

TRIBUTARY AREAS		
AREA DESCRIPTION	AREA (AC)	LEGEND COLOR
DEVELOPED AREA TRIBUTARY TO WQ BASIN	683	
DEVELOPED AREA NOT TRIBUTARY TO WQ BASIN*	132	
NATURAL AREA TRIBUTARY TO WQ BASIN	333	
NATURAL AREA NOT TRIBUTARY TO WQ BASIN	1343	

* IMPERVIOUS DEVELOPED AREAS NOT DRAINING TO WATER QUALITY BASINS SHALL BE TREATED BY FILTERRA UNITS PRIOR TO DISCHARGING INTO RESERVOIR

SITE DESIGN BMP'S & LOW IMPACT DESIGN

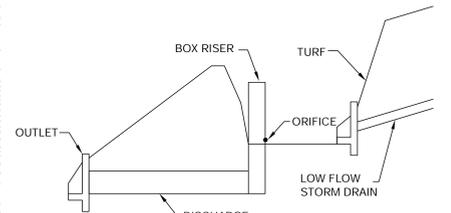
- MINIMIZE IMPERVIOUS FOOTPRINT
- **CLUSTERED LOT DESIGN**
- MINIMIZE EROSION FROM SLOPES
- MINIMIZE DISTURBANCE TO NATURAL DRAINAGES
- MINIMIZE SOIL COMPACTION
- DRAIN RUNOFF FROM IMPERVIOUS AREAS TO PERVIOUS AREAS
- **CURB CUTS TO LANDSCAPING**
- **VEGETATED SWALES**
- CONSERVE NATURAL AREAS & DRAINAGES

TREATMENT CONTROL BMP'S

- WATER QUALITY BASIN
- INLET INSERT WITH ADVANCED MEDIA FILTER
- VEGETATED SWALE
- FILTERRA UNIT

SOURCE CONTROL BMP'S

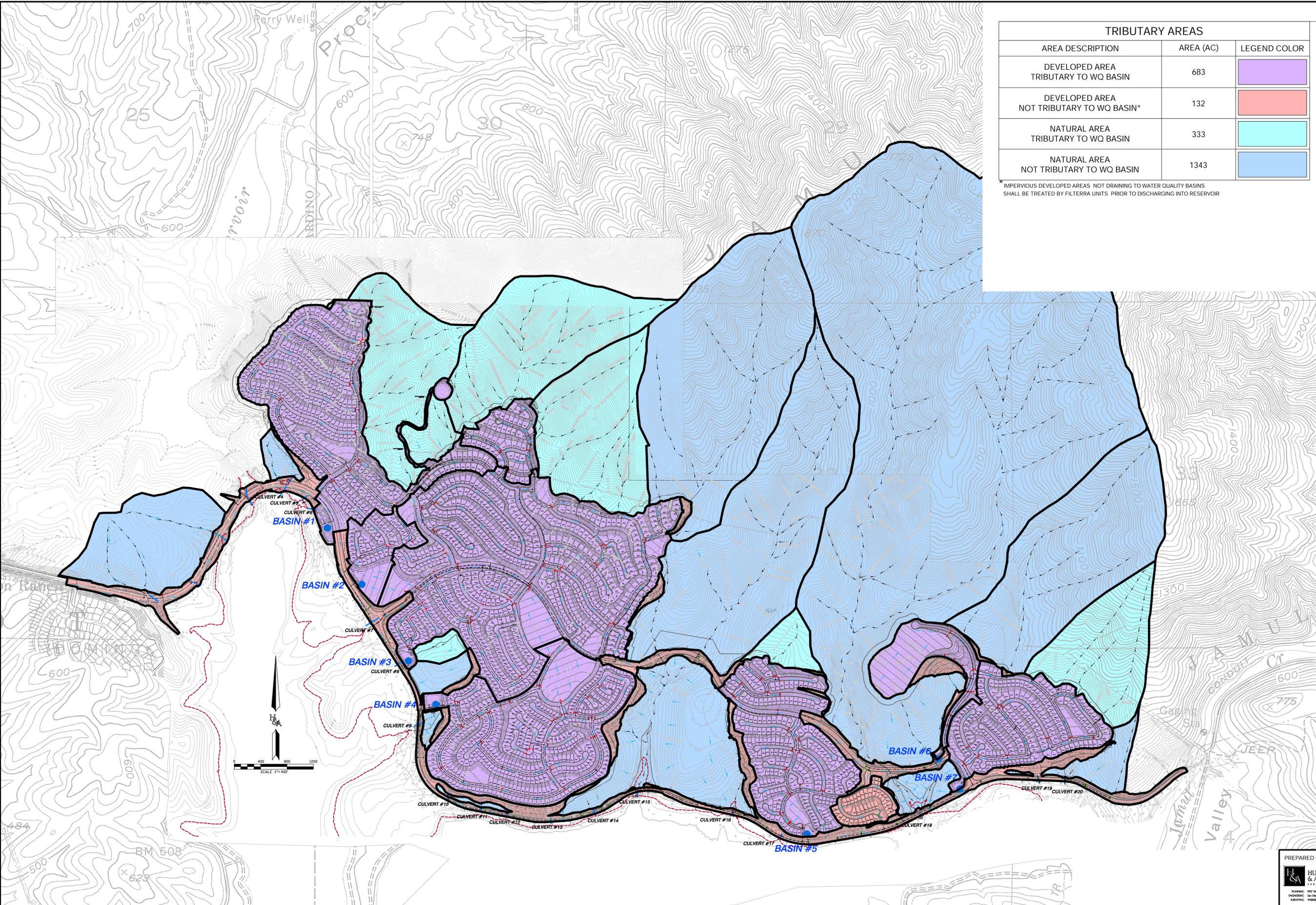
- STORM DRAIN INLET STENCILING
- LANDSCAPE/OUTDOOR PESTICIDE USE



WATER QUALITY BASIN
NOT TO SCALE

LEGEND:

-  WATER QUALITY BASIN
-  INLET INSERT WITH BIOGREEN MEDIA FILTER OR EQUIVALENT AS PART OF TREATMENT TRAIN
-  FILTERRA UNIT
-  CULVERT LOCATION ALONG OTAY LAKES RD
-  RESERVOIR WATER SURFACE ELEVATION 490.7



PREPARED BY:
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WATER QUALITY AREAS
OTAY RANCH
RESORT VILLAGE
County of San Diego, California

SHEET
1
OF
1



THE CITY OF SAN DIEGO

MEMORANDUM

DATE: February 13, 2012

TO: Jeanette Temple, Development Project Manager, Development Services

FROM: Jeffery Pasek, Watershed Manager, Long-Range Planning & Water Resources Division

SUBJECT: Otay Ranch Resort, Public Utilities' review of report on salt and nutrient loading

Dexter Wilson Engineering, consultants to Baldwin & Sons, prepared a memorandum that reports on their assessment of salt and nutrient loading to Lower Otay Reservoir from the Otay Ranch Resort project area. The following is a review of this memorandum by Public Utilities.

The memorandum uses a simple method to estimate the increased salt and nutrient loading from the project area. The method used is to calculate the rate of runoff from the various parts of the project area and assume a concentration of salt in the runoff. Then a calculation is applied: the runoff rate multiplied by the concentration yields load. While this method can be valid, it is of course dependent on the accuracy of the assumption about the concentration of salt in the runoff from the project area. The memorandum (page 3, first paragraph) states that runoff from developed project areas is assumed to have salt concentration of 800 mg/l. It would be well if the memorandum documented the sources of this information; that is to say, references should be cited.

A different approach would be to estimate the amount of salt applied to the ground surface of the developed areas; e.g. pounds of salt applied per acre per year. Salt is applied in the form of landscape water, fertilizers, soil amendments, pet wastes, and other human activities. Because salt is nearly perfectly conservative, one can assume that all the applied salt eventually gets to the reservoir. This approach was not used. It is not clear which approach would be more accurate.

A similar discussion holds for estimating the increased loading of nitrogen and phosphorous to the reservoir, with the exception that some nitrogen and some phosphorous is removed by the BMP treatment features of the project. In the memorandum the assumed concentrations of nitrogen and phosphorous in runoff from developed project areas are given on p. 3, last paragraph and in the third table, respectively. No references are cited for these values.

The assessment presented in the memorandum is that the project will increase salt and nutrient loading to the reservoir by certain amounts. The memorandum provides the following:

	increased load to Otay Reservoir, lbs/yr	percentage increase in Otay Reservoir when the reservoir is full; i.e., 49,850 AF
Salt [as TDS]	254,000	0.4%
nitrogen	1,400	2.3%
phosphorous	58	no percentage increase is stated

The effect of salt or nutrient loading on the reservoir will depend on the volume of water in storage. Lower Otay Reservoir is rarely full. At smaller reservoir volumes the effects will be greater. We recommend describing salt and nutrient loading relative to reservoir volumes that can reasonably be expected over the lifespan of the Otay Ranch Resort project. We suggest using the average reservoir volume and the 30th percentile reservoir volume. Using a thirty year period of record [1980 to 2010] of storage in Lower Otay Reservoir, we have roughly calculated the percentage increase in salt and nitrogen at average storage and 30th percentile storage.

	increased load to Otay Reservoir, lbs/yr	Percentage increase in Otay Reservoir at average storage; i.e., 40,300 AF *	Percentage increase in Otay Reservoir at 30th percentile storage; i.e., 37,200 AF *
Salt [as TDS]	254,000	0.5%	0.6%
nitrogen	1,400	2.8%	3.1%
phosphorous	58	no data available	

*These storage volumes are derived from records of hydrographic data archived by the City. These data are available upon request.

In summation: We have no reason to disagree with the numerical results presented in the memorandum. References should be cited. The increases in salt and nutrient loading should be described relative to the average reservoir volume and the 30th percentile reservoir volume. The memorandum's assumptions, calculations, and results should be disclosed in the project's Environmental Impact Report documents.

Jeffery Pasek
 Watershed Manager

cc: Marsi A. Steirer, Deputy Director, Long-Range Planning & Water Resources Division
 Cecilia Gallardo, Assistant Deputy Director, Development Services
 Anna McPherson, Senior Planner, Development Services
 RMU 2.0

MEMORANDUM

605-827

TO: File

FROM: ^{SMN} Stephen M. Nielsen, P.E., Dexter Wilson Engineering, Inc.

DATE: February 23, 2015

SUBJECT: Otay Ranch Resort Urban Runoff

This memorandum provides an addendum to the February 22, 2012 memorandum that was prepared for the Otay Ranch Resort to address the impacts of urban runoff on Lower Otay Reservoir. In particular, we evaluated salt loading as expressed in total dissolved solids (TDS) and nutrient loading in the form of nitrogen and phosphate. Since the 2012 memorandum was prepared using a previous version of the project tentative map and drainage data, the purpose of this memorandum is to verify that the findings from the 2012 study are valid for the current development plan and project drainage data.

Table 1 provides a comparison of the post development drainage basin areas from the 2012 Study and based on the current development plan. As shown, the changes to the area description are minimal. The anticipated quantity of salt in the project's runoff entering the reservoir will increase by approximately 1.0 percent from the 2012 analysis based on these revised acreages. Similarly, the nutrient loading will be reduced by approximately 1.0 percent from the 2012 analysis based on these revised acreages. We have, therefore, concluded that the findings of the 2012 analysis remain valid as these are insignificant

changes in the total quantities of these constituents (salts and nutrients) in the project's runoff.

TABLE 1 OTAY RANCH RESORT TRIBUTARY AREA SUMMARY		
Post Development Area Description	Acreage per 2012 Analysis	Acreage per Current Development Plan
Natural Area Not Tributary to WQ Basin	1,343	1,323
Natural Area Tributary to WQ Basin	333	338
Developed Area Not Tributary to WQ Basin	132	166
Developed Area Tributary to WQ Basin	683	660

SMN:pjs