Stormwater Trash Control Implementation Plan and Approach to Demonstrating Trash Full Capture Equivalency

Submitted by:

The Monterey Regional Stormwater Management Program on behalf of:

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Submitted in Compliance With:
Water Code Section 13383 Order to Submit a Method to Comply with Statewide Trash Provisions;
Requirements for Traditional Small Municipal Separate Storm Sewer System (MS4) Permittees

PREFACE

The California State Water Resources Control Board plans to incorporate requirements for trash reductions from stormwater discharges into the Phase II NPDES permit for municipal stormwater discharges issued to applicable municipalities in Monterey County. As a first step towards issuing these requirements, the State Water Board issued Orders to Permittees under California Water Code section 13383 on June 2, 2017 that requires Phase II municipalities and non-traditional Permittees to begin planning for the implementation of the trash reduction requirements and, if selecting the "Track 2" compliance approach, to submit an implementation plan that identifies the controls that Permittees will implement, how they will achieve Full Capture System Equivalency (FCSE), and how FCSE will be demonstrated. This Implementation Plan is submitted collectively by the cities of Seaside, Carmel by-the-Sea, Sand City, and Del Rey Oaks; and the unincorporated County of Monterey, in compliance with the 13383 Order.

This Plan's content and assumptions used when developing are based on the current understanding of trash problems in Monterey County and the effectiveness of control measures designed to reduce trash impacts associated with Municipal Separate Storm Sewer (MS4) discharges. This Plan is intended to be iterative and may be modified in the future based on information gained through the implementation of trash control measures and additional observations of trash levels associated with municipal stormwater. Additionally, the funding needed to implement the trash control measures included in this Plan, is subject to approval by the respective governing bodies of the Monterey Permittees. Therefore, the cities of Seaside, Carmel by-the-Sea, Sand City, and Del Rey Oaks; and the unincorporated County of Monterey reserve the right to revise or amend this Plan at their discretion. All significant revisions or amendments will be documented through the annual reporting process outlined in the Phase II NPDES permit, or through resubmittal of a revised plan independent of the Permit.

Under section 13389 of the California Water Code, the adoption of a NPDES permit that includes requirements for trash reduction and/or trash control measure implementation is exempt from the provisions of Chapter 3 of the California Environmental Quality Act (CEQA). Trash control measures described with this Plan and implemented as an extension of this Plan or a subsequent NPDES permit may or may not be exempt from CEQA.

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Section 1. Introduction

Background

In response to the challenges with trash levels in receiving waters (e.g., creeks, rivers, lakes, and shorelines), the State Water Resources Control Board (State Water Board) adopted the *Trash Amendments* in 2015. This action amended two statewide water quality control plans to include trash control requirements for owners or operators of municipal separate storm sewer systems (MS4s). The Trash Amendments define trash as follows:

> *All improperly discarded solid material from any production, manufacturing, or processing operation including, but not limited to, products, product packaging, or containers constructed of plastic, steel, aluminum, glass, paper, or other synthetic or natural materials.*

Consistent with the Amendments, the cities of Seaside, Carmel by-the-Sea, Sand City, and Del Rey Oaks; and the unincorporated County of Monterey (collectively referred to a Monterey Permittees) will be required via the NPDES permit to significantly reduce the amount of trash discharged to local water bodies from their MS4s, beginning no later than 2020 and continuing through the next decade. Because the Trash Amendments are not self-implementing, trash reduction requirements and milestones will be implemented through the Phase II NPDES permit issued to the Monterey Permittees and other public agencies throughout the County and California, or through other regulatory Orders.

To initiate trash control measure implementation planning, the State Water Board issued an Order to Phase II Permittees under California Water Code section 13383 in June 2017 requesting that each public agency choose their compliance strategy for addressing the Trash Amendments, and submit a response by September 2, 2017 via the statewide Storm Water Multiple Application and Report Tracking System (SMARTS). The Monterey Permittees notified the State Water Board at that time of their intention to implement the "Track 2" compliance approach. This Implementation Plan describes background information on baseline trash levels, the approach that will be used to demonstrate trash reductions, and the initial actions that Monterey Permittees will take to address trash in MS4 discharges.

Trash Sources and Pathways

Trash in creeks, lakes and shorelines originates from a variety of sources, including pedestrian litter, inadequate waste container management, on-land dumping, and litter from vehicles (Figure 1). Pedestrian litter is found frequently in high-traffic areas such as commercial districts, transit centers, and around special events. Waste containers may be overflowing or dispersing trash before during or after collection. Litter from vehicles can include litter from uncovered loads. On-land dumping may also be a significant source of trash generation.

As illustrated in Figure 1, trash is transported to receiving waters through three main pathways: 1) Stormwater Conveyances; 2) Wind; and, 3) Direct Dumping. Stormwater or urban runoff conveyance systems (e.g., MS4s) consist of curbs/gutters, and pipes and channels that discharge to urban creeks, lakes and shorelines. This Implementation Plan and associated trash control measures described within are focused on reducing trash from the stormwater conveyance pathway. Although trash control measures implemented by the Monterey Permittees may partially address trash

transported from other (non-stormwater) pathways, they are not explicitly designed to fully address trash from these pathways.

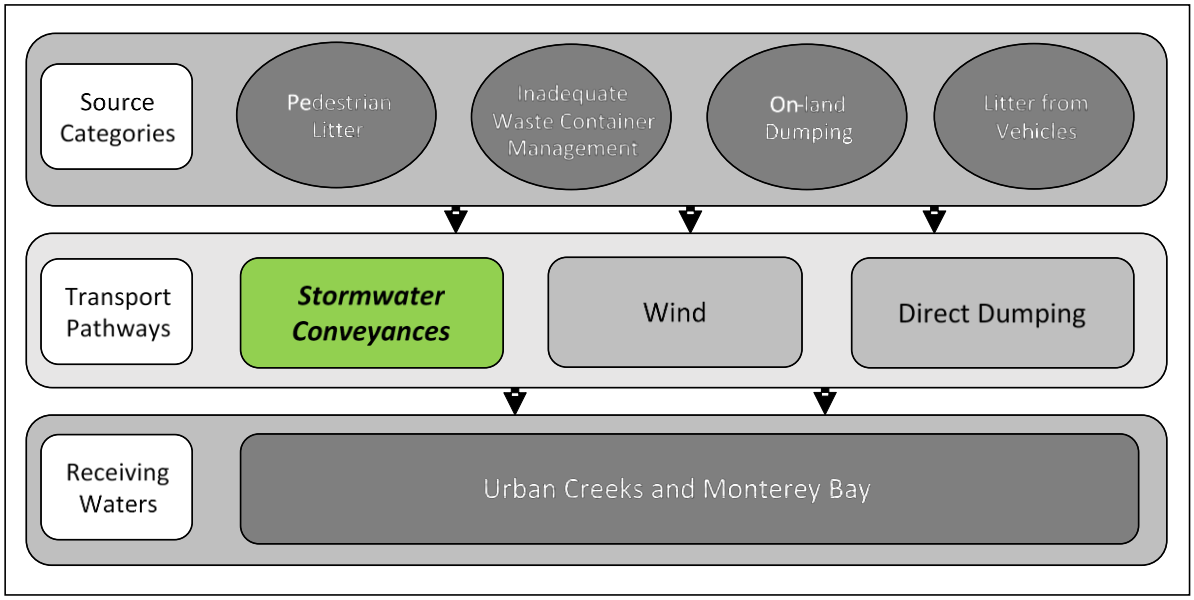


Figure 1. Trash sources categories and transport pathways to urban creeks and the Monterey Bay.[1]

Applicable Land Areas (Priority and Alternative Equivalent Land Use Areas)

A central element of the statewide Trash Amendments is the designation of land areas where cities, counties and other applicable public agencies will need to implement new or enhance existing trash control measures to reduce trash in stormwater. These designated land areas are based on land uses currently developed (i.e., not simply zoned) and are presumed to generate high levels of trash. In the Trash Amendments, these areas are referred to as "Priority Land Uses or PLUs". PLUs include all land areas currently developed as high density residential (HDR), industrial, commercial, mixed urban, and public transportation stations and are connected to Permittee MS4s subject to the Trash Amendments and subsequent requirements.[2] The PLU areas for each Monterey Permittees are fully described in Section 2 of the Plan.

Because not all PLU areas generate significant levels of trash and not all trash is generated solely from PLUs, the Trash Amendments allow Permittees to propose "alternative equivalent land areas" that better represent high trash generation in their jurisdictional areas. Permittees can substitute one or more PLUs with alternate equivalent land use areas that generate trash at rates equivalent to or greater than the PLU area being substituted. Substituting PLUs for land areas that generate trash allows Permittees the flexibility to focus enhanced controls on trash-prone areas within their communities, as opposed to addressing trash in areas just because they fall into one of the PLUs. A discussion of the process that Monterey Permittees will follow when substituting alternative equivalent land areas for PLU areas is discussed in Sections 3 and 5.

[1] This Implementation Plan is only focused on reducing trash from the stormwater conveyances pathway, consistent with the scope of the State Water Board's Trash Amendments.
[2] It is assumed that Permittees will need to address trash from PLU areas draining publicly-owned storm drain inlets located on the public right-of-way and trash from PLU areas that drain to storm drain inlets located on private property and are connected to the Permittee's MS4.

Compliance Options and Related Considerations

The Trash Amendments provide Permittees with two options (i.e., tracks) to demonstrate compliance with trash reduction requirements in PLU areas of equivalent land areas:

- **Track 1 – Full Capture Systems:** Install, operate and maintain State Water Board certified/approved trash full capture systems in the storm drain system that drains all PLUs or equivalent alternative land areas. Full Capture Systems are those that trap all particles that are 5 millimeter (mm) or greater, and have a design treatment capacity that is either: a) not less than the peak flow rate resulting from a one-year, one-hour storm in the subdrainage area, or b) appropriately sized and designed to carry at least the same flows as the corresponding storm drain. The 5 mm size limit corresponds with the diameter of a cigarette butt. Over 40 types of full capture systems have been certified by the State Water Board to-date.
- **Track 2 - Full Capture System Equivalent (FCSE):** Implement a combination of full capture systems, multi-benefit projects, institutional controls, and/or other treatment controls to achieve full capture system equivalency, or the same performance results as Track 1. Example controls mentioned in the Trash Amendments include partial capture devices, street sweeping, and green infrastructure and Low Impact Development (LID) controls. If choosing Track 2, Permittees will need to show equivalency to Track 1 performance using an approach that is acceptable by the State Water Board. Additionally, cities, towns and counties that opt to comply with the requirements via Track 2 will be required to submit an implementation plan and map illustrating: (a) the combination of trash controls selected and the rationale for the selection, (b) how the combination of selected controls is designed to achieve Track 1 equivalency, and (c) how Track 1 equivalency will be demonstrated.

As previously described, Monterey Permittees have selected Track 2 as their compliance approach.

Purpose and Organization of Implementation Plan

This Implementation Plan (Plan) details how Monterey Permittees will address the Trash Amendments and subsequent NPDES requirements via the Track 2 compliance approach and the method in which Full Capture System Equivalency (FCSE) will be demonstrated. The rationale for selecting the combination of trash controls included in the Plan and descriptions of how the controls are designed to achieve FCSE are included. The Plan also fully describes the FCSE method that will be used to demonstrate equivalency with trash full capture systems.

Section 2 of the Plan describes the scope of trash issues in the Monterey Permittee PLU areas, including the methods used to determine and document the baseline trash generation levels in each PLU area. Section 3 provides the rationale behind the FCSE approach selected by Monterey Permittees and how FCSE will be demonstrated. FCSE will be demonstrated through a combination of trash full capture system installation and maintenance, On-Land Visual Trash Assessments (OVTAs), and accounting for the trash reduction benefits of cleanup events in receiving waters. Section 4 describes trash control measures that are currently being implemented in PLU areas, and additional control measures that are initially planned to enhance trash reduction/prevention. Section 5 describes the anticipated methodologies (e.g., monitoring and assessment) that will be used to track and report progress towards FCSE. Section 6 provides a tentative schedule for planned control measure implementation, evaluation and reporting.

Four appendices are included (A-D). Appendix A includes the revised jurisdictional and priority land use maps as required by the 13383 Order. Appendix B includes preliminary baseline trash generation maps, as required by the 13383 Order. Appendix C provides a more comprehensive description of the potential OVTA Program that Monterey Permittees may implement. Appendix D includes a series of preliminary project scopes of work and cost estimates that Monterey Permittees are planning to implement in the first few years of the stormwater trash control program.

Section 2. Scope of Trash Issues

Monterey Permittee Characteristics and Priority Land Use (PLU) Areas

This section describes the general geographic and demographic characteristics of each Monterey Permittee. The extent and location of PLU areas within the jurisdictional areas of each Permittee are also described. Jurisdictional areas are comprised of the land areas within a Permittee's jurisdictional boundaries that are part of the designated Regulated Small MS4 as specified by the SWRCB in WQO No. 2013-0001-DWQ (i.e., Phase II NPDES Permit for Small MS4s). PLU areas were identified consistent with the PLU definitions described in the Trash Amendments.[3]

City of Seaside

The City of Seaside has a population of roughly 34,000 and is located in the northwestern portion of Monterey County, 2.3 miles east-northeast of the City of Monterey. Seaside is home to California State University, Monterey Bay (CSUMB) and the Monterey College of Law, which are located on the site of the former military base Fort Ord. Seaside was incorporated in 1954 and has a total land area of 9.4 square miles (5738 acres). According to the 2012-2016 American Community Survey, the household median income in Seaside is $53,406. The main receiving water body associated with Seaside is the Monterey Bay (Pacific Ocean).

Table 1 lists the PLU areas within the City of Seaside. The City has 838.5 acres of PLU area. Maps included in **Appendix A** illustrate the locations of the City's jurisdictional boundary, each PLU area and the City's stormwater conveyance system associated with these PLU areas. The City mapped parcels identified as PLU areas using the latest available Geographical Information System (GIS) data layers.

City of Carmel by-the-Sea

The City of Carmel-by-the Sea (Carmel) has a population of roughly 3,700 and is located on the Monterey Peninsula in Monterey County, 4.2 miles west-southwest of the City of Monterey. Carmel is predominantly known for its serene natural beauty, rich artistic history, and dog-friendly community. Carmel was incorporated in 1916 and has a total land area of 1.06 square miles (676 acres). According to the 2012-2016 American Community Survey, the household median income in Carmel is $81,607. The main receiving water body associated with Carmel is the Carmel Bay (Pacific Ocean).

Table 1 lists the PLU areas within the City of Carmel-by-the Sea. The City has 197.9 acres of PLU area. Maps included in **Appendix A** illustrate the locations of the City's jurisdictional boundary, each PLU area and the City's stormwater conveyance system associated with these PLU areas. The City mapped parcels identified as PLU areas using the latest available GIS data layers.

[3] Priority land uses are defined as those developed sites, facilities, or land uses (i.e., not simply zoned land uses) within the MS4 permittee's jurisdiction from which discharges of trash are regulated by these trash provisions as follows: (1) **High-Density Residential**: all land uses with at least ten (10) developed dwelling units/acre; (2) **Industrial:** land uses where the primary activities on the developed parcels involve product manufacture, storage, or distribution (e.g., manufacturing businesses, warehouses, equipment storage lots, junkyards, wholesale businesses, distribution centers, or building material sales yards); (3) **Commercial**: land uses where the primary activities on the developed parcels involve the sale or transfer of goods or services to consumers (e.g., business or professional buildings, shops, restaurants, theaters, vehicle repair shops, etc.); (4) **Mixed Urban:** land uses where high-density residential, industrial, and/or commercial land uses predominate collectively (i.e., are intermixed). (5) **Public Transportation Stations**: facilities or sites where public transit agencies' vehicles load or unload passengers or goods (e.g., bus stations and stops).

City of Sand City

The City of Sand City has a population of roughly 380 and is located on the shores of Monterey Bay, two miles northeast of the City of Monterey. Sand City is predominantly an industrial and business community with a number of large retail businesses. Sand City was incorporated in 1960 and has a total land area of 0.56 square miles (355acres 347 acres). According to the 2012-2016 American Community Survey, the household median income in Sand City is $45,000. The main receiving water body associated with Sand City is the Monterey Bay (Pacific Ocean).

Table 1 lists the PLU areas within the City of Sand City. The City has 91.1 acres of PLU area. Maps included in **Appendix A** illustrate the locations of the City's jurisdictional boundary, each PLU area and the City's stormwater conveyance system associated with these PLU areas. The City mapped parcels identified as PLU areas using the latest available GIS data layers.

City of Del Rey Oaks

The City of Del Rey Oaks (formerly, Del Rey Woods) has a population of roughly 1,650 and is located in the northwestern portion of Monterey County, four miles east of the City of Monterey. Del Rey Oaks was incorporated in 1953 and has a total land area of 0.48 square miles (671 acres). According to the 2012-2016 American Community Survey, the household median income in Del Rey Oaks is $86,806. The main receiving water body associated with Del Rey Oaks is the Monterey Bay (Pacific Ocean).

Table 1 lists the PLU areas within the City of Del Rey Oaks. The City has 49.6 acres of PLU area. Maps included in **Appendix A** illustrate the locations of the City's jurisdictional boundary, each PLU area and the City's stormwater conveyance system associated with these PLU areas. The City mapped parcels identified as PLU areas using the latest available GIS data layers.

County of Monterey/Unincorporated Monterey County

Unincorporated Monterey County has a population of roughly 100,200 and is comprised of communities including Pajaro, Moss Landing, Las Lomas, Aromas, Elkhorn, Prunedale, Boronda, Spreckles, Toro Park, East Garrison, San Benancio, Corral de Tierra, Coastal Area (Carmel Valley, Del Monte Forest, Cachagua, Big Sur), and South County (Chualar, Pine Canyon, Lockwood, Bradley, San Lucas, San Ardo). In total, the unincorporated County is approximately 3,700 square miles in size, with the vast majority of the land areas being open space, rural and forested land uses. According to the 2010 census, the household median income is $52,538. The main receiving water body associated with is the Monterey Bay (Pacific Ocean), although many of the unincorporated communities are associated with local creeks.

Approximately 102.6 square miles (65,666 acres) of Unincorporated Monterey County is subject to the Phase II Municipal General NPDES Permit. The census-designated communities of Pajaro, Las Lomas, Elkhorn, Moss Landing, Prunedale, Boronda, and Carmel Valley Village are included in this area, and median household incomes range from $38,542 to $82,566 within these communities. The population of Monterey County's Phase II Permitted-Area is 62,727 (2010 census).

Table 1 lists the PLU and non-PLU areas within Unincorporated Monterey County. The County has 503.2 acres of PLU area. Maps included in **Appendix A** illustrate the locations of the City's jurisdictional boundary, each PLU area and the City's stormwater conveyance system associated with these PLU areas. The City mapped parcels identified as PLU areas using the latest available GIS data layers.

Table 1. Priority Land Use (PLU) and Non-Priority Land areas (acres) in the jurisdictional boundaries of each Monterey Permittee.

Permittee	Priority Land Use (PLU) Areas						Non-PLU Areas	Total Areas (PLU & Non-PLU)
	Commercial	High Density Residential	Industrial	Mixed Urban	Public Transportation Stations [a]	Total PLU Area		
Seaside	138.1	558.1	0.0	141.6	0.7	**838.5**	4,899	5,738
Carmel by-the-Sea	43.1	154.7	0.0	0.0	0.2	**197.9**	478	676
Sand City	49.6	1.2	11.5	28.8	<0.1	**91.1**	264	355
Del Rey Oaks	14.8	12.9	21.7	0.0	0.1	**49.6**	622	671
Unincorporated County (Permitted MS4 Area)	253.1	112.6	136.9	0.0	0.6	**503.2**	65,163	65,666
Totals	**498.6**	**839.5**	**170.2**	**170.4**	**1.6**	**1,680.3**	71,426	73,106

[a] Public transportation stations are bus stops within the jurisdictional boundaries of Monterey Permittees. The associated PLU area associated with each bus stop was assumed to be 200 square feet (0.0046 acres).

Baseline Trash Generation Categories

Consistent with the 13383 Order, each Monterey Permittee developed baseline trash generation levels for all PLU areas in an effort to illustrate the varying levels of trash generated in these areas. Trash generation levels were developed using the *On-land Visual Trash Assessment (OVTA) Protocol A – Street and Sidewalk Survey* (EOA 2017). OVTA protocols provide methods for visually observing the level of trash present on the roadway, curb and gutter, sidewalk, and other areas adjacent to the street or on a parcel that could potentially contribute trash to the MS4.

Consistent with the State Water Board's *Recommended Trash Assessment Minimum Level of Effort for Establishing Baseline Trash Generation Levels*, two OVTAs were conducted by Monterey Permittees for each PLU area during 2017 and 2018. Assessments were conducted by two trained personnel and prior to street sweeping, to reduce the possibility that the baseline trash levels would be underestimated.

Based on the level of trash observed during each OVTA, each associated PLU area was placed into one of the four trash generation categories summarized in Table 2. For each PLU area, the worse of the two OVTA scores observed was used as the final baseline trash generation category for each PLU area. Selecting the higher generation category further ensures that the levels of baseline trash generation in PLU areas are not underestimated.

Table 2. Definitions of on-land trash assessment (OVTA) categories.

OVTA Category	Summary Definition
A (Low)	• Effectively no trash is observed in the assessment area. • There may be some trash in the area, but it is not obvious at first glance. • One individual could easily clean up all the trash observed while walking at normal pace. • No additional trash reduction measures are needed in the assessment area.
B (Moderate)	• Predominantly free of trash, except for a few littered areas. • Some trash is noticeable at first glance. • The trash observed could be collected by one or two individuals, but would require walking at a slower than normal pace. • Additional trash reduction measures are needed in the assessment area.
C (High)	• Predominantly littered, except for a few clean areas. • Trash is widely/evenly distributed and/or small accumulations are noticeable on the streets and sidewalks. • It would take multiple people to remove all trash from the area, frequently requiring individuals to stop walking to remove the trash. • Roughly 4 times as much trash as a "B" level.
D (Very High)	• Trash is continuously seen throughout the assessment area and there is a strong impression of lack of concern for litter. • Large piles of trash may be observed. • It would take a large number of people during an organized effort to remove all trash from the area, consistently requiring individuals to stop to remove the trash. • Roughly 3 times as much trash as a "C" level.

Monterey Permittee *Preliminary Baseline Trash Generation Maps* based on the application of OVTA scores are included in **Appendix B**. Trash generation categories for each PLU area are depicted using the four colors illustrated in Table 3. Summary statistics of baseline trash generation levels observed in PLU areas for each Monterey Permittee are presented in Table 4.

Table 3. Trash Generation Categories and Associated On-land Visual Trash Assessment (OVTA) Scores.

Trash Generation Category	Low	Moderate	High	Very High
OVTA Score	A	B	C	D
Colors on Baseline Trash Generation Maps	Green	Yellow	Red	Purple

Table 4. Monterey Permittee Priority Land Use (PLU) areas (acres) in each baseline trash generation category.

Permittee		Trash Generation Category				
		Low	Mod	High	Very High	Total
Seaside	Acres	159.0	603.1	76.4	0.0	**838.5**
	%	*19.0%*	*71.9%*	*9.1%*	*0.0%*	*100.0%*
Carmel by-the-Sea	Acres	110.1	83.8	4.0	0.0	**197.9**
	%	*55.7%*	*42.3%*	*2.0%*	*0.0%*	*100.0%*
Sand City	Acres	34.7	53.5	2.9	0.0	**91.1**
	%	*38.1%*	*58.7%*	*3.2%*	*0.0%*	*100.0%*
Del Rey Oaks	Acres	40.8	4.5	4.3	0.0	**49.6**
	%	*82.3%*	*9.1%*	*8.7%*	*0.0%*	*100.0%*
Unincorporated County (Permitted MS4 Area)	Acres	230.5	202.3	69.4	1.0	**503.2**
	%	*45.8%*	*40.2%*	*13.8%*	*0.2%*	*100.0%*

Section 3. Definition of Full Capture System Equivalency and Method Used to Demonstrate Equivalency

Trash control measures implemented by Monterey Permittees under the Track 2 compliance approach will likely include trash full capture systems, multi-benefit projects, institutional controls, source controls, and/or other treatment controls. The Monterey Permittees' method and assumptions used to demonstrate that the combination of controls implemented by Permittees will be equivalent to the trash reduction via full capture systems are described in this section.

Consistent with the Trash Amendments definition of full capture system equivalency (FCSE), the trash controls implemented by Monterey Permittees will collectively reduce trash to a level that is equivalent to a scenario where full capture systems are installed and maintained in all storm drains associated with Monterey Permittee PLUs. The FCSE definition that will be utilized by Monterey Permittees includes the following guidelines/components, which are more fully described later in this section:

- Baseline Trash Generation – PLU land areas that are in each baseline trash generation category are depicted on Monterey Permittee *Baseline Trash Generation Maps*, which are included in **Appendix B.** The area (acres) in each generation category multiplied by the average annual trash generation rate (gallons/acre) provide the estimated volume of trash that enters MS4s each year from PLU areas. This baseline trash volume serves as the volume of trash that must be reduced to achieve FCSE.
- Reductions via Trash Full Capture Systems – PLU areas (or alternative equivalent land areas) that drain to adequately maintained certified full capture systems will have achieved the goal of the Trash Amendments. The volume of trash captured by these systems (based on the area on the baseline map that is treated by a system) is accounted by comparing against the Permittee's baseline trash volume that is generated from all PLU areas.
- Reductions via Other On-land Control Measures - PLU areas that generate low levels of trash, as demonstrated by a consistent "A" OVTA score, have achieved FCSE. For on-land control measures (other than full capture systems), the volume of trash reduced is determined by comparing recent OVTA scores to the baseline map and the improvements in trash generation are calculated in terms of volume reduction.
- Receiving Water Cleanup Offset - Should Monterey Permittees conduct trash cleanup events in receiving water bodies and quantify the volume of trash removed from these events, an offset credit of up to 10% of the Permittee's baseline trash volume that is generated from all PLU areas will be allowed. These cleanup activities provide direct water quality benefits that are not otherwise accounted for via full capture systems or other (on-land) control measures.

The following sections describe the justification for why the combination of these guidelines/components are equivalent to the trash reduction that would occur if full capture systems are installed and maintained in all storm drains associated with Monterey Permittee PLUs (i.e., FCSE).

Comparison of Low Trash Generation and Full Capture System Performance

Baseline trash generation is the volume of trash from PLU areas that enters an MS4 over the course of a year. Because full capture systems installed in MS4s are only designed to intercept trash greater than 5mm that is transported via relatively moderate-sized storms (i.e., 1-year, 1-hour), trash

transported via larger storm events bypasses or overflows the system. Trash that bypasses or overflows is transported downstream to a receiving water body. Full capture systems, therefore, do not capture all trash generated by PLU areas and transported to MS4s.

To better illustrate how FCSE is established, terms are introduced below to conceptually understand the performance of a full capture system. In a situation where a full capture system has been installed, the portion of trash that is generated in the drainage area and captured by a full capture system is termed the "**Captured Trash.**" The portion of the trash that is generated, but bypasses or overflows a system is termed the "**Uncaptured Trash.**" Together, the Intercepted and Untreated Trash equal the baseline level of trash that is generated and enters MS4s each year. Figure 2 illustrates the use of these terms.

Figure 2. Illustration of the capture, uncaptured, and baseline trash levels

In defining FCSE, the level (rate or volume) of trash that is "uncaptured" (i.e., bypasses or overflows) by a full capture system provides a "ceiling" for the amount of trash that can acceptably be transported downstream via a full capture system. This ceiling can be used as a goal to evaluate the performance of other types of control measures. Should the amount of trash observed via OVTAs in a given land area be less than or equal to these ceiling, then the control measure should be seen as equivalent to the full capture system.

Trash generation levels observed via OVTAs were compared to uncaptured trash levels to determine if a specific OVTA score could be seen as comparable to the performance of a certified full capture system (i.e., FCSE). To conduct this evaluation, the results of an extensive study of trash generation and OVTA scores recently conducted in the San Francisco Bay Area Bay Area Stormwater Management Agencies Association (BASMAA 2014) and the documented performance of trash full capture systems (Allison et al. 1998; Caltrans 2004; DeCarlo 2004; Lee et al. 2006; City of Los Angeles 2006; City of San Diego 2012) were obtained and reviewed. Through the BASMAA 2014 study, OVTAs were conducted multiple times in areas draining to 154 storm drain inlets, where trash was collected, characterized and quantified. The rates that trash entered MS4s during all storm events (i.e., not only the 1-year, 1-hour storm) were calculated for each inlet and compared to OVTA scores (A, B, C & D) in adjacent land areas. Descriptive statistics for annual trash generation rates established through the study are presented in Table 5, in comparison to the OVTA scores observed. Figure 3 illustrates the relationship established between trash generation rates and OVTA scores established through the study. The average trash generation rates for each trash generation category have been adopted by Monterey Permittees for the purposes of establishing baseline levels of trash generation.

Table 5. A comparison of trash generation rates (gallons/acre/year) for stormwater established in the San Francisco Bay Area (BASMAA 2014) and On-land Visual Trash Assessment (OVTA) scores established in the associate drainage areas.

Statistic	Trash Generation Category Observed			
	A (Low)	B (Moderate)	C (High)	D (Very High)
Maximum	8.3	24.4	94.7	252.8
90th %	5.9	14.0	48.1	145.4
75th %	2.9	9.7	38.6	129.0
Median	1.4	6.5	23.0	88.0
Mean (Average)	2.2	7.6	26.9	100.3
25th %	0.8	4.2	15.3	69.8
10th %	0.4	2.8	11.2	42.2
Minimum	0.2	2.0	6.3	27.1
n	*38*	*54*	*46*	*16*

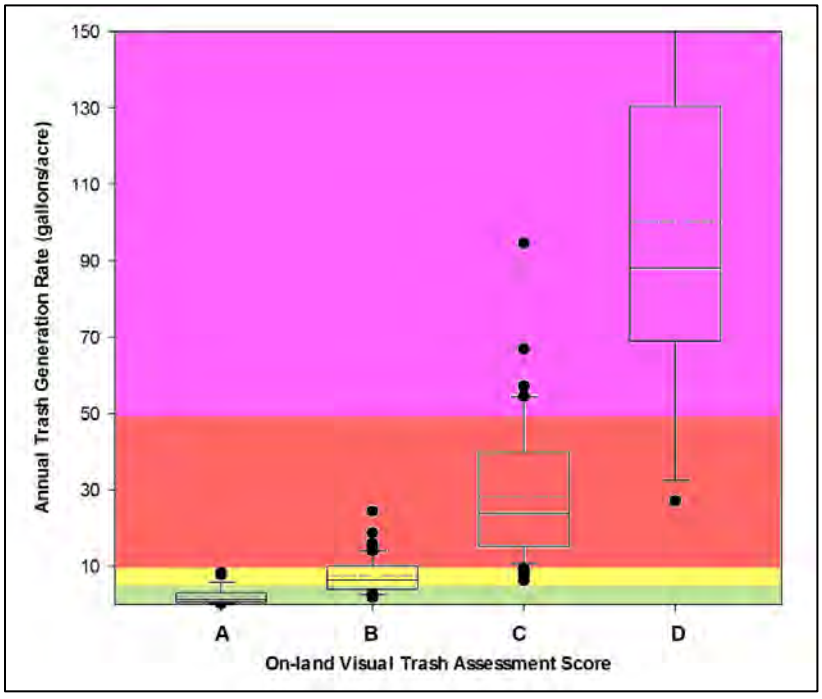


Figure 3. Relationship between trash generation rates established by BASMAA (2014) and On-land Visual Trash Assessment (OVTAs) conducted in the areas draining to trash monitoring locations.

Based on the results of the BASMAA study, land areas that consistently achieve an "A" OVTA score, generate an average annual trash volume of 2.2 gallons per acre. This low trash generation rate serves as a comparative to the "uncaptured" trash that bypasses/overflows a full capture system. The performance that a full capture system would need to achieve to reach a 2.2 gallons/acre rate were calculated using the average trash generation rates developed by BASMAA (see Table 5). These performance goals are presented in Table 6.

By comparing the full capture system performance that would be needed to attain this low trash generation rate of 2.2 gallons/acre to the performance reported in recent studies of full capture systems (Allison et al. 1998; Caltrans 2004; DeCarlo 2004; Lee et al. 2006; City of Los Angeles 2006; City of San Diego 2012), it is highly unlikely that full capture systems certified by the State Water Board could achieve the performance necessary (i.e., 71% - 98% interception of trash transported via all storm events) to equal the low trash generation rate of 2.2. gallons/acre. Therefore, it is concluded that land areas consistently generating low levels of trash, as demonstrated by consistent "A" OVTA scores, contribute a level of trash that is equal to (or less than) the portion of trash that is uncaptured by (i.e., overflows or bypasses) a full capture system that is installed in an area that generates moderate, high or very high levels of trash.

Based on this analysis, the **FCSE definition** that will be used by Monterey Permittees for measuring achievement of trash reduction goals via OVTAs is defined as the following:

"The achievement of Low Trash Generation in a land area,
as demonstrated by consistent "A" OVTA scores within that area"

Table 6. Comparison of the level of trash capture performance that would be needed to achieve a "Low Trash Generation" rate (i.e., 2.2 gallons/acre yr^{-1}) under different baseline trash generation scenarios.

Category	Baseline Trash Generation Category		
	Moderate	High	Very High
Average Baseline Trash Generation Rate (gallons/acre yr^{-1})	7.6	29.9	100.3
Average Low Trash Generation Rate (gallons/acre yr^{-1})	2.2	2.2	2.2
Trash Capture Performance [a] (% Reduction) Needed to Achieve Low Trash Generation Rate	71%	93%	98%

[a] The trash capture performance that would need to be attained are associated with all stormwater flows, not just the peak flow generated from the 1-year, 1-hour (i.e., "Full Capture") storm event.

Monterey Permittee Baseline Trash Generation

The estimated baseline volume of trash generated from PLU areas in each Monterey Permittee's jurisdictional boundary was calculated using: 1) Permittee baseline trash generation maps depicting trash generating areas (see Table 4) ; and 2) annual average trash generation rates listed in Table 7 that were developed and utilized in San Francisco Bay Area (BASMAA 2014). The recent evaluation of OVTAs conducted by BASMAA (2017) as part of the *Tracking California's Trash* (TCT) project concluded that the average generation rates established by BASMAA (2014) correspond well to OVTA scoring categories (A/B/C/D). Based on these findings, average trash generation rates used in the San Francisco Bay Area were assigned to all PLU areas depicted on Monterey Permittee baseline trash generation maps. By multiplying these rates by the corresponding acres within each of the PLU areas, the estimated average baseline volumes of trash that are annually generated from PLU areas and enter MS4s were calculated (Table 8). This trash volume represents the amount of trash that enters the MS4 prior to the implementation of new or enhanced controls described in Section 4 of this Plan. This baseline volume of trash will be compared against "current" trash levels calculated in future years to evaluate improvements in the levels of trash in stormwater. Baseline trash volumes for each Monterey Permittee are presented in Table 8.

Please note: Average rates developed by BASMAA (see Table 5) were rounded (similar to rounding conducted by SF Bay Area Permittees via NPDES permits) to allow for easier communication and comparison between trash generation categories. Additionally, as described earlier in this section, the rates associated with the "low" trash generating category are FCSE and therefore for the purposes of calculating trash generation, are considered to have a generation rate of zero.

Table 7. Trash generation rates (gallons/acre/year) used in the San Francisco Bay Area to establish the level (gallons) of trash generation.

Trash Generation Category	Low	Moderate	High	Very High
Average Trash Generation Rate (gallons/acres yr^{-1})	0 (FCSE)	7.5	30	100

Table 8. Baseline trash generation (gallons) in Monterey Permittee Priority Land Use (PLU) areas.

Permittee		Trash Generation Category				
		Low	Mod	High	Very High	Total
Seaside	gallons	0 (FCSE)	4,523	2,292	0	**6,815**
	%		*66.4%*	*33.6%*	*0.0%*	*100.0%*
Carmel by-the-Sea	gallons		629	120	0	**749**
	%		*84.0%*	*16.0%*	*0.0%*	*100.0%*
Sand City	gallons		401	87	0	**488**
	%		*82.2%*	*17.8%*	*0.0%*	*100.0%*
Del Rey Oaks	gallons		34	129	0	**163**
	%		*20.7%*	*79.3%*	*0.0%*	*100.0%*
Unincorporated County	gallons		1,517	2,082	100	**3,699**
	%		*41.0%*	*56.3%*	*2.7%*	*100.0%*

Reductions via Trash Full Capture Systems

Trash full capture systems certified by the State Water Board may be installed by Monterey Permittees. Should installation occur, the land areas (PLU and non-PLU) draining to the systems will be delineated and the associated volume of trash that is generated from these areas will be calculated. This volume of trash associated with a full capture system will be considered fully addressed, achieving the goal of the Trash Amendments. To demonstrate progress towards FCSE, the volume of trash generated in these areas will be accounted for and compared against the Permittee's baseline trash volume generated from all PLU areas. Should non-PLU areas be addressed by full capture systems, then baseline trash generation levels will be established for these areas using methods comparable to State Water Board's *Recommended Trash Assessment Minimum Level of Effort for Establishing Baseline Trash Generation Levels* and trash generation rates included in Table 7. These non-PLU areas addressed by full capture systems will be considered "Alternative Equivalent Land Areas", consistent with the Trash Amendments, and the trash generated by these areas and captured by these systems will be applied against the baseline trash volume to demonstrate progress towards FCSE.

Reductions via Other On-land Control Measures

Trash reductions associated with on-land control measures other than full capture systems will be demonstrated by conducting OVTAs in a representative portion of the PLU areas. As previously described, PLU areas that generate low levels of trash, as demonstrated by a consistent "A" OVTA score[4], will have achieved FCSE. Additionally, in PLU areas where OVTA scores improve over time, the estimated trash reduction associated with these areas will be calculated by applying the average rates presented in Table 7 to the OVTA results and comparing against baseline trash volumes presented in Table 8. Additional details on the potential OVTA Program included in **Appendix C** and a more complete description of the process that will be used to calculate trash reductions via OVTAs is further described in Section 5.

Receiving Water Cleanup Offset

Should Monterey Permittees conduct trash cleanup events in receiving water bodies and quantify the volume of trash removed from these events, an offset credit of up to 10% of the Permittee's baseline trash volume will be included as part of their demonstration of FCSE or progress towards FCSE. These cleanup activities provide direct water quality benefits that are not otherwise accounted for via full capture systems or other (on-land) control measures. The methods used to calculate reductions offsets for cleanups is described in Section 5 of this Plan. This method is similar to methods being used in the San Francisco Bay Area.

Additional Methods to Demonstrate Progress Towards FCSE

Should Monterey Permittees choose to establish additional or complementary methods to those described in this section, a full description and justification of the use of the methods will be provided in revised versions of this Implementation Plan or equivalent (i.e., annual reports).

[4] The term consistent will be defined in the future by Permittees, in consultation with Regional Water Board staff, based on an analysis of OVTA data collected to demonstrate FCSE.

Section 4. Existing & Planned Trash Control Measures

Monterey Permittees are currently conducting stormwater planning projects to identify the most cost-effective and technically feasible trash control measures to address the Trash Amendments and subsequent NPDES requirements. Planning projects that are currently underway are described in this section. Additionally, controls that Monterey Permittees are currently implementing and controls that Permittees plan to implement to reduce trash in stormwater discharges are summarized. Existing and planned trash control measures are organized by Permittee, after brief summaries of the types of trash control measures that Permittees may implement to achieve trash reduction goals.

Summary of Potential Trash Control Measures

Full Capture Systems

A trash full capture system is defined as a single system (or a series of systems) that traps all particles that are 5 mm or greater and has a design treatment capacity that is either: a) of not less than the peak flow rate, Q, resulting from a 1-year, 1-hour, storm in the subdrainage area, or b) appropriately sized to, and designed to carry at least the same flows as, the corresponding storm drain" (State Water Board 2015). The State Water Board certifies trash full capture systems and maintains a list of systems that have been certified. Systems certified by the State Water Board include larger "end-of-pipe" and "in-line" netting and screening devices, smaller screening devices installed in storm drain vaults or catch basins, and multi-beneficial stormwater treatment systems. The most current list of certified full capture systems can be found at https://www.waterboards.ca.gov/water_issues/programs/stormwater/trash_implementation.html. Although no full capture systems have been identified to-date in Monterey Permittee jurisdictional areas, opportunities and costs associated with new full capture systems are being explored by specific Permittees.

Other Stormwater Treatment Systems

Stormwater treatment systems such as extended detention basins, bioretention facilities and infiltration trenches may not be designed to address trash transported during the "trash full capture storm event" (i.e., peak flow from one-year, one-hour event). Therefore, these treatment systems may not be considered trash full capture systems by the State or Regional Water Board. However, this does not mean that these systems have no trash reduction benefit, rather the trash reduction efficiencies of other (non-full capture) treatment systems has not yet been established. Opportunities to account for the trash reduction benefits are further described in the next section.

Street Sweeping

Public agencies and private land owners conduct street sweeping to remove litter from streets and parking lots and reduce sediment buildup on impervious surfaces. Street sweeping studies have shown that under ideal conditions (i.e., slow operator speeds, good condition of the roadway surface, and minimal/no automobiles parked along curb) a street sweeper can remove nearly all litter from the swept area. However, sweeping will not remove trash from sidewalks or roadside vegetation where trash is often observed and may be available to the MS4. Although the Monterey Permittees already conduct sweeping on many roadways, more frequent sweeping or improved sweeping

conditions (e.g., removal of parked cars along the curb) may reduce the amount of trash observed on streets, possibly to a level of FCSE.

On-Land Cleanups

Cleanups that remove trash from streets, sidewalks, and adjacent properties can have a significant impact on the levels of trash observed and available to the MS4. Cleanups can occur by agency staff, contractors hired as part of association and business improvement districts (BIDs), or volunteers. Based on literature reviews conducted, the effectiveness of on-land cleanup in reducing trash reaching the stormwater conveyance system has not been evaluated in the context of FCSE. That said, conducting consistent on-land cleanups could conceptually sustain an improved level of trash (i.e., low generation) in areas with moderate or high baseline trash levels. The magnitude (frequency) and extent (location) to which cleanups would need to be conducted to observe reductions in trash to acceptable levels (i.e., FCSE) is likely dependent upon the baseline level of trash generation that occurs in the PLU area. The higher the trash generation, the more frequent trash would need to be removed to achieve the FCSE standard set forth by the State Water Board. The costs associated with on-land cleanups will be site-specific and dependent on the type (e.g., agency staff, contractor or volunteers) and number of individuals needed for the cleanup events, and the frequency of cleanups that would need to occur.

Illegal Dumping Prevention/Abatement

Successful anti-littering and illegal dumping enforcement activities include laws and ordinances that prohibit littering or dumping of trash on private or public properties. Laws are enforced by various municipal agency staff (e.g., police, sheriff and public works department staff) who issue citations in response to citizen complaints or other enforcement methods (e.g., surveillance cameras, signage and/or physical barriers installed at illegal dumping hot spots). In some California jurisdictions, the minimum fine for littering is $500 and the maximum penalty is $1,000. However, it is difficult to enforce small littering events unless they are witnessed, or solid proof exists linking the offender to the litter. As a result, enforcement tends to focus on larger-scale illegal dumping activities.

The effectiveness of illegal dumping prevention and abatement programs in reducing trash entering the MS4 is not well established. Effectiveness will likely be site-specific and dependent upon the strategies used to detour illegal dumping from occurring. Costs associated with these programs are also program-specific. Larger cities spend hundreds-of-thousands to millions each year trying to prevent and cleanup illegal dumping.

Improved Trash Bin/Container Management

Receptacles used to place/store trash or recyclables prior to collection by a public agency or private waste hauler reduce the potential for littering and trash loading to MS4s. The effectiveness of trash containers in reducing trash in stormwater conveyance systems is not well studied, however, based on literature reviews, the success of this control measure is likely dependent upon:

- the location and density of the receptacles,
- size of the bin/container in relationship to the size needed to service users,
- frequency of maintenance, and
- the ability of the bin/container to capture and contain the trash deposited.

Enhanced strategies designed to improve the effectiveness of this control measure include:

- Identifying whether trash containers are sufficiently located in high trash generating areas and are adequately designed to manage trash types that are typically generated from activities occurring at these areas (e.g., containers with larger openings designed to accommodate larger trash items (e.g., pizza boxes) are in locations where people dispose of these items (e.g., near schools or parks);
- Increasing the level of inspection and maintenance of containers in high trash generating areas;
- Installation of specialty trash bins/containers (e.g., bins for cigarette butts, sharps, etc.) in strategic locations to eliminate or reduce the prevalence of these items in stormwater;
- Installation of new technologies (e.g., Big Belly Solar Trash Compactors) to reduce trash in stormwater and reduce the cost of adding trash containers or increasing the frequency of maintenance.

The cost of implementing enhanced trash bin/container management actions will be site-specific.

Other Types of On-land Actions

In addition to the trash control measures described above, other actions implemented in an Agency's jurisdiction may also improve the level of trash in stormwater. Actions may include those that reduce the generation of litter via source controls, such as ordinances that prohibit the distribution or sale of litter-prone items (e.g., plastic bag bans), business inspection programs that target overflowing or inadequate waste management practices, or public education programs that change littering behavior; or those that intercept trash once littering has occurred (e.g., curb inlet screens). The reduction benefits associated with these actions are challenging to quantify and likely site/program-specific. That said, these actions can (individually or collectively) have a positive impact on the level of trash in stormwater.

Creek and Shoreline Cleanup Events

Trash cleanup events that occur in receiving water bodies provide important and direct water quality benefits. Additionally, these events engage citizens and provide valuable entry points to educate volunteers on the impacts of trash and the importance environmental stewardship. These events are supported and/or actively coordinated by Permittees and other civic organizations. Trash removed during these cleanup events can originate from multiple sources and pathways, including those not directly associated with MS4 discharges.

Monterey Permittee Existing and Planned Control Measures

The approach that Monterey Permittees are taking on trash control measure implementation is to implement initial projects outlined in **Appendix D** and then based on the outcomes of the projects, update this implementation plan and the associated schedule. This section includes descriptions of existing trash control measures that Permittees are currently implementing and brief descriptions of the projects planned for implementation in FYs 2018-19, 2019-20 and FY 2020-21.

City of Seaside

- **Full Capture Systems:** No full capture systems have been identified in the City of Seaside to-date. In an effort to evaluate opportunities and costs associated with the installation and maintenance of full capture systems, Monterey Permittees recently conducted an *Evaluation*

of Stormwater Trash Control Measure Opportunities and Constraints. The City of Seaside is currently considering the recommendations of the evaluation and plans to further evaluate the feasibility and costs of installing a trash capture system that would address trash levels equivalent to the baseline level of trash generated from PLU areas in the City. A preliminary scope and cost estimate for the project (feasibility study) that the City is considering (in collaboration with the City of Sand City) is included in **Appendix D** (see Project #1).

- **Other Stormwater Treatment Systems:** A total of seven Contech hydrodynamic separator (HDS) units that treat runoff prior to infiltration within the Seaside Autocenter and two Contech HDS units that treat runoff prior to infiltration within the West Broadway downtown redevelopment are currently operational in the City of Seaside. Additionally, two retention basins that retain runoff from Seaside Highlands housing development and 24 infiltration features collect runoff along General Jim Moore Boulevard, Eucalyptus Road and small portion of parker flats cutoff road are operational.
- **Street Sweeping:** The City currently performs street sweeping within the City limits twice per month. With the exception of street segments with red curbs, automobiles are generally allowed to remain parked on the street during sweeping. The City is currently not anticipating any street sweeping enhancements to control trash in stormwater discharges.
- **On-Land Cleanups:** The City contracts with HOPE Services for at least weekly cleanup of parks and around municipal buildings. The City is currently planning to continue this contract with this non-profit organization.
- **Illegal Dumping Prevention and Abatement:** Litter and illegal dumping cleanup events are periodically conducted or coordinated by the City and annual countywide cleanup days are coordinated by the County's Solid Waste Management Services Department. No new or additional illegal dumping prevention or abatement controls are currently planned by the City.
- **Improved Trash Bin/Container Management:** See on-land cleanup. Public works staff maintains public trash containers a minimum of once per week or more frequent depending upon the facility.
- **Creek/Shoreline Cleanups:** Beach cleanups are periodically conducted by the City at Roberts Lake and by Surfrider Foundation at beaches in the City. Through MRSWMP, the City promotes annual beach cleanups organized by Save Our Shores.

Carmel by-the-Sea

- **Full Capture Systems:** No full capture systems have been identified in the City of Carmel. In an effort to evaluate opportunities and costs associated with the installation and maintenance of full capture systems, Monterey Permittees recently conducted an *Evaluation of Stormwater Trash Control Measure Opportunities and Constraints*. The City of Carmel is currently considering the recommendations of the evaluation and depending on the outcomes of the initial project designed to quantify the benefits of existing stormwater treatment systems (see below), the City may decide to further evaluate the feasibility and costs of installing trash capture systems that would address trash in land areas within the City.

- **Other Stormwater Treatment Systems:** Four hydrodynamic separator (HDS) stormwater treatment units are currently operational in the City (Figure 2) as well as a number of low impact development (LID) systems that were installed on private property via redevelopment requirements. An approach to demonstrating the trash reduction benefits for these types of systems is planned by Monterey Permittees, consistent with the implementation schedule described in Section 6. This reduction benefit could (conceptually) be defined by developing a trash reduction efficiency curve for these systems based on an understanding of proportions of trash transported during flows (or equivalent volumes) leading up to the peak flow of a region-specific one-year, one-hour storm event, and applying the efficiency rating to the systems of interest. A description of the project planned by Monterey Permittees is included in **Appendix D** (see Project #5). In combination with reductions demonstrated via OVTAs conducted within the area draining to a subject stormwater treatment system, the reduction benefit assigned to the treatment system may then be able to demonstrate FSCE.
- **Street Sweeping:** The City of Carmel currently performs street sweeping within the City limits according to the following schedule:
    - Downtown Area – 2x/week;
    - Residential areas – 2-3x/week; and
    - Scenic Road and Del Mar Avenue – 1-2x/week.

  With the exception of street segments with red curbs, automobiles are generally allowed to remain parked on the street during sweeping. The City is currently not envisioning any street sweeping enhancements to further control trash in stormwater discharges.
- **On-Land Cleanups:** On-land cleanups are periodically conducted by City staff and volunteers. The City is currently running a pilot weekend cleanup program with City staff (4 hours each weekend day) at high-use coastal areas and downtown locations. This pilot program is focused on summertime cleanups when visitor numbers in downtown and beach parking areas are the highest. As an enhancement to this control measure, the City of Carmel is planning to conduct a project that entails establishing and implementing a pilot enhanced on-land trash cleanup project in the downtown business district. The project will include contracting with a not-for-profit organization to conduct enhanced on-land cleanups. Similar cleanup programs have been instituted by other Northern California cities with great success, including neighboring cities in Monterey County. On-land Visual Trash Assessments (OVTAs) will also be conducted to assess improvements in the levels of trash on streets and sidewalks where the cleanup program is implemented. A preliminary scope and cost estimate for the project is included in **Appendix D** (see Project #4).
- **Illegal Dumping Prevention and Abatement:** Litter and illegal dumping cleanup events are periodically conducted or coordinated by the City of Carmel and annual countywide cleanup days are coordinated by the County's Solid Waste Management Services Department. No new or additional illegal dumping prevention or abatement controls are currently planned by the City.

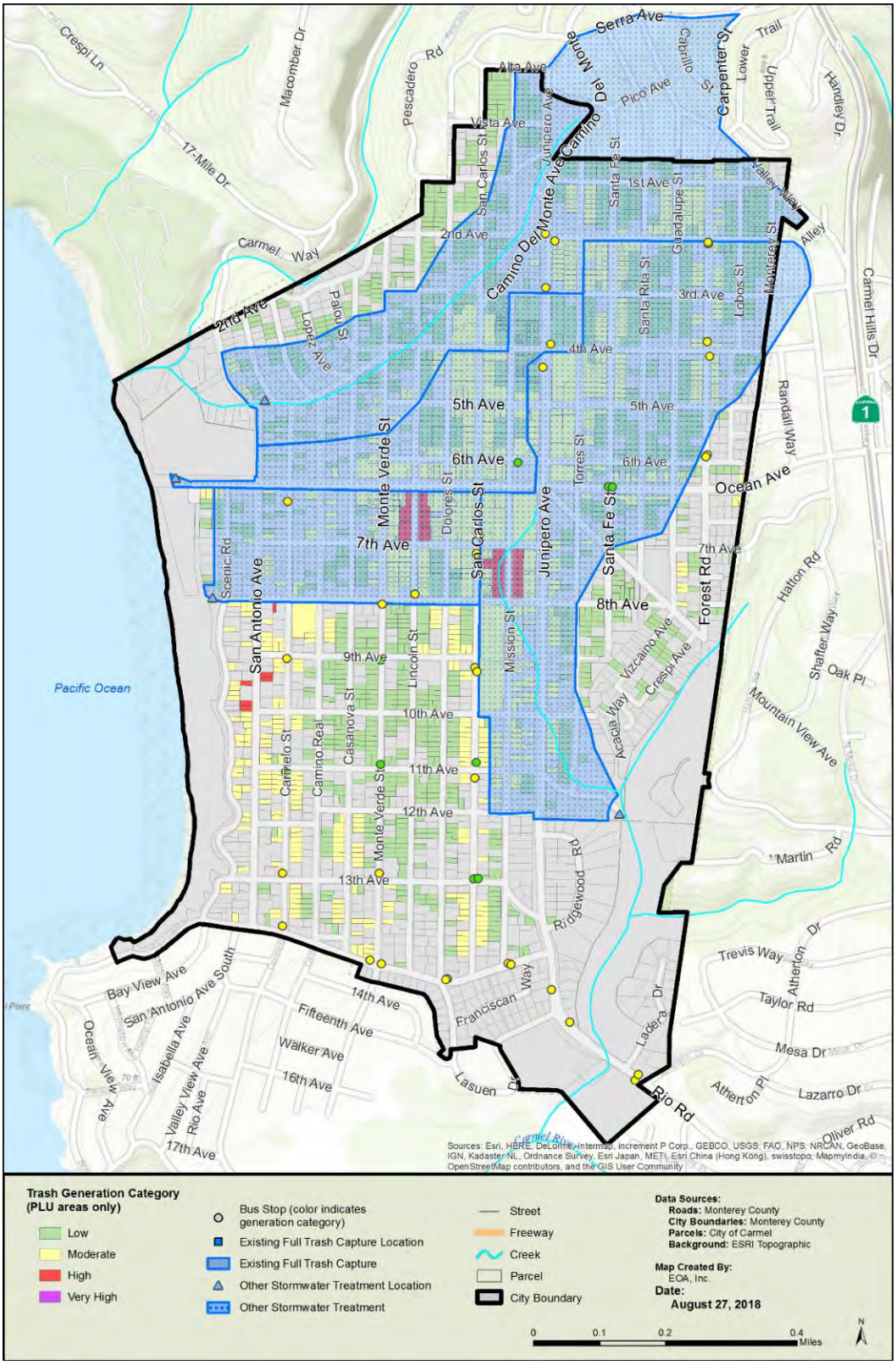


Figure 4. Existing stormwater treatment systems in the City of Carmel by-the-Sea.

- **Other On-Land Control Measures**: The City of Carmel-by-the-Sea has adopted several product bans to help reduce litter in and around the City. The City's Environmentally Acceptable Materials Ordinance (Chapter 8.68 of the Municipal Code) prohibits polystyrene food packaging, as well as food packaging that is non-recyclable or non-compostable (including plastic straws and utensils) at restaurants and food vendors in the City. This ordinance also requires that straws and utensils only be provided upon request. Chapter 8.74 of the City's Municipal Code also prohibits single-use plastic carry-out bags.
- **Creek/Shoreline Cleanups:** Beach cleanups are conducted by City staff each week and there are monthly beach cleanups by the Carmel Residents Association. The Friends of the Mission Trail Nature Preserve conduct monthly cleanups in the riparian areas of the creek at Mission Trail Nature Preserve.

City of Sand City

- **Full Capture Systems:** No full capture systems have been identified in Sand City as of the preparation of this report. However, the City will be evaluating whether the existing storm water interceptor and dry well/percolation trench systems within the Edgewater and Sand Dollar Shopping Centers meet the criteria for full capture systems. This determination will be made based upon a review of record information for the construction of these systems and associated hydrologic/hydraulic calculations (if available). Additionally, in an effort to evaluate opportunities and costs associated with the installation and maintenance of full capture systems, Monterey Permittees recently conducted an *Evaluation of Stormwater Trash Control Measure Opportunities and Constraints*. Sand City is currently considering the recommendations included in the evaluation and plans to further evaluate the feasibility and costs of installing a trash capture system that would address trash levels equivalent to the baseline level of trash generated from PLU areas in the City. A preliminary scope and cost estimate for the project (feasibility study) that the City is considering (in collaboration with the City of Seaside) is included in **Appendix D** (see Project #1).
- **Other Stormwater Treatment Systems:** Several storm water interceptor and dry well/percolation trench systems are currently operational within the commercial shopping centers at the north end of the City that address stormwater from the shopping center parking lots and adjacent public streets. Additionally, a number of low impact development (LID) systems have been installed on private property via redevelopment requirements.
- **Street Sweeping:** The City currently performs street sweeping on a weekly basis (Wednesdays) on all public streets. With the exception of street segments with red curbs, automobiles are generally allowed to remain parked on the street during sweeping. However, the City performs street sweeping between the hours of 12 am and 6 am in order to minimize the number of vehicles parked on City streets and to maximize the amount of curb miles swept. The City is currently not anticipating any street sweeping enhancements to control trash in stormwater discharges.
- **On-Land Cleanups:** The City of Sand City contracts with Hope Services to provide trash and litter pickup throughout the City. This work is performed five days a week, six hours each day. On Tuesdays, Hope Services focuses their cleanup in areas that are difficult for the City's street sweeper to reach (e.g. behind tree bulb outs, corners, etc.), thereby reinforcing the City's street sweeping program.

- **Illegal Dumping Prevention and Abatement:** Litter and illegal dumping cleanup events are periodically conducted or coordinated by the City and annual countywide cleanup days are coordinated by the County's Solid Waste Management Services Department. No new or additional illegal dumping prevention or abatement controls are currently planned by the City.
- **Improved Trash Bin/Container Management:** The City's Public Works Department handles the management of all trash bins and/or receptacles in the City, including those near the beach and within City parks. Typically, trash receptacles are emptied on Mondays, Wednesdays, and Fridays, and all trash is disposed of properly. In addition, Hope Services, mentioned above, also periodically checks trash bins during the week.
- **Creek/Shoreline Cleanups:** Beach cleanups are periodically conducted by volunteer via Save Our Shores. Additionally, the City of Sand City sponsors and/or participates in several beach cleanup events throughout the year. These events are either directly sponsored by the City or supported through the use of City staff time. For example, the City often provides public works department staff to assist in the collection of trash, litter, debris, and to dispose of this material using City vehicles. The City advertises beach cleanup events via public announcements, the City's web page, and through newsletters sent out to residents and businesses.

City of Del Rey Oaks

- **Full Capture Systems:** No full capture systems have been identified in the City of Del Rey Oaks to-date. In an effort to evaluate opportunities and costs associated with the installation and maintenance of full capture systems, Monterey Permittees recently conducted an *Evaluation of Stormwater Trash Control Measure Opportunities and Constraints*. The City of Del Rey Oaks is currently considering the recommendations included in the evaluation and plans to further evaluate the feasibility and costs of installing a trash capture system that would address trash levels equivalent to the baseline level of trash generated from PLU areas in the City. A preliminary scope and cost estimate for the project is included in **Appendix D** (see Project #3).
- **Other Stormwater Treatment Systems:** No other stormwater treatment systems have been identified by the City to-date. The City is currently not anticipating installing additional stormwater treatment systems, but in the future will document systems installed in the City via new/redevelopment projects.
- **Street Sweeping:** The City currently performs street sweeping at a monthly frequency on all public streets. With the exception of street segments with red curbs, automobiles are generally allowed to remain parked on the street during sweeping. The City is currently not anticipating any street sweeping enhancements to control trash in stormwater discharges.
- **On-Land Cleanups:** Public work staff maintains parks weekly, which is adequate giving the limited trash generation in local parks. The City is currently not anticipating the implementation of additional on-land cleanups to control trash in stormwater discharges.
- **Illegal Dumping Prevention and Abatement:** Litter and illegal dumping cleanup events are periodically conducted or coordinated by the City and others are coordinated by the City's Citizen's Action Group. No new or additional illegal dumping prevention or abatement controls are currently planned by the City.

- **Improved Trash Bin/Container Management:** Public trash containers are maintained weekly or more frequently as needed. No new or additional controls to address trash from inadequate bin/container management are currently planned by the City.

Unincorporated Monterey County

- **Full Capture Systems:** No full capture systems have been identified in the unincorporated Monterey County to-date. In an effort to evaluate opportunities and costs associated with the installation and maintenance of full capture systems, Monterey Permittees recently conducted an *Evaluation of Stormwater Trash Control Measure Opportunities and Constraints*. The County is currently considering the recommendations included in the evaluation and plans to further evaluate the feasibility and costs of installing a trash capture system that would address trash levels equivalent to the baseline level of trash generated from PLU areas in the community of Pajaro. A preliminary scope and cost estimate for the project is included in **Appendix D** (see Project #2).
- **Other Stormwater Treatment Systems:** Monterey County Public Works maintains three hydrodynamic separators in the Pajaro and Boronda communities. While not approved as full trash capture devices by the State Water Board, these facilities do capture and retain trash that has already entered the storm drain system and would otherwise be conveyed to downstream receiving waters. An approach to demonstrating the trash reduction benefits for these types of systems is planned by Monterey Permittees, consistent with the implementation schedule described in Section 6. This reduction benefit could (conceptually) be defined by developing a trash reduction efficiency curve for these systems based on an understanding of proportions of trash transported during flows (or equivalent volumes) leading up to the peak flow of a region-specific one-year, one-hour storm event, and applying the efficiency rating to the systems of interest. A description of a project planned by Monterey Permittees is included in **Appendix D** (see Project #5). In combination with reductions demonstrated via OVTAs conducted within the area draining to a subject stormwater treatment system, the reduction benefit assigned to the treatment system may then be able to demonstrate FSCE.
- **Street Sweeping:** The County currently performs street sweeping once before rainy season and once after rainy season on roads maintained by the County within the Phase II MS4 General Permit area. With the exception of street segments where parking is not allowed during any time, automobiles are generally allowed to remain parked on the street during sweeping. The County is currently not anticipating any street sweeping enhancements to control trash in stormwater discharges.
- **On-Land Cleanups:** Cleanups are held regularly throughout Monterey County. Sponsoring partners include Monterey County Environmental Health Bureau, Salinas Valley Solid Waste Authority, the Salinas Valley cities, and the waste haulers. A schedule and calendar of cleanup events is located on the SalinasValleyRecycles.org website.
- **Illegal Dumping Prevention and Abatement:** Litter and illegal dumping cleanup events are periodically conducted or coordinated by the County Health Department, Salinas Valley Solid Waste Authority and a number of civic organizations. Monterey County Public Works Department also responds to reports of illegal dumping and coordinates its actions with the Illegal Dumping and Litter Abatement Task Force which meets monthly. Beyond these actions, no new or additional illegal dumping prevention or abatement controls are currently

planned by the County. In general, illegal dumping occurs more often in the less-populated areas of the County and less in the developed, urbanized areas.

- **Improved Trash Bin/Container Management:** Monterey County does not provide trash bins or containers for public use, but bins are provided and managed by the franchised waste hauler for each municipality. The installation of public receptacles in populated areas of the County will be investigated and considered for implementation as a non-structural control measure.
- **Creek/Shoreline Cleanups:** The Monterey Regional Stormwater Management Program is a local sponsor of Coastal Cleanup Day which is held annually on the third Saturday in September. Save Our Shores is a Santa Cruz non-profit organization. that organizes over 200 cleanup events annually in and around Monterey Bay, including Coastal Cleanup Day. Over the course of a year, cleanup events in Monterey and Santa Cruz Counties recruit about 10,000 volunteers who collect over 15 tons of trash. Also, the Monterey County Environmental Health Bureau sponsors a Natividad Creek cleanup event annually in April around Earth Day.

Regional Public Education and Outreach

Over the years the Monterey Permittees have implemented and continue to implement a broad range of public education and public outreach activities regionally through the Monterey Regional Stormwater Management Program (MRSWMP) that work to educate and engage residents and visitors alike about the impacts of trash and the importance of environmental stewardship. Examples of these activities include: a region-wide volunteer-based storm drain emblem program that has been effective at educating the public that storm drains flow directly to waterways; a school outreach program led by a marine biologist that engages youth on the downstream impacts of trash in the Monterey Bay; a long-running TV, radio, newspaper, brochure, and social media campaign that raises awareness of trash issues; and participation in public events with a focus on the impacts of trash in the environment. Where feasible, the MRSWMP plans to continue identifying public education and outreach opportunities to incorporate proper trash management and disposal messaging into regional outreach and events.

Section 5. Tracking and Progress Reporting

The Full Trash Capture System Equivalency (FCSE) approach selected by Monterey Permittees includes methods to track the progress made in addressing the trash reduction requirements included in the Trash Amendments and subsequent NPDES permit requirements. Methods described include those designed to assess reductions associated with trash full capture systems, other trash control measures including institutional and source controls, and trash reduction offsets (i.e., creek and shoreline cleanups).

The baseline trash generation levels depicted on Monterey Permittee trash generation maps serve as the starting point to compare against reductions achieved by trash control measures implemented in PLU areas. The acreage of PLU areas within each trash generation category (see Table 7) multiplied by the average trash generation rates (see Table 8) for each category, provide the total gallons of trash that Monterey Permittees need to reduce annually to achieve FCSE:

- City of Seaside – 6,815 gallons
- City of Carmel by-the-Sea – 749 gallons
- City of Sand City – 488 gallons
- City of Del Rey Oaks – 163 gallons
- Unincorporated Monterey County – 3,699 gallons

Full Capture Systems

Progress towards FCSE associated with the installation and maintenance of trash full capture systems will be tracked and calculated by conducting the following:

- **Delineation of Areas Treated by Full Trash Capture Systems** – All areas draining to trash full capture systems installed by Monterey Permittees, or by a private land owner addressing trash from an area identified by a Permittee, that will be used to demonstrate trash load reductions will be delineated using a combination of desktop and field techniques. Delineation of areas treated by these systems will be georeferenced in Permittee Geographical Information Systems (GIS). These drainage areas will be overlaid onto the applicable Permittee's baseline trash generation maps to identify the area and the trash reduction from this area attributable to the full capture system. This GIS database will be updated as new full capture systems are installed.
- **Full Capture Operation and Maintenance Program** – Permittees will oversee the maintenance of all full capture systems owned and operated by Monterey Permittees. Systems will be inspected and cleaned consistent with the schedule defined by the Permittee that is needed to adequately maintain the functionality of the systems. Maintenance records are kept by the Permittee and any issues that have arisen are documented and remedied as necessary. Once the Phase II NPDES stormwater permit is reissued, Permittees will evaluate maintenance practices to ensure consistency with associated requirements in the Permit.

Other Actions On-land Control Measures (via OVTAs)

OVTA Program Design

OVTAs have been identified by the State Water Board as a leading indicator of trash load reductions from stormwater discharges. There are currently three OVTA protocols – A, B and C. Protocol A is a

walking method conducted on streets that have sidewalks. Protocol B is a driving survey conducted on streets without sidewalks or that are otherwise unsafe to walk. Protocol C is for conducting area-based assessments where there are no streets associated with a land area. As applicable, OVTA protocols A, B and C will be used by Monterey Permittees to evaluate the effectiveness of stormwater trash control measures and assess progress towards the FCSE definition utilized by Monterey Permittees.

As applicable, the OVTA program will be implemented over time in PLU areas that are not addressed by trash full capture systems and have moderate, high or very high baseline trash generation levels. Those PLU areas that are identified as low trash generating on Monterey Permittee baseline trash generation maps are assumed to have achieved FCSE and therefore no additional OVTAs will be conducted in these land areas.

To measure trash reductions in applicable moderate, high and very high areas, OVTA sites will be randomly selected to cover at least 10% of available street lengths and/or PLU areas. To avoid biasing the selection of sites, assessment sites will be randomly selected from an assessment frame composed of potential site locations spanning all available street lengths and areas associated with PLUs.

To ensure that the OVTA sites are representative of all applicable PLU areas, OVTA site selection will be guided by baseline trash generation levels depicted on Monterey Permittee baseline maps. Sites will be selected in a manner to preserve proportionality between baseline trash generation areas and the sites selected for assessment.

The methods that that will be used to develop the OVTA Program for the Monterey Permittees, including the random selection of assessment sites that will ensure that they accurately represent trash levels in each applicable PLU area, are documented in **Appendix C**. The selection of representative assessment sites where future OVTAs will be conducted provides the confidence necessary to accurately report to the State Water Board progress towards trash reduction goals. Assessment results from the OVTA Program will represent on-going trash levels on streets, sidewalks and land areas in Permittee PLU areas to provide a comparison to baseline levels illustrated on Permittee maps. The levels of trash present in these areas correlate well with the amount of trash observed in the stormwater conveyance system (BASMAA 2017) and therefore are indicators of trash reduction in stormwater discharges associated with PLU areas.

Modifications to OVTA Program Over Time

The OVTA program described in this Plan is designed to address the Trash Amendments and subsequent requirements to demonstrate FCSE in areas not addressed by trash full capture systems. Should Monterey Permittees decide to install additional trash full capture systems, then the OVTA program will be modified to remove sites within areas addressed by these systems. Additionally, as new full capture systems are installed, new assessment sites may need to be established to allow OVTA sites to remain representative of the broader PLU areas and provide confidence in the trash reductions being reported. The evaluation of the OVTA program will occur annually, prior to assessments beginning each fiscal year, and modifications will be documented consistent with reporting requirements included in the Phase II NPDES permit.

Calculating Trash Reductions via OVTAs

The step-wise process used to calculate the percentage of trash reduced in a specific area using OVTA results is listed below:

1. For each OVTA site, the "average linear feet" in each OVTA scoring category will be calculated using data from multiple assessment events.

2. The average linear feet in each category for all sites will then be summed to obtain the "total average linear street feet" in each scoring category.

3. The "% of average linear feet" will then be calculated for each scoring category by dividing the total average linear feet for each category (developed in step #2) by the total average linear street feet for all categories combined. These percentages represent the proportions of the PLU area that are currently in each category.

4. For each category, the % of average linear street feet (calculated in Step #3) is then multiplied by the total PLU area (acres) in the Permittee's jurisdiction to determine the "acreage currently in each category."

5. The acreage currently in each category are then multiplied by the applicable trash generation rates to establish the "current volume of trash" generated in Permittee PLUs.

6. The current volume of trash is then subtracted from the Permittee's baseline trash volume (i.e., 17,456 gallons), and the remainder is the "volume of trash reduced" in the given year, as observed by OVTAs.

7. The volume of trash reduced is then divided by the baseline trash volume and once multiplied by 100, it represents the "Percentage of Trash Reduced" as observed by OVTAs.

Trash Reduction Offsets – Channel and Shoreline Cleanups

Trash cleanups events that occur in receiving water bodies provide important and direct water quality benefits. Additionally, these events engage citizens and provide valuable entry points to educate volunteers on the impacts of trash and the importance environmental stewardship. These events are supported and/or actively coordinated by Permittees. Trash removed during these cleanup events can originate from multiple sources and pathways, including those not directly associated with MS4 discharges.

In addition to implementing trash full capture systems and other trash controls designed to prevent or reduce trash discharges, Permittees may also choose to offset part of its trash load reduction requirements by conducting cleanups of trash from channel and shoreline areas. Similar to Phase I MS4s in the SF Bay Area, Permittee proposes to claim up to a 10% trash reduction for conducting trash cleanups in receiving water bodies. This offset will recognize the value of these cleanup events and account for the short-term benefit of cleanups compared to ongoing trash generation levels associated with the Permittee's MS4.

Because the trash removed during the receiving water cleanup event(s) has already impacted the water body, an offset ratio of two-to-one will be used when comparing the volumes of trash removed during the event(s) to the trash volume depicted by the Permittee's baseline trash generation map. The following formula will be used to generate each percent trash of trash reduction demonstrated by the Permittee for these actions:

$$\textbf{Percent Trash Offset} = \frac{\text{Trash Removed} / 2}{\text{Baseline Trash Load}} \text{ x } 100$$

where:	*Trash Removed =*	*Volume of Trash Removed from all channel and/or shoreline events during a given fiscal year*
	2 =	*Trash Reduction Offset (2:1 ratio)*
	Baseline Trash Load =	*Volume of Trash Represented by Baseline Trash Generation Map*

Regardless of the percent trash offset calculated using the formula above, the maximum offset that each Monterey Permittee will claim is ten percent reduction against its baseline level of trash generation.

Reporting Progress Towards FCSE

Reporting requirements for Monterey Permittees will be established through the reissued Phase II NPDES permit for MS4s. Example metrics that may be reported are included below. An example dashboard illustrating progress towards trash reduction goals and associated metrics is included as Figure 11.

- Trash Full Capture Systems
  - PLU areas addressed (acres)
  - Trash Reduced (gallons)
  - Progress towards trash reduction goals (%)
  - Average maintenance frequency (#)
  - Summary of maintenance issues

- Other Control Measures (via OVTAs)
  - OVTA Sites Assessed (#)
  - Average assessment frequency at each site (#)
  - Proportion of PLU areas assessed (%)
  - Trash Reduced (gallons)
  - Progress towards trash reduction goals (%)

- Channel and Shoreline Cleanups (Offsets)
  - Sites cleaned (#)
  - Frequency of cleanups at each site (#)
  - Volume of trash removed (gallons)
  - Progress towards trash reduction (%)

STORMWATER TRASH REDUCTION PROGRESS SUMMARY

Instructions: *In (MM/DD/YYYY) format, enter the date range of the OVTAs that you would like to include when calculating trash load reductions:*

Beginning Date	7/1/2018
End Date	6/30/2018
Reporting Year	FY 17-18

BASELINE	Area (Acres)	Load (Gallons)	
Total Baseline - Priority Land Uses (PLUs)	**280**	**9,625**	-

TYPE OF TRASH CONTROL MEASURE	Area (Acres)	Load Reduced (Gallons)	% Reduction
Trash Full Capture Systems			
Full Capture - PLU Areas	56	1,925	20.0%
Full Capture - Equivalent Alternative Land Uses (Non-PLU A	0	0	0.0%
Subtotal Full Capture	**56**	**1,925**	**20.0%**
Other Types of Control Measures			
Other Control Measures - PLU Areas (via OVTA	-	**5,470**	**56.8%**
Receiving Water Cleanup Offsets			
# of Cleanups in Reporting Period	2	-	-
Cleanups - Volume (gallons) Removed	-	7,500	-
Cleanups - Volume Removed (10:1 Offset)	-	750	7.8%
Cleanups - Total Offset (with 10% Maximum applied)	-	-	**7.8%**

PROGRESS SUMMARY FOR REPORTING YEAR	Load Reduced (Gallons)	% Reduction
Progress Towards Full Capture Equivalency	**8,145**	**84.6%**
Remaining to be Addressed	*1,480*	*15.4%*
OVTA SUMMARY FOR REPORTING YEAR		
Total # of Active OVTA Sites		28
% of Applicable PLUs Assessed		16%
Total # of OVTA Events Conducted in Reporting Period		72
Average # of OVTA Events per Site		2.6

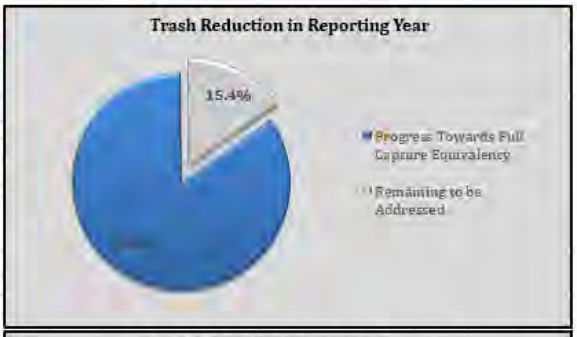


Figure 5. Example of dashboard of trash reduction tracking and reporting metrics.

Section 6. Implementation Schedule

The implementation of trash control measures required to reach FCSE by Monterey Permittees is currently planned to occur in a timeframe consistent with Trash Amendment requirements (i.e., achievement of FSCE no later than 2030). A preliminary implementation schedule for all planned enhancements is described in Table 9. This preliminary schedule provides a timeframe for reducing trash discharged from Permittee PLU areas in order to reach a 100% compliance with the Trash Provisions (and subsequent NPDES requirements) by 2030. Should this compliance schedule change, this implementation plan will be adjusted accordingly.

Table 9. Preliminary schedule for Monterey Permittees to implement initial projects described in Appendix D and update the Track 2 Implementation Plan and schedule.

Project	Summary Description	Implementation Date (Fiscal Year) for Planned New/Enhanced Trash Control Measures											
		2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
#1: Large Trash Full Capture System - *West Bay Avenue Catchment* (Seaside and Sand City)	Implement Project #1 (West Avenue Catchment) – Feasibility Evaluation	X	X										
	Based on the outcomes of the feasibility evaluation, engage Caltrans in discussions regarding Financial Contribution Only (FCO) funding and a Cooperative Implementation Agreement (CIA) to fund the installation of a large capture system.		X										
	Based on the outcomes of the feasibility evaluation, conduct OVTAs in non-PLU areas within the catchment to establish baseline trash generation levels.		X										
#2: Evaluation of a Large Trash Full Capture System - *Pajaro Catchment* (County of Monterey)	Implement Project #2 (Pajaro Catchment) – Feasibility Evaluation	X	X										
	Based on the outcomes of the feasibility evaluation, engage Caltrans in discussions regarding Financial Contribution Only (FCO) funding and a Cooperative Implementation Agreement (CIA) to fund the installation of a large capture system.		X										
	Based on the outcomes of the feasibility evaluation, conduct OVTAs in non-PLU areas with the catchment to establish baseline trash generation levels.		X										

Project	Summary Description	Implementation Date (Fiscal Year) for Planned New/Enhanced Trash Control Measures											
		2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
#3: Evaluation of Trash Sources and the Installation of Small Trash Full Capture Devices (Del Rey Oaks)	Conduct site visits to trash generating PLU areas and identify trash sources.	X	X										
	Select and install small trash full capture devices.		X										
	Delineate and map land areas addressed by small full capture devices		X										
	Begin to maintain full capture devices and track/report on maintenance issues.		X	X									
#4: Enhanced On-land Cleanup Program and On-land Visual Trash Assessments (Carmel by-the-Sea)	Develop and execute agreement with non-profit organization or other group to conduct enhanced on-land cleanups in downtown area.	X	X										
	Implement pilot enhanced on-land cleanup program		X	X	X								
	Conduct On-land Visual Trash Assessments		X	X	X								
#5: Evaluation of the Trash Reduction Benefits of Existing Hydrodynamic Separator Units (Multiple Entities)	Inventory existing HDS Units	X	X										
	Develop methodology for evaluating trash reduction benefit		X	X									
	Apply methodology and calculate trash reduction benefit		X	X									
Update Implementation Plan and Schedule	Based on the implementation of the initial projects listed above, update the Trash Control Measures Implementation Plan and schedule. Submit to State/Regional Water Board.			X	X								
Full-scale implementation of trash control measures	Implement control measures at full scale, as informed by initial project results and NPDES permit requirements.				X	X	X	X	X	X	X	X	X

Section 7. References

BASMAA (2014). San Francisco Bay Area Stormwater Trash Generation Rates. Final Technical Report. Prepared by EOA, Inc. https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/BASMAA_Trash_Generation_Rates_Final_Report.pdf

BASMAA (2017). *Tracking California's Trash Project: Evaluation of the On-land Visual Assessment Protocol as a Method to Establish Baseline Levels of Trash and Detect Improvements in Stormwater Quality*. Bay Area Stormwater Management Agencies Association. State Water Resources Control Board Grant Agreement No. 12-420-550. Prepared by EOA, Inc. http://basmaa.org/Announcements/tracking-cas-trash-on-land-visual-assessments.

EOA (2017). On-land Visual Trash Assessment Protocol for Stormwater: Protocol A – Street and Sidewalk Survey. Version 2.0. Prepared by EOA, Inc. September. http://eoainc.com/ovta_fc/.

EOA (2018). On-land Visual Trash Assessment Protocol for Stormwater: Protocol B – Driving Survey. Version 2.0. Prepared by EOA, Inc. March. http://eoainc.com/ovta_fc/.

EOA and Keish Environmental (2018). On-land Visual Trash Assessment Protocol for Stormwater: Protocol C – Area-based Survey. Version 1.0. Prepared by EOA, Inc and Keish Environmental. http://eoainc.com/ovta_fc/.

Appendix A

Jurisdictional and Priority Land Use Maps

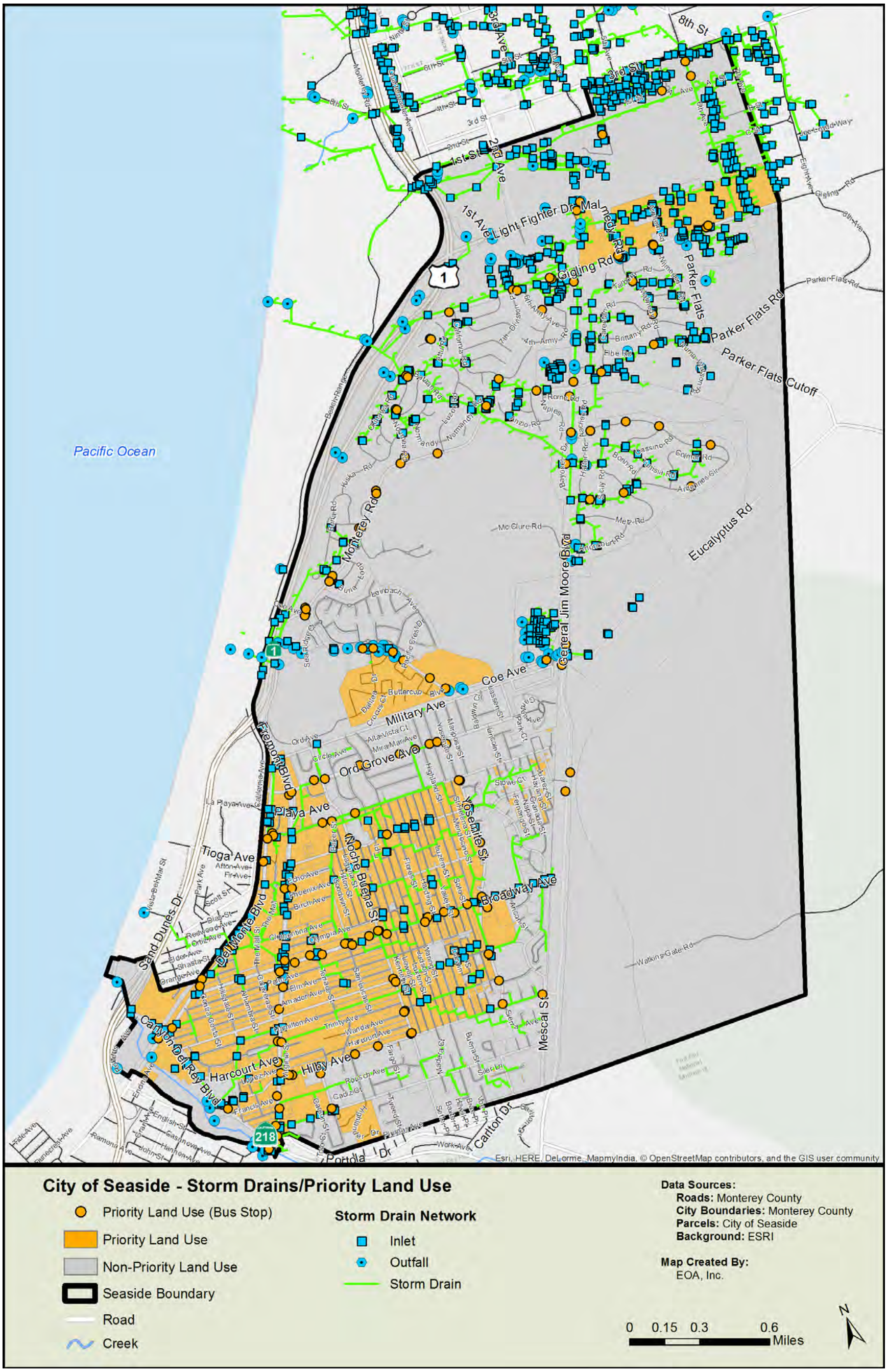


Figure A-1. City of Seaside Jurisdictional and Priority Land Use Areas.

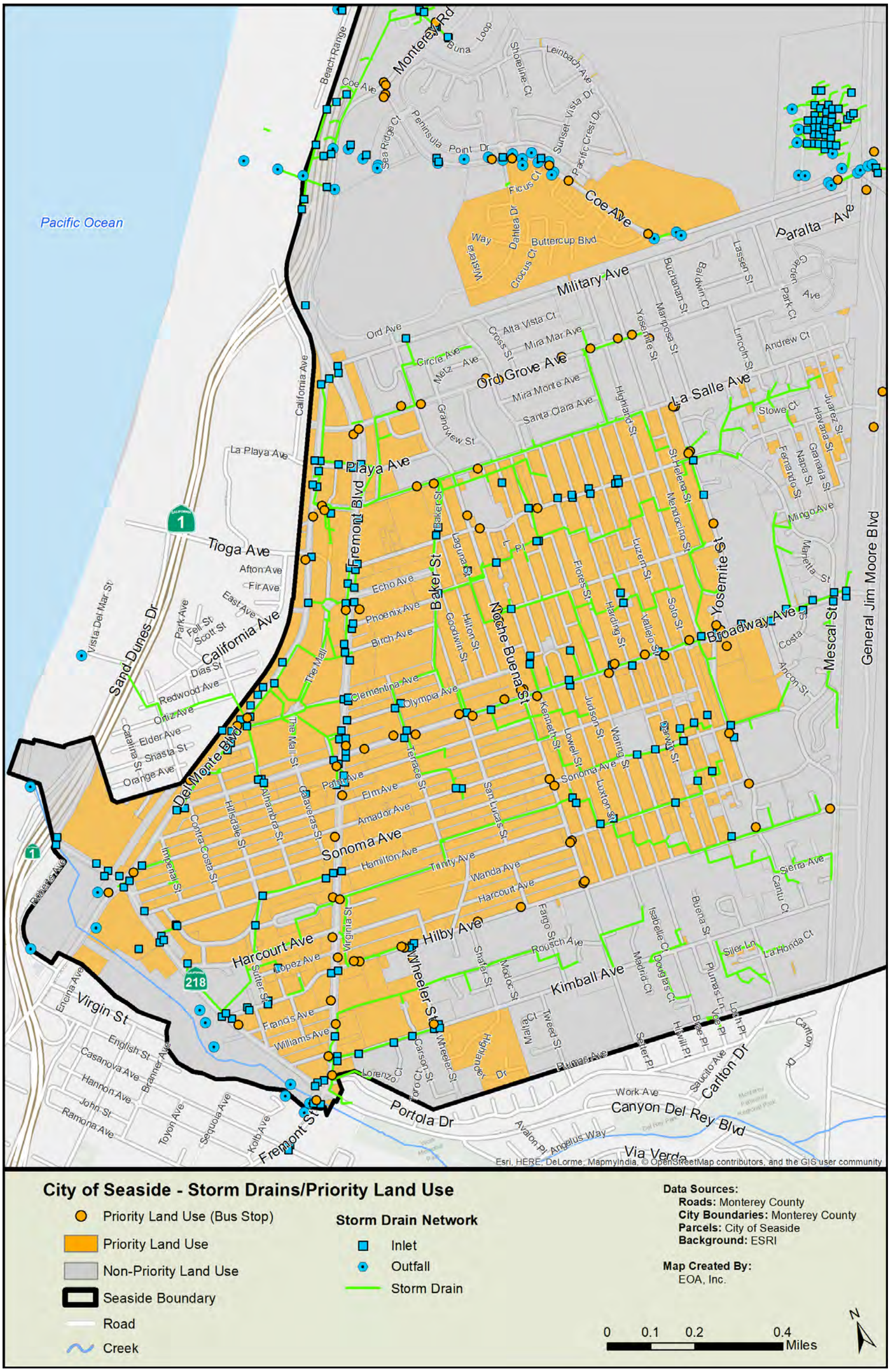


Figure A-2. City of Seaside Jurisdictional and Priority Land Use Areas - Southwest

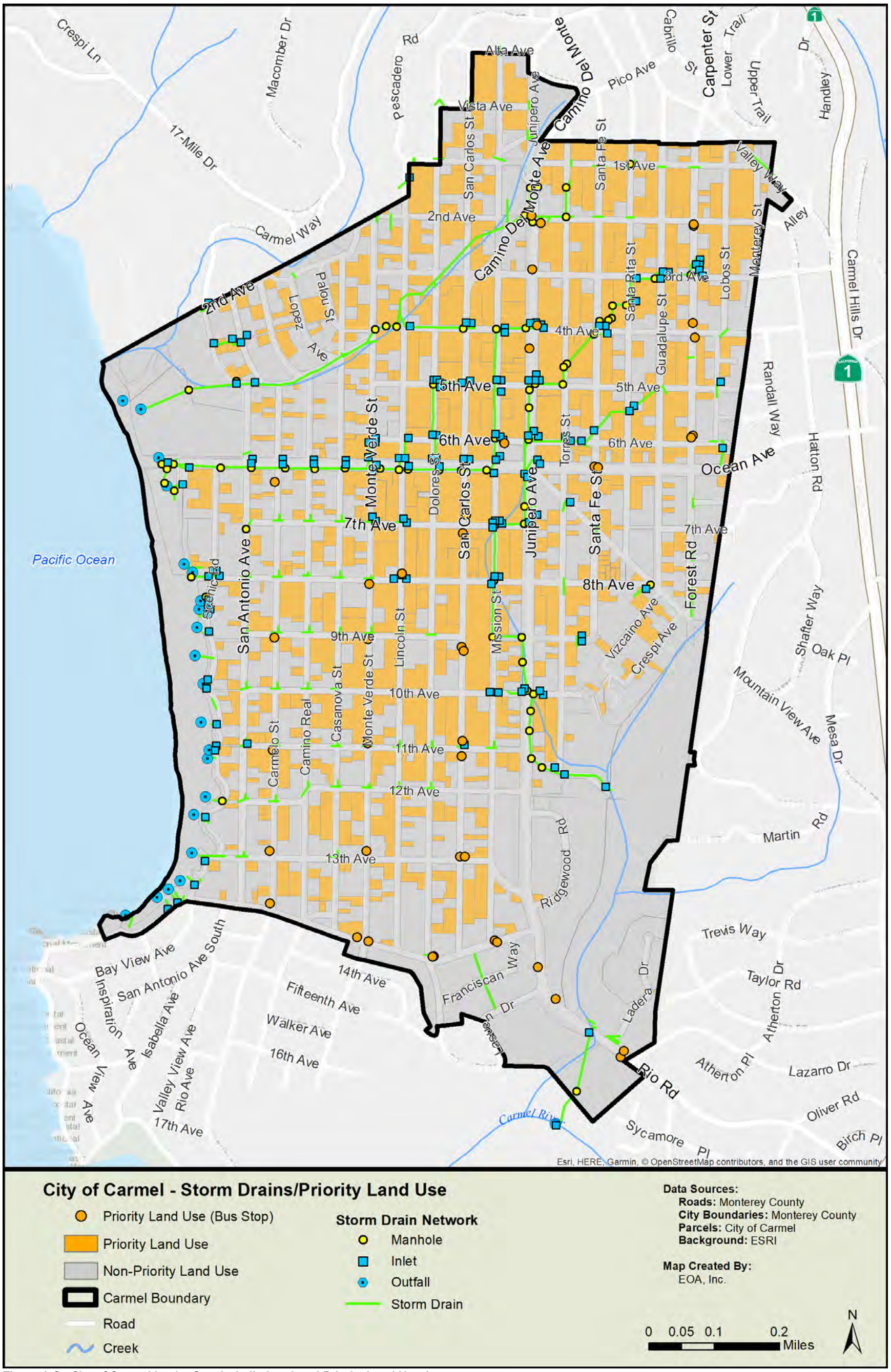


Figure A-3. City of Carmel by-the-Sea Jurisdictional and Priority Land Use Areas.

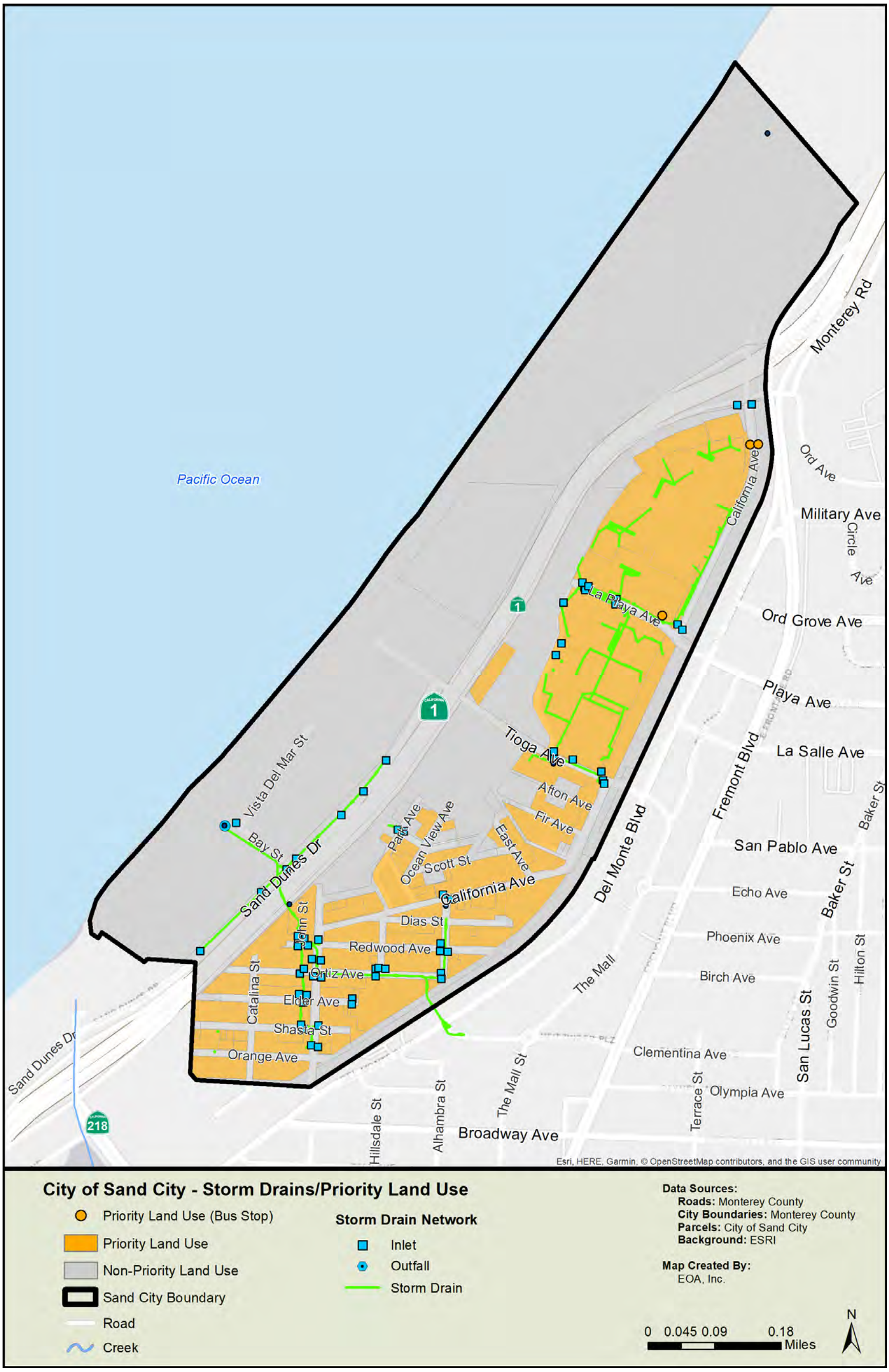


Figure A-4. City of Sand City Jurisdictional and Priority Land Use Areas.

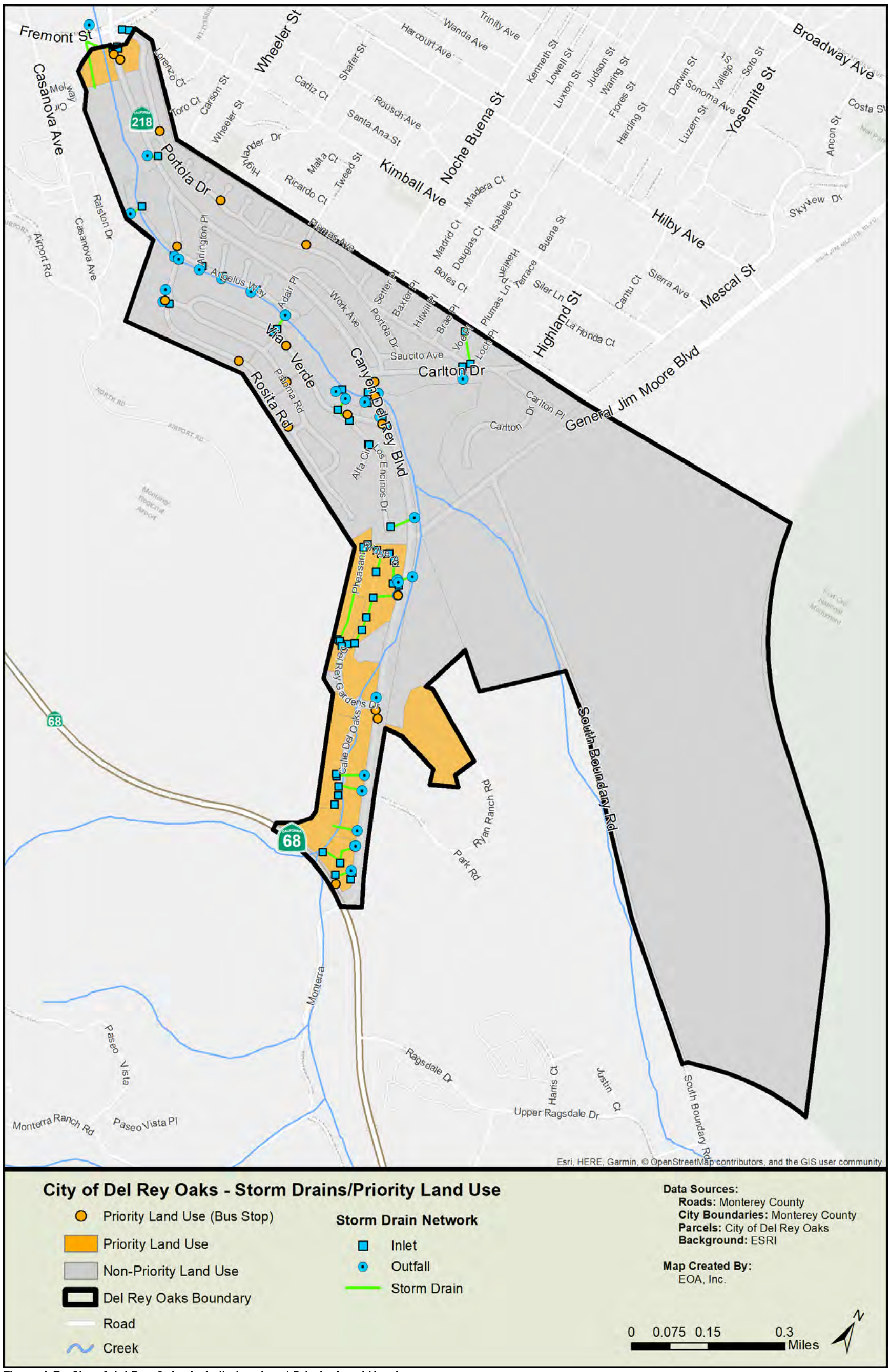


Figure A-5. City of del Rey Oaks Jurisdictional and Priority Land Use Areas.

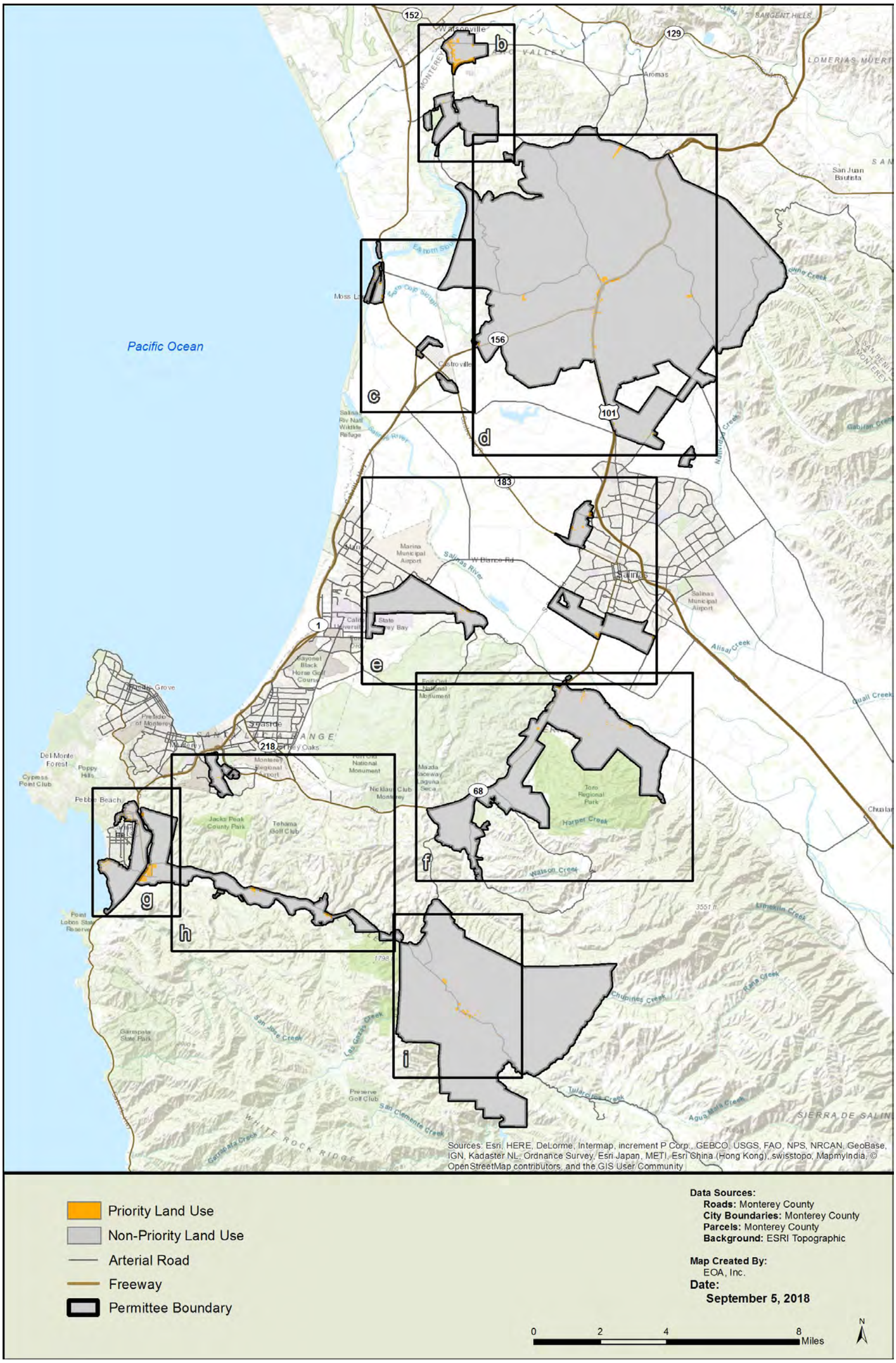


Figure A-6a. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Overview

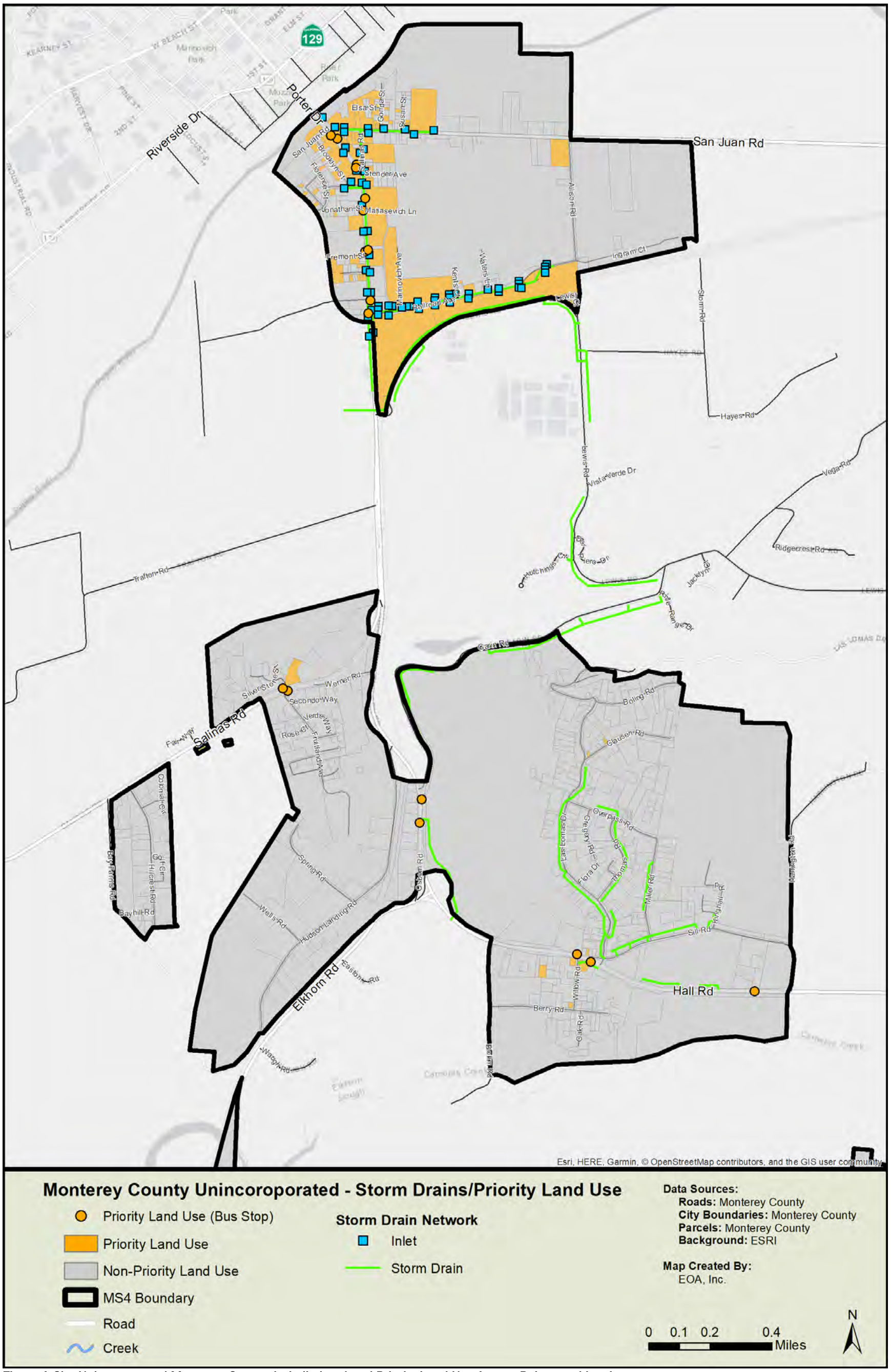


Figure A-6b. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Pajaro and Las Lomas areas.

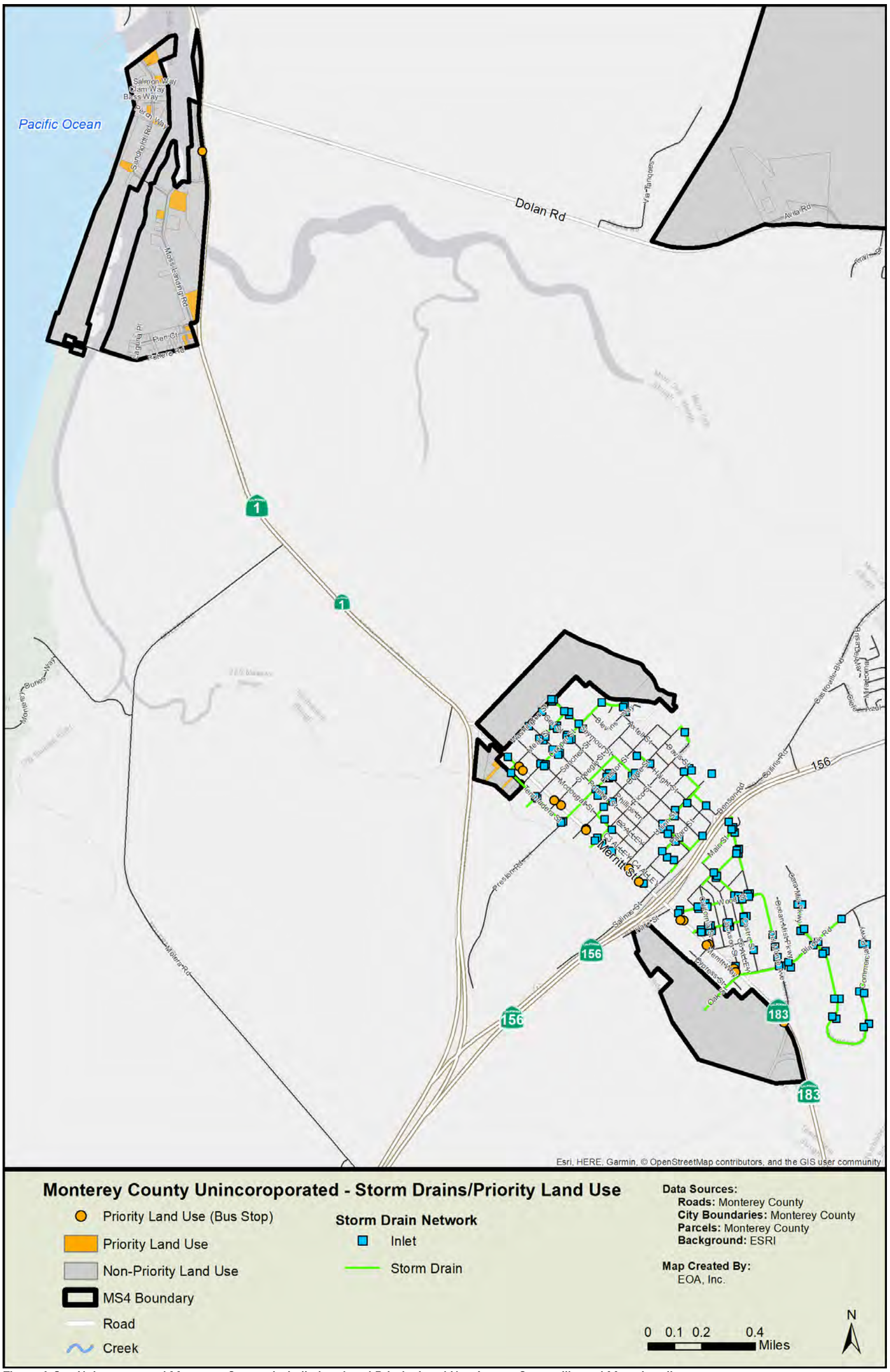


Figure A-6c. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Castroville and Moss Landing areas.

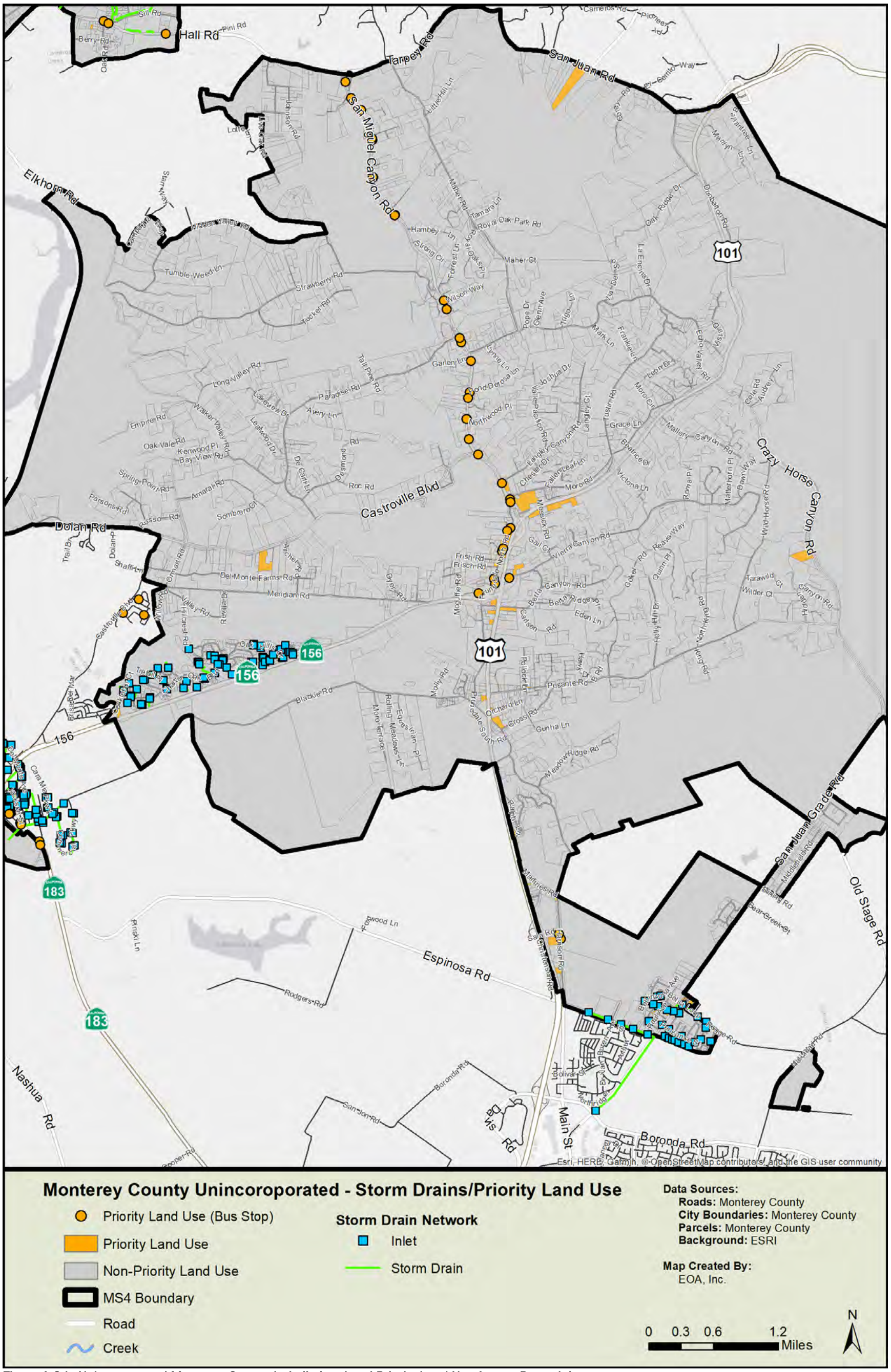


Figure A-6d. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Prunedale area.

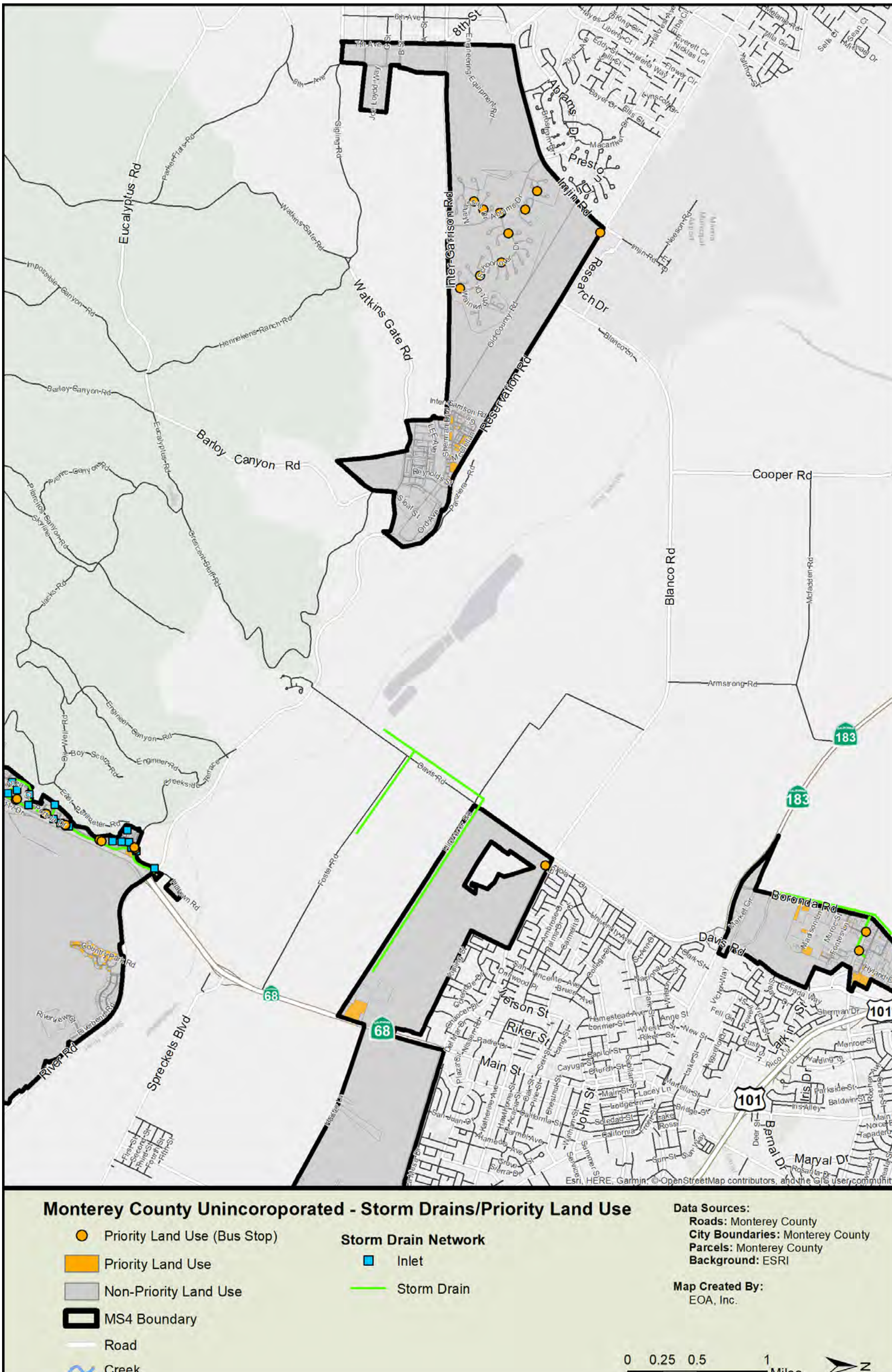


Figure A-6e. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Boronda and East Garrison areas.

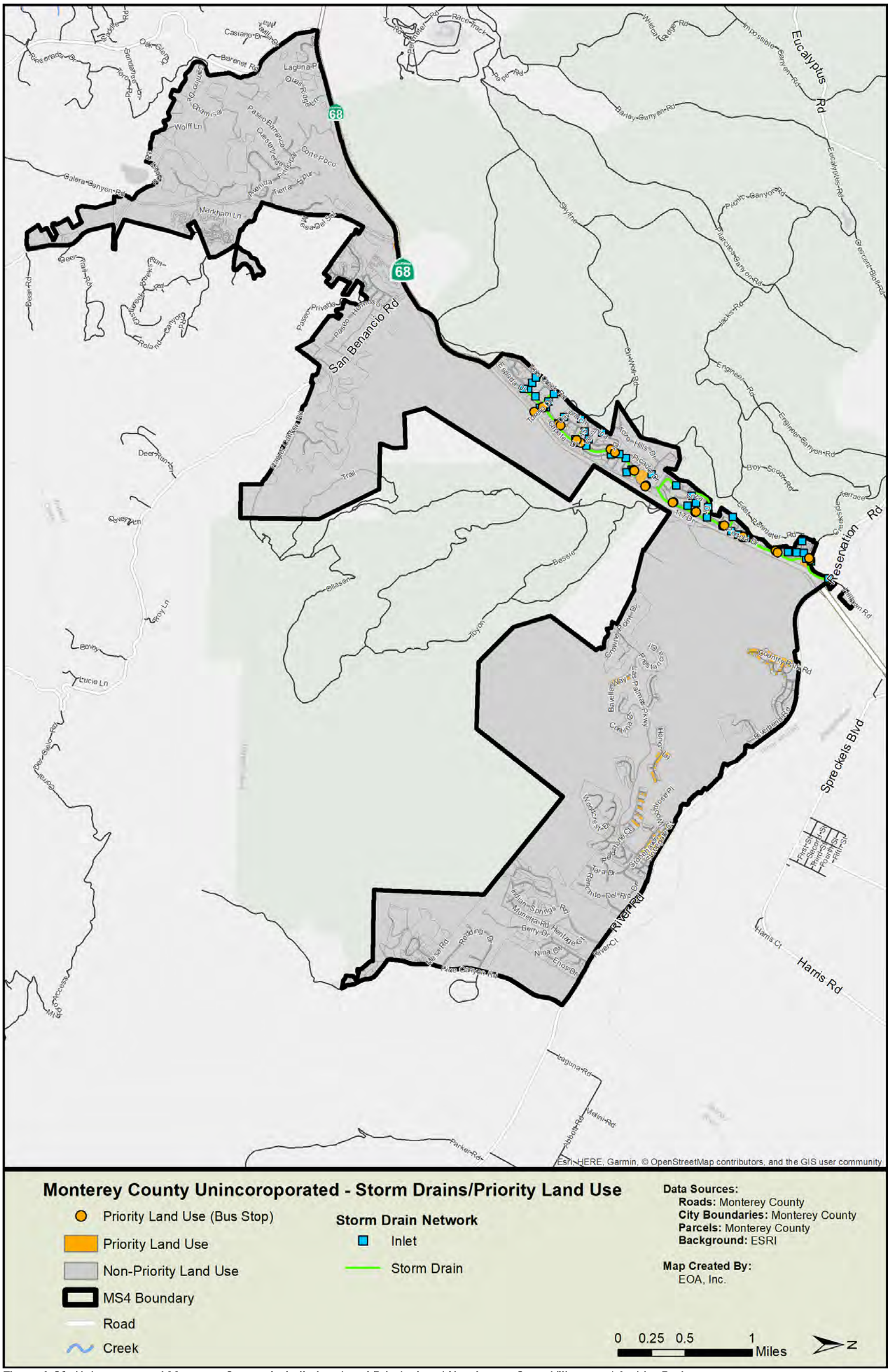


Figure A-6f. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Serra Village and Ambler Park areas.

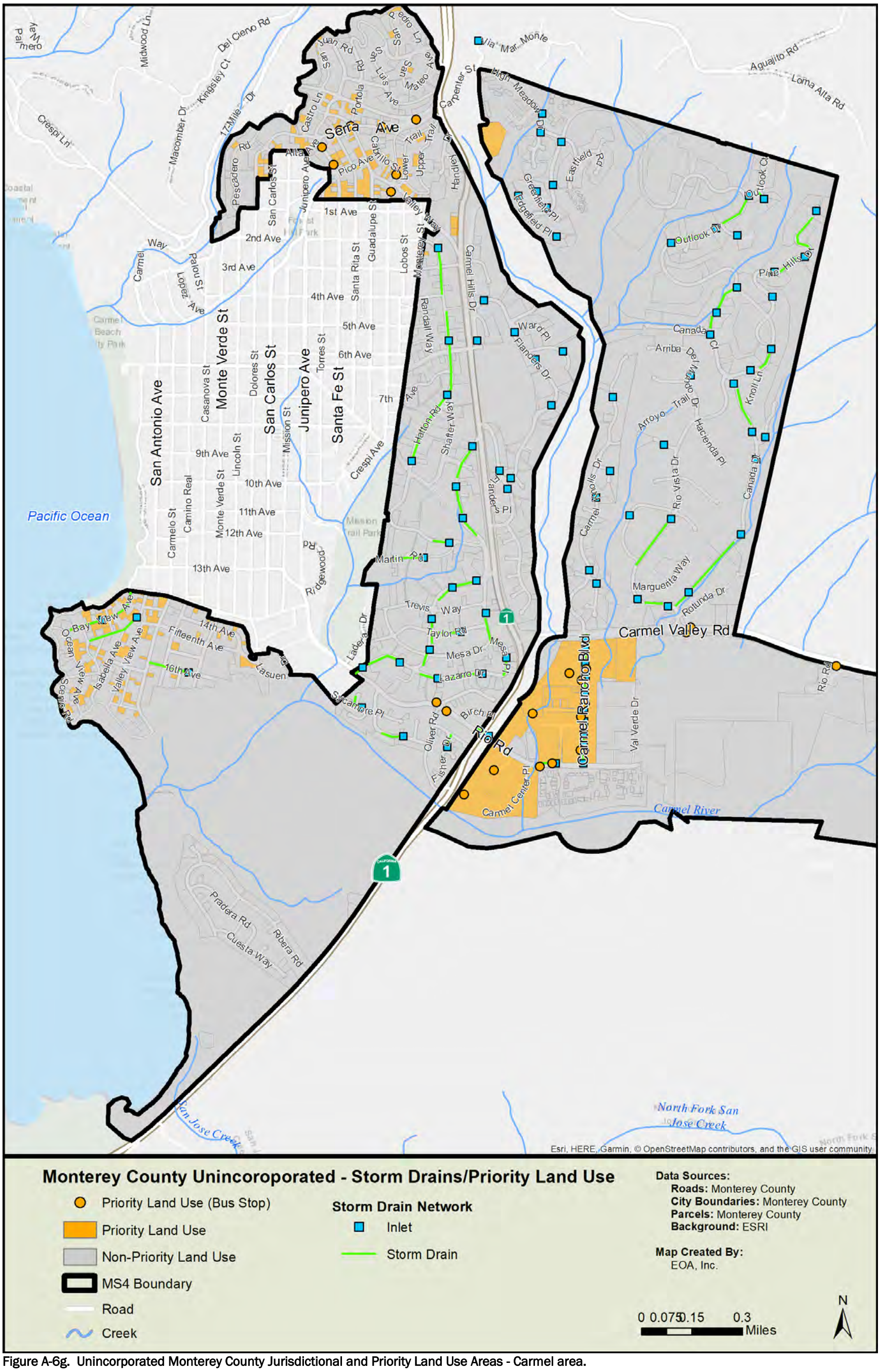


Figure A-6g. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Carmel area.

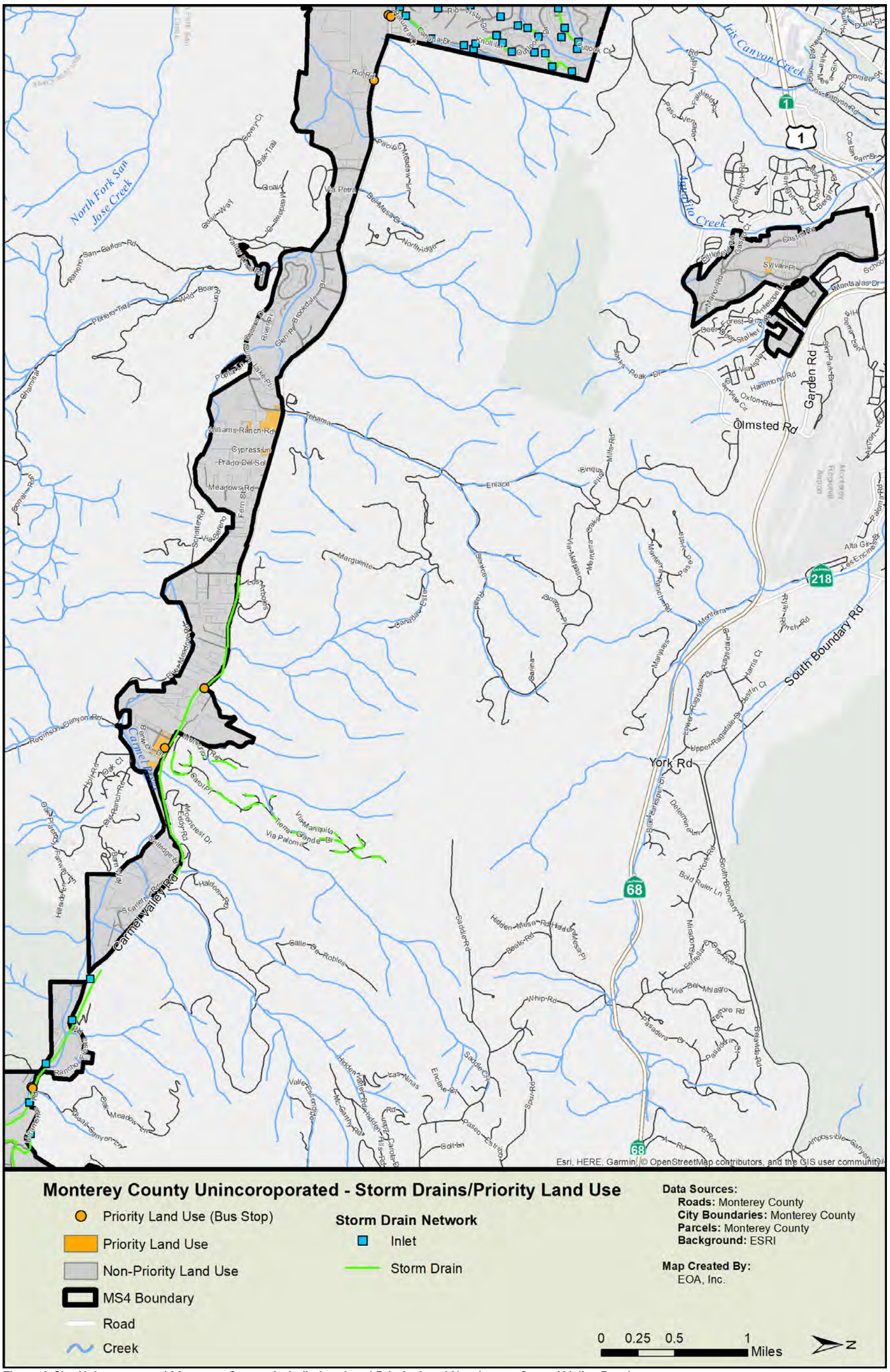


Figure A-6h. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Carmel Valley Road area.

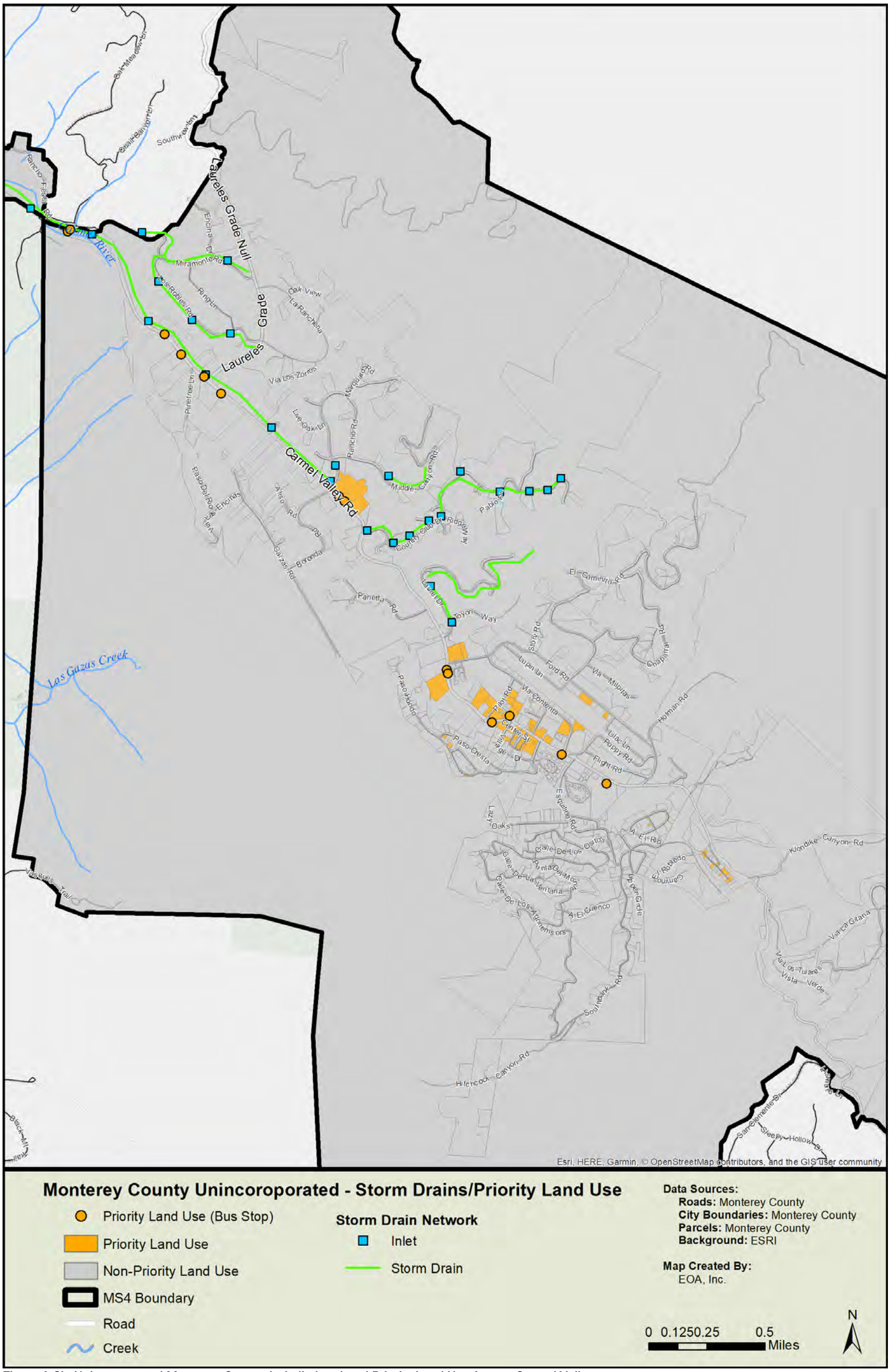


Figure A-6i. Unincorporated Monterey County Jurisdictional and Priority Land Use Areas - Carmel Valley area.

Appendix B

Preliminary Baseline Trash Generation Maps

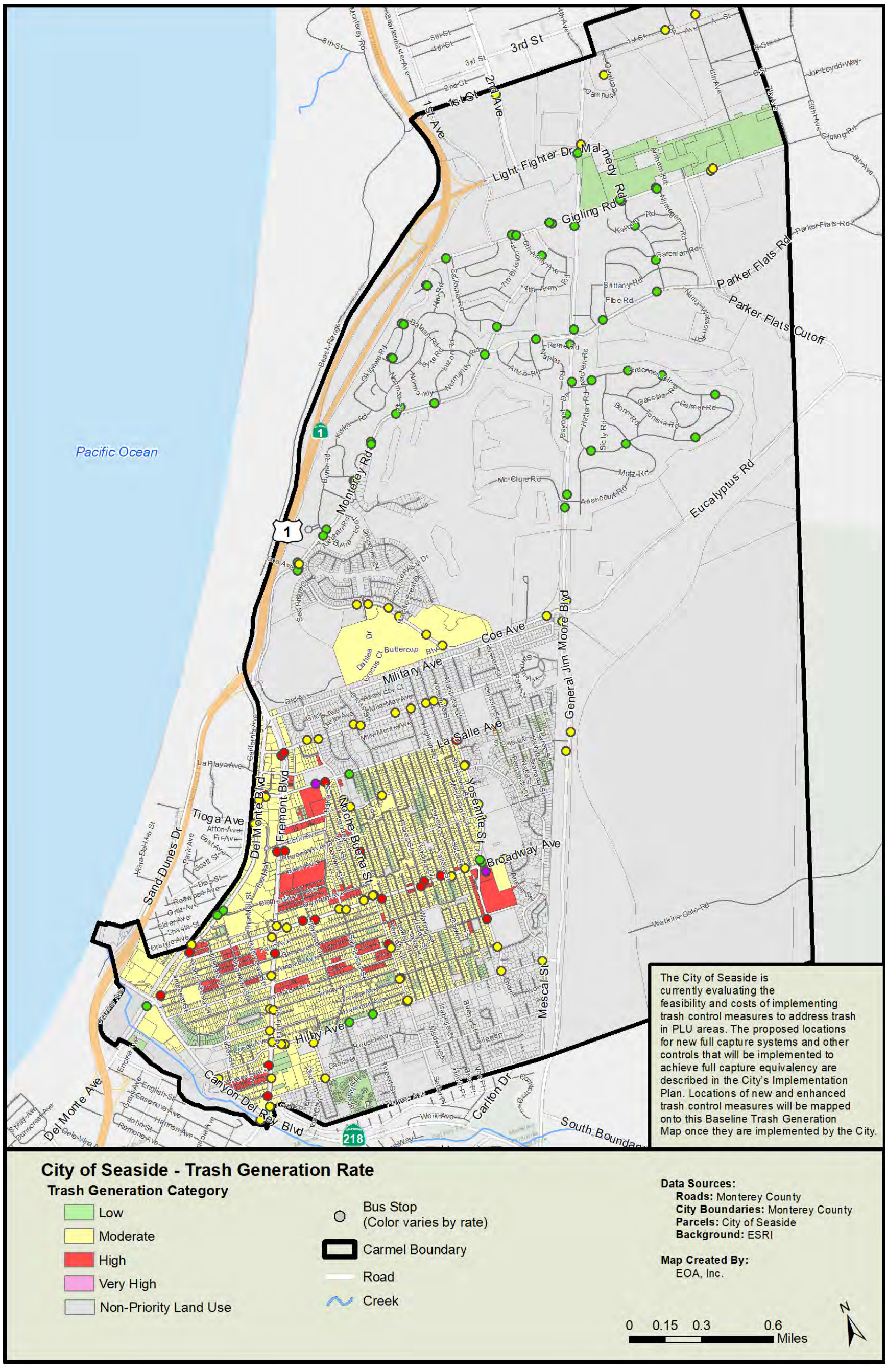


Figure B-1. City of Seaside Preliminary Baseline Trash Generation Map.

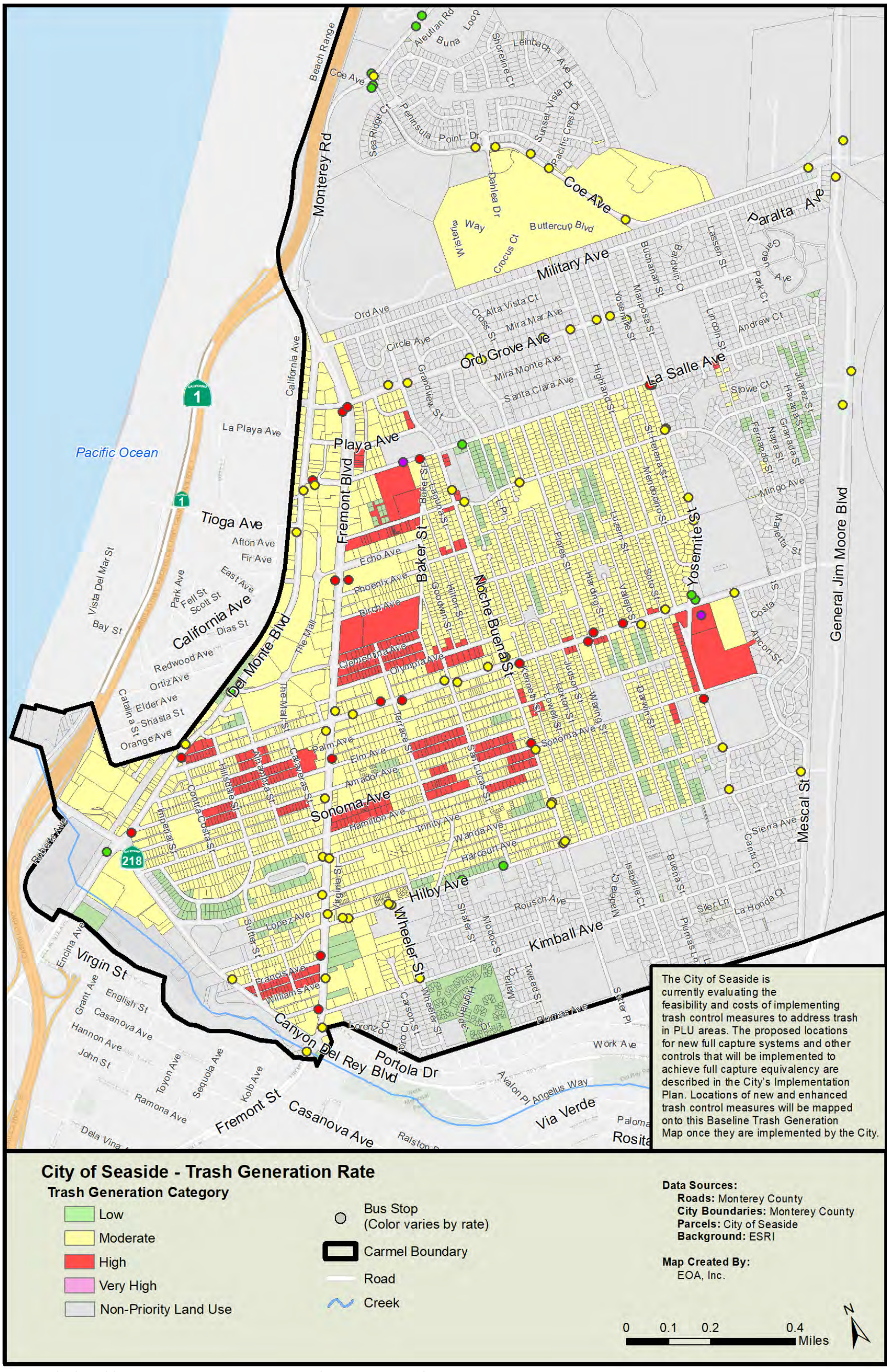


Figure B-2. City of Seaside Preliminary Baseline Trash Generation Map - Southwest.

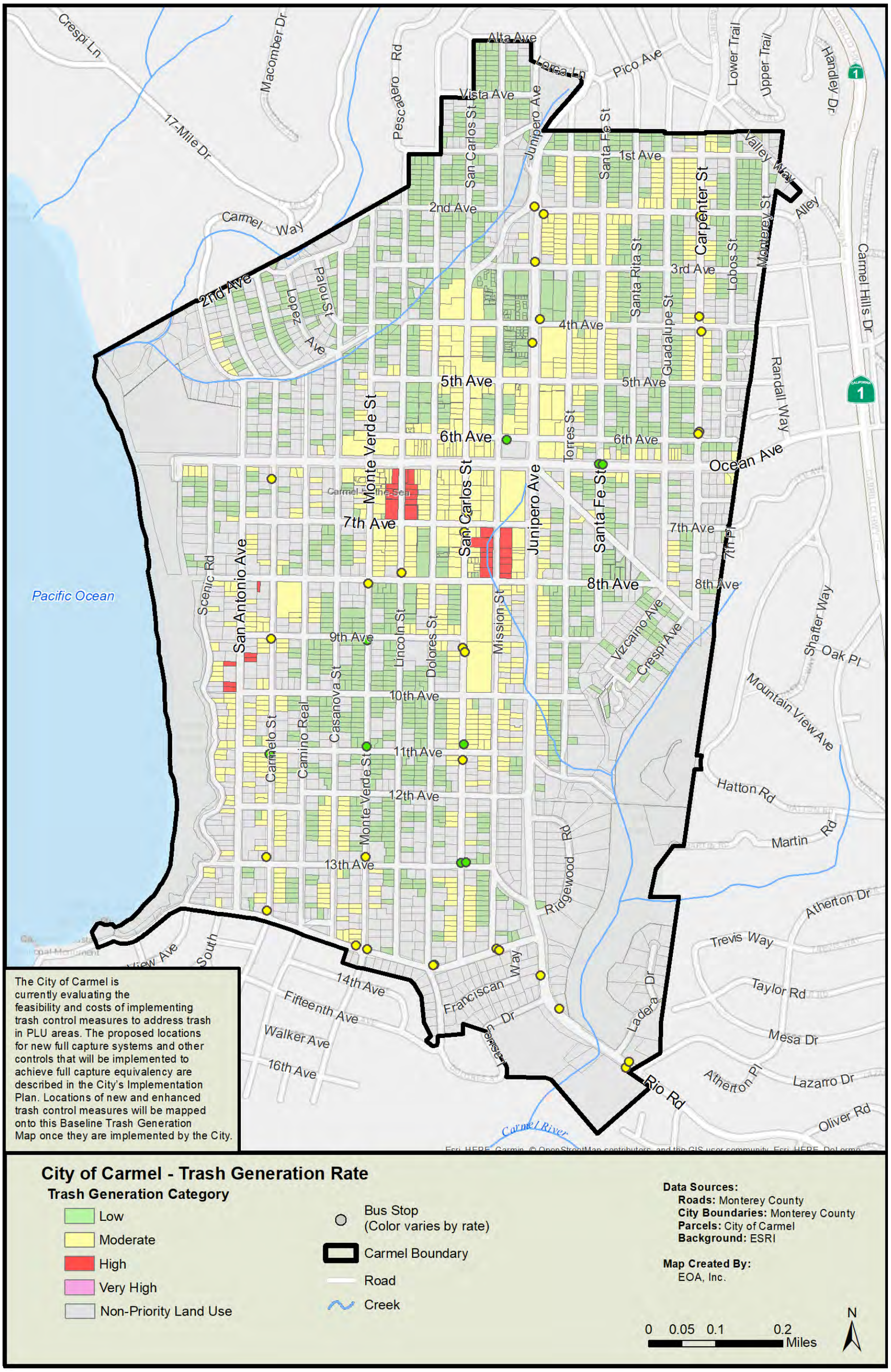


Figure B-3. City of Carmel by-the-Sea Preliminary Baseline Trash Generation Map.

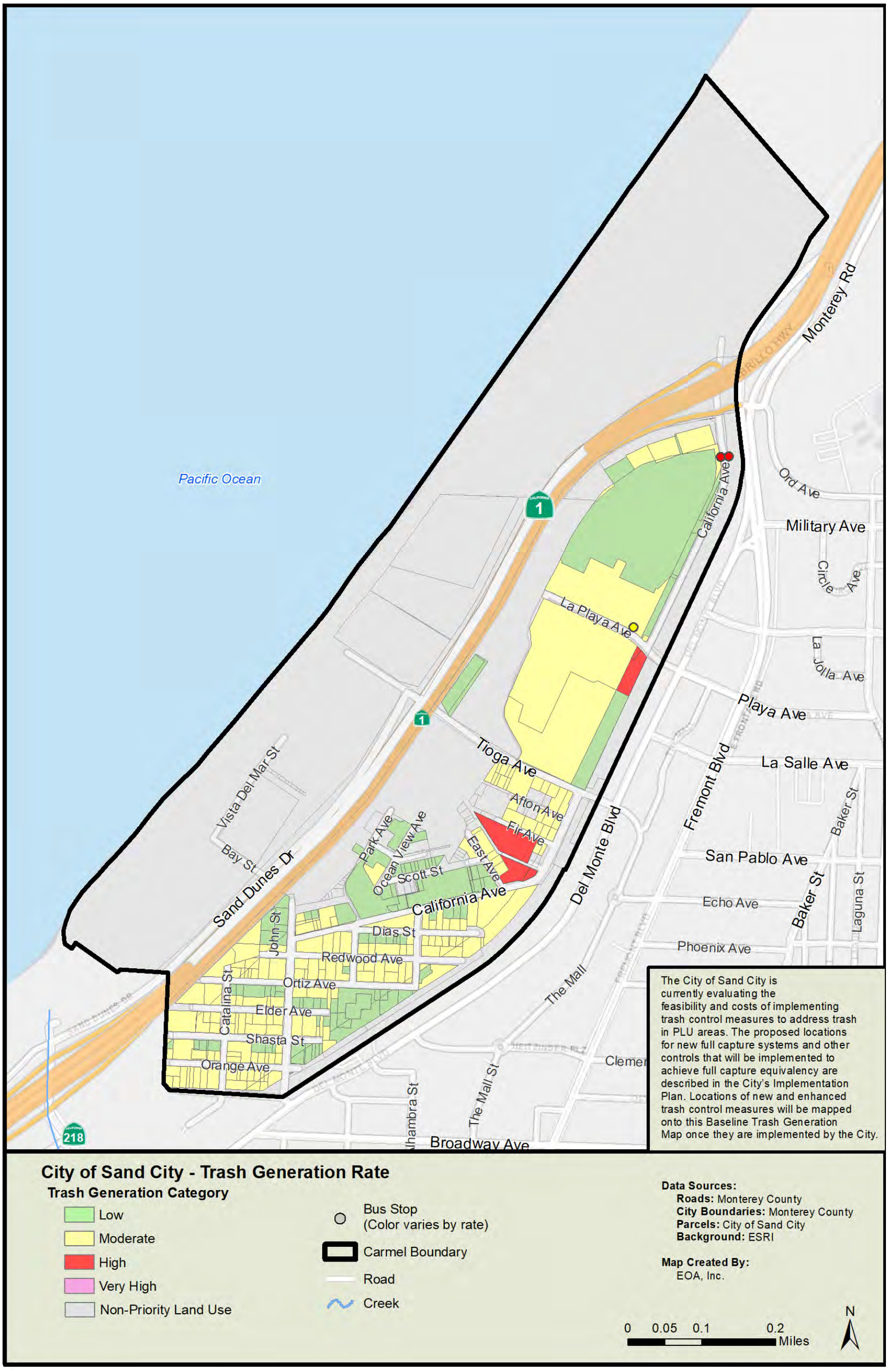


Figure B-4. City of Sand City Preliminary Baseline Trash Generation Map.

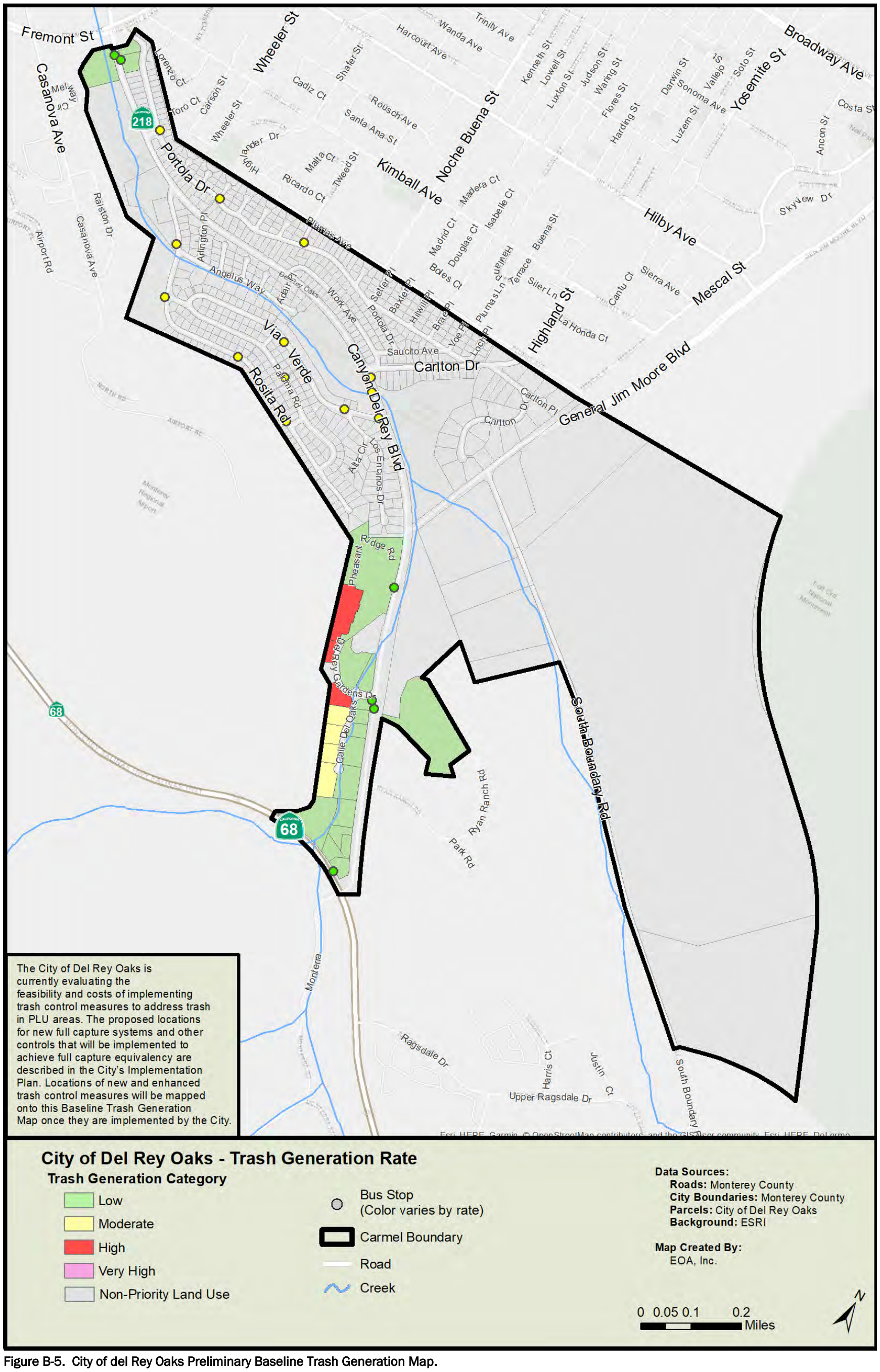


Figure B-5. City of del Rey Oaks Preliminary Baseline Trash Generation Map.

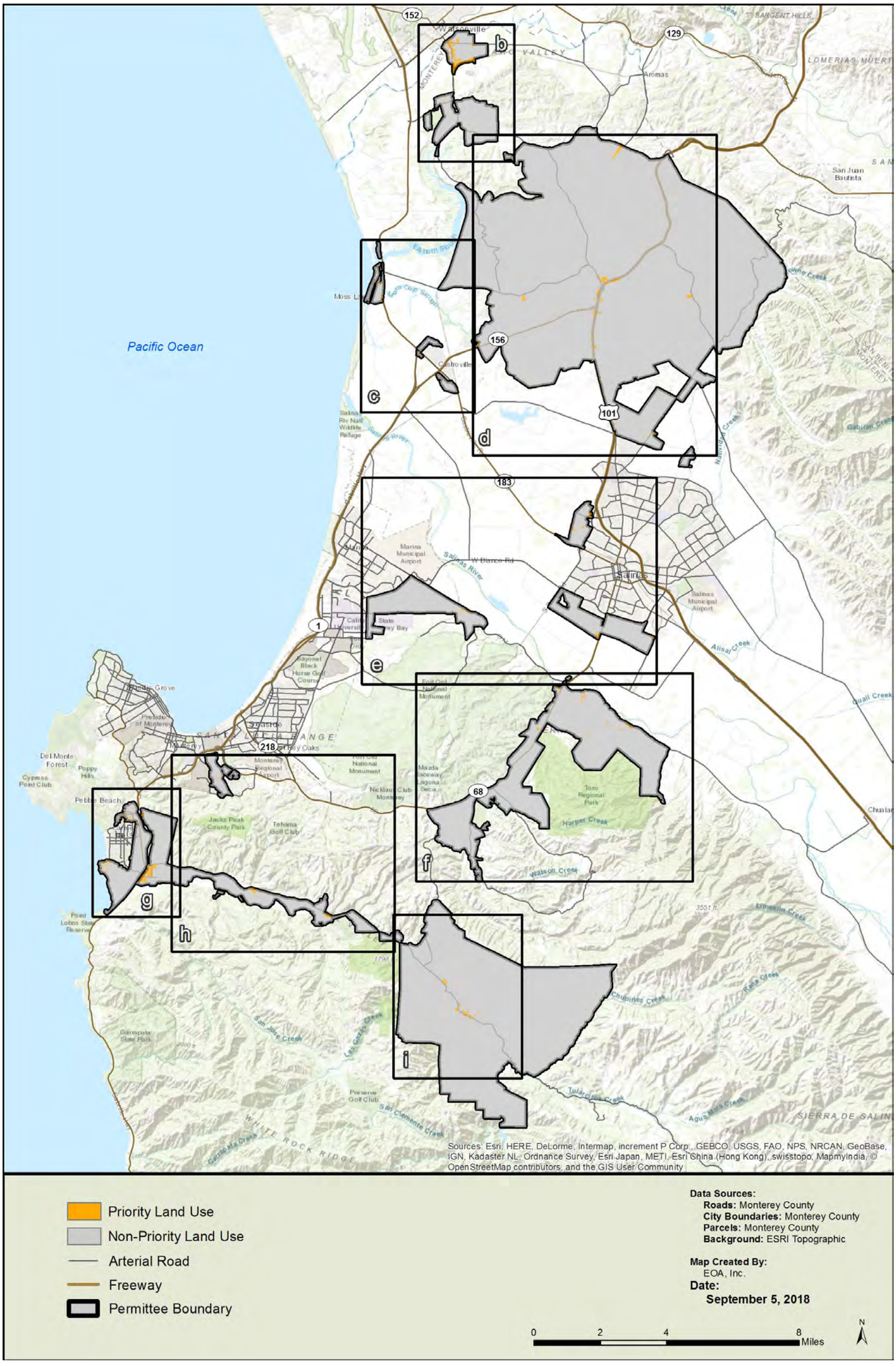


Figure B-6a. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Overview

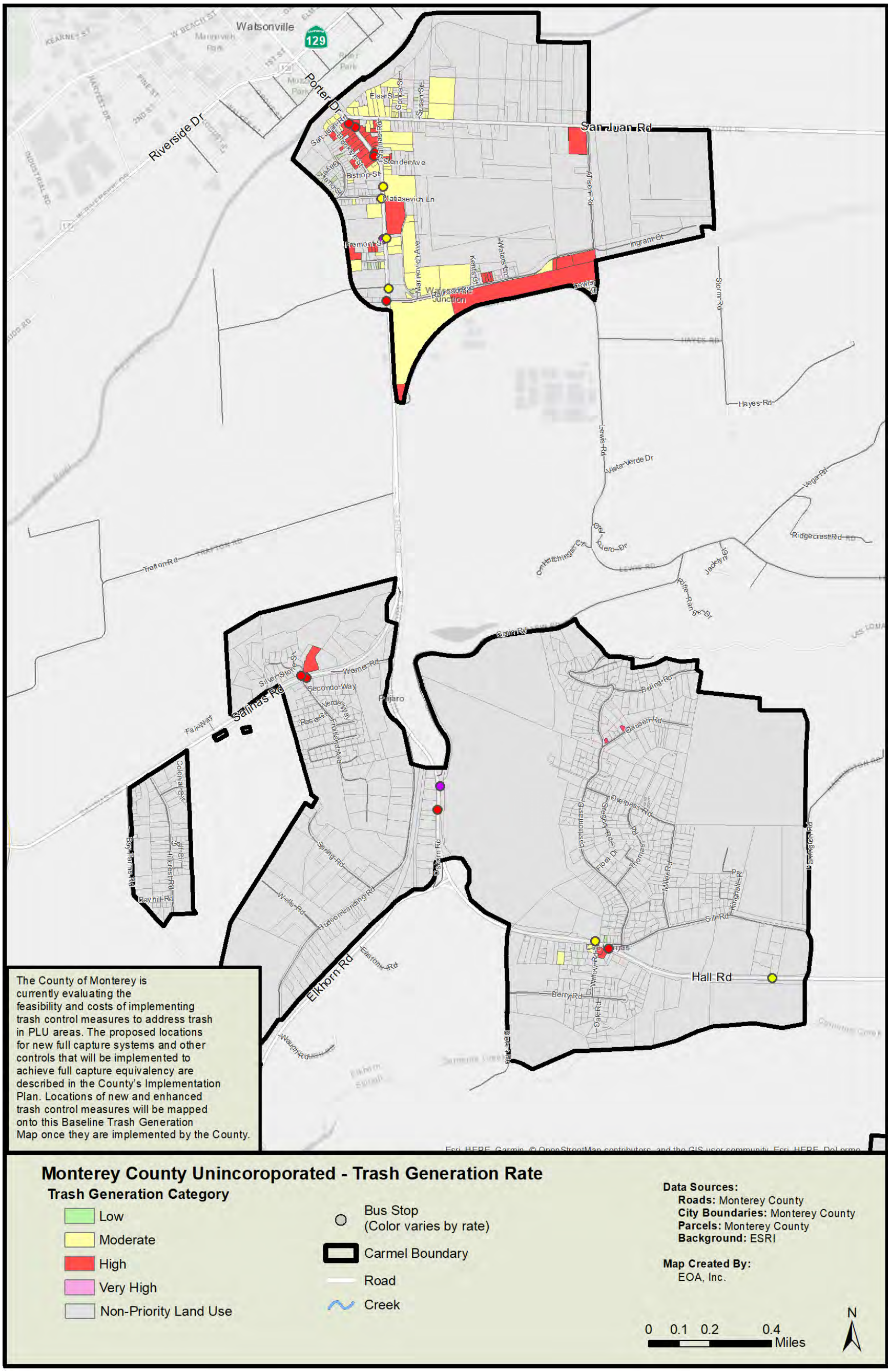


Figure B-6b. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Pajaro and Las Lomas areas.

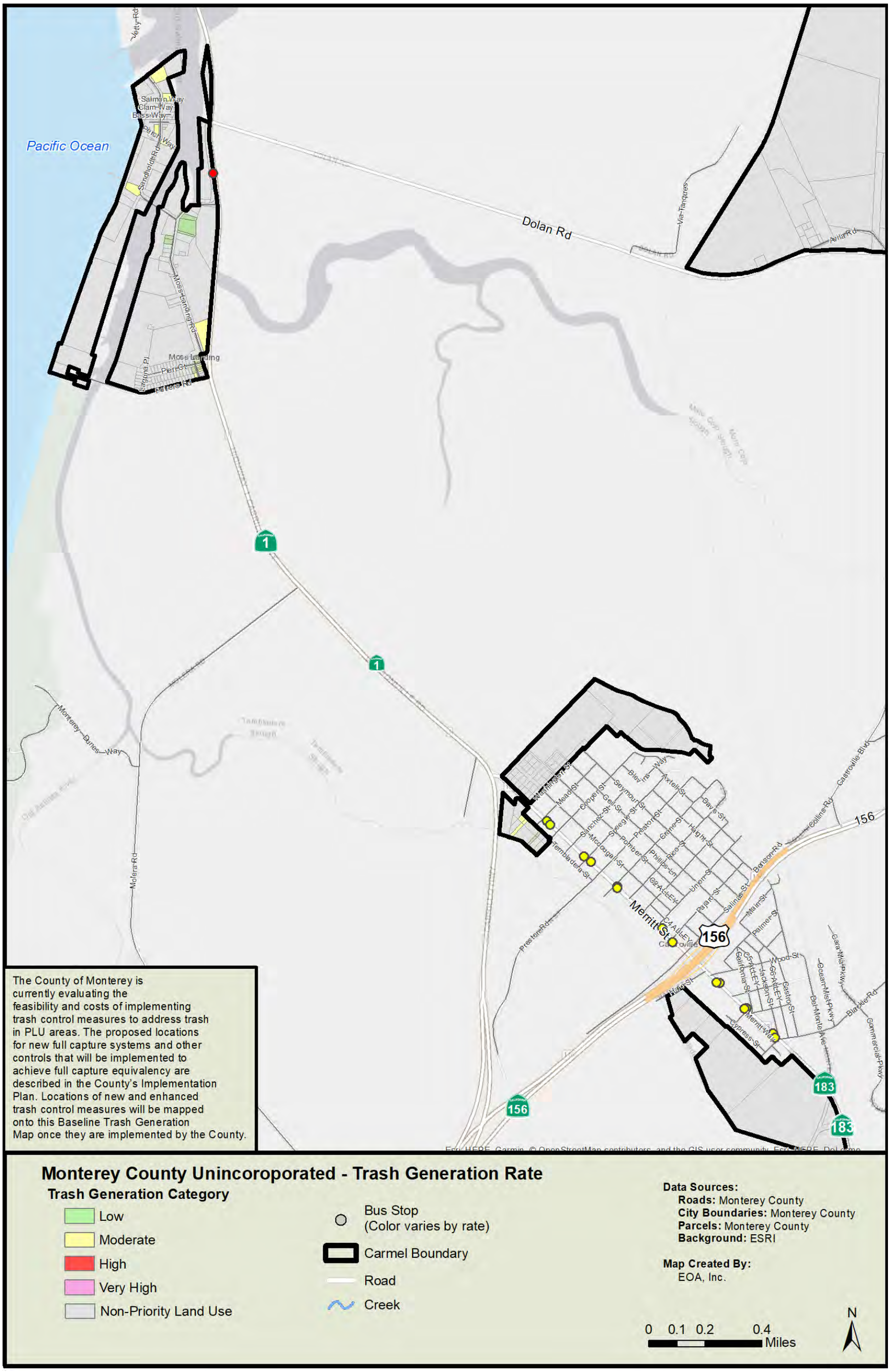


Figure B-6c. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Castroville and Moss Landing areas.

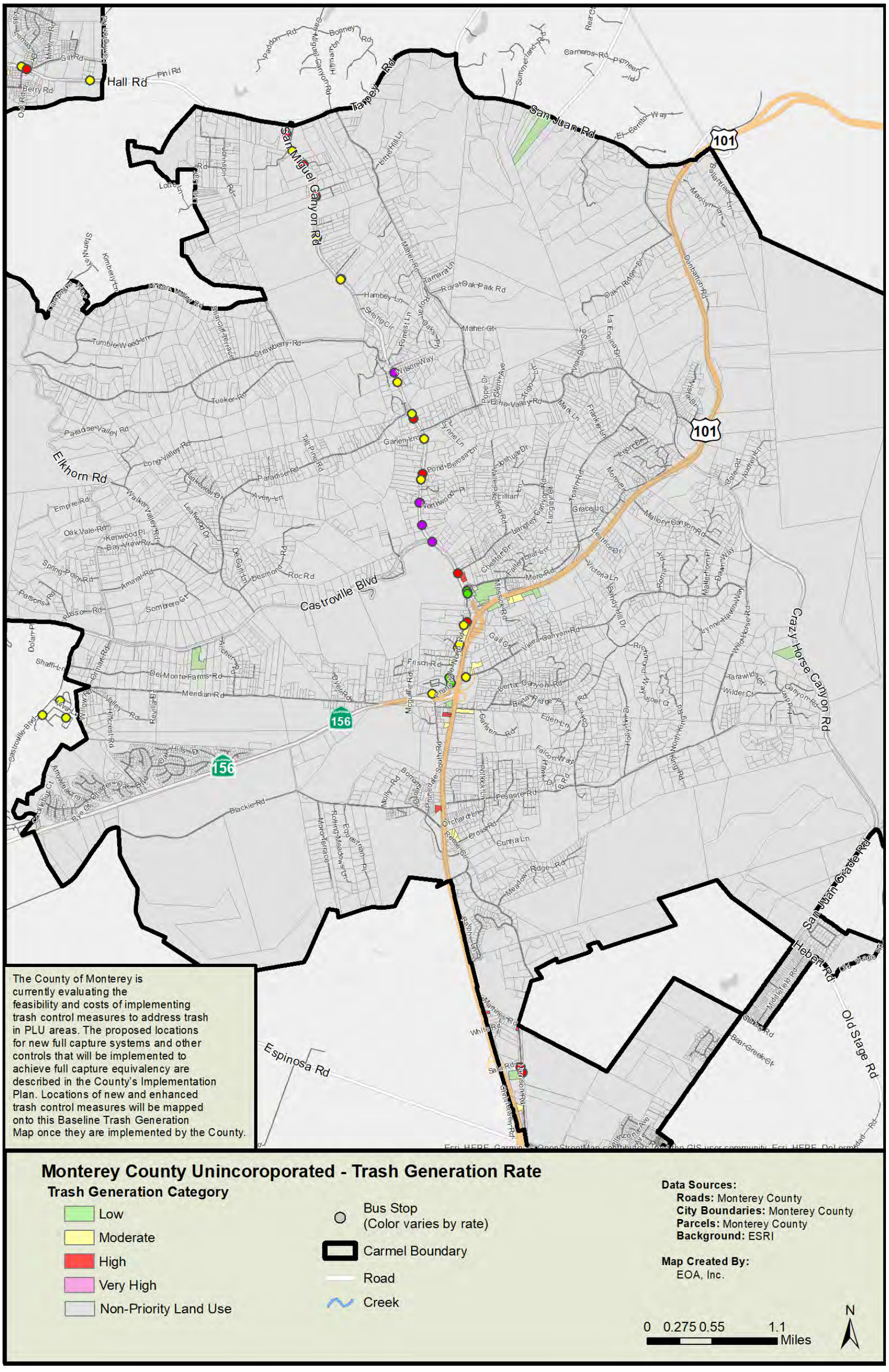


Figure B-6d. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Prunedale area.

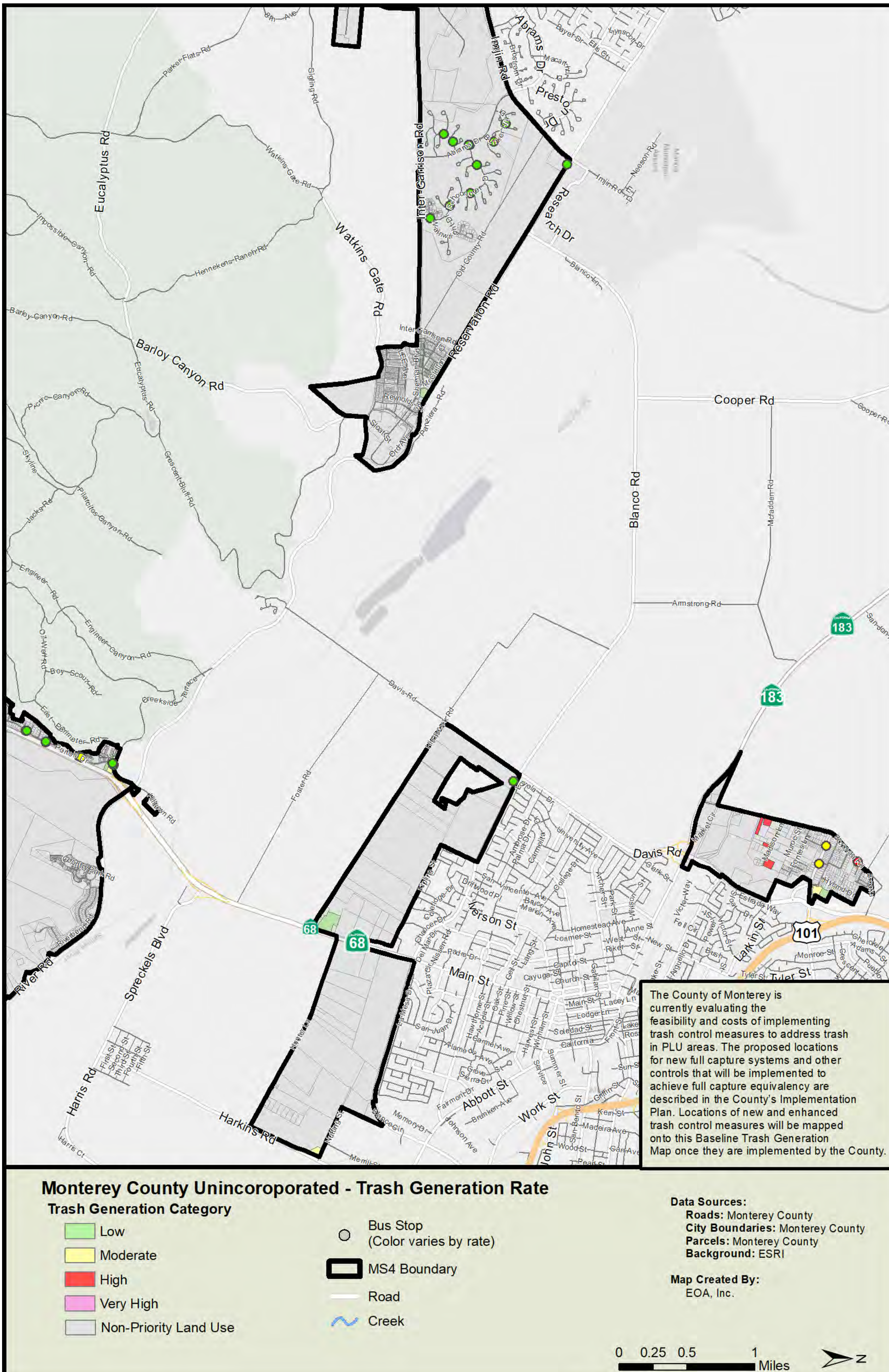


Figure B-6e. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Boronda and East Garrison areas.

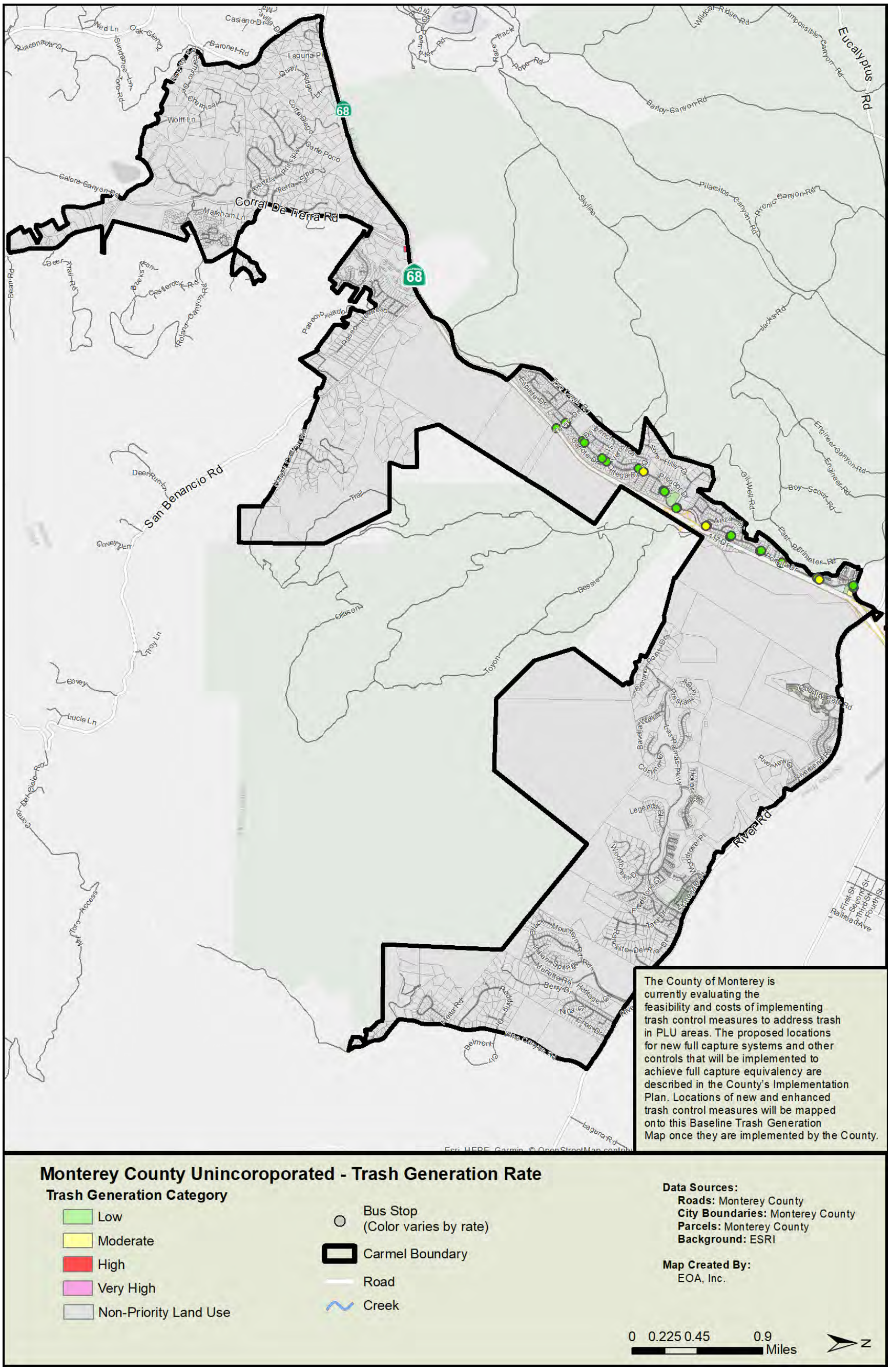


Figure B-6f. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Serra Village and Ambler Park areas.

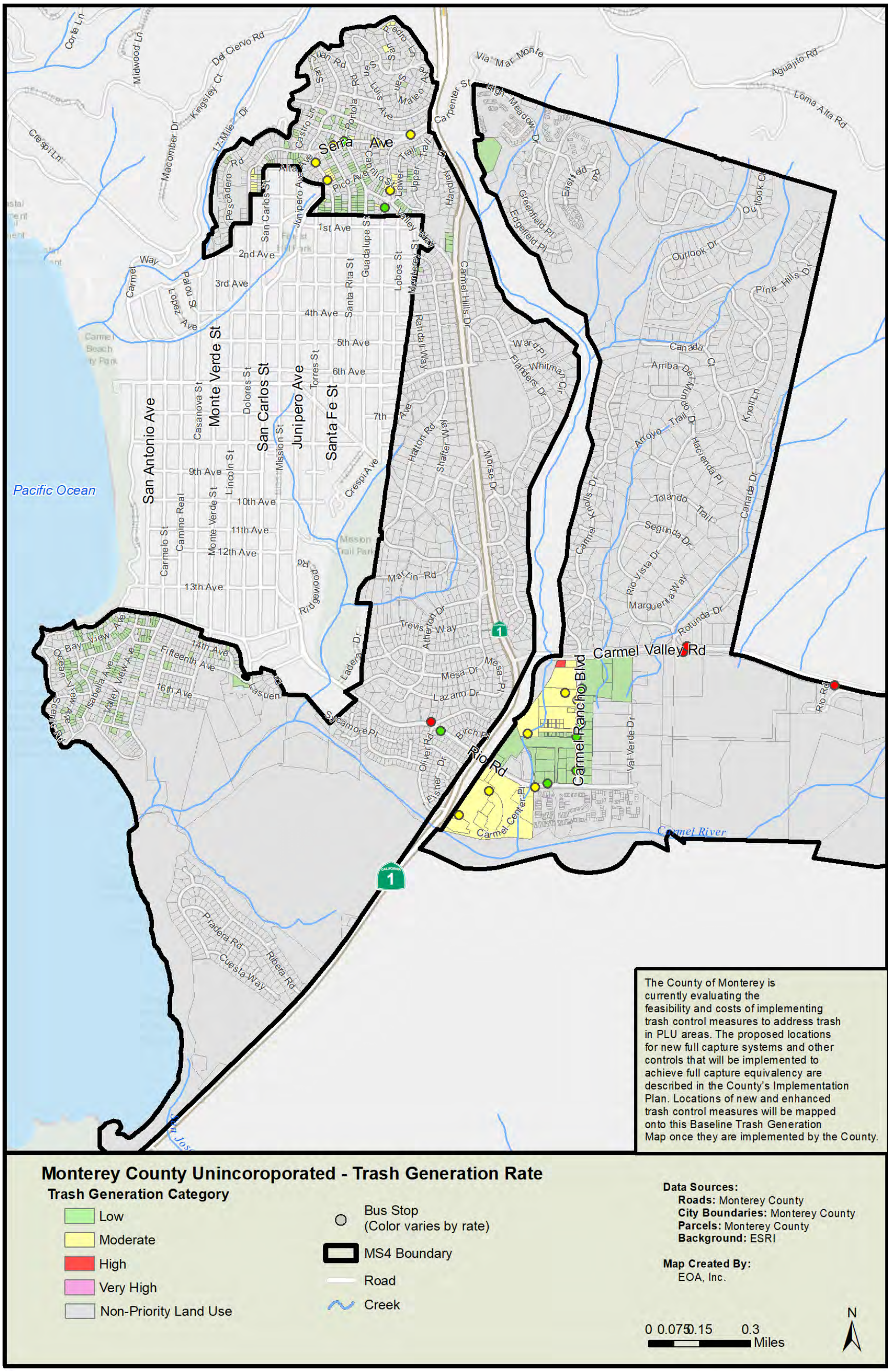


Figure B-6g. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Carmel area.

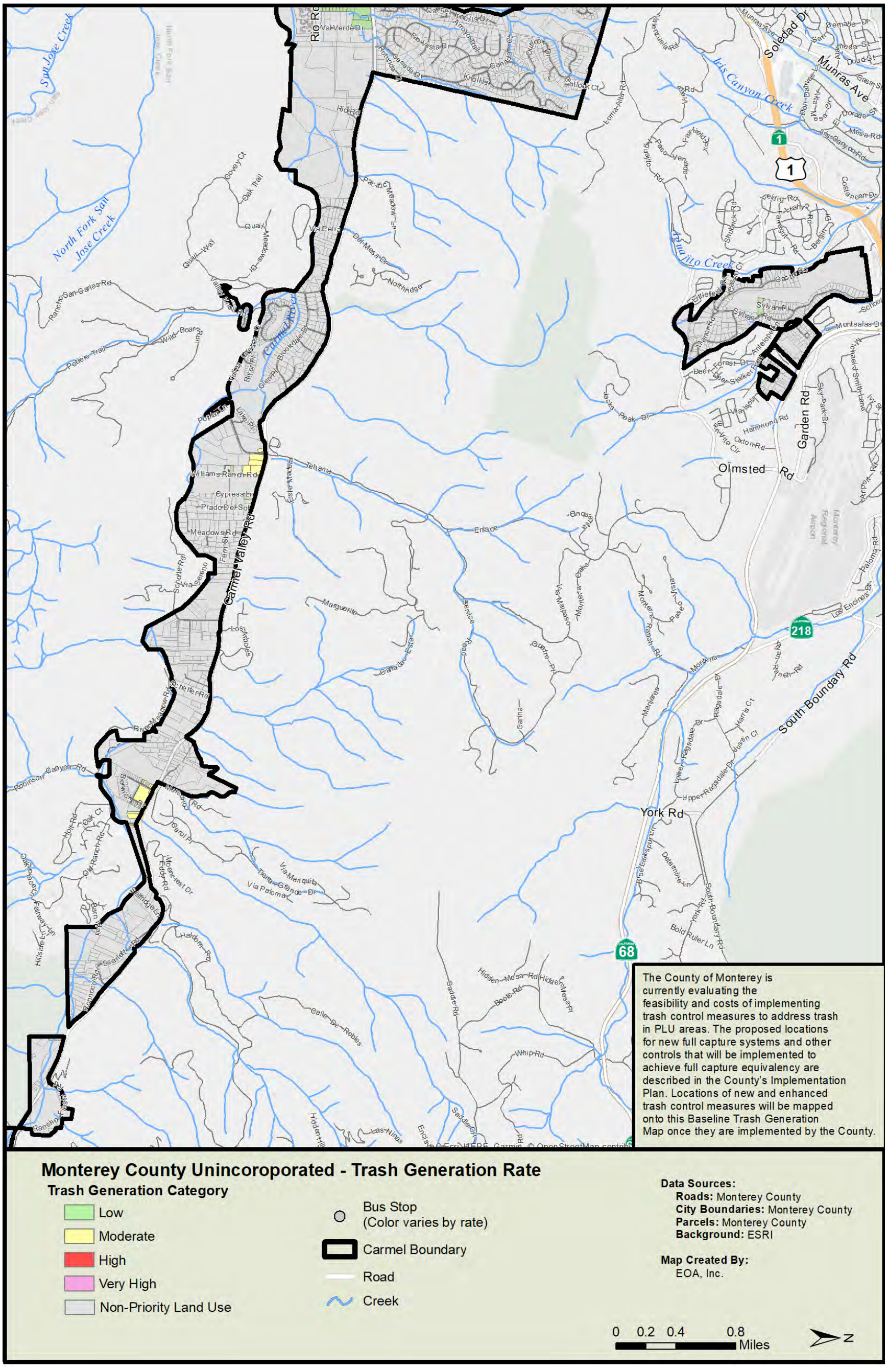


Figure B-6h. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Carmel Valley Road area.

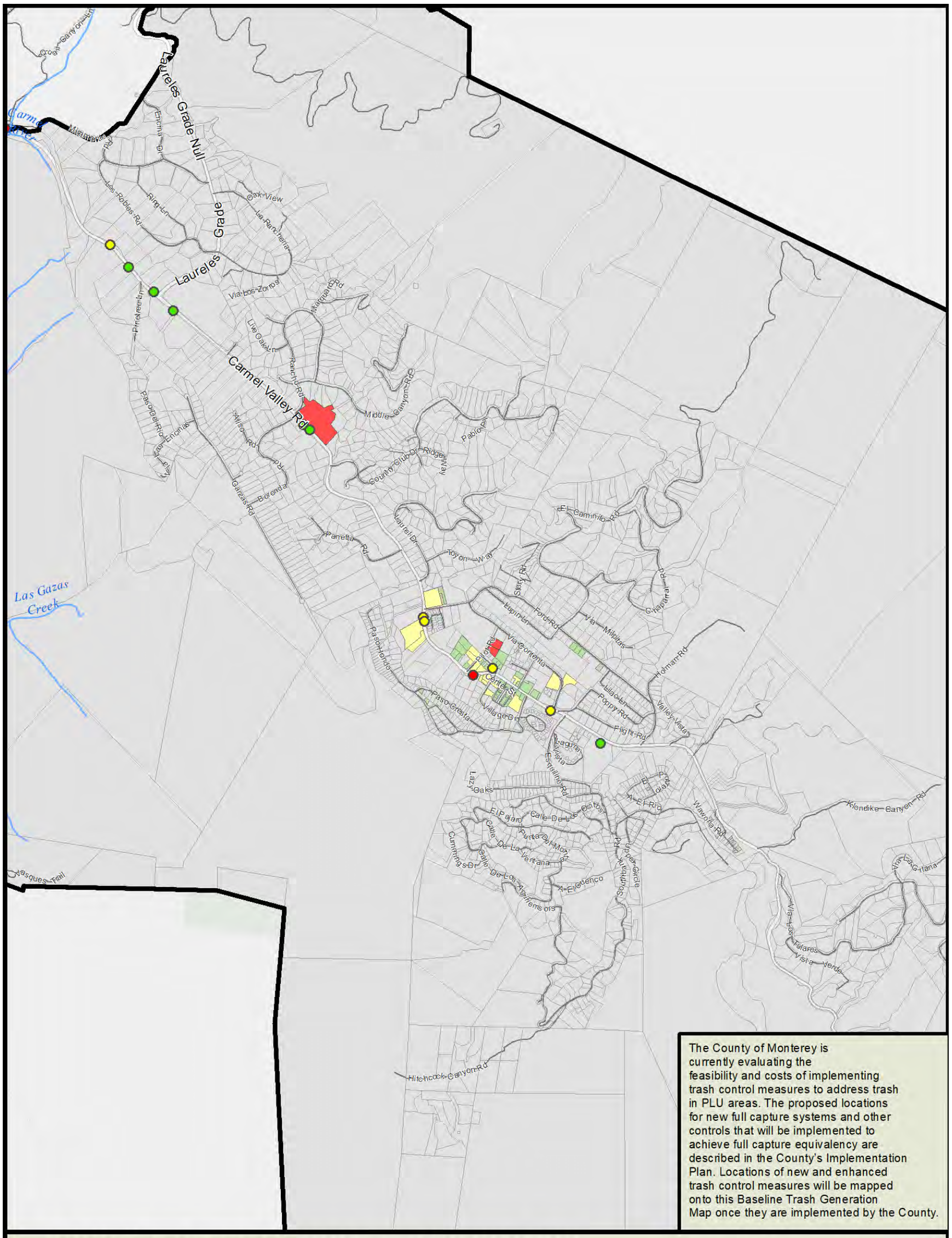


Figure B-6i. Unincorporated Monterey County Preliminary Baseline Trash Generation Map - Carmel Valley area.

Appendix C

Full Description of Potential OVTA Program

On-Land Visual Trash Assessment Program

OVTAs have been identified by the State Water Board as a leading indicator of trash load reductions in stormwater discharges from MS4s. There are three OVTA protocols. Protocol A is for OVTAs conducted on streets with sidewalks, Protocol B is for driving surveys on streets without sidewalks or that are otherwise unsafe for pedestrians, and Protocol C is for area-based assessments where there are no streets. It is likely that a combination of all three protocols will be used to assess progress toward trash reduction goals.

The methods used to develop the OVTA Program for the Monterey County Agencies, including the random selection of assessment sites that will ensure that they accurately represent trash levels in each PLU area, are documented in this section. The selection of representative assessment sites where future OVTAs will be conducted provides the confidence necessary to accurately report trash load reductions to the State Water Board. Assessment results from the OVTA Program will represent on-going trash levels on streets, sidewalks and land areas to provide a comparison to baseline levels. The levels of trash present in these areas correlate well with the amount of trash observed in MS4s (BASMAA 2017).

Please note: the assessment needs identified in this Appendix are preliminary and presented for illustrative purposes. At this time, Monterey Permittees are not committing to conducting assessments at the levels included in this section. The assessment needs identified in this section assume that no full capture systems are or will be installed within Monterey Permittee jurisdictional areas and that Permittees would choose to conduct assessments in locations representative of all PLU areas. Should full capture systems be installed, then the assessment needs included in the table would need to be reevaluated and implemented consistent with NPDES permit requirements.

Creating the OVTA Assessment Frame

An assessment (or sampling) frame is a list or set of information that defines a population of interest where a sampling site can be selected from. The assessment frame for evaluating trash levels in PLU areas over time is based on the lengths of all public streets/sidewalks and transects established on other PLU areas that are not direct associated with streets. Streets/sidewalks are represented in GIS by a curb line network, which was created using the Monterey County road centerline dataset for the and buffering that line by a radius based on the road type (local, arterial, collector, etc.).

Once the assessment frame was developed, each segment of the curb line network and the transects for areas were assigned a baseline trash generation category (i.e., low, moderate, high, or very high). Assignments were based on the trash generation level depicted on the baseline trash generation map. Applicable curb feet within each trash generation category are listed in Table C-1. Curbs lines and transects associated with low trash generating areas and areas addressed by trash full capture systems are not included in the applicable assessment frame lengths because in both cases, the trash reduction goal has been achieved for these areas.

Table C-1. Assessment frame lengths (feet) associated with each PLU area and each trash generation category. Lengths are based on the Baseline Trash Generation.

PLU Area	Type of Assessment Area	Assessment Frame Lengths (feet) in each Baseline Trash Generation Category			
		Moderate	High	Very High	Total
Seaside	Street/Sidewalk	278,604	31,764	--	310,369
	Transect	7,799	2,082	--	9,881
	Total	**286,403**	**33,847**	--	**320,250**
Carmel-by-the-Sea	Street/Sidewalk	45,643	2,167	--	47,810
	Transect	597	0	--	597
	Total	**46,240**	**2,167**	**–**	**48,407**
Sand City	Street/Sidewalk	19,621	1,168	--	20,789
	Transect	1,923	163	--	2,086
	Total	**21,544**	**1,331**	**–**	**22,875**
Del Rey Oaks	Street/Sidewalk	638	1,886	–	2,524
	Transect	204	207	–	411
	Total	**842**	**2,093**	**–**	**2,935**
Unincorporated County	Street/Sidewalk	31,074	14,597	436	46,107
	Transect	12,066	4,015	--	16,081
	Total	**43,140**	**18,612**	**436**	**62,188**

Identifying Assessment Needs

Once the assessment frame was completed, assessment needs (extent and frequency) were identified prior to selecting OVTA sites. Similar to the Phase I NPDES Permit in the SF Bay Area, target assessment lengths representing at least 10% of the curb miles and transects that are representative of each PLU area were established. To ensure that the 10% of curb and transect feet selected are representative of the all applicable areas in each PLU, the trash generation levels in all PLUs and the proportion of these areas that are within each baseline trash generation category were calculated (Table C-2).

Table C-2. Proportions of PLU areas in each baseline trash generation category.

PLU Area	Area	Proportions of PLU Areas in Each Baseline Trash Generation Category		
	(acres)	Mod	High	Very High
Seaside	563	89%	11%	0%
Carmel-by-the-Sea	382	95%	5%	0%
Sand City	201	95%	5%	0%
Del Rey Oaks	382	51%	49%	0%
Unincorporated County	201	74%	25%	< 1%

For each Monterey Permittee, the proportions of land areas that fall within each applicable baseline trash generation category (as illustrated in Table C-2) serve as a guide for establishing the assessment needs for each PLU and ensuring the sites that are ultimately selected are representative of the trash levels in all Monterey Permittee PLU areas. To identify the assessment needs for each Permittee, the proportions in Table C-2 for each trash generation category were multiplied by 10% of the total curb/transect lengths presented Table C-1 for each PLU area. This resulted in the minimum lengths of assessments that the Monterey Permittees should assess to achieve the 10% target. This set of assessment lengths is intended to adequately represent the trash levels in each PLU area. These assessment lengths for each of the Monterey Permittee's PLU areas are presented in Table C-3.

Table C-3. Minimum assessment lengths in each PLU area where OVTAs will be conducted by the Monterey County Agencies.

PLU Area	Type of Assessment Area	Assessment Lengths (feet) in each Baseline Trash Generation Category			
		Moderate	High	Very High	Total
Seaside	Street/Sidewalk	27,860	3,176	--	31,037
	Transects	780	208	--	988
	# 500 ft OVTA Sites	58 (56 street & 2 transects)	8 (7 street & 1 transects)	--	66
Carmel-by-the-Sea	Street/Sidewalk	4,564	217	--	4,781
	Transects	60	0	--	60
	# 500 ft OVTA Sites	11 (10 street & 1 transects)	1 (1 street & 0 transects)	--	12
Sand City	Street/Sidewalk	1,962	117	--	2,079
	Transects	192	16	--	209
	# 500 ft OVTA Sites	5 (4 street & 1 transect)	2 (1 street & 1 transect)	--	7
Del Rey Oaks	Street/Sidewalk	64	189	--	252
	Transects	20	21	--	41
	# 500 ft OVTA Sites	2 (1 street & 1 transect)	2 (1 street & 1 transect)	--	4
Unincorporated County	Street/Sidewalk	3,107	1,460	44	4,567
	Transects	1,207	401	--	1,608
	# 500 ft OVTA Sites	10 (7 street & 3 transects)	4 (3 street & 1 transect)	1 (1 street & 0 transects)	15

Selecting and Drawing Assessment Sites

Should Permittees decide to move forward with conducting OVTAs, each OVTA site will be roughly 500 feet in length. Considering this, potential site locations will be identified at every 500-foot interval along the assessment frame, beginning with a randomly selected starting point. This will result in approximately 926 potential assessment sites between the five agencies. These potential

sites will then be placed in a random order to form a list of randomly selected assessment sites that were evaluated to avoid biasing the site selection process, and allowing the sites that are eventually selected to be representative of broader applicable areas within the entire PLU area.

Beginning at the top of the randomly ordered assessment site list, potential sites will be evaluated and compared to the assessment needs listed in Table C-3. A site will be rejected from the list if the length of the site is addressed by a trash full capture system, or if the site does not assist the Permittee in maintaining representativeness of the baseline acres that the assessment sites are intended to represent.

Assuming no additional full capture systems are installed, OVTA sites representing 42,760 feet of curb length and 2,906 feet of transects will be selected using the process described above. This equates to roughly 91, 500-foot assessment sites, although approximately 104 sites will be needed to ensure that each Baseline Trash Generation Category for each Permittee is represented (see Table C-3). At the time this Plan was finalized, assessment sites had not yet been established. Sites selection is currently planned in FY 2019-20 and will be adjusted based on future implementation of full capture systems and other trash control measures.

Assessment Frequency and Averaging Period

Based on the findings of the *Tracking California's Trash* project that evaluated the results of over 3,000 OVTAs, the frequency of assessments needed confidently demonstrate an improvement in trash levels is highly dependent on the degree of improvement that one wishes to assert with statistical confidence (BASMAA 2016). For demonstrating compliance with trash load reductions required by the Bay Area Phase I NPDES permit for municipal stormwater, the study recommended conducting a minimum of 3 assessments per year at each OVTA site. Additionally, the study indicated that decisions on whether trash reductions are best depicted by assessments conducted in one or more years should be made based on: 1) the required reporting cycle; 2) the variability in OVTA scores at the set of sites; and 3) the timing of the anticipated improvement in trash generation levels. For Monterey Permittees, averaging the two most recent years of data (i.e., ~ 6-8 OVTA results) when reporting trash load reductions to the State Water Board should provide an acceptable level of confidence in depicting the "on-going" levels of trash associated with its stormwater conveyance system.

Modifications to the OVTA Program Over Time

The OVTA program described in this document is designed to address Trash Amendment requirements and represent on-going levels of trash in areas that are not treated by trash full capture systems, and are generating moderate, high, or very high levels of trash. Should any of the Permittees elect to install additional trash full capture systems, then the OVTA program should be modified to remove sites within areas now addressed by full capture systems. Additionally, as new full capture systems are installed, new assessment sites may need to be established to allow the set of OVTA sites to remain representative of the broader areas within each PLU for which trash load reductions are being reported. It is recommended that an evaluation of the OVTA program occur annually, prior to assessments beginning each fiscal year, and modifications be documented each Agency's corresponding annual reports to the State/Regional Water Board.

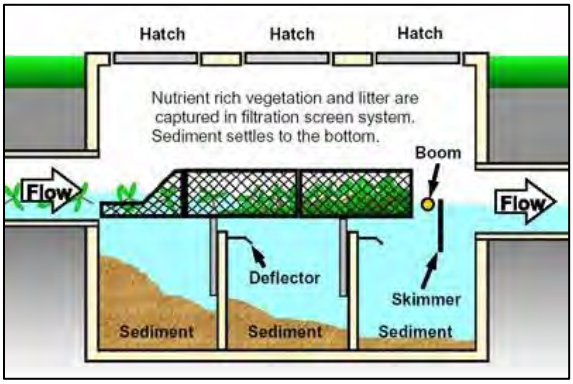
Appendix D

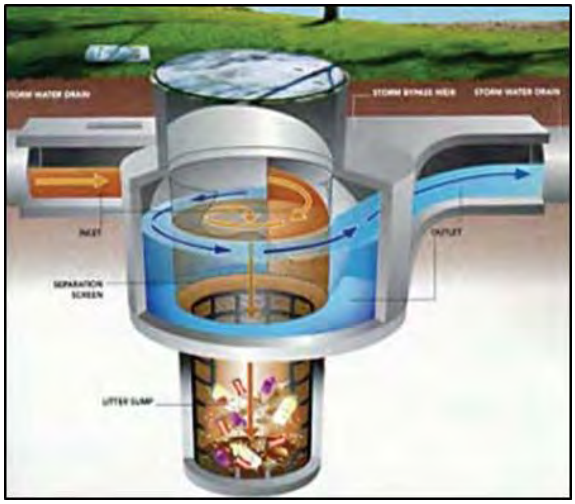
Draft Project Scopes and Cost Estimates

Project #1: Feasibility Evaluation of a Large Trash Full Capture System *West Bay Avenue Catchment*

Implementing Entity(s): Cities of Seaside and Sand City

Background & Project Summary





Municipalities in Monterey County are subject to requirements in the Phase II NPDES permit issued by the State Water Resources Control Board (State Water Board) and administered by the Central Coast Regional Water Quality Control Board (Regional Water Board). In 2017 the State Water Board issued a 13383 Order, requiring Phase II municipalities to submit a method to comply with the statewide trash provisions/amendments and submit a Trash Control Measures Implementation Plan that describes the actions that will be taken to achieve significant reductions in trash discharged from municipal separate storm sewer systems (MS4s). The purpose of this scope of work and cost estimate is to describe a proposed project that is intended to assist Monterey County municipalities in beginning to address the trash reduction requirements described in the 13383 Order. Full compliance with the trash reduction requirements is required by 2030.

This proposed feasibility study entails the evaluation of the feasibility and costs of constructing a large, high flow capacity certified trash full capture system at a location within the City of Sand City's MS4 that addresses 100% of the trash reduction requirements for both the City of Seaside and Sand City. For the five Monterey Permittees addressed by the Implementation Plan, this system would address roughly 65% of the baseline trash generated. The project will include the identification of: the optimal location(s) where the full capture system (see examples above) could be sited, in consideration of localized site constraints, including utilities, permitting and tidal influence; the hydraulic sizing of the system needed to address the peak flow from runoff generated from the 1-year, 1-hour storm event in the drainage area of the system; the conceptual design of the system and revised cost estimate for design and construction; the anticipated maintenance and operation requirements and costs; and a proposed scheme for the two cities to share the costs of design, construction and maintenance/operation. The study will build upon recent trash full capture opportunities and constraints analysis conducted for the Monterey Regional Stormwater Management Program (EOA, 2018) and preliminary trash full capture design calculations conducted for the City of Seaside (Wallace Group 2018).

Project Location

The general location of the proposed study is on the 90" main line of the underground stormwater conveyance that runs directly down West Bay Street in the City of Sand City (see map insert). From a maximum trash reduction benefit perspective, the optimal location to site the device would be between its outfall at Monterey Bay and its intersection with Sand Dunes Drive (westside of the Highway 101). If sited at in this segment of the conveyance system, an estimated 1080 acres of land area (901 acres in Seaside and 179 acres in Sand City) would be addressed by the system. Alternative locations upstream of this segment of the stormwater conveyance could also be viable

sites for the device, but may not provide a commensurate trash reduction benefit. Siting the device west of Sand Dunes Drive would allow each City to demonstrate full compliance with trash reduction requirements.

Scope of Work

1. Identify Optimal Siting – This task would identify the optimal location(s) where the full capture system could be sited along the main 90" line. The task would include field visits to the site and an evaluation of the localized site constraints, including potential conflicts with utilities (underground and overhead). Additionally, any environmental and other permitting needs would be identified, including access for maintenance and operation of the device. Issues associated with tidal influence would also be identified.
2. Develop Hydraulic Sizing – For the system to be considered a "full capture system", it must screen trash >5mm in size from the peak flow generated from the 1-year, 1-hour storm event in the drainage area of the system. An initial study was conducted for the City of Seaside in 2007 by Schaaf and Wheeler to identify the hydrology associated with the West Bay Catchment. Subsequent to this initial study, two preliminary estimates of the peak flow from the catchment were also generated for the City. One from the Wallace Group (2018) that used local rainfall depths and the rationale method described by the State Water Board, and one from EOA (2018) that also used local rainfall depths, but used a method that takes into consideration time of concentration and existing stormwater treatment within the drainage area, which is also allowed per State Water Board guidance materials. The two methods generate significantly different rainfall depths (Wallace Group – 0.44 inches and EOA – 0.34 inches) and peak flows (Wallace Group – 282 cfs and EOA – 144 cfs). Additionally, different drainage areas were used in each analysis. This task would refine the drainage areas, rainfall depths and peak flow computations to ensure the systems are sized correctly and therefore could be considered "full capture."
3. Conceptual Design and Cost Estimate – Following the finalization of the hydraulic sizing for the selected site, a conceptual design of the system and a refined cost estimate for designing and constructing the system can be developed. Through this task, the different trash full capture systems currently certified by the State Water Board would be evaluated for feasibility of constructing at the selected site and the costs of various alternatives would be developed and presented to the cities. Maintenance and operation requirements and associated costs and a preliminary evaluation of potentially required environmental permitting (e.g., CEQA) would also be included in the analysis. The advantages and disadvantages of each alternative would be documented to allow the cities to fully evaluate which designs/types of systems are the most feasible and cost-effective to implement and maintain. As an outcome of this task, the cities would have the information necessary to decide whether to move forward with the design and construction of the system.
4. Cost Sharing Alternatives – In addition to the design and costing of the system, the potential sources of funding and approaches to sharing costs between the cities would be explored in this task. Alternative cost-sharing schemes for the design, construction and maintenance/operation of the systems would be summarized and presented to City staff, which would set an agreeable course for developing a cost-sharing agreement or memorandum of understanding between the two cities.

Cost Estimate for Project

The estimated cost for completion of this feasibility study is between $35,000 and $50,000, not including City staff time. This is a broad cost estimate that should be refined based upon the negotiated scope of services between the cities and a qualified engineering firm.

The preliminary planning level "base" costs for the planning, design, and purchase and construction/installation of the device are estimated to be between $1.8M and $3.1M (Wallace Group 2018; EOA 2018). Annual costs of maintaining the system is estimated at approximately $7,500 (EOA 2018). Implementation of this device would require City Council approval for funding and procurement of a design/construction contractor.

Project Schedule

It is anticipated that this project would begin in 2019 and be completed prior to end of 2020.

References

EOA (2018). Evaluation of Stormwater Trash Control Measure Opportunities and Constraints. Draft. Prepared for the Monterey Regional Stormwater Management Program. Prepared by EOA, Inc. September.

Wallace Group (2018). Del Monte Stormwater Diversion Draft Preliminary Design Memorandum. Prepared for the City of Seaside. September.

Schaaf and Wheeler (2007). Bay Avenue Storm Drain Hydrology Memorandum. Prepared for the City of Seaside. October.

Project #2: Evaluation of a Large Trash Full Capture System
Pajaro Catchment

Implementing Entity(s): Unincorporated County of Monterey

Background & Project Summary

Municipalities in Monterey County are subject to requirements in the Phase II NPDES permit issued by the State Water Resources Control Board (State Water Board) and administered by the Central Coast Regional Water Quality Control Board (Regional Water Board). In 2017 the State Water Board issued a 13383 Order, requiring Phase II municipalities to submit a method to comply with the statewide trash provisions/amendments and submit a Trash Control Measures Implementation Plan that describes the actions that will be taken to achieve significant reductions in trash discharged from municipal separate storm sewer systems (MS4s). The purpose of this scope of work and cost estimate is to describe a proposed project that is intended to assist Monterey County municipalities in beginning to address the trash reduction requirements described in the 13383 Order. Full compliance with the trash reduction requirements is required by 2030.

This proposed project entails the evaluation of the feasibility and costs of constructing a large, high flow capacity certified trash full capture system at a location within the Unincorporated County of Monterey that addresses approximately 80% of the County's trash reduction requirements. The project will include the identification of: the optimal location(s) where the full capture system (see example above) could be sited, in consideration of localized site constraints, including utilities and permitting; the hydraulic sizing of the system needed to address the peak flow from runoff generated from the 1-year, 1-hour storm event in the drainage area of the system; the conceptual design of the system and revised cost estimate for design and construction; and the anticipated maintenance and operation requirements and costs. The project will build upon recent trash full capture opportunities and constraints analysis conducted for the Monterey Regional Stormwater Management Program (EOA, 2018) and evaluate opportunities for funding from partner agencies (i.e., Caltrans).

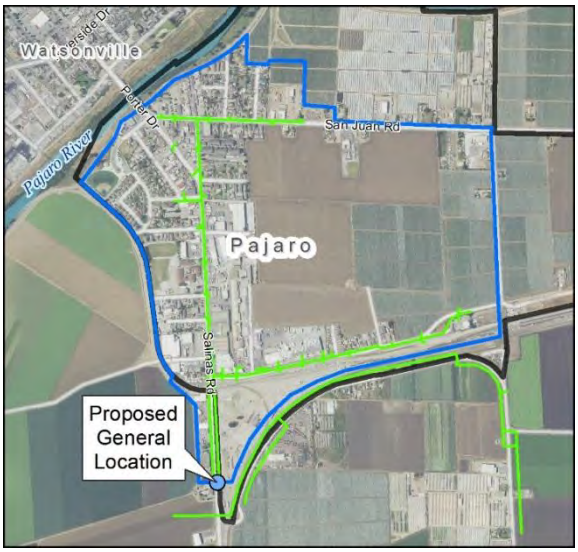
Project Location

The general location of the project is along the dual main stormwater conveyance lines that run parallel to Salinas Road, downstream of Watsonville Junction and the Pajaro area (see map insert on next page). From a maximum trash reduction benefit perspective, the optimal location to site the device would be at or directly upstream of the stormwater outfall that discharges into a roadside ditch that begins at Trafton Road. If sited at this location, an estimated 400 acres of land area would be addressed by the system. Alternative locations upstream of this outfall in the underground portion of the County-maintained stormwater conveyance could also be viable sites for the full capture system and should be explored.

Scope of Work

1. **Identify Optimal Siting –** This task will identify the optimal location(s) where the full capture system could be sited along or at the outfall of the 42-inch and 48-inch stormwater conveyance lines. The task will include field visits to the site and an evaluation of the localized site constraints, including potential conflicts with utilities (underground and overhead). Additionally, any environmental and other permitting needs will be identified, including access for maintenance and operation of the device. Issues associated with potential flooding will also be identified.

2. Develop Hydraulic Sizing – For the system to be considered a "full capture system", it must screen trash >5mm in size from the peak flow generated from the 1-year, 1-hour storm event in the drainage area of the system. A preliminary estimate of the peak flow has been generated by EOA (2018) that used local rainfall depths and a rationale method that takes into consideration time of concentration and existing stormwater treatment within the drainage area. EOA's estimate of the 1-hr rainfall depth for the 1-year storm event is 0.31 inches and the resulting peak is 60 cfs, distributed between the 48-inch and 42-inch drainage lines. This task will refine the drainage areas, and recalculate the rainfall depths and peak flow to ensure the systems are sized correctly and therefore would be considered "full capture."



3. Conceptual Design and Cost Estimate – Following the finalization of the hydraulic sizing for the selected site, a conceptual design of the system and a refined cost estimate for designing and constructing the system can be developed. Through this task, the different trash full capture systems currently certified by the State Water Board will be evaluated for feasibility of constructing at the selected site and the costs of various alternatives will be developed and presented to the cities. Maintenance and operation requirements and associated costs and a preliminary evaluation of potentially required environmental permitting (e.g., CEQA) would also be included in the analysis. The advantages and disadvantages of each alternative will be documented to allow the cities to fully evaluate which designs/types of systems are the most feasible and cost-effective to implement and maintain. As an outcome of this task, the cities will have the information necessary to decide whether to move forward with the design and construction of the system.

Cost Estimate for Project

The estimated cost for completion of this project is between $35,000 and $50,000, not including County staff time. This is a broad cost estimate that should be refined based upon the negotiated scope of services between the cities and a qualified engineering firm.

The preliminary planning level "base" costs for the planning, design, and purchase and construction/installation of the device are estimated to be roughly $1.3M (EOA 2018). Should the County decide to move forward with an "end-of-pipe" netting system, base costs could be significantly less. Annual costs of maintaining the system at the location identified is estimated at approximately $5,000 (EOA 2018). Implementation of this device would require City Council approval for funding and procurement of a design/construction contractor

Project Schedule

It is anticipated that this project would begin in 2019 and be completed prior to end of 2020.

References

EOA (2018). Evaluation of Stormwater Trash Control Measure Opportunities and Constraints. Draft. Prepared for the Monterey Regional Stormwater Management Program. Prepared by EOA, Inc. September.

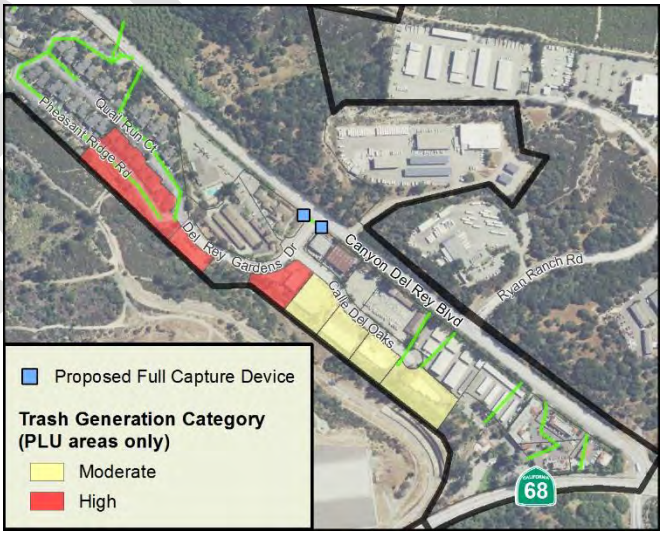
Project #3: Evaluation of Trash Sources and the Installation of Small Trash Full Capture Devices

Implementing Entity(s): City of Del Rey Oaks

Background & Project Overview

Municipalities in Monterey County are subject to requirements in the Phase II NPDES permit issued by the State Water Resources Control Board (State Water Board) and administered by the Central Coast Regional Water Quality Control Board (Regional Water Board). In 2017 the State Water Board issued a 13383 Order, requiring Phase II municipalities to submit a method to comply with the statewide trash provisions/amendments and submit a Trash Control Measures Implementation Plan that describes the actions that will be taken to achieve significant reductions in trash discharged from municipal separate storm sewer systems (MS4s). The purpose of this scope of work and cost estimate is to describe a proposed project that is intended to assist Monterey County municipalities in beginning to address the trash reduction requirements described in the 13383 Order. Full compliance with the trash reduction requirements is required by 2030.

This proposed project entails the evaluation of trash levels and sources in trash generating priority land use (PLU) areas identified by the City of Del Rey Oaks, and the purchase, installation and maintenance of two small full capture devices in two catch basins located near these PLUs. The project will include conducting site visits to trash generating PLU areas (9 acres) identified on the City's Baseline Trash Generation Map in an attempt to identify trash sources and control measures that the City could implement (or cause to be implemented) to address trash from these properties. Additionally, the project would include purchasing and installing State Water Board certified small trash capture devices (see example on next page) in two stormwater catch basins near these PLU areas, and delineating and mapping the extent of the land areas draining to each full capture device.



Project Location

The general location of the project is the area on Del Rey Garden Drive and Calle Del Oaks, near Canyon Del Rey Boulevard, as identified in the map insert to the right. The two stormwater catch basins are located at the intersection of Canyon del Rey Boulevard and Del Rey Garden Drive. This area contains nearly all trash generating PLU areas identified in the City.

Scope of Work

1. **Conduct Site Visits to Trash Generating PLU Areas and Identify Trash Sources –** PLU areas within the project area have been identified as generating high or moderate levels of trash, and therefore enhanced trash control measures are required to address trash in these areas. As a first step toward understanding the sources of trash in these areas and the appropriate trash control measures to implement, site visits to the trash generating properties will be conducted following On-land Visual Trash Assessment (OVTA) protocols. Sources of trash associated with each property will be documented during site visits and (as appropriate) outreach will be conducted to property owners/managers on the trash reduction requirements and actions that the property owner can take to reduce trash levels on the properties and adjacent streets and sidewalks.

2. Select, Install and Maintain Small Trash Full Capture Devices – The State Water Board certifies proprietary stormwater treatment devices as "trash full capture" systems. Numerous small and large (high flow capacity) systems have been certified to-date. For a stormwater treatment system to be considered a "trash full capture system", it must screen trash >5mm in size from the peak flow generated from the 1-year, 1-hour storm event in the drainage area of the system and be maintained adequately. In this task, the City will research, select, purchase and install two small full capture devices in catch basins draining trash generating PLU areas. Following installation, the City will inspect and maintain the devices to evaluate the functioning of the devices and maintenance requirements. The City may also choose to install auto-retractable screens (see image on bottom-right) on the curb inlet faces of the catch basins, which will likely reduce the maintenance frequency of the devices.

3. Delineate and Map Land Areas Addressed by Small Full Capture Devices – Once the City installs two small capture devices, the City will delineate and map the land areas draining each catch basin. By mapping the drainage areas, the City will have information to assist the City in demonstrating progress towards trash reduction goals established by the State Water Board.

Cost Estimate for Project

The estimated cost for completion of this project is roughly $1,500 to $3,000 (EOA 2018), not including City staff time. This cost estimate assumes that City staff will conduct Task 1 and 3. Should the City decide to hire a contractor/consultant to conduct these tasks, the cost estimates above would increase. Additionally, if the City decides to install auto-retractable screens in addition to the small full capture systems, the cost estimates above would increase.

Project Schedule

It is anticipated that this project would begin in 2019 and be completed prior to end of 2020.

References

EOA (2018). Evaluation of Stormwater Trash Control Measure Opportunities and Constraints. Draft. Prepared for the Monterey Regional Stormwater Management Program. Prepared by EOA, Inc. September.

Project #4: Enhanced On-land Cleanup Program and On-land Visual Trash Assessments

Implementing Entity(s): City of Carmel by-the-Sea

Background & Project Overview

Municipalities in Monterey County are subject to requirements in the Phase II NPDES permit issued by the State Water Resources Control Board (State Water Board) and administered by the Central Coast Regional Water Quality Control Board (Regional Water Board). In 2017 the State Water Board issued a 13383 Order, requiring Phase II municipalities to submit a method to comply with the statewide trash provisions/amendments and submit a Trash Control Measures Implementation Plan that describes the actions that will be taken to achieve significant reductions in trash discharged from municipal separate storm sewer systems (MS4s). The purpose of this scope of work and cost estimate is to describe a proposed project that is intended to assist Monterey County municipalities in beginning to address the trash reduction requirements described in the 13383 Order. Full compliance with the trash reduction requirements is required by 2030. It is anticipated that this project would occur prior to 2022.

This proposed project entails establishing and implementing (at a pilot scale) an enhanced on-land trash cleanup project in the City of Carmel-by-the-Sea. The project will include contracting with a non-profit organization or other group to conduct enhanced on-land cleanups. Preliminarily, the City is considering working with Hope Services, a leading provider of services to people with developmental disabilities, to conduct enhanced on-land cleanups in the downtown portion of the City. Similar cleanup programs have been instituted by other Northern California cities with great success, including neighboring cities in Monterey County. On-land Visual Trash Assessments (OVTAs) will also be conducted to assess improvements in the levels of trash on streets and sidewalks where the cleanup program is implemented.

Project Location

The general location of the project is the downtown business district in the City of Carmel by-the-Sea. On the City's Baseline Trash Generation Map, this area is identified as one of the highest trash generating areas within the City. The geographical extent of the enhance cleanup program will be defined via the agreement with Hope Services.

Scope of Work

1. **Develop and Execute Agreement with Hope Services –** In coordination with Hope Services, the City will develop a scope of services and execute an agreement to implement a pilot enhanced on-land cleanup project in the downtown area of the City. The tasks that will be included in the agreement will include the pickup of trash/litter present on streets and sidewalks in the project area. The frequency of cleanup events that will occur will be identified in the agreement.
2. **Implement Pilot Enhanced On-land Cleanup Program** – Hope Services will conduct cleanup events at a frequency that the City believes will establish a consistent "low/A" trash generation level (i.e., a level equivalent to trash full capture) on the streets and sidewalks in the downtown area. The date and extent of the cleanup events and the volume of trash removed via each event will be tracked by the organization and reported to the City.
3. **Conduct On-land Visual Trash Assessments –** Once the pilot enhanced cleanup project is implemented, the City will conduct On-land Visual Trash Assessments (OVTAs) to evaluate the ability of the cleanup events at the frequency implemented to reduce trash on streets and sidewalks in the downtown. The City will

conduct OVTAs consistent with established protocols (EOA 2017, EOA 2018, EOA and Keish Environmental 2018) and at a frequency necessary to evaluate the ability of the project to establish a consistent "low/A" trash generation level (i.e., a level equivalent to trash full capture) on streets and sidewalks in the downtown area. For example, if cleanups occur at a monthly frequency, then OVTAs should occur at least monthly half-way between the cleanups, and preferably more frequently between cleanups to observe variations in OVTA scores and determine whether more frequent cleanups are need in some or all areas. All OVTA data will be tracked and managed by the City.

Cost Estimate for Project

The estimated cost for implementing this project is roughly $15,000 over 12 months, not including City staff time. This cost estimate assumes that City staff will conduct Task 1 and 3. Should the City decide to hire a contractor/consultant to conduct these tasks, the cost estimates above would increase.

Project Schedule

It is anticipated that this project would begin in 2019 and be completed prior to end of 2021.

References

EOA (2017). On-land Visual Trash Assessment Protocol for Stormwater. Protocol C – Driving Surveys v.1.0. Prepared by EOA, Inc. September.

EOA (2018). On-land Visual Trash Assessment Protocol for Stormwater. Protocol A – Street and Sidewalk Surveys v.2.0. Prepared by EOA, Inc. April.

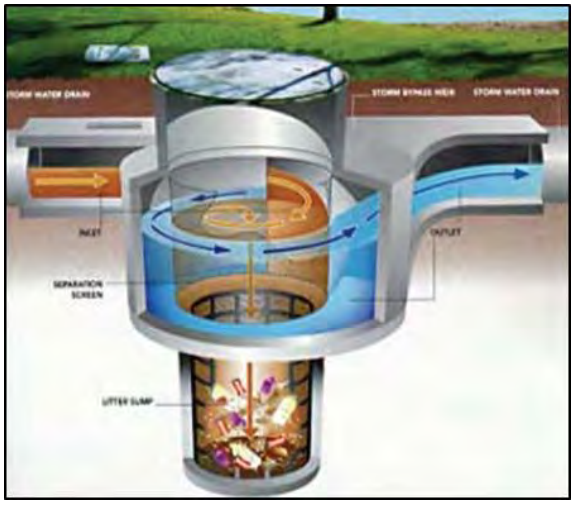
EOA and Keish Environmental (2018). On-land Visual Trash Assessment Protocol for Stormwater. Protocol C – Area-based Surveys. Prepared by EOA, Inc and Keish Environmental, Inc. April.

Project #5: Evaluation of the Trash Reduction Benefits of Existing Hydrodynamic Separator Units

Implementing Entity(s): Multiple

Background & Project Summary

Municipalities in Monterey County are subject to requirements in the Phase II NPDES permit issued by the State Water Resources Control Board (State Water Board) and administered by the Central Coast Regional Water Quality Control Board (Regional Water Board). In 2017 the State Water Board issued a 13383 Order, requiring Phase II municipalities to submit a method to comply with the statewide trash provisions/amendments and submit a Trash Control Measures Implementation Plan that describes the actions that will be taken to achieve significant reductions in trash discharged from municipal separate storm sewer systems (MS4s). The purpose of this scope of work and cost estimate is to describe a proposed project that is intended to assist Monterey County municipalities in beginning to address the trash reduction requirements described in the 13383 Order. Full compliance with the trash reduction requirements is required by 2030.



Currently the State Water Board has certified a series of proprietary stormwater treatment systems as "trash full capture systems." Hydrodynamic separator (HDS) units are include on the list of certified full capture systems if adequately sized to address the trash full capture design criteria (i.e., screen >5mm and treat the 1-year, 1-hr peak flow rate). There are a number of HDS units that were installed prior to the development of the criteria and address peak flow rates less that those generated by the 1-year, 1-hr storm event. For some municipalities, such as the City of Carmel by-the-Sea, these existing stormwater treatment systems receiving runoff from large land areas (e.g., >100 acres) that contain priority land use (PLU) areas that generate significant levels of trash. This proposed project entails conducting an evaluation and quantifying the trash reduction benefits of existing HDS units. By evaluating and quantifying the benefits of these systems, cities within Monterey County can adequately account for the trash reduction benefits of existing stormwater treatment systems that otherwise would not be included in the compliance framework adopted by the State Water Board.

This project will include the identification of existing HDS units in the County and calculation of their stormwater treatment capacity, the establishment of a methodology to evaluate the trash reduction benefits associated with treatment of different levels of peak flow, and based on this methodology, the quantification of the expected trash reduction benefits of each HDS unit inventoried.

Project Location

The desktop study will include HDS units in Monterey County.

Scope of Work

1. **Inventory Existing HDS Units** -Through this task a full inventory of HDS units currently operational in the cities of Carmel, Del Rey Oaks, Seaside, Sand City and the County of Monterey will be compiled by querying city/county staff. The compilation will include information necessary to

calculate the flow that the systems are designed to treat and compare against the full capture design criteria, including the location of the system, its drainage area, and the vendor and model number and configuation of the device.

2. Develop Methodology for Evaluating Trash Reduction Benefit – Currently, no methodology exists to establish a trash reduction benefit of stormwater treatment systems that treat flows less than those generated from the 1-year, 1-hour storm event. Through this task, a literature review will be conducted to summarize the methods used to calculate the pollutant reduction benefits of treatment systems for other pollutants that may behave similarly in the environment (e.g., gross solids) and information on the variations in the amount of trash transported within a storm event and among different sized storm events. Based on the findings of the literature review, a draft methodology will be developed for review and comment by cities/county and Regional Water Board staff. Based on comments received, a final methodology will be developed and incorporated into the "Full Capture Equivalency" methodology initially described in the regional Trash Control Measure Implementation Plan submitted to the State and Regional Water Boards in December 2018.
3. Apply Methodology and Calculate Trash Reduction Benefit – Using the accepted final methodology developed in Task 2, the trash reduction benefits of existing HDS units will be calculated through this task and incorporated into the regional Trash Control Measure Implementation Plan initially submitted to the State and Regional Water Boards in December 2018. As needed, the control measure described in the Implementation Plan will be adjusted to account for the reductions associated with existing HDS units.

Cost Estimate for Project

The estimated cost for completion of this project is approximately $25,000, not including City staff time. This is a broad cost estimate that should be refined based upon the negotiated scope of services between the cities and a qualified engineering firm.

Project Schedule

It is anticipated that this project would begin in 2019 and be completed prior to end of 2020.