PEBBLE BEACH
COMPANY

September 19, 2014

Dr. Mariela Paz Carpio-Obeso
State Water Resources Control Board
Ocean Standards Unit
1001 I Street
Sacramento, CA 95814

Re: Draft ASBS Compliance Plan

Dear Dr. Carpio-Obeso:

Enclosed is a CD with the Draft ASBA Compliance Plan. If you have any questions about the amendment, please contact me at (831) 649-2740.

Best Regards,

PEBBLE BEACH COMPANY

Callie Muller
Legal Affairs
4005 Sunridge Road
Pebble Beach, CA 93953

DRAFT

ASBS SPECIAL PROTECTIONS

COMPLIANCE PLAN

for

PEBBLE BEACH COMPANY

1.0 BACKGROUND

On March 20, 2012, the State Water Resources Control Board (SWRCB) adopted *Special Protections for Areas of Special Biological Significance (ASBS), Governing Point Source Discharges of Storm Water and Nonpoint Source Waste Discharges* (hereinafter referred to as the "Special Protections"). There are 34 ASBS, making up approximately one third of the California coastline. In the Monterey Bay area, Pebble Beach Company (PBC) is one of five local ASBS parties with outfalls that discharge into ASBS. PBC's discharges flow into the Carmel Bay ASBS.

The area of the Carmel Bay watershed within the unincorporated Del Monte Forest (excluding land within the city limits of Carmel-by-the-Sea) is approximately 1,500 acres. Land uses within this area are mixed: natural open space, low-density residential, recreational, and visitor-serving commercial. The predominant land uses are natural open space and low-density residential. PBC owns and operates a number of businesses within the lowermost portions of the watershed, occupying approximately 10 acres of the 1,500 acres total: The Lodge at Pebble Beach (The Lodge), Casa Palmero, The Beach & Tennis Club, The Spa at Pebble Beach, The Lodge Chevron Station, The Lodge Retail Arcade, Pebble Beach Golf Links (PBGL), and Peter Hay par-3 golf course. Total hotel rooms within this area are 185, located at The Lodge and Casa Palmero.

This Compliance Plan is intended to fulfill the requirements contained in Section I.A.2 of the SWRCB's Special Protections. PBC's plans to comply with each required element of the Compliance Plan are described below.

2.0 MAPPING

2.1 Required Content: This element must show and describe:

a. Areas of sheet runoff.
b. Prioritized discharges, i.e. those that pose the greatest water quality threat and which may need to have structural BMPs installed on them to achieve compliance.
c. Descriptions of any structural BMPs already employed and/or BMPs to be employed in the future.
d. Storm water conveyances in relation to other features such as service areas, sewage conveyances and treatment facilities, landslides, areas prone to erosion, and waste and hazardous material storage areas, if applicable.
e. A procedure for updating the map and plan when changes are made to the storm water conveyance facilities.

2.2 Map - Compliance Plan:

a. **Areas of Sheet Runoff**. There are no areas of sheet runoff within the Del Monte Forest's Carmel Bay ASBS watershed. All runoff flows into PBC's storm drainage system which is shown on the map in Attachment 1.

b. **Prioritized Discharges**. Three of PBC's outfalls which discharge to the Carmel Bay ASBS have the largest drainage areas and include both commercial and residential land uses within their drainage areas. These are shown on the map in Attachment 1 as outfalls #1, #11, and #17. Outfall #1 has a catchment area of 309.64 acres (55.33 impervious acres); outfall #11 has a catchment area of 75.36 acres (10.01 impervious acres), and outfall #17 has a catchment area of 114.55 acres (29.58 impervious acres). Because these have the highest volumes of discharge, and because they drain PBC's commercial area within the ASBS watershed, they are considered to have the greatest potential to affect water quality in the ASBS. PBC's dry weather monitoring project also determined that these and an additional six storm drains discharge

dry weather flows to the ASBS. For this reason (dry weather flow), these additional six drains are considered priority discharges. They are shown on the map in Attachment 1 as outfalls #9, #19, #19b, #20, #22, and #23.

c. **Structural BMPs.**

Existing BMPs

The current structural BMPs are shown on the map in Attachment 1. PBGL is equipped with a number of structural BMPs: (1) chemical storage building, (2) advanced spill containment system surrounding the fuel bay, (3) roofed maintenance building for equipment maintenance and storage, (4) state-of-the-art Rainbird Irrigation System to maximize efficiency and minimize runoff, (5) oil and grease/sediment traps for parking areas, and (6) subsurface drains beneath tees, greens, and sand traps to capture and disperse storm water to vegetated buffer areas for filtering and absorption of any nitrate or pesticide residue. The Chevron Station is equipped with an advanced spill containment system and grease interceptor.

Future BMPs

PBC is currently reviewing options for the elimination of non-stormwater discharges to the Carmel Bay ASBS. The preferred alternative involves the installation of five diversions to the sanitary sewer. PBC has not yet chosen which systems will be implemented to address non-stormwater discharges. Please refer to section 3.2 of this compliance plan and the associated attachments for a more detailed discussion of PBC's work to date on non-stormwater discharges.

Given the limited amount of wet weather data available, we are unable to determine what, if any, additional structural BMPs will be needed to achieve wet weather compliance. PBC will continue to assess wet weather water quality with the Central Coast ASBS Regional Monitoring Program during the 2014-15 winter season. For more information on the Central Coast ASBS Regional Monitoring Program, please refer to Section 4.2 of this compliance plan. If additional BMPs are found to be necessary, PBC will include details on any future BMPs in the final ASBS compliance plan.

d. **Storm Water, Sewage, and Recycled Water Conveyances.** The majority of PBC's storm drainage system consists of small natural creeks and open, unlined storm water drainage channels along Del Monte Forest road-sides as shown on the map in Attachment 1. Closer to the ocean, storm drain pipes convey storm water under roads and areas where channel migration would result in harmful erosion. The sanitary sewer pipelines are owned and operated by the Pebble Beach Community Services District (PBCSD), delivering wastewater to Carmel Area Wastewater District's (CAWD) wastewater treatment facility. The CAWD facility is located to the south of Pebble Beach and the City of Carmel-by-the-Sea, where locally generated wastewater is converted into high-quality MF/RO recycled water. This recycled water is piped back into the Del Monte Forest and used to irrigate all of the golf courses there as well as most of the athletic fields of Stevenson School, a local high school. The sanitary sewer and recycled water pipelines are highlighted on Attachment 1.

e. **Landslide or Erosion Prone Areas.** There are no areas within the Del Monte Forest's Carmel Bay ASBS watershed that flow into PBC's storm drainage system which are considered prone to either landslides or erosion.

f. **Hazardous Material Storage Facilities.** Hazardous material storage areas are shown on the map in Attachment 1. These areas are located at the PBGL Maintenance Facility, The Lodge (emergency generator location),the Chevron Station, Casa Palmero, and The Beach & Tennis Club. These facilities are inspected annually by the County of Monterey Department of Public Health, Division of Environmental Health, to ensure that all hazardous materials are properly stored and managed, and that no discharge of such materials to PBC's storm drainage system is occurring. There are only small localized refuse collection areas at businesses located in the Lodge Complex commercial area and at private residences within the watershed.

g. **Map Updating.** PBC's storm drainage map is updated as necessary to reflect any changes or additions that have been made to it.

3.0 NON-STORMWATER DISCHARGES

3.1 Required content: This element must show and describe:

a. The measures by which all non-authorized non-storm water runoff (e.g., dry weather flows) have been eliminated;

b. How these measures will be maintained over time; and

c. How these measures will be monitored and documented.

3.2 Non-stormwater Discharges Compliance Plan:

a. **Elimination of Non-Authorized Non-Stormwater Discharges.** In April 2014, Balance Hydrologics, Inc. (Balance) and L&S/WWD Engineering (L&S) completed a comprehensive year long dry weather storm drain monitoring project within the Del Monte Forest portion of the Carmel Bay ASBS watershed. This project was designed to understand the nature of dry weather discharges to the Carmel Bay ASBS emanating from the Del Monte Forest by characterizing their quantity, quality, and impact (if any) on the receiving water. The findings of this project are provided in Attachment 2. Follow-on work completed by Balance and L&S concluded that full diversion of all significant non-stormwater discharges to Carmel Bay can be achieved, outlining a number of options in their report entitled, "Draft Basin Report for Non-Stormwater Flow Controls at the Pebble Beach Golf Links" (Attachment 3). The preferred alternative entails the construction of five diversion facilities along the shoreline edge of PBGL. The overall system is shown schematically in Plate 2 and in the form of preliminary engineering plans in Appendix A of Attachment 3.

In July 2014, additional sampling was performed by Balance to assess the effectiveness of new source control measures implemented by PBGL maintenance staff to prevent discharges of pesticides. Two pesticides of concern (Triclopyr and Chlorothalonil) that were detected in earlier monitoring efforts were not found in any of the discharges sampled in July 2014, verifying that the new source control measures in place are effective. The new source control measures include:

1. Repair of PBGL Maintenance Wash Rack - Wash rack was not working properly during a period of the initial monitoring project. Overflow was entering a nearby storm drain that ties into the 9th Green storm drain. The wash rack has been repaired and will be monitored closely by PBGL maintenance staff.

2. Turflon –*Triclopr* – Turflon will not be used in the wall to wall spray program to eradicate Kikuyu grass at PBGL. Maintenance staff will intensify mechanical eradication (increase hand removal) while using a few other chemicals that have seen early success in trials performed on property and off. This combination of mechanical and chemical pressure will hopefully keep Kikuyu at bay and eliminate any potential discharge concerns. The efficacy of this new program will be evaluated in two years to determine its effectiveness. We will continue to use a small amount (less than 5 gallons per year) when we are spot treating specific areas for other broadleaf weeds and undesirable grasses. This change in control practices will lead to a dramatic decrease in overall usage year over year, with a 63% decrease from 2013 and an 80% decrease from 2012.

3. Daconil – *Cholorothalonil* – This fungicide has proven to be very successful in the Monterey Peninsula climate for diseases affecting agronomy conditions on PBGL. This chemical is sprayed on greens, tees, and fairways for control of Fusarium Patch. It has also been used in the past on roughs for Rust. PBGL will no longer spray this fungicide in rough areas and will instead strictly limit its use to greens and tees (total of 4 out of 99 acres), with occasional usage on fairways as a last resort, and no usage in rough areas. The decrease from no longer spraying fairways and roughs on a regular basis should remove over 80% of total usage of this product.

4. Spray Program – A 10 foot no spray buffer along all waterways has been created. All drains along the golf course are covered with lids when spraying chemicals. Staff will continue to monitor the weather and will never spray when rain is imminent. Staff will also continue to find ways to alleviate pest problems through sound cultural practices and use chemicals only as a last resort.

The July 2014 sampling also analyzed for a list of chemicals requested by CAWD to assess whether the water quality in the dry-weather flow would be acceptable for diversion to its treatment facility. CAWD found water quality to be acceptable for treatment, and has therefore approved non-stormwater diversions from PBC's proposed drainage system to their treatment facility. Once the systems are online, additional quarterly monitoring will be required so that a baseline of water quality can be established. After a baseline is demonstrated, sampling frequency may be reduced. A detailed discussion of the July 2014 sampling results, procedures, quality assurance, and quality control can be found in Attachment 4.

b. **Maintenance, Monitoring, and Documentation of Future Dry Weather Measures.** PBC will submit plans for operation, maintenance, monitoring, and documentation with the Final ASBS Compliance Plan, which is currently due September 20, 2015.

4.0 WET WEATHER DISCHARGES

4.1 Required content: This element must address storm water discharges (wet weather flows) and, in particular, describe how pollutant reductions in storm water runoff that are necessary to comply with the Special Protections will be achieved through BMPs.

4.2 Compliance Plan:

a. Monitoring

Section IV of the Special Protections, *Monitoring Requirements*, will be fulfilled by PBC's participation in the Central Coast ASBS Regional Monitoring Program (RMP).

The RMP is a collaboration of various agencies and entities on the Coast, covering an area from Big Sur, in Monterey County, to Pt. Reyes, in Marin County. The project includes monitoring requirements (i.e. water sampling and analysis for various pollutants of concern) specified in the Special Protections for ten (10) participants designated as Responsible Parties that include: The Counties of Marin, Monterey, and San Mateo; the Cities of Carmel-by-the-Sea, Monterey, and Pacific Grove; Caltrans; Hopkins Marine Station; Monterey Bay Aquarium; and PBC. The Scope of Work for the RMP has been developed through discussions with staff from both the State and Regional Water Boards, as well as the responsible parties discharging storm water into ASBS.

The Ocean Plan prohibits the discharge of both point and non-point source waste into ASBS unless the SWRCB grants an "exception". In 2012, the SWRCB approved a list of direct or indirect storm water discharges into local ASBS, including the Carmel Bay ASBS, which included the City of Carmel-by-the-Sea, the County of Monterey, and PBC.

Water quality and biological sampling of urban storm water discharges and receiving waters are a mandatory stipulation of the Special Protections for Areas of Special Biological Significance. In 2012, PBC joined forces with nine (9) other ASBS permittees along the Central Coast of California to form a collaborative RMP to comply with the monitoring requirements of the Special Protections. The purposes of the RMP are to leverage limited agency funds to address shared monitoring compliance needs by providing consistent methods and data quality among all participants, while also performing the scientific work required

by the Special Protections in a manner so the final data can be compared to or contrasted with those from other regional efforts along the California coastline.

In early 2013, a RMP Memorandum of Agreement (see Attachment 5) was executed among all parties to perform a coordinated monitoring effort to investigate concentrations of pollutants of concern at particular freshwater reference sites, ocean receiving water sites, and urban storm water discharge sites. Additionally, the program includes biological and bioaccumulation monitoring, as well as waterfront compliance monitoring of the Stillwater Yacht Club's mooring field in Stillwater Cove.

Applied Marine Sciences (AMS) was selected to direct and perform the scientific monitoring needs of the RMP members, including field and follow-up analytical and statistical work. Monterey Bay National Marine Sanctuary staff and volunteers also assist with portions of the ASBS monitoring program.

In total, the RMP has 40 sampling locations. Five (5) storm water discharges are sampled along the Del Monte Forest portion of the Carmel Bay ASBS to assist in better understanding the relative health of this ASBS ecosystem and the effects of discharges entering it. A list of all sampling sites, including their respective sampling requirements and the overall sampling scheme, is outlined in "Exhibit E" of the MOA found in Attachment 5. For PBC's portion of the Carmel Bay, the 48" storm drain located near the 18th Green of PBGL and The Lodge was chosen to be sampled for receiving water quality and rocky intertidal biological monitoring, as well as for storm water outfall/discharge monitoring. Bioaccumulation studies are occurring at the Fanshell Overlook in the Del Monte Forest nearshore area and are being performed by Central Coast Long-term Environmental Assessment Network (CCLEAN) in collaboration with this RMP. Those data are planned for use in determining the existing relative health of Peninsula nearshore biological environment for this RMP effort.

Water quality and biological results received over two years of the RMP program will be analyzed to determine the relative health of the ASBS being studied as a part of this RMP. These efforts are also meant to identify any potential urban storm water discharges that may be negatively affecting the health of the ASBS, including that of the Carmel Bay ASBS.

As of September 2014, only one sampling season has been completed – Season 1, Winter 2013/2014. Season 1 data are undergoing quality assurance/quality control (QA/QC) review and statistical analyses. Preliminary results are expected in late September 2014, with final report generation in October 2014. Final results were not available for inclusion in this Draft Compliance Plan; however, study results will be shared as they become available, and subsequent water quality reports shall be incorporated into this Plan in future finalization efforts. Season 2, Winter 2014/2015 sampling results are anticipated for preliminary review in summer 2015 with subsequent analytical report finalization in fall 2015.

The RMP efforts at Carmel Bay ASBS sampling locations and all others in the region are providing the scientific water quality and biological data necessary to comply with the monitoring requirements of the Special Protections at this time. The study results are anticipated to provide insight to the local agencies and SWRCB as to the current and relative health and quality of California ASBS. Additionally, further study of the RMP's reference site water quality data is planned for utilization as part of a SWRCB contract to analyze the North Coast, Central Coast, and South Coast reference data report to be produced by contractor Ken Schiff.

Process for Exceedances

The process for evaluating whether alterations of natural ocean water quality in the Carmel Bay ASBS are occurring is still in development. If exceedances of Ocean Plan Water Quality Objectives (WQOs) are observed, it does not necessarily imply that natural ocean water quality will be altered, nor would observed alterations in natural ocean water quality necessarily be caused by discharges from the land-based watershed. Dilution processes within the receiving water are an important consideration as well as ocean influences that may not be detected at reference points. The challenges in establishing these types of regulatory links will be considered as the regional natural water quality process and standards are defined.

Once the process for evaluating exceedances is finalized, Section I.A.3.e of the ASBS Special Protections states that if the initial results of post-storm receiving water quality testing indicate levels higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, then PBC must re-sample the receiving water, pre- and post-storm. If, after re-sampling, the post-storm levels are still higher than the 85th percentile threshold of reference water quality data and the pre-storm receiving water levels, for any constituent, then natural ocean water quality is being exceeded. If this occurs, PBC must comply with section I.A.2.h. Determining compliance with this natural water quality requirement is illustrated in Attachment 1 to the Special Protections, and is contained in Attachment 6.

PBC has already implemented a number of non-structural BMPs including public education, source control, and good housekeeping practices as part of its Storm Water Management Program and participation in the Monterey Regional Stormwater Management Program (MRSWMP). PBC has also installed structural BMPs as noted in section (a) above. Because of these actions, PBC anticipates that its storm water discharges will not cause the receiving water to exceed natural water quality levels. However, this conclusion will only be known with certainty after the monitoring required under Section IV of the Special Protections has been performed.

If it is found that PBC's discharges are causing an exceedance of natural water quality, then PBC will address this occurrence by preparing and submitting a report as required by Section I.A.2.h of the Special Protections.

b. **Erosion Control Section.**

Required content: This element shall address erosion control and the prevention of anthropogenic sedimentation in ASBS, such that natural habitat conditions in the ASBS are not altered by anthropogenic sedimentation caused by discharges from PBC's storm drainage system.

Compliance Plan:

The majority of PBC's outfalls are small pipes and discharge small volumes with low amounts of sediment. PBC therefore believes that the Biological and Bioaccumulation Monitoring components of the Central Coast ASBS Regional Monitoring Program will show that sediment from PBC's discharges is not altering natural habitat conditions.

If it is found that sediments contained in PBC's discharges are altering natural habitat conditions, then PBC will address this occurrence by preparing and submitting a report evaluating the situation and describing BMPs that PBC will implement to remedy it.

c. **BMPs Section.**

Required content: This element must describe the non-structural BMPs currently employed and planned in the future (including those for construction activities), and include an implementation schedule. Public education and outreach must be one of the

non-structural BMPs, and these must adequately inform the public that direct discharges of pollutants from private property entering PBC's storm drainage system are prohibited.

This element must also describe the structural BMPs, including any low impact development (LID) measures, currently employed and planned for higher threat discharges and include an implementation schedule. To control storm water runoff discharges (at the end-of-pipe) during a design storm, permittees must first consider, and where feasible use, LID practices to infiltrate, use, or evapotranspire storm water runoff on-site, if LID practices would be the most effective at reducing pollutants from entering the ASBS.

Compliance Plan:

1. Non-Structural BMPs

Public Education and Outreach:

PBC is a Coordinating Entity in the Monterey Regional Storm Water Management Program (MRSWMP). Public Education and Public Outreach Programs are carried out under E.7 and E.8 NPDES Permit Requirements of the MRSWMP.

As a Coordinating Entity, PBC is carrying out existing Public Education BMPs under E.7 to increase public awareness of what constitutes poor stewardship of storm water as a resource. The Public Education Plan focuses on topics such as reducing pollution from lawn and gardening activities, improper disposal of household hazardous wastes, illegal disposal activities, pet wastes, improper handling and disposal of trash, restaurant activities, and automotive activities.

The existing Public Outreach BMPs which PBC is carrying out under E.8 provide opportunities for public hands-on involvement in a variety of activities to increase public awareness of what constitutes poor stewardship of storm water as a resource, and to increase public actions such as reporting of problems to authorities.

Details of the Public Education and Public Outreach activities carried out each year are included in the MRSWMP Annual Reports, which can be viewed and downloaded at www.montereysea.org, under the Program Documents tab.

Construction Activities:

PBC hires outside architects, engineers, and contractors for its construction projects, and by contract requires them to comply with all applicable regulations and laws, including both structural and non-structural BMPs.

Pressure Washing:

Both outside companies and PBC staff periodically pressure wash of sidewalks and buildings around The Lodge and other resort facilities as a regular maintenance protocol. Both have been advised and are trained appropriately to ensure that no runoff is discharged into the storm drain system. Vacuum-boom systems are used in cases where vacuuming the runoff is necessary.

Vehicle Maintenance:

All fleet vehicles are taken to Central Fleet Maintenance for maintenance. Central Fleet Maintenance is located outside of the ASBS watershed; however, measures are in place at this facility to protect stormwater.

Car Washing:

Car washing of all fleet vehicles occurs at the Pebble Beach Company Resource Management Offices (Corp Yard), which is outside of the ASBS watershed. Some vehicles are washed by outside contractors who use a vacu-boom system to capture runoff. Other vehicles are cleaned in the Corp Yard wash rack, which is equipped with a closed-loop system and recycles the wash water.

Landscaping:

Integrated pest management ("IPM") is key to the maintenance of PBC's golf courses and landscaping. By closely monitoring golf course conditions, staff are able to identify thresholds for pest and disease management, allowing the turf and plants to recover on their own and utilizing natural management techniques as much as possible. If pesticides are required, trained and permitted professional PBC staff are responsible for all applications and every effort is made to utilize less toxic, less mobile, and less persistent pesticides where possible. The application of fertilizers and pesticides strictly follows manufacturers' recommendations. Maintenance staff closely monitors the weather as well, ensuring that no applications are made when rain is expected within 24 hours. The majority of weeds on PBC's golf courses and throughout Pebble Beach Company Resorts are pulled by hand.

Below are additional landscaping measures:

- Monitor application rates of fertilizers and nitrogen content of reclaimed irrigation water, and adjust fertilizer application as necessary.

- Time fertilizer application to coincide with the period of greatest plant uptake and avoid periods of potential rainfall-runoff events.
- Utilize designated and controlled areas at each of PBC golf course maintenance facility for the proper mixing and loading of pesticides into application equipment.
- Appropriately time and locate pesticide application to avoid identified sensitive areas.
- Utilize high tech weather stations on each golf course to increase the efficiency and effectiveness of irrigation and pesticide applications.
- Licensed Pesticide Applicator applies all pesticides in accordance with all applicable laws.
- Utilize chemical storage buildings and advanced spill containment systems at all golf course maintenance facilities. Spill containment systems surround the fueling areas. PBC promotes proper chemical storage, handling, and disposal practices to enhance safety and minimize contamination. Proper chemical storage buildings reduce poison hazards or other accidents, ensuring the safety of both workers and environment.
- "Certified Audubon Cooperative Sanctuary" designation by Audubon International for PBC's Del Monte Golf Course, Spyglass Hill Golf Course, The Links at Spanish Bay, and Pebble Beach Golf Links. The Audubon Cooperative Sanctuary Program for Golf Courses (ACSP) is an education and certification program that promotes ecologically-sound land management and the conservation of natural resources on established golf courses. To reach certification, a course must demonstrate that they are maintaining a high degree of environmental quality in a number of areas including: Environmental Planning, Wildlife & Habitat Management, Outreach and Education, Chemical Use Reduction and Safety, Water Conservation, and Water Quality Management. The Links at Spanish Bay was designated

in July 2000, followed by Spyglass Hill in October 2000, Del Monte in January 2001, and finally Pebble Beach Golf Links in March 2003.

- Inspect annually all company resorts, restaurants, maintenance facilities, and gas stations for stormwater compliance. Inspections continually assess and revise our policies, programs, and actions to ensure industry leadership as responsible environmental stewards.
- Inspect and clean all stormwater catch basins annually, before each storm season.
- Stencil storm drains within the Del Monte Forest, a highly effective public education tool.
- Maintain 17-Mile Drive regulatory signage for the public- no littering, etc.
- Irrigate exclusively with reclaimed water at all golf courses and driving ranges. This water naturally contains some nutrients (nitrates) and thus reduces the amount of fertilizer required.
- Cover trash areas and loading docks.
- Utilize designated wash areas at all PBC restaurants for the cleaning of floor mats and other large items that cannot fit in kitchen sinks or dishwashers. These areas are tied to the public sewer system.
- Utilize equipment-washing recycle systems at each of PBC's golf course maintenance facilities. The systems recycle the wash water for continual use.
- Utilize oil and grease/sediment traps in parking lots and golf course maintenance facilities to intercept and contain oily residue and debris washed from vehicle areas.
- Utilized subsurface drains beneath tees, greens, and sand traps at all golf courses to capture and disperse irrigation water to vegetated buffer areas for filtering and absorption of any nitrate or pesticide residue.

- Maintain natural drainages in the Del Monte Forest. The majority of runoff is directed through existing native, grass-lined, permeable drainage swales, vegetated filter strips, and seasonal drainage channels, naturally improving water quality. These areas help improve the quality of stormwater by slowing water velocities and trapping/filtering sediment, metals, nutrients, petroleum products, pesticides, bacteria, and other contaminants.
- Manage native vegetated buffers around golf courses and driving range turf areas to optimize catchment areas. As stormwater runoff flows through these channels, it is treated by filtering through: the vegetation in the channel, a subsoil matrix, and/or the underlying soils, removing sediment, organic material, nutrients, pesticide residues, and other chemicals.

2. Structural BMPs

Chemical Storage Facilities

The PBGL Maintenance Facility is equipped with an advanced chemical storage and spill containment building. Hazardous materials are also stored in appropriate permitted indoor facilities at the Chevron Station, The Lodge Generator, Casa Palmero, and The Beach & Tennis Club. These facilities are inspected annually by the County of Monterey Department of Public Health, Division of Environmental Health, to ensure that all hazardous materials are properly stored and managed, and that no discharge of such materials to PBC's storm drainage system is occurring.

Car & Equipment Washing:

The PBC Corp Yard, located outside the ASBS drainage, is equipped with a vehicle wash rack, which is a closed-loop system that captures and recycles the wash water. The PBGL Maintenance Facility is also equipped with a closed-loop wash rack for cleaning vehicles and equipment.

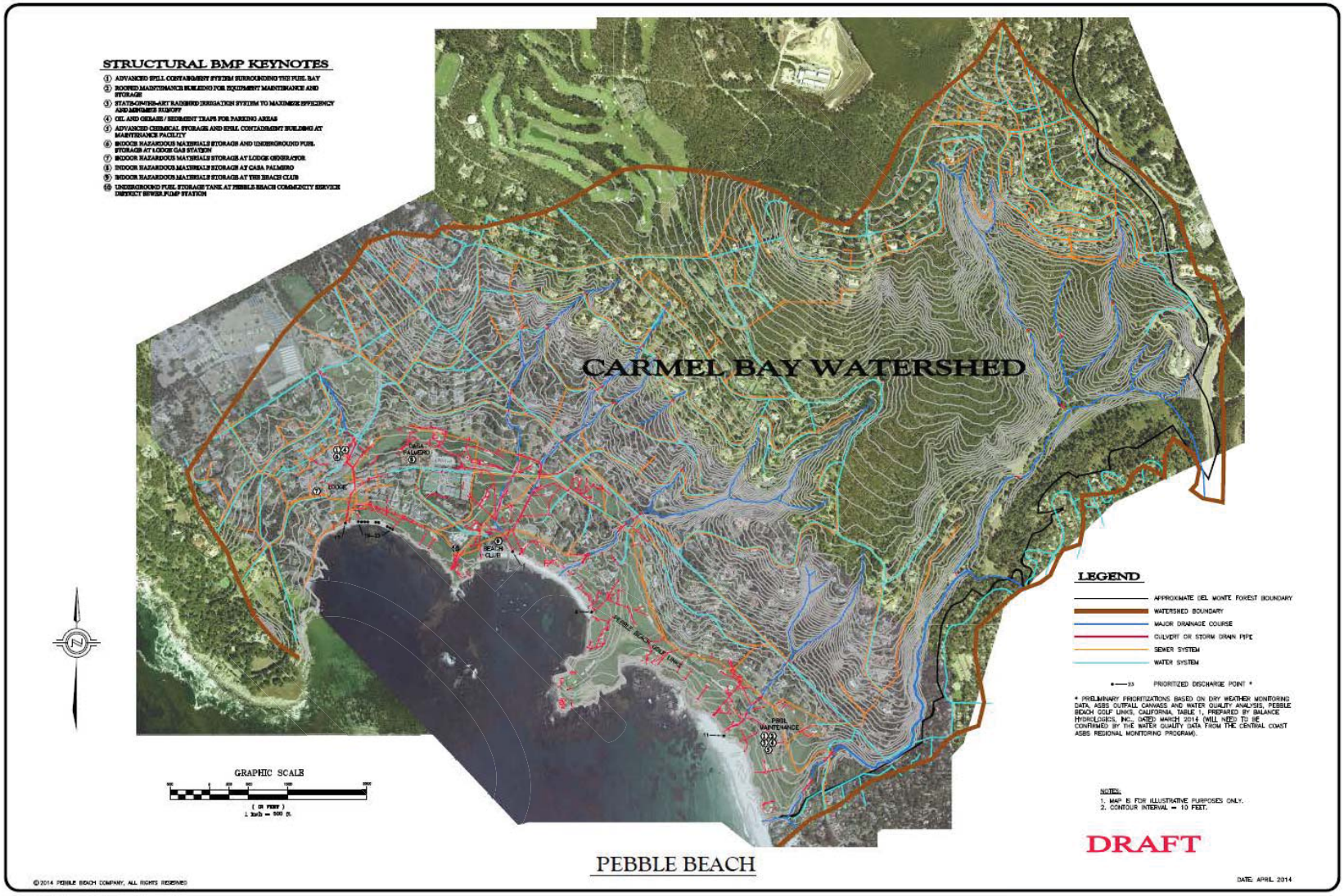
3. Implementation Schedule

Since all of the BMPs described in this Section of the Compliance Plan are already being implemented, no Implementation Schedule is needed for them. As discussed above under the Wet Weather Discharges section, the need for any additional structural BMPs to comply with the Special Protections will only be known after the benchmark of natural ocean water quality is set and further monitoring work is completed. **The process for evaluating whether alterations of natural ocean water quality in the Carmel Bay ASBS are occurring is still in development**. If any additional structural BMPs are needed, an Implementation Schedule for them will be prepared at that time.

ATTACHMENT 1

STORM DRAINAGE SYSTEM MAP

(SEE FOLLOWING PAGE)


STRUCTURAL BMP KEYNOTES
1 ADVANCED SPILL CONTAINMENT SYSTEM SURROUNDING THE FUEL BAY
2 ROOFED MAINTENANCE BUILDING FOR EQUIPMENT MAINTENANCE AND STORAGE
3 STATE-OF-THE-ART RADIOMED IRRIGATION SYSTEM TO MAXIMIZE EFFICIENCY AND MINIMIZE RUNOFF
4 OIL AND GREASE / SEDIMENT TRAPS FOR PARKING AREAS
5 ADVANCED CHEMICAL STORAGE AND SPILL CONTAINMENT BUILDING AT MAINTENANCE FACILITY
6 INDOOR HAZARDOUS MATERIALS STORAGE AND UNDERGROUND FUEL STORAGE AT LODGE GAS STATION
7 INDOOR HAZARDOUS MATERIALS STORAGE AT LODGE GENERATOR
8 INDOOR HAZARDOUS MATERIALS STORAGE AT CASA PALMERO
9 INDOOR HAZARDOUS MATERIALS STORAGE AT THE BEACH CLUB
10 UNDERGROUND FUEL STORAGE TANK AT PEBBLE BEACH COMMUNITY SERVICE DISTRICT SEWER PUMP STATION
CARMEL BAY WATERSHED
CASA PALMERO
LODGE
BEACH CLUB
PBSD MAINTENANCE
GRAPHIC SCALE
LEGEND
APPROXIMATE (EL MONTE FOREST BOUNDARY
WATERSHED BOUNDARY
MAJOR DRAINAGE COURSE
CULVERT OR STORM DRAIN PIPE
SEWER SYSTEM
WATER SYSTEM
PRIORITIZED DISCHARGE POINT *
* PRELIMINARY PRIORITIZATIONS BASED ON DRY WEATHER MONITORING DATA, ASBS OUTFALL CANVASS AND WATER QUALITY ANALYSIS, PEBBLE BEACH GOLF LINKS, CALIFORNIA, TABLE 1, PREPARED BY BALANCE HYDROLOGICS, INC., DATED MARCH 2014 (WILL NEED TO BE CONFIRMED BY THE WATER QUALITY DATA FROM THE CENTRAL COAST ASBS REGIONAL MONITORING PROGRAM).
NOTES:
1. MAP IS FOR ILLUSTRATIVE PURPOSES ONLY.
2. CONTOUR INTERVAL = 10 FEET.
DRAFT
PEBBLE BEACH
© 2014 PEBBLE BEACH COMPANY, ALL RIGHTS RESERVED
DATE: APRIL 2014

ATTACHMENT 2

FINAL DRY WEATHER MONITORING REPORT
PEBBLE BEACH DISCHARGES TO CARMEL BAY ASBS

PLEASE REFER TO THE ENCLOSED FILE:

"ATTACHMENT 2_ FINAL DRY WEATHER MONITORING REPORT"

ATTACHMENT 3

DRAFT CONCEPTUAL DESIGNS - ELIMINATION OF NON-STORMWATER DISCHARGES TO CARMEL BAY ASBS

PLEASE REFER TO THE ENCLOSED FILE:

"ATTACHMENT 3_ DRAFT ASBS CONCEPTUAL DESIGNS - PBC NON-STORMWATER DISCHARGES"

ATTACHMENT 4

BALANCE HYDROLOGICS INC., MEMO
PHASE 2 PESTICIDE AND STILLWATER PIER EXTENDED SAMPLING RESULTS, JULY 2014

PLEASE REFER TO THE ENCLOSED FILE:

"ATTACHMENT 4_ BALANCE MEMO_ PHASE 2 SAMPLING JULY 2014"

ATTACHMENT 5

MEMORANDUM OF AGREEMENT

CENTRAL COAST REGIONAL AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE DISCHARGERS MONITORING PROGRAM

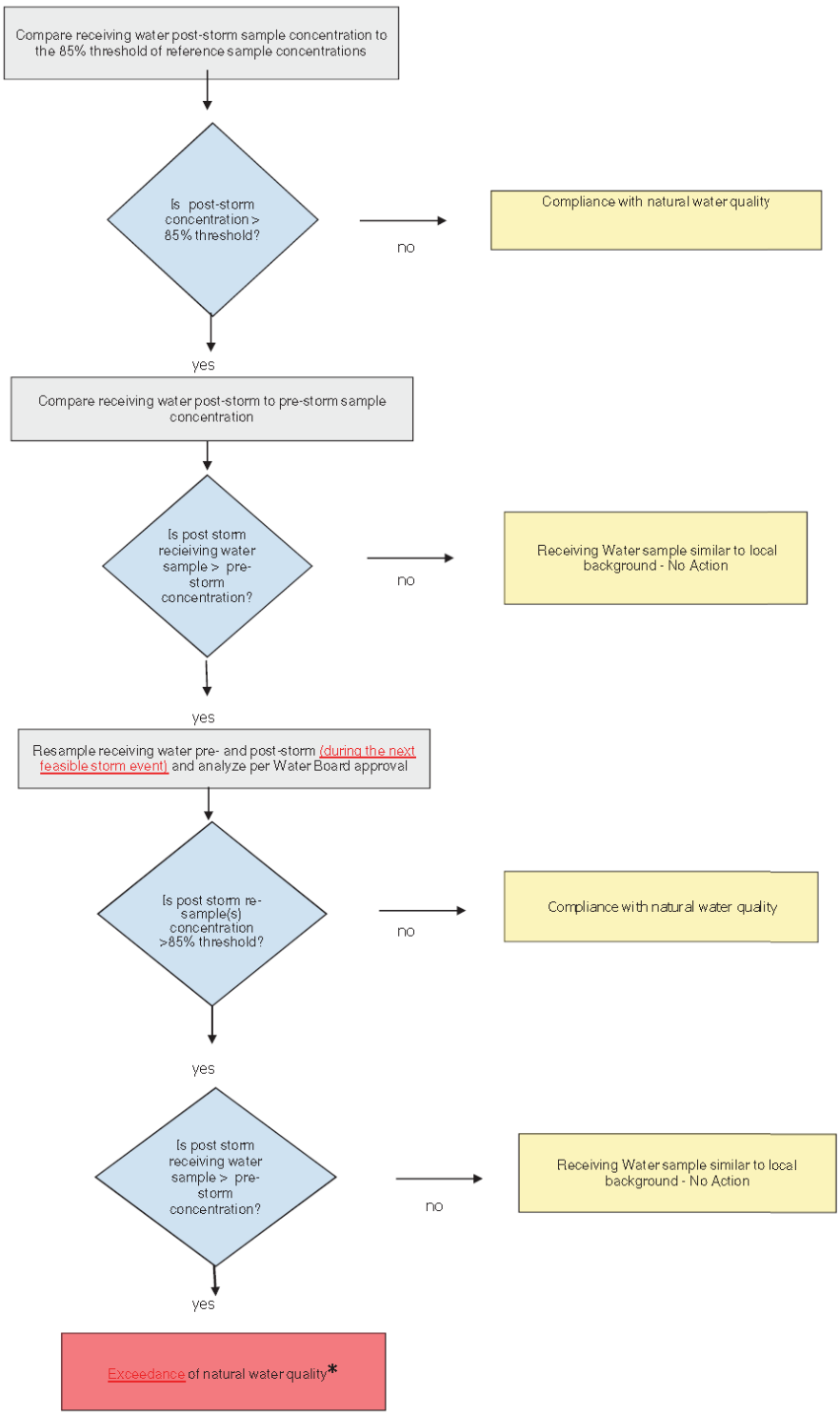
PLEASE REFER TO THE ENCLOSED FILE "ATTACHMENT 5_ASBS RMP MOA"

ATTACHMENT 6

FLOW CHART
FOR
DETERMINING COMPLIANCE
WITH
NATURAL WATER QUALITY

(SEE FOLLOWING PAGE)

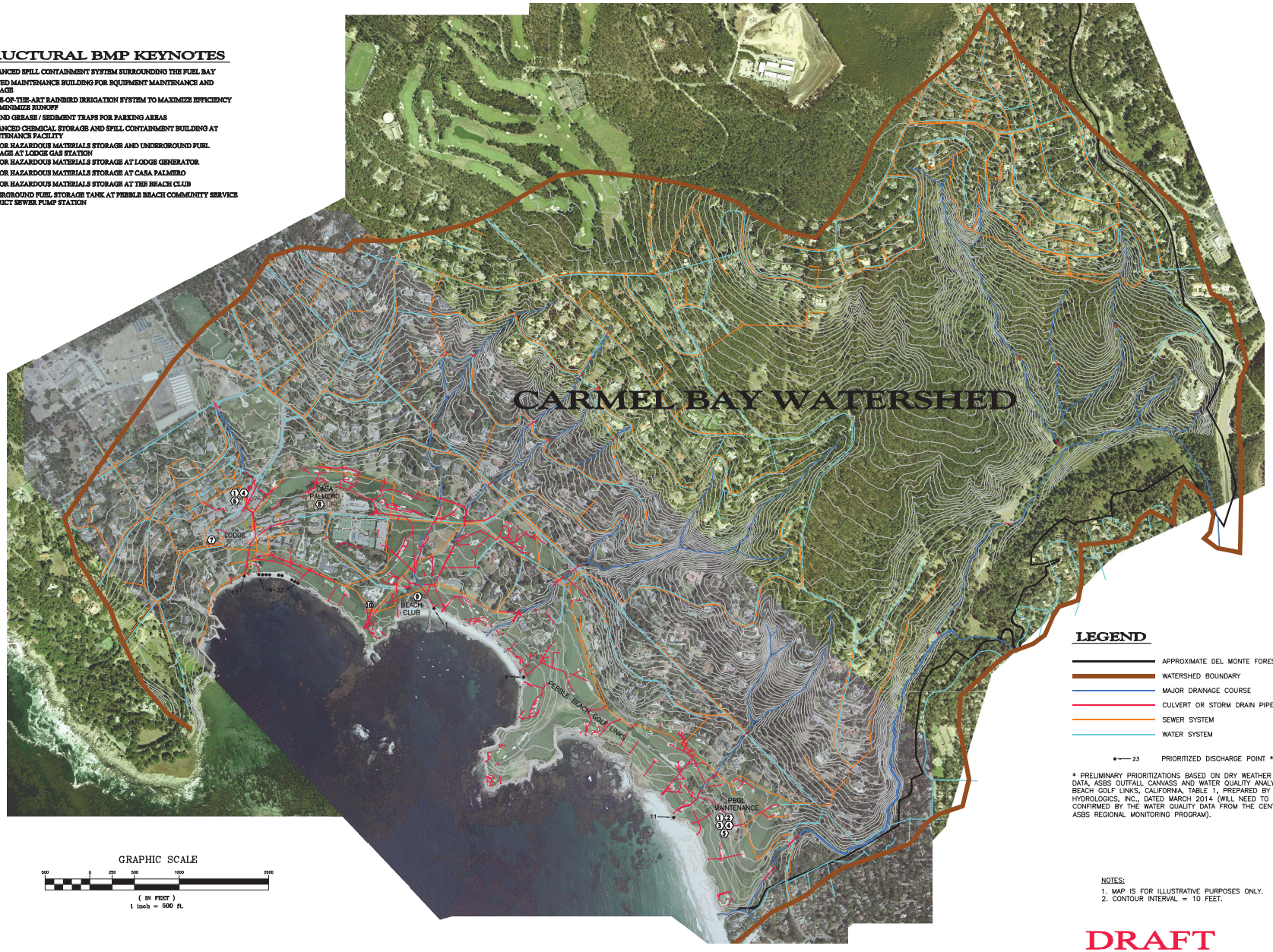
Attachment 1
Special Protections Sections I(A)(3)(e) and I(B)(3)(e)
Flowchart to Deteremine Compliance with Natural Water Quality



*** When an exceedance of natural water quality occurs, the discharger must comply with section I.A.2.h (for permitted storm water) or section I.B.2.c (for nonpoint sources). Note, when sampling data is available, end-of-pipe effluent concentrations will be considered by the Water Boards in making this determination.**

STRUCTURAL BMP KEYNOTES

1. ADVANCED SPILL CONTAINMENT SYSTEM SURROUNDING THE FUEL BAY
2. ROOFED MAINTENANCE BUILDING FOR EQUIPMENT MAINTENANCE AND STORAGE
3. STATE-OF-THE-ART RAINBIRD IRRIGATION SYSTEM TO MAXIMIZE EFFICIENCY AND MINIMIZE RUNOFF
4. OIL AND GREASE / SEDIMENT TRAPS FOR PARKING AREAS
5. ADVANCED CHEMICAL STORAGE AND SPILL CONTAINMENT BUILDING AT MAINTENANCE FACILITY
6. INDOOR HAZARDOUS MATERIALS STORAGE AND UNDERGROUND FUEL STORAGE AT LODGE GAS STATION
7. INDOOR HAZARDOUS MATERIALS STORAGE AT LODGE GENERATOR
8. INDOOR HAZARDOUS MATERIALS STORAGE AT CASA PALMERO
9. INDOOR HAZARDOUS MATERIALS STORAGE AT THE BEACH CLUB
10. UNDERGROUND FUEL STORAGE TANK AT PEBBLE BEACH COMMUNITY SERVICE DISTRICT SEWER PUMP STATION



LEGEND

- APPROXIMATE DEL MONTE FOREST BOUNDARY
- WATERSHED BOUNDARY
- MAJOR DRAINAGE COURSE
- CULVERT OR STORM DRAIN PIPE
- SEWER SYSTEM
- WATER SYSTEM
- •— 23 PRIORITIZED DISCHARGE POINT *

* PRELIMINARY PRIORITIZATIONS BASED ON DRY WEATHER MONITORING DATA, ASBS OUTFALL CANVASS AND WATER QUALITY ANALYSIS, PEBBLE BEACH GOLF LINKS, CALIFORNIA, TABLE 1, PREPARED BY BALANCE HYDROLOGICS, INC., DATED MARCH 2014 (WILL NEED TO BE CONFIRMED BY THE WATER QUALITY DATA FROM THE CENTRAL COAST ASBS REGIONAL MONITORING PROGRAM).

GRAPHIC SCALE

500 0 250 500 1000 2000

(IN FEET)

1 inch = 500 ft.

NOTES:

1. MAP IS FOR ILLUSTRATIVE PURPOSES ONLY.
2. CONTOUR INTERVAL = 10 FEET.

DRAFT

PEBBLE BEACH

DATE: APRIL 2014

DRAFT Design Basis Report for Non-Stormwater Flow Controls at the Pebble Beach Golf Links

Prepared for:

Pebble Beach Company

Balance Hydrologics, Inc.

September 2014

L&S ENGINEERING AND SURVEYING, INC

September 18, 2014

Project Assignment: 214040

DRAFT Design Basis Report for Non-Stormwater Flow Controls at the Pebble Beach Golf Links

A report prepared for:

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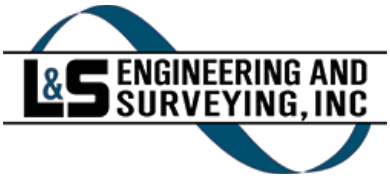

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

PLATES

APPENDICES

LIST OF ACRONYMS

ASBS	Area of Special Biological Significance
CAWD	Carmel Area Wastewater District
CIMIS	California Irrigation Management Information System
DBR	Design Basis Report
DA	Drainage Area
ETI	Evapotranspiration-Infiltration
PBC	Pebble Beach Company
PBCSD	Pebble Beach Community Services District
PBGL	Pebble Beach Golf Links
RWQCB	Regional Water Quality Control Board

1 PROJECT OVERVIEW

This Design Basis Report (DBR) presents background information, technical analyses, and preliminary designs for infrastructure needed to control non-stormwater discharges to the Carmel Bay Area of Special Biological Significance (Carmel Bay ASBS or "ASBS") from outfalls on the Pebble Beach Golf Links (PBGL) property. Such discharges are regulated and, in general, prohibited by State Water Resources Control Board Resolution No. 2012-0012.

The DBR summarizes project work that builds on past monitoring and flow gaging activities, most recently in 2013, to identify the locations, and quantify the volumes, of non-stormwater discharges from outfalls located at the site. Data from the earlier studies was used to develop continuous simulation hydraulic models for each discharge point that were then run to provide specific information for the design of infrastructure improvements capable of diverting all non-stormwater flows upstream of the respective outfalls. Concurrent survey work refined mapping of drainage, sanitary sewer, and electrical utilities in the vicinity of the identified outfalls, allowing selection of preferred locations for construction of the diversion systems. The combined design and survey information were then used to prepare preliminary designs and cost estimates for each of the flow control locations.

1.1 Authorization and Objectives

The work summarized in this report was authorized by the Pebble Beach Company per a contract with Balance Hydrologics dated April 25, 2014.[1]

The scope of work included a number of specific objectives including:

- *Compiling previous monitoring information*. The previous monitoring work completed in 2013 identified four generalized locations where non-stormwater discharges occur directly to Carmel Bay. Continuous recording flow

[1] Balance Hydrologics was one member of the overall project team, which included L&S Engineering and Surveying as the lead for utility mapping, infrastructure design, and cost estimating.

measurements were completed at each of these locations. The pertinent data was assembled and pre-processed as input for continuous-simulation diversion modeling.

- *Modeling of non-stormwater flow diversion infrastructure needs*. Factors such as the magnitude and timing of flows are of particular importance in the design of robust diversion systems. Therefore, high-resolution time step diversion models were prepared for each of the outfalls to assess the preferred type and size of infrastructure needed to completely eliminate non-stormwater discharges.

- *Assessing options for re-use of diverted flows*. Successful elimination of non-stormwater discharges requires effective source control, appropriate diversion systems, and a sustainable means of re-using the diverted flows. Thus, a primary objective of the work was identification of alternatives for re-using diverted flows that are commensurate with the magnitude and timing of the flow patterns at each location.

- *Preparing preliminary diversion system designs and cost estimates*. Modeling and alternatives assessments were structured so as to provide the specific, detailed design information needed to prepare preliminary designs and cost estimates for the preferred system configurations with the objective of having project components that can readily be moved forward to final design and construction.

- *Summarizing the work in a Design Basis Report*. A concise summary of the work completed to characterize non-stormwater control needs, identify practical approaches for discharge elimination, and present the pertinent preliminary designs is useful on a number of levels including project approval, permitting, and detailed design.

1.2 Prior Studies

Work in preparing this DBR builds on the extensive environmental monitoring program implemented by Pebble Beach Company at the site over many years. Of particular importance is the non-stormwater monitoring and testing work carried out during the summer of 2013 and summarized in the report titled "ASBS Outfall Canvass and Water Quality Analysis, Pebble Beach Golf Links, Monterey County, California" prepared by Balance Hydrologics.

1.3 Report Structure

The ensuing discussion in this DBR is divided into three additional chapters. Chapter 2 discusses the work completed to characterize and then model the magnitudes and patterns associated with non-stormwater discharges leading to identification of the specific diversion requirements at each location. Chapter 3 reviews the factors indicating diversion to the sanitary sewer system as the preferred alternative and then discusses the preliminary designs and costs of the required systems. Lastly, Chapter 4 discusses on-site re-use or disposal alternatives including the parameters and factors that would be necessary to implement them.

2 NON-STORMWATER FLOW CONTROL CONSIDERATIONS AND DIVERSION REQUIREMENTS

As mentioned previously, challenges related to the control of non-stormwater flows at PBGL are directly linked to the quantity and quality of the flow intercepted by the local drainage network and then conveyed to outfall structures along the shoreline of Carmel Bay. This chapter discusses the information available to the flow streams at those outfalls that directly discharge to the Bay, and presents details of the analyses and modeling completed to derive specific diversion design parameters from the available data.

2.1 Drainage Infrastructure Overview

The Pebble Beach Golf Links is situated on a coastal terrace that stretches along the northern perimeter of Carmel Bay. This terrace feature is roughly perpendicular to the intermittent creek channels that drain the relatively steep, forested and urbanized hillsides inland from the Bay. This landscape configuration leads to a local drainage network that generally cuts across the course, with relatively large drainage areas passing through the PBGL site rather than originating on it. This cross-course configuration leads to numerous outfalls along the coastline edge of the Links (see Plate 1), though, as described below, not all of these discharge directly to the Bay.

Runoff from the larger drainage areas is conveyed in storm drain pipes or, in a few cases, open channels. The largest watershed passing through the PBGL originates in the inland hills and cuts across the northern half of the course enroute to Stillwater Cove, where it terminates in a 30-inch diameter pipe just east of the Beach Club complex and Stillwater Pier. This watershed has a total area of approximately 330 acres, of which 42 acres are actually on PBGL property. Another relatively large drainage area is located at the northern end of the site, where runoff from roughly 114 acres, including the Peter Hay Golf Course, passes under the Lodge to a 48-inch diameter pipe outfall.

Golf course areas are typically well-drained in order to reduce maintenance needs and enhance play. At PBGL this is evident in a relatively dense system of lateral storm drain

pipes that feed into the trunk drainage lines. Underdrain systems are also extensive and include both French drain and curtain drain configurations. The underdrains generally discharge into storm drain laterals, but in a number of cases have small outfalls themselves.

2.2 Previous Assessment Work and Identification of Problem Outfalls

In the context of controlling non-point source pollution, regulatory initiatives relating to non-stormwater discharges have generally taken a secondary role to the much larger discharges from stormwater runoff. Thus, there is almost universally much more data available to characterize stormwater flows than there is for their non-stormwater counterparts. However, work for this DBR was fortunate to have a very complete picture of the location, quantity, quality, and timing of non-stormwater flows based on the extensive monitoring program initiated by the Pebble Beach Company in 2013. This work was discussed in detail in the previously cited report prepared by Balance Hydrologics (Hecht and others, 2014). That report included extensive discussions of meteorology, geology, and soil characteristics as pertinent to understanding the source, quantity, and quality of non-stormwater discharges as the PBGL.

Perhaps the most fundamental aspect of the work in 2013 was the complete canvassing of the coastline along the PBGL site to identify all outfalls.[2] This included extensive topographical survey work so that the precise location and elevation of each outfall could be cataloged. Not counting seeps, a total of 28 constructed outfalls were identified.

Further field monitoring was then completed to assess which of the outfalls were actually active during the dry season and discharge directly into the Carmel Bay ASBS. The resulting sub-set of eight outfalls is much smaller in number than the total, reflecting a number of factors that likely include care in siting infrastructure away from the Bay itself, relatively low levels of urbanization, the sophistication of the PBGL irrigation system,

[2] Previous stormwater management work undertaken by the Pebble Beach Company had produced much detailed survey work, but that work had generally focused on wet weather flows, with a reduced emphasis on underdrain outfalls and their precise location.

and the unusually dry summer conditions. The location and character of the directly discharging outfalls is summarized in Table 2-1, listed in order from west to east.

Table 2-1 Location and type for outfalls with direct discharge of non-stormwater flow

Outfall	Number[1]	Location		Elevation	Size and Type
		Northing	*Easting*	*(ft, NAVD)*	
18th Green	17	2,102,973	5,695,498	17.9	48-inch storm drain
18th Fairway	19	2,102,990	5,695,742	15.9	12-inch underdrain
18th Fairway	19b	2,102,990	5,695,738	14.8	10-inch wall drain
18th Fairway	20	2,102,984	5,695,908	15.3	12-inch underdrain
18th Fairway	22	2,102,912	5,696,063	12.6	24-inch storm drain
18th Fairway	23	2,102,908	5,696,070	11.9	8-inch underdrain
Stillwater Pier	1	2,102,611	5,697,620	10.6	30-inch storm drain
6th Fairway	9	2,101,845	5,698,623	17.6	12-inch storm drain
9th Green	11	2,100,277	5,700,301	19.0	36-inch storm drain

Notes: 1 = Identification number per the canvass of outfall structures in the report ASBS Outfall Canvass and Water Quality Analysis, (Hecht and others, July 2014). Outfalls listed in bold italic were equipped with continuous logging flow monitoring stations. Northing, easting, and elevation data per L&S Engineering and Surveying. Location in California State Plane Zone 4.

2.3 Quantity and Timing of Non-Stormwater Flows

A particularly important aspect of the monitoring work completed in 2013 was the installation of continuous sampling flow measurement stations at four of the primary direct discharge locations identified in the outfall canvassing. Each of these outfalls was equipped with a low-flow weir insert and a datalogger programmed to record flow at 15-minute intervals throughout the monitoring period. The resulting dataset provides a detailed picture of the quantity and timing of non-stormwater flows.

Data at the flow monitoring stations was generally collected from late March to mid-October. However, there were a number of small rain events in March and April during the monitoring period. Therefore, to create a common period for comparing the various sites that is focused on non-stormwater flows only, a common data analysis period was selected spanning the period from May 1 to September 30 (inclusive, a period of 153 days total). Summary data for the four stations is presented in Table 2-2 for this period of analysis, and the locations of the outfalls and their respective drainage areas are illustrated on Plate 1.

Table 2-2 Summary of measured non-stormwater discharges

Outfall	Drainage Area	Total Discharge			Instaneous Discharge (*gpm*)		
	(acres)	*(gallons)*	*(gal/day)*	*(ac-ft)*	*Average*	*Max*	*Min*
18th Green	114	876,600	5,700	2.7	4.0	109.2	1.0
Stillwater Pier	333	2,315,700	15,100	7.1	10.5	157.3	1.8
6th Fairway	19	194,000	1,300	0.6	0.9	22.4	0.1
9th Green	75	350,400	2,300	1.1	1.6	29.9	0.0

Note: Data for period from May 1 to September 30, 2013.

Reference to Plate 1 shows that three of the monitoring locations (18th Green, Stillwater Pier, and 9th Green) include extensive areas inland and upslope of the PBGL. The remaining drainage area (6th Fairway), is predominately located within the course itself.

As shown in Table 2-2, total non-stormwater discharge for the period ranged from a low of 194,000 gallons (0.6 acre-feet) for the 6th Fairway outfall to a high of 2,315,700 gallons

(7.1 acre-feet) for the outfall at Stillwater Pier.[3] Instantaneous discharge values, perhaps most important for diversion design, were correlated with overall drainage area. The lowest average instantaneous discharge was 0.9 gpm as measured at the 6th Fairway, with the highest average value of 10.5 gpm measured at Stillwater Pier. Despite the wide range of drainage area and land use, the correlation between measured flow metrics and overall drainage area was quite strong. An example of this is illustrated in Figure 2-1, which shows measured flow rate for the period in gallons per day plotted against overall drainage area. Though the sample size is small, there is quite good fit at 45 gallons/acre/day over the summer period.

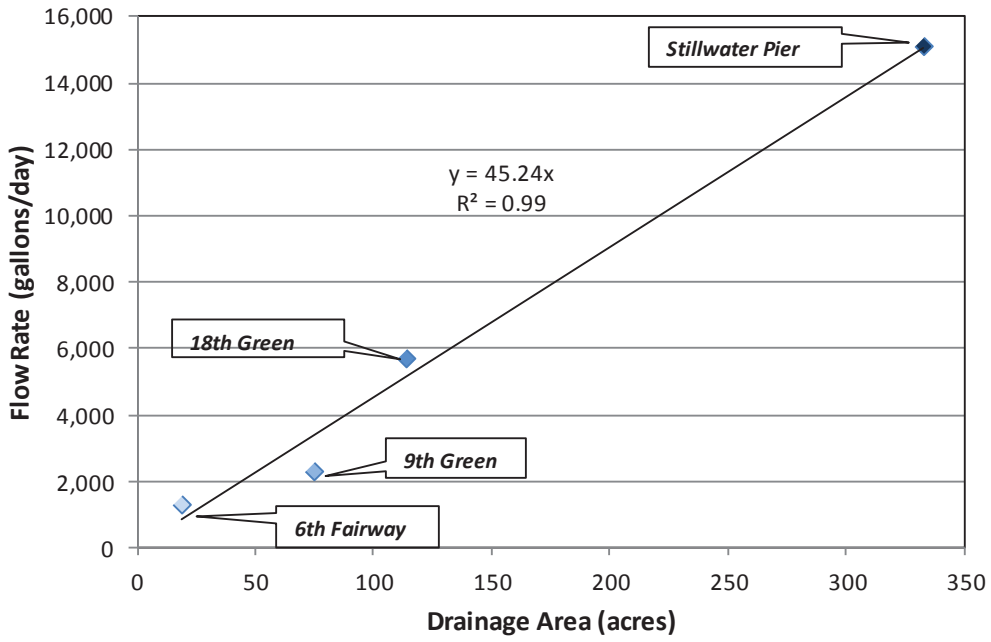


Figure 2-1 Non-stormwater flow rate as a function of drainage area

[3] The July 2014 report discusses the specific climate conditions of drought that characterized the monitoring period and the implications for non-stormwater flow rates in other, wetter years. This DBR is based on the assumption that wetter years are likely to be characterized by a general shift upwards in discharge metrics, particularly in the early part of the summer season as groundwater levels drop. However, the datasets strongly indicate that anthrophogenic sources account for the major deviations from baseline non-stormwater flow rates, and those sources are not likely to change significantly in wetter years. In fact, with respect to applied irrigation, they may actually be less.

The correlation shown in Figure 2-1 is an important guide to estimating potential flow rates at ungaged outfalls at the PBGL. For example, the 24-inch line at the 18th Fairway (Table 2-1, Outfall #22) is a proposed diversion location as discussed below. With a total drainage area of roughly 45 acres, it is reasonable to assume that this outfall will have flow characteristics intermediate to those measured at the 6th Fairway and 9th Green locations.

Additional data analysis was carried out to more thoroughly characterize the range of flows at each of the monitored outfalls. Of particular interest in this regard is a histogram representation of the flow data, which tabulates the frequency of flow at various discharge levels as shown in Table 2-3.

Table 2-3 Flow duration of non-stormwater discharges

Flow Range	Duration of Flow (*hours for period of analysis*)			
(gpm)	18th Green	Stillwater Pier	6th Fairway	9th Green
0 to 10	3,498.7	2,202.5	3,659.4	3,530.4
10 to 20	156.3	1,301.0	12.5	134.7
20 to 30	11.9	118.5	0.2	6.9
30 to 40	3.0	30.2	0.0	0.0
40 to 50	1.1	12.0	0.0	0.0
50 to 60	0.3	2.6	0.0	0.0
60 to 70	0.2	2.7	0.0	0.0
70 to 80	0.4	0.4	0.0	0.0
80 to 90	0.3	0.2	0.0	0.0
90 to 100	0.1	0.1	0.0	0.0
100 to 110	0.1	0.2	0.0	0.0
110 to 120	0.0	1.5	0.0	0.0
120 to 130	0.0	0.3	0.0	0.0
130 to 140	0.0	0.1	0.0	0.0
140 to 150	0.0	0.0	0.0	0.0
150 to 160	0.0	0.1	0.0	0.0

The values in Table 2-3 show two distinct patterns at a generalized level. Flow rates at the 6th Fairway and 9th Green outfalls are tightly clustered at very low levels, with discharge never exceeding 30 gpm during the period of analysis. This is in contrast to the 18th Green and Stillwater Pier outfalls where there are numerous departures from the predominant lower flow values. This is particularly evident at Stillwater Pier, which shows a notable (though short duration) grouping of flows in the range of 100 to 130 gpm.

The range of flow rates has a direct impact on the system capacity required to achieve any desired target diversion level for a given outfall. This is illustrated in Table 2-4, which shows the percentage of total non-stormwater runoff in the period of analysis as a function of the instantaneous flow rate. In this case, the latter metric is representative of the diversion rate (without system storage) that would be needed to eliminate the respective percentage of non-stormwater discharge to Carmel Bay.

Table 2-4 Percentages of total non-stormwater discharge as a function of observed flow rate

Portion of Total Flow	Instaneous Flow Rate (*at or below in gpm*)			
(%)	18th Green	Stillwater Pier	6th Fairway	9th Green
10	2.4	6.9	0.5	0.5
20	2.8	7.9	0.5	1.6
30	3.0	8.9	0.6	3.3
40	3.4	9.7	0.8	4.5
50	3.9	10.6	0.9	5.8
60	4.7	11.8	1.1	8.6
70	6.6	13.4	1.7	13.6
80	9.2	16.7	3.9	15.7
90	12.7	22.5	7.2	16.2
95	16.7	32.2	10.0	17.7
100	109.2	157.3	22.4	29.9

Table 2-4 underscores the extent of extra diversion capacity that is needed to reach 100-percent elimination of non-stormwater discharges. For example, a diversion capacity of just under 17 gpm at the 18th Green outfall would eliminate 95 percent of the flow to the Bay over the measured period of May through September. However, the diversion rate would need to increase substantially to just under 110 gpm to completely eliminate non-stormwater flows. Similarly, at Stillwater Pier 95 percent of the total non-stormwater discharge volumes occurs at flow rates of roughly 32 gpm, but the remaining 5 percent of total volume sees flow rates range up to 157 gpm. The more uniform flow patterns at the 6th Fairway and 9th Green mean that there is less of a difference between the flow rates that represent 95 percent and 100 percent of the seasonal volume, but the difference is still substantial. ***That said, this DBR is based on providing full capacity (with storage freeboard and reserve pump capacity) necessary to achieve full diversion of non-stormwater flows as measured in 2013***. This will provide a "safety factor" to account for the likelihood of higher flow rates in normal or above-average rainfall years.

Finally, the background data analysis considered one additional characteristic of the measured non-stormwater discharges, hourly variation in flow rate over the course of the day. Intra-day flow variations, if large, can have important implications for the way that diverted flows are handled. Therefore, data for the May through September period was post-processed to identify average instantaneous flow rates for each hour over the course of the day. The resulting average daily flow cycle for the four outfalls is shown in Figure 2-2.

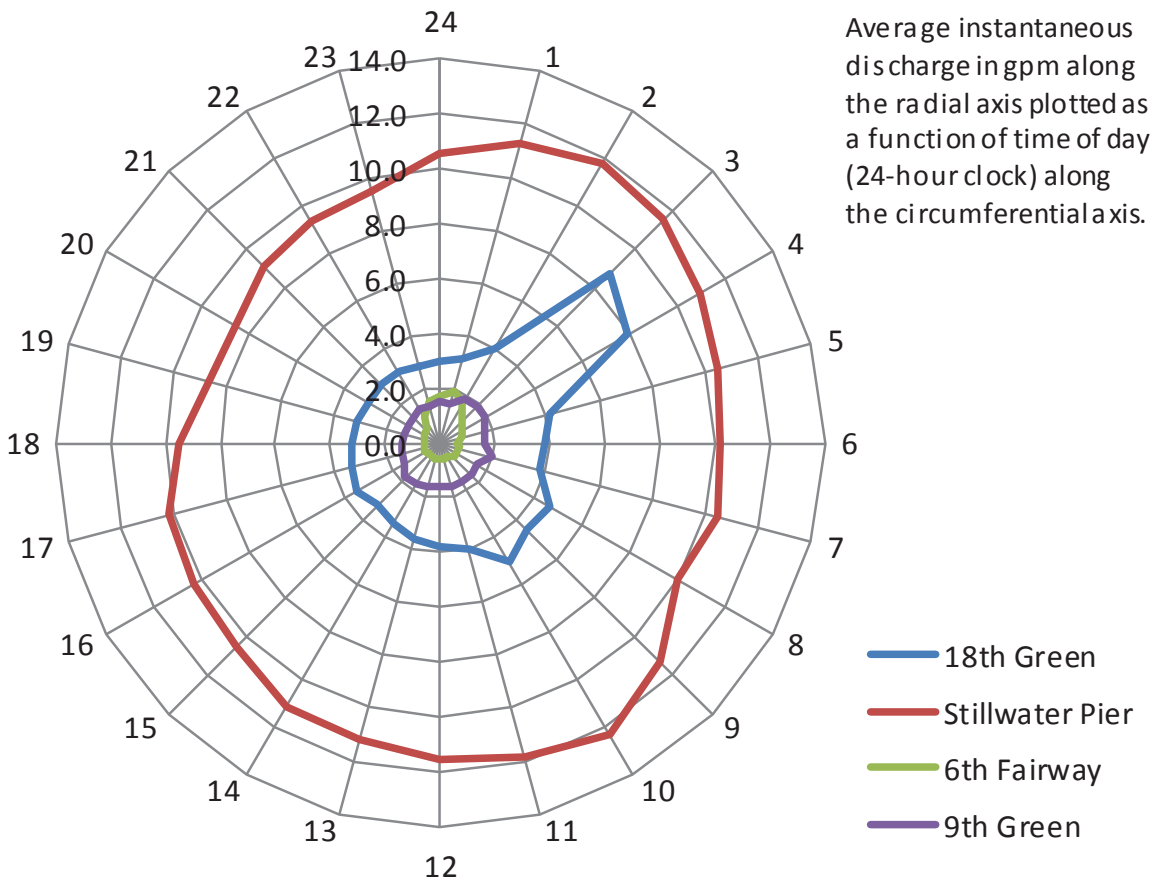


Figure 2-2 Average instantaneous discharge as a function of time of day

The plotted data in Figure 2-2 confirms some degree of diurnal cycling of non stormwater discharges, though the patterns are only markedly exaggerated in the case of the 18th Green and 6th Fairway where the peak hourly flow rate is over twice that of the daily minimum. The 18th Green displayed a very noticeable peak in the period from 2:00 AM to 4:00 AM, while the peak for 6th Fairway was somewhat earlier and spanned a range of five hours beginning at 10:00 PM. All sites showed minimum flow rates in the very late afternoon or early evening hours. Importantly, the high overall flow rates at the Stillwater Pier outfall varied the least over the course of the day.

2.4 Non-Stormwater Flow Water-Quality Considerations

The 2013 monitoring work showed that water-quality considerations for the re-use or disposal of diverted non-stormwater flows were limited to the relatively high observed salinity values. In this case "relatively" is the important operative word since the measured average specific conductivity values of 1,800 to 8,000 µmhos/cm are actually in the range typically classified as slightly to moderately saline. The highest measured values were found at the 18th Green outfall, which is consistent with the geology of the Peter Hay drainage. Salinity values at this outfall are well in excess of those recommended for irrigation purposes without leaching or prior dilution with higher quality water. Values at the other outfalls, including that at Stillwater Pier which accounts for 62 percent of the measured non-stormwater discharge, are markedly lower, averaging slightly greater than 2,000 µmhos/cm. The latter values are indicative of moderately low salinity hazard for use as irrigation water.

2.5 Options for Flow Control

Once characterization of the non-stormwater discharges was completed, the information was used to identify and evaluate options for the re-use of the diverted flows. Options considered included on- and off-site re-use, recognizing both the relatively large quantities involved and the aforementioned elevated salinity values.

Options specifically considered included:

- *Diversion to the sanitary sewer (off-site re-use)*. Noting the need for treatment and/or dilution to reduce salinity, this option was limited to diversion of flows to the local sanitary sewer system. Diverted flows would be conveyed to the Carmel Area Wastewater District (CAWD) treatment plant where facilities are already in place to recycle and re-use the water. This option is discussed in detail in Chapter 3.
- *Diversion to evapotranspiration/infiltration basins (on-site re-use)*. This option would entail diverting flow streams to appropriately located and sized dedicated basins where the water would be lost to both evapotranspiration from

selected vegetation and infiltration into the underlying soil. This option is discussed in detail in Chapter 4.

- *Diversion to the local irrigation system (on-site re-use)*. In this case, infrastructure would be needed to store and dilute non-stormwater flows with higher quality water prior to re-use on site as irrigation augmentation. This option is also discussed in Chapter 4.

2.6 Modeling of Projected Pumping Requirements for Flow Control

In all cases, the low elevation of the outfall structures that exhibit direct non-stormwater discharges preclude the exclusive use of simple gravity diversion systems if 100-percent elimination is the control goal.[4] Therefore, regardless of the ultimate form of re-use, pump infrastructure is needed to collect and divert non-stormwater flows prior to their discharge to Carmel Bay.

Appropriate pump station designs for each outfall require several key parameters to assure that any given diversion rate is achieved. Perhaps the most important are the pumping rate and the storage volume of the wet well in which the pump (or pumps) are located. Clearly, providing a pump with capacity greater than the greatest incoming flow would result in complete capture and diversion. However, such a pump would be markedly oversized for the more typical lower flow rates that constitute the bulk of the seasonal non-stormwater discharge volume and, running less efficiently, would require more power. Therefore, pump stations provide wet well volume to handle occasional surges in flow. The storage volume in the wet well allows use of a smaller pump that can run at a more efficient level while still achieving full capture of the flow. Wet well volume is also important in controlling how often the pump switches on and off (cycling time), with too little volume potentially resulting in rapid cycling that can lead to motor wear or failure.

[4] Gravity diversion could be used to divert flow from the respective drainage areas at higher elevations (e.g. well inland from the shoreline). However, such a configuration would still require diversion pumps near the respective outfalls to capture non-stormwater flows originating on the PBGL site. Thus, both gravity and pumped infrastructure would be required and the savings in operating cost compared to pumping all the (relatively small) flows at the "end-of-pipe" was deemed to not be sufficient to merit the added initial costs.

To assess the key parameters for pump station design a continuous-simulation spreadsheet model was created for each of the PBGL outfalls where flow data had been collected. The models used the respective flow records as input and included variables for pumping rate and wet well dimensions. The original 15-minute flow record at each site was converted to a 3-minute record using linear interpolation so that the modeling could accommodate pump cycle times as low as 5 minutes. The models covered the entire period from May 1 to September 30, 2013 and were run iteratively to assess the efficiency of various combinations of pump rating and wet well dimension that would be needed to achieve complete capture and diversion of the non-stormwater flow stream. Model runs focused on use of a standard 5-foot diameter manhole as the wet well structure, which, if practical, would eliminate the need for cast-in-place structures, resulting in lower construction costs. The results of the modeling runs are summarized in Table 2-5.

Table 2-5 Pump rating and wet well volumes to achieve full diversion of non-stormwater flows

Pump Rating	18th Green		Stillwater Pier		6th Fairway		9th Green	
	Depth	Volume	Depth	Volume	Depth	Volume	Depth	Volume
(gpm)	*(feet)*	*(gallons)*	*(feet)*	*(gallons)*	*(feet)*	*(gallons)*	*(feet)*	*(gallons)*
10	---	6,300	---	260,000	3.2	460	---	35,000
15	---	4,400	---	68,000	2.0	290	---	7,000
20	---	3,500	---	26,000	**1.9**	**280**	9.7	1,400
25	---	3,000	---	18,000	2.0	290	4.9	710
30	---	2,700	---	12,000	2.1	300	**2.2**	**320**
40	---	2,000	---	10,500	2.2	320	2.4	350
50	9.2	1,330	---	9,000	2.4	350	2.7	390
75	5.0	720	---	6,000	3.2	460	3.3	480
100	**4.2**	**610**	---	2,500	---	---	---	---
125	4.8	700	**5.0**	**720**	---	---	---	---
150	4.9	710	6.0	870	---	---	---	---

Notes: All volumes are based on a standard 5-foot diameter manhole at the depth indicated. The depth would be the minimum as measured from the flow line of the storm drain trunk at the point of diversion to the invert of the wet well structure. Where no depth is indicated, but a wet well volume is listed, the depth would be in excess of 10 feet and deemed impractical. Optimal combinations of pumping rate and wet well are called out in bold.

The iterative model runs provide design information for appropriate combinations of pump capacity and wet well volume for each outfall. The "optimum" values called out in the table are those that minimize wet well volume, which may not be the least costly approach in the long-run if operating costs can be lowered by standardizing pump installations across a number of outfalls. The modeling results presented in Table 2-5 point out important design parameters for each of the outfalls including:

- *18th Green Diversion*. As noted in Table 2-3 and Table 2-4, the field measurements from the 18th Green outfall show that non-stormwater flows there are generally quite low, with less than 24 hours in aggregate of flows rates exceeding 20 gpm in the period of analysis. However, departures above that range were found to range up to and above 100 gpm. Therefore, full capture would require relatively large pump capacity, relatively large wet well volumes, or an appropriate compromise between the two. For example, using a pump rated at 20 gpm, which would be suitable to divert 95 percent of the total dry season volume, would require 3,500 gallons of wet well volume to give 100 percent capture. Though not a large volume, the latter is much larger than what can be provided in a standard manhole configuration. The minimum wet well capacity to achieve full capture is 610 gallons, which would require a pump with a rating of 100 gpm.[5]

  Given that the vast majority of flows at this site are less than 20 gpm, installing a single pump with 100 gpm capacity would not be the most efficient solution. Flow ranges of the type observed at the 18th Green are most frequently handled using a duplex pump configuration. Additional model runs were carried out to assess a dual pump system and found that a duplex configuration with each pump rated at 40 gpm would be capable of full flow diversion. In this case, it was assumed that a somewhat larger 6-foot diameter manhole would be needed to accommodate the additional pump, in which case the minimum

[5] In all cases the modeling assumed 0.5 feet of freeboard between the maximum predicted wet well water elevation and the point of overflow to the existing outfall.

required wet well volume would be 780 gallons (e.g. 3.7 feet of storage depth in a 6-foot diameter manhole).

- *18th Fairway Diversion*. Flow gaging was not carried out at the 18th Fairway outfall. Therefore, no specific diversion system modeling was completed for this site. However, it is reasonable to assume that non-stormwater outflow at this site would generally approximate that at the 9th Green as discussed below. This assumption is based on the existing 45 acre drainage area at this outfall, which would be increased to approximately 54 acres by interconnecting several smaller existing outfall along the 18th hole that directly discharge to Carmel Bay. This compares to a total drainage area of 75 acres at the 9th Green.

- *Stillwater Pier Diversion*. As discussed previously, the Stillwater Pier outfall accounts for 62 percent of the measured non-stormwater flow at the PBGL. Additionally, this outfall exhibits flow rates that more frequently range above 50 gpm. Capture of 95 percent of non-stormwater volume could be achieved using a pump with a rating as low as 33 gpm. However, the frequent higher flow departures would then require a wet well volume of nearly 12,000 gallons to achieve 100 percent capture. The minimum wet well volume using a simplex pump configuration would be 720 gallons at a pump rating of 125 gpm.

  As with the 18th Green, the flow patterns at Stillwater Pier are likely much better handled using a duplex pump system. A duplex pump configuration with each pump rated at 60 gpm with a wet well volume of 840 gallons would be adequate to achieve full diversion of the observed flows.

- *6th Fairway Diversion*. The consistently low flow rates measured at the 6th Fairway outfall are amenable to a small single pump configuration. As shown in Table 2-5, the optimum system would include 20 gpm of pump capacity with a wet well volume of 280 gallons, a configuration that could easily be accommodated in a standard 5-foot manhole.

- *9th Green Diversion*. Flow patterns at the 9th Green Outfall are also tightly clustered at the lower range, with no significant departures to higher flows observed. Therefore, a small single pump configuration would also work well at this location. The optimum configuration would use a 30 gpm rated pump with a wet well volume of 320 gallons.

3 DIVERSION TO THE SANITARY SEWER SYSTEM

Diversion to the local sanitary sewer system is the preferred alternative for re-use of non-stormwater flows captured at the PBGL site. This approach minimizes the need for new infrastructure and, most importantly, directs the intercepted flow stream to an established facility (the CAWD treatment plant) where existing processes can easily address the elevated salinity of the water and maximize the potential for beneficial end use. Appropriately enough, these beneficial end uses would include returning the treated flows to the PBGL as recycled water for irrigation.

3.1 Local Sanitary Sewer Infrastructure

The local sanitary sewer system that would be utilized is illustrated in Plate 2. The sanitary sewer trunk lines generally follow the inland boundary of the course and include an existing pump station and 8-inch force main located near the 18th Tee.

3.2 Flow Diversion Locations and Infrastructure Needs

Full diversion of the direct non-stormwater discharges to Carmel Bay can be achieved through the construction of five diversion facilities along the shoreline edge of the course. The overall system is shown schematically in Plate 2 and in the form of preliminary engineering plans in Appendix A.

The typical diversion configuration would utilize new paired manhole structures as show in Figure 3-1. One of the manholes would be constructed along the existing storm drain line and would serve as a "forebay" for the second off-line manhole which would house the pump or pumps and serve as the wet well. The forebay manhole would be connected to the wet well manhole by a raised inverted pipe. This configuration would limit the potential for sediment and coarse debris to enter the wet well and interfere with pump functions.

The pump installations would include either one or two active pumps as described below. Back-up pumps and emergency back-up power would not be provided, since primary pump failure would not pose a hazard (unlike sanitary sewer or flood control

pump stations). Pump operation would be controlled by simple level sensors. An alarm system would be installed at each location, triggered by prolonged elevated wet well water depths that would be indicative of pump failure. The suggested pump sizes are all in the range of equipment that could be readily removed and replaced with a minimum of effort.

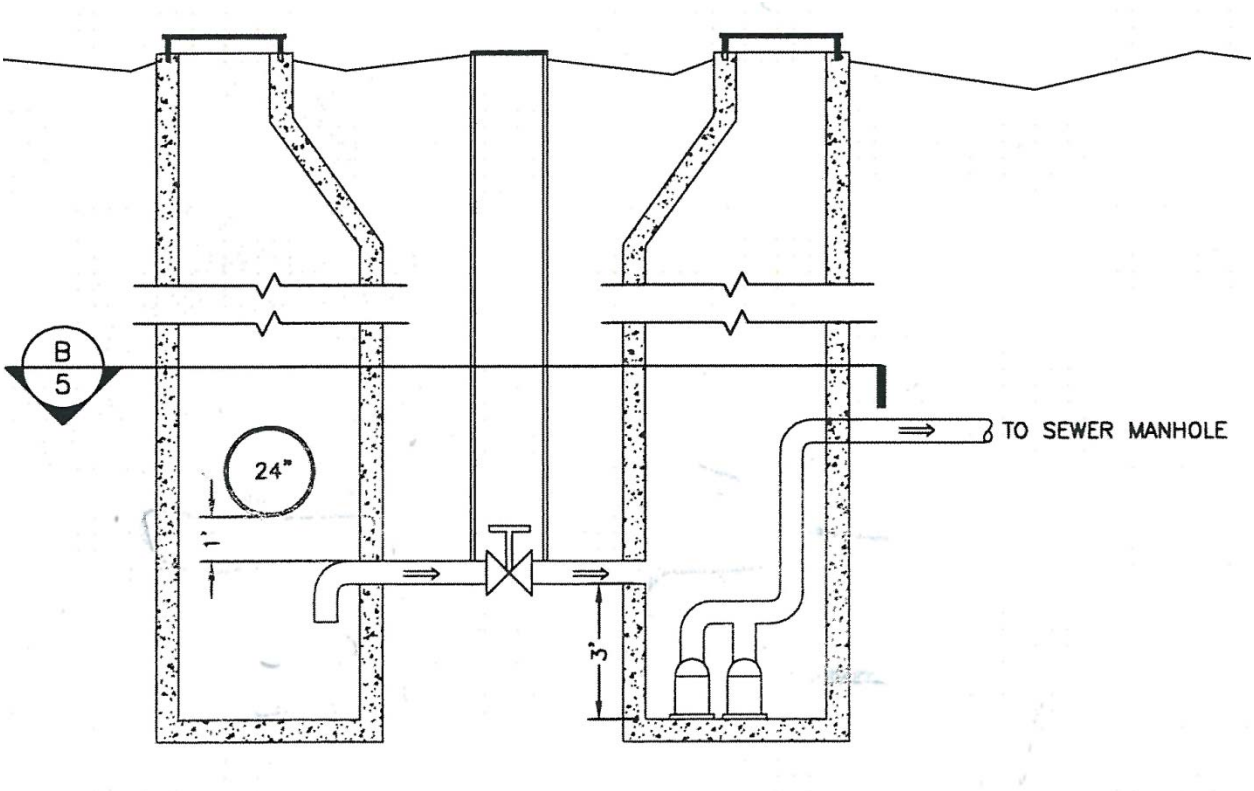


Figure 3-1 Proposed diversion facility dual manhole configuration

The diversion facilities would be operational for the period from April 1 to October 31 of each year. The passive dual manhole configuration of each diversion would not interfere with the normal stormwater drainage function of the respective storm drain lines. Therefore, the systems could be allowed to function during small storm events that might occur late or early in the rainy season. However, prolonged operation during particularly wet periods would lead to additional wear on the pump infrastructure.

Specific requirements and considerations for each diversion facility include the following:

- *18th Green Diversion*. This diversion facility benefits from very close proximity to a sanitary sewer line, but requires installation on the existing 48-inch storm drain. The dual manholes would need to be installed with invert elevations of 15.3 feet and rim elevations on the order of 26 feet, giving a structure depth of 10.7 feet. The preferred pump installation would utilize two 40 gpm rated pumps operating in duplex mode with each pump alternating as lead and lag pump to equalize wear. The required force main would be approximately 30 feet in length and preliminary plans call for a 90-foot run for power. Average seasonal diversion rates (April 1 to October 31) can be expected to be on the order of 6,000 gallons/day, with the maximum diversion rates set by the combined pump capacity of 80 gpm.[6]

- *18th Fairway Diversion*. This diversion facility would be constructed on top of the terrace near the shoreline outfall of the existing 24-inch storm drain line. Additional connector pipe would be required to intercept flow from several adjacent underdrain lines that currently discharge through separate small outfalls (see Table 2-1). The dual manholes would be installed with invert elevations of 8.2 feet and rim elevations on the order of 18 feet, giving a structure depth of 9.8 feet. The preferred pump installation would utilize a single 30 gpm rated pump. The required diversion force main to the sanitary sewer would be approximately 170 feet in length and preliminary plans call for a 340-foot run to bring power to the site. As much as 600 feet of auxiliary piping would be needed to connect the existing adjacent underdrains to the diversion facility. The best estimate for the average seasonal diversion at this site is on the order of 2,000 gallons/day.

[6] Again, it is important to note that gaging of non-stormwater discharges has not been carried out in years of average or above-average rainfall. Therefore, total diverted volumes could be substantially higher in such years, though maximum inflows to the sanitary sewer system would be limited by the installed pump capacity.

- *Stillwater Pier Diversion*. This diversion facility is proposed just upstream of the existing 30-inch diameter outfall to Stillwater Cove, immediately east of the Pier. The diversion manholes would be constructed with invert elevations at 7.4 feet and rim elevations of 18 feet, giving a structure depth of 10.6 feet. The recommended pump installation is for duplex pumps rated at 60 gpm each. The diversion force main would cut across the 4th Fairway to connect to the sanitary sewer and power connection will require a run of approximately 530 feet. Past gaging data indicates this will be by far the largest diversion, with average flow rates of at least 16,000 gallons/day.

- *6th Fairway Diversion*. Though the smallest capacity of the proposed diversion facilities, the remote location of the 6th Fairway outfall requires a more auxiliary work. The facility would be constructed on the 12-inch storm drain line approximately 50 feet inland from the existing outfall. Invert elevations for the dual manholes would be 35.0 feet, with rim elevations of 43 feet giving structure depths of 8.0 feet. The facility would be equipped with a single pump rated at 20 gpm. The diversion force main would be 760 feet long, skirting the 6th Fairway and crossing the 14th Fairway to connect to the trunk sanitary sewer line. Power would need to be brought from the old maintenance yard, a run of approximately 1,450 feet. Diverted flows can be expected to average at least 1,500 gallons/day over the operational season.

- *9th Green Diversion*. This 24-inch outfall is also located at a relatively remote location with respect to other utilities. The proposed diversion facility location is 60 feet inland from the outfall, just over the terrace edge from the 9th Green. The manhole structures would have invert elevations at 26.7 feet and rim elevations of 35 feet, giving a total depth of 8.3 feet. As per the facility at the 18th Fairway, a single pump rated at 30 gpm is recommended. The diversion force main would run 740 feet north and east skirting the 9th Green and 13th Tees enroute to the sanitary sewer. Power would be brought in from the maintenance yard, a run of roughly 570 feet. Average seasonal diversions from this facility would be on the order of 2,500 gallons/day.

3.3 Construction Considerations and Preliminary Cost Estimates

The proposed diversion facilities entail a number of important construction considerations that would need to be carefully considered. Clearly, careful coordination would be needed with the Pebble Beach Community Services District and CAWD to schedule and complete the connections to the existing sanitary sewer lines. Additionally, it is important to note that all the diversion facilities except that at Stillwater Pier require construction directly adjacent to, or actually across, the play area of the course. Scheduling and execution of the work in a manner that does not interfere with play would be of the highest priority.

Preliminary cost estimate information is provided in Appendix B.

4 ON-SITE DIVERSION AND CONTROL

Control of diverted flows on-site presents a number of design challenges. This is particularly true with the three western outfalls (18th Green, 18th Fairway, and Stillwater Pier) where the quantity and/or salinity of the flow streams are considerations and additional space constrictions come into play.

It is important to note that the diversion facilities discussed in the previous chapter would be required for on-site control, with the only exception being the connections to the sanitary sewer system.

4.1 Evapotranspiration/Infiltration Basins

Where the quantity of diverted flow is low enough and salinity is not a consideration, a viable on-site control approach would be capture and pumping to specially constructed evapotranspiration/infiltration basins (ETI basins). Diverted flows would be spread over the basins which would be designed with the maximum surface area practicable to maximize evapotranspiration. Where appropriate, total basin areas could be reduced by allowing infiltration to occur as well. In that case, the basins would be need to be located in areas where groundwater depth is low enough and sub-surface transmissivity is high enough that groundwater mounding would not occur. Additionally, the location of each basin would need to be carefully selected so that percolated flows are not immediately intercepted by an existing underdrain system, potentially leading to exacerbated non-stormwater flows at other outfalls.

To assess the practicality of using ETI basins, the diversion simulation model was modified to include measured data from the Pacific Grove meteorological station operated by the California Irrigation Information Management System (CIMIS) for the May 1 to September 30 period of analysis. Additional model variables for basin dimensions and groundwater transmissivity were also added.

The model runs showed that ETI basins would be excessively large for all but the smallest non-stormwater flow streams at the site. Approximate dimensions of an ETI basin for the smallest diversion (6th Fairway) would be on the order of 10,000 square feet. This would

increase to nearly 19,000 square feet for an intermediate diversion amount such as that at the 9th Green outfall. It is unlikely that a suitable location could be found for ETI basins necessary to handle larger diversion volumes, particularly those for Stillwater Cove, where over 1.5 acres of space would be needed.

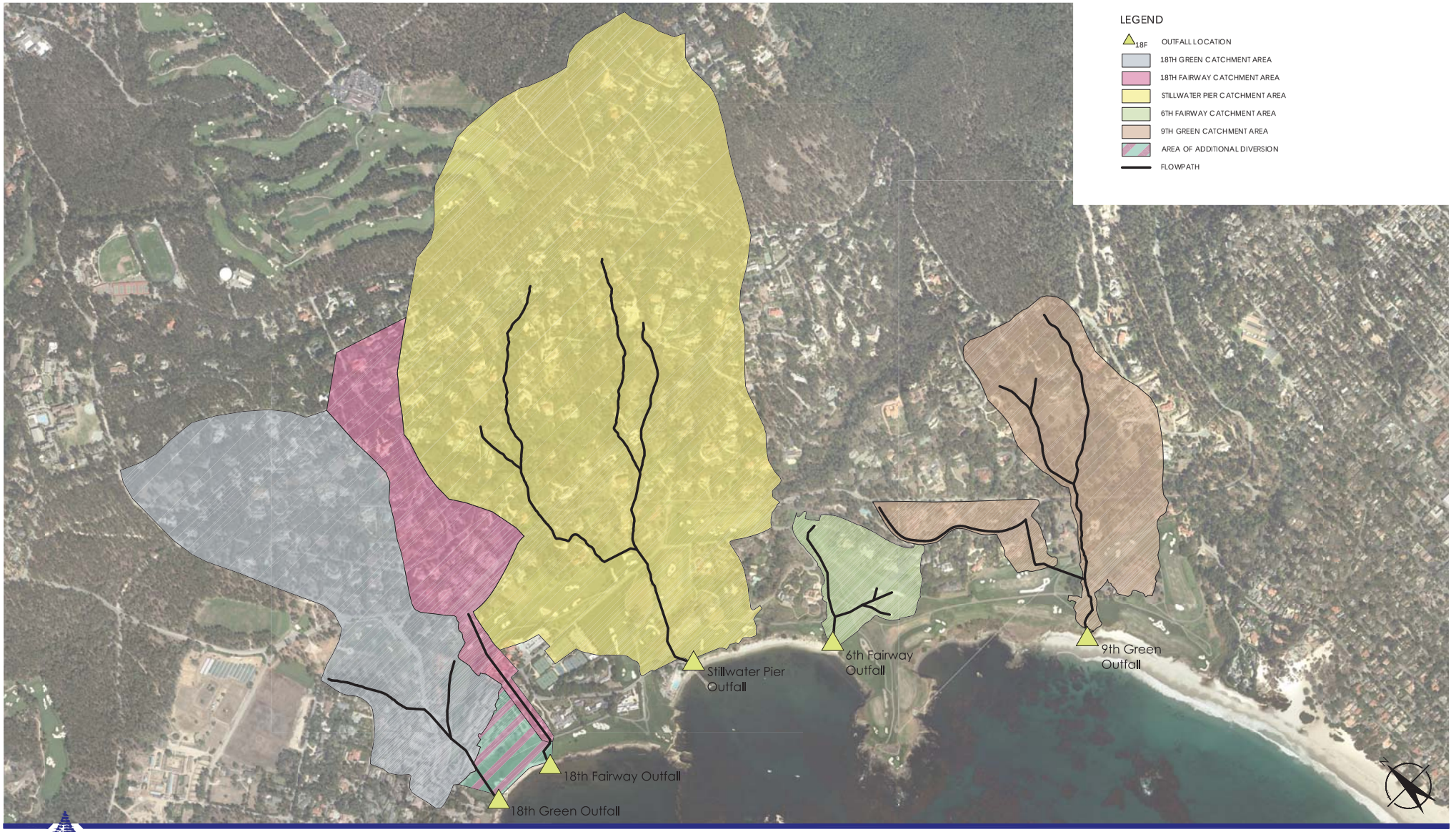
This alternative was not developed in detail given the projected additional costs of constructing and maintaining the ETI basins and the fact that the diverted flows would not have the same potential for beneficial re-use as with diversion to the sanitary sewer system.

4.2 Re-use for On-site Irrigation

Re-use for on-site irrigation could prove practical as long as sufficient auxiliary infrastructure was constructed to store and blend the diverted non-stormwater flows to reduce salinity values to ranges compatible with the exacting landscaping demands at the site. The required infrastructure (in addition to the diversion facilities) would include tank storage and reconfiguring the existing irrigation system to supply specified zones with post-blended water. Recycled water supplied by the CAWD plant would be the source of blend water. Dilution rates to allow use on turf areas would need to be quite high, ranging up to 25:1 or more for the case of the higher salinity flows from the 18th Green outfall.

Given the additional infrastructure and operation costs involved, this alternative was not pursed in detail. However, the diversion simulation model can be readily adapted to size the required infrastructure should diversion to the sanitary sewer system prove impractical.

Plates



Balance Hydrologics, Inc.

214040 Report Plates.dwg

Plate 1. **Outfalls with direct discharge of non-stormwater flows to Carmel Bay, Pebble Beach Golf Links**

0' 400' 800' 1600'

SCALE: 1" = 800'

Balance Hydrologics, Inc.

214040 Report Plates.dwg

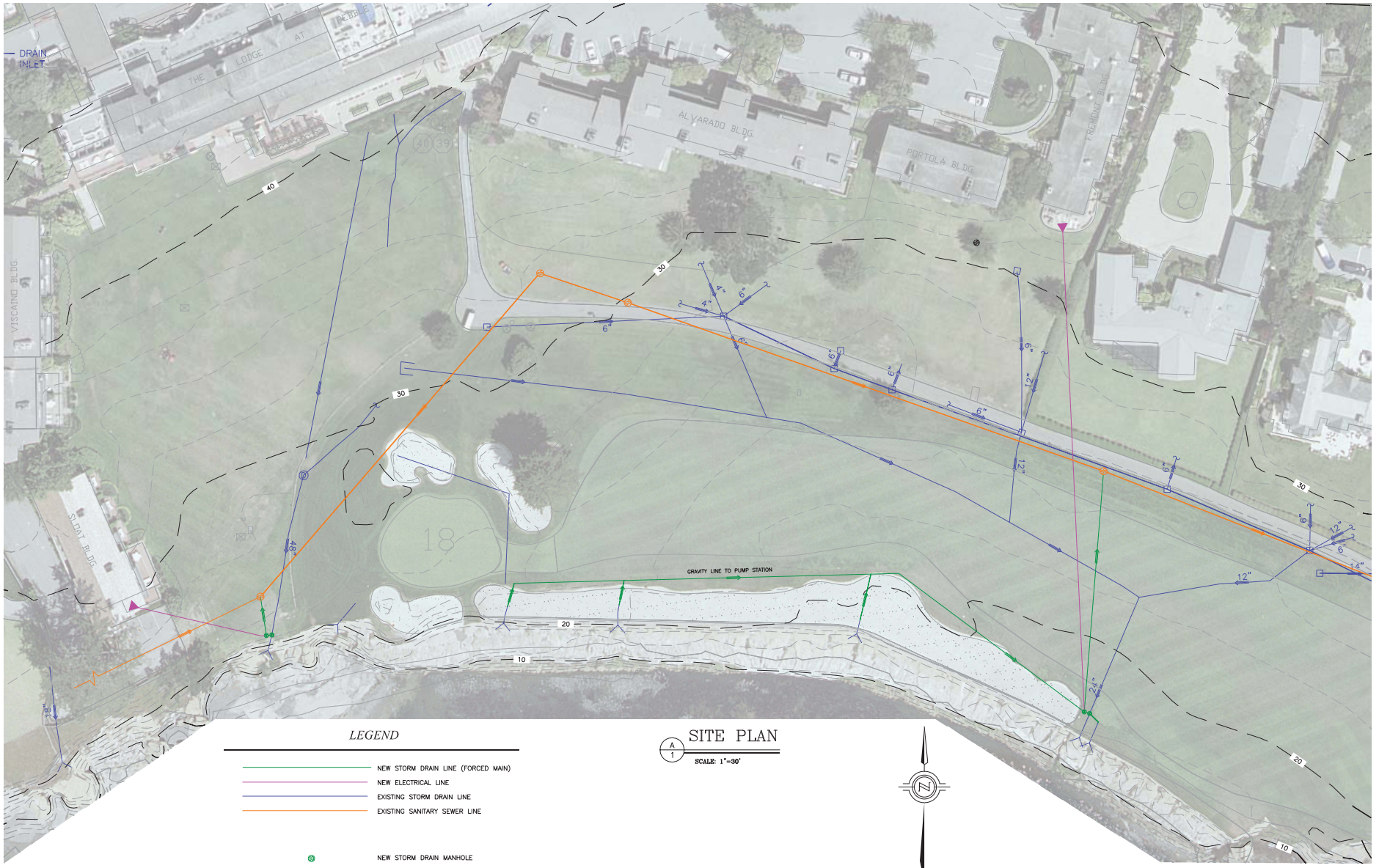
Plate 2. **Schematic of non-stormwater flow diversion to the sanitary sewer system, Pebble Beach Golf Links.**

0' 200' 400' 800'

SCALE: 1" = 400'

Appendix A.

Preliminary engineering plans for diversion to the sanitary sewer system



LEGEND

- NEW STORM DRAIN LINE (FORCED MAIN)
- NEW ELECTRICAL LINE
- EXISTING STORM DRAIN LINE
- EXISTING SANITARY SEWER LINE

- NEW STORM DRAIN MANHOLE
- EXISTING STORM DRAIN MANHOLE
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER CLEANOUT
- POINT OF ELECTRICAL CONNECTION

A/1 SITE PLAN

SCALE: 1"=30'

GRAPHIC SCALE 30 0 15 30 60

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DESIGNED BY: N/A
DATE: 9/15/14
SCALE: AS SHOWN
JOB NUMBER: 14-030
LAST REVISED:
REVISED BY:

PEBBLE BEACH GOLF LINKS
STORMWATER CAPTURE PLAN

HOLE 18

PEBBLE BEACH COMPANY
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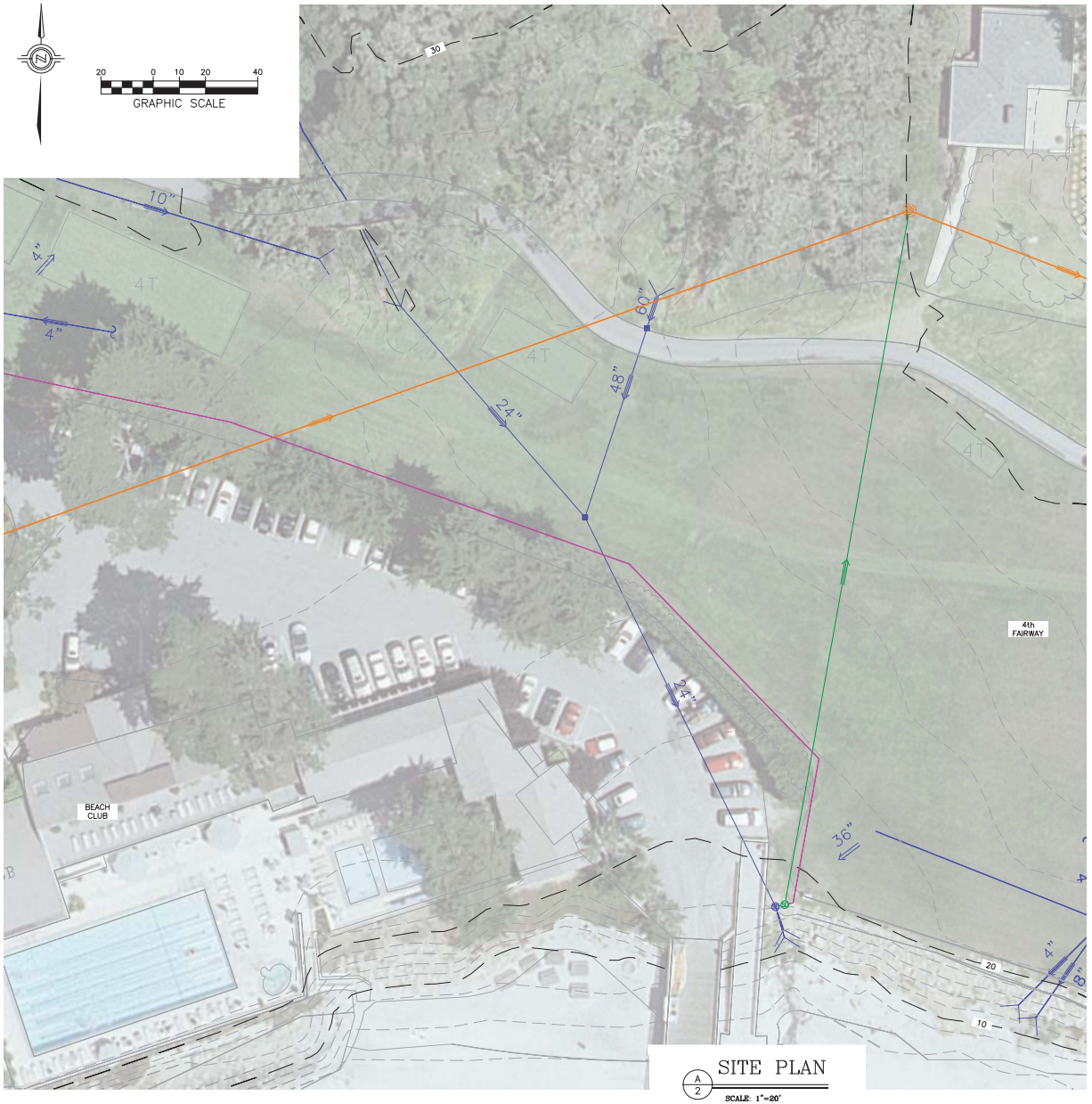
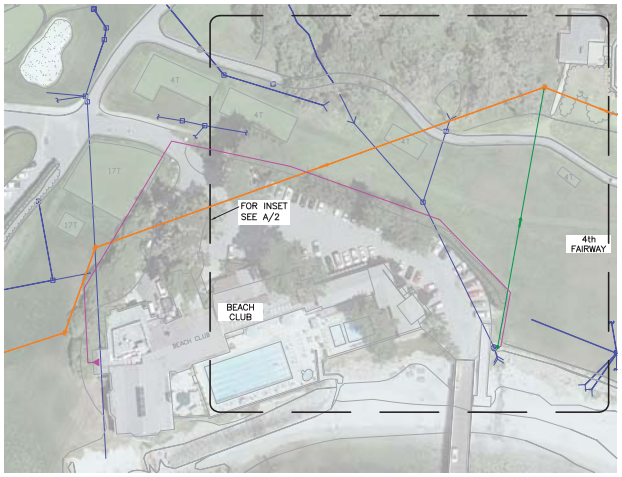
SHEET 1 OF 5 SHEETS



A/2 SITE PLAN

SCALE: 1"=20'



B/2 SITE PLAN

SCALE: 1"=60'

LEGEND

- NEW STORM DRAIN LINE (FORCED MAIN)
- NEW ELECTRICAL LINE
- EXISTING STORM DRAIN LINE
- EXISTING SANITARY SEWER LINE
- NEW STORM DRAIN MANHOLE
- EXISTING STORM DRAIN MANHOLE
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER MANHOLE (NOT SURVEYED)
- EXISTING SANITARY SEWER CLEANOUT
- POINT OF ELECTRICAL CONNECTION

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PEBBLE BEACH GOLF LINKS
STORMWATER CAPTURE PLAN
HOLE 4

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PARCEL INFORMATION

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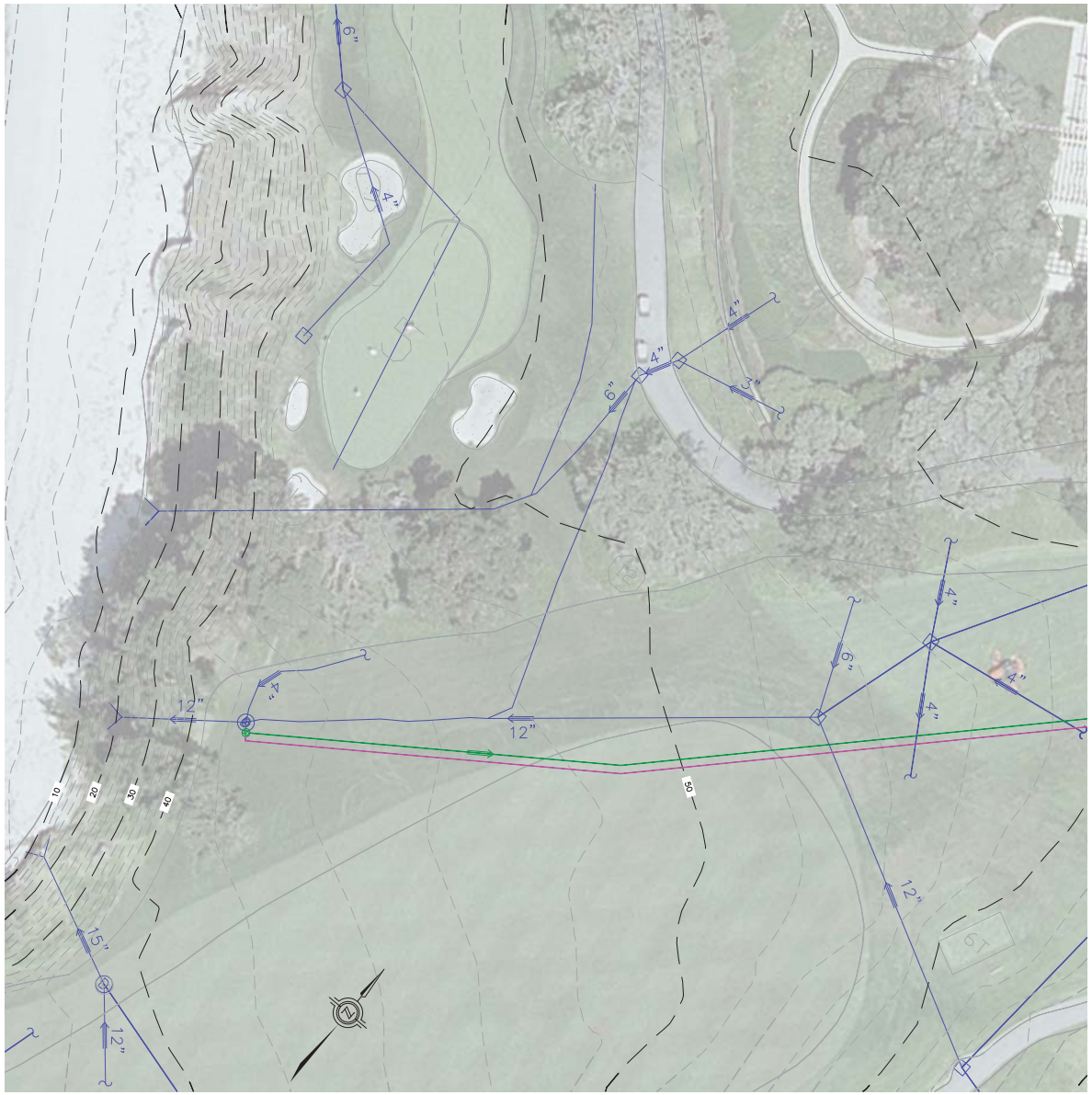
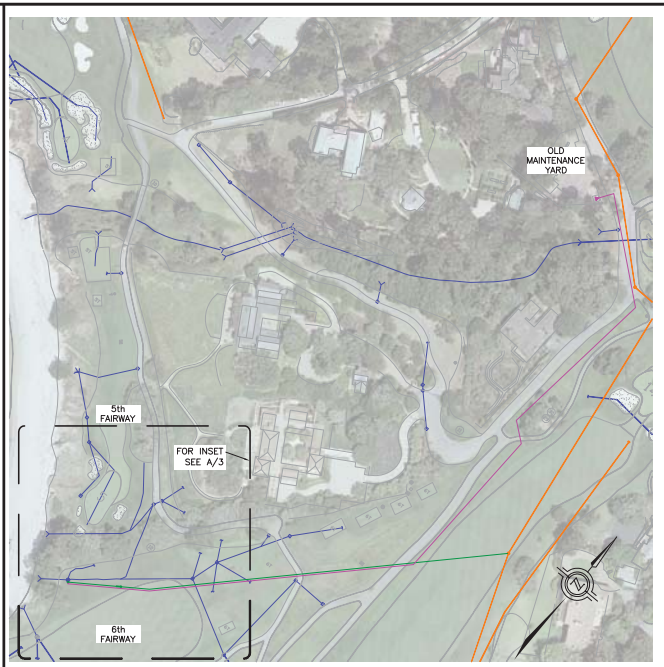


20 0 10 20 40
GRAPHIC SCALE

A/3 SITE PLAN
SCALE: 1"=20'



100 0 50 100 200
GRAPHIC SCALE

B/3 SITE PLAN
SCALE: 1"=100'

LEGEND

- NEW STORM DRAIN LINE (FORCED MAIN)
- NEW ELECTRICAL LINE
- EXISTING STORM DRAIN LINE
- EXISTING SANITARY SEWER LINE

- NEW STORM DRAIN MANHOLE
- EXISTING STORM DRAIN MANHOLE
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER MANHOLE (NOT SURVEYED)
- EXISTING SANITARY SEWER CLEANOUT
- POINT OF ELECTRICAL CONNECTION

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PEBBLE BEACH GOLF LINKS
STORMWATER CAPTURE PLAN
HOLE 6

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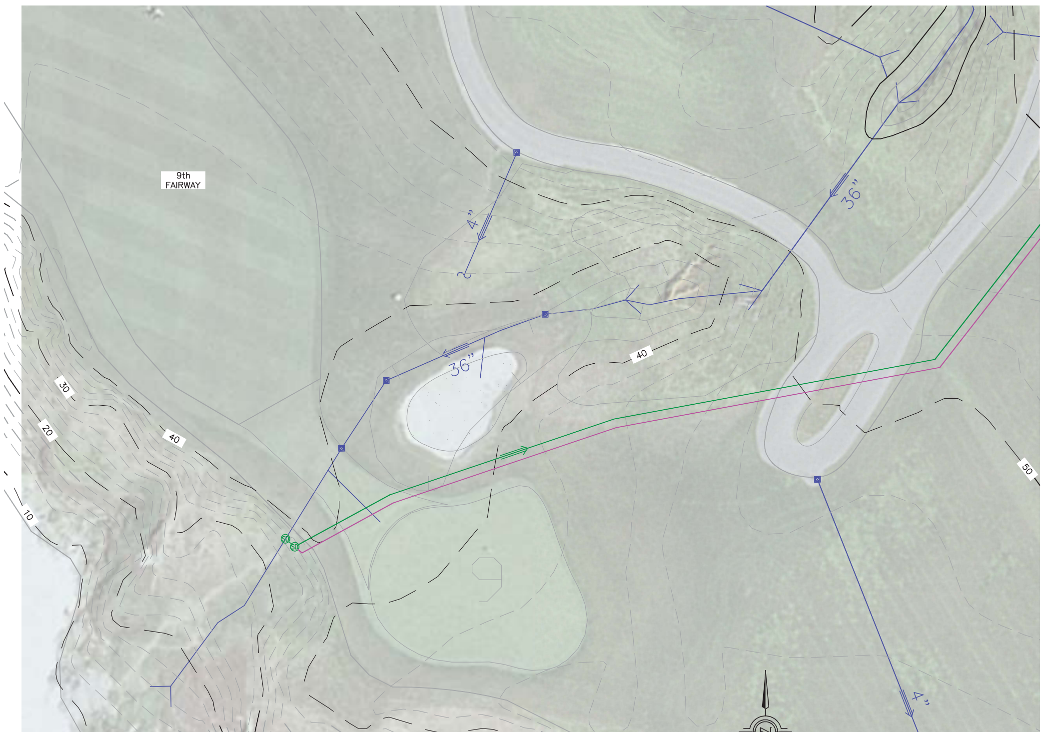
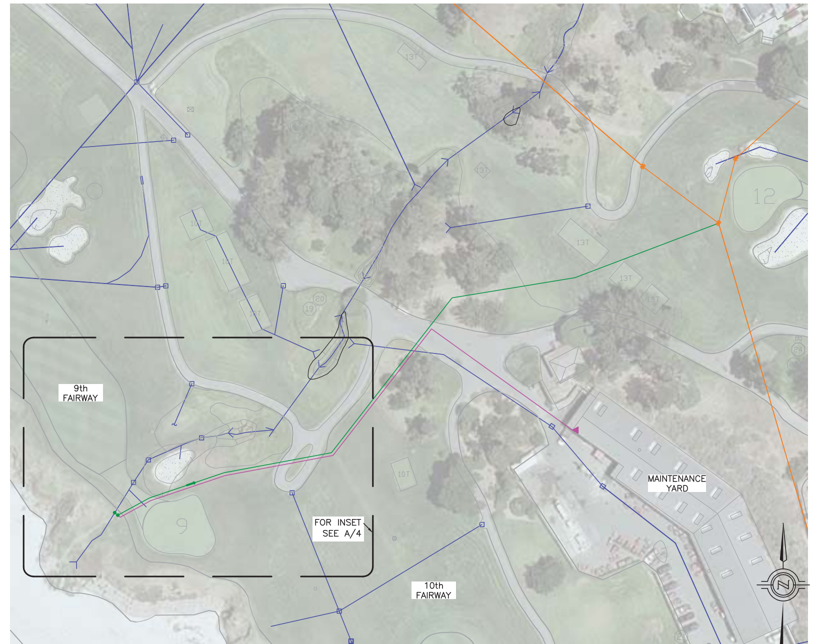
PARCEL INFORMATION

SHEET 3 OF 5 SHEETS



A/4 SITE PLAN
SCALE: 1"=20'

GRAPHIC SCALE 20 0 10 20 40



B/4 SITE PLAN
SCALE: 1"=60'

GRAPHIC SCALE 60 0 30 60 120

LEGEND

- NEW STORM DRAIN LINE (FORCED MAIN)
- NEW ELECTRICAL LINE
- EXISTING STORM DRAIN LINE
- EXISTING SANITARY SEWER LINE

- NEW STORM DRAIN MANHOLE
- EXISTING STORM DRAIN MANHOLE
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER MANHOLE (NOT SURVEYED)
- EXISTING SANITARY SEWER CLEANOUT
- POINT OF ELECTRICAL CONNECTION

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PEBBLE BEACH GOLF LINKS
STORMWATER CAPTURE PLAN
HOLE 9

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PARCEL INFORMATION:

SHEET 4 OF 5 SHEETS

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DRAWN BY: PJM
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SCALE: AS SHOWN
JOB NUMBER: 14-030
LAST REVISED:
REVISED BY:

PEBBLE BEACH GOLF LINKS
STORMWATER CAPTURE PLAN

DETAILS

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PARCEL INFORMATION:

SHEET 5 OF 5 SHEETS

Appendix B.

Preliminary engineering costs estimates for diversion to the sanitary sewer system

L&S ENGINEERING AND SURVEYING, INC

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 17, 2014

Summary

Location	Construction Cost	Soft Cost	Total
18th Green	$ 79,522.50	$ 33,500.00	$113,023
18th Fairway	$ 84,467.50	$ 33,500.00	$117,968
Stillwater Pier	$ 104,880.00	$ 33,500.00	$138,380
6th Fairway	$ 139,265.00	$ 33,500.00	$172,765
9th Green	$ 113,505.00	$ 33,500.00	$147,005
	TOTAL ESTIMATED CONSTRUCTION COST		**$689,140**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Stations	5	EA	$3,500	$17,500

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 15, 2014

18th Green

Construction Cost	Number	Unit	Unit Cost	Total
Mobilization/De-mobilization	1	LS	- -	$2,000
Wet wells (5-foot diameter manholes)	2	EA	$15,000	$30,000
40GPM Duplex pump station, hatch, controls and assembly	1	EA	$20,000	$20,000
Site work	1	EA	$10,000	$10,000
2 1/2 inch PBC Piping to existing sewer main	30	LF	$55	$1,650
Electrical and telephone conduit/conductors to pump station	100	LF	$35	$3,500
Miscellaneous appurtenances	1	LS	- -	$4,000
			Subtotal	$69,150
			15% Contingencies	$10,373
			TOTAL ESTIMATED CONSTRUCTION COST	**$79,523**

Soft cost	Number	Unit	Unit Cost	Total
Engineering				
Civil (PS&E)	1	EA	$18,000	$18,000
Electrical	1	EA	$4,000	$4,000
Soils	1	EA	$3,000	$3,000
			Subtotal engineering cost	$25,000
Permits				$2,000
Surveying				$2,000
Construction staking				$1,500
Inspections				$3,000
			TOTAL ESTIMATED SOFT COST	**$33,500**
			TOTAL ESTIMATED COST	**$113,023**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Station manholes	1	EA	$3,500	$3,500

L&S ENGINEERING AND SURVEYING, INC

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 15, 2014

18th Fairway

Construction Cost	Number	Unit	Unit Cost	Total
Mobilization/De-mobilization	1	LS	- -	$2,000
Wet wells (5-foot diameter manholes)	2	EA	$15,000	$30,000
15GPM Duplex pump station, hatch, controls and assembly	1	EA	$15,000	$15,000
Site work	1	EA	$10,000	$10,000
2 1/2 inch PBC Piping to existing sewer main	170	LF	$35	$5,950
Electrical and telephone conduit/conductors to pump station	340	LF	$25	$8,500
Miscellaneous appurtenances	1	LS	- -	$4,000
			Subtotal	$73,450
			15% Contingencies	$11,018
			TOTAL ESTIMATED CONSTRUCTION COST	**$84,468**

Soft cost	Number	Unit	Unit Cost	Total
Engineering				
Civil (PS&E)	1	EA	$18,000	$18,000
Electrical	1	EA	$4,000	$4,000
Soils	1	EA	$3,000	$3,000
			Subtotal engineering cost	$25,000
Permits				$2,000
Surveying				$2,000
Construction staking				$1,500
Inspections				$3,000
			TOTAL ESTIMATED SOFT COST	**$33,500**
			TOTAL ESTIMATED COST	**$117,968**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Station manholes	1	EA	$3,500	$3,500

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 15, 2014

Stillwater Pier

Construction Cost	Number	Unit	Unit Cost	Total
Mobilization/De-mobilization	1	LS	- -	$2,000
Wet wells (5-foot diameter manholes)	2	EA	$15,000	$30,000
60GPM Duplex pump station, hatch, controls and assembly	1	EA	$20,000	$20,000
Site work	1	EA	$10,000	$10,000
2 1/2 inch PBC Piping to existing sewer main	270	LF	$35	$9,450
Electrical and telephone conduit/conductors to pump station	710	LF	$25	$17,750
Miscellaneous appurtenances	1	LS	- -	$4,000
			Subtotal	$91,200
			15% Contingencies	$13,680
			TOTAL ESTIMATED CONSTRUCTION COST	**$104,880**

Soft cost	Number	Unit	Unit Cost	Total
Engineering				
Civil (PS&E)	1	EA	$18,000	$18,000
Electrical	1	EA	$4,000	$4,000
Soils	1	EA	$3,000	$3,000
			Subtotal engineering cost	$25,000
Permits				$2,000
Surveying				$2,000
Construction staking				$1,500
Inspections				$3,000
			TOTAL ESTIMATED SOFT COST	**$33,500**
			TOTAL ESTIMATED COST	**$138,380**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Station manholes	1	EA	$3,500	$3,500

L&S ENGINEERING AND SURVEYING, INC

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 15, 2014

6th Fairway

Construction Cost	Number	Unit	Unit Cost	Total
Mobilization/De-mobilization	1	LS	- -	$2,000
Wet wells (5-foot diameter manholes)	2	EA	$15,000	$30,000
15GPM Duplex pump station, hatch, controls and assembly	1	EA	$15,000	$15,000
Site work	1	EA	$10,000	$10,000
2 1/2 inch PBC Piping to existing sewer main	760	LF	$35	$26,600
Electrical and telephone conduit/conductors to pump station	1420	LF	$25	$35,500
Miscellaneous appurtenances	1	LS	- -	$4,000
			Subtotal	$121,100
			15% Contingencies	$18,165
			TOTAL ESTIMATED CONSTRUCTION COST	**$139,265**

Soft cost	Number	Unit	Unit Cost	Total
Engineering				
Civil (PS&E)	1	EA	$18,000	$18,000
Electrical	1	EA	$4,000	$4,000
Soils	1	EA	$3,000	$3,000
			Subtotal engineering cost	$25,000
Permits				$2,000
Surveying				$2,000
Construction staking				$1,500
Inspections				$3,000
			TOTAL ESTIMATED SOFT COST	**$33,500**
			TOTAL ESTIMATED COST	**$172,765**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Station manholes	1	EA	$3,500	$3,500

L&S ENGINEERING AND SURVEYING, INC

COST ESTIMATE TO DESIGN AND INSTALL
STORMWATER PUMP STATION
FOR DRY WEATHER STORMWATER DIVERSION
September 15, 2014

6th Green

Construction Cost	Number	Unit	Unit Cost	Total
Mobilization/De-mobilization	1	LS	- -	$2,000
Wet wells (5-foot diameter manholes)	2	EA	$15,000	$30,000
15GPM Duplex pump station, hatch, controls and assembly	1	EA	$15,000	$15,000
Site work	1	EA	$10,000	$10,000
2 1/2 inch PBC Piping to existing sewer main	720	LF	$35	$25,200
Electrical and telephone conduit/conductors to pump station	580	LF	$25	$14,500
Miscellaneous appurtenances	1	LS	- -	$4,000
			Subtotal	$98,700
			15% Contingencies	$14,805
			TOTAL ESTIMATED CONSTRUCTION COST	**$113,505**

Soft cost	Number	Unit	Unit Cost	Total
Engineering				
Civil (PS&E)	1	EA	$18,000	$18,000
Electrical	1	EA	$4,000	$4,000
Soils	1	EA	$3,000	$3,000
			Subtotal engineering cost	$25,000
Permits				$2,000
Surveying				$2,000
Construction staking				$1,500
Inspections				$3,000
			TOTAL ESTIMATED SOFT COST	**$33,500**
			TOTAL ESTIMATED COST	**$147,005**

Yearly Maintenance Cost	Number	Unit	Unit Cost	Total
Pump Station manholes	1	EA	$3,500	$3,500

MEMO

To: Thomas Quattlebaum

From: Krysia Skorko, Bill Christner and Barry Hecht

Date: August 14, 2014

Subject: Phase 2 pesticide and Stillwater Pier extended sampling results, July 2014

Introduction and Purpose

This memo and the attached tables contain the results of surface water samples collected at Pebble Beach Golf links on July 17th, 2014. The results obtained from this study may inform decisions regarding management of dry-season percolate, include the feasibility of diverting dry season waters to Carmel Area Wastewater District (CAWD) facilities.

Sampling for chlorothalonil and triclopyr took place on July 17th, 2014, at Pebble Beach Golf Links, to re-test a small subset of sites where exceedances of these pesticides were observed in 2013 ASBS dry- season sampling. During 2013, elevated levels of one or both pesticides were found at the 18th green, Stillwater Pier, and the 9th green (Figure 1). These sites, which are all outfalls at the downstream end of their watersheds, were re-sampled on July 17th, 2014, along with paired surface water sites upstream (2nd green, Peter Hay), to allow for detection of upstream sources of contaminants, if any. In the Figure 1 map, red arrows indicate resampling sites for both chlorothalonil and triclopyr (Stillwater Pier, the 2nd green and the 9th green). Because triclopyr was not detected at either Peter Hay or the 18th green in 2013, sampling only for chlorothalonil was conducted here (shown with purple arrows in Figure 1). For quality control, one field blank and one field duplicate were collected for each constituent. Specific conductance (SC) was also measured at all sites. We also sampled for a wider range of constituents at Stillwater Pier.

Discharge measurements and/or estimates were also made at each site after samples were collected. These measurements may be used in combination with analyte concentrations to calculate loadings. Loadings provide a more direct comparison of water quality results between WY13 and WY14. Both years were characterized by dry conditions. At the San Clemente Dam, the rainfall total for WY 2014 is 10.42 inches, or 49% of the long-term annual average of 21.29 inches. WY13 was slightly wetter, with 14.6 inches of rain recorded, or 69% of the long term average.

Ambient conditions on the sampling day consisted of hazy skies with temperatures in the mid to upper 70s. Only 0.01 inches of precipitation had been reported in the previous ten (10) days at the Monterey Airport (KMRY), and water levels at all sampling sites were low as expected during dry season sampling.

Sampling Procedures

Water-quality sampling procedures were based on the state's 2013 Central Coast ASBS Regional Monitoring Plan Standard Operating Procedures for Collection of Water Samples (SOP FS-1). This document describes required techniques for collecting water samples that are compatible with SWAMP (Surface Water Ambient Monitoring Program) standards, including sample labeling, sample collection methods, sample preservation, quality assurance/quality control, sample shipping and chain of custody procedures. This document also specifies sampling containers and hold times.

All samples were collected from discharge points (pipe/culvert) or a stream directly into pre-cleaned sample containers. Unpreserved containers were triple-rinsed with sample water. Contamination was avoided by using a modified "clean hands" technique where the sampler used talc-free latex gloves and was the only person to handle the sample, bottle, cap, or apparatus during sample collection.

All samples were placed directly on ice in opaque coolers in the field and kept below 6◦C throughout the shipping and delivery process. All glass sample bottles were wrapped in bubble wrap for additional protection from glass breakage.

Samples were clearly labeled with sample identification numbers, dates, times, sampler initials and sample analyte. Chain of custody forms were provided to the laboratories to promote traceable possession of the samples from collection time to the time results were received.

SCT (specific conductance and water temperature) was measured at all surface water sites; results are reported in Table 1. To avoid contamination, equipment that was re-used between sites was triple-rinsed with sample water after each use. The order of sampling proceeded from the lowest chlorothalonil concentrations of the most recent prior sampling to the highest. Sampling times are noted in Table 1.0.

Discharge was measured at sampling sites by collecting a measured volume in a secondary container over a measured time interval. For sites with high discharge (Stillwater Pier, 18th green), a 5 gallon bucket was used to collect flow by holding the bucket directly beneath the outfall. For sites with low discharge (Peter Hay, 9th green), a 1-gallon plastic bag was used in a similar manner to collect as much of the flow as possible. Due to the geometry of the outfalls, capturing 100% of the flow was not possible at every site and a small percentage of the flow did by-pass the collection bucket/bag. Estimates of the percent flow captured were made for each discharge measurement. Containers were partially filled to prevent spillage. Water was allowed to collect in the container for an arbitrary amount of time, and the collection time recorded. The volume collected was then measured with a graduated cylinder. The total volume collected per unit time was used to calculate the sample site discharge. Adjustments were made according to field estimates of the percentage of total flow captured in the container. If the estimated percent captured was below 85%, the measurement was deemed inaccurate and discarded. This procedure was repeated 3 times at each site, and the average of these trials was used to estimate the flow. Due to the geometry of the channel at the 2nd Green site, flow volume collection was impractical and discharge was estimated from visual observation.

To avoid contamination potential from the measurement instruments, discharge was calculated after all water quality samples had been collected. The results of these measurements, reported in Table 1.0, are similar (within 2 to 3 gallons per minute) to discharge measurements made in July 2013.

Results and QA/QC: Pesticide Samples

Laboratory results for pesticide samples were received from Appl, Inc, our partner laboratory, on July 23rd, 2014. These results are summarized in Table 1.0. In summary, no chlorothalonil or triclopyr detections were recorded at any site. These results are shown as "ND" (not detected) in Table 1.0.

Field quality control samples (duplicates and blanks) collected by Balance have no data flags; all blank samples had result of ND (not detected), and field duplicates had results that were in line with the results of their parent sample.

Laboratory quality control procedures were conducted. Standards for each constituent (quinclorac for triclopyr, decachlorobiphenyal and TCMX for chlorothalonil) were added to each sample after testing. These standards are molecules of similar structure used as surrogates for the tested constituent. Results for these surrogates were analyzed to be within a statistically generated expected range of values, indicating the sample extraction process was acceptable, according to Appl, Inc. Spike matrix tests for chlorothalonil and triclopyr also showed acceptable results.

Results and QA/QC: Stillwater Pier Samples

Laboratory results for the expanded Stillwater Pier samples were analyzed by Monterey Bay Analytical Service (MBAS) in Monterey, CA. Results were received by Balance on Thursday, July 31, 2014 and are summarized in Tables 1.1 through 1.4. A total of seventeen (17) water samples were collected for analysis from the outfall pipe discharge at Stillwater Pier.

As part of our internal QA/QC of the laboratory testing service Balance submitted double samples for cyanide and ammonia analysis. The double samples consisted of one blank water sample for cyanide and one duplicate water sample for ammonia. Unfortunately, due to miscommunication with MBAS, results from the expanded sampling at Stillwater Pier, including duplicates and blanks, were not reported separately. Therefore the internal QA/QC assessment of MBAS testing at Stillwater Pier is unavailable. However, MBAS has its own QA/QC protocol and the analysis for all samples satisfied their QA/QC protocols.

MBAS and their associated laboratories utilize three processes in their quality control program; duplicates, blanks, and spikes. All three processes were utilized in the analysis of the Stillwater Pier water samples with no indication of poor-quality samples. Chain-of-custody procedures for all samples are intact and each sample can be traced through the analysis. All samples were analyzed within the hold-times prescribed for each analyte.

Water samples for Volatile Organic Compound (VOC) were flagged for air bubbles in the sample bottles. Air introduced into a VOC sample has the potential to volatilize organic compounds in the sample, thus reducing the detectable level in the sample. However, the samples were deemed to be in "good condition" and analyzed.

Physical Parameters

Physical parameters reported for Stillwater Pier include: hardness, pH, turbidity, total dissolved solids (TDS), specific conductance, and discharge (Table 1.1). As mentioned above, site discharge was 0.2 cfs (10.2 gpm) and estimated as the average of three (3) measurements. Hardness is reported in terms of mg/L of calcium carbonate ($CaCO_3$). Total hardness is 491 (mg/L) $CaCO_3$ indicating a more basic water chemistry, which is reflected in the pH value of 7.9. Turbidity was 1.8 nephelometric units (ntu) with a TDS of 1.5 (mg/L). Low turbidity values indicate good water clarity (NDWR, 2013) and correspond with the low TDS reading of 1.5 mg/L, which is well below the reporting limit of 10 mg/L. Specific conductance is a measure of the water's ability to pass (conduct) a current. This ability is directly related to the presence and amount of ions in the water column (NDWR, 2013). A direct linear relationship exists between specific conductance and TDS based on empirical data for a specific site (American Public Health Association, 1992). Further testing may lead to development of this relationship for Stillwater Pier.

Total Mercury and Trace Metals

Total mercury and trace metals sampled at Stillwater Pier are listed in Table 1.2. No mercury was detected at this sampling and no concentrations were detected for seven of the thirteen (13) metals sampled. While five metals were detected at or above their reporting limits (arsenic, chromium, copper, selenium and zinc), none of these concentrations were above the limits specified for water quality objectives in the California Ocean Plan (SWRCB, 2012).

Inorganics, Non-Metallics, and Nutrients

Results for inorganic and non-metallic analytes are reported in Table 1.3. Neither carbonate (as $CaCO_3$) nor cyanide were detected at this sampling (ND), with detections for all other constituents. Cyanide was the only inorganic analyte sampled that has a concentration level specified by the Ocean Plan, with an instantaneous maximum of 10 ug/L.The Central Coast Basin Plan (RWQCB, 2011) was also consulted for maximum concentration levels for fluoride of 0.0024 mg/L. A total of 1.2 (mg/L) of fluoride were present in the sample, which is higher than the maximum specified in the Central Coast Basin Plan. The 0.0024 (mg/L) fluoride concentration is the limiting concentration level for samples measured at or below 53.7 degrees F (12 degree C) and decreases with increasing temperature (RWQCB, 2011). No other analytes detected had concentration limits set by the California Ocean Plan or Central Coast Basin Plan,

The suite of nutrients samples includes ammonia, calcium, nitrate as N, nitrate as NO3, nitrite as N, and dissolved orthophosphate. Of these, all were detected above the reporting limit except for nitrite as N, which was not detected, and dissolved orthophosphate, which was detected at the reporting limit of 0.1 mg/L. The only nutrient with a limit set by the California Ocean Plan is ammonia as N, with an instantaneous limit of 6 mg/L. Balance collected two ammonia samples, a parent sample and a duplicate collected at the same time. The concentration detected at Stillwater Pier was 0.7 mg/L, well below the specified limit.

Two samples were submitted for analysis of cyanide. The two cyanide samples consisted of a water sample from Stillwater Pier and a blank sample of deionized water. No cyanide was detected in either sample as reported by MBAS.

Comparison with 2013 ASBS sampling results

Some of the suite of samples tested at Stillwater Pier in July 2013 were also tested in July and September of 2013. Nutrients tested in both 2013 and 2014 are ammonia, nitrate, nitrite and dissolved orthophosphate. Metals tested in both 2013 and 2014 are mercury, arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver and zinc. These constituents were tested in all surface and groundwater monitoring sites in 2013; the results are included in Table 2.0 through 2.3.

At Stillwater Pier, the only exceedance of Ocean Plan or Central Coast water board trace metal standards in 2013 was for nickel, which exceeded the limit of 2 ug/L at 5.25 ug/L in July and 4.70 ug/L in September of 2013 (Table 2.0). In 2014, nickel was not detected at Stillwater Pier (Table 1.2). While no nutrients exceeded standards in either year at Stillwater Pier, increased in concentration levels were seen for ammonia as N between July 2013 and July 2014. In this time period, ammonia increased from 0.28 mg/L to 0.7 mg/L. All other nutrients were found in decreased concentrations in 2014 (Tables 1.3, 2.1).

In addition to data from Stillwater Pier, Tables 2.0-2.3 contain results for nutrients and metals sampled at all monitoring sites in 2013, including three groundwater wells. Trace metal exceedances in groundwater samples are thought to be the result of natural geologic formations; these results are discussed in detail in our 2013 ASBS sampling report (Table 2.2). No exceedances for nutrients were found in groundwater wells (Table 2.3).

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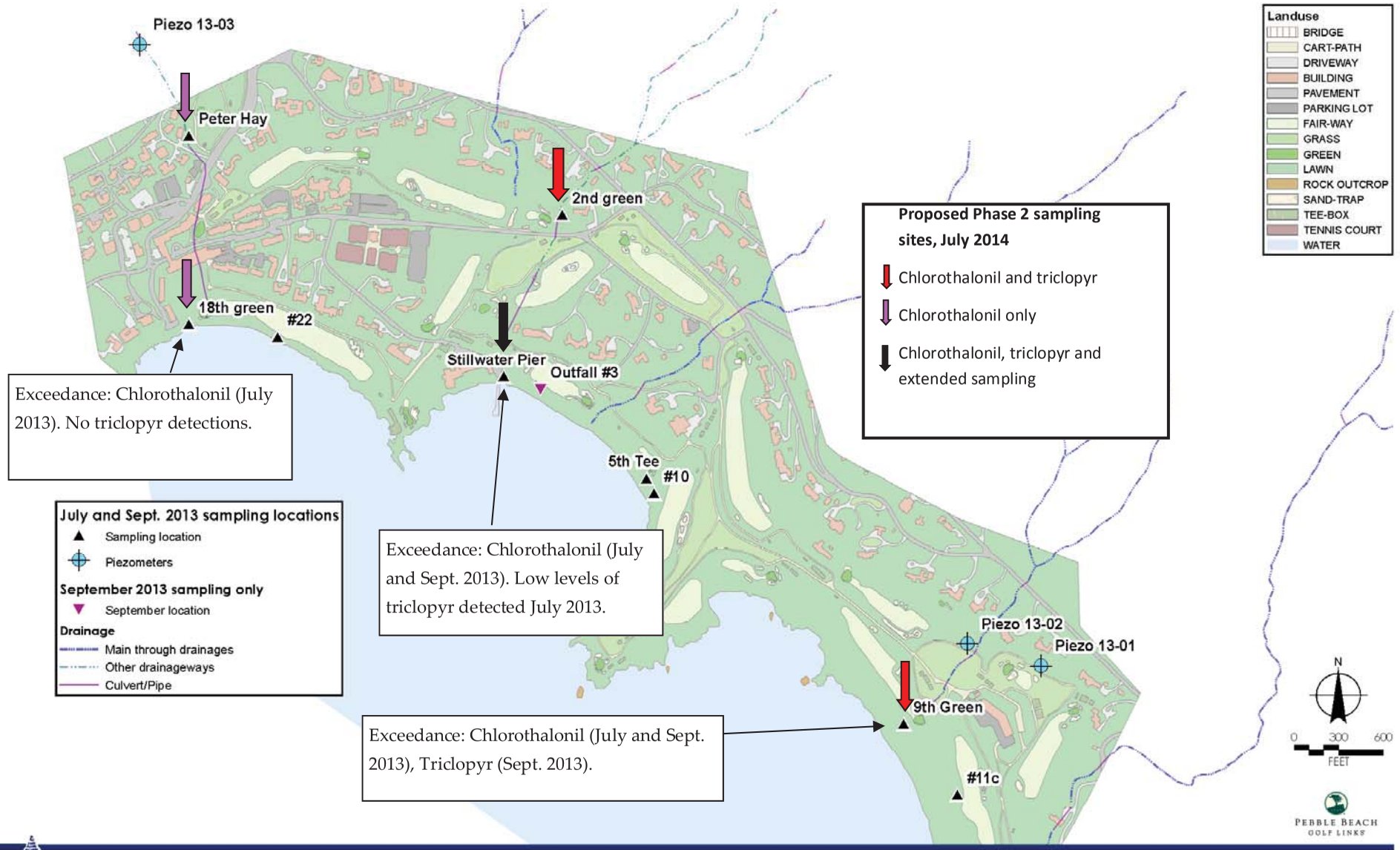


Balance Hydrologics, Inc.
213031 Monitoring locations.mxd

Figure 1. Map of July and September 2013 ASBS samples, with callouts to samples that exceeded EPA aquatic life benchmarks for chlorothalonil and triclopyr. Phase 2 sampling locations are shown with arrows. Chlorothalonil was sampled at all sites. Triclopyr was sampled at Stillwater Pier, the 9th green, and the 2nd green. An extended set of analytes were sampled from Stillwater Pier.

Table 1.0. Summary of water quality in streams and outfalls, Pebble Beach Golf Links, July 2014.

Field observations						*Triclopyr*	*Chlorothalonil*
Date	Time	Observer	Discharge	SC @ 25 C (us)	Sample ID	Triclopyr	Chlorothalonil
			(gpm)			*(ng/L)*	*(ng/L)*
		Reporting Limits (PQL):	**7/17/2014**			100	200
		Method Detection Limits (MDL):	**7/17/2014**			30	100
2nd Green drainage (upstream site)							
7/17/2014	09:30 - 09:33	KS, DJ, BC	1	2706	2G-01	…	ND
	09:38 - 09:42				2G-02	ND	…
Peter Hay drainage (upstream site)							
7/17/2014	10:08	KS, DJ, BC	1.96	4619	PH-01	…	ND
	10:06				PH-02 (blank)	…	ND
18th Green drainage (downstream site)							
7/17/2014	11:03	KS, DJ, BC	3.72	3775	18G-01	…	ND
	11:04				18G-02 (dup)	…	ND
Stillwater Pier outfall (downstream 2nd green drainage)							
7/17/2014	11:47	KS, DJ, BC	10.18	2377	SP-01	…	ND
	11:48				SP-02	ND	…
	11:49				SP-03 (dup)	ND	…
9th Green drainage (downstream of upper 9th gage)							
7/17/2014	13:16 - 13:19	KS, DJ, BC	0.77	2487	9G-01	…	ND
	13:22 - 13:23				9G-02	ND	…
	13:26				9G-03 (blank)	ND	…
Lowest EPA pesticide aquatic life benchmark (acute or chronic)						180,000	600

All analyses conducted by AAPL Labs, Fresno, CA, a state-certified facility.
Samplers: KS = Krysia Skorko, DJ = Dana Jepsen, BC = Bill Christner
2nd Green drainage flow was estimated; all others measured in field using volume calculation methods.

Table 1.1. Summary of physical water quality parameters in the Stillwater Pier outfall, Pebble Beach Golf Links, July 17, 2014.

Field observations						*Physical water quality parameters*		
Date	Time	Observers[1]	Discharge	SC @ 25 C (us)	Hardness (as $CaCO_3$)	Total Dissoloved Solids (TDS)	Tubidity	pH (laboratory)
			(gpm)	*(umhos/cm)*	*(mg/L)*	*(mg/L)*	*NTU*	*pH (H)*
Reporting Limits (PQL):				1	10.0	10	0.05	
CA Ocean Plan Max Instaneous Concentrations				NA	NA	NA[2]	225	6 .0 - 9.0
Stillwater Pier outfall (downstream 2nd green drainage)								
7/17/2014	12:15	KS, DJ, BC	10.2	2512	491	1,448	1.8	7.9

All analyses conducted by Monterey Bay Analytical Services (MBAS), Monterey, CA, a state-certified facility.

1 - Observers: KS = Krysia Skorko, DJ = Dana Jepsen, BC = Bill Christner

2 - maxiumum concentration depends on background concentration of seawater

Table 1.2. Summary of trace metal water quality parameters in the Stillwater Pier outfall, Pebble Beach Golf Links, July 17, 2014.

Field observations				*Priority pollutant metals*												
Date	Time	Observers[1]	Discharge	**Mercury**	**Antimony**	**Arsenic**	**Beryllium**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Zinc**
			(gpm)	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*
Reporting Limits (PQL):				0.5	1	1	1	0.5	2	4	5	10	2	10	1	10
CA Ocean Plan Max Instantaneous Concentrations:				0.4	1200[2]	80	0.033	10	20	30	20	50	150	7	2[2]	200
Stillwater Pier outfall (downstream 2nd green drainage)																
7/17/2014	11:51	KS, DJ, BC	10.18	ND	ND	3	ND	ND	2	22	ND	ND	8	ND	ND	43

All analyses conducted by Monterey Bay Analytical Services (MBAS), Monterey, CA, a state-certified facility.

1 - Observers: KS = Krysia Skorko, DJ = Dana Jepsen, BC = Bill Christner.

2 - Maximum 30-day average concentration.

Table 1.3. Summary of inorganic and nutrient water quality in the Stillwater Pier outfall, Pebble Beach Golf Links, July 17, 2014.

Field observations					*Inorganics, Non-Metallics*								*Nutrients*						
Date	Time	Observers[1]	Discharge	pH (laboratory)	Total Alkalinity (as $CaCO_3$)	Bicarbonate (as HCO_3)	Bromide	Carbonate (as $CaCO_3$)	Chloride	Cyanide	Flouride	Sulfate	Ammonia-N	Calcium	Nitrate-N	Nitrate as NO_3	Nitrate + Nitrite as N	Nitrite-N	Dissolved orthophosphate-P
			(gpm)	*pH (H)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(ug/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*
Reporting Limits (PQL):					2	10	0.1	10	1	5	0.1	1	0.5	0.5	0.1	1	0.1	0.1	0.1
CA Ocean Plan Max Instaneous Concentrations:					NA	NA	NA	NA	NA	10	0.0024[2]	NA	6	NA	NA	NA	NA	NA	NA
Stillwater Pier outfall (downstream 2nd green drainage)																			
7/17/2014	11:56 - 12:14	KS, DJ, BC	10.18	7.9	189.0	231	1.0	ND	522	ND	1.2	248	0.7	101	3.1	14	3.1	ND	0.1

All analyses conducted by Monterey Bay Analytical Services (MBAS), Monterey, CA, a state-certified facility.

1 - Observers: KS = Krysia Skorko, DJ = Dana Jepsen, BC = Bill Christner.

2- maximum contaminant level from Central Coast Basin Plan, measured at-or-below 53.7 deg-F.

Table 1.4. Summary of water quality data for volatile organic compounds (VOCs) at Stillwater Pier outfall, Pebble Beach Golf Links, July 17, 2014.

Field observations					Organic Compounds	
Date	Time	Observer	Discharge	pH (laboratory)	Semi-Volatile Organic Compounds	Volitale Organic Compounds
			(gpm)	*pH (H)*	(ug/L)	(ug/L)
		Reporting Limits (PQL):	**7/17/2014**		1.0 - 5.0	0.5
		CA Ocean Plan Max Instaneous Concentrations:				
7/17/2014	11:52 - 12 :05	KS, DJ, BC	10.18	7.9	ND	ND

All analyses conducted by Monterey Bay Analytical Services (MBAS), Monterey, CA, a state-certified facility.

1 - Observers: KS = Krysia Skorko, DJ = Dana Jepsen, BC = Bill Christner.

2- maximum contaminant level from Central Coast Basin Plan, measured at-or-below 53.7 deg-F.

ND = Not Detected

Table 2.0 Summary of trace metal water quality in surface water, Pebble Beach Golf Links, July and September 2013.

Field observations			*Total Mercury*	*Trace Metals, High Salinity Trace Metals (*)*								
Date and Time	Observer	Discharge	Total Mercury	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Silver	Zinc
		(gpm)	*(ng/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*
Reporting Limits (PQL):		**7/10/2013**	0.2	0.06 (0.2*)	0.03 (0.15*)	0.10 (0.17*)	0.10 (0.15*)	0.03 (0.15*)	0.03 (0.09*)	1.0 (0.56*)	0.04 (0.14*)	0.70 (0.14*)
		9/18/2013	0.2	0.06 (0.2*)	0.03 (0.15*)	0.10 (0.17*)	0.10 (0.15*)	0.03 (0.15*)	0.03 (0.09*)	1.0 (0.56*)	0.04 (0.14*)	0.70 (0.14*)
Method Detection Limits (MDL):		**7/10/2013**	0.2	0.04 (0.2*)	0.01 (0.15*)	0.03 (0.17*)	0.04 (0.15*)	0.02 (0.15*)	0.01 (0.09*)	0.60 (0.56*)	0.02 (0.14*)	0.50 (0.14*)
		9/18/2013	0.2	0.04 (0.2*)	0.01 (0.15*)	0.03 (0.17*)	0.04 (0.15*)	0.02 (0.15*)	0.01 (0.09*)	0.60 (0.56*)	0.02 (0.14*)	0.50 (0.14*)
Malpaso Creek (reference site)												
7/10/2013 11:00	JJ, MB (AMS)		1.58	0.29*	ND*	0.49*	0.92*	0.48*	0.68*	5.53*	ND*	27.2*
9/18/2013 21:45	RI, BB (AMS)		ND	0.99*	0.17*	ND*	1.00*	ND*	0.26*	2.95*	ND*	3.30*
Stillwater Pier (receiving water)												
7/10/2013 9:30	JJ, MB (AMS)		2.72	1.20*	0.16*	1.01*	2.59*	1.22*	1.23*	4.04*	ND*	8.63*
9/18/2013 21:45	RI, BB (AMS)		2.05 (1.96)	1.75*	0.21*	1.16*	2.60*	1.12*	1.12*	3.30*	ND*	8.10*
Peter Hay drainage (upstream site)												
7/10/2013 18:45	CW, JP	1.37	9.83	ND*	ND*	ND*	0.35*	ND*	5.99*	1.38*	ND*	3.81*
9/18/2013 21:45	CW, JP	0.40	11.9 (39.2) (41.8)	ND*	ND*	0.23*	0.99*	0.28*	4.86*	1.8*	ND*	5.87*
18th Green drainage (downstream Peter Hay site)												
7/10/2013 12:25	CW, JP	5.10	14.00	2.56*	ND*	ND*	8.57*	0.39*	4.30*	1.01*	ND*	194.0*
9/18/2013 21:45	JP, GP	**2.60**	15.10	30.3 (27.5)	0.1 (0.10)	3.34 (3.10)	11.8 (11.5)	0.42 (0.51)	8.87 (8.75)	17.8 (18.7)	0.52 (0.44)	44.70
2nd Green drainage (upstream site)												
7/10/2013 17:50	CW, JP	2.80	101.00	14.80	0.10	4.11	14.10	4.31	5.68	7.05	0.28	56.40
9/18/2013 21:45	JP, GP	4.20	10.60	15.00	DNQ	2.02	3.81	0.50	3.54	7.64	ND	17.70
Stillwater Pier outfall (downstream 2nd green drainage)												
7/10/2013 9:50	CW, JP	**12.80**	6.93	12.6 (13.3)	0.05 (0.06)	1.36 (1.42)	9.68 (9.80)	0.27 (0.29)	5.25 (5.41)	6.25 (7.06)	ND (ND)	18.6 (18.8)
9/18/2013 21:45	JP, GP	9.00	3.09 (14.1) (13.3)	14.10	DNQ	1.30	4.56	ND	4.70	6.55	ND	6.72
Site #3 (outfall south of Stillwater Pier)												
7/10/2013 21:45	CW, JP	**...**	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
9/18/2013 21:45	GP, JP	0.36	10.60	15.80	0.06	1.57	4.16	DNQ	6.93	10.90	ND	0.71
Site #22 (outfall from hole 18 sand trap)												
7/10/2013 12:50	CW, JP	1.60	5.22			ns	ns	ns	ns	ns	ns	ns
9/18/2013 21:45	JP, GP	**1.20**	6.65	10.20	0.03	1.34	14.10	0.08	4.12	4.45	ND	14.90
5th Tee drainage (downstream of upper 5th gage)												
7/10/2013 10:40	CW, JP	**...**	ND	10.00	ND	0.96	1.30	ND	4.69	5.46	ND	4.47
9/18/2013 21:45	JP, GP	...	7.63	9.17	ND	0.93	1.78	ND	4.80	4.64	ND	10.20
Site #10 (12-inch outfall pipe)												
7/10/2013 11:05	CW, JP	1.60	0.34	7.73	0.03	0.88	0.68	ND	5.43	4.09	ND	ND
9/18/2013 21:45	JP, GP	1.20	0.36	7.27	0.03	0.78	0.93	ND	5.30	4.39	ND	ND
9th Green drainage (downstream of upper 9th gage)												
7/10/2013 21:45	CW, JP	**0.35**	12.50	19.00	0.04	2.33	3.06	0.10	7.13	9.06	ND	8.80
9/18/2013 14:45	JP, GP	**0.63**	11.90	16.50	0.13	1.91	4.95	0.11	7.68	8.78	ND	33.80
Site 11c (seep on hole #10 bluff)												
7/10/2013 15:20	CW, JP		3.30	12.80	0.07	1.79	0.96	ND	7.51	5.11	ND	1.06
9/18/2013 21:45	JP, GP	**0.25**	3.25	11.20	0.11	1.56	1.26	ND	7.45	4.79	ND	2.71
Basin Plan water quality objectives (Central Coast Water Board, 2011):			50 [6]	--	0.2	50	10	10	2 [7]	--	--	20

* Reporting limits, method detection limits, and results from high salinity sites

Duplicate and blank samples shown in parentheses

Table 2.1 Summary of nutrient water quality in surface water, Pebble Beach Golf Links, July and September 2013.

Field observations						*Nutrients* [2]			
Date and Time	Observer	Discharge	Water Temperature	Specific conductance	pH (laboratory)	Ammonia-N	Nitrate-N	Nitrite-N	Dissolved orthophosphate-P
		(gpm)	*(°C)*	*(µmhos/cm @ 25°C)*	*pH (H)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*
Reporting Limits (PQL): [5]				**7/10/2013**		0.05	0.1	0.1	0.1
				9/18/2013		0.05	0.1	0.1	0.1
Malpaso Creek (reference site)									
7/10/2013 11:00	JJ, MB (AMS)				8.1	ND	ND	ND	ND
9/18/2013 12:00	JJ, MB (AMS)				7.9	ND	0.20	ND	ND
Stillwater Pier (receiving water)									
7/10/2013 9:30	JJ, MB (AMS)				8.0	0.06	ND	ND	ND
9/18/2013 9:40	JJ, MB (AMS)				7.7	0.07	0.1	ND	ND
Peter Hay drainage (upstream site)									
7/10/2013 8:40	GP, JP	1.37	15.3	7680	7.8	ND	0.5	ND	ND
9/18/2013 18:15	GP, JP	0.40	17.7	6750	7.8	0.09	0.6	ND	ND
18th Green drainage (downstream Peter Hay site)									
7/10/2013 12:15	GP, JP	5.10	16.9	10430	8.2	0.09 (0.10)	3.3	ND	0.2
9/18/2013 12:50	GP, JP	2.60	18.8	4303	8.5 (8.1)	0.12 (0.10)	2.2 (2.2)	ND (ND)	0.1 (ND)
2nd Green drainage (upstream site)									
7/10/2013 17:45	CW, JP	2.80	16.3	2014	8.0	0.49	0.50	ND	0.2
9/18/2013 15:25	GP, JP	4.20	16.9	3240	8.1	0.07	ND	ND	ND
Stillwater Pier outfall (downstream 18th green drainage)									
7/10/2013 9:45	CW, JP	12.80	15.3	2080	8.0	0.28	5.6	0.2	0.3
9/18/2013 9:10	GP, JP	9.00	15.0	2134	8.0	0.06	0.1	ND	0.1
Site #3 (outfall south of Stillwater Pier)									
7/10/2013 21:45	CW, JP	…	…	…	ns	ns	ns	ns	ns
9/18/2013 9:45	GP, JP	0.36	21.1	3029	7.8	<10	10.6	ND	ND
Site #22 (seep)									
7/10/2013 13:00	CW, JP	1.60	18.8	1769	8.2	ND	1.4	ND	0.3
9/18/2013 13:45	GP, JP	1.20	22.3	1714	8.2	0.06	0.1	0.2	0.1
5th Tee drainage (downstream of upper 5th)									
7/10/2013 10:35	CW, JP	…	…	…	8.2	0.17	7.4	0.2	0.1
9/18/2013 10:15	GP, JP	…	…	…	8.2	0.59	7.2	0.3	ND
Site #10 (12-inch outfall pipe)									
7/10/2013 11:00	CW, JP	1.60	16.9	1686	8.2	ND	12.1	ND	ND
9/18/2013 10:45	GP, JP	1.20	18.2	1669	8.2	ND	10.8	0.2	ND
9th Green drainage (downstream of upper 9th)									
7/10/2013 14:40	CW, JP	0.35	16.0	2435	8.2	0.12	5.2	0.3	1.0
9/18/2013 17:00	GP, JP	0.63	18.0	2596	8.0	3.2 (2.96)	2.7	0.6	0.8
Site 11c (seep on hole #10 bluff)									
7/10/2013 15:15	CW, JP				8.4	ND	36.2	ND	ND
9/18/2013 17:30	GP, JP	0.25	22.8	2372	8.7	ND	34.3	ND	ND
SWRCB Ocean Plan (2012)--instantaneous maximum						6			
SWRCB Ocean Plan (2012)-daily maximum						2.4			
SWRCB Ocean Plan (2012)--6-month median						0.6			

Table 2.2 Summary of trace metal water quality in ground water monitoring wells, Pebble Beach Golf Links, July and September 2013.

Field observations					*Trace Metals*									*DTW*
Date and Time	Observer	Water Temperature	Specific conductance	**pH (laboratory)**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Lead**	**Nickel**	**Selenium**	**Silver**	**Zinc**	
		(°C)	*(µmhos/cm @ 25°C)*	*pH (H)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*(ug/L)*	*ft*
Reporting Limits (PQL): [5]			**7/10/2013**		0.06	0.03	0.30	0.10	0.03	0.03	1.00	0.04	0.70	
			9/18/2013		0.06	0.03	0.30	0.10	0.03	0.03	1.00	0.04	0.7	
Piezometer 13-01 (along north border of 12th fairway)														
7/10/2013 16:05	CW, JP	16.1	2044	6.9	15.4 (0.93)	1.22 (ND)	63.5 (ND)	30.2 (ND)	15.8 (ND	81 (ND)	8.96 (ND)	0.1 (ND)	89.1 (ND)	29.50
9/18/2013 16:00	CW, JP	17.0	2040	6.7	14.2	0.47	13.6	11.4	3.25	32.1	8.90	0.11	28.4	29.68
Piezometer 13-02 (west of Upper 9th stream gage)														
7/10/2013 16:45	CW, JP	ns	ns	7.2	29.2	8.47	564	301	2.11	1317	15.3	0.97	989	14.85
9/18/2013 16:25	CW, JP	17.3	3737	7.0	41.5	4.63	324	242	2.91	1004	25.4	0.58	742	14.68
Piezometer 13-03 (north of Peter Hay stream gage, south side of former stables property)														
7/15/2013 11:00	JJ, MB (AMS)	16.1	4251	6.5	ns	ns	ns	ns	ns	ns	ns	ns	ns	5.86
9/18/2013 18:40	CW, JP	17.3	4969	6.8	26.4	0.67	4.17	7.20	1.45	13.7	21.2	0.31	20.6	6.65
Basin Plan water quality objectives (Central Coast Water Board, 2011):					--	0.2	50	10	10	2 [7]	--	--	20	

Table 2.3 Summary of nutrient water quality in ground water monitoring wells, Pebble Beach Golf Links, July and September 2013.

Field observations					*Nutrients* [2]				*DTW*
Date and Time	Observer	Water Temperature	Specific conductance	pH (laboratory)	Ammonia-N	Nitrate-N	Nitrite-N	Dissolved orthophosphate-P	
		(°C)	*(µmhos/cm @ 25°C)*	*pH (H)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*(mg/L)*	*ft*
Reporting Limits (PQL): [5]			**7/10/2013**		0.05	0.1	0.1	0.1	
			9/18/2013		0.05	0.1	0.1	0.1	
Piezometer 13-01 (along north border of 12th fairway)									
7/10/2013 16:05	CW, JP	16.1	2044	6.9	ND	1.6	ND	ND	29.50
9/18/2013 16:00	CW, JP	17.0	2040	6.7	ND	1.40	ND	ND	29.68
Piezometer 13-02 (west of Upper 9th stream gage)									
7/10/2013 16:45	CW, JP	ns	ns	7.2	ND	0.90	ND	ND	14.85
9/18/2013 16:25	CW, JP	17.3	3737	7.0	ND	1.40	ND	ND	14.68
Piezometer 13-03 (north of Peter Hay stream gage, south side of former stables property)									
7/15/2013 11:00	JJ, MB (AMS)	16.1	4251	6.5	0.27	4.90	ND	ND	5.86
9/18/2013 18:40	CW, JP	17.3	4969	6.8	0.22	1.90	ND	ND	6.65
SWRCB Ocean Plan (2012)--instantaneous maximum					6				
SWRCB Ocean Plan (2012)-daily maximum					2.4				
SWRCB Ocean Plan (2012)--6-month median					0.6				

MEMORANDUM OF AGREEMENT

CENTRAL COAST REGIONALAREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE DISCHARGERS MONITORING PROGRAM

This Memorandum of Agreement (AGREEMENT), dated, for reference purposes only, December 1, 2012, is made by and between the MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY, hereinafter referred to as "AGENCY," a Joint Powers Authority (JPA) organized under the laws of the State of California, and the following entities, each of which is hereinafter referred to as "DISCHARGER" or collectively as "DISCHARGERS":

CITY OF PACIFIC GROVE, a municipal corporation of the State of California;
CITY OF MONTEREY, a municipal corporation of the State of California;
CITY OF CARMEL-BY-THE-SEA, a municipal corporation of the State of California;
COUNTY OF MONTEREY, a political subdivision of the State of California;
COUNTY OF SAN MATEO, a political subdivision of the State of California;
COUNTY OF MARIN, a political subdivision of the State of California;
PEBBLE BEACH COMPANY, a California general partnership;
THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY, THROUGH ITS HOPKINS MARINE STATION, a trust with corporate powers under the laws of the State of California;
MONTEREY BAY AQUARIUM, a 501(c)(3) a nonprofit incorporated in the State of California
CALIFORNIA DEPARTMENT OF TRANSPORTATION (Caltrans), an executive department of the State of California

The AGENCY and the above-mentioned entities may also hereinafter be collectively referred to as "PARTIES" or individually as "PARTY."

RECITALS:

A. The California Ocean Plan ("Ocean Plan") prohibits the discharge of both point and nonpoint source waste into Areas of Special Biological Significance ("ASBS"), unless the State Water Resources Control Board ("SWRCB") grants an exception.

B. The DISCHARGERS have been determined to have direct or indirect storm water discharges into the Carmel Bay ASBS, the Pacific Grove ASBS, the Año Nuevo ASBS, the James V. Fitzgerald ASBS, and the Duxbury Reef ASBS.

C. The SWRCB has adopted "Special Protections for Selected Storm Water and Nonpoint Source Discharges into Areas of Special Biological Significance," dated March 20, 2012, and adopted Resolutions No. 2011-0050/0051, on October 18, 2011.These documents are hereinafter referred to simply as the "Special Protections," and the "Mitigated Negative

Declarations"(MNDs). These Special Protections and MNDs contain monitoring requirements with which each of the DISCHARGERS are required to comply commencing in the winter of 2012-2013.

D. In and for the mutual interest of the DISCHARGERS, the DISCHARGERS wish to develop and implement a Regional Monitoring Program by entering into this AGREEMENT for the purpose of cooperating to efficiently and economically comply with the Special Protections and MNDs monitoring requirements.

NOW, THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:

Section 1. Incorporation of Recitals

1.1 The foregoing Recitals are incorporated into this AGREEMENT.

Section 2. Central Coast Regional ASBS Dischargers Monitoring Program

2.1 There is hereby established the Central Coast Regional ASBS Dischargers Monitoring Program ("Program") that is intended to fulfill the DISCHARGERS' respective discharge monitoring and obligations set forth in Section IV of the Special Protections and the MND's.

Section 3. Effective Date and Term

3.1 The effective date of this AGREEMENT shall be the date it is duly executed by all of the DISCHARGERS.

3.2 This AGREEMENT shall terminate on June 30, 2015 unless extended, or terminated earlier, pursuant to Section 8.3 or 8.4, by the DISCHARGERS.

Section 4. Management Committee

4.1 A Management Committee consisting of one representative of each of the DISCHARGERS is hereby created to provide for overall coordination, review, and budget oversight with respect to the Program.

4.2 The Management Committee shall: provide technical oversight, direct and guide the Program, review and approve the Program Budget, select consultant(s) or outside contractor(s), and establish timelines and budgets for completion of Program tasks. The Management Committee shall consider Special Protections monitoring and MND monitoring compliance issues as its primary objective in approving Program tasks and corresponding budgets compliance with Section IV of the Special Protections and Monitoring requirements of the MNDs.

4.3 The Management Committee Bylaws (Exhibit A) shall govern the Management Committee and its meetings.

4.4 Meetings of the Management Committee shall be subject to the California Brown Act (Government Code section 54950 et seq.).

Section 7. Additional Rights and Duties of the DISCHARGERS

7.1 In addition to participation in the Management Committee, each of the DISCHARGERS agrees to perform the following duties:

7.1.1 Participate in Management Committee meetings and activities, and other meetings required of the DISCHARGERS;

7.1.2 Provide the requisite reports to the Administrator for purposes of complying with the joint reporting and compliance mandates applicable to the Special Protections and MNDs and the status Program implementation.

7.2 DISCHARGERS agree they are individually responsible for compliance matters not covered by this AGREEMENT.

7.3 This AGREEMENT does not restrict the DISCHARGERS from the ability to individually (or collectively) request modifications of or to otherwise challenge, administratively, through litigation, or otherwise, Special Protections or MNDs or other requirements to the extent that a requirement affects an individual DISCHARGER (or group of DISCHARGERS).

Section 8. Additional Parties, Early Termination of Dischargers, and Third Party Data Sharing

8.1 Subject to a majority vote of the DISCHARGERS, any agency, corporation or individual responsible for discharges to the State of California's Areas of Special Biological Significance within Regional Water Quality Control Boards (RWQCB) Regions 2 or 3 may become a member of the Program and a party to this AGREEMENT (a "New Party"). New Parties shall execute a copy of this AGREEMENT through their appropriate officials pursuant to the authority conferred by the governing body of the New Party. The Representative of the New Party shall file with the Administrator a duly executed copy of the AGREEMENT. Upon approval, each New Party shall pay an Annual Assessment as determined by the Management Committee. In addition to paying the Annual Assessment, each New Party shall also pay an appropriate buy-in fee as established by the Management Committee, intended to reimburse the Program Fund for the New Party's share of costs that the DISCHARGERS have expended up to the date of the New Party's membership.

8.2 Upon approval of the Management Committee Members, the DISCHARGERS may enter into agreements with third-party state or federal agencies for the purpose of sharing data. These agencies shall not become a party to this AGREEMENT, shall not have representation on the Management Committee, and shall not be part of the cost-sharing described in the Program Budget Guidelines and Cost Share (Exhibit C). Such agreements shall be for the sole objective of data sharing.

8.3 Any DISCHARGER may terminate its participation in this AGREEMENT by giving the Management Committee at least thirty (30) days written notice. If a DISCHARGER terminates its participation, the terminating DISCHARGER will bear the full responsibility for its compliance with the monitoring requirements of the Special Protections commencing on the date it terminates its participation. Unless the termination is scheduled to be effective at the close of the fiscal year in which the notice is given, termination shall constitute forfeiture of all of the terminating DISCHARGER's contributed share of the

Program Budget for the fiscal year in which the termination occurs. The cost allocations for the remaining DISCHARGERS shall be recalculated for the following fiscal year by the DISCHARGERS without the withdrawing DISCHARGER'S participation.

8.4 This AGREEMENT shall terminate immediately and without further notice should sufficient DISCHARGERS terminate their participation pursuant to Section 8.3 such that only a single DISCHARGER has not terminated its participation (Remaining DISCHARGER). Unless the AGREEMENT terminates pursuant to this section at the close of a fiscal year, any funds remaining in the Program Budget shall be forfeited to the Remaining DISCHARGERS to be used solely and exclusively in furtherance of the Remaining DISCHARGER's monitoring requirements pursuant to the Special Protections.

Section 9. General Provisions

9.1 Amendment. This AGREEMENT may be amended only by written agreement of all PARTIES. All PARTIES agree to bring any proposed amendment to this Agreement to their respective Executive Management, as applicable, within two (2) months following acceptance of the proposed amendment by the Management Committee.

9.2 Execution. This AGREEMENT may be executed by facsimile and delivered in any number of copies (counterparts) by the DISCHARGERS. When each DISCHARGER has signed and delivered at least one (1) counterpart to the Administrator, each counterpart shall be deemed an original and, taken together, shall constitute one and the same AGREEMENT, which shall be binding and effective as to the PARTIES hereto.

9.3 Liability. No PARTY shall, by entering into this AGREEMENT, participating in the Management Committee, or serving as the Administrator, assume or be deemed to assume responsibility for any other PARTY in complying with the requirements of the Special Protections. This AGREEMENT is intended solely for the convenience and benefit of the PARTIES and shall not be deemed to be for the benefit of any third party and may not be enforced by any third party, including, but not limited to, the Environmental Protection Agency, the SWRCB, the RWQCB, or any other person.

In lieu of and notwithstanding the pro rata risk allocation which might otherwise be imposed between the DISCHARGERS pursuant to Government Code Section 895.6, the DISCHARGERS agree that all losses or liabilities incurred by a DISCHARGER shall not be shared pro rata, but instead, the DISCHARGERS agree that pursuant to Government Code Section 895.4, each of the DISCHARGERS shall fully defend, indemnify, and hold harmless each of the other DISCHARGERS from any claim, expense, or cost, damage, or liability imposed for injury, including, but not limited to, as defined by Government Code Section 810.8,occurring by reason of the negligent acts or omissions or willful misconduct of the indemnifying DISCHARGER, its officers, agents, or employees, under or in connection with or arising from any work, authority, or action taken under this AGREEMENT, including but not limited to any non-compliance by a DISCHARGER with its obligations under the Special Protections or MNDs. No DISCHARGER, nor any officer, Councilmember, Board member, employee, or agent thereof, shall be responsible for any damage or liability incurred by reason of the negligent acts or omissions or willful misconduct of any other DISCHARGERS, their officers, Council members, Board members, employees, or agents, under or in connection with or arising from any work,

authority, or actions taken under this AGREEMENT, including but not limited to any non-compliance by a DISCHARGERS with its obligations under the Special Protections or MNDs.

Notwithstanding the above, if the Administrator is negligent or intentionally wrongful in the performance of its duties under this AGREEMENT, it will be liable to the DISCHARGERS for any consequences of such negligent or intentionally wrongful performance.

9.4 Venue. Venue for any actions brought under this Agreement shall be as prescribed by California or Federal law.

9.5 Notices: Unless otherwise specified herein, all notices or demands required under this Agreement shall be in writing and shall either be hand-delivered or mailed by first class registered or certified mail, postage prepaid, addressed to the PARTIES to the addresses and to the attention of the person named in Exhibit D.

9.6 Governing Law: The terms of this Agreement are governed by, and shall be construed in accordance with, the laws of the State of California.

9.7 Severability: If any provision of this Agreement is held to be invalid, for any reason, by a court of law, the remaining provisions of this Agreement shall not be affected thereby and shall continue in full force and effect.

9.8 Authorization: Each individual signing this Agreement warrants that he/she is authorized to do so on behalf of the entity on whose behalf he/she is signing and that they have the authority to bind that entity/individual to all the terms of this AGREEMENT, unless the individual's signature block indicates a different purpose for their signature.

9.9 Waiver: No waiver by the PARTIES of any breach of any provision of this Agreement shall constitute a waiver of any other breach or of such provision of this Agreement.

9.10 Entire Agreement: This Agreement, including Exhibits A, B, C, D, and E constitutes the complete and exclusive understanding between the PARTIES which supersedes all previous agreements, written or oral, regarding the subject matter of this Agreement. No changes, modifications or amendments to this Agreement (including Exhibit A, B, C, D and/or E) shall be valid unless they are in writing and duly executed by authorized representatives of all the PARTIES.

IN WITNESS WHEREOF, the PARTIES hereto have executed this AGREEMENT as of the dates shown below:

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

Date: Apr 23, 2013

Signature

Keith Israel, General Manager
Printed Name and Title

CITY OF PACIFIC GROVE

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF MONTEREY

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF CARMEL-BY-THE-SEA

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MONTEREY

Date: _____

_____
Signature

_____
Printed Name and Title

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Date: 2/5/13

By: _____
Scott McGowen, Asst. Division Chief
Division of Environmental Analysis

APPROVED AS TO FORM:

_____
Attorney for the California Department of Transportation

IN WITNESS WHEREOF, the PARTIES hereto have executed this AGREEMENT as of the dates shown below:

CITY OF CARMEL-BY-THE-SEA

Date: 1/23/13

Signature

Jason Stilwell, City Administrator
Printed Name and Title

COUNTY OF SAN MATEO

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MARIN

Date: _____

_____
Signature

_____
Printed Name and Title

PEBBLE BEACH COMPANY

Date: _____

_____
Signature

_____
Printed Name and Title

HOPKINS MARINE STATION

Date: 17 December, 2012

Signature

Lawrence M. Gibbs, CIH
Associate Vice Provost for EH&S
Printed Name and Title

MONTEREY BAY AQUARIUM

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF SAN MATEO

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MARIN

Date: 1/29/13

Judy Arnold
_____
Signature

JUDY ARNOLD, PRESIDENT
Printed Name and Title

PEBBLE BEACH COMPANY

Date: _____

_____
Signature

_____
Printed Name and Title

HOPKINS MARINE STATION

Date: _____

_____
Signature

_____
Printed Name and Title

MONTEREY BAY AQUARIUM

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF SAN MATEO

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MARIN

Date: _____

_____
Signature

_____
Printed Name and Title

PEBBLE BEACH COMPANY

Date: _____

_____
Signature

_____
Printed Name and Title

HOPKINS MARINE STATION

Date: _____

_____
Signature

_____
Printed Name and Title

MONTEREY BAY AQUARIUM FOUNDATION

Date: 12-17-12

Ed Prohaska
Signature

Ed Prohaska CFO
Printed Name and Title

IN WITNESS WHEREOF, the PARTIES hereto have executed this AGREEMENT as of the dates shown below:

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF PACIFIC GROVE

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF MONTEREY

Date: _____

APPROVED BY:
Kurt
City Attorney's Office

Fred Meurer
Signature

Fred Meurer, City Manager
Printed Name and Title

CITY OF CARMEL-BY-THE-SEA

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MONTEREY

Date: _____

_____
Signature

_____

IN WITNESS WHEREOF, the PARTIES hereto have executed this AGREEMENT as of the dates shown below:

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF PACIFIC GROVE

Date: 2-20-13

THOMAS FRUTCHEY
Signature

THOMAS FRUTCHEY
Printed Name and Title
City Manager

Sarah Hardgrove
Environmental Programs Manager

CITY OF MONTEREY

Date: _____

_____
Signature

_____
Printed Name and Title

CITY OF CARMEL-BY-THE-SEA

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MONTEREY

Date: _____

_____
Signature

_____
Printed Name and Title

Printed Name and Title

COUNTY OF SAN MATEO

Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF MARIN

Date: _____

_____
Signature

_____
Printed Name and Title

PEBBLE BEACH COMPANY

Date: 12/18/12

Mark Stilwell
Signature

Mark Stilwell, Executive VP
Printed Name and Title

HOPKINS MARINE STATION

Date: _____

_____
Signature

_____
Printed Name and Title

MONTEREY BAY AQUARIUM

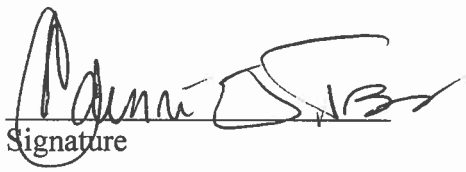
Date: _____

_____
Signature

_____
Printed Name and Title

COUNTY OF SAN MATEO

Date: January 8, 2013



(Resolution #072327)

Signature

Adrienne J. Tissier, President, Board of Supervisors, San Mateo County
Printed Name and Title

COUNTY OF MARIN

Date: _____

_____
Signature

_____
Printed Name and Title

PEBBLE BEACH COMPANY

Date: _____

_____
Signature

_____
Printed Name and Title

HOPKINS MARINE STATION

Date: _____

_____
Signature

_____
Printed Name and Title

MONTEREY BAY AQUARIUM

Date: _____

_____
Signature

_____
Printed Name and Title

EXHIBIT "A"

CENTRAL COAST REGIONAL AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE DISCHARGERS MONITORING PROGRAM

MANAGEMENT COMMITTEE BYLAWS

The Central Coast Regional Areas of Special Biological Significance Dischargers Monitoring Program Management Committee shall be governed by the following Bylaws.

1. Representation. Each DISCHARGER shall designate a representative to attend meetings in person, by telephone or via a web-based meeting of the Management Committee, and may designate alternates as set forth in this AGREEMENT. If a DISCHARGER'S representative is unable to attend a meeting, the DISCHARGER'S alternates shall attend.

2. Voting. Each DISCHARGER shall have one vote and the Management Committee representative or their alternate shall vote on behalf of the DISCHARGER unless stated otherwise in this AGREEMENT. Voting on all matters shall be on a voice vote unless a roll call vote is requested by any member in attendance or is required pursuant to the Brown Act.

   All actions taken by the Management Committee require the affirmative vote of a majority of the Management Committee members entitled to vote. However, the Program Budget, or any other matter having a financial impact on a DISCHARGER not contemplated in the Program Budget, shall be approved by a two-thirds majority vote of a quorum present at the Management Committee meeting where the action is taken.

3. Quorum. A majority of the Management Committee entitled to vote constitutes a quorum for the transaction of business.

4. Officers. The officers of the Management Committee shall consist of a Chair and Vice Chair. The Chair shall preside over all meetings of the Management Committee, and may call special meetings as necessary upon one week of notice to all DISCHARGERS. The Chair may vote on, and second any motion, but may not make a motion. The Vice Chair shall perform the duties of the Chair in the Chair's absence.

   In the first Fiscal Year the Administrator shall preside over the initial meeting of the Management Committee, and the first order of business for the initial meeting of the Management Committee shall be the election of the Chair and Vice Chair. The Chair and Vice Chair shall take up their duties immediately upon election.

   In subsequent Fiscal Years the positions of Chair and Vice Chair shall be filled by election annually at the Management Committee's meeting in January. If either position becomes vacant for any reason, an election shall be held to fill the position(s) at the next meeting of

the Management Committee. Should both positions be vacant at the same time, the Administrator shall serve as Chair until a Chair is elected by the Management Committee.

5. Meeting Schedule. Regular meetings will be held at a frequency commensurate with the workload of the Management Committee at pre-arranged dates.

6. Starting Time. Meetings will start promptly at the times designated in the meeting notices. Representatives shall endeavor to notify the Administrator whether they will be late or unable to attend.

7. Limitation of Discussion. Discussion on any particular matter by either Management Committee members or by any member of the general public may be limited at the discretion of the chair to such length of time as the chair may deem reasonable under the circumstances.

8. Administrator. The Administrator shall serve as Secretary. The Secretary shall, upon consultation with the Chair, prepare an agenda for each meeting, keep and publish minutes for each meeting (which shall be approved by the Management Committee at the subsequent meeting), prepare and post any notices as may be required by law, and have custody of all documents relating to the Management Committee.

   The Administrator shall also serve as Treasurer. The Treasurer shall manage the Program Fund as set forth in the AGREEMENT.

9. New Members. New members may be added to the Management Committee as set forth in Section 8.1 of this AGREEMENT.

10. Bylaws. The information set forth in these Bylaws shall be deemed sufficient to serve as the Bylaws for the Management Committee, subject to approval by the DISCHARGERS.

11. Conduct of Meetings. The meetings are to be guided by the principles of Robert's Rules of Order. The Chair shall decide all questions of order.

12. Program Attorney. The Management Committee may select an attorney or law firm ("Program Attorney") to provide legal advice to the Management Committee on matters involving the Program. The Program Attorney may be the attorney of record for one of the DISCHARGERS, so long as such representation is disclosed and any conflicts of interest are resolved. The Program Attorney may provide such services under separate contract with any DISCHARGER or DISCHARGERS, but shall provide advance notification to all DISCHARGERS before providing such services to identify and resolve possible issues of conflict of interest. The Administrator may assist in coordination of activities with the Program Attorney, and shall provide such assistance as the Program Attorney may require, but shall not give direction to the Program Attorney without prior authorization from the Management Committee.

13. Amendment. These Bylaws may be amended only by a majority vote of all DISCHARGERS.

EXHIBIT "B"

CENTRAL COAST REGIONAL
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE
DISCHARGERS MONITORING PROGRAM

RESPONSIBILITIES OF ADMINISTRATOR

The Administrator shall have the following responsibilities:

1. The Administrator shall administer the AGREEMENT, and maintain an appropriate book of accounts, which, among other things, shall specifically identify the costs incurred in implementing the AGREEMENT. These records shall be subject to inspection by any of the DISCHARGERS at all reasonable times.

2. Subject to the prior approval of the Management Committee, the Administrator may enter into such agreements as necessary with public agencies or outside contractors and consultants to carry out the Program objectives.

3. The Administrator shall serve as the Secretary and Treasurer to the Management Committee.

4. Arranging for and conducting meetings of the Management Committee, including preparation of agenda materials and meeting minutes.

5. The Administrator shall perform such other duties as may be required and agreed to by the Management Committee, including, but not limited to, contracting with and managing the work of outside consultants and contractors to perform related work if deemed necessary and appropriate by the Management Committee. The Administrator shall act in a reasonable amount of time to execute contracts with consultants and/or contractors, which have been requested and approved by the Management Committee. The Administrator shall provide a copy of any contract executed on behalf of the Program to any DISCHARGER or person designated by any DISCHARGER or the Management Committee upon request. The contract template shall require consultants to indemnify and name all DISCHARGERS as additional insured and shall meet minimum coverage amounts for insurance policies. The Management Committee shall approve by a majority vote the contract template to be used by the Administrator.

EXHIBIT "C"

CENTRAL COAST REGIONAL
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE
DISCHARGERS MONITORING PROGRAM

PROGRAM BUDGET GUIDELINES AND COST SHARE

Program Budget Guidelines

The Year 1 Program budget shall be based upon 1) the State Water Board's approved scope of work, a request for professional services, and the selected contractor's cost proposal, and 2) Program Administrator actual time and materials costs, but not to exceed $50,000, based on the billing rate schedule included below. The Administrator costs in Year 1 shall include, but not be limited to, the following activities:

- Establishment of program fund and accounting
- Invoices to DISCHARGERS
- Solicitation for professional services to implement Scope of Work
- Procurement and management of professional services agreement
- Coordination with Management Committee

For subsequent Fiscal Years, the Administrator will prepare a Draft Program Budget no later than April 1 for the succeeding Fiscal Year. The Draft Program Budget shall include a breakdown of the costs allocated to each DISCHARGER, in accordance with the Cost Sharing table below. The Administrator will revise the Draft Program Budget, as appropriate, to address concerns and comments from the Management Committee and the Management Committee will then approve and adopt a final Program Budget by June 15 prior to the wet season in which monitoring will occur.

The Administrator and the DISCHARGERS recognize that the Program Budget will be based on estimated costs, and that actual costs may differ from the budgeted amounts. If it appears that costs will exceed the budgeted amounts, the Administrator will notify the Management Committee as soon as the Administrator becomes aware of this and before incurring costs in excess of the budgeted amounts. If the Management Committee determines it is appropriate to have the Administrator incur additional costs above the budgeted amounts, the Administrator will prepare and submit a budget revision request for approval by the Management Committee. Time shall be allotted for Management Committee representatives to request their respective governing Boards or Councils to approve a budget increase request prior to approving a Program Budget revision. Only after the Management Committee approves an increase in the Program Budget will the Administrator incur costs in excess of the budgeted amounts. If there are unspent funds left at the end of the fiscal year, the Administrator will return to each DISCHARGER the unspent portion of that DISCHARGER'S payment, or credit that amount to

the DISCHARGERS annual assessment for the subsequent fiscal year, at DISCHARGER's discretion.

The Administrator will establish a separate job-cost code in its accounting system, to track the hours spent and out-of-pocket expenses directly related to performing work as the Administrator, which will be charged to the Program Fund. The Administrator will include in the Management Committee's meeting agenda reports a summary of the work the Administrator has performed during the intervening time period, the total costs of that work, and the portion of the cost allocated to each DISCHARGER. The portion of the cost allocated to the DISCHARGER will be calculated in accordance with the cost-sharing approach outlined in the Cost-Sharing chart below.

The costs for the Program Administrator will consist of direct costs, as described below.

Cost-Sharing

The Cost Sharing table below shows how the annual Program Budget will be shared amongst the DISCHARGERS based on the Scope of Work ("Exhibit E"). Each DISCHARGER's Percentage Participation in the Program Budget components shall be as set forth in the table below:

Agency	Outfalls 18" to 36"	Percentage of outfalls 18" - 36" (Budget A)	Outfalls = to or >36" w/ receiving water	Percentage of outfalls = to or >36" (Budget B)	Outfalls = to or >36" w/out receiving water	Percentage of outfalls = or >36" (Budget C)	Percentage Participation in Budget Component D
Pacific Grove	7	30.4%	1.83	22.9%	1	50%	11.6%
City of Monterey	0	0 %	.5	6.3%	0	0%	11.6%
Carmel	9	39.1%	1	12.5%	0	0%	11.6%
PBC	3	13%	1	12.5%	1	50%	11.6%
MBA	0	0%	.33	4.2%	0	0%	7.1%
Hopkins	0	0%	.33	4.2%	0	0%	7.1%
Marin County	0	0%	1	12.5%	0	0%	11.6%
Monterey County	0	0 %	1	12.5%	0	0%	11.6%
San Mateo County	4	17.4%	1	12.5%	0	0%	11.6%
Caltrans	0	0%	0	0%	0	0%	4.9%
Total	23	100%	8	100%	2	100%	100%

Program Budget Components

The Program Budget shall be allocated into the following components:

- Component "A" shall consist of all costs associated with Program Core Monitoring for Runoff and Outfalls from 18" to <36" diameter.
- Component "B" shall consist of all costs associated with Program Core Monitoring for Outfalls from >36" diameter, with a receiving water site.
- Component "C" shall consist of all costs associated with Program Core Monitoring for Outfalls from >36" diameter, without a receiving water site.

- Component "D" shall consist of the Program Regional Monitoring, including large discharge receiving water, reference site receiving water, rocky intertidal and bioaccumulation monitoring, technical management and reporting, and Program Administrator costs (not to exceed $50,000 in Year 1). Caltrans shall participate only in the bioaccumulation and rocky intertidal Program Regional Monitoring.

Annual Assessment

Each DISCHARGER's Annual Assessment shall be the sum of the amounts calculated by multiplying each component of the Program Budget by the DISCHARGER's Percentage Participation in that component.

Administrator Costs

Administrator costs will be compensated for actual direct costs on a time and materials basis. In Year 1, time and materials costs shall not exceed $50,000 and shall be charged at the following rates (salary plus benefits):

Admin Assistant	$55/hr
Executive Assistant	$65/hr
Accountant	$80/hr
Associate Engineer	$110/hr
Director of Finance	$135/hr
Director of Admin Services	$150/hr
Assistant General Manager	$165/hr
General Manager	$190/hr

Direct Costs are defined as costs incurred for necessary services and/or materials in the course of managing the Program. Direct costs shall be charged at actual cost. All direct costs shall be tracked and accounted for each fiscal year and provided in an independent annual audit in accordance with Section 5.8. Direct costs are those which can be and are tracked through time cards, invoices, record keeping systems, and other records that specifically allocate a cost to the Central Coast Regional Areas of Special Biological Significance Dischargers Monitoring Program.

EXHIBIT "D"

NOTICES

Pursuant to Section 9.5, unless otherwise specified, all notices or demands required under this Agreement shall be in writing and shall either be hand-delivered or mailed by first class registered or certified mail, postage prepaid, addressed to the PARTIES to the addresses and to the attention of the person named below:

CITY OF PACIFIC GROVE:

Sarah Hardgrave
Environmental Programs Manager
Public Works Department
2100 Sunset Drive
Pacific Grove, CA 93950

CITY OF MONTEREY:

Tom Reeves
City Engineer
Plans and Public Works
580 Pacific St.
Monterey, CA 93940

CITY OF CARMEL-BY-THE-SEA:

Jason Stilwell
City Administrator
Carmel-by-the-Sea City Hall
P.O. Box CC
Carmel-by-the-Sea, CA 93921

COUNTY OF MONTEREY:

Tom Harty
Stormwater Program Manager
Department of Public Works
168 West Alisal Street, 2nd Floor
Salinas, CA 93901

COUNTY OF SAN MATEO:

James C. Porter
Director

Department of Public Works and Parks
555 County Center, 5th Floor
Redwood City, CA 94063-1665

COUNTY OF MARIN:

Terri Fashing
Stormwater Program Administrator
Marin County Department of Public Works
3501 Civic Center Drive, Room 304
San Rafael, CA 94903

PEBBLE BEACH COMPANY:

Thomas Quattlebaum
Environmental Manager
4005 Sunridge Road
Pebble Beach, CA 93953

THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY, THROUGH ITS HOPKINS MARINE STATION:

Chris Patton
Hopkins Marine Station
Stanford University
Pacific Grove CA 93950-3094

MONTEREY BAY AQUARIUM:

Roger Phillips
Director of Applied Research
Monterey Bay Aquarium
886 Cannery Row
Monterey, CA 93940

CALIFORNIA DEPARTMENT OF TRANSPORTATION (Caltrans):

EXHIBIT "E"

SCOPE OF WORK

Central California Areas of Special Biological Significance
Storm Water Monitoring to Satisfy Special Protections
November 26, 2012

I. Introduction

The Central Coast ASBS Regional Monitoring Program will be implemented during the 2012–2013 and 2013-2014 storm seasons and includes all ASBS responsible parties[1] on the Central Coast, covering an area from Big Sur, in Monterey County, to Pt. Reyes, in Marin County. This Scope of Work for the Central Coast ASBS Regional Monitoring Program has been developed through discussions with staff from State and Regional Water Boards, as well as the responsible parties discharging storm water into Areas of Special Biological Significance (ASBS).

II. Technical Program

In all specifications for storm water and receiving water monitoring that follow, the minimum requirement for a storm shall satisfy the criteria specified in the Special Protections (i.e., >0.10 inches of rainfall resulting in runoff, >72 hours from the previous storm). Moreover, every attempt shall be made to satisfy the criteria for storm runoff monitoring conducted by the Monterey Bay National Marine Sanctuary (i.e., sheeting water on roadways, heavy flow through the storm drain system and conductivity levels less than 1000 micro Siemens (μS) and declining) and ensure sufficient time after the initiation of rainfall to allow for time of concentration to include flow runoff from all parts of the catchment or watershed.

This Scope of Work covers monitoring requirements specified in the Special Protections for 12 participants[1] designated as Responsible Parties, as follows:

- National Park Service, Point Reyes National Seashore
- Marin County
- San Mateo County
- Monterey Bay Aquarium
- Hopkins Marine Station
- City of Monterey
- City of Pacific Grove
- Carmel by the Sea
- Pebble Beach Company

[1] It should be noted that three participants, Caltrans, National Park Service and California Department of Parks and Recreation, have not yet committed to full participation in the Central Coast regional program. These State and Federal Agencies may contract separately to implement their monitoring requirements, but with a commitment that they use the same monitoring design, laboratories for sample analysis and provide their data for analysis with the other participants.

- Monterey County
- California Department of Parks and Recreation
- Caltrans

While the City of Monterey is a Responsible Party, it does not operate any storm runoff outfalls of its own that drain into an ASBS. It does, however, contribute runoff to an ASBS outfall operated by the City of Pacific Grove. Storm water, sediment, receiving water and reference site monitoring will be performed under this Scope of Work for Monterey Bay Aquarium and Hopkins Marine Station in compliance with the individual Draft Mitigated Negative Declaration documents issued to each. These two participants have other monitoring requirements for seawater discharges that are being performed outside this Scope of Work.

A. Core Monitoring

1. Runoff Flow Measurements
   Total annual storm runoff from each participant shall be estimated (modeled) by using measured rainfall and the amount of impervious area (to be provided by each participant) in each catchment. Targeted ground-truth measurements will be made to calibrate the model. This runoff modeling will permit estimates of total annual and event-specific loads for each participant.

2. Discharge Monitoring
   All outfalls ≥18 inches shall be sampled, as follows:
   a. 1 storm in each of 2 years, except for discharges at receiving water sites, which shall be sampled in the same 3 storms sampled for receiving water;
   b. Each sample shall be analyzed for oil and grease, total suspended solids and fecal indicator bacteria;
   c. Annual samples (1 storm in each year) shall be analyzed for critical life stage chronic toxicity with a sea urchin using salted-up water.

   All samples from outfalls ≥36 inches shall be sampled, as follows:
   a. 1 storm in each of 2 years, except for discharges at receiving water sites, which shall be sampled in the same 3 storms each year that are sampled for receiving water;
   b. Each sample shall be analyzed for oil and grease, total suspended solids and fecal indicator bacteria, California Ocean Plan trace metals, polynuclear aromatic hydrocarbons, organophosphorous pesticides, pyrethroid pesticides and nutrients (ammonia, nitrate, urea and phosphate);
   c. Annual samples (1 storm in each year) shall be analyzed for critical life stage chronic toxicity with a sea urchin test using salted-up discharge water.

B. Receiving Water and Reference Monitoring

1. Receiving Water Monitoring
   Receiving water (receiving water = in the surf zone at the point of contact between runoff and the ocean) at 11 large storm water outfalls selected to represent worst-case conditions shall be sampled as follows:
   a. Samples shall be collected before and during 3 storms in each of 2 years;
   b. Each sample shall be analyzed for oil and grease, total suspended solids, fecal indicator bacteria, California Ocean Plan trace metals, polynuclear aromatic

hydrocarbons, organophosphorous pesticides, pyrethroid pesticides and nutrients (i.e., nitrate, ammonia, urea, orthophosphate);

c. Samples collected during storms shall be analyzed for critical life stage chronic toxicity with 3 marine species (sea urchin, mussel and giant kelp).

Specific locations of outfalls to be monitored are as follows:

>18"	>36"	Responsible Party	Location	Longitude	Latitude	Nearest SWRCB Site		
						ID	Longitude	Latitude
	X[a]	Marin County	Trailhead at Agate Beach	-122.71059	37.89749	DUX009	-122.71058	37.89757
X		San Mateo County	Maritime Walk	-122.517537	37.531153	FIT012	-122.51756	37.53115
X		San Mateo County	Juliana	-122.516679	37.529092	FIT015	-122.51667	37.52915
X		San Mateo County	Distillery	-122.513269	37.517706	FIT028	-122.51355	37.51789
X		San Mateo County	Madrone	-122.511592	37.514237	FIT029	-122.51067	37.51246
	X[a]	San Mateo County	Weinke Way	-122.516958	37.528645	FIT016	-122.5173	37.5282
X		California State Parks	Año Nuevo	-122.32181	37.11666	ANO012	-122.32181	37.11666
	X	California State Parks	Point Lobos	-121.93812	36.5187	PTL004	-121.93812	36.5187
	X[a]	California State Parks	Año Nuevo	-122.33662	37.13245	ANO027	-122.33662	37.13245
	X	California State Parks	Point Lobos	-121.94775	36.51524	PTL034	-121.94775	36.51524
	X	California State Parks	Julia Pfeiffer Burns	-121.68885	36.17192	PFE008	-121.68885	36.17192
	X	California State Parks	Julia Pfeiffer Burns	-121.68629	36.17072	PFE011	-121.68629	36.17072
	X	California State Parks	Julia Pfeiffer Burns	-121.68281	36.16924	PFE012	-121.68281	36.16924
	X	California State Parks	Julia Pfeiffer Burns	-121.6773	36.16634	PFE015	-121.6773	36.16634
	X	California State Parks	Julia Pfeiffer Burns	-121.6764	36.16569	PFE016	-121.6764	36.16569
	X	California State Parks	Julia Pfeiffer Burns	-121.66883	36.1553	PFE026	-121.66883	36.1553
	X	California State Parks	Julia Pfeiffer Burns	-121.66781	36.15469	PFE027	-121.66781	36.15469
	X[a]	Pacific Grove	Lover's at Ocean View	-121.91614	36.6246	PCG120	-121.91613	36.6246
X		Pacific Grove	Ocean View between Fountain Avenue and 15th Street	-121.914835	36.62381	PCG215	-121.91484	36.62378
	X[ab]	Pacific Grove	Ocean View between 12th Street and 13th Street	-121.913831	36.622873	PCG219	-121.91381	36.62281
	X	Pacific Grove	Ocean View at 15th Street	-121.91472	36.62339	PCG217	-121.91472	36.62339
X		Pacific Grove	Ocean View between Clyte Street and Naiad Street	-121.919561	36.627369	PCG069	-121.91955	36.62735
X		Pacific Grove	Northwest corner of Lover's Point Park at Ocean View Boulevard	-121.916596	36.626648	PCG098	-121.91657	36.6266
X		Pacific Grove	Grand Avenue at Ocean View	-121.914835	36.62381	PCG215	-121.91484	36.62378
X		Pacific Grove	8th Street at Ocean View	-121.910348	36.621624	PCG229	-121.91036	36.62162
X	X[ac]	Pacific Grove	Ocean View at the Hopkins Marine Laboratory Stanford University	-121.90305	36.61897	PCG257 PCG258	-121.90305	36.61897
X		Pacific Grove	At Ocean View between 7th Street and 5th Street	-121.909634	36.621125	PCG230	-121.90995	36.62115

>18"	>36"	Responsible Party	Location	Longitude	Latitude	Nearest SWRCB Site		
						ID	Longitude	Latitude
	X[a]	County of Monterey	Scenic Road (12")	-121.93286	36.54439	CAR029	-121.93286	36.54439
	X[a]	Carmel	4th Avenue	-121.93075	36.55610	CAR062	-121.93075	36.55605
X		Carmel	Ocean Avenue	-121.93030	36.55502	CAR061	-121.93033	36.55501
X		Carmel	8th Avenue	-121.92940	36.55250	CAR059	-121.92933	36.55275
X		Carmel	10h Avenue	-121.92898	36.55007	CAR050	-121.92904	36.55003
X		Carmel	11th Avenue	-121.92877	36.54883	CAR046	-121.92877	36.54881
X		Carmel	13th Avenue	-121.92903	36.54641	CAR037	-121.9291	36.5464
X		Carmel	parking lot at Del Mar near Ocean Avenue	-121.93003	36.55442	CAR060	-121.93006	36.55439
X		Carmel	9th Avenue	-121.92890	36.55117	CAR055	-121.92891	36.55117
X		Carmel	Scenic Road & Santa Lucia Avenue	-121.92962	36.54552	CAR093	-121.92968	36.54547
X		Carmel	12th Avenue	-121.92857	36.54765	CAR044	-121.92854	36.54767
X		Pebble Beach Company	Stillwater Pier	-121.942739	36.566625	CAR279	-121.94274	36.56655
X		Pebble Beach Company	18th Fairway PBGL	-121.948014	36.567247	CAR299	-121.94803	36.5672
X		Pebble Beach Company	18th Green PBGL / Lodge	-121.950131	36.567372	CAR221	-121.9501	36.56738
	X[a]	Pebble Beach Company	18th Green PBGL / Lodge	-121.950097	36.567383	CAR220	-121.95001	36.56741
	X	Pebble Beach Company	9th Green PBGL	-121.933397	36.560394	CAR076	-121.93337	36.5603
X[a]		Caltrans	Fitzgerald	-122.51771	37.53154	FIT011	-122.51771	37.53154
	X	Caltrans	Año Nuevo	-122.29297	37.10714	ANO035	-122.29297	37.10714
	X	Caltrans	Año Nuevo	-122.297	37.11084	ANO034	-122.297	37.11084
	X	Caltrans	Año Nuevo	-122.29764	37.1113	ANO032	-122.29764	37.1113
	X[a]	Caltrans	Año Nuevo	-122.29881	37.11202	ANO033	-122.29881	37.11202
	X	Caltrans	Año Nuevo	-122.30121	37.11334	ANO030	-122.30121	37.11334
	X	Caltrans	Carmel Bay	-121.9247	36.52453	CAR007	-121.9247	36.52453
X		Caltrans	Carmel Bay	-121.92457	36.52469	CAR026	-121.92457	36.52469

[a] = Sites selected for discharge receiving water monitoring
[b] = Monitoring of this site will be shared between the cities of Pacific Grove and Monterey
[c] = Monitoring of this site will be shared among Pacific Grove, Monterey Bay Aquarium and Hopkins Marine Station

2. Reference Site Monitoring

Ocean water at 11 selected reference sites (reference site = in the surf zone at the mouth of a watershed with >90% open space and no listed water quality impairments) shall be sampled as follows:

a. Samples shall be collected during 3 storms in each of 2 years;
b. Each sample shall be analyzed for oil and grease, total suspended solids, fecal indicator bacteria, California Ocean Plan trace metals, polynuclear aromatic hydrocarbons, organophosphorous pesticides, pyrethroid pesticides and nutrients;
c. Each sample shall be analyzed for of critical life stage chronic toxicity with 3 marine species (sea urchin, mussel and giant kelp).

The proposed locations for reference sites span the study region. One reference site described below is not part of this Scope of Work, but is included because State Water Board staff requested that the Central Coast regional program determine the location of that reference site. Locations of sites south of Point Lobos were selected based upon a reconnaissance survey made on November 19, 2012. Several of these southern sites involve either substantial hikes, permission from property owners or special permission for vehicle access. Consequently, adjustments to site locations may be necessary. Moreover, access to at least one site will require crossing a creek to reach the beach at the creek mouth and extreme precautions will be necessary during storm events. The proposed reference locations for water quality monitoring are as follows:

Region	Specific Site
North of Point Reyes	Salmon Creek (USAF responsibility, not covered by this Scope of Work))
San Mateo County	Tunitas Creek
	Gazos Creek
South of Año Nuevo	Scott Creek
Non-urban shoreline in Monterey Bay	La Selva Beach
	Marina State Beach
South of Point Lobos	Malpaso Creek[a]
	Doud Creek
	Little Sur River[b]
Big Sur coast[a]	Big Sur River
	Sycamore Creek
	Big Creek
Total covered by the Scope of Work	11

[a] = Beach access to ocean requires crossing the creek.
[b] = Public access to be determined.

3. Biological Monitoring

Recent studies have examined whether rocky intertidal communities vary in response to storm water discharges. Initial results from southern California suggest that 2 out 11 discharge sites exhibited community composition and abundances that could be consistent with storm water discharges (Raimondi *et al*, 2012). Consequently, monitoring of rocky intertidal communities shall be part of this program. The community structure in rocky intertidal habitats shall be measured once at 6 sites near ASBS storm water discharges and at 2 reference sites. Sampling shall involve point-contact estimates of substrate coverage by species along transects from the high intertidal zone to the low intertidal zone. Biological monitoring sites have been selected in consultation among permittees and regulatory agencies with consideration for the locations of sites with existing data.

Rocky intertidal communities will be sampled at the following sites:

ASBS	Sampling Site Name
Año Nuevo Point and Islands ASBS	Año Nuevo
Carmel Bay ASBS	Stillwater
Duxbury Reef ASBS	Bolinas Point
James V. Fitzgerald Marine Reserve ASBS	Fitzgerald Marine Reserve
Pacific Grove ASBS	Hopkins
Point Lobos Ecological Reserve ASBS	Point Lobos
Reference	Santa Maria Creek
Reference	Pigeon Point

4. Bioaccumulation Monitoring

California mussels are known to accumulate concentrations of pollutants in their tissues to concentrations much higher that found in the surrounding water. Consequently, they have been widely applied in studies of water quality status and trends (e.g., CCLEAN, 2012; Davis *et al*, 1999). Consequently, concentrations of contaminants shall be measured in resident mussels from sites near ASBS storm water discharges and from reference sites distant from urbanized ASBS areas utilizing existing programs, wherever possible, as follows:

a. Population composites of mussels of roughly uniform shell length shall be collected from each of 7 sites.

b. Each composite shall be thoroughly homogenized and analyzed for polynuclear aromatic hydrocarbons, polychlorinated biphenyls, polybrominated diphenyl ethers, chlorinated pesticides, pyrethroid pesticides and Lomefloxacin. These analytes are slightly different from those measured in sections A and B and, except for pyrethroids and Lomefloxacin, are consistent with those measured by CCLEAN.

The following sites will be sampled for bioaccumulation:

Sites
Point Reyes
Scott Creek

Sites
Laguna Creek
41st Avenue, Capitola
Lovers Point
Fanshell Overlook, 17-Mile Drive
Carmel River Beach
Total = 7

C. Mooring Field Operations (Pebble Beach Company only)

1. Receiving Water

Ocean receiving water at the mooring facility shall be sampled as follows:

a. Samples shall be collected monthly from May through October on a high use weekend in each month.
b. Samples shall be analyzed for Ocean Plan indicator bacteria, residual chlorine, copper, zinc, grease and oil, methylene blue active substances (MBAS), and ammonia nitrogen.

2. Sediments

Subtidal sediment shall be sampled, as follows:

a. Samples shall be collected annually from within the mooring field and below the pier.
b. Samples shall be analyzed for Ocean Plan Table 1 metals (for marine aquatic life beneficial use), acute toxicity (using *Eohaustorius estuaries)*, PAHs, and tributyltin.

D. General Requirements

1. Ensure Data Quality

a. All sampling and analysis shall conform to a Sampling and Analysis Plan (SAP) and to a Quality Assurance Program Plan (QAPP) that are consistent with requirements of the State of California Surface Water Ambient Monitoring Program (SWAMP). At a minimum, sampling shall be conducted so as to ensure that samples are representative of the site and matrix being sampled and to minimize the introduction of extraneous contamination into samples. Ultra-clean techniques shall be used for collection samples to be analyzed for organic contaminants and trace metals.
b. Samples of the same type shall all be performed by the same laboratory and shall include appropriate lab blanks, certified reference materials, matrix spikes and matrix spike duplicates and reporting limits shall equal or be lower than those required by SWAMP.
c. An audit will be prepared describing laboratory performance relative to data quality objectives prescribed in the QAPP.

2. Ensure data availability

All chemical data will be uploaded to the California Environmental Data Exchange Network annually.

3. Reporting

Annual reports shall be delivered within 6 months of the completion of laboratory analyses. At a minimum, annual reports shall include a complete description of sampling methods, sites and analytical methods and analysis of data, including comparison of data from discharges and their respective receiving water sites with those from reference sites and the California Ocean Plan and shall be comparable to Schiff *et al* (2011). The annual report for the second year will be cumulative, including analysis of all data from both years to provide a characterization of storm water discharges and their effects on receiving water quality in Areas of Special Biological Significance.

4. Areas of Special Biological Significance Included

Storm runoff from program participants flows into the following ASBS:

- National Park Service, Point Reyes National Seashore
  - Point Reyes Headlands ASBS
  - Double Point ASBS
  - Duxbury Reef ASBS
- County of Marin
  - Duxbury Reef ASBS
- County of San Mateo
  - James V. Fitzgerald ASBS
- California State Department of Parks and Recreation
  - Año Nuevo ASBS
  - Point Lobos ASBS
  - Julia Pfeiffer Burns ASBS
- Monterey Bay Aquarium
  - Pacific Grove ASBS
- Hopkins Marine Station
  - Pacific Grove ASBS
- City of Monterey
  - Pacific Grove ASBS
- City of Pacific Grove
  - Pacific Grove ASBS
- City of Carmel
  - Carmel Bay ASBS
- Pebble Beach Company
  - Carmel Bay ASBS
- County of Monterey
  - Carmel Bay ASBS
- Caltrans
  - James V. Fitzgerald ASBS
  - Año Nuevo ASBS

- Carmel Bay ASBS

D. Literature Cited

CCLEAN. 2012. Central Coast Long-term Environmental Assessment Network Annual Report, 2010–2011.

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