August 24, 2020

Attention: Imported Water Committee

Regional Conveyance System Study - Phase B. (Action)

Staff Recommendation
Adopt the General Manager’s recommendation to defer expenditure of Phase B funding and proceed as described in her August 24 Letter (Attachment 4).

Fiscal Impact
The project budget and the fiscal years 2020 and 2021 Capital Improvement Program appropriation support the staff recommended action of expending a not to exceed amount of $200,000 from Phase B of the study. The rate category for this project is customer service.

Executive Summary
- The Water Authority currently receives delivery of its low cost, highly reliable QSA supplies through an Exchange Agreement with the Metropolitan Water District of Southern California (MWD), which expires in 2047 for the IID Water Transfer.
- Also, in 2047, the initial term of the IID Water Transfer ends but may be extended to 2077 by mutual consent of the parties.
- The Water Authority has studied alternative conveyance of its QSA supplies incrementally over the years to maintain options and help inform these future decisions on supply and conveyance and mitigate the risk of cost uncertainty.
- In June 2019, the Board approved a $3.9 million capital budget (staff and consultant costs) for a new two phase study with a scope shaped by input from the CRWG, Board, and Member Agency Managers (MAM), to expand upon past studies and explore partnership opportunities that could reduce cost and risk and provide regional benefits.
- In July 2019, the Board authorized a professional services agreement with Black & Veatch Corporation (BV) totaling $1,890,000 for Phases A and B.
- Phase A focused on engineering and costs and results demonstrate that the RCS is technically viable, economically competitive, and worth studying further.
- As directed by the Board, staff is returning at the completion of Phase A work for the Board’s consideration to proceed with Phase B.
- Phase B be would refine Phase A work, include detailed economic analyses, cost approximately $1.3 million (staff and consultant costs), and take approximately a year to complete with an offramp for the Board to consider potential next steps.
- At the August 24 Colorado River Workgroup (CRWG) meeting, staff recommended and the CRWG concurred with deferring the Board’s decision on Phase B until November 2020 to provide time for additional dialogue with member agencies and outreach to stakeholders, as outlined in the General Manager’s letter (Attachment 4), in a not to exceed amount of $200,000 of Phase B funding.

Background
Through the 2003 QSA, the Water Authority receives nearly 280,000 acre-feet (AF) each year of
conserved water from an agriculture to urban water transfer with IID and the investment the Water Authority has made in lining the earthen portions of the All-American and Coachella Canals, for up to 75 years and for 110 years, respectively. The Water Authority depends on these cost-effective QSA supplies as they currently serve 50% of the region’s demands. The Water Authority’s QSA supplies are also highly reliable based on the water right priorities established in the California Seven Party Agreement and other numerous other contracts, court decisions and regulatory guidelines known as the Law of the River. The Law of the River establishes the California Colorado River priority system for each of the water agency’s share of California’s 4.4 million AF of annual apportionment. The Water Authority’s QSA water falls within IID’s Priority 3 supplies, meaning they are largely insulated from Colorado River cutbacks due to their high-priority status on the river. For example, in the event of a shortage on the river, MWD’s lower Priority 4 supplies would face cuts before Priority 3 water would be impacted. The California priority system of the Colorado River water aims to provide long-term sustainability of the river. In general, water from Colorado River tends to be more secure than other Southern California imported water sources due to California’s senior water rights status based on the Law of the River, as well as the large storage portfolio the Colorado River system offers.

Since the Water Authority does not have a pipeline or aqueduct to the Colorado River to directly convey its QSA supplies to the San Diego region, it pays MWD to deliver these supplies through MWD’s Colorado River Aqueduct. There are three key QSA-related agreements that prescribe terms for receiving this water:

1. IID Conserved Water Transfer Agreement (200,000 AF/year) which has an initial term that expires in 2047 but has an option to extend through 2077 with mutual agreement of the parties (the Water Authority and IID);
2. Canal Lining Agreement (~80,000 AF/year) which ends in 2112; and
3. MWD Exchange Agreement addresses the transportation of these supplies but ends in 2047 for the IID Transfer Water with no option to extend. It is in place for the entire 110-year term of the canal lining water. The MWD Exchange Agreement contains a right for the Water Authority to terminate on five year’s notice.

Consequently, there are decisions on the horizon that are equal parts related to supply and conveyance. In terms of supply, one of the driving factors for this study is that the RCS would protect the cost effective QSA supplies. QSA supplies support the incremental development of member agency local supply projects as demands and price signals dictate their inclusion in the regional water supply portfolio. As such, QSA and locally developed supplies are complementary and not in competition. To that end, if in 2047 the 200,000 AF of IID Transfer Water were to be replaced with additional local supplies, it would come at triple the cost. This is because any additional locally developed supplies could only be accomplished through a combination of seawater desalination and reuse due to the limited available wastewater available in the region after the development of member agency reuse projects currently planned or conceptually identified. Alternatively, if the Water Authority were to substitute MWD water for its QSA supplies, it would also cost significantly more on a fixed and volumetric basis, and the region’s water supply reliability would be greatly reduced due to MWD’s lower priority status on the Colorado River and cutbacks triggered by the Lower Colorado River Drought Contingency Plan.
In terms of conveyance, both not having an arrangement to transport the IID Transfer Water and the rising cost of MWD’s Exchange Agreement rate are both important factors in studying the RCS. Over two decades of history has shown that MWD’s rates are increasing at more than double the rate of inflation. In fact, the Exchange Agreement rate has increased 30% in the past four years. In MWD’s 998 offer it acknowledged that “if the current contract price is retained, SDCWA is estimated to pay Metropolitan between $11.978 billion and $17.984 billion (in 2019 dollars) through 2112.” To manage cost uncertainty and ensure water reliability, the Water Authority continues to refine and progress the RCSS to provide optionality of the region’s future water resource mix and mitigate risk. The RCSS helps to inform these decisions and provides choices for the Water Authority Board on the composition of the region’s water resource portfolio after 2047. These options must be assessed both quantitatively and qualitatively to determine the most cost-effective reliable water resource mix for future generations.

While it is true that the Water Authority has studied direct conveyance of its QSA supplies over the years, mainly as part of the Regional Water Facilities Optimization and Master Plan Update efforts, the current two-phase study is distinct. Though it builds and refines past work, it also includes key areas that were not previously assessed to determine feasibility, such as integration of the RCS into the Water Authority’s Aqueduct system. Furthermore, the current study looks at the RCS through a new lens of potential partnerships and multi-use along each of the conveyance routes that could yield benefits to multiple stakeholders in the Southwest, in alignment with Governor Newsom’s recently finalized Water Resilience Portfolio. Additionally, an economic analysis and impact to rates was not performed in previous studies. Proceeding with the Phase B Scope of Work allows the Water Authority to continue to study the potential of method (b) while still not foreclosing method (a).

The CRWG was created to provide input to staff on this study and other Colorado River issues. Staff met with the CRWG, Board, and the member agency managers group several times to develop the RCSS scope of work. Input from these groups resulted in the following direction from the Board:

- Include Northern Alternative 3A, last studied in 1996, in the analysis
- Bifurcate the study into two phases
- Prioritize the work by with Phase A largely focused on refining the technical analysis to update the all-in costs of the alternatives and determine any fatal flaws
- Proceed with Phase A work only and expend no more than $2.6 million (including staff and consultant costs) allocated to Phase A
- Include an offramp for the Board at the end of each phase
- Study the multi-use concept of potential compatible partnership projects such as operational surface water and groundwater storage, projects at the Salton Sea, renewable energy generation and use, bi-national projects, and public-private-partnerships
- Take a conservative approach and do not include partnership or grant funding in the baseline Phase A cost analyses to review RCS viability without such funding

In June 2019, the Board approved a $3.9 million capital budget for the RCS two-phase study. In July 2019, the Board authorized a professional service agreement with BV totaling $1,890,000
for Phase A and B scope of work for technical and financial analysis of the RCS. Table 1 shows the Final Scope of Work by Phase for BV, other consultants, and Water Authority staff. This scope was shaped by inputs from the CRWG, Board, and MAM, and items prioritized by phase.

Table 1. Final Scope of Work By Phase

<table>
<thead>
<tr>
<th>Phase A ($2.6M)</th>
<th>Phase B ($1.3M)</th>
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</thead>
<tbody>
<tr>
<td><strong>BV ($1.89M)</strong></td>
<td><strong>New</strong></td>
</tr>
<tr>
<td>• New</td>
<td>• Partnership structures/funding</td>
</tr>
<tr>
<td>• Northern Alternative 3A</td>
<td>• Project delivery methods</td>
</tr>
<tr>
<td>• System integration</td>
<td>• Property requirements</td>
</tr>
<tr>
<td>• Multi-use, partnerships &amp; funding opportunities</td>
<td><strong>Update/Refine</strong></td>
</tr>
<tr>
<td><strong>Update/Refine</strong></td>
<td>• Demand forecast – 2015 Urban Water Management Plan (UWMP) 2018 Interim</td>
</tr>
<tr>
<td>• Demand forecast – 2015 Urban Water Management Plan (UWMP) 2018 Interim</td>
<td>• Conveyance alignment &amp; tunneling</td>
</tr>
<tr>
<td>• Treatment, blending &amp; brine management</td>
<td>• Site layouts</td>
</tr>
<tr>
<td>• Permit &amp; environmental requirements</td>
<td>• Geotechnical desktop study</td>
</tr>
<tr>
<td>• Risk analysis - Qualitative</td>
<td>• Risk analysis - Quantitative</td>
</tr>
<tr>
<td>• All-In costs for preliminary economic analysis</td>
<td>• All-In cost for economic analysis</td>
</tr>
<tr>
<td>• Initial screening of alternatives</td>
<td>• Final screening of alternatives</td>
</tr>
<tr>
<td><strong>Water Authority Staff and Consultants ($2.01M)</strong></td>
<td><strong>New</strong></td>
</tr>
<tr>
<td>• BV technical analysis support</td>
<td>• BV technical analysis support</td>
</tr>
<tr>
<td>• BV preliminary partnership analysis support</td>
<td>• Potential partners engagement</td>
</tr>
<tr>
<td>• Preliminary economic analysis</td>
<td>• Partnership and funding opportunities quantification</td>
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<tr>
<td></td>
<td>• Economic and sensitivity analyses</td>
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<tr>
<td></td>
<td>• Legal agreement reviews</td>
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<td></td>
<td>• Stakeholder outreach</td>
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There are three Alternatives under study as shown in Attachment 1: Northern Alternative 3A (Tunnel), Southern Alternative 5A (Tunnel) and Southern Alternative 5C (Open Trench). Note that the objectives of Phase A work are (1) to confirm that there are no technical or financial flaws and (2) to screen the three alternatives down to two. This strategy helps to reserve budget for a detailed economic and further legal analyses and dialogue with partners for the most viable alternatives in Phase B, if Phase A results justified moving forward. It is also important to note that after the RCSS budget was approved in June 2019, the Board directed staff to study Alternative 3A in addition to the other two alternatives, it also added an independent, third-party review of BV’s financial analysis. Both of these items were accommodated within the existing budget and schedule. Staff has completed the Phase A work plan and no technical or financial fatal flaws have been identified. Since Phase A began in July 2019, staff has provided updated to the CRWG, Board, and MAM. Staff last presented an update on the Phase A analysis at a Special Imported Water Committee in March 12 with subsequent special MAM meetings to further explain and answer questions regarding the initial Phase A results and background on the Law of the River and QSA. Staff presented Phase A final results to the CRWG on August 24 and is returning to the Board with a detailed report and recommendation from the CRWG on Phase B for the Board’s consideration.
Previous Board action: On July 25, 2019, the Board authorized the General Manager to award a professional services contract to BV to provide professional services to implement the Scope of Work for the Regional Conveyance System Study for a not-to-exceed amount of $1,890,000.

Discussion
The objective of Phase A was to identify any technical or financial fatal flaws before investing additional funds to perform a deeper economic, legal, and other analyses included in Phase B scope. Phase A is complete, and no technical or financial fatal flaws were identified for any of the alternatives. This conclusion was informed by both Water Authority led analyses and an analysis funded by 18 of the Water Authority member agencies. The detailed reports can be found on the Water Authority’s website at https://www.sdcwa.org/colorado-river-supplies-management. Additionally, similar to what was done for the 2013 Regional Water Facilities Optimization and Master Plan Update, BV and staff prepared the RCSS Phase A Executive Summary which may also be accessed by the link.

Water Authority Led Analyses
The Water Authority-led analyses includes: 1) BV’s technical and financial analyses; 2) Hunter Pacific Group’s (HPG) independent review of BV’s financial analysis; 3) staff’s preliminary economic analysis; 4) and a preliminary partnership and funding opportunities assessment.

BV Technical and Financial Analyses
The focus of the Phase A analysis was refining the technical work to update the cost estimates for the three alternatives studied, screening the three alternatives down to two, and evaluating partnerships opportunities at a high level. Key findings of RCSS Phase A include:

- The region will continue to need QSA water through 2112.
- All three RCS alternatives are viable from a technical and engineering perspective.
- Alternatives 3A and 5A are economically competitive and provide long-term reliability and low cost water to the region.
- Alternative 5C is not economically competitive with Alternatives 3A and 5A and will not be recommended for further study.
- Alternatives 3A and 5A could be integrated without major changes to current Water Authority operations.
- Potential multi-agency, multi-use partnerships and other agreements could significantly reduce the cost and enhance the value of each RCS alternative and provide regional benefits to San Diego, California and the Southwest. *(Note this is based on the preliminary Phase A partnership analysis.)*
- Blending RCS deliveries with other supplies in existing reservoirs is no longer feasible and treatment of RCS supplies would be required to match the salinity of water currently delivered by MWD.
- Due to the decades-long process for designing, permitting, and building a major conveyance system, continuing to Phase B of the current study is recommended to retain the RCS as a viable option. *(Note the second of numerous future offramps is included at the end of Phase B.)*
Finally, the RCS is sized to accommodate the full QSA supply only. The baseline alternatives all assume treatment in the Imperial Valley which would result in approximately 20,000 AF of treatment losses. The need for treatment would be further evaluated in Phase B if it moves forward. This approach was taken to both capture all potential costs and provide flexibility in partnership opportunities.

_Hunter Pacific Group (HPG) Independent Financial Review_

HPG was retained through a competitive acquisition process to review BV’s financial analyses, including the capital and OMR cost estimates, adequacy of contingencies, schedules and risk register. The HPG team was selected based on its tunneling and geotechnical experience, familiarity with projects of similar magnitude, and team composition including estimating, scheduling, and risk experts.

Staff acted as the intermediary between BV and HPG to provide the required files and facilitate meetings to answer questions regarding key assumptions. BV updated its capital estimates based on some of HPG’s recommendations. Specifically, the costs of tunneling and operational storage were updated, as were detailed design costs that were previously accounted for in the economic analysis but not in the financial analysis. Together, these changes increased the RCS cost estimate from approximately $4.3 billion to $4.9 billion, as shown in Table 2. The high end of HPG’s estimate was $5.3B and fell within staff’s +/- 40% high-level sensitivity analysis requested by the Board. HPG deemed BV’s operations, maintenance, and replacement (OMR) costs, and contingencies and associated assumptions as appropriate. Additionally, the independent Water Authority Member Agency led review reached similar conclusions regarding the capital and annual OMR cost estimates.

**Table 2. Capital and Annual OMR Costs**

<table>
<thead>
<tr>
<th></th>
<th>Alternative 3A</th>
<th>Alternative 5A</th>
<th>Alternative 5C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital Cost</strong></td>
<td>$4.95 B</td>
<td>$4.96 B</td>
<td>$4.86 B</td>
</tr>
<tr>
<td><strong>Annual OMR Cost</strong></td>
<td>$143 M</td>
<td>$149 M</td>
<td>$258 M</td>
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HPG did not identify any fatal flaws in regard to BV’s preliminary risk analysis or schedule, but the firm made some suggestions on potential project delivery methods, contingencies, and tunnel construction packaging.

**Staff’s Preliminary Economic Analysis**

BV’s costs and schedule information were primary inputs into staff’s preliminary economic analyses. Based on this information, a life-cycle cost analysis was performed to compare the three RCS alternatives. At the request of the Board, the Phase A economic analysis was expanded to compare both supply and conveyance options as well.

Net present value (NPV) is one of many capital budgeting methods used to evaluate potential capital projects in which an entity might want to invest. NPV uses discounted cash flows in the analysis, which makes the NPV more precise than many of the other capital budgeting methods as it considers both risk and time value of money. Table 3 includes the Capital and NPV Comparison of the three RCS alternatives.
Table 3. Capital and NPV Comparison of RCS Alternatives (2020 – 2112)

<table>
<thead>
<tr>
<th>RCS Alternative</th>
<th>Capital Cost</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative 3A</td>
<td>$4.95 B</td>
<td>$25.1 B</td>
</tr>
<tr>
<td>Alternative 5A</td>
<td>$4.96 B</td>
<td>$25.8 B</td>
</tr>
<tr>
<td>Alternative 5C</td>
<td>$4.86 B</td>
<td>$38.1 B</td>
</tr>
</tbody>
</table>

The figures in Table 3 helped to inform the Phase A two-step alternatives screening process which aimed to reduce the alternatives to two or less. Step 1 compared the alternatives to the project objectives including: cost competitiveness; consistency with Water Authority investments in terms of providing resilience and reliability; and multiple benefits. Steps 2 compared the alternatives based on assigned scores in categories such as NPV, environmental, regulatory, institutional, OMR, and partnership criteria. As a result, it is recommended that Alternative 5C be eliminated from further study.

Table 4 illustrates the NPV comparison of supply and conveyance for three options (1) RCS Alternatives 3A and 5A - Extension of the IID Water Transfer to 2112 (2) Additional Local Supplies - Replacement of the 200,000 AF of IID Water Transfer supplies with additional local supplies; or (3) MWD Reliance - Replacement of the 200,000 AF of IID Water Transfer supplies with MWD supplies. The NPVs reflected in Table 4 include the cost of supplies in addition to capital and OMR costs.

Table 4. NPV Comparison of Supply and Conveyance Options (2020-2112)

<table>
<thead>
<tr>
<th>Option</th>
<th>NPV</th>
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<tbody>
<tr>
<td>RCS Alternative 3A</td>
<td>$32.0 B</td>
</tr>
<tr>
<td>RCS Alternative 5A</td>
<td>$32.7 B</td>
</tr>
<tr>
<td>Additional Local Supplies</td>
<td>$49.0 B</td>
</tr>
<tr>
<td>MWD Reliance</td>
<td>$50.8 B</td>
</tr>
</tbody>
</table>

‘Additional’ local supplies means supplies that would be developed in excess of the planned member agency local supply development projects included in the 2015 UWMP, which include:

- Pure Water San Diego, Phases 1 & 2
- East County Advanced Water Purification Project
- Otay Ocean Water Desalination
- Fallbrook Groundwater Recovery
- Pure Water Oceanside

Phase A analysis assumed that all member agency planned projects would be built according to the online dates and production rates provided by the member agencies. As such, replacing 200,000 AF of IID Transfer Water with additional local supply development water would require a combination of recycled water and seawater desalination water due to the limited availability of wastewater to produce this volume after member agency projects are built. Given this, a melded rate of $3,370/AF was calculated based on 42% of the supplies coming from reuse and 58% from seawater desalination. A melded rate of $3,000/AF, as shown in Table 4, was the original high-level estimate for the Additional Local Water Supplies Option. However, based on comments...
from member agencies, staff has since then refined this calculation with a melded rate of $3,370/AF.

As shown in Table 4, on an aggregate basis the Phase A preliminary economic analysis shows that Alternatives 3A and 5A provide significant savings over the MWD Reliance and Additional Local Supply Development Options -- even before accounting for cost savings and other benefits associated with potential partnerships. The RCSS Phase A baseline analysis intentionally takes a very conservative approach and does not include any partnerships or other third-party participation benefits or funding that would reduce the cost of the RCS. By design, staff has also taken a conservative approach when estimating the cost of the options involving MWD. For instance, staff did not include the costs of various MWD planned projects such as the Delta Conveyance Project, Regional Recycled Water Program, or asset management projects nor addressing California Aqueduct subsidence issues, each of which could cost MWD billions of dollars. These costs would be evaluated in the Phase B scope and would likely make the NPV of the RCS even more cost competitive in contrast.

Preliminary Partnership and Funding Opportunities Assessment

As directed by the Board, Phase A included a preliminary qualitative assessment of potential partnerships, while Phase B would quantify the opportunities identified in Phase A through dialogue with potential partners. Phase A identified several potential multi-use opportunities along each of the alternatives that appear to be compatible with the objectives of the RCS. They also could align with the Governor’s Water Resilience Portfolio. These potential multi-use projects include operational storage, renewable energy integration, binational projects, and habitat restoration at the Salton Sea. Potential partners include local agencies, like Water Authority member agencies and IID, state agencies such as California Natural Resources Agency, federal agencies such as the Bureau of Reclamation, Native American tribes, Mexico, private entities such as renewable energy providers, and other stakeholders such as agricultural and environmental justice groups. Many partnerships could bring potential funding opportunities. As part of Phase B, staff would begin to explore these opportunities, including engaging in dialogue with potential partners, with a focus towards lowering the overall project cost and mitigating rate impacts during construction. A deeper analysis of partnerships in Phase B would refine the preliminary economic analysis in Phase A. Phase B would also include discussions with Water Authority member agencies on local storage opportunities.

DLM Engineering, Inc. in association with Gillingham Water (DLM&G) Review

Some member agencies hired DLM&G to review the Water Authority-led analyses. This input is welcomed as an added layer to help inform the Phase B decision by the Board. The Board decision on Phase B was delayed from the July to August Board meeting to allow additional time for DLM&G to complete its work product and incorporate funding agencies’ comments into its final report. To facilitate DLM&G’s review and promote transparency, staff provided the requested in-house draft economic model and assumptions and staff and BV met with DLM&G for approximately eight hours over four meetings to answer questions and review assumptions.
On July 22, staff received the DLM&G Report. Not only did staff and BV review the DLM&G Report, but also requested independent consultants Stratecon, Inc. (Stratecon)\(^1\) and Water Resource Consultants, Inc. (WRC)\(^2\) to provide additional insight on the DLM&G Report and help to further inform the Phase B recommendation. The Water Authority requested Stratecon to assess the DLM&G Review, identify additional issues not addressed in their report, and provide recommendations for further economic due diligence and risk assessment of the RCS. The Water Authority also asked WRC to review DLM&G’s Report to specifically provide an opinion on DLM&G’s conclusion that, while the RCS is technically feasible and its estimate of costs are reasonable, the RCS is not cost-effective when evaluated using what DLM&G believe are more reasonable assumptions about MWD price escalation and future water rates. The following are staff and BV’s responses to the DLM&G Report followed by opinions rendered by Stratecon and WRC.

**Staff and BV Responses to DLM&G Report**

The following staff and BV’s responses to key assertions from the DLM&G Report.

- The DLM&G Report concludes that BV’s technical analysis and costs are appropriate. Staff appreciates DLM&G’s review in addition to that of HPG as the all-in-costs are key inputs for the Phase B economic analysis.

- The DLM&G Report assumes that MWD rates could not continue to increase at their historical annual Full Service average of 5.1 percent, thus it concludes staff’s MWD rate assumptions are not correct. However, the DLM&G Report does not provide any data to support its conclusion about MWD rates; it simply states, “they cannot” be this high. Staff’s assumption of MWD’s forecasted rate increases is based on 20 years of historical MWD rate increases and MWD’s own forecasts of its rate increases, while the DLM&G Report conclusion does not cite MWD foundational data at all in support of its conclusion. Additionally, they fail to apply any analytical support or technical basis for their opinion. Further, the 5.1 percent used in staff’s analysis is conservative as it does not consider other potential MWD cost drivers for planned projects such as the Delta Conveyance Project, Recycled Water Program, and asset management projects, or California Aqueduct subsidence issues.

- The DLM&G Report asserts that a “standard” NPV analysis of 30 or 40 years should have been used. Staff disagrees as a global “standard” does not exist. The RCS should not be viewed on a 40-year debt service basis when the asset (and its supply) are expected to last 100-years. Staff’s NPV timeframe is appropriate for large multi-generational projects such as the RCS. This is further supported as the same duration is used by the State of California for the Delta Conveyance Project.

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\(^1\) Stratecon’s principal, Rodney T. Smith, Ph.D., possesses 46 years of experience in strategic planning and economics consultant specializing in the economics, finance, and policy of water resources.

\(^2\) Robert Campbell, WRC’s principal possesses 45 years of experience in providing planning, management, financial and rate expert advice to public and private water entities throughout California and was previously employed by MWD and the Water Authority.
The DLM&G Report states that the Water Authority did not address the risk of potential lower Water Authority member agency demands in its analysis. Staff disagrees. The Water Authority analyses does recognize a variety of risks, including lower demands, which is why the RCSS takes a phased approach. Due to timing, Phase A analysis was based on the 2018 Interim Demand Forecast Reset which established a revised demand forecast for the San Diego region through 2040. To develop the revised demand on the Water Authority, staff assessed current consumptive water use levels and member agencies’ updates to production volumes and schedules for certain planned local supply development projects identified in the 2015 UWMP. Phase B would include an update based on the 2020 Long Range Demand Forecast and 2020 UWMP. The Water Authority’s analysis forecasts that all planned local supply development projects will be built, and it shows that the region will still need QSA supplies in addition to supplies from MWD into the future. Any updates to MWD’s demands and resulting impact on MWD rates and the cost of the MWD Reliance Option would also be included in Phase B.

The DLM&G Report recommends negotiating a new Exchange Agreement with MWD as the single option for transportation of the IID transfer water. While discussions on Exchange Agreement modifications are not currently underway, staff agrees that future discussions with MWD could be conducted concurrently with Phase B of the RCS to provide maximum flexibility for the region in decision-making and risk mitigation in regard to cost uncertainty. However, staff disagrees with DLM&G’s position that negotiation of a new Exchange Agreement should be the single option given recent unsuccessful discussions between the Water Authority and MWD on agreement modifications. Additionally, because of the long project lead time associated with the RCSS (~25-years) and contractual IID Water Transfer Agreement milestones involving term extensions the risk of banking 50% of the region’s water supply future on reaching a mutually agreeable deal with MWD within a compressed window is not prudent.

Appendix A of the DLM&G Report (Appendix A) poses valid questions from the member agency Chief Financial Officers that are included in the scope of Phase B. However, the DLM&G Report did not include key qualitative considerations raised by Water Authority staff, such as contractual constraints of the QSA agreements, recognition of the value of Senior Priority QSA supplies and reliability, or the Water Authority’s successful track record in negotiating mutually beneficial agreements with IID.

Stratecon and WRC’s Responses to DLM&G Report
The following are highlights from Stratecon and WRC’s detailed comments contained in Attachments 2 and 3, respectively.

- Stratecon finds staff’s escalation assumptions to be reasonable and the alternative advanced by the DLM&G Review to be unreasonable. Stratecon states the DLM&G Review includes many deficiencies in economic analysis, analytic methods and lack of publicly available substantive data that provide a context for the economic analysis and risk assessment for the RCS.
• Stratecon disagrees with the DLM&G assertion that staff favors a “non-standard” approach and finds a project life cycle analysis based on a time horizon through 2112, the end of the canal lining water term, to be reasonable. Stratecon notes long-term projects require a long-term perspective in that proper economic assessment must match the timing of estimated costs with the timing of estimated benefits. Water infrastructure generally has useful lives in excess of the term of initial project financing. As such, understanding the uncertainty of future predictions is inherent to proper economic analysis and risk assessment of long-term infrastructure projects. DLM&G’s statements are at odds with the use of risk assessment by the Bureau of Reclamation, California Department of Water Resources, economics, business and finance over the past thirty years.

• Stratecon states that future rate predictions should be grounded by history and economic analysis. Rather than looking at the actual dynamics on the Colorado River and other drivers of MWD’s water rates, the DLM&G Review presumes that the failure of the prediction from a 2008 study about climate change was due to “adaptations and adjustments” but does not mention any adaptations and adjustments. The DLM&G discussion of the New York Times article evidences a lack of understanding of uncertainty.

• Stratecon notes the escalation issue is one of the most critical issues for assessment of the economic viability of RCS, yet the DLM&G use of an alternative escalation assumption is without any analytical or factual foundation. Stratecon (and WRC) present factual, public information on the various drivers of MWD water rates. As shown by the historic record MWD (Stratecon Report Figure 2 and Stratecon Report Table 2) water rates have increased substantially faster than inflation.
WRC concurs with Stratecon that the DLM&G Report is not based on any past or future data analyses; rather, it simply concludes that future MWD rates as projected by the Water Authority “cannot” happen. WRC agrees that the Water Authority’s projections are reasonable projections of MWD’s future costs as they are based on the historical record and, if anything, are unduly conservative as they do not include other factors that could further increase MWD rates.

WRC notes that in addition to the 81-year historical trend of MWD’s average annual rate increases, looking ahead, several key drivers will result in MWD rate increases that are likely to approximate if not exceed the Water Authority’s projections. These key drivers include (1) the need to make significant investments in system asset replacements and rehabilitations in both MWD’s and the SWP’s water delivery systems (2) continued investments in the Bay-Delta to address yet-to-be-monetized objectives including climate change, environmental and water supply reliability; (3) continued investment in Colorado River programs, regional and local supply development to augment diminishing water supply availability in the Colorado River Basin and to mitigate for droughts and impacts.
in both the northern California and Colorado River watershed areas due to climate change; (4) continued reductions in supplemental water demands from MWD due to conservation and local supply development within its service area; and (5) other factors such as further environmental challenges and constraints, hydrology and weather patterns, increased energy prices and declining freshwater supplies. The resulting impact on MWD member agencies, including the Water Authority, depends on MWD's cost of service allocations and any future adjustments in its rate structure.

- The DLM&G Review states “detailed consideration of the future of MWD rate structures is beyond our scope of work.” Stratecon finds the DLM&G Review recommendation of a renegotiated exchange agreement incomplete and not cognizant of actual negotiations. Stratecon states that the Water Authority has been trying to negotiate a fair wheeling agreement with MWD for two decades, and there is no new information, insight or strategy provided by the DLM&G Review. Additionally, MWD’s valuation of its 998 offer notes that “Metropolitan’s annual transportation rate increases, which reflect increasing costs to Metropolitan, have averaged 4.6 percent.” MWD’s own financial valuation of its offer assumes that these rate increases will continue through 2112.

- Stratecon and WRC both note that Water Authority staff and MWD staff have common expectations about MWD’s future.

- Stratecon acknowledges the valuable input provided in DLM&G’s Appendix A and provides several suggestions regarding Phase B analysis, many of which are already included in Phase B scope, including further evaluation of MWD rates and demands, Water Authority rates considering MWD rates, Water Authority demands, and RCS financing plan.

Summary
Phase A results demonstrate the RCS is cost competitive on an aggregate basis with other options even without partnerships or grant funding. Phase B would further help to refine Phase A and answer additional questions on economics, including integrating partnerships and funding opportunities and evaluating financing options that could help to offset project costs. Should the Board authorize Phase B, it will answer many additional questions about mitigating short-term rate impacts, exploring partnerships and associated funding opportunities, developing a plan of finance, performing a legal analysis of agreements and water rights issues and other work outlined in Table 1. Phase B would take approximately one year for BV, staff, and other as-needed consultants to complete their analyses. At that time, there would be another offramp for the Board to consider any potential next steps.

Staff Recommendation
In the context of a multi-generational project, Phase B existing funding of $1.3 million represents a small investment that would inform a major decision on water supply and transportation coming in 2047. At the same time, understanding the complexity of the issues involved and the volume of various reports and materials, at the August 24 CRWG meeting, staff recommended and the CRWG concurred with deferring the Board’s decision on Phase B until November 2020.
to provide time for additional dialogue with member agencies and outreach to stakeholders, as outlined in the General Manager’s letter (Attachment 4), in a not to exceed amount of $200,000 of Phase B funding.

Prepared by: Kelly Rodgers, Director of the Colorado River Program
  Pierce Rossum, Rate & Debt Manager
  Mojgan Poursadighi, Engineer P.E.
Reviewed by: Dan Denham, Deputy General Manager
Approved by: Sandra L. Kerl, General Manager

Attachments:

1. RCS Alternatives Map
2. Stratecon, Inc. Review
3. WRC Review
4. General Manager’s Letter
Regional Conveyance System Study Alternatives

- Alternative 3A
- Alternative 5A
- Alternative 5C
August 23, 2020

VIA Email

Dan Denham
Deputy General Manager
San Diego County Water Authority
4677 Overland Avenue
San Diego, CA 92123

Dear Mr. Denham:

RE: DLM Engineering/Gillingham Review of SDCWA Regional Conveyance System Feasibility Review (July 2020)

The San Diego County Water Authority (“Water Authority”) asked Stratecon Inc to review the above captained report (hereinafter cited as “DLM&G Review”). Based on Stratecon’s experience and expertise, while I identify many deficiencies in the analytic methods, assumptions and lack of data in the DLM&G Review, the review identifies relevant issues (especially in Appendix A, Comments from Member Agency Chief Financial Officers) that Stratecon recommends be part of ongoing comprehensive review of the Regional Conveyance System (“RCS”).

Executive Summary

The DLM&G Review includes many deficiencies in economic analysis, analytic methods and lack of publicly available substantive data that provide a context for the economic analysis and risk assessment for the Regional Conveyance System (“RCS”). I find the Water Authority staff escalation assumptions reasonable and the alternative advanced by the DLM&G Review not reasonable. While additional economic analysis and risk assessment is warranted in Phase B, Stratecon does not find troubling that a financial plan was not developed in Phase A. The additional analysis in Phase B will provide the foundation for determination of an optimal finance plan. The key findings are provided below.

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1 The Review was commissioned by a group of Water Authority members identified as “participating member agencies” at p. ii.
Long-Term Projects Require A Long-Term Perspective

Proper economic assessment must match the timing of estimated costs with the timing of estimated benefits. Water infrastructure generally has useful lives in excess of the term of initial project financing. I disagree with the DLM&G assertion that the Water Authority staff favors a “non-standard” approach. The selected time horizon, 2112, runs through the term of the agreement for Canal Lining water. As staff indicate that an acceptable extension of agreement with IID to 2112 is one of the conditions for a successful project, a project life cycle analysis based on a time horizon through 2112 is reasonable.

The DLM&G Review of future uncertainty is puzzling. Understanding the uncertainty of future predictions is inherent to proper economic analysis and risk assessment of long-term infrastructure projects. Their statements, as discussed below, are at odds with the use of risk assessment by the Bureau of Reclamation, California Department of Water Resources, economics, business and finance over the past thirty years.

Future Rate Predictions Should be Grounded by History and Economic Analysis

Any prediction, of course, can be wrong. Learning occurs from understanding the reasons for success or failure of a prediction. Rather than looking at the actual dynamics on the Colorado River and other drivers of Metropolitan’s water rates, the DLM&G Review presumes that the failure of the prediction from a 2008 study about climate change was due to “adaptations and adjustments”. What were the adaptations and adjustments? The DLM&G Review mentions none. The DLM&G discussion of the New York Times article evidences a lack of understanding of uncertainty.

The escalation issue is one of the most critical issues for assessment of the economic viability of RCS, yet the DLM&G use of an alternative escalation assumption is without any analytical or factual foundation. Stratecon presents factual, public information on the various drivers of Metropolitan water rates. As shown by the historic record, Metropolitan water rates increase substantially faster than inflation, except for the time period 1985-2007.

The year 2003 was transformative. The era of a full Colorado River Aqueduct ended. Water allocations from the State Water Project have plummeted. A diminished water supply portfolio prompted Metropolitan spending trying to meet demands for Metropolitan water. This ushered in another era of Metropolitan water rates increasing substantially faster than inflation. To date, Metropolitan spending on new water resources has been unsuccessful.

Below, I outline how Phase B can provide the economic analysis and risk assessment to inform decision-makers.
Relying on Negotiations of the Exchange Agreement is not Prudent

The DLM&G Review stated “detailed consideration of the future of MWD rate structures is beyond our scope of work.” Stratecon finds the DLM&G Review recommendation of a renegotiated exchange agreement incomplete and not cognizant of actual negotiations. The Water Authority has been trying to negotiate a fair wheeling agreement with Metropolitan for two decades, and there is no new information, insight or strategy provided by the DLM&G review.

Additionally, Metropolitan’s valuation of its offer notes that “Metropolitan’s annual transportation rate increases, which reflect increasing costs to Metropolitan, have averaged 4.6 percent.” Metropolitan’s financial valuation of its offer assumes that these rate increases will continue through 2112. Water Authority staff and Metropolitan staff have common expectations about Metropolitan’s future.

The discussion addresses the following:

- Stratecon’s experience and expertise related to the proper economic analysis and risk assessment of a long-term infrastructure project
- Assessment of the DLM&G Review
- Identification of additional issues not addressed by the DLM&G Review
- Recommendations for further economic due diligence and risk assessment of the RCS

Stratecon Expertise and Experience

Stratecon Inc. ([www.stratwater.com](http://www.stratwater.com)) is a strategic planning and economics consulting firm specializing in the economics, finance, and policy of water resources. I am involved as an advisor in the acquisition of water rights throughout the western United States and in the sale and leasing of water rights and water supplies to public and private sector water users. This first-hand experience in the decades-long development of water markets provides industry expertise to identify the best candidates and navigate related public policy issues.

I advise public and private sector clients, including high net worth investors, on business and public policy issues concerning water resources, including California’s Drought Water Bank, the government of New South Wales, Australia’s effort to privatize irrigation organizations, and the economic, financial, legal, and political dimensions of water transactions in many western states. I worked on the IID/San Diego County Water Authority Agreement, the settlement of Colorado River disputes on behalf of the Imperial Irrigation District, and the acquisition of 42,000 acres from the United States Filter Corporation, an unit of Veolia Environment. I am routinely involved in economic valuation of water rights, water investments, and negotiation of water acquisition and transportation agreements. I also perform studies on the economic risk of water shortages and valuation of surface water and groundwater storage. I also serve as an expert witness in the economic valuation of groundwater resources, disputes over the economic interpretation of water contracts, economics of water conservation and water use practices, rate-setting of municipal water systems and the socio-economic impacts of land fallowing.
I received a Ph.D. in Economics from the University of Chicago and a Bachelor of Arts in Economics from the University of California at Los Angeles. Prior to making a full time commitment to the private sector, I was a professor of economics at Claremont McKenna College for fifteen years, Director of the Lowe Institute of Political Economy, and a member of the editorial board of Economic Inquiry, the professional economics research journal of the Western Economics Association. In 1989, I was the John M. Olin Visiting Professor of Law and Economics at Columbia Law School. In the late 1970s and early 1980s, I was a visiting assistant professor of economics at the Graduate School of Business, University of Chicago, where I also served as the Associate Director of the Center for the Study of the Economy and the State, founded by the late Nobel Prize winner in economics, George Stigler. I started my career after graduate school as an economist at the RAND Corporation, where I participated in a study commissioned by the California Legislature on the role of markets to address California’s water problems.

Assessment of DLM&G Review

The discussion focuses on Section 2 (“Economic Analysis”), Section 3.3 (“Risk Review”) and Appendix A (“Comments from Member Agency Chief Financial Officers”).

Section 2.1: DLM&G Review suggests that Water Authority staff used “unusually long evaluation timeframes” and price escalation assumptions “that are highly implausible.” Disagree.

Project life cycle analysis is the starting point for economic analysis and risk assessment. For example, California Department of Water Resources’ analysis of the various renditions of a twin tunnel project combined a 10 to 15-year development period with a 50-year period of operations. The recent analysis of the single tunnel project uses a 100-year period of operations.

In Texas, the San Antonio Water System (“SAWS”) entered into a 30-year agreement with a private party to develop a regional water pipeline that secured groundwater through 3,200 leases of groundwater rights from landowners.2 At the end of the 30-year period, debt is retired and equity owners sell the infrastructure and interest in project groundwater leases for $1. Recognizing that the useful life of project infrastructure extended beyond the term of project financing, SAWS entered follow-on negotiations with groundwater right owners to extend their leases beyond 30 years. SAWS time horizon extended far beyond the term of initial project financing or the agreement with the private project consortium.

Stratecon routinely uses life cycle project models for public and private sector clients. As a negotiator for IID, I developed (in consultation with IID board and staff and public input) a proprietary economic and risk assessment model of the economics of its historic agreement with the Water Authority. The “time horizon” of the model extended through the longest term under negotiation. (75 years of operations following five years of negotiations and regulatory approvals).

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There were two components: (1) contract structure entertaining up to 78 different pricing structures and (2) a life cycle project cost model that combined alternative scenarios for IID system conservation investments and twenty cohorts of on-farm conservation programs. Both components required addressing the uncertainty of projections about future economic conditions.

As general partner for Southwest Texas Water Resources, LLC (“STWR”), I proposed in 2011 a $300 million regional pipeline system backed by leases of groundwater rights to meet SAWS water demands. In response to a competitive solicitation by SAWS, STWR proposed a lease with an initial term of 50 years of operation and renewal provisions. Working with a major international investment bank responsible for project financing, the time horizon of the proprietary financial model extended beyond the term of initial project financing. The model addressed the uncertainty of future economic conditions through the design of contractual provisions and the use of hedging instruments during the planning and negotiation period as well as operations.

During the past two years, Stratecon has participated in negotiations and arbitrations involving the development of groundwater in west Texas for the oil and gas industry. In all instances, private parties are interested in life cycle project analysis. Assessing the useful life of assets is essential for decision-making. A proper analysis, of course, considers investment requirements beyond initial capital investment. Determining the time profile of replacement and renewals over a project’s useful life is an important component of project life cycle analysis.

Water infrastructure generally has useful lives in excess of the term of initial project financings. Consider, for example, the Colorado River Aqueduct. Built in the 1930s, water first flowed in 1939.\(^3\) Eighty-one years later, the aqueduct remains the backbone of the Metropolitan Water District of Southern California’s (“Metropolitan”) water system. Project operations and further investments have continued for decades beyond the retirement of debt financing for initial construction. This has enabled Metropolitan to move available Colorado River water for decades and into the foreseeable future.

I address the DLM&G Review’s discussion of price escalation below in Section 2.5.

**The takeaway, long-term projects require a long-term perspective.**

**Section 2.2:** Disagree with the assertion that the Water Authority staff favors a “non-standard” approach. The selected time horizon, 2112, runs through the term of the agreement for Canal Lining water. Water Authority staff indicate that an acceptable extension of Water Authority’s agreement with IID to 2112 is one of the conditions for a successful project. A project life cycle analysis based on a time horizon through 2112 is reasonable.

DLM&G Review’s “standard first-year unit cost analysis” (summarized in DLM&G’s Figure 2-1) is flawed. It compares the price of a Metropolitan exchange in the year 2020 with the

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\(^3\) [https://en.wikipedia.org/wiki/Colorado_River_Aqueduct](https://en.wikipedia.org/wiki/Colorado_River_Aqueduct)
estimated annualized capital and operating cost (including replacement and renewals) for conveyance starting twenty-five years later (2045). The calculation compares conveyance in the year 2020 (“apples”) with conveyance in the year 2045 (“oranges”).

Figure 1 shows the time dimension of proper project assessment. The status quo continues through 2047. In this figure there are two options: A and B. One option is the RCS. The other option a negotiated extension of the exchange agreement. The key point is that what matters is what the options look like in 2047 and thereafter. Comparing one option for conveyance in the future versus the cost of the other option conveying water in the year 2020 makes no economic sense.

An economically meaningful comparison matches the timing of benefits (conveyance) versus the timing of costs. Under the Water Authority staff’s assumption about the escalation of Metropolitan rates, the cost of the Metropolitan water exchange in 2045 is $1,449 per acre foot, or about $100/AF greater than the estimated annualized cost for the RCS, not $1,088 per acre foot stated in DLM&G’s Figure 2-2. (See discussion below regarding price escalation assumption.) The relative economic attractiveness of the options will also depend on their respective dynamics after the first year of project operations.

The DLM&G Review of future uncertainty is puzzling. It states:

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4 The prospect for a renegotiated exchange agreement before 2045 is addressed below.
5 $1,449/AF = $482/AF (1+.045)^25
“Predictions about the future are uncertain and become more so with longer periods of forecast. Economic analysis typically discounts future costs and benefits in part to account for this uncertainty.”

Returning to Figure 1, the status quo as well as the decision to select Option A or Option B involves predictions about the future. As discussed more extensively below, the statement that uncertainty about future costs and benefits are properly addressed by discount rates is at odds with the use of risk assessment by the Bureau of Reclamation, California Department of Water Resources, economics, business and finance over the past thirty years (see below).

The takeaways, (1) proper economic assessment must match the timing of estimated costs with the timing of estimated benefits, and (2) understanding the uncertainty of future predictions is inherent to proper economic analysis and risk assessment of long-term infrastructure projects.

Section 2.3: In this section, DLM&G Review acknowledges the need for “extended period analysis”. It opines that the Water Authority staff use of the 2112 time-horizon, while tied to term of contractual commitments, “otherwise has no significance to economic theory or analysis.”

Disagree. It is common to link conveyance projects to the resources transported. Oil and natural gas pipelines are built based on contractual commitments by future users. California’s State Water Project did the same. Contractual commitments provide the collateral for project financing. In the petroleum industry, pipeline projects may proceed without 100% contractual commitments. The project proponents often see “option value” from uncommitted capacity. By linking a 100% committed supply to a conveyance investment, the Water Authority staff is taking a conservative approach relative to the business practices in other industries.

Stratecon does agree with the DLM&G Review that transparency is required. In representing IID, my economic analysis was vetted in public workshops, presentations before the local Farm Bureau, banking institutions financing Imperial Valley agriculture, and individual farmers. Recommendations for a continued vetting process are provided below.

The takeaways, (1) economic analysis and commercial practices support the Water Authority staff use of the 2112 time-horizon, and (2) given the inevitable uncertainty of any long-term infrastructure project, the nature of project risks should be fully vetted and understood ahead of decision-making.

Section 2.4: DLM&G Review argues that the RCS entails generational transfers of costs and benefits. The time profiles in DLM&G’s Figures 2.5 and 2.6 depend on the project’s finance plan. The greater the role of PAYGO financing, the longer and more severe the “red bars” in these figures. For project financing, finance structure matters in both the terms of financial tranches and whether interest payments are based on fixed or indexed rates.
Regarding the latter, US treasury notes with fixed nominal and inflation-protected yields (Treasury Inflation Protected Securities, “TIPS”) are informative. The capital market sets pricing so that nominal and inflation-protected securities of the same term are financially equivalent. Relative to the use of the fixed nominal structure, inflation-protected financial instruments will “flatten the curve” in Figures 2.5 and 2.6.

The Water Authority is familiar with an indexed financial structure. The financial terms of the Carlsbad desalination plant escalated debt and equity returns by 2.5% annually. By escalating debt and equity payments for long-lived projects, a finance plan that matches the term of debt structure to the project’s useful life and makes both debt and equity payments subject to inflationary adjustments and deferred payments at the end of the payment period provides the best economic incentives for water conservation and project developers to full-fill their contractual obligations.

Stratecon does not find it troubling that a financial plan has not been fully investigated during Phase A. It makes sense to develop first a project definition, prepare a cost analysis and perform preliminary economic analysis. As discussed below, significant economic analysis and risk assessment remains for Phase B of the study. Development of a meaningful finance plan builds on a fully vetted economic analysis. As they say on Wall Street, need to know all aspects of the deal before turning to financial engineering.

The takeaway, the RCS finance plan will determine the timing of project costs relative to the timing of project benefits.

Section 2.5: The DLM&G Review believes that Water Authority staff used “highly implausible” assumption in projecting future Metropolitan water rates.

The foundation of DLM&G Review’s position is two-fold. First, a methodological point of view stated as follows:

“Accurate forecasting of long term water rates is difficult. Many factors drive the price of water, including capital costs, increased operating cost, and changing sales volumes. A standard assumption on rate forecasting is that the further out the forecast horizon, the more inaccurate the future projection, because it is impossible to anticipate with any accuracy future conditions and their effect on rates. When forecasting future water rates, most projections will trend back to assumptions on underlying inflation or some small increment above inflation so as not to overstate the compounding effect of escalation factors. This is also reflected in the more

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standard approach to the length of an economic analysis so as not to skew the results 
based on diminishing accuracy of forecasted key variables and cost drivers.”

The second point is that “systems adapt and adjust.”

The methodological point of view is incoherent. The DLM&G Review is correct that there 
are many factors driving the price of water. Longer forecast horizons are often accompanied by 
more uncertainty in forecasts about the future. The following two sentences are problematic:

- “When forecasting future water rates, most projections will trend back to assumptions on 
underlying inflation or some small increment above inflation so as not to overstate the 
compounding effect of escalation factors.”
- “This is also reflected in the more standard approach to the length of an economic analysis 
so as not to skew the results based on diminishing accuracy of forecasted key variables and 

cost drivers.”

The first sentence is, at best, a conjecture about the many factors impacting future water prices. 
The DLM&G Review offers no facts or analysis in support of the conjecture. The second sentence 
reflects a retreat from the job at hand—understanding the uncertainty of future predictions is 
inherent to proper economic analysis and risk assessment of long-term infrastructure projects.

The DLM&G Review discussion of the New York Times article evidences a lack of 
understanding of uncertainty. The key point in the selected quote from a 2008 study is “a 50 
percent chance of (Lake Mead) becoming unusable by 2021 . . . if demands remain unchanged and 
if human-induced climate change (quote truncated).”8 Presumably, the study concluded there was 
a 50% probability that Lake Mead will remain useable by 2021.

A one-time toss of a coin yielding “tails” does not mean the coin is not perfectly balanced 
providing “heads” 50% of the time and “tails” 50% of the time. A meaningful test of the accuracy 
of the study’s prediction would have been to compare the actual elevations of Lake Mead since 
2008 with the trajectory of Lake Mead elevations forecasted by the study, assessing whether actual 
runoff in the Colorado River Basin reflected the predicted impact of “human-induced climate 
change” and the extent to which demands for Colorado River remained unchanged.

Any prediction, of course, can be wrong. Learning occurs from understanding the reasons 
for success or failure of any prediction. Rather than looking at the actual dynamics on the Colorado 
River and other drivers of Metropolitan’s water rates, the DLM&G Review presumes that the 
failure of the prediction from a 2008 study about climate change was due to “adaptations and 
adjustments”. What were the adaptations and adjustments? The DLM&G Review mentions none.

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8 Emphasis added.
The DLM&G Review uses an alternative escalation assumption: use the Water Authority staff assumption for 20 years (5.1% for Tier 1 water rates and 4.5% for exchange rate) and drop the escalation rate to 3.7% thereafter.

The DLM&G Review offers the following as justification:

“Rather than basing economic analysis on such an unlikely occurrence (Water Authority escalation assumption), it seems prudent to us, and much more plausible, to assume MWD will make adaptations and adjustments to prevent rates from increasing to the point where they drive away most or all of their water sales. Whether those adjustments entail reductions in the costs driving the price increases, shifting costs to unavoidable fixed charges or other measures is beyond the scope of our review. Nevertheless, the finding holds that rates are highly unlikely to increase at these levels relative to other supply options for the simple reason they cannot.”

The economic analysis behind this narrative is missing. What are the adaptations and adjustments? None are discussed. What are the price points that “drive away most or all” water sales? Economic analysis would look at the relative trends of all factors driving demand for Metropolitan water (see below). DLM&G Review is silent. What is the levels of “other supply options”. DLM&G Review is silent.

The escalation issue is one of the most critical issues for assessment of the economic viability of RCS. Public information on the various drivers of Metropolitan water rates are presented below. The purpose is two-fold: (1) provide a factual framework for assessing the reasonableness of Water Authority staff’s escalation assumptions, and (2) identify key issues confronting predictions of future conditions.

**History of Metropolitan Water Rates**

Metropolitan’s real (inflation-adjusted) water price has been on an increasing trend since 1960 (see Figure 2). The real water price was increasing through the mid-1980s, then remained unchanged through 2007, and has been on a sharp upward trend thereafter (see Table 2). There is a stubborn dynamic of Metropolitan water rates increasing faster than inflation.

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9 Data compiled from Metropolitan annual reports and resolutions. Water rate is for untreated full service until 2003 and Tier 1 rate for untreated water service thereafter. Readiness-to-Serve (“RTS”) charge equals RTS revenue requirement divided by the RTS Base (Metropolitan’s 10-Year running average of total firm deliveries). Real Water Rate equals sum of the Water Rate and the RTS Charge adjusted by the Consumer Price Index where 2020$ = 1.0.
The drivers during these time periods provide a context for predicting Metropolitan’s future. The first period (1960-1984) was a transition from property taxes to water rates as well as phasing in payments for the State Water Project. The second period (1985-2007) was a period of rising water sales from the ramp up of deliveries from the State Water Project and continuation of a full Colorado River Aqueduct (see below). Third period (2008-2020) reflects Metropolitan’s need to develop new water supplies to back-stop declines in Colorado River water supplies and declining allocations from the State Water Project (see below). Recommendations about developing a framework for predicting future Metropolitan prices are made below.

Metropolitan’s rate for full water service is now based on components for water supply, system access, water stewardship and system power (see Table 3). The largest component is
system access followed by the Tier 2 and Tier 1 rates for water supply. Since 2008, the System Access rate and the Tier 1 supply has increased, respectively, by almost 6% per year and 7.4% per year faster than inflation.

Table 3
Composition of Metropolitan’s Full-Service Rate for Untreated Water*

<table>
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<th>Time Period</th>
<th>Tier 1 Supply</th>
<th>Tier 2 Supply</th>
<th>System Access</th>
<th>Water Stewardship</th>
<th>System Power</th>
<th>Tier 1 Full Service</th>
<th>Tier 2 Full Service</th>
<th>Readiness-to-Serve Charge</th>
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<td>CAGR</td>
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<tr>
<td>2003-2020</td>
<td>6.4%</td>
<td>3.9%</td>
<td>5.4%</td>
<td>6.3%</td>
<td>2.5%</td>
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</tr>
<tr>
<td>2008-2020</td>
<td>9.1%</td>
<td>4.6%</td>
<td>7.6%</td>
<td>8.3%</td>
<td>1.8%</td>
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<td>2020 Rate</td>
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<td>Real CAGR</td>
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<td>2003-2020</td>
<td>4.2%</td>
<td>1.8%</td>
<td>3.3%</td>
<td>4.1%</td>
<td>0.4%</td>
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<td>2008-2020</td>
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<td>4.9%</td>
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<td>3.3%</td>
</tr>
</tbody>
</table>

*CAGR (cumulative average growth rate)

As a Ph.D. economist, best practices distinguish between general inflation and changes in inflation-adjusted prices (“real prices”). From an economic perspective, real prices measure how Metropolitan’s water rates change relative to the general price level. If the real price were constant over time, price projections are driven solely by expected inflation.10 If the real prices are not constant, then price projections involve expected inflation plus adjustments for projected changes in real prices.

As shown by the historic record, Metropolitan water rates increase substantially faster than inflation, except for the time period 1985-2007. Since then, all components of Metropolitan’s rate structure (other than System Power) has increased substantially faster than inflation. To understand what has driven Metropolitan’s water rates historically and going forward, one must look at Metropolitan’s water supply sources and demands for Metropolitan water.

Metropolitan’s Colorado River Water Supplies

Under a 1931 Agreement among California parties, Metropolitan has a Priority 4 right for 550,000 acre feet (“AF”) per year and Priority 5 right of 662,000 AF per year of the total

10 The pricing of nominal and inflation protected U.S. treasury notes provide a market estimate of expected inflation.
consumptive use of Colorado River water available to California.\footnote{11} These priorities are junior to 3.85 million AF of Colorado River water for Priorities 1, 2 and 3.\footnote{12} Given that California’s total annual entitlement to Colorado River water equals 4.4 million AF, Metropolitan will receive water under its Priority 5 right only when there is unused entitlement water from Arizona or Nevada or when there is surplus Colorado River water in the Lower Basin.\footnote{13}

The historic record of Colorado River water deliveries can be divided into two periods: pre-2003 versus 2003 and thereafter (see Figure 3).\footnote{14} Before 2003, Metropolitan routinely received water under its Priority 5 right. In 29 of the 39 years for the period 1964-2002, Metropolitan’s Colorado River water supplies ranged between 1.1 million AF and 1.3 million AF per year.\footnote{15} During the last decade of the 20th Century, Arizona and Nevada’s use of Colorado River water was rapidly approaching their Colorado River water entitlements. As a result, the availability of water under Metropolitan’s Priority 5 right to keep Metropolitan’s Colorado River Aqueduct full had come to an end. The loss of this Colorado River water would have been even more devastating to Metropolitan and its member agencies absent the execution of the Quantification Settlement Agreement (“QSA”) and related agreements in 2003.

\footnote{11} Boulder Canyon Project Agreement, Requesting Apportionment of California’s Share of the Waters of the Colorado River Among the Applicants in the State, August 18, 1931, Sections 4 and 5.
\footnote{12} Ibid, Section 3.
\footnote{13} The text ignores Metropolitan’s liability for a cutback in its Priority 4 right when the use of Colorado River water by California Indian Tribes and miscellaneous Present Perfected Rights exceeds 14,500 AF per year.
\footnote{14} Compiled from Decree Accounting Reports 1964-2018, Arizona v. California, U.S. Bureau of Reclamation, \url{https://www.usbr.gov/lc/region/g4000/wtracct.html#decree} (hereinafter cited as “Decree Accounting Reports”).
\footnote{15} The Colorado River water in excess of Metropolitan’s Priority 4 right was unused entitlement water from Arizona and Nevada during this time period. Starting in 1989, Metropolitan’s water conservation agreement with the Imperial Irrigation District generated about 100,000 AF per year of conserved Colorado River water, although 20,000 AF of this amount was available to the Coachella Valley Water District. Therefore, the amount of Colorado River water available to Metropolitan under its agreement with the Imperial Irrigation District accounted for a minor share of the water available to Metropolitan above its Priority 4 right.
Since 2003, there have been two sources of Colorado River water conveyed through Metropolitan’s Colorado River Aqueduct: (i) Metropolitan water available under its Priority 4 right, own transfer agreements and programs and (ii) the Water Authority’s Colorado River water acquired under its long-term water and conservation agreement with the Imperial Irrigation District (“IID”) and the lining of the All American Canal and the Coachella Canal. For the 2003-2019 time period, the annual amount of Colorado River water conveyed through the Colorado River Aqueduct averaged 855,895 AF, of which 724,374 AF were Metropolitan’s Colorado River water supplies and 131,521 AF were the Water Authority’s Colorado River water supplies (see Table 4). Concerning future Colorado River water supplies, San Diego’s supply situation is firm—set in contract. Metropolitan’s Colorado River water situation is complex and nuanced.

Table 4
Average Annual Colorado River Water Supplies (AF): 2003-2018

<table>
<thead>
<tr>
<th>Metropolitan</th>
<th>Water Authority</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>724,374</td>
<td>131,521</td>
<td>855,895</td>
</tr>
</tbody>
</table>

16 Compiled from Decree Accounting Reports.
Metropolitan has entered into long-term water conservation agreements with IID and the Palo Verde Irrigation District (“PVID”). Metropolitan recently purchased land in PVID and is now the largest landowner in PVID. Metropolitan also has access to unused Priority 3 water, Intentionally Created Surplus credits, engages in interstate banking arrangements and related transfers with the Southern Nevada Water Authority and participates in system efficiency projects in the Lower Basin.

Under the QSA, Metropolitan’s available Colorado River water is adjusted annually depending on whether the consumptive use of Colorado River water under Priority 1, 2 and 3b is below or above 420,000 AF.17 Priority 1, 2 and 3b are, respectively, the consumptive use of Colorado River water by PVID, the Reservation Division of the Yuma Project and the Lower Palo Verde Mesa.18 By reducing PVID’s use of Colorado River water, PVID land falling increases the amount of Colorado River water available to Metropolitan (see Figure 4).

![Figure 4](http://www.usbr.gov/lc/region/g4000/crwda/crwda.pdf)

18 The Bureau of Reclamation also includes the use of Colorado River water on Yuma Island in the calculation.
Figure 5 plots Metropolitan’s Agricultural Adjustment (on the vertical axis) versus the amount of water conserved by PVID land fallowing (on the horizontal axis) to illustrate how land fallowing under Metropolitan’s agreement with PVID is a key driver of Metropolitan’s Agricultural Adjustment. The annual variation of the amount of water conserved by land fallowing explains 72% of the annual variation in Metropolitan’s Agricultural Adjustment for available Colorado River supplies from the consumptive use of Priority 1, 2 and 3b. For the period 2005-2019, “Metropolitan Agricultural Adjustment” has averaged 19,768 AF. Even though PVID land fallowing averaged 94,293 AF, there has been sustained overruns by Priority 1, 2 and 3b relative to the 420,000 AF benchmark.\(^{19}\)

Metropolitan must engage in significant land fallowing to offset its liability for underwriting the risk that the consumptive use of Colorado River water by Priority 1, 2 and 3b (plus Yuma Island) exceeds 420,000 AF per year. Metropolitan must conserve about 77,800 AF of water by land fallowing for Metropolitan to avoid its liability for Priority 1, 2 and 3b overruns (see Figure 5).\(^{20}\)

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\(^{19}\) Without land fallowing, the estimated value of Metropolitan adjustment is -93,525 (the intercept in the equation in Figure 3).

\(^{20}\) The value of “x” that yields an estimated Metropolitan Adjustment of zero using the equation in Figure 5.
after accounting for the liability of Priority 1, 2 and 3b overruns (19,768 AF) is about 21% of the average annual amount of 94,293 AF of land falling.

Table 5 compares Metropolitan’s Colorado River water supplies before and after 2003. For the ten years before 2003, Metropolitan’s Colorado River water supplies averaged 1,203,822 AF. From 2003 and thereafter Metropolitan’s supplies from its Priority 4 rights and transfer agreements with IID and PVID averaged 664,061 AF. When combined with the average amount of unused Priority 3 water available, Metropolitan’s Colorado River water supplies averaged 752,990 AF. Therefore, the end of the era of unused entitlement water and surplus water means that, despite its programs over the past eighteen years, Metropolitan has 450,832 AF per year less Colorado River water. San Diego’s independent Colorado River supplies offset 237,711 AF of Metropolitan’s reduced Colorado River water supplies in 2019 and will offset 277,000 AF per year of Metropolitan’s reduced Colorado River water supplies over the long-term.

Table 5
Comparison of Metropolitan’s Annual Colorado River Water Supplies Pre and Post 2003

<table>
<thead>
<tr>
<th>Item</th>
<th>AF</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-2003</td>
<td>1,203,822</td>
<td>Mostly Priority 4 and Priority 5 water</td>
</tr>
<tr>
<td>Post-2003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priority 4</td>
<td>550,000</td>
<td>Exclusive of liability for Indian/Misc. PPRs</td>
</tr>
<tr>
<td>IID</td>
<td>94,293</td>
<td>Per-2003 agreement</td>
</tr>
<tr>
<td>PVID</td>
<td>19,768</td>
<td>Inclusive of liability for Priority 1, 2 3b overruns</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>664,061</td>
<td></td>
</tr>
<tr>
<td>Unused Priority 3</td>
<td>88,929</td>
<td>In excess of Priority 4 right pre-2003 agreement</td>
</tr>
<tr>
<td>Total</td>
<td>752,990</td>
<td></td>
</tr>
<tr>
<td>Lost Supply</td>
<td>450,837</td>
<td></td>
</tr>
</tbody>
</table>

State Water Project

The history of SWP allocations has three distinct time periods (see Figure 6). Between 1968 through 1989, SWP allocations averaged 95%. Spurred by the 1991 drought, SWP allocations dropped and averaged 73% through the 1990s. There was a brief recovery in SWP allocations, increasing by 10 percentage points until the early 2000s as environmental problems in the Delta mounted. Since then, average SWP allocations have been declining. The final SWP Allocation for 2014 was only 5% (most of the year the declared SWP Allocation was zero). The

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21 19,193 AF equals the projected Metropolitan Agricultural Adjustment from Figure 3 when PVID land falling equals 94,293 AF.
22 Before the 1994 Monterey Amendment, agencies submitted water requests reflecting their actual water demands. With the Monterey Amendment, available water was pro-rated in accordance with requests. This provided an incentive for agencies to request their full entitlement amounts (see Figure 7).
Final Allocation for 2015 was 20%. Final Allocations increased in 2016 and 2017, plummeted in 2018, increased to 75% for 2019 and fell again to 20% in 2020.

The period of 90%+ SWP Allocations corresponded to the scheduled build-up of the SWP (see Figure 7). SWP Contract Amounts grew until 1990. Therefore, the relevant historical period for SWP Allocations going forward is the post-1989 record. After the Monterey Amendments to SWP contracts, SWP contractors now request their full contract amounts each year.

The legendary disputes over water exports from northern California to Southern California have been ongoing for over 40 years when the State Water Resources Control Board initiated hearings to revise water quality standards in the Bay Delta. Since 2003, the loss of Colorado River water supplies created a shift to increase the reliance on the State Water Project. With the continued collapse of the delta ecosystem, the 2009 Delta Reform Act included the state policy to reduce Delta reliance. Consistent with that policy directive, the 10-year running average of State Water Project allocations fell from 65% to 50% by 2020.
Conclusions Regarding Metropolitan’s Water Sources

The year 2003 represents a turning point for Metropolitan’s water sources. On the Colorado River, the era of large volumes of Priority 5 Colorado River water ended. On the positive side, the QSA paved the way for Metropolitan’s long-term fallowing program that has conserved, on average, 94,293 AF per year. On the downside, Metropolitan assumed the risk for overruns by Priority 1, 2 and 3b. The net effect has been that its PVID venture has yielded, on average, 19,768 AF per year of Colorado River water. The year 2003 was also a turning point for Metropolitan with respect to SWP supplies with the emergence of a decreasing trend in SWP Table A Allocations.

Metropolitan Water Sales

Metropolitan’s water sales have been declining (see Figure 8). Metropolitan’s water sales including Water Authority exchanges fell by 921,850 acre-feet per year from Fiscal Year Ending 2007 to Fiscal Year Ending 2019. Metropolitan’s water sales excluding Water Authority exchanges is the data provided in Metropolitan’s annual reports. The data Water Sales with exchanges is the data compiled from Annual Reports of the Metropolitan Water District of Southern California, Table “Water Use by Metropolitan’s Member Agencies” Table 1-2 in the 2019 Annual Report and comparable tables in earlier annual reports. Metropolitan includes San Diego’s Colorado River water supplies from its IID Agreement and Canal Lining projects in San Diego’s local water supplies in its estimate of firm supply.

23 Data compiled from Annual Reports of the Metropolitan Water District of Southern California, Table “Water Use by Metropolitan’s Member Agencies” Table 1-2 in the 2019 Annual Report and comparable tables in earlier annual reports. Metropolitan includes San Diego’s Colorado River water supplies from its IID Agreement and Canal Lining projects in San Diego’s local water supplies in its estimate of firm supply. The data Water Sales with exchanges is the data provided in Metropolitan’s annual reports. The data Water Sales without exchanges subtracts San Diego’s Colorado River water from its IID Agreement and Canal Lining projects.
exchanges fell by 1,088,829,486 acre-feet per year from Fiscal Year Ending 2007 to Fiscal Year Ending 2019.

Metropolitan’s water sales decline with increased local rainfall and Metropolitan’s real water price and increases with real (inflation-adjusted) personal income in the six counties within Metropolitan’s service area. Two significant factors regarding member agency local supplies also have an impact on Metropolitan’s water sales. First, the greater the water available from the Los Angeles Aqueduct, the lower Metropolitan’s water sales. Second, with the initiation of the Water Authority’s significant acquisitions of Colorado River water and Canal Lining water in 2003, there is now an independent declining trend in Metropolitan’s water sales.

The composition of Metropolitan’s water sales has also shifted (see Figure 9). Starting in 2013, Metropolitan eliminated separate pricing for agricultural water and replenishment relative to firm water service. All water sales are now at full-service pricing. Sales to agricultural water

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24 Metropolitan Water District of Southern California Water Supply Assessment and Use Among Its 26 Member Agencies, Rodney T. Smith, Ph.D., Stratecon Inc., April 9, 2016, prepared for the San Diego County CWA (hereinafter cited as “Stratecon 2015 Study”), p. 36.

25 Ibid.
users has been eliminated. Metropolitan water sales to its member agencies for storage are substantially lower as well.

**Figure 9**

*Metropolitan’s Water Sales (without San Diego Exchanges)*

<table>
<thead>
<tr>
<th>Fiscal Year Ending</th>
<th>Firm Demand</th>
<th>Agricultural</th>
<th>Storage</th>
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<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
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<td>2018</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
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</tbody>
</table>

*Understanding Metropolitan’s Past and Predicting Its Future*

The year 2003 was transformative for Metropolitan. The era of a full Colorado River Aqueduct ended. Water allocations from the State Water Project have plummeted. A diminished water supply portfolio prompted Metropolitan spending trying to meet demands for Metropolitan water. Where Metropolitan water rates only increased with inflation for about 20 years through 2007, there has been another era of Metropolitan water rates increasing substantially faster than inflation. To date, Metropolitan spending on new water resources has been unsuccessful. Its PVID land fallowing program has been a tool to manage its risk from Priority 1&2 overruns, rather than producing a significant new water supply. With increasing water rates, the demand for Metropolitan water has been declining.

Continuation of Metropolitan’s efforts to develop new water sources requires additional investments. Will new water supply ventures finally prove successful? Will they become cheaper or more expensive over time? Recommendations for further vetting of projections of Metropolitan’s future are provided below.
Based on the Stratecon 2015 Study, there are three trends at work for the future demand for Metropolitan water: (1) increased real personal income of its service area, (2) changing real price for Metropolitan water, and (3) declining demand due to member agency local projects. The trend annual growth of real personal income in Metropolitan’s service area is 2.6%. Therefore, Metropolitan’s real water rate can increase by 5.6% annually to offset the impact of real personal income growth on Metropolitan’s water demand.\(^2\) With expected inflation currently running at 1.28%,\(^2\) the annual increase in Metropolitan’s nominal water price when the real water rate is increasing by 5.6% is 7.0%.\(^2\) In other words, Metropolitan water rates would have to increase by 200 basis points faster than the Water Authority staff assumption to offset trend growth in real personal income.

The takeaways: (1) Within the context of Metropolitan’s past and current circumstances, I find the Water Authority staff escalation assumptions reasonable and the alternative advanced by the DLM&G Review not reasonable as based on assumptions rather than data and analysis, and (2) further due diligence on Metropolitan’s plan for meeting future water demands in Southern California can improve the economic foundation of predictions and risk assessment.

Section 2.6: The DLM&G Review considers Metropolitan’s offer for a renegotiated exchange agreement. Under their assumptions, the review calculates a potential benefit from a renegotiated exchange agreement. A key point is made about the benefit:

“A shift by METROPOLITAN of costs from volumetric charges to fixed charges . . . could reduced (sic) . . . the economic advantage of a Negotiated Exchange Option.”

The DLM&G Review does not recognize the substance of the Water Authority-Metropolitan negotiations as reported in public 998 Offer negotiations. In its counterproposal, the Water Authority accepted Metropolitan’s proposed price terms and proposed the following “reset”:\(^2\)

“As of 2019, the price under the Exchange Agreement is $453 AF, which consists of a $326 System Access Rate and a $127 AF System Power Rate (the “2019 Price Components”). The Water Authority shall be protected against any changes in the

\(^2\) Metropolitan water sales increased at 0.95 of the annual increase in real personal income in Metropolitan’s six county service area. Metropolitan’s water sales decreased by -0.44 of the annual increase in Metropolitan’s real water rate. Stratecon 2015 Study, p. 36. The growth of Metropolitan water demand at trend growth in real personal income and an increasing real Metropolitan water rate of 5.6% is zero: .95*2.6%-.44*5.6% ~ 0%

\(^2\) Expected inflation implied by the yield of nominal 10-year Treasury notes (0.73%) and yield on 10-year TIPS (-0.54%).

\(^2\) Estimate of nominal growth uses the Fisher equation: \((1 + n) = (1 + r)(1 + \pi)\), where \(n\) = growth in nominal price, \(r\) = growth in real price, and \(\pi\) = expected inflation

\(^2\) Letter from Jim Madaffer (Chair of San Diego County Board of Directors) to Gloria Gray (Chairwoman; METROPOLITAN Board of Directors), “Settlement Offers”, dated December 19, 2019, p. 2.
recovery of costs that are currently included in either of the 2019 Price Components as follows: Should at any point in time during the term of the Exchange Agreement METROPOLITAN in any manner move any of the costs in either of the 2019 Price Components to any other cost recovery mechanism (such as a fixed charges, or property taxes), the Water Authority’s Fixed Price shall be reduced commensurately. For example, the System Access Rate is currently about 72% of the overall 2019 Price Components. Should METROPOLITAN move 50% of cost recovery of the System Access Rate to another form of cost recovery, the Fixed Price would receive a credit of about 36% (half of the 72% portion of the overall 2019 Price Components). Also, if there is a material reduction or elimination of costs that are currently in the 2019 Price Components, the Water Authority will similarly receive a commensurate reduction in the Fixed Price.”

This was rejected by Metropolitan.

The Water Authority’s position on a renegotiated Exchange rate is not only reasonable, but essential to securing benefits from a renegotiated price term. After all, the Water Authority is familiar with the risks associated with a restructuring of Metropolitan water rates. Its 1998 agreement with IID addresses this issue as a “Fundamental Change”. The 1998 agreement outlined a calculation of a “financially-equivalent” Replacement Rate after any Metropolitan restructuring.

The DLM&G Review stated “detailed consideration of the future of METROPOLITAN rate structures is beyond our scope of work.” The DLM&G Review recommendation of a renegotiated exchange agreement is incomplete and is not cognizant of actual negotiations that have occurred. The Water Authority has been trying to negotiate a fair wheeling agreement with Metropolitan for two decades, and there is no new information, insight or strategy provided by the DLM&G review.

Interestingly, Metropolitan’s valuation of its offer notes that “Metropolitan’s annual transportation rate increases, which reflect increasing costs to Metropolitan, have averaged 4.6 percent.” Its financial valuation of its offer assumes that these rate increases will continue through 2112. Water Authority staff and Metropolitan staff have common expectations about Metropolitan’s future. In addition, Metropolitan proposes to include the cost of any new Delta conveyance into the Exchange fee. In which case, there is a substantial “upside” in the Exchange fee proposed by Metropolitan.

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30 See “Agreement for Transfer of Conserved Water between Imperial Irrigation District and the San Diego County Water Authority, dated April 29, 1998, for definition of Fundamental Change (p. 28), for definition of Replacement Rate (p. 31), and impact of Fundamental Change on Contract Price (p. 36).

31 Letter from Barry Lee (counsel for Metropolitan) to John Keker (counsel for the Water Authority), titled “San Diego County Water Authority v. Metropolitan Water District of Southern California”, dated November 15, 2019, p. 6.
The Takeaways, (1) a renegotiated exchange agreement with Metropolitan must address the financial consequences of potential Metropolitan rate restructuring, and (2) Metropolitan’s projections of its annual transportation rate charges conform with the projections by Water Authority staff.

Section 2.7: The DLM&G Review raises questions about the post-2034 contract prices for IID water. The proper analysis of this issue should be conducted within the context of the actual contractual provisions of the transfer agreement.

The Base Contract price is defined as follows:32

Base Contract Price = [METROPOLITAN Full Water Rate – Base Wheeling Rate] x [1 – Applicable Discount Rate] + 50% x [Base Wheeling Rate – lessor of the Actual Wheeling Rate or 115% of the Base Wheeling Rate]

The Metropolitan Full Water Rate is a combination of volumetric and non-volumetric Metropolitan charges.33 The Base Wheeling Rate reflects IID and the Water Authority’s interpretation of the Katz wheeling bill, which is substantially below Metropolitan’s exchange fee.34 The Applicable Discount Rate is now 5%.35 The change in the Base Contract price is related to the change in its components as follows:36

Change Base Contract Price = 95%*Change in METROPOLITAN Full Rate % – 102.5%*Change in Base Wheeling Rate

That is, the Base Contract Price changes by less than the Change in Metropolitan charges as measured by the contractually defined Metropolitan Full Water Rate and declines with increases in the Base Wheeling Rate. Projecting changes in the Base Contract Price should be based on projections of the underlying components.

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32 Revised Fourth Amendment to Agreement between Imperial Irrigation District and the San Diego County Water Authority for Transfer of Conserved Water, October 10, 2003, §5.1(d), pp. 11-12. See Exhibit A for discussion of contractual definition of Full METROPOLITAN Water Rate and Base Wheeling Rate are calculated.
33 See Exhibit A of the 1998 Agreement for discussion of contractual definition of Full METROPOLITAN Water Rate and Base Wheeling Rate are calculated.
34 Statement based on my participation in the negotiation and drafting of the 1998 transfer agreement.
35 See definition of Applicable Discount Rate in 1998 Agreement, p. 25. After 2020, the Applicable Discount Rate is 5%.
36 The term for the Change in the Base Wheeling Rate collects the term (1- Applicable Discount Rate), or 95%, with the term 50% x [Base Wheeling Rate – lessor of the Actual Wheeling Rate or 115% of the Base Wheeling Rate]. Since the Actual Wheeling Rate is greater than the Base Wheeling Rate, the second term is 50% of 100% less 115% of the Change in the Base Wheeling Rate. Collecting these two terms, 95% - 50%*15% = 102.5%.
The Base Contract Price will also be subject to a shortage premium after 2034.\textsuperscript{37} As with projecting changes in the Base Contract Price, projecting the timing and magnitude of shortage premium payments requires analysis of the contractual triggers and contractual calculations.

The Base Contract Price is subject to a price redetermination starting in 2035. Whether or not the IID Contract price will be subject to a price redetermination depends on the development of a water transfer market with enough “eligible” and “qualifying” transactions to trigger the contractual conditions for a price redetermination.\textsuperscript{38} The nature of any price adjustment, in turn, will depend on the underlying economics driving the transfer market in California.

In sum, the price provisions of the transfer agreement were heavily negotiated to capture the underlying economics of water and water markets in California. The DLM&G Review’s discussion of future IID contract prices is detached from contractual provisions and the related underlying economics. Their assumptions lack analytic foundation.

The takeaway, projections of future IID contract prices should be based on the underlying contractual provisions.

Section 2.8: The DLM&G Review notes that grant funding would reduce the cost of the RCS. A complete analysis would address any terms and conditions tied to grant funding.

The takeaway, a comprehensive analysis of grant funding should include an analysis of the economic cost, if any, of terms and conditions.

Section 2.9: The DLM&G Review posits that the economics of Water Authority local projects may differ from the economics of Member Agency local supply projects. Project specific analysis would be helpful. In my experience, many analyses do not properly cost, for example the creation of new supplies from recycling. Many urban water management plans discuss the cost of recycled water at the plant but exclude the cost of recycled water distribution systems.

The Water Authority’s analysis of the Carlsbad project is an example of a complete analysis. Project cost analysis included the cost of conveying water from the desalination plant to a delivery point in the Water Authority’s water distribution system.

The takeaway, economic analysis of local supply projects must include the cost of creating and moving water to relevant distribution systems.

Section 2.10: The DLM&G Review discusses ascertaining the water rate impacts of the RCS. A complete analysis should identify the impact on forecasted rate structures. Until a proper economic assessment is completed, including a completed RCS Finance Plan, discussion of rate impacts at this time prior to Phase B of the RCS study is unduly speculative.

\textsuperscript{37} See Exhibit D of the 1998 Agreement for discussion of the Shortage Premium,\textsuperscript{38} See Section 5 and Exhibit E of the 1998 Agreement.
The takeaway, the economic analysis and risk assessment discussed above provides the foundation for structuring a finance plan that provides the foundation for determination of water rates.

Section 3.3 (Risk Review): The DLM&G Review discusses the need for consideration of the risk of underlying water demands. Both the demand for Metropolitan water and Water Authority water should be investigated.

As with all aspects of project analysis, factual accuracy is essential. Stratecon notes that projections of future projects are inherently risky. Expectations about the timing, volume and terms of the availability of future water supplies may prove inaccurate. For example, in its 2010 Urban Water Management Plan, Los Angeles Department of Water & Power projected that the use of recycled water in FY 2014-2015 would reach 49,990 acre-feet.³⁹ Actual use was 36,738 acre-feet, or 70% below LADWP’s projections.⁴⁰ Track records of past projections should be part of assessments of the viability of currently planned projects.

The takeaways, (1) risk assessment of demand for Water Authority water is as appropriate as is a risk assessment of demand for Metropolitan water, and (2) predicting potential projects is an ongoing process.

Appendix A: Comments from Member Agency Chief Financial Officers:

Many of the comments are useful and worthy of further consideration. The table below provides my observation on each comment. Each comment is paraphrased rather than extensively quoted.

<table>
<thead>
<tr>
<th>Member Agency CFO Comment</th>
<th>Stratecon Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Finds Water Authority escalation assumption unrealistic</td>
<td>• See discussion above</td>
</tr>
<tr>
<td>• METROPOLITAN may change its rate structure in the next 100 years</td>
<td>• Prudent long-term planning by the Water Authority should consider the prospect of Metropolitan changing its rate structure</td>
</tr>
<tr>
<td>• The Water Authority’s cost of debt may be as high as 6.5%</td>
<td>• The relevant cost of debt will be at market conditions at the time of financing. Municipal interest rates generally follow U.S. treasury yields and inversely related to the strength of the economy</td>
</tr>
</tbody>
</table>

³⁹ Los Angeles Water & Power Urban Water Management Plan, 2015, p. 4-25, Exhibit 4N.
⁴⁰ Ibid.
<table>
<thead>
<tr>
<th><strong>Member Agency CFO Comment</strong></th>
<th><strong>Stratecon Response</strong></th>
</tr>
</thead>
</table>
| • What is the cost of stranded assets?  
• What is Water Authority’s share of Metropolitan’s cost to operate, maintain, repair and replacement their facilities?  
• Metropolitan will change rate structure to impose costs on the Water Authority | • Like all aspects of a long-term infrastructure project, this involves projections of future market conditions  
• The prospect as well as costs of stranded assets, considering salvage values, should be considered.  
• The Water Authority’s share of Metropolitan costs should be investigated and is an important consideration about Metropolitan as a water provider as well as the RCS.  
• The prospect that Metropolitan may change its rate structure should be part of the Water Authority’s long-term strategic planning separate and apart from as well as in conjunction with the RCS. |
| • Consider link between IID contract price and Metropolitan rates  
• Need to have a term sheet with IID for contract extension before project is started | • Analysis should be based on the analysis of contractual provisions (see above).  
• A stated condition by Water Authority staff. |
| • RCS should be financed by property tax or like the Water Authority’s Infrastructure Access Rate | • Should be considered as an alternative in the finance plan. |
| • The time profile of benefits and costs should be discussed by the Water Authority Board  
• An analysis beyond 30 to 40 years should be included | • Agree.  
• The appropriate analysis is the project’s useful life which exceeds 40 years (see above). |
<p>| • Water Authority should explain basis for all their assumptions and complete sensitivity analysis and perform probability analysis. | • All assumptions should be grounded on specific economic analysis of all factors and subject to risk assessment. |
| • Water Authority should break down the transportation costs by capital and operation and maintenance | • Suggest including the cost of replacement and renewals. |</p>
<table>
<thead>
<tr>
<th><strong>Member Agency CFO Comment</strong></th>
<th><strong>Stratecon Response</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• As member agency reduce demands on Water Authority, what impact does it have on RCS?</td>
<td>• RCS should be assessed within the context of expectations about future conditions, including member agency demands for Metropolitan water and Water Authority water.</td>
</tr>
<tr>
<td>• Water Authority should treat local supply alternative as a project.</td>
<td>• Economic analysis of alternatives benefits from consideration of specific projects.</td>
</tr>
<tr>
<td>• RCS repair and replacement costs may be underestimated.</td>
<td>• Repair and replacements costs should be included in project life cycle analysis.</td>
</tr>
<tr>
<td>• Is there a benefit to pursuing long-term debt?</td>
<td>• Yes. The role, structure and amount of debt should be determined as part of an optimal financing plan developed in Phase B of the RCS study.</td>
</tr>
<tr>
<td>• Review assumptions and provide off ramps before issuing debt.</td>
<td>• Assessment of a long-term infrastructure project should be subject to continued testing of underlying assumptions.</td>
</tr>
<tr>
<td>• Is there an opportunity to connect member agency reservoirs in South County</td>
<td>• Defer to Water Authority staff and member agencies.</td>
</tr>
<tr>
<td>• Could Water Authority monetize the value of IID water to another entity?</td>
<td>• Always recommend considering trading opportunities.</td>
</tr>
<tr>
<td>• Identify quantifiable and non-quantifiable project and environmental risks.</td>
<td>• Agree.</td>
</tr>
<tr>
<td>• Is there a value to a local water supply that is long-term and drought proof?</td>
<td>• Yes. DWR assessment of Bay Delta projects provides a reasonable economic model to quantify benefits (see below). The method requires fundamental economic and hydrological analysis discussed below.</td>
</tr>
<tr>
<td>Member Agency CFO Comment</td>
<td>Stratecon Response</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>• Water Authority should review “IC modifications” to identify any improvements.</td>
<td>• Any proposed improvements should be considered on the merits.</td>
</tr>
</tbody>
</table>

**Identification of additional issues not addressed by the DLM&G Review**

There are additional issues that should be considered in the economic assessment of the RCS: water supply reliability, climate change, and COVID-19.

**Water Supply Reliability:** As emphasized by California’s Department of Water Resources (“DWR”), water shortages have economic consequences. In 2013, DWR estimated the annual economic cost of municipal water shortages borne by water users at $812/AF for 5% water shortages increasing to $2,504/AF for 25% shortages (see Figure 10).\(^{41}\) Assuming that the real cost of water shortages has not changed since 2013, the economic cost of water shortages in 2020 dollars is 12% higher than in 2013.\(^{42}\) In other words, the annual economic cost of 5% or 25% water shortages, respectively, are now $909/AF and $2,804/AF.

Water shortages also impact the finances of water providers. The loss of water sales means less revenue is available to meet (especially the fixed) cost of water providers. Water systems based on less reliable water supplies requires higher financial reserves than water systems based on more reliable supplies.

The frequency, magnitude and duration of water shortages depend on the reliability of water supplies. Both of Metropolitan’s major supply sources face future challenges. Metropolitan also faces the need for further investments to repair its deteriorating water supply portfolio.

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\(^{41}\) “Is Bay Delta Conservation Plan a Doable Deal?”, presentation by Rodney T. Smith to Special Imported Water Committee Meeting, Bay Delta Conservation Plan, Economic Analysis, San Diego County Water Authority, September 12, 2013, slide 19.

\(^{42}\) Estimate based on Bureau of Labor Statistics “CPI Inflation Calculator”, [https://www.bls.gov/data/inflation_calculator.htm](https://www.bls.gov/data/inflation_calculator.htm). The assumption that the real economic cost of shortages has remained unchanged is probably wrong. Recommendations on how to investigate this issue are made below.
The risk of Colorado River water shortages is becoming material (see Figure 11). In successive forecasts starting in 2015, the prospect of a shortage of Colorado River water was looming “next year” with increasing risk in subsequent years (although the January 1, 2017 forecast backed off from earlier forecasts due to high runoff). The January 1, 2019 forecast was the most alarming with shortage becoming virtually unavoidable in the early 2020s. Due to a high runoff in the Colorado River Basin, the June 2019 forecast stretched out shortage risk into the mid-2020s. The April 2020 forecast has the risk of shortages returning to earlier projections by 2023.

Figure 10
Annual Economic Cost of Municipal Water Supply Shortages

<table>
<thead>
<tr>
<th>Magnitude of Water Shortages</th>
<th>5%</th>
<th>10%</th>
<th>15%</th>
<th>20%</th>
<th>25%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal Loss (2013$ Per Acre Foot of Water Shortage)</td>
<td>$812</td>
<td>$1,072</td>
<td>$1,414</td>
<td>$1,874</td>
<td>$2,504</td>
</tr>
<tr>
<td>Average Loss (2013$ Per Acre Foot of Water Shortage)</td>
<td>$708</td>
<td>$822</td>
<td>$960</td>
<td>$1,128</td>
<td>$1,337</td>
</tr>
</tbody>
</table>

Colorado River

The risk of Colorado River water shortages is becoming material (see Figure 11). In successive forecasts starting in 2015, the prospect of a shortage of Colorado River water was looming “next year” with increasing risk in subsequent years (although the January 1, 2017 forecast backed off from earlier forecasts due to high runoff). The January 1, 2019 forecast was the most alarming with shortage becoming virtually unavoidable in the early 2020s. Due to a high runoff in the Colorado River Basin, the June 2019 forecast stretched out shortage risk into the mid-2020s. The April 2020 forecast has the risk of shortages returning to earlier projections by 2023.

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43 Compiled from Reclamation’s Five-Year Projections of risk of water shortages.
The Drought Contingency Plan (“DCP”) calls for California to make 200,000 AF to 350,000 AF available through conservation to increase Lake Mead storage when the elevation of Lake Mead drops to and below 1,045 feet. IID has opted out of the DCP. Metropolitan backstops California’s obligation. The DCP continues through 2026 as a bridge to an anticipated longer-term agreement among Colorado River Basin parties (including Mexico). With California agreeing to obligations under the DCP, should one anticipate that the anticipated long-term agreement have a smaller, larger, or same obligation?

The future for the Colorado River depends on which road we are traveling. Have we been in a prolonged drought, or are the unusually wet hydrologic conditions in the early 20th century giving way to the long-term average calculated by tree-ring studies (see Figure 12)? Under the former belief, the last decade was a drought. Under the latter belief, a drought in the first decade of the 21st century was broken by the year 2011 until returning in 2018. Have we been experiencing

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the “long-term” new normal? The nature of the risks we are managing depends on which world we are inhabiting. The value of seniority of Colorado River water will increase over time.

State Water Project

The California WaterFix had been a central focus of Metropolitan’s multi-year effort to secure new water supplies for its member agencies. Governor Newsom replaced the twin tunnels project with the single tunnel project under development. The design, cost and timing are under investigation.

It is difficult to foresee any project commencing operations before 2040 at the earliest. On the eve of the cancellation of WaterFix, project operations were not anticipated to start until 2035. How long will Governor Newsom new venture take to complete environmental review, litigation and negotiation of contractual arrangements? What happens before then?

In the “interim”, California water users are stuck with the delivery problems of the current State Water Project. Figure 13 illustrates the variability in SWP water supplies for urban water users under the existing SWP.45 The “probability of exceedance” gives the forecasted probability that available annual water supplies will exceed the amount shown on the vertical axis. For

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45 Figure 14 plots the data points read from Figure 1 “Total SWP Deliveries” in *Economic Analysis of the California WaterFix*, Prepared for California Department of Water Resources by David L. Suding, Ph.D. The Brattle Group September 20, 2018, p.12.
example, there is a 63% probability that annual available water supplies will exceed 48%; and a 37% probability that annual available water supplies will be less than 48%. The average allocation is 49%, the 10-year running average of actual SWP allocations since 2016 (see Figure 6).

There are significant risks confronting the State Water Project apart from the environmental challenges in the Bay Delta. Land subsidence in the Central Valley threatens the delivery capacity of the California Aqueduct that will increase SWP project costs.

Climate Change: Climate change is another factor affecting future water supplies. By the last quarter of this century, climate change is estimated to reduce runoff on the Colorado River by 10%. California is also to lose “much of spring snowpack.”

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46 Figures in text from curves plotted in Figure 14.
47 See Update on California Aqueduct Subsidence, Metropolitan Water District of Southern California, Member Agency Managers Meeting, January 17, 2020.
49 Ibid, p. 15.
Monitoring the accuracy of such projections is essential for Water Authority planning. The reduction in runoff on the Colorado River will increase the frequency, magnitude and duration of Colorado River water shortages. This should further increase the value of senior priority claims on Colorado River water. Loss of spring snowpack will also prove significant. Depending on the location of lost snowpack, this would reduce SWP allocations with or without a new Delta conveyance facility. If the lost snowpack reduces the yield of the Los Angeles Aqueduct, this would increase the demand for Metropolitan water, putting further stress on Northern California and increased dependence on the over-appropriated Colorado River.

COVID-19 Pandemic: The COVID-19 pandemic is (hopefully) once in a lifetime disrupter of our lives. The public health establishment has been shattered and is being rebuilt on the fly. The economy is in shambles. We are learning about supply chains and interconnectedness of economic activity. Rapid joblessness and burgeoning food lines bring back visions of the Great Depression, where the U.S. economy (measured by inflation-adjusted Gross Domestic Product) contracted by 26% over four years. The U.S. economy did not fully recover to pre-Depression levels until the end of the 1930s. Economic historians believe it took World War II to put our country’s economy back on its feet.

As in other states, shutdown of the economy has generated widespread unemployment in California (see Figure 14). Before mid-March, weekly initial unemployment claims averaged 45,828 claims. Initial unemployment claims increased 4-fold in the third week of March and 23-fold in the fourth week. Initial claims peaked at 1,058,325 by the end of March. While initial unemployment claims have declined, they still average about 200,000 claims per week, or almost 5-fold the weekly rate before mid-March. The new initial unemployment claims have matured into increased continuing claims. California’s insured unemployment rate stood at 2% in mid-March and peaked at 27.8% in the first week of May. By mid-July, California’s insured unemployment rate stands at 15.6%.

The economy is on the road to credit defaults and bankruptcy. Will laid-off workers be rapidly integrated back into their previous jobs? With businesses closing, millions of the unemployed will be chasing job opportunities disappearing into bankruptcy. The water industry is not immune to the economic fallout from COVID-19.

Associations of public agencies and private water utilities estimate the annualized nationwide impact of COVID-19 on drinking water utilities at $13.9 billion. Declining water

sales and increased payment delinquencies will stress the industry’s finances. Many water agencies in California have reduced or even suspended planned rate increases and are monitoring operational COVID-19 impacts for potentially further cutbacks.

The shutdown of the economy was admittedly essential for public health but will be consequential for the long-term health of the U.S. economy (see Figure 15).\textsuperscript{53} Consider two scenarios. The COVID-19 disruption will be twice as severe and “only” take one-more year to reach bottom than the Great Depression, but the economy will not recover to the pre-COVID-19 trend until the mid-2030s. Even if the COVID-19 disruption “just proves” to be another Great Depression, California’s economic future is a great departure from the pre-pandemic trend.

\textsuperscript{53} COVID-1
The immediate economic disruption from COVID-19 is painful and severe. Examining how the economy unfolds will prove essential for planning by water agencies. Having said that, even if the COVID-19 pandemic proves worse than the Great Depression, the California economy has a quarter of century to recover from the pandemic.

The impact of COVID-19 on the economics of water projects will be the greatest on projects initiating operations within the next decade. Longer-term projects, such as the RCS, may find that, because their underlying economics are based on long-term economic conditions, COVID-19 pandemic may prove less challenging.

**Recommendations for further economic due diligence and risk assessment of the RCS**

Economic assessment of any long-term project, including RCS, needs to be based on projections of the future that are inevitably subject to uncertainty. Innovation in information technology has increased exponentially the ability to develop and assess projections about the future for decision-making.  

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54 For background, see *Risk Assessment Framework: Navigating Uncertainty*, 2019
Since the 1990s, the Bureau of Reclamation has been developing simulation models of the availability of Colorado River in the face of unknown hydrologic conditions and assumptions about water demands and policy. This analytic tool supported negotiations of interim surplus guidelines in 2003, interim guidelines for shortage sharing on the Colorado River in 2007 and the Drought Contingency Plan in 2019.

Starting in 2002, California’s Department of Water Resources has been conducting simulation studies of the deliverability of SWP water under unknown hydrologic conditions and assumptions about water demands and policy. This analytic tool supported assessment of the twin tunnel projects and now the single tunnel project.

In the private sector, the use of quantitative risk assessment models has exploded. Investments in the petroleum sector, development of structured finance products and many other sectors now use quantitative risk assessment. Stratecon routinely uses quantitative risk assessment for analyzing proposed water investments and transactions.

The discussion below presents questions for economic analysis and risk assessment in Phase B, scope of analytic tools, the need for learning during the period of RCS assessment before decision-making, potential strategic alliances, and a framework for collaboration going forward.

Questions for Phase B: The lists provided below identify substantive issues identified above for inclusion in Phase B of the RCS study.

**Metropolitan Issues**

*Objective:* Provide sound analytic and factual foundation for projecting future Metropolitan water rates and charges and reliability of Metropolitan water service.

1. Forensic analysis of the causes, planning assumptions behind the historic increases in Metropolitan’s water rates and charges.
2. Identify and handicap the “bets” behind relying on Metropolitan water supplies going forward as evidenced by its current Integrated Resources Plan.
3. Develop, assess and update forecast tool for analyzing the reliability of Metropolitan’s current and proposed future water supplies.
4. Review true costs and water yield of Metropolitan’s proposed and planned projects and assess impact on Metropolitan water rates and charges and their contribution to the reliability of Metropolitan future water supplies.
5. Project the source and amount of future demand for Metropolitan’s water service.
6. Develop, assess and update forecast tool of Metropolitan’s water rates and charges.

**Long-Term Strategic Planning Issues**

*Objective.* Assure that analytic and factual foundation of RCS conforms with analysis and facts employed on Metropolitan issues.
1. Develop an analysis of the reliability of the Water Authority’s water supplies based on composition of Water Authority’s water supply portfolio (preferential rights within Metropolitan, additional purchases from Metropolitan, Colorado River water supplies, Carlsbad Desalination Project and other current and proposed Water Authority or member agency projects).

2. Develop an analysis of future demand for Water Authority water service.

3. Assure that assessments of the Water Authority’s future projects conform with methods used to assess Metropolitan projects (address timing of investments versus water yields, cost escalation, project risk assessment).

4. Develop an optimal RCS financial plan.

5. Assure that projections of Water Authority’s rates and charges conforms with methods used to project Metropolitan’s rates and charges.

Scope of Analytic Tools: The Economic Model developed by Water Authority staff and adapted by DLM&G are financial projections under different scenarios based on stated assumptions. As discussed above, the issues raised by the DLM&G Review need further investigation into the underlying economics and risk factors facing the Water Authority and Metropolitan.

Figure 16 sketches the various components of a follow-on assessment. Colorado River and SWP water supply models should be based on the Bureau of Reclamation and DWR models adjusted for risk analysis of climate change and other issues. The findings become input for an integrated water supply reliability models for Metropolitan and the Water Authority. The Metropolitan issues identified above would be the basis for a Metropolitan rate model. Metropolitan and Water Authority water demand models should be based on statistical models identifying the factors driving historical adjusted for projections of local water projects and the feedback between water pricing and water demand. The RCS cost model from Phase A could be updated to assure consistency between the analysis of future economic conditions throughout the “circle” in Figure 16. This information then feeds into the development of an optimal RCS finance plan. As discussed above, with the RCS finance plan and the other findings, one has the inputs for the Integrated RCS Decision Model. The economic analysis and risk assessment discussed above is driven by the findings of investigating the underlying economics and risks assessments and identifying the “bets” under project alternatives.
Learning During Risk Assessment in Preparation for Decision-Making: Predicting the future is difficult. Some fundamental premises may prove correct. Others incorrect. It is essential to continue to test underlying premises (see Figure 17).
Initial models are constructed, and predictions made. Preliminary findings are advanced. Given the lengthy period of project development for the RCS, there will be the opportunity to monitor how the world unfolds relative to predictions. Is the world unfolding as predicted, or not? This testing provides the opportunity to learn and ultimately improve the tools for decision-making.

**Potential Strategic Alliances:** Potential strategic alliances can change the economics of the RCS. The opportunities to enter into power agreements with local third parties may prove beneficial. Potential partners include the Imperial Irrigation District and geothermal producers in the Imperial Valley. Binational opportunities may also exist. The State of Baja has long-term plans to build natural gas-powered power plants in the Mexicali Valley.

Strategic opportunities may also exist in water. Water Authority staff assume that water must be purchased from Metropolitan to offset the loss of water from water treatment. Local water supplies opportunities may prove attractive.

Finally, it is common for regional conveyance projects to look for partnership opportunities along its pipeline route. The RCS may provide a link to a regional system for local communities who especially face severe water problems with few, if any, alternatives.
Collaboration Going Forward: Multi-billion, long-term capital investments involve the future. The RCS or any other water project is no exception. The more extensive the information and analysis of the underlying economics and risks of a project and its alternatives, the better the prospect for prudent decision-making. Critical judgments must be made with incomplete information. What next decade looks like may or may not conform with today’s expectations.

Decision-making in the face of uncertainty is an art as well as a science. Achieving consensus among decision-makers is facilitated through understanding of underlying economics and risk assessments. Common understandings are most likely to occur through exchange of information and analysis.

Conclusion

Thank you for the opportunity to consider the questions being raised about the RCS. There are really few bad questions. There is a pathway for finding the most informative answers for Water Authority decision-making.

Rodney T. Smith
President
August 23, 2020

Dan Denham, Deputy General Manager
San Diego County Water Authority
4677 Overland Avenue
San Diego, California 92123-1233

RE: Comment on DLM Engineering and Gillingham Water Review of SDCWA Projections for MWD Price Escalation and Water Rates

Introduction and Executive Summary

The San Diego County Water Authority (SDCWA) has asked Water Resource Consultants Inc. (WRC) to comment on the engineering review by DLM Engineering and Gillingham Water (DLM&G) (Review) related to SDCWA’s Regional Conveyance System (RCS) and draft Phase A study (RCS Study). Specifically, WRC has been asked to express an opinion on the engineers’ conclusion that, while the RCS is technically feasible and its estimate of costs reasonable, the RCS is not cost-effective when evaluated using what DLM&G believe are more reasonable assumptions about MWD price escalation and future water rates. The sole focus of this paper is to comment on DLM&G’s assumptions and analysis regarding MWD future price escalation and water rates, and not on any other issues raised in the Review.

The engineers conclude that SDCWA’s projection of MWD rates is not “economically sustainable,” and, as a result, is highly unlikely to occur. In support of its conclusion, the engineers opine that MWD will either have to reduce the costs that drive the rates, shift costs away from volumetric-based charges to firm unavoidable fixed charges, or a combination of the two. This opinion is not based on any actual MWD data, project(s) review or even MWD rate projections. Rather, the DLM&G conclusion that “rates are highly unlikely to increase at these levels relative to other supply options,” is based solely on its own conclusory statement that, “they cannot.”

WRC is familiar with and has reviewed the long-term historical trend in MWD rates as well as other factors and key drivers that will be likely to contribute to future rate trends at MWD. This data and my analysis support SDCWA’s MWD rate projections over the study period for the RCS and other project alternatives. The Analysis section of this report explains in more detail the data and methodology supporting my conclusions.

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Professional Qualifications of WRC

WRC was founded in 2008. The firm specializes in providing planning, management, financial and rate expert advice to public and private water entities throughout California. Its principal, Robert Campbell, has over 45 years experience working in the public and private sector water industry. Prior to founding WRC, Mr. Campbell was employed at the Metropolitan Water District ("MWD") from 1970 to 1991 serving in various engineering, operations, and financial management levels and as the Financial Services Manager responsible for directing preparation of the agency's annual capital and operating budget, managing debt restructurings and issuance, preparing financial feasibility and rate analyses of agency capital and water resource improvement programs, and developing and implementing tax, revenue, and rate setting policies. During 1983-1984, he co-managed a year-long revenue and rate restructuring process with the District's Board of Directors resulting in substantial changes to MWD's water and tax rate policies, the addition of new fixed revenue sources and debt issuance alternatives, and reserve policy changes.

From 1991 to 2003 he was employed by the San Diego County Water Authority (SDCWA) where he served as its Chief Financial Officer directing all financial operations including accounting, treasury, debt administration, and revenue and rate setting policies. During this period, he directed a two-year cost of service, revenue and rate restructuring process with SDCWA and its 24 member agencies to diversify rates and charges and provide new and more stable revenue sources. He also served as an executive level manager in the General Manager's office directing and managing the development, acquisition and implementation of new diversified water resources, including negotiating and obtaining water agreements related to the Colorado River Quantification Settlement Agreement (QSA), SDCWA’s up to 75- year Transfer Agreement with the Imperial Irrigation District for 200,000 acre-feet of conserved water, Allocation Agreement for 77,700 acre-feet of conserved water from the All American and Coachella Canal lining projects, and SDCWA/MWD Exchange Agreement for conveyance of 277,700 acre feet of imported water transfers. From 2003 to 2008, he served at SDCWA in a consulting capacity providing advice on implementation of the QSA and related transfer agreements, and new programs related to water transfers and groundwater storage agreements with various California entities.

Mr. Campbell holds both Bachelor of Arts and Master of Public Administration degrees from California State University, Northridge.

Analysis

As noted above, WRC's review is expressly limited to analyzing the available data regarding MWD's future rates as projected by SDCWA to evaluate the feasibility of the RCS.

The economic analysis presented by SDCWA assumes MWD prices will escalate at 5.1 percent per year throughout the 92-year period of analysis. Data presented by Water Authority staff at
its March 12, 2020 special board meeting documented that MWD Full Service Tier 1 Supply rate has a 20-year escalation average of 5.1 percent per year and that the Exchange rate components (System Access + Water Stewardship + System Power) have a collective 20-year escalation average of 4.5 percent per year. The Phase A RCS Study applies the overall 5.1 percent Full Service rate to all MWD rate components (Tier 1 Supply and Exchange rates).

DLM&G state that... "Accurate forecasting of long term water rates is difficult. Many factors drive the price of water, including capital costs, increased operating cost, and changing sales volumes." They go on to state that... "[t]he point is that MWD price escalation at 5.1 percent over the entire 92 year period of analysis is not sustainable, and is therefore highly unlikely to occur; the system will need to adapt and adjust."

WRC's analysis shows that the SDCWA baseline assumption is not just reasonable based on historical facts, but conservatively lower than the past 81-years of record. While systems may adapt and adjust, the DLM&G Review provides no evidence to support when or how MWD will adapt and adjust. Until now, MWD’s budget and water rates have continued to increase in spite of significantly lower sales of MWD water. WRC’s analysis also looks ahead to identify the cost drivers that will likely result in MWD rate increases that meet or exceed the SDCWA projections.

Overview of MWD

The Metropolitan Water District Act authorizes MWD to levy property taxes within its service area; establish water rates; impose charges for water standby and service availability; incur general obligation bonded indebtedness and issue revenue bonds, notes and short-term revenue certificates; execute contracts; and exercise the power of eminent domain for the purpose of acquiring property. MWD’s charges for water sales and availability are fixed by its Board, and are not subject to regulation or approval by the California Public Utilities Commission or any other state or federal agency; MWD’s rates are subject to Proposition 26 and other cost of service rate-setting legal requirements. MWD’s service area comprises approximately 5,200 square miles and includes portions of the six counties of Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura. The collective economy of the six counties which comprise MWD’s service area has a gross domestic product larger than all but fifteen nations of the world. MWD began delivering water in 1941. MWD’s water is a supplemental supply for its member agencies, most of whom have other sources of water. MWD has historically provided between 40 and 60 percent of the water used annually within its service area.

MWD owns and operates an extensive water delivery system including: the Colorado River Aqueduct, 16 hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes and five water treatment plants. Four of these treatment plants are among the 10 largest plants in the world. MWD is the largest distributor of treated drinking water in the United States. The District imports water from the Feather River in Northern California and the Colorado River to supplement the local supplies available to its member agencies. It also provides financial

2 Ibid, pages 15-16.
subsidies to some member agencies to develop water recycling, storage and other local water supplies.

**Brief Historical Overview of MWD Rates and Taxation Policies**

MWD was formed in 1928. Until water deliveries began in 1941, MWD’s activities were, by necessity, supported entirely through the collection of *ad valorem* property taxes. In 1960, when the District’s participation in the State Water Project was under consideration, MWD’s water pricing and taxation policies came under extensive discussion. A specific water pricing and taxation policy was developed which applied to the future costs of the State Water Project as well as the continuing costs of the Colorado River Aqueduct.

Costs of the combined projects would be repaid under a formula which required all operating costs and at least half of the capital costs would be paid by water users. The remaining capital costs would be paid by taxpayers, with the expectation and plan that the tax burden would gradually be reduced over time as greater amounts of water were sold.

In 1974, MWD’s board again looked at the District’s taxing and water pricing policies. That review was prompted by a number of factors including the greatly expanded area of the District, the effects of limitations on State Water Contract project supplies, the future loss of Colorado River water, long-term energy costs, and whether the rising price of water would have an effect on consumption.

In 1979, a new formula for setting water rates and tax rates was developed. It was called the "proportionate use formula." Under this formula, water users would pay all operating and maintenance costs and an increasing portion of capital costs as water deliveries increased. Taxpayers, meanwhile, would pay the remaining capital costs, but their share would decrease as water sales increased.

Since the early 1980s, water sales revenues have provided approximately 75 to 85 percent of total revenues and *ad valorem* property taxes have accounted for about 10 percent of revenues. MWD’s remaining revenues are *de minimis*, and have been derived principally from the sale of hydroelectric power, interest on investments and additional revenue sources (water standby charges and availability of service charges beginning in 1993).

Beginning in fiscal year 1990-91, *ad valorem* taxes were applied solely to pay annual debt service on MWD’s general obligation bonds and a small portion of State Water Contract payment obligations, pursuant to requirements in the MWD Act that limit property tax collections to the amount necessary to pay annual debt service on MWD’s general obligation bonds plus the portion of its State Water Contract payment obligation attributable to the debt service on State general obligation bonds for facilities benefiting MWD that were outstanding as of 1990-91. Under this requirement, MWD’s *ad valorem* property tax revenue has been decreasing, and will continue to decrease as the bonds are retired. However, the MWD Act permits MWD to set aside the prescribed reductions in the tax rate if the Board, following a
public hearing with 10 days’ prior written notice to the Speaker of the California Assembly and the President pro Tempore of the Senate, finds that such revenue in excess of the restriction is “essential to the fiscal integrity of the district.”

MWD historically identified three kinds of water service: (1) full service; (2) replenishment (discontinued effective December 31, 2012); and (3) interim agricultural (discontinued effective December 31, 2012). Beginning in 2003, MWD implemented a two-tiered supply rate structure which unbundled its full service water rate into separate rate components: (1) tier-one and tier-two supply; (2) system access, for conveyance and distribution; (3) water stewardship; (4) power; and (5) treatment.

The process for the delivery of water not owned or controlled by MWD is referred to as “wheeling.” Under the current rate structure, wheeling parties pay the System Access Rate and Water Stewardship Rate, Treatment Surcharge (if applicable) and power costs for wheeling transactions. MWD’s wheeling rate has been the subject of litigation between SDCWA and MWD in which the Court found MWD’s wheeling rate and charges under the Water Authority’s Exchange Agreement illegal, based on its inclusion of the Water Stewardship Rate. MWD recently suspended charging its Water Stewardship Rate for calendar years 2021 and 2022, but has announced it plans to bring back an alternative funding source for its water conservation and demand management programs as part of its 2022 rate setting process.

MWD currently has two sources of fixed revenue (taxes and Standby/RTS/Capacity charges) that comprise approximately 15-20% of its revenue base (but see discussion below how wheeling revenues paid by SDCWA are the financial equivalent of a fixed charge).

**Summary of MWD Revenues**

<table>
<thead>
<tr>
<th>Revenue Category</th>
<th>Fiscal Year Ended June 30, 2019</th>
<th>Percent Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>$1,149</td>
<td>74.7%</td>
</tr>
<tr>
<td>Taxes</td>
<td>145</td>
<td>9.5</td>
</tr>
<tr>
<td>Standby, RTS, Capacity Charges</td>
<td>170</td>
<td>11.0</td>
</tr>
<tr>
<td>Other(^4)</td>
<td>74</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,538</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Since the California Legislature placed limitations on MWD’s authority to impose ad valorem property taxes, its tax revenues have gradually diminished as originally planned. As noted above, MWD has authority to impose a greater tax levy if the Board of Directors finds that such revenue is “essential” to maintain MWD’s “fiscal integrity.” Since fiscal year 2014, MWD has

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\(^4\) Interest income, Power sales, and miscellaneous income.
voted to suspend the tax limitation and maintain the fiscal year 2013 ad valorem tax rate in order to pay for a greater portion of MWD’s SWP obligation that would otherwise have to be paid by other water rates and charges.

The RTS charge is designed to recover a portion of capital expenditures for infrastructure projects needed to provide standby service, and peak conveyance needs. The RTS is allocated to each member agency in proportion to the rolling ten-year share of firm deliveries through MWD’s system. The budgeted total RTS revenue for fiscal year ended June 30, 2019 was $136.5 million, of which $43.6 million was estimated to be collected via a Standby Charge on property parcels. Each year MWD prepares an Engineer's Report as part of its cost of service analysis to determine the costs that could be paid from the RTS. The benefits described in this Engineer’s Report greatly exceed the fiscal year 2019 RTS/Standby Charge budgeted amount by at least $347 million.

In designing rates, fixed charges are viewed as being desirable from a utility viewpoint because they provide a measure of revenue stability to the utility. At the same time, advocates of conservation believe that a rate structure must find a reasonable balance between fixed and variable charges that allows the variable charge to provide an adequate and reasonable price signal to the customer regarding their consumptive use. These differing views provide a clear example that the goals and objectives of the utility, customers, and various community stakeholders should be carefully considered in the design of rates in general. And, of course, no matter how a rate structure is designed as between volumetric and fixed charges, the rates must comply with California law regarding cost of service.

Principles of water conservation best management practices strongly encourage recovering the maximum amount of revenue from variable commodity charges. However, best management practices also recognize the challenges and financial constraints presented for utilities that are 100% dependent on variable commodity charges. To achieve a reasonable balance between fixed and variable charges, many water utilities have adopted a practice of not deriving more than about 30% of total revenues from fixed charges – and again, all in compliance with cost of service limitations.

**MWD’s 81-Year Historical Rate Trends Support SDCWA Projections**

Financial analysts and economists often use historical data among other factors to forecast future water rate trends. Historical trends are one tool that can be helpful in extrapolating future trends especially as the duration and availability of historical data increases and other contributing factors to rate increases are identified. Rather than looking at snapshots in time such as 10- or 20-year timeframes, longer periods can help to smooth out variations due to temporary or periodic anomalies such as weather related demand and sales variations that cause above average or below average rate adjustments. Historical trends must of course also be subject to review based on known changed circumstances that may impact future rates and

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trends (see discussion below on the key drivers that are likely to impact future MWD water rates).

Since 1941 when MWD first began charging water rates, untreated rates have escalated nearly 100 fold over the past 81 years, from $8 per acre foot in 1941 to $799 per acre foot in 2022, and treated rates have escalated from $15 per acre foot to $1143 per acre foot. Overall, the average annual increase has been 5.5 percent between 1941 and 2022. Over the same period the untreated rate has increased at an average annual rate of 5.85 percent.

Since 1980, when MWD was mandated by state law to begin shifting its revenue policies away from taxes to deriving a majority of its revenues from water rates, untreated rates continued to steadily increase from $79 per acre foot to $799 per acre foot in 2022, and treated rates have increased from $104 per acre foot to $1143, or an average annual increase of 5.66 percent and 5.87 percent respectively over the 42-year period.

Since 2003 when MWD unbundled its rate structure untreated and treated rates have increased at an average annual rate of 4.83 percent and 5.57 percent over the 19-year period\(^6\). MWD's unbundled wheeling or transportation rate (excluding the Water Stewardship Rate) has increased at an average annual rate of 4.76 percent over the same period.

What is evident over all the above periods is that MWD’s Tier 1 full service untreated and treated rate increases of 5.85 percent and 5.5 percent, respectively, have steadily trended upward over the duration of the 81-year period.\(^7\) Between 1941 and 1979 taxes were the predominant source of revenue, which served to dampen the impact and steepness of the curve

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\( ^6\) 5.2% and 5.88% if the Water Stewardship Rate for years 2021 and 2022 (presently funded from reserves) is included.

\( ^7\) MWD’s Tier 2 water sales are essentially zero, the reasons for which are beyond the scope of this comment.
of water rate increases in those early years. However, it is notable that throughout the remaining 42-year period after 1979 rates increased at an annual average of 5.66 percent and 5.87 percent, respectively for untreated and treated rates. In some isolated or intermediate periods, fluctuations up or down in annual sales has resulted in above average and below average rate increase years but the trend has been consistently upward over a longer duration. A variety of factors have consistently contributed to the increases over the period mostly due to revenue requirements for system capital construction and replacements, operation and maintenance, water supply acquisitions, treatment and water quality requirements, and environmental and State Water Project costs. The following table describes historical trends in the various treated and untreated rate components for the stated time periods, used as part of Water Authority projections of future MWD water rates and charges.

#### MWD Historic Rate Increases 1941-2022

<table>
<thead>
<tr>
<th>Rate or Rate Component</th>
<th>1941</th>
<th>1980</th>
<th>2003</th>
<th>2022</th>
<th>Average Annual Increase 1941 to 2022 (%)</th>
<th>Average Annual Increase, 1980 to 2022 (%)</th>
<th>Average Annual Increase, 2003 to 2022 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 Supply, $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$73</td>
<td>$243</td>
<td>N/A</td>
<td>N/A</td>
<td>6.53%</td>
</tr>
<tr>
<td>System Access, $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$141</td>
<td>$389</td>
<td>N/A</td>
<td>N/A</td>
<td>5.49%</td>
</tr>
<tr>
<td>Water Stewardship, $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$23</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>System Power, $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$89</td>
<td>$167</td>
<td>N/A</td>
<td>N/A</td>
<td>3.37%</td>
</tr>
<tr>
<td>Untreated, Full Service, $/AF</td>
<td>$8</td>
<td>$79</td>
<td>$326</td>
<td>$799$</td>
<td>5.85%</td>
<td>5.66%</td>
<td>4.83%</td>
</tr>
<tr>
<td>Treatment Surcharge, $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$82</td>
<td>$344</td>
<td>N/A</td>
<td>N/A</td>
<td>7.84%</td>
</tr>
<tr>
<td>Treated, Full Service, $/AF</td>
<td>$15</td>
<td>$104</td>
<td>$408</td>
<td>$1143</td>
<td>5.5%</td>
<td>5.87%</td>
<td>5.57%</td>
</tr>
<tr>
<td>Wheeling Service $/AF</td>
<td>N/A</td>
<td>N/A</td>
<td>$230</td>
<td>$556</td>
<td>N/A</td>
<td>N/A</td>
<td>4.76%</td>
</tr>
</tbody>
</table>

8 Rate has been suspended for years 2021 and 2022 and is being funded from reserves.
9 Inclusion of suspended Water Stewardship Rate of $65/AF would increase untreated full service rate to $864/AF resulting in corresponding average annual increase for 2003 to 2022 of 5.2%.
Key Drivers that Could Impact MWD’s Future Water Rates also Support SDCWA Projections

While looking back at historical trends is useful in extrapolating future trends in water rates, it is also essential to consider factors and known drivers that could materially influence future rate trends. Following are several key factors that are likely to impact MWD’s future water rates, causing them to increase at a pace higher than historical trends.

A. Cost Impact of Extension of State Water Project Contract and Delta Conveyance Project

Extension of State Water Project Contract

MWD’s State Water Project Contract accounts for nearly 50 percent of the total entitlement contracted for by all contractors and provides MWD with rights to water through 2035. MWD intends to exercise its option to extend its agreement with the State through 2085, which will result in continued escalating capital and annual minimum operations and maintenance costs (OMP&R) through 2085. State project expenditures account for approximately 37 percent of MWD’s annual budget expenditures. The California Aqueduct is approaching 60 years since construction and operation began. DWR’s assets and the supporting water management infrastructure are reaching end of life. DWR will need to address its aging infrastructure, and impacts associated with climate change, population growth, ecosystem stressors, and funding constraints.

In the next three years, DWR plans to adopt a framework for condition assessment, risk management, and strategic planning for capital investments to prepare the SWP infrastructure for the next 50 years. The Oroville spillways emergency accelerated the Department’s understanding of the dual realities of aging infrastructure and extreme hydrology. The Department will reconstruct both spillways to their original design capacity and advance the development of a comprehensive needs assessment for the safe operation of the dam and its appurtenances into the future; complete an asset management plan for all State Water Project facilities; and obtain permits for and begin implementation of a delta conveyance facility. While it is unknown at this time what the aging infrastructure and related project replacement costs will be, estimates of a delta conveyance facility are in the billions of dollars (see discussion below).

Delta Conveyance Project

Governor Newsom issued an Executive Order directing State agencies to develop a comprehensive statewide strategy to build a climate-resilient water system that included consideration of a single tunnel Bay-Delta facility in lieu of MWD’s proposed two-tunnel WaterFix project. Cost of a single tunnel facility is estimated at $12.13 billion in 2020 dollars. MWD’s proportional share could be 1/2 to 2/3 of the cost, or up to $8 billion. If financed at 4% over a 40 year repayment period annual debt service payments would be approximately $404 million. Annual facility O&M, power, replacement and mitigation costs would add approximately $50 million per year resulting in total annual payments of

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10 Excludes Water Stewardship Rate.
11 Department of Water Resources Strategic Plan, dated October 2019.
12 MWD Board of Directors Letter 8-7 dated April 10, 2018, page 2.
$454 million (2020 dollars). The construction period for the project is estimated at 15 years. Construction cash flows would be financed throughout this period with the final bond issuance when construction is substantially complete and the project becomes operational (15th year). Assuming construction were to begin within the next five years the expected operational date would be somewhere between 2036 and 2041 and final repayment of the bonds would conclude between 2076 and 2081. It is estimated that MWD's annual rate increases for the project could be up to 2% during the 15-year construction period with annual payments continuing for an additional 25 years.\footnote{Ibid, page 2.}

The project has several significant uncertainties which could result in additional risks and cost escalation. These include timing of project construction and final operational date, interest rate risk, and SWP contractor default on payments for which MWD ratepayers may be responsible. These risks are generally identified in a MWD staff report to its Board of Directors seeking approval for one of two options for implementing California WaterFix, and MWD’s most recent Official Statement issued in connection with the sale of bonds.\footnote{MWD Board of Directors Letter 8-7 dated April 10, 2018, Attachments 1 through 3 and MWD Water Revenue Bonds, Final Official Statement, Water Revenue Refunding Bonds, 2020 Series C, June 9, 2020, page A-18.} It should also be noted that MWD has advocated to DWR to allow Delta tunnel facilities to be characterized as “supply and/or transportation” rather than as supply costs, as they would be under the current SWP contract; this would have a unique and materially negative impact on San Diego ratepayers who have made alternative investments to reduce demand on the Bay-Delta.

B. **Cost Impact of SWP Aqueduct Land Subsidence**

Land subsidence has affected the conveyance capacity of certain portions of the California Aqueduct which will require restoration, the full potential scope of which is beyond this analysis.\footnote{CALIFORNIA AQUEDUCT SUBSIDENCE STUDY San Luis Field Division San Joaquin Field Division, dated June 2017.} While studies are currently underway to evaluate operating scenarios and project alternatives, MWD's General Manager reported that preliminary estimates by DWR could be as high as "$3 billion to $5 billion in 2020 dollars for repairing the aqueduct over the next generation."\footnote{Oral report by Jeffrey Kightlinger to San County Water Authority Board of Directors, December 19, 2019.} MWD's proportional share of the costs could be at least one-half or more of these costs. These numbers may be refined once additional phases of DWR's subsidence study report are released.

C. **Cost Impact of MWD’s Regional Recycled Water Program**

MWD’s Conceptual Planning Studies Report completed in 2019\footnote{Regional Recycled Water Program Conceptual Planning Studies, Report No. 1618, dated February 21, 2019.} presents the results of further technical studies and analyses related to the Regional Recycled Water Program (RRWP) being considered by MWD and the Sanitation Districts of Los Angeles County (Sanitation Districts).

As configured in the 2016 Feasibility Study, the RRWP would produce up to 150 million gallons per day (mgd) or 168,000 acre-feet per year of purified water in partnership with the Sanitation Districts. A new advanced water treatment facility would be located at the Sanitation Districts’ Joint Water Pollution
Control Plant (JWPCP) in Carson and a new regional conveyance system would deliver a reliable source of IPR water to recharge four regional groundwater basins: Central, West Coast, Main San Gabriel, and Orange County.

The Feasibility Study assumed that the 150-mgd program would be implemented in a single phase. One of the primary goals of the conceptual planning studies was to evaluate implementation phasing alternatives. Program phasing can be advantageous when there are uncertainties regarding the ultimate demands, availability of source water supply, or needed capacity of a program.

The Conceptual Planning Studies Report updated costs estimates for a single phase and compared those costs with a proposed program first phase project (Backbone System) to be implemented in multiple phases. The single phase project capital costs were estimated at $3.08 billion (2018 dollars) and annual O&M costs were estimated at $134 million. The proposed Backbone System phase 1 capital costs were estimated at $2.62 billion plus an additional $782 million second phase for a total capital cost of $3.4 billion (2018 dollars). Annual O&M costs were estimated at $129 million.

MWD staff is moving forward with this project and therefore its costs should be included in any review of MWD’s projected rates. 18

D. Cost Impact of MWD Asset Management Program

Asset replacement and refurbishment is a growing concern across the nation. In 2002 MWD completed an asset replacement funding study. 19 The study’s purpose was two-fold. First, the study forecast the annual amount of replacement and refurbishment (R&R) needed to maintain MWD’s system at its current reliability level. Second, various funding methods were evaluated in terms of rate impact and funding adequacy. In addition, staff evaluated necessary changes to existing reserve and capital funding strategies in light of MWD’s extensive R&R needs.

The method used in the asset replacement study was consistent with that employed at a number of other water utilities. An asset inventory was identified utilizing MWD's fixed asset records. These assets were divided into asset classes, each with a designated economic life. The life of the asset classes was determined on the basis of engineering analysis by MWD and the consultant on the study, Brown and Caldwell. Given these projected timelines, a computer model estimated the current replacement value of MWD's capital assets and projected R&R funding needs by year. The planning horizon was 50 years, although funding needs were estimated for the next 30 years.

The replacement value of MWD's system was estimated to be $12.6 billion in 2002 dollars ($18-20 billion in 2020 dollars). This does not include obligations that MWD has with regard to the State Water

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18 MWD has not had a long-range finance plan since 2004; instead, it provides 10-year rate projections every two years when it sets rates and charges for the next two calendar years. During the 2020 rate-setting, MWD included only planning costs of the Delta tunnel and RRWP for 2021 and 2022 and did not include any capital costs of the Delta tunnel or RRWP in later years. For this reason alone, SDCWA projections of MWD rate increases are highly conservative.

Project, discussed above. Annual R&R funding needs were estimated to be between $100 million and $150 million over the initial 10 years, with annual expenditures forecast to increase to over $200 million in 20 years and over $300 million in 30 years, or approximately $6.7 billion over a 30-year period. Currently annual R&R expenditures total $120 million and are funded by pay-as-you-go revenues in the annual budget. These expenditures are expected to gradually increase over the next 30 years.

E. **Cost Impact of MWD Local Resource Program (LRP)**

Since 1982, MWD has assisted local agencies to develop local water recycling and groundwater recovery projects (LRP) by providing funding assistance through the rates and charges it imposes on MWD member agencies. In 2014 the program was revised to include seawater desalination. The target level for achieving new water supplies through this program was, upon the recommendation of MWD staff, increased in 2018 to 170,000 acre feet.

In June 2018 MWD staff presented a graphic\(^{20}\) to its Board that estimated future LRP expenditures for currently contracted LRP projects. An analysis of the graphic estimates that future expenditures from 2020 onward are $325.5 million. LRP s approved since that 2018 report total an estimated additional $504.2 million (assuming full term incentive for projects) resulting in current future total LRP obligations of $829.7 million.

While MWD’s funding assistance has contributed to achieving statewide water conservation goals and development of additional local supplies in the region, the program has a two-fold impact on MWD water rates. Conservation and local supply development decreases water purchases from MWD and also results in a corresponding contractual obligation for funding assistance over a duration of up to 25 years.

MWD historically funded LRP financial assistance through its Water Stewardship Rate which has been suspended and is presently being funded over the next two years from reserves.

F. **Impact of Member Agency Water Supplies Developed without MWD Subsidies**

Several MWD member agencies or their sub-agencies are developing, planning or considering additional local water projects without reliance on MWD subsidies. Examples of this include construction of additional wells (Three Valleys MWD), enhancing conjunctive use of groundwater (Eastern and Western MWD), and water transfers (City of Los Angeles and Santa Margarita Water District). Like projects that receive MWD subsidies, these projects will reduce demand for MWD supplies and thereby have an impact on future MWD water rates or rate components applied across a decreasing sales base. As MWD rates continue to increase, more and more projects are likely to become economically viable with or without subsidies.

\(^{20}\) June 12, 2018 Presentation to MWD Conservation Local Resources Committee titled “Update of Status of Local Resources Program.”
G. **Impact of Reduced Demand for MWD Water**

MWD water sales to its member agencies have been declining from about 1.88 million acre-feet in 2014 to 1.16 million acre-feet in 2019.\(^{21}\) Leaving aside wheeling charges paid by SDCWA (which MWD includes in its reported “water transactions”), MWD *water sales* have declined by 720,000 acre feet over the past five years. A significant portion of this decline can be attributed to continued conservation and development of local supplies by MWD’s member agencies. While this trend could reasonably be expected to continue due to increasing MWD rate increases and additional member agency local supply development, MWD’s current 10-year rate forecast assumes MWD water sales will *increase* from projected 2020 of 1.27 million acre feet to 1.47 million acre feet. The forecast does not provide any explanation of the projected increase in water sales over the forecast period. The forecast also assumes annual rate increases will range between 3 to 5 percent; however, as noted earlier, billions of dollars in planned capital costs have not been included in these rate projections. A continued downward trend from 2019 MWD water sales would have a material impact on projected rates in the 10-year period and beyond. Since MWD relies on revenues from water sales and SDCWA’s wheeling for about 75 percent of its total revenues, MWD also must plan for the risk that SDCWA may construct alternative facilities for the delivery of its 280,000 acre feet of Colorado River water.\(^{22}\) This wheeled water supply represents nearly 18 percent of MWD’s total water deliveries and currently provides MWD with a much needed fixed revenue source.

H. **Impact of Continued Disputes Over MWD Cost Allocation**

One of the major issues in the rate litigation between SDCWA and MWD is whether Proposition 26 and other legal requirements mandating that rates and charges bear a reasonable relationship to benefits received by customers, apply to MWD. While the Water Authority contends that Proposition 26 applies to MWD (and in fact was applied by the Court of Appeal to MWD’s rates in the 2010-2012 cases), MWD continues to deny that is the case, opening the possibility for unlawfully shifting costs among customers to the detriment of San Diego County and the potential for further litigation. Based on historical experience, the continued practice of allocating costs without regard to which agencies benefit from MWD expenditures would drive MWD rate impacts even higher than those projected by SDCWA in the RCS Study.

**Conclusion**

The DLM&G engineers’ report is not based on past or future data analyses; rather, it simply concludes that future MWD rates as projected by SDCWA “cannot” happen. SDCWA’s projections, on the other

\(^{21}\) MWD Water Revenue Bonds, Final Official Statement, Water Revenue Refunding Bonds, 2020 Series C, June 9, 2020, page A-98, Historical Water Transactions as Billed. To distinguish between water sales and wheeling, MWD’s “water transactions” have been adjusted here to exclude SDCWA wheeling as a MWD “water sale” or “transaction.” Preliminary data from MWD sales estimates ending June 30, 2020 indicate a continuing decline in its water sales to 1.1 million acre feet, or 780,000 acre feet since 2014.

\(^{22}\) SDCWA is conducting a Regional Conveyance Study now to explore potential alternatives to use of MWD facilities to transport its Colorado River water.
hand, are based on the historical record and reasonable projections of MWD’s future costs; the Water Authority’s projections are, if anything, unduly conservative.23

The 81-year historical trend of MWD’s average annual rate increases demonstrates that SDCWA’s projections are reasonable based on a historical fact basis. Looking ahead, several key drivers will result in MWD rate increases that are likely to approximate if not exceed SDCWA’s projections. These key drivers include (1) the need to make significant investments in system asset replacements and rehabilitations in both MWD’s and the SWP’s water delivery systems due to the infrastructure of these systems reaching the end of their useful life; (2) continued investments in the Bay-Delta to address yet-to-be-monetized objectives including climate change, environmental and water supply reliability; (3) continued investment in Colorado River programs, regional and local supply development to augment MWD’s lower priority right to Colorado River water due to risk of diminishing water supply availability in the Colorado River Basin and to mitigate risk of drought impacts in both the northern California and Colorado River watershed areas due to climate change (some of these costs could be reduced if MWD were to manage its resources in cooperation with its own member agencies).24

Future MWD rates will also be impacted by continued reductions in supplemental water demands from MWD due to conservation and local supply development within its service area. It is also reasonable to assume that factors unknown today such as further environmental challenges and constraints, hydrology and weather patterns, increased energy prices and declining freshwater supplies could also significantly contribute to escalation of MWD water prices given the heavy reliance on exported water systems over which MWD has little control.

While it is clear that MWD rates may reasonably be expected to increase consistent with historical trends or more due to the above factors and key drivers, now and into the foreseeable future, the impacts on individual MWD member agencies such as the Water Authority also depend on MWD’s cost of service allocations and any future adjustments in its rate structure, which are unknown and beyond the scope of this review.

Sincerely,

Robert Campbell
Water Resource Consultants Inc.

23 Management changes and a host of other political challenges at MWD, both internally and externally, are beyond the scope of this comment.
24 Again, the subject of how MWD could more economically manage Colorado River issues is beyond the scope of this paper.
August 24, 2020

San Diego County Water Authority Board Members

RE: Board Item 7.6, Regional Conveyance System Study – Phase B (Action)  
General Manager’s Comments and Recommendation

Dear Board Members:

Attached are the supplemental board materials relating to Agenda Item 7.6, Regional Conveyance System Study – Phase B (Action). I wanted to provide these additional comments and perspectives for your consideration prior to the board meeting.

As you know, the Board was originally scheduled to vote on Phase B of the Regional Conveyance System Study ("RCSS") at its June 25 Board meeting, authorizing the expenditure of an additional $1.3 million. However, that vote was deferred, first due to COVID impacts and then later, to allow Water Authority staff sufficient time to receive and consider a report prepared by DLM Engineering/Gillingham Water ("DLM&G Report" or "Report") at the request of a number of Water Authority member agencies.

We received the DLM&G Report on July 21, just two days prior to our July 23 Board meeting. Given the shortness of time, we chose to again recommend deferring action on Phase B to our August Board meeting, so that we would have an opportunity for complete and thoughtful review of the Report’s findings.

Staff was extremely pleased to see that the Report confirmed the basic findings of the RCS that the Regional Conveyance System ("RCS" or "Project") is technically feasible and the estimate of project costs reasonable. That’s an excellent starting point as well as confirmation of Water Authority staff’s diligent work and the work of our consultant team on the Project; we very much appreciate this feedback and confirmation from DLM&G and the member agencies.

But at the same time, the Report questioned the RCSS Phase A analysis of the Project alternative, namely, continued reliance on the Metropolitan Water District of Southern California ("MWD") to transport the Water Authority’s Colorado River supplies ("Project Alternative"). Specifically, the Report presented a conclusion that the RCS is not cost-effective when compared to the Project Alternative, based on different assumptions about MWD’s future water rate structure and price escalation. This is an entirely different issue than whether the Project itself is feasible.

As you all know as Water Authority Board members, managing and predicting the future of MWD rate impacts involves many highly complex issues the Water Authority’s MWD Program and four MWD Board representatives engage on continuously and directly at MWD, as reported each month to the Water Authority’s Board of Directors. Even with the benefit of this reporting, we realize that it is extremely difficult, not only for our Board members but also for our member
agency managers and governing bodies, to follow let alone predict MWD outcomes. In fact, MWD’s vision and business plan for the future is currently the topic of discussion by the MWD Board itself, in connection with the update of its Integrated Resources Plan and subsequent planned rate review.

Due to the heavy workload of our MWD Program, and also to obtain the benefit of independent review, I made the decision that the Water Authority should ask consultants to analyze the DLM&G Report. Accordingly, the Water Authority retained Bob Campbell, former Water Authority CFO and former MWD Financial Services Manager, who is both well-known to our board members and member agencies and highly knowledgeable about the issues at hand; and, Rod Smith of Stratecon, Inc., a highly respected industry economist who has worked in the past for the Water Authority, MWD, Imperial Irrigation District (“IID”), and many others public and private sector clients, to review the DLM&G Report’s assumptions about MWD’s future rates and projected and potential financial impacts on San Diego County ratepayers. These reports have just recently been completed and are included in your supplemental materials.

The Board’s decision to authorize Phase B $1.3 million spending is important, but pales by comparison to the financial impacts on San Diego County of MWD’s wheeling charges, which MWD itself has estimated at between $11.978 billion and $17.984 billion (in 2019 dollars) through 2112. **The critical decision to be made by the Water Authority Board isn’t whether or not to spend $1.3 million, but rather, to decide the preferred alternative between the two available options.**

It is up to the Board of Directors to decide whether to proceed now with Phase B spending or whether to delay that decision. It is my strong recommendation that the Water Authority Board delay spending on the technical portion of Phase B and engage with our member agencies on the real issue at hand, namely, **informed consideration of the choice between two alternatives.** The Water Authority will also benefit from additional discussion and collaboration with other key stakeholders, including MWD, IID and others, prior to the technical portions of Phase B being expended. This would result up to $200,000 of the $1.3 million of the Phase B funds to be expended and a final decision on authorizing further Phase B spending at the November Board meeting.

The Water Authority Board’s responsibility is to determine what is in the best **long-term interest of San Diego ratepayers.** **Accordingly, the Water Authority welcomes and wants to take the time necessary to ensure the full exchange of information and viewpoints in an effort to develop as broad a consensus as possible on long-term decisions, based on facts and data, in a fully transparent process.**

I want to express appreciation to all of the Water Authority Board members, member agency managers, their governing boards and stakeholders for their thoughtful engagement to date. We welcome the continued participation of all stakeholders and interested parties.

Sandra L. Kerl
General Manager