2015-2016

Phase II Small MS4 Annual - Report

REPORTING PERIOD:07/01/2015 - 06/30/2016

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Permittee Information

City of Buellton

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Phase II Small MS4 Annual - Report - 2015-2016

Questions & Answers

Q No.	Text	DropDown Answer	CheckBoxAnswer	DescriptiveAnswer	Date Answer	Number Answer
	GENERAL					
1	Per Section E.1., did you continue to implement your previously approved storm water management plan? If 'No', please provide a brief explanation in the comments section. (Years 1 - 5) (Please note: This question is for renewal permittees only. If you are a new permittee, please select 'NA')	Yes				
2	If you relied on another entity (co-permittee or SIE) to implement one or more of the permit requirements did the co-permittee or SIE meet the permit requirements that were implemented on your behalf? (Years 1 - 5) If 'Yes', please attach a copy of the agreement that you may have with the other entity. If 'No', please provide a brief explanation.	Yes				
	PROGRAM MANAGEMENT					
3	Reviewed and/or revised any relevant ordinances or other regulatory mechanisms, or adopted any new ordinances or regulatory mechanisms to obtain adequate legal authority as specified by Section E.6.a.(ii)(a-j)? (pgs. 20-22, Year 2) If 'No', please provide a brief explanation in the comments section.	N/A				
4	Certified legal authority, as specified by section E.6.b.? (page 22, Year 2) If 'Yes'', attach required statement signed by an authorized signatory certifying adequate legal authority to comply with all Order requirements. (E.6.b.(ii)(a-e), page 22). (Year 2) If "No", please provide a brief explanation.	N/A				
5	Developed and began implementation of Enforcement Response Plan as specified by Section E.6.c.(ii)(a-f)? (pgs. 22-24, Year 3); OR Implemented the Enforcement Response Plan as specified in Section E.6.c.(ii)(a-f)? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
	EDUCATION AND OUTREACH					
6	Selected one or more of the Public Education and Outreach options? (E.7.a, page 25.) (Year 1) If yes, which option was selected to comply with section E.7.? Provide answer in comments section. (Year 1) For countywide/regional collaborative option selection, upload required attachment: agreement confirming collaboration with other MS4s. (Year 1)	N/A				

7	Developed and began implementation of storm water public education and outreach program as specified by section E.7.a.(ii)(a - m)? (pgs. 25-27, Year 2); OR Continued implementation of storm water public education and outreach program as specified by section E.7.a.(ii)(a - m)? (pgs. 25-27, Year 3-5) If 'No', please provide a brief explanation.	Yes				
8	Developed and began implementation of a public education strategy that established education tasks based on water quality problems, target audiences and anticipated task effectiveness? (E.7.a.(ii)a, page26) (Year 2); OR Continued implementation of a public education strategy that established education tasks based on water quality problems, target audiences and anticipated task effectiveness? (Years 3-5) If 'No', please provide a brief explanation. THIS QUESTION IS REDUNDANT WITH THE QUESTIONS DIRECTLY ABOVE AND HAS BEEN REMOVED. YOU HAVE NO NEED TO ANSWER THIS QUESTION	N/A				
9	Developed and implemented a training program for all staff who, as part of their normal job responsibilities, may be notified of, come into contact with, or otherwise observe an illicit discharge or illegal connection to the storm drain system, as specified by section E.7.b.1.(ii)(a-g), page 27) (Year 3); OR Continued to implement the training program for all appropriate staff? (Years 4-5) If 'NA', please provide a brief explanation.	Yes				
10	Provided construction outreach and education training for staff implementing construction site storm water runoff control program, as specified by section E.7.b.2.a(ii)(a-c), page 28 (Years 2-5) If 'NA', please provide a brief explanation.	Yes				
11	Developed and distributed educational materials to construction site operators, as specified by section E.7.b.2(b)(ii)(a-d), (page 29, Year 3); OR Continued to distribute educational materials? (Years 4-5) If 'NA', please provide a brief explanation.	Yes				
12	Updated existing storm water website, as necessary, to include information on appropriate selection, installation, implementation and maintenance of BMPs? (E.7.b.2.(b)(ii)(d), page 29) (Years 3-5) If 'No', please provide a brief explanation.	Yes				
13	Trained employees on how to incorporate pollution prevention/good housekeeping techniques into Permittee operations, as specified by section E.7.b.3.(ii)(a-d), pages 29-30 (Years 2-5) If 'NA', please provide a brief explanation.		Yes			
	PUBLIC INVOLVEMENT AND PARTICIPATION PROGRAM					

14	Involved the public in the development and implementation of activities related to the program, as specified by section E.8.(ii)(a-e)? (Years 2-5) If 'No', please provide a brief explanation.	Yes				
	ILLICIT DISCHARGE DETECTION AND ELIMINATION					
15	Created and/or maintained outfall map? (E.9.a., page 31) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
16	Included in the outfall map, location of all outfalls that are operated by the Permittee within the urbanized area, drainage areas, and land use(s) contributing to those outfalls that are operated by the Permittee, and that discharge within the Permittee's jurisdiction to a receiving water? (E.9.a(ii)(a), page 31) (Year 2) If 'No', please provide a brief explanation.	N/A				
17	Included in the outfall map, the location (and name, where known to the Permittee) of all water bodies receiving direct discharges from those outfall pipes? (E.9.a(ii)(b), page 31) (Year 2) If 'No', please provide a brief explanation.	N/A				
18	Included in the outfall map, priority areas, as specified in E.9.a.(ii)(c)(1-8), pages 31 -32. (Year 2) If 'No', please provide a brief explanation.	N/A				
19	Included in the outfall map, field sampling stations? (E.9.a(ii)(d), page 32) (Year 2) If 'No', please provide a brief explanation.	N/A				
20	Included in the outfall map, the permit boundary? (E.9.a(ii)(e), page 32) (Year 2) If 'No', please provide a brief explanation.	N/A				
21	Maintained inventory of all industrial/commercial facilities/sources within the Permittee's jurisdiction (regardless of ownership) that could discharge storm water pollutants to the MS4? (E.9.b., page 32) (Year 2) If 'No', please provide a brief explanation.	N/A				
22	Included in the inventory, the facility name, address, nature of business/activity, physical location of storm drain receiving discharge, name of receiving water and if the facility/source is tributary to a Clean Water Act Section 303(d) listed water body segment or water body segment subject to a TMDL? (E.9.b(ii)(a), page 32) (Year 2) If 'No', please provide a brief explanation.	N/A				

23	Included in the inventory: vehicle salvage yards, metal and other recycled materials collection facilities, waste transfer facilities, vehicle mechanical repair, maintenance or cleaning; building trade central facilities or yards; corporation yards; landscape nurseries and greenhouses; building material retailers and storage; plastic manufacturers; other facilities designated by the Permittee or Regional Water Board to have reasonable potential to contribute to pollution of storm water runoff? (E.9.b(ii)(b), page 33) (Year 2) If 'No', please provide a brief explanation.	N/A				
24	Determined if facilities that are required to be covered under the Statewide Industrial General Permit (IGP) have done so and notified Regional Water Board of any non-filers? (E.9.b(ii)(c), page 33) (Year 2) Attached copies of the notification of non-filers to the Regional Water Board (E.9.b(ii)(c)page 33) (Year 2) If 'No', please provide a brief explanation.	N/A				
25	Updated the inventory annually? (E.9.b(ii)(d), page 33) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
26	Developed and implemented procedures to proactively identify illicit discharges originating from priority areas identified in Section E.9.a.(ii)(c), at least once over the length of the permit term. OR, established a self-certification program where Permittees require reports from authorized parties demonstrating the prevention and elimination of illicit discharges at their facilities in priority areas at least once over the length of the permit term? (E.9.b(ii)(e), page 33) (Year 2) OR Implemented the procedures established per E.9.b.(ii).(e).? (Years 3-5) If 'No', please provide a brief explanation.	Yes				
27	Conducted field sampling of any outfalls that were flowing or ponding when it had been more than 72 hours after the last rain event (i.e., were suspected of illicit discharges) during outfall inventory mapping (under section E.9.a., page 31)? (E.9.c., page 34) (Year 2) If 'No', please provide a brief explanation.	N/A				

28	Conducted monitoring for the parameters listed in Table 1 (page 34), or for parameters selected by Permittee based on local knowledge of pollutants of concern in priority areas? (E.9.c(ii)(a), page 34) (Years 2-5) If tailored parameter action levels, attach justification and modifications to parameters If 'No', please provide a brief explanation.	No		No. The City of Solvang did not have any outfalls flowing or ponding more than 72 hours after a rain event, and therefore, the City did not conduct any field sampling. Yes. The City of Buellton conducted field sampling of River View Park West (Outfall ID 1A) and East (Outfall ID 2A) Outfall Structures that had ponded more than 72 hours after a rain event and conducted monitoring for parameters listed within Table 1 (page 34) with the exception of fluoride. The City of Buellton does not fluoridate their tap water but adds chlorine to disinfect their tap water. The City of Buellton substituted total chlorine (field test) as an alternative indicator parameter than fluoride to help identify tap or irrigation water from natural water sources.		
29	Verified that indicator parameter action levels in Table 2 (page 35), or tailored parameter action levels were not exceeded? (E.9.c.(ii)(b), page 35) (Years 2-5) If tailored parameter action levels, attach justification and modifications to parameter action levels. If 'No', please provide a brief explanation.	No		No. The City of Solvang did not have any outfalls flowing or ponding more than 72 hours after a rain event, and therefore, the City did not conduct any field sampling. Yes. The City of Buellton verified if indicator parameter action levels within Table 2 or tailored parameter action levels were exceeded. The City also consulted with the Central Coast Regional Water Quality Control Board Staff regarding Sample Results/Action Levels for the following indicator parameters: Outfall ID 1A - Specific Conductivity 2500 umhom/cm and Total Chlorine 0.05 mg/L; Outfall ID 2A - Specific Conductivity 2160 umhom/cm and Total Chlorine 0.03 mg/L.		
30	Conducted follow-up investigations per Section E.9.d. if the action level concentrations were exceeded? (E.9.c(ii)(c), page 35) (Years 2-5) If 'No', please provide a brief explanation.	No		No. The City of Solvang did not have any outfalls flowing or ponding more than 72 hours after a rain event, and therefore, the City did not conduct any field sampling; and therefore did not conduct any monitoring or follow-up investigations. No. Based on previous discussions with the Central Coast Regional Water Quality Control Board, City of Buellton did not conduct any additional follow-up investigations The local geology can contribute to the exceedances of specific conductivity and are most likely background levels. The total residual chlorine is lower than domestic water source and would be investigated if over 1 ppm.		
31	Developed written procedures for conducting investigations into the source of all suspected illicit discharges? (E.9.d.ii(a-e), page 36) (Year 2) If 'No', please provide a brief explanation.	N/A				
32	Investigated within 24 hours, non-storm water discharges suspected of being sanitary sewage and/or significantly contaminated? (E.9.d.(ii)(a), page 36) (Years 2-5) If 'No', please provide a brief explanation.	Yes				

33	Prioritized investigations of suspected sanitary sewage and/or significantly contaminated discharges over investigations of non-storm water discharges suspected of being cooling water, wash water, or natural flows? (E.9.d.(ii)(b), page 36) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
34	Reported immediately the occurrence of any flows believed to be an immediate threat to human health or the environment to local Health Department? (E.9.d.(ii)(c), page 36? (Years 2-5) If 'No', please provide a brief explanation.	No		No. The City of Buellton nor the City of Solvang had any flows believed to be a threat to human health or the environment that needed to be immediately reported to thelocal health department.		
35	Determined and documented through investigations the source of all non-storm water discharges? (E.9.d.(ii)(d), page 36) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
36	Implemented corrective actions to eliminate illicit discharges as specified in section E.9.d.(ii)(e), page 36. (Years 2-5) If 'No', please provide a brief explanation.	Yes				
37	Developed and began implementing a spill response plan? (E.9.e., page 36) (Year 1); OR Continued to implement a spill response plan (Years 2 -5) If 'No', please provide a brief explanation.	Yes				
	CONSTRUCTION SITE STORM WATER RUNOFF CONTROL PROGRAM					
38	Developed an enforceable construction site storm water runoff control ordinance for all projects that disturb less than one acre of soil? (E.10., page 37) (Year 2) If 'No', please provide a brief explanation.	N/A				
39	Created, maintained, and continuously updated an inventory of all projects subject to local construction site storm water runoff control ordinance according to the minimum requirements listed in section E.10.a(ii)(a-h) ? (E.10.a., page 37) (Years 1-5) If 'No', please provide a brief explanation.	Yes				
40	Developed procedures that include the minimum requirements listed in section E.10.b(ii)(a-e) to review and approve construction plan documents? (i.e., erosion and sediment control plans). (E.10.b., page 38) (Year 1) If 'No', please provide a brief explanation.	N/A				
41	Used legal authority to implement procedures for inspecting public and private construction projects and conducted enforcement as necessary? (E.10.c, page 39). (Years 2-5) If 'No', please provide a brief explanation.	Yes				
42	Conducted inspections, at a minimum, at priority construction sites prior to land disturbance, during active construction and following active construction? (E.10.c.(ii), page 39) (Years 2-5) If 'No', please provide a brief explanation.	Yes				

43	Included in inspection, an assessment of compliance with the Permittee's construction site storm water control ordinance and other applicable ordinances? (E.10.c.(ii), page 39) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
44	Active site inspections included inspections of BMP maintenance, BMP effectiveness and verification of no pollutant of concern discharge? (E.10.c.(ii), page 39) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
45	Based inspection prioritization criteria on project threat to water quality (includes soil erosion potential, site slope, project size and type, sensitivity of receiving water bodies, proximity to receiving water bodies, non-storm water discharges, projects more than one acre that are not subject to the CGP and past record of non-compliance)? (E.10.c.(ii), page 39) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
	POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR PERMITTEE OPERATIONS PROGRAM					
46	Developed and maintained an inventory of Permittee-owned or operated facilities within your jurisdiction that are a threat to water quality, as specified in E.11.a(ii), page 40. (Years 2-5) If 'No', please provide a brief explanation.	Yes				
47	Developed and submitted a map that identifies the location of inventoried Permittee-owned/operated facilities, storm drainage system corresponding to the each of the facilities and the receiving water, facility name and management including contact information? (E.11.b., page 41) (Year 2) If 'No', please provide a brief explanation.	N/A				
48	Conducted annual inspections of and assessed the pollutant discharge potential for all Permittee-owned facilities to identify Hotspots, as specified in section E.11.c., page 41. (Year 3); If 'No', please provide a brief explanation	Yes				
49	Developed and implemented SWPPPs for hotspots as specified in section E.11.d.(ii)(a-c), page 42-43)? (Year 4) If 'No', please provide a brief explanation.	N/A				
50	Conducted quarterly visual inspection of hotspots and hotspot discharge locations? (E.11.e.(ii)(a and c), page 43) (Year 5) If 'No', please provide a brief explanation.	N/A				
51	Conducted annual comprehensive hotspot inspection? (E.11.e(ii)(b), page 43) (Year 5) If 'No', please provide a brief explanation.	N/A				
52	Inspected each inventoried facility that is not a hotspot once during permit term? (E.11.e(ii)(d), page 44) (Year 5) If 'No', please provide a brief explanation.	N/A				

53	Implemented procedures to assess and prioritize maintenance of storm drain system infrastructure and assigned a high priority to each catch basin meeting any of the criteria listed in section E.11.f(ii)(1-5), page 44? (Year 2) If 'No', please provide a brief explanation.	N/A				
54	Began maintenance of storm drain systems according to the procedures and priorities developed according to section E.11.g.(ii)(a-e), page 45? (Year 3) If 'No', please provide a brief explanation. THIS QUESTION IS REDUNDANT WITH THE QUESTIONS DIRECTLY BELOW AND HAS BEEN REMOVED. YOU HAVE NO NEED TO ANSWER THIS QUESTION	N/A				
55	Developed and implemented a strategy to inspect storm drain systems, based on the priorities assigned in section E.11.f.(ii), page 44. (E.11.g.(ii)(a), page 45). (Year 3); OR Continued to implement the strategy to inspect storm drain systems? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
56	Developed and implemented a schedule to clean high priority catch basins and other systems? (E.11.g.(ii)(b), page 45) (Year 3); OR Continued to implement a schedule to clean high priority catch basins? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
57	Ensured that each catch basin in high foot traffic areas includes a legible storm water awareness message? (E.11.g.(ii)(c), page 45) (Years 3-5) If 'No', please provide a brief explanation.	Yes				
58	Reviewed and maintained high priority facilities and removed trash and debris from high priority areas prior to the rainy season? (E.11.g.(ii)(d), page 45). (Years 3-5) If 'No', please provide a brief explanation.	Yes				
59	Developed and maintained a procedure to dewater and dispose of materials extracted from catch basins that ensures that water removed during the catch basin cleaning process and waste material will not reenter the MS4? (E.11.g.(ii)(e), page 45). (Year 3) Continued to implement a procedure to dewater and dispose of materials extracted from catch basins? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
60	Developed program to assess O&M activities for potential to discharge pollutants and inspected all O&M BMPs quarterly as specified in section E.11.h.(ii)(a-d), page 45-46? (Year 3) If 'No', please provide a brief explanation. THIS QUESTION IS REDUNDANT WITH THE QUESTIONS DIRECTLY BELOW AND HAS BEEN REMOVED. YOU HAVE NO NEED TO ANSWER THIS QUESTION	N/A				

61	Developed and implemented a program that includes activities listed in section E.11.h.ii(a)(1-8), page 46, to assess O & M activities and subsequently developed applicable BMPs? (E.11.h(ii)(a), page 46) (Year 3); OR Continued to implement a program to assess O&M activities? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
62	Identified all materials that could be discharged from each of these O&M activities, and which materials contain pollutants? (E.11.h(ii)(b), page 46) (Years 3-5) If 'No', please provide a brief explanation.	Yes				
63	Developed and identified a set of BMPs that, when applied during Permittee O&M activities, will reduce pollutants in storm water and non-storm water discharges? (E.11.h(ii)(c), page 46) (Year 3); OR Continued to implement identified BMPs for O&M activities? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
64	Evaluated all BMPs implemented during O&M activities quarterly? (E.11.h(ii)(d), page 46) (Years 3-5) If 'No', please provide a brief explanation.	No		No. The City of Buellton and Solvang will begin quarterly inspections following the approval of the O&M Assessment Program. Each City will evaluate BMPs implemented during municipal O&M activities as identified during inspection of a scheduled maintenance activity.		
65	Developed and implemented a process for incorporating water quality and habitat enhancement into new and rehabilitated flood management projects? (E.11.i, page 46-47) (Year 3); OR Continued to implement the process for incorporating water quality enhancement into flood management projects? (Years 4-5) If 'No', please provide a brief explanation.	Yes				
66	Implemented a landscape design and maintenance program to reduce the amount of water, pesticides, herbicides and fertilizers used by Permittee? (E.11.j., page 47) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
67	Evaluated pesticides, herbicides and fertilizers used and application activities performed and identified pollution prevention and source control opportunities? (E.11.j(ii)(a), page 47) (Year 2) If 'No', please provide a brief explanation.	N/A				
68	Implemented practices that reduced the discharge of pesticides, herbicides and fertilizers as specified in section E.11.j(ii)(b)(1-4), page 47-48)? (Years 2-5) If 'No', please provide a brief explanation.	Yes				
69	Implemented educational activities for municipal applicators and distributors? (E.11.j(ii)(b)(1), page 47) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
70	Implemented landscape management measures that rely on non-chemical solutions, including the measures specified in section E.11.j.(ii)(b)(2)(a-i), page 47? (Years 2-5) If 'No', please provide a brief explanation.	Yes				

71	Collected and properly disposed of unused pesticides, herbicides and fertilizers? (E.11.j(ii)(b)(3), page 48)(Years 2-5) If 'No', please provide a brief explanation.	Yes				
72	Minimized irrigation runoff by using an evapotranspiration-based irrigation schedule and rain sensors? (E.11.j(ii)(b)(4), page 48), (Years 2-5) If 'No', please provide a brief explanation.	Yes				
73	Recorded the types and amounts of pesticides, herbicides and fertilizers used in the permit area? (E.11.j(ii)(c), page 48) (Years 2-5) If 'No', please provide a brief explanation.	Yes				
	POST CONSTRUCTION STORMWATER MANAGEMENT PROGRAM					
74	Regulated development to comply with sections E.12.b. through E.12.l of permit? (E.12.a., page 48) (Years 2-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
75	Required implementation of site design measures for all projects that create and/or replace 2,500- 5,000 square feet of impervious surface (including single family homes, that are not part of a larger plan of development)? (E.12.b., page 48-49) (Years 2-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
76	Implemented standards, including measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management, on projects that create and/or replace more than 5,000 square feet of impervious surface (Regulated Projects)? (E.12.c., pages 49 -51) (Years 2-5) If 'No', please provide a brief explanation.	N/A		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
77	Required Regulated Projects to implement source control measures? (E.12.d., page 51-52) (Years 2-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
78	Required Regulated Projects to implement LID standards designed to reduce runoff, treat storm water, and provide baseline hydromodification management to the extent feasible, to meet the Numeric Sizing Criteria for Storm Water Retention and Treatment under section E.12.e(ii)c., page 53. (E.12.e., page 52-56)? (Years 2-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		

79	Developed and implemented hydromodification management procedures for Regulated Projects that created and/or replaced one acre or more of impervious surface as specified by section E.12.f? (pgs. 56 - 57, Year 3); OR Continued to implement hydromodification management procedures for Regulated Projects? (Years 4-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
80	Developed and/or modified enforceable mechanisms to implement E.12.b through E.12.f., if necessary? (E.12.g., page 58) (Years 3-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
81	Implemented an O&M verification program for storm water treatment and baseline hydromodification structural controls measures on all Regulated Projects, as specified by section E.12.h.(ii)(a-e), page 58-60? (Years 2-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
82	Inventoried and assessed the maintenance condition of structural post-construction BMPs within your jurisdiction? (E.12.i., page 60) (Years 3-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
83	Developed and maintained a plan to inventory, map and determine the relative maintenance condition of structural post-construction BMPs as specified by section E.12.i(ii)(a-d), page 60-61? (Year 3); OR Continued to implement plan to inventory, map and assessment of maintenance condition of post-construction BMPs? (Years 4-5) If 'No', please provide a brief explanation.	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		
84	Conducted an analysis of the landscape code to correct gaps and impediments impacting effective implementation of post-construction standards? (E.12.j(ii)(a), page 61) (Year 1) If 'No', please provide a brief explanation.	N/A				
85	Completed any changes to the landscape code to effectively administer post-construction requirements? (E.12.j(ii)(b), page 61) (Years 2-5) If 'No', please provide a brief explanation.	No		The City of Buellton and the City of Solvang did not find any impediments with administering the post construction requirements during the Municipal Landscape Gap Analysis but the Cities are considering future opportunities to improve that were identified during the analysis and/or adopt a new ordinance to align with the Department of Water Resource's Model Water Efficient Landcape Ordinance (MWELO).		
86	Implemented post-construction storm water management requirements based on a watershed-process approach as specified by section E.12.k, page 62? (Years 1 - 5)	NA		These requirements are superseded by the Central Coast adopted Post-Construction Requirements (PCRs). The Cities shall comply with the adopted and approved Stormwater Management Requirements for Development Projects in the Central Coast Region dated July 12, 2013.		

87	Proposed alternative post-construction requirements that achieved multiple-benefits as specified by section E.12.l., page 62? (Years 1 - 5)	No		Neither the City of Buellton or the City of Solvang submitted a proposal to the Regional Water Board or the Executive Officer to obtain approval for alternative post-construction measures for multiple-benefit projects.		
	WATER QUALITY MONITORING					
88	Indicate which water quality monitoring approach applies to your jurisdiction. Check all that apply.		303(d) Monitoring			
89	If you selected TMDL Monitoring or 303(d) Monitoring, did you consult with your Regional Water Board within Year 1 of the permit to determine monitoring study design and implementation schedule? (Year 1) If 'No', please provide a brief explanation.	N/A				
90	Indicate if you are or will be conducting water quality monitoring individually or as part of a regional program. (Years 1 and 2) If regional program, list the name of the program in the text box below. If a Permittee has a population less than 50,000 AND is not required to conduct ASBS, TMDL or 303(d) Monitoring (Sections E.13.(a)-(c)), then enter N/A					
91	Provide a status update regarding the development (including consultation with Regional Boards, if applicable), submittal and/or approval of the monitoring study design and implementation schedule. (Year 1)					
92	Upload the Monitoring Study Design and any available results for the monitoring option that applies to your jurisdiction. (Year 2)					
93	Provide a summary of the implementation of the water quality monitoring program and related results. (Year 3 - 5) Upload the Monitoring Study Results. {required}			On 3/4/16, Santa Barbara County Project Clean Water received Executive Officer Approval for the revised Urban Stormwater Monitoring Plan (USWMP) and the Quality Assurance Plan (QAPP) that was submitted with the 2014-2015 Annual Report. The first year of wet weather urban runoff was initiated in Year 3. Four storms were monitored at a total of 6 sites representing different land use types. The monitoring program is a coordinated effort with the cities of Buellton, Solvang, Goleta and Carpinteria. Wet weather monitoring will continue through permit term.		
	PROGRAM EFFECTIVENESS ASSESSMENT					
94	Developed and implemented a Program Effectiveness Assessment and Improvement Plan (PEAIP) that includes the minimum requirements listed in section E.14.a(ii)(a-f), page 70-72)? (Year 2) Continued to implement the PEAIP? (Years 3-5) If 'No', please provide a brief explanation. If 'Yes', upload required PEAIP as attachment. {required if 'Yes'}	Yes				

95	Provide a description of implementation of the Program Effectiveness Assessment and Improvement Plan, a summary of data obtained through effectiveness assessment measures and the short and long-term progress of the storm water program and an analysis of the data as described on page 72 of the permit. Upload as an attachment. (Years 3 - 5) {required}					
96	Identified and summarized BMP and/or program modification identified in priority program areas that will be made in next permit term? (E.14.b.(ii)(a-d), page 72-73) (Year 5) If 'No', please provide a brief explanation. If 'yes', upload required PEAIP as attachment. {required if 'Yes'}	N/A				
	TOTAL MAXIMUM DAILY LOADS COMPLIANCE REQUIREMENTS					
97	Attached TMDL implementation status report that includes the information listed in section E.15.d(i-iv), page 74 of permit? (Years 1-5) {required if 'Yes'} If 'No', please provide a brief explanation.	NA		Although the Santa Ynez River is a 303(d) impaired water body, it was not identified within "Phase II Permit Traditional Small MS4 Attachment G-Region Specific Requirements" that outlines Regional Water Board Approved TMDLs.		
	ADDITIONAL INFORMATION					
98	Optional: If you have any additional information, reports or attachments that you would like to provide to describe your storm water program please use the text box and/or the upload attachment button below. (Years 1 - 5)					

Phase II Small MS4 Annual - Report - 2015-2016

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualilfied personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that threre are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Rose Hess	**Title: Director of Public Works**	**Date: 10/14/2016**

Phase II Small MS4 Annual - Report - 2015-2016

ATTACHMENTS

Attachment Title	Description	Date Uploaded	Attachment Type	Attachment Hash	Doc Part No/Total Parts
USWMP 2015-2018	Phase II Small MS4 Annual Report 2015-2016-USWMP 2015-2018	2016-10-06 11:52:46.0	Supporting Documentation	cae76ff2bfbffbf110cdd81fa0ee7a91c604e9c3212251c2ced856991c9ac4	1/1
Phase II Small MS4 Annual Report 2013-2014-Attachment 1-Item 2-Buellton and Solvang MOU-112513	Phase II Small MS4 Annual Report 2013-2014-Attachment 1-Item 2-Buellton and Solvang MOU-112513	2016-10-04 13:39:23.0	Supporting Documentation		1/1
PEAIP Buellton and Solvang	Phase II Small MS4 Annual Report 2015-2016-PEAIP-Buellton and Solvang	2016-10-06 12:03:06.0	Supporting Documentation	3688936dc72a206d3f852524b37036bd3a74b0ba6ff1ac234b3af939c723478	1/1
PEAIP_Map-Buellton	PEAIP Map-Buellton	2016-10-06 12:03:10.0	Supporting Documentation	495b7015834e62f1f77182493c1465592b5460f743deded4ff93eabe4a68c9	1/1
Outfall_Map-Solvang	Outfall Map-Solvang	2016-10-06 12:03:11.0	Supporting Documentation	52faf850a0246bc345c1db5e95e4306d4df96577994a733712716242aa465c9	1/1
QAPP for USWMP for 2015-2018	Phase II Small MS4 Annual Report 2015-2016-QAPP for USWMP 2015-2018-No Attachments	2016-10-06 16:20:31.0	Supporting Documentation	3a91c3c6f6f304aea366f2d533b40ef83a5c6ee365eb27c36dd89dcaae1	1/1
Santa Barbara County Memorandum-Transmittal of 303d Monitoring Program Results 2015-2016-101416	Phase II Small MS4 Annual Report 2015-2016-SBC Memorandum-Transmittal of 303d MPR 2015-2016-101416	2016-10-13 18:55:10.0	Supporting Documentation	859c4fcf2331e3bb0dee5a31c6c0f05f6d352c3848c846960abb2253971a8	1/1
PEAIP Annual Summary-Buellton and Solvang	Phase II Small MS4 Annual Report 2015-2016-PEAIP Annual Summary-Buellton and Solvang-101416	2016-10-14 13:12:27.0	Supporting Documentation	d05feb2ae683bd66a1b7c9c5d3d675fe96deef1d393da5c3913533716c5	1/1
PEAIP-GeoSyntec Consultants-Storm Water Pollutant Model Results-Buellon	Phase II Small MS4 Annual Report 2015-2016-PEAIP-GSC SWPLM Results-Buellton-041516	2016-10-13 18:41:24.0	Supporting Documentation	ad301399c73bd2b819974c734e788e14b2a34524a2c46094c4d60798fa9f54	1/1
PEAIP-GeoSyntec Consultants-Storm Water Pollutant Model Results-Solvang	Phase II Small MS4 Annual Report 2015-2016-PEAIP-GSC SWPLM Results-Solvang-041516	2016-10-13 18:41:31.0	Supporting Documentation	58a1b2ba5b1b832a867e43a7ff2bb3c5cab338ad42f1f4eb686c6869bd85ce5	1/1

Urban Storm Water Monitoring Plan 2015-2018

For the NPDES Phase II Small MS4 General Permit
Sections E.13.c *303(d) Monitoring* and E.14.a *Program Effectiveness Assessment and Improvement Plan*

***For the following Regulated MS4s*:**

City of Goleta
City of Carpinteria
City of Buellton
City of Solvang
Unincorporated Santa Barbara County

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Introduction

The NPDES Municipal General Permit E.13.c. 303(d) Monitoring section outlines requirements as follows:

> All Permittees that discharge to waterbodies listed as impaired on the 303(d) list where urban runoff is listed as the source, shall consult with the Regional Water Board within one year of the effective date of the permit to assess whether monitoring is necessary and if so, determine the monitoring study design and a monitoring implementation schedule. Permittees shall implement monitoring of 303(d) impaired water bodies as specified by the Regional Water Board Executive Officer.

During initial consultations with the Santa Barbara County MS4s (August 19, 2014), Regional Water Board staff indicated that permittees should monitor for pollutants typically associated with wet weather discharges, rather than limit monitoring to listed impairments for the County's receiving waters. Regional Water Board staff also indicated that, for MS4s, instream monitoring was less important than discharge monitoring (specifically, pollutant *loading*). In an email dated July 25, 2014, Regional Water Board staff also provided supplemental guidance to Permittees as follows:

- Prepare and submit a draft plan for 303(d) monitoring program by January 1, 2015. Incorporate: catchment-based discharge monitoring; source tracking/source ID; synthesis and reporting of data. Receiving water monitoring not required.
- Prepare and submit a Quality Assurance Project Plan (QAPP), for 303(d) monitoring program by May 1, 2015.
- Prepare to initiate monitoring program by Year 3: July 1, 2015.
- Prepare to submit monitoring results with Year 3 and subsequent Annual Reports (E.14.a.iii)

In conjunction with this guidance, the Regional Water Board staff also identified that BMP Effectiveness Assessment should include a pollutant loading model, as follows:

> Identify Steps to Quantify Pollutant Loads and Pollutant Load Reductions Achieved by the Program as a Whole (E.14.a):

- Evaluate and select flow and pollutant loading models
- Prioritize load quantification by catchment: e.g., determine annual average volume of discharge to receiving waters from outfalls draining priority areas and quantify pollutant loads for catchments with largest volumes first; or, use available constituent concentration data from existing data to screen for problem outfalls
- Provide schedule for completing pollutant load quantification to inform submittal of Stormwater Program Modifications by Year 5 (E.14.b)

The Cities of Carpinteria, Goleta, Buellton and Solvang, and the County of Santa Barbara determined that monitoring and modeling requirements are related insofar as the future monitoring results should inform future modeling efforts. Therefore, this monitoring plan is designed so that the results will be useable for future refinement of the County-wide pollutant load model.

Goals and Objectives of Monitoring

The goal of this monitoring effort is to characterize pollutant concentrations and loads from representative MS4 discharge locations within the County, excluding the City of Santa Barbara. The objective of this effort is to collect sufficient data to inform, update, or calibrate the land use-based pollutant load model. The monitoring program is defined for a period of three years, at which time continuing monitoring, or revisions to this plan, will be considered.

This monitoring program focuses on pollutants typically associated with wet weather MS4 discharges in key watersheds. Samples will be taken at the outfalls discharging into impaired waterbodies. The results of monitoring will then be used to inform a pollutant load model.

Observation of velocity, depth and area of flow will inform flow estimates for each sampling event. These values will not be used to compute loading but rather to document field conditions at the time of sampling. Loading will not be specifically determined for each sampling location. Water quality data from the sampling sites will be used as Event Mean Concentrations for each land use. A model will then determine runoff volume based on rainfall and watershed character and loading will be computed as a total annual load for the entire MS4. The pollutant load results will be used to support model calibration and allow a more accurate prediction of local conditions. The model results will then be used to prioritize catchments, i.e. rank or categorize catchments by their generated pollutant load. This will help identify potential locations for and prioritize BMPs to improve overall program effectiveness and success.

Over time as the monitoring data is used to inform the model, the model results will be used as part of implementing the Permittee's Program Effectiveness Assessment and Improvement Plans, by allowing the Permittees to assess subwatersheds with existing BMPs, compare pollutant loading between subwatersheds, and better tailor future BMPs by focusing on areas of potentially higher pollutant load.

Pollutant Parameters

Pollutants of concern were selected based upon the following criteria:

1. Pollutants are representative of typical MS4 wet weather discharges and impairments to urban receiving waters;
2. Pollutants are cost-effective to analyze and don't require special sample collection or handling procedures;
3. Pollutants can be addressed through BMPs in the Permittee's stormwater program (and BMP performance data exist in order to model these pollutants), and
4. Pollutants are of interest to Regional Water Board staff based on initial discussions.

Some pollutants identified on the 303(d) list for County receiving waters were not selected because they did not meet the above criteria. For example, bacteria is not included because it would require special sampling (flow weighted composites might need to be replaced with grab samples) and short hold time requirements., Also, given its ubiquitousness in the natural and urban environments, the uncertainty regarding its sources to/in urban MS4s, and the uncertainty regarding effective source control strategies (and their performance), bacteria has been excluded from this monitoring plan. A preferable approach for addressing bacteria (or "pathogens") is through dry weather monitoring when illicit discharges can be observed. These discharges would then be investigated through source-tracking and special studies to identify source-specific BMPs. Further, bacteria modeling for annual pollutant load based on land use Event Mean Concentrations will be developed.

Similarly, salts (such as chloride, sodium, and boron), legacy chlorinated pesticides (primarily associated with agricultural activities), and selenium (primarily associated with rising groundwater) will not be included as these are primarily dry weather issues and/or not associated with MS4 wet weather discharges. Pollutant effects such as DO, and algae/eutrophication were excluded since they are less associated with wet weather conditions or wet weather MS4 discharges.

Discharges into Orcutt Creek are not included in this plan because that waterbody is subject to TMDLs and therefore subject to a separate monitoring program.

The following parameters will be analyzed:

- Acute Toxicity (Hyallella sp)
- Metals (dissolved Al, Cu, Zn, Cd, Pb, and Fe)
- TSS
- Hardness
- Nutrients
- Temperature
- pH
- Pesticides (listed below)

Pesticides will include organophosphate pesticides, carbamates, pyrethroids, neonicotinoids (acetamidprid, clothianidin, dinotefuran, imidiaclorprid, thiacloprid, and thiamethoxam), and diuron (including DCPMU, DCPU, and 3,4-DCA).

Site Conditions and Characteristics

Six MS4 outfall sampling locations, each representing drainage areas with varying land use, will be monitored. There were twenty sites tentatively identified; six were selected that best represent the land use character to best inform the model. These are located in Solvang, Buellton, Goleta, and Carpinteria.

The six locations were selected based on the following considerations:

- Safety and accessibility – sampling locations should be safely accessible during wet weather conditions
- Performance – accurate flow estimates and sample collection can be reproduced at that location
- Drainage area characteristics – drainage areas should represent homogenous urban land use to the extent possible, with a large enough area to be representative of typical variability that is expected within that land use type in this study area.

The targeted urban land use categories are:

- Single-family, or low density residential
- Multi-family or high density residential
- Commercial
- Industrial (multiple industrial sites may be necessary to characterize the diversity of "industrial" areas in this study area)

Other potential urban land use categories that are not included, but can be modeled are:

- Transportation (outside of Caltrans, finding an outfall with this homogeneous land use within the MS4 may prove challenging.
- Open Space (these areas generally don't have storm sewers and may prove similarly challenging)
- Agriculture

Proposed Locations

Monitoring locations are shown in Table 1 and Figure 1 and summarized below.

Watershed: Santa Monica Creek, Franklin Creek, Carpinteria Salt Marsh
City of Carpinteria (medium density residential)
City of Carpinteria (indoor urban agriculture)

Watersheds: San Jose Creek, Las Vegas Creek
City of Goleta (industrial)
City of Goleta (commercial)

Watershed: Santa Ynez River and tributaries
City of Solvang (low density residential)
City of Buellton (industrial)

Table 1. Monitoring Locations

Location	Land Use	Receiving Water
City of Solvang	Low density residential	Santa Ynez River
City of Carpinteria	Medium density residential	Franklin Creek
City of Goleta	Commercial	Las Vegas
City of Buellton	Industrial	Santa Ynez River
City of Goleta	Industrial	San Jose Creek
City of Carpinteria	Indoor Urban Agriculture	Franklin Creek

Figure 1. Monitoring Locations

The County of Santa Barbara will be responsible for the monitoring logistics and managing the lab contracts. This includes tracking and selecting a storm to monitor, providing one or two staff to conduct the sampling, determining the number of time-proportioned aliquots (10 to 12 based on storm depth collected over a period of two hours), and arranging for courier pick-up of sample bottles. The Cities have agreed through an MOU to fund their proportionate cost of the monitoring effort. The Cities may provide an additional staff person so that there are two people working together for safety during the stormwater monitoring activities.

Monitoring Frequency and Event Targeting

Time-paced aliquots will be taken at ten or twelve minute intervals for two hours in duration as the characteristics of the individual storms allow. A minimum number of aliquots will be taken depending on the forecast rain event depth, ranging from 10 for storms 0.2" to 1.0" and 12 for storms greater than 1.0". Details are shown in the QAPP. Subsequently to the sampling event, data obtained from the County of Santa Barbara Water Resources Division rain gauge network will be used to describe the rainfall pattern and the timing of the sampling. The monitoring program will not include automated samples. Representative composite samples will be generated by combining aliquots. The toxicity aliquots will be combined in the field, resulting in a single composite sample for toxicity analysis. The samples for analysis of the remaining analytes will be collected in aliquots and combined into one composite sample by the analyzing laboratory.

Two sites will be monitored per storm, grouped as follows:

Storm 1 – Carpinteria area (two outfalls)

Storm 2 – Goleta area (two outfalls)

Storm 3 – Santa Ynez (one outfall each from Buellton and Solvang)

During a given year, as many storms will be monitored as possible, but no more than 18sampling events per year.

Targeted storm events will be those forecast for 50-75% probability of 0.2" or greater over a period of 24 hours. The County's Water Resources Division hydrologists will provide updated forecast information for the specific sampling locations. The County develops forecasts based on a contracted private weather forecaster, National Weather Service information, and professional judgment based on local experience.

Sample Collection Procedures

Water samples will be manually collected from outfalls during the storm event.

Based upon the prediction of the anticipated storm duration, field staff will collect samples at ten or twelve minute intervals over a period of two hours with a target of achieving 10-12 individual aliquots per storm. Temperature and pH will be measured from the toxicity composite sample. Flow estimates will be based on observation and if possible, direct measurement of velocity and area of flow.

Clean bottles will be supplied by the analyzing laboratories. Samples will be kept on ice and held for a courier service. All hold times for the sample parameters will be followed. Chain of custody forms will be provided to the lab courier.

Quality Assurance Project Plan (QAPP)

All monitoring samples shall be collected and analyzed according to the details presented in the Program QAPP. The QAPP will be prepared consistent with the California Surface Water Ambient Monitoring Program Quality Assurance Program Plan (Sep 1, 2008, or most current).

Data Management and Reporting

Results of the prior season's monitoring will be reported annually under the Municipal General Permit report, via SMARTs, Oct 15th each year. Results will also be uploaded to CEDEN.

As described in the Goals and Objectives section above, a land use-based pollutant load model will be used to calculate wet weather loads produced in the monitoring area, prioritize catchments for BMP placement, and evaluate the performance of existing and future BMPs. The monitoring data collected through the activities described in this Plan will be used to inform the model, by providing site-specific land use pollutant concentration data. As described above, monitoring outfalls will be selected based on their drainage areas consisting of a more or less homogenous land use category. Since land use-based pollutant concentration data are limited, and to our knowledge, there is currently no dataset representing this monitoring area, the proposed monitoring program will allow for more representative and reliable modeling results. Once 8 to 10 storms have been analyzed, the EMCs used in the model will be revised to include our local runoff concentrations, and new modeling results will be reported.

MEMORANDUM OF UNDERSTANDING
BETWEEN THE CITIES OF SOLVANG AND BUELLTON

Regarding the status of the Cities of Buellton and Solvang as Co-Permittees, and preparation and submittal of Annual Reports required by the Phase II Small MS4 NPDES Municipal Stormwater General Permit

This Memorandum of Understanding (MOU or Agreement) is entered into between the City of Buellton and the City of Solvang, referred to herein as the **"Parties,"** for the purpose of defining agency roles, responsibilities, and commitments in connection with the Parties functioning as Co-Permitees under their respective Phase II Small MS4 NPDES Municipal Stormwater General Permits, and the preparation and submittal of Annual Reports required by the Permits. In consideration of the mutual covenants and conditions contained herein, the Parties agree as follows:

1. Description

The new Phase II Small MS4 NPDES Municipal Stormwater General Permit, adopted by the State Water Resources Control Board on February 5, 2013, includes a provision for agencies regulated under the Permit to comply with certain aspects of the Permit as "Co-Permittees". Agencies covered under the Permit as Co-Permittees may submit a single joint Annual Report. It is the intent and purpose of this MOU to define the roles and responsibilities of the Parties for the purpose of preparing and submitting joint Annual Reports. The Parties agree that upon execution by both Parties this MOU is to be effective beginning Fiscal Year 2013-14.

2. Lead Agency

The City of Buellton shall be the Lead Agency and sole administrator of the joint Annual Report, and shall be responsible for preparing and submitting the joint Annual Report on behalf of the Parties. The City of Buellton shall also be responsible for contracting with a qualified stormwater consultant, as may be necessary, to prepare the joint Annual Report, and shall be the sole administrator of said consultant contract.

3. Insurance Coverage and Indemnification

The Parties agree to maintain liability insurance in an amount sufficient to protect against claims that may be filed against the Parties for the services they provide. The Parties may elect to self-insure against such claims as provided by their respective government policies, or procure third party insurance coverage.

In lieu of and notwithstanding the pro rata risk allocation which might otherwise be imposed between the parties pursuant to Government Code Section 895.6, the parties agree that all losses or liabilities incurred by a party shall not be shared pro rata but instead the Parties agree that pursuant to Government Code Section 895.4, each of the parties hereto shall fully indemnify and hold each of the other parties, their officers, board members, employees and agents, harmless from any claim, expense or cost,

damage or liability imposed for injury (as defined by Government Code Section 810.8) occurring by reason of the negligent acts or omissions or willful misconduct of the indemnifying party, its officers, board members, employees or agents, under or in connection with or arising out of any work, authority or jurisdiction delegated to such party under this Agreement. No party, nor any officer, board member, employee or agent thereof shall be responsible for any damage or liability occurring by reason of the negligent acts or omissions or willful misconduct of other parties hereto, their officers, board members, employees or agents, under or in connection with or arising out of any work, authority or jurisdiction delegated to such other parties under this Agreement.

4. Funding

It is anticipated that the City of Buellton, as the Lead Agency, will utilize Consultant services to prepare and submit the joint Annual Reports. The Parties will share equally in the net Consultant costs associated with the preparation and submittal of the joint Annual Reports. Staff time costs and incidental costs incurred by each Party in connection with preparation of the joint Annual Report shall be borne separately by each Party.

The Parties agree to annually budget for and commit sufficient funds to complete the preparation and submittal of joint Annual Reports. The funding allocation is subject to final budget approval by the respective city councils. The City of Buellton will bill the City of Solvang annually for its share of the joint Annual Report by approximately October 31. The City of Solvang agrees to make payment to the City of Buellton within 30 days of receipt of invoice.

All other aspects of each Parties stormwater management program shall be administered and funded separately unless identified otherwise in this MOU.

5. Term of Agreement

The Agreement will remain in effect until such time as one of the Parties so chooses to terminate the Agreement. The party choosing to terminate the Agreement shall give the other party a minimum of 6 months advanced notice prior to terminating the Agreement.

6. Annual Reporting

On an annual basis, the City of Buellton shall prepare and submit, or have Consultant prepare and submit Annual Report for both agencies as Co-Permittees to the Regional Water Quality Control Board (RWQCB). The City of Buellton shall be responsible for addressing any comments from RWQCB, and prepare and submit revised Annual Report as may be required.

7. Records

The Parties shall keep such records as may be necessary to assist in completion of Annual Reports. In addition, the City of Buellton shall keep records comprising the

Annual reports, and shall maintain such records for a period of five (5) years. All accounting records shall be kept in accordance with generally accepted accounting principles. Either Party shall have the right to review all such documents and records at any time during City of Buellton's regular business hours upon reasonable notice.

8. Cooperation and Coordination Meetings

Staff of the Parties agree to communicate regularly and cooperate with each other to the full extent as may be required for successful completion of Annual Reports. Staff of the Parties agree to meet at least once annually to discuss implementation of the MOU, and other stormwater management issues of common interest.

9. Contracting for Consultant Services

In March of each year the City of Buellton shall solicit a fee proposal(s) from its qualified Consultant(s) specifically to prepare and submit the joint Annual Report for the purposes of budgeting and cost sharing. The fee amount shall be communicated by the City of Buellton to the City of Solvang by April 15 allowing the Parties to incorporate the appropriate amount in their draft fiscal budgets.

10. Consultant Insurance

The City of Buellton shall require any Consultant performing work in connection with the preparation and submittal of joint Annual Reports to maintain general liability insurance, professional liability insurance, automobile liability insurance, and workers compensation insurance each in amount not less than $1,000,000 while performing work, and for a period of two years following completion of such work. The insurance certificate shall include the City of Solvang as additional insured. Consultant shall provide both Parties with copies of the Certificates of Insurance, including the endorsement(s) naming the Parties as additional insured. The insurance certificate shall require the insurance carrier to provide 30 days written notice to the Parties in the event of cancellation.

11. Amendment

This MOU may only be amended in writing with consent of both Parties.

12. Termination

Either Party to this MOU may terminate its participation under this Agreement by giving 6 months written notification to the other Party.

13. Points of Contact

All notices referenced in this Agreement shall be in writing and shall be given by first class mail addressed as follows, or at such other address or to such person that the parties may from time to time designate in writing:

City of Buellton
Public Works Director
107 West Highway 246
Buellton, CA 93427

City of Solvang
Public Works Director
411 Second Street
Solvang, CA 93463

Signatures

CITY OF BUELLTON

Mark Bierdzinski, City Manager

11-14-2013
Date

Approved as to Form:
Ralph Hanson
City Attorney

By:

Ralph Hanson, City Attorney for City of Buellton

CITY OF SOLVANG

Brad Vidro, City Manager

11-25-13
Date

Approved as to Form:
Roy Hanley
City Attorney

By:

Roy Hanley, City Attorney for City of Solvang

Program Effectiveness Assessment and Improvement Plan (PEAIP) Framework for Traditional MS4s

FEBRUARY 2016

CITY OF BUELLTON AND CITY OF SOLVANG

Program Effectiveness Assessment and Improvement Plan

Prepared by

MNS ENGINEERS, INC.

This *Program Effectiveness Assessment and Improvement Plan* uses the California Stormwater Quality Association (CASQA) guidance document, *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs* (February 2015), as its basis and is consistent with the approach described therein. Much of the text in this document is directly from the CASQA guidance document.

Collaborative Project Partners

The Program Effectiveness Assessment and Improvement Plan (PEAIP) were developed by the following agencies involved in this multi-agency PEAIP:

- City of Buellton
- City of Solvang

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1. Introduction

The Phase II Small Municipal Separate Storm Sewer System (MS4) General Permit[1] (Phase II Permit) requires the development and implementation of a *Program Effectiveness Assessment and Improvement Plan* (PEAIP). The PEAIP must address each of the elements outlined in Provision E.14 (traditional small MS4s). The PEAIP must include the strategy that the City of Buellton (COB) and City of Solvang (COS) will use to track the short- and long-term effectiveness of the stormwater program, the specific measures that will be used to assess the effectiveness of the prioritized best management practices (BMPs), groups of BMPs, and/or the stormwater program as a whole, and a description of how the COB and COS will use the information obtained through the PEAIP to improve the stormwater program.

The COB and COS's stormwater program addresses many pollutants of concern (POCs) and implements a wide range of BMPs; however, consistent with Provision E.14 requirements, the PEAIP will present a plan for assessing the effectiveness of a subset of prioritized BMPs that are focused on high- and medium-priority POCs. This approach provides a manageable assessment program that can be improved, targeted, and refined.

The COB and COS has developed this PEAIP as a guide for its stormwater staff to assist them in conducting program effectiveness assessments (EAs). The PEAIP is modeled after the methodology described within the California Stormwater Quality Association (CASQA) document, *A Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs* (February 2015).[2] The PEAIP outlines the approach that the COB and COS will use to adaptively manage its stormwater program to improve its effectiveness at reducing the identified high- and medium-priority POCs, thereby achieving the maximum extent practicable (MEP) standard and protecting water quality.

The PEAIP is focused on the *impact* that the stormwater program is having rather than the strict *implementation* of the program. By focusing the EA in this manner, the COB and COS will increase their ability to understand if its stormwater program is achieving the intended outcomes and can identify necessary modifications to the program to make it more effective.

This PEAIP addresses the requirements in Provision E.14, as summarized in **Table 1**.

[1] Order No. 2013-0001-DWQ, effective July 1, 2013

[2] Language from the 2015 CASQA Guidance Document is used as the basis for much of the PEAIP.

Table 1. Phase II Permit PEAIP Provisions and Corresponding PEAIP Sections (Traditional MS4s)

Phase II Permit Provision(s)	PEAIP Section
E.14.a.(i-iii)	1. Introduction
E.14.a.(i) E.14.a.(ii)(b)(5)	2.1. Identification of Sources and Impacts 2.1.2. Urban Runoff and MS4 Contributions[3]
E.14.a.(i) E.14.a.(ii)(b)(1)	2.3. Identification of the Stormwater Program Activities
E.14.a.(i) E.14.b.(i) and (ii)	5. Program Reporting and Modifications
E.14.a.(ii)(a)(1)	1.1. Stormwater Program Goals and Objectives
E.14.a.(ii)(a)(2-9)	2. Program Effectiveness Assessment Approach and Development
E.14.a.(ii)(b)(2)	2.2. Identification of the Key Target Audiences 2.2.2. Barriers and Bridges to Action[4]
E.14.a.(ii)(b)(3)	2.2. Identification of the Key Target Audiences 2.2.1. Target Audience Actions[5]
E.14.a.(ii)(b)(4)	2.1. Identification of Sources and Impacts 2.1.3. Source Contributions[6]
E.14.a.(ii)(b)(6)	2.1. Identification of Sources and Impacts 2.1.1. Receiving Water Conditions
E.14.a.(ii)(c-d)	4. Data Assessment and Collection
E.14.a.(ii)(e-f)	3. Management Questions

The schedule for the implementation of the PEAIP is as follows:

- Year 2 Annual Report (October 15, 2015): Submit the PEAIP
- Year 3 and Year 4 Annual Reports (October 15, 2016 and October 15, 2017): Describe the implementation of the PEAIP, summarize the data obtained, and provide an analysis of the data (i.e., the EA)
- Year 5 Annual Report (October 15, 2018): Describe the implementation of the PEAIP, summarize the data obtained, provide an analysis of the data (i.e., the EA), and describe any program modifications identified

[3] Provision E.14.a.(ii)(b)(5) uses the term "MS4 Discharge Quality" for Outcome Level 5; however, the 2015 CASQA Guidance Document and this PEAIP use the term "Urban Runoff and MS4 Contributions" for Outcome Level 5 to reflect the new approach that has been developed.

[4] Provision E.14.a.(ii)(b)(2) uses the term "Awareness" for Outcome Level 2; however, the 2015 CASQA Guidance Document and this PEAIP use the term "Barriers and Bridges to Action" for Outcome Level 2 to reflect the new approach that has been developed.

[5] Provision E.14.a.(ii)(b)(3) uses the term "Behavior" for Outcome Level 3; however, the 2015 CASQA Guidance Document and this PEAIP use the term "Target Audience Actions" for Outcome Level 3 to reflect the new approach that has been developed.

[6] Provision E.14.a.(ii)(b)(4) uses the term "Pollutant Load Reductions" for Outcome Level 4; however, the 2015 CASQA Guidance Document and this PEAIP use the term "Source Contributions" for Outcome Level 4 to reflect the new approach that has been developed.

1.1. STORMWATER PROGRAM GOALS AND OBJECTIVES

Stormwater programs are inherently complex due to a number of factors such as: the number of pollutant sources (construction, industrial, commercial, residential, new development, etc.), the limited ability to directly control the behaviors of target audiences, the extensive geographic coverage of the programs, the number of constituents that must be addressed, the co-mingling of flows within the drainage system, and the potential impacts to water quality from other sources (wind-blown materials, groundwater seepage, aerial deposition, etc.).

The overall goals of the COB and COS's stormwater management program are to a) reduce the potential impact(s) of pollution from urban areas on waters of the State and waters of the United States (U.S.) and protect their beneficial uses; and b) develop and implement an effective stormwater program that is well-understood and broadly supported by stakeholders.

The core objectives of the stormwater program are to:

1. Identify and make a reasonable effort to control those pollutants in urban runoff that exceed water quality objectives (WQOs), as measured in the waters of the State and waters of the U.S., and protect the beneficial uses of the receiving waters;
2. Comply with the federal and State regulations to eliminate or control, to the MEP, the discharge of pollutants associated with urban runoff from the COB and COS's stormwater drainage system;
3. Develop a cost-effective program which focuses on the prevention of pollution in urban stormwater;
4. Seek cost-effective alternative solutions where prevention is not a practical solution for exceedances of WQOs; and
5. Coordinate the implementation of control measures with other agencies.

The PEAIP supports these stormwater program goals and objectives by providing a framework for the implementation and assessment of prioritized BMPs focused on the high- and medium-priority POCs, as well as a feedback loop for the adaptive management of the COB and COS's stormwater program. When considered as part of a larger program planning process, assessment principles and approaches can help to guide managers toward implementation strategies with the greatest opportunity for long-term success.

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2. Program Effectiveness Assessment Approach and Development

This PEAIP was developed to implement a focused evaluation of priority program elements and BMPs, ensuring that they are well-targeted and determining whether intended results are being achieved.

Stormwater program management[7] can be described by a cycle divided into three phases of activity (**Figure 1**):

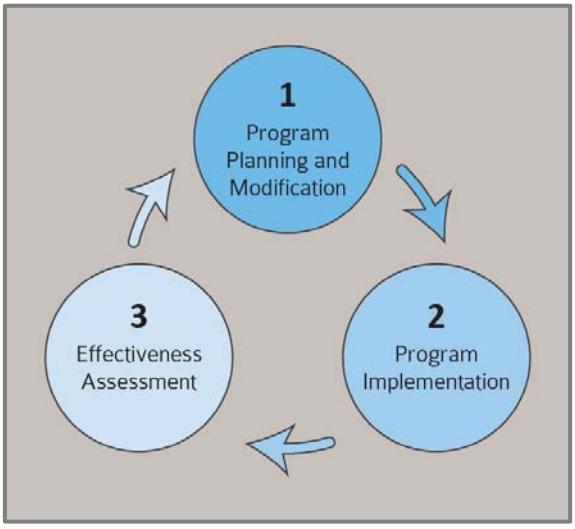

Figure 1. The Program Management Cycle (CASQA, 2015)

- Program Planning and Modification – In this phase, the COB and COS is identifying the critical components and POCs for its stormwater program, as well as developing an EA approach and associated management questions to assist in determining if the program is achieving the intended results.
- Program Implementation – In this phase, the COB and COS is implementing the program and obtaining the assessment data needed to answer the management questions.
- Effectiveness Assessment – In this phase, the COB and COS is conducting EAs, reviewing the results, and determining if any program modifications are necessary. This is typically conducted as a part of the Annual Reports and/or Report of Waste Discharge, but may also be a part of other regulatory requirements such as 303(d) Monitoring or Total Maximum Daily Loads (TMDLs) when proposed or established. Once identified, the COB and COS can make the program modifications and initiate the next round of implementation, leading again to renewed assessment and planning (see **Section 5**).

This process is applied repeatedly over time in order to focus the stormwater program in on the most effective BMPs and the achievement of the desired results.

The CASQA EA approach[8] utilizes a general model that aggregates three primary components from the six outcome levels and associated, general outcome types (**Figure 2**). The three primary components are:

[7] See 2015 CASQA Guidance Document, Section 3.0: Introduction to Strategic Planning for Stormwater Management Programs

[8] See 2015 CASQA Guidance Document, Section 2.0: Stormwater Management Approach

- Sources and Impacts (Outcome Levels 4-6) – This component addresses the generation, transport, and fate of urban runoff pollutants. It includes sources (sites, facilities, areas, etc.), stormwater conveyance systems, and the water bodies that ultimately receive the source discharges (receiving waters). This component is typically assessed on a long-term basis.
- Target Audiences (Outcome Levels 2-3) – This component focuses on understanding the behaviors of the people responsible for source contributions. It explores the factors that determine existing behavioral patterns and looks for ways to replace polluting behaviors with non-polluting behaviors. This component is typically assessed on a short- and/or long-term basis.
- Stormwater Programs (Outcome Level 1) – Stormwater programs are the road map for the improvements that managers wish to attain in receiving waters. Their immediate purpose is to describe programs that will facilitate changes in the behaviors of key target audiences. This component is typically assessed on a short-term basis.

The six categories of outcome levels establish a logical and consistent organizational scheme for assessing and relating individual outcomes.

This PEAIP will focus primarily on the Target Audiences (Outcome Levels 2 and 3) and the Sources and Impacts (Outcome Level 4 and 5) and will provide a plan to collect data that can be used to improve the stormwater program and protect water quality. Assessment at Outcome Level 6 may be undertaken once program implementation has progressed to a point that improvements in outfall and receiving water quality are statistically significant. The timeframe for this level of change to be realized will vary based on a variety of factors.

The approach to be used for each of the outcome levels is described in more detail within this section.

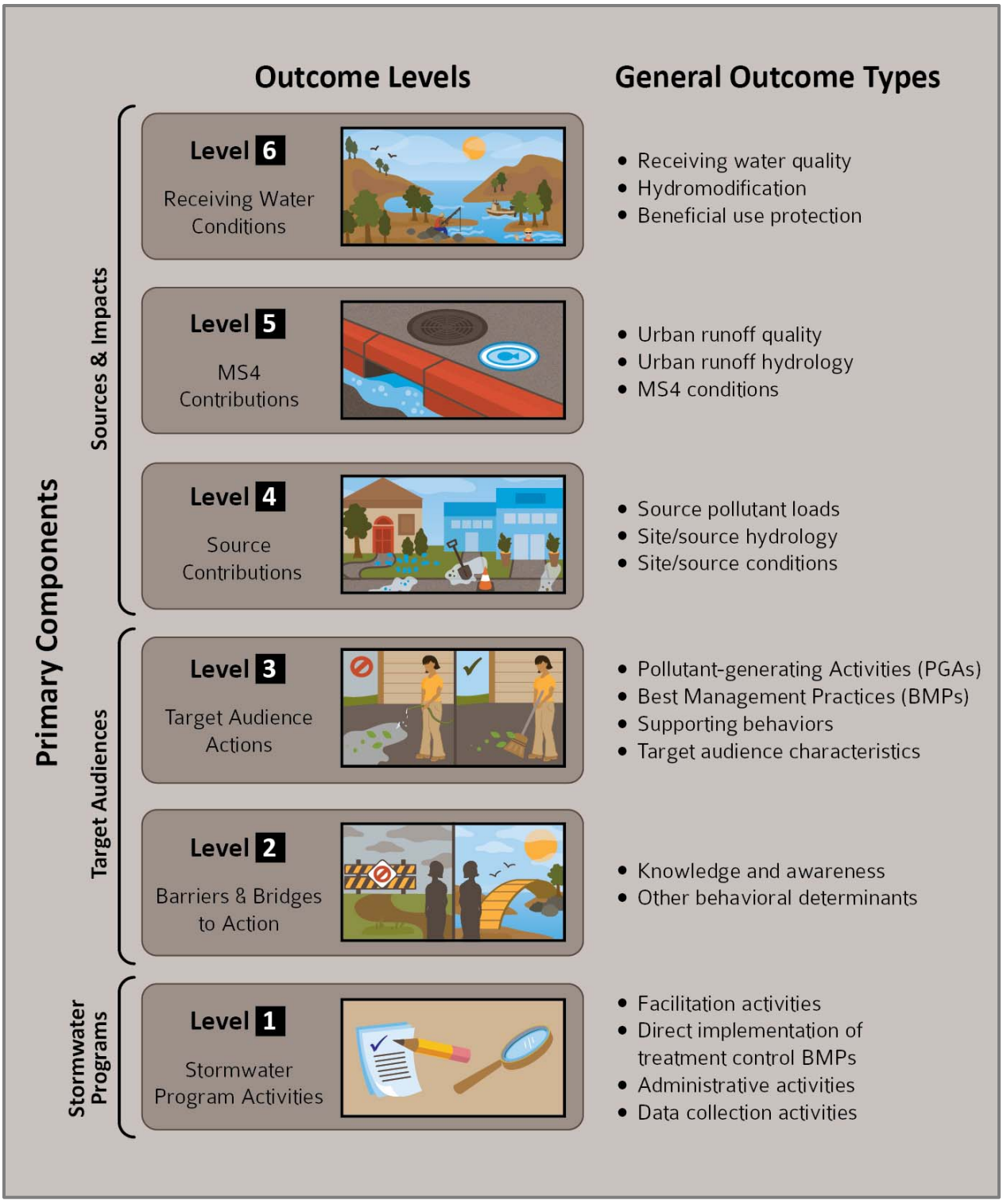

Figure 2. General Stormwater Management Model (CASQA, 2015)

2.1. IDENTIFICATION OF SOURCES AND IMPACTS[9]

2.1.1. Receiving Water Conditions (Outcome Level 6)[10]

One of the primary objectives of the stormwater program is the protection of the beneficial uses of the receiving waters. The Phase II Permit recognizes that there is a need to conduct the EA based on prioritized POCs. The number of POCs ultimately selected may be determined by established TMDLs, other known pollutants present in 303(d) listed waterbodies and/or regional issues identified by COB and COS.

This PEAIP will focus on high- and medium POCs (see **Section 2.1.2**) and will, over time and to the extent feasible, assess protection of the beneficial uses of the receiving waters through attainment of the water quality objectives (WQO's).

Although Outcome Level 6 assessments (i.e. instream monitoring of receiving water conditions) may occur in future as a part of this effort or as part of a regional effort, COB and COS used current receiving water conditions to focus this PEAIP, and in the selection of key metrics to assess the effectiveness of the stormwater program.

In order to identify the POCs for the PEAIP, the COB and COS reviewed the a) proposed TMDLs by the Central Coast Regional Water Quality Control Board, b) 2010 303(d) List of Impaired Waterbodies, c) Central Coast Regional Water Quality Control Board (CCRWQCB) April 24th, 2014 Consultation Handout "Solvang – Buellton Urban Water Quality Profile", d) Central Coast Ambient Monitoring Program's (CCAMP) Ambient Water Quality Data, e) COB and COS Storm Water Management Plan's (SWMP) Guidance Document's List of POCs, and f) proposed regional Urban Storm Water Monitoring Plan. Best professional judgment, knowledge of local and/or regional water quality issues and common urban pollutants were also factors in the identification of POCs and summarized in Attachment B. The category of receiving water impairment that was identified and considered to be for prioritization is in **Appendix B** and summarized and ranked below in **Figure 3**.

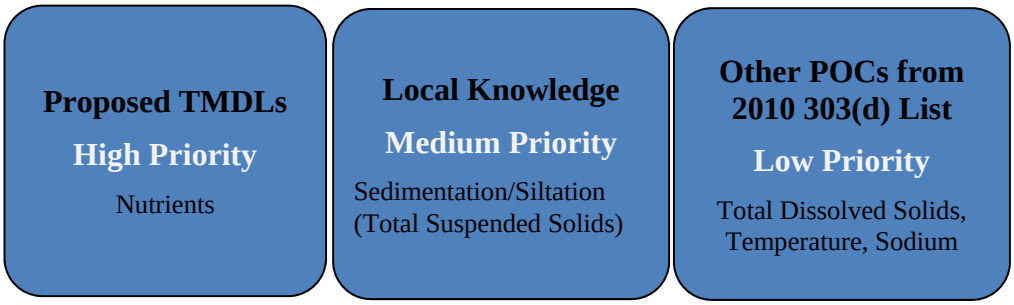

Figure 3. Prioritized POCs for the PEAIP

[9] See 2015 CASQA Guidance Document, Section 4.0: Source and Impact Strategies

[10] See 2015 CASQA Guidance Document, Section 4.2 Outcome Level 6: Receiving Water Conditions.

The highest priority POC was selected because of the proposed TMDL under development by the Central Coast Regional Water Quality Control Board and in consideration of known steelhead habitat sensitivity. Medium-priority POCs continue to be addressed through implementation of the stormwater management program / Guidance Document. Low-priority POCs are also addressed through the stormwater management program, although urban runoff contributions are considered minor, and will not be addressed in this PEAIP.

2.1.2. Urban Runoff and MS4 Contributions (Outcome Level 5)[11]

Level 5 Outcomes may be measured either within the MS4 or within discharges from the MS4. In either case, evaluation typically focuses on pollutant concentrations or loads, or both. Level 5 Outcomes provide a direct linkage between upstream sources and receiving waters and, as such, are a critical expression of stormwater program success. However, due to the temporal and spatial variability of water quality data, it is extremely challenging and takes many years and a significant amount of data to establish linkages between pollutants in MS4 discharges and the conditions within the receiving waters.

The COB and COS used known urban runoff and MS4 contributions were used to focus the PEAIP and select the key metrics that will be used to assess the effectiveness of the stormwater programs The COB and COS will focus its evaluation of Outcome Level 5 on the high- and medium-priority POCs and by doing so will help direct the COB and COS's efforts and provide the basis for the management questions outlined in **Section 3**.

Since TMDLs will have a significant influence on the stormwater program, nutrients are considered to be a high-priority for this PEAIP.

As shown in Figure 3 above, the COB and COS recognizes other pollutants based on 303(d) listed water bodies where urban runoff has been listed as the source of the pollutant (Table 2). Other sources and factors contribute to these impairments. The 303(d) list does not attribute magnitude to any urban runoff.

Table 2. PERMITTEE-Listed Water Bodies

Watershed	Water Body[1]	Pollutant	Source Category
Santa Ynez (314)	Santa Ynez River	Sedimentation/Siltation	Agriculture Resource Extraction Urban Runoff / Storm Sewers
Santa Ynez (314)	Santa Ynez River	Sodium	Agriculture Flow Regulation / Modification Grazing-Related Sources Natural Sources Other Urban Runoff

[11] See 2015 CASQA Guidance Document, Section 4.3 Outcome Level 5: MS4 Conditions

Santa Ynez (314)	Santa Ynez River	Temperature, water	Agriculture Disturbed Sites (Land Develop.) Flow Regulation / Modification Grazing-Related Sources Other Urban Runoff
Santa Ynez (314)	Santa Ynez River	Total Dissolved Solids	Agriculture Municipal Point Sources Natural Sources Other Urban Runoff

Note:
1. 2010 303(d) List

Although nutrients and sediment were selected as the high- and medium-priority POCs, the COB and COS recognize the value of considering other pollutants listed on the 303(d) list as well as common urban pollutants. The COB and COS will continue to assess the 303(d) list to understand which TMDLs may be developed in the future and plan for them as needed. Professional judgment and knowledge of local and regional water quality issues will continue to be factors in the identification of priority POCs. Due to the large size of the watershed compared to the urbanized portion and the very small proportion of urban contribution compared to background, agricultural, and runoff affected by water supply-related flow regulation, these pollutants are currently considered a low priority urban source.

In time, the COB and COS will be able to evaluate the effectiveness of its stormwater program at Outcome Levels 5 using our stormwater discharge monitoring results for the selected POCs. Depending upon data availability, Outcome Level 5 may allow the COB and COS to quantify the pollutant concentrations and/or load reductions achieved by the stormwater program. Given the time and data necessary to assess these Outcome Levels, the COB and COS will incorporate these results into long-term effectiveness assessments.

The POCs identified for the PEAIP for specific COB and COS are summarized in **Table 3.**

Table 3. High- and Medium-Priority POCs[1]

Permittee	PEAIP Pollutants for Concern (POCs)	
	Nutrients	Sedimentation/Siltation (Total Suspended Solids)
COB	✓	✓
COS	✓	✓

Note:
1. This table is current as of June 17, 2015. It is dynamic and subject to change as new information is received.

The POC-specific shading shown in **Figure 4** is used throughout the remainder of the document to visually connect the various figures and tables.

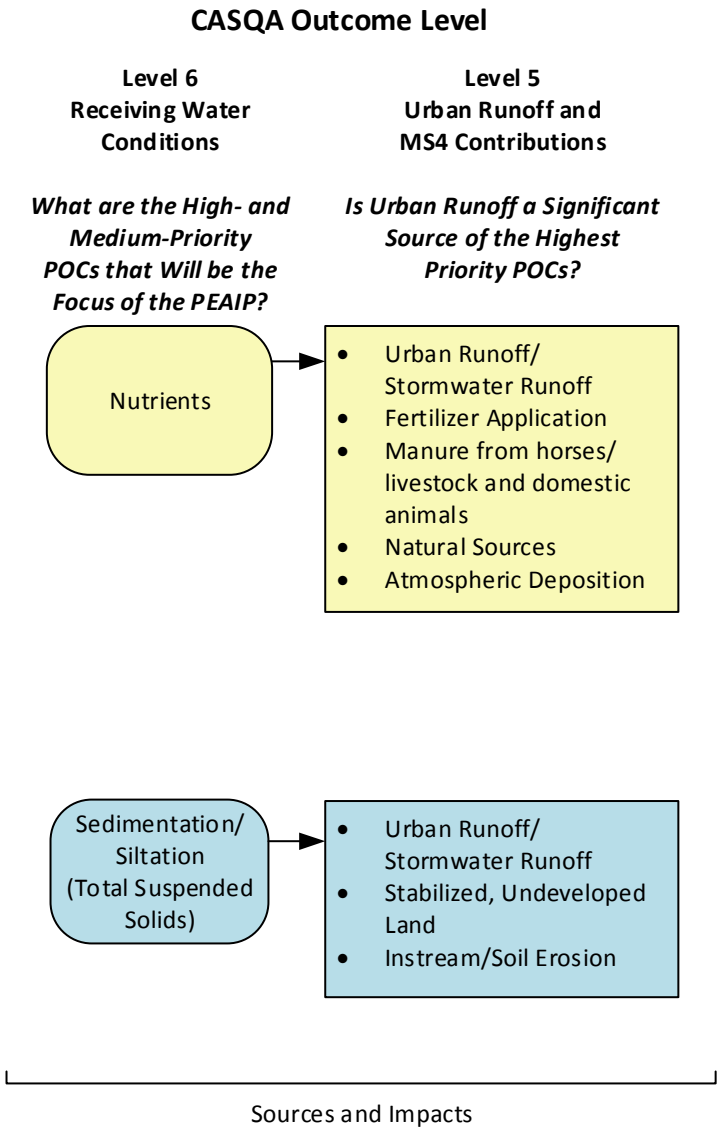

Figure 4. Sources of the High- and Medium-Priority POCs

2.1.3. Source Contributions (Outcome Level 4)[12]

Outcome Level 4 addresses urban sources and the discharges from them. A source is anything with the potential to generate pollutants prior to their introduction to the MS4. Source loadings are the pollutant loadings added by the urban sources to an MS4. Source reductions are the changes in the amounts of pollutants associated with specific sources before and after BMPs are employed. However, it is challenging to measure source loadings and/or reductions achieved by individual and/or groups of BMPs. As a result, the COB and COS will need to rely on direct measurements (where possible) and/or estimates of source reductions.

The COB and COS will focus its evaluation of Outcome Level 4 on the high- and medium-priority POC. Doing so will help direct the COB and COS's efforts and provide the basis for the management questions outlined in **Section 3**.

As management questions are developed, the COB and COS will consider the implementation requirements of future TMDLs, as well as best professional judgment. In order to determine the specific target audiences and the appropriate prioritized BMPs, the COB and COS has evaluated the POCs as they relate to urban land use to identify the primary urban runoff sources of each POC, as shown in **Figure 5**. The COB and COS expects assessment at this Outcome Level to be included in long-term EAs through a 303(d) water quality monitoring program.

The 303(d) water quality monitoring program will be conducted at two locations in urban areas of the Santa Ynez River watershed: Buellton and Solvang. Data will be incorporated into a pollutant load model to estimate average annual baseline pollutant loads -- from the full watersheds, the jurisdictional MS4 areas, and the storm drain system subcatchments -- using a static average-annual land use based spreadsheet calculation.

The model is a static spreadsheet approach that can estimate pollutant load reductions anticipated from BMPs during wet weather loading. Pollutants that can be modeled are: indicator bacteria, nutrients (total nitrogen, total phosphorus, nitrate, total kjeldahl nitrogen, dissolved phosphorus), metals (total copper, total lead, total zinc), and/or TSS. (Refer to the Geosyntec Consultants Modeling Approach Memorandum "Program Effectiveness Assessment and Improvement Plan Approach to Quantify Pollutant Loads and Pollutant Load Reductions dated October 12, 2015 that was submitted through the Storm Water Multiple Application and Report Tracking System Database).

[12] See 2015 CASQA Guidance Document, Section 4.4 Outcome Level 4: Source Contributions

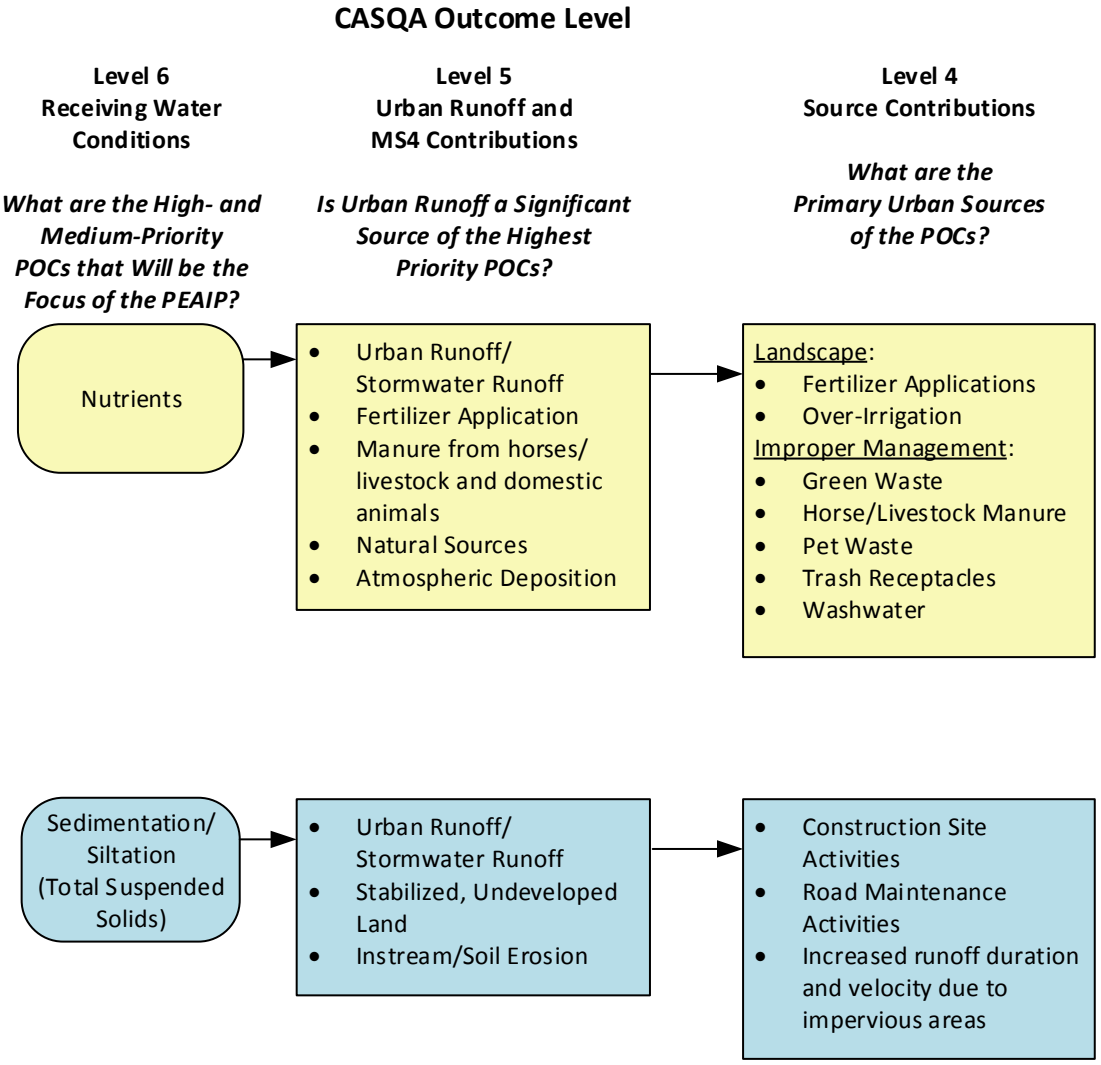

Figure 5. Primary Urban Sources of the High- and Medium-Priority POCs

2.2. IDENTIFICATION OF THE KEY TARGET AUDIENCES (OUTCOME LEVELS 2 AND 3)[13]

This component focuses on the actions of target audiences and the factors that influence them. Target audiences are the individuals and populations that a stormwater program is directed to and may include, but are not limited to, municipal employees, contractors, and the general public. Because source reductions can only be achieved by the people responsible for pollutant loadings, a successful program will be one that is able to induce positive behavioral changes in the target audiences.

Although Outcome Levels 3 (Target Audience Actions) and 2 (Barriers and Bridges to Action) are closely related, they are distinct outcome levels.

- Outcome Level 3 focuses on the identification of target audiences associated with the primary sources of high- and medium priority POCs, as well as the behavioral patterns of these target audiences, with the goal of assessing *behavior change* over time.
- Outcome Level 2 focuses on identification of the factors that influence target audience behaviors, with the goal of using these factors to develop strategies to increase target audience *awareness* of the need to reduce pollutant-generating activities (PGAs) and implement prioritized BMPs. Level 2 Outcomes are often used to gauge progress in, or to refine approaches for, achieving Level 3 Outcomes (see **Section 2.2.2**).

[13] See 2015 CASQA Guidance Document, Section 5.0: Target Audience Strategies

2.2.1. Target Audience Actions (Outcome Level 3)[14]

Level 3 Outcomes address the actions of target audiences and whether or not changes are occurring within these target audiences over time. The major categories of target audience actions are:

- PGAs – behaviors that contribute pollutants to urban runoff (e.g., pressure washing without containment, improper pet waste disposal, spills during materials loading and unloading)
- BMPs – activities or other controls that are implemented to reduce or eliminate discharges of pollutants (e.g., integrated pest management (IPM) practices, implementation of secondary containment)
- Supporting behaviors – include a wide range of potential actions that are distinct from BMP implementation but help support the implementation (e.g., pollution incident reporting, public involvement)

The COB and COS will focus its evaluation of Outcome Level 3 on the actions of target audiences for the high- and medium-priority POCs. The COB and COS has identified the critical target audience(s) for the specific urban runoff source(s) of each high- and medium-priority POC (**Figure 6**), along with management questions that delineate the critical target audience actions (**Section 3**).

The COB and COS will evaluate the effectiveness of its stormwater program at Outcome Level 3 by using the management questions to guide its assessment of target audience implementation of BMPs and reduction of PGAs. It is expected that assessment at this outcome level will be included in the short- and long-term EAs.

[14] See 2015 CASQA Guidance Document, Section 5.2 Outcome Level 3: Target Audience Actions

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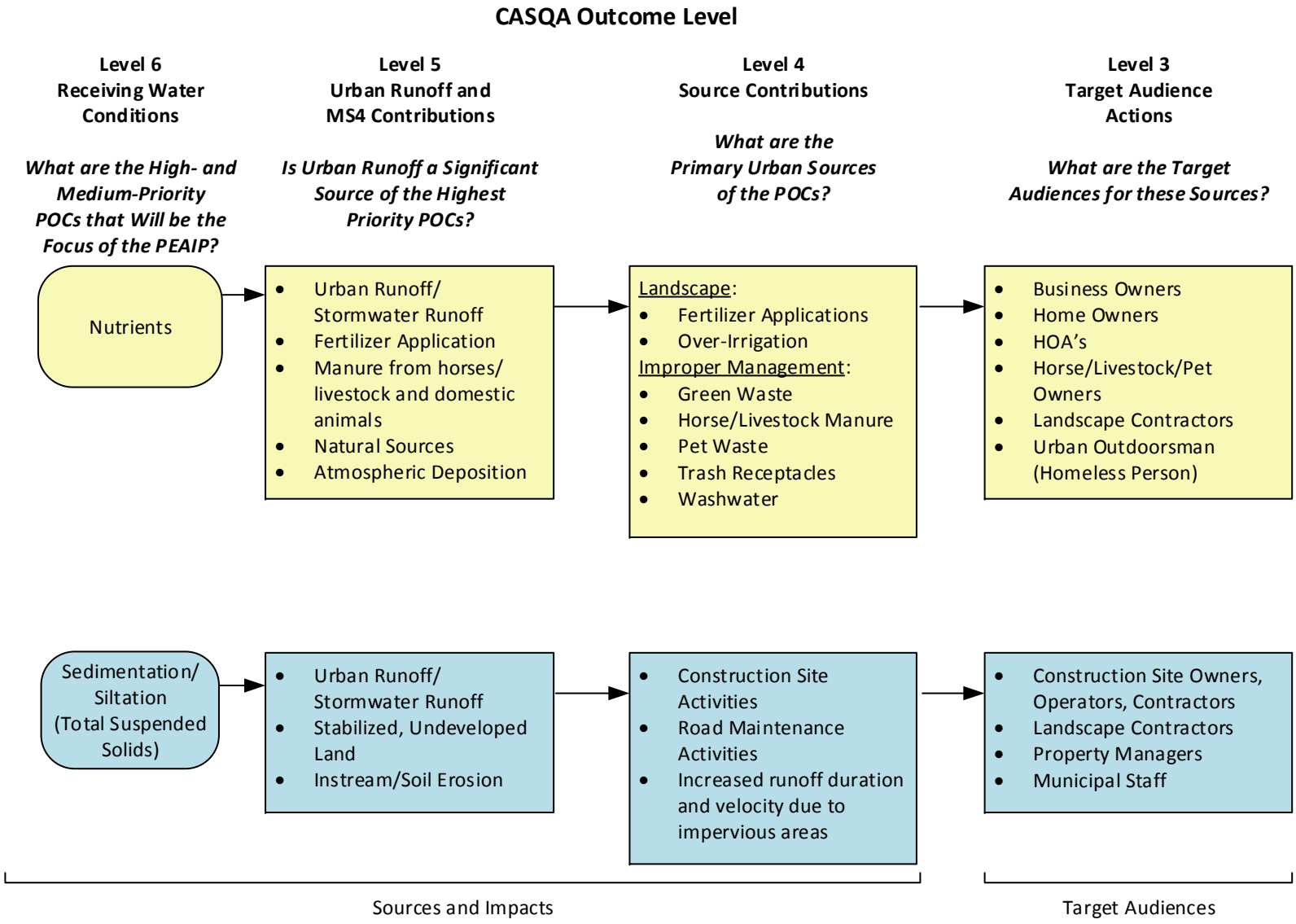

Figure 6. Target Audiences Identified for Urban Runoff Source Contributions of POCs

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2.2.2. Barriers and Bridges to Action (Outcome Level 2)[15]

Outcome Level 2 is critical because it forms the basis for achieving desired behavioral changes and provides a means of gauging progress toward achievement. The term "barriers and bridges" refers to the fact that there are factors that may aid or inhibit a desired behavior and that these need to be understood in order to affect the desired change. The targeted audience won't behave differently unless they understand the problem and are motivated and able to change.

Outcome Level 2 provides a means of gauging whether the prioritized activities (e.g., outreach, municipal staff training) are producing changes in the behavior of the target audiences through increased knowledge, awareness, and changes in attitudes. Examples of Outcome Level 2 range from awareness of basic concepts (e.g., why stormwater pollution is a problem; the difference between storm drains and the sanitary sewer) to specific knowledge (e.g., how to properly dispose of pet waste; how to properly install and maintain a silt fence).

Outcome Level 2 provides a means to gauge progress in, or to refine approaches for, achieving Outcome Level 3. That is, an understanding of whether awareness, knowledge, and/or attitudes have changed will allow the identification of barriers and bridges that may be influencing the desired target audience behavior.

The COB and COS will work to identify barriers and bridges that may be influencing target audience behavior. The COB and COS will assess Outcome Level 2 on an as-needed basis as part of the adaptive management process (**Figure 7**). The COB and COS expects assessment at this Outcome Level to be included in short- and long-term EAs.

[15] See 2015 CASQA Guidance Document, Section 5.3 Outcome Level 2: Barriers and Bridges to Action

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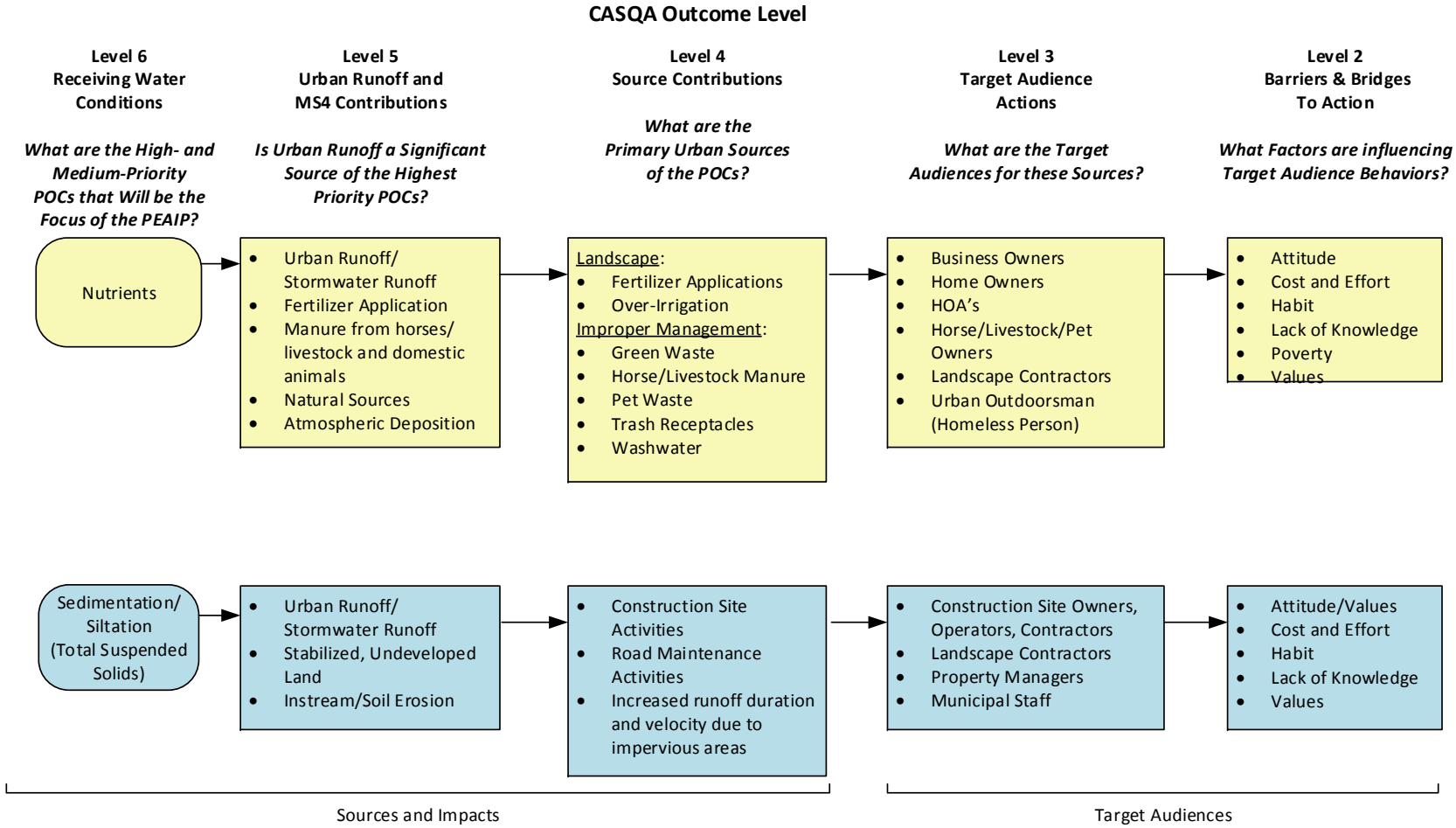

Figure 7. Assessment of Barriers and Bridges to Action

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2.3. IDENTIFICATION OF THE STORMWATER PROGRAM ACTIVITIES (OUTCOME LEVEL 1) [16]

Level 1 Outcomes focus on the various activities that are conducted within a program. Examples of these activities include providing education to residents, inspecting businesses, conducting surveys of target audiences, and conducting monitoring. Outcome Level 1 only measures the *implementation* of the stormwater program, rather than the *impact* of the program is having. The EAs will focus on the impact of the stormwater program by assessing Outcome Levels 2 through 5 as they relate to the high- and medium-priority POCs.

Based on the identification of the high- and medium-priority POCs and their potential sources, target audiences, and key implementation activities (prioritized BMPs), the COB and COS has identified the Program Elements for which the implementation of prioritized BMPs will be assessed (**Table 4**).

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The COB and COs used this as the basis for both the management questions (see **Section 3**) and the identification of prioritized BMPs, or key implementation activities, for specific target audiences.

[16] See 2015 CASQA Guidance Document, Section 6.0 Program Implementation Strategies and Section 6.2 Step 1-A: Program Implementation Activities

Table 4. Program Elements for Which Prioritized BMPs Will Be Assessed through the Identified Management Questions

Program Element	Phase II Permit Provision(s)	Pollutants of Concern (POCs)	
		Nutrients	Sedimentation/Siltation (Total Suspended Solids)
Education and Outreach	E.7	✓	✓
Public Involvement and Participation	E.8	✓	--
Illicit Discharge Detection and Elimination (IDDE)	E.9	✓	✓
Construction Site Stormwater Runoff Control	E.10	--	✓
Pollution Prevention/Good Housekeeping	E.11	✓	✓
Post Construction Stormwater Management	E.12	--	✓
Water Quality Monitoring	E.13	✓	✓

For each high- and medium-priority POC, a summary of prioritized BMPs for the identified target audiences is provided in

Figure 8. More detail is provided within the management questions (**Section 3**), as well as the data assessment and collection table(s) within **Section 4**.

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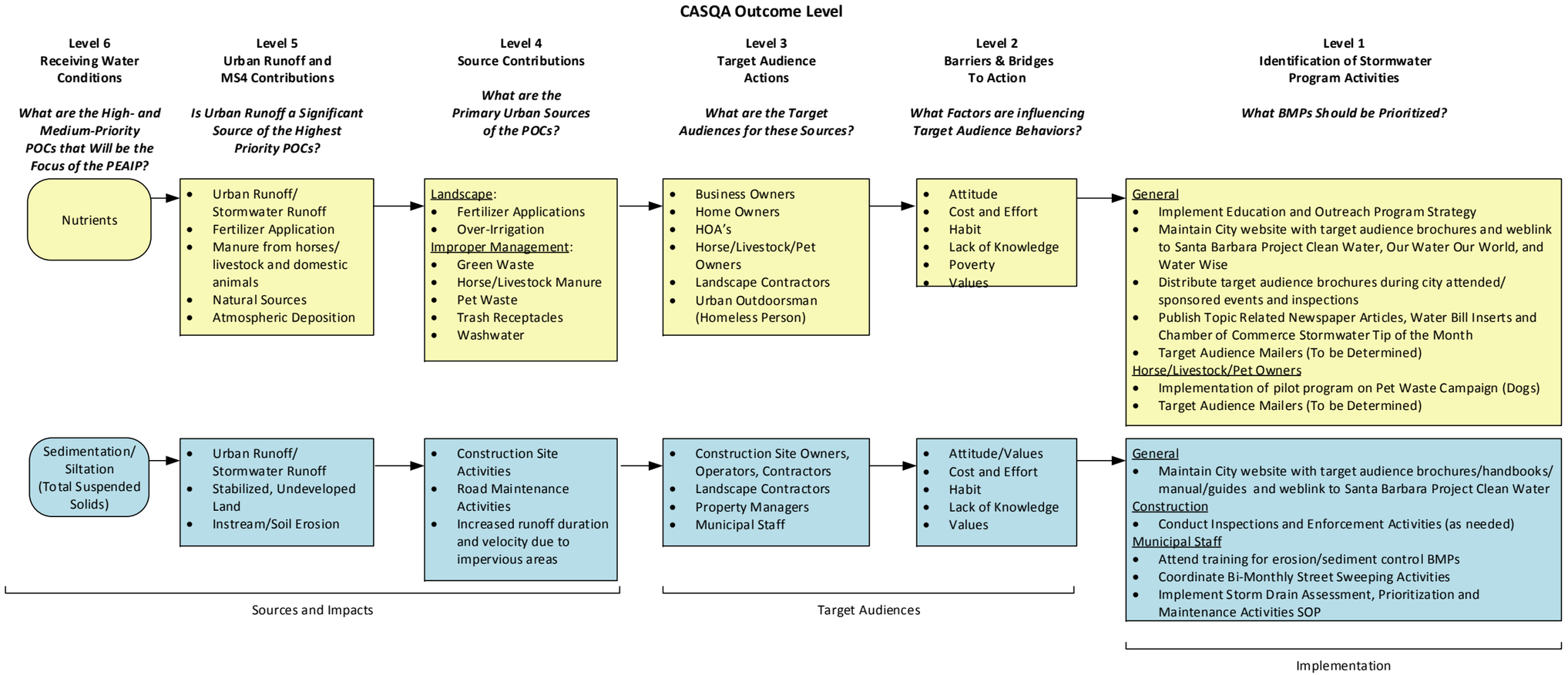

Figure 8. Prioritized BMPs Identified for Target Audiences

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3. Management Questions[17]

In order to focus the EAs, the COB and COS has identified management questions for the prioritized BMPs that may be implemented to address the high- and medium-priority POCs.

The assessment data and information collected by the COB and COS (**Section 4**) are focused on Outcome Levels 2 through 5 and will be used to answer programmatic-based management questions related to the prioritized BMPs.

Pursuant to Provision E.14(a)(ii)(e-f), the types of questions that were considered for this PEAIP include the following:[18]

- To what extent did implementation of the BMPs, group of BMPs, or stormwater program enhance or change the urban runoff and discharge quality?[19] [OL5]
- To what extent did prioritized BMPs or group of BMPs reduce pollutant loads from their sources to the storm drain system?[20] [OL4]
- To what extent did prioritized BMPs or group of BMPs change the target audience's behavior?[21] [OL3]
- What barriers or bridges are influencing or could influence the target audience's ability or desire to implement the prioritized BMPs or group of BMPs? [OL2]

Section 4 summarizes the management questions and CASQA Outcome Level(s) addressed.

[17] See 2015 CASQA Guidance Document, Section 7.3 Assessment Objectives, Attachment B: Sources and Activities Profile Sheets, and Attachment C: Pollutant Profile Sheets

[18] The PEAIP is focused on the *impact* that the stormwater program is having rather than the strict *implementation* of the program. Thus, the question listed in Provision E.14.a.(ii)(e)(1) regarding implementation of the Permit requirements is not included in the PEAIP.

[19] E.14.a.(ii)(f)(1)

[20] E.14.a.(ii)(e)(3)

[21] E.14.a.(ii)(e)(2)

4. Data Assessment and Collection

4.1. DATA ASSESSMENT METHODS[22]

During the EA process, the data collected will be assessed and/or analyzed using a variety of methods, such as:

- **Qualitative assessment** includes confirmation that an activity (e.g., construction site inspections) was conducted and/or that a specific task (e.g., completion of a pet waste brochure) was completed, as well as narrative assessment.
- **Descriptive statistics** are numbers that are used to summarize and describe data. Several descriptive statistics are often used at one time, to give a full picture of the data. Examples of descriptive statistics are counts (includes quantification and tabulation), averages, variance, etc. Other information includes: direct quantitative measurements of pollutant load removal, estimates of pollutant load removal for BMPs where direct measurement of pollutant removal is overly challenging, and direct quantitative measurement of behaviors that serve as proxies of pollutant removal or reduction.
- **Comparisons to established reference points** involve comparing collected data to established targets (targeted outcomes, discharge prohibitions, WQOs, required activity levels, etc.) or other reference points (other programs, previous results, baseline values, visual comparison using photographs over time, etc.].
- **Temporal change** is change over time. This includes variability, trends, and changes due to program implementation (e.g., simple change [absolute or %] or statistical trends).
- **Spatial analysis** allows comparisons between watersheds or other geographic areas. Impacts of runoff and/or control measures can be evaluated based on characteristics of the geographic regions (differences in land use, geology and geomorphology, hydromorphology, etc.).

[22] See 2015 CASQA Guidance Document, 6.3 Step 1-B Data Collection and Analysis Activities and 7.5 Data Analysis

4.2. DATA COLLECTION METHODS[23]

The assessment data will be collected through various means such as:

- **Internal Tracking by Stormwater Program** of internal program data only (e.g., inspection data, public outreach and education efforts)
- **Reporting to Stormwater Program** by third parties only (e.g., BMP maintenance certifications, industrial facility monitoring data)[24]
- **Site Investigations/Inspections** conducted by stormwater programs to directly observe or assess a practice (e.g., inspections, site visits, complaint investigations)
- **Interviews** conducted by stormwater programs to discern awareness and behavior (e.g., of third parties or stormwater program staff, municipal staff, public focus groups)
- **Surveying** by stormwater programs of third parties or stormwater program staff to discern knowledge, attitudes, awareness, behavior of a target audience (e.g., pre-/post-training surveys, public outreach surveys)
- **Monitoring and Sampling** data obtained directly by stormwater programs or contractors (e.g., receiving water or MS4 sampling, industrial facility visual observations during inspections)
- **Review of External Data Sources** by stormwater program staff (e.g., of data or information obtained via literature, the Regional Water Board, other regulatory programs, online databases, third parties)
- **Special Investigations** can encompass any of the categories above, but normally involve a more intensive one-time focus.

[23] See 2015 CASQA Guidance Document, 6.3 Step 1-B Data Collection and Analysis Activities, 7.4 Data Collection, Attachment B: Sources and Activities Profile Sheets, and Attachment C: Pollutant Profile Sheets

[24] The Phase II Permit requires Permittees to identify assessment methods for privately owned BMPs. At this time, the PERMITTEE does not anticipate that these types of BMPs (e.g., structural, treatment control) will need to be evaluated for the high priority POCs that have been identified.

4.3. DATA REQUIREMENTS FOR SELECTED METRICS AND OUTCOME LEVELS

In the table(s) below, the POC-specific management questions representing focused program activities and/or prioritized BMPs are presented by Program Element, along with the assessment methods that will be used during the EA process and the associated assessment data that should be collected for evaluation (**Table 5**). The CASQA outcome levels that may be supported by the EA results are also indicated. Where applicable, the units for the required data are specified.

Although **Table 5** identifies the management questions, data assessment methods, and data collection methods that will initially be used for the EAs, future PEAIPs may modify and/or incorporate other management questions or data assessment/collection methods based on the information gained from the implementation of the PEAIP. Any modifications to the PEAIP will be identified as a part of the Annual Reports.

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Table 5. Nutrients Questions, Data Assessment Methods, and Data Collection Methods, by Program Element

Management Questions	Data Assessment Methods	Data Collection Methods
Education and Outreach [Outcome Level 2-3]		
• Has the City developed education and outreach materials with information regarding proper use and disposal of fertilizers? • Are education and outreach materials available at City designated facilities, City sponsored events or on the City website? • Does the City have a targeted pet waste/livestock educational program? • Does the County support education for landscape contractors to reduce fertilizer? • Are education and outreach materials provided during Fats, Oil and Grease (FOG) and/or Industrial Wastewater Discharge (IWD) Inspections?	Descriptive Statistics • Number of education and outreach events participated in and estimated of number of education and outreach materials distributed at City designated facilities, City's sponsored event's Stormwater Display Booth or thru City website • Number of education and outreach materials provided during FOG and/or IWD Inspections • Number of target audience mailers to landscape contractors, residents along the river/creek with livestock; and/or homebrew beer, wine and distillery waste etc.	Internal Tracking by Stormwater Program • Brochure Distribution at City designated facilities, City sponsored events or thru City website • City SWMP File Views/Hits (English and/or Spanish) • Number of Visitors to the City's sponsored event's Stormwater Display Booth • Number of target audience mailers to residents along the river/creek with livestock; landscape contractors; homebrew beer, wine and distillery waste Review of External Data Sources • Brochure Distribution during FOG and/or IWD Program Inspection
Public Involvement and Participation [Outcome Level 2-3]		
• Has the City developed opportunities for citizen participation at City's sponsored event's Stormwater Display Booth? • Has the City developed opportunities for citizen participation on-line thru the City's Stormwater Webpage or Survey Monkey?	Qualitative Assessment • Confirmation of Stormwater Pollution Prevention Interested Parties Sign-Up List at City's sponsored event's Stormwater Display Booth Descriptive Statistics • Number of Visitors and Stormwater Quiz's Completed via City's sponsored event's Stormwater Display Booth • Number of on-line Storm Water Management Program Survey's completed and interested parties sign-up inquiry via the City's Stormwater Webpage or Survey Monkey	Interviews/Surveys Internal Tracking by Stormwater Program • Number of Visitors and Stormwater Quiz's Completed via City's sponsored event's Stormwater Display Booth • Number of Stormwater Survey's Completed and Interested Parties Sign-up Inquiry via City Stormwater Website or Survey Monkey Review of External Data Sources • Number of Stormwater Survey's Completed and Interested Parties Sign-up Inquiry via or Survey Monkey

Management Questions	Data Assessment Methods	Data Collection Methods
Illicit Discharge Detection and Elimination [Outcome Level 4]		
• Has the City developed IDDE procedures? • Are FOG and IWD Program participants operating in a manner that prevents nutrients from leaving the site? • Are green waste and pet waste collection programs in place? • Does City have legal authority to address non-storm water discharges?	Qualitative Assessment • Confirmation of local waste hauler (green waste) and Christmas Treecycle Program • Confirmation of City Mutt Mitt Stations Bi-weekly Maintenance Program • Confirmation of on-going City Staff IDDE Training • Confirmation of establish City Municipal Code and Certification of Legal Authority Descriptive Statistics • Number of IDDE Investigations and/or Inspections and follow-up at facilities with deficiencies • Number of FOG and/or IWD Inspection Reports and/or Violations	Internal Tracking by Stormwater Program • Stormwater Incident Report Form • Mutt Mitt Station Bi-weekly Maintenance Site Investigations/Inspections • City IDDE Site Investigations and/or Inspections with direct observation of an IDDE Review of External Data Sources • FOG and/or IWD Inspection Reports and/or Violations • Local Hauler Green Waste Website/Mailers
Pollution Prevention and Good Housekeeping [Outcome Level 2-4]		
• Is City effectively implementing BMPs (e.g. Mutt Mitt Stations) that target nutrient reduction in waterways? • Are FOG and/or IWD Program participants implementing a Pollutant Prevention and Good Housekeeping practices? • Are FOG and/or IWD Program participants aware of Cities SWMP requirements? • Are FOG and/or IWD Program participants aware of SWMP requirements for their business activity? • Do the FOG and IWD Program participants believe they are in compliance with the City's SW Program?	Qualitative Assessment • Confirmation of on-going City Staff Training Descriptive Statistics • Number of FOG and/or IWD Inspection Reports	Interviews/Surveying Review of External Data Sources • FOG and/or IWD Inspection Reports • FOG and/or IWD Inspection Report Stormwater Questionnaires

Water Quality Monitoring [Outcome Level 5]		
• Is the urban discharge a significant source of nutrients to receiving water?	• Comparing modeled data to established targets • Use local data acquired through regional 303(d) monitoring program	• Monitoring and sampling results • Pollutant load model results

Table 6. Sedimentation/Siltation (Total Suspended Solids) Questions, Data Assessment Methods, and Data Collection Methods, by Program Element

Management Questions	Data Assessment Methods	Data Collection Methods
Education and Outreach [Outcome Level 2-3]		
• Are City Grading Inspectors trained to review and inspect erosion and sediment control measures? • Are there educational opportunities at county sponsored events? • Are construction contractors informed of proper erosion and sediment control measures?	Qualitative Assessment • Confirmation of on-going City Grading Staff Training • Descriptive Statistics Number of new City Grading Staff Trained • Number of outreach events participated in and outreach materials distributed to construction contractors • Number of connections to construction contractors through grading permits and inspections	Internal tracking by stormwater program • Internal Tracking by City Engineering Department and/or Division Training • Number of Outreach Event Participation and Brochure Distribution via email • Number of connections with Construction Contractors through grading permits and inspections

Illicit Discharge Detection and Elimination [Outcome Level 4]		
• Does City implement field investigation program for complaints and discoveries of illicit discharges? • Does City have legal authority to address non-storm water discharges?	Qualitative Assessment • Confirmation that the City has IDDE Procedures (Spill Response Plan) • Confirmation of on-going City Staff IDDE Training • Confirmations of establish City Municipal Code and Certification of Legal Authority Descriptive Statistics • Number of IDDE Investigations and/or Inspections and follow-up at facilities with deficiencies	Internal tracking by stormwater program • Stormwater Incident Report Form Site Investigations/Inspections • City IDDE Site Investigations and/or Inspections with direct observation of an IDDE
Construction Site Stormwater Runoff Control [Outcome Level 2-3]		
• Are construction sites being managed in compliance with City Municipal Code? • Are Stormwater Pollution Prevention Plans (SWPPP), Erosion and Sediment Control Plans (E&SCP) and/or Stormwater Control Plans (SWCP) reviewed prior to permit issuance? • Are any sites a potential source of significant sediment discharge?	Descriptive Statistics • Number of Construction Sites issued Grading Permits • Number of SWPPP, E&SCP and SWCP reviewed prior to issuance of permit • Number of Construction Sites designated as a Water Quality Threat • Number Construction Site Inspections • Number of Verbal Warnings, Stop Work Order, Letter to Correct, Written Notice of Violation, Code Violations, Construction Bond, Penalties, Enforcement Actions (Administrative, Civil or Criminal Actions)	Internal tracking by stormwater program • SWPPP, E&SCP and SWCP • Construction Site Inspections • Construction Sites with Water Quality Threat • Verbal Warnings, Stop Work Order, Letter to Correct, Written Notice of Violation, Code Violations, Construction Bond, Penalties, Enforcement Actions (Administrative, Civil or Criminal Actions)

Post-Construction Site Stormwater Runoff Control [Outcome Level 2-3]		
• Is development being approved in compliance with Post-Construction Requirements (PCRs) and Low Impact Development (LID) Measures to promote runoff volume and rates?	Descriptive Statistics • Number of projects reviewed in compliance with PCRs and LID measures	Internal tracking by stormwater program • PCR and LID Projects
Pollution Prevention and Good Housekeeping [Outcome Level 2-3]		
• Are City facilities managed to reduce erosion and promote sediment retention?	Descriptive Statistics • Number of Pollution Prevention BMPs implemented at City owned and/or operated facilities	Internal tracking by stormwater program • Pollution Prevention and Good Housekeeping BMPs implemented at City owned and/or operated facilities
Water Quality Monitoring [Outcome Level 5]		
• Is the urban discharge a significant source of sediments to receiving water?	• Compare modeled data to established targets • Use local data acquired through regional 303(d) monitoring program	• Monitoring and sampling results • Pollutant load model results

5. Program Reporting and Modifications[25]

Beginning in Year 3, the PEAIP will be implemented, and EAs will be conducted each year and submitted along with the Annual Report. The completion of EAs is part of the program management cycle (**Figure 9**) and will, over time, inform program modifications.

During the EA process, the COB and COS will evaluate, assess, and/or analyze data and information collected using the methods in **Section 4.1,** and address specific management questions in **Section 4.3**.

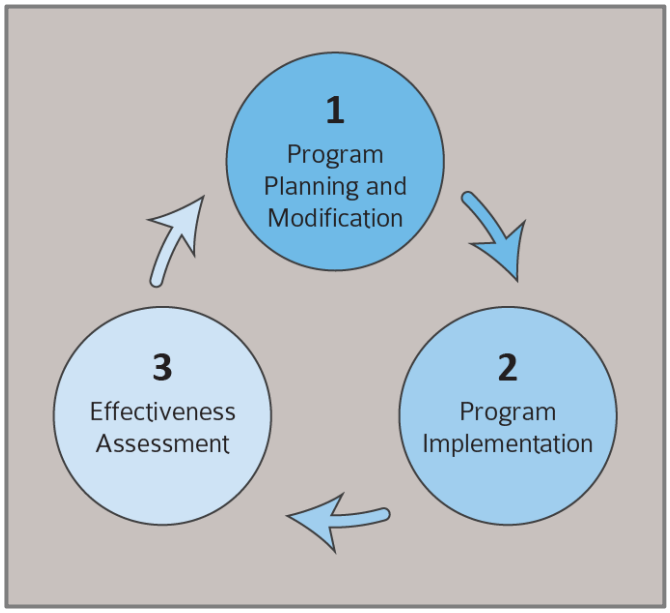

Figure 9. The Program Management Cycle (CASQA, 2015)

The EA may include both written and visual (i.e., tabular, graphical) depictions of the raw data (e.g., inspection data tracked internally by stormwater program) and the analyses that are conducted (e.g., descriptive statistics, qualitative analysis). The COB and COS will consider the results of the analyses along with the POC-specific management questions. Depending on the availability of historical data, the COB and COS expects more complex trends analyses to occur as part of the long-term EAs.

Beginning with the Annual

Beginning with the Annual Report in Year 5, in conjunction with the long-term EAs, the COB and COS will review the EAs and recommendations based on the experience of stormwater staff in implementing the program and identify areas for improvement. The management questions and data collection results will be reviewed and used as the basis for summarizing the short- and long-term progress of the stormwater program towards reducing the potential impacts of urban runoff on receiving waters. The COB and COS will identify modifications that may be necessary to improve program effectiveness at reducing pollutant loads, achieving the MEP standard, and protecting water quality.

The COB AND COS will provide a summary identifying the following types of modifications (as applicable):

[25] See 2015 CASQA Guidance Document, Section 7.0 Assessment Tools and Strategies, Section 7.2 Iterative and Adaptive Management, Section 7.3 Assessment Objectives, and Section 8.2 Program Modifications

- Improving upon the PEAIP by identification of any potential data gaps and/or revisions that may be necessary for the evaluation of the POC-specific management questions;
- Improving upon prioritized BMPs (i.e., key implementation activities) that have not been fully implemented and/or did not achieve the expected result;
- Continuing and expanding upon prioritized BMPs that proved to be effective, including identifying new prioritized BMPs or modifications to existing prioritized BMPs, with the goal of increasing pollutant load reductions;
- Discontinuing BMPs that may no longer be effective; and
- Based upon identification of bridges and barriers, changes in how the COB AND COS intends to provide outreach to target audiences in order to reduce PGAs and increase implementation of prioritized BMPs.

The COB and COS will provide the summary of program modifications with the Year 5 Annual Report and include the identified priority program areas and the schedule to complete the identified modifications during the next permit term. By conducting these assessments and modifying the program as needed, the COB and COS will ensure utilization of the program management cycle.

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List of Appendices

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Appendix A: Glossary of Terms[26]

Adaptive Management: Adaptive Management is a structured process of directing decision-making with an aim toward achieving identified goals or milestones and addressing/reducing uncertainty over time.

Assessment Methods: Assessment Methods are processes used to obtain or evaluate assessment data or information. Depending on the particular outcome and/or management questions, numerous assessment methods may be used.

Best Management Practice (BMP): Defined in 40 CFR 122.2 as schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce pollutants discharged to waters of the United States.

California Stormwater Quality Association (CASQA): Since 1989 CASQA has been a leader in the stormwater field. CASQA represents a diverse range of stormwater quality management organizations and individuals, including cities, counties, special districts, industries, and consulting firms throughout the state. The Effectiveness Assessment Subcommittee has provided input and guidance on stormwater program effectiveness assessment issues since 2004; developing a standardized conceptual approach to evaluating municipal program elements in 2007 and updating that approach in 2015.

Effectiveness Assessment (EA): Effectiveness Assessment includes the methods and activities that stormwater managers use to evaluate how well their programs are working, and to identify modifications necessary to improve them. EA is the mechanism by which feedback is evaluated to enable ongoing adaptive management.

Program Management Cycle: The Program Management Cycle broadly divides stormwater program management into three phases:

1. Program planning and modification;
2. Program implementation; and
3. Effectiveness assessment.

Over time, the repeated application of this process—each phase continuously informing the next—should result in the improvement of stormwater programs and the achievement of the desired results that they are designed to achieve.

Maximum Extent Practicable (MEP): The technology-based standard established by Congress in CWA section 402(p)(3)(B)(iii) for storm water that operators of MS4s must meet. Technology-based standards establish the level of pollutant reductions that dischargers must achieve, typically by treatment or by a combination of source and/or treatment control BMPs. MEP primarily emphasizes pollution prevention and source control BMPs (as the first line of defense) in combination with treatment methods serving as a backup (additional line of defense). MEP considers economics and is generally, but not necessarily, less stringent than best available technology or best available. A definition for MEP is not provided either in the statute or in the regulations. Instead the definition of MEP is dynamic and will be defined by the following

[26] The Glossary of Terms is primarily based on the Glossary of Acronyms and Terms in the *Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs*, CASQA 2015

process over time: municipalities propose their definition of MEP by way of the programs set forth in their stormwater management plans/programs. Their total collective and individual activities conducted pursuant to the runoff management programs becomes the proposal for MEP as it applies both to overall effort, as well as to specific activities (e.g., MEP for street sweeping, or MEP for MS4 maintenance).

In the absence of a definition, the State Water Resources Control Board defined MEP as set forth in a memo dated 11 February 1993, entitled "Definition of Maximum Extent Practicable," Elizabeth Jennings, Senior Staff Counsel.[27]

Municipal Separate Storm Sewer System (MS4)[28]: An MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is:

- Owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.;
- Designed or used to collect or convey stormwater;
- Not a combined sewer; and
- Not part of a Publicly Owned Treatment Works (POTW) (sewage treatment plant).

Outcome Level: The CASQA approach utilizes a series of six categories of outcomes to establish a logical and consistent organizational scheme for assessing and relating individual outcomes. The outcome levels represent a general progression of conditions that are assumed to be related in a sequence of causal relationships.

- **Outcome Level 6 (Receiving Water Conditions):** Level 6 Outcomes describe receiving water conditions. They can apply either to existing conditions or to improvements that will be sought over time through program implementation.
- **Outcome Level 5 (MS4 Contributions):** Level 5 Outcomes may be measured within the MS4, or as discharges from it. Evaluation typically focuses on pollutant concentrations and/or loads. Level 5 Outcomes provide a direct linkage between upstream sources and receiving waters and are a critical expression of program success.
- **Outcome Level 4 (Source Contributions):** Level 4 Outcomes measure reductions in the discharge of pollutants from sources.
- **Outcome Level 3 (Target Audience Actions):** Level 3 Outcomes address the actions of target audiences, and whether or not changes are occurring over time. The major categories of target audience actions are pollutant-generating activities (PGAs); best management practices (BMPs) and supporting behaviors.
- **Outcome Level 2 (Barriers and Bridges to Action):** Level 2 Outcomes provide a means of gauging whether activities are producing changes in the awareness, knowledge, or attitudes of target audiences. Level 2 Outcomes are often used to gauge progress in, or to refine approaches for, achieving Level 3 Outcomes.

[27] http://www.swrcb.ca.gov/water_issues/programs/stormwater/docs/def_mep_bj_21193.pdf

[28] Based on the definition in Title 40 Code of Federal Regulations §122.26 (b)(8)

- **Outcome Level 1 (Stormwater Program Activities):** Level 1 Outcomes, which are often defined by specific stormwater permit requirements, address a variety of stormwater program activities. This outcome level measures the *implementation* of the program, not the *impact* that the stormwater program is having.

Phase II MS4 Permit: The Phase II Permit, issued in 1999, requires regulated small MS4s in urbanized areas, as well as small MS4s outside the urbanized areas that are designated by the permitting authority, to obtain NPDES permit coverage for their stormwater discharges. Each regulated MS4 is required to develop and implement a stormwater management program/approach to reduce and/or eliminate the discharge of pollutants from the MS4 to the maximum extent practicable (MEP) and effectively prohibit discharges of non-stormwater into its MS4, unless such discharges are authorized.

Pollutant of Concern (POC): A pollutant that is reasonably expected to be present in urban runoff and may reasonably be expected to affect the designated uses of the receiving water. Urban runoff pollutants of concern may include sediments, non-sediment solids, nutrients, pathogens, oxygen-demanding substances, petroleum hydrocarbons, heavy metals, floatables, polycyclic aromatic hydrocarbons (PAHs), trash, and/or pesticides and herbicides.

Program Element: Program Elements are distinct components of a stormwater program that focus on reducing pollutants from a particular activity or pollutant source/target audience. The Program Elements for the Phase II municipal stormwater program include the following:

- Program Management
- Education and Outreach
- Public Involvement and Participation
- Illicit Discharge Detection and Elimination
- Construction
- Pollution Prevention/Good Housekeeping
- Post Construction
- Water Quality Monitoring

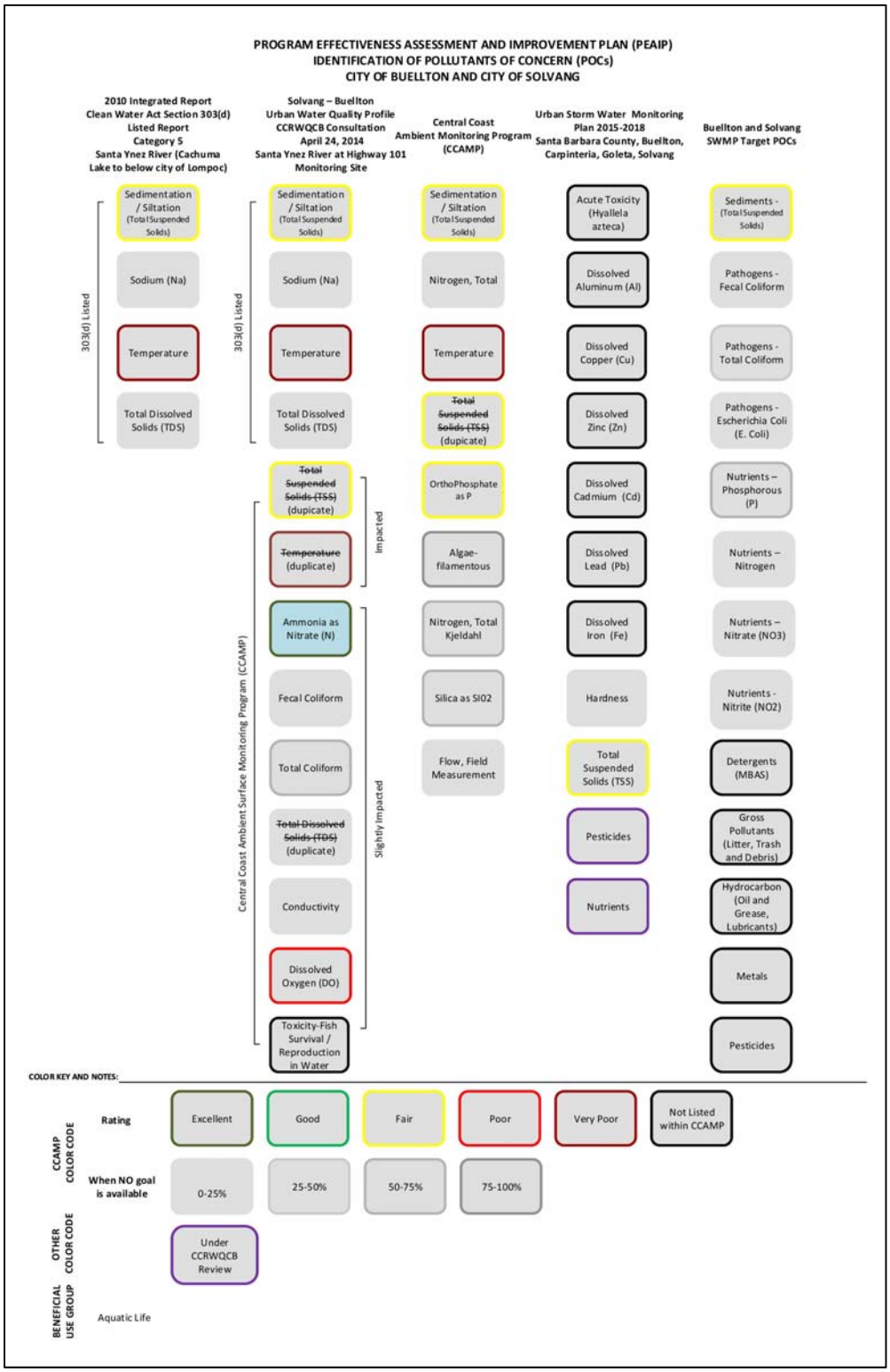
Receiving Water Conditions: Receiving Water Conditions can include any chemical, biological, or physical parameter that can be measured or assessed in receiving waters (i.e., chemical concentrations, dissolved oxygen levels, biological integrity, species diversity, eutrophication, microbiological or toxicological conditions, hydromodification).

Source: "Source" means anything with the potential to generate pollutants prior to their introduction to the MS4. A typical program broadly addresses the following source categories: residential areas, construction and development sites, commercial and industrial sources, and municipal operations. Sources may alternatively be defined by the populations associated with areas, facilities, or activities, e.g., residents, dog-walkers, mobile car washers, or restaurant employees.

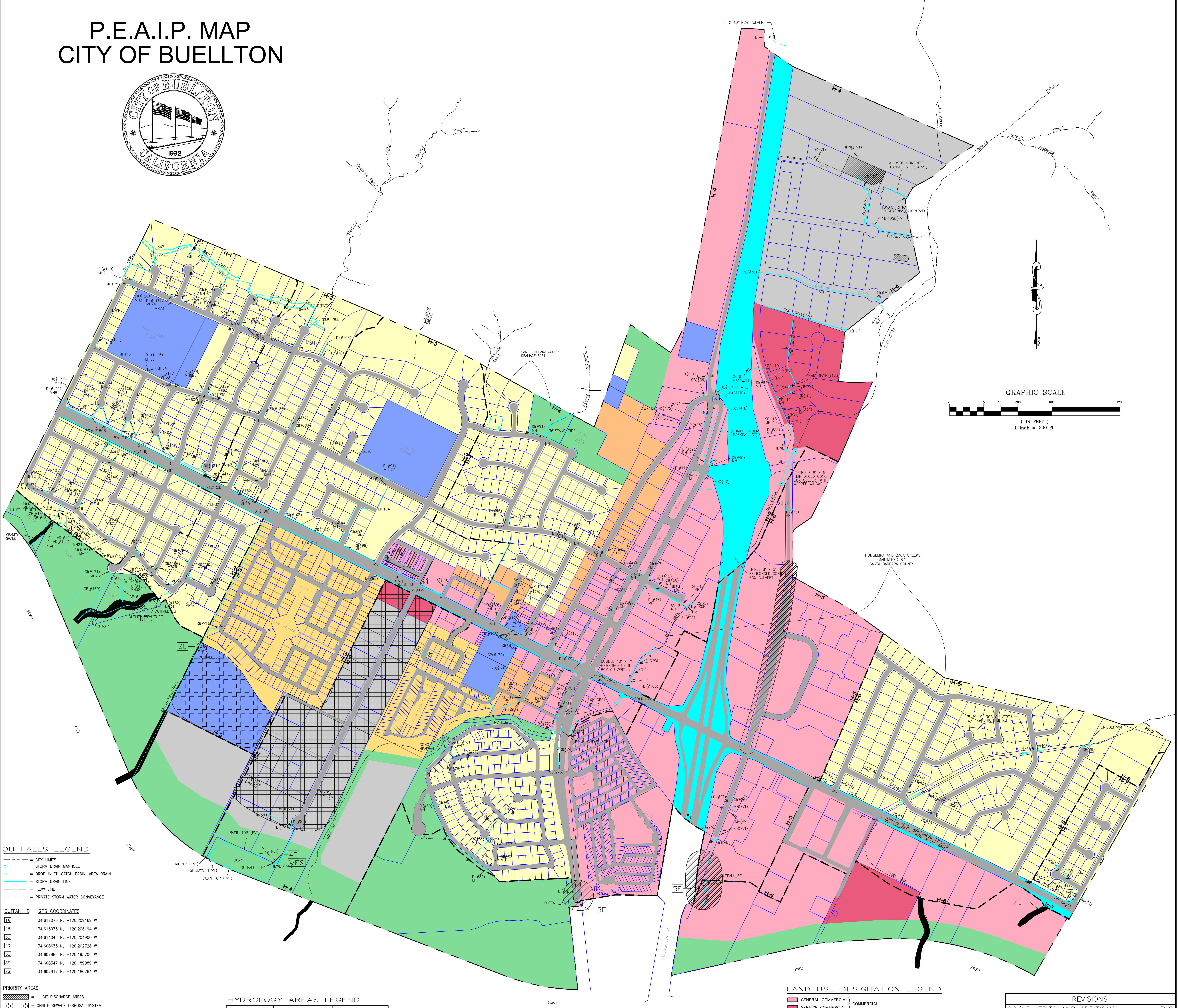
Source Contribution: Source Contribution can refer either to a source loading or to a reduction in that loading. Source loadings are the pollutant loadings added by sources to a MS4. Source reductions are changes in the amounts of pollutants associated with specific sources before and after control measures are employed.

Target Audience: A "Target Audience" consists of the people (individuals and populations) that are expected to gain knowledge or engage in the behaviors that a stormwater program is intended to elicit. BMPs and other controls are implemented by many types of third parties, so the term "target audience" is broadly defined and virtually any group of people could be a target audience, including municipal staff members, the general public, elected and appointed officials, other government agencies, etc.

Appendix B: PEAIP Identification of Pollutants of Concern (POCs)


PROGRAM EFFECTIVENESS ASSESSMENT AND IMPROVEMENT PLAN (PEAIP)
IDENTIFICATION OF POLLUTANTS OF CONCERN (POCs)
CITY OF BUELLTON AND CITY OF SOLVANG
2010 Integrated Report Clean Water Act Section 303(d) Listed Report Category 5 Santa Ynez River (Cachuma Lake to below city of Lompoc)
Solvang – Buellton Urban Water Quality Profile CCRWQCB Consultation April 24, 2014 Santa Ynez River at Highway 101 Monitoring Site
Central Coast Ambient Monitoring Program (CCAMP)
Urban Storm Water Monitoring Plan 2015-2018 Santa Barbara County, Buellton, Carpinteria, Goleta, Solvang
Buellton and Solvang SWMP Target POCs
303(d) Listed
Sedimentation / Siltation (Total Suspended Solids)
Sodium (Na)
Temperature
Total Dissolved Solids (TDS)
Nitrogen, Total
Total Suspended Solids (TSS) (duplicate)
OrthoPhosphate as P
Algae-filamentous
Nitrogen, Total Kjeldahl
Silica as SI02
Flow, Field Measurement
Acute Toxicity (Hyallela azteca)
Dissolved Aluminum (Al)
Dissolved Copper (Cu)
Dissolved Zinc (Zn)
Dissolved Cadmium (Cd)
Dissolved Lead (Pb)
Dissolved Iron (Fe)
Hardness
Total Suspended Solids (TSS)
Pesticides
Nutrients
Sediments - (Total Suspended Solids)
Pathogens - Fecal Coliform
Pathogens - Total Coliform
Pathogens - Escherichia Coli (E. Coli)
Nutrients – Phosphorous (P)
Nutrients – Nitrogen
Nutrients – Nitrate (NO3)
Nutrients - Nitrite (NO2)
Detergents (MBAS)
Gross Pollutants (Litter, Trash and Debris)
Hydrocarbon (Oil and Grease, Lubricants)
Metals
Pesticides
Impacted
Slightly Impacted
Central Coast Ambient Surface Monitoring Program (CCAMP)
Total Suspended Solids (TSS) (duplicate)
Temperature (duplicate)
Ammonia as Nitrate (N)
Fecal Coliform
Total Coliform
Total Dissolved Solids (TDS) (duplicate)
Conductivity
Dissolved Oxygen (DO)
Toxicity-Fish Survival / Reproduction in Water
COLOR KEY AND NOTES:
CCAMP COLOR CODE
Rating
Excellent
Good
Fair
Poor
Very Poor
Not Listed within CCAMP
When NO goal is available
0-25%
25-50%
50-75%
75-100%
OTHER COLOR CODE
Under CCRWQCB Review
BENEFICIAL USE GROUP
Aquatic Life

P.E.A.I.P. MAP
CITY OF BUELLTON



OUTFALLS LEGEND

- ― ― ― = CITY LIMITS
- ○ = STORM DRAIN MANHOLE
- ⊓ = DROP INLET, CATCH BASIN, AREA DRAIN
- ――― = STORM DRAIN LINE
- ―---― = FLOW LINE
- - - - - = PRIVATE STORM WATER CONVEYANCE

OUTFALL ID	GPS COORDINATES
1A	34.617075 N, −120.209169 W
2B	34.615075 N, −120.206194 W
3C	34.614042 N, −120.204900 W
4D	34.608633 N, −120.202728 W
5E	34.607886 N, −120.193706 W
5F	34.608347 N, −120.189989 W
7G	34.607917 N, −120.180264 W

PRIORITY AREAS

- = ILLICIT DISCHARGE AREAS
- = ONSITE SEWAGE DISPOSAL SYSTEM
- = INDUSTRIAL, COMMERCIAL OR MIXED USE AREA
- = ILLEGAL DUMPING AREA (TRASH/DEBRIS/BULK WASTE)

FIELD SAMPLING AREAS

- DFS = DRY WEATHER FIELD SAMPLING
- WFS = WET WEATHER FIELD SAMPLING

NOTE

* = ALL CATCH BASINS, DROP INLETS, MANHOLES, AND STORM DRAIN MANHOLES ARE CONSIDERED "CONFINED SPACES" AND SHALL REQUIRE A SPECIAL PERMIT PRIOR TO ENTRY

P:\CIBUE Buellton\BC141-Storm Drain System\DRAWINGS\PEAIP Map\PEAIP Map.dwg

HYDROLOGY AREAS LEGEND

Zone	Area (acres)	Impervious Area (acres)	Hydrologic Connectivity
H-1:	91.26	58.24	64%
H-2:	47.61	31.52	66%
H-3:	121.78	77.28	63%
H-4:	392.62	153.44	39%
H-5:	120.03	64.48	54%
H-6:	101.66	53.60	53%
H-7:	13.86	9.76	70%

- WATERSHED OUTLET
- EXISTING STORM DRAIN IMPROVEMENTS

USGS NHD SURFACE WATER DESIGNATION LEGEND

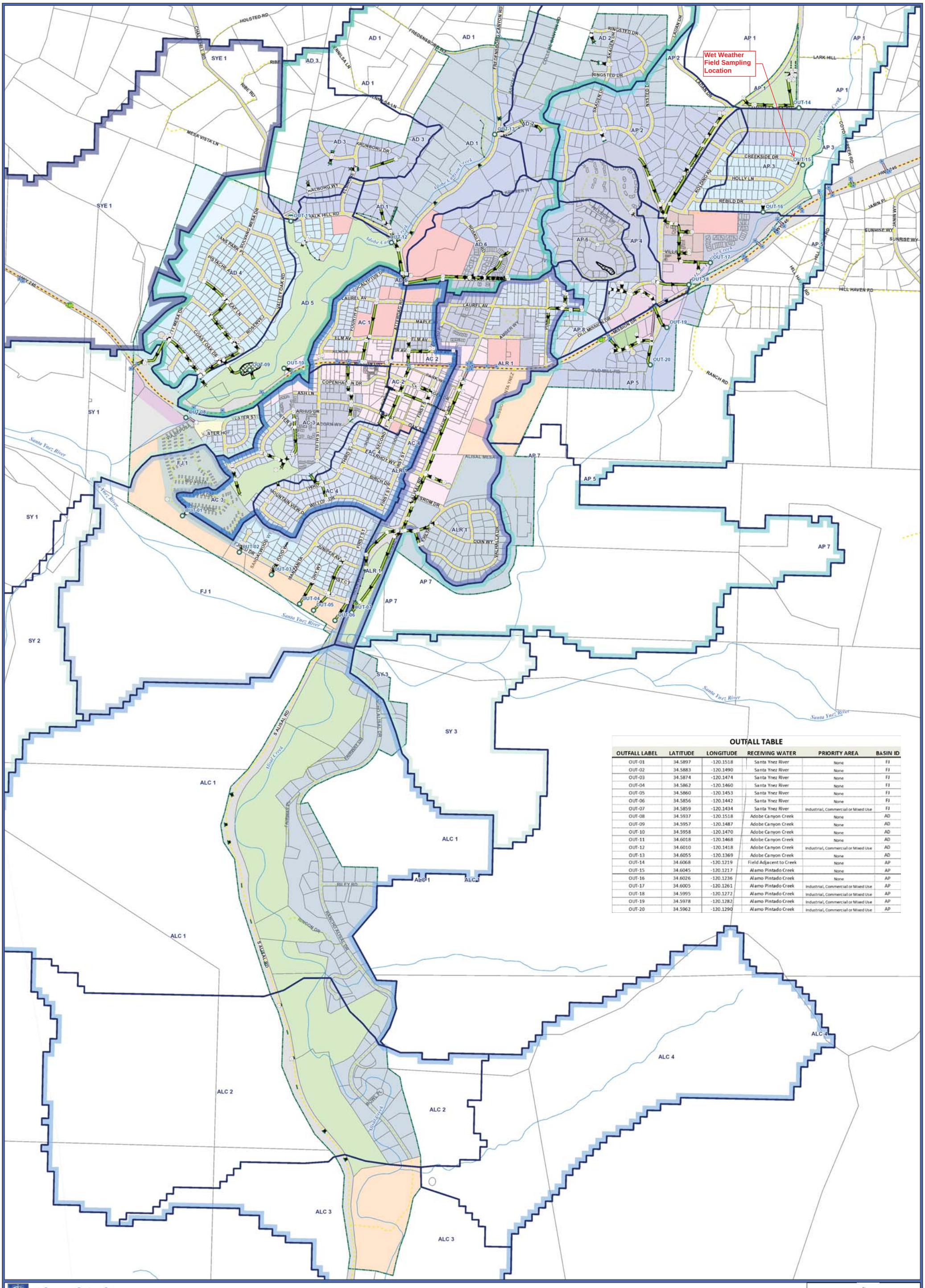
SANTA YNEZ RIVER: HUC12-180600100602 (303(d) LISTED WATER BODY)
ZACA CREEK: HUC12-180600100601

LAND USE DESIGNATION LEGEND

- GENERAL COMMERCIAL } COMMERCIAL
- SERVICE COMMERCIAL } COMMERCIAL
- INDUSTRIAL
- LOW DENSITY RESIDENTIAL } SINGLE FAMILY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL } SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- OPEN SPACE, PARKS, & RECREATION } OTHER
- PUBLIC, QUASI-PUBLIC, CITY OWNED } OTHER
- CALTRANS RIGHT-OF-WAY
- PAVED ROADS

* NO CULTIVATED OR UNPAVED ROADS

REVISIONS		
06/15	EDITS AND ADDITIONS	RLS
11/15	EDITS AND ADDITIONS	RLS
02/16	EDITS AND ADDITIONS	RLS
07/16	EDITS AND ADDITIONS	RLS
08/16	IMPERVIOUS AREA CALCULATIONS	RLS



OUTFALL TABLE

OUTFALL LABEL	LATITUDE	LONGITUDE	RECEIVING WATER	PRIORITY AREA	BASIN ID
OUT-01	34.5897	-120.1518	Santa Ynez River	None	FJ
OUT-02	34.5883	-120.1490	Santa Ynez River	None	FJ
OUT-03	34.5874	-120.1474	Santa Ynez River	None	FJ
OUT-04	34.5862	-120.1460	Santa Ynez River	None	FJ
OUT-05	34.5860	-120.1453	Santa Ynez River	None	FJ
OUT-06	34.5856	-120.1442	Santa Ynez River	None	FJ
OUT-07	34.5859	-120.1434	Santa Ynez River	Industrial, Commercial or Mixed Use	FJ
OUT-08	34.5937	-120.1518	Adobe Canyon Creek	None	AD
OUT-09	34.5957	-120.1487	Adobe Canyon Creek	None	AD
OUT-10	34.5958	-120.1470	Adobe Canyon Creek	None	AD
OUT-11	34.6018	-120.1468	Adobe Canyon Creek	None	AD
OUT-12	34.6010	-120.1418	Adobe Canyon Creek	Industrial, Commercial or Mixed Use	AD
OUT-13	34.6055	-120.1369	Adobe Canyon Creek	None	AD
OUT-14	34.6068	-120.1219	Field Adjacent to Creek	None	AP
OUT-15	34.6045	-120.1217	Alamo Pintado Creek	None	AP
OUT-16	34.6026	-120.1236	Alamo Pintado Creek	None	AP
OUT-17	34.6005	-120.1261	Alamo Pintado Creek	Industrial, Commercial or Mixed Use	AP
OUT-18	34.5995	-120.1272	Alamo Pintado Creek	Industrial, Commercial or Mixed Use	AP
OUT-19	34.5978	-120.1282	Alamo Pintado Creek	Industrial, Commercial or Mixed Use	AP
OUT-20	34.5962	-120.1290	Alamo Pintado Creek	Industrial, Commercial or Mixed Use	AP

City of Solvang

Key to Features

- City Boundary
- Tax Assessment Parcels
- Creeks & Streams
- City Zoning - By Code
  - 1-E-1
  - 10-R-1
  - 20-R-1
  - 3-E-1
  - 7-R-1
  - 8-R-1
  - AG
  - C-2
  - C-3
  - DR
  - I
  - M-I
  - MHP
  - P-1
  - P-O
  - REC
  - RES
  - TRC
- Outfall
- Structures
  - CATCH BASIN AND MANHOL
  - CATCH BASIN, INLET, DRAIN
  - HEADWALL, ENDWALL
  - JUNCTION STRUCTURE
  - RIP RAP
  - STORM DRAIN MANHOLE
  - STORM DRAIN CLEANOUT
- Storm Drain Pipe
- Channels & Waterways
  - DITCH; WATERWAY; V DITC
  - CULVERT
  - SWALE
- Basin Structures
  - RETENTION BASIN
  - DETENTION BASIN
- Drainage Sub-Basin
- Drainage Basin
  - AC
  - AD
  - ALC

N

Feet

0 1,167

State Plane California Zone V NAD 83
Santa Barbara County, California

Outfall Map

Compiled on 08/12/2016

DISCLAIMER: This map is for reference only. Although every effort has been made to ensure the accuracy of information, errors and conditions originating from physical sources used to develop the database may be reflected on this map. No level of accuracy is claimed for the boundary lines shown hereon and lines should not be used to obtain coordinate values, bearings or distances.

QUALITY ASSURANCE PROJECT PLAN for URBAN STORM WATER MONITORING PLAN 2015-2018

For the NPDES Phase II Small MS4 General Permit
Sections E.13.c *303(d) Monitoring* and E.14.a *Program Effectiveness Assessment and Improvement Plan*

Version 1.0
October 13, 2015

For the following Regulated MS4s:

City of Goleta
City of Carpinteria
City of Buellton
City of Solvang
Unincorporated Santa Barbara County

Group A. Project Management

A1.Title and Approval Sheet

PROJECT NAME: Urban Storm Water Monitoring Program

DATE: October 13, 2015

NAME OF RESPONSIBLE ORGANIZATION: County of Santa Barbara, Project Clean Water

Quality Assurance Project Plan (QAPP) Revision Number: Version 1.0

APPROVAL SIGNATURES

Permittee Organization – County of Santa Barbara
Project Clean Water

Project Title	Name	Position	Signature	Date
Project Manager	John Karamitsos	Manager	***Signed John Karamitsos***	
Project QA Officer	Cathleen Garnand	Civil Engineering Associate	***Signed Cathleen Garnand***	
Field Technician	Bree Belyea	Engineering Technician Specialist	***Signed Bree Belyea***	

Permittee Organization – Other MS4s

Project Title	Name	Position	Signature	Date
Representative for City of Goleta	Everett King	Environmental Services Coordinator	***Signed Everett King***	
Representative for City of Carpinteria	Erin Maker	Environmental Coordinator	***Signed Erin Maker***	
Representative for City of Buellton	Rose Hess	City Engineer	***Signed Rose Hess***	
Representative for City of Solvang	Bridget Elliot	Associate Engineer	***Signed Bridget Elliot***	

Contract Laboratories

Project Title	Name	Position	Signature	Date
Weck Labs, Inc. QA Officer	Alan Ching	Laboratory Director of Quality Assurance	***Signed Alan Ching***	
ABC Labs, Inc. QA Officer	Michael Machuzak	Laboratory Manager, Senior Scientist	***Signed Michael Machuzak***	

Central Coast Regional Water Quality Control Board

Project Title	Name	Position	Signature	Date
Permit Manager	Dominic Roques	Municipal Coordinator	***Signed Dominic Roques***	

QA Officer	Karen Worcester	Senior Environmental Scientist	***Signed Karen Worcester***	

The presence of a signature on this QAPP is an acknowledgement of Santa Barbara County Project Clean Water's lead role in the Monitoring Program. The names signify willingness to participate in the Monitoring Program, and provide personnel, material, and budgetary support as appropriate.

A2.Table of Contents

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A3.Distribution List

All key project participants and regulators will receive copies of this Quality Assurance Project Plan (QAPP) and any approved revisions of this plan as listed below:

County of Santa Barbara
John Karamitsos, Manager
Cathleen Garnand, Civil Engineering Associate
Bree Belyea, Engineering Technician Specialist

City of Goleta
Everett King, Environmental Services Coordinator

City of Carpinteria
Erin Maker, Environmental Coordinator

City of Buellton
Rose Hess, City Engineer

City of Solvang
Bridgett Elliot, Associate Engineer

Geosyntec Consultants
Brandon Steets, Associate

Weck Laboratories, Inc.
Alan Ching, QA Director

Aquatic Bioassay Consulting Laboratories, Inc.
Michael Machuzak, QA Manager

Central Coast Regional Water Quality Control Board
Dominic Roques, Municipal Coordinator
Karen Worcester, QA Officer

A4.Project/Task Organization

County of Santa Barbara

The County will conduct all field sampling and contract management for outsourced analyses. The partner Cities will provide field sampling staff as needed. See Table 1 for individual personnel responsibilities.

Water Quality Testing Laboratories

Aquatic Bioassay & Consulting Laboratories, Inc. (ABC Labs) will be the contract laboratory for the acute toxicity screening. Weck Laboratories, Inc. (Weck Labs) will test for metals, TSS, hardness, nutrients, and pesticides.

Table 1. Personnel Responsibilities

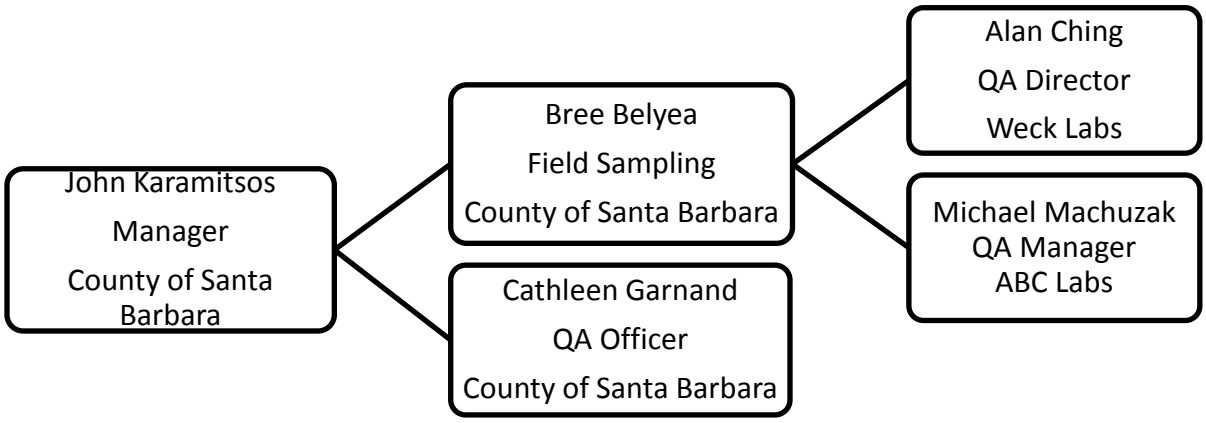
Name	Title	Organization	Project Role	Contact Information
John Karamitsos	Manager	County of Santa Barbara, Project Clean Water	Project Manager	805.568.3373 johnk@cosbpw.net
Cathleen Garnand	Civil Engineering Associate	County of Santa Barbara, Project Clean Water	QA Officer for Project, General Permit Coordinator	805.568.3561 cgarnan@cosbpw.net
Bree Belyea	Engineering Tech Specialist	County of Santa Barbara, Project Clean Water	Field Sampling, Lab Coordinator	805.568.3321 bbelyea@cosbpw.net
Michael Machuzak	Laboratory Manager	ABC Laboratories, Inc.	QA Manger for Acute Toxicity Testing	(805)643-5621 michaelm@aquabio.org

Alan Ching	QA Director	Weck Laboratories, Inc.	QA Director	(626)336-2139 alan.ching@wecklabs.com

Quality Assurance Officer Role and QAPP Maintenance

Cathleen Garnand will review all project data. She is responsible for ensuring that all QA parameters are met, including field sampling and transport, and laboratory testing. Mrs. Garnand plays an advisory role in aspects of data collection and reporting. She will coordinate with the contract labs to ensure appropriate QA measures are upheld. Bree Belyea will maintain and update the approved quality assurance project plan (QAPP) as needed.

Figure 1. Organizational Chart and Responsibilities



A5.Problem Definition/Background

For the purposes of the Urban Storm Water Monitoring Program, the County of Santa Barbara and Partner Cities are required to perform urban catchment-based discharge monitoring and source tracking/source identification. The overall goal of the monitoring is to meet the requirements specified in the NPDES Municipal General Permit E.13.c. 303(d) Monitoring section and to characterize pollutant concentrations and loads from representative MS4 discharge locations within the County. These water quality data can then be used to inform the development of a County-wide pollutant load model.

303(d) Monitoring Requirements

The General Permit E.13.c. 303(d) Monitoring outlines requirements as follows:

> All Permittees that discharge to waterbodies listed as impaired on the 303(d) list where urban runoff is listed as the source, shall consult with the Regional Water Board within one year of the effective date of the permit to assess whether monitoring is necessary and if so, determine the monitoring study design and monitoring implementation schedule. Permittees shall implement monitoring of 303(d) impaired water bodies as specified by the Regional Water Board Executive Officer.

During consultations with the County (August 19, 2014) Regional Water Board staff indicated that instream monitoring was less important than discharge monitoring (specifically, pollutant *loading*). This monitoring program focuses on pollutants typically associated with wet weather MS4 discharges in key watersheds.

A6. Project/Task Description

Storm water samples will be collected at outfalls representing drainage areas with specific land uses. Samples will be taken at the outfalls discharging into urban waterbodies. As many storms as possible will be monitored each storm season. It is unlikely there will be more than nine suitable storms each year. Two sites will be sampled during each storm. All water samples will be tested for toxicity and will be analyzed for trace metals, total suspended solids, nutrients, and hardness. Temperature and pH will also be measured. The outcome of the toxicity screening will dictate which samples will be further analyzed for the presence of pesticides. There will be coordination with Weck Laboratories to archive samples to allow for the delayed pesticide screening within the required hold times.

The pollutants of concern were selected based upon the following criteria:

1. Pollutants are representative of typical MS4 wet weather discharges and impairments to urban receiving waters
2. Pollutants are cost-effective to analyze and don't require special sample collection or handling procedures
3. Pollutants can be addressed through BMPs in the Permittee's stormwater program (and BMP performance data exist in order to model these pollutants)
4. Pollutants are of interest to Regional Water Board staff based on initial discussions.

Table 2. Target Analytes

Analyte	WQS	unit	Method Detection Limits	Method Reporting Limits	Source WQS
TSS			-	5.0 mg/l	
DP	0.3	mg/l			Santa Maria River Nutrient/Bacteria TMDL wet weather WLA for MS4s
Ammonia			0.048 mg/l	0.10 mg/l	
Nitrate, Nitrite, Nitrate+Nitrite	8	mg/l	10 ug/l	100 ug/l	Santa Maria River Nutrient/Bacteria TMDL wet weather WLA for MS4s
Nitrogen, total Kjeldahl			0.050 mg/l	0.10 mg/l	
Phosphorus, Dissolved	0.3	mg/l	0.0014 mg/l	0.010 mg/l	Santa Maria River Nutrient/Bacteria TMDL wet weather WLA for MS4s
Orthophosphate, Total & Dissolved			0.83 ug/l	10 ug/l	
Copper, dissolved	13	ug/l	0.13 ug/l	0.50 ug/l	CTR default value (acute freshwater criteria, hardness -100 mg/l)
Copper, total	14	ug/l	0.13 ug/l	0.50 ug/l	CTR default value (acute freshwater criteria, hardness -100 mg/l)
Iron, Total & Dissolved	1000	ug/l	0.91 ug/l	20 ug/l	USEPA Aquatic Life Criteria, acute freshwater
Lead, Total & Dissolved	82	ug/l	0.031 ug/l	0.20 ug/l	CTR default value (acute freshwater criteria, hardness -100 mg/l)
Zinc,Total & Dissolved	120	ug/l	0.94 ug/l	5.0 ug/l	CTR default value (acute freshwater criteria, hardness -100 mg/l)
Carbamate Pesticides	2.1	ug/l	0.30-0.60 ug/l	2.0 ug/l	USEPA Aquatic Life Criteria, acute freshwater
Pyrethroid Pesticides	0.8	ug/l	0.50-2.4 ng/l	2.0 ng/l	USEPA Aquatic Life Criteria, acute freshwater
Diuron	80	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Acetamiprid	10.5	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Clothianidin	11	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Dinotefuran	6360	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Imidacloprid	34.5	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Thiacloprid	18.9	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater
Thiamethoxam	17.5	ug/l		0.5 ug/l	USEPA 2003 Aquatic Life Benchmarks, acute freshwater

A Storm Report will be drafted and provided to the partner Cities after each storm sampling event. This report will contain details on the outcome of the sampling event (actual rainfall, timing of the storm, locations sampled) and any deviations from the Monitoring Plan that may have occurred.

Work Schedule

Table 3. Work Schedules

Permit Year	Date	Task
Permit Year 2	November 2014	Submit Monitoring Plan
Permit Year 2	July 2015	Submit QAPP
Permit Year 3-5	July 2015-June 2016 and annually thereafter	Sample all suitable storms, up to 9 per year, and submit storm reports to Partner Cities
Permit Year 3-5	May 2016, and annually thereafter	Review Quality Control data and conduct assessments.
Permit Year 3-5	May 2016-June 2016 and annually thereafter	Compile data for annual reporting process
Permit Year 3-5	October 2016 and annually thereafter	Submit project data to SMARTS and CEDEN

Geographic Location

All sampling sites are located within Santa Barbara County. Figure 2 shows an overview map of the sampling

areas within Santa Barbara County and Figure 3-6 show specific sampling locations. Table 4 summarizes site locations and land use.

Figure 2. Overview Map of Project Area

Figure 3. Buellton Monitoring Site

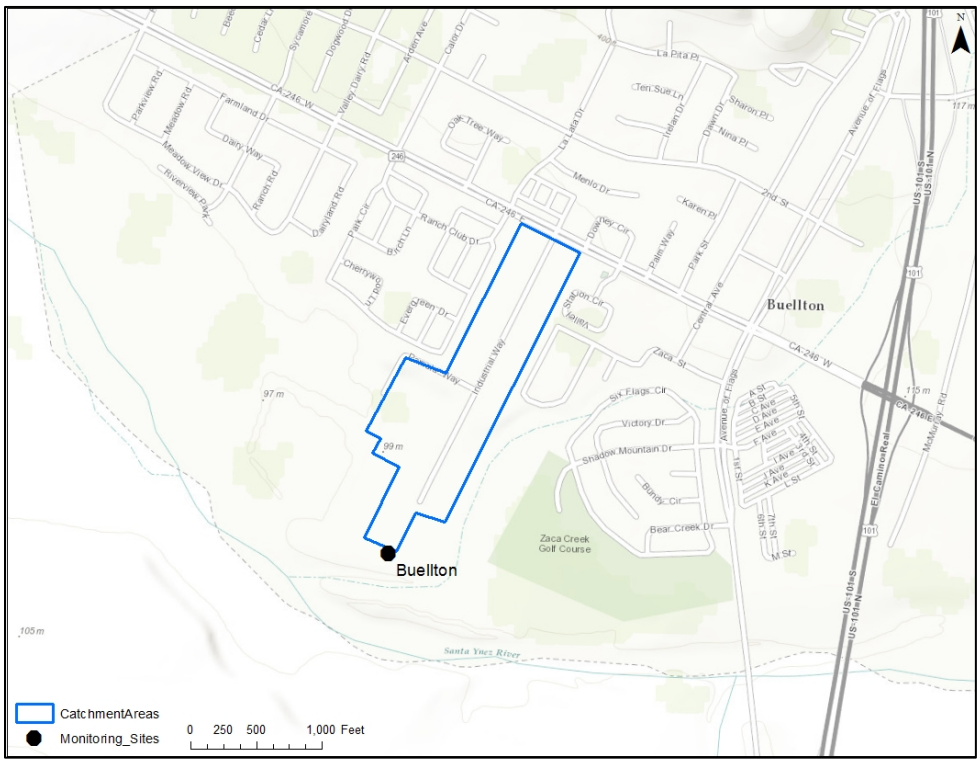


Figure 4. Solvang Monitoring Site

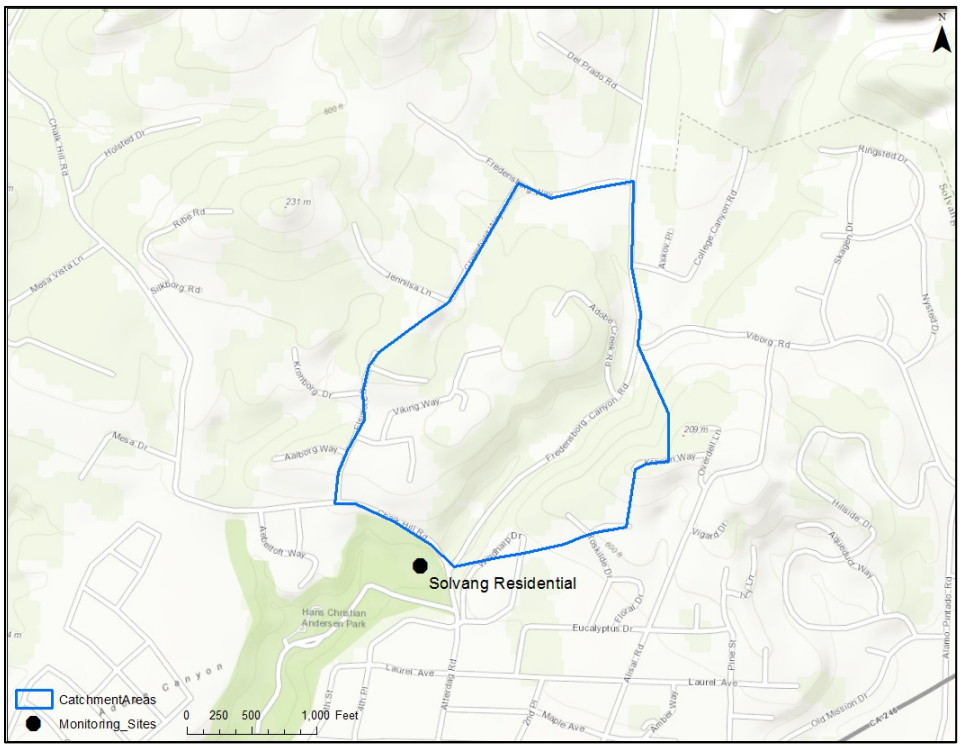


Figure 5. Carpinteria Monitoring Sites

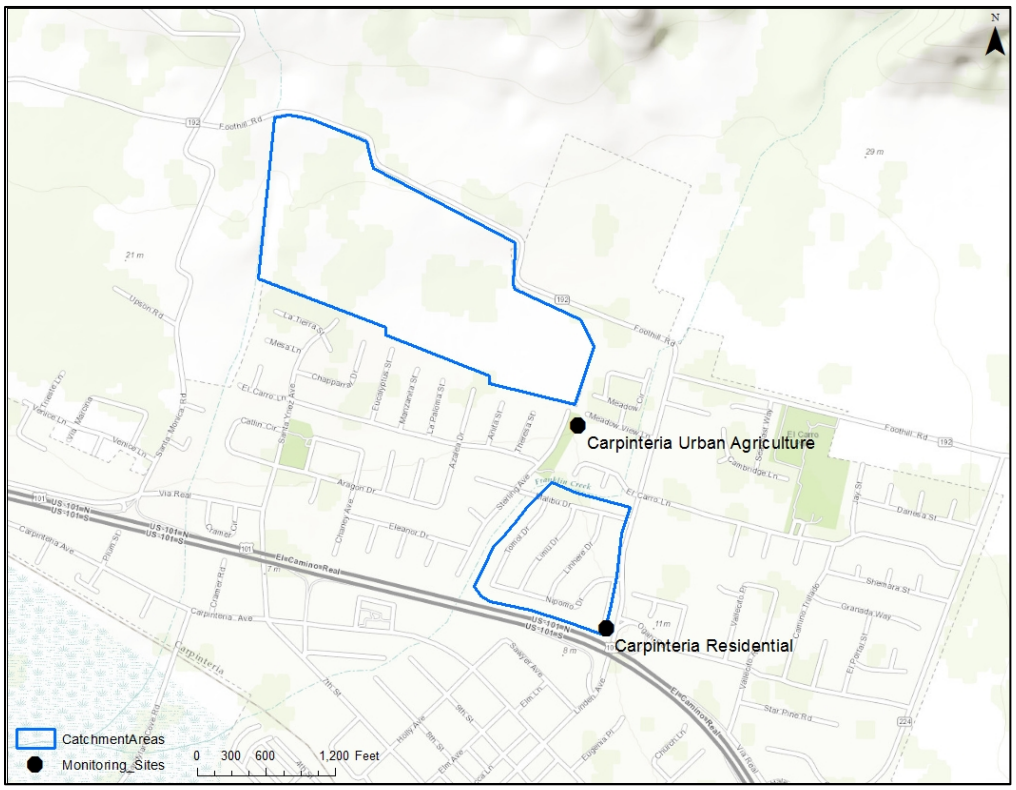


Figure 6. Goleta Monitoring Sites

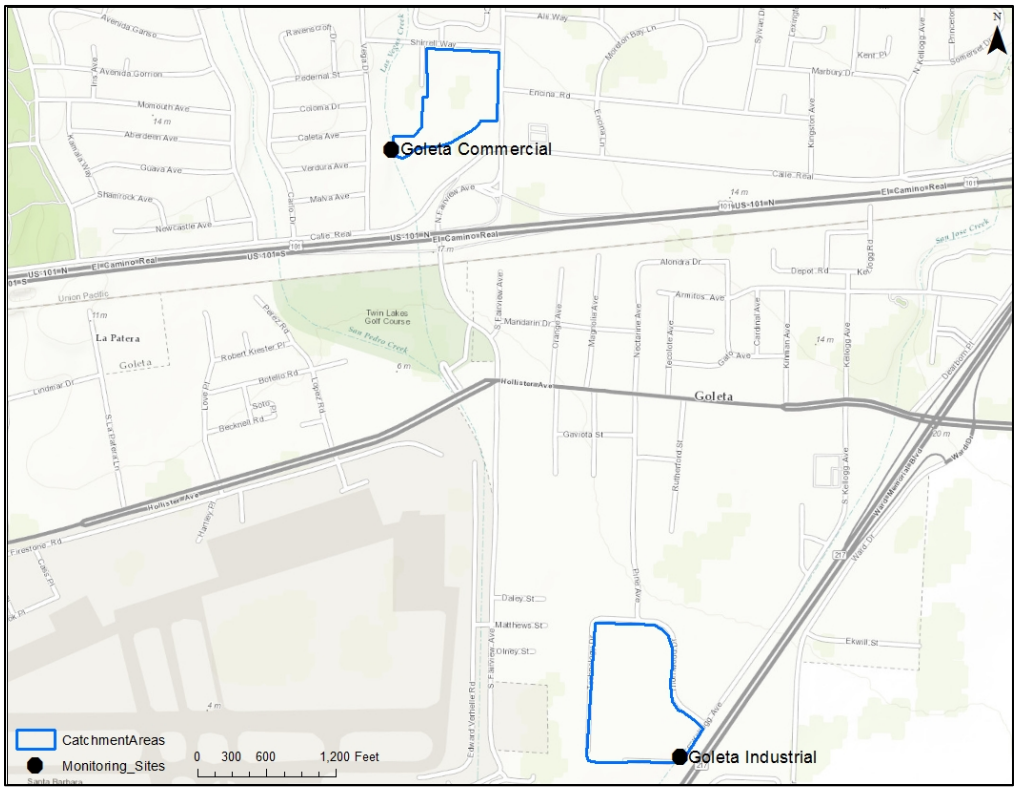


Table 4. Location and Land Use of Sampling Sites

Location	Land Use	Receiving Water	Drainage Acres
City of Solvang	Low density residential	Santa Ynez River	114.8
City of Carpinteria	Medium density residential	Franklin Creek	25.9
City of Goleta	Commercial	Las Vegas	11.8
City of Buellton	Industrial	Santa Ynez River	31.2
City of Goleta	Industrial	San Jose Creek	21.1
City of Carpinteria	Indoor Urban Agriculture	Franklin Creek	82.2

Constraints

Santa Barbara County has received 50% or less of average annual rainfall since 2012. The main foreseeable limitation is the uncertainty of rain events for the duration of the project.

A7.Quality Objectives and Criteria for Measurement Data

Consistency in the collection and analysis of data is achieved through the application of universal Measurement Quality Objectives (MQOs). As defined by the U.S. Environmental Protection Agency (EPA), these are acceptance criteria for data quality attributes such as precision, accuracy, and completeness. Adherence to the MQOs ensures that data generated will be of known and documented quality and support submitting project data to CEDEN. Numerical MQOs for the constituents being sampled are listed in Section B4. All MQOs are taken from SWAMP 2013 tables.

Accuracy is a measure of how closely the analytical result or field measurement represents the true quantity found in the sample and will be determined by measuring recoveries using matrix spikes, laboratory control spikes, and/or reference materials. Method blanks will be utilized to check for contamination.

Precision describes the degree to which repeated measurements under the same conditions produce the same results. Precision will be calculated using relative percent differences (RPD) obtained through duplicate analysis of samples, such as laboratory control spike duplicates and matrix spike duplicates.

Data completeness is a measure of the amount of successfully collected and analyzed data relative to the amount of data planned to be collected for the project. The Monitoring Plan requires every field site to be sampled during each storm season, for a minimum of three datasets per sampling site over the duration of the project. All suitable storms (up to nine per year) will be monitored each year. Any additional sampling events

each year will serve as a buffer in case of human error or equipment failure. These additional data will also help inform the development of the pollutant loading model.

Representativeness is a qualitative measure of the degree to which the environmental data generated by the monitoring program accurately and precisely represent actual environmental conditions. In this study, representativeness is addressed by the overall design of the monitoring program; by selecting appropriate sampling locations, and by maintaining the integrity of the samples after collection.

Bias is the systemic or persistent distortion of a measurement process that causes under or over prediction of sampled or measured values relative to the true value. Bias will be assessed through negative controls (blanks). Detectable quantities in the blanks would indicate positive bias.

There are no previously collected data for this Project.

A8.Special Training Needs/Certification

Specialized Training or Certifications

No specialized training or certifications are required of Project personnel for this project. All field personnel have received health and safety training as well as general field training to ensure consistency and comparability. Both Weck and ABC labs are ELAP certified.

Training and Certification Documentation

A complete listing of laboratory accreditation certificates is available directly from the contract laboratories. Training records for individual laboratory tasks are maintained at the laboratories and are available upon request from the QA Officer of each facility.

A9.Documents and Records

The following documents, records, and electronic files will be produced:

- Quality Assurance Project Plan
- Monitoring Plan
- Storm Reports (drafted and submitted to partner Cities after each storm sampling event)
- Field Sampling Data Sheets (internal documentation available upon request)
- Chain of Custody (COC) Forms (exchanged for signatures with labs and kept on file)
- Lab Sample Disposition Logs (internal documentation available upon request from contract laboratories)
- Calibration Logs for measurements of water quality standards (internal documentation available upon request Labs)
- Refrigerator Logs (internal documentation available upon request from contract laboratories)
- Equipment Calibration and Maintenance Logs (internal documentation available upon request from permittee and contract laboratories)
- Quality Assurance data (internal documentation available upon request from contract laboratories)

Following each monitoring event, the Field Technician shall provide the Program QA Officer with copies of completed field logs and copies of the chain-of-custody forms for all samples submitted for analysis. At a minimum, the following sample-specific information will be provided for each sample collected.

- Sample ID (unique for each sample and replicate)
- Monitoring location (e.g., latitude/longitude coordinates)
- Number of sub-samples in composite (if appropriate)
- Quality Control (QC) sample type (if appropriate)
- Date and time(s) of collection
- Requested analyses (specific parameters or method references)

In compliance with email guidance from the Regional Board email dated July 25, 2014, monitoring results will be will be reported annually under the Municipal General Permit Report via SMARTS. Results will also be uploaded to CEDEN. The Year 3 Annual Report (October 15, 2016) will be the first report to incorporate these results. Data generated under this Monitoring Plan will be entered into the California Environmental Data Exchange Network (CEDEN).

Copies of this QAPP will be distributed by the QA Officer to all parties directly involved in this project. Any future amended QAPPs will be distributed in the same fashion. All originals of the first and subsequent amended QAPPs will be held by the County. Field sampling data sheet and chain of custody forms will be stored at County offices for 5 years. Electronic copies of documents will be stored on the County of Santa Barbara Public Works server network. These servers are backed up daily.

Group B. Data Generation and Acquisition

B1. Sampling Process Design (Sampling Design and Logistics)

The Urban Storm Water Monitoring Program is designed to meet NPDES Phase II Small MS4 Municipal General Permit requirements and produce quality, representative data that can also be used to inform a County-wide pollutant load model.

Composite samples are used to determine average concentrations of pollutants. Storm events with a 50-75% probability of producing 0.2" or greater will trigger a sampling event. The County's Water Resources Division hydrologists will provide updated forecast information and the quantified precipitation forecast for the specific storm event.

Two sites will be monitored per storm. Aliquots will be collected at twenty minute intervals and subsequently combined into one composite sample. The samples will be drawn by hand from the outfall openings. The number of aliquots will vary based off predicted storm characteristics as shown in Table 5, taken from the Caltrans Stormwater Monitoring Protocols. Some estimation is necessary to predict the forecasted storm rainfall depth to determine the number of representative aliquots to draw.

Table 5. Composite Sampling Aliquot Requirements

Total Event Precipitation	Minimum Acceptable Number of Aliquots	Percent Capture Requirement
0-0.25"	6	85
0.25-0.5"	8	80
0.5-1"	10	80
>1"	12	75

Sample collection points were evaluated based on the following criteria: safe access during wet weather conditions, the possibility of reproducing accurate flow monitoring and sample collection, and drainage area representative of a specific land use to the extent possible. Sampling locations have been selected to represent drainages with specific land use. Multiple locations representing the different land use target types were surveyed and primary sample sites were selected. If a site becomes inaccessible, a secondary site with the same land use characteristics will replace the original site.

The project activity schedules are changeable due to the variable nature of the rain events being monitored. Samples will be delivered to the contract lab the day of collection if possible, or held on ice and transferred the next day if sampling occurs outside of normal business hours. A courier service or overnight shipping will be utilized to ensure the laboratory receives the samples with adequate time to meet the sample holding time limits. Hold times are shown in Section B3. All data collected are used to achieve objectives and there are no data that will be collected for informational purposes only.

Natural variability in pollutant concentrations during a rain event is expected. Variability is addressed by taking time-spaced aliquots over the duration of the storm and compositing the samples before laboratory analysis. Bias can be minimized through consistent staff training and emphasis on SOPs for sample collectors.

B2.Sampling (Sample Collection) Methods

A multi-bottle, time-proportional composite sampling protocol will be followed. Time spaced aliquots will be taken every ten or twelve minutes for two hours as the characteristics of the individual storms allow. This approach was selected because it offers the most convenience for manual sampling while providing a better representation of the overall event concentration than a single grab sample. Consideration was given to various methods, such as the use of automatic samplers, and it was determined this approach would be representative while practical. Consideration was also given to the various methods of composite sampling such as time-based, time-proportional, and weight-proportional approaches described in the Caltrans Guidance Manual for stormwater monitoring.

Samples are collected in pre-sterilized bottles or containers provided by the contract laboratories. The type and size of the container and any required preservatives will be appropriate for the constituents to be analyzed. The aliquot volume is predetermined based on the total sample volume required by the analyzing laboratories.

The contract laboratories will handle sample and byproduct disposal and decontamination according to their SOPs. The lab can be contacted if additional information is needed. If problems with field sampling are identified, the Field Technician and QA Officer will discuss and implement corrective actions. Corrective actions will be detailed in the Storm Report for the associated sampling event.

Sample bottles will be pre-labeled with site name, laboratory, required analysis and sampler initials prior to collection. Date and time will be recorded at the time of collection. Glass sample bottles will be wrapped with bubble wrap when feasible. Samples will be stored in coolers with ice until received by the laboratories. A courier or shipping service with sample handling experience will be employed by the lab to transport the samples. The Field Technician is responsible for filling out the Chain of Custody form with field sample details and transferring samples and forms to the courier or shipper. The chain-of-custody (COC) form, provided by the laboratory in advance, shall include event name, sample site ID, date and time of sampling, number of bottles, requested analyses, sampler name(s), and relevant comments. See Appendices D and E for Chain of Custody forms. COCs shall travel with the samples until logged in at the laboratory. The laboratory shall verify that samples match those noted on the COC. Any discrepancies or problems shall be documented during the login procedure and be reported to the laboratory QA Officer, who will notify County staff.

Samples for the target parameters will be collected according to the SWAMP SOP in Appendix A: Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California. Version 1.1 updated March 2014. Sample containers, volumes, preservative, and hold times are provided in Table 6-11.

Table 6. Sample Handling and Custody for Acute Toxicity (From SWAMP 2013 Table)

Sample Handling/Collection	
Test Parameter	*Recommended Conditions*
Relevant Media	Water
Sample Container Type	Amber glass
Sample Preservation	Wet or blue ice in field; 0 - 6 °C refrigeration in laboratory; dark at all times
Sample Receipt Temperature	0 - 6 °C
Holding Time	<48 hours@ 0 - 6 °C; dark

Table 7. Sample Handling and Custody for Metals (From SWAMP 2013 Table)

Analyte	Recommended Container[1]	Recommended Preservation[2,3]	Required Holding Time[4]
Trace Metals[8] (Dissolved)	P	Filter within 15 minutes of collection; HNO_3 to pH<2 within 48 hours and at least 24 hours prior to analysis	6 months at room temperature following acidification
Trace Metals[8] (Total)	P	HNO_3 to pH<2 within 48 hours and at least 24 hours prior to analysis	6 months at room temperature following acidification

[1] "P" is polyethylene; "G" is glass; "PA" is any plastic that is made of a sterilizable material (polypropylene or other autoclavable plastic)

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (within 15 minutes).

[3] Per 40 CFR 136.3, an aqueous sample may be collected and shipped without acid preservation. However, acid must be added at least 24 hours before analysis to dissolve any metals that adsorb to the container walls. If the sample must be analyzed within 24 hours of collection, add the acid immediately.

[4] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[5] If the analytical method doesn't include preservation, analysis must occur within 24 hours.

[6] Methylmercury samples may be shipped to the laboratory unpreserved if they are collected in fluoropolymer bottles, filled to the top with no head space, capped tightly, and maintained at ≤6 °C from the time of collection until preservation. The samples must be acid-preserved within 48 hours of sampling.

[7] Including the species selenite, selenate, and selenocyanate

[8] With the exception of mercury, methylmercury, hexavalent chromium, and selenium speciation

Table 8. Sample Handling and Custody for TSS (From SWAMP 2013 Table)

Parameter	Recommended Container[1]	Recommended Preservation[2]	Required Holding Time[3]
Suspended Sediment Concentration **Total Suspended Solids**	G, P	Cool to ≤6 °C	7 days
Total Dissolved Solids	P	Cool to ≤6 °C	7 days

[1] "P" is polyethylene; "G" is glass

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[3] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

Table 9. Sample Handling and Custody for Hardness (From SWAMP 2013 Table)

Analyte	Recommended Container[1]	Recommended Preservation[2,3]	Required Holding Time[4]
Hardness (as $CaCO_3$)	P	Cool to ≤6 °C; HNO_3 or H_2SO_4 to pH<2	6 months

Table 10. Sample Handling and Custody for Nutrients (From SWAMP 2013 Table)

Analyte	Recommended Container[1]	Recommended Preservation[2]	Required Holding Time[3]
Ammonia (as N)	P	Cool to ≤6 °C; samples may be preserved with 2 mL of H_2SO_4 per L	48 hours; 28 days if acidified
Kjeldahl Nitrogen (Total)	P	Cool to ≤6 °C; H_2SO_4 to pH<2	7 days; 28 days if acidified
Nitrate (as N)	P	Cool to ≤6 °C	48 hours (unless calculated from nitrate + nitrite (as N) and nitrite (as N) analyses)
Nitrate + Nitrite (as N)	P	Cool to ≤6 °C; H_2SO_4 to pH<2	48 hours; 28 days if acidified
Nitrite (as N)	P	Cool to ≤6 °C	48 hours
Nitrogen (Total)	P	Cool to ≤6 °C; H_2SO_4 to pH <2	28 days
Orthophosphate (Dissolved, as P; ***Soluble Reactive Phosphorus***)	P	Filter within 15 minutes of collection[4]; cool to ≤6 °C	48 hours
Orthophosphate (Total, as P)	P	Cool to ≤6 °C	48 hours
Phosphorus (Dissolved, as P)	P	Filter within 15 minutes of collection; cool to ≤6 °C; H_2SO_4 to pH <2	28 days
Phosphorus (Elemental)	G	Cool to ≤6 °C	48 hours
Phosphorus (Total, as P)	P	Cool to ≤6 °C; H_2SO_4 to pH <2	28 days

[1] "P" is polyethylene; "G" is glass

[2] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[3] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[4] Per 40 CFR 136.3, the immediate filtration requirement in orthophosphate measurement is to assess the dissolved or bio-available form of orthophosphorus (i.e., that which passes through a 0.45-micron filter), hence the requirement to filter the sample immediately upon collection (i.e., within 15 minutes of collection).

Table 11. Sample Handling and Custody for Pesticides (From SWAMP 2013 Table)

Matrix	Recommended Container[2]	Recommended Preservation[4]	Required Holding Time[2]
Carbamate Pesticides **Organochlorine Pesticides** **Organophosphate Pesticides** **Wastewater Organochlorine Pesticides**	G	Cool to ≤6 °C; pH 5-9	7 days until extraction, 40 days after extraction
Diesel Range Organics **Triazine Pesticides**	G	Cool to ≤6 °C	7 days until extraction, 40 days after extraction
Glyphosate	G	Cool to ≤6 °C; store in the dark; 0.008% $Na_2S_2O_3$ if residual chlorine is present; freeze to ≤-20 °C	18 months (14 days if unfrozen)
Phenols[5]	G	Cool to ≤6 °C; 0.008% $Na_2S_2O_3$ if residual chlorine is present	7 days until extraction, 40 days after extraction
Polychlorinated Biphenyls (as Congeners/Aroclors)	G	Cool to ≤6 °C	1 year until extraction, 1 year after extraction
Polynuclear Aromatic Hydrocarbons	G	Cool to ≤6 °C; store in the dark; 0.008% $Na_2S_2O_3$ if residual chlorine is present	7 days until extraction, 40 days after extraction
Pyrethroids	G	Cool ≤ 6 °C in the dark; samples must be extracted or preserved according to laboratory procedures with suitable preservative or extraction solvent within 72 hours of collection	7 days until extraction, 40 days after extraction
Surfactants	G	Cool to ≤6 °C, store in the dark	7 days until extraction, 40 days after extraction

[1] Pyrethroids information applies to a whole water matrix.

[2] "G" is glass

[3] Per 40 CFR 136.3, aqueous samples must be preserved at ≤6 °C, and should not be frozen unless data demonstrating that sample freezing does not adversely impact sample integrity is maintained on file and accepted as valid by the regulatory authority. The preservation temperature does not apply to samples that are analyzed immediately (less than 15 minutes).

[4] Each "Required Holding Time" is based on the assumption that the "Recommended Preservation" (or a method-mandated alternative) has been employed. If a "Required Holding Time" for filtration, preservation, preparation, or analysis is not met, the project manager and SWAMP Quality Assurance Officer must be notified. Regardless of preservation technique, data not meeting the "Required Holding Time" will be appropriately flagged in the SWAMP database.

[5] This table applies to phenols analysis using gas chromatography. Guidelines for the colorimetric analysis of phenols are located in *Conventional Parameters in Water* Table 2*: Sample Handling*.

B3. Analytical Methods

There are no recommended reporting limits for toxicity in the 2008 SWAMP QAPRP. There is no in situ or continuous monitoring for this project. No specific method performance criteria are identified.

Laboratory procedures, equipment and instrumentation are described in the supporting document for acute toxicity analysis found in Appendix B. Analytical methods for chemical analyses are included in Appendix C. The SOPs indicate procedures to follow when failures occur, identifying individuals responsible for corrective action and associated documentation. In the case a failure is not specified in the SOP, best professional judgment will be used and the laboratories will communicate to the County about the data quality. The SOPs indicate appropriate sample disposal procedures; if they are not identified in the SOP, they are available in the laboratory general QAPP, which is available upon request. Any modifications to standard methods are indicated in the SOPs.

B4. Quality Control

Acute Toxicity

Acute toxicity will be measured with *Hyalella azteca*, a test organism sensitive to pyrethroid pesticides and used in regulatory programs in the region and included on the alternate species list for EPA/821/R-02/012.

Quality control activities and calculations for acute toxicity analysis are taken from the SWAMP 2013 table and shown in Table 12. Corrective actions are shown in Table 13.

Table 12. Quality Control for Acute Toxicity (From SWAMP 2013 Table)

Negative Controls	Frequency of Analysis	Control Limits
Laboratory Control Water	Laboratory control water consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch.	Laboratory control water must meet all test acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Conductivity/Salinity Control Water	A conductivity or salinity control must be tested when these parameters are above or below the species tolerance.	Follow EPA guidance on interpreting data and refer to tables below for tolerance ranges.
Additional Control Water	Additional method blanks are required whenever manipulations are performed on one or more of the ambient samples within each analytical batch (e.g., pH adjustments, continuous aeration).	There must be no statistical difference between the laboratory control water and each additional control water within an analytical batch.
Sediment Control	Sediment control consistent with Section 7 of the appropriate EPA method/manual must be tested with each analytical batch of sediment toxicity tests.	Sediment control must meet all data acceptability criteria (please refer to Section 7 of the appropriate EPA method/manual) for the species of interest.
Positive Controls	**Frequency of Analysis**	**Control Limits**
Reference Toxicant Tests	Reference toxicant tests must be conducted monthly for species that are raised within a laboratory, or per analytical batch for commercially-supplied or field-collected species.	Last plotted data point (LC50 or EC50) must be within 2 SD of the cumulative mean (n=20). Reference toxicant tests that fall outside of recommended control chart limits are evaluated to determine the validity of associated tests. An out of control reference toxicant test result does not necessarily invalidate associated test results. More frequent and/or concurrent reference toxicant testing may be advantageous if recent problems have been identified in testing.

Field Quality Control	Frequency of Analysis	Control Limits
Sample Duplicate	5% of total project sample count	Recommended acceptable RPD<20%
Field Blanks	Based on project requirements	No statistical difference between the laboratory control water (or sediment control) and the field blank within an analytical batch
Bottle Blanks	Based on project requirements	No statistical difference between the laboratory control water and the equipment blank within an analytical batch

[1]Unless method specifies more stringent requirements.

In special cases where the criteria listed in the above tables cannot be met, EPA minimum criteria may be followed. The affected data should be flagged accordingly.

Test data are reviewed to verify that the test acceptability criteria for a valid test have been met. Any test not meeting the minimum test acceptability criteria is considered invalid. All invalid tests should be repeated with the newly collected sample. If this is not possible, the test should be repeated with an archived sample and all tests must be properly flagged.

Deviations from the summary of recommended test conditions must be evaluated on a project-specific basis to determine the validity of test results. Depending on the degree of the departure and the objective of the test, deviations from recommended conditions may or may not invalidate a test result. Before rejecting or accepting a test result as valid, the reviewer should consider the degree of the deviation and the potential or observed impact of the deviation on the test result. For example, if dissolved oxygen is measured below 4.0 mg/L in one test chamber, the reviewer should consider whether any observed mortality in that test chamber corresponded with the drop in dissolved oxygen.

Table 13. Corrective Actions for Acute Toxicity (From SWAMP 2013 Table)

Negative Controls	Corrective Action
Laboratory Control Water	If tested with in-house cultures, affected samples and associated quality control must be retested within 24 hours of test failure. If commercial cultures are used, they must be ordered within 16 hours of test failure for the earliest possible receipt. Retests must be initiated within 30 hours of receipt, depending on the need for organism acclimation. The laboratory should try to determine the source of the control failure, document the investigation, and document the steps taken to prevent a recurrence.
Conductivity/Salinity Control Water	Affected samples and associated quality control must be flagged.
Additional Control Water	Based on the objectives of the study, a water sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence. This is not applicable for TIE method blanks.
Sediment Control	Based on the objectives of the study, a sediment sample that has similar qualities to the test sample may be used as an additional control. Results that show statistical differences from the laboratory control should be flagged. The laboratory should try to determine the source of variation, document the investigation, and document the steps taken to prevent a recurrence.
Positive Controls	**Corrective Action**
Reference Toxicant Tests	If the LC50 exceeds +/- two standard deviations of the running mean of the last 20 reference toxicant tests, the test should be flagged.
Field Quality Control	**Corrective Action**
Field Duplicate	For duplicates with a heterogeneous matrix, results that do not meet SWAMP criteria should be flagged. The project coordinator should be notified so that the sampling team can identify the source of variation and perform corrective action prior to the next sampling event.
Field Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.
Equipment Blanks	If contamination of the field blanks and associated samples is known or suspected, the laboratory should flag the affected data. The project coordinator should be notified so that the sampling team can identify the contamination source(s) and perform corrective action prior to the next sampling event.

Metals

Quality control activities and calculations for metals analysis are taken from the SWAMP 2013 table and shown in Table 14. Corrective actions are shown in Table 15.

Table 14. Quality Control for Metals (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	80-120% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material[2]	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg)
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	75-125% recovery (70-130% for MMHg); RPD<25%
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Internal Standard	Accompanying every analytical run when method appropriate	60-125% recovery
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL), unless otherwise specified by method
Field Blank, Equipment Blank	Per method	Blanks<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Not applicable to selenium speciation

Table 15. Corrective Actions for Metals (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

TSS

Quality control activities and calculations for TSS analyses are taken from the SWAMP 2013 table and shown in Table 16. Corrective actions are shown in Table 17.

Table 16. Quality Control for TSS Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Laboratory Blank[2]	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Laboratory Duplicate[3]	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Not applicable to volatile suspended solids

[3] Applicable only to total suspended solids, total dissolved solids, and ash-free dry mass

Table 17. Corrective Actions for TSS Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Hardness

Quality control activities and calculations for hardness analyses are taken from the SWAMP 2013 table and shown in Table 18. Corrective actions are shown in Table 19.

Table 18. Quality Control for Hardness Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	80-120% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent (n/a for chlorophyll a and pheophytin a)	80-120% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent (n/a for chlorophyll a and pheophytin a)	80-120% recovery; RPD<25% for duplicates
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent (chlorophyll a/pheophytin a: per method)	RPD<25% (n/a if native concentration of either sample<RL)
Internal Standard	Accompanying every analytical run as method appropriate	Per method
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate[2]	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

[2] Field duplicate relative percent differences are not calculated for chlorophyll a analyses for bioassessment

Table 19. Corrective Actions for Hardness Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Nutrients

Quality control activities and calculations for nutrients analyses are taken from the SWAMP 2013 table and shown in Table 20. Corrective actions are shown in Table 21.

Table 20. Quality Control for Nutrients Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Calibration Standard	Per analytical method or manufacturer's specifications	Per analytical method or manufacturer's specifications
Calibration Verification	Per 10 analytical runs	90-110% recovery
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Reference Material	Per 20 samples or per analytical batch, whichever is more frequent	90-110% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery RPD<25% for duplicates
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD<25% (n/a if native concentration of either sample<RL)
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD<25% (n/a if native concentration of either sample<RL)
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analyte

[1] Unless method specifies more stringent requirements

Table 21. Corrective Actions for Nutrients Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Calibration Standard	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Laboratory Duplicate	Reanalyze the duplicate samples to confirm the results. Visually inspect the samples to determine if a high RPD between the results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

Pesticides

Quality control activities and calculations for pesticides analyses are taken from the SWAMP 2013 table and shown in Table 22. Corrective actions are shown in Table 23. Analyses of pyrethroid pesticides are shown separately in Tables 24 and 25.

Table 22. Quality Control for Pesticides Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[4]	Per analytical method	Per analytical method
Calibration	Initial method setup or when the calibration verification fails	• Correlation coefficient (r^2 >0.990) for linear and non-linear curves • If RSD<15%, average RF may be used to quantitate; otherwise use equation of the curve • First- or second-order curves only (not forced through the origin) • Refer to SW-846 methods for SPCC and CCC criteria[4] • Minimum of 5 points per curve (one of them at or below the RL)
Calibration Verification	Per 12 hours	• Expected response or expected concentration ±20% • RF for SPCCs=initial calibration[4]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analytes
Reference Material	Per 20 samples or per analytical batch (preferably blind)	70-130% recovery if certified; otherwise, 50-150% recovery
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD)
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150% or based on historical laboratory control limits (average±3SD); RPD<25%
Surrogate	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure
Field Quality Control	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	Per method
Field Blank, Travel Blank, Equipment Blank	Per method	<RL for target analytes

[1] Unless method specifies more stringent requirements; ELISA results must be assessed against kit requirements.

[2] Pyrethroids quality control guidelines are presented in Table 2 immediately below.

[3] All detected analytes must be confirmed with a second column, second technique, or mass spectrometry.

[4] Mass spectrometry only

Table 23. Corrective Actions for Pesticides Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Calibration	Recalibrate the instrument. Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Reanalyze the calibration verification to confirm the result. If the problem continues, halt analysis and investigate the source of the instrument drift. The analyst should determine if the instrument must be recalibrated before the analysis can continue. All of the samples not bracketed by acceptable calibration verification must be reanalyzed.
Laboratory Blank	Reanalyze the blank to confirm the result. Investigate the source of contamination. If the source of the contamination is isolated to the sample preparation, the entire batch of samples, along with the new laboratory blanks and associated QC samples, should be prepared and/or re-extracted and analyzed. If the source of contamination is isolated to the analysis procedures, reanalyze the entire batch of samples. If reanalysis is not possible, the associated sample results must be flagged to indicate the potential presence of the contamination.
Reference Material	Reanalyze the reference material to confirm the result. Compare this to the matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all of the samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike to confirm the result. Review the recovery obtained for the matrix spike duplicate. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Matrix Spike Duplicate	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Reanalyze the matrix spike duplicate to confirm the result. Review the recovery obtained for the matrix spike. Review the results of the other QC samples (such as reference materials) to determine if other analytical problems are a potential source of the poor spike recovery.
Internal Standard	Check the response of the internal standards. If the instrument continues to generate poor results, terminate the analytical run and investigate the cause of the instrument drift.
Surrogate	Analyze as appropriate for the utilized method. Troubleshoot as needed. If no instrument problem is found, samples should be re-extracted and reanalyzed if possible.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	Visually inspect the samples to determine if a high RPD between results could be attributed to sample heterogeneity. For duplicate results due to matrix heterogeneity, or where ambient concentrations are below the reporting limit, qualify the results and document the heterogeneity. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.
Field Blank, Travel Blank, Equipment Blank	Investigate the source of contamination. Potential sources of contamination include sampling equipment, protocols, and handling. The laboratory should report evidence of field contamination as soon as possible so corrective actions can be implemented. Samples collected in the presence of field contamination should be flagged.

[1] Pyrethroids corrective actions are presented in Table 5 immediately below

Table 24. Quality Control for Pyrethroids Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Frequency of Analysis	Measurement Quality Objective
Tuning[2]	Per analytical method	Per analytical method
Calibration	Daily, or just prior to analysis; five or more standards spanning the sample result range[3], with the lowest standard at or below the RL	r ≥0.995 (or r^2 ≥0.995, all curve types not forced through origin)
Calibration Verification	Per 10 analytical samples[4]	80-120%[5]
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analytes
Laboratory Control Sample[6]	Per 20 samples or per analytical batch, whichever is more frequent	50-150%
Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	50-150%
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	50-150%; RPD≤35%
Surrogate[7]	Included in all samples and all QC samples	Based on historical laboratory control limits (50-150% or better)
Internal Standard	Included in all samples and all QC samples (as available)	Per laboratory procedure
Field Quality Control[8]	**Frequency of Analysis**	**Measurement Quality Objective**
Field Duplicate	5% of total project sample count	RPD ≤ 35%

[1] Unless project specifies more stringent requirements

[2] Mass spectrometry only

[3] Sample results above the highest standard are to be diluted and re-analyzed.

[4] Analytical samples include samples only and do not include clean-out or injection blanks.

[5] Limit applies to a mid-level standard; low-level calibration checks near the reporting limit may have a wider range that is project - specific

[6] Laboratory control samples must be matrix-specific. A clean sediment, roasted sand, or roasted sodium sulfate may be used for sediments.

[7] Laboratory historical limits for surrogate recovery must be submitted to the SWAMP database in the lab result comment section.

[8] A technical group consisting of regional, laboratory, and research representatives determined that field blanks do not provide technical value to a pyrethroids data set.

Table 25. Corrective Actions for Pyrethroids Testing (From SWAMP 2013 Table)

Laboratory Quality Control	Recommended Corrective Action
Calibration	Affected samples and associated quality control must be reanalyzed following successful instrument recalibration.
Calibration Verification	Initial calibration is analyzed immediately after calibration and should be from a source different than the calibration curve. Bracketing continuing calibration standards are used every ten sample runs for quantitation per method protocol. The analysis must be halted, the problem investigated, and the instrument recalibrated. All samples after the last acceptable continuing calibration verification must be reanalyzed.
Laboratory Blank	The sample analysis must be halted, the source of the contamination investigated, the samples along with a new laboratory blank prepared and/or re-extracted, and the sample batch and fresh laboratory blank reanalyzed. If reanalysis is not possible due to sample volume, flag associated samples.
Laboratory Control Sample	The LCS is analyzed in the same manner as an environmental sample and the spike recovery demonstrates the accuracy of the method. Affected samples and associated quality control must be reanalyzed following LCS troubleshooting and resolution. After troubleshooting, compare to matrix spike/matrix spike duplicate recovery data. If adverse trends are noted, reprocess all samples associated with the batch.
Matrix Spike	The spiking level should be near the midrange of the calibration curve or at a level that does not require sample dilution. Appropriately spiked results should be compared to the matrix spike duplicate to investigate matrix interference. If matrix interference is suspected, the matrix spike result must be flagged. Appropriately spiked results should be compared to the matrix spike duplicate to investigate matrix interference. If matrix interference is suspected and LCS recoveries are acceptable, the matrix spike and matrix spike duplicate results must be flagged.
Matrix Spike Duplicate	The spiking level should be should be near the midrange of the calibration curve or at a level that does not require sample dilution. Appropriately spiked results should be compared to the matrix spike to investigate matrix interference. If matrix interference is suspected and LCS recoveries are acceptable, the matrix spike duplicate result must be flagged.
Surrogate	Analyze as appropriate per method. Trouble shoot as appropriate, if no instrument problem is found samples should be re-extracted and re-analyzed if possible.
Internal Standard	Analyze as appropriate per method. Troubleshoot as appropriate. If, after trouble-shooting, the responses of the internal standards remain unacceptable, the analysis must be terminated and the cause of drift investigated.
Field Quality Control	**Recommended Corrective Action**
Field Duplicate	For duplicates with a heterogeneous matrix or ambient levels below the reporting limit, failed results may be flagged. All failures should be communicated to the project coordinator, who in turn will follow the process detailed in the method.

B5. Instrument/Equipment Testing, Inspection, and Maintenance

Laboratory instruments and equipment are inspected and maintained by the State certified contract laboratories. Details about testing schedules, testing criteria, spare parts (location and availability), inspection, personnel responsible, and corrective actions can be obtained from the laboratory if needed. The laboratories will provide pre-sterilized collection bottles and ensure the bottle contain the appropriate preservative prior to

delivery to County staff. There is no field equipment used in this project.

B6. Instrument/Equipment Calibration and Frequency

Both project laboratories maintain calibration practices as part of the method SOPs, performed by laboratory technicians under the direction of the individual lab QA Officers. Details about calibration frequency, test criteria, standards or certified equipment, and corrections of deficiencies can be obtained from the laboratories if needed.

B7. Inspection/Acceptance of Supplies and Consumable

All supplies, containers, and other consumable equipment used in this study will be inspected upon purchase or delivery by the Field Technician. The contracted laboratories will determine that all supplies and consumables comply with acceptance criteria outlined in their Standard Operating Procedures prior to conducting analyses. The laboratories will perform inspections of all project related materials per the acceptance criteria within their respective SOPs.

B8. Non-direct Measurement

Rain gauge data from the County of Santa Barbara Water Resources Division (WRD) will be used to plot a hydrograph of each storm event to inform mixing of the composite samples after each sampling session. WRD has 75 rain gauges County-wide that are calibrated annually each September.

B9. Data Management

The County of Santa Barbara and the contracted laboratories will be responsible for the project's data handling and storage. The data produced during this project will be managed following SWAMP protocols and be held in a SWAMP-compatible database at the County. Laboratory data will be transferred to the County in .pdf format and compiled into the database. Data will be reviewed to ensure that they are consistent with the format of the database and other data records. The County database is backed up on a daily basis. Original raw data sheets are stored at the contracted laboratory. All data are compiled and analyzed by the Field Technician. The QA Officer is responsible for overall data quality review. There is no continuous monitoring raw data. There are no identified procedures to demonstrate the acceptability of hardware and software configurations.

Group C. Assessment and Oversight

C1. Assessments and Response Actions

Assessments will be conducted by the QA Officer at the end of each storm season. Assessments will include:

1. Review of field notebooks and datasheets for completeness.

2. Review of laboratory data against SWAMP QA Tables.
3. If necessary, request for corrective action to laboratory QA officers.
4. Confirm corrective actions have been taken.
5. Review of electronic data formatted by Field Technician.
6. Request for corrective action, including data flagging, to Field Technician.
7. Confirm corrective actions have been taken.

A log of assessment activities for this Project will be maintained by the QA Officer and summarized for the Project Manager to review before the annual Municipal General Permit reporting is submitted via SMARTS. The QA Officer has the authority to issue stop work orders.

The laboratories will also conduct assessment activities, and the laboratory QA Officers can be contacted if more information is required.

C2. Reports to Management

A summary of all sampling events will be drafted by the Field Technician and submitted to the QA officer at the end of each rainy season. The summary will include any recommended program changes. Reporting is described in section A9

Group D. Data Validation and Usability

D1. Data review, Verification, and Validation Requirements

Data generated for the field monitoring component of this project will be reviewed by the QA Officer, and compared against the MQOs and the QA/QC practices provided in section A7.

D2. Verification and Validation Methods

In addition to the MQOs presented in Tables 13 through 17, the standard data validation procedures documented in the contract laboratories' Quality Assurance Manuals will be used to accept, reject, or qualify the data generated by the laboratory. Laboratory personnel will verify that the measurement process met all specified MQOs or acceptable deviations explained, for each batch of samples before proceeding with the analysis of a subsequent batch. When QA requirements have not been met, the samples will be reanalyzed when possible and only the results of the reanalysis will be submitted, provided they are acceptable. The contract laboratory's QA Officer will be responsible for validating data generated by the laboratory. All data reported will be assessed for errors in transcription, calculation, and computer input. Field data will be entered electronically and verified against the field data log sheets. The project QA Officer is responsible for reviewing data against the SWAMP MQOs provided in section B5. The project QA Officer will contact the laboratory QA Officer should QC issues be identified and work with them to resolve any data and or procedures that are not consistent with the QC measures described in this document.

D3. Reconciliation with User Requirements

The project is designed to collect data that can be used to characterize pollutant concentrations and loads from representative MS4 discharge locations within the County. The laboratory information produced will be used to estimate a pollutant load for the sampled drainage areas. These results will be used to support model calibration and allow more accurate prediction of local conditions. The model results will then be used to prioritize catchments by their generated pollutant load. This will help identify potential locations for BMPs to improve overall program effectiveness. Data that meet the QA requirements in this document will be considered to meet the user's requirements.

The reports produced by this project will describe some of the limitations of the data. This includes constraints and ability to meet project Measurement Quality Objectives. For data that do not meet MQOs, management has two options: 1. Retain the data for analytical purposes, but flag these data for QA deviations in CEDEN. 2. Do not retain the data and exclude them from all calculations and interpretations. The choice of option is the decision of the Project QA Officer and State Waterboard staff. If qualified data are to be used, then it must be made clear in any associated reporting that these deviations do not alter the conclusions.

Appendix A: Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California. Version 1.1 updated March 2014

Appendix B: EPA Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition October 2002

Appendix C: Weck Laboratories Analytical Methods Standard Operating Procedures

Appendix D: Weck Laboratories Chain of Custody Form

Appendix E: Aquatic Bioassay & Consulting Laboratories Chain of Custody Form

Appendix F: Field Sampling Data Sheet

County of Santa Barbara Public Works Department
Project Clean Water
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SCOTT D. MCGOLPIN
Director

THOMAS D. FAYRAM
Deputy Director

Memorandum

Date: October 14, 2016

To: 303(d) Monitoring Partner Agencies:
Erin Maker, City of Carpinteria
Everett King, City of Goleta
Bridget Elliot, City of Solvang
Rose Hess, City of Buellton
Mary Zepeda, MNS representing Buellton and Solvang

From: Cathleen Garnand, County of Santa Barbara

Subject: Transmittal of 303(d) Monitoring Program Results, 2015-2016

Background

In accordance with the NPDES California Phase II General Municipal MS4 Permit section E.13.c requirements, the County, along with partner cities of Carpinteria, Goleta, Solvang, and Buellton, implemented a storm water quality monitoring program. This program, consisting of a Monitoring Plan and QAPP, was approved by the Central Coast Regional Water Quality Control Board in their letter dated March 4, 2016.

The storm water quality monitoring is intended to address both the requirements of E.13.c but also to work toward addressing the program effectiveness assessment approach of E.14.a.iii by focusing on wet weather runoff from urban areas, and using that data to support a pollutant loading model.

The following summary and supporting documents describe implementation of the first year of that monitoring effort.

Summary

During the reporting period of Jul1 2015 – Jun30 2016, four separate wet weather events were monitored at a total of six unique sampling sites. These include:

Date	Rainfall (in)	Location	Type
Jan 5	1.65	Goleta	Commercial

Jan 5	1.43	Carpinteria	Residential
Jan 31	1.11	Carpinteria	Agricultural
Feb 17	0.10	Goleta	Industrial
Mar 5	0.67	Solvang	Residential

The Sampling Log (Attachment 1) describes the storm events that were tracked throughout the year. The log includes details on forecasts, events that were considered but not monitored, and events that we attempted to monitor but had to abort for reasons such as lack of sufficient runoff.

The Preparation Guide (Attachment 2) summarizes planning, storm event thresholds and triggers, and preparation activities. The Preparation Guide includes sampling procedures and storm monitoring contacts.

The lab results are summarized in Attachment 3. Each year, additional monitoring data will be included on this spreadsheet. After three years of successful monitoring, the results will be used for to revise event mean concentrations used in the pollutant load model for the various land use types, as appropriate.

Thresholds and standards do not exist for many of the parameters analyzed, however results that are noteworthy for discussion include the following:

Aluminum
Carpinteria Urban Agriculture, Goleta Industrial: Sources can be metal roofing and gutters, deteriorating scrap metal, also associated with naturally occurring soil and geologic conditions, high concentrations may be linked to erosion in the watershed or within a stream channel. The Water Quality Control Plan for the Central Coast Basin, 2011, established a Maximum Contaminant Level of 1000 ug/l. It is unclear if this references total or dissolved aluminum. The EPA National Recommended Water Quality Aquatic Life Criteria lists Criterion Maximum Concentration at 750 ug/l expressed in terms of total recoverable metal in the water column.

Copper
Goleta Industrial: Possible sources include pesticides and fungicides (anti-fouling coatings), automotive brake pads, and metal and electrical manufacturing.

Cyfluthrin
Goleta Commerical, Carpinteria Residential: Pyrethroid insecticide used for structural pest control and livestock operations.

Dichloran
Goleta Commerical, Carpinteria Residential, Buellton Industrial: Fungicide used commercially on celery and lettuce, post-harvest treatment for cut flowers, not available for retail sale. No reported uses recorded with the Agricultural Commissioner's Office for 2016 in Santa Barbara County. No water quality standards. Not sure of possible sources.

Fipronil
Carpinteria Residential: Phenylpyrazole insecticide used for structural pest control, and flea and tick treatments for pets.

L-Cyhalothrin
Carpinteria Urban Agriculture, Goleta Industrial, Solvang Residential: Pyrethroid insecticide used for crop protection, structural pest control, and for treating parks, recreational areas, and athletic fields.

Lead
Goleta Industrial: Possible sources, tire wear, lubricating oil and grease, bearing wear, paint, and batteries.

Permethrin
Carpinteria Urban Agriculture and Solvang Residential: Pyrethroid insecticide used as crop protectant, and for indoor and outdoor residential pest control. Also a common ingredient in lice and scabies treatments.

Perylene-d12
All sites: No water quality standards. Polycyclic aromatic hydrocarbon.

Triphenyl phosphate
All sites: No water quality standards yet. Used as a plasticizer in varnishes and lacquers, and fire retardant in electronics, hydraulic fluids and glues.

Zinc
All sites : Major sources are galvanized surfaces (roofs, gutters, flashing, fencing, guard rails, downspouts and drainage pipes), and wear debris from vehicle tires.
Highest at the Goleta Industrial site, where most buildings in the drainage area have metal roofing.

Toxicity
Hyalella azteca was the test organism used.

Sample date	Site Name	% Survival in 100% Sample	% Survival in Control
1/5/2016	Carpinteria Residential	5	100
1/5/2016	Goleta Commercial	90	100
1/5/2016	Buellton Industrial	90	100
1/31/2016	Carpinteria Agriculture	65	95
2/17/2016	Goleta Industrial	75	90
3/5/2016	Solvang Residential	95	95

The field data and raw data from the laboratory analysis are available at FTP site:
ftp://pwftp.countyofsb.org/Water/FTP/PROJECT%20CLEAN%20WATER/Lab%20Data%20303(d)%20Monitoring/

Attachment 1 - Sampling Log for 2015/16

Rainfall data sources and distance to sampling locations

Carpinteria: Santa Barbara County Flood Control District Official Daily Rainfall Record Station 208, Carpinteria Fire Station, within 0.75 miles of both Carpinteria sampling locations.
Goleta: National Weather Service Station KSBA, Santa Barbara Airport, within 1 mile of both Goleta sampling locations.
Buellton: Santa Barbara County Flood Control District Official Daily Rainfall Record Station 233 Buellton Fire Station #31, 0.50 miles.
Solvang: Santa Barbara County Flood Control District Official Daily Rainfall Record Station 393 Solvang PW Water, 1.3 miles.

15 November 2015
Rain 0.08", B Belyea visited both Goleta sites. Both locations had significant flow within an hour of the rain starting. After the rain stopped, flow had decreased significantly, but was strong enough to sample after 25 minutes at the industrial site and 40 minutes at the commercial site.
M Zepeda visited Buellton site.

Thursday 10 Dec 2015 PM through Friday 11 Dec 2015
Forecast Rain likely (~0.25").
Planned to sample Thursday evening/night, storm arrived later than forecast and rainfall amount was minimal. Considered sampling pre-dawn on Friday, did not go out, storm was too small.

13 December 2015
Rain 0.11". B Belyea evening sampling at Goleta Commercial site with C Garnand. Rain stopped before all samples were collected, filled three of five amber liter bottles.
For Goleta Commercial site, arrive asap, site flows very quickly after rain starts.

19 December 2015
Rain 0.18". C Garnand and E Maker daytime sampling at Carpinteria Residential site. B Belyea provided input on storm duration from Goleta, drops started at 11am, fully raining at 11:27am, no rain in downtown SB at 11:35am, stopped raining in Goleta at 12:24pm, barely sprinkling in Goleta at 12:34pm, started raining 12:42pm in Carp, no runoff in gutters downtown SB at 1:08pm storm moved very fast and had nothing behind the front. Gutter water at Carp residential site had black tint, not opaque, question of asphalt resurfacing upstream. No samples

21 December 2015
Forecast: Tuesday Chance of light rain (~0.10" to ~0.25")
20% chance (South Coast) / 70% chance (North County)

3 January 2016
Forecast storm arrival pushed back, majority of rain to fall between midnight and nine am Jan 4, looks to be spotty, fast moving storm. No rainfall.

5 January 2016
Sampled Goleta Commercial, Buellton Industrial, and Carpinteria Residential. Temperature and pH not measured at any site on this date.

Rain 1.65”. B Belyea sampled Goleta Commercial, joined later by C Garnand. B Belyea in office at 620am, worried might miss storm if wait til 8am to start. First sample 702am, last sample 851am, rain stopped by 915am. Sampling surface runoff at outfall to Las Vegas Creek, water was clear with brown tint, and odorless, trash present in runoff.

Rain 1.43”. E Maker sampled Carpinteria Residential. First sample 740am, last 930am. Sampling runoff flowing into drop inlet at El Carro Lane and Sterling Ave. Water was murky, brown, odorless, and had an oily sheen.

Rain 0.64”. M Zepeda and B Elliott sampled Buellton Industrial. First sample at 803am, last 953am. Sampling outfall to retention basin, water was cloudy, brown, and odorless.

19 January 2016
Rain 0.48” over 10 hours, light rain intensity not enough to create flows. Did not sample, forecast discussion mentioned weak cold front moving through the area, but will weaken considerably as it rounds Point Conception.

31 January 2016
Rain 1.11”. E Maker and C Garnand sampled Carpinteria Urban Agriculture. First sample 1037am, last 1237pm. Sampling outfall to Franklin Creek, site odor of sulfides, water was murky with sediment, brown, and odorless. Water was clear by 12pm. Air temp 16C, water temp 13C, pH 6.6

17 February 2016
Rain 0.10”. B Belyea sampled Goleta Industrial. First sampling 340pm, rain stopped and sky cleared to partly cloudy, flow stopped, only six samples collected. Waited at home about 4 miles west of sample site, returned to site after started raining again, light rain but enough to start flow and resume sampling. Sample 7 at 622pm, last sample at 712pm. Sampling surface runoff entering drop inlet at South Kellogg Ave and School Bus Lane, water was cloudy, brownish black, odorless and had an oily sheen. Air temp 16C, water temp 12C, pH 6.5. Only 0.01” rain in Santa Ynez, so did not try to sample Solvang site.

5 March 2016
Rain 0.67”. B Belyea sampled Solvang Residential, hard rain during drive from Goleta to Solvang, rain to light rain for the entire duration of sampling. First sample 1030pm, last sample 1230am. Sampling surface runoff entering drop inlet at intersection if Rebild Drive and Creekside Drive. Water was clear, colorless, and had no odor. Air temp 12C, water temp 14C, pH 8.2

Attachment 2 – Preparation Guide

Pre-Event:

1. PCW staff will be responsible for tracking the long-range forecast and making go/no-go decision to sample. Prediction of storm event exceeding 0.25" within 3 days will trigger notification and PCW staff will confirm the team of two people who will perform the sampling. 2 days prior to event, Weck Labs and Aquatic Bioassay Consulting labs will be notified.
2. 24 hours prior, if the storm looks promising, a standby 2-hr window will be set for sampling. If storm moves faster than original expected, samplers will be contacted to determine whether they can adjust their schedules; if not, a back-up team member may be required.
3. PCW staff will make final decision to begin sampling.
4. Samplers will report either to OSH parking lot for Goleta sampling, or to the Sterling Ave. location for Carpinteria sampling. Samplers are responsible for providing their own transportation to staging area, but can join PCW staff and vehicle during the sampling.

Samplers shall arrive prepared:	PCW will provide:
1. Dressed appropriately for the weather 2. With own rain gear and safety boots	1. Nitrile gloves 2. Sampling bottles, 6 amber glass plus 1 plastic gallon carboy. 3. Thermometer and pH probe (unless cities have their own pH probe) 4. Safety cones for traffic, if working in gutter. 5. Flashlights and lighting, if night. 6. Safety vest(s) 7. Camera (take pictures) 8. Towel

Sampling Procedures:

1. Water will be collected using the stainless steel sampling cup and transferred into 1-liter glass amber bottles (no preservatives). The stainless steel cup will be rinsed with deionized or tap water prior to initial use, and at conclusion of sampling.
2. Note that for storms forecasted to be 0.25" - 1", 500 ml aliquots, or half of one-liter amber bottle, will be taken at approximately **12 minute intervals** over a period of approximately two hours, resulting in 10 total aliquots filling 5 one-liter amber bottles. For storms >1" storm with large QPF during the sampling will be **10 minute intervals**, resulting in 12 aliquots filling 6 one-liter amber bottles. (Note: the lab will perform the compositing).
3. Amber bottles will be kept on ice throughout sampling event
4. PCW staff will arrange for bottles to be collected by the lab couriers.
5. For the toxicity plastic container, try to approximate the ounces listed in the table

	0.25"-1.0"	interval	>1" storm	interval

Standard 2 hours	10 samples	12 minutes	12 samples	10 minutes
Abbreviated 1 hour	10 samples	6 minutes	12 samples	5 minutes
1 gallon toxicity	10 samples 12.8 oz/sample		12 samples 10.67 oz/sample	

Contact numbers:

Water Resources/PCW Reception	568-3440
Bree Belyea	cell 698-0621, office 568-3321
Cathleen Garnand	cell 403-0742 office 568-3561
John Karamitsos	cell 598-7735 office 568-3373 (Fridays 739-8761)
Erin Maker	cell 637-2763 office
Mary Zepeda	cell 722-7140
Everett King	cell 509-2468

Analyte	Water Quality Standard	WQS Units	Source WQS	Detection Limit	Units	5 Jan 2016 Goleta Commercial	5 Jan 2016 Carpinteria Residential	5 Jan 2016 Buellton Industrial	31 Jan 2016 Carpinteria Urban Agriculture	17 Feb 2016 Goleta Industrial	5 Mar 2016 Solvang Residential
Toxicity % survival in 100% sample	n/a	n/a	n/a			90	5	90	65	75	95
pH	6.5-8.3		Water Quality Control Plan for the Central Coast Basin,			n/a	n/a	**n/a**	6.6	6.5	8.2
1-(3,4-Dichlorophenyl)-3-methylurea				0.14	ug/l	ND	ND	ND	ND	ND	ND
1-(3,4-Dichlorophenyl)urea				0.070	ug/l	ND	ND	ND	ND	ND	ND
1,3-Dimethyl-2-nitrobenzene					ng/l	534	538	495	469	831	589
3,4-Dichloroaniline				0.12	ug/l	ND	ND	ND	ND	ND	ND
3-Hydroxycarbofuran				0.48	ug/l	ND	ND	ND	ND	ND	ND
Acetamiprid	10.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	ND	ND	ND
Aldicarb	10	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.38	ug/l	ND	ND	ND	ND	ND	ND
Aldicarb sulfone	140	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.45	ug/l	ND	ND	ND	ND	ND	ND
Aldicarb sulfoxide	21.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.41	ug/l	ND	ND	ND	ND	ND	ND
Allethrin	1.05	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.85	ng/l	ND	ND	ND	ND	ND	ND
Aluminum, Dissolved				1.3	ug/l	11	15	29	40	58	19
Aluminum, Total	1000	ug/l	Water Quality Control Plan for the Central Coast Basin, Municipal/Domestic, 2011	1.3	ug/l	290	940	980	1600	2000	370
Ammonia as N				0.048	mg/l	0.17	0.20	0.14	0.18	0.87	ND
Azinphos methyl (Guthion)	0.08	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	5.5	ng/l	ND	ND	ND	ND	ND	ND
Bifenthrin	800	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.79	ng/l	3.3	28	2.0	5.6	ND	ND
Bolstar/Sulprofos				4.6	ng/l	ND	ND	ND	ND	ND	ND
Cadmium, Dissolved	1.8	ug/l	USEPA Aquatic Life Ambient Water Quality Criteria, acute freshwater 2016	0.041	ug/l	ND	ND	ND	ND	0.19	ND
Cadmium, Total	5.733	ug/l	USEPA Aquatic Life Ambient Water Quality Criteria, acute freshwater 2016	0.041	ug/l	ND	ND	0.13	0.12	0.44	0.14
Calcium, Total				0.0160	mg/l	4.90	6.50	8.49	9.77	24.0	11.0
Carbaryl	0.85	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.48	ug/l	ND	ND	ND	ND	ND	ND
Carbofuran	1.115	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.59	ug/l	ND	ND	ND	ND	ND	ND
Chlorpyrifos	0.05	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	6.9	ng/l	ND	ND	ND	ND	ND	ND
Clothianidin	11	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	ND	ND	ND
Copper, Dissolved	10	ug/l	Water Quality Control Plan for the Central Coast Basin, Aquatic Life, 2011	0.13	ug/l	4.5	4.9	5.6	5.1	31	8.6
Copper, Total				0.13	ug/l	9.1	12	12	13	46	12
Coumaphos	0.037	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	5.1	ng/l	ND	ND	ND	ND	ND	ND
Cyfluthrin	12.5	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.83	ng/l	2.5	14	ND	ND	ND	3.5
Cypermethrin	210	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.66	ng/l	2.8	4.5	3.8	ND	ND	ND
Deltamethrin/Tralomethrin	0.055	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	1.9	ng/l	ND	ND	ND	ND	ND	ND
Demeton-o				10	ng/l	ND	ND	ND	ND	ND	ND
Demeton-s				10	ng/l	ND	ND	ND	ND	ND	ND
Desulfinylfipronil	100	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.0	ng/l	6.8	110	9.2	ND	ND	3.1
Diazinon	105	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	5.2	ng/l	10	ND	ND	58	ND	ND
Dichloran				0.80	ng/l	3.2	2.0	3.6	ND	ND	ND
Dichlorvos	0.035	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.9	ng/l	ND	ND	ND	ND	ND	ND
Dimethoate	21.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	6.2	ng/l	ND	ND	ND	ND	ND	ND
Dinotefuran	484150	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	0.85	ND	ND
Disulfoton	1.95	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	10	ng/l	ND	ND	ND	ND	ND	ND
Diuron	80	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.060	ug/l	ND	ND	ND	ND	ND	ND
Ethoprop	22	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	6.7	ng/l	ND	ND	ND	ND	ND	ND
Ethyl parathion				5.4	ng/l	ND	ND	ND	ND	ND	ND
Fenpropathrin (Danitol)	0.265	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.0	ng/l	ND	ND	ND	ND	ND	ND
Fensulfothion				2.9	ng/l	ND	ND	ND	ND	ND	ND
Fenthion				3.8	ng/l	ND	ND	ND	ND	ND	ND
Fenvalerate/Esfenvalerate				0.98	ng/l	ND	ND	ND	ND	ND	ND
Fipronil	110	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.0	ng/l	27	170	15	ND	ND	3.1
Fipronil sulfide				2.0	ng/l	ND	12	ND	ND	ND	ND
Fipronil sulfone	360	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.0	ng/l	23	300	45	ND	ND	12
Hardness as CaCO3, Total	>100 = hard, <100=soft	mg/l CaCO3	Water Quality Control Plan for the Central Coast Basin, 2011	0.0894	mg/l	14.9	22.8	28.6	36.6	76.2	34.1
Imidacloprid	34.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	ND	ND	ND
Iron, Dissolved	5000	ug/l	Water Quality Control Plan for the Central Coast Basin, Agricultural, 2011	0.91	ug/l	ND	ND	42	96	84	ND
Iron, Total				0.91	ug/l	380	1200	1500	2100	2800	580
L-Cyhalothrin	3.5	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	1.2	ng/l	ND	ND	ND	11	140	48
Lead, Dissolved	50	ug/l	Water Quality Control Plan for the Central Coast Basin, Municipal/Domestic, 2011	0.031	ug/l	ND	ND	ND	0.21	0.61	ND
Lead, Total				0.031	ug/l	0.92	1.7	2.0	5.2	8.5	0.55
Linuron	60	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	n/a	n/a	n/a	n/a	ND	ND
Magnesium, Total				0.0120	mg/l	0.657	1.60	1.81	2.97	3.97	1.62
Malathion	0.1	ug/l	USEPA Aquatic Life Criteria, chronic freshwater	7.6	ng/l	ND	ND	ND	ND	34	ND
Merphos				5.8	ng/l	ND	ND	ND	ND	ND	ND
Methiocarb	3.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.57	ug/l	ND	ND	ND	ND	ND	ND
Methomyl	2.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.30	ug/l	ND	ND	ND	ND	ND	ND
Methyl parathion				6.3	ng/l	ND	ND	ND	ND	ND	ND
Mevinphos				4.2	ng/l	ND	ND	ND	ND	ND	ND
Naled	0.07	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	7.6	ng/l	ND	ND	ND	ND	ND	ND

Nitrate as N				0.041	mg/l	0.15	0.42	0.13	2.8	1.2	0.18	
Nitrate as NO3	45	mg/l	Water Quality Control Plan for the Central Coast Basin, municipal supply, 2011			0.6645	1.8606	0.5759	12.404	5.316	0.7974	values determined by multiplying Nitrate as N by factor of 4.43
Nitrite as N				10	ug/l	ND	ND	ND	ND	160	ND	
Nitrite as NO2	10000	ug/l	Water Quality Control Plan for the Central Coast Basin, livestock watering, 2011							526.4		values determined by multiplying Nitrite as N by factor of 3.29
Nitrogen, Total	0.38	mg/l	USEPA Nutrient Criteria Rivers and Streams Ecoregion III, 2002	0.060	mg/l	1.2	25	0.93	3.8	5.3	0.70	
NO2+NO3 as N				10	ug/l	170	440	160	2900	1400	200	
o-Phosphate as P				0.0017	mg/l	0.16	0.18	0.13	0.91	0.20	0.17	
o-Phosphate as P, dissolved				1.7	ug/l	160	180	130	870	ND	170	
Oxamyl	90	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.48	ug/l	ND	ND	ND	ND	ND	ND	
Pendimethalin	140	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.50	ng/l	9.3	2.6	2.6	ND	ND	ND	
Permethrin	10.6	ng/l	OPP Aquatic Life Benchmarks, acute invertebrates	5.0	ng/l	8.8	ND	9.7	12	ND	20	
Perylene-d12					ng/l	215	197	303	224	162	206	
Phorate	0.3	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	3.0	ng/l	ND	ND	ND	ND	ND	ND	
Phosphorus as P, Total	0.02188	mg/l	USEPA Nutrient Criteria Rivers and Streams Ecoregion III, 2002	0.035	mg/l	0.19	0.24	0.21	1.1	0.66	0.24	
Phosphorus, Dissolved				0.035	mg/l	0.15	0.17	0.13	0.93	0.26	0.15	
Prallethrin	3.1	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.92	ng/l	ND	ND	ND	ND	ND	ND	
Propoxur (Baygon)	5.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.60	ug/l	ND	ND	ND	ND	ND	ND	
Ronnel (Fenchlorphos)				4.1	ng/l	ND	ND	ND	ND	ND	ND	
Stirophos (Tetrachlorvinphos)	0.95	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	3.1	ng/l	ND	ND	ND	ND	ND	ND	
Sumithrin (Phenothrin)	2.2	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	2.4	ng/l	ND	ND	ND	ND	ND	ND	
Tefluthrin	0.035	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates	0.93	ng/l	ND	ND	ND	ND	ND	ND	
Thiacloprid	18.9	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	ND	ND	ND	
Thiamethoxam	17.5	ug/l	OPP Aquatic Life Benchmarks, acute invertebrates		ug/l	ND	ND	ND	ND	ND	ND	
TKN				0.050	mg/l	1.0	24	0.77	0.94	4.0	0.51	
Tokuthion (Prothiofos)				7.8	ng/l	ND	ND	ND	ND	ND	ND	
Total Suspended Solids					mg/l	19	46	36	100	73	42	
Trichloronate				6.7	ng/l	ND	ND	ND	ND	ND	ND	
Triphenyl phosphate					ng/l	1010	620	742	709	1010	893	
Triphenyl phosphate					ng/l	671	326	542	334	919	348	
Zinc, Dissolved	4	ug/l	Water Quality Control Plan for the Central Coast Basin, Aquatic Life, 2011	0.94	ug/l	61	13	29	32	150	10	
Zinc, Total				0.94	ug/l	92	41	73	84	300	22	

City of Buellton and City of Solvang
Stormwater Program Effectiveness Assessment and Improvement Plan (PEAIP)
Annual Summary 2015-2016

1. PEAIP Summary Introduction:

The City of Buellton (COB) and City of Solvang (COS) prepared and submitted to the State Water Resources Control Board a multi-agency PEAIP for Year 2 on October 13, 2015 through the Storm Water Multiple Application and Report Tracking System (SMARTS) Database. COB and COS subsequently submitted a revision dated February 19, 2016 to be uploaded with Year 3 Annual Report. This report summarizes implementation of the PEAIP for Year 3 of the National Pollutant Discharge Elimination System's (NPDES) Phase II Municipal Small Separate Sewer (MS4) General Permit, for calendar year July, 1 2015 through June 30, 2016.

The purpose of the PEAIP is to track the short- and long-term effectiveness of the stormwater program, the specific measures that will be used to assess the effectiveness of the prioritized best management practices (BMPs), the groups of BMPs, and/or the stormwater program as a whole. The purpose of the PEAIP is also to provide a description of how the COB and COS will use the information obtained through the PEAIP to improve the stormwater program. The PEAIP outlines the approach that the COB and COS will use to adaptively manage its stormwater program to improve its effectiveness at reducing the identified high- and medium-priority Pollutants of Concern (POCs), thereby achieving the maximum extent practicable (MEP) standard and protecting water quality. The PEAIP is focused on the ***impact*** that the stormwater program is having rather than the strict *implementation* of the program. By focusing the Effectiveness Assessment in this manner, the COB and COS will increase their ability to understand if its stormwater program is achieving the intended outcomes and can identify necessary modifications to the program to make it more effective.

The PEAIP for Year 3 focused ***primarily*** on the California Stormwater Quality Association (CASQA) Outcome Levels for Target Audiences (Outcome Levels 2-3), and the Sources and Impacts (Outcome Level 4-5). The COB and COS developed management questions for high-priority POCs (Nutrients) and the medium-priority POCs (Sedimentation/Siltation and Total Suspended Solids), and then conducted a data collection assessment of each of these POCs. The data collected will be utilized by both the COB and COS to improve the stormwater program and protect water quality.

In order to determine the specific target audiences and the appropriate prioritized BMPs, the COB and COS reviewed the following: a) proposed TMDLs by the Central Coast Regional Water Quality Control Board, b) 2010 303(d) List of Impaired Waterbodies, c) Central Coast Regional Water Quality Control Board (CCRWQCB) April 24th, 2014 Consultation Handout "Solvang – Buellton Urban Water Quality Profile", d) Central Coast Ambient Monitoring Program's (CCAMP) Ambient Water Quality Data, e) COB and COS Storm Water Management Plan's (SWMP) Guidance Document's List of POCs, and f) proposed regional Urban Storm Water Monitoring Plan. Best professional judgment, knowledge of local and/or regional water quality issues and common urban pollutants were also factors in the identification of POCs.

Target audiences for each source of high- and medium-priority POCs have been identified and the COB and COS have actively taken steps, during each permit year, to identify and

bridge communication and action barriers through the selection and implementation of prioritized BMPs.

The prioritized BMPs reflect stormwater program activities that are intended to change behaviors of target audiences and result in pollutant source mitigation. The prioritized BMPs, listed below in Figure 8 Prioritized BMP Identified for Target Audiences within COB and COS PEAIP, are being implemented as part of the Cities stormwater program, and where applicable, corresponding data was collected and analyzed at the close of Permit Year 3 in order to assess program effectiveness and identify opportunities for program improvement.

2. Data Summary – Program Assessment

In accordance to the NPDES Phase II MS4 General Permit's Section E.7, both the COB and COS have developed and implemented a Stormwater Education and Outreach Program Strategy. The program's goal is to inform people of the impacts of stormwater discharge on water bodies and the steps they can take to reduce pollutants in stormwater and how they can become involved in restoration activities.

The Cities education and outreach campaign involves a combination of: (1) implementing a pilot Community Based Social Marketing (CBSM) campaign to promote changes in people's behavior related to management of dog waste that will improve the quality of the Cities stormwater and surface waters; (2) conducting surveys or quizzes; (3) provide education and outreach materials (i.e. printed materials, billboard, mass transit advertisement, television advertisements, and websites) to target audiences as appropriate; (4) utilizing public input in developing outreach through event participation; (5) providing availability of water efficient/pesticide and fertilizer application/stormwater brochures within each City office and/or website; (6) promoting reporting of illicit discharges or connections'; (7) providing availability of pesticide and fertilizer application within each City office and/or website; (8) provide educational materials to school children to promote stormwater pollution prevention; and (9) Develop messaging to reduce discharges from organized car washes, mobile cleaning and pressure washing activities.

On each of the City's stormwater website, an online survey was conducted to assess the public's knowledge on their Stormwater Management Program (SWMP). Based on the lack of participation in the online survey received for Year 2 (4 Responses COB; 10 Responses COS), Year 3 (1 Responses COB; 6 Responses COS), the Cities altered their approach to promoting the online surveys by directing the community through Water Bill Inserts and Chamber of Commerce E-Newsletters to survey weblink and/or provided direct mailers to target audiences as described below within the POCs data summary to achieve the MEP standard.

For the PEAIP, the COB and COS focused its data assessment for Nutrients and Sedimentation/Siltation (Total Suspended Solids) using the Management Questions, Data Assessment and Data Collection Methods outlined within Table 5 and 6 of the COB and COS PEAIP. The data assessment for each POC consisted primarily of a qualitative assessment and/or a descriptive statistic methodology and the data collection methods included internal tracking by stormwater program, review of external data sources, interviews/surveys, site investigations/inspections; and monitoring and sampling as described below within COB and COS PEAIP.

The data summary for the high-and medium-priority POCs by program element are as follows:

NUTRIENTS

Education and Outreach [CASQA Outcome Level 2-3]

COB Data Assessment/Collection:
During Year 3, COB participated in 3 education and outreach events (Buellton BBQ Bonanza, State of the City, Santa Ynez Valley Earth Day Event) and sponsored a Stormwater Display Booth at each event. The numbers of education and outreach materials distributed during events related to Nutrients (Gardener's Guide to Clean Water; Home Owner's Guide to BMPs; Recognizing and Reporting Stormwater Pollution; Protecting Water Quality from Urban Runoff) are as follows: Buellton BBQ Bonanza (37 Visitors: 8 Brochure Distribution 8); State of the City (15 Visitors; 9 Brochure Distribution); and Santa Ynez Valley Earth Day (168 Visitors; 17 Brochure Distribution).

The COB also distributed brochures through brochure displays at designated City facilities (City Hall Main Office, Planning Department and the Santa Ynez Valley Botanical Garden). The numbers of education and outreach materials distributed at the City facilities related to Nutrients (61 Gardener's Guide to Clean Water; 2 Home Owner's Guide to BMPs; 0 Business Owner's Guide to BMPs, 30 Recognizing and Reporting Stormwater Pollution; 2 Protecting Water Quality from Urban Runoff) as well as had 4197 File Views/Hits (2284 English; 1913 Spanish) thru the City's website. The COB also provides weblinks to additional resources on the City's website to the Santa Barbara County Project Clean Water, Our Water Our World and the Less is More website.

In addition, the COB's Authorized Contract Staff distributed 153 education and outreach materials distributed during Fats, Oil and Grease (FOG) and Industrial Waste Discharge (IWD) Inspection related to Nutrients (40 Business Owner's Guide to BMPs; 4 Beverage Manufacturing and Stormwater; 10 Mobile Cleaning – Food Service; 37 Restaurant Owners Guide; 38 FOG Program; 24 COB – SWRCB Industrial Storm Water Pollution Prevention Plan Requirements).

COB also sent a "Buellton Residents Neighboring the Santa Ynez River with Livestock" target audience mailers to 3 property owners to obtain assistance with the reduction and/or elimination of nutrients that have the potential to end up in the river should they come in contact with stormwater runoff. The COB also sent a "Homebrew Beer, Wine and Distillery Waste" target audience mailer to 46 current residents of a residential community to provide residents information on the COB's Storm Water Management and Discharge Control Ordinance as well as emailed the COB BMPs for Landscape Maintenance to the Landscape Maintenance Contractor. For the documents the COB has posted on their website, there were more File Views/Hits on the website for the Spanish version then the English version of the stormwater brochures. Based on these results, the COB will pursue additional Spanish education and outreach activities.

COS Data Assessment/Collection:
During Year 3, the COS participated in 3 education and outreach events (Recycle: What, Why and How, State of the City, Santa Ynez Valley Earth Day Event) and sponsored a Stormwater Display Booth at each event. The numbers of education and outreach materials distributed during events related to Nutrients (Gardener's Guide to Clean Water; Home

Owner's Guide to BMPs; Recognizing and Reporting Stormwater Pollution; Protecting Water Quality from Urban Runoff) are as follows: Santa Ynez Valley Earth Day (168 Visitors; 17 Brochure Distribution). At the Recycle: What, Why and How and State of the City event, there were no brochures taken from the Stormwater Display Booths. In previous years, the COS set up a Stormwater Display Booth at the Solvang Farmers Market where more brochures taken; therefore, the COS will focus on a Solvang Farmers Market and Earth Day Event to meet this permit requirement.

The COS also distributed brochures through brochure displays at City Planning/Public Works/Building Department. The numbers of education and outreach materials distributed at the City Planning Department were not counted nor were the File Views/Hits on the COS's website. The COS also provides weblinks to additional resources on the City's website to the Santa Barbara County Project Clean Water, Our Water Our World and the Less is More website. To improve the effectiveness of the brochure counts in Year 4, an additional brochure display has been installed at City Hall Main Office and brochure counts are taken monthly.

In addition, the COS mailed "Notification – Drainage Inspection & Maintenance" target audience mailers to 57 property owners/tenants to obtain assistance ensure drainage areas are kept clean and to remind them that yard waste, leaves, fireplace ashes, pet waste and manure pollutants are not allowed in or along the watercourse or any other part of the storm drain system. The COS also sent BMPs for Landscape Maintenance to the COS's Landscape Maintenance Contractor and to Skytt Mesa LLMD for their Landscape Maintenance Contractor. In Year 4, the COS will pursue additional Spanish education and outreach materials after looking at COB's results.

Public Involvement and Participation [CASQA Outcome Level 2-3]

COB Data Assessment/Collection:
In addition to COB stormwater website online survey discussed in the Program Assessment Section above, the COB and COS conducted an additional online survey for business that was promoted through the Chamber of Commerce E-Newsletter and the Buellton Buzz (Water Bill Insert) and received 11 responses for Year 2 and 1 responses or Year 3 that included 22.22% of the responses were from Restaurants and 77.78% responses were from Other types of business such as Real Estate, Professional Services, Service/Self Storage, Internet Sales, Real Estate Financing and Advertising. Although the Cities did not receive any responses from the following types of businesses, the Cities continues to modify their education and outreach strategy to these target audiences: Beverage/Distillery/ Wine Production; Beverage Tasting/Storage, Building Material Retailers and Storage, Corporate Yard, Gas Station, Landscape, Manufacturing and Processing, Metal and other Recycled Material Collection, Mobile Cleaning, Transportation and Vehicle Mechanical Repair, Maintenance or Cleaning Businesses. The survey results gave the Cities information about the general business population but were not able to isolate specific target audience results. In Year 4, the Cities began an additional education and outreach activity by launching a "Stormwater Pollution Prevention for Restaurant Owners" Direct Mailer Campaign (41 Mailers COB and 60 Mailers COS) to Restaurant Owners with an invitation to participate in an online Stormwater Management Program Survey for Restaurants.

The COB Contract Staff also initiated an annual survey during their FOG and IWD Program Inspections beginning Year 2 (11 FOG Questionnaires) and Year 3 (27 FOG and 11 IWD

Questionnaires) to engage the target audience with the following 3 questions: (1) Are you familiar with the COB's Storm Water Program?; (2) Are you aware of the requirements for your type of business activity?; and (3) Do you believe your business is in compliance with the City's Storm Water Program?. The FOG and IWD Questionnaires showed more than 50% were unaware of their business activities impact to stormwater. Based on the results, COB Contract Staff will continue to engage FOG and IWD Program participants by conducting the Stormwater Questionnaires and providing stormwater outreach related materials during the inspection.

The COB also participated in education and outreach events (Buellton BBQ Bonanza, State of the City, Santa Ynez Valley Earth Day Event). The number of Stormwater Quiz's/Survey's and Interested Parties Sign-up Inquiry at the Stormwater Display Booth are as follows: Buellton BBQ Bonanza (37 Visitors; 5 Stormwater Quiz; 0 Interested Parties Sign-up); State of the City (15 Visitors; 0 Stormwater Quiz; 0 Interested Parties Sign-up); and Santa Ynez Valley Earth Day (168 Visitors 168; 3 Stormwater Quiz; 8 Stormwater Survey; 1 Interested Parties Sign-up). The COB did not have any additional Interested Parties Sign-ups through the City's Stormwater Website or the online business survey. There no changes to the survey or quizzes at outreach events at this time until the COB have comparable data through ongoing surveys.

COS Data Assessment/Collection:
In addition to the COS stormwater website online survey discussed in the Program Assessment Section above, the COB and COS conducted an additional online survey for business that was promoted through the Chamber of Commerce E-Newsletter and the Buellton Buzz (Water Bill Insert) and received 11 responses for Year 2 and 1 responses or Year 3 that included 22.22% of the responses were from Restaurants and 77.78% responses were from Other types of business such as Real Estate, Professional Services, Service/Self Storage, Internet Sales, Real Estate Financing and Advertising. Although the Cities did not receive any responses from the following types of businesses, the Cities continues to modify their education and outreach strategy to these target audiences: Beverage/Distillery/ Wine Production; Beverage Tasting/Storage, Building Material Retailers and Storage, Corporate Yard, Gas Station, Landscape, Manufacturing and Processing, Metal and other Recycled Material Collection, Mobile Cleaning, Transportation and Vehicle Mechanical Repair, Maintenance or Cleaning Businesses. The survey results gave the Cities information about the general business population but were not able to isolate specific target audience results. In Year 4, the Cities began an additional education and outreach activity by launching a "Stormwater Pollution Prevention for Restaurant Owners" Direct Mailer Campaign (41 Mailers COB and 60 Mailers COS) to Restaurant Owners with an invitation to participate in an online Stormwater Management Program Survey for Restaurants.

The COS also participated in education and outreach events (Recycle: What, Why and How, State of the City, Santa Ynez Valley Earth Day Event). The number of Stormwater Quiz's/Survey's and Interested Parties Sign-up Inquiry at the Stormwater Display Booth are as follows: Santa Ynez Valley Earth Day (168 Visitors 168; 3 Stormwater Quiz; 8 Stormwater Survey; 1 Interested Parties Sign-up). For the booths at the Recycle: What, Why and How and State of the City event, there were no quizzes taken during the event. The COS did not have any additional Interested Parties Sign-ups through the City's Stormwater Website or the online business survey. There no changes to the survey or quizzes at outreach events at this time until the COS have comparable data through ongoing surveys.

Illicit Discharge Detection and Elimination [CASQA Outcome Level 4]

COB Data Assessment/Collection:

During Year 3, the COB continues to implement its Illicit Discharge Detection and Elimination (IDDE) Program through Buellton Municipal Code (BMC) Title 15 Stormwater Chapter 15.01 Stormwater Management and Discharge Control also known as the Stormwater Management and Discharge Ordinance and the COB Stormwater Program Management Certification Statement which provides the COB full legal authority to implement and enforce each of the NPDES Phase II MS4 General Permit requirements. The COB also developed a draft Enforcement Response Plan that includes enforcement measures and tracking of the types of enforcement responses.

The COB has also implemented a Spill Response Plan which provides guidance to City Staff and Authorized Contract Staff responding to a complaint or notice of a spill discharge or illicit connection; and conducting an investigation to locate and identify the source of a non-stormwater discharge. During Year 3 (rescheduled dates in Year 4), both City Staff and Authorized Contract Staff (11 City Staff and 13 City Contract Staff) were provided IDDE and Staff and Site Operator Training. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections. In Year 3, there were 2 out of 3 site investigations associated with nutrient related discharges. All nutrient related investigations were located within the residential zone. Form these investigations, the COB issued 2 written notices and 2 notices of violations with all incidents resolved and the City continues provide education and outreach activities related to nutrients in Year 4.

In addition, the COB's Stormwater Program Coordinator reviewed all FOG and IWD inspection reports and/or violations for non-stormwater discharges which were resolved through the FOG program without impacts to receiving water quality. Although the COB had implemented an IDDE Program, the City does not have enough comparable data at this time to warrant any changes to the program. The COB will continue education and outreach efforts to help minimize and eliminate pollutants from entering the storm drain system.

As part of the Stormwater Management Program, the COB continues to contract with a local waste hauler for management of green waste and coordinates and promotes the annual Christmas Treecycle Program through the Chamber of Commerce E-Newsletter, Buellton Buzz (Water Bill Insert) and both the COB and Waste Hauler websites. This program allows residents to drop off their trees until 2nd week in January for mulching and reuse within the community. The COB also maintains 10 Mutt Mitt Stations (5 River View Park; 3 Oak Valley Park; 1 PAWS Dog Park; 1 Via Corona Road). There are 4 additional Mutt Mitt Stations (1 North and 1 South Side along Highway 246 near the corner of Sycamore Drive; and 1 North and 1 South Side along Highway 246 near the corner of Valley Dairy) that are being maintained by Buellton Veterinary Clinic. In Year 4, the COB will review the recommendations from the pilot pet waste campaign to determine additional implementation measures.

COS Data Assessment/Collection:

During Year 3, the COS continues to implement its IDDE Program through SMC Title 14 Stormwater Management also known as the Stormwater Management Ordinance and the

COS Stormwater Program Management Certification Statement which provides the COS full legal authority to implement and enforce each of the NPDES Phase II MS4 General Permit requirements.

The COS has also implemented a Spill Response Plan which provides guidance to City Staff and Authorized Contract Staff responding to a complaint or notice of a spill discharge or illicit connection; and conducting an investigation to locate and identify the source of a non-stormwater discharge. In Year 3, the 6 new City employees were provided IDDE and Staff and Site Operator. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections. In Year 3, there were 4 out of 10 site investigations associated with nutrient related discharges. All nutrient related investigations were located within the commercial zone. Form these investigations, the COS issued 4 verbal warnings and 1 written notice with all incidents resolved and the City has targeted restaurants for additional stormwater education and outreach activities in Year 4.

As part of the Stormwater Management Program, the COS continues to contract with a local waste hauler for management of green waste and coordinates/promotes green waste recycling in the community through the waste hauler. The COS continues to maintain Mutt Mitt Stations (Hans Christian Andersen Park, Sunny Fields Park, Solvang Parks, and Veterans Memorial Building). In Year 4, the COS will review the recommendations from the pilot pet waste campaign to determine additional implementation measures.

Pollution Prevention and Good Housekeeping [CASQA Outcome Level 2-4]

COB Data Assessment/Collection:
During Year 2, the COB launched “Close the Poop Loop”, a pilot pet waste campaign, aimed to target unattended dog waste throughout the City. The campaign was created in collaboration with the Cities of Carpinteria, Goleta, Guadalupe, Lompoc, Santa Barbara, Santa Maria, Solvang and the County of Santa Barbara’s Project Clean Water to encourage residents to pick up after their dogs and toss the waste in the trash. The Mutt Mitt Program’s efforts to continue to provide pet waste disposal bags at River View Park, Oak Park and PAWS Dog Park for use by the public, has helped reduce or eliminate pet waste at those locations. In total, the Mutt Mitt Program’s Bi-weekly Maintenance provided approximately 72,000 bags during Year 3. The results of Year 2 pilot pet waste campaign Pre- and Post-campaign Survey Results indicated that there was 0% change even though the COB developed strategic partnerships with 2 pet-related businesses within the targeted areas to display campaign materials to local dog owners in places they frequent and from people they trust as well as target 1 dog related event and conducted various messaging campaigns. In Year 4, the COB will review the recommendations from the pilot pet waste campaign to determine additional implementation measures.

The COB Contract Staff conducted a total of 70 FOG and 16 IWD Program Inspections with 69 FOG Inspections with no stormwater violations; and all16 IWD Inspections indicating no stormwater violations. As mentioned within the Education and Outreach [CASQA Outcome Level 2-3] Section, the COB Contract Staff initiated an annual survey during their FOG and IWD Program Inspections beginning Year 2 (11 FOG Questionnaires) and Year 3 (27 FOG and 11 IWD Questionnaires) to engage the target audience with the following 3 questions: (1) Are you familiar with the COB's Storm Water Program?; (2) Are you aware of the requirements for your type of business activity?; and (3) Do you believe your business is in

compliance with the City's Storm Water Program? The FOG and IWD Questionnaires showed more than 50% were unaware of their business activities impact to stormwater. Based on the results, the COB Contract Staff will continue to engage FOG and IWD Program participants by conducting the Stormwater Questionnaires and providing stormwater outreach related materials during the inspection. In Year 4, the COB will modify its FOG Questionnaire/Survey to address good housekeeping behaviors and habits.

The COB continues to provide IDDE and Staff and Site Operator Training as described within the Illicit Discharge Detection and Elimination [CASQA Outcome Level 4] Section above.

COS Data Assessment/Collection:
During Year 2, the COS has launched a Close the Poop Loop, a pilot pet waste campaign, aimed to target unattended dog waste throughout the City. The campaign was created in collaboration with the Cities of Carpinteria, Goleta, Guadalupe, Lompoc, Santa Barbara, Santa Maria, Buellton and the County of Santa Barbara's Project Clean Water to encourage residents to pick up after their dogs and toss it in the trash. The Mutt Mitt Program's efforts to continue to provide pet waste disposal bags at Hans Christian Andersen Park, Sunny Fields Park, Solvang Parks, and Veterans Memorial Building for use by the public, has helped reduce or eliminate pet waste at those locations. In total, the Mutt Mitt Program's Bi-weekly Maintenance provided approximately 8,000 bags during Year 3. The results of Year 2 pilot pet waste campaign Pre- and Post-campaign Survey Results indicated that there was 0% change even though the COS developed strategic partnerships with 3 pet-related businesses within the targeted areas to display campaign materials to local dog owners in places they regularly frequent and from people they trust as well as target 1 dog related event and conducted various messaging campaigns. In Year 4, the COS will review the recommendations from the pilot pet waste campaign to determine additional implementation measures.

In Year 3; the COS's FOG Program is managed by the Waste Water Division and did not conduct any surveys. In Year 4, the COS will incorporate a FOG Questionnaire/Survey during their routine inspections. The questionnaire/survey will include the following 3 questions as well as questions to gauge good housekeeping behaviors and habits: (1) Are you familiar with the COS's Storm Water Program?; (2) Are you aware of the requirements for your type of business activity?; and (3) Do you believe your business is in compliance with the City's Storm Water Program?

The COS continues to provide IDDE and Staff and Site Operator Training as described within the Illicit Discharge Detection and Elimination [CASQA Outcome Level 4] Section above.

Water Quality Monitoring [CASQA Outcome Level 5]

Both the COB and COS are participating in the Santa Barbara County Public Works Department's regional water quality monitoring program. The draft Urban Storm Water Monitoring Plan (titled Receiving Water Monitoring Plan) FY 2015-2018 was submitted to Region 3 Water Board on December 29, 2014. This plan included a regional monitoring approach for Cities of Buellton, Solvang, Carpinteria, Goleta and the County of Santa Barbara. The Quality Assurance Project Plan along with the updated Urban Storm Water Monitoring Plan, revised to address comments from the Regional Board was submitted on October 13, 2015 through the SMARTS Database. On March 4, 2016, Santa Barbara

County Project Clean Water received Executive Officer Approval for the revised Urban Stormwater Monitoring Plan (USWMP) and the Quality Assurance Plan (QAPP). Monitoring was initiated during Year 3 and results will be reported as part of the Year 3 and subsequent Annual Reports.

The results of the USWMP will provide a land use-based pollutant load model that will be used to calculate wet weather loads produced in the monitoring area, prioritize catchments for BMP placement, and evaluate the performance of existing and future BMPs. The monitoring data collected in Year 3 through the activities described in this Plan were used to inform the model, by providing site-specific land use pollutant concentration data. As described within the USWMP, the monitoring outfalls will be selected based on their drainage areas consisting of a more or less homogenous land use category. Once 8 to 10 storms have been analyzed, the EMCs used in the model will be revised to include our local runoff concentrations, and new modeling results will be reported.

SEDIMENTATION/SILTATION (Total Suspended Solids)

Education and Outreach [CASQA Outcome Level 2-3]

COB Data Assessment/Collection:
During Year 3, the COB has implemented a Spill Response Plan which provides guidance to City Staff and Authorized Contract Staff responding to a complaint or notice of a spill discharge or illicit connection; and conducting an investigation to locate and identify the source of a non-stormwater discharge. Both City Staff and Authorized Contract Staff (4 City Staff and 9 City Contract Staff) were provided IDDE; Staff and Site Operator Training; and Permittee Staff Training. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections.

The COB maintained connections with 6 construction contractors through issuance of grading permits and inspections which occur at various frequencies (Prior to Land Disturbance; Prior to Rainy Season; Prior to any Forecast Storm (50% or Greater); During Rainy Season; After Rain Events that cause Runoff; 24-Hour Interval during Extended Rain Event; During Active Construction; Following Active Construction; and/or Monthly) to ensure the construction contractors are informed of proper erosion and sediment control measures.

Additionally, the COB also provided each construction contractor a copy of EPA's Construction Outreach Poster (24 in x 36 in) "Stormwater and the Construction Industry" (via hand delivered and email). The poster which was modified to include the COB contact information and Storm Drain Curb Marker Logo "Only Rain, Down the Storm Drain" contains both written and visual examples on how to "Maintain your BMPs" at a construction site. The COB made it clear that the poster does not replace BMP requirements listed with the sites Stormwater Pollution Plan (SWPPP) and/or Erosion and Sediment Control Plan (E&SCP) nor does it eliminate any additional BMPs that the construction contractor may be implementing as part of their plan. The EPA's Construction Outreach Poster (24 in x 36 in) "Stormwater and the Construction Industry" was also added to the COB website for availability to the construction industry. In addition, the COB uploaded "Prevent Soil Erosion on Your Property – A Homeowner's Guide to Erosion Control" guide onto the City's website as additional education and outreach materials for Homeowners.

The COB also participated in promoting County of Santa Barbara Project Clean Water's Storm Water Workshop "Requirements for Land Development Projects: Using the Updated Storm Water Technical Guide and Calculator. The free workshop for land development professionals, civil engineers, architects, geotechnical engineers, development, agents, contractors and municipal staff. The workshop was held at 3 optional locations on November 18, 2015 (San Luis Obispo), November 19, 2015 (UCSB) and November 20, 2015 (Santa Maria). The COB made 8 education and outreach connections to Stormwater Professionals through the City Engineering Department via phone and/or email correspondence. The COB also made 29 additional connections to Storm Water Professionals regarding 2 free workshops being held on 5/17/16 and 5/19/16 which focuses on design, construction, water quality volume, maintenance and inspection of the permeable paver In Year 4, the COB will continue to distribute workshop information to local Stormwater Professionals and investigate the feasibility and logistics in organizing a stormwater workshop for construction site operators.

COS Data Assessment/Collection:

During Year 3, the COS has implemented a Spill Response Plan which provides guidance to City Staff and Authorized Contract Staff responding to a complaint or notice of a spill discharge or illicit connection; and conducting an investigation to locate and identify the source of a non-stormwater discharge. There were 2 City Staff that were provided IDDE; Staff and Site Operator Training; and Permittee Staff Training. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections.

The COS maintained connections with 3 construction contractors through issuance of grading permits and inspections which occur at various frequencies to ensure the construction contractors are informed of proper erosion and sediment control measures.

Additionally, the COS also provided each construction contractor a copy of EPA's Construction Outreach Poster (24 in x 36 in) "Stormwater and the Construction Industry" (via hand delivered and email). The poster which was modified to include the COS contact information and Storm Drain Curb Marker Logo "No Dumping, Drains to River" contains both written and visual examples on how to "Maintain your BMPs" at a construction site. The COS made it clear that the poster does not replace BMP requirements listed with the sites Stormwater Pollution Plan (SWPPP) and/or Erosion and Sediment Control Plan (E&SCP) nor does it eliminate any additional BMPs that the construction contractor may be implementing as part of their plan. The EPA's Construction Outreach Poster (24 in x 36 in) "Stormwater and the Construction Industry" was also added to the COS website for availability to the construction industry. In addition, the COS distributed "Prevent Soil Erosion on Your Property – A Homeowner's Guide to Erosion Control" within May's Water Bill as well as uploaded the guide onto the City's website as additional education and outreach material for Homeowner's.

The COS also participated in promoting County of Santa Barbara Project Clean Water's Storm Water Workshop "Requirements for Land Development Projects: Using the Updated Storm Water Technical Guide and Calculator. The free workshop for land development professionals, civil engineers, architects, geotechnical engineers, development, agents, contractors and municipal staff. The workshop was held at 3 optional locations on

November 18, 2015 (San Luis Obispo), November 19, 2015 (UCSB) and November 20, 2015 (Santa Maria). The COS made 24 education and outreach connections to Stormwater Professionals through the City Engineering Department via phone and/or email correspondence. The COS also made 29 additional connections to Storm Water Professionals regarding 2 free workshops being held on 5/17/16 and 5/19/16 which focuses on design, construction, water quality volume, maintenance and inspection of the permeable paver In Year 4, the COS will continue to distribute workshop information to local Stormwater Professionals and investigate the feasibility and logistics in organizing a stormwater workshop for construction site operators.

Illicit Discharge Detection and Elimination [CASQA Outcome Level 4]

COB Data Assessment/Collection:

During Year 3, the COB continues to implement its IDDE Program through BMC Title 15 Stormwater Chapter 15.01 Stormwater Management and Discharge Control also known as the Stormwater Management and Discharge Ordinance and the COB Stormwater Program Management Certification Statement which provides COB full legal authority to implement and enforce each of the NPDES Phase II MS4 General Permit requirements. The COB also developed a draft Enforcement Response Plan that includes enforcement measures and tracking of the types of enforcement responses.

The COB has also implemented a Spill Response Plan which provides guidance to City Staff and Authorized Contract Staff responding to a complaint or notice of a spill discharge or illicit connection; and conducting an investigation to locate and identify the source of a non-stormwater discharge. During Year 3, both City Staff and Authorized Contract Staff (11 City Staff and 13 City Contract Staff) were provided IDDE and Staff and Site Operator Training. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections. In Year 3, there were no site investigations associated with sedimentation/siltation related discharges from construction site. As part of the Stormwater Management Program, the COB continues to work with construction contractors to resolve any corrective actions and/or discrepancies found during the inspection.

COS Data Assessment/Collection:

During Year 3, the COS continues to implement its IDDE Program through SMC Title 14 Stormwater Management also known as the Stormwater Management Ordinance and the COS's Stormwater Program Management Certification Statement which provides the City full legal authority to implement and enforce each of the NPDES Phase II MS4 General Permit requirements. The COS also developed a draft Enforcement Response Plan that includes enforcement measures and tracking of the types of enforcement responses. In Year 3, there were 6 out of 10 site investigations associated with sedimentation/siltation related discharges from construction sites. From these investigations, the COS issued 5 verbal warnings/written notices and 1 administrative citation as a result of construction activities. As part of the Stormwater Management Program, the COS continues to work with construction contractors to resolve any corrective actions and/or discrepancies found during the inspection.

The COS has also implemented a Spill Response Plan which provides guidance to City Staff responding to a complaint or notice of a spill discharge or illicit connection; and

conducting an investigation to locate and identify the source of a non-stormwater discharge. There were 2 City Staff that were provided IDDE; Staff and Site Operator Training; and Permittee Staff Training. The training has provided an increase in stormwater general awareness amongst staff and has result in and an increase in reporting of possible illicit discharges or connections.

Construction Site Stormwater Runoff Control [Outcome Level 2-3]

COB Data Assessment/Collection:

During Year 3, the COB issued 3 new construction site grading permits. Since all 3 construction sites are working under a SWPPP approved by the State Water Resources Control Board. All 3 construction sites had an E&SCP, the COB does not consider sites with an E&SCP a water quality threat as long as the site continues to actively implement the E&SCP.

Two of the construction sites received discretionary approval after March 6, 2014 and required the submittal of a Storm Water Control Plan (SWCP) which was developed for compliance with Post Construction Requirements (PCRs) and Low Impact Development Measures. The COB completed the review and approval of each sites SWCP during the projects construction phase due to late submittal. The COB has implemented a new plan check process to avoid late submittals in the future.

The COB also continued to inspection 6 construction sites which are occur at various frequencies to ensure the construction contractors are informed of proper erosion and sediment control measures. For these 6 construction sites and in total, the COB conducted the following inspections with some sites having duplicate monthly inspections: 6 Prior to Land Disturbance; 4 Prior to Rainy Season; 93 Prior to any Forecast Storm (50% or Greater); 97 During Rainy Season; 12 After Rain Events that cause Runoff; 33 24-Hour Interval during Extended Rain Event; 94 During Active Construction; 10 Following Active Construction; 65 Monthly). As part of the Stormwater Management Program, the COB will continue to monitor the erosion and sediment control measures. Due to the high volume of construction inspections, the COB will re-evaluate the frequency of inspections to ensure effective use of resources while still complying with the NPDES Phase II MS4 General Permit requirements.

COS Data Assessment/Collection:

During Year 3, the COS monitored 3 construction sites. Construction at 2 sites began in prior years. The COS also issued 1 new construction site grading permit but this new project is currently on hold. One of the construction sites is working under a SWPPP approved by the State Water Resources Control Board. All 3 construction sites have an E&SCP, the COS does not consider sites with an E&SCP a water quality threat as long as the site continues to actively implement the E&SCP. It should be noted that all 3 construction sites received discretionary approval prior to March 6, 2014; and therefore, these sites did not require the submittal of a SWCP to comply with PCRs and LID Measures. There was also 1 residential construction site that was not required to implement an E&SCP because it fell below the regulatory threshold requiring a SWPPP or a SWCP. Even though the residential construction site was not required to implement an E&SCP, the City requested that the construction documents include an E&SCP for City review and approval.

As a result of our learning experience with this residential project, the COS will require an E&SCP for all future construction sites that are requesting a grading permit.

The COS also inspected the 3 construction sites and 1 residential construction site at various frequencies to ensure the construction contractors were informed of proper erosion and sediment control measures. As part of the Stormwater Management Program, the COS will continue to monitor the erosion and sediment control measures. The COS will re-evaluate the frequency of inspections to ensure effective use of resources while still complying with the NPDES Phase II MS4 General Permit requirements.

Post-Construction Site Stormwater Runoff Control [CASQA Outcome Level 2-3]

COB Data Assessment/Collection:
During Year 3, there were 2 construction sites received discretionary approval after March 6, 2014, Both sites required the submittal of SWCP to comply with PCRs and LID Measures. The COB completed the review and approval of each sites SWCP during the projects construction phase due to late submittal. The COB has implemented a new plan check process to avoid late submittals in the future.

COS Data Assessment/Collection:
During Year 3, there were no construction sites that received discretionary approval after March 6, 2014 that required a submittal of a SWCP to comply with PCRs and LID Measures. Out of 3 construction sites, there was 1 construction site that implemented a LID Measure.

Pollution Prevention and Good Housekeeping [CASQA Outcome Level 2-3]

COB Data Assessment/Collection:
During Year 3, the COB Street Sweeping Maintenance Contractor continues to conduct Bi-Monthly Street Sweeping Activities on all municipal streets (residential and arterial roads but not private roads), alleyways, and parking lots based on a pre-determined frequency and route. By conducting street sweeping activities, the COB minimized sedimentation/siltation from the entering the storm drain conveyance system. The COB also developed and implemented a Storm Drain System Assessment, Prioritization and Maintenance Standard Operating Procedure (SOP) to comply with the NPDES Phase II MS4 General Permit.

In response to a Central Coast Regional Water Quality Control Board Inspection, the COB installed interim erosion and sediment controls at the Waste Water Treatment Plan until removal of piles of old accumulated materials have been completed. In addition, the COB installed Sediment Control BMPs (fiber rolls) around the excavated areas at Reservoir 1 to eliminate any sediment from leaving the site.

The Storm Drain Maintenance Contractor (SDMC) inspected and cleaned all 137 catch basins and drop inlets and 10 area drains. COB also worked with a Landscape Maintenance Contractor (LMC) to schedule annual maintenance activities on 3 above-ground conveyance systems. During the inspection/maintenance activity, the SDMC was able to remove buckets of sediment/sand/dirt/rocks (including trash and debris) from the Storm Drain System. Based on the results of these activities, the COB also updated its inventory for Year 4 to include newly identified structures, replace/install damaged/missing

Storm Drain Curb Markers; and facilitated storm drain infrastructure repairs. In Year 4, the COB will continue to work with a SDMC and LMC to conduct inspection/maintenance activities on the City's Storm Drain System. The City will compare Year 3 and Year 4 inspection results to prioritize inspection and maintenance activities in order to ensure effective use of resources while still complying with the NPDES Phase II MS4 General Permit requirements.

COS Data Assessment/Collection:
During Year 3, the COS Street Sweeping Maintenance Contractor continues to conduct Street Sweeping Activities on all municipal streets (residential and arterial city streets) bi-monthly, downtown village area once per month, alleys downtown every month, and Hans Christian Andersen Park and Sunny Fields Park quarterly. By conducting street sweeping activities, the COS minimized sedimentation/siltation from the entering the storm drain conveyance system to comply with the NPDES Phase II MS4 General Permit.

In response to erosion control and soil preservation concerns during the rainy season, all Public Works Divisions were instructed to inspect areas around their facilities that may be prone to erosion during heavy storms. Various maintenance activities were identified. Staff was instructed to add fiber rolls, erosion control blankets, and native grass seeds to all areas recently disturbed during routine maintenance activities. Public Works staff was provided various BMP installation details and received instructions on installation of the BMPs.

The COS also developed and implemented a Storm Drain System SOP for Assessing & Prioritizing Maintenance Activities to comply with all required program elements of the NPDES Phase II MS4 General Permit. The COS has over 300 storm drain structures in its inventory. The COS does not have the resources to inspect and clean all storm drain structures annually. The COS used their GIS database to develop a method for prioritizing and assessing the inventory. All high-priority areas were inspected and minor maintenance was performed. Additional maintenance will be scheduled during Year 4. The City is going to continue with the assessment method describe above for the remainder of this permit term.

Water Quality Monitoring [CASQA Outcome Level 5]

Both the COB and COS are participating in the Santa Barbara County Public Works Department's regional water quality monitoring program. The draft Urban Storm Water Monitoring Plan (titled Receiving Water Monitoring Plan) FY 2015-2018 was submitted to Region 3 Water Board on December 29, 2014. This plan included a regional monitoring approach for Cities of Buellton, Solvang, Carpinteria, Goleta and the County of Santa Barbara. The Quality Assurance Project Plan along with the updated Urban Storm Water Monitoring Plan, revised to address comments from the Regional Board was submitted on October 13, 2015 through the SMARTS Database. On March 4, 2016, Santa Barbara County Project Clean Water received Executive Officer Approval for the revised Urban Stormwater Monitoring Plan (USWMP) and the Quality Assurance Plan (QAPP). Monitoring was initiated during Year 3 and results will be reported as part of the Year 3 and subsequent Annual Reports.

The results of the USWMP will provide a land use-based pollutant load model that will be used to calculate wet weather loads produced in the monitoring area, prioritize catchments for BMP placement, and evaluate the performance of existing and future BMPs. The Plan

will be used to inform the model, by providing site-specific land use pollutant concentration data. As described within the USWMP, the monitoring outfalls were selected based on their drainage areas consisting of a more or less homogenous land use category. The first year of wet weather urban runoff was initiated in Year 3. Four storms were monitored at a total of 6 sites representing different land use types. Once 8 to 10 storms have been analyzed, the event mean concentrations used in the model will be revised to include our local runoff concentrations, and new modeling results will be reported.

3. Short- and Long-Term Program Effectiveness

The City of Buellton and the City of Solvang have two short term goals. Comply with the NPDES Phase II MS4 General Permit requirements and to fully implement the SOPs developed during this permit term to minimize the identified high- and medium-priority POCs from entering the Storm Drain System. Continue to collect and track program data that will be used to modify and improve each City's Storm Water Management Program.

The long term goal of the effectiveness assessment program is to reduce pollutants from the MS4 to the maximum extent practicable. By applying Best Management Practices that are effective in reducing or eliminating the discharge of pollutants to the waters of the U.S. Through the emphasis of pollutant reduction and source control BMPs to prevent pollutants from entering storm water run-off. Our Cities recognize that this is a dynamic process and may require changes over time as we gain experience and as new science and technologies become available.

Prepared for

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Storm Water Pollutant Load Model – Results for the City of Buellton MS4 Permit Area

Buellton, CA

Prepared by

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April 15, 2016

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1. Introduction

The Load, Prioritization, and Reduction Model (LPRM) was developed to aid the participating agencies within the County of Santa Barbara (Cities of Goleta, Carpinteria, Solvang, and Buellton, and the County of Santa Barbara) in:

- Quantifying average annual existing (baseline) pollutants loads from rainfall occurring in the MS4 Permit area;
- Prioritizing catchments for BMP implementation; and
- Estimating the anticipated load reductions resulting from implementation of the Program Effectiveness Assessment and Improvement Plans (PEAIPs).

The LPRM fulfills the requirements specified by the 2013 California Phase II General Municipal Separate Storm Sewer System (MS4) Permit (MS4 Permit) and the July 25, 2014, Central Coast Regional Water Quality Control Board (Regional Board) "Effectiveness Assessment and Monitoring" guidance letter. A discussion of the modeling approach and the default model values are included in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions (Geosyntec, 2015a). The PEAIP LPRM Guidance Document Memorandum (Geosyntec, 2015b) describes the model organization, how users can add new BMPs and extract model results for future annual reports, how to modify model defaults, and how model calculations are performed.

This report summarizes the LPRM inputs and results for the PEAIP implementation through 2015.

1.1 MS4 Permit Area

The MS4 Permit regulates discharges from the storm drain system of designated municipalities, referred to as MS4 discharges. The City of Buellton is located in Santa Barbara County, and the MS4 Permit area encompasses approximately 1.6 square miles (Figure 1). The MS4 Permit area is a relatively small portion of the Santa Ynez watershed, whose runoff is mostly from open space and agriculture. The Buellton MS4 permit area is grouped into 8 land uses, including single family residential (39%), commercial (30%), open space (13%), industrial (11%), education (4.0%), and multi-family residential (2.3%).

Runoff from highways 101 and 246, which runs through the center of the MS4 permit area, is covered under the Caltrans MS4 permit and is therefore not the responsibility of the City of Buellton. Therefore, all the Caltrans areas have been removed from this analysis. The City of Buellton is also not responsible for discharges from Industrial General Permit (IGP) parcels, which are covered under a separate IGP permit, so these parcels are also removed from the analysis of the MS4 permit area

1.2 Overview of Model Features

The LPRM utilizes spatial data from GIS, including land use and soil data, to estimate runoff volume and pollutant loading for modelable pollutants[1]. Specifically, the major output features of the LPRM are as follows:

- Quantification of average annual baseline loads from the MS4 Permit area, for runoff volume and up to 15 pollutants;
- Prioritization of catchments (and land uses), based on pollutant contributions and jurisdictional pollutant priorities, for BMP implementation; and
- Estimation of anticipated runoff volume and pollutant load reductions achieved by BMP implementation since 2013.

[1] As discussed in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo, the first step in modeling exercise was to identify pollutants for which land use event mean concentration data existed. These pollutants were called modelable pollutants.

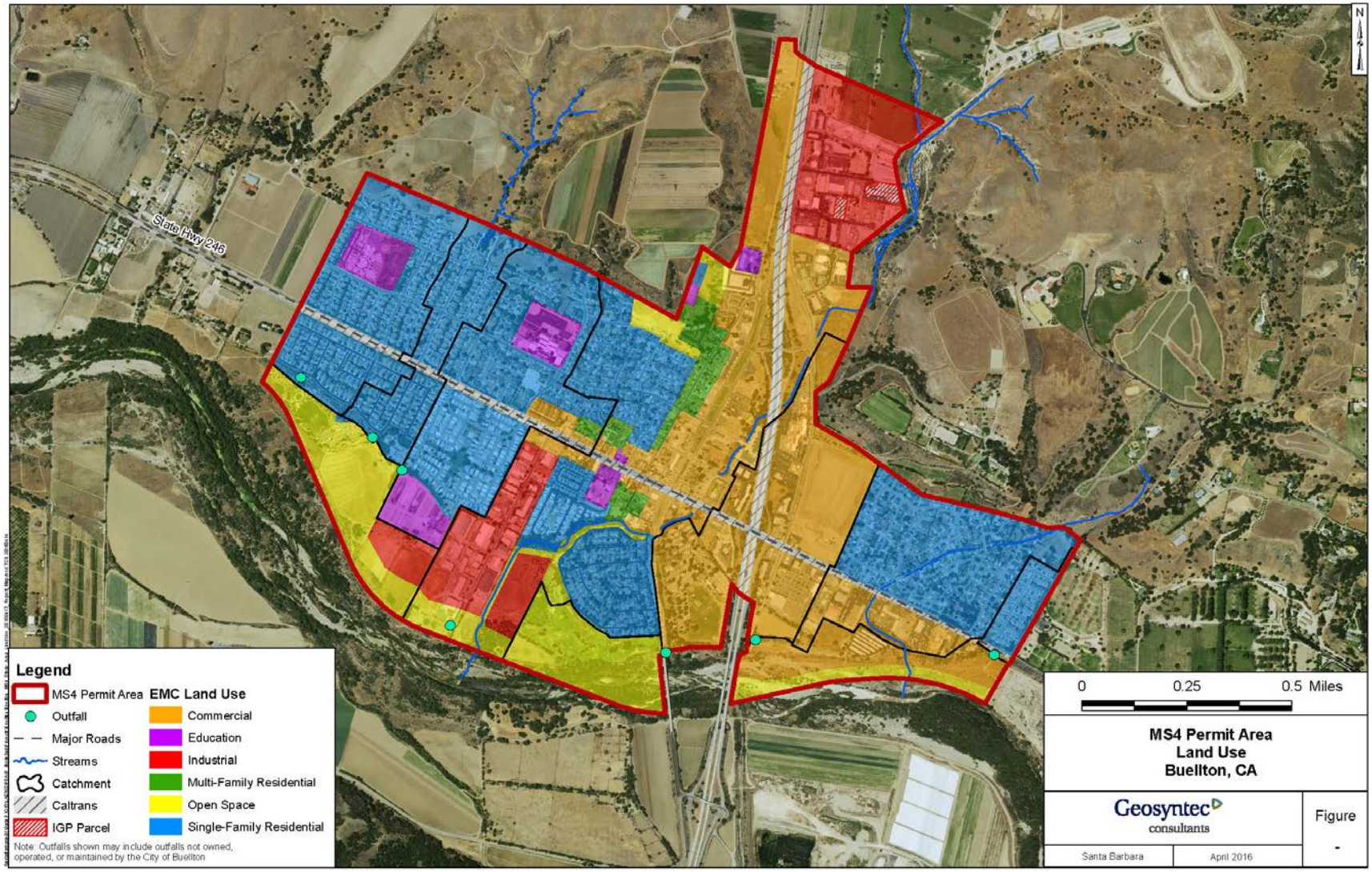

Figure 1. MS4 Permit Area

2. Model Inputs

The PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo discusses the default datasets and inputs required for the LPRM. The sections below are intended to describe variations from the default datasets in the used in the LPRM and inputs selected for the LPRM; as well as provide context for these changes and selections. Several default datasets for the LPRM have not been modified from what was described in the Modeling Approach Memo, including:

- Modelable pollutants;
- Pervious runoff coefficients by hydrologic soil group;
- Land use pollutant EMCs;
- Priority pollutants (i.e., dissolved phosphorus, dissolved copper, dissolved zinc, and fecal coliform); and
- Weighting factors for computing multi-pollutant CPI scores

2.1 Soils

The soil data, a SSURGO database acquired from the Natural Resources Conservation Service (United States Department of Agriculture), was characterized by hydrologic groups (A, B, C, or D), to help define the runoff potential of each soil type in the PLRM (Figure 2). Hydrologic soil group A is defined by a high saturated hydraulic conductivity (i.e., high infiltration potential) and therefore has low runoff potential. Alternatively, hydrologic soil group D has high runoff potential and low saturated hydraulic conductivity. In areas where the SSURGO database did not provide a hydrologic soil group, the average pervious runoff coefficient of the four soil groups (0.075) was used.

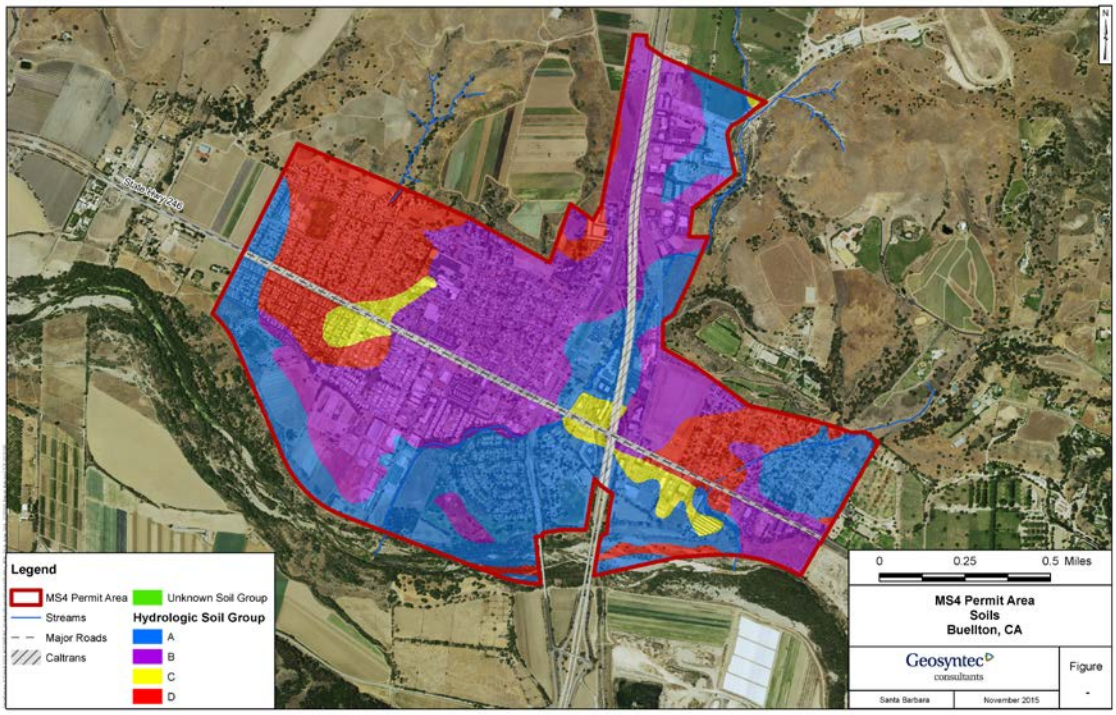

Figure 2. MS4 Permit Area Soils

2.2 Land Use EMC Groups and Imperviousness

The City of Buellton's general land use categories covering the MS4 Permit area contained varying and unique descriptors which were more detailed than the eight EMC land use groups used in the LPRM. Table B-15 shows how these general land use categories were initially classified into the eight land use EMCs for the LPRM. This table also shows percent imperviousness values for the detailed land uses developed based on available literature, including Los Angeles County Hydrology Manual land use imperviousness used as defaults in SBPAT (Geosyntec, 2012) and values determined for Ventura County and used in the Draft Santa Clara River Indicator Bacteria TMDL Implementation Plan (County of Ventura, 2015). Using this detailed land use dataset accounts for the variation in percent impervious values throughout each specific land use and provides results more representative of the modeled area.

Additionally, to calculate watershed loads, EMC land use groups and imperviousness were needed for area outside the MS4 permit area, but within the watershed. Table B-16 shows how EMC land use groups and average imperviousness were assigned to the parcel dataset downloaded from the County of Santa Barbara GIS Catalog (County of Santa Barbara, 2015), which was used to classify land use within the County of Santa Barbara but outside of the participating agencies MS4 Permit areas (i.e., for use in watershed analyses).

All EMC land use and imperviousness classifications shown in Appendix B served as a starting point for determining input to the LPRM. Adjustments were made to both land use EMC groups and imperviousness based on visual observation of aerial imagery or local knowledge of the area.

2.3 Precipitation Data

A rainfall station was selected for each area that was in close proximity and contained at least 30 years of data in the Period of Record (POR) (Figure 3). Historical rainfall data was downloaded from the County of Santa Barbara Public Works Department[2] for Buellton Fire Station, Goleta Fire Station #14, and Carpinteria Fire Station. The average annual rainfall depth (calculated from the total water year depths over the POR) was calculated and each jurisdictional area (and watershed) was assigned an average annual rainfall depth based on proximity to each of the three gages (Table 1).

Table 1. Selected Rainfall Station Information

Rainfall Station	Station #	Jurisdictions Influenced	Annual Precipitation Depth (inches)				Period of Record (years)
			Average	Median	Min	Max	
Buellton Fire Station #31	233	Buellton, Solvang, and County Unincorporated - North County	16.8	14.7	5.9	41.6	61
Goleta Fire Station #14	440	Goleta and County Unincorporated - South County	18.5	16.5	6.9	47.9	74
Carpinteria Fire Station	208	Carpinteria and County Unincorporated - South	19.2	17.3	5.8	51.5	67

[2] http://cosb.countyofsb.org/pwd/pwwater.aspx?id=3790

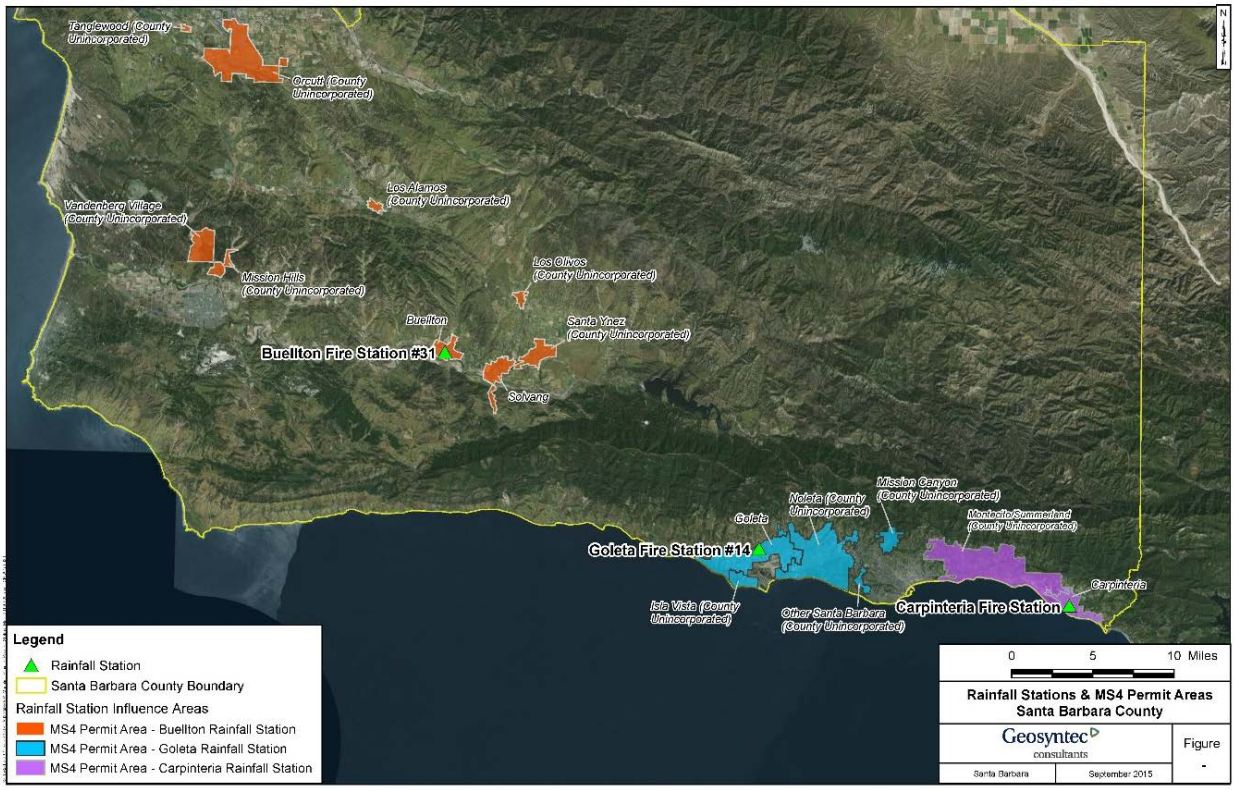

Figure 3. Rainfall Stations and MS4 Permit Areas

2.4 Hydrologic Calibration

Since the runoff coefficient is determined using an empirical formula that does not account for site-specific conditions, a calibration was performed to adjust the runoff coefficients. The calibration compared the LPRM calculated annual discharge volumes to streamflow gage observed annual discharge volumes in Atascadero Creek. The selected streamflow gauge is in the Goleta Slough watershed, a predominately urban drainage area, with nearly 30 years of data. This comparison was conducted for years with greater than 4,000 ac-ft of measured streamflow, which minimized error while also analyzing an adequate number of years (12). The runoff coefficients in the LPRM are adjusted based on a constant factor to minimize the overall difference between the observed and predicted annual volumes, which was determined to be 1.03.

2.5 BMPs Modeled

The LPRM is capable of quantifying the anticipated wet weather pollutant load reductions achieved by a variety of BMPs that could be implemented within the MS4 Permit area. BMP performance for BMPs implemented since 2013 have been evaluated and are presented herein. PEAIP BMP implementation by the City of Buellton since 2013 can be grouped into three categories for modeling. These categories, redevelopment (Section 2.5.1), brake pad copper

phase-out legislation (Section 2.5.2), and other non-quantifiable non-structural BMPs (Section 2.5.3), are discussed below. Non-quantifiable non-structural BMPs include programs that target wet weather pollutant sources to the MS4; however, sufficient data do not exist to model pollutant load reductions from these programs separately. Therefore, a percent reduction is assumed for these programs based on best professional judgement, as outlined in Section 2.5.3.

2.5.1 Redevelopment

Redevelopment projects are subject to the 2013 Post-Construction Stormwater Management Performance Requirements for Development Projects in the Central Coast Region (PCRs), based on the area of net impervious surface that the project creates and/or replaces. These PCRs require[3] that:

1. Projects that create and/or replace 2,500 or more square feet of net impervious surface - provide site design and runoff reduction;
2. Projects that create and/or replace 5,000[4] or more square feet of net impervious surface - implement LID standards that capture and treat the runoff volume from the project site produced during the 85th percentile 24-hour storm event;
3. Projects that create and/or replace 15,000 or more square feet of net impervious surface - implement stormwater control measures that capture and retain on site the runoff volume from the project site produced during the 95th percentile 24-hour storm event; or
4. Projects that create and/or replace 22,000 or more square feet of net impervious surface - implement stormwater control measures to control peak flows to not exceed pre-project flows for the 2-year through 10-year events.

Therefore, over time, the measures implemented by these projects will result in pollutant load reductions from the MS4 Permit area relative to existing conditions. Redevelopment projects that implement post-construction requirements may be entered into the LPRM as they are completed.

To model the average percent capture of annual stormwater runoff volume[5] associated with post construction projects that trigger Performance Requirement No. 2, the following steps were taken:

- A LID BMP was sized to capture runoff from the 85th percentile 24-hour storm for one parcel of each applicable land use (single-family residential, multi-family residential, commercial, industrial, and education) and for two assumed hydrologic soil types (A and D), which takes into account the typical imperviousness for each land use group and a range of potential soil conditions (i.e., infiltration capacity).

[3] All preceding (i.e., less stringent requirements) are also required for the larger projects
[4] Excluding detached single family houses
[5] To keep the modeling assumptions and scenarios simpler and more straightforward a volume-based full treatment option (i.e., no infiltration) was evaluated as an alternative to the flow-through treatment option.

- Each BMP was modeled in EPA's Storm Water Management Model (SWMM) over an average rainfall year to determine the percentage of annual runoff captured by each land use and soil combination-specific LID BMP.
- The percent capture results for both land use-soil combinations (i.e., commercial-soil type A and commercial-soil type D) were averaged to determine an average percent capture for each land use.

The average percent capture values for each land use from the above analysis are incorporated into the LPRM and represent the percentage of annual runoff from redevelopment parcels that will be captured and treated by LID BMPs (Table 2).

Table 2. Modeled Percent Capture for Projects Triggering Performance Requirement #2 (sized to 85th percentile event) by Land Use

Land Use	% Capture
Residential	86%
Commercial	89%
Industrial	88%
Education	88%
Transportation	89%

The portion of runoff volume that is not captured (and instead bypasses) is assumed to have the same effluent concentration as the influent concentration. Since project-specific details and constraints related to infiltration are unknown (e.g., soils not conducive to infiltration, limited depth to groundwater), the LPRM provides three types of projects for the user to select in regards to treatment vs. infiltration:

1) Infiltration: 100 percent of the captured volume is infiltrated through the BMP, and therefore completely removed from the discharge;
2) Infiltration and Treatment: 50 percent of the captured volume is infiltrated through the BMP and 50 percent is not infiltrated, thus requiring treatment and discharge (flow-through treatment); and
3) Treatment: 100 percent of the captured volume is treated and discharged (flow-through treatment).

In the LPRM, the percentage that is captured and infiltrated is completely removed from the discharge and therefore an effluent concentration is not required. For the remaining percentage that is treated and discharged (for project types 2 and 3 above), the anticipated effluent

concentration of a biofilter (representing bioretention with underdrains)[6] is applied to this volume based on mean values from the International Stormwater BMP Database (Geosyntec, 2012). The effluent concentrations selected are shown in Table 3.

Table 3. Redevelopment LID Project Effluent Concentrations

TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	#/100mL
18.1	0.14	0.07	0.18	0.37	0.98	8.3	8.8	4.2	34.7	37.6	5,890

The LPRM calculates the pollutant load reductions achieved by redevelopment BMPs by finding the difference between the parcel (i.e., pre-BMP) runoff volume and pollutant loads and the post-BMP runoff volume and pollutant loads. Calculations are performed such that the BMP effluent concentration is not higher than the BMP influent concentration (i.e., implementation of a BMP cannot increase pollutant concentrations). If the effluent concentration is greater than the influent water quality concentration, then the post-BMP treated runoff concentration is set equal to the influent concentration for that pollutant.

The LPRM also supports a redevelopment BMP where the project is subject to Performance Requirement No. 3 (i.e., BMP sizing to retain the 95th percentile, 24-hour duration rainfall event). To model the average annual percent capture associated with these post-construction projects, the same steps outline above were followed. However, the LID BMP was instead sized to capture runoff from the 95th percentile, 24-hour storm event. The average annual percent capture by land use determined from the analysis, as shown in Table 4, is incorporated into the LPRM and represents the percentage of annual runoff from redevelopment parcels that will be captured and subject to runoff retention requirements. Instead of providing options for infiltration vs. treatment, this BMP assumes 100 percent infiltration, which completely removes the runoff volume from the discharge.

[6] Effluent quality assigned to treat underdrain discharge is based on the better performing characteristics of the "media filter" and "bioretention" categories for each pollutant.

Table 4. Modeled Percent Capture for Projects Triggering Performance Requirement #3 (sized to 95th percentile event) by Land Use

Land Use	% Capture[7]
Residential	100%
Commercial	100%
Industrial	100%
Education	100%
Transportation	100%

As of 2015, no redevelopment projects that trigger the LID post construction requirements are in construction or have been completed. The estimated pollutant load reductions from future redevelopment projects will be modeled in the year they are completed.

2.5.2 Brake Pad Copper Phase-out Legislation

The TDC Environmental study (TDC Environmental, 2013), discussed in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo, identifies three possible implementation scenarios, the least aggressive of which estimates that a 55 percent load reduction in copper will be achieved by 2032 due to the brake pad phase out. Therefore, the LPRM assumes a 55 percent total load reduction for copper (total copper and dissolved copper) due to the elimination of copper in brake pads over a 20-year period from 2013 to 2032. This translates into a 2.75 percent load reduction in copper each year (assuming a linear reduction over the time period), as shown in Table 5. This is the only BMP currently supported by the model that requires input by the user on a yearly basis, in order to demonstrate gradual brake pad phase-out over a 20-year period. All other BMPs only need to be entered to the LPRM once to quantify general reductions (i.e., other non-structural BMPs (CBSM)) or once per new project implemented (i.e., redevelopment).

Table 5. Load Reduction per Year from Brake Pad Copper Phase-out Legislation BMP (2013-2032)

BMP Type	Diss Cu	Tot Cu
	lb	lb
Brake Pad Copper Phase-out Legislation	2.75%	2.75%

[7] These reductions are based on continuous simulation results for an average rainfall year (2003 was selected), however other "average" years or a longer, multi-year simulation period may result in less than 100% capture.

2.5.3 Other Non-quantifiable Non-structural BMPs (CBSM)

The Santa Barbara County jurisdictions recently implemented a Community Based Social Marketing (CBSM) program, which focuses on education and public outreach to dog owners. This program targets public awareness, behavioral changes, and sustainable control of pet waste at (and avoidance of) the "source". Based on best professional judgment and consistent with other Southern California MS4 Permits, Reasonable Assurance Analysis modeling efforts have assumed a flat fixed percent reduction of 5-10% where data are lacking to support another value. This assumption is acceptable to Los Angeles and Orange County Regional Boards. Therefore, the LPRM assumes a total five percent reduction in bacteria (fecal coliform) based on best professional judgement and Regional Board acceptance for this BMP, as shown in Table 6.

Table 6. Load Reduction from Other Non-structural (CBSM) BMP

BMP Type	Fecal Col.
	10^12 MPN
Other Non-structural BMPs (CBSM)	5%

3. Model Results

The LPRM is capable of modeling the following pollutants: total suspended solids, total and dissolved phosphorus, ammonia, nitrate, total kjeldahl nitrogen, dissolved and total copper, total lead, dissolved and total zinc, and fecal coliform. The City of Buellton results for the identified priority pollutants – dissolved phosphorus, dissolved copper, dissolved zinc, and fecal coliform (see PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo for the basis of this pollutant prioritization) -- are presented in the following sections. Results for remaining pollutants modeled by the LPRM are included in Appendix A.

3.1 Baseline Loading

The LPRM produces average annual baseline loads (i.e., current conditions, or after the effective date of new MS4 Permit but before the addition of new BMPs or enhancement of existing BMPs according to the PEAIP) for the MS4 Permit area, shown in Section 3.1.1. In addition, the LPRM estimates pollutant loading from the entire surrounding watershed in order to provide information on the relative contribution of the MS4 Permit area to the receiving waters. Results for watershed pollutant loads are included in Section 3.1.2.

3.1.1 Baseline Loads for the MS4 Permit Area

Results for average annual baseline loads of the four priority pollutants identified for the City of Buellton MS4 Permit area are shown in Table 7. The total baseline watershed load is also included (to be discussed in subsequent sections). Nutrients and TSS were also identified as a

pollutant of concern for the Santa Ynez watershed. Therefore, results for nitrate TSS are also presented.

Table 7. Average Annual Baseline Loads for Priority Pollutants

Pollutant	Average Annual MS4 Baseline Load	Average Annual Watershed Baseline Load
Dissolved Phosphorus (lb)	570	77,000
Dissolved Copper (lb)	24	1,600
Dissolved Zinc (lb)	340	14,000
Fecal Coliform (10^12 MPN)	96	6,200
Nitrate (lb)	1,400	1,200,000
TSS (lbs)	222,900	4,300,000

Figure 4 through Figure 6 show the average annual baseline pollutant loads per acre for each EMC land uses within the MS4 Permit area. These plots illustrate which land uses are generating the greatest pollutant loading per unit area and they roughly reflect land use event mean concentrations (EMCs). However, other factors also contribute to loading by land use, most notably, imperviousness and the resultant runoff volume from a particular land use.

In general these charts show that industrial (high imperviousness and EMCs) and commercial (high imperviousness and EMCs) land uses contribute the most significant pollutant loadings of nutrients and metals. Industrial (high imperviousness and EMC), multi-family residential (high EMCs), and education (high EMC) provide the most significant bacteria loading. These charts, coupled with the land use map of the MS4 Permit area (Figure 1), can be utilized to target implementation of distributed structural BMPs or non-structural BMPs, since these are more cost-effectively sited by land use.

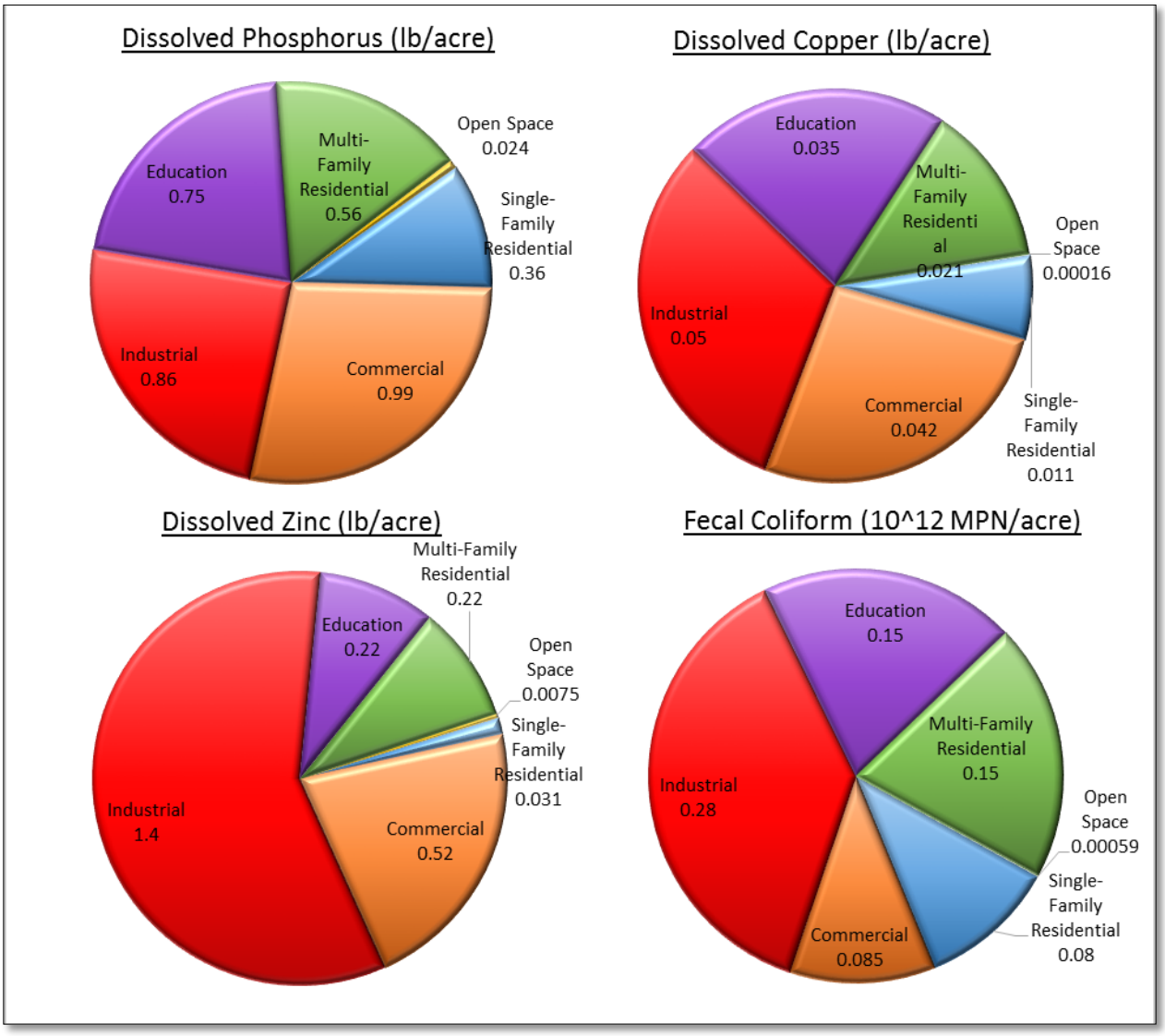

Figure 4. Average Annual Pollutant Loads per Acre for MS4 Permit Area by Land Use

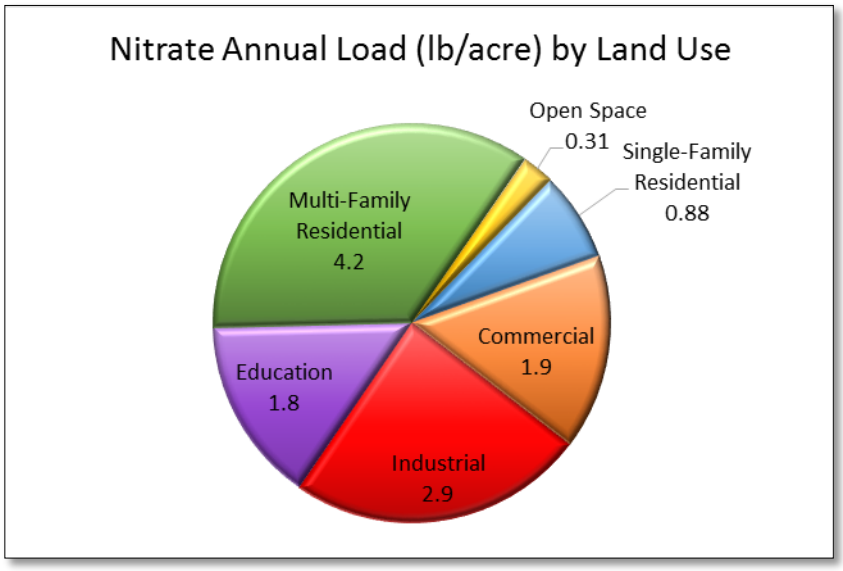

Figure 5. Average Annual Pollutant Loads per Acre for MS4 Permit Area by Land Use (for Nitrate)

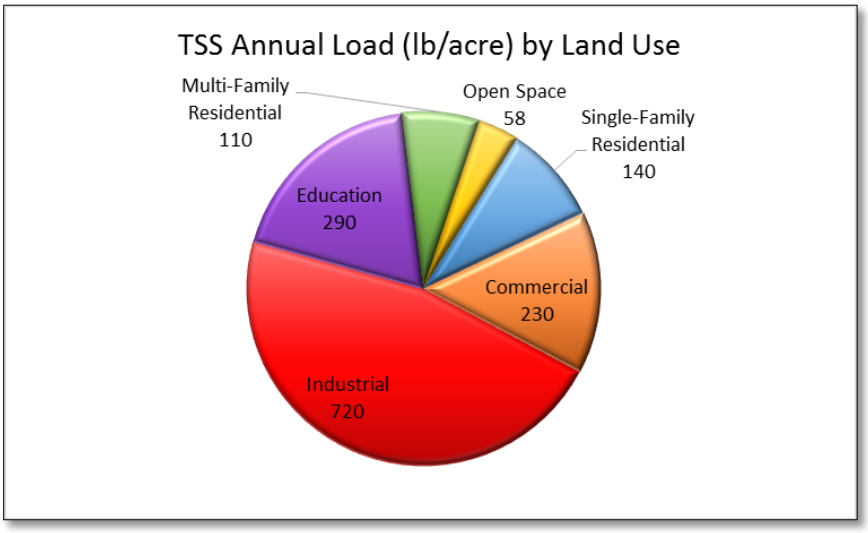

Figure 6. Average Annual Pollutant Loads per Acre for MS4 Permit Area by Land Use (for TSS)

3.1.2 Baseline Loads for Santa Ynez Watershed

The City of Buellton MS4 Permit area is located within the Santa Ynez Watershed, as shown in Figure A-18 in Appendix A. The LPRM analyzed the average annual baseline pollutants loads within the entire watershed, including a breakdown of contributions from MS4 and non-MS4 areas. Results for this watershed analysis are displayed in Figure 7 through Figure 9. These charts show that the City of Buellton's pollutant loading contributions to the Santa Ynez watershed are minor, ranging from 1-2 percent of the total watershed pollutant loads. Therefore, BMPs implemented by the City of Buellton will only have a minor impact on the total watershed load. In general, agriculture is the most significant contributor of dissolved phosphorus (41%),

dissolved copper (32%), fecal coliform (42%), and nitrate (68%). Open space is the most significant contributor of dissolved zinc (43%) and TSS (59%) loads to the watershed.

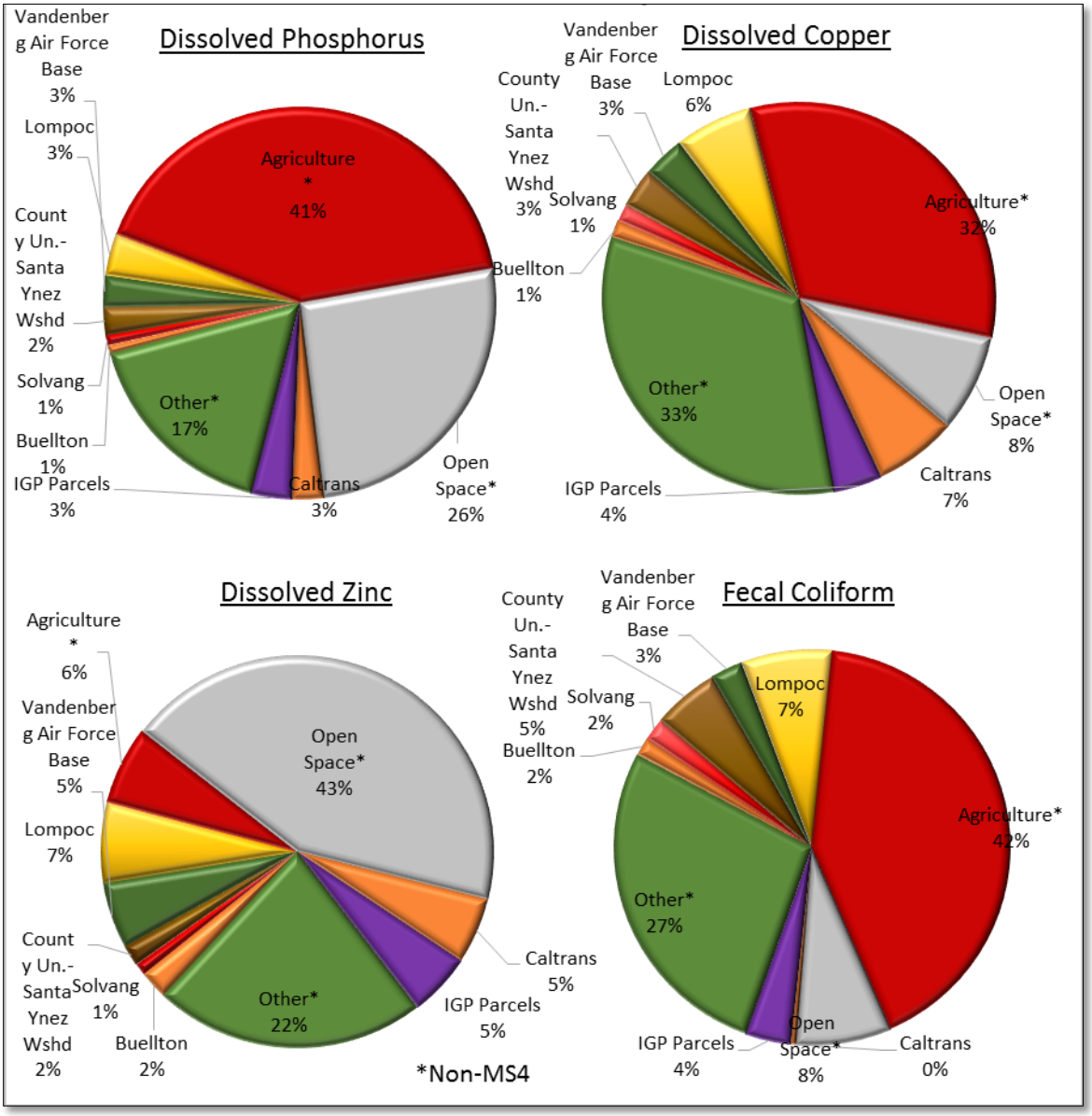

Figure 7. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez watershed)

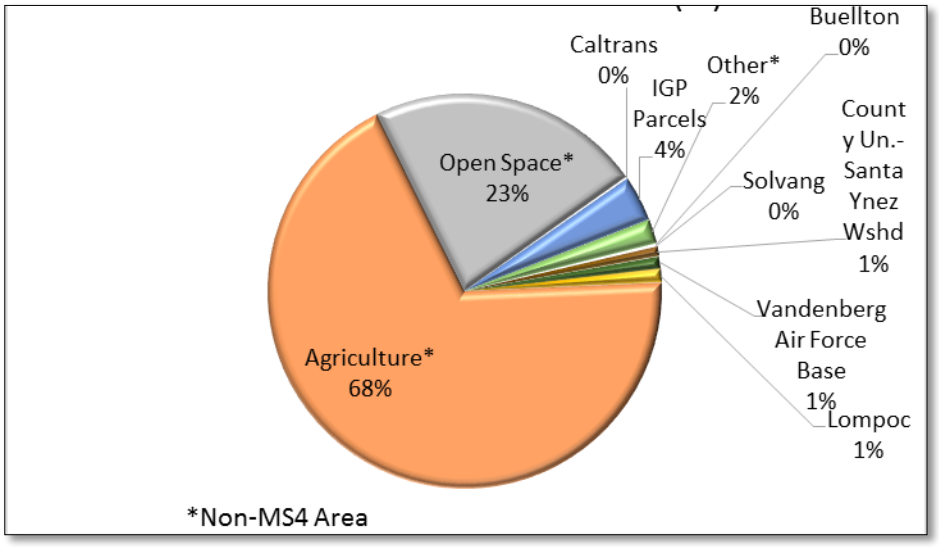

Figure 8. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez watershed) (for nitrate)

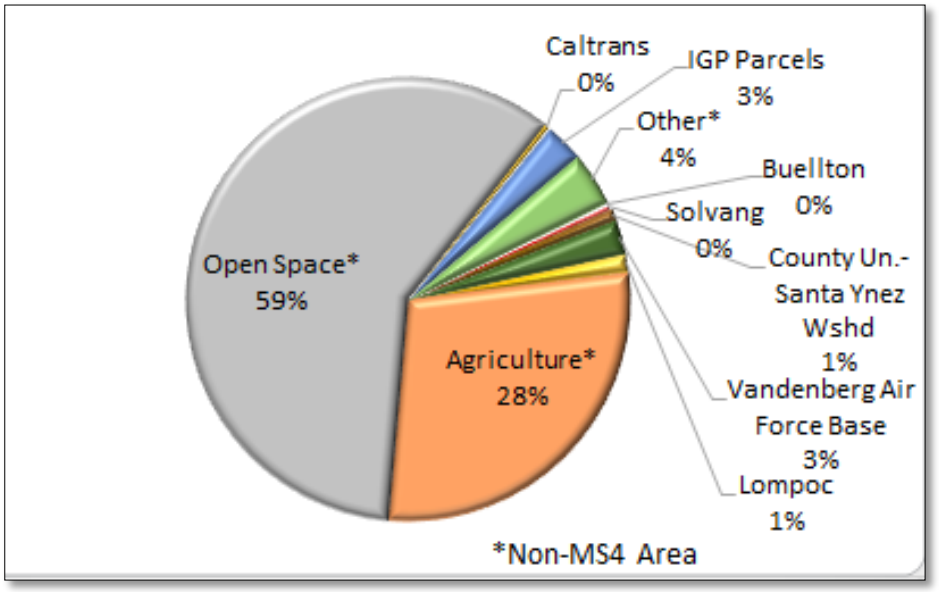

Figure 9. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez watershed) (for TSS)

3.2 Prioritization

The LPRM also produces results for catchment prioritization, which reflect the relative magnitude of pollutant loading (per unit area) by catchment and illustrate the priority among catchments for certain types of BMP implementation. Catchment prioritization index (CPI) scores were developed for individual pollutants and multiple pollutants weighted based on priority. For the multiple pollutant weighting, pollutants that are identified on the State's 303(d)

list or have an applicable TMDL for the water body in question are assigned a higher priority. The weighting value for water body-pollutant combinations with a 303(d)-listing is 2, water body-pollutant combinations with an approved TMDL have a weighting factor of 3, and all other priority pollutants have a weight factor of 1 (i.e., no adjustment to the pollutant-specific CPI). CPI scores range from one to five in order to easily compare scores among catchments, with one representing smaller loads per unit area and five representing larger loads per unit area. Details of the catchment prioritization process are included in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memorandum (Geosyntec, 2015b). Pollutant weight factors for the City of Buellton are shown in Table 8.

Table 8. Priority Pollutant Weights for Catchment Prioritization

Pollutant	Weight Factor
Dissolved Phosphorus	3
Dissolved Copper	1
Dissolved Zinc	1
Fecal Coliform	1

The overall CPI scores by catchment for the MS4 Permit area, with priority pollutants weighted based on watershed-specific priorities are illustrated in Figure 10. Maps reflecting pollutant CPI scores for individual priority pollutants and TSS are included in Appendix A.

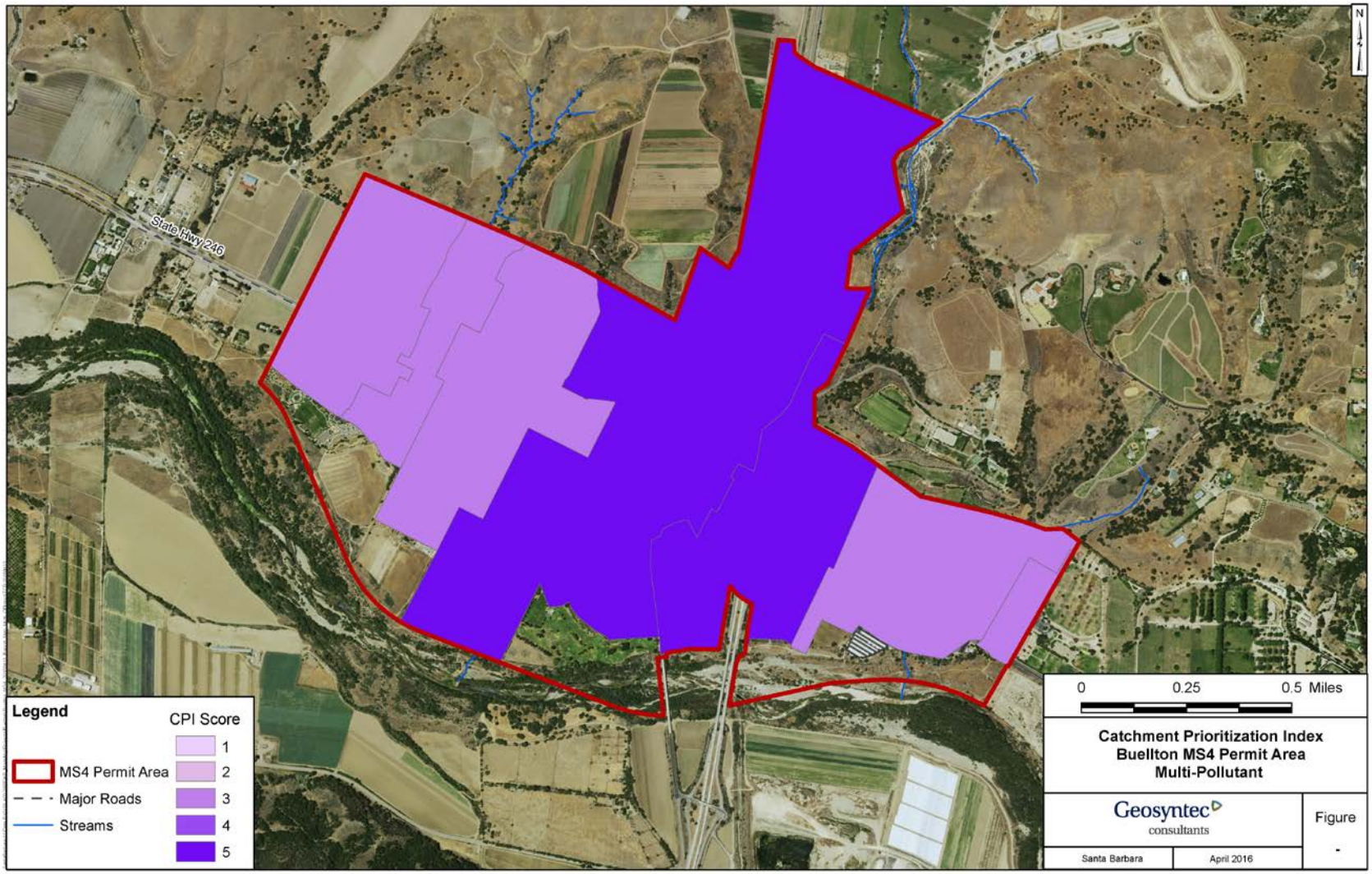

Figure 10. Multi-Pollutant CPI Map

3.3 BMP Load Reductions

The LPRM evaluates anticipated average annual runoff volume and pollutant load reductions resulting from implementation of BMPs within the MS4 Permit area. Figure 11 through Figure 15illustrate the average annual baseline load and the average annual load after BMP implementation has occurred through a given year, after accounting for reductions achieved by previously implemented BMPs (i.e., to prevent double counting), and the breakdown of load reduction by BMP type for the priority pollutants. Load reductions reflecting all pollutants analyzed by the LPRM are included in Appendix A.

These plots illustrate the portion of the annual baseline load that has been reduced by BMP implementation and which BMP type is achieving the greatest anticipated load reductions. The jurisdiction may perform a cost-benefit analysis to compare the cost of implementation of different BMPs with the anticipated load reduction, in order to implement the most cost-effective BMPs.

The load reduction in dissolved copper was achieved by the brake pad phase-out legislation BMP, while the other non-quantified non-structural (CBSM) BMP provided the load reduction for bacteria. It is anticipated that future redevelopment will contribute to load reductions in dissolved phosphorus and dissolved zinc in future implementation years.

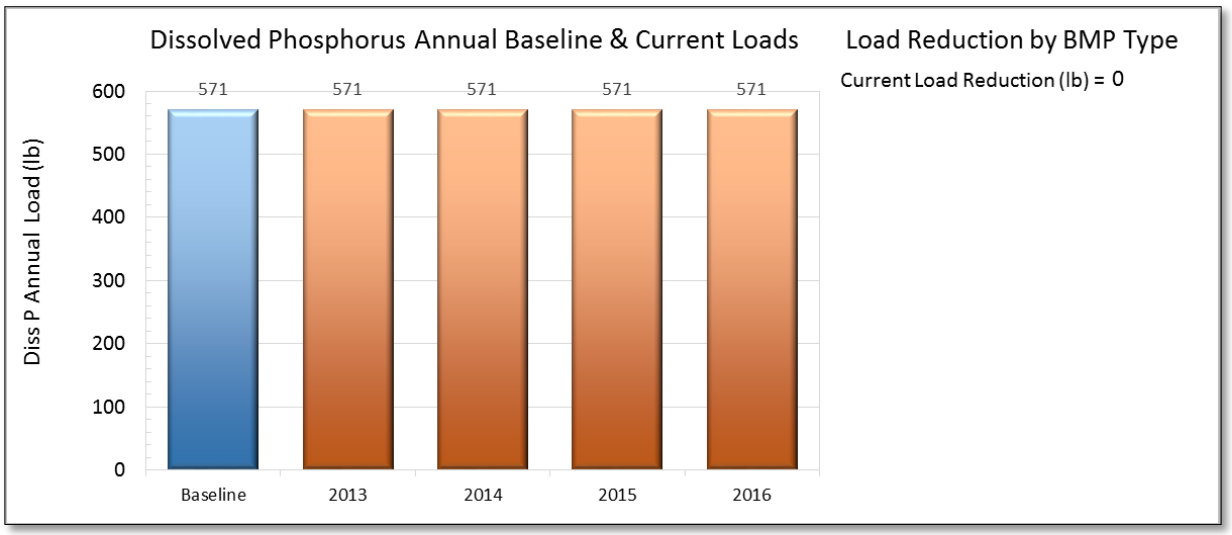

Figure 11. Dissolved Phosphorus Annual Loads and Reductions

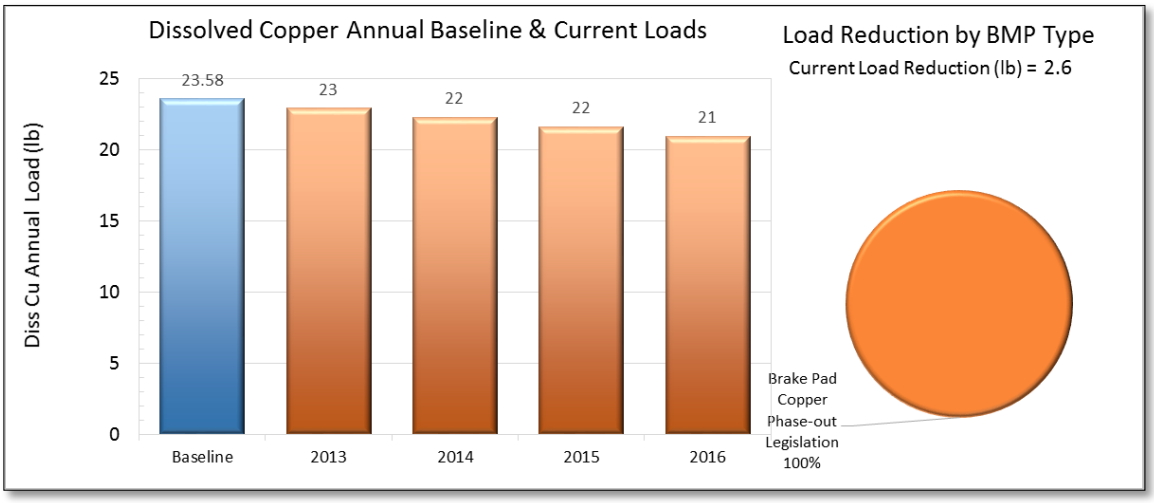

Figure 12. Dissolved Copper Annual Loads and Reductions

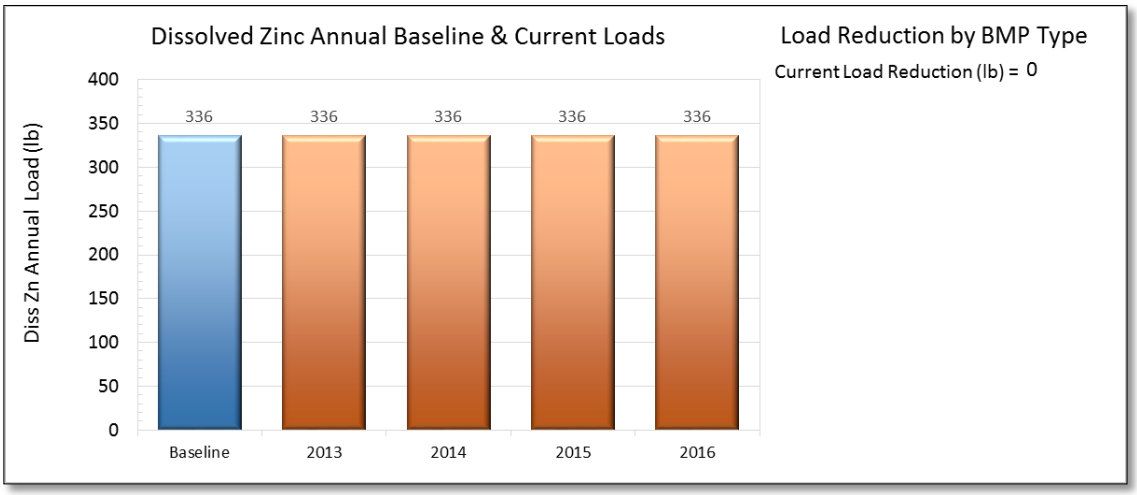

Figure 13. Dissolved Zinc Annual Loads and Reductions

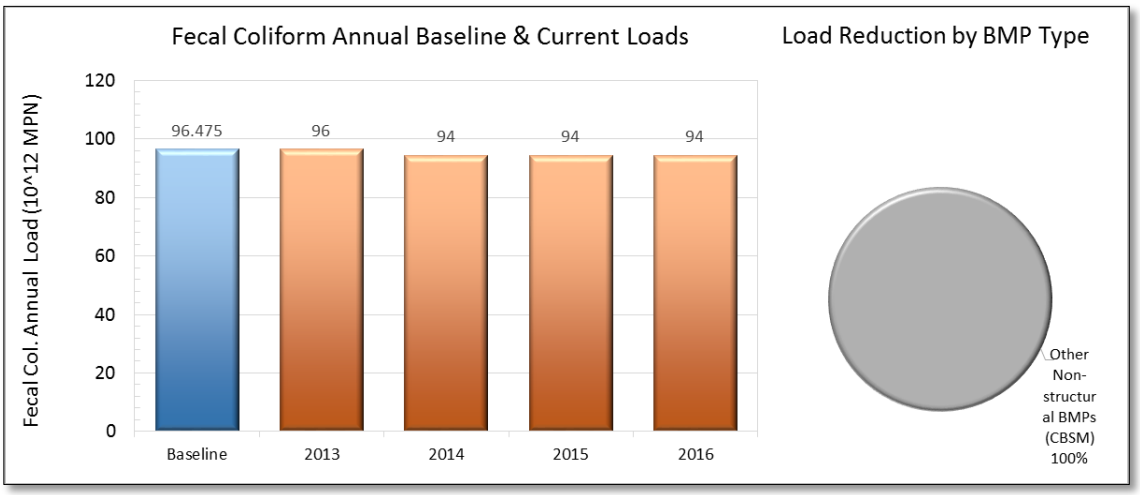

Figure 14. Fecal Coliform Annual Loads and Reductions

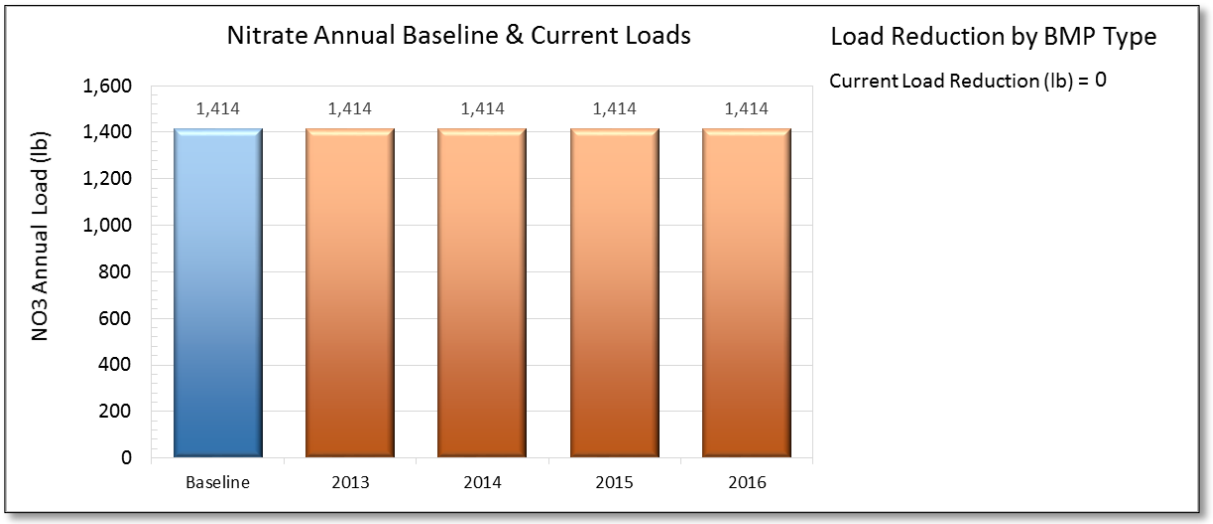

Figure 15. Nitrate Annual Loads and Reductions

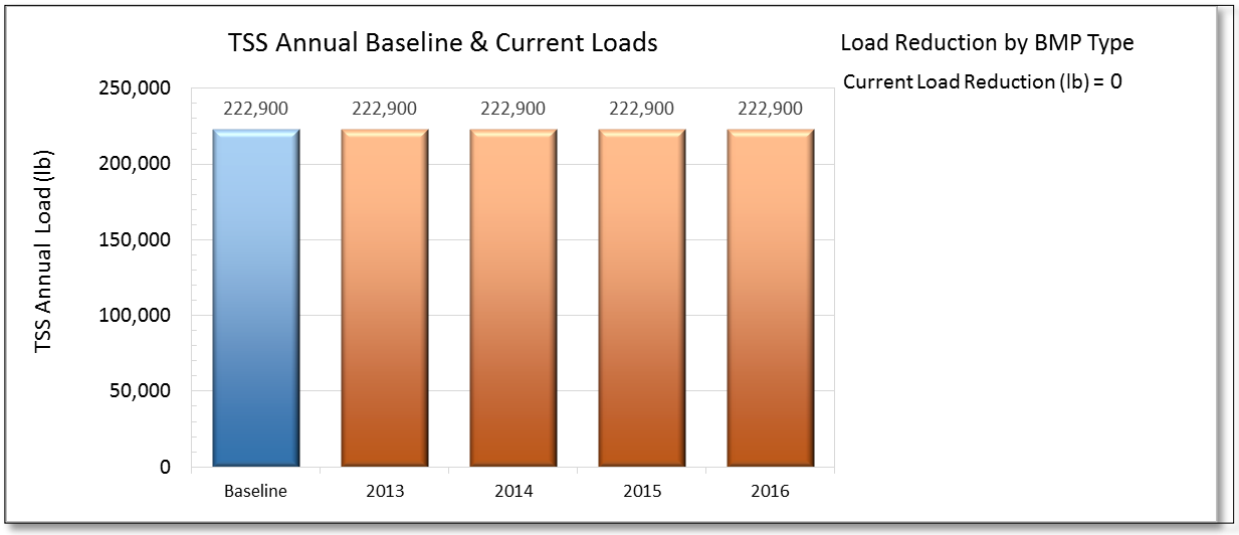

Figure 16. TSS Annual Loads and Reductions

3.4 Long-Term Planning

The LPRM can be used as a planning tool in addition to a BMP implementation tracking tool. It is anticipated that, in the future, other non-structural BMPs may be added and structural retrofit opportunities may be sought (e.g., through state grant funding), potentially resulting in a load reduction chart such as Figure 17.

The assumptions modeled for this **example hypothetical BMP implementation scenario** in the City of Goleta over the next 20 years, include:

- Redevelopment was implemented on all applicable land uses, using estimated annual redevelopment rates developed for the Los Angeles region (shown in Table 9).

Table 9. Estimated Annual Redevelopment Rates (City of Los Angeles Bureau of Sanitation, 2012)

Land Use	Annual Redevelopment Rate (% of total land use area)
Residential	0.18
Commercial	0.15
Industrial	0.34
Education	0.16
Transportation	2.7

- A structural infiltration-based BMP (infiltration basin) was modeled with a drainage area of 100 acres, 50 acres of single-family residential land use and 50 acres of commercial land use. It was assumed that the infiltration basin would capture 80 percent of the influent runoff volume and result in a 100 percent volume reduction of captured runoff. It was assumed that the infiltration basin was completed 15 years from now.
- The implementation of non-structural BMPs which do not have quantified reductions are modeled for the entire MS4 Permit area, assuming their combined benefit results increase each year to an estimated 10 percent reduction of all pollutant loads in 20 years from now.

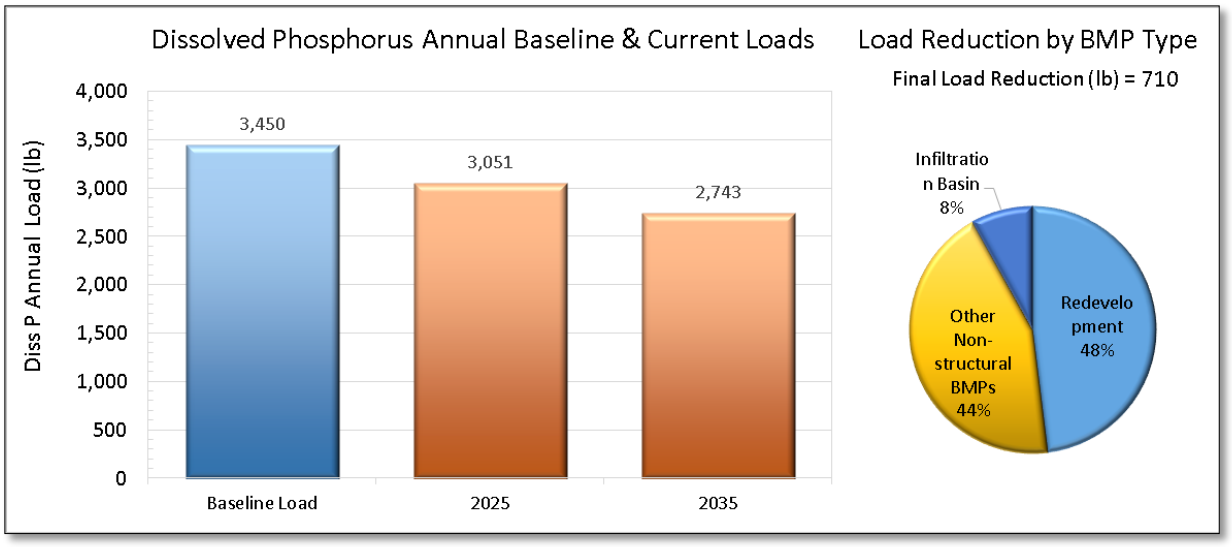

Figure 17. Dissolved Phosphorus Annual Loads and Reductions

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Appendix A – Supplemental Results

A.1 Baseline Loading

The average annual baseline loadings within the Buellton MS4 Permit area for all pollutants analyzed by the LPRM are shown in Table A-10.

Table A-10. Average Annual Baseline Loading for All Pollutants for the MS4 Permit area

Pollutant	Average Annual Baseline Load
Runoff (cu ft)	32,250,000
Total Suspended Solids - TSS (lb)	222,900
Total Phosphorus - Tot P (lb)	762
Dissolved Phosphorus – Diss P (lb)	571
Ammonia – NH3 (lb)	1,710
Nitrate – NO3 (lb)	1,414
Total Kjeldahl Nitrogen –TKN (lb)	6,133
Dissolved Copper – Diss Cu (lb)	24
Total Copper – Tot Cu (lb)	56
Total Lead – Tot Pb (lb)	24
Dissolved Zinc – Diss Zn (lb)	336
Total Zinc – Tot Zn (lb)	493
Fecal Coliform (10^12 MPN)	96

Table A-11 shows the distribution of the average annual baseline loads per land use acre for all pollutants, illustrating which land uses are generating the greatest pollutant loading per unit area.

Table A-11. Average Annual Baseline Loading per Acre for the MS4 Permit Area by Land Use for All Pollutants

Land Use	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	10^12 MPN
Single-Family Residential	18,000	140	0.45	0.36	0.55	0.88	3.3	0.011	0.021	0.013	0.031	0.081	0.08
Commercial	55,000	230	1.4	0.99	4.1	1.9	12	0.042	0.11	0.042	0.52	0.81	0.085
Industrial	53,000	720	1.3	0.86	2	2.9	9.5	0.05	0.11	0.054	1.4	1.8	0.28
Education	46,000	290	0.86	0.75	1.1	1.8	4.9	0.035	0.057	0.01	0.22	0.34	0.15
Transportation													
Multi-Family Residential	45,000	110	0.65	0.56	1.4	4.2	5.1	0.021	0.034	0.013	0.22	0.35	0.15
Agriculture													
Open Space	4,300	58	0.032	0.024	0.029	0.31	0.26	0.0002	0.0028	0.0008	0.0075	0.007	0.0006

The City of Buellton MS4 Permit area is located within the Santa Ynez waterhed, as shown in Figure A-18. Average annual baseline loading within the Santa Ynez watershed, including a breakdown of contributions from MS4 and non-MS4 areas, is shown in Table A-12 for all pollutants.

Table A-12. Average Annual Baseline Watershed Loading for All Pollutants

Area	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	10^12 MPN
Buellton MS4 Area	1%	0%	1%	1%	2%	0%	1%	1%	1%	1%	2%	2%	2%
Other MS4 Permit Areas	9%	5%	7%	9%	15%	3%	12%	15%	9%	12%	15%	14%	17%
Agriculture*	7%	28%	56%	41%	38%	68%	30%	32%	35%	34%	6%	27%	42%
Open Space*	69%	59%	19%	26%	24%	23%	37%	8%	35%	32%	43%	25%	7.7%
Caltrans	1%	0%	2%	3%	1%	0%	1%	7%	3%	2%	5%	4%	0%
IGP Parcels	2%	3%	4%	3%	4%	4%	3%	4%	3%	3%	5%	5%	4%
Other*	11%	4%	12%	17%	16%	2%	15%	33%	15%	16%	22%	22%	27%
Total Watershed	5.07E+09	8.1E+07	136,724	77,267	99,428	1,155,554	560,049	1,613	6,627	2,057	14,288	23,118	6,211

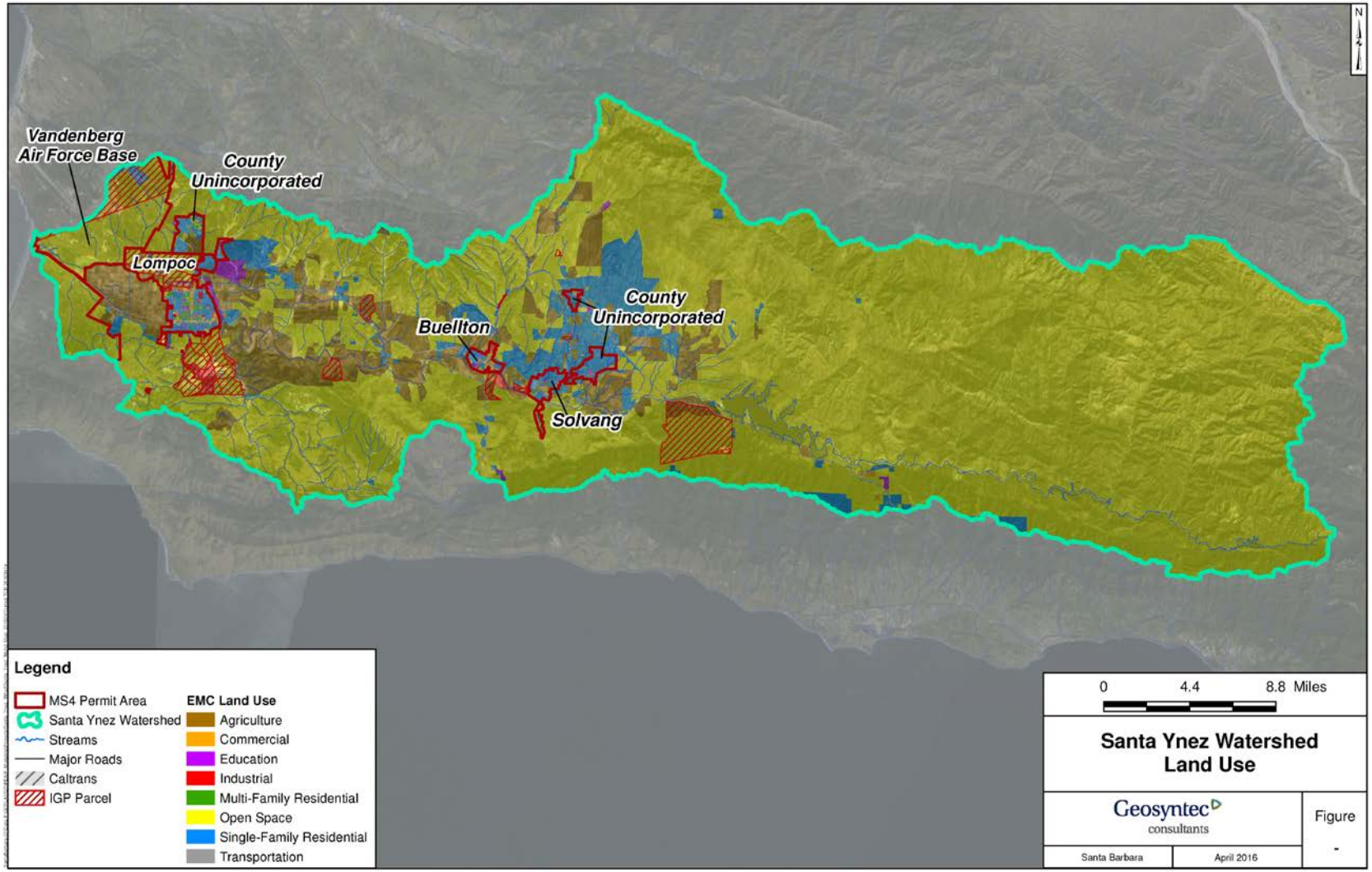

Figure A-18. Santa Ynez Watershed

A.2 Prioritization

The LPRM produces catchment prioritization results for individual pollutants. Estimated annual baseline loads are used to develop pollutant catchment prioritization index (PCPI) scores that represent the relative magnitude of pollutant loading per unit area in each catchment. These PCPI scores for priority pollutants are displayed in Figure A-19 through Figure A-24.

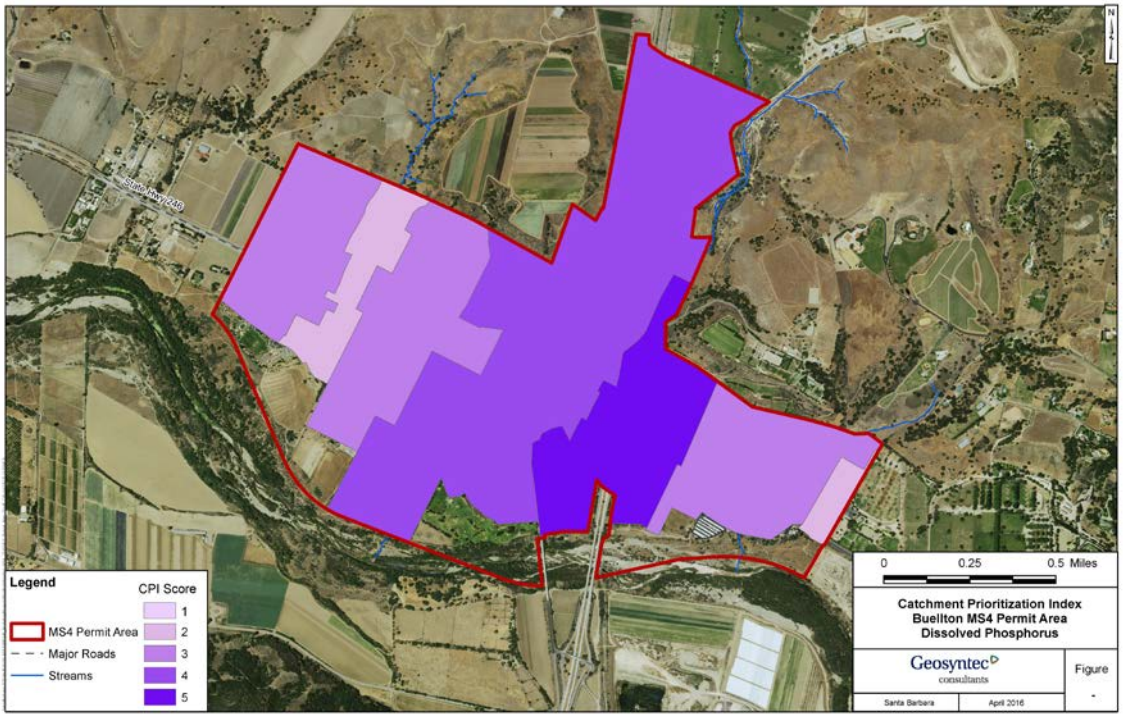

Figure A-19. CPI Scores for Dissolved Phosphorus

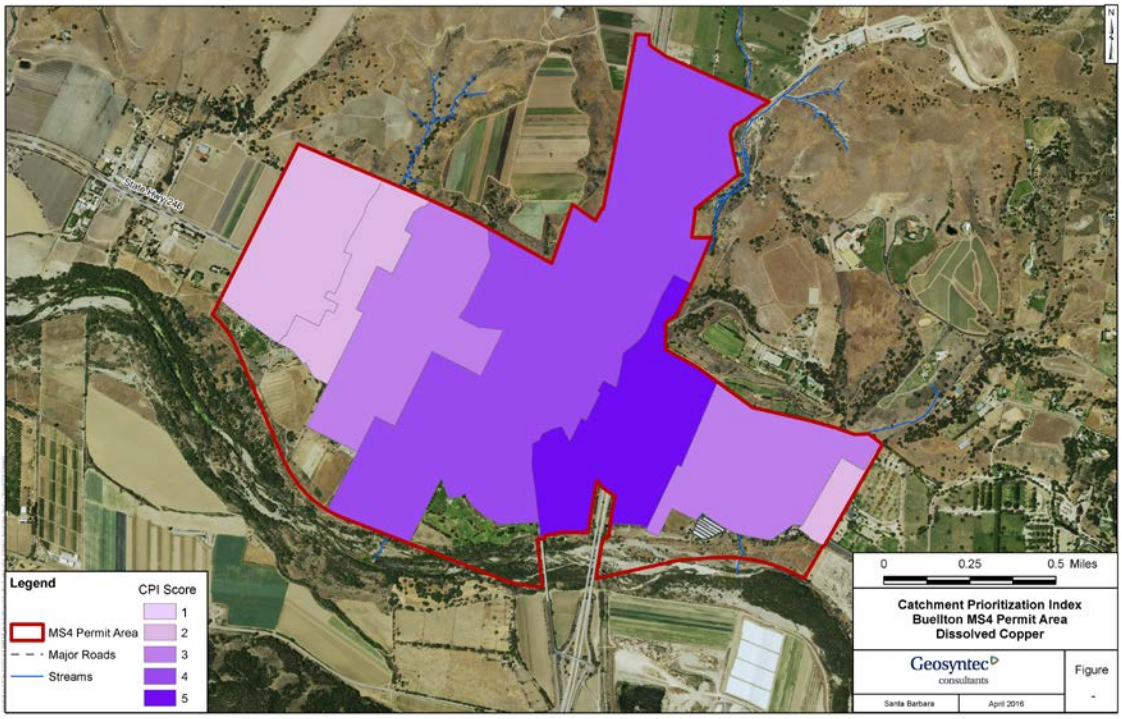

Figure A-20. CPI Scores for Dissolved Copper

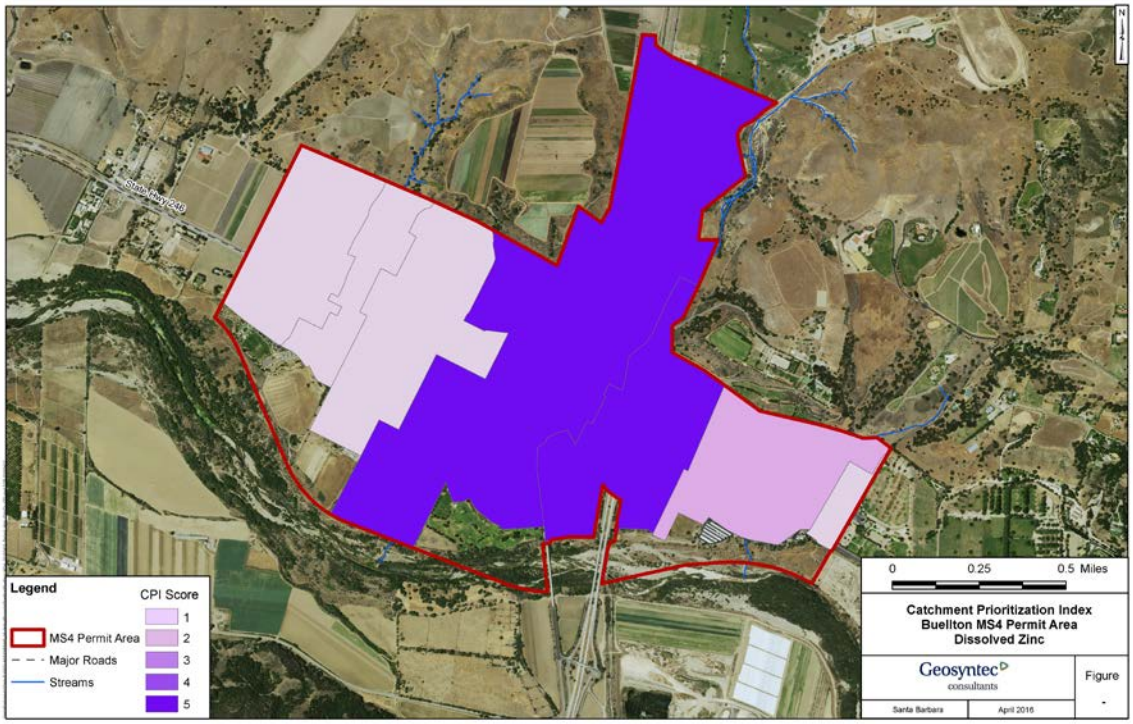

Figure A-21. CPI Scores for Dissolved Zinc

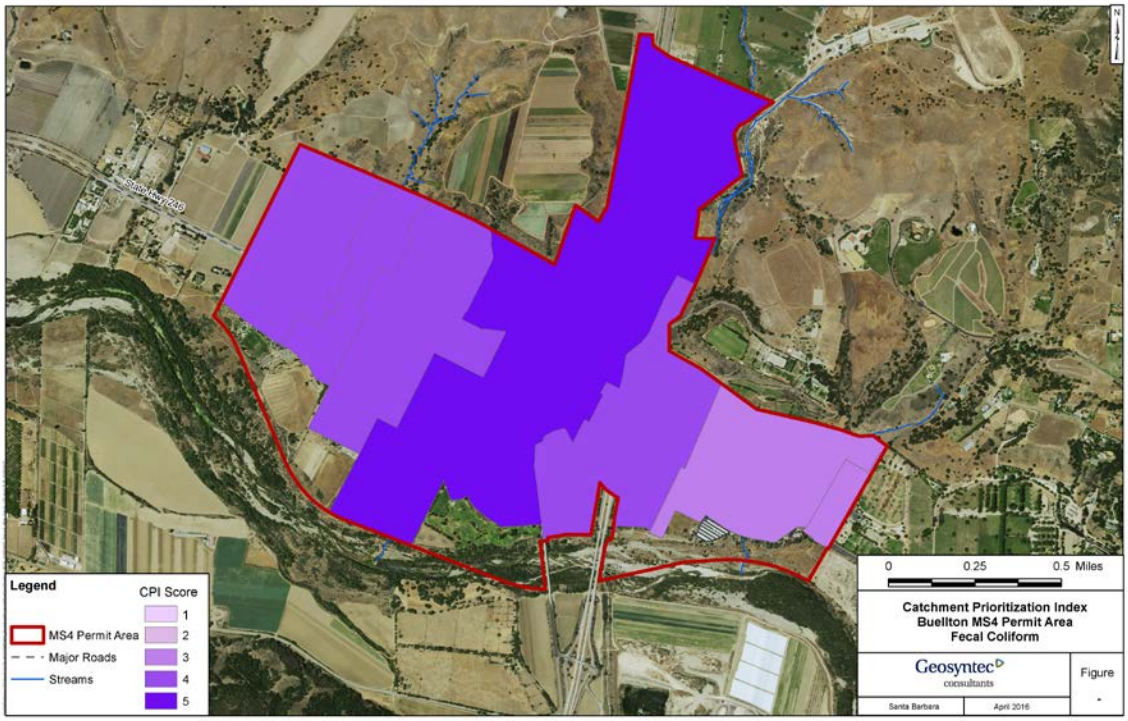

Figure A-22. CPI Scores for Fecal Coliform

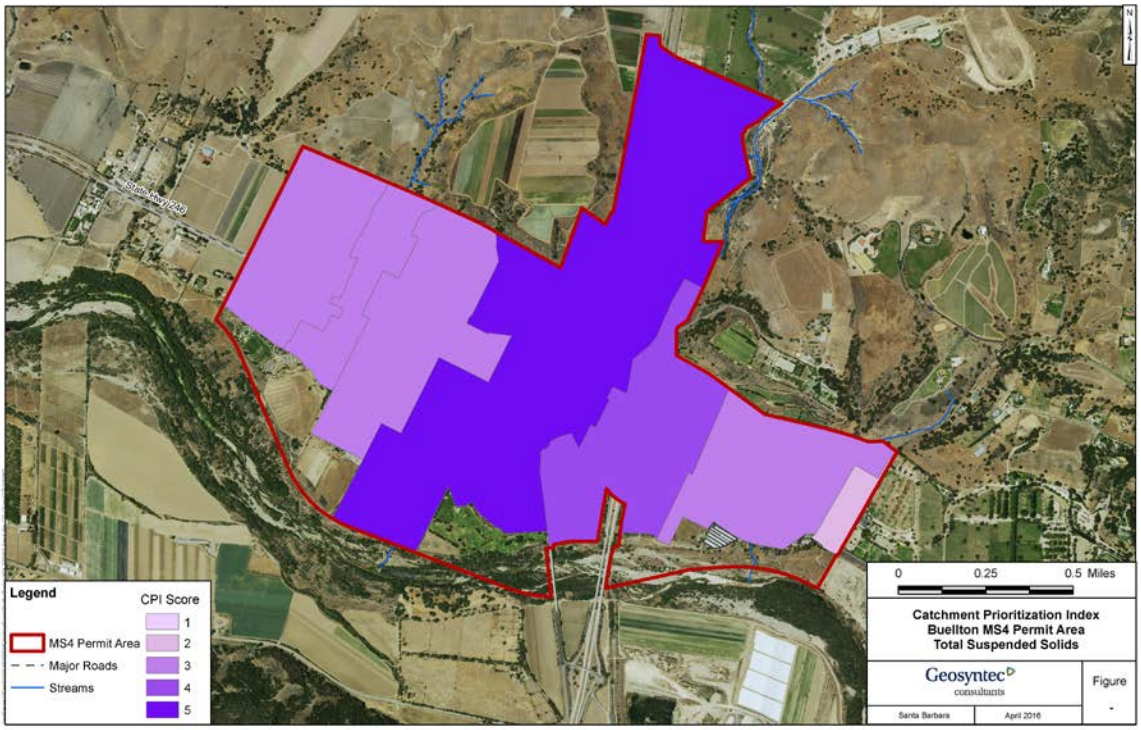

Figure A-23. CPI Scores for TSS

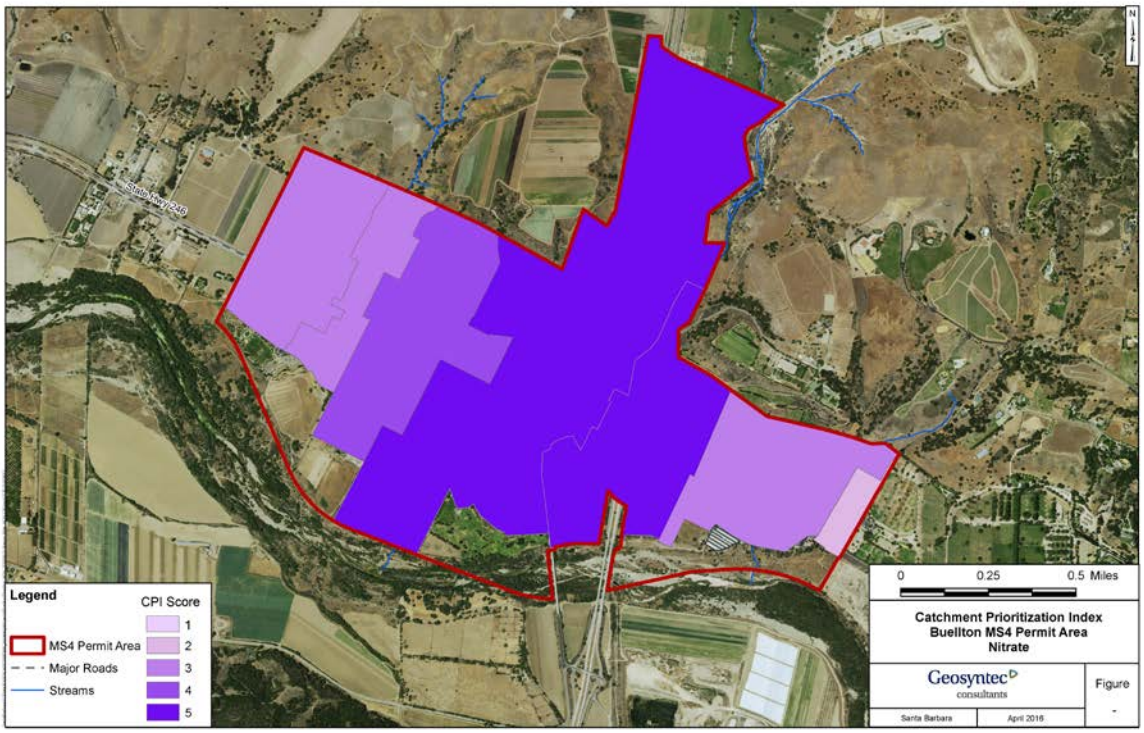

Figure A-24. CPI Scores for Nitrate

A.3 Reductions

Anticipated runoff volume and pollutant load reductions achieved by implementation of BMPs within the MS4 Permit area are evaluated by the LPRM. Table A-13 shows annual baseline and current loads, after subtracting reductions achieved by BMPs, for all pollutants analyzed. Table A-14 shows the current load reductions achieved by each BMPs implemented for all pollutants analyzed.

Table A-13. Total Load Reduction for All Pollutants

Load	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	10^12 MPN
Baseline	32,250,000	222,900	762	571	1,710	1,414	6,133	23.58	55.52	23.69	336	493	96.475
Reduction								2.6	6.1				2
% Reduction	0%	0%	0%	0%	0%	0%	0%	11.0%	11.0%	0%	0%	0%	2.1%
Current	32,250,000	222,900	762	571	1,710	1,414	6,133	20.98	49.42	23.69	336	493	94.475
Current Load by Year													
2013	32,250,000	222,900	762	571	1,710	1,414	6,133	23	54	24	336	493	96
2014	32,250,000	222,900	762	571	1,710	1,414	6,133	22	52	24	336	493	94
2015	32,250,000	222,900	762	571	1,710	1,414	6,133	22	51	24	336	493	94
2016	32,250,000	222,900	762	571	1,710	1,414	6,133	21	49	24	336	493	94

Table A-14. BMP Load Reductions for All Pollutants

BMP Type	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	10^12 MPN
Redevelopment													
Brake Pad Copper Phase-out Legislation								2.6	6.1				
Other Non-structural BMPs (CBSM)													2.0

Appendix B – Supplemental Model Input Data

B.1 Inside MS4 Permit Area

Table B-15. Typical Imperviousness and EMC Land Use Groups based on Land Use[1]

Land Use	Imperviousness (%)	EMC Land Use Group
GENERAL COMMERCIAL	91	Commercial
INDUSTRIAL	88	Industrial
LOW DENSITY RESIDENTIAL	21	Single-Family Residential
MEDIUM DENSITY RESIDENTIAL	42	Single-Family Residential
MULTI- FAMILY RESIDENTIAL	74	Multi-Family Residential
OPEN SPACE_PARKS and RECREATION	5	Open Space
PUBLIC_QUASI-PUBLIC	75	Education
SERVICE COMMERCIAL	91	Commercial

[1] Some values of imperviousness and EMC land use classifications were adjusted based on visual inspection of aerial imagery or knowledge of the area.

B.2 Outside MS4 Permit Area

Table B-16. Land Use and Imperviousness in the County of Santa Barbara (outside MS4 Permit area)

Land Use	EMC Land Use	Imperviousness (%)
Air Force Base	Varies based on aerial imagery	Varies based on aerial imagery
APARTMENTS, 5 OR MORE UNITS	Multi-Family Residential	74
AUDITORIUMS, STADIUMS	Commercial	91
AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC	Commercial	91
BANKS, S&LS	Commercial	91
BEACHES, SAND DUNES	Open Space	1
BED AND BREAKFAST	Multi-Family Residential	74
BOWLING ALLEYS	Commercial	91
CAMPS, CABINS	Open Space	2
CHURCHES, RECTORY	Education	82
CLUBS, LODGE HALLS	Education	47
COLLEGES	Education	47
COMMERCIAL (MISC)	Commercial	91
COMMERCIAL AND OFFICE CONDOS,PUDS	Commercial	91
CONDOS,COMMUNITY APT PROJS	Multi-Family Residential	86
DAIRIES	Agriculture	42

Land Use	EMC Land Use	Imperviousness (%)
DANCE HALLS	Commercial	91
DAY CARE	Education	68
DEPARTMENT STORES	Commercial	95
DRIVE-IN THEATRES	Commercial	91
DRY FARMS (MISC)	Open Space	1
FEED LOTS	Agriculture	2
FIELD CROPS-IRRIGATED	Agriculture	2
FIELD CROPS, DRY	Open Space	1
FLOWERS	Agriculture	2
GOLF COURSES	Open Space	3
HEAVY INDUSTRY	Industrial	90
HIGHWAYS AND STREETS	Transportation	91
HORSES	Agriculture	42
HOSPITALS	Commercial	74
HOTELS	Multi-Family Residential	96
INDUSTRIAL CONDOS,PUDS	Industrial	80
INDUSTRIAL, MISC	Industrial	80
INSTITUTIONAL (MISC)	Education	82
IRRIGATED FARMS, MISC	Agriculture	2
LIGHT MANUFACTURING	Industrial	80
LUMBER YARDS, MILLS	Industrial	91
MINERAL PROCESSING	Industrial	10
MINING	Industrial	10
MISCELLANEOUS	Open Space	2
MIXED USE-COMMERCIAL/RESIDENTIAL	Commercial	82
MOBILE HOME PARKS	Multi-Family Residential	74
MOBILE HOMES	Multi-Family Residential	74
MORTUARIES,CEMETERIES,MAUSOLEUMS	Education	10
NURSERIES,GREENHOUSES	Agriculture	15
OFFICE BUILDINGS, MULTI-STORY	Commercial	91
OFFICE BUILDINGS, SINGLE STORY	Commercial	91
OPEN STORAGE, BULK PLANT	Commercial	40
ORCHARDS	Agriculture	2
ORCHARDS, IRRIGATED	Agriculture	2
OTHER FOOD PROCESSING, BAKERIES	Commercial	91
PACKING PLANTS	Industrial	91
PARKING LOTS	Transportation	91
PARKS	Open Space	1
PASTURE-IRRIGATED	Agriculture	2

Land Use	EMC Land Use	Imperviousness (%)
PASTURE OF GRAZING, DRY	Open Space	1
PETROLEUM AND GAS	Industrial	91
PIPELINES,CANALS	Water	100
POULTRY	Industrial	91
PROFESSIONAL BUILDINGS	Commercial	91
PUBLIC BLDGS,FIREHOUSES,MUSEUMS,POST OFFICES,ETC	Commercial	91
RACE TRACKS, RIDING STABLES	Agriculture	42
RANCHO ESTATES (RURAL HOME SITES)	Single-Family Residential	12
RECREATION	Education	10
RECREATIONAL OPEN (MISC)	Open Space	1
RESIDENTIAL INCOME, 2-4 UNITS	Multi-Family Residential	74
REST HOMES	Education	80
RESTAURANTS,BARS	Commercial	91
RETAIL STORES, SINGLE STORY	Commercial	96
RIGHTS OF WAY,SEWER,LAND FILLS,ETC	Open Space	1
RIVERS AND LAKES	Water	100
SCHOOLS	Education	82
SERVICE STATIONS	Commercial	91
SHOPPING CENTERS (NEIGHBORHOOD)	Commercial	91
SHOPPING CENTERS (REGIONAL)	Commercial	95
SINGLE FAMILY RESIDENCE	Single-Family Residential	42
STORE AND OFFICE COMBINATION	Commercial	91
SUPERMARKETS	Commercial	91
TREE FARMS	Agriculture	2
TRUCK CROPS-IRRIGATED	Agriculture	2
UTILITY,WATER COMPANY	Industrial	91
VACANT	Open Space	1
VINES AND BUSH FRUIT-IRRIGATED	Agriculture	2
VINEYARDS	Agriculture	2
WAREHOUSING	Industrial	91
WASTE	Industrial	96
WATER RIGHTS,PUMPS	Industrial	91
WHOLESALE LAUNDRY	Commercial	91
TRANSPORTATION	Transportation	91

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Storm Water Pollutant Load Model – Results for the City of Solvang MS4 Permit Area

Solvang, CA

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April 15, 2016

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1. Introduction

The Load, Prioritization, and Reduction Model (LPRM) was developed to aid the participating agencies within the County of Santa Barbara (Cities of Goleta, Carpinteria, Solvang, and Buellton, and the County of Santa Barbara) in:

- Quantifying average annual existing (baseline) pollutants loads from rainfall occurring in the MS4 Permit area;
- Prioritizing catchments for BMP implementation; and
- Estimating the anticipated load reductions resulting from implementation of the Program Effectiveness Assessment and Improvement Plans (PEAIPs).

The LPRM fulfills the requirements specified by the 2013 California Phase II General Municipal Separate Storm Sewer System (MS4) Permit (MS4 Permit) and the July 25, 2014, Central Coast Regional Water Quality Control Board (Regional Board) "Effectiveness Assessment and Monitoring" guidance letter. A discussion of the modeling approach and the default model values are included in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions (Geosyntec, 2015a). The PEAIP LPRM Guidance Document Memorandum (Geosyntec, 2015b) describes the model organization, how users can add new BMPs and extract model results for future annual reports, how to modify model defaults, and how model calculations are performed.

This report summarizes the LPRM inputs and results for the PEAIP implementation through 2015.

1.1 MS4 Permit Area

The MS4 Permit regulates discharges from the storm drain system of designated municipalities, referred to as the MS4 discharges. The City of Solvang is located in Santa Barbara County, and the MS4 Permit area encompasses approximately 2.4 square miles (Figure 1). The MS4 Permit area is a relatively small portion of the Santa Ynez watershed, whose runoff is mostly from open space and agriculture. The Solvang MS4 permit area is grouped into 8 land uses, including single family residential (60%), open space (18%), multi-family residential (6.4%), commercial (6.0%), agriculture (3.6%) education (3.2%), and transportation (2.7%).

Runoff from highway 246, which runs through the center of the MS4 permit area, is covered under the Caltrans MS4 permit and is therefore not the responsibility of the City of Solvang. Therefore, all the Caltrans areas have been removed from this analysis. The City of Solvang is also not responsible for discharges from Industrial General Permit (IGP) parcels, which are covered under a separate IGP permit, so these parcels are also removed from the analysis of the MS4 permit area.

1.2 Overview of Model Features

The LPRM utilizes spatial data from GIS, including land use and soil data, to estimate runoff volume and pollutant loading for modelable pollutants[1]. Specifically, the major output features of the LPRM are as follows:

- Quantification of average annual baseline loads from the MS4 Permit area, for runoff volume and up to 15 pollutants;
- Prioritization of catchments (and land uses), based on pollutant contributions and jurisdictional pollutant priorities, for BMP implementation; and
- Estimation of anticipated runoff volume and pollutant load reductions achieved by BMP implementation since 2013.

[1] As discussed in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo, the first step in modeling exercise was to identify pollutants for which land use event mean concentration data existed. These pollutants were called modelable pollutants.

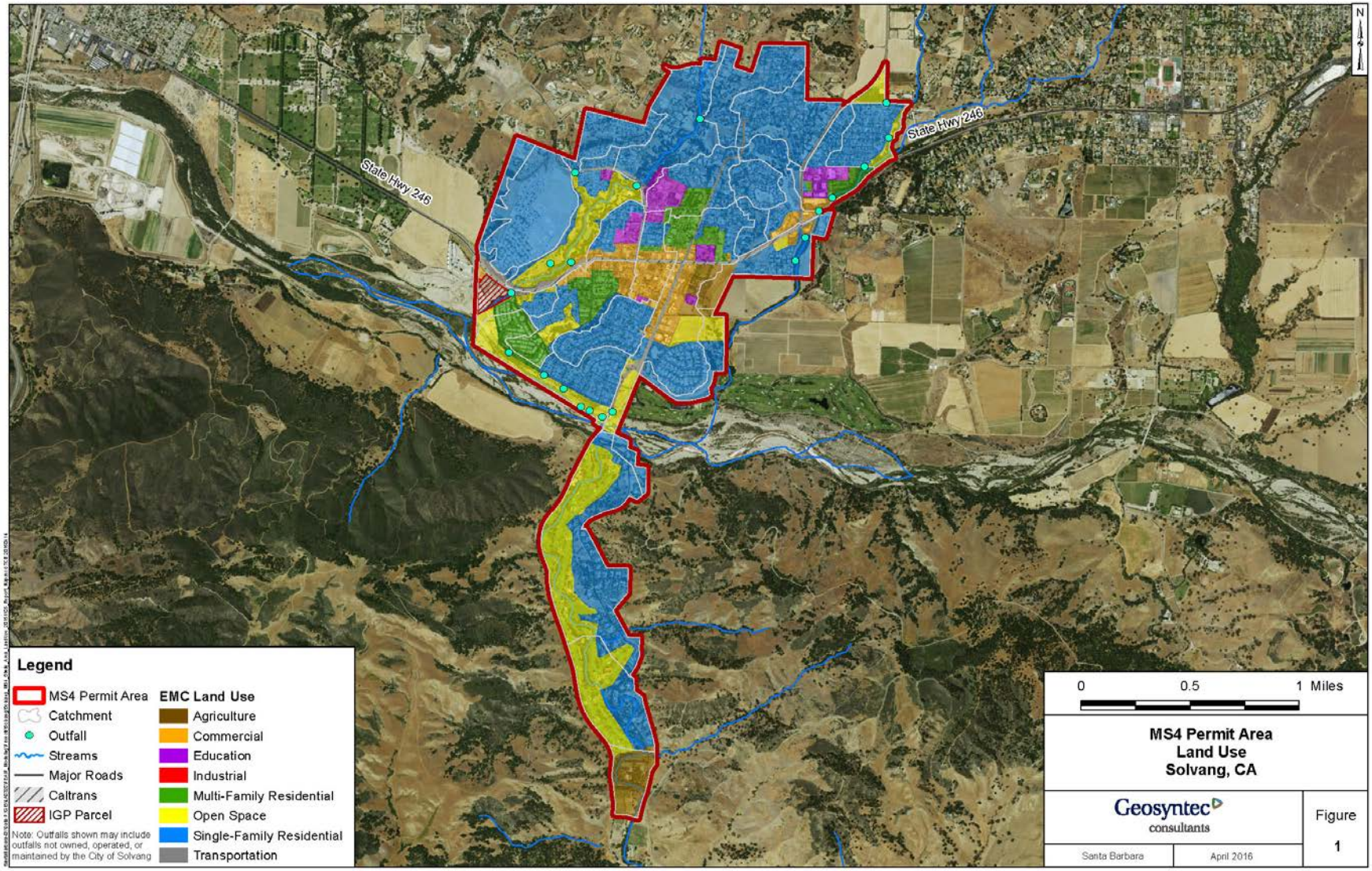

Figure 1. MS4 Permit Area

2. Model Inputs

The PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo discusses the default datasets and inputs required for the LPRM. The sections below are intended to describe variations from the default datasets in the used in the LPRM and inputs selected for the LPRM; as well as provide context for these changes and selections. Several default datasets for the LPRM have not been modified from what was described in the Memo, including:

- Modelable pollutants;
- Pervious runoff coefficients by hydrologic soil group;
- Land use pollutant EMCs;
- Priority pollutants (i.e., dissolved phosphorus, dissolved copper, dissolved zinc, and fecal coliform); and
- Weighting factors for computing multi-pollutant CPI scores

2.1 Soils

The soil data, a SSURGO database acquired from the Natural Resources Conservation Service (United States Department of Agriculture), was characterized by hydrologic groups (A, B, C, or D), to help define the runoff potential of each soil type in the PLRM (Figure 2). Hydrologic soil group A is defined by a high saturated hydraulic conductivity (i.e., high infiltration potential) and therefore has low runoff potential. Alternatively, hydrologic soil group D has high runoff potential and low saturated hydraulic conductivity. In areas where the SSURGO database did not provide a hydrologic soil group, the average pervious runoff coefficient of the four soil groups (0.075) was used.

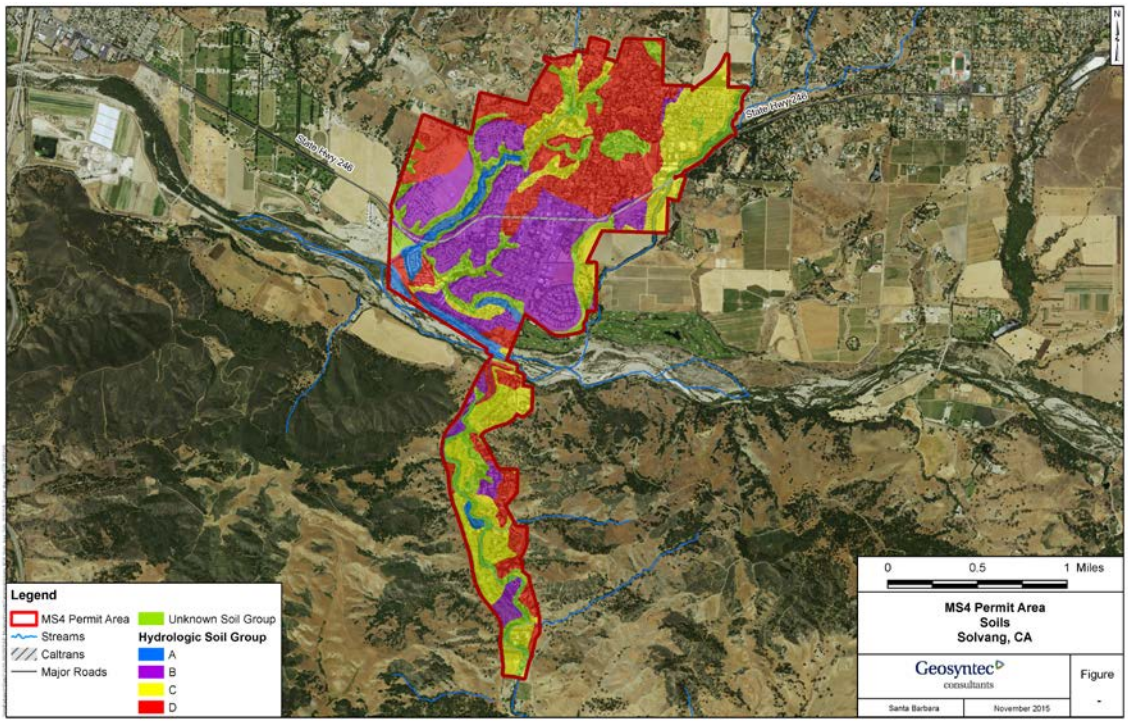

Figure 2. MS4 Permit Area Soils

2.2 Land Use EMC Groups Imperviousness

The City of Solvang's general land use categories covering the MS4 Permit area contained varying and unique descriptors which were more detailed than the eight EMC land use groups used in the LPRM. Table B-15 shows how these general land use categories were initially classified into the eight land use EMCs for the LPRM. This table also shows percent imperviousness values for the detailed land uses developed based on available literature, including Los Angeles County Hydrology Manual land use imperviousness used as defaults in SBPAT (Geosyntec, 2012) and values determined for Ventura County and used in the Draft Santa Clara River Indicator Bacteria TMDL Implementation Plan (County of Ventura, 2015). Using this detailed land use dataset accounts for the variation in percent impervious values throughout each specific land use and provides results more representative of the modeled area.

Additionally, to calculate watershed loads, EMC land use groups and imperviousness were needed for area outside the MS4 permit area, but within the watershed. Table B-16 in Appendix B shows how EMC land use groups and average imperviousness were assigned to the parcel dataset downloaded from the County of Santa Barbara GIS Catalog (County of Santa Barbara, 2015), which was used to classify land use within the County of Santa Barbara but outside of the participating agencies MS4 Permit areas (i.e., for use in watershed analyses).

All EMC land use and imperviousness classifications shown in Appendix B served as a starting point for determining input to the LPRM. Adjustments were made to both land use EMC groups and imperviousness based on visual observation of aerial imagery or local knowledge of the area.

2.3 Precipitation Data

A rainfall station was selected for each area that was in close proximity and contained at least 30 years of data in the Period of Record (POR) (Figure 3). Historical rainfall data was downloaded from the County of Santa Barbara Public Works Department[2] for Buellton Fire Station, Goleta Fire Station #14, and Carpinteria Fire Station. The average annual rainfall depth (calculated from the total water year depths over the POR) was calculated and each jurisdictional area (and watershed) was assigned an average annual rainfall depth based on proximity to each of the three gages (Table 1).

Table 1. Selected Rainfall Station Information

Rainfall Station	Station #	Jurisdictions Influenced	Annual Precipitation Depth (inches)				Period of Record (years)
			Average	Median	Min	Max	
Buellton Fire Station #31	233	Buellton, Solvang, and County Unincorporated - North County	16.8	14.7	5.9	41.6	61
Goleta Fire Station #14	440	Goleta and County Unincorporated - South County	18.5	16.5	6.9	47.9	74
Carpinteria Fire Station	208	Carpinteria and County Unincorporated - South	19.2	17.3	5.8	51.5	67

[2] http://cosb.countyofsb.org/pwd/pwwater.aspx?id=3790

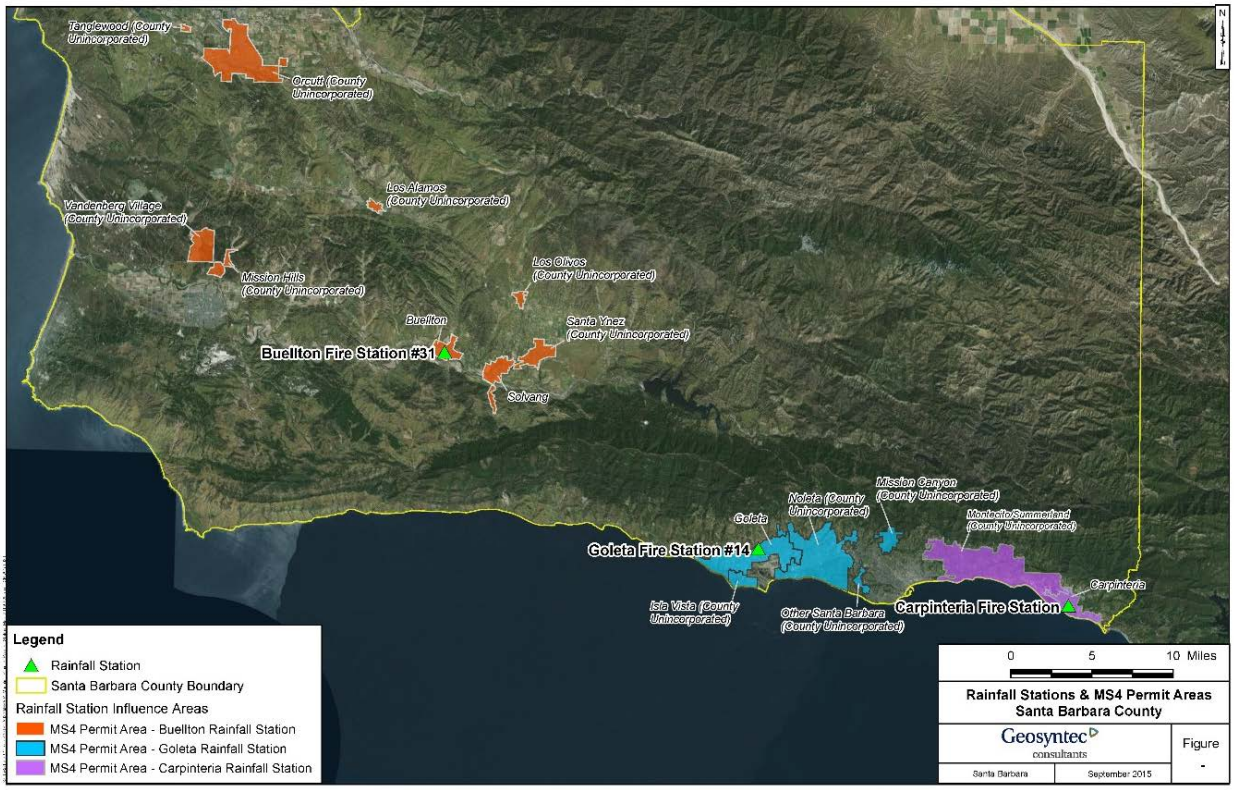

Figure 3. Rainfall Stations and MS4 Permit Areas

2.4 Hydrologic Calibration

Since the runoff coefficient is determined using an empirical formula that does not account for site-specific conditions, a calibration was performed to adjust the runoff coefficients. The calibration compared the LPRM calculated annual discharge volumes to streamflow gage observed annual discharge volumes in Atascadero Creek. The selected streamflow gauge is in the Goleta Slough watershed, a predominately urban drainage area, with nearly 30 years of data. This comparison was conducted for years with greater than 4,000 ac-ft of measured streamflow, which minimized error while also analyzing an adequate number of years (12). The runoff coefficients in the LPRM are adjusted based on a constant factor to minimize the overall difference between the observed and predicted annual volumes, which was determined to be 1.03.

2.5 BMPs Modeled

The LPRM is capable of quantifying the anticipated wet weather pollutant load reductions achieved by a variety of BMPs that could be implemented within the MS4 Permit area. BMP performance for BMPs implemented since 2013 have been evaluated and are presented herein. PEAIP BMP implementation by the City of Solvang since 2013 can be grouped into three categories for modeling. These categories, redevelopment (Section 2.5.1), brake pad copper

phase-out legislation (Section 2.5.2), and other non-quantifiable non-structural BMPs (Section 2.5.3), are discussed below. Non-quantifiable non-structural BMPs include programs that target wet weather pollutant sources to the MS4; however, sufficient data do not exist to model pollutant load reductions from these programs separately. Therefore, a percent reduction is assumed for these programs based on best professional judgement, as outlined in Section 2.5.3.

2.5.1 Redevelopment

Redevelopment projects are subject to the 2013 Post-Construction Stormwater Management Performance Requirements for Development Projects in the Central Coast Region (PCRs), based on the area of net impervious surface that the project creates and/or replaces. These PCRs require[3] that:

1. Projects that create and/or replace 2,500 or more square feet of net impervious surface - provide site design and runoff reduction;
2. Projects that create and/or replace 5,000[4] or more square feet of net impervious surface - implement LID standards that capture and treat the runoff volume from the project site produced during the 85th percentile 24-hour storm event;
3. Projects that create and/or replace 15,000 or more square feet of net impervious surface - implement stormwater control measures that capture and retain on site the runoff volume from the project site produced during the 95th percentile 24-hour storm event; or
4. Projects that create and/or replace 22,000 or more square feet of net impervious surface - implement stormwater control measures to control peak flows to not exceed pre-project flows for the 2-year through 10-year events.

Therefore, over time, the measures implemented by these projects will result in pollutant load reductions from the MS4 Permit area relative to existing conditions. Redevelopment projects that implement post-construction requirements may be entered into the LPRM as they are completed.

To model the average percent capture of annual stormwater runoff volume[5] associated with post construction projects that trigger Performance Requirement No. 2, the following steps were taken:

- A LID BMP was sized to capture runoff from the 85th percentile 24-hour storm for one parcel of each applicable land use (single-family residential, multi-family residential, commercial, industrial, and education) and for two assumed hydrologic soil types (A and D), which takes into account the typical imperviousness for each land use group and a range of potential soil conditions (i.e., infiltration capacity).

[3] All preceding (i.e., less stringent requirements) are also required for the larger projects
[4] Excluding detached single family houses
[5] To keep the modeling assumptions and scenarios simpler and more straightforward a volume-based full treatment option (i.e., no infiltration) was evaluated as an alternative to the flow-through treatment option.

- Each BMP was modeled in EPA's Storm Water Management Model (SWMM) over an average rainfall year to determine the percentage of annual runoff captured by each land use and soil combination-specific LID BMP.
- The percent capture results for both land use-soil combinations (i.e., commercial-soil type A and commercial-soil type D) were averaged to determine an average percent capture for each land use.

The average percent capture values for each land use from the above analysis are incorporated into the LPRM and represent the percentage of annual runoff from redevelopment parcels that will be captured and treated by LID BMPs (Table 2).

Table 2. Modeled Percent Capture for Projects Triggering Performance Requirement #2 (sized to 85th percentile event) by Land Use

Land Use	% Capture
Residential	86%
Commercial	89%
Industrial	88%
Education	88%
Transportation	89%

The portion of runoff volume that is not captured (and instead bypasses) is assumed to have the same effluent concentration as the influent concentration. Since project-specific details and constraints related to infiltration are unknown (e.g., soils not conducive to infiltration, limited depth to groundwater), the LPRM provides three types of projects for the user to select in regards to treatment vs. infiltration:

1) Infiltration: 100 percent of the captured volume is infiltrated through the BMP, and therefore completely removed from the discharge;
2) Infiltration and Treatment: 50 percent of the captured volume is infiltrated through the BMP and 50 percent is not infiltrated, thus requiring treatment and discharge (flow-through treatment); and
3) Treatment: 100 percent of the captured volume is treated and discharged (flow-through treatment).

In the LPRM, the percentage that is captured and infiltrated is completely removed from the discharge and therefore an effluent concentration is not required. For the remaining percentage that is treated and discharged (for project types 2 and 3 above), the anticipated effluent

concentration of a biofilter (representing bioretention with underdrains)[6] is applied to this volume based on mean values from the International Stormwater BMP Database (Geosyntec, 2012). The effluent concentrations selected are shown in Table 3.

Table 3. Redevelopment LID Project Effluent Concentrations

TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	#/100mL
18.1	0.14	0.07	0.18	0.37	0.98	8.3	8.8	4.2	34.7	37.6	5,890

The LPRM calculates the pollutant load reductions achieved by redevelopment BMPs by finding the difference between the parcel (i.e., pre-BMP) runoff volume and pollutant loads and the post-BMP runoff volume and pollutant loads. Calculations are performed such that the BMP effluent concentration is not higher than the BMP influent concentration (i.e., implementation of a BMP cannot increase pollutant concentrations). If the effluent concentration is greater than the influent water quality concentration, then the post-BMP treated runoff concentration is set equal to the influent concentration for that pollutant.

The LPRM also supports a redevelopment BMP where the project is subject to Performance Requirement No. 3 (i.e., BMP sizing to retain the 95th percentile, 24-hour duration rainfall event). To model the average annual percent capture associated with these post-construction projects, the same steps outline above were followed. However, the LID BMP was instead sized to capture runoff from the 95th percentile, 24-hour storm event. The average annual percent capture by land use determined from the analysis, as shown in Table 4, is incorporated into the LPRM and represents the percentage of annual runoff from redevelopment parcels that will be captured and subject to runoff retention requirements. Instead of providing options for infiltration vs. treatment, this BMP assumes 100 percent infiltration, which completely removes the runoff volume from the discharge.

[6] Effluent quality assigned to treat underdrain discharge is based on the better performing characteristics of the "media filter" and "bioretention" categories for each pollutant.

Table 4. Modeled Percent Capture for Projects Triggering Performance Requirement #3 (sized to 95th percentile event) by Land Use

Land Use	% Capture[7]
Residential	100%
Commercial	100%
Industrial	100%
Education	100%
Transportation	100%

As of 2015, one redevelopment project that triggers the LID post construction requirements is in progress, however has not been completed. The estimated pollutant load reductions from this redevelopment project will be modeled in the year it is completed.

2.5.2 Brake Pad Copper Phase-out Legislation

The TDC Environmental study (TDC Environmental, 2013), discussed in the Modeling Approach Memo, identifies three possible implementation scenarios, the least aggressive of which estimates that a 55 percent load reduction in copper will be achieved by 2032 due to the brake pad phase out. Therefore, the LPRM assumes a 55 percent total load reduction for copper (total copper and dissolved copper) due to the elimination of copper in brake pads over a 20-year period from 2013 to 2032. This translates into a 2.75 percent load reduction in copper each year (assuming a linear reduction over the time period), as shown in Table 5. This is the only BMP currently supported by the model that requires input by the user on a yearly basis, in order to demonstrate gradual brake pad phase-out over a 20-year period. All other BMPs only need to be entered to the LPRM once to quantify general reductions (i.e., other non-structural BMPs [CBSM]) or once per new project implemented (i.e., redevelopment).

Table 5. Load Reduction from Brake Pad Copper Phase-out Legislation BMP

BMP Type	Diss Cu	Tot Cu
	lb	lb
Brake Pad Copper Phase-out Legislation	2.75%	2.75%

2.5.3 Other Non-quantifiable Non-structural BMPs (CBSM)

The Santa Barbara County jurisdictions recently implemented a Community Based Social Marketing (CBSM) program, which focuses on education and public outreach to dog owners.

[7] These reductions are based on continuous simulation results for an average rainfall year (2003 was selected), however other "average" years or a longer, multi-year simulation period may result in less than 100% capture.

This program targets public awareness, behavioral changes, and sustainable control of pet waste at (and avoidance of) the "source". Based on best professional judgment and consistent with other Southern California MS4 Permits, Reasonable Assurance Analysis modeling efforts have assumed a flat fixed percent reduction of 5-10% where data are lacking to support another value. This assumption is acceptable to Los Angeles and San Diego County Regional Boards. Therefore, the LPRM assumes a total five percent reduction in bacteria (fecal coliform) based on best professional judgement and Regional Board acceptance for this BMP, as shown in Table 6.

Table 6. Load Reduction per Year from Other Non-structural (CBSM) BMP (2013-2032)

BMP Type	Fecal Col. 10^12 MPN
Other Non-structural BMPs (CBSM)	5%

3. Model Results

The LPRM is capable of modeling the following pollutants: total suspended solids, total and dissolved phosphorus, ammonia, nitrate, total kjeldahl nitrogen, dissolved and total copper, total lead, dissolved and total zinc, and fecal coliform. The City of Solvang results for the identified priority pollutants – dissolved phosphorus, dissolved copper, dissolved zinc, and fecal coliform (see PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memo for the basis of this pollutant prioritization) -- are presented in the following sections. Nitrate was also identified as a pollutant of concern, so results for nitrate are also presented in the following sections. Results for remaining pollutants modeled by the LPRM are included in Appendix A.

3.1 Baseline Loading

The LPRM produces average annual baseline loads (i.e., current conditions on the effective date of new MS4 Permit before the addition of new BMPs or enhancement of existing BMPs according to the PEAIP) for the MS4 Permit area, shown in Section 3.1.1. In addition, the LPRM estimates pollutant loading from the entire surrounding watershed in order to provide information on the relative contribution of the MS4 Permit area to the receiving waters. Results for watershed pollutant loads are included in Section 3.2.

3.1.1 Baseline Loads for the MS4 Permit Area

Results for average annual baseline loads of the four priority pollutants identified for the City of Solvang MS4 Permit area are shown in Table 7. Nitrate was also identified as a pollutant of concern, so results for nitrate are also included in the following sections. The total baseline watershed load is also included (to be discussed in subsequent sections).

Table 7. Average Annual Baseline Loads for Priority Pollutants

Pollutant	Average Annual MS4 Baseline Load	Average Annual Watershed Baseline Load
Dissolved Phosphorus (lb)	670	77,000
Dissolved Copper (lb)	24	1,600
Dissolved Zinc (lb)	140	14,000
Fecal Coliform (10^12 MPN)	120	6,200
Nitrate (lb)	2,500	1,200,000
TSS (lb)	252,700	4,300,000

Figure 4 through Figure 6 show the average annual baseline pollutant loads per acre for each of the EMC land uses within the MS4 Permit area. These plots illustrate which land uses are generating the greatest pollutant loading per unit area and they roughly reflect land use event mean concentrations (EMCs). However, other factors also contribute to loading by land use, most notably, imperviousness and the resultant runoff volume from a particular land use.

In general these charts show that transportation (high imperviousness), industrial (high imperviousness and EMCs) and commercial (high imperviousness and EMCs) land uses contribute the most significant pollutant loadings of nutrients and metals. Industrial (high imperviousness and EMC) provides the most significant bacteria loading, with the remaining bacteria load fairly distributed among other land uses. These charts, coupled with the land use map of the MS4 Permit area (Figure 1), can be utilized to target implementation of distributed structural BMPs or non-structural BMPs, since these are more cost-effectively sited by land use.

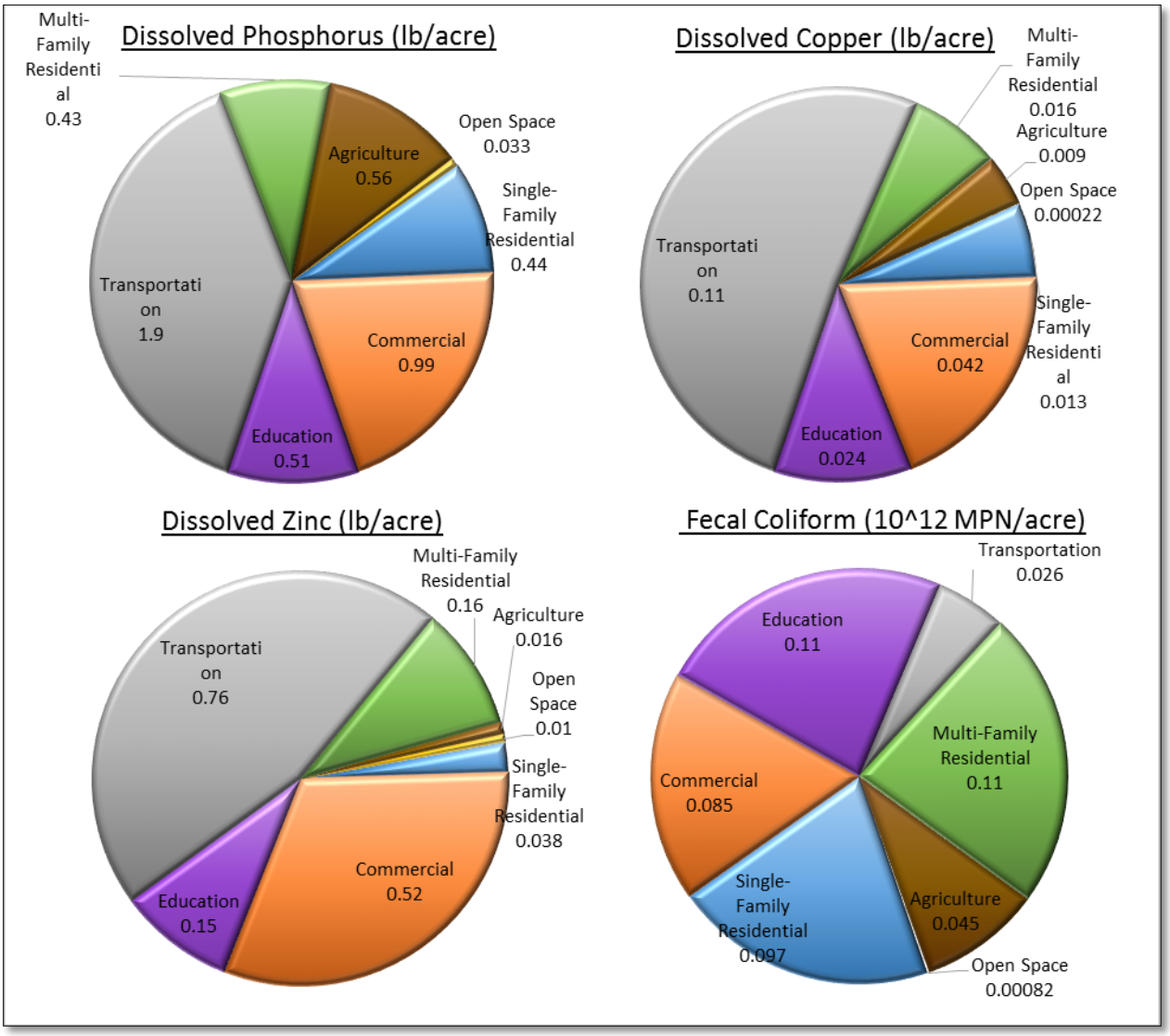

Figure 4. Average Annual Pollutant Loads per Acre for MS4 Permit Area by Land Use

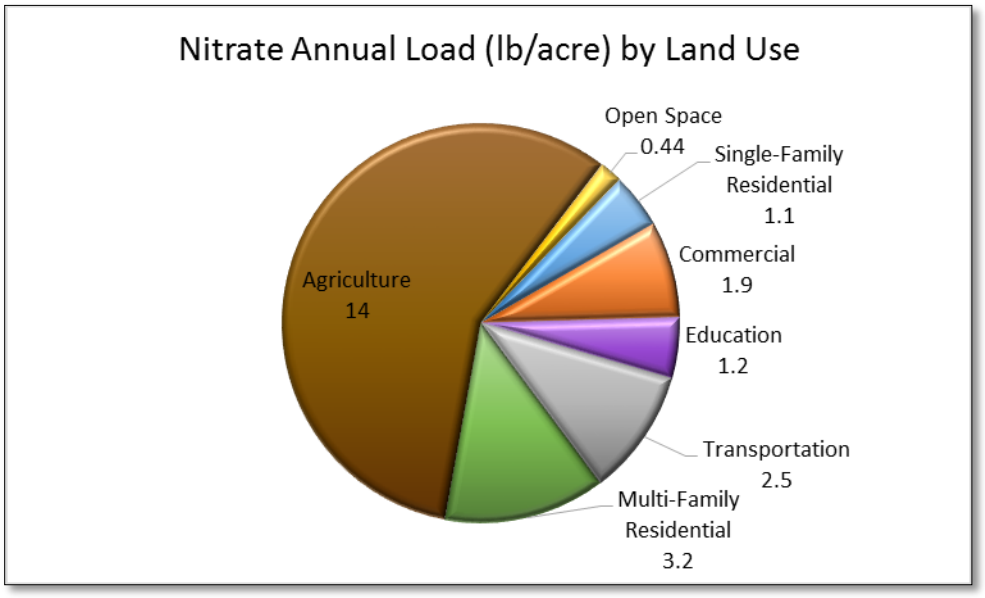

Figure 5. Average Annual Pollutant Load per Acre for MS4 Permit Area by Land Uses (Nitrate)

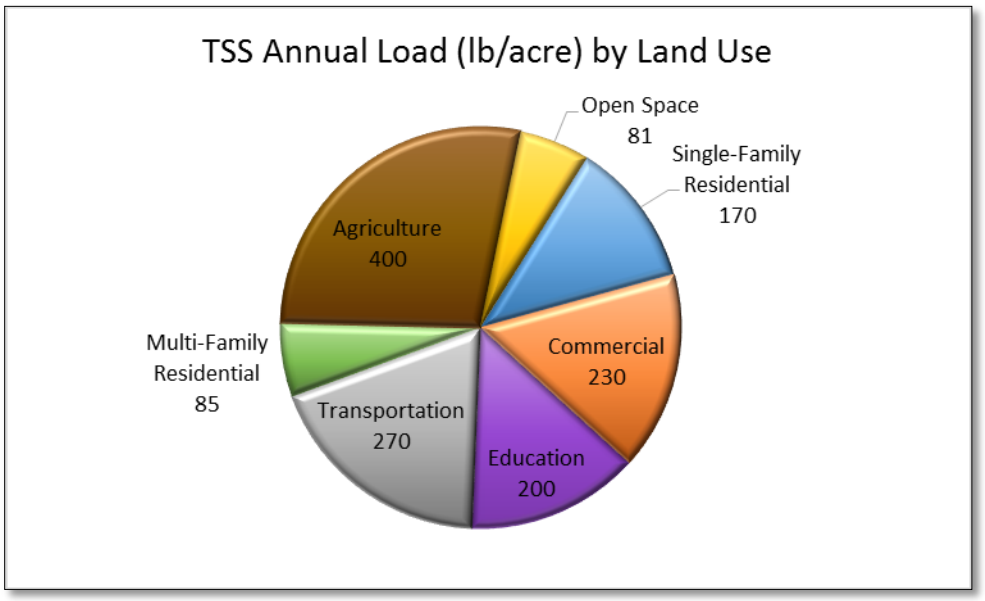

Figure 6. Average Annual Pollutant Load per Acre for MS4 Permit Area by Land Uses (TSS)

3.1.2 Baseline Loads for Santa Ynez Watershed

The City of Solvang MS4 Permit area is located within the Santa Ynez Watershed, as shown in Figure A-18 in Appendix A. The LPRM analyzed the average annual baseline pollutants loads within the entire watershed, including a breakdown of contributions from MS4 and non-MS4

areas. Results for this watershed analysis are displayed in Figure 7 through Figure 9. These charts show that the City of Solvang's pollutant loading contributions to the Santa Ynez watershed are minor, ranging from 0-2 percent of the total watershed pollutant loads. Therefore, BMPs implemented by the City of Solvang will only have a minor impact on the total watershed load. In general, agriculture is the most significant contributor of dissolved phosphorus (41%), dissolved copper (32%), fecal coliform (42%), and nitrate (68%). Non-MS4 open space is the most significant contributor of dissolved zinc (43%) and TSS (59%) loads to the watershed.

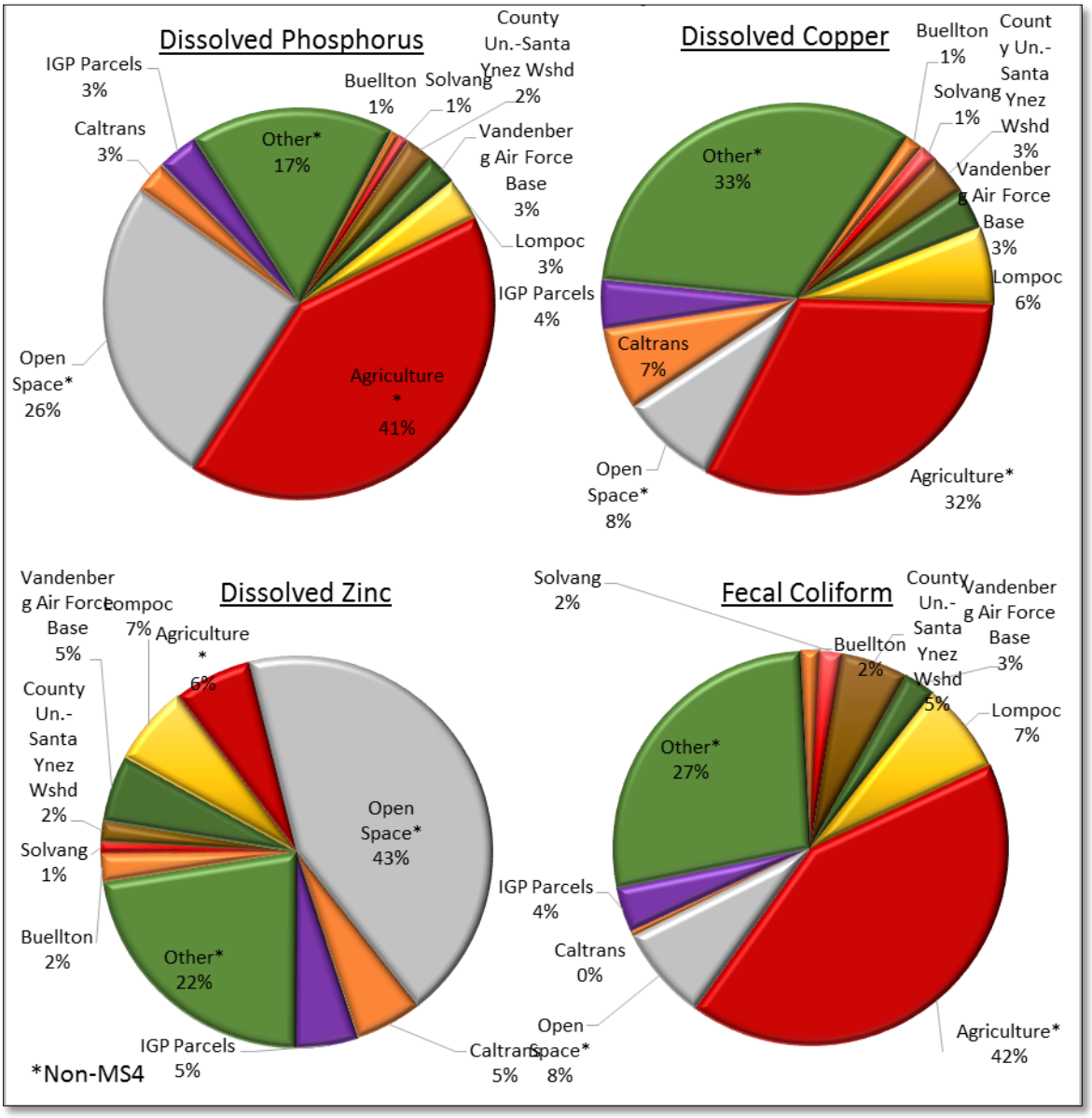

Figure 7. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez Watershed)

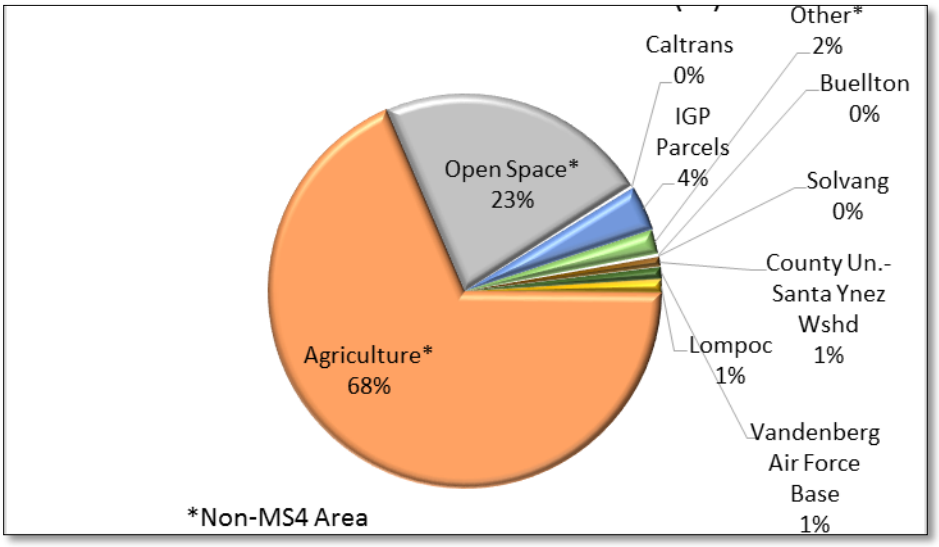

Figure 8. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez watershed) (for nitrate)

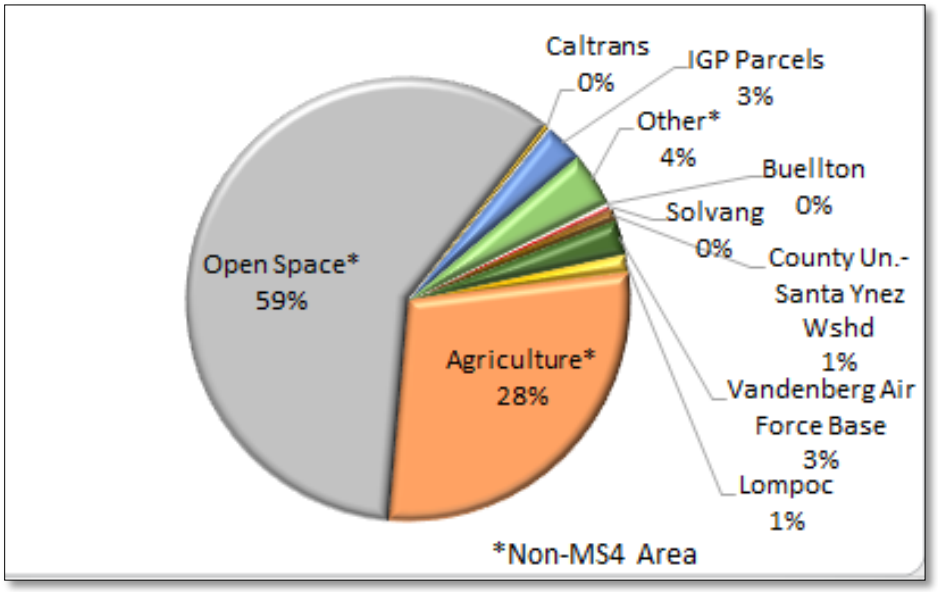

Figure 9. Percent of Average Annual Pollutant Load by MS4 Jurisdictions and non-MS4 Land Use (Santa Ynez watershed) (for TSS)

3.2 Prioritization

The LPRM also produces results for catchment prioritization, which reflect the relative magnitude of pollutant loading (per unit area) by catchment and illustrate the priority among catchments for certain types of BMP implementation. Catchment prioritization index (CPI) scores were developed for individual pollutants and multiple pollutants weighted based on priority. For the multiple pollutant weighting, pollutants that are identified on the State's 303(d)

list or have an applicable TMDL for the water body in question are assigned a higher priority. The weighting value for water body-pollutant combinations with a 303(d)-listing is 2, water body-pollutant combinations with an approved TMDL have a weighting factor of 3, and all other priority pollutants have a weight factor of 1 (i.e., no adjustment to the pollutant-specific CPI). CPI scores range from one to five in order to easily compare scores among catchments, with one representing smaller loads per unit area and five representing larger loads per unit area. Details of the catchment prioritization process are included in the PEAIP Approach to Quantify Pollutant Loads and Pollutant Load Reductions Memorandum (Geosyntec, 2015b). Pollutant weight factors for the City of Solvang are shown in Table 8.

.

Table 8. Priority Pollutant Weights for Catchment Prioritization

Pollutant	Weight Factor
Dissolved Phosphorus	3
Dissolved Copper	1
Dissolved Zinc	1
Fecal Coliform	1

The overall CPI scores by catchment for the MS4 Permit area, with priority pollutants weighted based on watershed-specific priorities are illustrated in Figure 10. Maps reflecting pollutant CPI scores for individual priority pollutants and TSS are included in Appendix A.

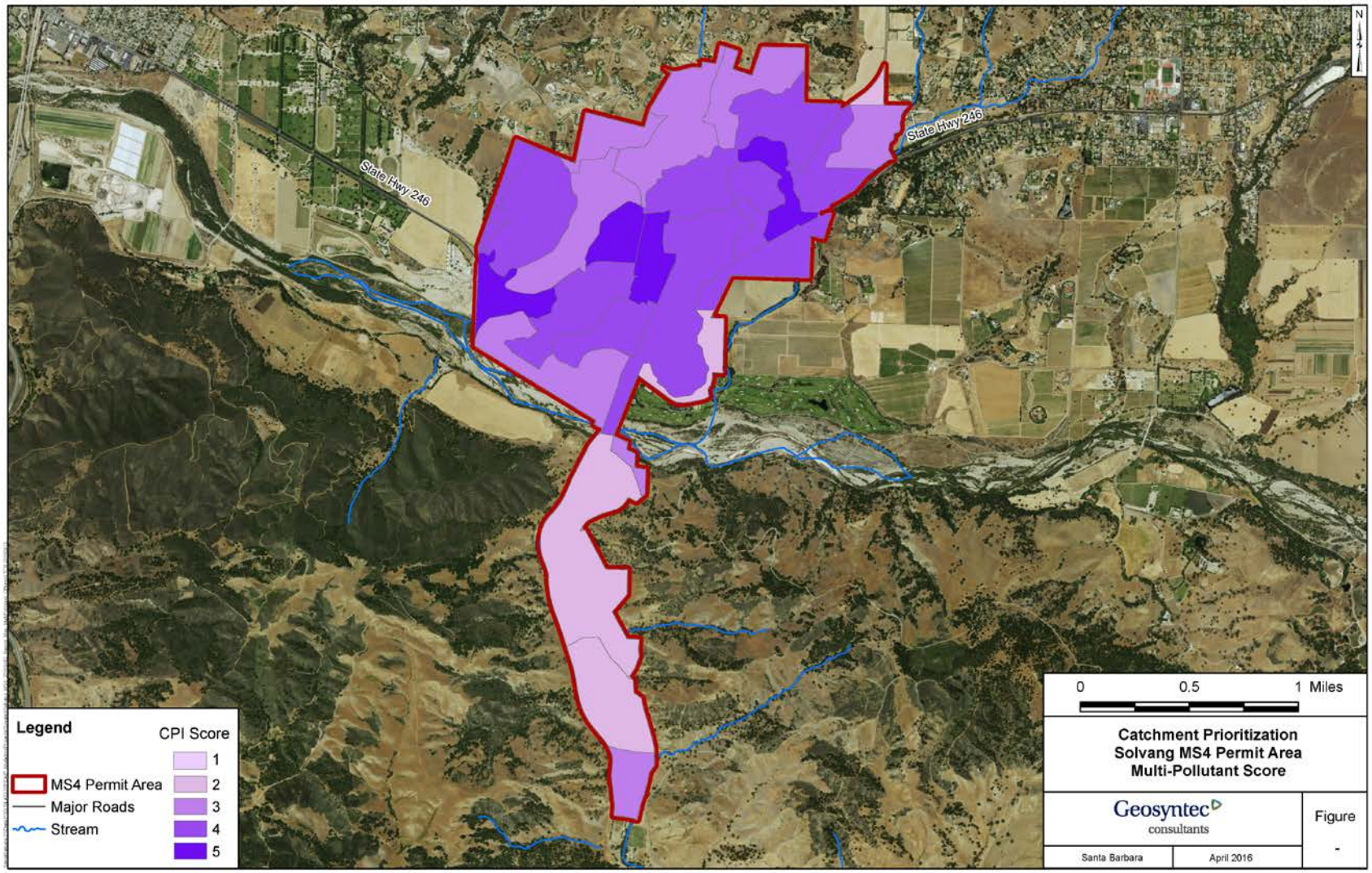

Figure 10. Multi-Pollutant CPI Map

3.3 BMP Load Reductions

The LPRM evaluates anticipated average annual runoff volume and pollutant load reductions resulting from implementation of BMPs within the MS4 Permit area. Figure 11 through Figure 16 illustrate the average annual baseline load and the average annual load after BMP implementation has occurred through a given year, after accounting for reductions achieved by previously implemented BMPs (i.e., to prevent double counting), and the breakdown of load reduction by BMP type for the priority pollutants. Load reductions reflecting all pollutants analyzed by the LPRM are included in Appendix A.

These plots illustrate the portion of the annual baseline load that has been reduced by BMP implementation and which BMP type is achieving the greatest anticipated load reductions. The jurisdiction may perform a cost-benefit analysis to compare the cost of implementation of different BMPs with the anticipated load reduction, in order to implement the most cost-effective BMPs.

The load reduction in dissolved copper was achieved by the brake pad phase-out legislation BMP, while the other non-quantified non-structural (CBSM) BMP provided the load reduction for bacteria. It is anticipated that future redevelopment will contribute to load reductions in dissolved phosphorus and dissolved zinc in future implementation years.

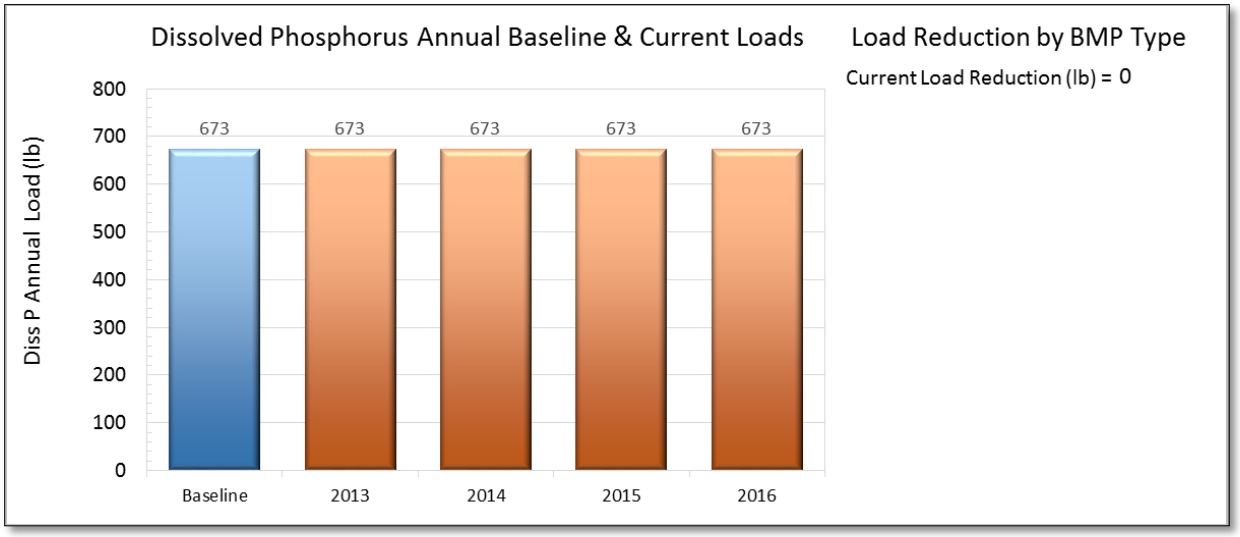

Figure 11. Dissolved Phosphorus Annual Loads and Reductions

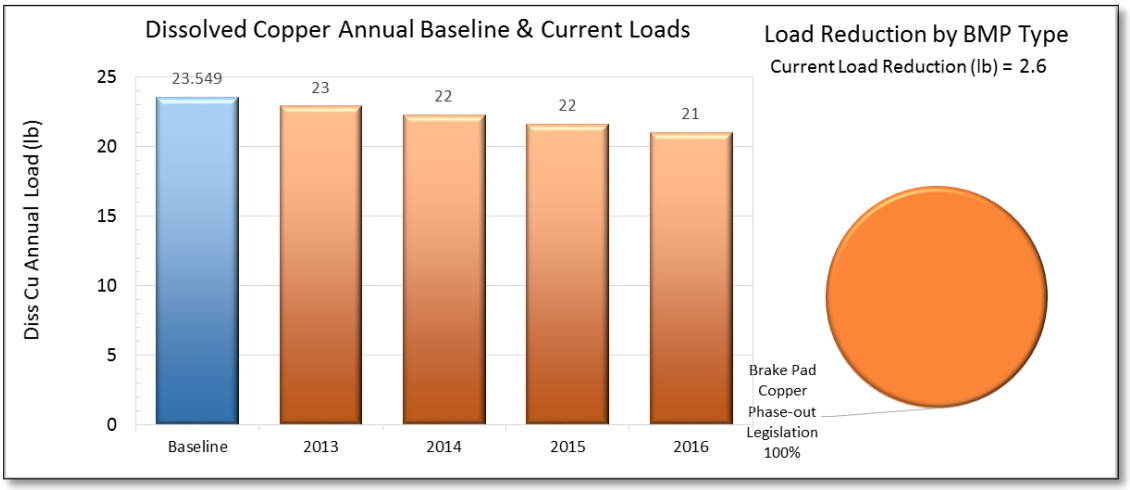

Figure 12. Dissolved Copper Annual Loads and Reductions

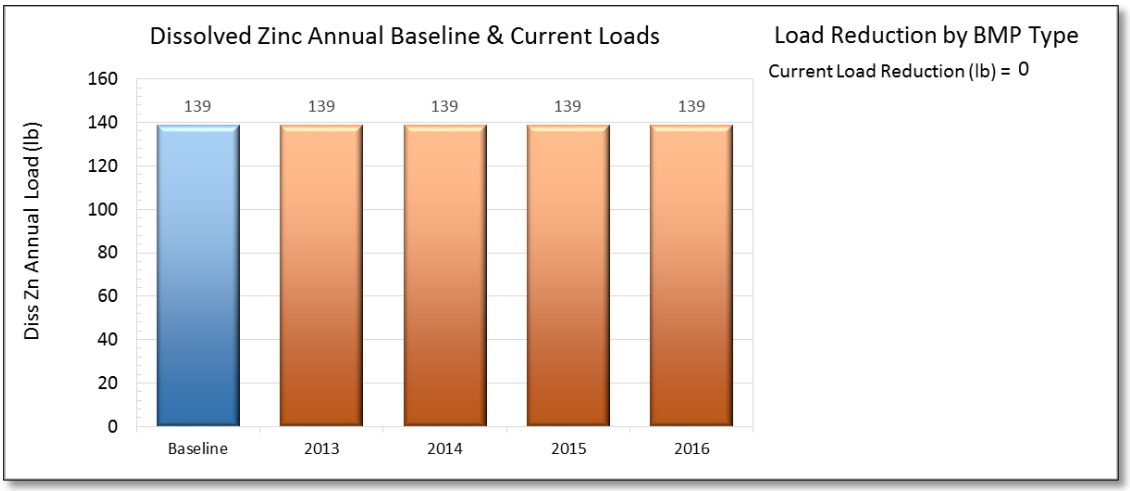

Figure 13. Dissolved Zinc Annual Loads and Reductions

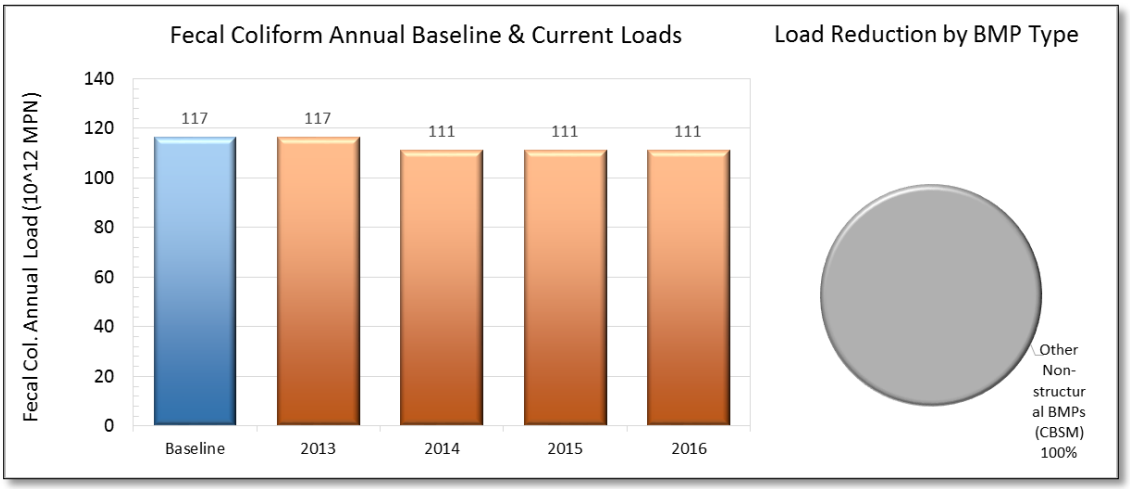

Figure 14. Fecal Coliform Annual Loads and Reductions

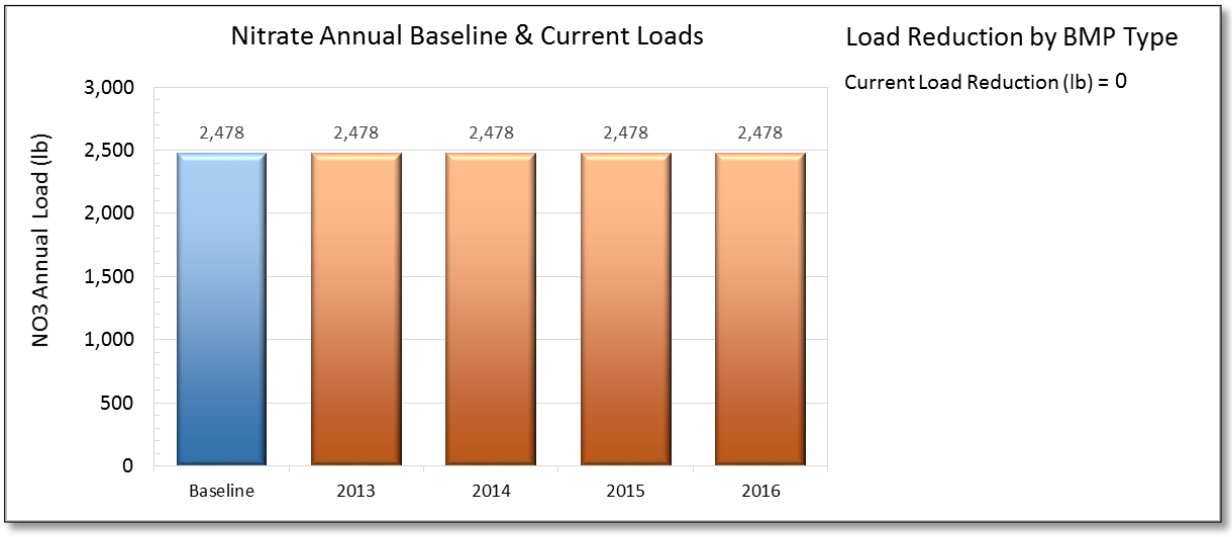

Figure 15. Nitrate Annual Loads and Reductions

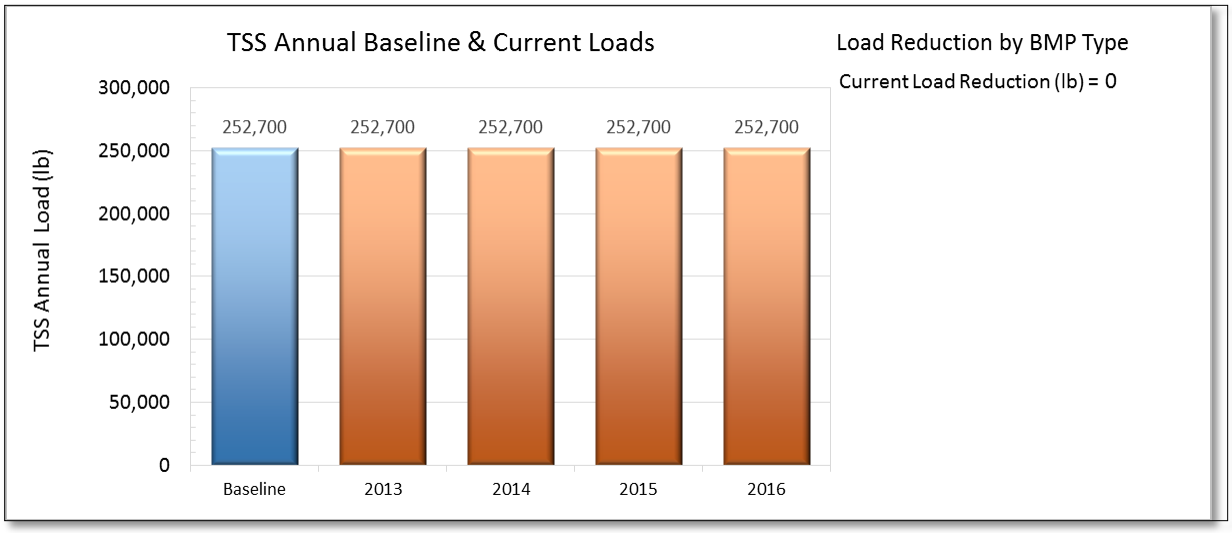

Figure 16. TSS Annual Loads and Reductions

3.4 Long-Term Planning

The LPRM can be used as a planning tool in addition to a BMP implementation tracking tool. It is anticipated that, in the future, other non-structural BMPs may be added and structural retrofit opportunities may be sought (e.g., through state grant funding), potentially resulting in a load reduction chart such as Figure 17.

The assumptions modeled for this **example hypothetical BMP implementation scenario** in the City of Goleta over the next 20 years, include:

- Redevelopment was implemented on all applicable land uses, using estimated annual redevelopment rates developed for the Los Angeles region (shown in Table 9).

Table 9. Estimated Annual Redevelopment Rates (City of Los Angeles Bureau of Sanitation, 2012)

Land Use	Annual Redevelopment Rate (% of total land use area)
Residential	0.18
Commercial	0.15
Industrial	0.34
Education	0.16
Transportation	2.7

- A structural infiltration-based BMP (infiltration basin) was modeled with a drainage area of 100 acres, 50 acres of single-family residential land use and 50 acres of commercial land use. It was assumed that the infiltration basin would capture 80 percent of the influent runoff volume and result in a 100 percent volume reduction of captured runoff. It was assumed that the infiltration basin was completed 15 years from now.
- The implementation of non-structural BMPs which do not have quantified reductions are modeled for the entire MS4 Permit area, assuming their combined benefit results increase each year to an estimated 10 percent reduction of all pollutant loads in 20 years from now.

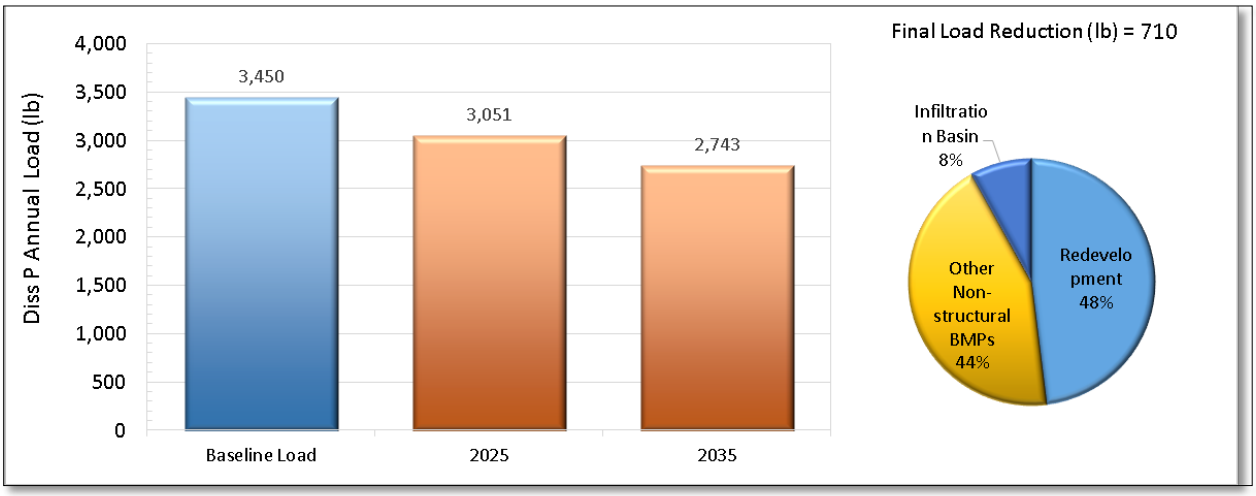

Figure 17. Dissolved Phosphorus Annual Loads and Reductions

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Appendix A – Supplemental Results

A.1 Baseline Loading

The average annual baseline loadings within the Solvang MS4 Permit area for all pollutants analyzed by the LPRM are shown in Table A-10.

Table A-10. Average Annual Baseline Loading for All Pollutants for the MS4 Permit area

Pollutant	Average Annual Baseline Load
Runoff (cu ft)	33,850,000
Total Suspended Solids - TSS (lb)	252,700
Total Phosphorus - Tot P (lb)	874
Dissolved Phosphorus – Diss P (lb)	673
Ammonia – NH3 (lb)	1,216
Nitrate – NO3 (lb)	2,478
Total Kjeldahl Nitrogen –TKN (lb)	5,845
Dissolved Copper – Diss Cu (lb)	24
Total Copper – Tot Cu (lb)	47
Total Lead – Tot Pb (lb)	21
Dissolved Zinc – Diss Zn (lb)	139
Total Zinc – Tot Zn (lb)	250
Fecal Coliform (MPN^12)	117

Table A-11 shows the distribution of the average annual baseline loads per acre for all pollutants, illustrating which land uses are generating the greatest pollutant loading per unit area.

Table A-11. Average Annual Baseline Loading for the MS4 Permit Area by Land Usefor All Pollutants

Land Use	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	lb/ acre	10^12 MPN/ acre
Single-Family Residential	22,000	170	0.55	0.44	0.67	1.1	4.1	0.013	0.026	0.016	0.038	0.099	0.097
Commercial	55,000	230	1.4	0.99	4.1	1.9	12	0.042	0.11	0.042	0.52	0.81	0.085
Industrial													
Education	32,000	200	0.59	0.51	0.79	1.2	3.4	0.024	0.039	0.0071	0.15	0.23	0.11
Transportation	55,000	270	2.3	1.9	1.3	2.5	6.3	0.11	0.18	0.031	0.76	1	0.026
Multi-Family Residential	34,000	85	0.49	0.43	1.1	3.2	3.8	0.016	0.026	0.0096	0.16	0.27	0.11
Agriculture	6,400	400	1.3	0.56	0.66	14	2.9	0.009	0.04	0.012	0.016	0.11	0.045
Open Space	6,000	81	0.045	0.033	0.041	0.44	0.36	0.00022	0.0039	0.0011	0.01	0.0098	0.00082

The City of Solvang MS4 Permit area is located within the Santa Ynez watershed, as shown in Figure A-18. Average annual baseline loading within the Santa Ynez watershed, including a breakdown of contributions from MS4 and non-MS4 areas, is shown in Table A-12 for all pollutants.

Table A-12. Average Annual Baseline Watershed Loading for All Pollutants

Area	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	10^12 MPN
Solvang MS4 Area	0.67%	0.31%	0.64%	0.87%	1.2%	0.22%	1.0%	1.5%	0.71%	1.0%	0.98%	1.1%	1.9%
Other MS4 Permit Areas	9.0%	5.0%	6.7%	9.1%	15%	3.0%	12%	15%	8.9%	12%	16%	15%	17%
Agriculture*	7%	28%	56%	41%	38%	68%	30%	32%	35%	34%	6%	27%	42%
Open Space*	69%	59%	19%	26%	24%	22%	37%	8%	35%	32%	44%	25%	7.7%
Caltrans	1.1%	0.33%	1.8%	2.6%	1.3%	0.22%	1.1%	6.8%	2.7%	1.6%	5.5%	4.3%	0.43%
IGP Parcels	2.4%	2.8%	3.7%	3.4%	3.7%	3.7%	3.2%	4.0%	3.5%	3.5%	5.2%	5.2%	3.7%
Other*	11%	4%	12%	17%	16%	2%	15%	33%	15%	16%	22%	22%	27%
Total Watershed	5.08E+09	8.11E+07	136,400	77,300	99,000	1,155,600	560,400	1,615	6,630	2,054	14,240	23,100	6,237

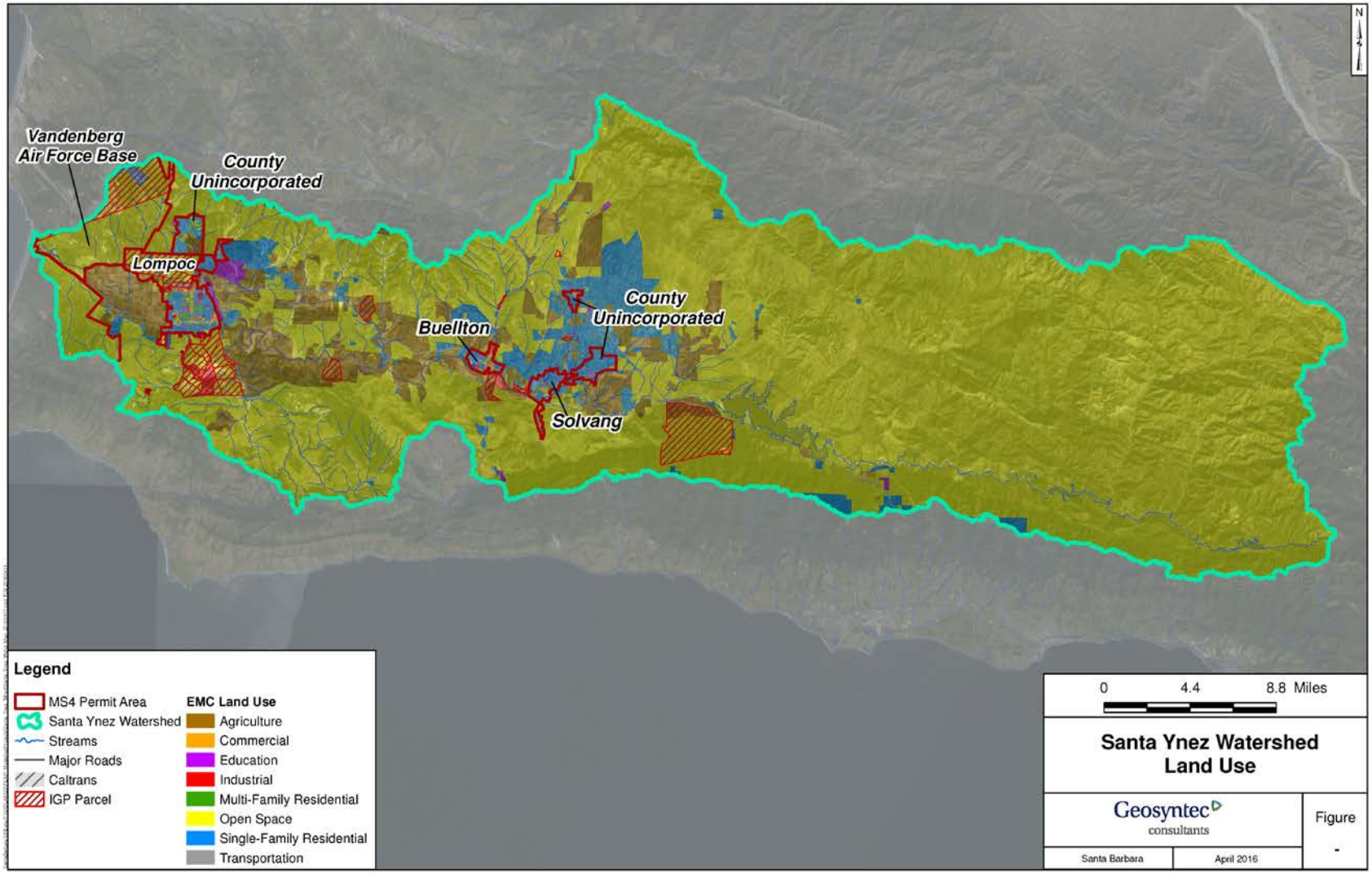

Figure A-18. Santa Ynez Watershed

A.2 Prioritization

The LPRM produces catchment prioritization results for individual pollutants. Estimated annual baseline loads are used to develop pollutant catchment prioritization index (PCPI) scores that represent the relative magnitude of pollutant loading per unit area in each catchment. These PCPI scores for priority pollutants are displayed in Figure A-19 through Figure A-24.

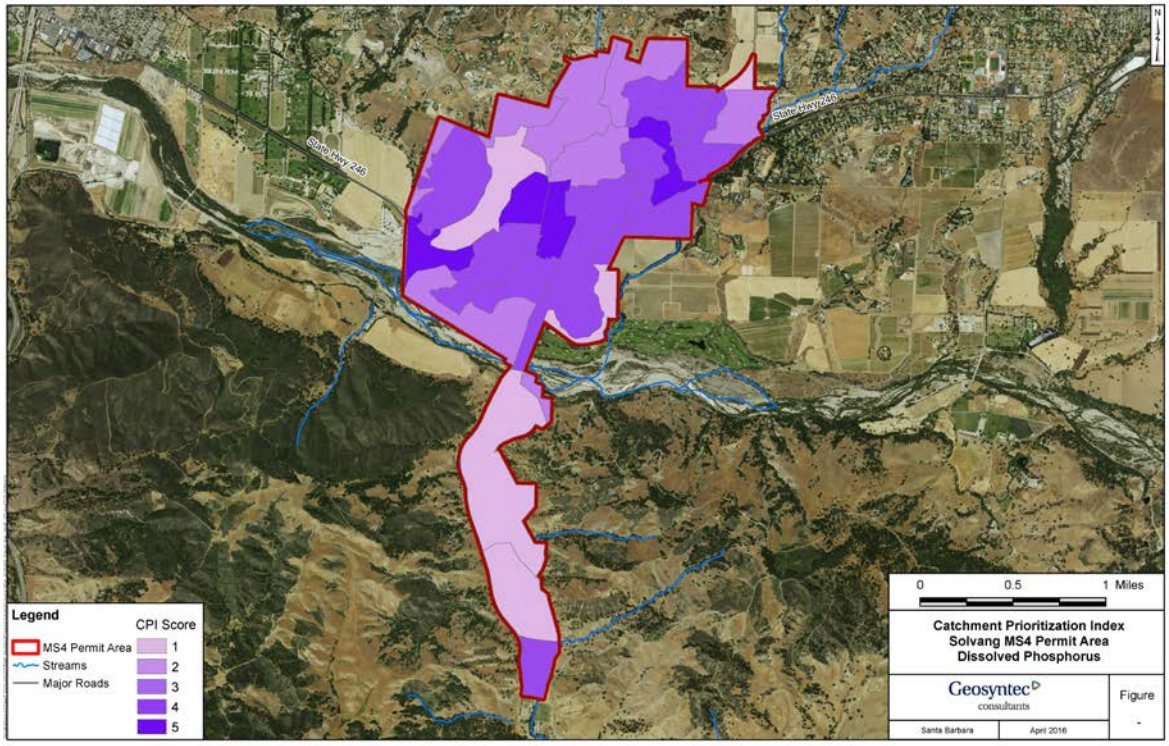

Figure A-19. CPI Scores for Dissolved Phosphorus

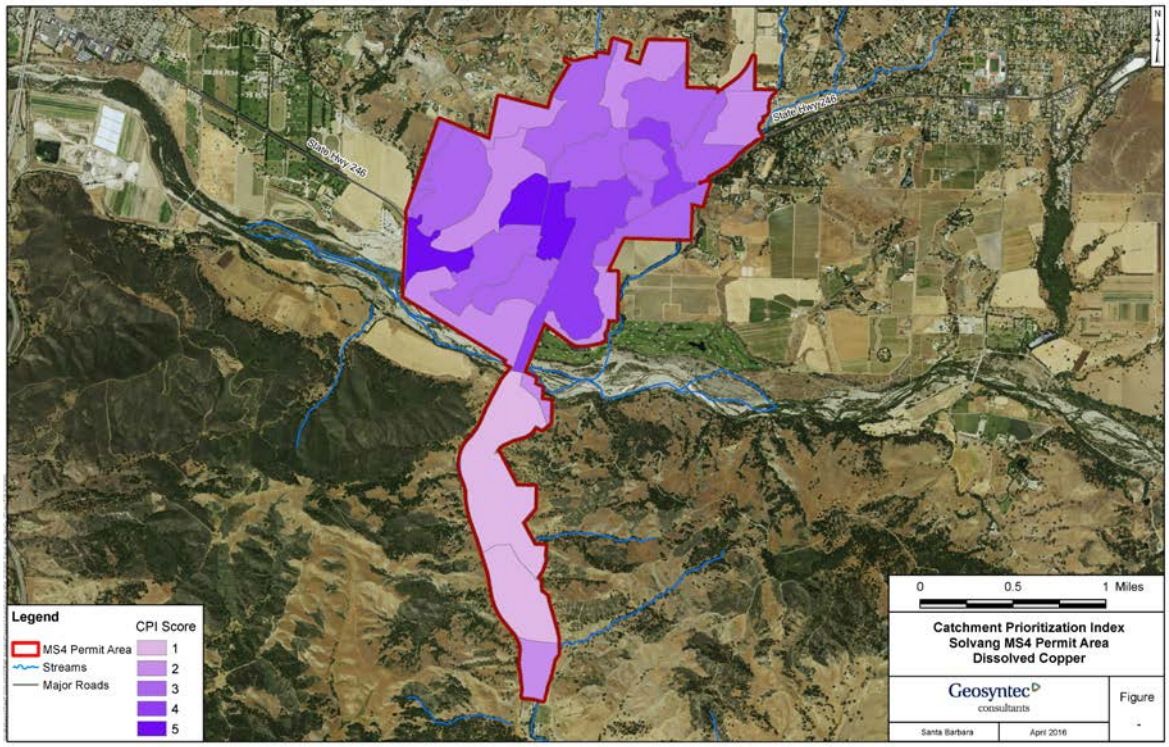

Figure A-20. CPI Scores for Dissolved Copper

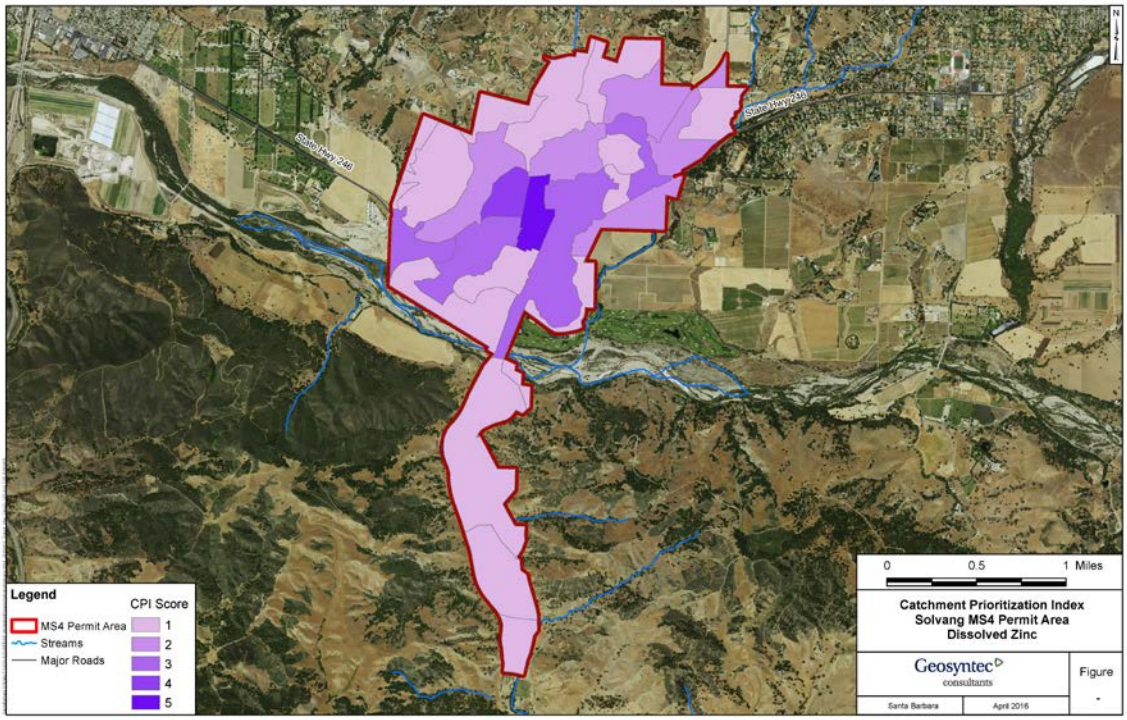

Figure A-21. CPI Scores for Dissolved Zinc

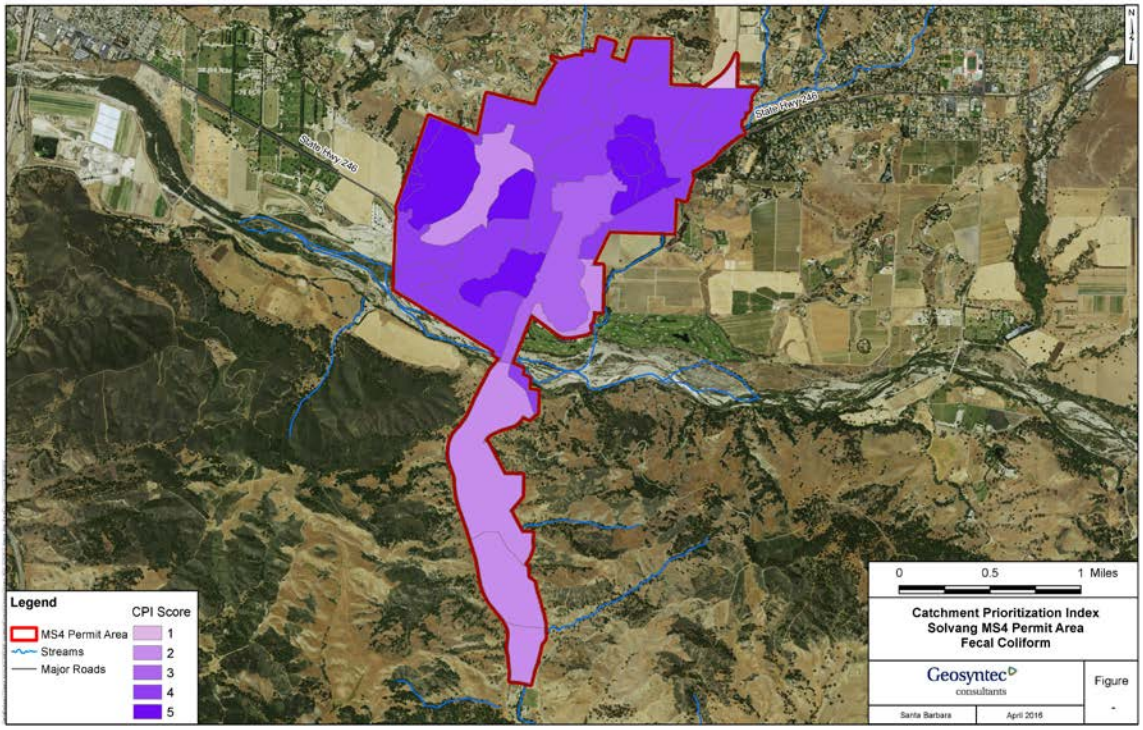

Figure A-22. CPI Scores for Fecal Coliform

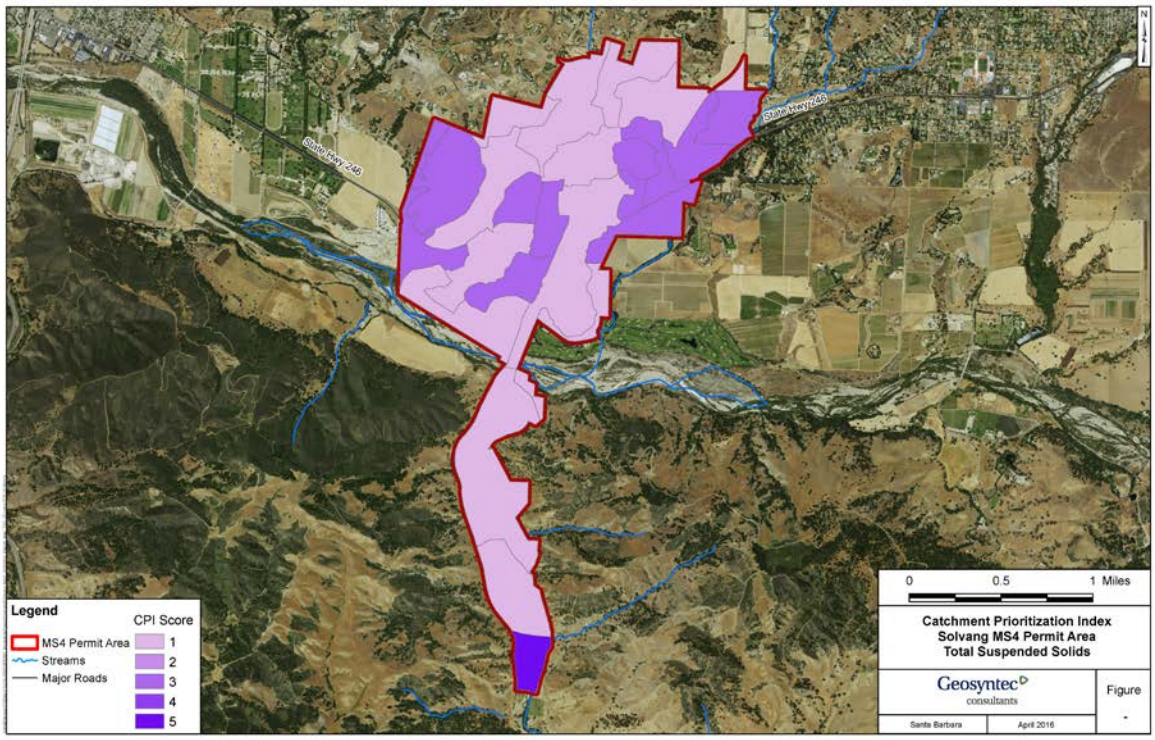

Figure A-23. CPI Scores for TSS

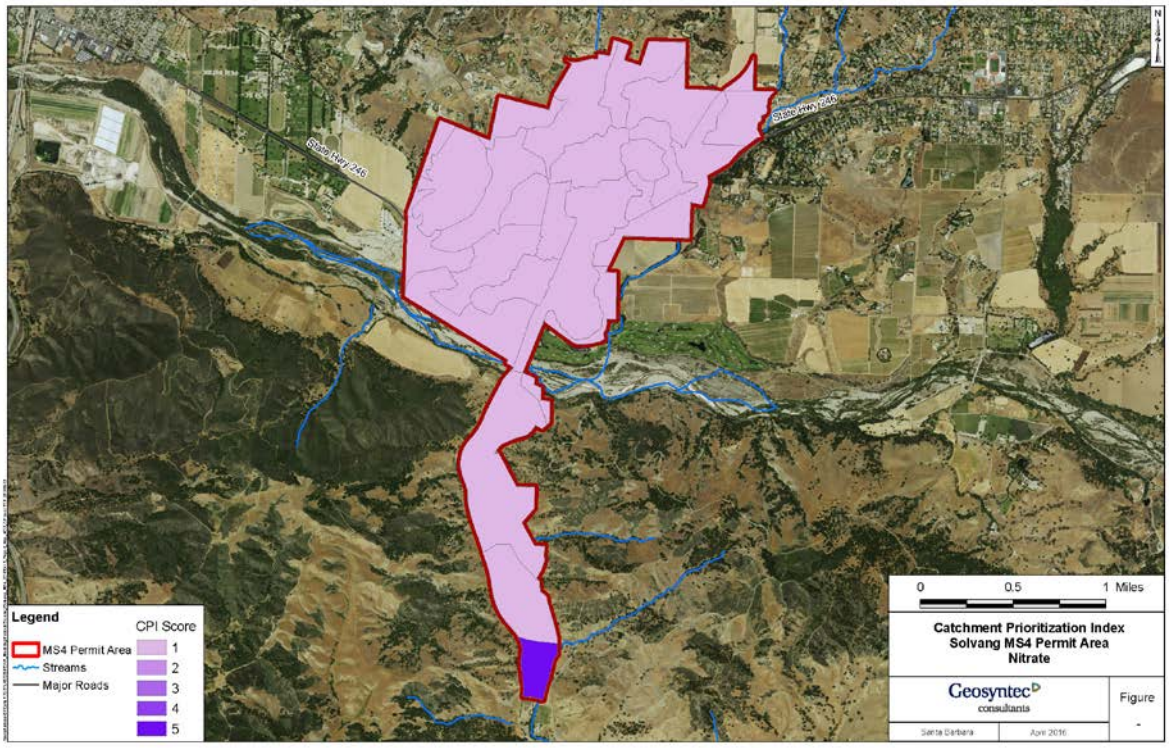

Figure A-24. CPI Scores for Nitrate

A.3 Reductions

Anticipated runoff volume and pollutant load reductions achieved by implementation of BMPs within the MS4 Permit area are evaluated by the LPRM. Table A-13 shows annual baseline and current loads, after subtracting reductions achieved by BMPs, for all pollutants analyzed. Table A-14 shows the current load reductions achieved by each BMPs implemented for all pollutants analyzed.

Table A-13. Total Load Reduction for All Pollutants

Load	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	10^12 MPN
Baseline	33,850,000	252,700	874	673	1,216	2,478	5,845	23.549	47.4	21.32	139	250	117
Reduction								2.6	5.2				5.2
% Reduction	0%	0%	0%	0%	0%	0%	0%	11.0%	11.0%	0%	0%	0%	4.5%
Current	33,850,000	252,700	874	673	1,216	2,478	5,845	20.949	42.2	21.32	139	250	111
Current Load by Year													
2013	33,850,000	252,700	874	673	1,216	2,478	5,845	23	46	21	139	250	117
2014	33,850,000	252,700	874	673	1,216	2,478	5,845	22	45	21	139	250	111
2015	33,850,000	252,700	874	673	1,216	2,478	5,845	22	44	21	139	250	111
2016	33,850,000	252,700	874	673	1,216	2,478	5,845	21	42	21	139	250	111

Table A-14. BMP Load Reductions for All Pollutants

BMP Type	Runoff	TSS	Tot P	Diss P	NH3	NO3	TKN	Diss Cu	Tot Cu	Tot Pb	Diss Zn	Tot Zn	Fecal Col.
	cu ft	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	lb	MPN ^12
Redevelopment													
Brake Pad Copper Phase-out Legislation								2.6	5.2				
Other Non-structural BMPs (CBSM)													5.2

Appendix B – Supplemental Model Input Data

B.1 Within MS4 Permit Area

Table B-15. Typical Imperviousness and EMC Land Use Groups based on Land Use[1]

Land Use	EMC Land Use Group	Imperviousness (%)
1 Dwelling Unit / 3 Acres	Single-Family Residential	21
1 Dwelling Unit / Acre	Single-Family Residential	21
10,000 Square Feet	Single-Family Residential	42
20,000 Square Feet	Single-Family Residential	21
7,000 Square Feet	Single-Family Residential	42
8,000 Square Feet	Single-Family Residential	42
Agricultural	Agriculture	2
Design Residential[2]	Multi-Family Residential	42
General Commercial	Commercial	91
Institutional	Education	47
Light Industry	Industrial	80
Mobile Home Park	Multi-Family Residential	74
Professional Institutional	Education	47
Professional Office	Commercial	91
Recreational	Open Space	3
Resource Management	Open Space	1
Retail Commercial	Commercial	91
Tourist Related Commercial	Commercial	91
Transportation	Transportation	91

[1] Some values of imperviousness or EMC land use classifications were adjusted based on visual inspection of aerial imagery or knowledge of the area.

[2] Imperviousness for "Planned" or "Design" land use designations were predominately determined by visual inspection of aerial imagery to reflect current land use designations.

B.2 Outside MS4 Permit Area

Table B-16. Land Use and Imperviousness in the County of Santa Barbara (outside MS4 Permit area)

Land Use	EMC Land Use	Imperviousness (%)
Air Force Base	Varies based on aerial imagery	Varies based on aerial imagery
APARTMENTS, 5 OR MORE UNITS	Multi-Family Residential	74
AUDITORIUMS, STADIUMS	Commercial	91
AUTO SALES, REPAIR, STORAGE, CAR WASH, ETC	Commercial	91
BANKS, S&LS	Commercial	91

Land Use	EMC Land Use	Imperviousness (%)
BEACHES, SAND DUNES	Open Space	1
BED AND BREAKFAST	Multi-Family Residential	74
BOWLING ALLEYS	Commercial	91
CAMPS, CABINS	Open Space	2
CHURCHES, RECTORY	Education	82
CLUBS, LODGE HALLS	Education	47
COLLEGES	Education	47
COMMERCIAL (MISC)	Commercial	91
COMMERCIAL AND OFFICE CONDOS,PUDS	Commercial	91
CONDOS,COMMUNITY APT PROJS	Multi-Family Residential	86
DAIRIES	Agriculture	42
DANCE HALLS	Commercial	91
DAY CARE	Education	68
DEPARTMENT STORES	Commercial	95
DRIVE-IN THEATRES	Commercial	91
DRY FARMS (MISC)	Open Space	1
FEED LOTS	Agriculture	2
FIELD CROPS-IRRIGATED	Agriculture	2
FIELD CROPS, DRY	Open Space	1
FLOWERS	Agriculture	2
GOLF COURSES	Open Space	3
HEAVY INDUSTRY	Industrial	90
HIGHWAYS AND STREETS	Transportation	91
HORSES	Agriculture	42
HOSPITALS	Commercial	74
HOTELS	Multi-Family Residential	96
INDUSTRIAL CONDOS,PUDS	Industrial	80
INDUSTRIAL, MISC	Industrial	80
INSTITUTIONAL (MISC)	Education	82
IRRIGATED FARMS, MISC	Agriculture	2
LIGHT MANUFACTURING	Industrial	80
LUMBER YARDS, MILLS	Industrial	91
MINERAL PROCESSING	Industrial	10
MINING	Industrial	10
MISCELLANEOUS	Open Space	2
MIXED USE-COMMERCIAL/RESIDENTIAL	Commercial	82
MOBILE HOME PARKS	Multi-Family Residential	74
MOBILE HOMES	Multi-Family Residential	74
MORTUARIES,CEMETERIES,MAUSOLEUMS	Education	10

Land Use	EMC Land Use	Imperviousness (%)
NURSERIES,GREENHOUSES	Agriculture	15
OFFICE BUILDINGS, MULTI-STORY	Commercial	91
OFFICE BUILDINGS, SINGLE STORY	Commercial	91
OPEN STORAGE, BULK PLANT	Commercial	40
ORCHARDS	Agriculture	2
ORCHARDS, IRRIGATED	Agriculture	2
OTHER FOOD PROCESSING, BAKERIES	Commercial	91
PACKING PLANTS	Industrial	91
PARKING LOTS	Transportation	91
PARKS	Open Space	1
PASTURE-IRRIGATED	Agriculture	2
PASTURE OF GRAZING, DRY	Open Space	1
PETROLEUM AND GAS	Industrial	91
PIPELINES,CANALS	Water	100
POULTRY	Industrial	91
PROFESSIONAL BUILDINGS	Commercial	91
PUBLIC BLDGS,FIREHOUSES,MUSEUMS,POST OFFICES,ETC	Commercial	91
RACE TRACKS, RIDING STABLES	Agriculture	42
RANCHO ESTATES (RURAL HOME SITES)	Single-Family Residential	12
RECREATION	Education	10
RECREATIONAL OPEN (MISC)	Open Space	1
RESIDENTIAL INCOME, 2-4 UNITS	Multi-Family Residential	74
REST HOMES	Education	80
RESTAURANTS,BARS	Commercial	91
RETAIL STORES, SINGLE STORY	Commercial	96
RIGHTS OF WAY,SEWER,LAND FILLS,ETC	Open Space	1
RIVERS AND LAKES	Water	100
SCHOOLS	Education	82
SERVICE STATIONS	Commercial	91
SHOPPING CENTERS (NEIGHBORHOOD)	Commercial	91
SHOPPING CENTERS (REGIONAL)	Commercial	95
SINGLE FAMILY RESIDENCE	Single-Family Residential	42
STORE AND OFFICE COMBINATION	Commercial	91
SUPERMARKETS	Commercial	91
TREE FARMS	Agriculture	2
TRUCK CROPS-IRRIGATED	Agriculture	2
UTILITY,WATER COMPANY	Industrial	91
VACANT	Open Space	1

Land Use	EMC Land Use	Imperviousness (%)
VINES AND BUSH FRUIT-IRRIGATED	Agriculture	2
VINEYARDS	Agriculture	2
WAREHOUSING	Industrial	91
WASTE	Industrial	96
WATER RIGHTS,PUMPS	Industrial	91
WHOLESALE LAUNDRY	Commercial	91
TRANSPORTATION	Transportation	91

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2015-2016

Phase II Small MS4 Annual - Report

REPORTING PERIOD:07/01/2015 - 06/30/2016

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Permittee Information

City of Buellton

Marc Bierdzinski

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Buellton

CA

93427

Phase II Small MS4 Annual - Report - 2015-2016

Questions & Answers

Q No.	Text	DropDown Answer	CheckBoxAnswer	DescriptiveAnswer	Date Answer	Number Answer
1	Did the Permittee upload the Central Coast Post-Construction Stormwater Requirements annual reporting form and all other documents required in the form? Access form here. If the form does not open, right click on the hyperlink and chose the option, 'Save Target As'. To get full utilization of the form, the form must be viewed and completed using Adobe software. Adobe Reader can be downloaded for free.	Yes				

Phase II Small MS4 Annual - Report - 2015-2016

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualilfied personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that threre are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: Rose Hess	**Title: Director of Public Works**	**Date: 10/14/2016**

Phase II Small MS4 Annual - Report - 2015-2016

ATTACHMENTS

Attachment Title	Description	Date Uploaded	Attachment Type	Attachment Hash	Doc Part No/Total Parts
Central Coast Post-Construction SWMR Annual Report Form-Buellton	Central Coast Post-Construction SWMR Annual Report Form-Buellton-FY2015-2016	2016-10-06 11:10:05.0	Supporting Documentation	505a4e248e636cd9276fc018e9b8db24ea54fdd01784fd37eab8ea159525e7e9	1/1
Central Coast Post-Construction SWMR Annual Report Form-Solvang	Central Coast Post-Construction SWMR Annual Report Form-Solvang-FY2015-2016	2016-10-06 11:10:09.0	Supporting Documentation	5cddc3d124d6d6b2b6c865c69460915df6847c43e27badf7f96b967cbae1911f	1/1

Central Coast Post-Construction Stormwater Management Requirements (PCRs)

Resolution No. R3-2013-0032

Annual Reporting Form

August 2014 Version

Due Date: By October 15, 2014 and October 15 annually thereafter, Permittees must submit this reporting form.

Instructions: Complete form electronically. Answer questions and supply requested information for the Reporting Period only. Upload completed form to Storm Water Multiple Application and Report Tracking System (SMARTS) and name the file, "*PCRs Annual Report [insert reporting period]".* Also, upload requested attachments to SMARTS using specified nomenclature.

SECTION I: GENERAL PERMITTEE INFORMATION

WDID# and Permittee Name: 3 42M2000150 - City of Buellton

County: Santa Barbara

SECTION II: REPORTING PERIOD

Reporting Period: 7/1/2015 - 6/30/2016

SECTION III: COMPLETED PROJECTS

How many projects, that received occupancy completion documentation (e.g., Certificate of Occupancy) during the Reporting Period, created and/or replaced ≥ 2,500 square feet of impervious surface? 0

SECTION III: CONTINUED ...

Project categories based on created and/or replaced impervious surface area		Number of Projects in each category that received occupancy completion documentation (e.g., Certificate of Occupancy) during the Reporting Period and had an approval per PCRs Provision B.1.c
Lower Bound	**Upper Bound**	
≥ 2,500 square feet	<5,000 square feet Net Impervious Area (all projects except single-family homes) and <15,000 square feet Net Impervious Area (only single-family homes)	0
≥5,000 square feet Net Impervious Area (all projects except single-family homes) and ≥15,000 square feet Net Impervious Area (only single-family homes)	<15,000 square feet (all projects except single-family homes) and <15,000 square feet Net Impervious Area (only single-family homes)	0
≥15,000 square feet (all projects except single-family homes) and ≥15,000 square feet Net Impervious Area (only single-family homes)	<22,500 square feet	0
≥22,500 square feet	N/A	0
Total		0

SECTION IV: PROJECTS SUBJECT TO POST-CONSTRUCTION REQUIREMENTS

Performance Requirements*	Number of Projects subject to Performance Requirements that received completion documentation during the Reporting Period	Number of Projects with structural Water Quality Treatment, Runoff Retention, and/or Peak Management controls	Number of Projects where field verification of Site Design, Water Quality Treatment, Runoff Retention, and/or Peak Management controls was completed	Number of Projects where field verification confirmed ALL Site Design, Water Quality Treatment, Runoff Retention, and/or Peak Management controls were implemented in accordance with PCRs
Only No. 1	0	N/A		
Only Nos. 1 and 2		0		
Only Nos. 1, 2, and 3			0	
Only Nos. 1, 2, 3, and 4				0
Total	0	0	0	0

* Only include projects once in table. For example, if a project triggers all four performance requirements, only address that project in the, “Only Nos. 1, 2, 3, and 4” row. Do not also count the project in the cells for the above three rows.

SECTION V: SPECIAL CIRCUMSTANCES AND ALTERNATIVE COMPLIANCE

Note: If the Permittee did not grant any Special Circumstances and/or Alternative Compliance for Projects that received completion documentation during the Reporting Period, skip Section V.

To add another Project, click 'Add Row'

Add Row | Delete Row

	Alternative Compliance type (Select all that apply)								
Names of Projects that received completion documentation during the Reporting Period and the Permittee granted Special Circumstances and/or Alternative Compliance	Watershed or Regional Plan	Urban Sustainability Area	Highly Altered Channel Special Circumstance	Intermediate Flow Control Facility Special Circumstance	Historic Lake or Wetland Special Circumstance	Technical Infeasibility Performance Requirement No. 2	Technical Infeasibility Performance Requirement No. 3	Technical Infeasibility Performance Requirement No. 4	**If technical infeasibility is rationale for Alternative Compliance, does Project's Stormwater Control Plan adequately demonstrate basis for infeasibility?**
	☐	☐	☐	☐	☐	☐	☐	☐	N/A

SECTION V: CONTINUED ...

To add another Project, click 'Add Row'

Add Row | Delete Row

	Alternative Compliance type (Select all that apply)								
Names of Projects that received completion documentation during the Reporting Period and the Permittee granted Special Circumstances and/or Alternative Compliance	Watershed or Regional Plan	Urban Sustainability Area	Highly Altered Channel Special Circumstance	Intermediate Flow Control Facility Special Circumstance	Historic Lake or Wetland Special Circumstance	Technical Infeasibility Performance Requirement No. 2	Technical Infeasibility Performance Requirement No. 3	Technical Infeasibility Performance Requirement No. 4	**If technical infeasibility is rationale for Alternative Compliance, does Project's Stormwater Control Plan adequately demonstrate basis for infeasibility?**
	☐	☐	☐	☐	☐	☐	☐	☐	N/A

SECTION VI: MITIGATION PROJECTS CONSTRUCTED FOR ALTERNATIVE COMPLIANCE

Were there any mitigation projects constructed for Alternative Compliance during the Reporting Period? ○ Yes ◉ No

If yes, did the Permittee upload to SMARTS the below information?

- A summary description of mitigation projects constructed during the Reporting Period comparing the expected aggregate results of Alternative Compliance projects to the results that would otherwise have been achieved by meeting the numeric Performance Requirements on-site. The summary should quantitatively compare results. For example, if the Alternative Compliance project is mitigating for a project that could not fully meet Performance Requirement No. 3 onsite, then the summary should quantify the following: 1) onsite retention volume required by Performance Requirement No. 3, 2) volume of runoff actually retained on site, and 3) volume of runoff retained at the Alternative Compliance project site.
- For public offsite mitigation projects, a summation of total offsite mitigation funds raised to date and a description (including location, general design concept, volume of water expected to be retained, and total estimated budget) of all pending public offsite mitigation projects

SMARTS upload title: "*PCRs Annual Report [insert reporting period] – Mitigation Projects"*

SECTION VII: LONG-TERM OPERATION AND MAINTENANCE

Did the Permittee upload to SMARTS a copy (e.g., screenshot) of the structural Stormwater Control Measure Operation and Maintenance database that shows all entries from the Reporting Period (see PCRs Provision E.3)? ○ Yes ◉ No

SMARTS upload title: "*PCRs Annual Report [insert reporting period] – Long-Term Operation and Maintenance*"

SECTION VIII: ADDITIONAL UPLOADS

Did the Permittee upload to SMARTS information to demonstrate Performance Requirement No. 1 was applied to all applicable projects during the Reporting Period (including sample checklist)? ○ Yes ◉ No

SMARTS upload title: "*PCRs Annual Report [insert reporting period] – Performance Req No1 Implementation"*

Central Coast Post-Construction Stormwater Management Requirements (PCRs)

Resolution No. R3-2013-0032

Annual Reporting Form

August 2014 Version

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WDID# and Permittee Name: 3 42M2000036 - City of Solvang

County: Santa Barbara

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Add Row | Delete Row

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	☐	☐	☐	☐	☐	☐	☐	☐	N/A

SECTION V: CONTINUED ...

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Add Row | Delete Row

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SMARTS upload title: "*PCRs Annual Report [insert reporting period] – Performance Req No1 Implementation"*

Report Summary Text File - Auto-generated by SMARTS on 10/14/2016 14:18:09

Name of Report: Central Coast Post-Construction Stormwater Requirements Annual Reporting 2015 - 2016 Annual

Certifier Name: Rose Hess
Certifier Title: Director of Public Works
Certifier Password Hash:
4e1ffe8558da4a65ec301aa56411a53c70684a2a605feb5997e1932e062464c8

Certifier User Account ID: 626600
Certification Computer IP: 198.143.34.1
Certification Executed On:
WARNING - Unable to Retrieve Certifier Details or Confirmation Number