

# Morro Bay Circulation Element Update

## Draft Technical Report

**Prepared For: Michael Baker International**

Central Coast Transportation Consulting  
895 Napa Avenue, Suite A-6  
Morro Bay, CA 93442  
(805) 316-0101

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# Contents

Contents.....	2
Introduction .....	3
Analysis Methods.....	4
Existing Conditions.....	5
Buildout Transportation Conditions.....	15
References.....	22
Figure 1: Existing Traffic Volumes .....	6
Figure 2: Buildout and Buildout Plus Project Volumes .....	16
Appendix A: Baseline Report Figures	
Appendix B: Traffic Count Sheets	
Appendix C: Intersection LOS Calculation Sheets	
Appendix D: Segment LOS Calculation Sheets	
Appendix E: Signal Warrant Analysis Sheets	

## Introduction

This report describes existing and future transportation conditions in the City of Morro Bay. This includes conditions related to driving, walking, bicycling, and transit in the City as well as parking and coastal access.

This report serves as a companion document to the Circulation Element of the Morro Bay General Plan Update. It describes the technical analysis results under Existing, Buildout, and Buildout Plus Project conditions.

Existing conditions reflect the current roadway network and traffic volumes collected in 2016. Buildout conditions reflect buildout of the City's current General Plan land uses. Buildout Plus Project reflects the updated General Plan land uses proposed as a part of the current update.

# Analysis Methods

## Intersection Analysis

The level of service thresholds for intersections and the pedestrian, bicycle, and transit modes based on the 6<sup>th</sup> Edition Highway Capacity Manual (HCM) are presented in Table 1.

Table 1: Intersection Level of Service Thresholds							
Signalized Intersections <sup>1</sup>		Stop Sign Controlled Intersections <sup>2</sup>		Two-Way Stop Sign Controlled <sup>3</sup>		Pedestrian, Bicycle, and Transit Modes <sup>4</sup>	
Control Delay (seconds/vehicle)	Level of Service	Control Delay (seconds/vehicle)	Level of Service	Control Delay (seconds/vehicle)	Level of Service	LOS Score	Level of Service
≤ 10	A	≤ 10	A	≤ 5	A	≤ 2.00	A
> 10 - 20	B	> 10 - 15	B	> 5 - 10	B	> 2.00-2.75	B
> 20 - 35	C	> 15 - 25	C	> 10 - 20	C	> 2.75-3.50	C
> 35 - 55	D	> 25 - 35	D	> 20 - 30	D	> 3.50-4.25	D
> 55 - 80	E	> 35 - 50	E	> 30 - 45	E	> 4.25-5.00	E
> 80	F	> 50	F	> 45	F	> 5.00	F

1. Source: Exhibit 18-4 of the 2010 *Highway Capacity Manual*.  
 2. Source: Exhibits 19-1 and 20-2 of the 2010 Highway Capacity Manual.  
 3. Source: Exhibits 19-2 of the 2010 Highway Capacity Manual.  
 4. Source: Exhibit 16-5 and 16-6 of the 2010 Highway Capacity Manual, assuming 60 ft<sup>2</sup>/p for pedestrian mode.

The study intersections were analyzed with the Synchro 10 software package applying the HCM 6<sup>th</sup> Edition methods.

## Segment Analysis

The study roadway segments were evaluated for auto, transit, pedestrians, and bicycles using the LOS+ software, which applies the HCM 2010 methods. The LOS score thresholds are shown in Table 2.

Table 2: Roadway Segment Level of Service Thresholds	
Auto, Pedestrian, Bicycle, and Transit Modes, Segments	
LOS Score	Level of Service
≤ 2.00	A
> 2.00-2.75	B
> 2.75-3.50	C
> 3.50-4.25	D
> 4.25-5.00	E
> 5.00	F

1. Source: Exhibits 16-5 and 16-6 of the 2010 Highway Capacity Manual, assuming 60 ft<sup>2</sup>/p for pedestrian mode

## Existing Conditions

This section is divided into the following subsections: 1) automobile intersection operations, 2) segment operations, 3) neighborhood traffic, 4) goods movement, 5) vehicle miles traveled, 6) collisions, 7) parking, 8) walking, 9) bicycling, and 10) transit

### 1. Automobile Intersection Operations

Traffic counts were collected at the study intersections in 2016 and are shown on Figure 1. Automobile intersection operations are typically described in terms of average delay experienced per vehicle during the peak hour of travel. The delay per vehicle correlates to an LOS grade ranging from LOS A for free-flowing conditions to LOS F for highly congested conditions. The City does not have a formal LOS threshold defining acceptable operations, but historically has applied the Caltrans target of LOS C or better. Operations at key intersections in the City in March 2016 are shown in Table 3 during the Saturday midday and weekday PM peak hours.

Table 3: Level of Service at Key Intersections (2016)				
Intersection	Peak Hour	V/C <sup>1</sup>	Delay <sup>2</sup>	LOS
1. San Jacinto Street/ Highway 1	Week PM	0.77	18.2	B
	Sat MID	0.72	17.1	B
2. San Jacinto Street/ Main Street <sup>3</sup>	Week PM	-	6.7 (13.9)	- (B)
	Sat MID	-	5.0 (10.0)	- (A)
3. State Route 41/ Highway 1 SB Ramps <sup>3</sup>	Week PM	0.40	<b>7.5 (28.7)</b>	<b>- (D)</b>
	Sat MID	0.30	6.7 (18.2)	- (C)
4. State Route 41/ Main Street	Week PM	0.99	<b>37.6</b>	<b>E</b>
	Sat MID	0.82	<b>28.3</b>	<b>D</b>
5. Beach Street/ Main Street	Week PM	0.52	13.9	B
	Sat MID	0.75	23.9	C
6. Morro Bay Boulevard/ Quintana Road	Week PM	0.70	12.7	B
	Sat MID	0.59	10.7	B
1. Volume to capacity ratio reported for worst movement. 2. HCM 2010 average control delay in seconds per vehicle. 3. For side-street-stop controlled intersections the worst approach's delay is reported in parentheses next to the overall intersection delay. Note: Unacceptable operations shown in bold text.				

The intersection of SR 41/Main Street (#4) operates at LOS E during the weekday PM peak hour and LOS D during the Saturday midday peak hour. These are below the Caltrans target of LOS C or better. This all-way stop-controlled intersection and nearby ramps have been under study for improvements through the Caltrans project development process and a roundabout is now planned. The southbound approach to the SR 41/Highway 1 southbound ramps intersection (#3) operates at LOS D during the weekday PM peak hour. All other intersections perform at or above LOS C.

Figure 1: Existing Volumes



Legend:	
xx(yy) - PM(Sat Mid) Peak Hour Traffic Volumes	(x) - Study Intersection

Existing Peak Hour Volumes																		
1.	<table border="1"> <tr> <td>← 7(11)</td> <td>→ 657(695)</td> <td>↙ 55(48)</td> <td>↘ Highway 1</td> </tr> <tr> <td>← 7(15)</td> <td>→ 15(22)</td> <td>↙ 43(61)</td> <td>↘ San Jacinto St</td> </tr> </table>	← 7(11)	→ 657(695)	↙ 55(48)	↘ Highway 1	← 7(15)	→ 15(22)	↙ 43(61)	↘ San Jacinto St	<table border="1"> <tr> <td>↑ 97(80)</td> <td>← 18(13)</td> <td>↙ 128(91)</td> <td>↘ San Jacinto St</td> </tr> <tr> <td>↑ 44(45)</td> <td>← 623(755)</td> <td>↙ 242(144)</td> <td>↘</td> </tr> </table>	↑ 97(80)	← 18(13)	↙ 128(91)	↘ San Jacinto St	↑ 44(45)	← 623(755)	↙ 242(144)	↘
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## 2. Roadway Segment Operations

Roadway segment operations in 2016 are described for pedestrians, bicycles, and vehicles in Table 4. The Embarcadero north of Pacific Street, Morro Bay Boulevard west of Quintana Road, and Main Street south of Radcliff Drive are short segments, with a high number of stops per mile, decreasing their auto performance. Main Street south of Radcliff Drive and westbound SR 41 east of Main Street have high free-flow speeds and no sidewalks, resulting in pedestrian LOS D. All other segments perform at or above LOS C. The City and Caltrans do not have LOS thresholds for pedestrian and bicycle facilities.

Segment	Peak Hour	Direction	Pedestrian		Bicycle		Vehicle		
			LOS Score <sup>1</sup>	LOS <sup>1</sup>	Score <sup>1</sup>	LOS <sup>1</sup>	V/C Ratio	Score <sup>1</sup>	LOS <sup>1</sup>
Embarcadero - North of Beach Street	Week PM	NB	2.10	B	4.00	B	0.10	3.28	C
		SB	1.51	A	2.76	C	0.10	3.02	C
	Sat MID	NB	2.48	B	3.02	C	0.18	3.28	C
Embarcadero - North of Pacific Street	Week PM	NB	1.32	A	2.86	C	0.08	3.72	D
		SB	1.16	A	2.74	B	0.07	3.72	D
	Sat MID	NB	1.51	A	3.38	C	0.09	3.72	D
Embarcadero - South of Pacific Street	Week PM	NB	1.13	A	2.54	B	0.05	3.28	C
		SB	1.12	A	2.68	B	0.06	3.28	C
	Sat MID	NB	1.32	A	3.12	C	0.07	3.28	C
Morro Bay Boulevard - West of Quintana Road	Week PM	EB	2.37	B	2.43	B	0.24	3.62	D
		WB	2.53	B	2.50	B	0.28	3.62	D
	Sat MID	EB	2.27	B	2.38	B	0.22	3.62	D
Main Street - South of Radcliff Drive	Week PM	NB	2.56	B	2.34	B	0.17	3.28	C
		SB	3.79	D	2.48	B	0.23	3.02	C
	Sat MID	NB	3.04	C	2.58	B	0.25	3.28	C
State Route 41 - East of Main Street	Week PM	EB	3.39	C	0.75	A	0.23	3.16	C
		WB	3.32	C	0.71	A	0.22	3.16	C
	Sat MID	EB	3.31	C	0.71	A	0.21	3.16	C
		WB	3.56	D	0.82	A	0.26	3.16	C

1. HCM 2010 pedestrian/bicycle score and LOS  
 2. Embarcadero - North of Pacific Street, Morro Bay Boulevard - West of Quintana Road, and Main Street - South of Radcliff Drive are short segments, increasing their stops per mile. This is the likely cause of their poor Vehicle LOS.  
 3. Main Street - South of Radcliff Drive SB and State Route 41 - East of Main Street WB have high Freeflow Speeds and no sidewalks. These are the likely causes of their poor Pedestrian LOS.

## 3. Neighborhood Traffic

There are a variety of different neighborhood types throughout Morro Bay. Most neighborhoods are served by a well-defined grid of local streets. This grid system spreads traffic by providing a variety of routes to destinations.

Some collector streets pass through residential areas. While traffic volumes along these corridors are well below the roadway's carrying capacity, the adjacent residences can be impacted by excessive vehicle volumes and speeds. Table 5 summarizes the volumes and speeds along key neighborhood roadway corridors in 2016.

Table 5: Neighborhood Roadway Traffic Conditions (2016)					
Segment	Peak Hour	Daily Traffic	Average Daily Traffic	85th Percentile Speed (mph)	Average 85th Percentile Speed (mph)
Kern Avenue - Anchor Street to Olive Street	Thursday	1365	1277	23.9	29.9
	Friday	1285		33.0	
	Saturday	1181		32.7	
Piney Way - South Street to Vista Street	Thursday	1524	1440	32.7	32.6
	Friday	1470		32.7	
	Saturday	1326		32.5	
Beachcomber Street - Mindoro Street to Luzon Street	Thursday	355	375	28.0	26.5
	Friday	353		26.4	
	Saturday	416		25.0	
Greenwood Avenue - Elena Street to San Joaquin Street	Thursday	307	258	26.3	25.5
	Friday	287		25.9	
	Saturday	180		24.4	

The roadways listed in Table 5 are classified as major collectors in the California Road Systems maps. However, they meet the criteria for a residential district as defined in Section 515 of the California Vehicle Code, and therefore have a prima facie speed limit of 25 mph. The segments of Kern Avenue and Piney Way show 85<sup>th</sup> percentile speeds of 29.9 and 32.6 mph, respectively.

#### 4. Goods Movement

Local businesses rely on roadways and other City infrastructure, such as piers, to transport goods. The following roadways, shown on Figure CIR-4, are identified as truck routes in the City's Circulation Element:

- Main Street from Yerba Buena Street to Morro Bay Boulevard
- SR 41/Atascadero Road east of Highway 1
- Quintana Road from Main Street to Morro Bay Boulevard and east of South Bay Boulevard
- Morro Bay Boulevard from Main Street to Highway 1
- Beach Street from the Embarcadero to Main Street
- Harbor Street from the Embarcadero to Main Street
- Highway 1 through the City

Downtown and Embarcadero area businesses receive deliveries from trucks parked at curbside spaces, in off-street lots, or in designated loading zones. Community members have also expressed concern about delivery trucks occasionally parked in the middle of streets, which can create or exacerbate congestion.

Commercial fishing and aquaculture offloading occurs at a number of piers along the Embarcadero. The City operates a launch ramp facility, fish cleaning station, and wash-down area for trailered vessels. No facilities are provided for large vessel haul-outs.

#### 5. Vehicle Miles Traveled

VMT measures travel on roadways by all types of motorized vehicles carrying passengers or cargo. Each mile traveled is counted as one vehicle mile regardless of the number of people in the vehicle. VMT is typically expressed as VMT per day. Table 6 shows daily VMT in Morro Bay as of 2016. In this table, the column titled "Daily VMT in SOP" reflects the vehicle miles traveled entirely within city limits and the City's sphere of influence. The column titled "Daily VMT in the County" reflects the vehicle miles traveled within the City's sphere of influence and those trips that either originated in San



Luis Obispo County and concluded in Morro Bay, or vice versa. The final column, “Daily VMT in State,” reflects vehicle miles traveled within the City’s sphere of influence, and those trips that either originated in Morro Bay and concluded anywhere in California (including San Luis Obispo County), or vice versa.

<b>Table 6: Vehicle Miles Traveled in Morro Bay (2016)</b>			
<b>Trip Type</b>	<b>Daily VMT in SOI</b>	<b>Daily VMT in County</b>	<b>Daily VMT in State</b>
Origin and destination within City SOI	52,256	52,256	52,256
Origin only within City SOI	16,061	48,024	63,788
Destination only within City SOI	16,422	50,924	66,688
<b>Total</b>	<b>84,739</b>	<b>151,205</b>	<b>182,732</b>
1. SOI = Sphere of Influence			
2. Source: SLOCOG and CA Statewide Travel Demand Models			

Daily VMT is shown for trips with both an origin and destination within the City and trips with either an origin or destination in the City, but not both. A Morro Bay resident driving to dinner on the Embarcadero would have an origin and destination within the City. A Morro Bay resident driving to work in Paso Robles would have an origin only within the City, while an Atascadero resident driving to work in Morro Bay would have a destination only within the City. A Fresno resident visiting Morro Bay would have a destination only within the City, and the trip length and VMT would be adjusted to reflect the portion of the trip occurring outside of San Luis Obispo County.

VMT estimates were extracted from the SLOCOG Travel Demand Model calibrated for use in Morro Bay. The SLOCOG Model tracks trips within the County but does not reflect regional trips that continue to destinations outside of the County. The California Statewide Model was used to determine the average trip lengths for trips leaving San Luis Obispo County, which were then used to forecast the daily VMT.

Trips with an origin and destination in the City were counted as being 100 percent generated by the City. Trips that have an ending or beginning in the City were counted as being 50 percent generated by the City. Trips that pass through the City but do not begin or end within the City were excluded from the VMT analysis.

**6. Collisions**

The Statewide Integrated Traffic Records System (SWITRS) is a tool used by the California Highway Patrol to collect and process collision information. Injury and fatal collision hot-spots (including vehicles, pedestrians, and bicyclists) throughout the City were reviewed based on five years of collision data. Most of the collisions occur at intersections along Highway 1 and along the Main Street and Morro Bay Boulevard corridors.

The California Office of Traffic Safety compares collision rates for cities throughout the state. There are 105 cities in Morro Bay’s category with a population between 10,001 and 25,000. In 2013, Morro Bay’s fatal and injury collision rank was 43 of 105, indicating that 42 similar-sized cities had higher collision rates and 62 had lower rates.

The 10 intersections with the largest number of reported collisions are summarized in Table 7. Where these intersections overlap with the intersections identified in the current General Plan, those values (for the period 1982–1984) are provided as well.

<b>Table 7: High Collision Locations in Morro Bay (2012-2014)</b>					
<b>Intersection</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Total</b>	<b>1982-1984</b>
Highway 1/Main Street	2	5	5	12	-
Quintana Road/South Bay Boulevard	5	3	4	12	2
Quintana Road/Main Street	3	2	4	9	5
Highway 1/Yerba Buena Street	3	4	2	9	4
Highway 1/San Jacinto Street	1	5	2	8	9
Highway 1/Morro Bay Boulevard	3	3	2	8	-
Quintana Road/Morro Bay Boulevard	2	2	3	7	7
Main Street/Morro Bay Boulevard	2	3	2	7	-
Main Street/SR 41	2	4	1	7	-
Embarcadero/Embarcadero	2	3	2	7	-

1. Source: California Highway Patrol 2014; City of Morro Bay 1988  
2. SWIIRS does not provide a precise location for all collisions, so it is unclear where the collisions at the Highway 1 intersections with Main Street and Morro Bay Boulevard occurred.

Five locations analyzed in the 1988 General Plan are also in the top 10 collision locations between 2012 and 2014. The number of reported collisions increased at three of these intersections, and stayed the same or decreased at two locations, despite traffic volume increases.

## **7. Parking**

The City prepared a Parking Management Plan in 2007, which focused on parking conditions Downtown and along the Embarcadero. Nearly 2,500 parking spaces are located in this study area. Of these, more than 70 percent are managed by the City. Occupancy surveys were also conducted from noon to 6:00 PM on a Tuesday preceding Memorial Day and Saturday of Memorial Day weekend of that year.

The occupancy surveys showed that parking on the Embarcadero was fully utilized and several Downtown blocks were nearly fully utilized during the peak hour of the holiday weekend. The high parking occupancy rates were short in duration and supply was available within four blocks of all surveyed areas at all times, even during a holiday weekend.

The study developed an action plan to address the temporary supply issues present during busy weekends and more effectively manage the City's parking supply. The action plan includes the following recommendations:

1. Enhance the signage program to better direct drivers to the appropriate parking areas.
2. Improve public information related to parking for different users.
3. Encourage shared parking between different land uses.
4. Encourage employee parking policies to support parking availability for visitors.
5. Expand and enhance trolley service.
6. Regulate delivery truck parking.
7. Replace parallel parking with angled parking in selected areas.
8. Enhance pedestrian facilities with a focus on connections to parking and attractions.
9. Modify time limits to more effectively utilize the parking supply.

10. Encourage public-private partnerships to effectively provide parking.
11. Monitor and adjust the Parking In-Lieu Fee program.
12. Allow the provision of pervious parking surfaces to minimize stormwater runoff.

The City is implementing the action plan as opportunities arise. As recently as June 28, 2016, the Morro Bay City Council was considering approaches to prevent parking requirements from negatively impacting economic development.

### ***Coastal Zone Access and parking***

Public parking provides access to the Coastal Zone at numerous locations in Morro Bay. More than 2,200 free public parking spaces are provided by the City in the Coastal Zone. The primary public access points are described below and shown on Figure CIR-5.

- North Point Natural Area, located at the north end of Toro Lane, provides 10 marked vehicle parking spaces on the bluff connecting to stairways and trails to the beach. These parking spaces are occasionally fully utilized, but additional curbside parking is nearby in the Morro Strand campground area.
- Beachcomber Street provides approximately one-half mile of curbside parking (roughly 100 spaces) on the bluffs above the Morro Strand campground. These spaces are frequented by surfers and other beachgoers.
- The Morro Strand campground provides five marked parking spaces for day use in addition to the camp sites.
- Beachcomber Street offers curbside parking and two informal off-street parking areas south of Alva Paul Creek.
- An off-street parking lot at the end of Azure Street provides approximately 30 parking spaces as well as a restroom for beachgoers. This parking lot connects to the Cloisters trail network.
- The Cloisters Community Park offers 28 off-street parking spaces serving the park and multiuse trails providing beach access.
- Informal dirt parking lots and curbside parking are situated along the Embarcadero north of Morro Creek. A bicycle and pedestrian bridge crosses Morro Creek to connect with the Harborwalk path.
- A dirt parking lot is located at the end of the Embarcadero just south of Morro Creek. This lot also offers parking for bikes and surreys.
- Numerous parking areas are along Coleman Drive between the Embarcadero and Morro Rock. These provide access to the Harborwalk, basketball courts, small craft launch sites at Coleman Beach, Morro Rock, and other amenities in the area. Most of the parking areas consist of dirt lots. The lot closest to the harbor mouth is closed to vehicles during high surf for public safety.
- Parking supply and demand along the Embarcadero south to the launch ramp are discussed in detail in the 2007 Parking Management Plan.
- An informal dirt parking area accommodating approximately 12 vehicles is situated on Main Street north of the Museum of Natural History. This lot is regularly used as a launching point for small boats.
- A paved parking lot is located at the Morro Bay State Park Marina serving the general public and vessel owners. This lot also provides access to estuary walking trails.

Free parking is provided at all coastal access parking locations.

### ***8. Walking***

The City's well-established grid network, mild weather, and relatively flat topography support walking and biking. The Morro Bay Bicycle and Pedestrian Master Plan (2011) describes existing conditions and identifies goals, objectives, and planned improvements to serve these modes of travel. The American Community Survey estimates that in 2014, 4.5 percent of working-age residents in Morro Bay walked to work, 1.4 percent biked to work, and 72.8 percent drove alone to work.

Pedestrian facilities consist of sidewalks, Class I paths, and crosswalks. Sidewalks are provided along the Embarcadero and along most streets in the Downtown area. Most single-family residential areas in the City lack sidewalks. Section 12.04.010 of the Municipal Code requires that new developments conform to the City's Standard Drawings and Specifications (City of Morro Bay, 1987), which require sidewalks for commercial, industrial, and high-density residential uses as well as on arterial, local, and collector roads not bordered by one or more of these land uses. Hillside streets in R1/R2 zoning are required to provide a flat, walkable surface on one side of the road.

#### ***Crosswalks***

There are four types of crosswalks in the City. Signalized crossings provide marked crosswalks and pedestrian signal heads. The three signalized intersections in the City provide signalized crossings on at least two legs of the intersection.

Controlled marked crossings provide striped crosswalks with a stop or yield sign on at least one leg of the intersection. There are 44 controlled marked crossings in the City, mostly in the Downtown area. There are two controlled marked crossings across Highway 1, one at San Jacinto Street and a second at Yerba Buena Street. A crosswalk, green bike lane striping, and Rectangular Rapid Flash Beacon were recently installed near the Atascadero Road/Highway 1 southbound ramp intersection. This area experiences high pedestrian volumes due to the proximity of the high school and nearby hotels.

Uncontrolled marked crossings provide striped crosswalks at mid-block and uncontrolled locations.

Unmarked crossings constitute the remainder of crosswalks wherever two public roads intersect, per the California Vehicle Code.

The Harborwalk provides a multi-use bicycle and walking path connecting the Embarcadero to Morro Rock. This path is heavily used by locals and visitors.

#### ***Trails***

The California Coastal Trail is a hiking and bicycling trail that spans from Oregon to Mexico. The California legislature formally established the trail in 2001 and provided a general alignment. There is some existing signage for the Trail along the Bayfront of the Embarcadero. Additional recreational hiking trails are provided in Morro Bay State Park. These include the Black Hill hiking areas and walking paths along the estuary near the State Park marina.

#### ***Schools***

Greenwood Avenue was identified prior to 2004 as the primary walking route to the City's only elementary school, Del Mar Elementary. No sidewalks are provided on Greenwood Avenue, causing pedestrians to walk in the roadway. In 2011 the City and stakeholders applied unsuccessfully for grant

funding for segment improvements through the Cycle 3 Federal Safe Routes to School Grants program. Funding for improvements to this segment has not yet been identified.

Morro Bay High School is connected to the Beach Tract by a Class I path. Many students walk through the Main Street/SR 41/Atascadero Road intersection, which is congested during peak hours. Recent pedestrian and bicycle improvements to the Highway 1 Southbound Ramps/Atascadero Road intersection have improved conditions for student cyclists and pedestrians.

### ***9. Bicycling***

Bicycle facilities are described in four classes of facilities:

- Class I bikeways provide a completely separate right-of-way for the exclusive use of bicycles and pedestrians with a minimum of vehicular cross-flow. The Harborwalk path is an example of a Class I facility. Approximately 3.6 miles of Class I facilities exist in the City.
- Class II bike lanes consist of a striped lane for one-way bicycle travel on a street or highway. Approximately 7.1 miles of Class II bike lanes exist in the City.
- Class III bike routes are shared by motorists and bicyclists. These routes are supplemented with signs and pavement legends including sharrows. The section of Beachcomber Street south of Yerba Buena Street is an example of a Class III bike route with sharrows.
- Class IV bike lanes, often called cycle tracks or protected bike lanes, are exclusive bike facilities physically separated from vehicles. Types of separation include grade separation, flexible posts, physical barriers, or on-street parking. No Class IV bike lanes currently exist in Morro Bay.

Figure CIR-1 shows existing and proposed bike facilities in Morro Bay. In addition to the California Coastal Trail discussed above, the California Pacific Bike Route connects Vancouver, British Columbia, to Imperial Beach, California, and follows Highway 1 through Morro Bay.

### ***10. Regional Transit***

The San Luis Obispo Regional Transit Authority (RTA) is a joint powers authority providing fixed-route regional service throughout the County and serving the Morro Bay Transit Center on Harbor Street. RTA provides ADA paratransit service through the Runabout, a demand response system operating within three-quarters of a mile of all fixed-route services in the County. Figure CIR-1 shows the RTA routes.

RTA Route 12 runs from Morro Bay to San Luis Obispo with stops in Los Osos, Cuesta College, and Cal Poly. It runs on one-hour headways on weekdays and two-hour headways on weekends.

RTA Route 15 runs from Morro Bay to San Simeon with stops in Cayucos and Cambria. It operates on two- to three-hour headways on weekdays and Saturdays and four-hour headways on Sundays.

RTA ridership has consistently increased each year since 2007. Additionally, 2013 ridership is 270 percent greater than 2003 ridership.

### ***11. Local Transit***

The City operates Morro Bay Transit, which provides fixed-route service with hourly headways from 6:25 a.m. to 6:45 p.m. on weekdays and 8:25 a.m. to 4:25 p.m. on Saturdays. Curb-to-curb service is provided within three-quarters of a mile of the fixed route on a reservation basis. This route serves the

City's major campgrounds, high school, senior center, grocery store, and neighborhoods throughout the City. Figure CIR-1 shows the Morro Bay Transit routes.

The Morro Bay Trolley operates three loops from Memorial Day weekend through the first weekend in October. The routes serve north Morro Bay, Downtown, and the waterfront with headways under one hour. Stops are provided at the State Park campground, Downtown, the Embarcadero, Morro Rock, and Morro Strand campground.

Morro Bay Transit's 2013 triennial performance audit provided four recommendations:

1. Establish performance standards for all services to better track performance trends.
2. Construct a full ridership profile based on the North County Transit Surveys and additional customer feedback. This information should be used to tailor marketing and public outreach activities.
3. Consider implementing targeted public information campaigns about services to increase ridership among key populations.
4. Make it easier for riders to submit feedback about transit services.

In response to the first recommendation, the City established performance standards regarding passengers per vehicle service hour and incentivized these goals in its service contract. To the second recommendation, the City solicited feedback through both print and electronic methods in addition to conducting on-board opinion surveys and boarding/alighting counts. The City acted on the third recommendation by publicizing unmet transit needs hearings, advertising in local newspapers, visiting senior centers, using targeted marketing to tourists, and identifying a small commuter market. The City implemented the fourth recommendation by offering several methods to receive customer feedback, including an online customer feedback link and a comment form printed in the Morro Bay Transit brochure.

Morro Bay Transit Fixed Route and Call-A-Ride service saw ridership increase by about 30 percent from fiscal years 2012 to 2015. However, over the same period, Morro Bay Trolley ridership decreased by about 15 percent.

The Morro Bay Senior Citizens, Inc. operates a senior transportation shuttle on Monday through Thursday from 9:00 a.m. to 4:00 p.m. It serves destinations throughout the County.

## Buildout Transportation Conditions

This section describes transportation conditions under Buildout and Buildout Plus Project conditions. Buildout conditions refer to anticipated buildout under the current General Plan. Buildout Plus Project conditions reflect conditions with the updated General Plan land uses in place.

### TRAVEL FORECASTS

The SLOCOG Travel Demand Model was applied to develop future year traffic forecasts. The SLOCOG Model estimates traffic using employees for most commercial uses. Because most land use planning uses building square footage instead of employees it was necessary to convert the planned commercial square footage to an equivalent number of employees using conversion factors. The conversion factors were developed using an inventory of existing uses and existing employees using land use data provided by SLOCOG.

The Buildout Plus Project scenario includes land use changes in a number of areas of the City, with the most prominent changes planned at the power plant site, the current wastewater treatment facility, and areas adjacent to SR 41 east of Highway 1. The zoning changes on these three sites could substantially increase the traffic generated in these areas. The precise level of traffic generation will depend on the intensity and mix of land uses. Because this information is not known at this time, these parcels were assumed to develop to 80 percent of their maximum allowed intensity using the generic zoning categories. Even with these reductions, the large growth in visitor serving commercial uses would result in major shifts in regional travel patterns. The Master Plan areas will require a more detailed analysis to determine off-site transportation impacts, connections, and mitigations.

The SLOCOG link-level model outputs were extracted for the study locations and used to develop turning movement forecasts using the difference method, where the buildout model's growth over the base year is added to the base year's traffic counts. The raw forecasts were then reviewed for reasonableness and adjusted where needed to ensure conservation of flow between closely spaced intersections.

### ROADWAY NETWORK IMPROVEMENTS

The SR 41/Main Street intersection was assumed to provide a roundabout incorporating the northbound Highway 1 on- and off-ramps consistent with the configuration described in the *State Route 1/State Route 41/Main Street Intersection Control Evaluation Step 2 Report* (Omni-Means, May 2016). This intersection was evaluated using the Sidra software package due to the six-leg configuration. The remaining intersection lane configurations and traffic control types were assumed to remain the same under Buildout conditions as Existing conditions.

Figure 2 shows the Buildout and Buildout Plus Project traffic volumes.



**Figure 2: Buildout and Buildout Plus Project Volumes**



<p>1.</p> <table border="1"> <tr> <td>↑ 10(20)</td> <td>↑ 120(100)</td> </tr> <tr> <td>↓ 720(760)</td> <td>↑ 30(20)</td> </tr> <tr> <td>↔ 60(60)</td> <td>↓ 160(120)</td> </tr> <tr> <td>Highway 1</td> <td>San Jacinto St</td> </tr> <tr> <td>10(20) ↗</td> <td>↘ 60(60)</td> </tr> <tr> <td>20(30) →</td> <td>↗ 750(900)</td> </tr> <tr> <td>50(70) ↘</td> <td>↘ 290(180)</td> </tr> </table>	↑ 10(20)	↑ 120(100)	↓ 720(760)	↑ 30(20)	↔ 60(60)	↓ 160(120)	Highway 1	San Jacinto St	10(20) ↗	↘ 60(60)	20(30) →	↗ 750(900)	50(70) ↘	↘ 290(180)	<p>2.</p> <table border="1"> <tr> <td>↑ 80(60)</td> <td>↑ 20(20)</td> </tr> <tr> <td>↓ 60(50)</td> <td>↑ 130(100)</td> </tr> <tr> <td>↔ 10(10)</td> <td>↓ 20(30)</td> </tr> <tr> <td>Main St</td> <td>San Jacinto St</td> </tr> <tr> <td>130(70) ↗</td> <td>↘ 110(90)</td> </tr> <tr> <td>120(70) →</td> <td>↗ 90(100)</td> </tr> <tr> <td>110(120) ↘</td> <td>↘ 30(20)</td> </tr> </table>	↑ 80(60)	↑ 20(20)	↓ 60(50)	↑ 130(100)	↔ 10(10)	↓ 20(30)	Main St	San Jacinto St	130(70) ↗	↘ 110(90)	120(70) →	↗ 90(100)	110(120) ↘	↘ 30(20)		
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xx(yy) - PM(Sat Mid) Peak Hour Traffic Volumes	(x) - Study Intersection
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## BUILDOUT CONDITIONS

This section describes 1) intersection operations, 2) segment operations, and 3) VMT under Buildout and Buildout Plus Project conditions.

### 1. Intersection Operations

Figure 2 shows the Buildout and Buildout Plus Project peak hour traffic volumes. Table 8 shows the LOS for the study intersections under Buildout and Buildout Plus Project conditions, with detailed calculation sheets included in Appendix C.

Table 8: Buildout and Buildout Plus Project Intersection Auto Levels of Service								
Intersection	Peak Hour	Buildout			Buildout + Project			
		V/C <sup>1</sup>	Delay <sup>2</sup> (sec/veh)	LOS <sup>3</sup>	V/C <sup>1</sup>	Delta	Delay <sup>2</sup> (sec/veh)	LOS <sup>3</sup>
1. San Jacinto Street/ Highway 1	Week PM	0.65	23.9	C	0.77	0.12	29.3	C
	Sat MID	0.65	22.8	C	0.78	0.13	27.5	C
2. San Jacinto Street/ Main Street <sup>3</sup>	Week PM	-	10.8 (21.9)	C	-	-	<b>51.8 (152.5)</b>	<b>F</b>
	Sat MID	-	8.5 (15.6)	B	-	-	<b>70.0 (186.5)</b>	<b>F</b>
3. State Route 41/ Highway 1 SB Ramps <sup>3</sup>	Week PM	<b>0.47</b>	<b>8.2 (31.8)</b>	<b>- (D)</b>	<b>&gt;1.0</b>	-	<b>- (&gt;200)</b>	<b>F</b>
	Sat MID	0.40	7.6 (21.1)	- (C)	<b>&gt;1.0</b>	-	<b>&gt;200 (&gt;200)</b>	<b>F</b>
4. State Route 41/ Main Street	Week PM	0.93	18.9	B	<b>2.91</b>	<b>1.98</b>	<b>&gt;200</b>	<b>F</b>
	Sat MID	0.64	10.7	B	<b>4.45</b>	<b>3.81</b>	<b>&gt;200</b>	<b>F</b>
5. Beach Street/ Main Street	Week PM	0.63	17.8	C	<b>1.72</b>	<b>1.09</b>	<b>173.8</b>	<b>F</b>
	Sat MID	<b>0.81</b>	<b>27.0</b>	<b>D</b>	<b>2.22</b>	<b>1.41</b>	<b>&gt;200</b>	<b>F</b>
6. Morro Bay Boulevard/ Quintana Road	Week PM	0.86	17.8	C	<b>2.02</b>	<b>1.16</b>	<b>&gt;200</b>	<b>F</b>
	Sat MID	0.74	13.4	B	<b>1.77</b>	<b>1.03</b>	<b>184.0</b>	<b>F</b>

1. Volume to capacity ratio reported for worst movement.  
 2. HCM 2010 average control delay in seconds per vehicle for SSSC, AWSC and Intersection #6 roundabout. HCM 2000 average control delay for signalized intersections. Sidra Analysis control delay for Intersection #4  
 3. For side-street-stop controlled intersections the worst approach's delay is reported in parenthesis next to the overall intersection delay. Unacceptable operations shown in bold text.

The following intersections operate below the LOS D threshold for vehicles:

- San Jacinto Street/Main Street (#2) operates at LOS F during the weekday PM and Saturday midday peak hours under Buildout Plus Project conditions.
- State Route 41/Highway 1 SB Ramps (#3) operates at LOS F on the southbound approach during the weekday PM and Saturday midday peak hours under Buildout Plus Project conditions.
- State Route 41/Main Street (#4) operates at LOS F during the weekday PM and Saturday midday peak hours under Buildout Plus Project conditions. Note that this reflects operations with the planned roundabout in place.
- Beach Street/Main Street (#5) operates at LOS F during the weekday PM and Saturday midday peak hours under Buildout Plus Project conditions.

- Morro Bay Boulevard/Quintana Road (#6) operates at LOS F during the weekday PM and Saturday midday peak hours under Buildout Plus Project conditions.

### ***Intersection Recommendations***

The addition of project traffic results in unacceptable traffic operations at five of the six study intersections during both of the analysis time periods. This is due in part to the assumption that undeveloped parcels in the City will develop to near the maximum allowed extent, when in practice many properties never develop and others develop less intensely than allowed by zoning regulations. These assumptions result in roughly doubling the total amount of non-residential square footage within the City, with much of the growth occurring near the waterfront. This level of growth would require substantial increases in the capacity of serving roadways and would likely impact intersections beyond those studied herein.

Master Plans will be required for the larger redevelopment areas that include the current wastewater treatment plant and power plant. These Master Plans will require detailed traffic studies to identify off-site impacts to transportation facilities (including Highway 1 and interchanges), the need for additional roadway connections, and other improvements. The scope of these studies will depend on the intensity of uses proposed for the sites.

The preliminary mitigations below list the needed improvements to improve service levels under Buildout Plus Project conditions. Signal warrant analysis sheets, if applicable, are included in Appendix E. None of these improvements are currently funded or included in any planning documents. They should be re-evaluated when specific land uses are proposed for the large development sites in the City.

- San Jacinto Street/Main Street (#2): It would be necessary to reconstruct this intersection and provide a roundabout or traffic signal to achieve acceptable operations.
- State Route 41/Highway 1 SB Ramps (#3): Acceptable operations could be provided by constructing a traffic signal, which is warranted. The signalized intersection would require expanding the westbound approach to include one left turn lane and a shared through-left lane; adding an eastbound right turn lane; and adding a second receiving lane on the south leg. Alternatively, a single-lane roundabout with bypass lanes could provide acceptable operations under Buildout Plus Project conditions.
- State Route 41/Main Street (#4): It would be necessary to expand the planned roundabout with additional entry and circulating lanes to provide acceptable operations under Buildout Plus Project conditions.
- Beach Street/Main Street (#5): A new vehicular connection from the power plant to Main Street near Highway 1 and across Morro Creek to Atascadero Road would reduce traffic levels at this intersection. Acceptable operations could also be provided by constructing a traffic signal, which is warranted. The signalized intersection would require expanding the southbound approach to include one left turn lane, one through lane, and one right turn lane; modifying the eastbound approach to include one left turn lane and a shared left-through-right lane; and adding a second receiving lane on the north leg. Alternatively, a single-lane roundabout with bypass lanes could provide acceptable operations under Buildout Plus Project conditions.

- Morro Bay Boulevard/Quintana Road (#6): It would be necessary to expand the roundabout with additional entry and circulating lanes to provide acceptable operations under Buildout Plus Project conditions.

The Master Plans should evaluate the need and benefit of providing a vehicular connection across Morro Creek, connecting the power plant site directly to Main Street, and impacts of redevelopment on the SR 41 and Main Street interchanges as well as Highway 1 and SR 41.

## ***2. Segment Operations***

Table 9 shows the segment operations during the weekday PM and Saturday MID peak hours under Buildout and Buildout Plus Project conditions.

The following deficiencies are reported:

### **Pedestrian:**

- #1a Embarcadero North of Beach Street operates at LOS F in the northbound direction both with and without the project due to the lack of sidewalks, and at LOS E in the southbound direction with the project on Saturday midday due to high adjacent vehicle volumes.
- #2 Morro Bay Boulevard west of Quintana Road operates at LOS E in the eastbound direction under Buildout Plus Project conditions due to high vehicular volumes.
- #3 Main Street south of Radcliff Drive operates at LOS E or F under Buildout Plus Project conditions due to high vehicle volumes adjacent to the sidewalk and the missing sidewalk for southbound pedestrians under the Highway 1 overcrossing.
- #4 SR 41 east of Main Street operates at LOS F under Buildout and Buildout Plus Project conditions due to high vehicle volumes and speeds and a lack of sidewalks.

**Bicycle:** There are no deficiencies reported on the bicycle segments with and without the project.

**Auto:** There are no deficiencies reported on the auto segments with and without the project.

Note that intersections are typically the constraint points for vehicular capacity, not segments. Refer to the preceding Intersection Operations section for vehicular recommendations.

**Table 9: Buildout and Buildout Plus Project Segment Pedestrian & Bicycle Levels of Service**

Segment	Peak Hour	Direction	Pedestrian				Bicycle				Vehicle					
			Buildout		Buildout + Project		Buildout		Buildout + Project		Buildout		Buildout + Project			
			LOS	LOS <sup>1</sup>	LOS	LOS <sup>1</sup>	LOS	LOS <sup>1</sup>	LOS	LOS <sup>1</sup>	V/C Ratio	LOS	LOS <sup>1</sup>	V/C Ratio	LOS	LOS <sup>1</sup>
1a. Embarcadero - North of Beach Street	Week PM	NB	2.06	F	3.27	F	2.69	B	3.35	C	0.09	3.28	C	0.34	3.28	C
		SB	1.44	A	3.40	C	2.69	B	3.53	D	0.09	3.02	C	0.47	3.02	C
	Sat MID	NB	2.41	F	4.55	F	2.98	C	3.64	D	0.17	3.28	C	0.61	3.28	C
		SB	1.67	A	4.60	E	2.89	C	3.74	D	0.13	3.02	C	0.70	3.02	C
1b. Embarcadero - North of Pacific Street	Week PM	NB	1.27	A	1.64	A	2.68	B	3.53	D	0.05	3.72	D	0.11	3.72	D
		SB	1.14	A	1.74	A	2.68	B	3.73	D	0.05	3.72	D	0.17	3.72	D
	Sat MID	NB	1.39	A	1.83	A	3.04	C	3.69	D	0.07	3.72	D	0.15	3.72	D
		SB	1.41	A	2.34	B	3.43	C	4.03	D	0.09	3.72	D	0.30	3.72	D
1c. Embarcadero - South of Pacific Street	Week PM	NB	1.17	A	1.40	A	2.68	B	3.38	C	0.05	3.28	C	0.08	3.28	C
		SB	1.12	A	1.56	A	2.68	B	3.60	D	0.05	3.28	C	0.13	3.28	C
	Sat MID	NB	1.23	A	1.47	A	2.87	C	3.47	C	0.06	3.28	C	0.10	3.28	C
		SB	1.27	A	1.84	A	3.12	C	3.80	D	0.07	3.28	C	0.19	3.28	C
2. Morro Bay Boulevard - West of Quintana Road	Week PM	EB	2.60	B	4.59	E	2.53	B	2.99	C	0.29	3.62	D	0.73	3.62	D
		WB	2.72	B	3.55	D	2.57	B	2.80	C	0.32	3.62	D	0.50	3.62	D
	Sat MID	EB	2.48	B	4.29	E	2.48	B	2.94	C	0.26	3.62	D	0.65	3.62	D
		WB	2.65	B	3.44	C	2.54	B	2.77	C	0.30	3.62	D	0.47	3.62	D
3. Main Street - South of Radcliff Drive	Week PM	NB	2.47	B	4.43	E	2.28	B	2.96	C	0.14	3.28	C	0.56	3.28	C
		SB	3.80	F	5.00	F	2.49	B	2.88	C	0.22	3.02	C	0.47	3.02	C
	Sat MID	NB	2.90	C	6.09	F	2.52	B	3.21	C	0.22	3.28	C	0.86	3.28	C
		SB	3.95	F	5.31	F	2.56	B	2.94	C	0.24	3.02	C	0.51	3.02	C
4. State Route 41 - East of Main Street	Week PM	EB	3.45	F	5.43	F	0.77	A	1.29	A	0.24	3.16	C	0.66	3.16	C
		WB	3.91	F	6.12	F	0.95	A	1.39	A	0.34	3.16	C	0.80	3.16	C
	Sat MID	EB	3.37	F	5.20	F	0.74	A	1.25	A	0.22	3.16	C	0.60	3.16	C
		WB	4.30	F	7.04	F	1.06	A	1.50	A	0.41	3.16	C	0.97	3.16	C

1. HCM 2010 pedestrian/bicycle score and LOS  
 2. Main Street - S of Radcliff Drive SB and State Route 41 - E of Main Street WB have high Freeflow Speeds and no sidewalks; likely causes of their poor Pedestrian LOS.

**Recommendations**

**Pedestrian:**

- #1a Embarcadero North of Beach Street: provide sidewalks and a vehicular connection shifting traffic away from Beach Street for the redeveloped power plant site.
- #2 Morro Bay Boulevard: provide a landscaped buffer at least two feet wide between the sidewalk and travel lanes.
- #3 Main Street south of Radcliff Drive: continuous sidewalks would be necessary to provide acceptable pedestrian operations. This is infeasible with the current overpass width but should be accommodated if the overpass is reconstructed.
- #4 SR 41 east of Main Street: provide sidewalks with a landscaped buffer when adjacent properties are redeveloped.

**3. VMT**

Table 10 shows the VMT under Buildout and Buildout Plus Project conditions. The substantial land use growth evaluated under Buildout Plus Project conditions results in a major increase in VMT.

<b>Table 10: VMT in Morro Bay (Buildout and Buildout Plus Project)</b>			
<b>Trip Type</b>	<b>Daily VMT in SOI</b>	<b>Daily VMT in County</b>	<b>Daily VMT in State</b>
Origin and destination within City SOI	63,301 (123,487)	63,301 (123,487)	63,301 (123,487)
Origin only within City SOI	18,268 (82,925)	53,405 (720,021)	71,734 (1,118,440)
Destination only within City SOI	18,535 (91,287)	58,616 (782,939)	76,945 (1,181,359)
<b>Total</b>	<b>100,104 (297,699)</b>	<b>175,322 (1,626,447)</b>	<b>211,981 (2,423,286)</b>

KEY: xx (yy) = Buildout (Buildout Plus Project) VMT  
 1. SOI = Sphere of Influence  
 2. Source: SLOCOG and CA Statewide Travel Demand Models

The increased VMT is attributable to the large increase in employment associated with significant commercial growth. Table 11 summarizes the ratio of jobs to households in Morro Bay and the County under Existing, Buildout, and Buildout Plus Project conditions using data extracted from the SLOCOG Travel Demand Model. The Buildout Plus Project scenario significantly increases the number of jobs in Morro Bay but does not provide a commensurate increase in households, which results in substantial new trips shifted to Morro Bay from other areas. This increase would be significant enough to modify regional travel patterns.

<b>Table 11: Jobs:Household Comparisons</b>			
	<b>Existing</b>	<b>Buildout No Project</b>	<b>Buildout Plus Project</b>
Morro Bay Jobs/HH	0.66	0.72	2.77
SLO County Jobs/HH	0.93	0.97	1.07

Source: SLOCOG Travel Demand Model, CCTC 2018

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