CITY OF BEVERLY HILLS

PUBLIC WORKS SERVICES DEPARTMENT

MEMORANDUM

TO: PUBLIC WORKS COMMISSION

FROM: Trish Rhay, Assistant Director of Public Works Services – Infrastructure & Field Operations

Michelle Tse, Senior Management Analyst MST

DATE: May 11, 2015

SUBJECT: WATER ENTERPRISE PLAN UPDATE

ATTACHMENT: 1. May 5, 2015 City Council Agenda Report – Water Enterprise Plan Recommendation

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The Water Enterprise Plan was scheduled for presentation to the City Council during the May 5, 2015, Formal Session. Staff will provide the Commission with an update on comments and direction provided by the Council.

For reference, a copy of the May 5, 2015, City Council agenda report is attached.

AGENDA REPORT

Meeting Date: May 5, 2015

Item Number: F-4

To: Honorable Mayor & City Council

From: Trish Rhay, Assistant Director of Public Works Services – Infrastructure & Field Operations

Michelle Tse, Senior Management Analyst MST.

Subject: WATER ENTERPRISE PLAN RECOMMENDATION

Attachments:

1. Psomas Memo 1 - Water Supply Alternatives & Recommendations for Proceeding with Further Detailed Analysis
2. Psomas Memo 4 - Ten-Year Estimated Costs for Nine Shortlisted Alternatives Including a Summary of Proposed Portfolio Scenario Costs
3. Psomas Memo 3 – Staff Augmentation Required to Address Water Enterprise Plan Recommendations
4. Psomas Memo 4a – Comparison of Ten-Year Estimated Costs for Nine Alternatives with MWD Purchases in Lieu of Implementing those Alternatives
5. January 13, 2015 Formal Session Agenda Report
6. Recommended 10 Year Financial Scenario – Financial Analysis

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RECOMMENDATION

Staff seeks authorization from the City Council to finalize the Water Enterprise Plan as recommended by the Public Works Commission.

INTRODUCTION

At the May 20, 2014 Formal meeting, the City Council approved an agreement to retain PSOMAS to work with the Public Works Commission ("Commission") and Public Work Services to develop a 10 year Water Enterprise Plan ("Plan"). There were two distinct goals to be achieved through the development of this plan.

1. Define the long term strategy for the City of Beverly Hills related to the City's water supply; and
2. Identify the portfolio of actions/projects needed to meet this long term goal.

This report transmits the proposed Water Enterprise Plan framework and financial analysis that has been reviewed by the Public Works Commission and is being brought forward to the City Council for approval to finalize the Plan.

The City was one of the founding members of Metropolitan Water District ("MWD") in 1928. The City began purchasing water from MWD in 1941, a practice that has continued for the past 74 years. At the time, MWD offered a much more plentiful, cost effective and reliable option for potable drinking water. Subsequently, the City moved forward with discontinuing all local well production and became 100% reliant on MWD for its drinking water supply. This water supply strategy served the City well for over four decades.

However, in the early 2000's, it became apparent on a regional level that this strategy may not be as sustainable as once thought. As a result, the City once again looked to develop its local supply to supplement MWD. In 2006, Beverly Hill re-established four production wells and constructed a Reverse Osmosis Water Treatment Plant to begin reducing the City's reliance on MWD.

In recent years, the State wide water outlook continues to put increasing pressure on the regional water supply system. This pressure has inspired local agencies to begin evaluating local options for water supply and creating a diverse water supply portfolio.

It is now the ideal time for Beverly Hills to re-evaluate its long term strategy for water supply. The recommended approach below outlines what the Public Works Commission and Public Works staff believe is the optimal long term (10 Year) water supply strategy and the corresponding portfolio of projects and program.

DISCUSSION

Over the last 10 months, the Commission worked with PSOMAS and staff to complete an iterative review process. Strategy approaches such as water supply independence (100% local supply) versus water supply reliability (water supply flexibility) were discussed and weighed through triple bottom line analysis. Local and regional water supply sources were evaluated for cost, technical feasibility, and social impacts.

As a result, the Commission and staff determined water supply reliability to be the appropriate long term strategy. A reliability strategy would lead to a portfolio that achieves flexibility in water management for any given supply condition while leveraging the city's member agency relationship with MWD. It was determined that water supply independence was costly and did not provide adequate benefits to justify the high cost. The triple bottom line analysis guided the determination of the appropriate level of reliability.

During that process, various water source alternatives were evaluated by the Commission and staff based on numerous considerations such as cost, reliability, implementation, local control, legal/institutional regulations, environmental factors and operational complexity. As a result of this process, the Commission felt that greater consideration should be given towards improving the City's water system reliability. The City currently receives 90% of its water supply from one source (i.e. Metropolitan Water

District). As such, the Commission felt that it was important to diversify its water supply portfolio as a way to increase the City's water source reliability. As part of the pre-analysis completed by PSOMAS and staff, the Commission agreed to reduce the City's reliance on MWD to 75% and increase the City's water supply reliability by looking at alternative water sources. Furthermore, the Commission agreed that the reliable water supply alternatives be further evaluated based on affordability.

Nineteen (19) potential alternatives were initially identified through a collaborative workshop process with the Commission and City staff. A list of the 19 alternatives and the analysis is included in this report as Attachment 1. Based on the reliability factor, evaluation of those 19 alternatives resulted in a recommendation to focus efforts and proceed with a more detailed study for nine (9) alternatives; these 9 alternatives and related staffing needs are included in this report as Attachments 2 and 3, respectively.

Staff subsequently provided an update on the Commission's analysis on these 9 alternatives during the January 13, 2015 Formal Session. A copy of the January 13, 2015 agenda report is included as Attachment 5 for reference. At this meeting, staff reviewed the 9 alternatives being considered and the preliminary cost estimates associated with each of these alternatives. The City Council was very supportive with the Plan's progress and directed staff to return with a final Plan recommendation for the City Council's consideration in April 2015.

Based on the goal of a 25% non-MWD sourced supply reliability target (i.e. 2,828 AFY), the following is a summary of the strategies that the Commission is recommending to be included as part of the Plan's framework. The 2,828 AFY is based on projections that the City would need 11,313 AFY in Year 2025, assuming the City complies with conservation requirements. The following sections highlight the estimated costs (which includes capital, staffing and operational/maintenance costs), and the amount of additional water produced from each project. The water supply alternatives are listed in no particular order.

1. Optimize Current Hollywood Basin Production – Improve the existing Reverse Osmosis plant production to match the current Hollywood Basin well production potential of 1,120 acre feet per year ("AFY"); this should be achievable pending corrective actions at the plant and shallow groundwater development now being studied by other consultants under City staff direction. This action is achievable within a two year time frame. There is currently $2 million in the budget to develop the shallow ground water well at 342 Foothill Road. Staff anticipates the project cost would cost approximately $2 million. This project is considered an early action item and is not addressed in the 10 year plan.

2. Develop New Central Basin Wells – Develop approximately 1,700 AFY of new groundwater in the unadjudicated portion of the Central Basin near Interstate 10, approximately four miles from Beverly Hills. Developing new wells in this area will be considerably more economical than developing new wells in the Hollywood Basin due primarily to anticipated low production rates in the Hollywood Basin (approximately 200-300 gallons per minute (gpm) per well vs. about 800 gpm in the Central Basin). Developing three new Central Basin wells will take approximately seven to eight years with an estimated cost ranging from $26.5 million to $56.9 million (in 2015 dollars).

   Significant aspects of this project include the following:

- Retaining a design consultant
- Acquiring land for an initial site
- Drilling a pilot test hole that will be converted to a production well
- Addressing California Environmental Quality Act ("CEQA") requirements
- Acquiring land for designing, drilling, and equipping two additional production wells
- Designing expanded treatment facilities and 24,000 feet of transmission pipelines
- Constructing all of the above facilities
- Testing and permitting all three wells and treatment facilities

3. Increase Water Conservation – Meet the conservation goals as outlined in SBx7-7, which is to reduce the per capita urban water use by 20% by December 2020, and strive to achieve additional conservation beyond mandated goals. By implementing a multi-pronged strategy including public/quasi-public analytic engagement programs (for parks, schools, civic center, greenbelts, hotels, etc.), residential analytic engagement programs, system loss reduction and operations programs, and enhanced rebate programs, the City should be able to realize nearly 1,200 AF in additional conservation over the next five years. All of the aforementioned conservation programs can be commenced over a six to twelve month period. Estimated costs range from $1.5 million to $3.2 million (in 2015 dollars).

   Please note a separate agenda is included on the April 21, 2015 Study Session, which provides an update to the City Council about water conservation in light of the mandatory state-wide conservation regulations released earlier this month.

4. Water Banking – Invest in a groundwater storage bank such as Willow Creek Bank, located in Antelope Valley, to address a potential two year shortage of 3,400 AF. This would provide the City with reserves in the event MWD supplies are severely impacted by a lengthy drought. Subject to the availability of purchased water (to place into the bank), this program can be set up within two years. Preliminary cost estimates for this approach is approximately $5.4 million to $11.6 million (in 2015 dollars). The variance in cost range is due to the varying nature in how water banking operations are set up so costs will vary.

5. MWD – Continue to rely on MWD for purchase of 75% (approximately 8,485 AFY) of City supplies. The estimated cost for this supply will be approximately $11 million annually.

6. Water Resource Manager – Although not a water supply alternative, the Public Works Commission has expressed a critical need for this full-time position to oversee, manage, and successfully execute the various strategies outlined in the Water Enterprise Plan.

In the event the above program does not result in Beverly Hills meeting its supply demands during a severe drought, the City could still purchase additional MWD water at penalty rates (approximately 2.5 times the current rate). While this water would be fairly expensive, it would nevertheless be less expensive than developing water under other short-term options.

Based on the recommended framework, PSOMAS forecasts that the City has the potential to decrease its MWD purchase from the current 12,495 AFY to 8,485 AFY by FY 2024/25.

In addition to the water supply alternatives outlined above, the Commission is also recommending that the City incorporate projects such as the reclaimed water (purple pipe) system as part of the Santa Monica Blvd. street rehabilitation. The intent is to build the infrastructure that will further support the City's conservation efforts when future reclaimed water infrastructure becomes available. Additionally, the City should continue to monitor and evaluate its water will-serve[i] policy on a regular basis.

FISCAL IMPACT

As part of the financial analysis, the following approach was used:

- Forecast the spending pattern of any given water source alternative over the next 10 years;
- Evaluate how water rates will be impacted; and
- Explore financing options, such as revenue offsets including capacity fees and grant funding opportunities

Certain base assumptions were used as part of the financial analysis. Staff will review these base assumptions in greater detail during the April 21, 2015 presentation to the City Council.

To provide an overview, Attachment 6 is the recommended financial portfolio to fund the Plan. The analysis includes the following base assumptions as part of the 10-year revenue (cash flow) analysis if the Plan were to be implemented.

Revenue Assumptions

- The base value of revenues used for this review assumed that revenues would decline from the current level as a result of reduced consumption (i.e. 50% of customers would reduce 10%. 25% of customers would maintain their current usage and 25% of customers would increase their consumption by 5%).

    - Misc. Revenue increase 2%/year through FY19/20, 1%/year from FY20/21 through FY24/25
    - Lease of property increase at 3%/year through FY19/20, 1%/year from FY20/21 through FY24/25
    - Estimated capacity fee revenues of $500,000 per year through FY 24/25
    - Grant funding of $2 million in Year 2019/20
    - Metropolitan Water District subsidy of $344 per acre ft. produced by the new wells (beginning in FY22/23)

Expense Assumptions

- Personnel Services – increase 2%/year through FY19/20, 3%/year from FY20/21 through FY24/25
    - Additional personnel increases based on PSOMAS estimates

        - FY15/16 to FY24/25 = $12,909,850 (Details are outlined in Attachment 2)
    - Materials/supplies increase of 4% in FY15/16, 3%/year from FY16/17 through FY24/25
    - Purchase water increase of 5%/year through FY19/20, 3%/year from FY20/21 through FY24/25
        - Reduced expenditures for Metropolitan water that is proportional to increased water production from new wells (beginning FY22/23)
    - Contractual services increase 4% in FY15/16, 3%/year from FY16/17 through FY24/25
    - Internal Service Fund charges increase 6.2% in FY15/16, average increase of 3.1%/year from FY16/17 through FY19/20, 3%/year from FY20/21 through FY24/25
    - Other Miscellaneous increase of 4%/year through FY19/20, 3%/year from FY 20/21 through FY24/25
    - Central Basin total expenses increased by 25% to $47M per the Commission's recommendation

- CIP projects with increases based on PSOMAS estimates (as outlined in Attachment 2; please note costs below may vary slightly due to the cost range related to water banking)
    - FY15/16 = $ 749,500
    - FY16/17 = $ 3,520,228
    - FY17/18 = $ 3,913,651
    - FY18/19 = $ 5,163,295
    - FY19/20 = $12,608,885
    - FY20/21 = $12,117,452
    - FY 21/22 = $ 4,046,350
    - FY 22/23 = $ 4,908,075
    - FY 23/24 = $ 5,055,342
    - FY 24/25 = $ 4,095,140

- Debt Service of $20M issued in FY16/17, $20M issued in FY19/20 and $20M in FY22/23 for an amount totaling $60M
    - Debt service payments (principal and interest beginning in FY16/17 and increasing with each additional issuance)
    - Interest rate is 4%

As part of the financial analysis, the Commission's proposal includes projected revenue offsets such as grant funding, capacity fees, and debt financing. Under this scenario, the additional revenue needed would be 5% in FY 16/17 through FY 18/19, 4% in FY 19/20 and 1% in FY 20/21 through FY 24/25.

Other revenues such as including two additional commercial tiers was discussed by the Commission as a way to address the equity in water rates paid by residential versus

commercial water customers. Currently, there is a 4-tier residential water rate structure but only a single tier water rate for commercial customers. If this approach is to be considered, staff will work with the Commission to first complete an engineering study to evaluate the City's operating costs before a proposed rate structure can be presented.

It is important to note that under the proposed framework, no additional revenue is needed in FY 15/16.

Don Rhoads	George Chavez
Finance Approval	Approved By

[i] A Will Serve letter is an agreement between a water supplier and property owner to provide water service. The water provider makes a determination if its system can provide water for the project development.

PSOMAS

TECHNICAL MEMORANDUM NO. 1

To: Trish Rhay and Steve Bucknam

From: Harvey R. Gobas, PE

Date: November 3, 2014

Subject: Review of Beverly Hills Water Supply Alternatives and Recommendations for Proceeding with Further Detailed Analysis

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EXECUTIVE SUMMARY

Psomas was retained by the City of Beverly Hills to evaluate potential alternative water supply options for increasing the reliability of the City's water system and/or conservation measures that can be employed to reduce system demands. Nineteen (19) potential alternatives were identified. These 19 alternatives can be grouped into the following three categories:

- Twelve (12) Baseline Water Supply Alternatives – These options include Metropolitan Water District Supply, three (3) Groundwater Development Options (Central Basin Wells, Hollywood Basin Wells and Spring Water Capture), three (3) Recycled Water options (Regional, Scalping Plant and Greywater Approaches), three (3) Reverse Osmosis Capture and Treatment options (for treating 4.5, 3.0 or 1.5 Million Gallons per Day [MGD]), Urban Runoff Capture and Treatment; and Ocean Desalination;
- Five (5) Water Supply "Insurance" Alternatives – These options would not represent direct sources of water, but could provide reserves that the City can tap into during times of drought, thereby increasing the overall reliability of the City's water supply. These include Water Banking, Transfers, Exchanges (potable), Recycled Water Exchanges and Antelope Valley Water Bank Drought Insurance; and
- Two (2) Conservation Alternatives – These two options include Compliance with SBx7-7[1] and Tailoring a Conservation Plan to the Unique Characteristics of the City of Beverly Hills.

Eight (8) criterion measures were identified for use in comparing these 19 alternatives. They include: Cost, Volume, Reliability, Timing, Local Control, Legal/Institutional, Environmental and Operational Complexity. Our project team, with input from City staff, assigned values to these criteria for each of the 19 alternatives. Overall weightings were then applied to each of the eight criteria categories to allow ranking of the 19 alternatives. A comprehensive excel spreadsheet was developed to allow changes to be easily made to the values and weightings to determine how those changes would impact the overall rankings.

While an infinite number of permutations can be considered, we evaluated ten (10) widely varying **Weighting Scenarios.** They included the following scenarios: (1) All eight criteria equally weighted; (2) "Timing" was eliminated from consideration with the other seven criteria equally weighted; (3) Cost, volume and reliability were equally weighted with the other five criteria eliminated from consideration; (4, 5, 6 and 7) Four separate scenarios in which either cost, environment, reliability or volume were weighted three times higher than the other seven criteria; (8) Cost, volume, reliability and environmental were weighted three times higher than the other criteria, with timing eliminated; (9) Volume, reliability and local control were weighted three times higher than the other criteria with timing eliminated; and lastly (10) Volume, reliability, local control and environment were weighted five times higher than the other criteria with timing eliminated.

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[1] This 2009 legislative package requires a statewide 20% reduction in urban per capita water use by 2020. It requires that urban water retail suppliers determine baseline water use and set reduction targets according to specified requirements, and requires agricultural water suppliers prepare plans and implement efficient water management practices (definition extracted from the Association of California Water Agencies website).

Based on this analysis, we recommend proceeding with detailed evaluations of the following nine alternatives: MWD, Water Banking, Conservation (both Tailored and SBx7-7 Conservation), Development of Central Basin and Hollywood Basin Wells (although not necessarily together), Antelope Valley Drought Insurance, Exchanges and Ocean Desalination. These nine alternatives consistently appeared among the top ranked alternatives for each of the ten weighted scenarios. The other ten alternatives consistently appeared in the bottom ten ranked alternatives regardless of which scenario was considered. The remaining ten alternatives should therefore be eliminated from further consideration.

INTRODUCTION

Psomas was retained by the City of Beverly Hills to evaluate potential alternative water supply options for increasing the reliability of the City's water system and/or conservation measures that can be employed to reduce system demands. With that in mind, nineteen potential alternatives were identified for initial evaluation with the intent of narrowing the list to the most promising of those alternatives for further detailed evaluation. Those nineteen alternatives, several of which were grouped in similar categories (i.e., 4a, 4b, etc.) are shown in Table 1 below:

Table 1
Water Supply Reliability or Conservation Alternatives

No.	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	2	Ocean Desalination
3	3	Urban Runoff – Capture and Treat Dry Weather Flows
4	4a	Recycled Water Regional Approach
5	4b	Recycled Water – Scalping Plant Approach
6	4c	Recycled Water – Greywater Approach
7	4d	Recycled Water Exchanges
8	5	Exchanges
9	6	Transfers
10	7	Water Banking
11	8	Antelope Valley Water Bank Drought Insurance
12	9a	Groundwater – Capture Spring Water
13	9b	Groundwater – Develop Hollywood Basin Wells
14	9c	Groundwater – Develop Central Basin (La Brea) Wells
15	10a	Conservation – Comply with SBx7-7
16	10b	Conservation – Tailor to Unique CBH Characteristics
17	11a	Capture and Treat RO Reject Water (1.5 MGD)
18	11b	Capture and Treat RO Reject Water (3.0 MGD)
19	11c	Capture and Treat RO Reject Water (4.5 MGD)

Eight criterion were then identified for the purpose of comparing the various alternatives. Those criterion along with a brief defining example, include:

1. **Cost** – The lower the cost, the greater the advantage
2. **Volume** – The higher the volume contributed by the resource, the greater the advantage
3. **Reliability** – The greater the hydrologic certainty (that the resource has a lower likelihood of being impacted by climatic changes or severity (e.g., drought)), the greater the advantage

4. **Timing** – The shorter the time required to implement, the greater the advantage
5. **Local Control** – The more control CBH has over the resource, the greater the advantage
6. **Legal/Institutional** – The less obstacles required to implement, the greater the advantage
7. **Environmental** – The less environmental impacts, the greater the advantage
8. **Operational Complexity** – The easier to operate and maintain, the greater the advantage

Each alternative was evaluated based upon technical information and/or team knowledge. The information was summarized in a series of spreadsheets.

Values were then assigned to these criteria for each of the 19 alternatives. These values were based on a 1 to 5 scale as defined in more detail in the Exhibit labeled "City of Beverly Hills Water Resource Alternative Options Ranking Criteria Details," which can be found in the Appendix to this Technical Memorandum. These values were assigned based on the extensive combined experience of our project team members as well as discussions with City management and staff.

Overall weightings were then applied for each of the criteria categories, which included the development of ten (10) Weighting Scenarios for further review and evaluation. A comprehensive spreadsheet encompassing all of the above factors was then prepared for the purpose of ranking the nineteen alternatives.

ALTERNATIVE RANKING

An initial ranking of all alternatives was prepared in which each of the eight criteria were equally weighted, i.e., each was assigned a relative weighting of 12.5% with the total summing to 100%. The results of Weighting Scenario 1 analysis are presented in Table 2 below:

Table 2
Weighting Scenario 1: Equal Weighting (12.5%) Assigned to Each Criterion

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	7	Water Banking
3	10b	Conservation – Tailor to Unique CBH Characteristics
4	10a	Conservation – Comply with SBx7-7
5	9c	Groundwater – Develop Central Basin (La Brea) Wells
6	8	Antelope Valley Water Bank Drought Insurance
7	9b	Groundwater – Develop Hollywood Basin Wells
8	5	Exchanges
9	2	Ocean Desalination
10	11c	Capture and Treat RO Reject Water (4.5 MGD)
11	11b	Capture and Treat RO Reject Water (3.0 MGD)
12	11a	Capture and Treat RO Reject Water (1.5 MGD)
13	6	Transfers
14	4a	Recycled Water Regional Approach
15	4d	Recycled Water Exchanges
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Based on feedback received from the City of Beverly Hills Public Works Commissioners as well as input from City management and staff, nine additional scenarios were considered including:

- **Weighting Scenario 2** – The Timing criterion is established at zero weighting with the other seven criteria having equal weightings of 14.3% totaling to 100%.
- **Weighting Scenario 3** – Cost, Volume and Reliability are assigned equal weightings of 33.3% and all other criteria are assigned a zero weighting.
- **Weighting Scenario 4** – Cost is weighted three times higher (30%) than all other criteria which are weighted at 10%
- **Weighting Scenario 5** – Environment is weighted three times higher (30%) than all other criteria which are weighted at 10%
- **Weighting Scenario 6** – Reliability is weighted three times higher (30%) than all other criteria which are weighted at 10%%
- **Weighting Scenario 7** – Volume is weighted three times higher (30%) than all other criteria which are weighted at 10%
- **Weighting Scenario 8** – Cost, Volume, Reliability and Environmental are weighted three times higher (20%) than the other criteria, which are weighted at 6.7% except for Timing (0%), which is deleted from consideration
- **Weighting Scenario 9** – Volume, Reliability and Local Control are weighted three times higher (23.1% each) than other criteria (7.7% each) with Timing (0%) deleted from consideration
- **Weighting Scenario 10** – Volume, Reliability, Local Control and Environment are weighted five times higher (21.7% each) than other criteria (4.3% each) with Timing (0%) deleted from consideration.

It is evident at this point, that an infinite number of possible permutations could be identified and ranked using the excel spreadsheet created for this purpose. However, it is recommended to evaluate the results of the ten (10) scenarios set forth above, before proceeding with additional analyses. Those results are summarized in Tables 3 through 10 on the following pages. Additional detailed information on all ten scenarios is presented in the Appendix.

Table 3
Weighting Scenario 2: Timing Deleted (0%); All Other Criteria Equally Weighted (14.3%)

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	10b	Conservation – Tailor to Unique CBH Characteristics
3	10a	Conservation – Comply with SBx7-7
4	9c	Groundwater – Develop Central Basin (La Brea) Wells
5	7	Water Banking
6	9b	Groundwater – Develop Hollywood Basin Wells
7	8	Antelope Valley Water Bank Drought Insurance
8	5	Exchanges
9	2	Ocean Desalination
10	11c	Capture and Treat RO Reject Water (4.5 MGD)
11	4a	Recycled Water Regional Approach
12	11b	Capture and Treat RO Reject Water (3.0 MGD)
13	11a	Capture and Treat RO Reject Water (1.5 MGD)
14	6	Transfers
15	4d	Recycled Water Exchanges
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 4
Weighting Scenario 3: Cost, Volume and Reliability Equally Weighted (33.3%); All Other Criteria Deleted (0%)

Ranking	Alternative No.	Description
1	7	Water Banking
2	5	Exchanges
3	2	Ocean Desalination
4	1	Metropolitan Water District of Southern California
5	9c	Groundwater – Develop Central Basin (La Brea) Wells
6	4a	Recycled Water Regional Approach
7	10b	Conservation – Tailor to Unique CBH Characteristics
8	10a	Conservation – Comply with SBx7-7
9	8	Antelope Valley Water Bank Drought Insurance
10	11c	Capture and Treat RO Reject Water (4.5 MGD)
11	9b	Groundwater – Develop Hollywood Basin Wells
12	6	Transfers
13	4d	Recycled Water Exchanges
14	11b	Capture and Treat RO Reject Water (3.0 MGD)
15	11a	Capture and Treat RO Reject Water (1.5 MGD)
16	4c	Recycled Water – Greywater Approach
17	4b	Recycled Water – Scalping Plant Approach
18	9a	Groundwater – Capture Spring Water
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 5

Weighting Scenario 4: Cost is Weighted 30% and All Other Criteria are Weighted 10%

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	10a	Conservation – Comply with SBx7-7
3	7	Water Banking
4	10b	Conservation – Tailor to Unique CBH Characteristics
5	9c	Groundwater – Develop Central Basin (La Brea) Wells
6	5	Exchanges
7	11c	Capture and Treat RO Reject Water (4.5 MGD)
8	11a	Capture and Treat RO Reject Water (1.5 MGD)
9	9b	Groundwater – Develop Hollywood Basin Wells
10	8	Antelope Valley Water Bank Drought Insurance
11	2	Ocean Desalination
12	11b	Capture and Treat RO Reject Water (3.0 MGD)
13	6	Transfers
14	4a	Recycled Water Regional Approach
15	4d	Recycled Water Exchanges
16	9a	Groundwater – Capture Spring Water
17	4b	Recycled Water – Scalping Plant Approach
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 6

Weighting Scenario 5: Environment is Weighted 30%; All Other Criteria are Weighted 10%

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	10b	Conservation – Tailor to Unique CBH Characteristics
3	10a	Conservation – Comply with SBx7-7
4	8	Antelope Valley Water Bank Drought Insurance
5	7	Water Banking
6	9c	Groundwater – Develop Central Basin (La Brea) Wells
7	9b	Groundwater – Develop Hollywood Basin Wells
8	5	Exchanges
9	11c	Capture and Treat RO Reject Water (4.5 MGD)
10	11b	Capture and Treat RO Reject Water (3.0 MGD)
11	11a	Capture and Treat RO Reject Water (1.5 MGD)
12	2	Ocean Desalination
13	6	Transfers
14	4a	Recycled Water Regional Approach
15	4d	Recycled Water Exchanges
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 7
Weighting Scenario 6: Reliability is Weighted 30%; All Other Criteria are Weighted 10%

Ranking	Alternative No.	Description
1	7	Water Banking
2	1	Metropolitan Water District of Southern California
3	10b	Conservation – Tailor to Unique CBH Characteristics
4	10a	Conservation – Comply with SBx7-7
5	9c	Groundwater – Develop Central Basin (La Brea) Wells
6	8	Antelope Valley Water Bank Drought Insurance
7	2	Ocean Desalination
8	9b	Groundwater – Develop Hollywood Basin Wells
9	5	Exchanges
10	11c	Capture and Treat RO Reject Water (4.5 MGD)
11	4a	Recycled Water Regional Approach
12	11b	Capture and Treat RO Reject Water (3.0 MGD)
13	11a	Capture and Treat RO Reject Water (1.5 MGD)
14	4b	Recycled Water – Scalping Plant Approach
15	4d	Recycled Water Exchanges
16	6	Transfers
17	4c	Recycled Water – Greywater Approach
18	9a	Groundwater – Capture Spring Water
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 8
Weighting Scenario 7: Volume is Weighted 30%; All Other Criteria are Weighted 10%

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	7	Water Banking
3	8	Antelope Valley Water Bank Drought Insurance
4	9c	Groundwater – Develop Central Basin (La Brea) Wells
5	5	Exchanges
6	2	Ocean Desalination
7	10b	Conservation – Tailor to Unique CBH Characteristics
8	6	Transfers
9	4a	Recycled Water Regional Approach
10	10a	Conservation – Comply with SBx7-7
11	9b	Groundwater – Develop Hollywood Basin Wells
12	4d	Recycled Water Exchanges
13	11c	Capture and Treat RO Reject Water (4.5 MGD)
14	11b	Capture and Treat RO Reject Water (3.0 MGD)
15	11a	Capture and Treat RO Reject Water (1.5 MGD)
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 9

Weighting Scenario 8: Cost, Volume, Reliability and Environment are Weighted 20%; All Other Criteria are Weighted 6.7% with Timing Deleted (0%) from Consideration

Ranking	Alternative No.	Description
1	1	Metropolitan Water District of Southern California
2	7	Water Banking
3	10b	Conservation – Tailor to Unique CBH Characteristics
4	10a	Conservation – Comply with SBx7-7
5	9c	Groundwater – Develop Central Basin (La Brea) Wells
6	8	Antelope Valley Water Bank Drought Insurance
7	5	Exchanges
8	2	Ocean Desalination
9	4a	Recycled Water Regional Approach
10	9b	Groundwater – Develop Hollywood Basin Wells
11	11c	Capture and Treat RO Reject Water (4.5 MGD)
12	6	Transfers
13	11b	Capture and Treat RO Reject Water (3.0 MGD)
14	11a	Capture and Treat RO Reject Water (1.5 MGD)
15	4d	Recycled Water Exchanges
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	4c	Recycled Water – Greywater Approach
19	3	Urban Runoff – Capture and Treat Dry Weather Flows

Table 10

Weighting Scenario 9: Volume, Reliability and Local Control are Weighted 23.1% with All Other Criteria Weighted 7.7% and Timing Deleted (0%)

Ranking	Alternative No.	Description
1	9c	Groundwater – Develop Central Basin (La Brea) Wells
2	7	Water Banking
3	2	Ocean Desalination
4	1	Metropolitan Water District of Southern California
5	10b	Conservation – Tailor to Unique CBH Characteristics
6	9b	Groundwater – Develop Hollywood Basin Wells
7	8	Antelope Valley Water Bank Drought Insurance
8	5	Exchanges
9	4a	Recycled Water Regional Approach
10	10a	Conservation – Comply with SBx7-7
11	4d	Recycled Water Exchanges
12	11c	Capture and Treat RO Reject Water (4.5 MGD)
13	11b	Capture and Treat RO Reject Water (3.0 MGD)
14	6	Transfers
15	11a	Capture and Treat RO Reject Water (1.5 MGD)
16	4b	Recycled Water – Scalping Plant Approach
17	9a	Groundwater – Capture Spring Water
18	3	Urban Runoff – Capture and Treat Dry Weather Flows
19	4c	Recycled Water – Greywater Approach

Table 11

Weighting Scenario 10: Volume, Reliability, Local Control and Environment are Each Weighted 21.7%; All Other Criteria are Weighted 4.3% with Timing Deleted (0%)

Ranking	Alternative No.	Description
1	8	Antelope Valley Water Bank Drought Insurance
2	10b	Conservation – Tailor to Unique CBH Characteristics
3	9c	Groundwater – Develop Central Basin (La Brea) Wells
4	7	Water Banking
5	1	Metropolitan Water District of Southern California
6	10a	Conservation – Comply with SBx7-7
7	9b	Groundwater – Develop Hollywood Basin Wells
8	5	Exchanges
9	2	Ocean Desalination
10	4a	Recycled Water Regional Approach
11	4d	Recycled Water Exchanges
12	11c	Capture and Treat RO Reject Water (4.5 MGD)
13	11b	Capture and Treat RO Reject Water (3.0 MGD)
14	4b	Recycled Water – Scalping Plant Approach
15	6	Transfers
16	11a	Capture and Treat RO Reject Water (1.5 MGD)
17	9a	Groundwater – Capture Spring Water
18	3	Urban Runoff – Capture and Treat Dry Weather Flows
19	4c	Recycled Water – Greywater Approach

FINDINGS AND CONCLUSIONS

Table 12 on the next page, summarizes the results of the **Weighting Scenario** analysis. The column to the far left shows the overall ranking of the 19 alternatives from highest to lowest. These rankings are based on the average ranking of each alternative as reflected in the second column from the left. The average rankings were calculated by summing the rankings of the noted alternative for each **Weighting Scenario** and then dividing by ten (the total number of scenarios). The last two columns describe the alternative and list the type of alternative (i.e., supply, insurance or conservation).

As can be seen, there is a clear delineation between the top nine ranked alternatives and the bottom ten alternatives (as reflected in the large gap between the ninth and tenth ranked alternatives; the 2.2 gap is the largest gap between any two ranked alternatives). In addition to Table 12, a Tabular Color Coded Summary of Supply/Reliability Alternatives by Weighting Scenario is also included in the Appendix.

Table 12
Summary of Weighting Scenario Analysis

Order of Ranking	Average Ranking	Alternative	Type of Alternative
Top Nine Ranked Alternatives			
1	2.1	MWD	Supply
2	2.7	Water Banking	Insurance
3	3.8	Conservation - Tailored	Conservation
4	4.3	Groundwater – Develop Central Basin	Supply
5	5.4	Conservation - Comply with SBx7-7	Conservation
6	5.9	Antelope Valley Water Bank Drought Insurance	Insurance
7	6.9	Exchanges	Insurance
8	7.7	Ocean Desalination	Supply
9	8.2	Groundwater – Develop Hollywood Basin	Supply
Bottom Ten Ranked Alternatives Note the Large 2.2 Gap Between Alternative Ranking Nos. 9 and 10			
10	10.4	Capture and Treat RO Plant Reject Water (4.5 MGD)	Supply
11	10.7	Recycled Water - Regional Approach	Supply
12	12.4	Capture and Treat RO Plant Reject Water (3.0 MGD)	Supply
13	13.0	Transfers	Insurance
14	13.2	Capture and Treat RO Plant Reject Water (1.5 MGD)	Supply
15	13.7	Recycled Water Exchanges	Insurance
16	15.8	Recycled Water - Scalping Plant Approach	Supply
17	17.1	Groundwater - Capture Spring Water	Supply
18	17.9	Recycled Water - Greywater Approach	Supply
19	18.8	Urban Runoff - Capture and Treat Dry Weather Flows	Supply

The **10 Scenarios** evaluated differ widely in their criteria weightings, yet the highest ranked alternatives are fairly consistent across the various combinations of weightings. This demonstrates that our analysis is not subject to significant movement caused by changing the relative weightings of the various criteria, i.e., it passes the sensitivity test.

Several important results can be seen from our analysis as summarized below:

1. **Metropolitan Water District is ranked No. 1** in six of the 10 scenarios, second in one scenario, fourth in two scenarios and fifth in the remaining one;
2. **Water Banking is ranked either first or second** in six of the ten scenarios and is in the top five in all ten scenarios;
3. **Conservation – Tailored to Unique CBH Characteristics** is in the top three in seven of the ten scenarios and in the top seven in all ten scenarios;

4. **Groundwater – Develop Central Basin Wells** is ranked in the top six in all ten scenarios;
5. **Conservation – Comply with SBx7-7** is ranked in the top four in six of the ten scenarios and in the top ten in the other four scenarios. It should be noted that, while SBx7-7 will achieve conservation goals, it is not truly an alternative in the same sense at the other nine alternatives since it is mandated by State law;
6. **Antelope Valley Drought Insurance** is ranked in the top seven in eight of the ten scenarios and in the top ten in all ten scenarios;
7. **Exchanges (excluding Recycled Water Exchanges)** are ranked twice in the top five and in the top nine in all ten scenarios;
8. **Ocean Desalination** is ranked twice in the top three and in the top nine in eight of the ten scenarios; and
9. **Groundwater – Develop Hollywood Basin** is ranked five times in the top seven scenarios and never lower than 11 in the rest of the scenarios;
10. All of the other alternatives consistently rank in the bottom half of the 19 scenarios.

RECOMMENDATIONS

Based on the above-noted findings and conclusions, we recommend proceeding with detailed evaluations of the following nine (9) highly ranked alternatives:

1. Metropolitan Water District;
2. Water Banking;
3. Conservation – Tailor to Unique CBH Characteristics;
4. Groundwater – Develop Central Basin Wells;
5. Conservation – Comply with SBx7-7;
6. Antelope Valley Drought Insurance;
7. Exchanges;
8. Ocean Desalination; and
9. Groundwater – Develop Hollywood Basin.

Four of the above options are **Baseline Supply Alternatives** (MWD, Central Basin Wells, Ocean Desalination and Hollywood Basin Wells); three of the recommended options are forms of **Water Supply Insurance**, which, if implemented, could increase the City's supply reliability (Water Banking, Antelope Valley Drought Insurance and Exchanges); and the last two options are **Conservation Measures** (Tailored to Unique CBH Characteristics and Comply with SBx7-7).

All other alternatives should be eliminated from further consideration at this time.

Appendix
to
Technical Memorandum No.1

- Ranking Criteria Details
- Alternative Ranking by Weighting Scenario
- Tabular Color-Coded Summary of Supply/Reliability Alternatives by Weighting Scenario

CITY OF BEVERLY HILLS WATER RESOURCE ALTERNATIVE OPTIONS
RANKING CRITERIA DETAILS

COST

The cost of the resource is greater than $2,500/AF	1
The cost of the resource is between $2,000-$2,500/AF	2
The cost of the resource is between $1,500-$2,000/AF	3
The cost of the resource is between $1,000-$1,500/AF	4
The cost of the resource is less than $1,000/AF.	5

NARRATIVE

The criteria is based on the concept that the higher the cost, the greater the disadvantage. The bracketed cost ranges are based on 2014 dollars and are based on the expected ranges that would be anticipated for water sources that are evaluated for the CBH.

VOLUME

The volume of the resource is less than 500 AFY.	1
The volume of the resource is between 500-1,500 AFY	2
The volume of the resource is between 1,500-2,500 AFY	3
The volume of the resource is between 2,500-3,500 AFY	4
The volume of the resource is greater than 3,500 AFY	5

The criteria is based on the concept that the higher the volume contributed by the resource, the greater the advantage. Small volumes <500 AFY are considered a significant disadvantage. Large volumes (>3,500 AFY) are considered a significant advantage.

RELIABILITY (Dependability)

The resource can be severely impacted.	1
The resource can be moderately to severely impacted.	2
The resource can be moderately impacted.	3
The resource can be slightly impacted.	4
The resource is not impacted and is always available.	5

The criteria is based on the concept of hydrologic certainty that "wet" water will be available. A source that is immune to current or future hydrologies would be considered as highly reliable (Number 5). An example would be ocean desalination as terrestrial hydrology would have a zero effect on the availability of the resource. Whereas State Project water can be highly dependent on Sierra Nevada snowpack and resulting hydrology of State Project dependent waters.

TIMING

The resource would take more than 20 years to develop and be available for consumptive use.	1
The resource would take between 5 to 20 years to develop and be available for consumptive use.	3
The resource would take less than 5 years to develop and be available for consumptive use.	5

The criteria is based on the concept of the ability of the proposed resource and associated agreements, legal/institutional constraints, and/or the construction of the related infrastructure could be completed within a set amount of years. A low number of years to successfully implement and make use of a resource is considered favorable whereas as high number of years is a disadvantage.

LOCAL CONTROL

The resource is not within local control (under CBH) and is subject to external influences.	1
The resource is under partial local control or agreements and potential adverse influences from external parties.	2
The resource is under partial local control or agreements and limited adverse influences from external parties.	3
Resource is under mostly local control but some external influences can impact the resource.	4
Resource is totally under local control.	5

NARRATIVE

Local control refers to whether the CBH controls the resource from generation to delivery to the CBH. If the resource and delivery are not under the control of CBH, it is considered a serious disadvantage. However, if the generation and delivery are under the control of CBH, then it is considered a significant advantage.

LEGAL/INSTITUTIONAL

Requires local or state legislation or institutional changes in order to implement.	1
Requires moderate to substantial Local legislation or institutional changes in order to implement.	2
Requires moderate permitting and institutional changes but are consistent with current State & Local requirements.	3
Requires minor permitting and some institutional changes but are consistent with current State & Local requirements.	4
No legal or institutional changes will be required to develop the resource.	5

Legal/institutional criteria refers to the degree of developing a particular resource will require legislation or institutional changes to be able to be implemented. It also includes the degree that litigation may occur as part of developing the resource. It does not pertain to CEQA impacts (that is covered in Environmental).

ENVIRONMENTAL

Will have adverse effects on the environment.	1
Will have moderate impact to the environment.	3
No impacts to the environment.	5

This criteria refers to the potential for developing the proposed resource and that environmental impacts will occur. Impacts that are adverse (unmitigable) are considered a serious disadvantage whereas a resource that poses little or no environmental impacts is considered a

OPERATIONAL COMPLEXITY (for CBH)

Will require dedicated additional personnel and/or substantial coordination with outside agencies to operate and maintain.	1
Will require some additional or part-time personnel to coordinate and manage the resource.	3
Does not require personnel for operations of the resource.	5

This criteria refers to the degree to which the CBH will be required to have dedicated additional personnel and/or substantial coordination to operate and maintain the resource. The concept is that the need for additional personnel indicates that the resource is complex to maintain and operate. Those resources that require substantial personnel are considered to be adverse (serious disadvantage) as opposed to those resources that require little or no staff (significant advantage).

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

NOTES:
AF=acre-feet; AFY=acre-feet per year, CBH= City of Beverly Hills; CEQA=California Environmental Quality Act;

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
1	Metropolitan Water District of Southern California	4.38	✓	1
7	Water Banking	3.88	✓	2
10b	Conservation – Tailor to Unique CBH Characteristics	3.75	✓	3
10a	Conservation – Comply with SBx7-7	3.75	✓	4
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.75	✓	5
8	Antelope Valley Water Bank Drought Insurance	3.75	✓	6
9b	Groundwater - Develop Hollywood Basin Wells	3.50	✓	7
5	Exchanges	3.50	✓	8
2	Ocean Desalination	3.50	✗	9
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.38	✗	10
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.25	✗	11
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.25	✗	12
6	Transfers	3.13	✗	13
4a	Recycled Water - Regional Approach	3.13	✗	14
4d	Recycled Water - Exchange	3.00	✗	15
4b	Recycled Water - Scalping Plant Approach	2.75	✗	16
9a	Groundwater - Capture Spring Water	2.63	✗	17
4c	Recycled Water - Greywater Approach	2.25	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.13	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
1	1	Metropolitan Water District of Southern California	4.38
9	2	Ocean Desalination	3.50
19	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.13
14	4a	Recycled Water - Regional Approach	3.13
16	4b	Recycled Water - Scalping Plant Approach	2.75
18	4c	Recycled Water - Greywater Approach	2.25
15	4d	Recycled Water - Exchange	3.00
8	5	Exchanges	3.50
13	6	Transfers	3.13
2	7	Water Banking	3.88
6	8	Antelope Valley Water Bank Drought Insurance	3.75
17	9a	Groundwater - Capture Spring Water	2.63
7	9b	Groundwater - Develop Hollywood Basin Wells	3.50
5	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.75
4	10a	Conservation – Comply with SBx7-7	3.75
3	10b	Conservation – Tailor to Unique CBH Characteristics	3.75
12	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.25
11	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.25
10	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.38

SCENARIO 1 - Baseline (All Criterion Equal Weighting - 12.5%)

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	1	1	1	1	1	1	1	
Actual	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%	100.0%
---	5	5	3	5	2	5	5	5	
---	3	5	5	3	3	2	2	5	
---	1	2	3	3	5	1	1	1	
---	2	5	5	1	2	4	3	3	
---	1	2	5	3	4	3	3	1	
---	2	2	4	3	1	1	2	3	
---	1	5	4	3	3	2	3	3	
---	4	5	4	3	3	3	3	3	
---	3	5	2	3	3	3	3	3	
---	4	5	5	5	3	3	3	3	
---	2	5	4	5	3	3	5	3	
---	2	2	2	3	5	3	3	1	
---	3	3	4	3	5	4	3	3	
---	4	4	4	3	5	4	3	3	
---	5	2	4	3	4	4	5	3	
---	4	3	4	3	4	4	5	3	
---	4	1	4	3	4	4	3	3	
---	3	2	4	3	4	4	3	3	
---	4	2	4	3	4	4	3	3	

5	Significant advantages	2	Some significant disadvantages
4	Some advantages	1	Serious disadvantages
3	Issues but manageable		

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score	Rank
1	Metropolitan Water District of Southern California	4.29	1
10b	Conservation – Tailor to Unique CBH Characteristics	3.86	2
10a	Conservation – Comply with SBx7-7	3.86	3
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.86	4
7	Water Banking	3.72	5
9b	Groundwater - Develop Hollywood Basin Wells	3.57	6
8	Antelope Valley Water Bank Drought Insurance	3.57	7
5	Exchanges	3.57	8
2	Ocean Desalination	3.57	9
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.43	10
4a	Recycled Water - Regional Approach	3.43	11
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.29	12
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.29	13
6	Transfers	3.14	14
4d	Recycled Water - Exchange	3.00	15
4b	Recycled Water - Scalping Plant Approach	2.71	16
9a	Groundwater - Capture Spring Water	2.57	17
4c	Recycled Water - Greywater Approach	2.14	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.00	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
1	1	Metropolitan Water District of Southern California	4.29
9	2	Ocean Desalination	3.57
19	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.00
11	4a	Recycled Water - Regional Approach	3.43
16	4b	Recycled Water - Scalping Plant Approach	2.71
18	4c	Recycled Water - Greywater Approach	2.14
15	4d	Recycled Water - Exchange	3.00
8	5	Exchanges	3.57
14	6	Transfers	3.14
5	7	Water Banking	3.72
7	8	Antelope Valley Water Bank Drought Insurance	3.57
17	9a	Groundwater - Capture Spring Water	2.57
6	9b	Groundwater - Develop Hollywood Basin Wells	3.57
4	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.86
3	10a	Conservation – Comply with SBx7-7	3.86
2	10b	Conservation – Tailor to Unique CBH Characteristics	3.86
13	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.29
12	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.29
10	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.43

SCENARIO 2 - Timing Deleted; All Other Criterion = 14.3%

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	1	1	0	1	1	1	1	
Actual	14.3%	14.3%	14.3%	0.0%	14.3%	14.3%	14.3%	14.3%	100.0%
---	5	5	3		2	5	5	5	
---	3	5	5		3	2	2	5	
---	1	2	3		5	1	1	1	
---	2	5	5		2	4	3	3	
---	1	2	5		4	3	3	1	
---	2	2	4		1	1	2	3	
---	1	5	4		3	2	3	3	
---	4	5	4		3	3	3	3	
---	3	5	2		3	3	3	3	
---	4	5	5		3	3	3	3	
---	2	5	4		3	3	5	3	
---	2	2	2		5	3	3	1	
---	3	3	4		5	4	3	3	
---	4	4	4		5	4	3	3	
---	5	2	4		4	4	5	3	
---	4	3	4		4	4	5	3	
---	4	1	4		4	4	3	3	
---	3	2	4		4	4	3	3	
---	4	2	4		4	4	3	3	

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
7	Water Banking	4.67	✓	1
5	Exchanges	4.33	✓	2
2	Ocean Desalination	4.33	✓	3
1	Metropolitan Water District of Southern California	4.33	✓	4
9c	Groundwater - Develop Central Basin (La Brea) Wells	4.00	✓	5
4a	Recycled Water - Regional Approach	4.00	✓	6
10b	Conservation – Tailor to Unique CBH Characteristics	3.67	✓	7
10a	Conservation – Comply with SBx7-7	3.67	✓	8
8	Antelope Valley Water Bank Drought Insurance	3.67	✗	9
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.34	✗	10
9b	Groundwater - Develop Hollywood Basin Wells	3.33	✗	11
6	Transfers	3.33	✗	12
4d	Recycled Water - Exchange	3.33	✗	13
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.00	✗	14
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.00	✗	15
4c	Recycled Water - Greywater Approach	2.67	✗	16
4b	Recycled Water - Scalping Plant Approach	2.67	✗	17
9a	Groundwater - Capture Spring Water	2.00	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.00	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
✓ 4	1	Metropolitan Water District of Southern California	4.33
✓ 3	2	Ocean Desalination	4.33
✗ 19	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.00
✓ 6	4a	Recycled Water - Regional Approach	4.00
✗ 17	4b	Recycled Water - Scalping Plant Approach	2.67
✗ 16	4c	Recycled Water - Greywater Approach	2.67
✗ 13	4d	Recycled Water - Exchange	3.33
✓ 2	5	Exchanges	4.33
✗ 12	6	Transfers	3.33
✓ 1	7	Water Banking	4.67
✗ 9	8	Antelope Valley Water Bank Drought Insurance	3.67
✗ 18	9a	Groundwater - Capture Spring Water	2.00
✗ 11	9b	Groundwater - Develop Hollywood Basin Wells	3.33
✓ 5	9c	Groundwater - Develop Central Basin (La Brea) Wells	4.00
✓ 8	10a	Conservation – Comply with SBx7-7	3.67
✓ 7	10b	Conservation – Tailor to Unique CBH Characteristics	3.67
✗ 15	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.00
✗ 14	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.00
✗ 10	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.34

SCENARIO 3 - Cost, Volume & Reliability = 33.3%; All Other = 0%

Criterion Selection Matrix

Option	Water Resource Alternative	Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
		Relative	1	1	1	0	0	0	0	0	
		Actual	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
7	Water Banking	---	5	5	3						
5	Exchanges	---	3	5	5						
2	Ocean Desalination	---	1	2	3						
1	Metropolitan Water District of Southern California	---	2	5	5						
9c	Groundwater - Develop Central Basin (La Brea) Wells	---	1	2	5						
4a	Recycled Water - Regional Approach	---	2	2	4						
10b	Conservation – Tailor to Unique CBH Characteristics	---	1	5	4						
10a	Conservation – Comply with SBx7-7	---	4	5	4						
8	Antelope Valley Water Bank Drought Insurance	---	3	5	2						
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	---	4	5	5						
9b	Groundwater - Develop Hollywood Basin Wells	---	2	5	4						
6	Transfers	---	2	2	2						
4d	Recycled Water - Exchange	---	3	3	4						
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	---	4	4	4						
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	---	5	2	4						
4c	Recycled Water - Greywater Approach	---	4	3	4						
4b	Recycled Water - Scalping Plant Approach	---	4	1	4						
9a	Groundwater - Capture Spring Water	---	3	2	4						
3	Urban Runoff - Capture & Treat Dry Weather Flows	---	4	2	4						

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
1	Metropolitan Water District of Southern California	4.50	✓	1
10a	Conservation – Comply with SBx7-7	4.00	✓	2
7	Water Banking	3.90	✓	3
10b	Conservation – Tailor to Unique CBH Characteristics	3.80	✓	4
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80	✓	5
5	Exchanges	3.60	✓	6
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.50	✓	7
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.40	✓	8
9b	Groundwater - Develop Hollywood Basin Wells	3.40	✗	9
8	Antelope Valley Water Bank Drought Insurance	3.40	✗	10
2	Ocean Desalination	3.40	✗	11
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.20	✗	12
6	Transfers	3.10	✗	13
4a	Recycled Water - Regional Approach	2.90	✗	14
4d	Recycled Water - Exchange	2.60	✗	15
9a	Groundwater - Capture Spring Water	2.50	✗	16
4b	Recycled Water - Scalping Plant Approach	2.40	✗	17
4c	Recycled Water - Greywater Approach	2.20	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	1.90	✗	19

ALTERNATIVE LIST

	Rank	Option	Water Resource Alternative	Weighting Score
✓	1	1	Metropolitan Water District of Southern California	4.50
✗	11	2	Ocean Desalination	3.40
✗	19	3	Urban Runoff - Capture & Treat Dry Weather Flows	1.90
✗	14	4a	Recycled Water - Regional Approach	2.90
✗	17	4b	Recycled Water - Scalping Plant Approach	2.40
✗	18	4c	Recycled Water - Greywater Approach	2.20
✗	15	4d	Recycled Water - Exchange	2.60
✓	6	5	Exchanges	3.60
✗	13	6	Transfers	3.10
✓	3	7	Water Banking	3.90
✗	10	8	Antelope Valley Water Bank Drought Insurance	3.40
✗	16	9a	Groundwater - Capture Spring Water	2.50
✗	9	9b	Groundwater - Develop Hollywood Basin Wells	3.40
✓	5	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80
✓	2	10a	Conservation – Comply with SBx7-7	4.00
✓	4	10b	Conservation – Tailor to Unique CBH Characteristics	3.80
✓	8	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.40
✗	12	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.20
✓	7	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.50

SCENARIO 4 - Cost = 30%; All Other Criterion = 10%

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	3	1	1	1	1	1	1	1	
Actual	30.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	100.0%
---	5	5	3	5	2	5	5	5	
---	3	5	5	3	3	2	2	5	
---	1	2	3	3	5	1	1	1	
---	2	5	5	1	2	4	3	3	
---	1	2	5	3	4	3	3	1	
---	2	2	4	3	1	1	2	3	
---	1	5	4	3	3	2	3	3	
---	4	5	4	3	3	3	3	3	
---	3	5	2	3	3	3	3	3	
---	4	5	5	5	3	3	3	3	
---	2	5	4	5	3	3	5	3	
---	2	2	2	3	5	3	3	1	
---	3	3	4	3	5	4	3	3	
---	4	4	4	3	5	4	3	3	
---	5	2	4	3	4	4	5	3	
---	4	3	4	3	4	4	5	3	
---	4	1	4	3	4	4	3	3	
---	3	2	4	3	4	4	3	3	
---	4	2	4	3	4	4	3	3	

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
1	Metropolitan Water District of Southern California	4.50	✓	1
10b	Conservation – Tailor to Unique CBH Characteristics	4.00	✓	2
10a	Conservation – Comply with SBx7-7	4.00	✓	3
8	Antelope Valley Water Bank Drought Insurance	4.00	✓	4
7	Water Banking	3.70	✓	5
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.60	✓	6
9b	Groundwater - Develop Hollywood Basin Wells	3.40	✓	7
5	Exchanges	3.40	✓	8
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.30	✗	9
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.20	✗	10
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.20	✗	11
2	Ocean Desalination	3.20	✗	12
6	Transfers	3.10	✗	13
4a	Recycled Water - Regional Approach	3.10	✗	14
4d	Recycled Water - Exchange	3.00	✗	15
4b	Recycled Water - Scalping Plant Approach	2.80	✗	16
9a	Groundwater - Capture Spring Water	2.70	✗	17
4c	Recycled Water - Greywater Approach	2.20	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	1.90	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
✓ 1	1	Metropolitan Water District of Southern California	4.50
✗ 12	2	Ocean Desalination	3.20
✗ 19	3	Urban Runoff - Capture & Treat Dry Weather Flows	1.90
✗ 14	4a	Recycled Water - Regional Approach	3.10
✗ 16	4b	Recycled Water - Scalping Plant Approach	2.80
✗ 18	4c	Recycled Water - Greywater Approach	2.20
✗ 15	4d	Recycled Water - Exchange	3.00
✓ 8	5	Exchanges	3.40
✗ 13	6	Transfers	3.10
✓ 5	7	Water Banking	3.70
✓ 4	8	Antelope Valley Water Bank Drought Insurance	4.00
✗ 17	9a	Groundwater - Capture Spring Water	2.70
✓ 7	9b	Groundwater - Develop Hollywood Basin Wells	3.40
✓ 6	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.60
✓ 3	10a	Conservation – Comply with SBx7-7	4.00
✓ 2	10b	Conservation – Tailor to Unique CBH Characteristics	4.00
✗ 11	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.20
✗ 10	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.20
✗ 9	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.30

SCENARIO 5 - Environmental = 30%; All Other Criterion = 10%

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	1	1	1	1	1	3	1	
Actual	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	30.0%	10.0%	100.0%
---	5	5	3	5	2	5	5	5	
---	3	5	5	3	3	2	2	5	
---	1	2	3	3	5	1	1	1	
---	2	5	5	1	2	4	3	3	
---	1	2	5	3	4	3	3	1	
---	2	2	4	3	1	1	2	3	
---	1	5	4	3	3	2	3	3	
---	4	5	4	3	3	3	3	3	
---	3	5	2	3	3	3	3	3	
---	4	5	5	5	3	3	3	3	
---	2	5	4	5	3	3	5	3	
---	2	2	2	3	5	3	3	1	
---	3	3	4	3	5	4	3	3	
---	4	4	4	3	5	4	3	3	
---	5	2	4	3	4	4	5	3	
---	4	3	4	3	4	4	5	3	
---	4	1	4	3	4	4	3	3	
---	3	2	4	3	4	4	3	3	
---	4	2	4	3	4	4	3	3	

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
7	Water Banking	4.10	✓	1
1	Metropolitan Water District of Southern California	4.10	✓	2
10b	Conservation – Tailor to Unique CBH Characteristics	3.80	✓	3
10a	Conservation – Comply with SBx7-7	3.80	✓	4
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80	✓	5
8	Antelope Valley Water Bank Drought Insurance	3.80	✓	6
2	Ocean Desalination	3.80	✓	7
9b	Groundwater - Develop Hollywood Basin Wells	3.60	✓	8
5	Exchanges	3.60	✗	9
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.50	✗	10
4a	Recycled Water - Regional Approach	3.50	✗	11
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.40	✗	12
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.40	✗	13
4b	Recycled Water - Scalping Plant Approach	3.20	✗	14
4d	Recycled Water - Exchange	3.20	✗	15
6	Transfers	2.90	✗	16
4c	Recycled Water - Greywater Approach	2.60	✗	17
9a	Groundwater - Capture Spring Water	2.50	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.30	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
✓ 2	1	Metropolitan Water District of Southern California	4.10
✓ 7	2	Ocean Desalination	3.80
✗ 19	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.30
✗ 11	4a	Recycled Water - Regional Approach	3.50
✗ 14	4b	Recycled Water - Scalping Plant Approach	3.20
✗ 17	4c	Recycled Water - Greywater Approach	2.60
✗ 15	4d	Recycled Water - Exchange	3.20
✗ 9	5	Exchanges	3.60
✗ 16	6	Transfers	2.90
✓ 1	7	Water Banking	4.10
✓ 6	8	Antelope Valley Water Bank Drought Insurance	3.80
✗ 18	9a	Groundwater - Capture Spring Water	2.50
✓ 8	9b	Groundwater - Develop Hollywood Basin Wells	3.60
✓ 5	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80
✓ 4	10a	Conservation – Comply with SBx7-7	3.80
✓ 3	10b	Conservation – Tailor to Unique CBH Characteristics	3.80
✗ 13	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.40
✗ 12	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.40
✗ 10	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.50

SCENARIO 6 - Reliability = 30%; All Other Criterion = 10%

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	1	3	1	1	1	1	1	
Actual	10.0%	10.0%	30.0%	10.0%	10.0%	10.0%	10.0%	10.0%	100.0%
---	5	5	3	5	2	5	5	5	
---	3	5	5	3	3	2	2	5	
---	1	2	3	3	5	1	1	1	
---	2	5	5	1	2	4	3	3	
---	1	2	5	3	4	3	3	1	
---	2	2	4	3	1	1	2	3	
---	1	5	4	3	3	2	3	3	
---	4	5	4	3	3	3	3	3	
---	3	5	2	3	3	3	3	3	
---	4	5	5	5	3	3	3	3	
---	2	5	4	5	3	3	5	3	
---	2	2	2	3	5	3	3	1	
---	3	3	4	3	5	4	3	3	
---	4	4	4	3	5	4	3	3	
---	5	2	4	3	4	4	5	3	
---	4	3	4	3	4	4	5	3	
---	4	1	4	3	4	4	3	3	
---	3	2	4	3	4	4	3	3	
---	4	2	4	3	4	4	3	3	

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
1	Metropolitan Water District of Southern California	4.50	✓	1
7	Water Banking	4.10	✓	2
8	Antelope Valley Water Bank Drought Insurance	4.00	✓	3
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80	✓	4
5	Exchanges	3.80	✓	5
2	Ocean Desalination	3.80	✓	6
10b	Conservation – Tailor to Unique CBH Characteristics	3.60	✓	7
6	Transfers	3.50	✓	8
4a	Recycled Water - Regional Approach	3.50	✗	9
10a	Conservation – Comply with SBx7-7	3.40	✗	10
9b	Groundwater - Develop Hollywood Basin Wells	3.40	✗	11
4d	Recycled Water - Exchange	3.40	✗	12
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.10	✗	13
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.00	✗	14
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	2.80	✗	15
4b	Recycled Water - Scalping Plant Approach	2.60	✗	16
9a	Groundwater - Capture Spring Water	2.50	✗	17
4c	Recycled Water - Greywater Approach	2.20	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.10	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
1	1	Metropolitan Water District of Southern California	4.50
6	2	Ocean Desalination	3.80
19	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.10
9	4a	Recycled Water - Regional Approach	3.50
16	4b	Recycled Water - Scalping Plant Approach	2.60
18	4c	Recycled Water - Greywater Approach	2.20
12	4d	Recycled Water - Exchange	3.40
5	5	Exchanges	3.80
8	6	Transfers	3.50
2	7	Water Banking	4.10
3	8	Antelope Valley Water Bank Drought Insurance	4.00
17	9a	Groundwater - Capture Spring Water	2.50
11	9b	Groundwater - Develop Hollywood Basin Wells	3.40
4	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80
10	10a	Conservation – Comply with SBx7-7	3.40
7	10b	Conservation – Tailor to Unique CBH Characteristics	3.60
15	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	2.80
14	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.00
13	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.10

SCENARIO 7 - Volume = 30%; All Other Criterion = 10%

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	3	1	1	1	1	1	1	
Actual	10.0%	30.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	100.0%
---	5	5	3	5	2	5	5	5	
---	3	5	5	3	3	2	2	5	
---	1	2	3	3	5	1	5	1	
---	2	5	5	1	2	4	3	3	
---	1	2	5	3	4	3	3	1	
---	2	2	4	3	1	1	2	3	
---	1	5	4	3	3	2	3	3	
---	4	5	4	3	3	3	3	3	
---	3	5	2	3	3	3	3	3	
---	4	5	5	5	3	3	3	3	
---	2	5	4	5	3	3	5	3	
---	2	2	2	3	5	3	3	1	
---	3	3	4	3	5	4	3	3	
---	4	4	4	3	5	4	3	3	
---	5	2	4	3	4	4	5	3	
---	4	3	4	3	4	4	5	3	
---	4	1	4	3	4	4	3	3	
---	3	2	4	3	4	4	3	3	
---	4	2	4	3	4	4	3	3	

5	Significant advantages	2	Some significant disadvantages
4	Some advantages	1	Serious disadvantages
3	Issues but manageable		

SCENARIO 8 - Cost, Volume, Reliability & Environmental = 20%; Timing = 0%; All Others = 6.7%

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
1	Metropolitan Water District of Southern California	4.40	✓	1
7	Water Banking	4.00	✓	2
10b	Conservation – Tailor to Unique CBH Characteristics	3.93	✓	3
10a	Conservation – Comply with SBx7-7	3.93	✓	4
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80	✓	5
8	Antelope Valley Water Bank Drought Insurance	3.80	✓	6
5	Exchanges	3.80	✓	7
2	Ocean Desalination	3.67	✓	8
4a	Recycled Water - Regional Approach	3.60	✗	9
9b	Groundwater - Develop Hollywood Basin Wells	3.40	✗	10
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.34	✗	11
6	Transfers	3.20	✗	12
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.14	✗	13
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.13	✗	14
4d	Recycled Water - Exchange	3.13	✗	15
4b	Recycled Water - Scalping Plant Approach	2.73	✗	16
9a	Groundwater - Capture Spring Water	2.40	✗	17
4c	Recycled Water - Greywater Approach	2.33	✗	18
3	Urban Runoff - Capture & Treat Dry Weather Flows	1.87	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
✓ 1	1	Metropolitan Water District of Southern California	4.40
✓ 8	2	Ocean Desalination	3.67
✗ 19	3	Urban Runoff - Capture & Treat Dry Weather Flows	1.87
✗ 9	4a	Recycled Water - Regional Approach	3.60
✗ 16	4b	Recycled Water - Scalping Plant Approach	2.73
✗ 18	4c	Recycled Water - Greywater Approach	2.33
✗ 15	4d	Recycled Water - Exchange	3.13
✓ 7	5	Exchanges	3.80
✗ 12	6	Transfers	3.20
✓ 2	7	Water Banking	4.00
✓ 6	8	Antelope Valley Water Bank Drought Insurance	3.80
✗ 17	9a	Groundwater - Capture Spring Water	2.40
✗ 10	9b	Groundwater - Develop Hollywood Basin Wells	3.40
✓ 5	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.80
✓ 4	10a	Conservation – Comply with SBx7-7	3.93
✓ 3	10b	Conservation – Tailor to Unique CBH Characteristics	3.93
✗ 14	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.13
✗ 13	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.14
✗ 11	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.34

Criterion Selection Matrix

Option	Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
	Relative	3	3	3	0	1	1	3	1	
	Actual	20.0%	20.0%	20.0%	0.0%	6.7%	6.7%	20.0%	6.7%	100.0%
1	---	5	5	3		2	5	5	5	
7	---	3	5	5		3	2	2	5	
10b	---	1	2	3		5	1	1	1	
10a	---	2	5	5		2	4	3	3	
9c	---	1	2	5		4	3	3	1	
8	---	2	2	4		1	1	2	3	
5	---	1	5	4		3	2	3	3	
2	---	4	5	4		3	3	3	3	
4a	---	3	5	2		3	3	3	3	
9b	---	4	5	5		3	3	3	3	
11c	---	2	5	4		3	3	5	3	
6	---	2	2	2		5	3	3	1	
11b	---	3	3	4		5	4	3	3	
11a	---	4	4	4		5	4	3	3	
4d	---	5	2	4		4	4	5	3	
4b	---	4	3	4		4	4	5	3	
9a	---	4	1	4		4	4	3	3	
4c	---	3	2	4		4	4	3	3	
3	---	4	2	4		4	4	3	3	

5	Significant advantages	2	Some significant disadvantages
4	Some advantages	1	Serious disadvantages
3	Issues but manageable		

SCENARIO 9 - Volume, Reliability & Local Control = 23.1%; Timing = 0%; All Others = 7.7%

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
9c	Groundwater - Develop Central Basin (La Brea) Wells	4.08	✓	1
7	Water Banking	4.00	✓	2
2	Ocean Desalination	3.92	✓	3
1	Metropolitan Water District of Southern California	3.85	✓	4
10b	Conservation – Tailor to Unique CBH Characteristics	3.77	✓	5
9b	Groundwater - Develop Hollywood Basin Wells	3.77	✓	6
8	Antelope Valley Water Bank Drought Insurance	3.77	✓	7
5	Exchanges	3.77	✓	8
4a	Recycled Water - Regional Approach	3.69	✗	9
10a	Conservation – Comply with SBx7-7	3.62	✗	10
4d	Recycled Water - Exchange	3.46	✗	11
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.39	✗	12
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.31	✗	13
6	Transfers	3.23	✗	14
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.16	✗	15
4b	Recycled Water - Scalping Plant Approach	3.15	✗	16
9a	Groundwater - Capture Spring Water	2.77	✗	17
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.62	✗	18
4c	Recycled Water - Greywater Approach	2.23	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
✓ 4	1	Metropolitan Water District of Southern California	3.85
✓ 3	2	Ocean Desalination	3.92
✗ 18	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.62
✗ 9	4a	Recycled Water - Regional Approach	3.69
✗ 16	4b	Recycled Water - Scalping Plant Approach	3.15
✗ 19	4c	Recycled Water - Greywater Approach	2.23
✗ 11	4d	Recycled Water - Exchange	3.46
✓ 8	5	Exchanges	3.77
✗ 14	6	Transfers	3.23
✓ 2	7	Water Banking	4.00
✓ 7	8	Antelope Valley Water Bank Drought Insurance	3.77
✗ 17	9a	Groundwater - Capture Spring Water	2.77
✓ 6	9b	Groundwater - Develop Hollywood Basin Wells	3.77
✓ 1	9c	Groundwater - Develop Central Basin (La Brea) Wells	4.08
✗ 10	10a	Conservation – Comply with SBx7-7	3.62
✓ 5	10b	Conservation – Tailor to Unique CBH Characteristics	3.77
✗ 15	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.16
✗ 13	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.31
✗ 12	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.39

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	3	3	0	3	1	1	1	
Actual	7.7%	23.1%	23.1%	0.0%	23.1%	7.7%	7.7%	7.7%	100.0%
---	5	5	3		2	5	5	5	
---	3	5	5		3	2	2	5	
---	1	2	3		5	1	1	1	
---	2	5	5		2	4	3	3	
---	1	2	5		4	3	3	1	
---	2	2	4		1	1	2	3	
---	1	5	4		3	2	3	3	
---	4	5	4		3	3	3	3	
---	3	5	2		3	3	3	3	
---	4	5	5		3	3	3	3	
---	2	5	4		3	3	5	3	
---	2	2	2		5	3	3	1	
---	3	3	4		5	4	3	3	
---	4	4	4		5	4	3	3	
---	5	2	4		4	4	5	3	
---	4	3	4		4	4	5	3	
---	4	1	4		4	4	3	3	
---	3	2	4		4	4	3	3	
---	4	2	4		4	4	3	3	

5	Significant advantages
4	Some advantages
3	Issues but manageable
2	Some significant disadvantages
1	Serious disadvantages

SCENARIO 10 - Volume, Reliability, Local Control & Environment = 21.7%; Timing = 0%; All Others = 4.3%

ALTERNATIVES RANKED IN ORDER

Option	Water Resource Alternative	Weighting Score		Rank
8	Antelope Valley Water Bank Drought Insurance	4.04	✓	1
10b	Conservation – Tailor to Unique CBH Characteristics	3.96	✓	2
9c	Groundwater - Develop Central Basin (La Brea) Wells	3.96	✓	3
7	Water Banking	3.91	✓	4
1	Metropolitan Water District of Southern California	3.91	✓	5
10a	Conservation – Comply with SBx7-7	3.78	✓	6
9b	Groundwater - Develop Hollywood Basin Wells	3.70	✓	7
5	Exchanges	3.70	✓	8
2	Ocean Desalination	3.70	✗	9
4a	Recycled Water - Regional Approach	3.65	✗	10
4d	Recycled Water - Exchange	3.52	✗	11
11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.31	✗	12
11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.26	✗	13
4b	Recycled Water - Scaping Plant Approach	3.26	✗	14
6	Transfers	3.22	✗	15
11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.09	✗	16
9a	Groundwater - Capture Spring Water	2.87	✗	17
3	Urban Runoff - Capture & Treat Dry Weather Flows	2.52	✗	18
4c	Recycled Water - Greywater Approach	2.22	✗	19

ALTERNATIVE LIST

Rank	Option	Water Resource Alternative	Weighting Score
5	1	Metropolitan Water District of Southern California	3.91
9	2	Ocean Desalination	3.70
18	3	Urban Runoff - Capture & Treat Dry Weather Flows	2.52
10	4a	Recycled Water - Regional Approach	3.65
14	4b	Recycled Water - Scaping Plant Approach	3.26
19	4c	Recycled Water - Greywater Approach	2.22
11	4d	Recycled Water - Exchange	3.52
8	5	Exchanges	3.70
15	6	Transfers	3.22
4	7	Water Banking	3.91
1	8	Antelope Valley Water Bank Drought Insurance	4.04
17	9a	Groundwater - Capture Spring Water	2.87
7	9b	Groundwater - Develop Hollywood Basin Wells	3.70
3	9c	Groundwater - Develop Central Basin (La Brea) Wells	3.96
6	10a	Conservation – Comply with SBx7-7	3.78
2	10b	Conservation – Tailor to Unique CBH Characteristics	3.96
16	11a	Capture and Treat R.O. Reject Water - 1.5 MGD	3.09
13	11b	Capture and Treat R.O. Reject Water - 3.0 MGD	3.26
12	11c	Capture and Treat R.O. Reject Water - 4.5 MGD	3.31

Criterion Selection Matrix

Weighting Factor	Cost	Volume	Reliability	Timing	Local Control	Legal/ Institutional	Environmental	Operational Complexity	
Relative	1	5	5	0	5	1	5	1	
Actual	4.3%	21.7%	21.7%	0.0%	21.7%	4.3%	21.7%	4.3%	100.0%
---	5	5	3		2	5	5	5	
---	3	5	5		3	2	2	5	
---	1	2	3		5	1	1	1	
---	2	5	5		2	4	3	3	
---	1	2	5		4	3	3	1	
---	2	2	4		1	1	2	3	
---	1	5	4		3	2	3	3	
---	4	5	4		3	3	3	3	
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---	2	2	2		5	3	3	1	
---	3	3	4		5	4	3	3	
---	4	4	4		5	4	3	3	
---	5	2	4		4	4	5	3	
---	4	3	4		4	4	5	3	
---	4	1	4		4	4	3	3	
---	3	2	4		4	4	3	3	
---	4	2	4		4	4	3	3	

5	Significant advantages	2	Some significant disadvantages
4	Some advantages	1	Serious disadvantages
3	Issues but manageable		

Tabular Color-Coded Summary of Supply/Reliability Alternatives by Weighting Scenario

RANKING	Scenario No.									
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
	All Equal	Timing Deleted, all others equal	Cost, Vol., Rel = 33%, all others=0	Cost=30%, all others=10%	Envir.=30%, all others=10%	Relia.=30%, all others=10%	Volume=30%, all others=10%	Cost, Vol., Rel. & Env.= 20%, all others=6.7%; timing=0	Vol., Rel., LC = 23.1%, all others=7.7%; timing=0	Vol., Rel., LC, Env. = 21.7%, all others=4.3%; timing=0
1	1	1	7	1	1	7	1	1	9c	8
2	7	10b	5	10a	10b	1	7	7	7	10b
3	10b	10a	2	7	10a	10b	8	10b	2	9c
4	10a	9c	1	10b	8	10a	9c	10a	1	7
5	9c	7	9c	9c	7	9c	5	9c	10b	1
6	8	9b	4a	5	9c	8	2	8	9b	10a
7	9b	8	10b	11c	9b	2	10b	5	8	9b
8	5	5	10a	11a	5	9b	6	2	5	5
9	2	2	8	9b	11c	5	4a	4a	4a	2
10	11c	11c	11c	8	11b	11c	10a	9b	10a	4a
11	11b	4a	9b	2	11a	4a	9b	11c	4d	4d
12	11a	11b	6	11b	2	11b	4d	6	11c	11c
13	6	11a	4d	6	6	11a	11c	11b	11b	11b
14	4a	6	11b	4a	4a	4b	11b	11a	6	4b
15	4d	4d	11a	4d	4d	4d	11a	4d	11a	6
16	4b	4b	4c	9a	4b	6	4b	4b	4b	11a
17	9a	9a	4b	4b	9a	4c	9a	9a	9a	9a
18	4c	4c	9a	4c	4c	9a	4c	4c	3	3
19	3	3	3	3	3	3	3	3	4c	4c

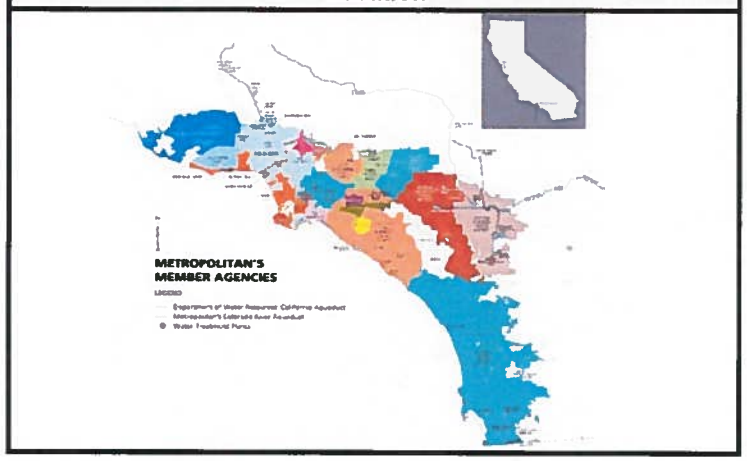
1	Metropolitan Water District of Southern California
2	Ocean Desalination
3	Urban Runoff – Capture and Treat Dry Weather Flows
4a	Recycled Water Regional Approach
4b	Recycled Water – Scalping Plant Approach
4c	Recycled Water – Greywater Approach
4d	Recycled Water Exchanges
5	Exchanges
6	Transfers
7	Water Banking
8	Antelope Valley Water Bank Drought Insurance
9a	Groundwater – Capture Spring Water
9b	Groundwater – Develop Hollywood Basin Wells
9c	Groundwater – Develop Central Basin (La Brea) Wells
10a	Conservation – Comply with SBx7-7
10b	Conservation – Tailor to Unique CBH Characteristics
11a	Capture and Treat RO Reject Water (1.5 MGD)
11b	Capture and Treat RO Reject Water (3.0 MGD)
11c	Capture and Treat RO Reject Water (4.5 MGD)

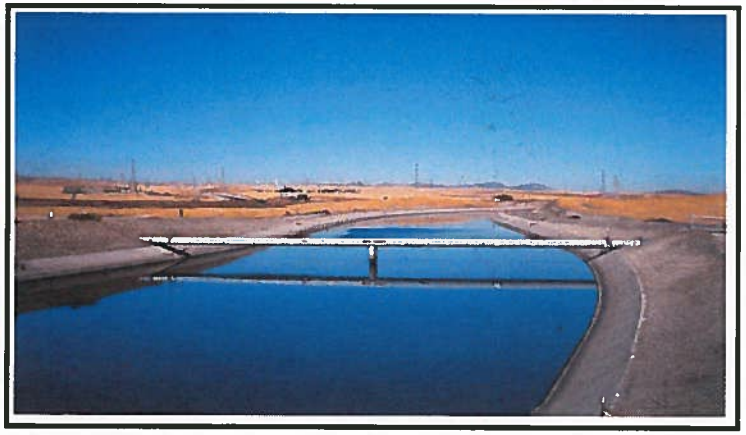
1: Metropolitan Water District of Southern California

Concept Description:

Metropolitan Water District of Southern California (MWD) is a wholesale water agency made up of 26 member agency. The CBH is a founding member and provides one of the 35 directors that govern MWD. MWD supplies include the State Water Project, The Colorado River, and numerous storage, water transfers, exchanges, fallowing projects, and banking projects. The MWD available supply, including storage has been adequate to meet MWD's needs for the last 20 years. However, to cautiously preserve its supplies MWD imposed allocations in 2009 and is considering imposing them again next year. In addition, in the event of a severe emergency or failure to agree on an allocation plan, MWD's code requires allocations to be generally distributed based upon "preferential rights" or cumulative fixed fees paid. Beverly Hills preferential rights is 0.98% of whatever water MWD has available. Minimum supplies, absent a major earthquake, are about 1.2 million AF/ year. The CBH share would be about 11,900 AF/year.

Location





Attributes

Advantages	Disadvantages
Proven, reliable sources	Reliability may degrade with time
Stable cost structure	Lack of local control
Excellent quality	SDCWA lawsuit could significantly impact cost
No additional facilities needed	Must have sufficient storage to plan for 7-day outage
All constructed	

Schedule

Already in service

Ranking

Selection Criteria	Rating
Cost	5
Volume	5
Reliability	3
Timing	5
Local Control	2
Legal/Institutional	5
Environmental	5
Operational Complexity	5

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Full Service Treated (2014) Tier 1 $890/AF

Full Service Treated (2014) Tier 2 $1,032/AF

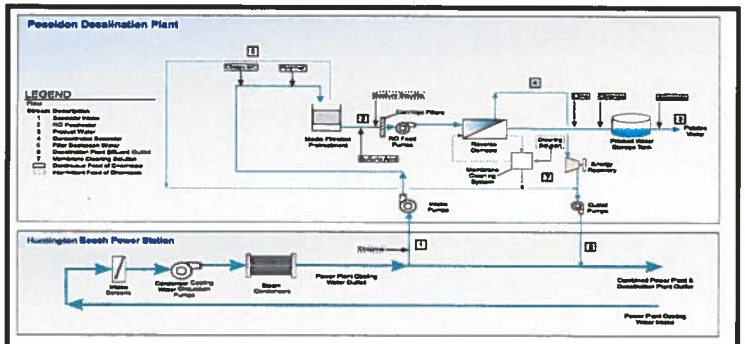
2: Ocean Desalination

Concept Description:

While the City of Beverly Hills (CBH) does not have direct ocean desalination opportunities, it is theoretically possible to "buy into" a planned coastal desalination plant and have water delivered by "exchange" through current Metropolitan service connections. The Huntington Beach desalination plant being planned by Poseidon Resources is closest to permitting and construction and is actively looking for water contractors. CBH would contract for a fixed amount of water for a specific term at a specific price. The water likely incur a "wheeling charge" for delivery/exchange by Metropolitan.

Location

The Plant is located in Huntington Beach, CA on the site of the AES Generating Station adjacent to Pacific Coast Highway



Attributes

Advantages	Disadvantages
Drought proof supply	Must pay MWD System Access Rate to move the water by Exchange to COBH
Provides baseload supply	Must be purchased irrespective of need
No direct operational responsibility	Requires first of its kind agreement for ocean desalination wheeling
Water would be by exchange, representing MWD's current water quality	Not clear plant will subscribe sufficiently to be cost-effective
The water supply would be controlled by the current HB City Council	The environmental community and current City Council oppose the plant
	Plant may have to change intake approach, incurring significant extra cost
	Local agencies have not committed to purchasing the water as of yet due to cost

Schedule

The Plant is currently awaiting approval by the CCC who have raised concerns over the proposed intake system. Studies are underway to assess use of beach wells. Such wells, if required, would add substantial cost to the project Assuming permits are issued and construction is initiated in the next 2 years, the Plant would come on line in approximately 2018-2020.

Ranking

Selection Criteria	Rating
Cost	3
Volume	5
Reliability	5
Timing	3
Local Control	3
Legal/Institutional	2
Environmental	2
Operational Complexity	5

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Poseidon Resources, the developer of the Huntington Beach plant has quoted a price of $1,424/ AF (Jan 2013 dollars, Huntington Beach Project) to local agencies to subscribe capacity of the plant. CBH would have to also negotiate and pay the Metropolitan Water District's Wheeling Rate which, under the current rate structure, is the System Access Rate ($243/AF) and Water Stewardship Rate ($41/AF), Treatment Surcharge (not applicable here) and power costs (at least $161/AF) for wheeling transactions. Total cost of this supply would be in excess of $1,900/AF (assuming the 2013 Poseidon pricing structure would continue to be honored).

3: Urban Runoff - Capture and Treat Dry Weather Flows

Concept Description:

Dry weather urban runoff in major storm channels can be collected, treated and reused to irrigate parks and open spaces. This alternative could be in competition with recycled water alternatives. It would require a separate distribution system and storage in addition to a treatment plant. The diversion would likely have to be in County of Los Angeles Flood Control Facility and coordination efforts would be involved with that agency.

Santa Monica Urban Runoff Recycling Facility

Attributes

Advantages	Disadvantages
Free source of water that is fairly reliable and drought proof	High capital and O&M cost
Reduces potable water demand	Requires land for treatment and storage
Environmental community support	Requires a separate distribution system
Removing and cleaning up source of somewhat polluted water	Depending on location could be competing with recycled water alternative
Potential grant or funding assistance available	Construction impacts due to treatment plant and new pipeline construction
	Conversion of existing irrigation systems sometimes difficult
	Could be some isolated community opposition due to treatment plant siting
	Diversion of tributary water to Ballona Cr.

Schedule

Could be implemented as soon as funding is available, however, planning, siting, design and construction could take at least 5 years.

Ranking

Selection Criteria	Rating
Cost	1
Volume	2
Reliability	3
Timing	3
Local Control	5
Legal/Institutional	1
Environmental	1
Operational Complexity	1

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

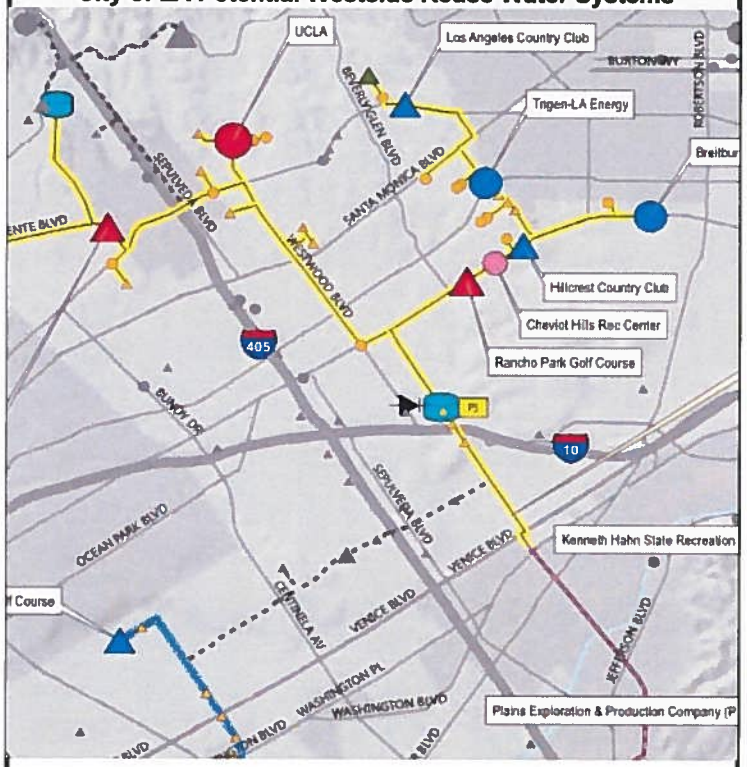
Estimated at greater than $2,500/AF.

4a: Recycled Water - Regional Approach

Concept Description:

While a recycled water source is currently not available to CBH, LADWP in their 2012 Non-Potable Reuse Master Planning Report includes a recycled water distribution system running up to the CBH's westerly boundary to serve LA Country Club. This facility is a part of DWP's "Potential Westside Service Area System". The assumption is made an agreement could be negotiated with DWP to provide additional capacity in this system and to extend it into CBH by running it easterly in San Vicente and Santa Monica Boulevards to serve landscaping along that corridor and potentially other uses such as parks and schools by extending pipelines off this main. This system is DWP's last tier of recycled water supply with a 20-year plan to develop a total of 59,000 AFY including their Existing, Proposed and Potential Non-Potable Reuse Systems along with 30,000 AFY of Groundwater Reuse so CBH has no control over when, and even if, it will actually occur.

City of LA Potential Westside Reuse Water Systems



Attributes	
Advantages	**Disadvantages**
Reliable, drought proof supply	Fairly high up front capital cost
Reduces potable water demand	Construction impacts due to new pipeline installation
Environmental community support	Conversion of existing irrigation systems sometimes difficult
Low O&M costs	DWP negotiation and coordination required
Potential grant or funding assistance available	Limited local control

Schedule

Since CBH is on the end of DWP's Westside System, and that system will likely be one of the last phases of their distribution system, it may be 2035 before recycled water is available.

Ranking	
Selection Criteria	**Rating**
Cost	2
Volume	5
Reliability	5
Timing	1
Local Control	2
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

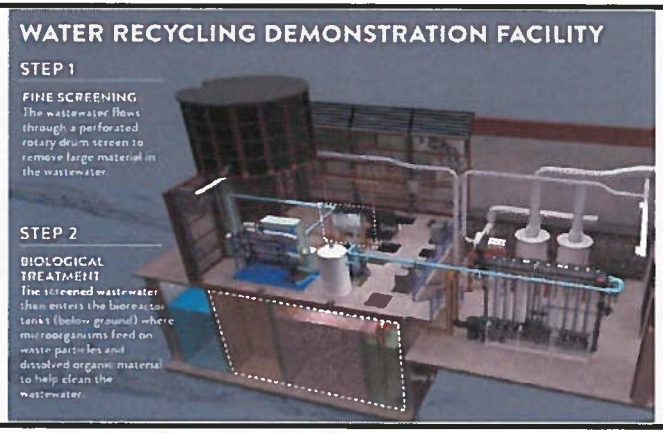
City of LA DWP's cost for Westside System was approximately $1,600/AF and assuming CBH can buy into that system for the same unit cost, extending it approximately 2.3 miles to serve local irrigation demands should run approximately $500 - $600/AF for a total of around $2,100-$2,200/AF.

4b: Recycled Water - Scalping Plant Approach

Concept Description:

The CBH could construct small wastewater reclamation plant(s) along sewer trunks to "scalp" sewage, treat it to tertiary standards, return the solids to the trunk sewer, and pump the recycled water to a distribution system for irrigation of parks, greenbelts and schools.

Wastewater Reuse Scalping Plant



Attributes

Advantages	Disadvantages
Reliable, drought proof supply	Very high up front capital cost
Reduces potable water demand	Requires land for treatment plant
Environmental community support	High O&M cost
Local control	Construction impacts due to treatment plant and new pipeline construction
Requires a treatment plant site	Conversion of existing irrigation systems sometimes difficult
Potential grant or funding assistance available	Could be some isolated community opposition due to treatment plant siting
	The exact need and areas that be converted for use of recycled water need to be identified

Schedule

Would take approximately 5 years to plan, obtain a site, design, finance, construct, and permit a scalping plant. The irrigation system could be constructed to coincide with the availability of recycled water.

Ranking

Selection Criteria	Rating
Cost	1
Volume	2
Reliability	5
Timing	3
Local Control	4
Legal/Institutional	3
Environmental	3
Operational Complexity	1

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

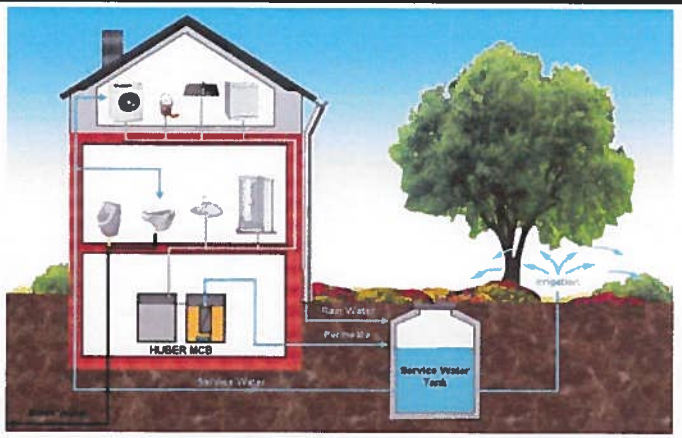
While large, regional wastewater reclamation plants are more prevalent, scalping plants are a way to obtain local control and avoid substantial pumping and distribution system costs. However, capital and O&M costs per acre-foot are substantially higher than regional systems due to the lost economies of scale for treatment. Another southern California City recently completed a demonstration scalping plant with total costs for amortized capital and O&M in the $7,500/AF range.

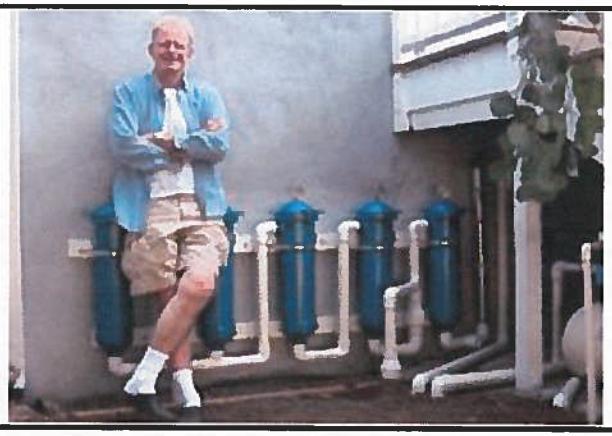
4c: Recycled Water - Greywater Approach

Concept Description:

Greywater recycling would involve local residents and businesses installing separate plumbing systems to capture greywater from washing machines, showers/baths and basins and then constructing tanks and pumps to enable them to utilize this water on their individual properties for irrigation of landscape. Greywater systems can be as simple as diverting washing machine water into a holding tank and from there sending it by gravity to drip irrigation systems or as complex as re-plumbing a home to capture water from basins, showers and washing machines, running it through a package treatment system, to a storage tank and pumping it to an irrigation system.

Greywater System





Attributes

Advantages	Disadvantages
No cost to CBH unless incentive rebate offered	High cost to homeowner or business owner
Reduces potable water demand	High cost per acre-foot
Reliable drought proof supply	Requires public support for implementation
Lower discharge to LA San District	

Schedule

Could be implemented immediately but since these would be private systems implementation is out of City control

Ranking

Selection Criteria	Rating
Cost	2
Volume	2
Reliability	4
Timing	3
Local Control	1
Legal/Institutional	1
Environmental	2
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

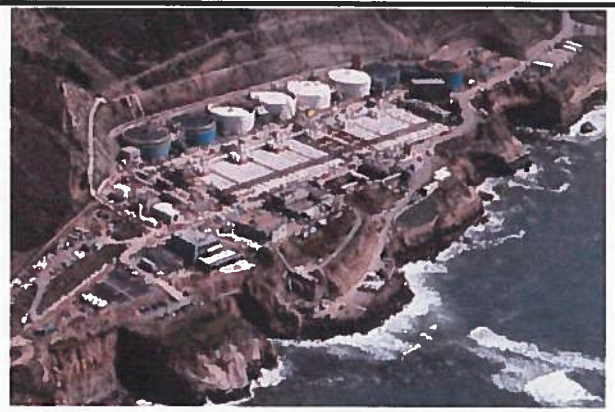
Costs for a simple system can be as low as $1,000 or less if installed by the owner to as much as tens of thousands of dollars if major re-plumbing and a treatment unit is professionally installed. Even a simple system could take over 10 years to recover the capital costs in water savings. If incentives were offered as in some states and municipalities, reduced pay-back could make these systems more prevalent. However, it would take thousands of them to result in an appreciable water savings as the average homeowner would save on the order of 0.1 to 0.2 AFY putting the cost in the range of $2,000 to $5,000/AF, assuming a 10-year life. However, since these are private systems, there is no cost to the City, with the exception of possible incentive rebates that could be offered.

4d: Recycled Water - Exchange

Concept Description:

With a regional project that would bring recyled water to CBH far from implementation, CBH could participate in another recycled water project and exchange that water for potable water. Pure Water San Diego is the City of San Diego's 20-year program to provide 90,000 AFY of potable reuse water from their Point Loma Wastewater Treatment Plant. A 15 MGD initial facility is planned to be operational by 2023 with the long term goal of producing 83 MGD by 2035. This alternative assumes the City of San Diego would allow CBH to financially participate in the project, exchanging the recyiced water yield for an equivalent supply from MWDSC. The exchange would be subject to wheeling charges by MWDSC and the San Diego County Water Authority.

System



The City of San Diego's Point Loma Wastewater Treatment Plant

Attributes

Advantages	Disadvantages
Reliable, drought proof supply	Must pay MWDSC & SDCWA System Access Rates to move the water by Exchange to CBH
Provides benefits to Southern California region by providing funding to help move regional project along	Requires first of its kind agreement for recycled water wheeling
Potential grant of funding assistance available	High cost per AF
No direct operational responsibility	Multiple agencies involved including MWDSC, SDCWA and City of San Diego
Could potentially phase participation	

Schedule

First phase scheduled to be available by 2023, with future phase(s) planned

Ranking

Selection Criteria	Rating
Cost	1
Volume	5
Reliability	4
Timing	3
Local Control	3
Legal/Institutional	2
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Current cost estimates for the San Diego project are upwards of $1,900/AF and we have assumed there would be a $100 incentive charge. CBH would have to negotiate and pay the Metropolitan Water District's Wheeling Rate which, under the current rate structure, is the System Access Rate ($243/AF) and Water Stewardship Rate ($41/AF), Treatment Surcharge and power costs (at least $161/AF) for wheeling transactions. In addition, San Diego County Water Authority would charge their "Transportation Rate", which is $101/AF for 2015. Based on the above, total cost of this supply would be in excess of $2,500/AF.

5: Exchanges

Concept Description:

Water exchanges are occasionally used to minimize capital investments or operating costs. One potential source of water for The CBH is the acquisition of water rights in the adjudicated portion of the Central Basin. While groundwater rights may be able to be purchased in this basin, the wells to extract the water would be a long distance from CBH, and much closer to the LADWP. Since the water would be of potable quality, it cannot be comingled with any facilities to take with from the unadjudicated portion of the Central Basin. Potentially, BH could purchase the water rights, construct the wells, and construct delivery facilities to the nearest connection to the LADWP system. The LADWP could then exchange the water to CBH at the current interconnection with the CBH and LADWP would charge administrative charge to compensate for the transaction. CBH would pay the capital and operating costs for the well pump station, pipelines meter connections and any upgrade needed at the existing connection.

Central Basin

Attributes

Advantages	Disadvantages
Southern California supply (local)	May be objections from other Central Basin pumpers
Reasonable cost	Rights may not be available
Two agency transaction	High initial capital outlay

Schedule

Three or more years from initiation.

Ranking

Selection Criteria	Rating
Cost	4
Volume	5
Reliability	4
Timing	3
Local Control	3
Legal/Institutional	3
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

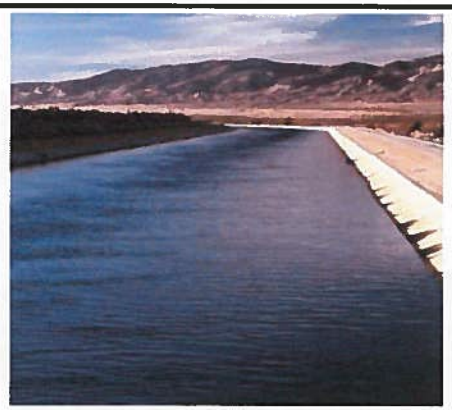
Approximately $1,100/AF.

6: Transfers

Concept Description:

A Water Transfer could provide an alternative source of supplemental water to the CBH. A water transfer is a contractual transfer of a block of water from an agency or individual which either has a legal water supply or water right that is in surplus to its needs and has the legal right and ability to sell or lease all or a portion of that water supply. Most of the current water transfer water is outside and north Los Angeles County. A water transfer would be wheeled through MWD using existing facilities and service connections including its capacity in the State Water Project facilities. CBH would contract for a fixed annual amount of water over a fixed period of time for a specific term and specific price. (i.e. a permanent long term annual supply or a fixed short term annual supply) Storing some or all the transferred water in a water bank is also an option and using in a time of need. In addition to the cost of the water, there will be wheeling charges for delivery, and exchange by MWD.

Location



Attributes

Advantages	Disadvantages
Water can be banked and used when needed	Must pay wheeling charges
Process and procedure well known and documented	Usually requires a take or pay contract
No direct operational responsibility	Usually a fixed multi year term contract
Can usually be arranged within one or two years	Wheeling subject to wheeling capacity availability in facilities
Take delivery through existing MWD connections	Availability of water for transfer could be limited
No water quality issues	May require a CEQA process
Subject to vulnerability of MWD facilities	May take several years to implement

Schedule

There is a limited amount of water available for transfer due to the drought. It will likely take one to two years to find transfer water, negotiate a contract and wheeling agreements as well as CEQA documentation. Could have in place in the 2016/17 time frame.

Ranking

Selection Criteria	Rating
Cost	3
Volume	5
Reliability	2
Timing	3
Local Control	3
Legal/Institutional	3
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

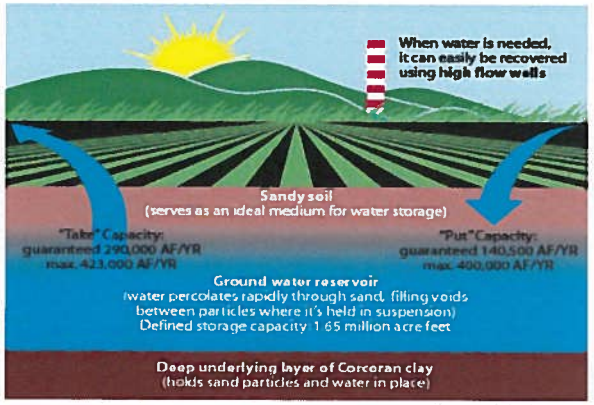
Assuming a 20 to 30 year term with an agency such as Rosedale Rio Bravo Water Storage District, cost would be in the range of $1,200 to $2,000.

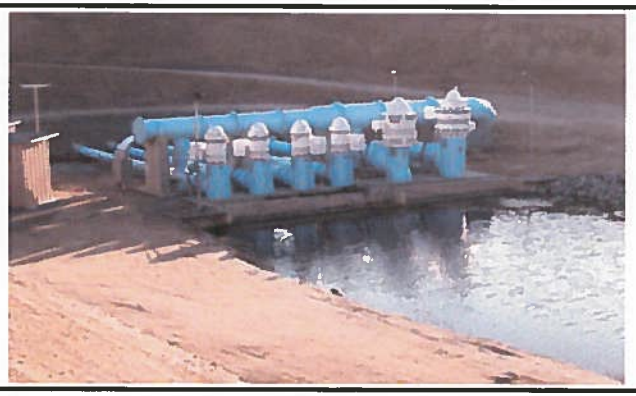
7: Water Banking

Concept Description:

A water bank is a managed set of facilities for storing water in an underground basin in times of surplus for subsequent extraction in time of shortage. Southern California has pioneered this water management tool with the Kern Water Bank, the Semitropic Water Bank and the Antelope Valley Water Bank as prime examples. Each requires that the managing entity has the right to store and extract water, and requires access to a source of water, construction of pipelines, canals and pump stations to move the water to the bank, spreading basins to facilitate recharging the water into the ground, wells for extractions of the water when needed, and pipelines and pump stations to move the water to a regional water transportation facility such as the State Water Project. Agencies desiring to store water in the bank pay a buy-in fee for investment for capital facilities. This gives them the right to store water. The agency is charged a per acre foot charge for water deposited into the bank and is subject to a water loss factor. There is normally an annual storage fee and sometimes an annual loss factor. Upon call on the water, there is an extraction fee and a power cost to move the water. If the water is transported to the Metropolitan Water District, it will be subject to MWD's wheeling fee unless it is MWD water to begin with. Water banks currently soliciting participation include the Semitropic Bank and Antelope Valley Bank.

Location





Attributes

Advantages	Disadvantages
Own stored water	Extensive coordination
Considered exempt to MWD's allocations	Distance from Beverly Hills
Proven technique	Initial buy-in fee of $1,500/AF
Water available when SWP allocations are low	In extreme drought, there has to be water in the SWP in order to move the water
	Have to buy water in advance and store in bank

Schedule

One to two years to purchase water and set up in bank.

Ranking

Selection Criteria	Rating
Cost	4
Volume	5
Reliability	5
Timing	5
Local Control	3
Legal/Institutional	3
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Put Fee - $78/ac-ft; Annual storage fee - $25/AF; agreed loss or leave behind of 10%; Take fee - $78/AF; Energy Fee - $80/AF; MWD water - $600/AF (no wheeling fee); Treatment cost 341/AF.
Approximately $1,300 per acre foot (based on banking and delivery of 1,000 ac-ft over a 5-year period).
An additional $1,500,000 initial fee that is presumed to be an asset and could be sold at a later date.

8: Antelope Valley Water Bank Drought Insurance

Concept Description:

The Antelope Valley Water Bank (AVWB) is a small (15,000 AF currently in storage) water bank in Kern County. The water in the bank is not saleable permanently outside of Kern County due to the regional wholesaler and county ordinances. State law does allow the loan of surface water for up to 5 years, as long as it is repaid at that time. AVWD is proposing two approaches to help mitigate the drought using its facilities. 1) A loan of the water to be repaid in 5 years; 2) Drought insurance whereby you pay an annual fee and exercise an option to take water when needed.
This scenario will cover the drought insurance option. Process = The City of Beverly Hills and AVWB would execute a 10-year agreement for 1,000 AF of water to be delivered in any year needed and repaid within 5 years. Multiple calls are permitted.

Antelope Valley Water Bank

Attributes

Advantages	Disadvantages
No capital outlay	Institutional complexity
Flexible call	Unproven
Considered extraordinary in MWD allocations	
Price is negotiable for initial purchaser	

Schedule

Could be implemented withis one year

Ranking

Selection Criteria	Rating
Cost	2
Volume	5
Reliability	4
Timing	5
Local Control	3
Legal/Institutional	3
Environmental	5
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

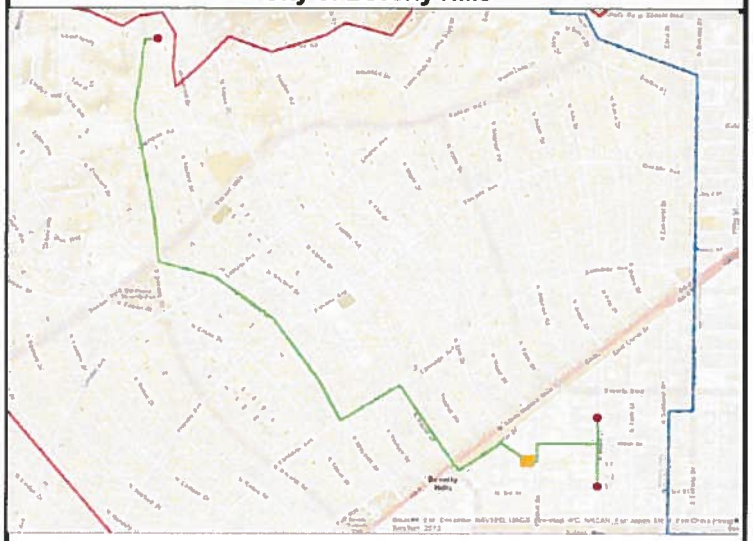
Annual insurance cost $120/AF or $120,000 for 1,000 AF (assume for 5 years or $600,000
Cost of water when delivered $600 AF plus Metropolitan wheeling cost ($243/AF).
Cost of replacement water depends on source $600 per AF
Total cost of AF used 1 times in 5yrs is: $120,000 x 5 = $600,000 + ($600 x 1,000 =) $600,000 +other costs; Total = $1.98 million
With 10% loss
Cost/AF = $1.98 million/900 AF = $2,200 AF

9-a: Groundwater - Capture Spring Water

Concept Description:

Historically, the area in east Beverly Hills and the City of West Hollywood has experienced shallow groundwater conditions that required the installation of collection systems that collected the water and discharged the water to local storm drain system for any below grade structures such as parking garages. The concept is to collect this groundwater, treat (to recycled water requirements) and distribute to recycled water end users. The current concept is to develop approximately 1,000 acre-feet (600 gpm). The concept would also require approximately 12,000 feet of pipeline from the collection areas and back to a new water treatment plant located at the Department of Public Works facility. In addition, would require 30,000 feet of recycle line from plant to distribution areas (LA Country Club, Burton Way, Park in southwest corner of CBH.

City of Beverly Hills



Attributes

Advantages	Disadvantages
Local control of water resources supply	Long-term maintenance and operational cost to operate plant & collection system
Assists in maintaining historical rights in Hollywood Basin	Would be highly susceptible to anthropogenic effects from residential, commercial & industrial activities.
Low vulnerability to external influences	Requires a separate plant and distribution system
Utilization of a resource currently being discharged to the ocean	Volume produced would be unreliable and would likely decrease in summer months
Potential grant or funding assistance available	Conversion of existing irrigation systems sometimes difficult
	Would likely require agreement with private parties to acquire water
	Construction impacts due to new pipeline installation

Schedule

Both the collection system and the recycled water distribution systems are not present in the CBH or West Hollywood. Collection system and treatment plant would take approximately 3 years. Distribution system would take approximately 2 years

Ranking

Selection Criteria	Rating
Cost	2
Volume	2
Reliability	2
Timing	3
Local Control	5
Legal/Institutional	3
Environmental	3
Operational Complexity	1

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Preliminary costs for the proposed concept would indicate approximately $2,400/AF with a life expectancy of the system at approximately 30 years.

9-b: Groundwater - Develop Hollywood Basin Wells

Concept Description:

Historically, the City of Beverly Hills (CBH) has developed groundwater in the Hollywood Basin. This concept would develop groundwater resources within the Hollywood Basin using new production wells. Estimated sustainable yield is 2,000 to 3,000 AFY with the CBH currently extracting 1,000 AFY. The current concept is to develop an additional 1,500 AFY for a total of 2,500 AFY. Preliminary calculations indicate a requirement for six to eight wells each producing approximately 200-300 gallons per minute. The preliminary location would be similar to the previously installed wells near the eastern boundary of CBH. The concept would also require approximately 24,000 feet of pipeline from the production wells back to the existing treatment plant located at the Department of Public Works facility.

Hollywood Basin

Attributes

Advantages	Disadvantages
Less susceptible to short-term drought conditions	Long-term maintenance and operational cost to operate & maintain wells
Local control of water resource supply	Does not prevent other parties from developing resource
Assists in maintaining historical rights in Hollywood Basin	Would require upgrade of existing treatment plant
Potential grant or funding assistance available	Construction impacts due to new pipeline installation

Schedule

Five to ten years to implement

Ranking

Selection Criteria	Rating
Cost	3
Volume	3
Reliability	4
Timing	3
Local Control	5
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

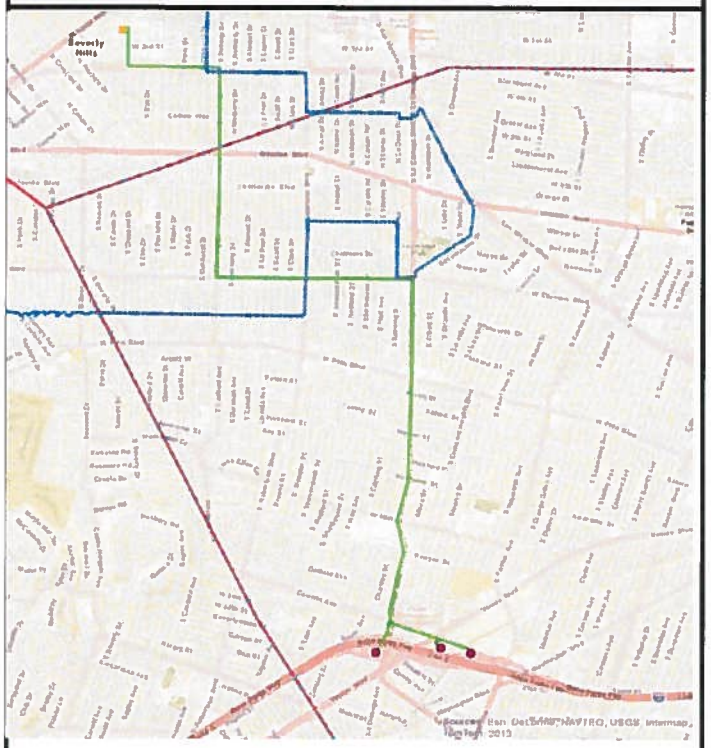
Preliminary costs for the proposed concept would indicate approximately $1,600/AF (2014) with a life expectancy of the wells at approximately 30 years.

9-c: Groundwater - Develop Central Basin (La Brea Sub-Basin) Wells

Concept Description:

Historically, the City of Beverly Hills (CBH) has developed groundwater in the La Brea Sub-Basin portion of the Central Basin (LBSB). This concept would develop groundwater resources within the LBSB using new production wells. Estimated sustainable yield in the LBSB is 3,000 AFY. The current concept is to develop 3,000 AFY in the LBSB and maintain 1,000 AFY in the Hollywood Basin (HB) for a total of 4,000 AFY from both the HB and LBSB. Preliminary calculations indicate a requirement for three wells each producing approximately 800 gallons per minute. The preliminary location would be similar to the previously installed wells near the confluence of Ballona Creek and the I-10 Freeway. The concept would also require approximately 23,000 feet of pipeline from the production wells back to the existing treatment plant located at the Department of Public Works facility.

La Brea Sub-Basin Portion of Central Basin



Attributes

Advantages	Disadvantages
Less susceptible to short-term drought conditions	Long-term maintenance and operational cost to operate & maintain wells
Local control of water resources supply	Does not prevent other parties from developing resource
Assists in maintaining historical rights in Central Basin	Would require upgrade of existing treatment plant
Potential grant or funding assistance available	Construction impacts due to new pipeline installation

Schedule

Five to ten years to implement

Ranking

Selection Criteria	Rating
Cost	4
Volume	4
Reliability	4
Timing	3
Local Control	5
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

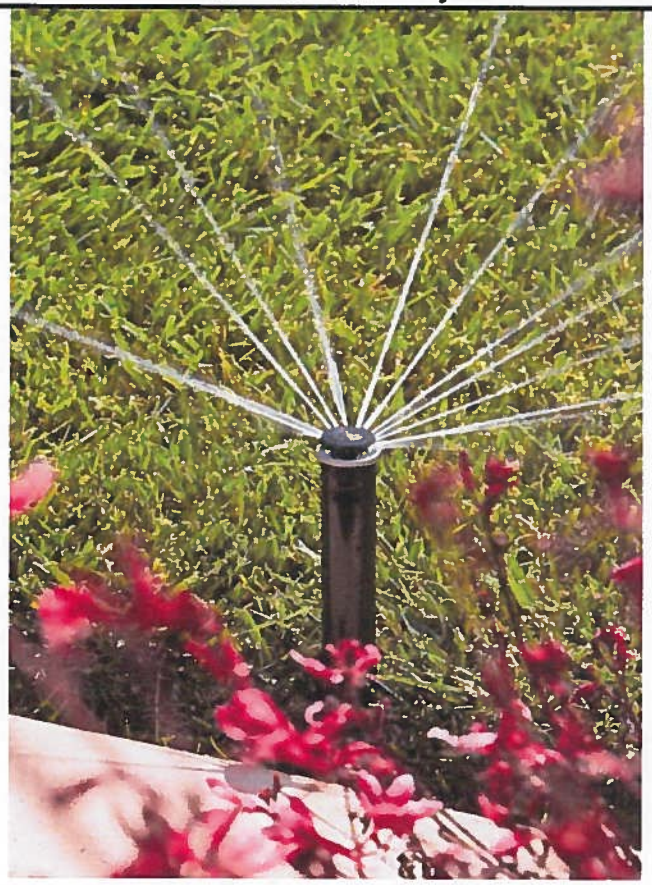
Preliminary costs for the proposed concept would indicate approximately $1,200/AF (2014) with a life expectancy of the wells at approximately 30 years.

10a: Conservation - Comply with SBx7-7

Concept Description:

The CBH desires to comply with SBx7-7 requiring a 20% reduction from the 10-year baseline average by Year 2020 as a minimum conservation goal. From the SBx7-7 update presented herein this results in a goal of 231 gallons per capita per day (gpcd) by 2020 with an interim target of 260 gpcd by 2015. Current water supply within the service area is 12,269 AFY (FY 2014) and current population is estimated at 42,858 resulting in a current use of 256 gpcd. Based on current usage a reduction of 1,175 AFY or 9.5% would be required utilizing the projected population for 2020. This would require additional conservation measures from water users in the service area averaging almost 200 AF each year for the next 6 years.

Water Use Efficiency



Attributes

Advantages	Disadvantages
This level of conservation meets State DWR guidelines	Revenue is reduced due to reduced sales
Permanent conservation results in permanent water demand reduction	Residents and businesses must be convinced to practice conservation
Demand reduction is reliable and drought proof	May require CBH to provide rebate incentives
Potential grant or funding assistance available	Landscaping palettes may need to be modified

Schedule

Would need to be implemented by 2020 to meet SBx 7-7 guidelines.

Ranking

Selection Criteria	Rating
Cost	5
Volume	2
Reliability	4
Timing	3
Local Control	4
Legal/Institutional	4
Environmental	5
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

Costs to an agency for water use efficiency programs have been shown to vary from the neighborhood of $50/AF to $2,500/AF conserved of the useful life. However, the customer would also incur certain costs which could be offset by savings on their water bills on many of the programs. Customer costs are not included. Indoor savings from such programs as washing machine and dishwasher replacement rebates also save City on sewer discharge fees.

10b: Conservation - Tailor to Unique CBH Characteristics

Concept Description:

Recognizing the CBH unique characteristics, a suite of conservation practices could be developed to attain the State mandated SBx7-7 requirements plus some additional conservation reaching a total demand reduction over current levels of approximately 18% by 2025. This could be achieved by continuing to conserve 200 AF each year beyond 2020 to 2025 and could involve such programs and devices as large landscape surveys, pay for performance incentives, public spaces program, smart timers, rotary nozzles, computerized irrigation controllers, turf removal, HEF washers and toilets, UL or waterless urinals, cooling tower retrofits, etc.

Water Use Efficiency

Attributes

Advantages	Disadvantages
This level of conservation exceeds State DWR guidelines	Revenue is reduced due to reduced sales
Permanent conservation results in permanent water demand reduction	Customers must be convinced to participate and practice conservation
Demand reduction is reliable and drought proof	Will require CBH to provide some level of rebates and incentives
Potential grant or funding assistance available	Landscaping palettes may need to be modified

Schedule

231 gallons per capita day would need to be attained by 2020 to meet SBx7-7 guidelines. Additional conservation could be implemented over the next 5 years to 2025 equating to a total savings of over 18% and a per capita rate of 210.7.

Ranking

Selection Criteria	Rating
Cost	4
Volume	3
Reliability	4
Timing	3
Local Control	4
Legal/Institutional	4
Environmental	5
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

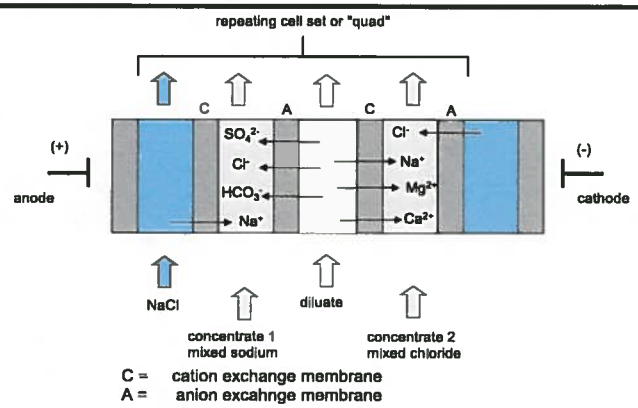
Costs to an agency for water use efficiency programs have been shown to vary from the neighborhood of $50/AF to $2,500/AF conserved of the useful life. However, the customer would also incur certain costs which could be offset by savings on their water bills on many of the programs. Customer costs are not included. Indoor savings from such programs as washing machine and dishwasher replacement rebates also save City on sewer discharge fees.

11a: Capture and Treat R.O. Reject Water - 1.5 MGD Plant Size

Concept Description:

Desalination with reverse osmosis (RO) membranes can be used to diversify and expand municipal water supplies, but desalination generates a concentrate byproduct that must be managed. Sustainable and environmentally responsible management of RO concentrate will be a prerequisite to expanded use of brackish and recycled water. For many inland communities, sustainable management of RO concentrate will require zero liquid discharge (ZLD) desalination. In ZLD desalination, concentrate is treated to recover it as product water, and there is no discharge of liquid waste from the plant. A new electrodialysis technology, electrodialysis metathesis (EDM), has emerged that offers the potential to reduce the costs and energy requirements for ZLD. The concept is to apply this technology to the RO concentrate from the CBH RO plant to try and capture the wastewater for beneficial use. Plant size is 1.5 MGD

Existing RO Treatment Plant



Attributes

Advantages	Disadvantages
Eliminate discharge of wastewater from RO plant	Operational complexity
Maximizes yield from existing facility	Unproven technology that has not been commercially demonstrated
Potential grant or funding assistance available	Handling and disposal of concentrate
	High energy requirement
	Space requirements
	Quantity of water generated dependent on plant throughput
	Increase to per unit discharge cost of waste stream to sewer system.

Schedule

Unknown. Further product development and commercial backing is needed to bring the EDM technology to market

Ranking

Selection Criteria	Rating
Cost	4
Volume	1
Reliability	4
Timing	3
Local Control	4
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

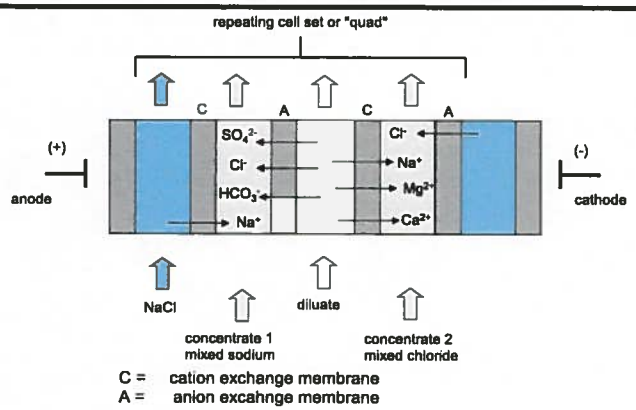
$840 to $1,300/AF

11b: Capture and Treat R.O. Reject Water - 3.0 MGD Plant Size

Concept Description:

Same concept as 11a except plant throughput has increased to maximum capacity of 3.0 MGD. The project anticipates that Option 9b, Groundwater Production from the Hollywood Basin would be required to achieve the plant capacity of 3.0 MGD.

Existing RO Treatment Plant



Attributes

Advantages	Disadvantages
Eliminate discharge of wastewater from RO plant	Operational complexity. Would require expanding capacity of existing plant.
Potential grant or funding assistance available	Unproven technology that has not been commercially demonstrated
	Handling and disposal of concentrate
	High energy requirement
	Space requirements
	Quantity of water generated dependent on plant throughput
	Increase to per unit discharge cost of waste stream to sewer system.

Schedule

Unknown. Further product development and commercial backing is needed to bring the EDM technology to market

Ranking

Selection Criteria	Rating
Cost	3
Volume	2
Reliability	4
Timing	3
Local Control	4
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

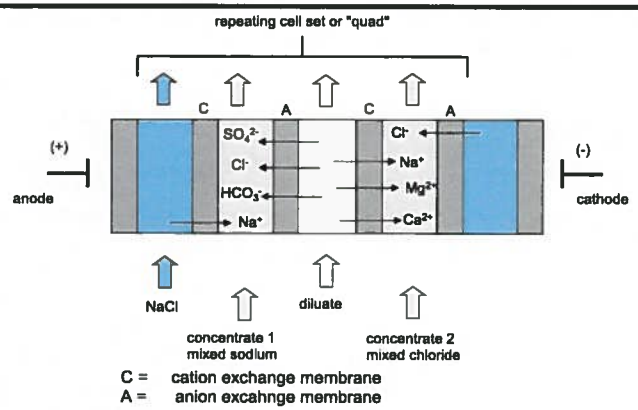
$1,300 to $1,600/AF

11c: Capture and Treat R.O. Reject Water - 4.5 MGD Plant Size

Concept Description:

Same concept as 11a except plant throughput increased to maximum capacity of 4.5 MGD. The project anticipates that Option 9c, Groundwater Production from the Central Basin (unadjudicated part) would be required to achieve the plant capacity of 4.5 MGD.

Expand RO Treatment Plant



Attributes

Advantages	Disadvantages
Eliminate discharge of wastewater from RO plant	Operational complexity
Maximizes yield from existing facility	Unproven technology that has not been commercially demonstrated
Potential grant or funding assistance available	Handling and disposal of concentrate
	High energy requirement
	Space requirements
	Quantity of water generated dependent on plant throughput
	Increase to per unit discharge cost of waste stream to sewer system.

Schedule

Unknown. Further product development and commercial backing is needed to bring the EDM technology to market

Ranking

Selection Criteria	Rating
Cost	4
Volume	2
Reliability	4
Timing	3
Local Control	4
Legal/Institutional	4
Environmental	3
Operational Complexity	3

Ranking Legend

Serious disadvantages	1
Some significant disadvantages	2
Issues but manageable	3
Some advantages	4
Significant advantages	5

Cost:

$1,100 to $1,400/AF.

PSOMAS

TECHNICAL MEMORANDUM NO. 4

To: Trish Rhay and Steve Bucknam

From: Harvey R. Gobas, PE

Date: January 15, 2015

Subject: Ten-Year Estimated Costs for Nine Shortlisted Alternatives Including a Summary of Recommended Portfolio Costs

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In response to questions from the Public Works Commissioners received earlier this week, we have created a series of spreadsheets identifying the estimated costs over the next ten years for the recommended Water Enterprise Plan portfolio as well as for the other short-listed alternatives that are not included in our recommendations.

In considering the actual costs that would be incurred for each of the nine shortlisted alternatives, we have assumed three percent compounded annual inflation over the ten year period and have escalated costs by that factor for each year. All of the costs also now include projected operation and maintenance expenditures. Given the preliminary nature of these estimates, we have also provided high and low ranges for the projected costs utilizing the widely accepted guidelines established by the American Association of Cost Estimators (AACE). Those guidelines suggest using (-30%) and (+50%) for the low and high ends of the range, respectively, for planning level projects in which no preliminary or final engineering design has been performed.

Additionally, we have created 10-year cost spreadsheets for MWD water purchases and for staffing. The MWD costs are based on MWD's currently adopted 10-year rates and thus, do not include any additional inflation factor. We have escalated the staffing costs by three percent per year, but have not applied the AACE high and low range factors to them. Please also note the staffing costs include 10 of the recommended 11 positions. The eleventh position (Water Conservation Coordinator) has been included with the Water Conservation Cost Table.

The overall, 10-year escalated costs for the recommended portfolio are summarized below. Detailed copies of the respective spreadsheets are also attached for your review. We will be summarizing this information and look forward to answering any related questions at the Special Public Works Commission meeting scheduled for January 22, 2015.

Recommended Portfolio Options	Sum of 10-Year Escalated Costs (Rounded)
Water Conservation (including Water Conservation Coordinator)	$3,700,000
Water Banking	$7,800,000
Groundwater Development (La Brea Sub-Basin)	$37,900,000
MWD Water Purchases	$105,700,000
Staffing	$12,900,000
Subtotal of Recommended Portfolio Options	$168,000,000
Subtotal Less MWD and Staffing	$49,400,000
Low Range Cost (-30% except for MWD and Staffing)	$153,200,000
High Range Cost (+50% except for MWD and Staffing)	$192,700,000

Annual Cost Summary For Recommended Portfolio[1]

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Conservation	$ 499,500	$ 418,953	$ 429,930	$ 311,700	$ 321,051	$ 330,683	$ 340,603	$ 350,822	$ 361,346	$ 372,187	$ 3,736,775
Water Banking	$ 2,720,000	$ 43,775	$ 1,262,471	$ 1,300,345	$ 47,834	$ 49,269	$ 50,747	$ 1,099,753	$ 1,132,746	$ 55,453	$ 7,762,394
Groundwater Development (LBSB)	$ 200,000	$ 2,446,000	$ 1,777,000	$ 2,841,000	$ 9,792,000	$ 9,390,000	$ 2,924,000	$ 2,766,000	$ 2,849,000	$ 2,934,000	$ 37,919,000
MWD Water Purchases	$ 10,723,750	$ 10,814,963	$ 10,234,680	$ 10,378,185	$ 10,551,264	$ 10,928,540	$ 11,360,160	$ 9,816,804	$ 10,231,146	$ 10,653,948	$ 105,693,440
Staffing	$ 725,000	$ 746,750	$ 1,510,722	$ 1,556,043	$ 1,602,725	$ 1,650,806	$ 1,700,330	$ 1,105,657	$ 1,138,826	$ 1,172,991	$ 12,909,850
Total	$ 14,868,250	$ 14,470,440	$ 15,214,802	$ 16,387,274	$ 22,314,874	$ 22,349,298	$ 16,375,841	$ 15,139,035	$ 15,713,064	$ 15,188,579	**$ 168,021,458**
								Subtotal (less MWD and Staffing)			**$ 49,418,168**
									Low Cost[2]	(- 30 %)	**$ 153,196,007.43**
									High Cost[2]	(+ 50%)	**$ 192,730,541.89**

[1] Costs are escalated at 3% annually, compounded with the exception of MWD Water Purchases which use MWD's currently adopted 10-year rates.

[2] Low and High Cost range calculated on sub-total of Water Conservation, Water Banking, and Groundwater Development only with MWD Water Purchase and Staffing Costs (no range applied) added directly.

Water Conservation Program Costs

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Conservation											
Capital Programs	$ 359,500	$ 274,753	$ 281,404	$ 158,719	$ 163,480	$ 168,385	$ 173,436	$ 178,639	$ 183,998	$ 189,518	
Staffing	$ 140,000	$ 144,200	$ 148,526	$ 152,982	$ 157,571	$ 162,298	$ 167,167	$ 172,182	$ 177,348	$ 182,668	
O&M[1]	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Total	$ 499,500	$ 418,953	$ 429,930	$ 311,700	$ 321,051	$ 330,683	$ 340,603	$ 350,822	$ 361,346	$ 372,187	**$ 3,736,775**
Captial Programs Backup											
Waterfluence	$ 7,500	$ 4,750	$ 3,250	$ 3,250	$ 3,250	$ 3,250	$ 3,250	$ 3,250	$ 3,250	$ 3,250	
Triton	$ 72,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	$ 42,000	
TaKaDu[2]	$ 180,000	$ 120,000	$ 120,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Enhanced Rebates	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	
Totals (2015 Dollars)	$ 359,500	$ 266,750	$ 265,250	$ 145,250	$ 145,250	$ 145,250	$ 145,250	$ 145,250	$ 145,250	$ 145,250	**$ 1,908,250**
Escalated Totals	$ 359,500	$ 274,753	$ 281,404	$ 158,719	$ 163,480	$ 168,385	$ 173,436	$ 178,639	$ 183,998	$ 189,518	**$ 2,131,831**
									Low Cost	(- 30 %)	**$ 1,492,282**
									High Cost	(+ 50%)	**$ 3,197,747**
Annual Inflation	3.0%										
Cost Escalation Factor	1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Assumes O&M for Water Conservation Programs is minor with exception of Water Conservation Coordinator and O&M to repair leaks discovered utilizing TaKaDu or similar system would be incurred anyway, but would just be more efficient.

[2] Assumes TaKaDu or similar program would justify itself, or not, after 3 years and if continued would not be allocated to WEP after this time.

Water Banking Annual Estimate of Costs

			FISCAL YEAR										Total
			2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Total in Storage		AF			1,700	3,400	3,400	3,400	3,400	1,700			
Draw		AF/Yr								1,700	1,700		
Replacement water		AF											
Initial Water Purchase					1,700	1,700							
Total Shares	1700												
Buy in Cost	$1,600	/Share	$ 2,720,000										
Initial Water Purchase	$600	/AF			$ 1,082,118	$ 1,114,582							
Initial Put Cost	$75	/AF			$ 135,265	$ 139,323							
O&M	$25	/Share		$ 43,775	$ 45,088	$ 46,441	$ 47,834	$ 49,269	$ 50,747	$ 52,270	$ 53,838	$ 55,453	
Draw Take	$75	/AF								$ 156,809	$ 161,513		
Power	$85	/AF								$ 177,717	$ 183,048		
Treat	$341	/AF								$ 712,958	$ 734,347		
Replacement Water	$440	/AF											
Replacement Put	$75	/AF											
Total Annual Costs			$ 2,720,000	$ 43,775	$ 1,262,471	$ 1,300,345	$ 47,834	$ 49,269	$ 50,747	$ 1,099,753	$ 1,132,746	$ 55,453	$ 7,762,394
											Low Cost	(- 30 %)	$ 5,433,675.45
											High Cost	(+ 50%)	$ 11,643,590.25
Annual Inflation	3.0%												
Cost Escalation Factor			1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Original unit costs are in 2015 Dollars. All other costs are inflated at 3% per year starting in 2016.

[2] Unit costs based on estimates provided by the Willow Springs Water Storage Bank

[3] Based on having a significant reduction in supply caused by drought condition once each decade

[4] Similar Costs to those incurred in years 1 - 10, will also ne incurred in years 11 - 20 and 12 - 30.

Water Drought Insurance Annual Estimate of Costs

				FISCAL YEAR										Total
				2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Insurance Water		AF		3400	3400	3400								
Draw on Insurance		AF					3400							
Term in years	4	Yrs												
Annual Fee	120	AF/Yr												
Water Insurance	3400	AF												
Loan Fee	$600	/AF												
Pay back Fee	$660	/AF												
Power	$85	/AF												
Wheeling	$257	/AF												
Treatment	$341	/AF												
Annual Fee				$ 408,000	$ 420,240	$ 432,847	$ 445,833							
Loan Fee				$ 2,040,000										
Energy Cost (est.)							$ 315,798							
MWD Wheeling Cost							$ 954,825							
MWD Treatment Cost							$ 1,266,908							
Bank Pay Back Cost										$ 2,679,453				
Total Annual Costs				$ 2,448,000	$ 420,240	$ 432,847	$ 2,983,363	$ -	$ -	$ 2,679,453	$ -	$ -	$ -	$ 8,963,904
Total Costs inflated over 10 years			$ 17,927,808										Low Cost	(- 30 %)	$ 6,274,733
Total Water Obtained			$ 3,400	Acre Feet									High Cost	(+ 50%)	$ 13,445,856
Annual Inflation	3.0%														
Cost Escalation Factor				1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Original unit costs are in 2015 Dollars. All other costs are inflated at 3% per year starting in 2016.

[2] Unit costs based on estimates provided by the Willow Springs Water Storage Bank and program limited to four year term.

[3] Water is to be repaid within 3 years of draw.

[4] Based on having a significant reduction in supply caused by drought condition once each decade

Water Spot Loan Estimate of Costs

					FISCAL YEAR										Total
					2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Loan water Available	3400	AF													
Draw on Loan		AF						3400							
Term in years	4	Yrs													
Loan Fee	$1,100	AF													
Water, af	3400	AF													
Pay back Fee	$660	/AF													
Power	$85	/AF													
Wheeling	$257	/AF													
Treatment	$341	/AF													
Loan Fee					$ 3,740,000										
Energy Cost (est.)								$ 315,798							
MWD Wheeling Cost								$ 954,825							
MWD Treatment Cost								$ 1,266,908							
Bank Pay Back Cost											$ 2,679,453				
Total Annual Costs					$ 3,740,000			$ 2,537,531			$ 2,679,453				$ 8,956,984
Total Costs inflated over 10 years				$ 17,913,968									Low Cost	(- 30 %)	$ 6,269,889
Total Water Obtained				$ 3,400	Acre Feet								High Cost	(+ 50%)	$ 13,435,476
Annual Inflation	3.0%														
Cost Escalation Factor		0.030			1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Original unit costs are in 2015 Dollars. All other costs are inflated at 3% per year starting in 2016.

[2] Unit costs based on estimates provided by the Willow Springs Water Storage Bank and program limited to four year term.

[3] Water is to be repaid within 3 years of draw.

[4] Based on having a significant reduction in supply caused by drought condition once each decade

Water Insurance Annual Estimate of Costs - Exchange from Central Basin with LADWP

					FISCAL YEAR										Total
					2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Production per well	1,000	gpm													
Annual Production	1,200	AF													
Land required	0.25	Acres													
Life of Wells for Production Estimate	40	Years													
Total production over life of wells	48000	AF													
CAPITAL COSTS															
Production Well:															
Purchase Water Rights in Main Central Basin	$15,000	per AF	1200	AFY	$18,540,000										
Land (cost per 0.25 acre)	$625,000	per 1/4 acre	1		$643,750										
Well installation & equipping	$2,500,000	per well	1					$1,406,886	$1,449,093						
Well permitting/Engineering	$375,000		1			$198,919	$204,886								
Forebay and Pump Station:															
Cost for Pump Station	$625,000	each	1					$703,443.01							
Permitting/Engineering for pipeline	$93,750		0				$81,955								
Pipeline:															
Cost for Pipeline	$250,000	$200 per foot	1000	LF					$289,819						
Permitting/Engineering for pipeline	$37,500		1					$42,207							
25% Contingencies in all costs	25%														
O & M COSTS															
Well O&M Cost (5% of Capital costs)		$1,075,000								$1,283,606	$1,322,114	$1,361,778	$1,402,631	$1,444,710	
Well Power Costs		$98,092								$117,126	$120,640	$124,259	$127,987	$131,827	
Forebay & Pump Station O&M Costs (5%)		$35,938								$42,911	$44,199	$45,525	$46,890	$48,297	
Forebay & Pump Station Power Costs ($)		$85,830								$102,486	$105,560	$108,727	$111,989	$115,348	
Pipeline O&M Costs (5% of Capital)		$14,375								$17,165	$17,679	$18,210	$18,756	$19,319	
WRD RA		$402,000								$480,009	$494,409	$509,242	$524,519	$540,254	
LADWP Wheeling @$200/AF		$300,000								$358,216	$368,962	$380,031	$391,432	$403,175	
Total Annual Costs					$19,183,750	$198,919	$286,841	$2,152,536	$1,738,911	$2,401,519	$2,473,564	$2,547,771	$2,624,204	$2,702,931	$36,310,945
													Low Cost	(- 30 %)	$25,417,662
													High Cost	(+ 50%)	$54,466,418
Annual Inflation	3.0%														
Cost Escalation Factor		0.03			1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	1.344	

[1] Original unit costs are in 2015 Dollars. All other costs are inflated at 3% per year starting in 2016.

[2] Estimate of first ten years of the project.

Groundwater Development Estimate of Costs

OPTION	ESTIMATED COST (2015 $)		FISCAL YEAR 2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	Total
La Brea Sub-Basin Groundwater	$23,850,000		Cost for Implementation ($)										
Feasibility Study	$500,000		200,000	300,000									$500,000
Land Acquisition/Pilot Well Study (1 well)	$3,000,000			2,000,000	1,000,000								$3,000,000
CEQA	$250,000			75,000	175,000								$250,000
Preliminary & Final Design	$1,300,000				500,000	800,000							$1,300,000
Final Land Acquisition	$2,000,000					1,800,000	200,000						$2,000,000
Pipeline Construction	$4,600,000						1,500,000	3,100,000					$4,600,000
RO Plant Upgrade	$7,000,000						5,000,000	2,000,000					$7,000,000
Well Construction (2 add'l wells)	$5,000,000						2,000,000	3,000,000					$5,000,000
System Permitting & Testing	$200,000								200,000				$200,000
	Capital Cost Sub-Total ($)		$ 200,000	$ 2,375,000	$ 1,675,000	$ 2,600,000	$ 8,700,000	$ 8,100,000	$ 200,000	$ -	$ -	$ -	$ 23,850,000
O&M (3,000 AFY GW)[1] Rate/Volume	$1,027/AF	2,190 AFY	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,249,130	$ 2,249,130	$ 2,249,130	$ 2,249,130	$ 8,996,520
Sub-Total (2015 dollars)	---	---	$ 200,000	$ 2,375,000	$ 1,675,000	$ 2,600,000	$ 8,700,000	$ 8,100,000	$ 2,449,000	$ 2,249,000	$ 2,249,000	$ 2,249,000	**$ 32,846,000**
Adjusted for Inflation	---	---	$ 200,000	$ 2,446,000	$ 1,777,000	$ 2,841,000	$ 9,792,000	$ 9,390,000	$ 2,924,000	$ 2,766,000	$ 2,849,000	$ 2,934,000	**$ 37,919,000**
												Low Cost (- 30 %)	**$ 26,543,300**
												High Cost (+ 150%)	**$ 56,878,500**
Annual Inflation		3.0%											
Cost Escalation Factor			1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

OPTION	ESTIMATED COST (2015 $)		FISCAL YEAR 2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	Total
Hollywood Basin Groundwater	$33,350,000		Cost for Implementation ($)										
Feasibility Study	$600,000		300,000	300,000									$600,000
Land Acquisition/Pilot Well Study (2 wells)	$6,000,000			4,000,000	2,000,000								$6,000,000
CEQA	$250,000			75,000	175,000								$250,000
Preliminary & Final Design	$2,000,000				500,000	1,500,000							$2,000,000
Final Land Acquisition	$4,000,000					3,600,000	400,000						$4,000,000
Pipeline Construction	$4,800,000						2,500,000	2,300,000					$4,800,000
RO Plant Upgrade	$7,000,000						5,000,000	2,000,000					$7,000,000
Well Construction (4 add'l wells)	$8,500,000						3,000,000	5,500,000					$8,500,000
System Permitting & Testing	$200,000								200,000				$200,000
	Capital Cost Sub-Total ($)		$ 300,000	$ 4,375,000	$ 2,675,000	$ 5,100,000	$ 10,900,000	$ 9,800,000	$ 200,000	$ -	$ -	$ -	$ 33,350,000
O&M (1,500 AFY GW)[2] Rate/Volume	$1,572/AF	1,500 AFY	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,358,000	$ 2,358,000	$ 2,358,000	$ 2,358,000	$ 9,432,000
Sub-Total (2015 dollars)	---	---	$ 300,000	$ 4,375,000	$ 2,675,000	$ 5,100,000	$ 10,900,000	$ 9,800,000	$ 2,558,000	$ 2,358,000	$ 2,358,000	$ 2,358,000	**$ 42,782,000**
Adjusted for Inflation	---	---	$ 300,000	$ 4,506,000	$ 2,838,000	$ 5,573,000	$ 12,268,000	$ 11,361,000	$ 3,054,000	$ 2,900,000	$ 2,987,000	$ 3,077,000	**$ 48,864,000**
												Low Cost (- 30 %)	**$ 34,204,800**
												High Cost (+ 50%)	**$ 73,296,000**
Annual Inflation		3.0%											
Cost Escalation Factor			1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] La Brea Sub-Basin has maximum production capability of 3,000 AFY netting 2,340 AFY supply after Plant reject. However, O&M cost based on 2,190 AFY groundwater production netting 1,708 AFY. This volume along with 1.0 MGD net from existing HB shallow wells/Plant would provide 25% reliability.

[2] Hollywood Basin assumed capable of producing an additional 1,500 AFY (average sustainable) netting 1,170 AFY supply after Plant reject. This volume along with 1.0 MGD net from existing HB shallow wells/Plant would provide a total of 2,290 AFY or an approximate 20% reliability.

Estimated Unsubsidized Cost of Huntington Beach Desalinization Plant Water at CBH Service Connection

OPTION	Cost / AF	Cost Without $250/AF LRP	Summary 2015 Costs/AF	FISCAL YEAR[4] 2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	10-Year Total (Assuming plant on-line in 2020/21)
Quoted HB Desal Plant Cost[1]	$ 1,424	$ 1,674												
Plus MWD LRP Subsidy	$ 250													
Capital Component (assumed 1/2 of cost and not subject to escalation)			$ 837						$ 837	$ 837	$ 837	$ 837	$ 837	
Operating Component (subject to 3% CPI escalation)			$ 837						$ 999	$ 1,029	$ 1,060	$ 1,092	$ 1,125	
Pipelines (Regional South Delivery System)	$ 138	$ 138	$ 138						$ 138	$ 138	$ 138	$ 138	$ 138	
Wheeling through MWD System[2]														
System Access Rate	$ 243													
Water Stewardship Rate	$ 41	$ 445	$ 445						$ 531	$ 547	$ 564	$ 581	$ 598	
Power Costs	$ 161													
			Sub-Total ($/AF)						$ 2,506	$ 2,552	$ 2,599	$ 2,648	$ 2,698	
Annual Cost for Total AF Commitment of		1,700							$ 4,259,818	$ 4,337,887	$ 4,418,299	$ 4,501,123	$ 4,586,431	$ 22,103,557
												Low Cost	(- 30 %)	$ 15,472,490
												High Cost	(+ 50%)	$ 33,155,336
Annual Inflation	3.0%													
Cost Escalation Factor				1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Source = 2013 Huntington Beach Plant Term Sheet

[2] May be avoidable with negotiations

[3] 3% escalation applied to operating and capital costs per term sheet (assumed annual cost split 50:50 between capital and operating costs)

[4] The absolute earliest the plant could come on-line is 2020/21; 10 yr cost total assumes plant is on-line in 2020/21 (last 5 years only)

MWD Purchase Costs

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Supply Breakdown											
Total Water Demand (AF)	12,495	12,325	12,350	12,375	12,328	12,340	12,380	12,420	12,460	12,493	
Less Cumulative Conservation (AF)	195	630	850	1,010	1,140	1,180	1,180	1,180	1,180	1,180	
Less HB GW (AF)	800	400	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	
Less La Brea Sub-Basin (AF)	0	0	0	0	0	0	0	1,708	1,708	1,708	
MWD Supply Required (AF)	11,500	11,295	10,380	10,245	10,068	10,040	10,080	8,412	8,452	8,485	
MWD Tier 1 Treated Rate ($/AF)[1]	$933	$958	$986	$1,013	$1,048	$1,089	$1,127	$1,167	$1,211	$1,256	
Total MWD Purchase Cost	$ 10,723,750	$ 10,814,963	$ 10,234,680	$ 10,378,185	$ 10,551,264	$ 10,928,540	$ 11,360,160	$ 9,816,804	$ 10,231,146	$ 10,653,948	**$ 105,693,440**

[1] MWD rate is average of calendar year Full Service Tier 1 Treated Volumetric Cost ($/AF) from Attachment 10 to 4/8/2014 MWD Board Meeting Package. Inflation built into these rates.

Recommended Staffing

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Ten Staff Positions[1]											
Project Manager 1	$ 175,000	$ 180,250	$ 185,658	$ 191,227	$ 196,964	$ 202,873	$ 208,959				
Project Manager 2	$ 175,000	$ 180,250	$ 185,658	$ 191,227	$ 196,964	$ 202,873	$ 208,959				
Project Manager 3	$ 175,000	$ 180,250	$ 185,658	$ 191,227	$ 196,964	$ 202,873	$ 208,959				
Water Resource Manager	$ 200,000	$ 206,000	$ 212,180	$ 218,545	$ 225,102	$ 231,855	$ 238,810	$ 245,975	$ 253,354	$ 260,955	
Water Treatment Operator 1			$ 141,100	$ 145,333	$ 149,693	$ 154,183	$ 158,809	$ 163,573	$ 168,480	$ 173,535	
Water Treatment Operator 2			$ 141,100	$ 145,333	$ 149,693	$ 154,183	$ 158,809	$ 163,573	$ 168,480	$ 173,535	
Water Treatment Operator 3			$ 141,100	$ 145,333	$ 149,693	$ 154,183	$ 158,809	$ 163,573	$ 168,480	$ 173,535	
Pump/Well Mechanic			$ 106,090	$ 109,273	$ 112,551	$ 115,927	$ 119,405	$ 122,987	$ 126,677	$ 130,477	
Pump/Well Electrician			$ 106,090	$ 109,273	$ 112,551	$ 115,927	$ 119,405	$ 122,987	$ 126,677	$ 130,477	
Water Distribution Operator			$ 106,090	$ 109,273	$ 112,551	$ 115,927	$ 119,405	$ 122,987	$ 126,677	$ 130,477	
Total Staffing Cost	$ 725,000	$ 746,750	$ 1,510,722	$ 1,556,043	$ 1,602,725	$ 1,650,806	$ 1,700,330	$ 1,105,657	$ 1,138,826	$ 1,172,991	**$ 12,909,850**
Annual Inflation	3.0%										
Cost Escalation Factor	1.000	1.030	1.061	1.093	1.126	1.159	1.194	1.230	1.267	1.305	

[1] Water Conservation Coordinator included in Water Conservation Costs. Assumes Project Managers phased out or re-assigned as construction of facilities is completed.

PSOMAS

TECHNICAL MEMORANDUM NO. 3

To: Trish Rhay and Steve Bucknam

From: Harvey R. Gobas, PE

Date: January 7, 2015

Subject: CBH Staff Augmentation Required to Address Water Enterprise Plan Recommendations

EXECUTIVE SUMMARY

The City of Beverly Hills currently imports an average of 90 to 95 percent of its water supply from the Metropolitan Water District (MWD). To increase the City's supply reliability, we recommend reducing dependence on MWD to 75 percent. To accomplish this objective, we recommend implementing a series of water supply portfolio options including: (1) Developing three new wells in the unadjudicated Central Basin; (2) Addressing on-going problems with the City's existing Reverse Osmosis (RO) Water Treatment Plant to allow treating water produced from two recently approved shallow groundwater wells in the Hollywood Basin; (3) Participating in a Water Bank allowing the City to access stored water during a drought; and (4) Implementing water conservation programs required to address State conservation legislation.

Implementing these recommended projects and programs will require augmenting current City staff with eleven new full-time positions including a Water Conservation Coordinator, three Engineering Project Managers, a Water Resources Manager, three Water Treatment Plant Operators, a Pump/Well Mechanic, a Pump/Well Electrician and a Water Distribution Operator. The first five positions should be filled beginning in the 2015/16 Fiscal Year. The last six positions should be filled once the new facilities (wells, pipelines, pumping plants, treatment plant upgrades, etc.) begin to come on-line in 2017/18. The estimated salary cost (including employee benefits) to fund these eleven positions in 2015 dollars is approximately $1.6 million.

INTRODUCTION

Psomas was retained by the City of Beverly Hills to evaluate potential options for enhancing the City's water supply reliability. Following a series of detailed evaluations, we recommended a portfolio of options aimed at decreasing the City's reliance on MWD from the current 90 to 95 percent level to 75 percent. To accomplish this objective, we recommend implementing the following options:

1. Central Basin – Developing three new wells in the unadjudicated portion of the Central Basin (La Brea Sub-basin) capable of producing approximately 1,700 AFY;
2. Hollywood Basin – Addressing on-going problems with the City's existing Reverse Osmosis (RO) Water Treatment Plant, which together with the drilling of two new shallow groundwater wells in the Hollywood Basin, will allow the City to produce and treat up to 1,120 AFY at the RO plant;
3. Water Bank – Participating in a Water Bank with the ability to store and access up to 3,400 AF during a two-year shortage;
4. Water Conservation – Implementing Water Conservation programs with the intent of conserving up to 1,180 AF;
5. MWD – Continuing to rely on MWD for up to 75 percent of the City's total water annual supply or approximately 8,485 AFY.

REQUIRED STAFFING TO ADDRESS WEP RECOMMENDATIONS

Achieving the above-noted objectives will require a concerted effort on the part of City staff. To manage these projects and programs, City staff should be augmented with eleven new positions as described below.

Central Basin Staffing Requirements

The development of three new wells in the Central Basin will take seven to eight years from inception to production and will require City staff management of design consultants during this extended period. Those staff members will also have to manage the design of other new related infrastructure including pipelines, pumping facilities and treatment plant upgrades. City staff will also have to manage related CEQA activities, acquisition of required land, testing and permitting. Given the extensive amount of work, we recommend two full time engineering project managers be added to current City staff. Both of these project managers should have a background in well and pipeline design with related construction management experience. These two staff positions will be needed by the beginning of the 2015/16 Fiscal Year.

In addition to the Engineering Managers, once the first well is in place, the City should augment its current production staff to include one-full-time pump/well mechanic, one full-time pump/well electrician and a full-time water distribution operator. The need for these three positions should commence during the 2017-18 Fiscal Year.

Hollywood Basin and RO Plant Staffing Requirements

The additional work associated with the management, drilling, equipping, testing and permitting of two new shallow groundwater wells and associated improvements and upgrades to the existing RO plant will require a full time engineering project manager over the next several years. The need for this staff position is immediate.

Once the treatment plant has been successfully upgraded, it should be capable of being operated on a 24/7 basis (as opposed to the current Monday-Friday operation). This will require round-the-clock operation and will necessitate the hiring of three new full-time treatment plant operators at least one of whom has a Grade 5 Treatment Plant Operator certification. The hiring of three additional plant operators will allow the City to fully staff the plant during both weekdays and weekends and will provide back-up staffing during holiday periods or when the primary operator is on vacation or out sick.

Water Banking Staffing Requirements

We also recommend the hiring a full-time Water Resources Manager to oversee all of the City's water programs and infrastructure. This individual will also play a key role in the negotiation and execution of a water banking agreement. The position should be filled during the 2015-16 Fiscal Year.

Water Conservation Staffing Requirements

We have recommended implementing a number of water conservation programs including separate analytic engagement programs addressing both public and quasi-public users as well as residential users, system loss reduction and operations enhancement, and continuation and enhancement of on-going rebate programs. The management of all of these programs will require a full time water conservation

coordinator, which will also satisfy Demand Management Measure (DMM) 12 of the California Urban Water Management Planning Act. The position should be filled during the 2015-16 Fiscal Year.

MWD Staffing Requirements

No additional staffing is required to continue 75 percent reliance upon MWD.

FUNDING TO STAFF THE RECOMMENDED POSITIONS

As noted in the previous section, we are recommending augmenting City staff with 11 new positions. Several of these positions should be filled during the 2015-16 Fiscal Year, while others will not be needed until the recommended facilities have been constructed and placed into service. The eleven positions are summarized in the Table 1 below. The table also notes the fiscal year in which each position should be filled and the estimated loaded cost in 2015 dollars (i.e., salary and benefits) for the designated employee. Once all eleven positions are filled, the annual loaded salary costs are estimated to be approximately $1.6 million.

Table 1
Recommended Staffing to Address WEP Recommendations

Recommended Staffing Position	FY Needed	Loaded Salary in 2015 Dollars
Water Conservation Coordinator (One Full-Time)	2014/15	$140,000
Project Managers (3 Full-Time)	2014/15 to 2015/16	$525,000
Water Resources Manager (One Full-Time)	2015/16	$200,000
Water Treatment Operators (3 Full-Time)	2017/18	$400,000
Pump/Well Mechanic (One Full-Time)	2017/18	$100,000
Pump/Well Electrician (One Full-Time)	2017/18	$100,000
Water Distribution Operator (One Full-Time)	2017/18	$100,000
Total Recommended Staffing Costs		**$1,565,000**

PSOMAS

TECHNICAL MEMORANDUM NO. 4a
(Temporary TM Identification No.)

To: Trish Rhay and Steve Bucknam

From: Harvey R. Gobas, PE

Date: February 19, 2015

Subject: Comparison of Ten-Year Estimated Costs for Nine Shortlisted Alternatives with MWD Water Purchases in Lieu of Implementing those Alternatives

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In response to questions from the Public Works Commission, we have utilized information originally presented in our Technical Memorandum No. 4 (Ten-Year Estimated Costs for Nine Shortlisted Alternatives) and compared those costs to MWD water purchases that would need to be made in lieu of implementing those recommended alternatives.

All assumptions stated in TM No. 4 still apply for each of the designated alternatives. The overall 10-Year escalated costs developed for each of the proposed portfolio scenarios, as originally presented in TM No. 4, are repeated below in Table 1.

Table 1
Summary of 10-Year Escalated Costs for Proposed Portfolio Scenario Alternatives

Proposed Portfolio Scenario	Sum of 10-Year Escalated Costs (Rounded)
Water Conservation (including Water Conservation Coordinator)	$3,700,000
Water Banking	$7,800,000
Groundwater Development (La Brea Sub-Basin)	$37,900,000
MWD Water Purchases (for remaining 75% of Supply excluding HB)	$105,700,000
Staffing	$12,900,000
Subtotal of Proposed Portfolio Scenario	$168,000,000
Subtotal Less MWD and Staffing	$49,400,000
Low Range Cost (-30% except for MWD and Staffing)	$153,200,000
High Range Cost (+50% except for MWD and Staffing)	$192,700,000

Comparison of 10-Year Alternative Costs with MWD Water Purchase Costs

At the request of the Public Works Commission, we compared the 10-Year Costs of each of the three proposed alternatives (water conservation, water banking and groundwater development of the La Brea Sub-Basin) with the cost of purchasing MWD water in lieu of implementing these individual alternatives. These comparisons are based on the costs derived in TM No. 4 for Water Conservation (refer to page 3 of TM No. 4), Water Banking (refer to page 4 of TM No. 4) and Groundwater Development of the La Brea Sub-Basin (refer to the upper portion of page 8 of TM No. 4). These costs were then compared with the cost of purchasing the same amount of MWD water (based on the factors presented on page 10 of TM No. 4).

The actual cost the City would have to pay for this additional MWD water is subject to possible wide fluctuation. A relatively low cost would apply if MWD's Tier 1 rates were in effect at the time of the purchase. However, it is unlikely that the City would be in a position to pay Tier 1 rates during times of drought and possible allocations. It is more likely, at least during some of these years, the City would have to pay MWD's penalty rate.[1] With that in mind, we have estimated both low and high ranges for the MWD purchase costs based on the Tier 1 rate (the low range) and the penalty rate (the high range). These calculations are presented in the attached Tables 2, 3, 4 and 5. The only thing we can state with any certainty is the actual cost paid for additional MWD water purchased in place of implementing the given alternative, would lie somewhere between the low and high ends of the range.

We also calculated the cost of additional MWD purchases that would be required if the City's four existing Hollywood Basin (HB) wells were shut down and the two newly proposed shallow groundwater wells were not developed. In these latter instances involving the HB wells, we do not have any baseline costs from which to compare the additional MWD purchase.[2]

Table 6 below summarizes the costs for purchasing additional MWD water at both Tier 1 and penalty rates, if such water had to be purchased in lieu of implementing the designated alternative.

Table 6
Comparison of 10-Year Escalated Alternative Costs with MWD Water Purchases

Proposed Portfolio Scenario	Annual Water Volume	Sum of 10-Year Escalated Costs (Rounded) for Implementing the Noted Alternative	10-Year MWD Purchase Cost Based on Tier 1 Rates (Rounded)	10-Year MWD Purchase Cost Based On Penalty Rates (Rounded)
Water Conservation (including Water Conservation Coordinator Salary)	Increases from 195 AFY in Year 1 to 1,180 AFY in Years 6-10 (Refer to Supporting Tables)	$3,700,000	$10,700,000	$34,100,000
Water Banking	1,700 AFY in Years 8 and 9 only	$7,800,000	$4,000,000	$12,800,000
Groundwater Development (La Brea Sub-Basin)	0 AFY in the first seven years; 1,708 AFY in years 8-10	$37,900,000	$6,200,000	$19,700,000
Continued Use of the Hollywood Basin	800 and 400 AFY in Years 1 & 2; 1,120 AFY in Years 3-10	Costs Indeterminate (Not Included in Previous WEP Studies)[3]	$11,100,000	$35,200,000

[1] Set at $2,960/AF, per MWD Board Action Memorandum dated 12/9/2014; we have assumed this penalty rate will escalate over the next 10 years at the same rate as MWD's Tier 1 projected rates (refer to Tables 2, 3, 4 and 5).

[2] The current operating costs for the four existing Hollywood Basin Wells, the two newly proposed shallow groundwater wells and the existing reverse osmosis treatment plant have been excluded from all previous WEP studies. There is therefore no basis on which to compare the additional MWD purchase costs presented in Table 6. We defer to City staff and to their consultants (Hazen and Sawyer and GHD) for a more accurate assessment of those HB groundwater production and treatment costs.

[3] See Footnote 2

Please note the costs presented in Table 6 assume only the noted portfolio option is eliminated and replaced with MWD purchased water (e.g., water conservation is eliminated and replaced with MWD purchases). There are actually 24 separate permutations that would be possible given the designated four alternatives. We believe presenting costs for each of those permutations extends well beyond the scope of the Commission's request and have therefore not included that level of detail in this TM.

Summary of Findings

It is important to keep in mind the primary intent of the Water Enterprise Plan, i.e., to identify potential alternative water supply sources to increase the overall reliability of the City's water system. Over the years, MWD has always been a reliable source of supply for the City, but given the on-going drought and the potential for future allocations, it is in the City's best interests to continue to seek alternatives for reducing the amount of water currently imported from MWD (approximately 90% of the City's total water supply over the past four decades).

Given the potential for future drought allocations, the actual dollar amount the City would have to pay to purchase additional water from MWD is uncertain at best. In plentiful times, Tier 1 rates would be in effect, but in water scares times, penalty rates would apply. As noted in Table 6, these costs could vary from a low of $4 M to a high of $35.2 M, depending on the alternative evaluated and the actual MWD rate in effect at the time of purchase.

Table 2 - Additional MWD Purchase Costs Assuming No Water Conservation - Based on Tier 1 Rates and on Penalty Rates

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Supply Breakdown											
Addl MWD Supply Reqd if No WC (AF)	195	630	850	1,010	1,140	1,180	1,180	1,180	1,180	1,180	
MWD Tier 1 Treated Rate ($/AF)[1]	$933	$958	$986	$1,013	$1,048	$1,089	$1,127	$1,167	$1,211	$1,256	
MWD Penalty Rate[2]	$2,960	$3,039	$3,130	$3,216	$3,327	$3,455	$3,577	$3,704	$3,842	$3,986	
MWD Purchase Cost Assuming Tier 1 Rate	$ 181,838	$ 603,225	$ 838,100	$ 1,023,130	$ 1,194,720	$ 1,284,430	$ 1,329,860	$ 1,377,060	$ 1,428,390	$ 1,481,633	**$ 10,742,386**
MWD Purchase Cost Assuming MWD Penalty Rate	$ 577,200	$ 1,914,795	$ 2,660,350	$ 3,247,683	$ 3,792,355	$ 4,077,118	$ 4,221,325	$ 4,371,150	$ 4,534,085	$ 4,703,093	**$ 34,099,155**

Table 3 - Additional MWD Purchase Costs Assuming No Water Banking - Based on Tier 1 Rates and on Penalty Rates

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Supply Breakdown											
Addl MWD Supply Reqd if No Water Banking (AF)								1,700	1,700		
MWD Tier 1 Treated Rate ($/AF)[1]	$933	$958	$986	$1,013	$1,048	$1,089	$1,127	$1,167	$1,211	$1,256	
MWD Penalty Rate[2]	$2,960	$3,039	$3,130	$3,216	$3,327	$3,455	$3,577	$3,704	$3,842	$3,986	
MWD Purchase Cost Assuming Tier 1 Rate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,983,900	$ 2,057,850	$ -	**$ 4,041,750**
MWD Purchase Cost Assuming MWD Penalty Rate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,297,420	$ 6,532,157	$ -	**$ 12,829,576**

Table 4 - Additional MWD Purchase Costs Assuming No Groundwater Development in the La Brea Sub-Basin - Based on Tier 1 Rates and on Penalty Rates

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Supply Breakdown											
Addl MWD Supply Reqd if No CB GW Devel (AF)								1,708	1,708	1,708	
MWD Tier 1 Treated Rate ($/AF)[1]	$933	$958	$986	$1,013	$1,048	$1,089	$1,127	$1,167	$1,211	$1,256	
MWD Penalty Rate[2]	$2,960	$3,039	$3,130	$3,216	$3,327	$3,455	$3,577	$3,704	$3,842	$3,986	
MWD Purchase Cost Assuming Tier 1 Rate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,993,236	$ 2,067,534	$ 2,144,601	**$ 6,205,371**
MWD Purchase Cost Assuming MWD Penalty Rate	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,327,055	$ 6,562,896	$ 6,807,529	**$ 19,697,479**

Table 5 - Additional MWD Purchase Costs Assuming No Water Production in the Hollywood Basin - Based on Tier 1 Rates and on Penalty Rates

	FISCAL YEAR										Total
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	
Water Supply Breakdown											
Addl MWD Supply Reqd if No HB GW Devel (AF)	800	400	1,120	1,120	1,120	1,120	1,120	1,120	1,120	1,120	
MWD Tier 1 Treated Rate ($/AF)[1]	$933	$958	$986	$1,013	$1,048	$1,089	$1,127	$1,167	$1,211	$1,256	
MWD Penalty Rate[2]	$2,960	$3,039	$3,130	$3,216	$3,327	$3,455	$3,577	$3,704	$3,842	$3,986	
MWD Purchase Cost Assuming Tier 1 Rate	$ 746,000	$ 383,000	$ 1,104,320	$ 1,134,560	$ 1,173,760	$ 1,219,120	$ 1,262,240	$ 1,307,040	$ 1,355,760	$ 1,406,296	**$ 11,092,096**
MWD Purchase Cost Assuming MWD Penalty Rate	$ 2,368,000	$ 1,215,743	$ 3,505,402	$ 3,601,392	$ 3,725,823	$ 3,869,807	$ 4,006,681	$ 4,148,888	$ 4,303,538	$ 4,463,953	**$ 35,209,227**

[1] MWD rate is average of calendar year Full Service Tier 1 Treated Volumetric Cost ($/AF) from Attachment 10 to 4/8/2014 MWD Board Meeting Package. Inflation built into these rates.
[2] MWD Penalty Rate ($/AF) is based on information included in MWD Board of Directors Board Action dated 12/9/2014.

AGENDA REPORT

Meeting Date:	January 13, 2015
Item Number:	F-2
To:	Honorable Mayor & City Council
From:	Trish Rhay, Assistant Director of Public Works Services – Utilities
	Michelle Tse, Senior Management Analyst MT
Subject:	WATER ENTERPRISE PLAN STATUS REPORT
Attachments:	None

RECOMMENDATION

The following is the preliminary recommendation on the Water Enterprise Plan ("Plan") presented by City staff and Psomas to the Public Works Commission ("Commission") during their January 8, 2015 meeting. The Commission had a lengthy discussion on this item and felt they needed additional time to further discuss the Plan. As such, the Commission will have a Special meeting on January 22, 2015 for further evaluation and discussion. A formal recommendation about the Water Enterprise Plan from the Commission will be presented for City Council's consideration at a future meeting.

Based on City staff's work with Psomas, a 25% non-Metropolitan Water District sourced supply reliability target is the recommendation for the initial 10 year plan window. To reach this target, the following actions are recommended:

1. Increase Current Hollywood Basin Production – Increase the existing Reverse Osmosis plant production to match the current Hollywood Basin well production potential of 1,120 AFY acre-feet ("AF") per year ("AFY"); this should be achievable pending corrective actions at the plant and shallow groundwater development now being studied by other consultants under City staff direction. This action is achievable within a two year time frame. There is currently $2 million in the budget to develop the shallow ground water well at 342 Foothill Road. This project is considered an early action item and is not addressed in the 10 year plan.

2. Develop New Central Basin Wells – Develop approximately 1,700 AFY of new groundwater in the unadjudicated portion of the Central Basin near Interstate 10,

approximately four miles from Beverly Hills. Developing new wells in this area will be considerably more economical than developing new wells in the Hollywood Basin due primarily to anticipated low production rates in the Hollywood Basin (approximately 200-300 gallons per minute (gpm) per well vs. about 800 gpm in the Central Basin). Developing three new Central Basin wells including retaining a design consultant; acquiring land for an initial site; drilling a pilot test hole that will be converted to a production well; addressing California Environmental Quality Act ("CEQA") requirements; acquiring land for designing, drilling, and equipping two additional production wells; designing expanded treatment facilities and 24,000 feet of transmission pipelines; constructing all of the above facilities; and testing and permitting all three wells and treatment facilities will take approximately seven to eight years. The estimated cost for this project may range from $23 million to $39 million (in 2015 dollars).

3. Increase Water Conservation – Meet current established SBx7-7 conservation goals by 2020 and strive to achieve additional conservation beyond mandated goals. Implementing a multi-pronged strategy including public/quasi-public analytic engagement programs (for parks, schools, civic center, greenbelts, hotels, etc.), residential analytic engagement programs, system loss reduction and operations programs, and enhanced rebate programs, the City should be able to realize nearly 1,200 AF in additional conservation over the next five years. All of the aforementioned conservation programs can be commenced over a six to twelve month period. Estimated costs may range from $1 million to $1.5 million (in 2015 dollars).

   Related to this item is that staff is working with the Conservation Subcommittee of the Public Works Commission to analyze and develop a water rate structure that inherently promotes water conservation. The proposed structure will be presented to the City Council at a meeting in April 2015.

4. Water Banking – Invest in a groundwater storage bank such as Willow Creek Bank, located in Antelope Valley, to address a potential two year shortage of 3,400 AF. This would provide the City with reserves in the event Metropolitan Water District supplies are severely impacted by a lengthy drought. Subject to the availability of purchased water (to place into the bank); this program can be set up within two years. Preliminary cost estimates for this approach is $4.5 million to $5.5 million (in 2015 dollars).

5. MWD – Continue to rely on Metropolitan Water District ("MWD") for purchase of 75% (approximately 8,485 AFY) of City supplies. The estimated cost for this supply will be $8 to 10 million annually.

In the event the above program does not result in Beverly Hills meeting its supply demands during a severe drought, the City could still purchase additional Metropolitan Water District water at penalty rates (approximately 2.5 times the current rate). While this water would be fairly expensive, it would nevertheless be less expensive than developing water under other short-term options.

INTRODUCTION

At the May 20, 2014 Formal meeting, the City Council approved an agreement to retain Psomas to evaluate potential water supply alternatives for increasing the reliability of the City's water supply system. Nineteen (19) potential alternatives were initially identified

through a collaborative workshop process with the Public Works Commission and City staff. Evaluation of those 19 alternatives resulted in a recommendation to focus efforts and proceed with additional detailed studies for the following nine (9) alternatives:

1. Metropolitan Water District (MWD);
2. Water Banking;
3. Conservation – Tailored to Unique City of Beverly Hills Characteristics;
4. Groundwater – Develop Central Basin (CB) Wells;
5. Conservation – Comply with SBx7-7[1];
6. Drought Insurance;
7. Potable Water Exchanges;
8. Ocean Desalination; and
9. Groundwater – Develop Hollywood Basin (HB)

This brief staff report summarizes the results of Psomas's detailed studies. A more in-depth presentation of the findings will be provided during the January 13, 2015 City Council Formal Session.

DISCUSSION

Since the mid-1970s, the City of Beverly Hills has obtained approximately 90 to 100 percent of its water supply from MWD with the remaining approximately ten percent pumped from four wells in the Hollywood Basin since the early 2000s. Water from those wells is then pumped to the City's Reverse Osmosis ("RO") Treatment Plant on Foothill Road prior to distribution to City residents and businesses. Total water use from 1996 through 2014 has varied from about 11,500 acre-feet[2] (AF) per year (AFY) to about 14,000 AFY. During the most recent 2013-14 Fiscal Year, the City required a total of 12,269 AF to supply demands within its service area, with all but 747 AF of that amount purchased from MWD.

In most years, MWD's water supply has been very reliable, with only three previous periods of cutbacks in allocated water (10% in 1976-77 and in 2007-09, and 17% in 1987-92). However, the ongoing drought has reduced MWD's available supplies and lessened its reliability as a dependable water supply source. With that in mind, the City has opted to evaluate other water supply alternatives aimed at increasing the City's overall system reliability. While MWD will remain a predominant supply source for Beverly Hills, it would be wise for the City to seek alternative water supply sources and increase its current non-MWD sourced supplies to 25%, from current levels of less than 10%.

FISCAL IMPACT

Based on the preliminary recommendation described above, the overall cost to implement the capital portion as outlined in Items 2 through 4 in the Recommendation section of this report will range from approximately $28.5 Million to $46 Million (in 2015

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[1] This 2009 legislative package requires a statewide 20% reduction in urban per capita water use by 2020. It requires that urban water retail suppliers determine baseline water use and set reduction targets according to specified requirements, and requires agricultural water suppliers prepare plans and implement efficient water management practices (definition extracted from the Association of California Water Agencies website).

[2] An Acre-Foot is a common volumetric measure in the water industry; it is the amount of water that can be stored in one acre of land to a depth of one foot and is equivalent to approximately 325,900 gallons.

dollars) depending on final design specifics and system enhancement locations. Once fully implemented, the City would need to add 11 additional full time staff positons to support the recommended program. These positions include one Water Conservation Coordinator, one Water Resources Manager, three Engineering Project Managers, three new Water Treatment Plant Operators, one Water Well Pump Mechanic, one Water Well Pump Electrician and one Water Distribution Operator. Annual loaded salaries for these eleven positions are estimated at approximately $1.6 million annually in 2015 dollars. Only the alternatives to increase the City's water reliability have been explored at this time.

The next phase of the study is to conduct a financial analysis on how to appropriately fund these projects, including an analysis on how water rates will be impacted, capacity fee projections, as well as seek available funding opportunities. Based on the analysis, the projects will be re-evaluated based on financial feasibility.

George Chavez
Approved By

Additional Revenue Requirements		5.00%	5.00%	5.00%	4.00%	1.00%	1.00%	1.00%
	Requested Fiscal Year 15/16	Projected Fiscal Year 16/17	Projected Fiscal Year 17/18	Projected Fiscal Year 18/19	Projected Fiscal Year 19/20	Projected Fiscal Year 20/21	Projected Fiscal Year 21/22	Projected Fiscal Year 22/23
Projected Revenues								
Service Charges	35,803,253	37,593,416	39,473,086	41,446,741	43,104,610	43,535,656	43,971,013	44,410,723
All other Revenue	1,855,280	1,922,378	2,318,445	2,322,188	2,311,650	2,334,767	2,358,114	2,381,695
MWD Credit for water production	-	-	-	-	-	-	-	587,552
Other Revenue Sources	-	-	-	-	-	-	-	-
Operating Revenues:	37,658,533	39,515,794	41,791,531	43,768,929	45,416,260	45,870,423	46,329,127	47,379,970
Projected Expenses								
Current Operations:	29,130,003	30,172,306	31,154,893	32,071,130	33,469,703	34,473,794	35,508,008	36,573,248
Personnel Svcs WEP Adds	725,000	746,750	1,510,722	1,556,043	1,602,725	1,650,806	1,700,330	1,105,657
Materials & Supplies WEP Adds	-	-	-	-	-	-	-	2,249,130
Reduction in purchased water	-	-	-	-	-	-	-	(1,993,236
Debt Service Interest WEP Adds	-	816,000	801,451	786,319	1,586,583	1,555,667	1,523,515	2,306,077
Operating Expense	29,855,003	31,735,056	33,467,066	34,413,492	36,659,011	37,680,267	38,731,853	40,240,876
Net from Operations	7,803,530	7,780,738	8,324,465	9,355,437	8,757,249	8,190,156	7,597,274	7,139,094
Plus Beginning Fund Balance	26,674,295	26,431,825	42,627,101	38,803,133	35,085,359	44,789,338	32,413,241	27,893,212
Capacity Charge	500,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000
Grants etc.					2,000,000			
Plus Bond or Other Financing	-	20,000,000	-	-	20,000,000	-	-	20,000,000
Funds Available	34,977,825	54,712,563	51,451,567	48,658,570	66,342,609	53,479,494	40,510,516	55,532,306
Capital Projects - Current	4,376,500	4,626,500	4,626,500	4,126,500	4,126,500	5,000,000	5,000,000	5,000,000
Central Basin	250,000	3,057,500	2,221,250	3,551,250	12,240,000	11,737,500	3,655,000	3,457,500
Banking	-	43,775	1,262,471	1,300,345	47,834	49,269	50,747	1,099,753
Conservation	499,500	418,953	429,930	311,700	321,051	330,683	340,603	350,822
Debt Service Principal	3,420,000	3,575,000	3,730,000	3,890,000	4,045,000	3,145,000	2,735,000	2,890,000
WEP Additions	-	363,734	378,283	393,415	772,885	803,801	835,953	1,233,125
Oper Rsvs & Cap Rplcmnt	26,431,825	42,627,101	38,803,133	35,085,359	44,789,338	32,413,241	27,893,212	41,501,107
Designated Ops Reserve	17,901,627	18,796,708	19,736,543	20,723,370	21,552,305	21,767,828	21,985,507	22,205,362
Restricted (Debt Reserve)	4,512,127	4,512,127	4,512,127	4,512,127	4,512,127	4,512,127	4,512,127	4,512,127
Capital Replacement	4,018,072	19,318,266	14,554,463	9,849,862	18,724,906	6,133,286	1,395,579	14,783,618
TOTAL	26,431,825	42,627,101	38,803,133	35,085,359	44,789,338	32,413,241	27,893,212	41,501,107