August 2, 2018

Ms. Hilary Chumpitazi
Accounting Manager/Treasurer
Municipal Water District of Orange County
P.O. Box 20895
Fountain Valley, CA 92728

Re: Municipal Water District of Orange County ("District") GASB 75 Valuation

Dear Ms. Chumpitazi:

This report sets forth the results of our GASB 75 actuarial valuation of the District's retiree health insurance program as of July 1, 2018.

In June 2004, the Governmental Accounting Standards Board (GASB) issued its accrual accounting standards for retiree healthcare benefits, GASB 43 and GASB 45. GASB 43/45 require public employers such as the District to perform periodic actuarial valuations to measure and disclose their retiree healthcare liabilities for the financial statements of both the employer and the trust, if any, set aside to pre-fund these liabilities. In June 2015, GASB released new accounting standards for postretirement benefit programs, GASB 74 and GASB 75, which replace GASB 43 and GASB 45, respectively.

The District selected DFA, LLC (DFA) to perform an actuarial valuation of the retiree health insurance program as of July 1, 2018. This report may be compared with the valuation performed by DFA as of July 1, 2016, to see how the liabilities have changed since the last valuation.

Financial Results

We have determined that the amount of actuarial liability for District-paid retiree benefits is $2,571,503 as of July 1, 2018. This represents the present value of all benefits expected to be paid by the District for its current and future retirees. If the District were to place this amount in a fund earning interest at the rate of 6.00% per year, and all other actuarial assumptions were exactly met, the fund would have exactly enough to pay all expected benefits.

This valuation includes benefits for 12 retirees as well as 14 active employees who may become eligible to retire and receive benefits in the future. It excludes employees hired after the valuation date.

When we apportion the $2,571,503 into past service and future service components under the Entry Age, Level Percent of Pay Cost Method, the Total OPEB Liability is $2,374,867 as of July 1, 2018. This represents the present value of all benefits accrued through the valuation date if each employee's liability is expensed from hire date until retirement date as a level percentage of pay. The $2,374,867 is comprised of liabilities of $1,553,444 for active employees and $821,423 for retirees.

The District has adopted an irrevocable trust for the pre-funding of retiree healthcare benefits. As of June 30, 2018, the trust balance or Plan Fiduciary's Net Position (GASB 75) is $2,077,720.

The Net OPEB Liability, Total OPEB Liability over the Plan Fiduciary's Net Position, is $297,147.

Discount Rate under GASB 75

For financial reporting purposes, GASB 75 requires a discount rate that reflects the following:

a. The long-term expected rate of return on OPEB plan investments – to the extent that the OPEB plan's fiduciary net position is projected to be sufficient to make projected benefit payments and assets are expected to be invested using a strategy to achieve that return;

b. A yield or index rate for 20-year, tax-exempt general obligation municipal bonds with an average rating of AA/Aa or higher – to the extent that the conditions in (a) are not met.

The amount of the plan's projected fiduciary net position and the amount of projected benefit payments should be compared in each period of projected benefit payments.

Based on these requirements and the following information, we have determined a discount rate of 6.00% for GASB 75 reporting purposes:

Expected Return on Assets	6.00%
Fidelity General Obligations 20-Year Index at June 30, 2018	3.62%
GASB 75 Discount Rate	6.00%

Net OPEB Expense

We have determined the following components of the District's Net OPEB Expense for fiscal year ending June 30, 2019: Service Cost, Interest Cost, and Expected Return on Assets. The Service Cost represents the present value of benefits accruing in the current year. Interest Cost represents the interest on the Total OPEB Obligation. Expected Return on Assets is the expected return based on a 6.00% investment rate of return. Other components (Deferred Outflows and Inflows) will be determined based on the Net OPEB Obligation as of June 30, 2019.

We summarize the valuation results in the table on the next page. We provide results at three discount rates (the expected return on assets, the Fidelity Bond rate index, and the blended GASB 75 rate, discussed above). All amounts are net of expected future retiree contributions, if any.

When the District begins preparation of the June 30, 2019 government-wide financial statements, DFA will be available to assist the District and its auditors in preparing the footnotes and required supplemental information for compliance with GASB 75 (and GASB 74, if applicable).

In the meantime, we are available to answer any questions the District may have concerning the report.

Actuarially Determined Contribution and Pay-As-You-Go with Implied Subsidy

We have calculated an actuarially determined contribution representing the Service Cost and a 30-year amortization (as a level percent of pay) of the Net OPEB Liability. We include the results in the table on the next page. We provide results at three discount rates (the expected return on assets, the Fidelity Bond rate index, and the GASB 75 rate).

An actuarially determined contribution is a potential payment to the plan determined using a contribution allocation procedure. It is not a required contribution, but a measurement commonly used to prefund OPEB benefits. We provide the amounts for illustrative purposes.

The actuarially determined contribution may be compared to the pay-as-you-go payment. The table shows the pay-as-you-go payment along with the projected implied subsidy payment.

The Funding Schedules section provides additional prefunding alternatives.

Municipal Water District of Orange County

Net OPEB Liabilities and Expense Under GASB 75 Accrual Accounting Standard

	July 1, 2018[1]		
	Actuarial Liability	**Municipal Bond Index**	**GASB 75 Rate**
Discount Rate	6.00%	3.62%	6.00%
Present Value of Future Benefits			
Active	$1,750,080	$2,755,949	$1,750,080
Retired	821,423	1,039,999	821,423
Total	$2,571,503	$3,795,948	$2,571,503
Total OPEB Liability (Actuarial Liability)			
Active	$1,553,444	$2,341,241	$1,553,444
Retired	821,423	1,039,999	821,423
Total	$2,374,867	$3,381,240	$2,374,867
Plan Fiduciary Net Position (Plan Assets)	$2,077,720	$2,077,720	$2,077,720
Net OPEB Liability (Unfunded Actuarial Liability)	$297,147	$1,303,520	$297,147
Sensitivity Analysis			
1% Decrease in Discount Rate	5.00%	2.62%	5.00%
Net OPEB Liability	$655,440	$1,926,370	$655,440
1% Increase in Discount Rate	7.00%	4.62%	7.00%
Net OPEB Liability	$7,484	$813,813	$7,484
1% Decrease in Trend Rate	5.00% decreasing to 4.00%	5.00% decreasing to 4.00%	5.00% decreasing To 4.00%
Net OPEB Liability	$10,262	$816,107	$10,262
1% Increase in Trend Rate	7.00% decreasing to 6.00%	7.00% decreasing to 6.00%	7.00% decreasing to 6.00%
Net OPEB Liability	$652,316	$1,925,122	$652,316

1. For the District's fiscal 2019 financial statements, DFA will provide separate schedules with supplemental GASB 75 information.
   a. If your auditors recommend that you report June 30, 2019 values, we will prepare the supplemental schedules in July, after June 30 asset values (if applicable) are known and updated municipal bond rates are published.
   b. If your auditors recommend that you report June 30, 2018 values, we will provide (upon request) supplemental schedules based on this report.

Municipal Water District of Orange County

Net OPEB Liabilities and Expense Under GASB 75 Accrual Accounting Standard

	July 1, 2018		
	Actuarial Liability	Municipal Bond Index	GASB 75 Rate
Discount Rate	6.00%	3.62%	6.00%
Components of Net OPEB Expense for fiscal year 2019			
Service Cost at Year-End	$34,408	$60,307	$34,408
Interest Cost	140,324	121,085	140,324
Expected Return on Assets	(124,663)	(124,663)	(124,663)
Subtotal	$50,069	$56,729	$50,069
Change in Deferred Outflows[2]			
Change in Deferred Inflows[3]			
Actuarially Determined Contribution (Fiscal 2019)			
Service Cost	$34,408	$60,307	$34,408
Amortization of Net OPEB Liability[4]	15,439	49,051	15,439
Total[5]	$49,847	$109,358	$49,847
Pay-As-You-Go Payment with Implied Subsidy (Fiscal 2019)			
Projected Pay-As-You-Go	$66,244	$66,244	$66,244
Projected Implied Subsidy	7,089	7,089	7,089
Total	$73,333	$73,333	$73,333

2. To be determined based on the Total OPEB Obligation and Plan Fiduciary Net Position as of June 30, 2019.
3. To be determined based on the Total OPEB Obligation and Plan Fiduciary Net Position as of June 30, 2019.
4. 30-year amortization (as a level percent of pay).
5. Estimated Actuarially Determined Contribution for Fiscal 2020:

	Actuarial Liability	Municipal Bond Index	GASB 75 Rate
Total	$51,342	$112,639	$51,342

Differences from Prior Valuation

The most recent prior valuation was completed as of July 1, 2016 by DFA. The AL (Accrued Liability) as of that date was $2,002,333, compared to $2,374,867 as of July 1, 2018. In this section, we provide a reconciliation between the two numbers so that it is possible to trace the AL from one actuarial report to the next.

Several factors have caused the AL to change since 2015. The AL increases as employees accrue more service and get closer to receiving benefits. There are actuarial gains/losses from one valuation to the next, and changes in actuarial assumptions and methodology for the current valuation. To summarize, the most important changes were as follows:

1. An increase in the AL of $146,843 resulting from an update to our valuation software; the update allows us to track experience more precisely over time;
2. A decrease of $18,131 resulting from population experience (terminations, retirements, and mortality) different than expected; and
3. An increase of $33,239 resulting from changes in healthcare premiums different than expected.

The estimated changes to the AL from July 1, 2016 to July 1, 2018 are as follows:

Changes to AL	**AL**
AL as of July 1, 2016	**$2,002,333**
Passage of time	210,583
Change in system	146,843
Change in census	(18,131)
Change in premium rates	33,239
AL as of July 1, 2018[1]	**$2,374,867**

1. Based on a discount rate of 6.00%.

Funding Schedules

There are many ways to approach the pre-funding of retiree healthcare benefits. In the *Financial Results* section, we determined the annual expense for all District-paid benefits. The expense is an orderly methodology, developed by the GASB, to account for retiree healthcare benefits. However, the GASB 75 expense has no direct relation to amounts the District may set aside to pre-fund healthcare benefits.

The table on the next page provides the District with three alternative schedules for funding (as contrasted with expensing) retiree healthcare benefits. The schedules all assume that the retiree fund earns, or is otherwise credited with, 6.00% per annum on its investments, a starting trust value of $2,077,720 as of July 1, 2018, and that contributions and benefits are paid mid-year.

The schedules are:

1. A level contribution amount for the next 20 years.
2. A level percent of the Unfunded Accrued Liability.
3. A constant percentage (3%) increase for the next 20 years.

We provide these funding schedules to give the District a sense of the various alternatives available to it to pre-fund its retiree healthcare obligation. The three funding schedules are simply three different examples of how the District may choose to spread its costs.

By comparing the schedules, you can see the effect that early pre-funding has on the total amount the District will eventually have to pay. Because of investment earnings on fund assets, the earlier contributions are made, the less the District will have to pay in the long run. Of course, the advantages of pre-funding will have to be weighed against other uses of the money.

The table on the following page shows the required annual outlay under the pay-as-you-go method and each of the above schedules. **The three funding schedules include the "pay-as-you-go" costs; therefore, the amount of pre-funding is the excess over the "pay-as-you-go" amount.**

Treatment of Implicit Subsidy

We exclude the implicit subsidy from these funding schedules because we do not recommend that the District pre-fund for the full age-adjusted costs reflected in the liabilities shown in the first section of this report. If the District's premium structure changes in the future to explicitly charge under-age 65 retirees for the full actuarial cost of their benefits, this change will be offset by a lowering of the active employee rates (all else remaining equal), resulting in a direct reduction in District operating expenses on behalf of active employees from that point forward. For this reason, among others, we believe that pre-funding of the full GASB liability would be redundant.

Municipal Water District of Orange County

Sample Funding Schedules (Closed Group)

Starting Trust Value of $2,077,720 as of July 1, 2018

Fiscal Year Beginning	Pay-as-you-go	Level Contribution for 20 years	Level % of Unfunded Liability	Constant Percentage Increase
2018	$66,244	$18,257	$28,452	$14,381
2019	82,459	18,257	28,452	14,812
2020	101,916	18,257	28,452	15,257
2021	117,993	18,257	28,452	15,714
2022	120,784	18,257	28,452	16,186
2023	122,919	18,257	28,452	16,671
2024	136,459	18,257	28,452	17,172
2025	143,115	18,257	28,452	17,687
2026	132,133	18,257	28,452	18,217
2027	142,784	18,257	28,452	18,764
2028	153,748	18,257	0	19,327
2029	155,056	18,257	0	19,907
2030	159,908	18,257	0	20,504
2031	168,886	18,257	0	21,119
2032	166,681	18,257	0	21,752
2033	171,369	18,257	0	22,405
2034	175,255	18,257	0	23,077
2035	184,043	18,257	0	23,769
2036	192,893	18,257	0	24,482
2037	189,960	18,257	0	25,217
2038	196,511	0	0	0
2039	186,861	0	0	0
2040	191,259	0	0	0
2041	193,794	0	0	0
2042	185,542	0	0	0
2043	186,635	0	0	0
2044	183,412	0	0	0
2045	179,305	0	0	0
2046	177,367	0	0	0
2047	174,690	0	0	0
2048	171,364	0	0	0
2049	167,490	0	0	0
2050	163,138	0	0	0
2055	135,372	0	0	0
2060	101,512	0	0	0
2065	68,647	0	0	0
2070	40,249	0	0	0
2075	18,315	0	0	0

Note to auditor: when calculating the employer OPEB contribution for the year ending on the statement date, we recommend multiplying the actual District-paid premiums on behalf of retirees by a factor of 1.1165 to adjust for the implicit subsidy.

Actuarial Assumptions

To perform the valuation, the actuary must make certain assumptions regarding such items as rates of employee turnover, retirement, and mortality, as well as economic assumptions regarding healthcare inflation and interest rates. Our assumptions are based on a standard set of assumptions we have used for similar valuations, modified as appropriate for the District. Retirement rates are based on recent District retirement patterns.

The discount rate of 6.00% is based on our best estimate of expected long-term plan experience for funded plans such as the District's. As discussed above, for financial reporting purposes under GASB 75, a discount rate of 6.00% reflects the required blend between discount and municipal bond rates. The healthcare trend rates are based on our analysis of recent District experience and our knowledge of the healthcare environment.

A complete description of the actuarial assumptions used in the valuation is set forth in the "Actuarial Assumptions" section.

Projected Annual Pay-as-you go Costs

As part of the valuation, we prepared a projection of the expected annual cost to the District to pay benefits on behalf of its retirees on a pay-as-you-go basis. These numbers are computed on a closed group basis, assuming no new entrants, and are net of retiree contributions. Projected pay-as-you-go costs for selected years are as follows:

FYB	Pay-as-you-go
2018	$66,244
2019	82,459
2020	101,916
2021	117,993
2022	120,784
2023	122,919
2024	136,459
2025	143,115
2026	132,133
2027	142,784
2030	159,908
2035	184,043
2040	191,259
2045	179,305
2050	163,138
2055	135,372
2060	101,512
2065	68,647
2070	40,249
2075	18,315

Implicit Subsidy and ASOP 6

When premiums charged for retiree healthcare are lower than expected claims, an implicit subsidy is realized. This occurs, for example, when pre-Medicare retirees are afforded medical coverage at the same rates as active employees.

Actuarial Standard of Practice No. 6 (ASOP 6), revised in May 2014, provides guidance in measuring OPEB obligations and determining periodic costs or actuarially determined contributions. The standard specifies that in (almost all instances), the actuary must include the value of this implicit subsidy in the GASB 45/75 liabilities.

This valuation reflects the value of the implicit subsidy equal to $247,807.

Funded Status

Exhibit Page 4 shows that (as of July 1, 2018) the irrevocable trust holds $2,077,720, against liabilities of $2,374,867, for a funded status of 87.5%. We understand that the District has established an internal reserve (called the OPEB Reserve) in the amount of $209,006. Considering trust and reserve the funded status is 96.3%.

	Irrevocable Trust	**Irrevocable Trust Plus, Internal Reserve**
1. Total OPEB Liability	$2,374,867	$2,374,867
2. Allocated Assets	2,077,720	2,287,626
3. Funded Status: (2) ÷ (3)	87.5%	96.3%
4. Amount to Attain 100% Status: (1) – (2)	$297,147	$88,141

Certification

The actuarial certification, including a caveat regarding limitations of scope, if any, is contained in the "Actuarial Certification" section.

We have enjoyed working with the District on this project and are available to answer any questions you may have concerning any information contained herein.

Sincerely,
DFA, LLC

Carlos Diaz, ASA, EA, MAAA
Actuary

Benefit Plan Provisions

The District provides health benefits for employees and qualified dependents (and also for retirees and their dependents) with a choice of five medical plans through the Association of California Water Agencies (ACWA) Joint Powers Insurance Authority: Anthem Blue Cross Classic Plan (PPO), Anthem Blue Cross CaliforniaCare Plan (HMO) and Kaiser, with Consumer Driven versions of both Anthem and Kaiser. Employees attaining age 55 and completing at least 10 consecutive years of full-time service with the District may retire with District-paid health premiums until age 65. The District will pay 100% of the premium for the lowest cost plan plus 90% of the difference to the plan selected, for retiree-only medical coverage, plus 80% of the combined retiree and spouse's (or domestic partner's) medical premium if such coverage is elected. If a retiree in receipt of benefits dies before age 65, the surviving spouse or domestic partner will receive the coverage to which the retiree would have been entitled until age 65 only.

When a retiree reaches age 65 and/or eligibility for Medicare, the District will pay the retiree up to $1,800 per year for reimbursement of the cost of Supplemental Medical Insurance and Medicare Prescription Drug (Part D) Insurance, upon satisfactory proof of reimbursable expenses. This benefit will continue for the further lifetime of the retiree only, with no coverage for spouse or domestic partner either before or after the retiree's death.

Retirees who had at least 25 consecutive years of full-time service with the District receive the following enhancements in addition to the benefits listed above:

(1) District-paid coverage includes dental and vision benefits as well as medical benefits;

(2) The post-age 65 coverage includes Medicare Part B premium reimbursements;

(3) The $1,800 per year limit on reimbursements does not apply; and

(3) Surviving spouses and/or domestic partners of retirees dying after age 65 receive ongoing District coverage for their further lifetimes.

Employees hired on or after July 1, 2012 are ineligible for District-paid retiree health benefits.

The following tables summarize the total monthly premiums for selected healthcare coverages for the 2018 calendar year:

Employees and Early Retirees	Blue Cross HMO	Blue Cross Classic PPO	Kaiser HMO	Delta Dental PPO	Vision
Employee/Retiree	$758.68	$852.34	$607.42	$52.22	$14.76
Emp./Ret. + 1	1,507.46	1,736.91	1,204.96	87.92	23.46
Emp./Ret. + 2+	2,021.80	2,335.06	1,700.90	133.72	45.71

Medicare-eligible Retirees	Blue Cross HMO	Blue Cross Classic PPO	Kaiser Senior Advantage	Delta Dental PPO	Vision
Retiree	$532.79	$543.43	$190.59	$52.22	$14.76
Retiree + 1	1,055.75	1,103.65	371.29	87.92	23.46

Valuation Data

Active and Retiree Census

Age distribution of retirees included in the valuation

Age	Count
Under 55	0
55-59	0
60-64	1
65-69	4
70-74	3
75-79	3
80+	1
Total	12
Average Age	72.0

Age/Years of service distribution of active employees included in the valuation

Years→	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	Total
Age									
<25	0	0	0	0	0	0	0	0	0
25-29	0	0	0	0	0	0	0	0	0
30-34	0	0	0	0	0	0	0	0	0
35-39	0	0	2	0	0	0	0	0	2
40-44	0	1	1	0	0	0	0	0	2
45-49	0	1	0	0	0	0	0	0	1
50-54	0	0	1	0	0	1	1	0	3
55-59	0	0	0	1	1	0	0	0	2
60-64	0	1	1	0	1	0	1	0	4
65+	0	0	0	0	0	0	0	0	0
All Ages	0	3	5	1	2	1	2	0	14

Average Age: 52.1
Average Service: 17.3

Actuarial Assumptions

The liabilities set forth in this report are based on the actuarial assumptions described in this section.

Valuation Date: July 1, 2018

Actuarial Cost Method: Entry Age, Level Percent of Pay

Discount Rate:

- Accrued Liability: 6.00% per annum
- GASB 75: 6.00% per annum

Return on Assets: 6.00% per annum

Salary Increases: 3.00% per annum

Pre-retirement Turnover: According to Crocker-Sarason Table T-5 less mortality, increased by 100% at all ages. Sample rates are as follows:

Age	Turnover (%)
25	15.4%
35	12.6
45	8.0
55	1.9

Pre-retirement Mortality: RP-2014 Employee Mortality, without projection. Sample deaths per 1,000 employees are as follows:

Age	Males	Females
25	0.48	0.17
35	0.52	0.29
45	0.97	0.66
55	2.79	1.67

Post-retirement Mortality: RP-2014 Healthy Annuitant Mortality, without projection. Sample deaths per 1,000 retirees are as follows:

Age	Males	Females
55	5.74	3.62
60	7.78	5.19
65	11.01	8.05
70	16.77	12.87
75	26.83	20.94
80	44.72	34.84
85	77.50	60.50
90	135.91	107.13

Actuarial Assumptions (Continued)

Claim Cost per Retiree or Spouse:

Age	Medical/Rx	Dental/Vision
50	$10,423	$804
55	12,083	804
60	14,007	804
64	15,765	804
65	5,666	804
70	6,104	804
75	6,576	804

Retirement Rates:

Age	Percent Retiring*
55	7.0%
56	8.0
57	9.0
58	10.0
59	15.0
60	20.0
61	25.0
62	30.0
63	35.0
64	40.0
65	50.0
66	60.0
67	70.0
68	80.0
69	90.0
70	100.0

* The percentage refers to the probability that an active employee who has reached the stated age will retire within the following year.

Trend Rate: Healthcare costs were assumed to increase according to the following schedule:

FYB	Medical/Rx	Dental/Vision
2018	6.0%	4.0%
2019+	5.0	4.0

Percent of Retirees with Spouses: Future Retirees: 60% of future retirees were assumed to have spouses. Female spouses assumed three years younger than male spouses. Current Retirees: Based on actual spousal data.

Actuarial Certification

The results set forth in this report are based on our actuarial valuation of the health and welfare benefit plans of the Municipal Water District of Orange County ("District") as of July 1, 2018.

The valuation was performed in accordance with generally accepted actuarial principles and practices. We relied on census data for active employees and retirees provided to us by the District. We also made use of claims, premium, expense, and enrollment data, and copies of relevant sections of healthcare documents provided to us by the District, and (when applicable) trust statements prepared by the trustee and provided to us by the District.

The assumptions used in performing the valuation, as summarized in this report, and the results based thereupon, represent our best estimate of the actuarial costs of the program under GASB 74 and GASB 75, and the existing and proposed Actuarial Standards of Practice for measuring post-retirement healthcare benefits.

Throughout the report, we have used unrounded numbers, because rounding and the reconciliation of the rounded results would add an additional, and in our opinion unnecessary, layer of complexity to the valuation process. By our publishing of unrounded results, no implication is made as to the degree of precision inherent in those results. Clients and their auditors should use their own judgment as to the desirability of rounding when transferring the results of this valuation report to the clients' financial statements.

The undersigned actuary meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Certified by:

Carlos Diaz, ASA, EA, MAAA
Actuary