Most recent aerial photographs of the Avila Planning Area.
- US Census Bureau, Census 2000 and 2010 data (in GIS format) for San Luis Obispo County and within the Avila Planning Area.
- Miscellaneous traffic circulation studies and traffic impact studies recently completed for the County.

Existing Setting

San Luis Obispo County is along the Pacific coastline in Central California, north of Santa Barbara. San Luis Obispo County consists of seven incorporated cities and multiple unincorporated communities.

Avila Beach is an unincorporated community within San Luis Obispo County and is approximately 10 miles south of the City of San Luis Obispo. The Avila Beach urban area includes an area bounded on the east by Highway 101, the city of Pismo Beach on the south, the Pacific Ocean on the west, and the Irish Hills to the north. It includes the Avila Valley area, the private recreation development of the San Luis Bay Inn, the Avila townsite and the Port San Luis area extending along the bayfront. Avila Beach is one of the main recreation/tourist areas of the County and has one of the most popular beaches. This resort orientation is expected to continue; additionally, development in outlying portions of the urban area could lead to full-time resident population increases as well.

Population within the region has seen fluctuations between 2000 and 2010. Population fluctuations change the transportation needs of the surrounding community. Based on the data from the U.S. Census Bureau for 2010 and 2000, San Luis Obispo County population has

increased by approximately 23,000 individuals from 246,681 in 2000 to 269,637 in 2010. In Avila Beach specifically, the community grew from approximately 1,100 individuals¹ in 2000 to over 1,600 individuals¹ in 2010.

These population fluxes cause future transportation needs to vary. These variations will be considered with the Circulation Plan and Traffic Impact Fee update. Figure 1 shows the study area and vicinity map. Figure 2 shows the Avila area with the Fee Area and Avila URL.

US 101 is the primary highway providing regional access and is located east of Avila Beach. Avila Beach has one way in and out. No north - south two-lane access, which the Fire Department considers essential for a large project, has been proposed. The Avila Area is designated "high fire hazard," has multiple earthquake faults, tsunami potential and a nuclear power facility."

US 101 is an interstate that provides access to Los Angeles, San Jose, and traverses the coastline to Oregon and Washington. Avila Beach Drive and San Luis Bay Drive are the primary arterials that provide access from US 101 to the Avila Beach area. Left turn bays exist at major intersections along Avila Beach Drive, and at few locations on San Luis Bay Drive. West of the freeway, these two routes join and traffic continues on Avila Beach Drive into the town and Port San Luis. Currently, these two interchanges operate unacceptably and are constrained due to lack of capacity from turn lanes and control. Avila Beach Drive and San Luis Bay Drive have high demand from US 101 north and south of Avila, respectively.

Traffic through Avila is composed of three main components: PG&E employment; recreational use; and residential and commercial use. Recreational and tourist traffic is drawn towards the beach, port area, and golf course and is higher during the summer or holiday months. Resorts and vacation rentals are mainly located along 1st Street, with the exception of the large resort San Luis Bay Inn located west of the beach, and other resorts located along Avila Beach Drive northwest of the central beach area. The commercial areas are located along Front Street with restaurants and shopping, and at the Harford Pier/Harbor District which also has a seasonal fish market. Special events mainly take place at the golf course and increase traffic and parking demand in the area. Parking is allowed on Avila Beach Drive west of San Luis Street and RV camping is provided in certain areas along Avila Beach Drive near Port San Luis. Parking within the town is provided with a large parking lot located at 1st Street and San Miguel Street, and diagonal parking is provided along the commercial areas on and adjacent to Front Street. Avila Beach Drive also serves PG&E's Diablo Canyon Power Plant, whose access road is located just north of the Harbor District.

Currently, San Luis Street, San Miguel Street, and 1st Street serve as access points into the commercial and beach area from Avila Beach Drive. During the summer peak, the beach is full and visitors create a high demand for parking. Future development within the town is projected to increase traffic at the access points and along Avila Beach Drive. With future development in the area, congestion at intersections is expected to increase and parking demand in town will rise beyond what is currently available. The Transportation System Management (TSM) program outlined in this report discusses alternatives for reducing traffic and parking congestion. In 2013, a parking study was completed for Avila that also details the existing parking conditions and recommended TSM programs.

¹ <http://censusviewer.com/city/CA/Avila%20Beach>

Existing Transportation System

The existing physical conditions for the Avila Beach roadway network are described below. A hierarchy of streets provides access to and from residential, commercial, and industrial uses throughout the County and beyond. A route's design, including number of lanes needed, is determined by its functional classification and its projected traffic levels to achieve "safe and convenient movement at the development intensity anticipated in the Land Use Element."

State Freeways

Controlled access facilities whose junctions are free of at-grade crossing with other roadways, railways, or pedestrian pathways, and instead are served by interchange facilities are classified as highways. Highways usually have posted speed limits ranging from 60 to 70 mph. The following freeway services the Avila Beach area.

U.S. Highway 101 (US 101) is a major north-south interstate that traverses coastal California. US 101 serves as the principal inter-regional auto and truck travel route that connects San Luis Obispo County (and other portions of the Central Coast) with the Los Angeles urban basin to the south, the San Francisco Bay Area to the north, and beyond to Oregon and Washington. Within San Luis Obispo County, US 101 provides major connection between and through several cities, including the Five Cities Area. East of the Avila Beach area, US 101 represents a major commuter travel route and varies from a five-lane to a four-lane divided freeway with a 65 mph posted speed limit. Within the study area, US 101 forms full access interchanges with San Luis Bay Drive to the northeast and Avila Beach Drive/Monte Road/Palisades Road to the east. US 101 between San Luis Obispo and Pismo Beach is also designated as State Route 1.

Arterials

Arterial facilities serve to connect areas of major activity within the urban area and function primarily to distribute cross-town traffic from freeways/highways to collector streets. Within the Avila Beach area, arterial streets are mostly two lane facilities with maximum operating speeds ranging from 30 to 45 mph. In addition, arterial facilities generally have limited access to adjacent land uses and have a design capacity of between 13,500 to 16,000 vehicles per day, depending on geometric design features such as turn lanes, shoulder widths, and travel lane widths. The following arterials service Avila Beach:

Avila Beach Drive is a major east-west two-lane undivided arterial. Avila Beach Drive is the main arterial in Avila Beach, and it goes from Port San Luis to the west, to US 101 to the east. Avila Beach Drive provides a full access interchange with US 101 at Monte Road and Shell Beach Road, approximately 3 miles east of Avila Beach.

San Luis Bay Drive is a major east-west two-lane undivided arterial. San Luis Bay Drive begins at Monte Road to the east and terminates at Avila Beach Drive to the west. San Luis Bay Drive provides a full access interchange with US 101 approximately 3 miles northeast of Avila Beach.

Collectors

Collectors function as connector routes between local and arterial streets providing access to residential, commercial, and industrial property. Additionally, the Circulation Element identifies collectors as serving to provide bicycle and equestrian travel away from arterials for safety

purposes. Two lane collectors have a maximum capacity of approximately 12,000 and generally operate at 30 to 40 mph.

Lupine Canyon Road is a private, gated two-lane undivided roadway that primarily runs east-west from Blue Heron Drive to the east, and circles through a large residential area, and ends at Country Club Drive/Blue Heron Drive. It provides access to seven neighborhoods and up to 623 units at build-out. The access points to Lupine Canyon Road from San Luis Bay Drive via Sparrow Street and Bay Laurel Place are gated access control for the San Luis Bay Estates.

Ontario Road is a two-lane undivided roadway that primarily runs north-south from Avila Beach Drive to the south to South Higuera Street to the north. Ontario Road is a collector north of San Luis Bay Drive and serves as the frontage road west of US 101.

See Canyon Road is a two-lane undivided collector that primarily runs north-south from San Luis Bay Drive to Prefumo Canyon Road/Coon Creek Road, See Canyon Road follows up the canyon providing access to vineyards, farms, and rural residences. The road is narrow, curvey and hilly, with a short unpaved portion.

Local Streets

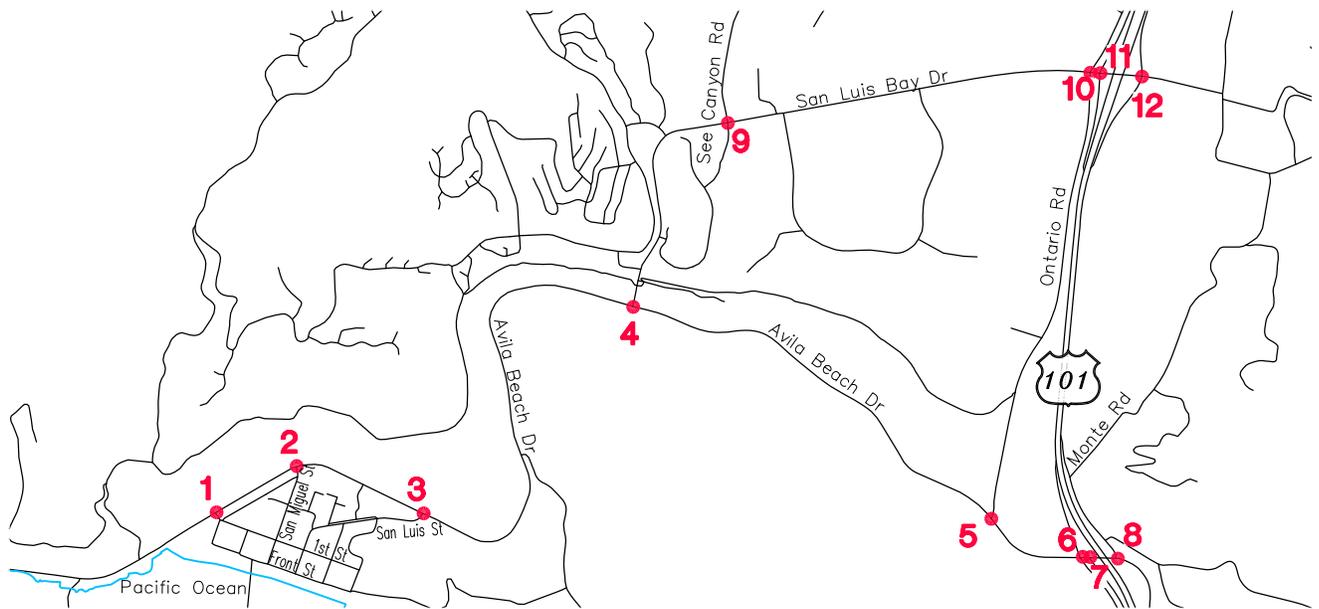
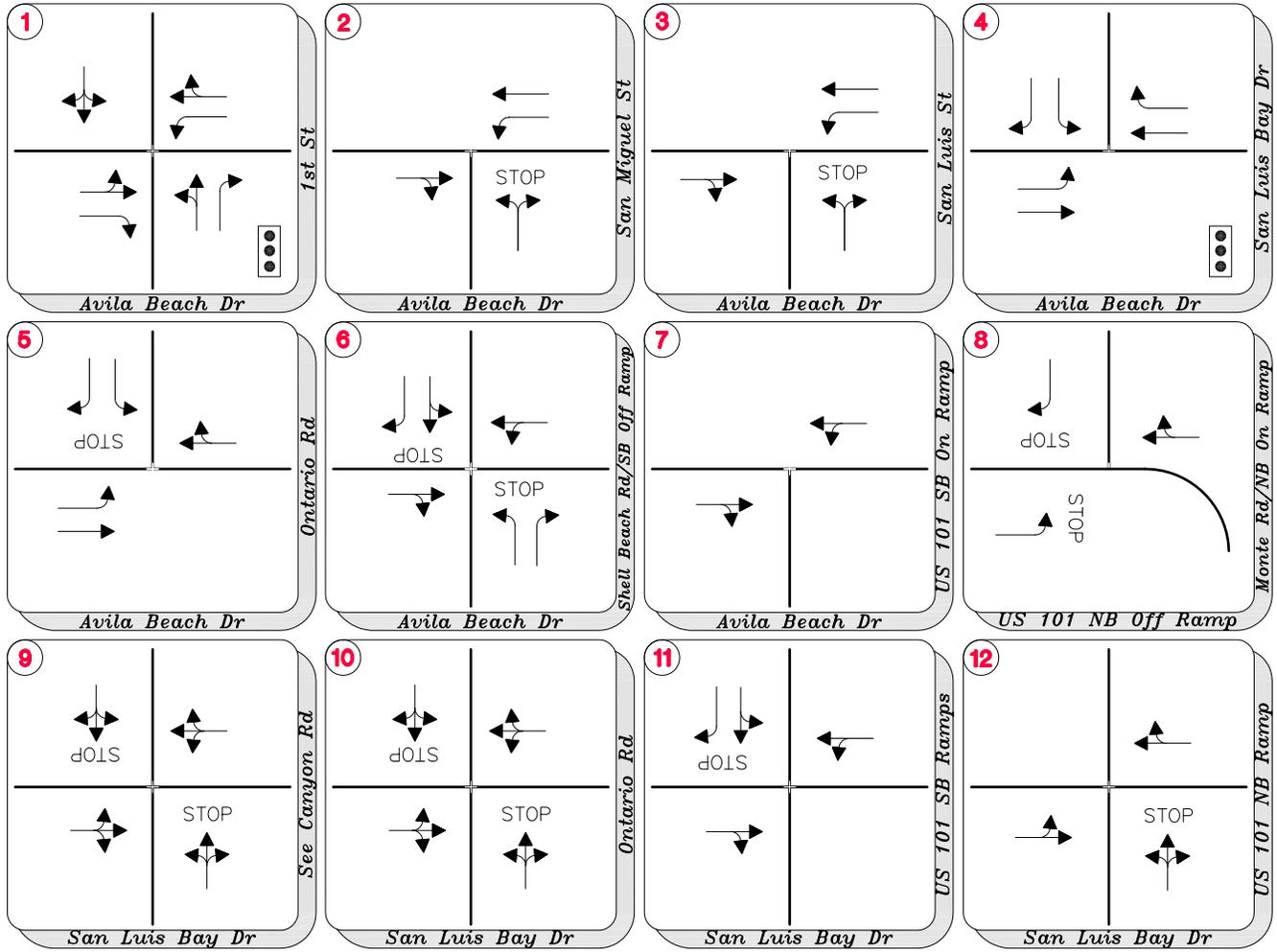
Local streets provide direct access to abutting properties and allow for localized movement of traffic. Local streets are characterized by low daily volumes of less than 2,000 and low operating speeds of 25 to 30 mph.

Existing Traffic Data Collection

In September 2014, Omni-Means collected daily roadway counts for 14 roadway segments and AM and PM peak hour turning movement counts at 12 key intersections. These counts were collected across Avila Beach in support of the traffic model development effort to follow. Counts were collected during an average weekday, when schools were in session. These counts will provide the baseline conditions for roadway and intersection facilities throughout Avila Beach. These volumes will help calibrate both existing and future traffic volume forecasts. Figure 3 presents the existing lane geometrics and control at the study intersections. Figure 4 presents the existing AM and PM peak hour volumes at the study intersections. Figure 5 presents the existing Average Daily Traffic on the roadways within Avila Beach.

In compliance with the Avila Beach Specific Plan and the San Luis Bay Coastal Plan Urban Area Standards, traffic counts were also collected for average hourly weekday two-way 3:00 pm to 6:00 pm during the second week in May along Avila Beach Drive.

Based on review of traffic count data collected from the 2nd week in May, the September 2014 counts were similar to the May counts on a daily basis. In September, the weekday Average Daily Traffic (ADT) is 11,136 west of San Luis Bay Drive. This is within less than 5% of the 10,649 ADT collected during the second week of May. On a peak hour basis, the difference between the 2nd week of May and September were more pronounced, and both volumes are presented in the roadway segment capacity analyses for Avila Beach Drive and San Luis Bay Drive in this report.

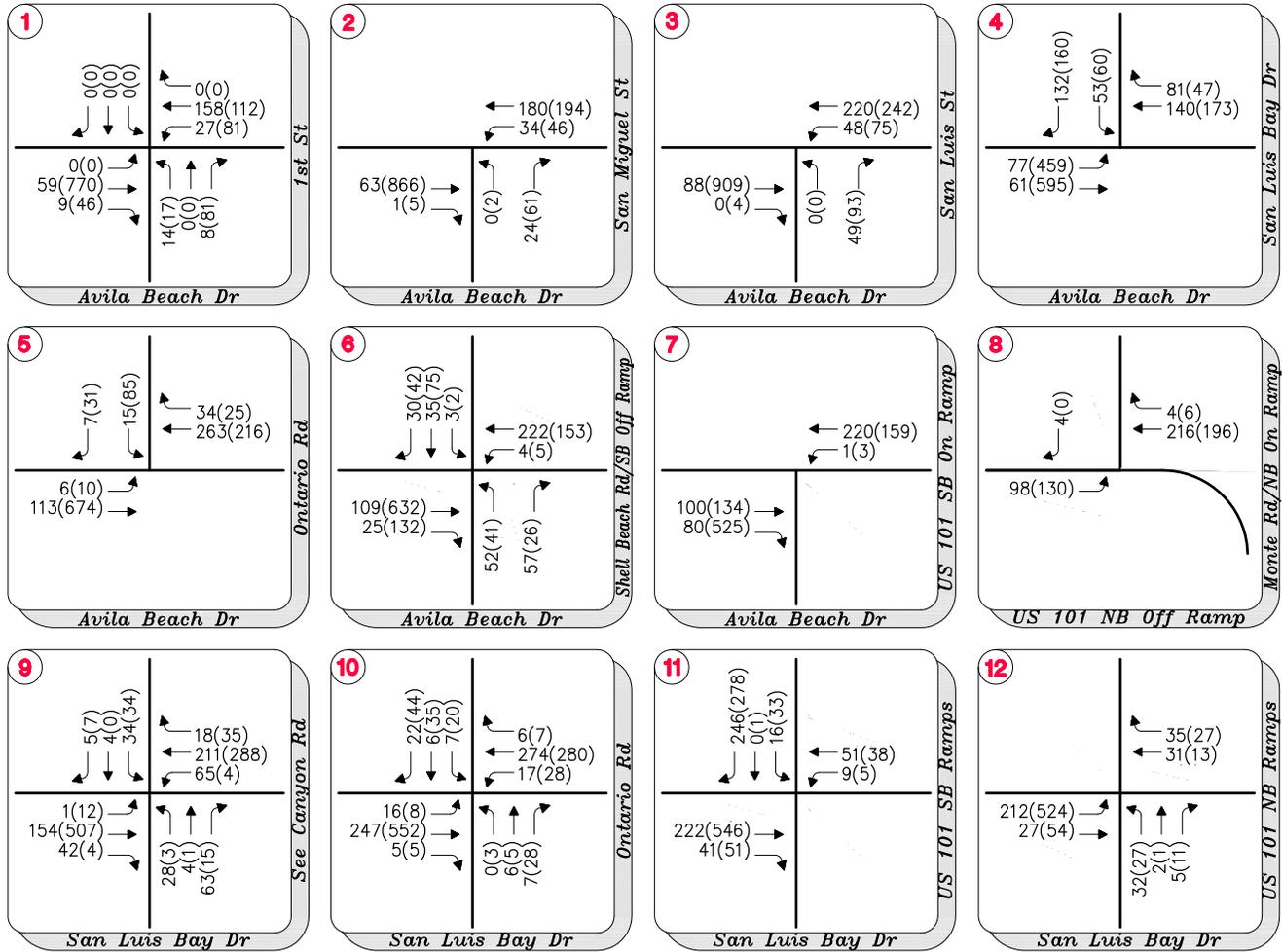


Avila Circulation Study & Traffic Impact Fee Update

Figure 3

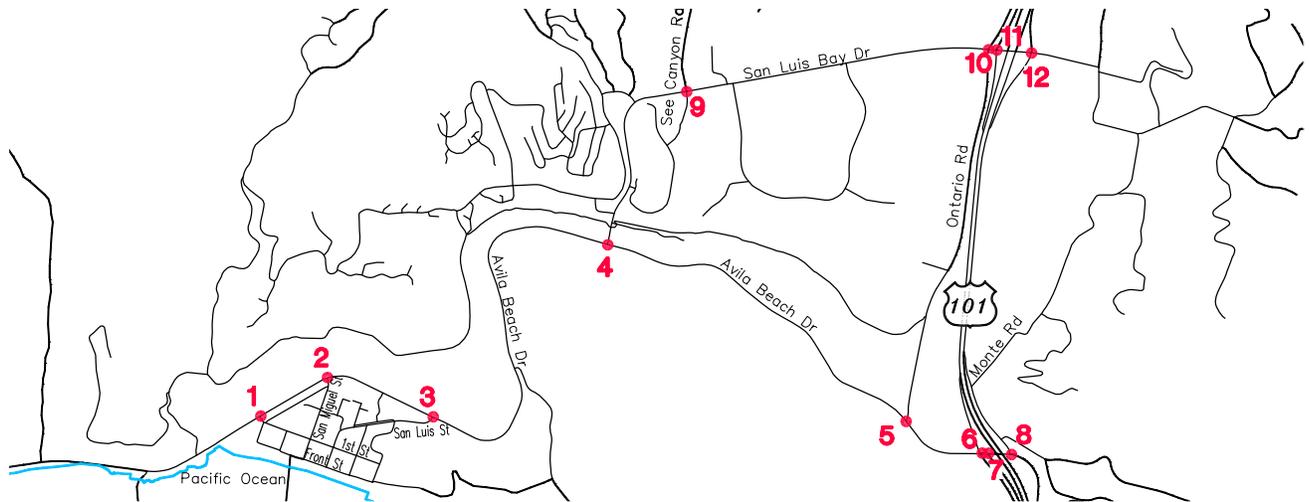
Existing Lane Geometrics and Control





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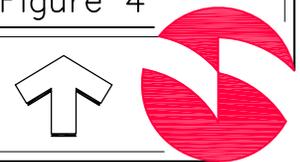
XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES

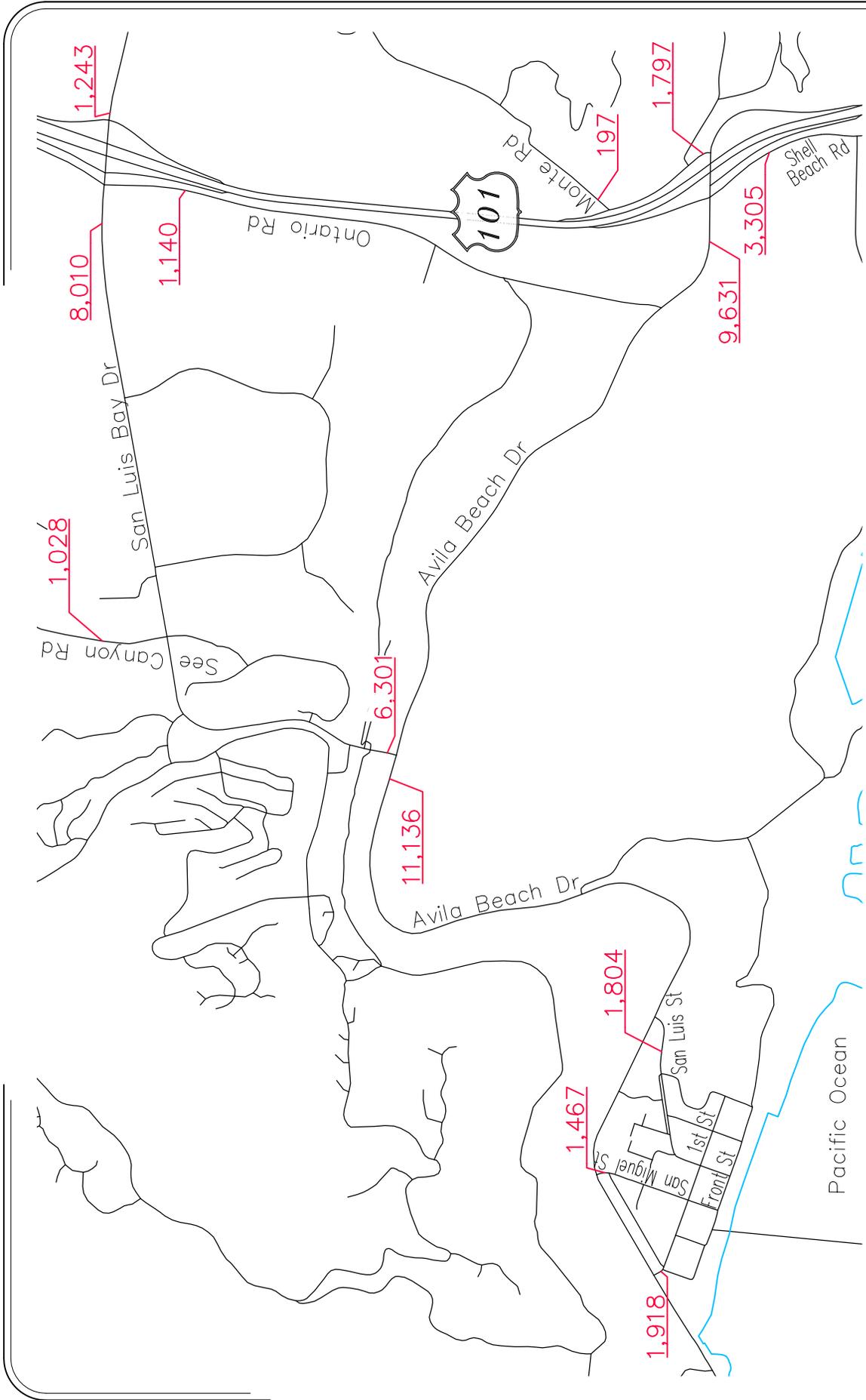


Avila Circulation Study & Traffic Impact Fee Update

Figure 4

Existing Peak Hour Traffic Volumes

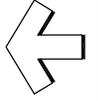




Avila Circulation Study and Traffic Impact Fee Update

Figure 5

Existing Average Daily Traffic (September 2014)



Levels of Service (LOS) Methodology

Avila Beach experiences variable traffic volumes between summer and winter and also fluctuations between weekday and weekend traffic. In compliance with the Avila Beach Specific Plan and the San Luis Bay Coastal Plan Urban Area Standards, traffic counts collected in the 2nd week of May were utilized to determine PM peak hour levels of service and identify deficiencies along Avila Beach Drive and San Luis Bay Drive. Counts collected in September 2014 were higher than in May during the PM peak hour, and are also presented in the roadway segment analyses for comparison purposes.

Traffic operations have been quantified through the determination of "Level of Service" (LOS). Level of Service is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection or roadway segment representing progressively worsening traffic conditions. The following section outlines the methodology and analysis parameters used to quantify existing conditions.

Roadway Segment Capacity

Roadway segment LOS for Avila Beach Drive and San Luis Bay Drive were determined using the capacities set in the *Avila Beach Drive Resource Capacity Study* (Wilbur Smith Associates, 1992). The capacities presented in the 1992 study take into account the higher than usual directionality along Avila Beach Drive. Capacity methodologies such as those in the Highway Capacity Manual typically assume a 60/40 peak hour directional split. The directional split for Avila Beach Drive is greater than this, ranging from 68% to 78% in the eastbound direction.

Arterials in Avila have lower effective capacity due to the higher directionality factor, as noted in the 1992 WSA study, which recommends a maximum two-way traffic volume of 1,280 vehicles per hour for LOS C. For the roadways which do not have left turn lanes, a 5% capacity reduction is applied, based on adjustments set in Florida Department of Transportation (FDOT) Quality/Level of Service Handbook Tables, 2012. The FDOT table for Peak Hour Two-Way volumes in transitioning areas on Class II facilities were used to determine the capacity for the study collectors.

Besides the adjustments made for directionality, the peak hour-based capacity thresholds applied in this study use built-in adjustment factors for typical intersection spacing, driveway spacing, etc. and therefore reasonably reflect roadway operations at a peak hour level. For standard roadways, LOS was estimated using peak-based LOS thresholds, as presented in Table 1.

Roadway segment LOS is a "planning level" evaluation of traffic operations and is a supplement to the intersection evaluation. Improvement design is ultimately driven by intersection operations that quantify such factors as approach and vehicle delay as well as queuing, taking into account existing intersection lane geometry and control type.

**TABLE 1
PEAK HOUR ROADWAY CAPACITIES BY FACILITY TYPE**

Roadway Type	Maximum Two-Way Peak Volume for Given Service Level				
	A	B	C	D	E
Two-Lane Arterial (w/LTL)	1,052	1,203	1,365	1,535	1,719
Two-Lane Arterial (No LTL)	1,001	1,149	1,300	1,460	1,635
Avila Two-Lane Arterial (w/LTL)	985	1,130	1,280	1,440	1,615
Avila Two-Lane Arterial (No LTL)	940	1,075	1,220	1,370	1,535
Avila Three-Lane Arterial (w/LTL)	1,655	1,900	2,150	2,420	2,715
Two-Lane Collector (w/LTL)	-	-	610	1,260	1,345
Two-Lane Collector (No LTL)	-	-	580	1,200	1,280

Notes:

1. As noted in the *Avila Beach Drive Resource Capacity Study, Wilbur Smith Associates, 1992, Arterials within Avila have lower effective capacity due to a higher directional factor in the PM peak hour.*
2. Standard Arterial and Collector LOS based on FDOT Peak Hour Two-Way Volumes for Transitioning Areas; and assumes a 0.6 directional factor, typ.
3. w/LTL indicates arterials with either continuous center left turn lane (LTL) or left turn lanes at major intersections.
4. No LTL indicates arterials without left turn lanes (LTL) at most major intersections.

Intersection LOS

Intersection Level of Service (LOS) will be calculated for all control types using the methods documented in the Transportation Research Board publications *Highway Capacity Manual, Fifth Edition, 2010*. Traffic operations have been quantified through the determination of LOS. LOS determinations are presented on a letter grade scale from "A" to "F", whereby LOS "A" represents free-flow operating conditions and LOS "F" represents over-capacity conditions. For a signalized or all-way stop-controlled (AWSC) intersection, an LOS determination is based on the calculated averaged delay for all approaches and movements. For a two-way stop controlled (TWSC) intersection, an LOS determination is based upon the calculated average delay for all movements of the worst-performing approach. LOS definitions for different types of intersection controls are presented in Table 2.

**TABLE 2
INTERSECTION LEVEL OF SERVICE CRITERIA**

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle		
				Signalized	Un signalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	< 10.0	< 10.0	< 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and < 20.0	>10.0 and < 15.0	>10.0 and < 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and < 35.0	>15.0 and < 25.0	>15.0 and < 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and < 55.0	>25.0 and < 35.0	>25.0 and < 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and < 80.0	>35.0 and < 50.0	>35.0 and < 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0	> 50.0	> 50.0

Level of Service Policy

San Luis Obispo County's General Plan Land Use and Circulation Element (LUCE) for San Luis Obispo (SLO) Area Plan, (August 2013) specifies minimum LOS standards for all streets and intersections within the Avila Beach area. Section 5.4 establishes the following threshold for acceptable LOS:

Utilize the Resource Management System (RMS) to determine when specific actions must be taken to address existing and projected deficiencies in service levels.

The RMS uses traffic data for Avila based on the second average weekday from 3 pm to 6 pm on Tuesday, Wednesday, or Thursday.

Objectives:

- Monitor traffic conditions on major arterials and urban/rural arterials to identify existing deficiencies.
- Project future traffic conditions based on anticipated local development trends and traffic from outside the sub-area using computer-based modeling techniques.
- Utilize computer-based modeling techniques to assess the most cost-effective strategies for roadway improvements and alternative transportation programs that provide a level of service (LOS) D or better at peak commuter periods.

The following policies were used to determine the acceptable level of service thresholds:

- The Coastal San Luis Bay Area Plan and Inland San Luis Obsipo Area Plan establishes the following:

The Level of Service (LOS) for Avila Beach Drive and San Luis Bay Drive shall be based on the average hourly weekday two-way 3:00 p.m. to 6:00 p.m. traffic counts to be conducted during the second week in May of each year. [Added 1995, Ord. 2702]

- San Luis Obispo County's General Plan LUCE for SLO Area Plan, the San Luis Bay Coastal Area Plan establishes the following related to service levels:

Avila Beach Drive shall not be subjected to traffic levels exceeding level of service "C".

- The Road and Interchanges section of the 2012-214 Resource Summary Report (RSR) of the RMS states the following regarding LOS for areas outside of the Avila Beach Urban Reserve Line (URL):

San Luis Obispo County has established LOS "C" as the threshold for the acceptable operation of roadways and interchanges in rural areas and LOS "D" in urban areas.

- In addition to the County's policies, Caltrans also provides guidance on LOS policy on State facilities. Caltrans' Guide for the Preparation of Traffic Impact Studies contains the following policy pertaining to the LOS standards within Caltrans jurisdiction:

Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and LOS "D" on State highway facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.

Consistent with Caltrans and County policies, this study will consider **LOS "C"** as the standard acceptable threshold for all study intersections and roadways on Avila Beach Drive, those maintained by the State/Caltrans jurisdiction (i.e., ramp intersections, and intersections along State Highways), and those in rural Areas (outside URL).

Also consistent with Caltrans and County policies, this study will consider **LOS "D"** as the standard acceptable threshold for all study intersections and roadways inside the Urban Reserve Line, except for Avila Beach Drive and within Caltrans jurisdiction.

Existing Traffic Operations

Existing Roadway Segments Service Levels

Existing roadway LOS was determined on a daily basis for 14 intersections throughout the Avila Beach area. These intersections were analyzed using Synchro 8 (Trafficware). Existing AM and PM peak hour intersection traffic operations were quantified utilizing the existing intersection lane geometrics and controls and the existing traffic volumes. Table 3 contains a summary of the existing roadway analysis and LOS conditions.

TABLE 3
EXISTING CONDITIONS: PEAK HOUR ROADWAY LEVEL OF SERVICE FOR NON-SUMMER WEEKDAYS

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Peak of ADT	Existing LOS
September 2014 Counts						
1	Avila Beach Drive	W of US 101 SB Ramps	Two-Lane Arterial (w/LTL)	C	996	B
2	Avila Beach Drive	W of San Luis Bay Drive	Two-Lane Arterial (w/LTL)	C	1,316	D
3	Avila Beach Drive	E of Lighthouse Road	Two-Lane Arterial (w/LTL)	C	273	A
4	1st Street	S of Avila Beach Drive	Two-Lane Collector	D	233	≤C
5	Monte Road	NE of US 101 NB On Ramp	Two-Lane Collector	C	24	≤C
6	Monte Road	N of Avila Beach Drive	Two-Lane Collector	C	177	≤C
7	Ontario Road	S of San Luis Bay Drive	Two-Lane Collector	D	133	≤C
8	San Luis Street	SW of Avila Beach Drive	Two-Lane Collector	D	167	≤C
9	San Luis Bay Drive	N of Avila Beach Drive	Two-Lane Arterial (w/LTL)	D	724	A
10	San Luis Bay Drive	W of Ontario Road	Two-Lane Arterial (No LTL)	D	865	A
11	San Luis Bay Drive	E of US 101 NB Ramps	Two-Lane Arterial (No LTL)	C	116	A
12	San Miguel Street	S of Avila Beach Drive	Two-Lane Collector	D	134	≤C
13	See Canyon Road	N of San Luis Bay Drive	Two-Lane Collector	D	103	≤C
14	Shell Beach Road	S of Avila Beach Drive	Two-Lane Collector	C	417	≤C
May 2015 Counts and Estimates						
1	Avila Beach Drive (May Estimate)	W of US 101 SB Ramps	Two-Lane Arterial (w/LTL)	C	826	A
2	Avila Beach Drive (May Count)	W of San Luis Bay Drive	Two-Lane Arterial (w/LTL)	C	1,092	B
9	San Luis Bay Drive (May Estimate)	N of Avila Beach Drive	Two-Lane Arterial (w/LTL)	D	601	A
10	San Luis Bay Drive (May Estimate)	W of Ontario Road	Two-Lane Arterial (No LTL)	D	718	A
11	San Luis Bay Drive (May Estimate)	E of US 101 NB Ramps	Two-Lane Arterial (No LTL)	C	96	A

Notes:

1. **BOLD** = Unacceptable operations
2. w/LTL indicates arterials with either continuous center left turn lane (LTL) or left turn lanes at major intersections.
3. No LTL indicates arterials without left turn lanes (LTL) at most major intersections.
4. May Estimates based on Avila Beach Drive factor of 0.83 for May counts to September counts

As shown in Table 3, all roadway segments operate at acceptable LOS based on the 2nd week of May data for Avila Beach Drive and San Luis Bay Drive, and based on the September data for collector facilities.

Existing Intersections Service Levels

Existing AM and PM peak hour intersection LOS was determined for 12 intersections throughout the Avila Beach area. These intersections were analyzed using Synchro 8 (Trafficware). Existing AM and PM peak hour intersection traffic operations were quantified utilizing the existing intersection lane geometrics and controls and the existing traffic volumes. Table 4 contains a summary of the existing intersection analysis and LOS conditions.

TABLE 4
EXISTING CONDITIONS: INTERSECTION LEVEL OF SERVICE FOR NON-SUMMER WEEKDAYS

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met? ³	Delay	LOS	Warrant Met? ³
1	1st St & Avila Beach Dr	Signal	C	14.4	B	-	16.2	B	-
2	San Miguel St & Avila Beach Dr	TWSC	C	8.8	A	-	19.6	C	-
3	San Luis St & Avila Beach Dr	TWSC	C	9.1	A	-	23.1	C	-
4	San Luis Bay Dr & Avila Beach Dr	Signal	C	16.6	B	-	16.5	B	-
5	Ontario Rd & Avila Beach Dr	TWSC	C	11.2	B	-	23.9	C	-
6	Shell Beach Rd/101 SB Off Ramp & Avila Beach	TWSC	C	11.2	B	-	31.7	D	Yes
7	US 101 SB On Ramp & Avila Beach Dr ⁴	NC			N/A	-		N/A	-
8	Monte Rd/101 NB Off Ramp & Avila Beach Dr	TWSC	C	9.6	A	-	5.0	A	-
9	See Canyon Rd & San Luis Bay Drive Dr	TWSC	D	19.6	C	-	20.6	C	-
10	Ontario Rd & San Luis Bay Drive Dr	TWSC	D	12.4	B	-	25.6	D	-
11	US 101 SB On/Off Ramp & San Luis Bay Dr	TWSC	C	10.0	A	-	10.5	B	-
12	US 101 NB On/Off Ramp & San Luis Bay Drive	TWSC	C	13.8	B	-	35.5	E	No

Notes:

1. *AWSC = All Way Stop Control; TWSC = Two Way Stop Control*

2. *LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal*

3. *Warrant = Based on California MUTCD Warrant 3*

4. *NC = No Control as it is an on-ramp only intersection. Synchro software does not provide LOS for uncontrolled intersections*

As shown in Table 4, the intersections of US 101 SB Off Ramp/Shell Beach Road/Avila Beach Drive and US 101 NB On/Off Ramp at San Luis Bay Drive operate at unacceptable LOS in the PM peak hour, during non-summer weekday conditions.

Existing Land Uses

According to a review of the parcel land use database (in GIS format) provided by County staff, 14,500 acres out of the modeled 24,800 acres are within the existing Avila Traffic Fee Area, and therefore are included in the traffic model area. Existing and approved development includes Harbor Terrace and the approved but un-built dwelling units in San Luis Bay Estates. Regional beach access will cause higher traffic volumes during peak summer months. A summary of the County's General Plan land use designations is shown below in Table 5.

**TABLE 5
EXISTING LAND USES**

Land Use	2015 Conditions		
	Fee Area	Non-fee Area	Avila Total
Residential (dwelling units)	1,228	55	1,283
Single Family	968	18	986
Multi Family	253	0	253
Mobile Home	7	37	44
Non-Residential (acres)	8,501	3,817	12,318
Agriculture	6,987	3,817	10,803
Commercial + Motel	18	0	18
Golf/Recreation	428	0	428
Industrial	96	0	96
Office	0	0	0
Public Facility/Other Service	973	0	973
Estimated Employment	1,896	35	1,931
Retail	270	0	270
Service	1,546	0	1,546
Other	80	35	115

Non-fee Area consists of parcels outside the Avila Fee Area that are included in the Avila Travel Demand Model.

Chapter 3

Base Year Traffic Model Development

This chapter presents the supporting technical documentation for the Avila traffic model development process.

Data Sources

The travel demand model is based on land use information at parcel level resolution as provided by the County of San Luis Obispo Engineering Department in ESRI Arc View Shape file format. The parcel, road and county limit shape file were projected into California State Plane, Zone IV, US Foot, coordinate systems using the Lambert Conformal Conic projection.

Data Evaluation

In order to generate an accurate representation of the existing land use patterns within the study area, an evaluation of the parcel land use data was performed. The County assessor uses a numeric code to describe the land use of parcels within the County. The model roadway network was created using existing roadway maps and the parcel shape file.

The Traffic Analysis Zones (TAZs) creation process begins by determining which parcels contribute traffic to the model network roads. Each parcel is analyzed to determine how the traffic it generates will logically shed to the model network. A TAZ is composed of all the parcels that shed to common model network roads. Creation of the model network is completed with the addition of centroid connectors from the TAZs.

Choice of Model Software – Cube/Voyager

The CUBE/Voyager (Citilabs) software suite was used for the current update to the Avila Travel Demand Model. The travel demand model follows an industry-standard four-step procedure for modeling travel demand. The steps are as follows:

1. Trip Generation – Estimate the trips generated and attracted by individual Traffic Analysis Zones (TAZs)
2. Trip Distribution – Match trips that are generated and attracted between zones for varying trip purposes.
3. Mode Choice – Select a travel mode for a particular trip.
4. Assignment – Select a path for the chosen travel mode and trip.

Creation of TAZ Map

Avila land uses are simplified into areas referred to as “Traffic Analysis Zones” (TAZs) for travel demand modeling purposes. Aggregating minute areas like parcels into larger zones decreases the computation intensity of the model and simplifies data processing. The TAZs are defined using real-world traffic boundaries, such as natural geographic barriers (e.g. rivers and creeks) and “man-made” barriers (e.g. major street right-of-ways and railroads).

Figure 6 presents the Avila TAZ boundary map. A total of 43 TAZs were defined for the Avila area. The TAZ boundaries are separated into two areas, as presented in Figure 6. Area 1 of the two model areas is the fee area, which will be used in the Avila Circulation Study and Impact Fee Update.

Tables 1 and 2 in the Appendix show the land use by TAZ for 2015 and 2035. Figures 1 and 2 in the Appendix show land use growth from 2015 to 2035 for residential dwelling units and employment by TAZ.

Land Use –TAZ Integration

Travel demand models simulate travel demand by first estimating trips generated in zones within the study area. The number and type of trips generated and attracted between areas depend on land use. The County Assessor’s parcel database provides land use data in terms of zoning and development type (e.g. housing, commercial development, public uses). The land uses were further simplified into housing unit and employment estimates, which are consistent with the US Census. The existing land uses within the Avila area are as previously summarized in Table 5.

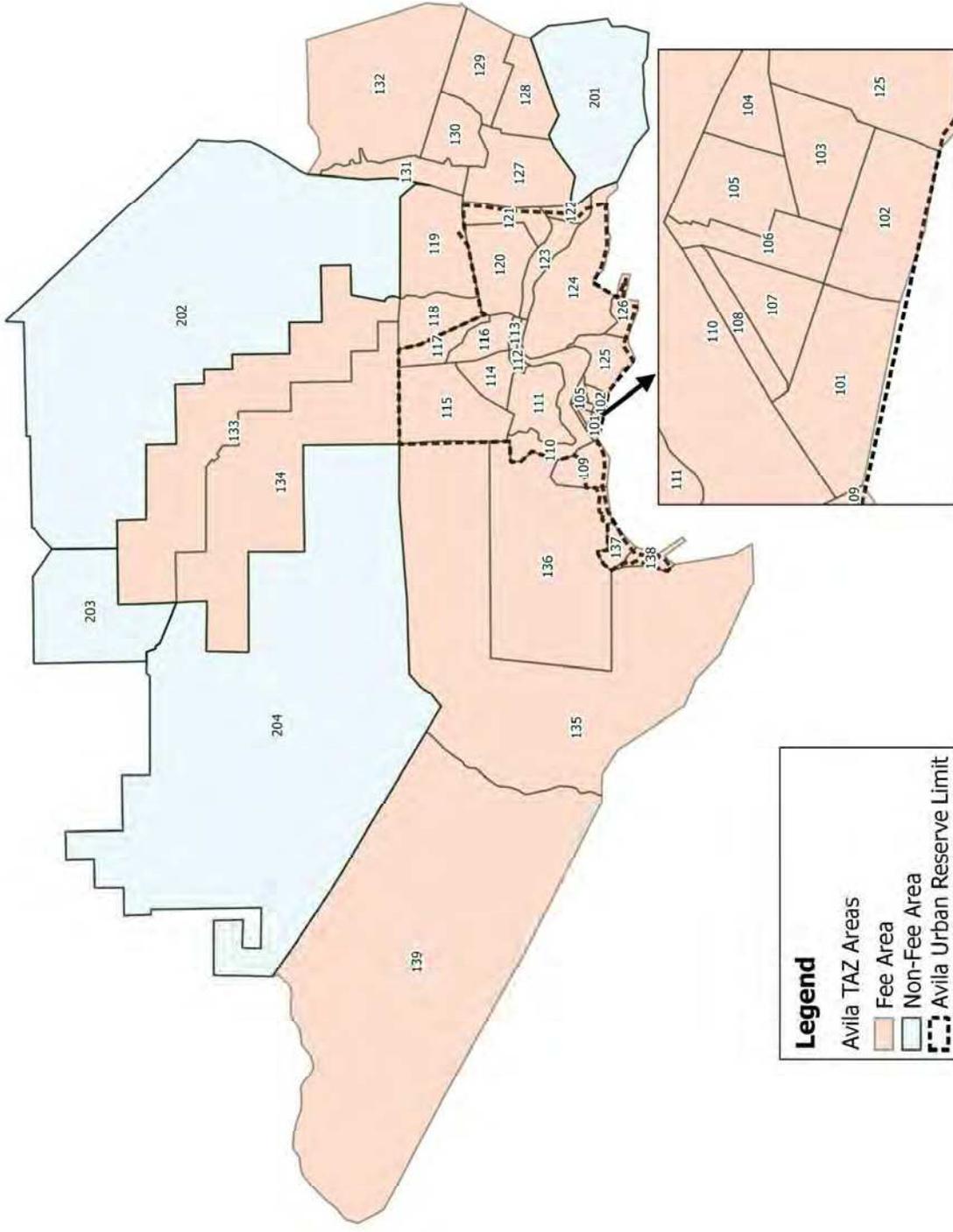
Network Creation

Street networks handle the trips generated by land use. The travel demand model simulates a road’s ability to handle travel demand based on facility type (e.g. freeway, highway, arterial, and collector), number of lanes, speed, and alignment. Figure 7 shows the Base Year network map, which reflects the existing Avila area roadway system.

Table 6 presents the road classification categories, the associated operating characteristics of each category, and examples of roads in each category.

**TABLE 6
ROADWAY CLASSIFICATION**

Classification	Capacity (Vehicles per Lane per Hour)	Free-Flow Speed (mph)	Example Roadway
Freeway	2000	65-70	US Highway 101
Highway	1000	45-55	Highway 1
Arterial	800	35-45	San Luis Bay Drive
Collector	600	25-35	See Canyon Road
Local	300	25-35	San Rafael Street



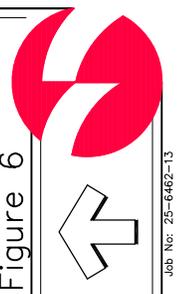
Legend

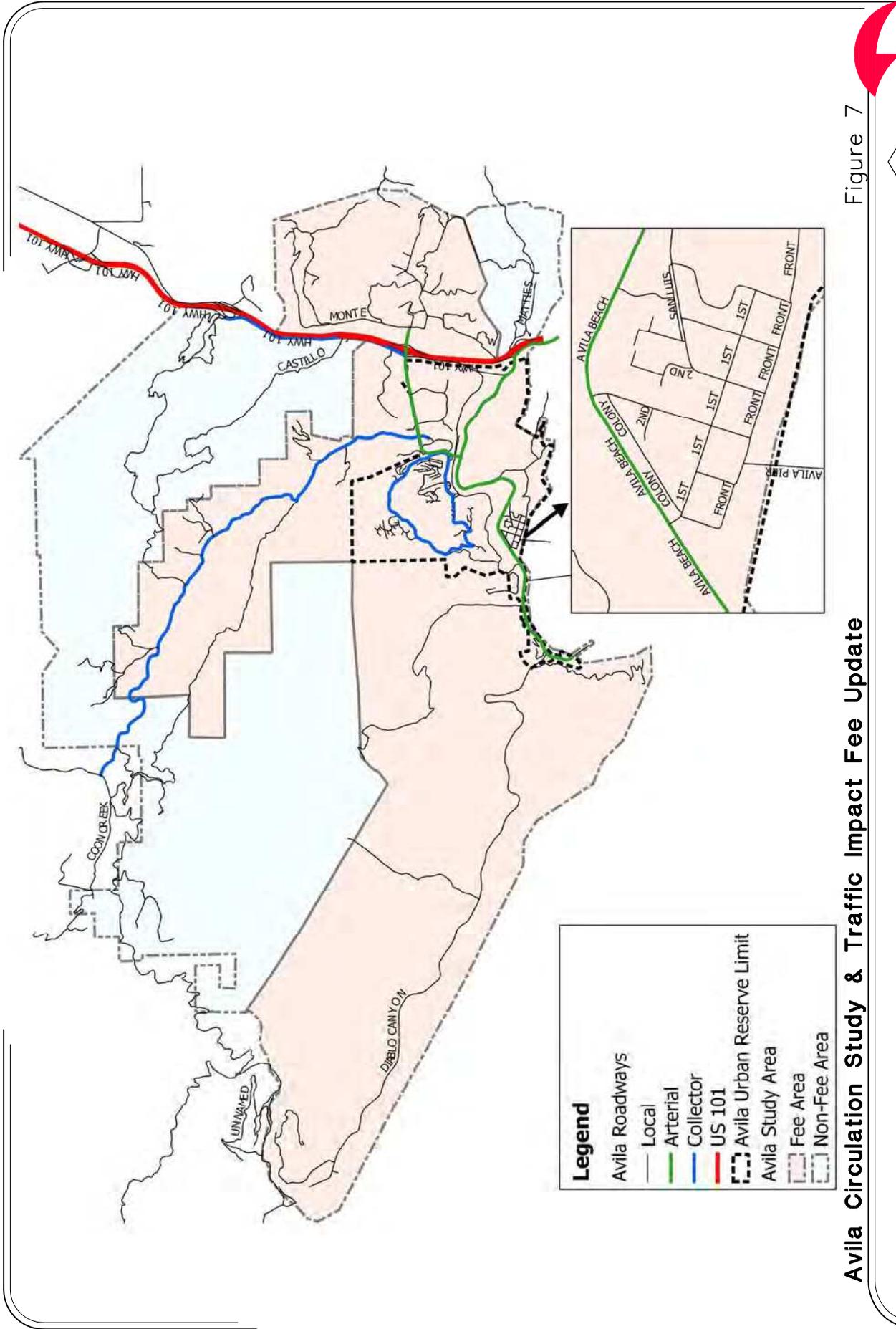
- Avila TAZ Areas
- Fee Area
- Non-Fee Area
- Avila Urban Reserve Limit

Avila Circulation Study & Traffic Impact Fee Update

Figure 6

Avila Traffic Analysis Zone (TAZ) Map

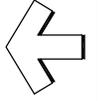




Avila Circulation Study & Traffic Impact Fee Update

Figure 7

Avila Roadway Network



Trip Generation

Land uses generate a varying number of trips based on development type and development quantity. Trip producing land use groups include single-family and multi-family residential dwelling units. Trip attracting land use groups include retail, office, industrial and educational land uses. The land use quantities derived from the parcel database was converted into dwelling unit and employment estimates. These TAZ-level estimates were checked for consistency with the US Census and the regional model.

Each trip purpose has a different trip generation rate for each land use. Trip generation rates for individual land uses were checked against traffic studies contained in the Institute of Transportation Engineers *Trip Generation, 9th Edition* manual.

Trip Distribution

The trips generated and attracted between land uses depend on trip purpose and network impedance. Modeled trips were sorted into five trip purpose categories.

1. Home-Based Work (HBW)
2. Home-Based Education (HBE)
3. Home-Based Shop (HBS)
4. Home-Based Other (HBO)
5. Other-Based Other (OBO)

The ability for one land use to satisfy the trip purpose of another land use leads to the creation of an origin-destination pairing (e.g. a trip from a residential area to an area containing retail development). The likelihood of such a pairing also depends on the travel time for such a trip to occur. Long travel times between zones, which are affected by congested roadways, decrease the likelihood of an origin-destination pairing and results in the model seeking another closer trip pairing opportunity.

Mode Choice

The Avila travel demand model solely simulates automobile travel patterns. Transit service is not a major component of the vehicular traffic within Avila and was not considered in the travel demand model process.

Trip Assignment

Trips between origin-destination pairs are assigned by the model using an equilibrium process. The multiple possible paths between zones are iteratively loaded until no one path provides an advantage over another. The volumes on each network link are then compared against real-world traffic counts to determine model correctness. The following section outlines the model calibration procedure.

Model Calibration

The previous section described the creation of a complete but “un-validated” base year model, i.e. the model may not accurately reflect real-world travel demand. Calibrating the model so that it reasonably reflects real world travel demand requires matching the model estimate on a set of links against traffic counts. The calibration process and technical information is included in the Appendix.

Chapter 4

Build-Out Conditions Traffic Model Development

The creation of a long-term future conditions traffic forecast model for the Avila planning area involved the following steps.

Creation of Future Conditions Land Use Database

The Avila built-out land use database was created by assuming existing uses on currently developed lands and build-out per the County's general plan (provided by San Luis Obispo County) on vacant and/or underdeveloped lands. Parcels that were considered "vacant" (San Luis Obispo County Assessor's criteria) were first identified. The currently vacant parcels were segregated into residential and non-residential land use categories based on General Plan zoning designations contained in the County tract map. The Avila Planning Area comprises of approximately 24,800 acres, of which approximately 481 acres of lands are considered "vacant" by the San Luis Obispo County Assessor's parcel data. The area currently has 2,075 acres of residential, 31 acres of retail/commercial/service, 96 acres of industrial, 10,800 acres of general agricultural, 1,257 acres of golf/recreational/open space, 990 acres of other/public/government land uses, and approximately 9,070 acres of rural/mountainous lands.

Future land use projections were based on the San Luis Obispo County General Plan. The build-out of the area per General Plan zoning is projected to result in 2,533 acres of residential, 46 acres of retail/commercial/service, 96 acres industrial, 10,800 acres of general agricultural, 1257 acres of golf/recreational/open space, 998 acres of other/public/government use, and approximately 9,070 acres of rural/mountainous lands. The development densities for build-out land uses were projected to remain consistent with existing land use density. Residential unit density for future development was projected based on the residential unit densities per land use presented in the General Plan.

Much of the residential development in the Avila area, outside of the "downtown" Avila area, has been developed as clusters. These clusters are primarily residential developments and may be near recreational areas (e.g. resorts, bike trails, etc.) and include some commercial development. Examples of these developments include those along Lupine Canyon Road. Including vacant parcels in these residential clusters and the remaining undeveloped residential parcels some areas east of US 101, the residential build-out of the Avila area is projected to result in 1,119 single-family dwelling units, 280 multi-family dwelling units and 44 mobile homes. This residential growth projection represents a 160 dwelling unit increase.

The build-out land use database, as described above, is summarized in Table 7. Land use for each TAZ was tabulated and included in the Appendix, in addition to maps showing growth by dwelling unit and employees.

**TABLE 7
BUILD-OUT LAND USES**

Land Use	Fee Area			Non-fee Area		
	Existing	Added	Build-Out	Existing	Added	Build-Out
Residential (dwelling units)	1,228	160	1,388	55	0	55
Single Family	968	133	1,101	18	0	18
Multi Family	253	27	280	0	0	0
Mobile Home	7	0	7	37	0	37
Non-Residential (ksf)	370,300	657	370,957	166,260	0	166,260
Agriculture	304,334	0	304,334	166,260	0	166,260
Commercial + Motel	782	288	1,070	0	0	0
Golf/Recreation	18,629	0	18,629	0	0	0
Industrial	4,175	150	4,325	0	0	0
Office	2	81	83	0	0	0
Public Facility/Other Services	42,378	139	42,516	0	0	0
Estimated Employment	1,896	148	2,044	35	0	35
Retail	270	64	334	0	0	0
Service	1,546	69	1,615	0	0	0
Other	80	15	95	35	0	35

**Non-fee Area consists of parcel outside the Avila Fee Area that are included in the Avila Travel Demand Model.*

Year 2035 as the Future Conditions' Model Year

Caltrans and other agencies typically require twenty years or more of design life span for improvements to their transportation facilities. Recognizing these concerns, and based on discussions with County staff, year 2035 was agreed to as the cumulative or long-term future conditions' traffic model forecast year. Year 2035 is also anticipated to be consistent with the long-range forecast year for the upcoming Regional Traffic Model (RTM) developed by SLOCOG.

State facilities including US 101 within the vicinity of the Community's planning area have experienced approximately 0.4% to 0.6% compounded annual growth in AADT over the last ten years (2004 through 2014). Based on Caltrans ten-year count data and considering differential rates of growth for communities adjacent to the Avila area (e.g. Shell Beach and San Luis Obispo), the twenty-year US 101 background traffic change has been calculated as 27% growth from the south and 34% growth from the north. Growth from local gateways, particularly from the City of San Luis Obispo to the north and Shell Beach to the south, was based on regional growth projections from the County travel demand model. The year 2035 growth from local gateways has been assumed at 22% consistent with the County travel demand model.

The Build-Out land use database (General Plan build-out land uses) was multiplied with the calibrated existing conditions trip generation rates to develop the projected future trip generation. The updated year 2035 gateway trip production-attraction table and "through" (external or X-X) trip table were incorporated into the Build-Out traffic model.

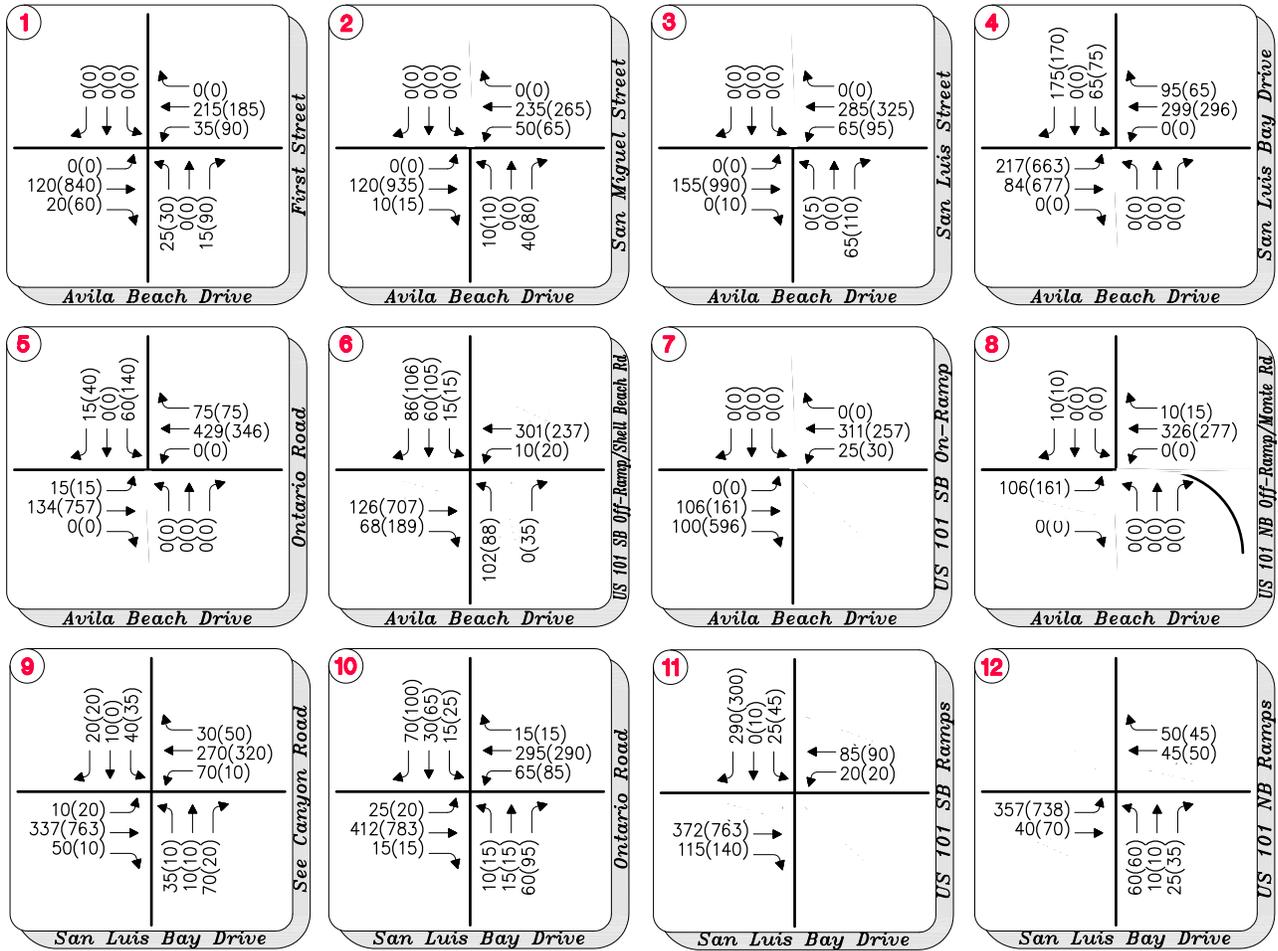
Build-Out Model Network

The projected Build-Out segment volumes are listed in Table 8 and illustrated on Figure 8. Estimate peak hour intersection volumes at study intersections are shown in Figure 9. The Build-Out model land uses and trip volumes generated by TAZ are shown in the Appendix.

Based on the link volumes and roadway characteristics provided by the County, the peak hour levels of service were estimated using Highway Capacity Manual 2000 and 2010 (HCM 2000 and 2010) methodologies. The daily volume thresholds for roadways are presented in Table 1 provide a generalized estimate on typical roadway capacities.

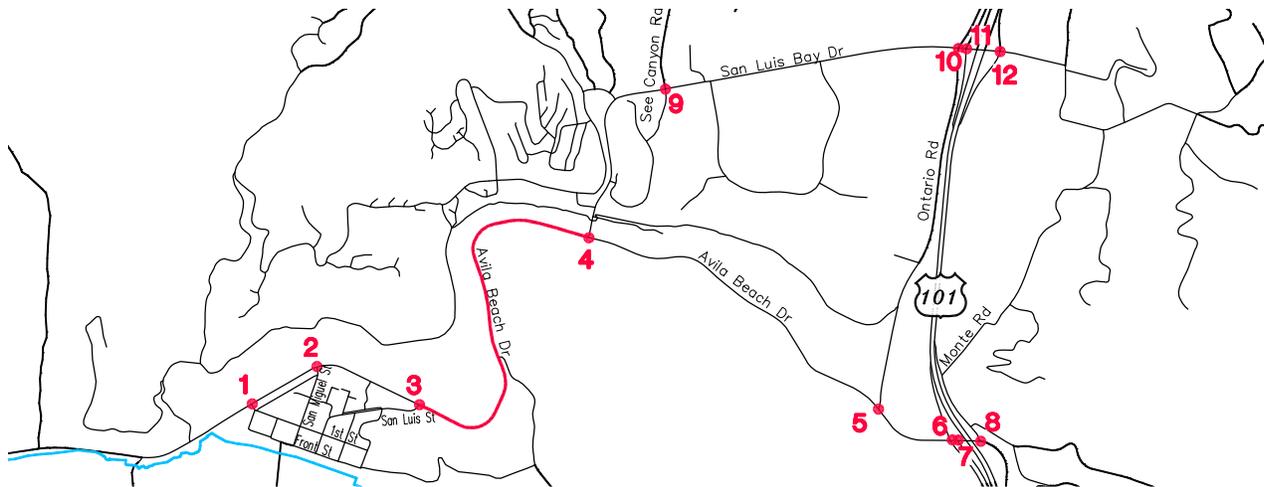
Future intersection LOS was estimated using the projected Build-Out traffic volumes (Figure 8) and Highway Capacity Manual 2000 methodologies. Table 2 provides the typical delay thresholds for intersections of varying control types (e.g. signal, two-way stop, all-way stop). The *Synchro 8* (Trafficware) software program was used to implement the HCM 2010 analysis methodologies.

Table 9 shows the estimated intersection LOS under existing intersection controls and the projected Build-Out intersection volumes, as shown in Figure 9.



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES
 (XX) - PM PEAK HOUR TRAFFIC VOLUMES



Avila Circulation Study & Traffic Impact Fee Update

Figure 9

Build-Out Peak Hour Traffic Volumes



TABLE 8
BUILD-OUT CONDITIONS: PEAK HOUR ROADWAY SEGMENT AVERAGE DAILY TRAFFIC LEVELS OF SERVICE FOR NON-SUMMER WEEKDAYS

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Buildout Peak Projection	Buildout Peak LOS
1	Avila Beach Drive	W of US 101 SB Ramps	Avila Two-Lane Arterial (w/LTL)	C	1,239	C
2	Avila Beach Drive	W of San Luis Bay Drive	Avila Two-Lane Arterial (w/LTL)	C	1,660	E
3	Avila Beach Drive	E of Lighthouse Road	Avila Two-Lane Arterial (w/LTL)	C	296	A
4	1st Street	S of Avila Beach Drive	Two-Lane Collector (No LTL)	D	245	≤C
5	Monte Road	NE of US 101 NB On Ramp	Two-Lane Collector (No LTL)	C	26	≤C
6	Monte Road	N of Avila Beach Drive	Two-Lane Collector (No LTL)	C	138	≤C
7	Ontario Road	S of San Luis Bay Drive	Two-Lane Collector (No LTL)	D	296	≤C
8	San Luis Street	SW of Avila Beach Drive	Two-Lane Collector (No LTL)	D	186	≤C
9	San Luis Bay Drive	N of Avila Beach Drive	Avila Two-Lane Arterial (w/LTL)	D	1,054	B
10	San Luis Bay Drive	W of Ontario Road	Avila Two-Lane Arterial (No LTL)	D	1,135	C
11	San Luis Bay Drive	E of US 101 NB Ramps	Avila Two-Lane Arterial (No LTL)	C	144	A
12	San Miguel Street	S of Avila Beach Drive	Two-Lane Collector (No LTL)	D	161	≤C
13	See Canyon Road	N of San Luis Bay Drive	Two-Lane Collector (No LTL)	D	113	≤C
14	Shell Beach Road	S of Avila Beach Drive	Two-Lane Collector (No LTL)	C	527	≤C
May 2035 Estimates						
1	Avila Beach Drive	W of US 101 SB Ramps	Avila Two-Lane Arterial (w/LTL)	C	1,070	A
2	Avila Beach Drive	W of San Luis Bay Drive	Avila Two-Lane Arterial (w/LTL)	C	1,436	D
9	San Luis Bay Drive	N of Avila Beach Drive	Avila Two-Lane Arterial (w/LTL)	D	906	A
10	San Luis Bay Drive	W of Ontario Road	Avila Two-Lane Arterial (No LTL)	D	975	A
11	San Luis Bay Drive	E of US 101 NB Ramps	Avila Two-Lane Arterial (No LTL)	C	123	A

Notes:

- BOLD** = Unacceptable operations
- w/LTL indicates arterials with either continuous center left turn lane (LTL) or left turn lanes at major
- No LTL indicates arterials without left turn lanes (LTL) at most major intersections.
- Peak Projections based on average factor for ADT/Peak Hour, May estimates based on factor of Avila Beach Drive projections

As shown in Table 8, the segment of Avila Beach Drive west of San Luis Bay Drive is projected to operate at an unacceptable LOS during 2nd week of May under build-out conditions.

TABLE 9
BUILD-OUT CONDITIONS: INTERSECTION LEVELS OF SERVICE FOR NON-SUMMER WEEKDAYS

#	Intersection	Control Type ^{1,2}	Target LOS	Hour		Hour		Warrant Met? ³
				Delay	LOS	Delay	LOS	
1	1st St & Avila Beach Dr	Signal	C	16.3	B	32.0	C	-
2	San Miguel St & Avila Beach Dr	TWSC	C	9.9	A	27.4	D	Yes
3	San Luis St & Avila Beach Dr	TWSC	C	9.6	A	30.2	D	Yes
4	San Luis Bay Dr & Avila Beach Dr	Signal	C	17.5	B	25.8	C	-
5	Ontario Rd & Avila Beach Dr	TWSC	C	15.4	C	88.7	F	Yes
6	Shell Beach Rd/101 SB Off Ramp & Avila Beach	TWSC	C	16.7	C	694.5	F	Yes
7	US 101 SB On Ramp & Avila Beach Dr ⁴	NC			N/A		N/A	-
8	Monte Rd/101 NB Off Ramp & Avila Beach Dr	TWSC	C	10.5	B	9.9	A	-
9	See Canyon Rd & San Luis Bay Drive Dr	TWSC	D	27.1	D	34.6	D	-
10	Ontario Rd & San Luis Bay Drive Dr	TWSC	D	22.4	C	309.4	F	Yes
11	US 101 SB On/Off Ramp & San Luis Bay Dr	TWSC	C	11.0	B	12.9	B	-
12	US 101 NB On/Off Ramp & San Luis Bay Drive	TWSC	C	24.9	C	581.0	F	Yes

Notes:

- AWSC = All Way Stop Control; TWSC = Two Way Stop Control
- LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal
- Warrant = Based on California MUTCD Warrant 3
- NC = No Control as it is an on-ramp only intersection. Synchro software does not provide LOS for uncontrolled intersections

Shown in Table 9, intersections of San Luis Bay Drive at Ontario Road and at the US 101 NB Ramps, Avila Beach Drive at US 101 SB Off-Ramp/Shell Beach Road and at Ontario Road, and Avila Beach Drive at the San Luis Street and at the San Miguel Street entrances into Town are projected to result in deficient LOS or worse under build-out conditions. Intersection improvement alternatives are evaluated in a subsequent section.

Circulation Issues of Concern

The following are summaries of circulations issues of concern predicted by the Avila/ Traffic Model for Build-out cumulative conditions. Utilizing average daily traffic (ADT) predictions produced by the model, the peak hour-based Levels of Service for each roadway segment were calculated according to the methodology described in Chapter 2. Consistent with San Luis Obispo County and Caltrans policies, LOS “C” was taken as the general threshold for acceptable/tolerable operations for rural areas, areas within Caltrans jurisdiction, and along Avila Beach Drive, and LOS “D” was taken as the general threshold for urban areas (Avila URL). Roadway segments with projected LOS worse than the identified thresholds were determined as “deficient”. Implications on community traffic conditions and safety are also described in this section, along with possible effects resulting from approved/planned capital improvement projects listed in the 2013 Avila Capital Improvement Program (CIP) Update project inventory.

Roadways

Avila Beach Drive west of San Luis Bay Drive – This roadway is projected to operate at deficient LOS “D” under build-out conditions. The PM peak hour volumes are heavy in the eastbound direction.

Intersections

Avila Beach Drive/First Street/San Juan Street - This intersection is busy on weekends due to its proximity to the Bob Jones Pathway terminus, gold course event parking entrance, aquarium and playground. Available right-of-way would accommodate a right turn lane onto Avila Beach Drive to alleviate Congestion.

Avila Beach Drive/Shell Beach Road/US 101 SB Off-Ramp – The intersection of Avila Beach Drive at US 101 SB Off-Ramp/Shell Beach Road currently operates at LOS “D” and worsens under build-out conditions. The lack of capacity from turn lanes and intersection control types causes major delays through this intersection. This intersection is also closely spaced with the US 101 SB On-Ramp. Modifications at this interchange including a Project Study Report (PSR) for installing a roundabout at the SB ramps are recommended, which is currently in preparation by Caltrans.

San Luis Bay Drive/US 101 NB Ramps – This intersection currently operates at LOS “E” in the PM peak hour and worsens under build-out conditions. Modifications at this interchange including a US 101 bridge widening and a PSR are recommended.

Avila Beach Drive/San Luis Street – This intersection is projected to operate at deficient LOS “D” under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

Avila Beach Drive/San Miguel Street – This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

Avila Beach Drive/Ontario Road – This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

San Luis Bay Drive/Ontario Road – This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

Emergency Evacuation

This is an excerpt from the 2009 Update Study:

As part of the operations plans for the Diablo Canyon Nuclear Power Plant, an Emergency Evacuation Plan has been prepared and, in the wake of current disasters such as Hurricane Katrina, has been reevaluated by the San Luis Obispo County Civil Grand Jury in the 2006-2007 San Luis Obispo County Civil Grand Jury Report. Based on the results of this report one recommendation was made to the current Evacuation Plan. Historically, the Cave Landing Road to Bluff Drive segment leading to Shell Beach has been considered an alternative evacuation route. As stated in the Grand Jury Report, Cave Landing Road is a dirt road that should be upgraded and designated as exit route from Avila Beach to Shell Beach. The estimated cost to upgrade and designate Cave Landing Road as an alternative route is \$6,000,000 to \$10,000,000, largely due to the need to construct a structure to bridge a significant landslide that has closed Cave Landing Road. The County Office of Emergency Services is responsible for managing the plan.

The County Fire Chief has asserted that any additional large development, such as that proposed for the golf course, should involve a new second route constructed to County roadway standards.

A new route is necessary to address that Avila Beach has "one-way in, one-way out" by a two-lane narrow road without adequate shoulders and only a parallel one-lane "designated" emergency route involving the Bob Jones Pathway. Avila's resident population of under 2,000 is swelled by five to six times during warm weather.

In 2015, Cal Fire announced it would not sign off on any future large land developments in the Avila Beach area due to traffic congestion on Avila Beach Road and the lack of a secondary access road in the event of an emergency evacuation.

A previous study determined that it was not feasible to widen Avila Beach Drive from the town of Avila Beach to US Highway 101 due to the environmental constraints of San Luis Creek on one side and the steep hills on the other.

Another alternative identified emergency evacuation route often discussed consists of a northerly road from the end of Avila Beach Drive to Port San Luis. The route would begin at the heavily guarded and security gated entrance of the PG&E Diablo Canyon Nuclear Power Plant, and land owned by PG&E. The route continues on a paved road through Montana de Oro State Park, entering the town of Los Osos. The route would continue along Los Osos Valley Road to US Highway 101 in San Luis Obsipo.

This lengthy evacuation route has several difficulties that make it less than ideal. In summary, further study is needed to locate a new County road that meets all the requirements for a 'secondary route'.

Chapter 5

Transportation Improvement Needs and Circulation Plan Recommendations

This section presents the results of analyses on traffic network improvements considered for construction. The analyses' intent is to use the Avila Traffic Model to test the potential improvements and determine the overall circulation benefits of the potential improvements.

Base Network

The effectiveness of traffic improvements were evaluated against a Build-out "base" traffic scenario that had no traffic improvements. The Build-out "base" scenario for the alternatives evaluation was a model network that superimposed the build-out land uses onto the existing traffic network. Consistent with the General Plan, a large amount of development was modeled in the single family cluster developments, multi-family developments in the core beach area, the Harbor Terrace development along Avila Beach Drive, and the Tree Cubes resort on Ontario Road. As expected, all existing capacity problems are exacerbated at build-out, particularly at the major intersections within the Avila area, e.g. US 101 interchanges with Avila Beach Drive and San Luis Bay Drive.

Interchange access to US 101 and east-west access across the freeway were projected as constrained. Avila Beach Drive and San Luis Bay Drive are particularly constrained due to high demand from US 101 north and south of Avila, respectively. Avila Beach traffic access was also constrained at the access points from Avila Beach Drive. The improvements consider traffic signalization at the major Avila Beach Drive access points into the core beach area, and improved access at the US 101 interchanges and frontage roads.

Transportation Improvement Needs

Avila Beach Interchange Improvements

The Avila Beach Drive/US 101 Southbound Ramps are configured such that the on-ramp forms a T-intersection in close proximity to the US 101 Southbound Off-Ramp/Shell Beach Road intersection. Avila Beach Drive also serves as the primary arterial for traffic from the south to access Avila Beach. During peak hour periods, the intersection is severely constrained and extensive queuing occurs on the ramps, causing significant delays. The volumes are projected to satisfy peak hour warrants for a traffic signal at the Shell Beach Road/US 101 SB Off-Ramp intersection. Caltrans is in the process of preparing a PSR for installing a roundabout at the SB ramps.

Avila Beach Drive/Ontario Road

This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

San Luis Bay Drive Interchange Improvements

The San Luis Bay Drive/US 101 Southbound Ramps are configured such that the intersection is in close proximity to the Ontario Road intersection. During peak hour periods, the intersections of San Luis Bay Drive/US 101 Northbound Ramps and San Luis Bay Drive/Ontario Road is severely constrained and extensive queuing occurs on the side-street and ramp approaches, causing significant delays. San Luis Bay Drive also serves as the primary arterial for traffic from the north to access Avila Beach. The volumes are projected to satisfy peak hour warrants for a traffic signal under build-out conditions for the US 101 Northbound Ramps intersection. The following improvement was previously included in the Avila 2013 CIP Update, which is to improve the interchange with traffic signals, roundabouts, or additional lanes; including US 101 bridge widening and PSR.

Avila Beach Drive/San Luis Street

This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

Avila Beach Drive/San Miguel Street

This intersection is projected to operate at deficient LOS "D" under build-out conditions. The volumes are projected to satisfy peak hour warrants for a traffic signal. Intersection improvements and traffic signal installation at this intersection are recommended.

Avila Beach Drive west of San Luis Bay Drive

This roadway is projected to operate at deficient LOS "D" under build-out conditions. The PM peak hour volumes are heavy in the eastbound direction. Roadway improvements to widen Avila Beach Drive between San Luis Street and San Luis Bay Drive to two lanes eastbound, and one lane westbound, are recommended.

Transportation System Management

Transportation System Management (TSM) programs have been established to help reduce traffic and parking congestion while avoiding the need for high capital cost improvements. TSM programs are oriented for commuting traffic, with policies or incentives implemented at major employment sites, downtown areas, or on regional highways with a large percentage of commuter trips.

Avila is primarily a recreational area, with Diablo Canyon Nuclear Power Plant as the only large employer, which is large enough to warrant an on-site TSM program. However, the focus of TSM programs would need to address the recreational travel for the beach during seasonal peaks or holidays to reduce auto trips into town and the associated parking congestion. The following TSM measures may be used:

- Public Transit Service Improvements
- Intercept Parking with Shuttle Transit Service and Bus Transport
- Ride-Sharing incentives
- Bicycle/Transit facilities
- Parking Management

- Travel Demand Management
- Spot Roadway Improvements to remove localized bottlenecks
- RV Parking Management
- Golf Cart Provisions
- Special Event Parking Management

Public Transit Improvements

Avila Beach is relatively isolated with a limited residential population base and public transit would not likely play a major role for an average weekday. This would be difficult for families transporting beach equipment. However, during the summer weekends and holidays public transit could reduce traffic levels to and from the beach area. It is recommended that as parking becomes more difficult in town, a regional transit strategy be implemented, operating seasonally between the Five Cities area, Avila Beach, and San Luis Obispo. It is recommended that the transit service also possibly provide service between intercept parking facilities and Avila Beach with 30-minute headways.

The Avila Trolley provides free transit services from Pismo Beach Premium Outlets to various destinations in Avila Beach, including Avila Beach Drive at Ontario (Hot Springs Resort), Bob Jones Bike Trail at Ontario Road, Avila Beach at 1st (Near Golf Course), and Port San Luis at Fat Cats.

Intercept Parking

An Intercept Parking Facility near US 101 with bus or shuttle service to Avila beach is warranted based on various reasons. Buses which transport people from intercept parking to the beach and remain nearby would be desirable. Buses on standby near the beach can be used during emergency evacuation situations. Since the demand for beach use is projected to grow and be greater than the parking supply, the excess parking demand can only be satisfied off-site. Currently, parking in Avila Beach is already at or near capacity during the summer weekends and holidays. As described in the 2009 Circulation Study, the estimated development of the planned land uses in Avila will result in an excess of parking demand by about 200 stalls. Avila Beach is accessed via two points from US 101, and routing drivers to an intercept parking facility would be easily implemented. Two locations are suggested for the intercept parking facilities. The first location is at the PG&E visitor center on Ontario Road to intercept traffic from the north, which has 75 stalls and would greatly minimize capital cost associated with parking lot development. This lot could also be used as a park & ride lot for commuters into San Luis Obispo. A lease agreement between the County and PG&E would have to be completed for seasonal use. The second location is near the Avila Beach Drive interchange with a 100-125 stall lot that would need to be constructed to intercept traffic from the south.

The shuttle bus would be used to transport people from the intercept parking lots to Avila Beach, town, and harbor. Changeable message signs would be constructed at each of the interchanges to inform drivers of alternative parking options when the downtown Avila parking is at or near capacity, or when there is a special event. For Park & Ride development, appropriate signage would also be in place on the freeway ramps.

Other alternative parking options include augmentation of parking within the Town core by purchasing additional land adjoining the Harbor District lot on First Street, or develop a new lot within Town. Another option is to develop the Unocal property along Avila Beach Drive just west of Cave Landing Road to provide intercept parking with a shuttle into Town. Additional

improvements for access on Avila Beach Drive would also be needed to accommodate right and left turns and safely address any sight distance concerns.

The county of San Luis Obispo In-Lieu Parking Fund, administered by the Department of Planning and Building, is comprised of fees for commercial development in downtown Avila Beach in-lieu of providing onsite parking. A fee is required for newly constructed parking spaces, as well as for occupancy changes to existing parking spaces.

PG&E Diablo Canyon Power Plant Shuttle Service

The Diablo Canyon Power Plant, operated by PG&E, is located approximately 6 miles west of its gated entrance at Avila Beach Drive, and has approximately 1,500 employees. Avila Beach Drive west of San Luis Bay Drive reaches capacity during build-out conditions. In an effort to reduce the amount of traffic on Avila Beach Drive, solutions include moving the automobile employee trips (PG&E) to employer-based shuttle buses and provide parking via a Park & Ride lot as previously discussed. Shuttle buses and Park & Ride lots provide a relatively low-cost solution for both participating employees and the reduction of improvements to the roadway. The participants would save cost in their personal vehicle maintenance and operation, and would reduce vehicular volumes on Avila Beach Drive.

Bicycle Provisions

Bicycling should be encouraged as an alternative means of transportation within Avila. The provision of bike lanes on Avila Beach Drive and San Luis Bay Drive should be included as an element of any roadway widening. Providing alternative transportation to the beach and Town areas is recommended, including the improvements or addition of bicycle facilities. Bicycle access from the beach is facilitated by the Bob Jones Pathway parking lot on Ontario Road. This lot overflows on weekends and off parking expansion is need.

The County Bikeways Plan was updated in 2010 and encourages the use of walking and bicycling within the Avila Beach area. The Plan shows a Class II Bikeway connecting Avila Beach and the Harbor. County Parks is pursuing a beachfront Class I. The plan entails closing existing gaps, removing existing perceived barriers for commuters, providing links to public transportation, and connecting to surrounding communities. The plan also encourages additional bicycle parking and storage facilities in the unincorporated areas at retail, office, school, public agencies, or other locations.

Special Event Parking Management

The Port San Luis Harbor District currently has in place requirements for permits for special events on District property. Outside the Harbor District however, it is recommended for the County to consider a special event ordinance for events such as concerts, festivals, special events related to the Golf Course, etc. In addition, traffic management at all special events should be handled through the County permit process, including requirement for the preparation of a traffic management plan for each event. In order to implement the Goals 2 and 3 of the 2009 Circulation Study, any special event that provides a traffic control plan should look at using intercept parking lots and shuttles as part of the management plan.

RV Parking Management

Changeable message signs at arterial intersections with Ontario Road should be installed to inform whether RV parking spaces are available. This would deter unnecessary trips for unavailable spaces at the Harbor. When the approved Harbor Terrace development with additional RV spaces becomes operational this measure will have increased benefit.

Golf Cart Provisions

There have been several discussions about Golf Cart Use in downtown Avila. The California Vehicle Code sections 21115, 21115.1 and, 21716 governs Golf Carts on local roads. A summary of what is allowed under these statutes is provided below.

1. This allows the board to approve ordinances that would allow the following on County maintained roads:
 - a. Golf carts can be used on roads posted at 25 mph or less within a "real estate development that offers golf facilities."
 - b. Golf Cart crossings to be established on roads with a speed limit of 45 mph or less.
2. There is also a designation for a "low-speed vehicle" in the vehicle code, some golf carts might comply with this definition. Low Speed Vehicles are defined in the Code of Federal Regulations and have to have minimum safety features, such as lap belts. They also must be registered with the DMV (unlike golf carts) and have a license plate issued. These vehicles are allowed to operate on any road with a posted speed limit of 35 mph or less and can cross roadways with posted speed limits in excess of 35 mph at any intersection, unless it is a state highway

Potential Avila Beach Drive speed reduction for Harbor Terrace traffic safety could result in licensed golf carts being allowed to travel on the arterial between San Luis Bay Estates and downtown Avila Beach.

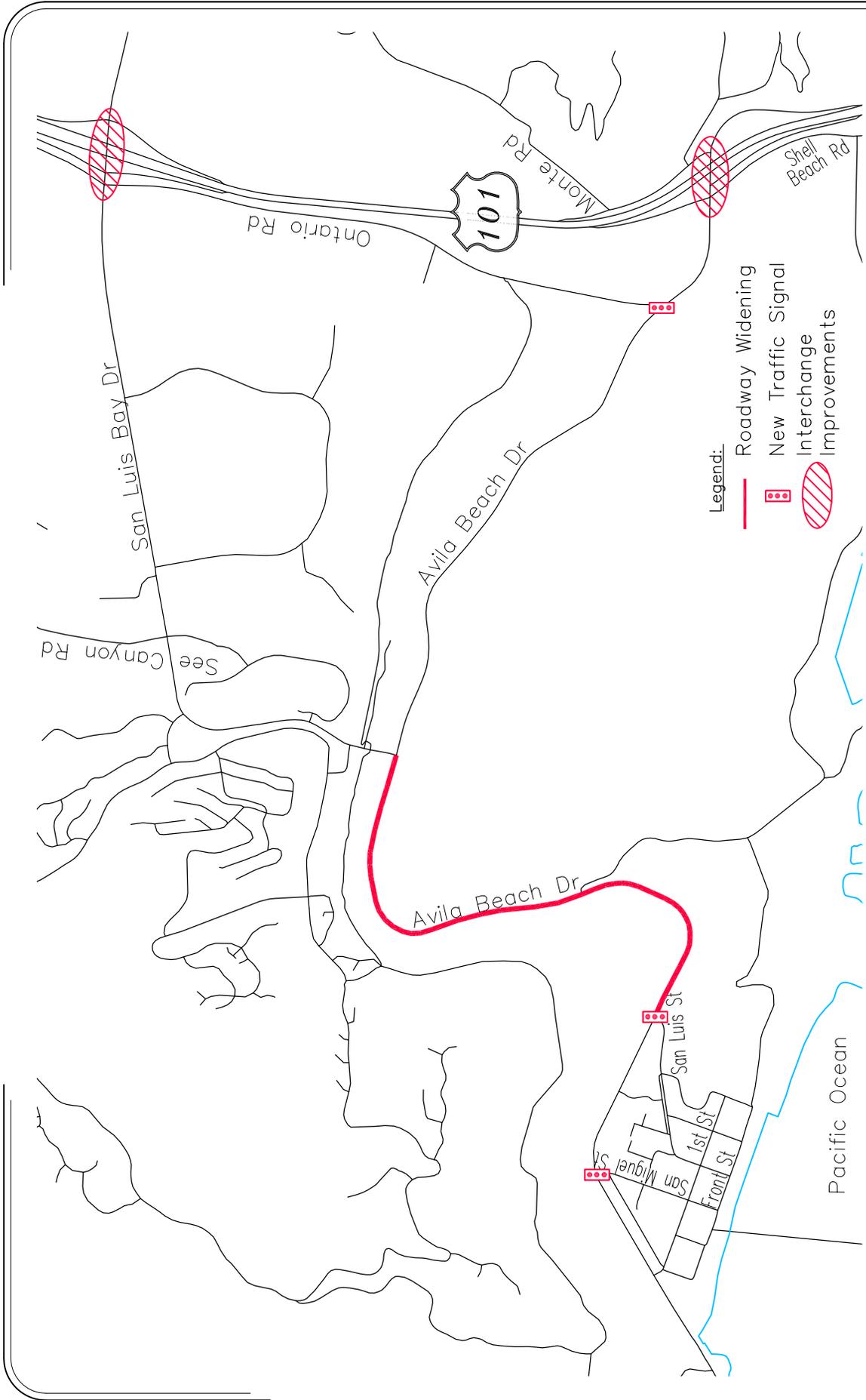
Summary TSM Recommendations

Key elements for the program that should be considered for implementation are intercept parking with bus or shuttle service, public transit service improvements and bicycle facilities. Policies should also be established to limit public parking supply increases in the future. The primary objective of the TSM program should be to effectively manage traffic and parking in the future. The following are the recommended TSM programs:

- Initiate direct bus service linking San Luis Obispo, Avila Beach, Pismo Beach
- Implement intercept Park & Ride lots with shuttle service
- Improve bicycle facilities and routes – Bob Jones Trail, bike lanes
- Implement US 101 changeable message signs directing to intercept parking facilities
- Implement a County permit process for all special events
- Establish a parking district for Avila Beach for on-going improvements, or encourage the Community Services District to include parking

Circulation Plan Analysis and Recommendations Summary

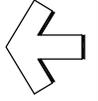
The summary of improvements listed above, along with improvements listed previously at other deficient intersections, was analyzed both on at intersections for Build-Out scenarios, as necessary. Figure 10 presents the network improvements listed above.



Avila Circulation Study and Traffic Impact Fee Update

Figure 10

Transportation Improvements



Build-out Conditions roadway LOS at the deficient locations, with the necessary improvements, is presented in Table 10. Build-out Conditions intersection LOS at the deficient locations, with the necessary improvements, is presented in Table 11.

**TABLE 10
BUILD-OUT IMPROVED CONDITIONS: PEAK HOUR ROADWAY LEVELS OF SERVICE**

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Buildout Peak Projection	Buildout Peak LOS
May 2035 Estimates						
2	Avila Beach Drive	W of San Luis Bay Drive	Avila Three-Lane Arterial (w/LTL)	C	1,436	A

Notes:

1. **BOLD** = Unacceptable operations
2. w/LTL indicates arterials with either continuous center left turn lane (LTL) or left turn lanes at major
3. No LTL indicates arterials without left turn lanes (LTL) at most major intersections.
4. Peak Projections based on average factor for ADT/Peak Hour, May estimates based on factor of Avila Beach Drive projections

**TABLE 11
BUILD-OUT IMPROVED CONDITIONS: INTERSECTION LEVELS OF SERVICE**

#	Intersection	Control Type ^{1,2}	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS Warrant Met? ³	Delay	LOS Warrant Met? ³
2	San Miguel St & Avila Beach Dr	Signal	C			13.0	B Yes
3	San Luis St & Avila Beach Dr	Signal	C			18.7	B Yes
5	Ontario Rd & Avila Beach Dr	Signal	C			7.5	A Yes
6	Shell Beach Rd/101 SB Off Ramp & Avila Beach Dr	Intersection geometrics to be determined. Interchange improvement subject to Caltrans ICE process and approvals.					
7	US 101 SB On Ramp & Avila Beach Dr ⁴	Intersection geometrics to be determined. Interchange improvement subject to Caltrans ICE process and approvals.					
10	Ontario Rd & San Luis Bay Drive Dr	Intersection geometrics to be determined. Interchange improvement subject to Caltrans ICE process and approvals.					
11	US 101 SB On/Off Ramp & San Luis Bay Dr	Intersection geometrics to be determined. Interchange improvement subject to Caltrans ICE process and approvals.					
12	US 101 NB On/Off Ramp & San Luis Bay Drive Dr	Intersection geometrics to be determined. Interchange improvement subject to Caltrans ICE process and approvals.					

Notes:

1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control
2. LOS = Delay based on average of all approaches for Signal
3. Warrant = Based on California MUTCD Warrant 3
4. NC = No Control as it is an on-ramp only intersection. Synchro software does not provide LOS for uncontrolled intersections

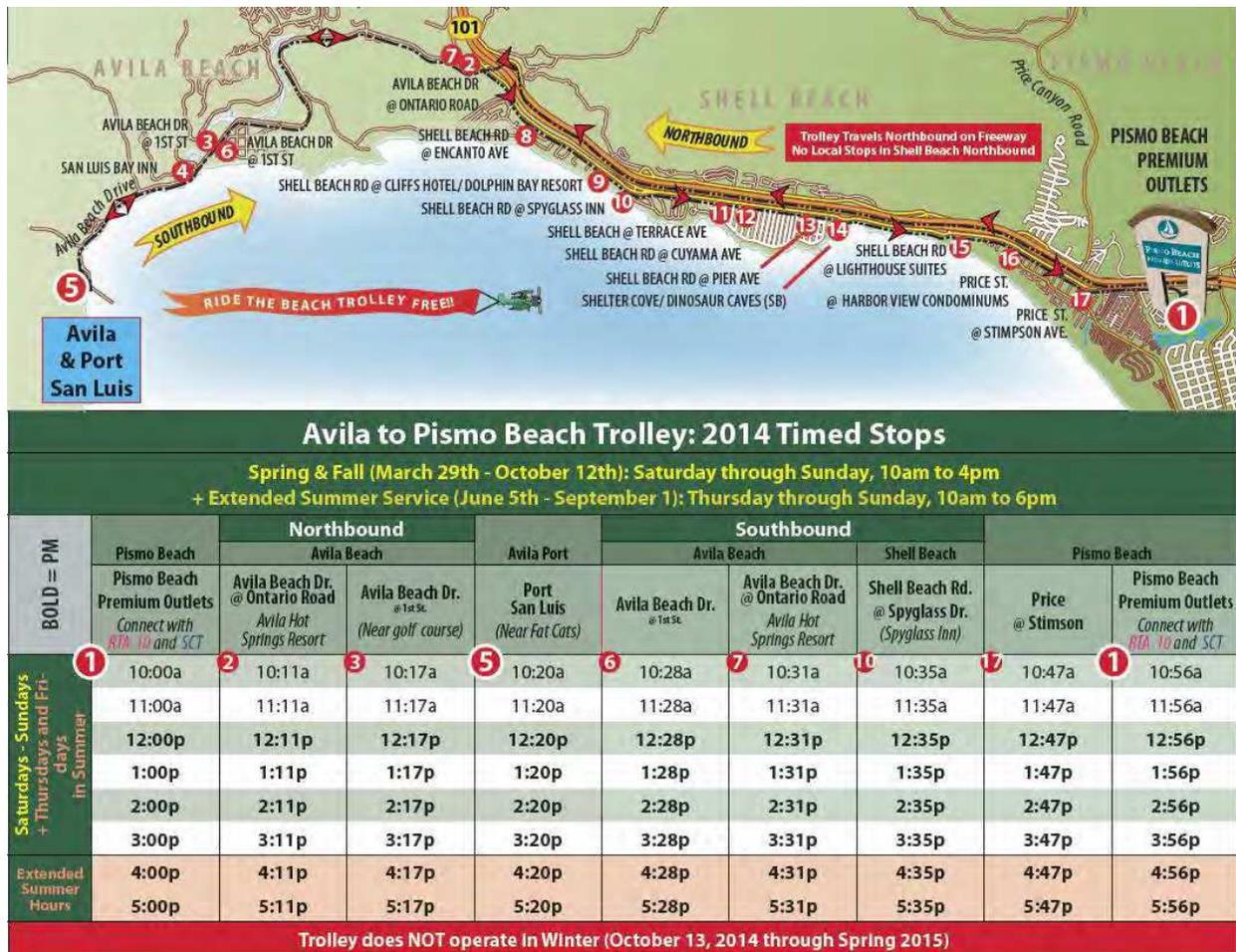
Chapter 6

Alternative Transportation Modes

Public Transportation

The only public transportation within the Avila Beach area is provided by the Avila Beach Trolley and the Fish and Farmer's Market Trolley. The Avila Beach Trolley is a free seasonal trolley that provides service from Pismo Beach Premium Outlets to Port San Luis. The trolley is in service only on Saturdays and Sundays from late March to mid-October, and on Thursdays and Fridays with extended hours from June 5th to September 1st. The Fish and Farmer's Market Trolley is free and in service on Friday evenings from April through September. Figure 11 shows the Avila Beach Trolley route and service times.

Figure 11 - Avila Beach Trolley



Bicycle and Pedestrian Routes

San Luis Obispo recently updated the Bikeways Plan in 2010. The plan encourages the use of walking and bicycling and recognizes three classes of bikeways:

Class I Multi Use Path. Typically known as bike paths, Class I facilities are multi-use facilities that provide a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.

Class II Bike Lane. Known as bike lanes, Class II facilities provide a striped and signed lane for one-way bicycle travel on each side of a street or highway. The minimum width for bike lanes ranges between four and five feet depending upon the edge of roadway conditions (curbs). Bike lanes are demarcated by a six-inch white stripe, signage and pavement legends.

Class III Bike Route. Known as bike routes, Class III facilities provide signs for shared use with motor vehicles within the same travel lane on a street or highway. Bike routes may be enhanced with warning or guide signs and shared lane marking pavement stencils. While Class III routes do not provide measure of separation, they have an important function in providing continuity to the bikeway network.

Existing Pedestrian and Bicycle Facilities

The current bicycle and trail network consists of Class I, Class II, and Class III bicycle facilities. The County currently has 6 bike facilities throughout the County consisting of 1 Class I, 3 Class II, and 2 Class III facilities. The County has a pavement management program and regularly makes repairs as needed. According to the 2010 Bikeways Plan, the Class I bike paths within the area consists of the Bob Jones Bike Trail, which goes from San Juan Street through the Avila Beach golf resort, continues on Blue Heron Drive, then heads east to Ontario Road, and will eventually parallel US 101 toward the City of San Luis Obispo. The traffic signal located on Avila Beach Drive at First Street connects to the Bob Jones Trail.

The following segments currently have Class II Bike Lanes where:

- Ontario Road from Avila Beach Drive to Bob Jones Trail connection
- Avila Beach Drive from San Luis Street to San Luis Bay Drive
- Shell Beach Road from Avila Beach Drive to Ontario Ridge Trail

The following segments currently are Class III Bike Routes, where Class II does not exist:

- Avila Beach Drive
- Ontario Road

Avila Beach has two proposed Class II facilities. The proposed facilities include upgrading Ontario Road north of the Bob Jones Trail from Class III to Class II. Also, a Class II Bike Lane is proposed for San Luis Bay Drive and Avila Beach Drive. The 2010 Bikeways Plan existing and proposed facilities for Avila Beach are shown in Figure 12.

**COUNTY
Bikeways Plan
2010 UPDATE**

Figure 12:

Avila Beach

County Roadways

-  Existing Class I Bikeway
-  Proposed Class I Bikeway (Conceptual Alignment)
-  Existing Class II Bikeway
-  Proposed Class II Bikeway
-  Existing Class III Bikeway
-  Proposed Class III Bikeway
-  County Maintained Road

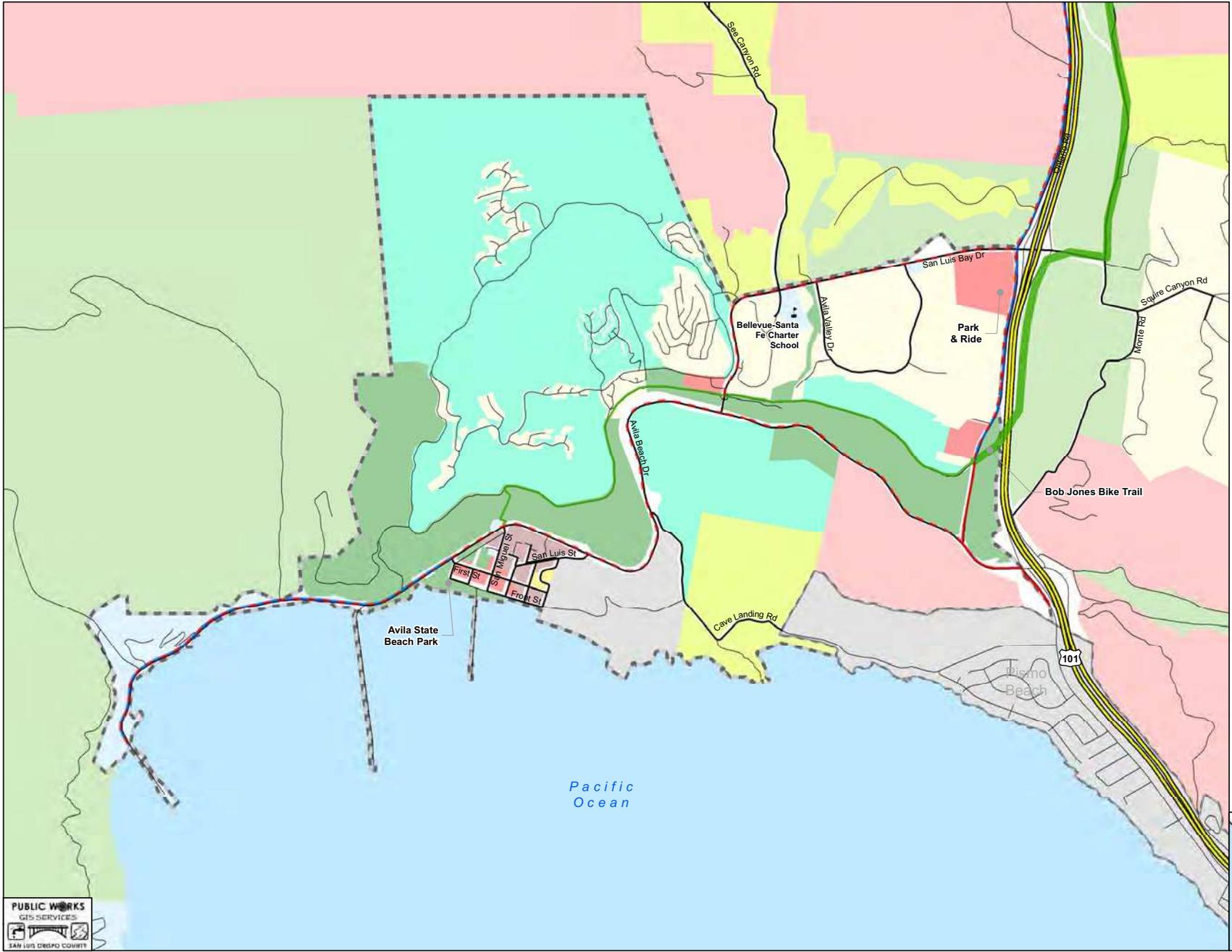
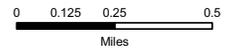
Cal Trans Roadways

- (For Bikeways See Appendix G)
-  US Highway
 -  State Highway

Land Use Category

-  Agriculture
-  Commercial Retail
-  Commercial Service
-  Industrial
-  Multi-Land Use Category
-  Office Professional
-  Open Space
-  Public Facility
-  Recreation
-  Rural Lands
-  Residential Multi Family
-  Residential Rural
-  Residential Suburban
-  Residential Single Family

-  Non-County Road
-  Rail Road
-  City Limit
-  U/R Boundary
-  School



Attachment 2

Truck Routes

Truck routes are intended to carry heavyweight commercial, industrial, and agricultural vehicles through and around the community with minimum disruption to local auto traffic and minimum annoyance to residential areas. The 1982 Surface Transportation Assistance Act set standards for large trucks, known as STAA trucks, and set minimum truck sizes that states must allow on the National Network including the Interstate System and other defined routes. US 101 is the only designated truck route in the Avila Beach area, and statewide is a National Truck Network.

Rail Operations

No commuter rail transportation (AMTRAK) is currently located in the Avila Beach area. The nearest Amtrak is located in the City of Grover Beach and San Luis Obispo. These facilities are 9 miles and 10 miles away, respectively, from Avila Beach.

Airports

Oceano County Airport is approximately 11 miles south of the Avila Beach area, located in the unincorporated community of Oceano, southwest of Arroyo Grande. The airport is mainly used for recreational activities and is accessible off of Highway 1.

The San Luis Obispo County Regional Airport, also known as McChesney Field, is located in the City of San Luis Obispo about 10 miles north of Avila Beach. It is served by two commercial airlines providing services to Los Angeles, Phoenix, and San Francisco. It is also home to full service general aviation and corporate facilities. McChesney Field is located on the west side of SR 227, about 2 miles east of US 101.

Chapter 7

Cost Estimates and Funding Mechanisms, Including Transportation Impact Fees

This chapter presents the cost estimates developed for the recommended transportation improvements and discusses possible funding mechanisms.

Cost Estimates

A series of planning level cost estimates have been prepared by County Public Work Staff for projects discussed in Chapter 4 and 5. The cost estimates are necessary to determine the funding amount required to implement the transportation improvements. A summary of the recommended projects, cost estimates, recommended funding sources, and expected project completion dates are shown in Table 12.

All cost estimates include the cost of construction, right-of-way, design, administration, environmental considerations, and inspection. All costs for construction activity were determined from typical experiences in San Luis Obispo County. Construction costs include clearing and grubbing, paving, storm drains, lighting, signing, and striping. Roadway edge improvements like curb, gutter, and sidewalk are generally excluded since they are usually constructed at the time of adjacent development.

Funding Mechanisms

Implementation of the elements of the transportation plan for Avila will require sources of revenue dedicated to infrastructure investment. Local government has traditionally provided for public facilities, with the costs being financed by revenues derived from gasoline tax and state and federal funds. In the recent past, the traditional revenue sources have shrunk to inadequate levels through a combination of growth, aging capital facilities, State realignment of property tax revenues, construction cost inflation, increasing costs of environmental mitigation and competing needs for limited public dollars.

I. Impact Fees – The California Government Code (Sections 66001-66025) grants authority to local agencies to establish, increase, or impose fees as a condition of approval of a development project within their jurisdictional boundaries. California courts require that such fees be reasonably related to the contributing development's impact on community facilities. Provided that the impact fees are used to finance construction of specific facilities, impact fees are not considered taxes and, therefore, do not require electorate approval. San Luis Obispo County adopted Ordinance No. 2379 in 1988 to provide for the collection of roadway impact fees. A fee program has been established for the study areas of the San Luis Bay (Avila Valley), North Coast (Cambria), Los Osos, San Miguel, South County (Nipomo Mesa), and Templeton. The impact fee is collected at the time of development and held in an account dedicated for road improvements within the area of benefit. Credits toward the fee are provided to landowners who dedicate right-of-way and/or construct facilities listed on the capital improvements table (Table 12).

TABLE 12
AVILA CIRCULATION STUDY 2015 UPDATE CAPITAL IMPROVEMENTS PROJECTS

#	Type	Road	To/From	Recommended Improvement	Estimated Total Project Costs 2016	FUNDING		% RIF	RIF spent (as of 2/23/16)	Expected Const.
						Other Sources	Funding From RIF			
Road Improvement Fee Projects										
300506	Interchange Improvements	Avila Beach Drive	Shell Beach Road to Monte Road	Roundabout and/or other intersection improvements	\$7,920,000	\$3,960,000	\$3,960,000	50%	\$2,273	2020
	Road Widening	Avila Beach Drive	San Luis Street to San Luis Bay Drive	Two (2) eastbound lanes, one (1) westbound lane, turn lanes at intersections and bike lanes	\$4,100,000	\$3,034,000	\$1,066,000	26%		2035
	Signal Installation	Avila Beach Drive	at San Luis Street	Signalization and intersection improvements	\$400,000	\$200,000	\$200,000	50%		2025
300554	Signal Installation	Avila Beach Drive	at San Miguel Street	Signalization and intersection improvements	\$400,000	\$200,000	\$200,000	50%	\$673	2025
	Signal Installation	Avila Beach Drive	at Ontario Road	Signalization and intersection improvements	\$400,000	\$200,000	\$200,000	50%		2025
	Interchange Improvements	San Luis Bay Drive	Ontario Road to Monte Road	Roundabout and/or other intersection improvements	\$4,000,000	\$2,000,000	\$2,000,000	50%		2035
	Circulation Study			Circulation Study Updates thru 2035	\$500,000	\$0	\$500,000	100%	\$186,428	
Discretionary Projects										
	Road Widening	Avila Beach Drive	First Street to San Luis Street	Widening for bike lanes	\$1,000,000	\$1,000,000		0%		-
	Road Widening	Avila Beach Drive	San Luis Bay Drive to Ontario Road	Widening for bike lanes	\$3,000,000	\$3,000,000		0%		-
	Parking Lot	Avila Beach Drive		100 stall intercept parking lot	\$1,093,178	\$1,093,178		0%		-
	Pedestrian Improvements	Avila Beach Drive	Port San Luis to Unocal Pier	Pedestrian Walkway	\$300,000	\$300,000		0%		-
	Trail	Cave Landing Road	Avila Beach to Pismo Beach	Construct trail in existing easement	\$379,000	\$379,000		0%		-
	Road Widening	San Luis Bay Drive	Avila Beach Drive to Bay Laurel Place	Widening for bike lanes	\$822,824	\$822,824		0%		-
Completed Projects										
300364/P12 A702	Bridge Widening	San Luis Bay Drive	Avila Valley Drive to Ontario Road	Bridge Replacement and Widening to three (3) lanes	\$6,785,310	\$5,185,470	\$1,599,840	24%	\$1,599,840	Complete
300349	Signal Installation	Avila Beach Drive	at First Street	Signalization and intersection improvements	\$245,602	\$245,602	\$0	0%	\$0	Complete
P12A125	Road Widening	Avila Beach Drive	at Cave Landing Road	Intersection Improvements	\$50,000	\$0	\$50,000	100%	\$50,000	Complete
-	Road Widening	Ontario Road	Higuera Street to Bob Jones Trailhead	Widening for bike lanes	\$650,600	\$650,600	\$0	0%	\$0	Complete
TOTAL CIP (All projects)					\$32,046,514					
TOTAL CIP (uncompleted projects)					\$24,315,002					
TOTAL RIF (uncompleted projects)					\$8,126,000	(used for fee calculation)				

The current Fee Program balance is \$481,503, as shown in Table 14.

For the Avila area, impact fees were established in Fiscal Year 1990/91 to fund the portion of roadway needs that are attributable to new development within the study area. These improvements were explicitly determined for the likely types of development that will occur in this area over the next 50 or more years. The following discussion highlights the considerations involved in establishing an equitable basis for impact fees in the Avila area.

A. Public/Private Share of Costs – In determining an appropriate level for the impact fees, improvement costs must first be apportioned among the public and private sectors according to the benefits provided to existing and future traffic sources. Existing deficiencies are not eligible for correction with impact fee funding, and such costs must be subtracted from the cost estimates. Existing deficiencies are defined as problems present at the time of initial roadway or intersection construction (i.e. vertical and horizontal curves).

The next step in assigning eligible costs to the impact fee calculation is to estimate the portion of roadway improvement costs attributable to through traffic. These costs are not eligible for funding by impact fees. In Avila, most through traffic uses Highway 101. “Local” traffic, i.e. traffic generated within the Avila Valley, creates the need for improvements at the freeway interchanges. For this reason, the improvements to the Avila Beach Drive and San Luis Bay Drive interchanges are partially included in the impact fee calculations. Also, the need for improvements at intersections along Avila Beach Drive is a result of local development and, therefore, has been included in the impact fee calculations. The recommended impact fee schedule is shown in Table 15.

B. Fee Area – The Avila study area is characterized by a core area that is accessed from US 101 by either San Luis Bay Drive or Avila Beach Drive, thereby forming a natural transportation barrier or “traffic shed” into the beach town. For the most part, the recommended transportation improvements are concentrated in the urban area, and in the east portion near US 101. The Fee Area is a subset of the model area, using the See Canyon and Davis Canyon areas to the north, residential developments along Lupine Canyon and immediately east of US 101, the Avila Beach area, and extending west to include the Diablo Canyon Power Plant as the primary boundary. Figure 1 shows the boundary of the fee area.

C. Distribution Among Future Traffic Sources. When the total private share of costs has been established, these costs must be further distributed among the various land uses that contribute to traffic growth. The calculated fees are based on the amount of traffic generated during the weekday afternoon (PM) peak hour by each type of new development. The amount of traffic is determined from the Institute of Transportation Engineers (ITE)-published *Trip Generation (9th Edition)*. The change in land use and corresponding number of equivalent trip units, PM peak hour trips, has been recalculated to reflect year 2015 conditions.

Table 13 shows the projected future land use for residential, non-residential, and miscellaneous land uses between the year 2015 and 2035 models.

**TABLE 13
2015 MODEL UPDATE LAND USE (NON-SUMMER WEEKDAYS PEAK HOUR TRIPS)**

Fee Area Land Use	Land Use					Peak Hour Trips		
	Units	Existing	Added	Build-Out	EDU	Existing	Added	Build-Out
Residential								
Single Family	DU	968	133	1,101	1.00	968	133	1,101
Multi Family	DU	253	27	280	0.62	157	17	174
Total Residential	DU	1,221	160	1,381		1,125	150	1,275
Non-Residential	Units	Existing	Added	Build-Out	EDU	Existing	Added	Build-Out
Agriculture	Acres	6,987	0	6,987	-	0	0	0
Commercial + Motel	KSF	196	72	272	3.71	727	378	1,105
Golf/Recreation	Acres	428	0	428	2.74/hole	49	0	49
Industrial	KSF	627	150	627	0.97	608	146	754
Office	KSF	0	20	21	1.49	0	24	24
Public Facility/Other	Acres	973	3	976	1.30	1,265	4	1,269
Harbor Terrace Non-Commercial	Acres	0	35	35	1.65	0	58	58
Total Non-Residential	KSF	9,211	280	9,346	9	2,650	610	3,260

Notes:

EDU - Equivalent Dwelling Unit

PHT - Peak Hour Trips

As shown in Table 13, the growth in peak hour trips for build-out is largely due to single family dwelling units, commercial/retail, and public facility/other uses which include RV lots.

To calculate the recommended fees, the eligible improvement costs are divided by the total number of new trip ends. Table 14 summarizes the funding from impact fees, the funds already contributed by existing development, and the added peak hour trips projected for future development within the Fee Area. The fees for any new development are calculated at the time of building permit issuance. Table 15 presents the recommended fee schedule.

**TABLE 14
AVILA PROJECT COSTS AND AREA TRIP SHARE**

	Total Required Funding From Impact Fees	Fund Balance (As of 10/2015)	Net Funding Required From Impact Fees
Fee Area Total	\$8,126,000	\$481,503	\$7,644,497
Peak Hour Trips:	760	Cost per/PHT:	\$10,061.99

**TABLE 15
2015 RECOMMENDED FEE SCHEDULE PER PEAK HOUR TRIP**

Type	2014 Fee	2015 Fee	Fee Increase
Retail	\$3,846	\$10,062	\$6,216
Residential	\$3,846	\$10,062	\$6,216
Other	\$3,846	\$10,062	\$6,216

As shown in Table 15, the fee schedule as proposed results in a two-fold increase from the existing fee schedule. The fee schedule as proposed will result in a fully-funded fee program (\$8,126,000) upon build-out of all remaining vacant General Plan land uses.

Attachment 2

It is recommended that the County modify the Avila Road Improvement Fee based on the recommended fee structure shown in Table 15. Residential is defined as all places where people begin or end their day. (i.e. single family dwelling units, multi-family dwelling units, mobile home dwelling units). Retail is defined as all businesses such as retail, offices, and commercial service. Other includes anything not included in residential or retail. Transportation improvements identified in the CIP, and funded through the proposed fee program, are designed to accommodate peak weekday conditions during non-summer months. It is anticipated that some congestion will still occur at the peak of seasonal fluctuations. However, designing the transportation system to eliminate all congestion during peak seasonal demand would result in a system that is oversized for most times of the year. Additional revenue from fee and non-fee sources would be required to eliminate congestion during peak summer conditions.

Appendix

MODEL LAND USES BY TAZ

EXISTING CONDITIONS CALIBRATION REPORT

AVILA BEACH DRIVE CAPACITY MEMORANDUM

MODEL LAND USES BY TAZ

APPENDIX TABLE 1 - EXISTING LAND USES BY TAZ

EXISTING LAND USES BY TAZ							
TAZ	HH_0	HH_1	HH_2	RETAIL	SERVICE	OTHER	EDUC
101	0	12	19	94	63	0	0
102	1	16	26	49	34	0	0
103	1	19	31	0	0	0	0
104	1	12	20	0	0	0	0
105	1	29	47	0	0	0	0
106	0	11	18	25	16	0	0
107	0	5	8	20	14	0	0
108	0	1	1	0	0	0	0
109	0	0	1	0	11	0	0
110	0	0	1	0	43	0	0
111	0	31	51	0	0	0	0
112	0	22	36	0	0	0	0
113	0	0	0	30	21	0	0
114	0	44	75	0	0	0	0
115	0	32	55	0	0	0	0
116	0	60	102	0	0	0	0
117	0	24	41	0	0	0	0
118	0	3	6	0	0	0	0
119	0	8	14	0	0	1	0
120	0	23	38	0	6	0	154
121	0	3	6	17	11	0	0
122	0	0	0	0	6	0	0
123	0	0	0	0	21	0	0
124	0	2	3	0	25	0	0
125	0	0	0	0	0	10	0
126	0	0	0	0	0	0	0
127	0	10	17	0	0	2	0
128	0	4	7	0	0	0	0
129	0	22	36	0	0	0	0
130	0	13	22	0	0	0	0
131	0	0	0	0	0	1	0
132	0	11	18	0	0	0	0
133	0	33	55	0	0	0	0
134	0	4	8	0	0	0	0
135	0	0	0	0	0	28	0
136	0	0	1	0	2	12	0
137	0	0	0	0	25	0	0
138	0	0	0	35	32	0	0
139	0	0	0	0	1220	26	0
201	0	0	1	0	0	7	0
202	0	4	7	0	0	22	0
203	0	1	3	0	0	2	0
204	0	1	1	0	0	4	0

Attachment 2

APPENDIX TABLE 2 - 2035 LAND USES BY TAZ

2035 LAND USES BY TAZ							
TAZ	HH_0	HH_1	HH_2	RETAIL	SERVICE	OTHER	EDUC
101	0	12	19	96	64	0	0
102	1	17	29	57	40	0	0
103	1	19	31	0	0	0	0
104	1	17	28	0	0	0	0
105	1	30	49	0	0	0	0
106	1	14	22	25	16	0	0
107	0	5	8	26	17	0	0
108	0	6	10	0	0	0	0
109	0	0	1	0	11	0	0
110	0	0	1	0	43	0	0
111	0	33	56	0	0	0	0
112	0	22	36	0	0	0	0
113	0	0	0	35	23	0	0
114	0	44	75	0	0	0	0
115	0	49	82	0	0	0	0
116	0	60	102	0	0	0	0
117	0	24	41	0	0	0	0
118	0	4	6	0	0	0	0
119	0	9	16	0	0	1	0
120	0	23	39	0	6	0	154
121	0	7	11	42	28	0	0
122	0	0	0	0	6	0	0
123	0	0	0	0	21	0	0
124	0	4	8	0	25	0	0
125	0	0	0	0	0	25	0
126	0	1	2	0	0	0	0
127	0	12	19	0	0	2	0
128	0	5	8	0	0	0	0
129	0	24	41	0	0	0	0
130	0	17	28	0	0	0	0
131	0	0	0	0	0	1	0
132	0	16	28	0	0	0	0
133	0	35	58	0	0	0	0
134	0	4	8	0	0	0	0
135	0	0	0	0	0	28	0
136	0	0	1	0	2	12	0
137	0	0	0	18	60	0	0
138	0	0	0	35	36	0	0
139	0	0	0	0	1220	26	0
201	0	0	1	0	0	7	0
202	0	4	7	0	0	22	0
203	0	1	3	0	0	2	0
204	0	1	1	0	0	4	0

2015 Avila Circulation Study and Traffic Impact Fee Update

Existing Conditions Model Calibration Report

Prepared for:

County of San Luis Obispo



Prepared by:



**2015 Avila Circulation Study and Traffic Impact Fee Update
Existing Conditions Model Calibration Report**

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**TABLE 1:
EXISTING LAND USE**

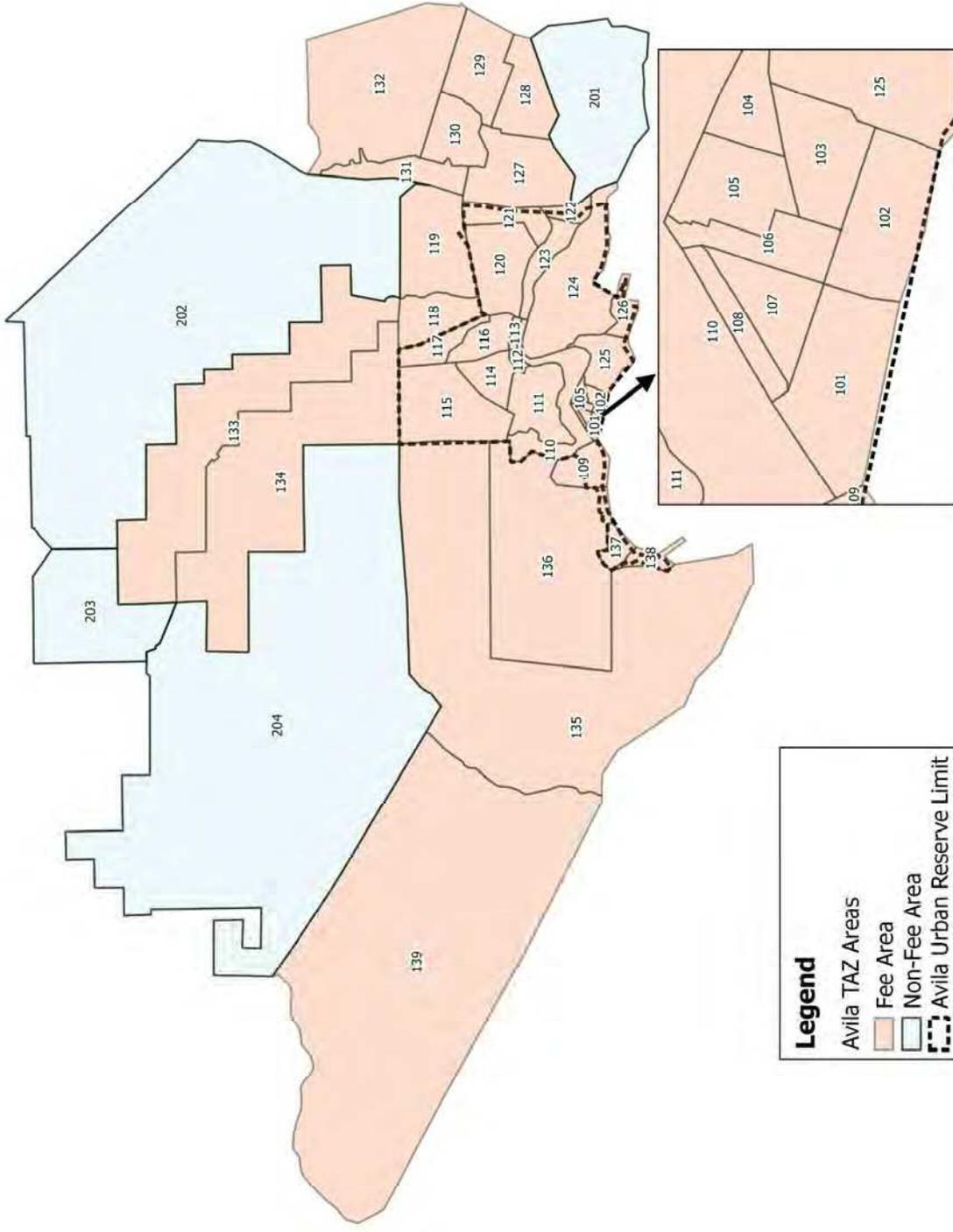
Land Use	2015 Conditions		
	Area 1	Area 2	AVILA TOTAL
Residential (dwelling units)	1,228	55	1,283
Single Family	968	18	986
Multi Family	253	0	253
Mobile Home	7	37	44
Non-Residential (acres)	8,501	3,817	12,318
Agriculture	6,987	3,817	10,803
Commercial + Motel	18	0	18
Golf/Recreation	428	0	428
Industrial	96	0	96
Office	0	0	0
Public Facility/Other	973	0	973
Estimated Employment	1,896	35	1,931
Retail	270	0	270
Service	1,546	0	1,546
Other	80	35	115

**Area 1 consists of parcels inside the Avila Fee Area, and Area 2 consists of parcels outside the Avila Fee Area that are included in the Avila TDM*

Creation of TAZ Map

Avila land uses are simplified into areas referred to as “Traffic Analysis Zones” (TAZs) for travel demand modeling purposes. Aggregating minute areas like parcels into larger zones decreases the computation intensity of the model and simplifies data processing. The TAZs are defined using real-world traffic boundaries, such as natural geographic barriers (e.g. rivers and creeks) and “man-made” barriers (e.g. major street right-of-ways and railroads).

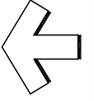
Figure 1 presents the Avila TAZ boundary map. A total of 43 TAZs were defined for the Avila area. The TAZ boundaries are separated into two areas, as presented in Figure 6. Area 1 of the two model areas is the fee area, which will be used in the Avila Circulation Study and Impact Fee Update.



Avila Circulation Study & Traffic Impact Fee Update

Figure 1

Avila Traffic Analysis Zone (TAZ) Map



Network Creation

Street networks handle the trips generated by land use. The travel demand model simulates a road's ability to handle travel demand based on facility type (e.g. freeway, highway, arterial, and collector), number of lanes, speed, and alignment. Figure 2 shows the Base Year network map, which reflects the existing Avila roadway system.

Table 2 presents the road classification categories, the associated operating characteristics of each category, and examples of roads in each category.

**TABLE 2:
ROADWAY CLASSIFICATION**

Classification	Capacity (Vehicles per Lane per Hour)	Free-Flow Speed (mph)	Example Roadway
Freeway	2000	65-70	US Highway 101
Highway	1000	45-55	Highway 1
Arterial	800	35-45	San Luis Bay Road
Collector	600	25-35	See Canyon Road
Local	300	25-35	San Rafael Street

Four-Step Modeling Process

The CUBE/Voyager (Citilabs) software suite was used for the current update to the Avila Travel Demand Model. The prior version of the Avila model also used CUBE. The travel demand model follows an industry-standard four-step procedure for modeling travel demand. The steps are as follows:

1. Trip Generation – Estimate the trips generated and attracted by individual Traffic Analysis Zones (TAZs)
2. Trip Distribution – Match trips that are generated and attracted between zones for varying trip purposes.
3. Mode Choice – Select a travel mode for a particular trip.
4. Assignment – Select a path for the chosen travel mode and trip.

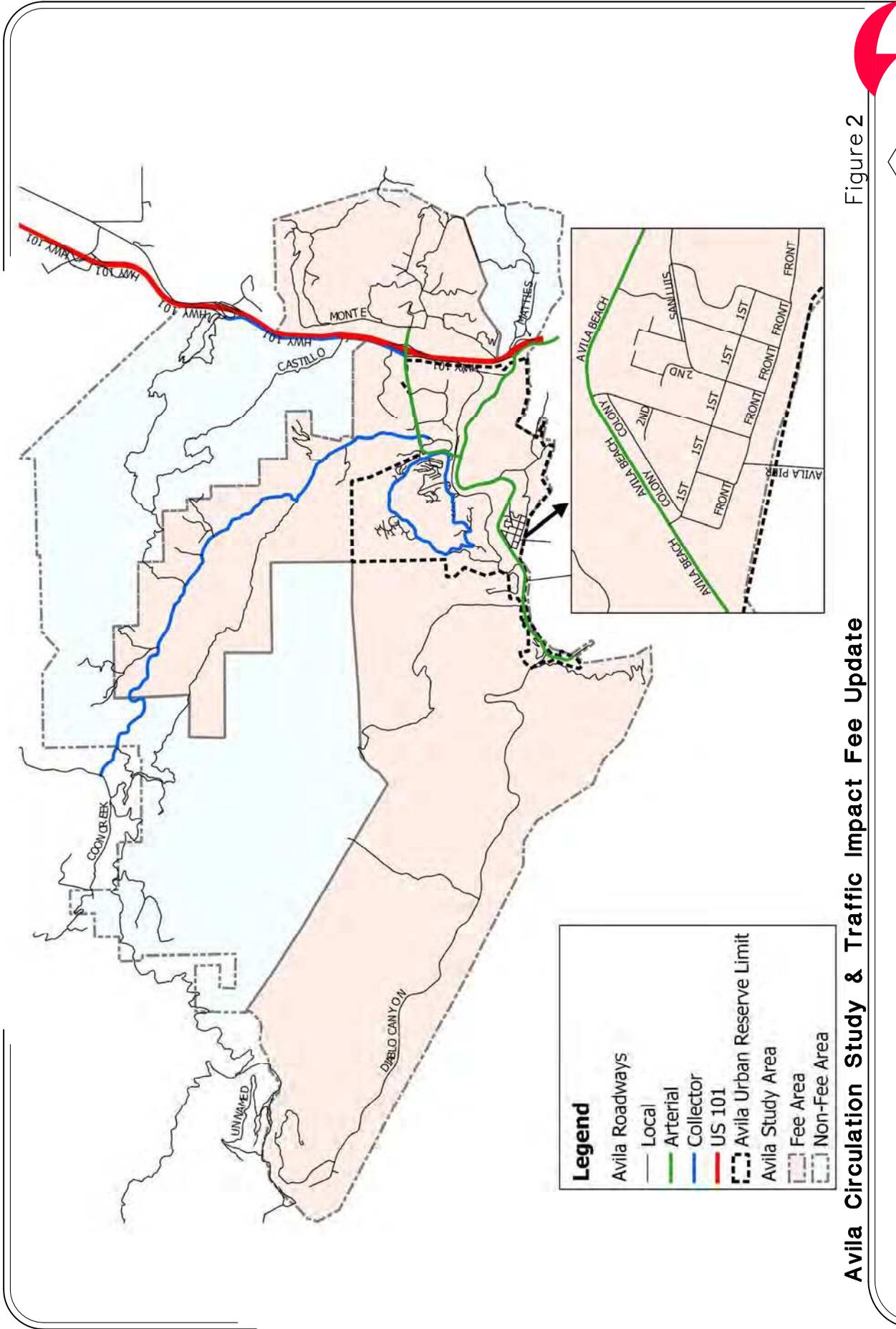
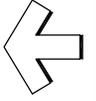


Figure 2

Avila Circulation Study & Traffic Impact Fee Update

Avila Roadway Network



Trip Generation

Land uses generate a varying number of trips based on development type and development quantity. Trip producing land use groups include single-family and multi-family residential dwelling units. Trip attracting land use groups include retail, office, industrial and educational land uses. The land use quantities derived from the parcel database was converted into dwelling unit and employment estimates. These TAZ-level estimates were checked for consistency with the US Census and the regional model.

Each trip purpose has a different trip generation rate for each land use. Trip generation rates for individual land uses were checked against traffic studies contained in the Institute of Transportation Engineers *Trip Generation, 9th Edition* manual.

Trip Distribution

The trips generated and attracted between land uses depend on trip purpose and network impedance. Modeled trips were sorted into five trip purpose categories.

1. Home-Based Work (HBW)
2. Home-Based Education (HBE)
3. Home-Based Shop (HBS)
4. Home-Based Other (HBO)
5. Other-Based Other (OBO)

The ability for one land use to satisfy the trip purpose of another land use leads to the creation of an origin-destination pairing (e.g. a trip from a residential area to an area containing retail development). The likelihood of such a pairing also depends on the travel time for such a trip to occur. Long travel times between zones, which are affected by congested roadways, decrease the likelihood of an origin-destination pairing and results in the model seeking another closer trip pairing opportunity.

Mode Choice

The Avila travel demand model solely simulates automobile travel patterns. Transit service is not a major component of the vehicular traffic within Avila and was not considered in the travel demand model process.

Trip Assignment

Trips between origin-destination pairs are assigned by the model using an equilibrium process. The multiple possible paths between zones are iteratively loaded until no one path provides an advantage over another. The volumes on each network link are then compared against real-world traffic counts to determine model correctness. The following section outlines the model calibration procedure.

Model Calibration

The previous section described the creation of a complete but “un-validated” base year model, i.e. the model may not accurately reflect real-world travel demand. Calibrating the model so that it reasonably reflects real world travel demand requires matching the model estimate on a set of links against traffic counts. Table 3 presents the calibration for each selected facility used in the calibration process.

**TABLE 3:
AVILA TRAVEL DEMAND MODEL - CALIBRATION SUMMARY**

Roadway	Location	Type	Count Year	Existing Traffic Count	Model Forecast	Model Diff	% Error Model	% Error Target
US 101	South of Los Osos Valley Road	Freeway	2014	66,200	65,700	500	-0.8%	7.0%
	North of San Luis Bay Drive	Freeway	2014	71,000	72,500	-1,500	2.1%	7.0%
	North of Avila Beach Drive	Freeway	2014	66,500	65,000	1,500	-2.3%	7.0%
	South of Avila Beach Drive	Freeway	2014	69,800	69,400	400	-0.6%	7.0%
Avila Beach Drive	West of US 101 SB Ramps	Arterial	2014	9,631	10,900	-1,269	13.2%	15.0%
	West of San Luis Bay Drive	Arterial	2014	11,136	11,500	-364	3.3%	15.0%
	East of Lighthouse/Pier	Arterial	2014	2,413	2,200	213	-8.8%	15.0%
1 St Street	South of Avila Beach Drive	Collector	2014	1,918	2,100	-182	9.5%	25.0%
Monte Road	North of US 101 NB On Ramp	Collector	2014	197	180	17	-8.6%	25.0%
	North of Avila Beach Drive	Collector	2014	1,797	2,500	-703	39.1%	25.0%
Ontario Raod	South of San Luis Bay Drive	Collector	2014	1,140	1,100	40	-3.5%	25.0%
San Luis Street	South/SW of Avila Beach Drive	Collector	2014	1,804	2,200	-396	22.0%	25.0%
San Luis Bay Drive	Nort of Avila Beach Drive	Arterial	2014	6,301	6,700	-399	6.3%	15.0%
	West of Ontario Road	Arterial	2014	8,010	8,900	-890	11.1%	15.0%
	East of US 101 NB Ramps	Collector	2014	1,243	1,400	-157	12.6%	25.0%
San Miguel Street	South of Avila Beach Drive	Collector	2014	1,467	1,600	-133	9.1%	25.0%
See Canyon Road	North of San Luis Bay Drive	Collector	2014	1,028	1,000	28	-2.7%	25.0%
Shell Beach Road	South of Avila Beach Drive	Collector	2014	3,305	3,200	105	-3.2%	25.0%

The existing traffic counts are compared to model link outputs by their difference. The associated percent model difference is then compared to an industry standard acceptable percent error target for each segment, by facility type, by screenlines, and by a system-wide correlation. As shown in Table 3, one roadway segment is highlighted where the model forecast % Error is higher than the target. This segment has been considered and analyzed based on the surrounding land uses and adjacent roadway data.

Road Type

The travel demand model validation is based on criteria created by the Federal Highway Administration (*Federal Highway Administration, Calibration and Adjustment of System Planning Models, 1990.*) and Caltrans (*California Department of Transportation, Travel Forecasting Guidelines, 1992.*). Table 4 presents the Federal Highway Administration (FHWA)-recommended absolute error targets for each facility type. The Root-Mean-Squared Error (RMSE) more heavily weights large errors.

**TABLE 4:
AVILA TRAVEL DEMAND MODEL – CALIBRATION SUMMARY**

Roadway Classification	Daily	Model	%	%	RMSE	RMSE
	Count	Volume	Model	Target	Model	Target
Freeway	273,500	272,600	0.3%	7.0%	1.6%	15.0%
Arterial	37,491	40,200	7.2%	15.0%	9.2%	40.0%
Collector/Local	13,899	15,280	9.9%	25.0%	16.5%	50.0%
Total	51,390	55,480	8.0%	5.0%	13.4%	35.0%

2. Federal Highway Administration, Calibration and Adjustment of System Planning Models, 1990.

3. California Department of Transportation, Travel Forecasting Guidelines, 1992.

Table 4 shows that the model satisfies each facility-specific absolute percent-error target and the RMSE targets for all facilities.

Screenlines

Screenlines are imaginary boundaries that measure the total traffic across multiple parallel routes. Screenlines allow for calibration across areas rather than at specific sites. Traffic count locations were selected such that four screenlines were defined for the Avila TDM.

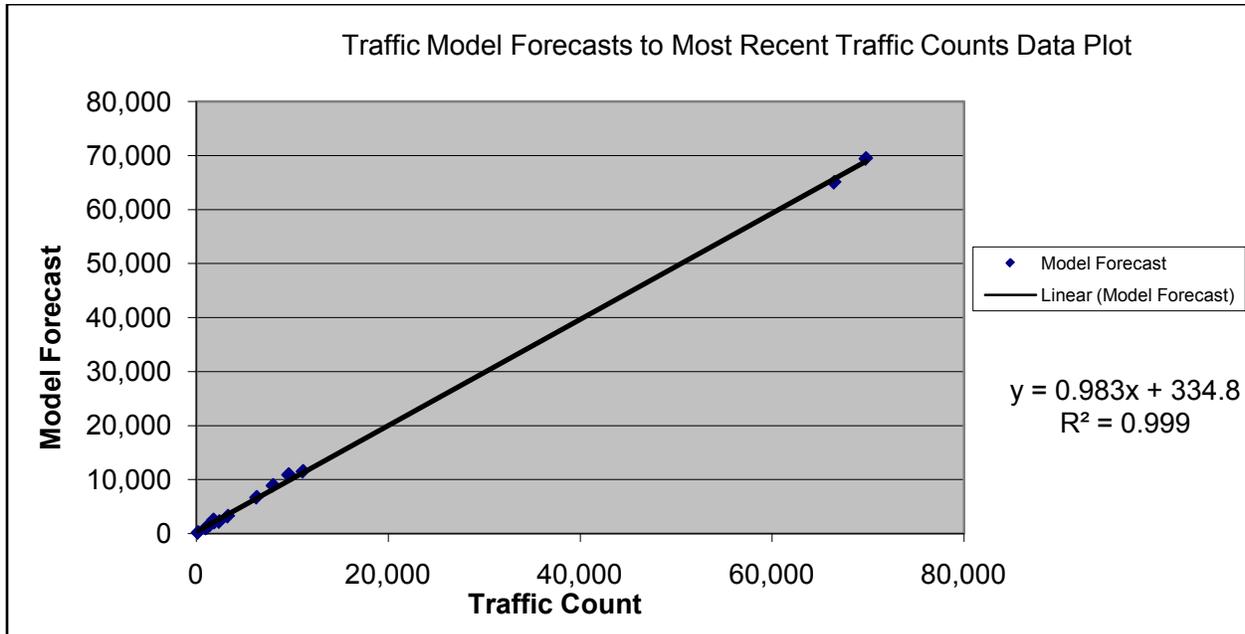
Table 5 shows the model screenline calibration results. All screenline results are within recommended percent error targets.

**TABLE 5:
AVILA TRAVEL DEMAND MODEL - SCREENLINE SUMMARY**

Screenline	Traffic Count	Model Volume	% Error Model	% Error Target
Avila, South of San Luis Bay Drive	67,640	66,100	2.3%	15.0%
US 101, n/o San Luis Bay Drive	66,500	65,000		
Ontario Road, s/o San Luis Bay Drive	1,140	1,100		
Avila, South of Avila Beach Drive	73,105	72,600	0.7%	15.0%
US 101, s/o Avila Beach Drive	69,800	69,400		
Shell Beach Road, s/o Avila Beach Drive	3,305	3,200		
Avila, West of US 101	17,641	19,800	12.2%	15.0%
San Luis Bay Drive, w/o Ontario Road	8,010	8,900		
Avila Beach Drive, w/o US 101 SB Ramps	9,631	10,900		
Avila, Downtown Access	5,189	5,900	13.7%	15.0%
San Luis Street	1,804	2,200		
San Miguel Street	1,467	1,600		
1st Street	1,918	2,100		

Region-wide Correlation Coefficient

The region-wide model correlation was calculated by plotting the model forecasts against the roadway counts. An acceptable correlation coefficient is 0.88. As shown in the following chart, which plots model traffic forecasts to the most recent traffic counts, the model correlation coefficient is 0.999, meaning the model explains slightly more than 99% of the variability in the traffic counts.





Memorandum

To: San Luis Obispo County	Date: March 23, 2016
Attn: Jeremy Ghent	Project: 2015 Avila Circulation Study and TIF Update
From: Rosanna Southern, Todd Tregenza	
Re: Avila Beach Drive Capacity Study	Job No.: 25-6462-13
	File No.: C1917MEM002.DOCX

CC:

Introduction

The Avila Beach Specific Plan was adopted by the County of San Luis Obispo Board of Supervisors in 2000, and establishes a standard for the level of service (LOS) along Avila Beach Drive. This policy states that the LOS along Avila Beach Drive shall be based on the average hourly weekday two-way 3:00 pm to 6:00 pm traffic counts conducted during the second week of May of each year. This policy was established in 1995 (Ord. 2702), and since then, commercial and residential development has occurred in the Avila Valley and beachfront areas, increasing the population and redefining traffic patterns in the area. The County is seeking re-evaluation of this May policy. This memorandum presents a summary of the analysis of traffic along Avila Beach Drive during certain times of the year, and compared to the 2nd week of May. In addition, the County installed a permanent count station in January, 2015, which will allow continued analysis and refinement of any policies as more data becomes available on seasonal fluctuations and trends become evident.

Previous related studies include the 1990 Avila Circulation Study by DKS, the 1992 Wilbur Smith Associates (WSA) Resource Capacity Study, and the 1994 County Department of Planning and Building Recommendations. The 1990 Study initially recommended widening Avila Beach Drive to support future growth, but due to environmental impacts no widening is recommended. The 1992 Study focused on summer weekend conditions and explored alternative strategies including changing the LOS policy, transportation system management, changes to the design hour, limiting physical improvement, and reducing development within Avila. The 1994 Recommendations included establishing average non-summer weekday peak hour traffic volumes as the basis for determining the LOS for Avila Beach Drive, and as an interim measure use the 345th highest hour for LOS determination instead of the 30th highest hour.

Data Collection

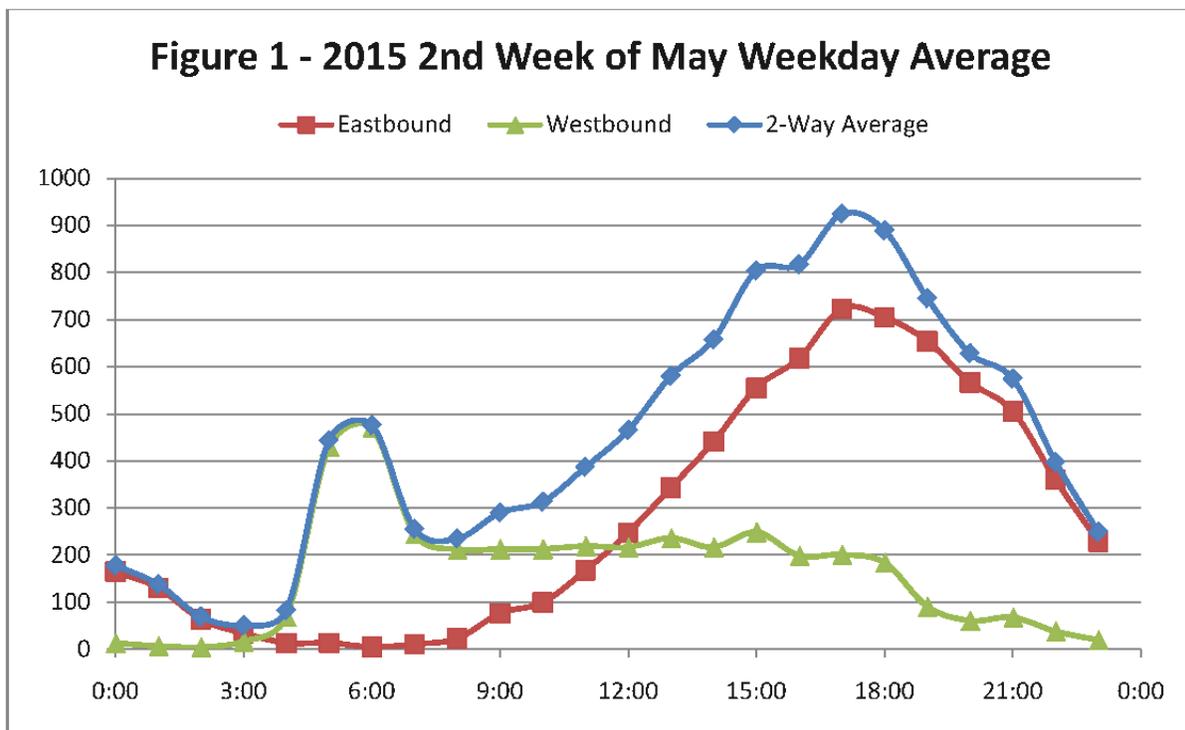
The analysis was done using hourly traffic data collected from March through August, 2015 at a permanent count station located on Avila Beach Drive. The permanent count station was installed in January 2015. Omni-Means also collected hourly counts for one week on Avila Beach Drive September 14-20th, 2014. The permanent count station and the September 2014 counts were collected on Avila Beach Drive west of San Luis Bay Drive.

Avila Beach Drive Capacity Analysis

The analysis compares the 2015 data collected from the permanent count station for the 2nd week of May, the summer weekday and summer weekend averages, the peak for July 4th Holiday weekend, and the September 2014 counts.

2nd Week of May Counts

The data analyzed for the second week of May, 2015 is based off of the permanent count station hourly data for the average weekday which includes data from Tuesday to Thursday. Figure 1 depicts the graph of the weekday average hourly traffic volumes for eastbound, westbound, and two-way traffic flows. The three-day average daily traffic is 10,651 vpd and the 5:00 pm peak hour volume is 924 vph.



2014 September Counts

The September counts were collected on a 15-minute basis on September 14-20, 2014. Figure 2A presents the average weekday two-way daily traffic volumes, Tuesday through Thursday. The average daily traffic (ADT) for the September data is within 4% of the 2nd week of May data, with the September peak hour volume being approximately 25% higher. Table 1 presents the peak hour volume and LOS and the daily volume comparison between the September and May data.



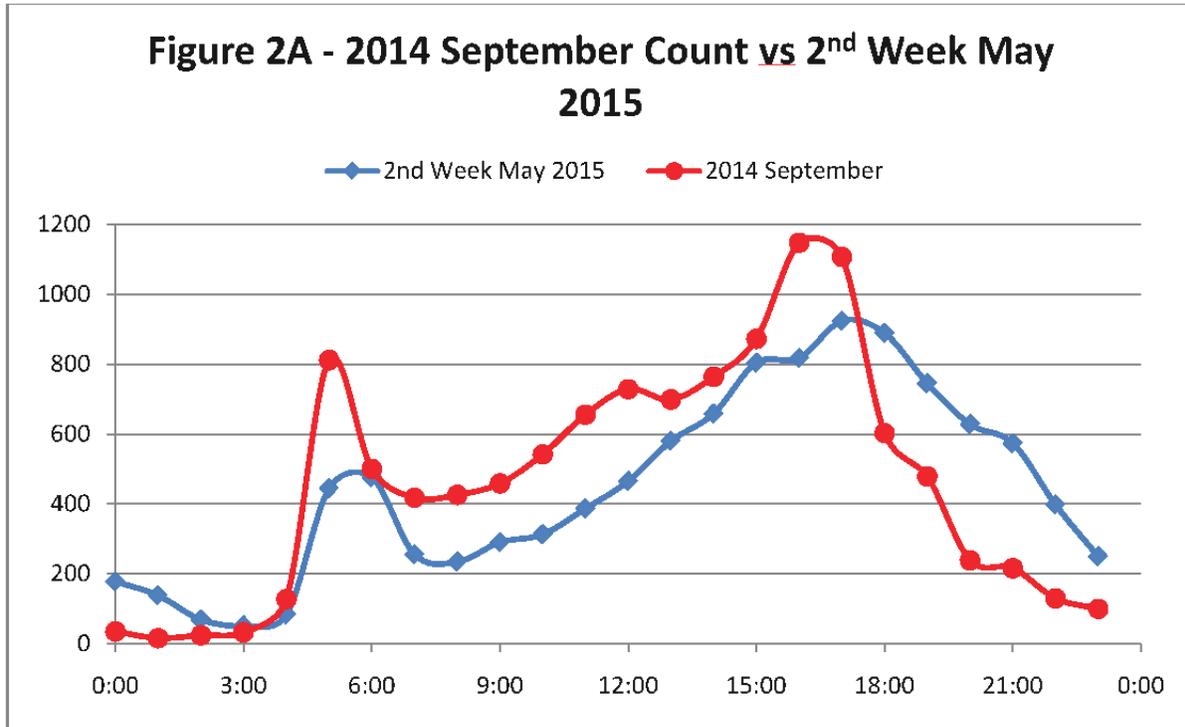


TABLE 1: SEPTEMBER VS MAY DATA

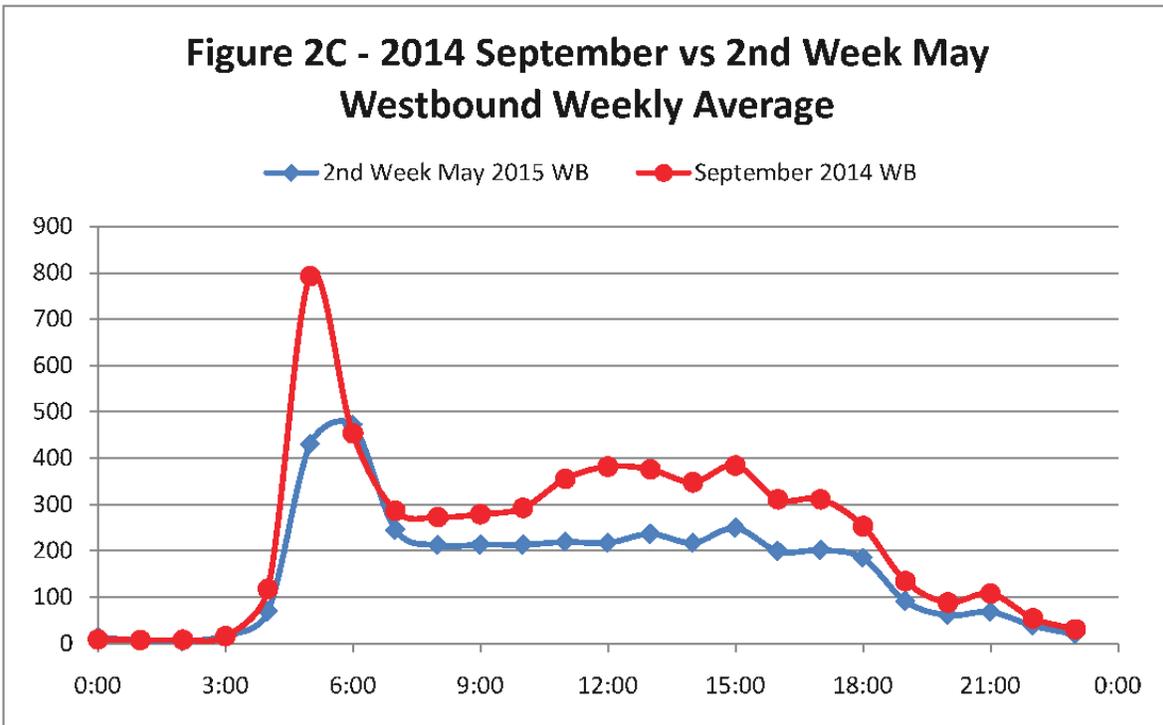
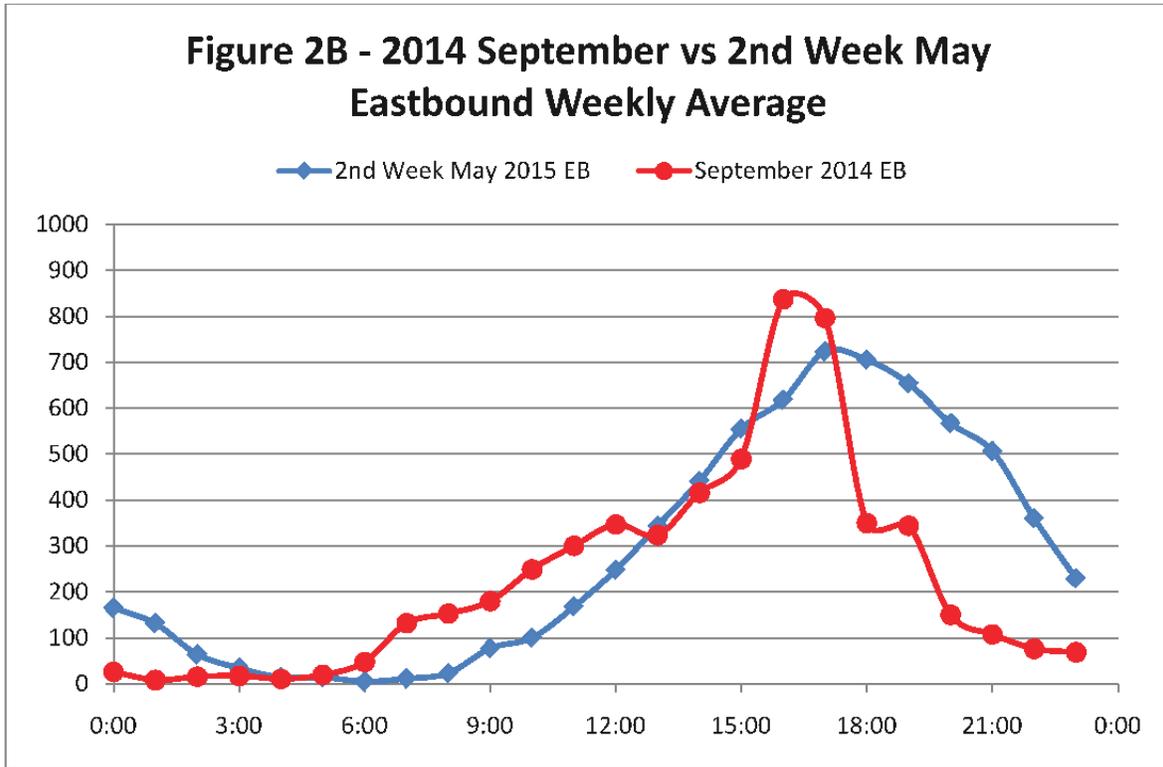
	Sep-14	May-15
PM Peak*	1,316	1,092
Peak LOS	C/D	A/B
Hourly Peak*	1,148	924
Peak LOS	B/C	A/B
ADT	11,136	10,651

*September PM Peak based on highest hour of 15-minute data, and Hourly Peak based on 60-minute (hourly) data

The "true" PM Peak hour volume is based on the highest hour for 15-minute data, which in this case for September is 4:30-5:30 p.m. The May data was received from the County only on an hourly basis. The "true" PM peak hour volume for May is expected to be similarly higher than the Hourly Peak, as shown in the September data. Therefore, the PM peak hour volume for May is determined using the difference between the September Hourly Peak volume compared to the September "true" PM Peak volume.

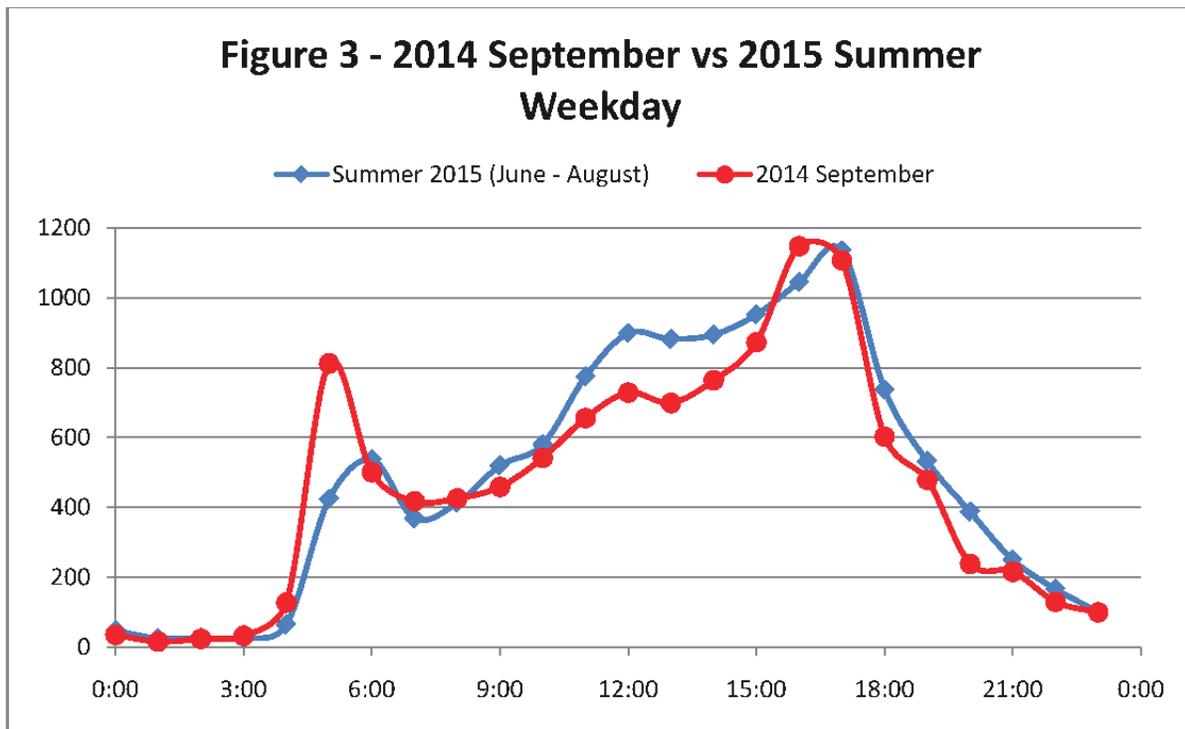
Figure 2B presents the ADT for the eastbound direction and Figure 2C presents the ADT for the westbound direction, comparing the September 2014 counts to the 2nd Week in May, 2015 data. As shown in Figures 2A, 2B and 2C, the directionality is similar between May and September, however the AM and PM peaks are higher in September than the May counts. The eastbound peak hour volumes gradually increase and decrease in May, while September shows a higher difference between peak and off-peak volumes.

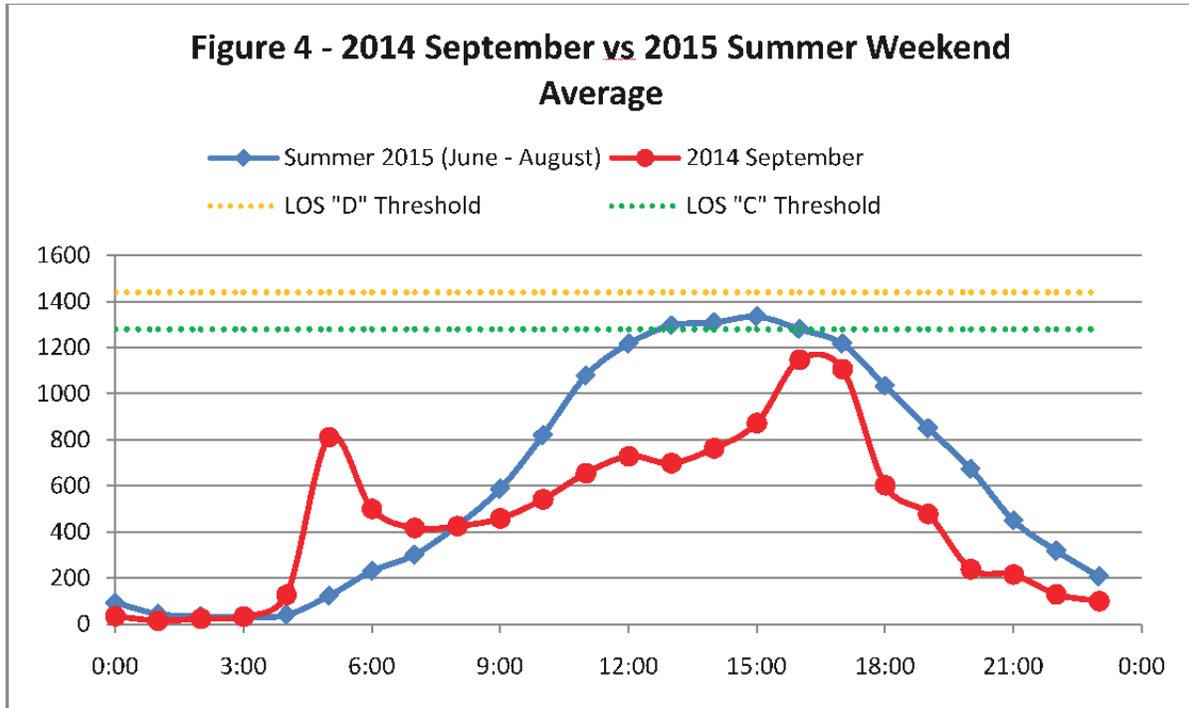




Summer Weekday and Weekend Averages

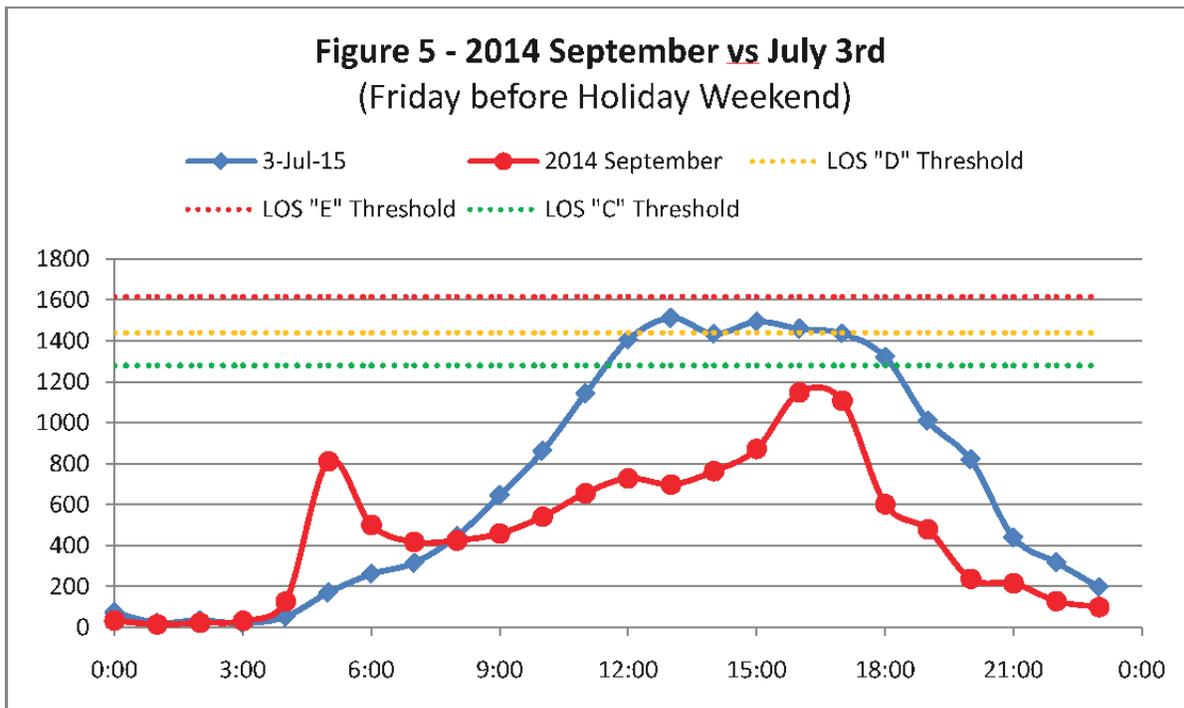
Comparison of the September 2014 counts to the permanent count station data for the summer weekday and weekend averages are based on the weekday average (3-day) Tuesday through Thursday. The summer peak is considered to be between June and August. Figure 3 presents the September weekday average compared to the summer weekday average. The September ADT is within 6%, and the peak hour volume is within 1%, of the summer weekday ADT. Figure 4 presents the September weekday ADT compared to the summer weekend average daily volume, and how the volumes compare to the LOS thresholds C and D. The weekday average for the summer and September data have similar PM peaks, however the September data shows a higher AM peak. The summer weekend traffic shows higher volume than the September weekday peak periods, with a long peak that begins in the late morning and tapers off in the evening.





July 4th Holiday Weekend Peak

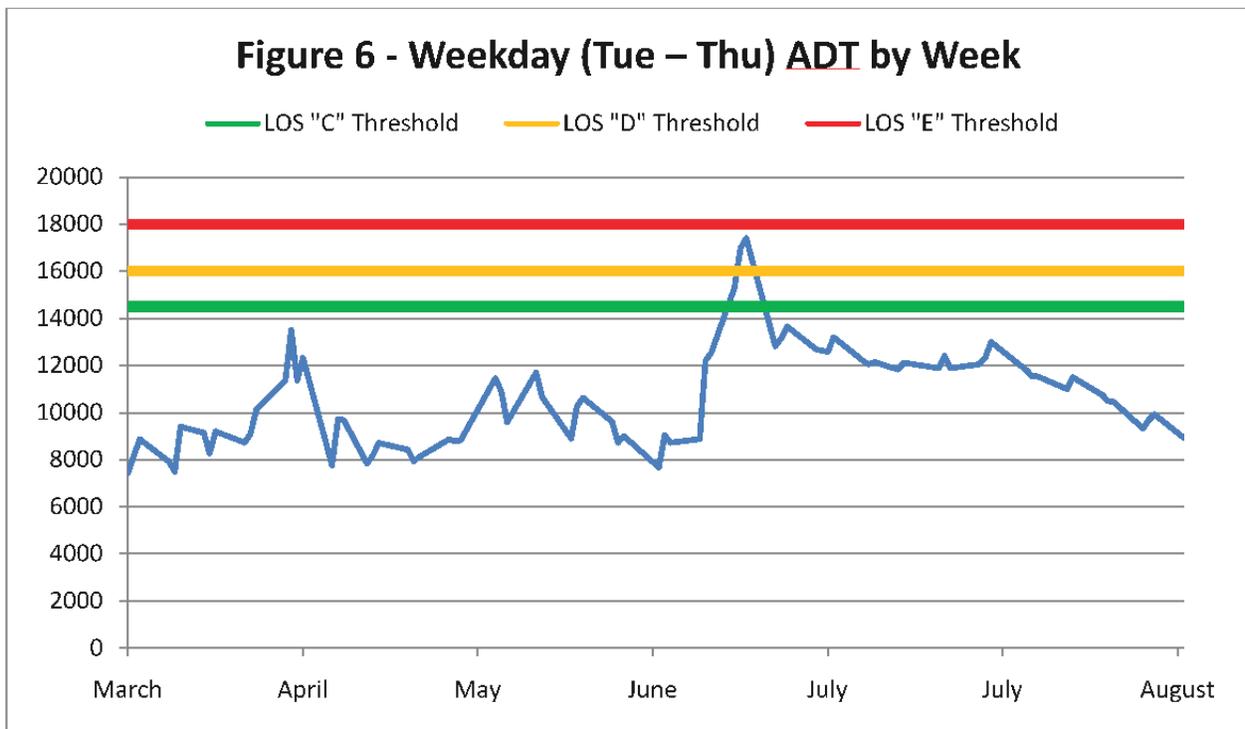
The July 4th holiday weekend peak was determined to be on Friday, July 3rd, 2015 for travelers coming in and out of the Avila Beach area. Figure 5 shows the daily graph of the average weekday September traffic volumes compared to the July 3rd daily traffic volume.

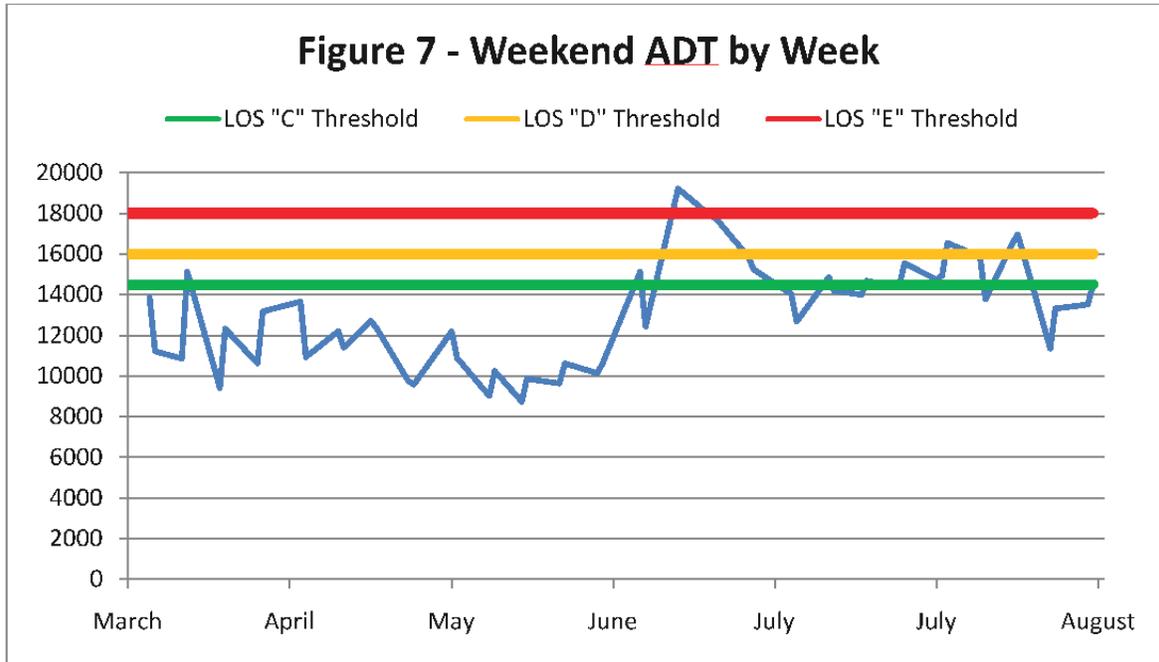


Summary

The Avila Beach Drive permanent count data taken January through August, 2015 indicated that the highest daily total was on Saturday, June 13, with 19,215 vehicles. The highest weekday volume was 17,410 vehicles on Wednesday, June 17. These volumes represent an LOS F and LOS E, respectively. The summer weekday ADT of 11,981 represents LOS B, while the 2nd week in May ADT of 10,794 represents LOS A conditions. Hourly data between March and August indicates that the highest hour had 1,833 vph on Saturday, June 13 at 3:00 pm, which equates to LOS F. The volume for the 30th highest hour of the dataset was 1,555 vph on Saturday, March 14th at 2:00 pm, which equates to LOS E. The volume for the 345th highest hour was 1,146 vph on Sunday, March 15th at 5:00 pm, which equates to LOS C. The 2nd week in May volumes are lower than the 30th highest hour and the September counts. The Avila Beach Drive is possibly reaching capacity considering the 30th highest hour is at LOS E, and the 2nd week of May is currently at LOS C or better.

A summary of the average weekday daily traffic by week from the Avila Beach Drive permanent count station is presented in Figure 6. A summary of the weekend daily traffic by week is presented in Figure 7. As shown in the figures, very few weekdays cross the LOS 'C' threshold, but weekdays have more intense AM and PM peak.





Conclusion

The 2nd week of May data is not consistent when compared to data obtained in the September and summer time periods. Figure 6 and Figure 7 show that the May data is lower than March, April and June; this data could fluctuate on a yearly basis and on a weekly basis is unpredictable. Determinations for capacity on Avila Beach Drive should consider the sensitivities of seasonal fluctuations as well as the directionality throughout the Community. ADT is generally undesirable as a basis for design, particularly for high-volume facilities and those which have atypical directionality. Intersection level of service analysis is preferred over roadway analysis in determining design of improvements and capacity since intersection analysis takes into account the directionality of the roadway volumes.

Using the 2nd week of May data to determine the service levels for Avila Beach Drive limits the data from year to year, without representation of seasonal fluctuations, and does not provide a conservative approach to determining volumes that accurately represent the prevailing conditions. Since the County installed a permanent count station on Avila Beach Drive in January, 2015, data can be provided at any time of the year and continued analysis on seasonal fluctuations, peaks and trends are now readily available. Therefore, it is recommended that data along Avila Beach Drive is not restricted to the 2nd week of May.

In summary, using the permanent count data, the following is recommended:

- Intersection level of service analysis is preferred over roadway analysis in determining design of improvements and capacity since intersection analysis takes into account the directionality of the roadway volumes.
- Using the 30th highest design hour volume or other comparable metrics is also a possibility due to the seasonal variations for this area, and this factor improves traffic forecasting for the specific flow rates and accounts for average fluctuations in ADT.

