



CITY OF DANA POINT CAPISTRANO BEACH STORM DRAIN IMPROVEMENT PROJECT



FINAL REPORT SWRCB Agreement No. 02-233-550-1

**PREPARED BY THE CITY OF DANA POINT
PUBLIC WORKS & ENGINEERING DEPARTMENT**

NOVEMBER 2007

Acknowledgements

The success of the City of Dana Point and its projects is dependent upon partnerships and cooperation with a myriad of different organizations and agencies. The City would like to recognize the following groups, all of which have contributed to this project in one form or another.

The City of Dana Point Council and Staff
State Water Resources Control Board
San Diego Regional Water Quality Control Board
South Orange County Wastewater Authority
South Coast Water District
County of Orange
Orange County Flood Control District
Orange County Health Care Agency
Associated Laboratories
Capistrano Bay Estates
State of California Department of Fish & Game
United States Army Corps of Engineers
State of California Department of Transportation
Metrolink

TABLE OF CONTENTS

EXECUTIVE SUMMARY

LIST OF ACRONYMS / SELECT TECHNICAL TERMS

1.	INTRODUCTION	1
1.1	Problem Statement & Existing Conditions.....	1
1.2	Project's Objective & Scope	2
1.3	Project Outcomes/Effectiveness/Benefits.....	3
1.4	Approach & Techniques	3
2.	TASK PRODUCTS & SCHEDULE OF COMPLETION	5
3.	PROJECT RESULTS	6
3.1	Project's Effectiveness in Achieving Goals.....	6
3.1.1	County of Orange Health Care Agency Annual Ocean & Bay Water Quality Report.....	6
3.1.2	Heal the Bay Annual Beach Report Card	7
3.1.3	Project's Effectiveness Evaluation in Compliance with Monitoring Plan (MP) & Quality Assurance Project Plan (QAPP)	7
3.1.4	Additional Benefits.....	12
4.	A LOOK TO THE FUTURE	13

REFERENCES

LIST OF TABLES

TABLE 1.1	Summary of Beach Postings	1
TABLE 2.1	Task Products & Schedule of Completion	5
TABLE 3.1	Bacteria Loading Upstream and Downstream of Hydrodynamic Separator	11
TABLE 3.2	Quantity of Material Removed from Hydrodynamic Separator	11
TABLE 4.1	Summary of Water Quality Projects and Costs	13

LIST OF FIGURES

FIGURE 1.1	Beautiful Capistrano Beach	1
FIGURE 1.2	Project Site Map	2
FIGURE 1.3	Previous Condition of Eroded Beach.....	3
FIGURE 1.4	Illustration of Solids Removal Unit.....	4
FIGURE 3.1	Capistrano County Beach and Feathered Beach Users.....	7
FIGURE 3.2	Sample Points at Diversion	9
FIGURE 3.3	AB411 Sample Sites and Location of Diversion System	10

APPENDICES

APPENDIX A Monitoring Data

**City of Dana Point Capistrano Beach Storm Drain Diversion Project
Executive Summary**



Project Description/Purpose/Approach: Capistrano County Beach, located in the City of Dana Point, is one of the most highly used beaches in the State of California and is administered by the County of Orange. This beach however, is currently subject to numerous postings due to levels of bacteria that exceed standards. Capistrano County Beach was posted with warning signs during the calendar year 94 days in 2004, 120 days in 2005, and 151 days in 2006.

Studies have shown that one significant source of bacteria is urban runoff flowing into storm drains that eventually discharge onto Capistrano County Beach. To reduce bacteria loading to Capistrano County Beach, the City of Dana Point constructed a

low flow diversion project that provides treatment of first-flush flows and diverts 100% of the dry weather flows from the Capistrano Bluffs to the sanitary sewer system. The diversion works complementary with existing diversions in the area, and will hopefully demonstrate a cumulative positive effect in the long term.

Project Scope: A new storm drain was constructed to alleviate some drainage concerns in a cliff top neighborhood above the Capistrano Beach area. The new storm drain system connects with an existing system that drains to the new hydrodynamic separator and low flow diversion structure. The treatment for the storm water has been designed as a treatment train, consisting first of a hydrodynamic separator, which filters the runoff through a hydrodynamic process. Captured solids are permanently retained within the screen and sump. Floating solids are kept in continuous motion on the water surface within the screen while heavier materials settle into the sump. Then, during periods of low flow (usually occurring from May to October), nuisance flow in the drainage basin that would previously discharge over the coastal bluffs and discharge directly to Capistrano County Beach, will instead be diverted to the sanitary sewer system via gravity flow. During periods of storm flow, the first flush of runoff will be treated via the hydrodynamic separator and then discharged to Capistrano County Beach via three HDPE pipes buried in the beach sand. In addition to storm drain improvements, the project also involves pavement rehabilitation, and water and sewer line relocations on Coast Highway, Palisades Drive, Camino Capistrano and Capistrano Beach.

Similar diversion projects have been constructed throughout Dana Point using funding from the Clean Beaches Initiative and have proven to be successful in reducing trash, sediment and bacteria loading to beaches within their respective drainage basins. Such projects include the Alipaz Storm Drain Diversion Project, the Del Obispo Storm Drain Diversion Project, and the North Creek Storm Drain Diversion Project.

Progress/Milestones Achieved/Schedule: Construction of the entire project began in October of 2005 and the hydrodynamic separator and diversion were completed in May 2006 and the entire project was complete in December 2006. The hydrodynamic separator and diversion is a small portion of a larger project. The diversion began operation in May 2007.

Other Public Agency/Private Partners: The City of Dana Point Council and Staff, State of California Water Resources Control Board, San Diego Regional Water Quality Control Board, South Orange County Wastewater Authority, South Coast Water District, County of Orange, Orange County Flood Control District, Orange County Health Care Agency, Associated Laboratories, Capistrano Bay Estates, State of California Department of Fish and Game, United States Army Corps of Engineers, State of California Department of Transportation, Metrolink

Project Cost: \$7,532,895.00 (includes storm drain and diversion)

Project Funding Sources: City of Dana Point, State Water Resources Control Board (SWRCB)

Clean Beaches Initiative Funding: \$500,000

Project Outcomes/Effectiveness/Benefits: The project goal is a reduction in the number of beach postings. The City monitored the storm drain outlet and the surf zone for bacteria for the 2007 AB411 period. Since the project has been implemented there appears to be a decrease in beach postings. The Heal the Bay Beach Report Card has given Capistrano Beach a grade of A+ for the summer 2007 season. Additional benefits of this project include the elimination of drainage over the bluff edge by rerouting the storm drain system which helps reduce erosion of the coastal bluffs in the vicinity of the project.

The Capistrano Beach Storm Drain Diversion Project may also offer additional benefits to the City that were not originally foreseen during the preliminary design phases. These benefits include the diversion of sewage spills and other illicit discharges, and providing a vehicle to pinpoint sources of over-watering via flow monitoring. The Capistrano Beach Storm Drain Diversion Project is undoubtedly a valuable addition in the effort to improve the water quality in local watersheds and keeping the public safe.

Acronyms / Select Technical Terms

AB411	Assembly Bill 411, added sections to the California Health & Safety Code to create bacteriological ocean water quality standards
BMD	Beach Mile Days, represents the measurement of the number of days and the linear area of ocean that is posted for a violation of the AB411 Ocean Water-Contact Sports Standard
BMP	Best Management Practices
cfs	cubic feet per second
HDPE	High-density polyethylene pipe
MP	Monitoring Plan
QAPP	Quality Assurance Project Plan
SCCWRP	Southern California Coastal Water Research Project
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
Best Management Practice-	as any program, technology, process, siting, criteria, operating method, measure, or device, which controls, prevents, removes, or reduces pollution
hydrodynamic separator-	flow-through structures with a settling or separation unit to remove sediments and other pollutants
nuisance flow-	urban runoff flow not resulting from a rain event

1. INTRODUCTION

1.1 Problem Statement & Existing Conditions

Capistrano County Beach & Capistrano Bay District Beach, located in the City of Dana Point, are two of the most highly used beaches in the State of California. Adjacent to each other and encompassing 0.25 and 1.6 miles of coastline respectively, these beaches are located along Coast Highway between Doheny State Beach and Poche Beach. Capistrano beaches draw beach goers year round with the scenic gorgeous blue skies and deep blue ocean waters. These beaches however, are currently subject to numerous postings due to levels of bacteria that exceed standards (see Table 1.1 below). After studying the watershed, the City has determined that dry weather sources of indicator bacteria may include, but are not limited to: urban runoff, bird and other animal pet waste, bacteria presence in sand, sediments and other beach wrack and natural debris, and bather sloughing. Since many sources of indicator bacteria are non-anthropogenic (not caused by human activity) and “un-controllable” the City focused efforts to control the “controllable” potential source of bacteria - urban runoff. Aggressive spill prevention management measures and sewer operation and maintenance programs by the South Coast Water District help ensure that there are no chronic human sewage inputs in the ocean.



Figure 1.1 - Beautiful Capistrano Beach

Table 1.1 Summary of Beach Postings

Capistrano County Beach				Capistrano Bay District Beach			
AB411 (April through October)				AB411 (April through October)			
Year	Postings	Days	Beach Mile Days (BMD) (Total Available: 53.5)	Year	Postings	Days	Beach Mile Days (BMD) (Total Available: 342.5)
2000	4	128	12.4	2000	2	53	59.6
2001	5	98	5.8	2001	5	31	4.6
2002	7	104	6.2	2002	6	77	97.9
2003	2	11	2.6	2003	5	25	18.4
2004	1	2	0.3	2004	3	4	1.7
2005	4	12	2.4	2005	2	9	11.3
2006	4	15	3.6	2006	6	4	21.5

CALENDAR YEAR				CALENDAR YEAR			
Year	Postings	Days	Beach Mile Days (BMD) (Total Available: 91.25)	Year	Postings	Days	Beach Mile Days (BMD) (Total Available: 584)
2000	6	248	24.1	2000	7	107	111.9
2001	7	238	13.5	2001	7	131	201.6
2002	8	242	10.3	2002	10	181	201.9
2003	2	100	24.8	2003	5	100	138.5
2004	3	94	21.4	2004	5	84	129.8
2005	6	120	29.4	2005	4	103	158.6
2006	6	151	37.2	2006	7	117	176.7
2007 (as of 10/29/07)	3	27	6.0	2007 (as of 10/29/07)	3	16	2.5

1.3 Project Outcomes/Effectiveness/Benefits

The anticipated project goal is a reduction in the number of beach postings, as well as to reduce the amount of urban runoff pollutants that enter the receiving waters. These goals, along with the City's aggressive source control program, will help the City restore beneficial uses at the Pacific Ocean shoreline in the long-term. The City continues to educate and outreach to its constituents, schools, businesses, contractors, etc. about the urban runoff regulations and the importance of protecting our resources; however, it is well documented that changing human behavior is a struggle and will not happen overnight. Therefore, for noticeable improvements in the short term, it appears that the end-of-pipe treatment solutions have been most effective.

Beyond hard data, a secondary and significant benefit of this project results from the elimination of drainage over the bluff edge by rerouting the storm drain system which will help reduce erosion of the coastal bluffs in the vicinity of the project. This alleviates safety hazards from potential landslides, as well as reduces sediment loads into the storm drain system and receiving waters. The usable area on the beach was also expanded year round, improving recreational beneficial use at the beach.

The Capistrano Beach Storm Drain Diversion Project may also contribute to the City's overall water quality program by providing capability to divert a sewage spill or other illicit discharge by containing it, as well as providing valuable and sometimes difficult to obtain flow data that can be used as a vehicle to pinpoint times and sources of over-watering, the main source of dry weather urban runoff. The Capistrano Beach Storm Drain Diversion Project is undoubtedly a valuable addition in our effort to improve the water quality in our local watersheds and keeping the public safe.

1.4 Approach & Techniques

Similar diversion projects have been constructed throughout Dana Point using funding from the Clean Beaches Initiative and have proven to be successful in reducing trash, sediment and associated pollutant loadings to beaches within their respective drainage basins. Such projects include the Alipaz Storm Drain Diversion Project, the Del Obispo Storm Drain Diversion Project, and the North Creek Storm Drain Diversion Project.

Independently, this project may not have a significant impact on beach postings at the Capistrano County and Capistrano Bay District beaches. However, combined with other



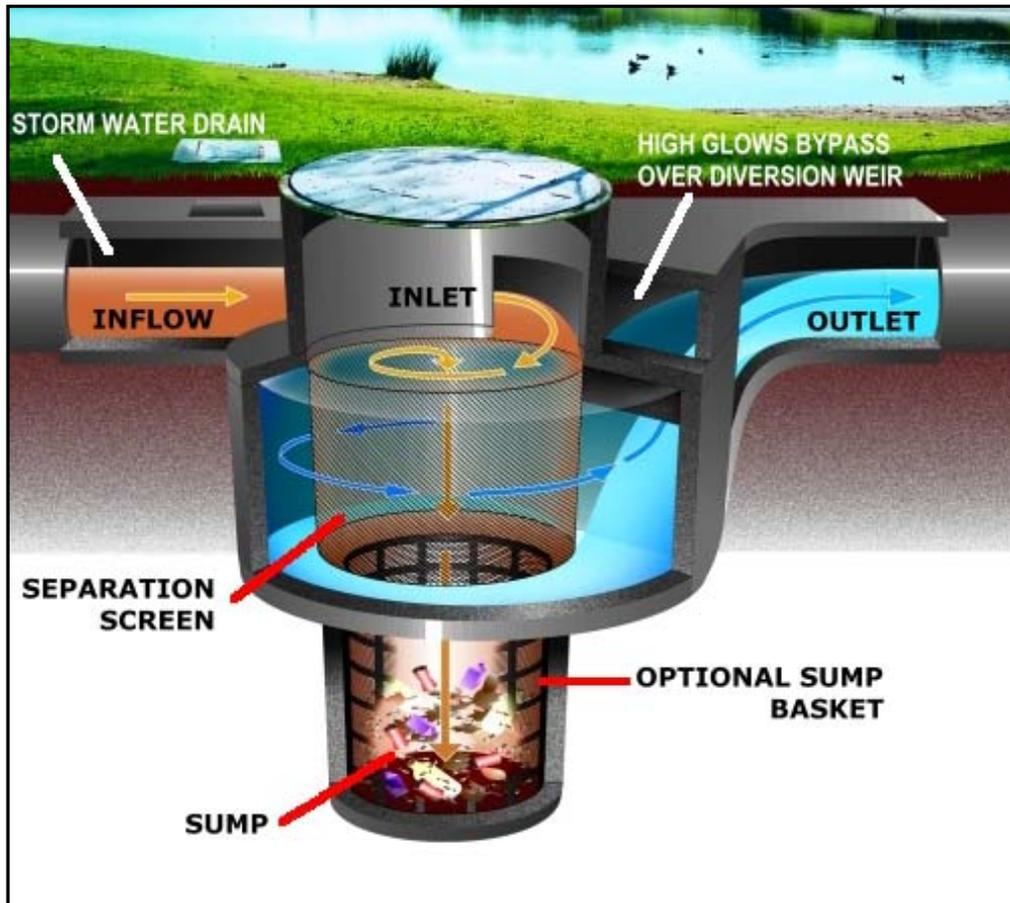
Figure 1.3 – Previous Condition of Eroded Beach

proactive measures to reduce pollution in the watershed, pollution could be dramatically reduced. The low flow diversion will direct low flows that generally have higher levels of pollutants to the sewer system, while the hydrodynamic separator will help remove oil, grease, sediment and trash from the storm water, resulting in improvements during both dry and rain conditions. The project will also provide for better beach access as the drain is being extended to the high tide line. The photo to the left illustrates the portion of the beach that has eroded due to consistent urban runoff. This photo was taken during an extremely low flow period of the dry weather season in order to accurately illustrate the

depth of the runoff channel and the significant impact it has on the beach area. The unusable beach area noted here will be eliminated. It is important to note that the County of Orange historically blocked the storm drain outlet shown in the above photo. Therefore, flows do exist, but were currently detained in an open swale upstream of this area.

The overall goal for the entire watershed is to reduce the number of beach mile-days of postings and closures at Capistrano County and Capistrano Bay District Beaches due to pollution from urban runoff.

Figure 1.4 Illustrates the solids removal unit and process.



2. TASK PRODUCTS & SCHEDULE OF COMPLETION

Table 2.1 Outline of the Tasks and Schedule of Completion for this Project.

Task	Product	Completion Date
1.0 Project Management and Administration		
1.2	Quarterly Progress Reports	March, June, Sept, Dec 2005, 2006,
1.5	Contract Summary Form	November 28, 2005
1.6	Subcontractor Documentation	August 2005
1.7	Project Survey Form	September 2007
2.0 California Environmental Quality Act (CEQA) Documents and Permits		
2.1	CEQA Documentation	September 6, 2000, and an amended MND was prepared and approved on November 20, 2002
2.2a	Agreement with the South Coast Water District	November, 2004
2.2b	County of Orange Encroachment Permit	January 6, 2005
2.2c	Coastal Development Permit	Resolution No. 02-11-20-80
2.2d	Dept. of Fish & Game Streambed Alteration Agreement	March 25, 2005, R5-2002-0429
2.2e	Site Development and Conditional Use Permit	See 2.2c above
2.2f	Army Corp of Engineers 404 Permit	May 8, 2003, 200300346-CJF
2.2g	Regional Water Quality Control Board 401 Permit	May 1, 2003 401 Cert. 026-142
2.2h	Orange County Fire Authority	CalOSHA 4/15/2004
2.2i	Caltrans Permit	OCTA – 2/1/2003
2.2j	SOCWA Special Waste Discharge Permit	09/2004
2.3	Approval Certifications	September 2005
3.0 Quality Assurance Project Plan (QAPP) and Monitoring and Reporting Plan		
3.1	QAPP	Approved June 24, 2005
3.2	Monitoring and Reporting Plan	Approved June 24, 2005
4.0 Project Construction		
4.1	Subcontract Documents	August, 2005
4.2	Evidence of Advertisement(s)	June 2, 2005
4.3	Copy of executed subcontract	July 13, 2005
4.5	Notice of Completion	December 20, 2006
4.6	Operator/Maintenance Manual and List of Attendees	April 2005
5.0 Reporting		
5.1	Annual Progress Summary	September 2005, 2006, 2007
5.2	Draft Final Report	September 2007
5.3	Final Report	November 2008

3. PROJECT RESULTS

This project was a small part of the City's Storm Drain Phase II Master Plan project, a challenging project of large scope which required cooperation and coordination with many agencies and other projects. Construction of this project was delayed several times due to scheduling and coordination with other projects in the vicinity, including underground work by the local sewerage agency and a cathodic protection project by a neighboring City. The project was completed in December 2006, several months later than anticipated.

The overall effectiveness evaluation of the Capistrano Beach storm drain diversion was constrained by the timeframe of this grant program; and therefore the best available data was used for the evaluation. Due to extreme drought conditions, the amount of nuisance runoff diverted was significantly lower and often non-existent, when compared to pre-project conditions. The lack of nuisance flow did not allow for a complete evaluation with original intent. It should be noted, though, that by thinking "outside the box" one can use the implications of a lack of data to come to certain conclusions as well. Some interesting thoughts and findings are presented below, as well as the traditional evaluation results, to the best of our ability.

3.1 *Project's Effectiveness in Achieving Goals*

The project's goal is a reduction in the number of beach postings, as well as a reduction in the amount of urban runoff pollutants that enter the receiving waters. Other goals include the elimination of drainage over the bluff edge by rerouting the storm drain system which will help reduce erosion of the coastal bluffs in the vicinity of the project, increasing the usable area of the beach and thus improving recreational beneficial use.

The project does have capability to contain an illicit discharge or sewer spill, but there have been no discharges or spills to date.

3.1.1 *County of Orange Health Care Agency Annual Ocean and Bay Water Quality Report*

Since there has been very low (too low to measure) nuisance flow volume, we are not able to directly correlate the beach posting data with the actual effectiveness of the diversion. Flow measurement was limited to the capabilities of the Isco 4250 Area Velocity (AV) flow meter with Doppler technology. This flow meter can measure flows with a level of 0.6 inches to 10 feet and a velocity of -5 to 20 ft/sec. Under conditions that we have normally seen with diversion flows, this flow meter would be appropriate; however since the flows were so low and under 0.6 inches in level, the flow meter was not able to calculate the flow volume. From the data provided in Table 1.1, it appears that the number of beach mile days may have improved. Definite results to compare the AB411 season and calendar year will be available September 1st and January 1st, respectively. However it should be noted that even without urban runoff discharging to the beach (due to lack of urban runoff or diversion), there has still been a few postings. This fact may help support the thought that the heavy population of birds may contribute to the high levels of bacteria detected occasionally.



Figure 3.1 – Capistrano County Beach and Feathered Beach Users.

Due to the concern of “uncontrollable” sources of bacteria, such as heavy bird populations and their impacts on beach water quality testing, public health and local economies, the City has aggressively pursued funding and its partnership with the Southern California Coastal Water Research Project (SCCWRP) to help further science and technology in this field. SCCWRP was recently awarded grant funding to conduct a microbial source tracking and epidemiology study at Doheny State Park Beach. The information gathered may have regional and national implications and may help to re-direct local efforts to protect human health and the environment. This project is also partially funded by the State Water Resources Control Board (SWRCB), Consolidated Grants Program, and Ocean Protection Program.

In summary, for data collected to date, it appears that there may be a reduction in beach postings.

3.1.2 Heal the Bay Annual Beach Report Card

Since the project monitoring period began in April 2007, both Capistrano Beach monitoring sites have received continuous weekly grades of A+. This has been consistent throughout the entire summer. In 2006 the beach received an A grade, so there has been a little improvement in beach water quality.

3.1.3 Project’s Effectiveness Evaluation in Compliance with Monitoring Plan (MP) and Quality Assurance Project Plan (QAPP)

This project was monitored in accordance with the procedures defined in the *City of Dana Point Bacteriological Monitoring of the Capistrano Beach Storm Drain Treatment and Low Flow Diversion Project Quality Assurance Project Plan* (March 2005), with the exceptions of 1) a compressed monitoring season due to the timeline of construction, diversion operation protocol and grant deadlines, and 2) the elimination of a redundant sampling point #3, as approved by Dayne Kendrick. An excerpt from the request for the modification is provided below:

This letter serves as an amendment to the Monitoring & Reporting Plan (MP) & Quality Assurance Project Plan (QAPP) for the City of Dana Point Bacteriological Monitoring of the Capistrano Beach Storm Drain Treatment and Low Flow Diversion Project, March 2005, approved by Laura Peters on June 24, 2005. The amendment proposed is as follows:

- Eliminate redundant sampling point #3

As proposed, monitoring locations #2, sanitary sewer connection line just downstream of the diversion, and #3, proposed Capistrano beach storm drain downstream of the Hydrodynamic separator, are, in reality, the same sample. All the water downstream of the diversion will first pass through the Hydrodynamic separator (thus be located downstream of the Hydrodynamic separator). Therefore, it is proposed that Monitoring & Reporting Plan and QAPP be amended to eliminate the redundant sampling point #3.

Monitoring locations #1 & #2 will provide the information to evaluate the effectiveness and meet the goals of the plan.

The post construction monitoring occurred during the 2007 AB411 season (April 1 through October 31), and is evaluated with pre-project (baseline) data AB411 data, in lieu of a full year of post-project monitoring.

In summary, the quantity of flow diverted, Total Coliform, Fecal Coliform and Enterococcus was monitored weekly at the following two locations:

1. Proposed Capistrano Beach storm drain just upstream of the Hydrodynamic separator (upstream Location #1)
2. Downstream of the diversion/sanitary sewer connection (Location #2)

These locations and parameters provide results that:

- Quantify the bacteria concentration and loading in the untreated and undiverted dry weather flow from the proposed stormwater conveyance system.
- Assess the level of dry weather bacteria removal achieved (if any) by the coarse screening technology (i.e. hydrodynamic separator), and
- Quantify the bacteria load and volume of flow diverted to the sanitary sewer that is removed from the proposed Capistrano Beach storm drain and does not reach Capistrano County and Capistrano Bay District Beaches.

The figure below shows the sampling sites at the diversion structure.

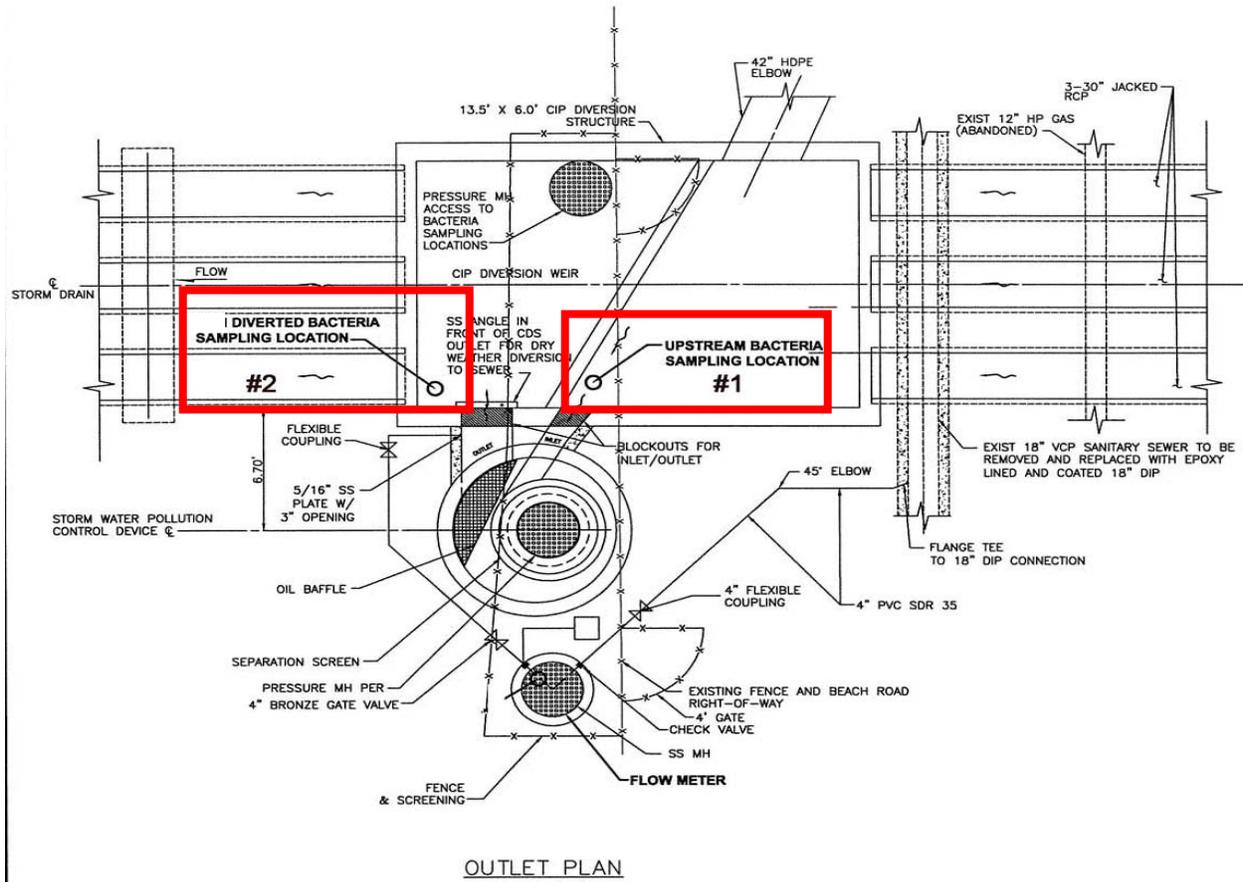


Figure 3.2 – Sample Points at Diversion

The figure below shows that AB411 samples site, S-9, S-11 and S-13 and the location of the diversion system. Sample point S-9 represents Capistrano County Beach and S-11 and S-13 represent Capistrano Bay District Beach.



Figure 3.3 – AB411 Sample Sites and Location of Diversion System

From the data provided in Appendix A, and the summary provided in Table 3.1, one can see that there are highly variable bacteria loads in the urban runoff entering the hydrodynamic separator. The majority of samples do exceed Rec-1 standards.

From the data provided in Appendix A, it appears that the hydrodynamic separation unit has not reduced bacteria levels; in fact it appears that without continuous flow bacteria levels may increase in the hydrodynamic separator. This is not surprising, as we are finding out through science and studies that bacteria can continue to grow, proliferate and/or regenerate in various environments. The extremely low flow we encountered at this site increases the retention time in the hydrodynamic separation unit which allows the existing bacteria to propagate. In addition, it should be noted that the primary pollutants that the hydrodynamic separation unit addresses

includes: gross solids (trash & debris), oils and hydrocarbons, and sediments with associated debris (which *could* include bacteria). Results may be different if there was a continuous flow through the hydrodynamic separator that would decrease retention time, so bacteria do not have time to sit and proliferate. In summary, the hydrodynamic separator did not reduce bacteria loads.

The flows downstream of the hydrodynamic separator did not discharge to the beach, thus the bacteria loads were removed from Capistrano Beach. Since the flows were so low, urban runoff accumulated in the vaults of the system and discharged (via a trickle too low to measure) to the sewer. No flow discharged to the beach. No vector issues were observed.

The data in Table 3.1 shows the bacteria loading in the upstream (untreated) urban runoff compared to the downstream (treated) runoff.

Table 3.1: Bacteria Loading Upstream and Downstream of Hydrodynamic Separator

Upstream (location #1)			
	MIN	MAX	AVE
Total Coliform (MPN/100mL)	2,400	90,000	36,100
Fecal (E. Coli) (MPN/100mL)	30	24,000	4,019
Enterococcus (MPN/100mL)	325	132,000	21,023
Downstream (Location #2)			
	MIN	MAX	AVE
Total Coliform (MPN/100mL)	2,400	240,000	60,711
Fecal (E. Coli) (MPN/100mL)	170	28,000	9,104
Enterococcus (MPN/100mL)	130	145,000	28,018

The City also quantified the amount of material that was removed from urban runoff with the hydrodynamic separator. The City of Dana Point generally maintains the hydrodynamic separator once per month or as needed.

Table 3.2: Quantity of material removed from hydrodynamic separator

DATE OF SERVICE	AMOUNT OF LITTER (LBS.)	AMOUNT OF SEDIMENT & VEGETATION (LBS.)
5/18/2006	7	2366
6/14/2006	4	377
8/17/2006	0.6	292
9/20/2006	1.6	293
11/22/2006	1.25	125
12/15/2006	3.7	249.3
1/17/2007	1.5	196
2/22/2007	2.8	270
3/23/2007	3	189.8
4/19/2007	1.3	157
5/25/2007	0.5	208
6/18/2007	2.3	297.1
TOTAL	29.55	5020.2

From the table above, approximately 5050 lbs of litter, sediment and vegetation was removed from urban runoff, preventing it from entering receiving waters, during the monitoring period. This indicates that the hydrodynamic separator is successful at removing a significant amount of debris from urban runoff. The hydrodynamic separator will also operate during storm events to treat the first flush, so we anticipate significant debris reductions to the beach water.

3.1.4 Additional Benefits

Beyond hard data, a secondary and significant benefit of this project results from the elimination of drainage over the bluff edge by rerouting the storm drain system which will help reduce erosion of the coastal bluffs in the vicinity of the project. This alleviates safety hazards from potential landslides, as well as reduces sediment loads into the storm drain system and receiving waters. The usable area on the beach was also expanded year round, improving recreational beneficial use at the beach.

The Capistrano Beach Storm Drain Diversion Project may also contribute to the City's overall water quality program by providing capability to divert a sewage spill or other illicit discharge by containing it, as well as providing valuable and sometimes difficult to obtain flow data that can be used as a vehicle to pinpoint times and sources of over-watering, the main source of dry weather urban runoff. The digital flow meter at the diversion records flow data every ten minutes. This allows the City to detect spikes in daily flow patterns and then systematically search the watershed for contributors of urban runoff from over-watering, waterline breaks, and sewer line breaks. By reviewing the watering schedules from local homeowners associations, the City may be able to pinpoint sources of over watering. Not only will this help to reduce urban runoff, but it would also aid in water conservation effort. Additionally, the flow meter will provide accurate data in the event of a water or sewer line break that drains into the watershed. This flow data can then be forwarded to the appropriate agency for their formal report to the County and/or State.

The Capistrano Beach Storm Drain Diversion Project is undoubtedly a valuable addition in our effort to improve the water quality in our local watersheds and keeping the public safe.

4. A LOOK TO THE FUTURE

The City has seen success in a number of diversion and treatment plant projects which help alleviate water quality problems at the storm drain outlets (aka “end-of-pipe solutions”). See **Table 4.1** below for a list of projects.

Table 4.1: Summary of Water Quality Projects and Costs

<i>Project Name</i>	<i>Status</i>	<i>Target Area</i>	<i>Funding Source</i>	<i>Grant Funds</i>	<i>Total Cost of Project</i>
Alipaz Storm Drain Treatment Facility	Complete	San Juan Creek / Doheny State Beach	Prop. 13	\$369,500	\$659,102
Del Obispo Storm Drain Treatment Facility	Complete	San Juan Creek / Doheny State Beach	Prop. 40	\$500,000	\$652,397
North Creek Storm Drain Diversion	Complete	San Juan Creek / Doheny State Beach	Prop. 13	\$380,500	\$1,028,691
Capistrano Beach Storm Drain	Complete	Capistrano Beach	Prop. 40	\$500,000	\$3,000,000
Salt Creek Ozone Treatment Facility	Complete	Salt Creek Beach / Monarch Beach	Prop. 40	\$4,000,000	\$6,700,000
Total				\$5,750,000	\$12,401,190

While diversion facilities and treatment plants help alleviate water quality problems at the storm drain outlets, source control is also extremely important. With this in mind, further efforts to aid in the improvement of water quality include a vigorous source control management program, including: commercial inspections, housekeeping management measures, grease interceptor incentive programs, programs to eliminate urban runoff through proper irrigation, discouraging residential car washing and dumping, an aggressive street sweeping program and the maintenance of catch basin filters in the storm drain inlets.

The City’s water quality program also includes a comprehensive public education component that includes programs targeting specific audiences, such as Homeowner’s Associations, residents (general public), local business owners, contractors and children. The City provides educational materials and give-aways at well-attended events, such as the Dana Point Whale Festival, Ocean Awareness Day, Earth Day, and Coastal Clean Up Day.

This project is another step that the City has taken to help restore beneficial uses in our local watersheds.

REFERENCES

Associated Laboratories Laboratory Reports, 2006-2007. City of Dana Point –
Capo Beach Storm Drain, Orange, CA.

Orange County Health Care Agency, 200. *200 Annual Ocean and
Bay Water Quality Report*. Orange County Health Care Agency,
<http://www.oc.ca.gov/hca/regulatory/ocean/downloads.htm>

Heal the Bay Beach Report Card, various data,
<http://www.healthebay.org/brc/statemap.asp>

United Storm Water, Inc. Summary for Maintenance Services of Full Capture Hydrodynamic separators
(CDS), FY06-07, City of Industry, CA.

For questions or comments concerning this report, please contact:

Lisa Zawaski, CPSWQ, CFM, EIT
Senior Water Quality Engineer
Phone: (949) 248-3584
Email: lzawaski@danapoint.org

Mailing address:
City of Dana Point
Public Works and Engineering Department
33282 Golden Lantern
Dana Point, CA 92629

APPENDIX A
MONITORING DATA

CAPO BEACH DIVERSION POST CONSTRUCTION MONITORING, CONTRACT #: 02-233-550-1

CAPO BEACH DIVERSION MONITORING PERIOD: 04/01/07 - 10/31/07																																																	
NOTES						Diversion started on May 15, 2007																																											
DATE OF SAMPLE	4/6/2007	4/11/2007	4/20/2007	4/23/2007	5/7/2007	5/15/2007	5/25/2007	6/1/2007	6/8/2007	6/15/2007	6/22/2007	6/29/2007	7/6/2007	7/13/2007	7/20/2007	7/27/2007	7/31/2007	8/9/2007	8/24/2007	8/31/2007	9/7/2007	9/14/2007	10/5/2007	10/12/2007																									
FLOW (MGD) - instantaneous	LOW	LOW	LOW	LOW	LOW	TOO LOW TO MEASURE	0 gallons diverted to sewer May 15-31. It appears the low flow is being detained in areas providing storage.	flow to low to measure																																									
CAPO BEACH DIVERSION before CDS Unit: Location #1																									Min	Max	Ave	REC-1 Criteria																					
Total Coliform (MPN/100mL)	24,000	50,000	5,000	90,000	2,800	24,000	5,000	30,000	2,400	5,000	24,000	17,000	24,000	>160000	24,000	>16000	50,000	90,000	24,000	13,000	50,000	160,000	30,000	50,000	2,400	160,000	36,100	10,000																					
Fecal (E. Coli) (MPN/100mL)	3,000	50	130	8,000	240	30	80	1,100	2,400	80	2,400	1,700	1,100	24,000	2,400	5,000	1,600	3,000	240	1,100	2,400	17,000	17,000	2,400	30	24,000	4,019	400																					
Enterococcus (MPN/100mL)	1,500	1,800	1,700	3,600	640	325	2,300	2,580	830	670	2,260	570	2,570	132,000	33,300	69,000	5,700	43,000	17,000	25,100	11,700	117,000	12,400	17,000	325	132,000	21,023	104																					
CAPO BEACH DIVERSION after CDS Unit: Location #2																									Min	Max	Ave	REC-1 Criteria																					
Total Coliform (MPN/100mL)	2,400	240,000	13,000	90,000	8,000	5,000	90,000	50,000	2,400	No Flow	24,000	No Flow	No Flow	160,000	24,000	>160000	No Flow	50,000	24,000	>160000	90,000	160,000	30,000	30,000	2,400	240,000	60,711	10,000																					
Fecal (E. Coli) (MPN/100mL)	400	2,400	170	3,000	2,400	300	2,400	1,600	2,400	No Flow	2,400	No Flow	No Flow	24,000	5,000	3,000	No Flow	3,000	24,000	28,000	30,000	22,000	1,600	24,000	170	30,000	9,104	400																					
Enterococcus (MPN/100mL)	130	1,070	2,100	40,000	845	460	4,800	94,200	1,100	No Flow	1,960	No Flow	No Flow	145,000	12,200	40,000	No Flow	52,000	14,300	15,000	9,200	84,000	16,000	26,000	130	145,000	28,018	104																					
Shaded values denote values which exceed Rec-1 Criteria																																																	