CITY OF BEVERLY HILLS
STAFF REPORT

Meeting Date: January 8, 2008

To: Honorable Mayor & City Council

From: Shana Epstein, Environmental Utilities Manager

Subject: Shallow Groundwater Study

Attachments: 1. Exhibits

INTRODUCTION

The Shallow Groundwater Study began as one of three prongs to solidify the City's local groundwater investment. The other two prongs included perfecting the City's water rights and amending the municipal code to increase accountability to those who dewater the Hollywood Basin. The Shallow Groundwater Study included assessment of 17 subterranean garage dewatering sites, and also an evaluation of the shallow groundwater that flows out of the City's old Reservoir No. 3B located on the west side of Coldwater Canyon Road, north of Sunset Blvd. Each site was evaluated first to see if the flow warranted further investigation. If the quantity was appropriate then the water quality was evaluated. Richard Slade and Associates, LLC was hired to conduct the study. This consultant has also compiled cost estimates for various alternatives for the possible re-use of these flows. The alternatives include treating the water at the existing plant with two options of collecting the water, building a new plant, using the water for irrigation, injecting the water back into the groundwater table, or redirecting the water to be treated at the Hyperion Wastewater Treatment Plant.

The City did amend the municipal code to strengthen the City's ability enforce accountability for dewatering. In addition, the City is still pursuing perfecting its water rights to the Hollywood Basin.

DISCUSSION

Subterranean Garage Dewatering Sites

Below is the conclusion by Richard Slade and Associates, LLC after reviewing these 17 sites. Again the process took into account the quantity of groundwater at each site as the first threshold before doing additional research.

Conclusion

"In order for a dewatering system site to be eligible as a candidate for use by the City as a potential water-supply source, certain basic tiered qualifying criteria, on a purely technical level, must be met. These criteria would include:

1. The site must be capable of supplying substantial and reliable flows of groundwater from its groundwater collection facilities; on the order of a few to several hundred gpm, or more, are preferable. Should a site be shown to have such substantial flows then;

2. The site needs to be located proximal to the existing water treatment plant owned by the City (see Figure 1). This will help determine the economic viability of using the prospective dewatering site as a groundwater supply source for the City. For example, the site may be able to produce several hundred gallons, per minute, but it could be located at a significantly great distance from the existing City treatment plant, requiring long and costly transmission lines. Thus, the cost of piping may cause the site to be not economically viable at this time.

3. Water quality should be such that the extracted groundwater can be treated by conventional methods currently used at the Beverly Hills water treatment plant. There are also many other issues that must be considered, such as: whether or not the flows can be sustained on a long-term basis, even throughout drought conditions (it is known that the shallow groundwater flows at each dewatering site will increase or decrease from season to season and also from year to year); entering into long-term contractual arrangements between the property owner and the City; designation of the parties responsible for the ongoing operation and maintenance of each dewatering system; potential logistical and liability issues should the dewatering system fail at any time during the City's extraction of groundwater from the facility; issues regarding changes in the chemistry of the collected groundwater at the site, such as from the detection of known or future contaminants; and issues related to responsibilities for groundwater cleanup if it were to become necessary.

A review of Table 1 (Attachment A) easily reveals that under Criterion No.1 above, only three sites appear to qualify for further consideration: the City's Site "A" parking structure; and the 331 and 407 North Maple Dr sites. These three sites combined might be able to currently produce flow rates as high as 700 gpm, under groundwater conditions observed in 2006 and early-2007. However, it is also possible that during exceptionally dry periods, actual rates achieved from the sumps could become greatly diminished, as compared to flows available during relatively wet periods."

Two of the three sites that received greater review include 407 N. Maple Drive and 331 N. Maple Drive. The additional investigation included the water quality, regulatory implications and costs. This additional research will be presented at the meeting, but can be reviewed in draft format in Attachment C – Table 2 Summary of Project Alternatives for 407 N. Maple Drive. The property management of 407 N. Maple Drive has been advised of the status of the study and the City is scheduling a meeting with 331 N. Maple Drive management to discuss the results. In summary the results are positive, but still require extensive water quality monitoring and analysis to finalize if it will be feasible to recover the shallow groundwater. The State of California's Department of Public Health (DPH), formerly known as Department of Health Services (DHS), will not determine the appropriate treatment to recover this water until at least 12 months of water quality monitoring have been completed.

Coldwater Canyon Sump

This site is located on Coldwater Canyon Avenue at an abandoned reservoir site, which is about 3,500 feet north of the existing Coldwater Canyon Reservoir. The estimated quantity of flow is 323 acre feet (AF) per year or 105 million gallons a year. The two

options to use this water are detailed in Table 2 - Summary of Project Alternatives (Attachment B). At this time, staff is not recommending to pursue any of these options due to the current cost estimates. The property is currently considered surplus.

FISCAL IMPACT

In regards to the two sites on Maple Drive that currently have considerable flow and reasonably good water quality, the funding as designated in the municipal code would come from the dewatering party, but there may be positive or negative cost impacts to the City's long-term operation depending upon the options selected. Staff has been provided with planning-level cost estimates for each alternative related to 407 N. Maple Drive in Attachment C.

These assumptions are considered draft because absolute costs for capital improvements or water quality monitoring are unknown at this time and were not included in the estimate. Hence, these cost estimates still have many caveats. The costs illustrated in Attachment C are amortized over a twenty year period to determine an annual cost per acre foot.

When evaluating the alternatives it is important to compare the estimated costs of acquiring the shallow groundwater to the price of imported water. The current cost of imported water for 2008 is $506 per acre foot (AF). An acre foot equals approximately 326,000 gallons. In addition, for every AF of water produced at the existing plant the City receives $250 from Metropolitan Water District.

RECOMMENDATION

At this time, staff is not prepared to make a recommendation to utilize this water or not and is only providing this information for discussion purposes. The next steps will include narrowing down the options to do further monitoring, investigating and completing negotiations. It will be at least twelve months of water quality monitoring before the DPH is willing to determine what treatment process should be prescribed.

David Gustavson
Approved By

Attachment "A"

TABLE 1
LIST OF POTENTIAL DEWATERING SITES
DRAFT

SITE NO.	FACILITY NAME	OWNER/AGENCY NAME	BEVERLY HILLS STREET ADDRESS	RWQCB COMPLIANCE FILE (CI) NO.[1]	SITE CONTACT NAME	SITE CONTACT PHONE NO.	AVERAGE FLOW RATE (gpm)
1	Two Rodeo Drive	Rodeo Owner Corp.	9480 Dayton Way	7002	Wendy Bentkoski	310.247.7070	2 to 176
2	Clarity Realty Partners, LP	Clarity Building	100 N. Crescent Dr	6904	Oscar Mueillo	310.452.1660	<0.1 to 1.1
3	Wilshire Doheny Building	Casden Properties, LLC	9090 Wilshire Blvd	6733	Art Forman	310.274.2182	20
4	Wilshire-San Vicente Plaza	Arden Realty L. P.	8383 Wilshire Blvd	8463	Nancy McGregor	323.653.8383	15
5	Doheny Estates	Doheny Estates HOA Inc.	433 N. Doheny Dr	6975	Alvaro Deleon	310.587.7355	25
6	B. N. Y. California Inc. (Barney's of New York)	B. N. Y. California Inc. (Barney's of New York)	9570 Wilshire Blvd	7073	Debra Punak	310.777.5711	20 to 24
7	Site "A" South Parking Structure	City of Beverly Hills	225 N. Crescent Dr	6684	Josette Decalzo	310.285.2495	200
8	9601 Wilshire	Douglas Emmett 2000 LLC	9601 Wilshire Blvd	8355	Mary Lowe	310.887.6441	12 to 13
9	407 North Maple Drive	407 N. Mapel LP Tishman Speyer Properties LP	407 N. Maple Dr	8180	Doug Akins	310.271.7362	300
10	La Cienega Center	George & Erika Kabor Family Trust	101 La Cienega Blvd	7938	Jerry King	562.921.1768	10 to 12
11	Maple Plaza	Tishman Speyer Properties LP	335-345 N. Maple Dr	6704	Doug Akins	310.271.7362	<<<1.0
12	331 N. Maple Dr	331 North Maple Drive Plaza LLC	331 N. Maple Dr	7738	Louie Cendejas	310.429.5414	180-200
13	Beverly Mercedes Place	Beverly Place LP Tishman Speyer Properties LP	9242-9250 Beverly Blvd.	6978	Doug Akins	310.271.7362	9 to 10
14	Palm Meridian Condominiums	Palm Residential Etco Homes	437 N. Palm Drive	8941	Bob Etebar	310.691.5500	26
15	Public Parking Structure	Platinum Paradigm Properties	375 N. Crescent Drive	9032	Roobik Asadorian	310.278.9732	1
16	Wilshire Rodeo Plaza	Trea Wilshire Rodeo LLC	131 S. Rodeo Drive	6679	Yohan Shim	310.285.0947	<1
17	William Morris Plaza	William Morris Plaza, Inc.	150 El Camino Drive	9230	Duane Behrens	310.544.1837	17

NOTE: (1) Discharges from all listed sites in thei table are regulated by the California Regional Water Quality Control Board, Los Angeles Region (RWQCB) under Board Order R4-2003-0111m NPDES No. CAG994004
(2) Data on table is based on annual reports and/or groundwater applications from each facility, as available.
(3) Average flow rates shown in final column above assume that the recent/current reported flow volumes in gpd are continuous and constant over the period of flow data collection.

DRAFT

TABLE 2 - SUMMARY OF PROJECT ALTERNATIVES

Alternative Number	Project Description	Advantages	Disadvantages
1	Water from the CCS would be pumped to an on-site package treatment plant and then pumped to the City's potable water distribution system. Flowrate: 200 gpm (323 AFY) Estimated Total Annual Cost: $1,500/AF	• Provides an additional water source. • Drilled wells not required. • No impact to existing RO Water Treatment Plant. • Would not require RO Treatment, but would require removal of iron using chemical oxidation, pressure (greensand) filtration and disinfection. Aluminum removal may be required with granular activated carbon filtration.	• Quantity of water from sump is unknown and may not be consistent in flow or quality. • DHS may consider this surface water and additional pretreatment may be needed. • DHS would require 1 year monitoring (on a monthly basis) to determine constituent variability in supply (turbidity, VOC, etc). • Concerns about viruses, pathogens, bacteria, coliforms in the sump water. • Need to provide secure facilities and practices at sump location • EIR and other environmental documentation may be required. • Locating the treatment plant on the existing abandoned reservoir site may require significant site work including demolition of the existing structure and import fill material.
2	Water from the CCS would be used for non-potable beneficial reuse – irrigation of golf courses, parks, etc. Flowrate: 200 gpm (323 AFY) Estimated Total Annual Cost: $280/AF	• No impact on existing RO Water Treatment Plant • Drilled wells not required • Provides beneficial reuse of water • Does not require any costly treatment processes. • No impact to existing abandoned Coldwater Canyon Reservoir	• Distribution system piping may be costly, depending on the location of the reuse • Irrigation requirements are lower in winter whereas highest sump flows may occur during the rainy season • Due to few irrigation uses in the immediate area, the majority of the water would still continue flowing to the storm drain. • EIR and other environmental documentation may be required.

TABLE 2
SUMMARY OF PROJECT ALTERNATIVES
PREPARED BY TETRA TECH, INC.

No	Project Description	Advantages	Disadvantages
1	Water from the 407 North Maple Drive sump would be pumped to the RO Water Treatment Plant for potable use. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost: $ 329/AF	• Site is close to the City's RO Water Treatment Plant (WTP). • DHS would allow some disinfection credits for RO. Disinfection Contact Time (CT) should be able to be met by the City using free chlorine in the existing 45,000 gallon clear well and chloramines in the pipeline prior to delivery of water to the first customer. • Separate drilled wells would not be required.	• DHS would consider this surface water and may require additional pretreatment depending on turbidity. • Existing WTP building does not have sufficient space for additional treatment (would need parking lot area for filters or other pretreatment equipment) • DHS would require 1 year monitoring (on a monthly basis) to determine constituent variability in supply (turbidity, VOC, etc). • Concerns about viruses, pathogens, bacteria, coliforms in the sump water. • Need to provide secure facilities and practices at sump locations (no chemical storage, provide access to City staff, etc) • Existing WTP may need to be re-rated as surface water plant due to supply source
2	Drill shallow wells with 50 ft sanitary seals adjacent to the dewatering site on Maple Drive and then pump the well water to the RO Water Treatment Plant for potable use. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost: $527/AF	• DHS would probably consider this to be groundwater due to presence of a sanitary seal. • Less chance of contamination for VOCs, oils, gasoline, bacteria, coliforms, etc compared to sump. • Less impact on seasonal water quality variation compared to sump. • DHS would not require 1 year of raw water monitoring, but would require the 4 log virus inactivation using disinfection based on the recently adopted Groundwater Rule. • Turbidity would be less of a concern due to pumping water through natural earth and the shallow well. • Existing WTP would not need to be re-rated due to supply source. • City would have control over supply source and wells.	• Although two wells have been assumed, it is unknown how many shallow wells would be needed to capture most of the flow on the upgradient side of the dewatering site. • The combined capacity of the shallow wells may be less than the current estimated flow of water being pumped at the Maple Drive site. • Higher cost of drilling new shallow wells compared to using existing sump. • Office building might still need to dewater, depending on the quantity of water captured by the shallow wells, and sump would be required as a backup in the event of failure of a shallow well pump. • Legal issues dealing with ownership changes (the property and its sump) and with rises in local groundwater levels and possible flooding of the garage if the shallow well pumps fail and if the property owner has disconnected his sump pumps.
3	Water from the 407 North Maple Drive sump would be used for non-potable beneficial reuse – irrigation of Beverly Gardens, Roxbury Park, La Cienega Park, carwash, etc. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost: $2,003/AF	• Little treatment required; possibly only disinfection. • No impact to existing RO Water Treatment Plant. • Shallow wells would not be required.	• New distribution system piping is costly and depends on the locations of the reuse (approximately 6 miles of new pipelines). • Disinfection may be required to maintain chlorine residual in the irrigation water. • Irrigation requirements are lower in winter, whereas highest sump flows may occur during the rainy season. Estimated beneficial water reuse is 37.6 million gallons/year compared with potential dewatering volume of 157 million gallons/year. Excess sump water would still flow to the storm drain. • Should be no cross connections between potable and reuse water at the irrigation sites. • Subject to DHS review and possibly RWQCB.
4	Water from the 407 North Maple Drive sump would be reused for direct deep well injection to the groundwater basin. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost:	• No impact to existing RO Water Treatment Plant. • Provides beneficial reuse of water to groundwater basin regardless of quantity of flow.	• DHS would require studies to determine if a 6-month travel time exists between injection and extraction wells. • RWQCB would need to review injection of water to groundwater basin. • Possible degradation of groundwater basin water quality from Maple Drive sump due to higher TDS (1,100 mg/l). • Treatment may be required to meet groundwater Basin Plan objectives. • After additional discussions with regulatory agencies, this alternative was eliminated from further analysis.

TABLE 2
SUMMARY OF PROJECT ALTERNATIVES
PREPARED BY TETRA TECH, INC.

	Not estimated		
No	Project Description	Advantages	Disadvantages
5	Water from the 407 North Maple Drive sump would be pumped to a separate package treatment plant adjacent to the City's existing RO plant for potable use. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost: $1,202/AF	• No impact to the existing RO water treatment plant operations. • DHS would allow some disinfection credits for RO. Disinfection Contact Time (CT) should be able to be met by the City using free chlorine in the existing 45,000 gallon clear well and chloramines in the pipeline prior to delivery of water to the first customer. • Drilled wells would not be required.	• A separate package plant would require additional space, labor, maintenance. • DHS would require 1 year monitoring (on a monthly basis) to determine constituent variability in supply (turbidity, VOC, etc). • Concerns about viruses, pathogens, bacteria, coliforms in the sump water. • Need to provide secure facilities and practices at sump location (no chemical storage, provide access to City staff, etc)
6	Water from the 407 North Maple Drive sump would be pumped to the sanitary sewer system. Estimated flowrate: 300 gpm (485 AFY) Estimated Total Annual Cost: $100/AF	• No treatment required. • No impact on existing RO Water Treatment Plant. • Shallow wells would not be required. • Least cost alternative.	• City may need to pay additional sewer fee charges. • Alternative does not provide for any potable or non-potable beneficial reuse and may not fit with the City goals. • Political concerns – alternative is similar to current practice of discharging water to storm drain. • Existing sewer lines may not have adequate capacity for the increased flows and therefore may need to upgraded.

CBH - City Council Informal Meeting - 01/08/2008

City of Beverly Hills
RCS Job No. 162-01
August 2007

DRAFT

Table 3
Preliminary Project Costs
Prepared by Tera Tech, Inc.
Alternative 1

Capital Costs

Item	Units	Quantity	Unit Cost	Total Cost
Sump Modifications	LS	1	$20,000	$20,000
New Sump Pumps	EA	2	$50,000	$100,000
Electrical and Instrumentation	LS	1	$85,000	$85,000
Piping from Sump to RO Plant	LF	1,900	$200	$380,000
Modifications to existing RO Plant (piping, SCADA, etc)	LS	1	$100,000	$100,000
Mobilization/Demobilization	LS	1	$25,000	$25,000
Subtotal				$710,000
Contingencies @ 20%				$142,000
Construction Cost				$852,000
Technical, Legal, Administrative @ 30%				$255,600
Total Capital Cost				$1,107,600
Amortization for 20 years at 6%				$96,600
Annual Capital Cost ($/1,000 gal. produced)				0.61

Annual O&M Costs

Power (only including sump pumps)	KW	165,000	$0.15	$24,750
Water Quality Monitoring	LS	1	$20,000	$20,000
Labor	LS	1	$10,000	$10,000
Materials	LS	1	$12,000	$8,000
Total Annual O&M Costs				$62,750

Total Costs

Total Amortized Capital Cost ($/1,000 gal)	0.61
Total Annual Operating Costs ($/1,000 gal)	0.40
Total Annual Cost ($/1,000 gal)	1.01
Total Annual Cost ($/AF)	329

Project Description:

Water from 407 Maple Drive sump would be reused for potable use and pumped to the RO Water Treatment Plant.
Flowrate: 300 gpm (485 AFY)

Does not include RO treatment costs such as power, chemicals, membranes, etc.

City of Beverly Hills
RCS Job No. 162-01
August 2007

DRAFT

Table 4
Preliminary Project Costs
Prepared by Tera Tech, Inc.
Alternative 2

Capital Costs

Item	Units	Quantity	Unit Cost	Total Cost
Drill new shallow wells	EA	2	$200,000	$400,000
New Vertical Turbine Pumps	EA	2	$75,000	$150,000
Civil/Sitework	LS	1	$20,000	$20,000
Electrical and Instrumentation	LS	1	$100,000	$100,000
Piping from wells to RO Plant	LF	1,900	$200	$380,000
Modifications to existing RO Plant (piping, SCADA, etc)	LS	1	$100,000	$100,000
Mobilization/Demobilization	LS	1	$50,000	$50,000
Subtotal				$1,200,000
Contingencies @ 20%				$240,000
Construction Cost				$1,440,000
Technical, Legal, Administrative @ 30%				$432,000
Total Capital Cost				$1,872,000
Amortization for 20 years at 6%				$163,200
Annual Capital Cost ($/1,000 gal. produced)				1.04

Annual O&M Costs

Power	KW	300,000	$0.15	$45,000
Water Quality Monitoring	LS	1	$20,000	$20,000
Labor	LS	1	$12,000	$12,000
Materials	LS	1	$15,000	$15,000
Total Annual O&M Costs				$92,000

Total Costs

Total Amortized Capital Cost ($/1,000 gal)	1.04
Total Annual Operating Costs ($/1,000 gal)	0.58
Total Annual Cost ($/1,000 gal)	1.62
Total Annual Cost ($/AF)	527

Project Description:

Drill shallow wells with 50 ft sanitary seals adjacent to the dewatering site on 407 N Maple Drive and then pump the well water to the RO Water Treatment Plant for potable use.

Flowrate: 300 gpm (485 AFY)

Does not include RO treatment costs such as power, chemicals, membranes, etc.

Shallow wells assumed 8 inch casing, 300 feet deep, 100 to 200 gpm per well.

City of Beverly Hills
RCS Job No. 162-01
August 2007

DRAFT

Table 5
Preliminary Project Costs
Prepared by Tera Tech, Inc.
Alternative 3

Capital Costs

Item	Units	Quantity	Unit Cost	Total Cost
Sump Modifications	LS	1	$20,000	$20,000
New Sunp Pumps	EA	2	$50,000	$100,000
Electrical and Instrumentation	LS	1	$85,000	$85,000
Disinfection Facilities	LS	1	$35,000	$35,000
Irrigation System Booster Pump Station	LS	2	$50,000	$100,000
Piping from Sump to Non-Potable Distribution System	LF	31,000	$200	$6,200,000
Mobilization/Demobilization	LS	1	$100,000	$100,000
Subtotal				$6,640,000
Contingencies @ 20%				$1,328,000
Construction Cost				$7,968,000
Technical, Legal, Administrative @ 30%				$2,390,400
Total Capital Cost				$10,358,400
Amortization for 20 years at 6%				$903,100
Annual Capital Cost ($/1,000 gal. produced)				5.73

Annual O&M Costs

Power	KW	300,000	$0.15	$45,000
Water Quality Monitoring	LS	1	$5,000	$5,000
Chemicals	LS	1	$8,000	$8,000
Labor	LS	1	$5,000	$5,000
Materials	LS	1	$3,000	$3,000
Total Annual O&M Costs				$66,000

Total Costs

Total Amortized Capital Cost ($/1,000 gal)	5.73
Total Annual Operating Costs ($/1,000 gal)	0.42
Total Annual Cost ($/1,000 gal)	6.15
Total Annual Cost ($/AF)	2,003

Project Description:
Water from 407 Maple Drive sump would be used for non-potable beneficial reuse – irrigation of Beverly Gardens, Roxbury Park, La Cienega Park, car wash. Water usage estimated at 37.5 million gallons per year (2006 water usage)
Flowrate: 300 gpm (485 AFY)

City of Beverly Hills
RCS Job No. 162-01
August 2007

DRAFT

Table 6
Preliminary Project Costs
Prepared by Tera Tech, Inc.
Alternative 5

Capital Costs

Item	Units	Quantity	Unit Cost	Total Cost
Sump Modifications	LS	1	$20,000	$20,000
New Sump Pumps	EA	2	$50,000	$100,000
Electrical and Instrumentation	LS	1	$200,000	$200,000
Package Treatment Plant, Piping and Building	LS	1	$1,800,000	$1,800,000
Piping from Treatment Plant to Potable Water System	LF	300	$200	$60,000
Civil Sitework (earthwork, paving, fencing)	LS	1	$50,000	$50,000
Mobilization/Demobilization	LS	1	$60,000	$60,000
Subtotal				$2,290,000
Contingencies @ 20%				$458,000
Construction Cost				$2,748,000
Technical, Legal, Administrative @ 30%				$824,400
Total Capital Cost				$3,572,400
Amortization for 20 years at 6%				$311,500
Annual Capital Cost ($/1,000 gal. produced)				1.98

Annual O&M Costs

Power	KW	600,000	$0.15	$90,000
Water Quality Monitoring	LS	1	$20,000	$20,000
Chemicals	LS	1	$50,000	$50,000
Labor	LS	1	$60,000	$60,000
Materials	LS	1	$50,000	$50,000
Total Annual O&M Costs				$270,000

Total Costs

Total Amortized Capital Cost ($/1,000 gal)	1.98
Total Annual Operating Costs ($/1,000 gal)	1.71
Total Annual Cost ($/1,000 gal)	3.69
Total Annual Cost ($/AF)	1,202

Project Description:
Water from 407 North Maple sump would be pumped to an on-site package treatment plant and then pumped to the City's potable water distribution system.
Flowrate: 300 gpm (485 AFY)

City of Beverly Hills
RCS Job No. 162-01
August 2007

DRAFT

Table 7
Preliminary Project Costs
Prepared by Tera Tech, Inc.
Alternative 6

Capital Costs

Item	Units	Quantity	Unit Cost	Total Cost
Piping from Sumps to sewer line	LF	500	$200	$100,000
Connection fee to sewer	LS	1	$10,000	$10,000
Mobilization/Demobilization	LS	1	$8,000	$8,000
Subtotal				$118,000
Contingencies @ 20%				$23,600
Construction Cost				$141,600
Technical, Legal, Administrative @ 30%				$42,500
Total Capital Cost				$184,100
Amortization for 20 years at 6%				$16,100
Annual Capital Cost ($/1,000 gal. produced)				0.10

Annual O&M Costs

Power (includes sump pump)	KW	150,000	$0.15	$22,500
Labor	LS	1	$5,000	$5,000
Materials	LS	1	$5,000	$5,000
Total Annual O&M Costs				$32,500

Total Costs

Total Amortized Capital Cost ($/1,000 gal)	0.10
Total Annual Operating Costs ($/1,000 gal)	0.21
Total Annual Cost ($/1,000 gal)	0.31
Total Annual Cost ($/AF)	100

Project Description:

Water from 407 Maple Drive sump would be pumped to the sanitary sewer system.

Flowrate: 300 gpm (485 AFY)