



City of Malibu

23825 Stuart Ranch Road ♦ Malibu, California ♦ 90265-4861
Phone (310) 456-2489 ♦ Fax (310) 317-0950 ♦ www.malibucity.org

September 30, 2011

Mr. Sam Unger, Executive Officer
California Regional Water Quality Control Board
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

RE: Memorandum of Understanding – Malibu Civic Center Wastewater Treatment Plan
Phase 1: Milestone 1 of 10

Dear Mr. Unger:

On August 19, 2001, the City of Malibu (City), the Los Angeles Regional Water Quality Control Board and the State Water Resources Control Board (Water Boards), entered into a Memorandum of Understanding (MOU) to essentially work together towards the common goal of designing and constructing a Wastewater Treatment Plan (Plan) for the City of Malibu Civic Center area. The MOU identifies a three-phased approach that requires Phase I to be implemented by November 5, 2015, and Phase 2 to be implemented by November 5, 2019. Implementation of Phase 3 will be dependent upon water quality monitoring data.

Phase 1 identifies 10 significant tasks and the due date for each. Accordingly, the first milestone reads:

1. *By **September 30, 2011**, submit a schedule and list of public outreach meetings and materials developed to inform the public about the development of a wastewater treatment facility.*

In accordance with Task 1 of the MOU, below is a listing of the City's past and proposed outreach meetings for the project:

Public Outreach Meetings:

1. Name: **City Manager's Civic Center Stakeholder Group**
Schedule: Meets on the last Thursday of each month at Malibu City Hall
Purpose: This group was established in December of 2009 and consists of business owners, residents, developers, real estate professionals and homeowner association (HOA) representatives within the prohibition boundary. The City organized these meetings to inform the stakeholders about the impacts and future plans of the prohibition and



wastewater treatment facility. Within this group, it is known that there is strong support from the commercial property owners for the project and that many other property owners are also supporters of the plan. For those that oppose the project or those that want more information, this group's meetings are a valuable discussion center for technical questions and factual updates. Attached is a sample sign in sheet from one of the meetings.

Materials: Over the last two years, the group has been provided PowerPoint presentations, schedules, graphs, maps, USGS data, technical reports and data, handouts, etc. Some of this information has been provided in previous quarterly reports to the Regional Board.

2. Name: **Technical Advisory Committee (TAC) for the Malibu Centralized Wastewater Project**

Schedule: Meets quarterly, or as information is available, at Malibu City Hall

Purpose: The TAC consists of scientific and technical professionals who assist with the overall design parameters. The group consists of individuals from the Regional Board, UCLA, Heal the Bay, Santa Monica Bay Restoration Commission, State Water Resources Control Board, wastewater practitioners, City staff and the City's design team. The project design team presents status updates on the project and in turn receives technical feedback and recommendations from the TAC members. The first TAC was held on September 12, 2011. (See attached sign-in sheet and meeting notes)

Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.

3. Name: **Wastewater Project Public Outreach Workshops.**

Schedule: It is anticipated that over the next several years, the City will conduct several community workshops to inform all affected residents and business owners regarding the wastewater design parameters and potential funding requirements. The first workshop will likely be held in mid-2012 and after approval of the groundwater injection plan to the Regional Board. In addition, public meetings will be conducted by the City's Planning Commission and the City Council in order to approve permits and environmental documents for the project.

Purpose: To inform the public of the progress and status of the project and to receive constructive feedback and project support from stakeholders, interest groups and the public at large.

Materials: PowerPoint presentations, schedules, graphs, maps, technical data and distribution of informational handouts focusing on project benefits, protection of public health and the ubiquity of recycled water use throughout California.

4. Name: **Homeowner Association (HOA) Meetings**

Schedule: Meet periodically at annual or special HOA meetings

Purpose: To inform residents that are affected by the prohibition about the progress of the wastewater treatment plants, the benefits and costs of the plan and the interim



building restrictions, and to receive constructive feedback and project support from residents and the HOA. There are five HOAs that are directly affected by the Prohibition, including those representing homeowners of Serra Canyon, Malibu Colony, Malibu Knolls, Malibu Road, and the condominiums on Civic Center Way. The City has already met with each of the HOAs on at least three occasions each over the last two years (except the condominium HOA). On October 2, 2011, City staff will meet with the Malibu Colony HOA and present information about the MOU and the Prohibition.

Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.

5. Name: **Wastewater Advisory Committee (WACO)**

Schedule: It is anticipated the City will provide updates to WACO on a periodic basis through the entire design and construction phases. This group meets on the fourth Thursday of each month at Malibu City Hall.

Purpose: This Committee provides review and input to City staff on matters within the City's jurisdiction concerning wastewater management, treatment and disposal, and provides updates on the progress and status of wastewater projects. Staff will use this forum for additional public outreach and to provide the Committee with updates on the status of the wastewater project.

Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.

6. Name: **Architects and Engineers (A&E) Technical Advisory Committee**

Schedule: This Committee meets on the first Wednesday of each month at Malibu City Hall.

Purpose: This Committee serves as a technical advisory committee to the City's Planning Manager to review, comment and make recommendations on proposed revisions to the General Plan, Zoning Ordinance and the Local Coastal Program and the development process. Staff will utilize this forum for additional public outreach, providing the public with updates on the status of the wastewater project, and to provide additional guidance during the environmental impact review (EIR) and permitting process.

Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.

7. Name: **Public Works Commission**

Schedule: Meets on the last Wednesday of each month at Malibu City Hall.

Purpose: Makes recommendations to the City Council on matters concerning capital projects, including stormwater and wastewater utilities and facilities, and all matters concerning Public Works services. Staff will utilize this forum for additional public outreach, providing the public with updates on the status of the wastewater project, and to provide additional guidance during the design, bidding and construction phases of the project.

Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.



8. Name: **Malibu TV, Website and Social Media**

Schedule: Periodically

Purpose: Provide easy public access and information on upcoming meetings and to provide overall updates on the status of the project. Staff will utilize this form of communication to provide maximum exposure for additional public outreach.

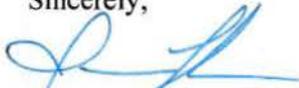
Materials: PowerPoint presentations, schedules, graphs, maps, technical data, handouts, etc.

Conclusion:

I trust the above information and attachments provides a thorough understanding of the City's current and proposed outreach efforts to the affected property owners and concerned citizens. I believe this information also satisfies Task No. 1 of Phase One of the MOU. As you can see, this effort has been ongoing for several years and will continue to be an important phase of the Wastewater Treatment Facility Plan.

If for any reason, additional information or clarification is needed, please do not hesitate to contact me at (310) 456-2489 ext. 226 or jthorsen@malibucity.org.

Sincerely,



Jim Thorsen
City Manager

Attachments: July 28, 2011 City Manager's Civic Center Stakeholder Group Sign-in Sheet
September 12, 2011 Wastewater Project TAC meeting notes and handouts

cc: Mayor Sibert and Honorable Members of the Malibu City Council
Vic Peterson, Environmental and Sustainability Director
Bob Brager, Public Works Director
Tom Howard, Executive Director, State Water Resources Control Board
Eric Wu, Los Angeles Regional Water Quality Control Board
Steve Clary, RMC Water and Environment



Sign-In Sheet -7/28/2011

CITY MANAGER'S CIVIC CENTER STAKEHOLDER GROUP

Initial to confirm attendance	[Please indicate Work (W) / Home (H) / Call (C)]						
	First Name	Last Name	Company / Agency	Primary Phone	Secondary Phone	Fax	Email
	Anne	Payne	Resident	(310) 456-3507			thepaynes@malibuonline.com
	Andrew	Sheldon	City of Malibu	(310) 456-2489			asheldon@ci.malibu.ca.us
BAC	Barbara	Cameron	City of Malibu	(310) 457-2060			malibuqrants@aol.com
	Barry	Kinyon	23405 PCH	(310) 456-6926	(310) 251-9254	(310) 456-7965	
	Bill	Rhodes	Malibu Road	(310) 293-2084		(310) 456-5872	billinmalibu@earthlink.net
BT	Brent	Thorell	HRL Laboratories	(310) 317-5188		(310) 317-5651	bthorell@hrl.com
	Carl	Ehrli	Our Lady of Malibu	(818) 880-1759			ehrlccf@ik.netcom.com
	Christi	Hogin	City of Malibu	(310) 643-8448		(310) 643-8441	CHogin@LocalGovLaw.com
	Cindy	McAfee	Malibu Colony Plaza	(310) 451-9877			cmcafee@soboroff.com
	Connie	James	Malibu Knolls Homeowners Association	(310) 456-0796	(310) 804-8218		Connie.James@pepperdine.edu
OR	Craig	George	City of Malibu	(310) 456-2489			CGEORGE@ci.malibu.ca.us
DR	Dan	Ross	Malibu Board of Realtors	(310) 702-7121			danielross@coldwellbanker.com
	David	Reznick	Malibu Bay Company	(310) 456-6555	(310) 456-9462	456-9462	rez1@earthlink.net
	Don	Schmitz	Schmitz & Associates / La Paz	(310) 589-0773	(818) 338-3636	(310) 589-0773	DonS@schmitzandassociates.net
	Ed	Gonzalez	Vista Pacifica Townhomes	(310) 456-9756		(310) 456-9756	edgonzalezphd@gmail.com
GAL	Gene	Lucaro	Latham & Watkins	(213) 891-8332	(213) 248-0584	(213) 891-8763	gene.lucaro@lw.com
	Geoffrey	Nathanson					hnagin@verizon.net

Sign-In Sheet -7/28/2011

CITY MANAGER'S CIVIC CENTER STAKEHOLDER GROUP

Initial to confirm attendance	First Name	Last Name	Company / Agency	[Please indicate Work (W) / Home (H) / Cell (C)]			Email
				Primary Phone	Secondary Phone	Fax	
J.A.	Grant	Adamson	Mariposa Land Company	(310) 456-3230	(310) 779-9542	(310) 456-3182	ghadamson@aol.com
J.J.	J.J.	O'Brien	Weintraub Financial Services	(310) 457-8970			jjobrien@weintraubfs.com
	Jason	Gannon					jjgannon@thekroankegroup.com
	Jay	Gilberg	Malibu Country Mart	(310) 826-5635			jaygilberg@kossfinancial.com
	Jay	Luchs	Malibu Village	(310) 489-5000	(310) 550-2603	(310) 552-2111	jayluchs@yahoo.com
	Jeff	Follert	Serra Canyon POA	(310) 994-6148			jrf@usinter.net
	Jim	Thorsen	City of Malibu	(310) 456-2489		(310) 456-2760	jthorsen@ci.malibu.ca.us
	Joan	Knapp	Knapp Trust	(310) 457-2577		(310) 457-2577	joanbknapp@aol.com
	Meril	May	Coldwell Banker	(310) 924-9955		(310) 589-5527	meril.may@gmail.com
	Michael	Barsocchini	Malibu Knolls	(310) 458-3825		(310) 456-5872	mebarch@aol.com
	Michael	Heslov	Soboroff Partners	(310) 451-9877	(310) 993-1999	(310) 393-3207	mheslov@soboroff.com
	Michael	Koss	Malibu Country Mart	(310) 826-5635			michaelkoss@kossfinancial.com
	Michael	Novotny	Cross Creek LLC	(310) 317-1715	(310) 924-9317	(310) 317-4291	michaeln@prumalibu.com
	Noah	Shore	Fortress Inv. Group	(310) 228-3024	(970) 948-3445		nshore@fortress.com
	Patricia	Gartland	Miramar	(310) 456-0063			p.blue@mac.com
	Paul	Grisanti	Coldwell Banker	(310) 317-9328	(310) 505-5006	(310) 456-2819	pgrisanti@netvip.com
	Paul	Spiegel	Malibu Association of Realtors	(310) 963-0442			pauls86@gmail.com

Sign-In Sheet - 7/28/2011

CITY MANAGER'S CIVIC CENTER STAKEHOLDER GROUP

Initial to confirm attendance	[Please indicate Work (W) / Home (H) / Cell (C)]						
	First Name	Last Name	Company / Agency	Primary Phone	Secondary Phone	Fax	Email
	Peggy	Thomas	Our Lady of Malibu	(310) 456-2361		(310) 456-3942	pthomas@olmalibu.org
	Pouya	Abdi	Malibu Village	(310) 487-7767	(310) 275-6222	(310) 275-6223	pa@retailholdingsgroup.com
	Rebekah	Evans	Malibu Chamber of Commerce	(310) 456-9025	(310) 913-7990	(310) 456-0195	revans@malibu.org
	Rhiannon	Bailard	Pepperdine University	(310) 506-4702			rhiannon.bailard@pepperdine.edu
	Richard	Scott	Malibu Knolls POA	(310) 456-5373	(310) 994-0348	(310) 456-9729	rsmalibu@gmail.com
	Richard	Sol					RichardSolArchitect@gmail.com
	Richard	Weintraub	Weintraub Financial Services	(310) 457-8130		(310) 457-8128	rweintraub@weintraubfs.com
	Rick	Margolis	Malibu Colony HOA	(310) 508-7888		(310) 456-5661	rick@columbusoacific.com
	Robert	Gold	Big Rock Partners	(310) 734-2353			rgold@BigRockPartners.com
<i>R</i>	Roger	Gronwald	HRL Laboratories	(310) 317-5615	(805) 573-5021	(310) 317-5676	rgronwald@hrl.com
	Connie	James	Knolls Homeowners				Connie.James@pepperdine.edu
<i>g</i>	Stu	McNeis	Malibu Country Mart	(310) 625-5281		(310) 826-1458	stephen@kossfinancial.com
	Steve	Soboroff	Soboroff Partners	(310) 451-9877			steve@soboroff.com
	Susan	Harmon	HRL Laboratories	(310) 317-5252		(310) 317-5651	scharmon@hrl.com
	Vic	Peterson	City of Malibu	(310) 456-2489			vpeterson@ci.malibu.ca.us

Sally *DeJama* *KNOLL* 310-456-2536
JAN HALL *SERRA PATIENT* 310-462-8121
OZZIE SILVA 310-456-8054
A.R. ANNELIESE KNOR *RESIDENT* 310-456-8835
 310-943-3818 *JAN - HALL@YAHOO.COM*
 310-456-7594 *ABASpiniT@AOL.COM*
H KNOR@MSN.COM

Meeting Notes

Malibu Wastewater Project



Meeting Date: September 12, 2011
Time: 09:30 AM – 2:00 PM
Location: New Malibu City Hall
Subject: Technical Advisory Committee Meeting

PARTICIPANTS:

City of Malibu: Jim Thorsen, Bob Brager, Andrew Sheldon, Craig George, Barbara Cameron, Elizabeth Shavelson, Olivia Damavandi, Bonnie Blue

RMC: Steve Clary, John Thayer

Other: Jack Topel, Santa Monica Bay Restoration Commission; Mark Gold, Heal the Bay; Richard Laton, CSU Fullerton/Earth Consultants International; Dan Wendell, Groundwater Dynamics; Eric Wu, LA-RWQCB; Michael Stenstrom, UCLA; Vanessa Thulsiraj, UCLA; Zita Yu, UCLA; Jeff Bouse, County of Los Angeles DPW

PURPOSE OF MEETING

The Technical Advisory Committee meeting for the Malibu Wastewater Design Project included the following presentation topics for discussion:

- I. Update from RMC on wastewater project**
 - a. Phasing of proposed collection system service area within Prohibition Zone
 - b. Memorandum of Understanding (MOU) with RWQCB adopted August 2011: milestones and schedule
 - c. Projected volume of effluent for Phase 1 (2015), Phase 2 (2019), and Phase 3 (post 2019)
 - d. Design status of collection system
 - e. Potential sites for treatment plant
 - f. Reuse potential
 - g. Seasonal storage (potential collaboration with Pepperdine)
 - h. Insufficiency of reuse plus shallow-aquifer percolation to dispose of total anticipated effluent volume
 - i. Groundwater injection concept
 - j. Fieldwork and modeling necessary to confirm injection viability
 - k. Test well locations

DISCUSSION SUMMARY:

The discussion summary notes are organized by selected presentation topics outlined in Item I above and do not necessarily reflect the exact order of discussion.

Potential sites for treatment plant

- The group discussed sludge disposal, and it was acknowledged by the group that truck hauling of waste activated sludge is the preferred method of sludge disposal for such a small plant. Furthermore, on-site sludge thickening is the recommended method for reducing the number of truck trips, but it would not be economical for such a small plant to have its own digesters. Jeff Bouse of the County reported that he trucks the Malibu Mesa WWTP sludge to the Los Angeles Tillman Plant. Dr. Stenstrom reported that on-site thickening without digestion, along with truck hauling, is the preferred approach.

Reuse Potential

- Mark Gold expressed his opinion that the City should look at fire suppression and new commercial as potential additional uses of recycled water.
- In addition to the potential recycled water uses shown in the Powerpoint presentation, RMC mentioned that the City may have an interest in serving Hughes Research Lab with recycled water, if Hughes is amenable to using recycled water.

Insufficiency of reuse plus shallow-aquifer percolation to dispose of total anticipated effluent volume (and unavailability of alternate sewage disposal methods)

- The group discussed the possibility of pumping sewage to Hyperion, but it was acknowledged by Mark Gold that Sunset Mesa was the closest point to the existing Los Angeles Bureau of Sanitation collection system. The group expressed general agreement that because of the distance to this point, this concept was not feasible.

Groundwater Injection Concept

- Mark Gold emphasized the importance of documenting the water quality history of the existing deep aquifer, i.e. finding historical water quality data for TDS and nitrogen and performing periodic sampling to ascertain the current water quality for these parameters. In addition, Mark recommended documenting the last known historical year of groundwater withdrawals in the lower aquifer for potable water use. Mark advised the group that it will be important from a permitting standpoint not to claim that we are “improving” the quality of the lower aquifer, but instead acknowledge that we are complying with the RWQCB anti-degradation policy as demonstrated through documentation of existing water quality in the lower aquifer.
- Jim Thorsen would like to avoid re-designating the beneficial use of the lower aquifer. Mark Gold confirmed that re-designating the beneficial use could be cumbersome and should be avoided. Eric Wu expressed that he agreed with this approach.

- Mark Gold confirmed that avoiding lagoon discharge of injected effluent is important, but he also confirmed that it may be acceptable if a small percentage of the injected effluent flows to the lagoon instead of the ocean. In general, the preferred concept is to demonstrate in the groundwater model that the vast majority of the injected groundwater flows to the ocean. Mark also provided the group with background confirming that the key regulatory driver behind avoiding lagoon discharge is volume-based, i.e. to minimize creek flows and thereby avoid breaching of the berm at Surfrider Beach.

Fieldwork and modeling necessary to confirm injection viability

- Jim Thorsen suggested that despite the fact there are multiple test wells, the City would benefit if it was possible to limit the final installation to small number of injection wells as close to the ocean as possible (i.e. one or two injection wells). The group discussed the possibility of placing one of the final injection wells in the State Park located just to the east of the Colony.
- Richard Laton reminded the group that after the field testing activity, the test wells will serve a permanent purpose as monitoring wells.
- The testing regime consists of drilling 3 or 4 test wells and pumping them on a short-term basis at lower pumping rates (i.e. 100 gpm each) and then drilling and hydraulically testing a full-size injection well, which would first be pumped at 500 gpm, and then test-injected at a flowrate much lower than 500 gpm. The drilling, well logging, offshore geophysics, pump testing, and injection testing will provide the field data to build an accurate computer model of the flowpath of the effluent following injection.

Test well locations and logistics

- Mark Gold expressed an interest in ascertaining the relationship between the volume of injection and the groundwater level rise, but other members of the group cautioned that because the lower aquifer is confined or semi-confined, measured groundwater levels in the upper aquifer may not fluctuate in response to injection in the lower aquifer.
- Andrew Sheldon reminded the group that there were previously two leaking gas stations and one old dry cleaner site in the vicinity of the four proposed test well locations.
- The meeting ended with a discussion about the logistics of permitting the test well locations with the RWQCB.

Other topics

- The group determined that it would be advisable to involve CDPH in the TAC. Eric Wu reported that he would research to see who is the preferred contact at CDPH and notify the City, so CDPH can be involved in future meetings and advised of previous TAC meeting activity.

Malibu Centralized Wastewater Project



*Technical Advisory
Committee Meeting
September 12, 2011*



Purpose of Meeting

- Review MOU requirements and timetable
- Review design status of Centralized Wastewater Project
- Present need for groundwater injection
 - Role of reuse
 - Role and acceptability of other options
- Present approach to confirming viability of groundwater injection
- Discuss approach to Dept Public Health
- Discuss improvements to approach

MOU Phasing of Prohibition Zone



Other MOU Milestone Requirements

Requirement	Date
Schedule and list outreach meetings/materials	30 Sept 2011
Submit recycle/reuse study	31 Dec 2011
Conceptual groundwater injection plan	30 June 2012
Certified EIR	31 March 2013
Complete design of wastewater treatment facilities	30 June 2013
Start up Phase 1 collection and treatment	5 November 2015
Start up Phase 2 collection and treatment	5 November 2019

Volume of Effluent

Phase	Existing Flow*, gpd	Additional Future Flow, gpd	Total Flow at Buildout, gpd
1 (2015)	107,000	104,000	211,000
2 (2019)	139,000	0	139,000
<hr/>			
Subtotal	246,000	104,000	350,000
3 (post 2019)	122,000	30,000	152,000
Total	368,000	134,000	502,000

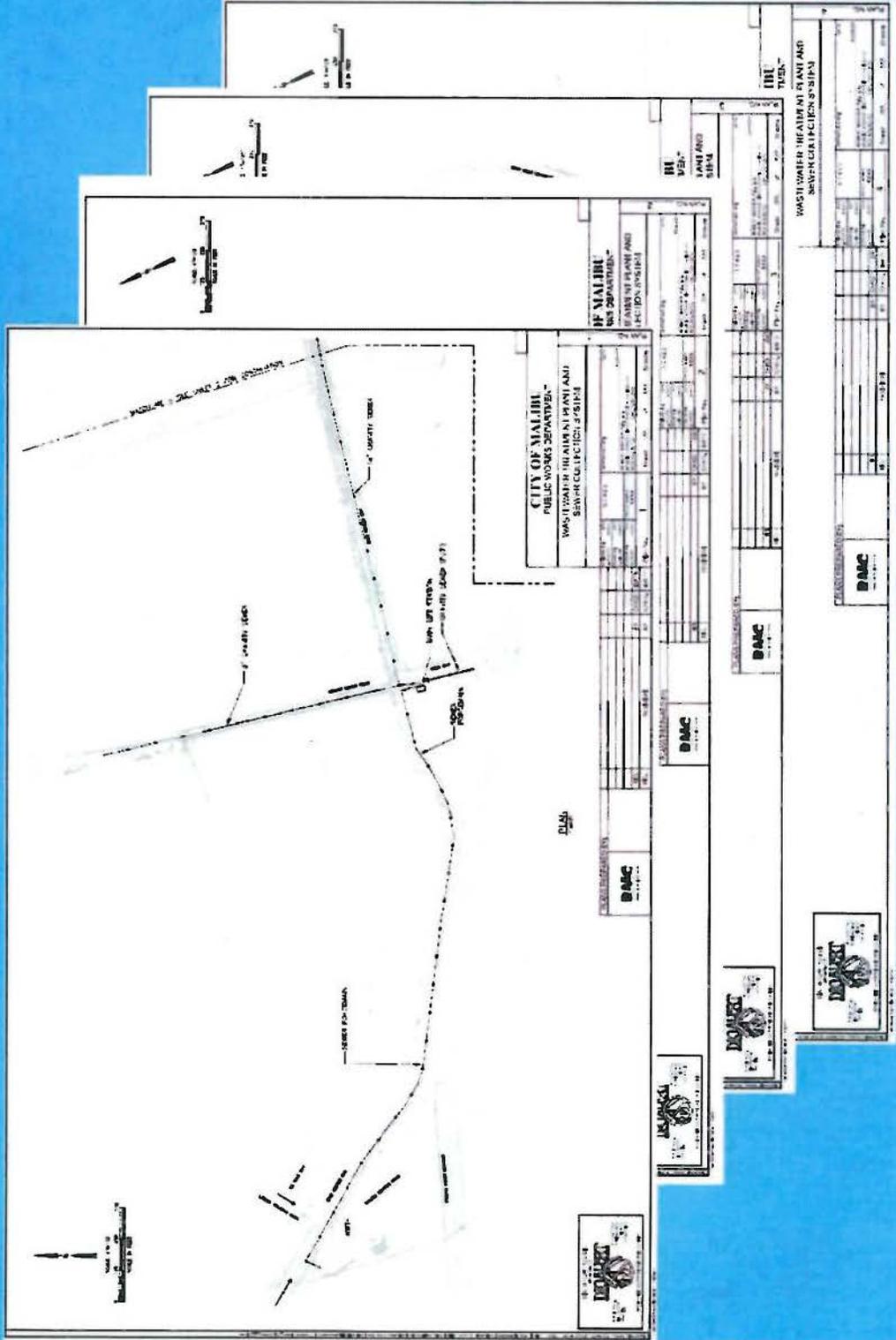
*Uses higher of RMC estimate/City permit or RWQCB estimate on parcel-by-parcel basis



Design Status

- Preliminary design of collection system completed
 - Need to confirm pump station locations
 - Need to resolve conflicts between existing utilities and new sewers
- Topographic survey of area completed
- Preliminary layout of treatment plant completed
- Location of treatment plant still 'on wheels'

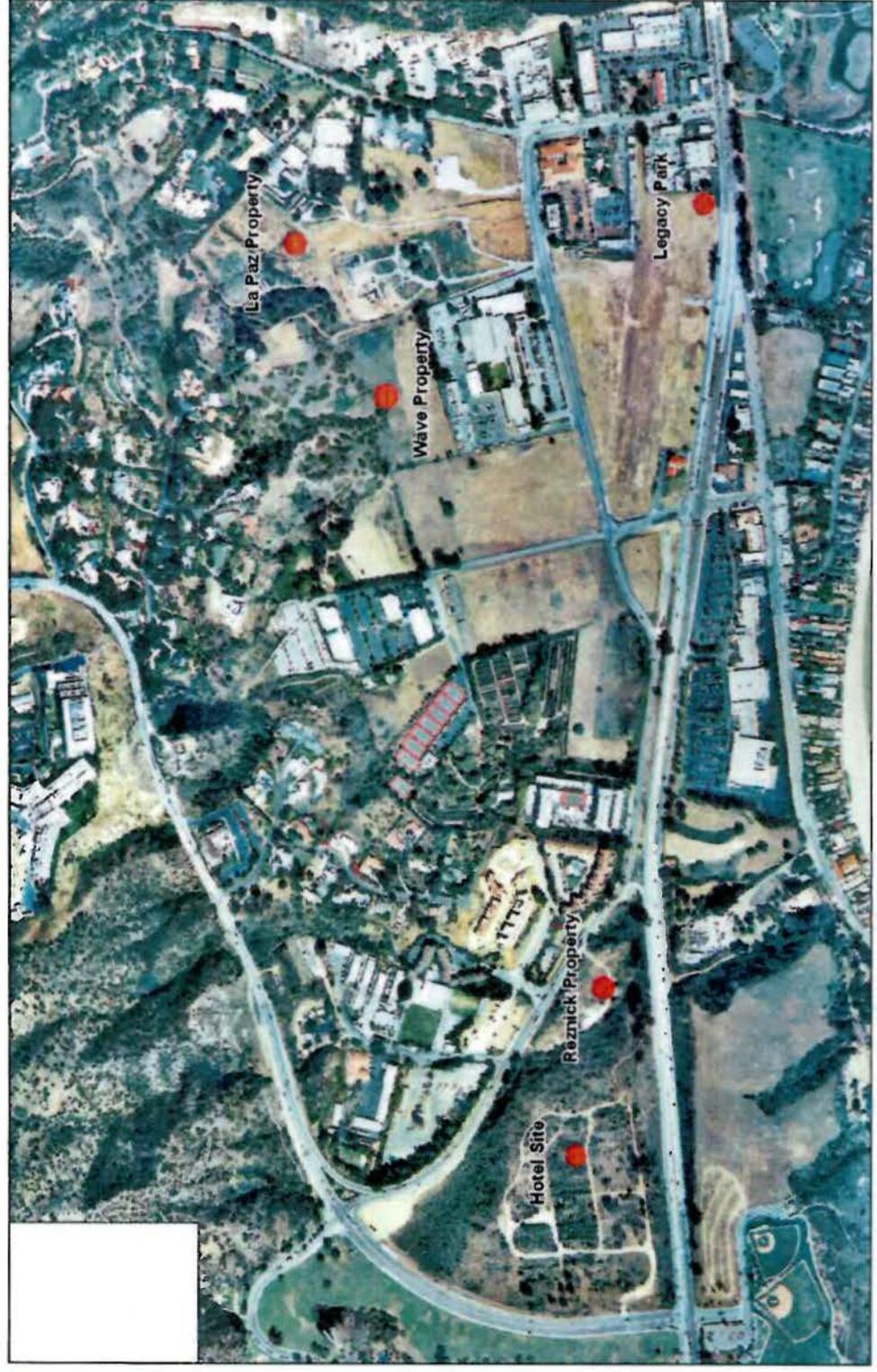
Collection System Design Ready for Final Design



Layout of MBR Treatment Plant



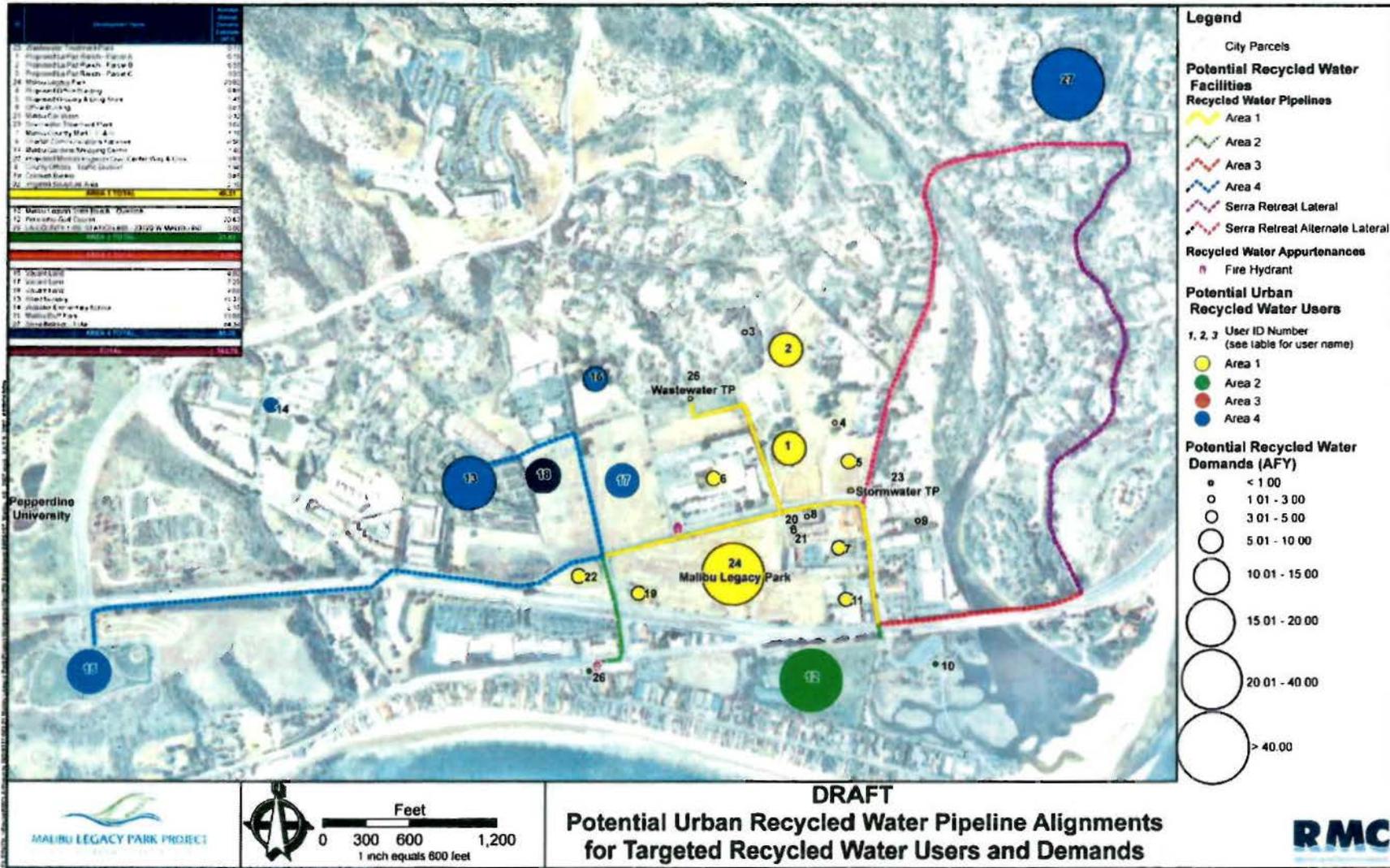
Potential Sites for Treatment Plant



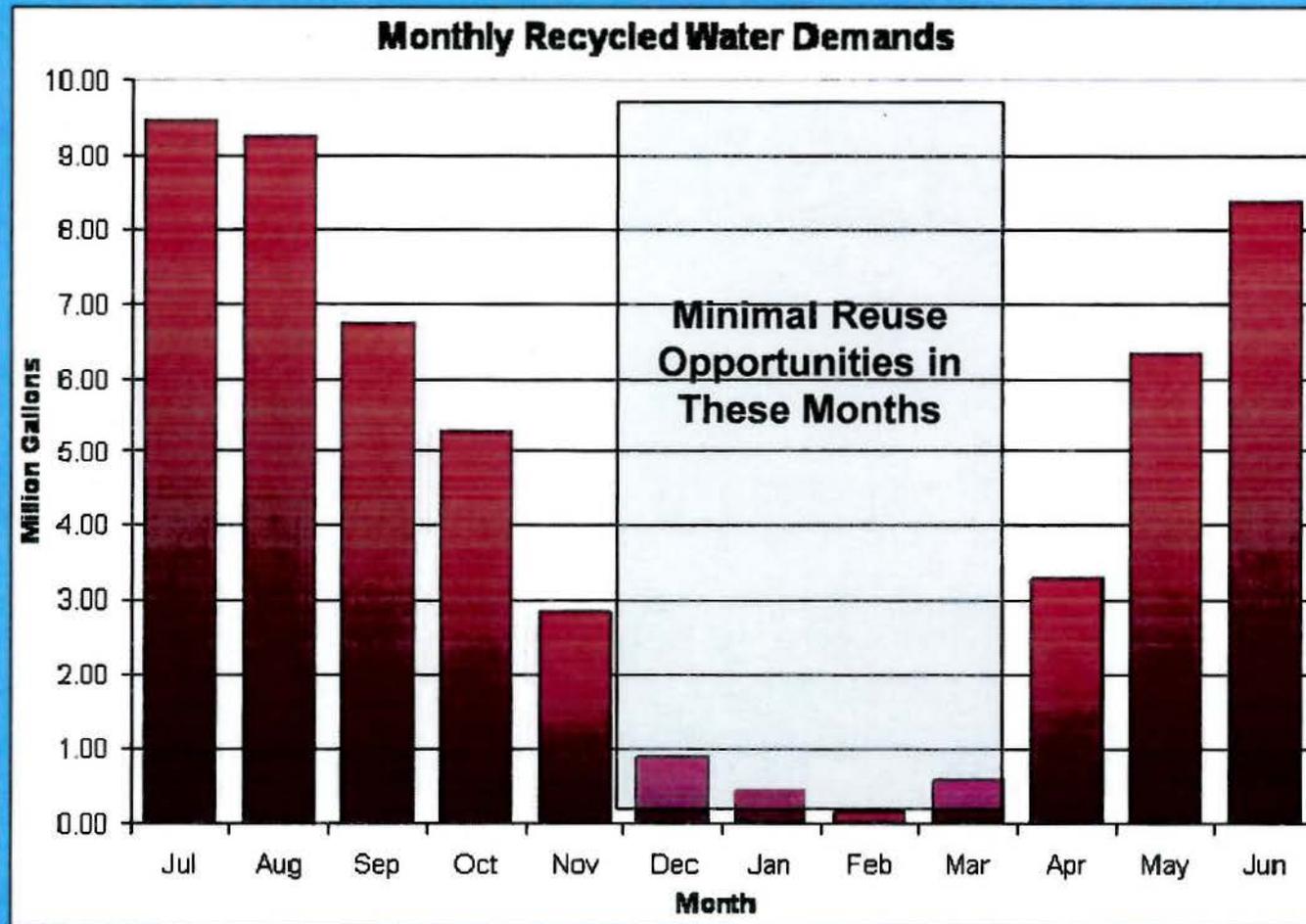
Potential Options for Effluent 'Management'

- Reuse/recycling
- Percolation (surface)
- Ocean discharge (outfall)
- Export to other treatment/disposal facilities
 - Hyperion TP
 - Tapia TP
- Groundwater injection

Reuse Potential Has Been Estimated...



Seasonal Storage is Needed to Maximize Reuse



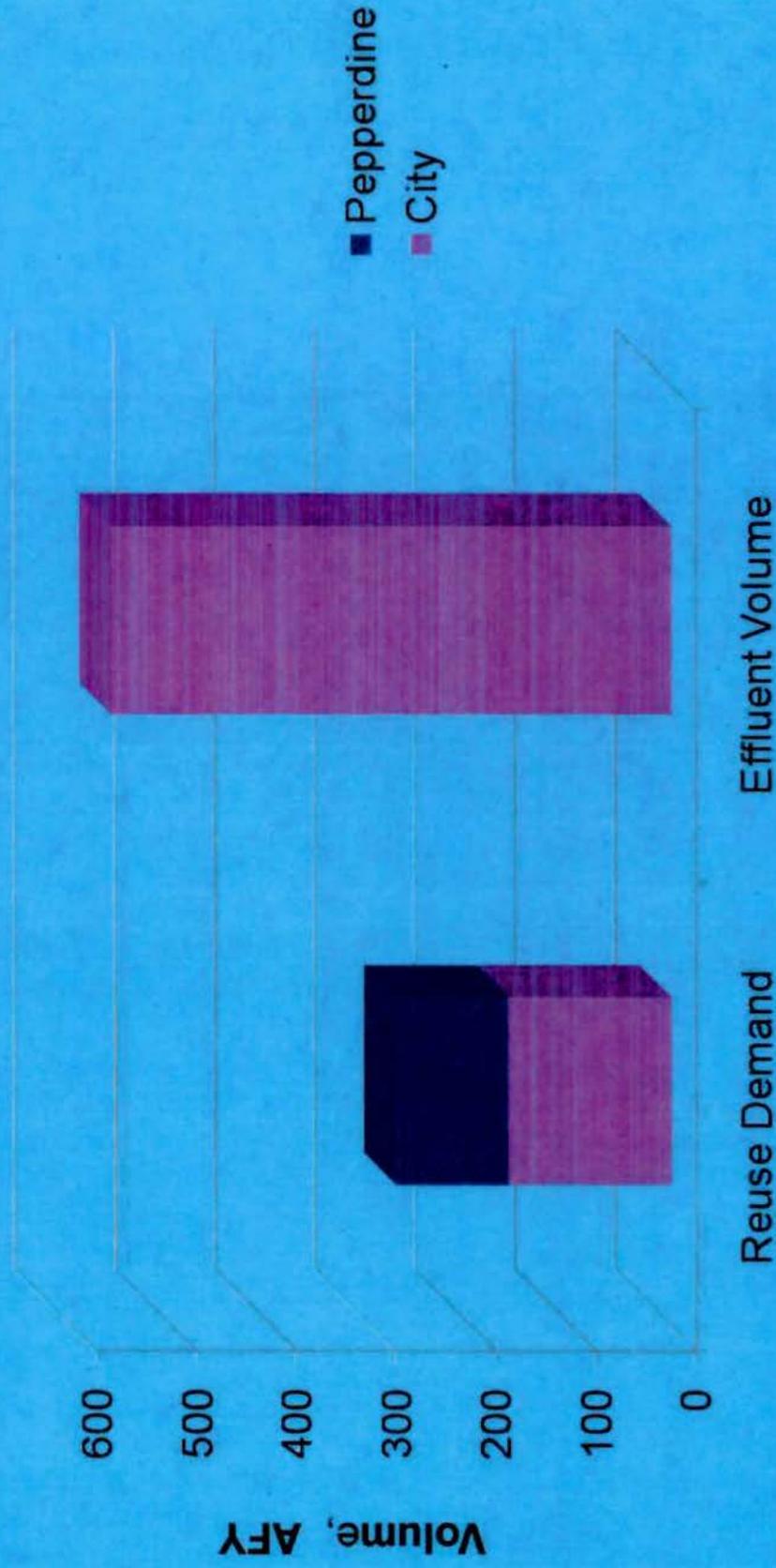
Pepperdine Could Use 100,000 gpd from Malibu, But...

Description	Volume, acre-ft/yr
Current Irrigation at Pepperdine U.	318
Recycled water from Pepperdine TP (with 8 MG storage)	-143
Remaining reuse potential	175
100,000 gpd from Malibu TP (with 15 MG storage at Pepperdine)	112

***... requires expansion of seasonal storage
from 8 MG to 15 MG***



Reuse Cannot Use Total Volume Generated



Surface/Shallow Percolation Potential Less than 143,000 gpd

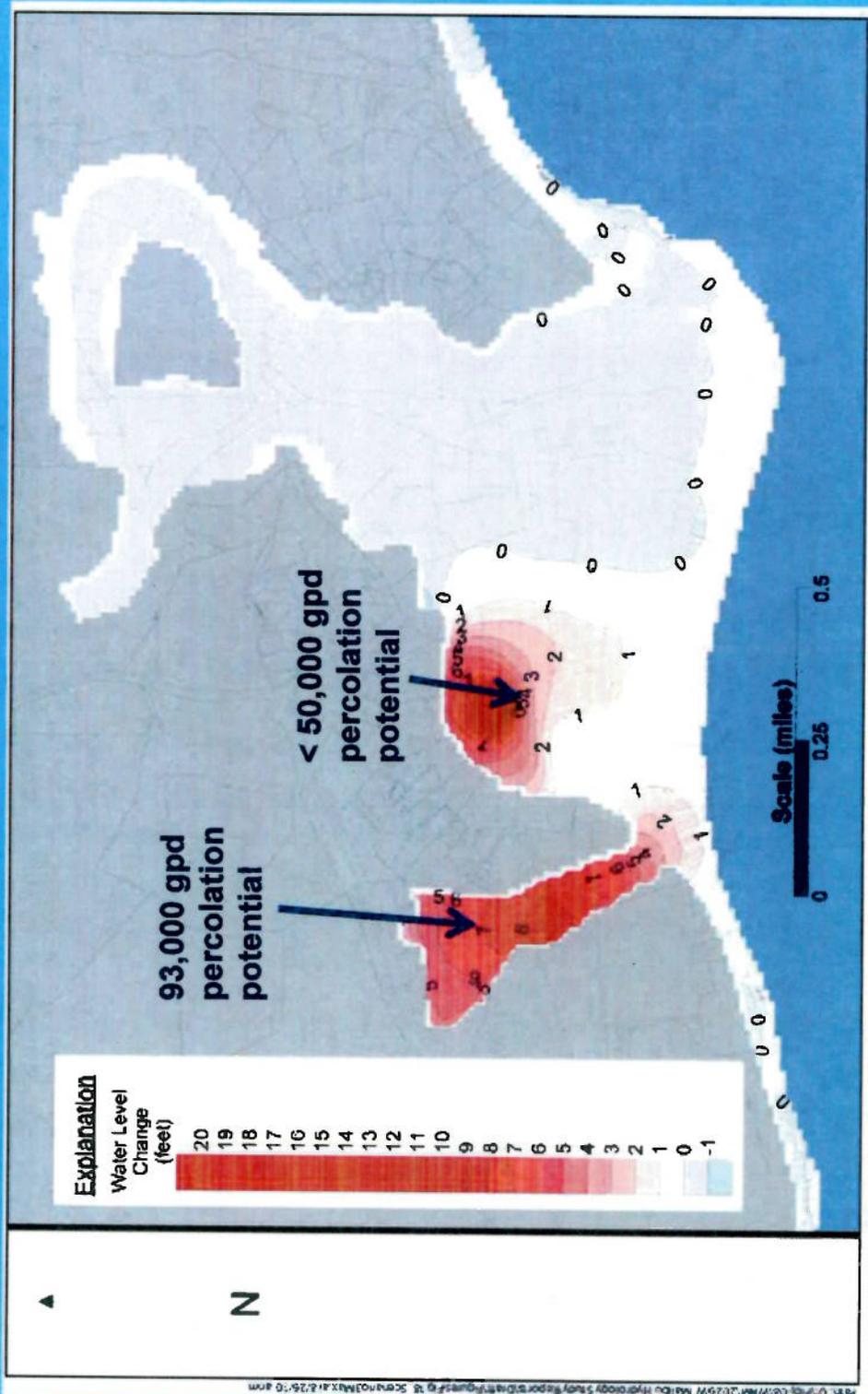
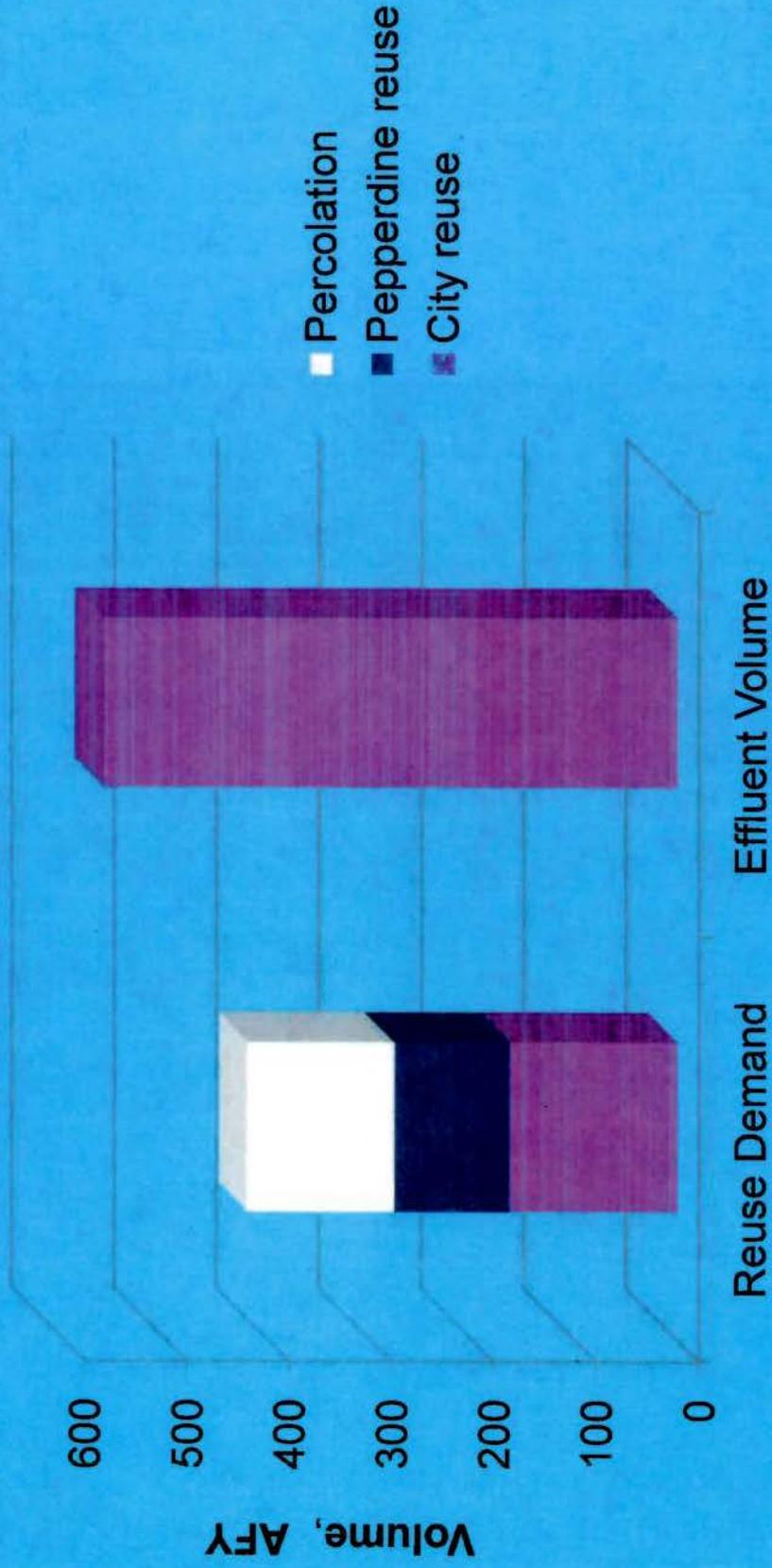


Figure 18: Water Table Changes Caused at High Water Condition, Scenario #3
Hydrology Study of Cumulative Impacts for the Civic Center Area
City of Malibu, California

Source: Municipal Services Collection and Services Area by BMC, 2018; modified from Appendix A Figures 3.23

Reuse + Percolation Capacity Insufficient for Total Volume



Following Options Not Acceptable, or Feasible

- Ocean discharge
- Export to Tapia TP or Hyperion TP

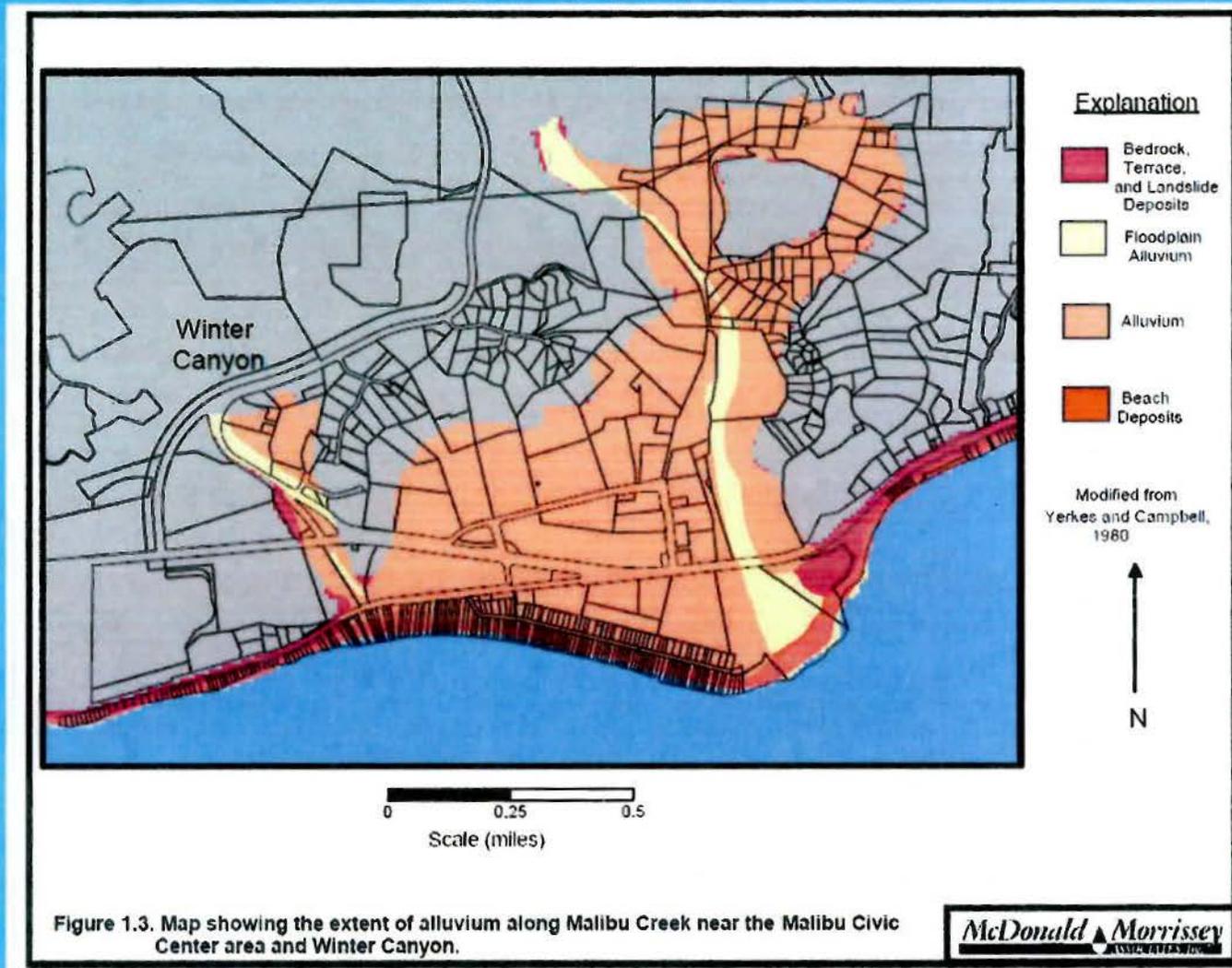
***... Therefore GW Injection is
Needed***



Why GW Injection May be Feasible



Alluvium Under Civic Center Area



Borings to Date Indicate Gravel Layer

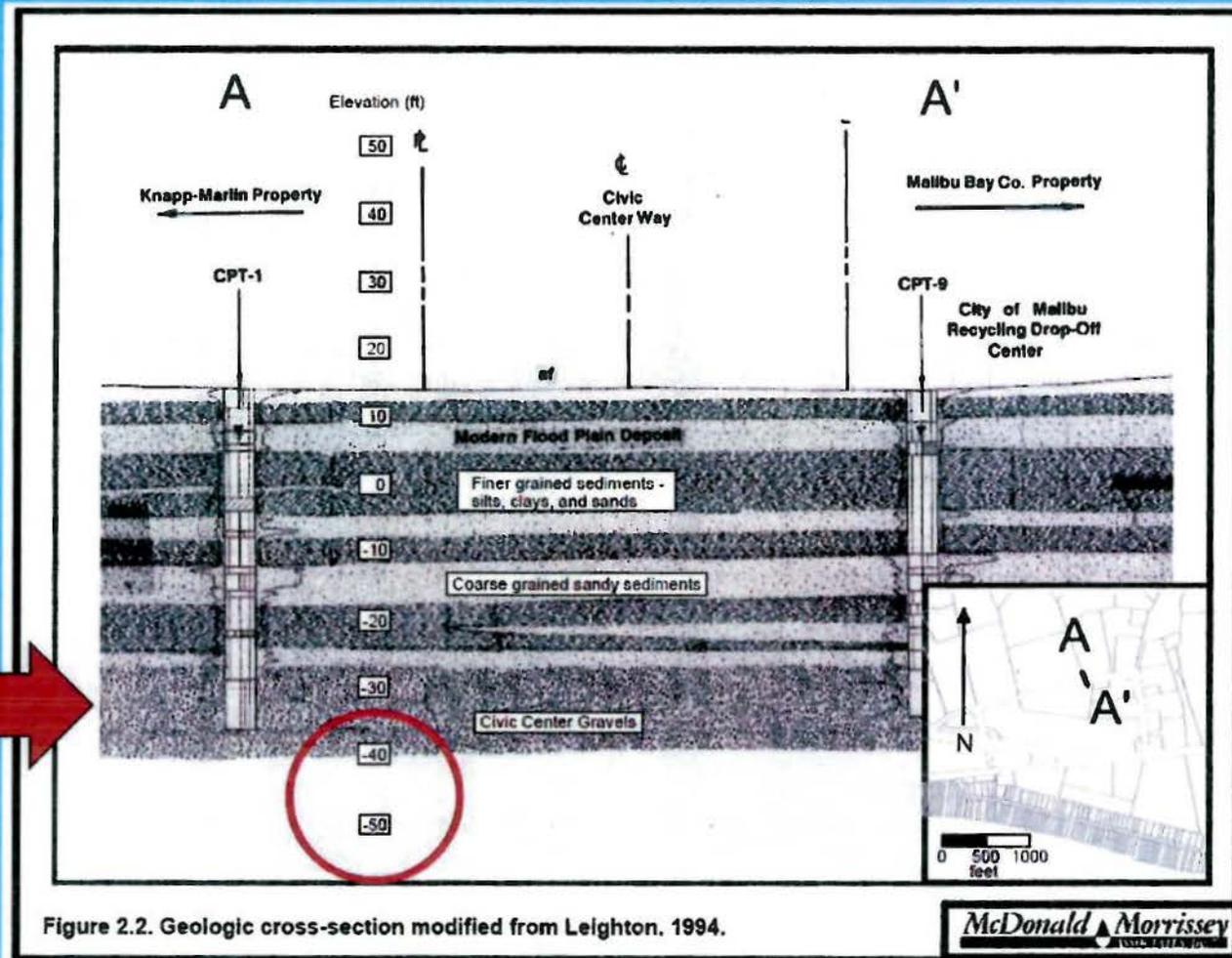
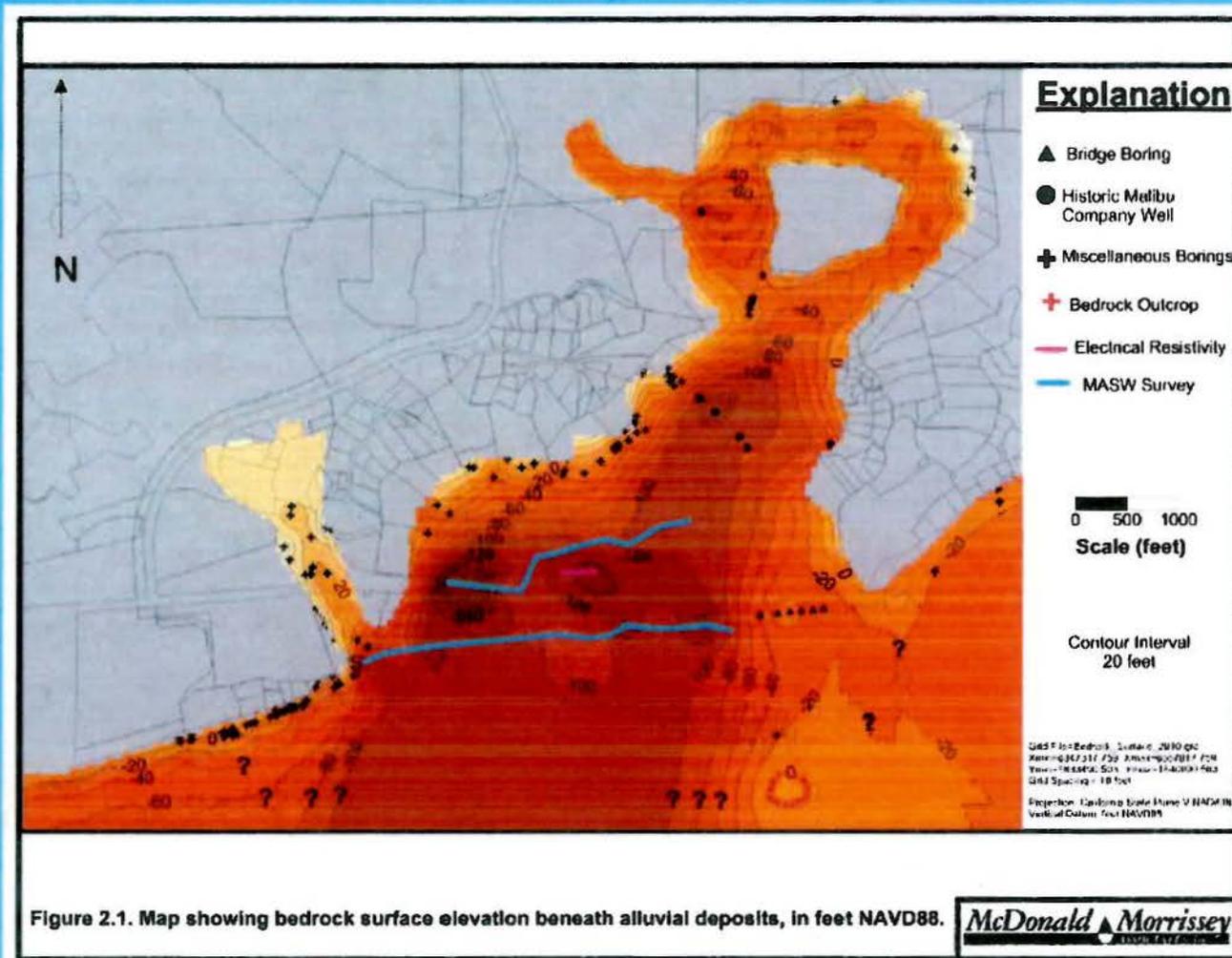


Figure 2.2. Geologic cross-section modified from Leighton, 1994.

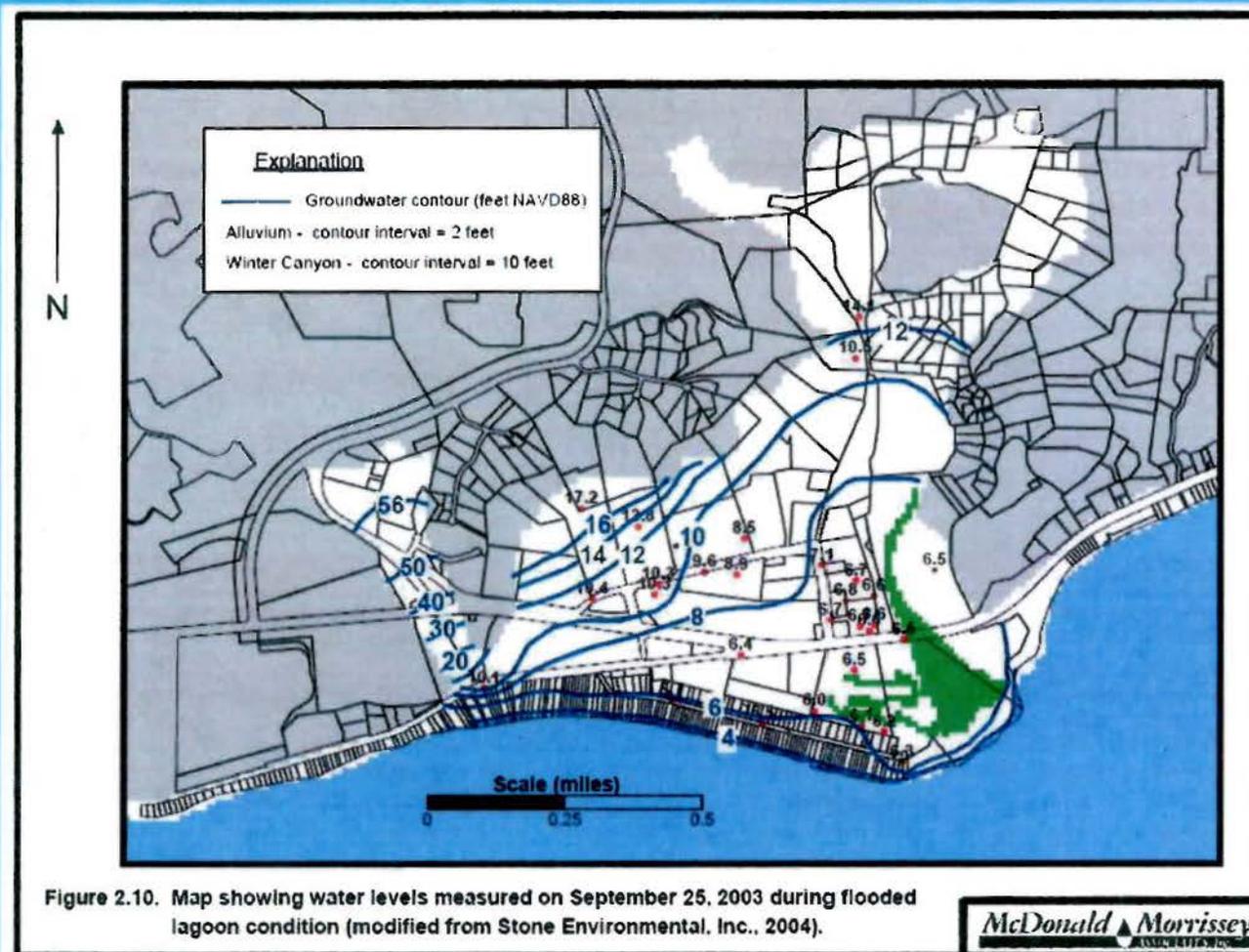
McDonald Morrissey
CONSULTING ENGINEERS



Depth to Bedrock Indicates Potential for Injection at Gravel Layer



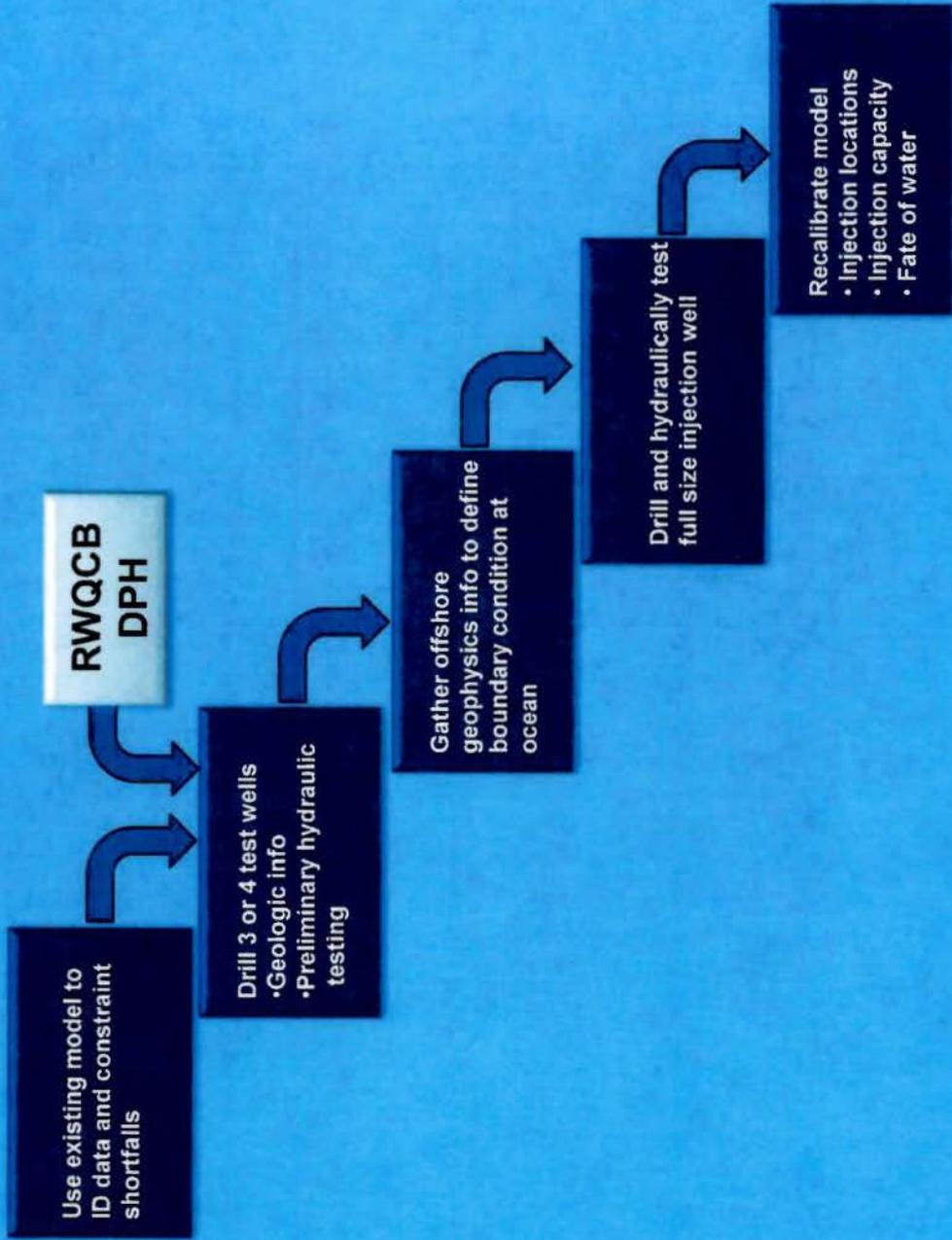
Previous Modeling Indicates Southerly Gradient (upper layer)



Existing GW Model Can be Used

- Original purpose:
 - GW mounding in upper strata due to surface percolation
- But needs augmentation
 - Geology to bedrock
 - Extent, depth, thickness of aquifer
 - Hydraulic performance of aquifer
 - Transmissivity
 - Boundary conditions
 - Ocean
 - Along Malibu Creek and Lagoon
 - Depth to bedrock

Approach to Confirming Injection Viability



RWQCB
DPH

Drill 3 or 4 test wells
•Geologic info
•Preliminary hydraulic testing

Gather offshore geophysics info to define boundary condition at ocean

Drill and hydraulically test full size injection well

Recalibrate model
• Injection locations
• Injection capacity
• Fate of water

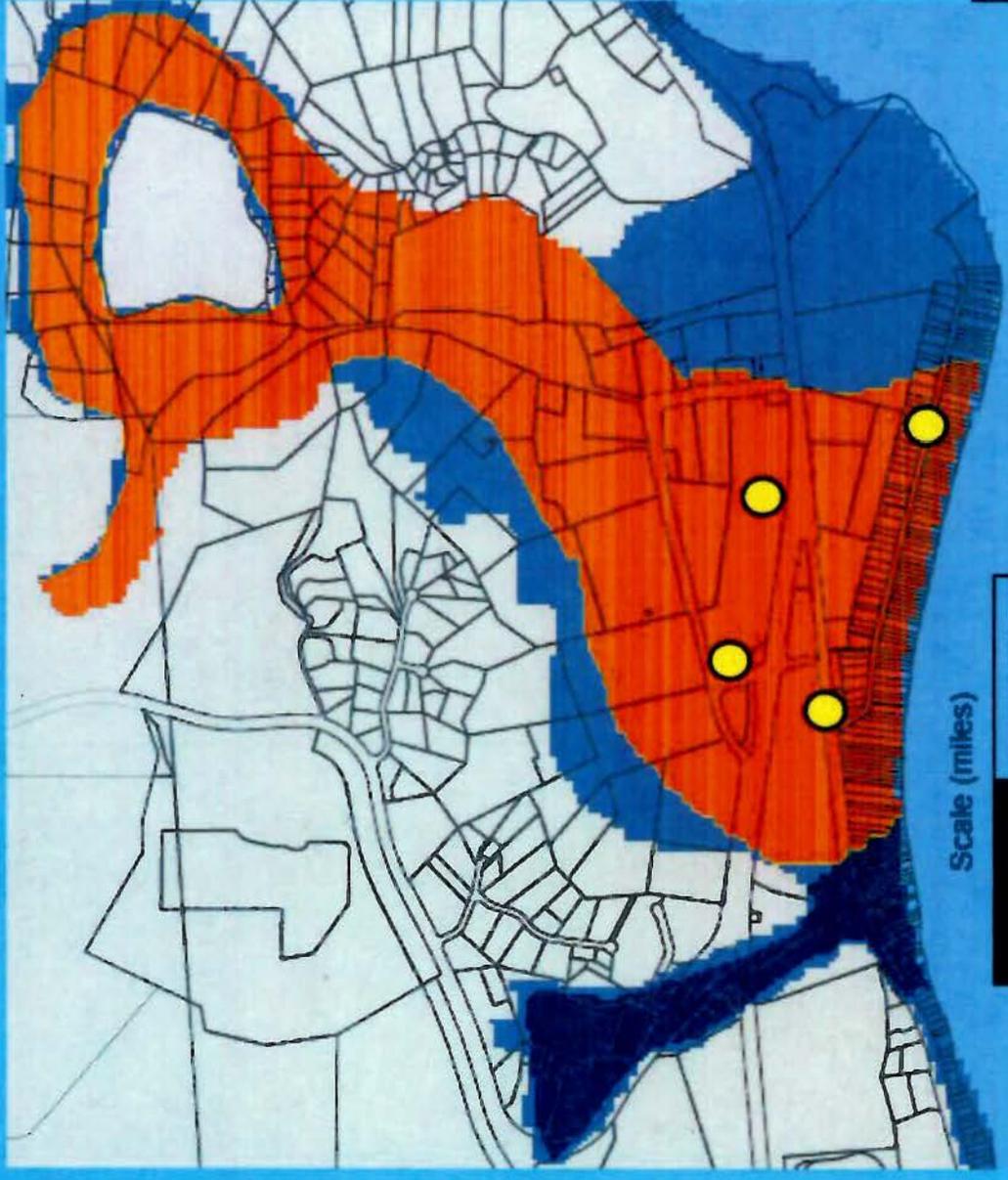
Sept 2011 ← → May 2012



Implications of Field Drilling and Hydraulic Testing

- **Permitting**
 - Drilling
 - Access/Traffic
 - NPDES
- Disposal of pumped water during testing
 - Flowrate, volume
 - Duration
 - Storm drain/Legacy Park/Ocean

Approximate Test Well Locations



Rationale for Allowing GW Injection w/o Reverse Osmosis

- Small well defined ground water basin
- No potable wells
 - Seawater intrusion halted previous use as water supply
- Future land use of down gradient areas known and will not change
 - Malibu Colony dwellings
 - Pacific Ocean
- Will improve aquifer
 - Reverse seawater intrusion
- Project corrects problem of long standing
 - Reduction/elimination of septic systems