





WATER REUSE ANALYSIS

WHOLE FOODS IN THE PARK  
SHOPPING CENTER  
23401 CIVIC CENTER WAY  
MALIBU, CA 90265

Prepared For:  
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Project: L103 Whole Foods

September 2, 2011



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**Subject: Water Reuse Analysis, Whole Foods in the Park, 23401 Civic Center Way, Malibu, California.**

**Reference: 1. Goldman Firth Rossi Architecture, Inc.: Architectural Plan, Revision 3 dated April 28, 2011.**

**2. Valley Crest Design-Build: Landscape Plans and Water Budget Calculations, Revision 2 dated August 22, 2011.**

Dear Mr. Soboroff,

Following is a Water Reuse Analysis for proposed new shopping center at the subject property in the City of Malibu.

## **1.0 Introduction**

The subject property is located in the Malibu Civic Center Area, and is proposed to be developed as a shopping center to be named Whole Foods in the Park. The shopping center will contain approximately 38,000-sf of total development that will include a 25,000-sf Whole Foods Market. The balance of the shopping center will be served by a combination of restaurants and retail. The wastewater generated by the development will be served by the forthcoming centralized wastewater treatment system currently being designed in the Malibu Civic Center Area. The centralized wastewater treatment system will generate Title 22 unrestricted non-potable reuse water for dispersal throughout the Malibu Civic Center Area in a combination of subsurface dispersal and water reuse. The Malibu Civic Center Area contains two distinct hydrogeologic watersheds: that which drains towards Winter Canyon and that which drains toward the Malibu Lagoon. Due to nutrient limitations of the Malibu Lagoon, reuse of effluent in properties situated within the Malibu Lagoon hydrogeologic watershed may be limited. The City has not yet determined whether the property is located in that portion of the Malibu Civic Center Area hydrogeologic watershed appropriate for irrigation reuse of effluent. This Report has been

prepared to provide examples of various methods by which project elements could be used, added, or redesigned to use reclaimed water from the city’s treatment plant should that become necessary.

## 1.1 Wastewater Source

The wastewater source is to be the proposed combination of grocery, retail, and restaurants. The following table presents the calculated proposed wastewater generation rates for the proposed development, which includes grocery market, retail and restaurant. These rates are based upon Wastewater Generation Rate Calculations, dated August 17, 2011, provided as Attachment 2 of this Report. The design daily flow rate represents anticipated average wastewater flows.

Table 1. Daily Design Flowrate Calculations

<b>Building</b>	<b>Proposed Design Daily Flowrate (gpd)</b>	<b>Proposed Design Daily Flowrate (mgd)</b>	<b>Percent of Total (%)</b>
Bldg 1	1,979	0.722	21.2
Bldg 2	1,829	0.668	19.6
Bldg 3	287	0.105	3.1
Bldg 4	335	0.122	3.6
Whole Foods	4,910	1.792	52.5
<b>Total WW</b>	<b>9,340</b>	<b>3.409</b>	<b>100.0</b>

The total annual volume of wastewater that is anticipated to be generated by the subject property is 3.409 million gallons per year (mgd).

## 2.0 Water Reuse Options

If necessary, the proposed development may be modified to accept and reuse a portion of the wastewater generated once it has been treated by the City to reclaimed water standards. This includes the following options in order of practicality:

1. Utilize reclaimed water in the proposed predominantly low water use landscape proposed by Valley Crest Design Group.

2. Change the 12-foot high by 285-foot long noise attenuation wall at the northern property line to a 3,420-square foot (sf) “water wall” with a three-foot wide basin at the base. This equates to a total water surface area of 4,275-sf of very high water use category.
3. Use reclaimed water for toilet flushing in the building. Due to aesthetic concerns of the reclaimed water, supplemental treatment would be necessary prior to introducing into the buildings for this use. The treatment components would occupy an approximate 10-ft by 10-ft aboveground area, and would need to be covered and / or enclosed. The treatment components would require ongoing consumable materials as well as operations and maintenance in order to ensure that reclaimed water is supplied which is aesthetically suitable for the type of development proposed.

## **2.1 Water Reuse Calculations.**

Provided as Attachment 1 of this Report are Water Budget Calculations dated September 2, 2011 based upon the landscape palette as proposed Valley Crest Design Group. The rationale utilizes an average reference evapotranspiration (ET<sub>o</sub>) value of 44.2 in/yr as published by the California Irrigation Management Information System (CIMIS) for Santa Monica Station 099. This area is considered generally representative of the Malibu area, albeit slightly lower in Reference Evapotranspiration. Actual ET was calculated utilizing the Water Use Classifications of Landscape Species (WUCOLS) method and the Estimated Total Water Use (ETWU) formula:

$$ETWU = (ET_o) \times (0.623) \times (PF) \times (HA / IE)$$

The following table defines the variables of this formula, and summarizes values used in the Water Budget Calculations presented in Attachment 1 of this Report.

Table 2. ETWU Calculation Data

ETo =	Reference Evapotranspiration (inches per year)	44.2
PF =	Plant Factor from WUCOLS	
	Low =	0.3
	Med =	0.5
	High =	1.0
	Very High =	1.1
HA =	Hydrozone Area (square feet)	Per Table 3
0.623 =	Conversion Factor (from inches to gallons per square foot)	0.623
IE =	Irrigation Efficiency	
	Bubblers =	0.80
	Drip =	0.90
	Spray =	0.65
	Water Features =	0.80

**Option 1: Landscape Irrigation**

Table 3. Water Budget Calculations

Hydrozone	Area (sf)	Valley Crest Baseline Plant Factor (PF)	Baseline Water Use (mgy)
<b><u>Low</u></b>			
Hydrozone with Low Plant Factor	55,944	0.3	0.521
<b><u>Medium</u></b>			
Hydrozone with Medium Plant Factor	3,177	0.5	0.054
<b>Total</b>			<b>0.575</b>

The current landscape plant palette as proposed by Valley Crest Design Group will require 0.575 mgy of water.

### **Option 2: Water Requirements for 4,275-sf “Water Wall”**

As presented in the Water Budget Calculations in Attachment 1 of this Report, converting the noise attenuation wall currently proposed to a “water wall” will result in an additional 0.162 mgd of reclaimed water use.

### **Option 3: Water Requirements for Toilet Flushing with Reclaimed Water**

As presented in Table 1, the total annual volume of wastewater that is anticipated to be generated by the subject property is 3.409 million gallons per year (mgd). With modern water conservation fixtures and in consideration of the type of use proposed, it is estimated that toilet flushing will account for approximately 19-percent of the wastewater generation. As such, by converting potable water toilet flushing currently proposed to use reclaimed water will result in an additional 0.648 mgd of reclaimed water use.

## **3.0 Conclusions**

Providing that the Regional Board approves the application of treated water for irrigation purposes in the Civic Center area in Malibu, reuse of effluent in the landscape as evaluated in Option 1 (landscape irrigation per the proposed landscape plan – predominantly low water use) results in reuse of approximately 16.9-percent of the total estimated annual wastewater generation by the proposed development. This reuse alternative is contingent upon the City being able to demonstrate that in consideration of the hydrogeology of the site and its proximity to the Malibu Lagoon, reuse of treated effluent at this site is appropriate. Option 2 (water wall) would serve to use a smaller percentage of wastewater generation (4.8%). Because of its location, however, such a wall would have to be developed in a manner that does not become an attractive nuisance or present a health risk. Reuse of effluent for toilet flushing as evaluated in Option 3 offers to significantly reduce the potable water requirement of the property (19.0%). This option, however, should be considered with caution based upon the aesthetics typical of reclaimed water. In order to ensure that this alternative does not result in offensive odors and discoloration of drainage fixtures, supplemental post-treatment may be necessary prior to introduction into the buildings. Other options explored, such as landscape irrigation with high water use or the creation of wetlands on site, could require lining the planted areas, with all the



potential attendant problematic issues of lined planters and/or the elimination of a key neighborhood-serving park and playground project element. To be conservative, therefore, these further options are not recommended for this site at this time. It is also worth noting that the efficiency of plumbing fixtures is anticipated to increase significantly in the coming years, and that the wastewater generation rates will be able to be reduced from those design rates presented in this Report. This will help to further minimize the volume of wastewater to be reused onsite if deemed as necessary.

#### **4.0 Limitations**

This report has been prepared in accordance with generally accepted practice. No warranties, either expressed or implied, are made as to the professional advice provided under the terms of the agreement and included in this report.

This report has been prepared for the exclusive use of Mr. Steve Soboroff and his authorized agents and is not intended for transfer or use by other parties without written review by Consultant. Please contact the undersigned if there are any questions concerning this Report or the recommendations included herein.

Respectfully submitted,  
EPD Consultants, Inc.

Kevin Poffenbarger, PE  
RCE 69089, Exp 6/30/12  
Senior Project Engineer

Attachments: 1. Water Budget Calculations dated September 2, 2011  
2. Wastewater Generation Rate Calculations, dated August 17, 2011.

Xc: Addressee (1)  
File (1)

**Water Budget Calculations**

REVISED 9.02.11

**ETWU (Estimated Total Water Use) Calculations**

**Whole Foods on the Park**  
**Civic Center Way & Cross Creek Road**  
**Malibu, CA 90265**

<b>ETWU = Eto x 0.62 x PF x HA / IE</b>	
Average Reference Evapotranspiration (ETo), CIMIS	44.2 in/yr

Hydrozone Areas per Landscape Architect	Area (HA) (in sf)	Baseline Water Use Type	Baseline Plant Factor (PF)	Irrigation Efficiency (IE)	Baseline Water Use (ETWU) (gal/y)	Proposed Water Use Type	Proposed Plant Factor (PF)	Incremental Proposed Water Use (ETWU) (gal/y)	Total Proposed Water Use (ETWU) (gal/y)
<b>Low</b>									
Hydrozone with Low Plant Factor	55,944	Low	0.3	0.8879	520,500				520,500 gal / y
<b>Medium</b>									
Hydrozone with Medium Plant Factor	3,177	Medium	0.5	0.8	54,460				54,460 gal / y
Hydrozone 36 - Pond and Water Wall	4,275			0.8	0	Very High	1.1	161,864	161,864 gal / y
<b>Total ETWU</b>					574,961			161,864	<b>736,824 gal / y</b>

## Whole Foods in the Park- Est. Avg Wastewater Flow

Revised: 08.17.11

Building	
1	1979 gpd
2	1829 gpd
3	287 gpd
4	335 gpd
5 (Whole Foods)	4910 gpd
<b>Total Daily Flow Rate</b>	<b>9340 gpd</b>

### Building 1 Proposed Flows

1 Restaurant 1		
Total Restaurant Space	1500 square feet	
# of Seats	54 seats	(5)
Waste Flow per Seat	30 gpd	(2), (8)
<b>Restaurant Flow</b>	<b>1620 gpd</b>	

2 Carryout Restaurant 1		Source
Total Carryout Space	515 square feet	
Flow per Area (Restaurant, Carryout)	40 gpd/ 100 s.f.	(2)
Carryout Restaurant Flow	206 gpd	
# of Employees	5 employees	(5)
Flow per Employee	10 gpd/employee	(2)
Employee Flow	50 gpd	
Bar / Restaurant Grease Flow	103 gpd	(2)
<b>Total Carryout Restaurant Flow</b>	<b>359 gpd</b>	

<b>Total Peak Design Daily Flow Rate -- Building 1</b>	<b>1979 gpd</b>
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### Building 2 Proposed Flows

1 Retail		
Total Retail Space	1101 square feet	
Flow per Area (Retail)	0.08 gpd/s.f.	(7), (2)
Area Flow	88 gpd	
<b>Retail Flow</b>	<b>88 gpd</b>	

2 Restaurant 2		
Total Restaurant Space	1000 square feet	
# of Seats	35 seats	(5)
Waste Flow per Seat	30 gpd	(2), (8)
<b>Restaurant Flow</b>	<b>1050 gpd</b>	

<b>3 Carryout Restaurant 2</b>		Source
Total Carryout Space	500 square feet	
Flow per Area (Restaurant, Carryout)	40 gpd/ 100 s.f.	(2)
Carryout Restaurant Flow	200 gpd	
# of Employees	5 employees	(5)
Flow per Employee	10 gpd/employee	(2)
Employee Flow	50 gpd	
Bar / Restaurant Grease Flow	100 gpd	(2)
<b>Total Carryout Restaurant Flow</b>	<b>350 gpd</b>	

<b>4 Carryout Restaurant 3</b>		Source
Total Carryout Space	485 square feet	
Flow per Area (Restaurant, Carryout)	40 gpd/ 100 s.f.	(2)
Carryout Restaurant Flow	194 gpd	
# of Employees	5 employees	(5)
Flow per Employee	10 gpd/employee	(2)
Employee Flow	50 gpd	
Bar / Restaurant Grease Flow	97 gpd	(2)
<b>Total Carryout Restaurant Flow</b>	<b>341 gpd</b>	

<b>Total Peak Design Daily Flow Rate -- Building 2</b>	<b>1829 gpd</b>
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**Building 3 Proposed Flows**

<b>1 Retail</b>		
Total Retail Space	3592 square feet	
Flow per Area (Retail)	0.08 gpd/s.f.	(7), (2)
Area Flow	287 gpd	
<b>Retail Flow</b>	<b>287 gpd</b>	

<b>Total Peak Design Daily Flow Rate -- Building 3</b>	<b>287 gpd</b>
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**Building 4 Proposed Flows**

<b>1 Retail</b>		
Total Retail Space	4183 square feet	
Flow per Area (Retail)	0.08 gpd/s.f.	(7), (2)
Area Flow	335 gpd	
<b>Retail Flow</b>	<b>335 gpd</b>	

<b>Total Peak Design Daily Flow Rate -- Building 4</b>	<b>335 gpd</b>
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**Building 5 Whole Foods Proposed Flows**

<b>1 Whole Foods</b>		Source
Total Retail Space	24549 square feet	
Flow per Area (Wet Store)	0.20 gpd/s.f.	(2), (8)
Area Flow	4910 gpd	
<b>Retail Flow</b>	<b>4910 gpd</b>	

<b>Total Peak Design Daily Flow Rate -- System 5</b>	<b>4910 gpd</b>
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**Total Flow - Proposed**

Building	
1	1979 gpd
2	1829 gpd
3	287 gpd
4	335 gpd
5 (Whole Foods)	4910 gpd
<b>Total Daily Flow Rate</b>	<b>9340 gpd</b>

**Source Notes**

- (1) Georgia Department of Natural Resources, Environmental Protection Division
- (2) Engineer's Estimate
- (3) City of Malibu Plumbing Code, Table K-3
- (4) California Plumbing Code
- (5) Per Restaurateur
- (6) Per Permit
- (7) City of Los Angeles, Bureau of Engineering, August 2, 2005
- (8) Dziechielowski, B et. al, Commercial and Institutional End Uses of Water, AWWA Research Foundation, 2000