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Subject: Palomar Airport Water Quality Basin
Technical Approach Summary

This document provides a summary of the technical approach and equipment utilized to assess the efficiency of the Palomar Airport Water Quality Basin. More detailed technical information is available in the Quality Assurance Project Plan (QAPP) and the Sampling and Analysis Plan (SAP) for the project which are on file with the County of San Diego.

Weston Solutions, Inc. (Weston) initiated the assessment of the Palomar Airport Water Quality Basin in November of 2005 and is currently completing the final report for this assessment.

The following sections provide a summary of work performed during this period.

Assessment Strategy
Five monitoring programs for the project included photo documentation, water quality monitoring, flow monitoring, sediment quality monitoring, and biological monitoring. Photo documentation monitored the conditions present both onsite of the facility and downstream of the project site at the bioassessment location before and after the construction of the facility to provide a qualitative record of the project. Monitoring of water quality and flow was conducted during wet weather events to characterize pollutant loading and to assess the pollutant removal efficiency of the facility. Sediment and debris captured by the treatment facility will be removed following the 2006-07 storm season. The removed materials will be weighed, separated, characterized, and analyzed to assess the effectiveness of the treatment facility in the removal of the solids in the stormwater. Bioassessment and habitat assessment monitoring was performed downstream of the treatment facility in Agua Hedionda Creek to assess the biological community and habitat downstream of the facility.

Photo Documentation
Photo documentation points were determined both on-site of the facility and at the bioassessment location to provide a qualitative assessment of the treatment facility and its effects downstream of the project area. A pre-construction survey of the project area was conducted in July of 2005 while on August of 2005 a survey of the bioassessment area was conducted to document pre-existing conditions. Photo documentation surveys of the project site have been conducted during the construction on February 1, 2006 and a post-construction survey on April 17, 2006. An additional bioassessment photo survey will be conducted following the first series of storms of the 2006-07 wet weather season.

Water Quality Monitoring
Samples collected were used to assess the function of the treatment facility by measuring the total reduction in pollutant load of runoff waters that flowed through the facility. Water quality was assessed through collection of flow weighted composite samples during storm and dry weather events.

Water Quality Sampling Locations

Sample locations were chosen to provide flow and analytical chemistry data for all runoff water entering and exiting the treatment facility. Flow monitoring and sampling equipment was installed in the 24 inch primary influent pipe and below the 2" weir at the effluent portion of the underground detention vault.

Water Quality Sampling Equipment

Flow-weighted composite samples were collected utilizing American Sigma 900MAX peristaltic samplers and American Sigma 950 OptiFlow flow meters. All equipment was remotely operated and monitored utilizing American Sigma 1000 cellular modems. Twelve-volt deep cycle marine batteries were used as power source. All equipment was permanently mounted in subterranean vaults above the water treatment facility to prevent theft and deter vandalism. The Palomar Airport rain gauges were utilized to measure rainfall during the storm events.

Storm Event Water Quality Monitoring

Weather events were monitored during the storm season utilizing National Weather Service (NWS) weather forecasts, radar, and satellite imagery. A storm was considered viable for monitoring if it was forecasted to produce at least 0.10 inches of rainfall. Rainfall amount, intensity, and duration were all carefully weighed when making a decision to monitor a storm.

When it was decided that a storm will be monitored several factors were looked at to determine the proper "pacing" for collecting flow weighted samples. Rainfall amount, intensity and duration are once again taken into consideration along with the amount of time since the last rain event and moisture level of soils in the surrounding area. Utilizing all of these factors a "pacing" can be chosen and set into the flow meter (e.g. a pacing of 10,000 cubic feet means that one sample will be collected for every 10,000 cubic feet of water that pass by the sample point).

Once a pacing interval is chosen it is then remotely programmed into the flow meter. The pacing is enabled at the onset of rainfall or with an increase in water level within the conveyance so that base flows are not sampled. Field teams are then dispatched to the site to ensure samples are being collected and equipment is functioning properly. Field crews also document atmospheric site conditions and collect physical water quality parameters. Provided sampling stations are performing properly, field crews leave the site, and the sampling stations are monitored remotely.

The progress of storms is monitored by radar, satellite, and a combination of NWS and private rain gauges. Based on observed and predicted rainfall and intensity and duration of rainfall, necessary adjustments to the sampling are made remotely during the storm.

The goal of storm event water sampling was to capture an entire storm. Therefore the influent sampling location may only be sampled for a few hours, while the effluent sampling location would undergo sampling for a much longer time in order to let the treatment facility drain.

Dry Weather Water Quality Monitoring

Flow through the treatment facility is constantly monitored and no measurable flow has been detected during dry weather periods. Dry weather sampling events were therefore not conducted due to the lack of measurable dry weather flows through the system.

Sediment Sampling

In order to assess the performance of the treatment facility, the sediment and debris captured by the treatment facility will be removed, characterized, and analyzed following the 2006/2007 wet season. The overall condition of the facility will be thoroughly documented and the total weight of the sediment removed will be recorded.

Removal of sediment and debris from the treatment facility will be accomplished using a thoroughly decontaminated vacuum truck. Sediment and debris from the hydrodynamic separator and detention vault will be collected into the vacuum truck tank. Upon completion of sediment removal from the treatment train facility, the vacuum truck will then transport the sediment to a predetermined location off site to be characterized and sub-sampled. Following arrival at the off site location, the sediment and debris will be placed in large, decontaminated, pre-weighed plastic buckets. Large debris and items not conducive to laboratory analysis will be removed and characterized visually. The remaining sediment will then be thoroughly homogenized and sampled in at least four locations or one sample per bucket, whichever is greater. These samples will be composited by the analytical laboratory into one sample for analysis. The plastic buckets will be set aside and allowed to thoroughly dry. Once dry, the buckets and sediment will be weighed and the weight of the bucket subtracted. This will allow for the calculation of the actual dry weight of sediment removed by the treatment facility. As a precaution in the event the sediment does not dry or the amount of sediment is too large for this method, the buckets and sediment will be weighed immediately after being placed in the pre-weighed plastic buckets while still wet and before being sampled. The laboratory will provide moisture content of the sediment so that dry weight may also be calculated by this method.

Bioassessment

Bioassessment was conducted prior to the construction of the treatment facility and following multiple storm events downstream of the facility where a natural stream bottom exists approximately two miles from the facility. Bioassessment utilizes aquatic organisms as indicators to assess the overall water quality of the water body.