

## STAFF REVIEW – WATER SUPPLY OPTIONS

Submitted to  
Council 5/3/17

**DATE:** May 2, 2017

**Agenda Item Title:** City of Flint Water Supply Options Analysis and Related Water System Changes

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### **Background/Summary of Proposed Action:**

The City is required to go through the Drinking Water Revolving Fund (DWRF) process in order to obtain the \$100 million federal WIIN dollars and the \$20 million State match for service line replacement and other related water infrastructure improvements. In this process the Federal and State governments required the City to determine if rehabilitating the City water plant was the best alternative for the use of these funds or were other water supply options better. In order to determine the best water supply option for the City, the City developed the criteria of cost, the best option for public health, water system reliability and the best implementation schedule for the selected water option.

The information highlighted on the five attachments to this staff review was utilized to analyze all potential water supply options. From this analysis, Option Four (4), which is to utilize Great Lakes Water Authority (GLWA) as the primary source for water and a combination Genesee County Drain Commissioner (GCDC) as the back-up water supply at an estimated net present value cost of \$269 million over a twenty-year period is being recommended as the best water supply option.

**Attachment 1:** entitled Water Supply Option Analysis, highlights the twelve primary water supply options along with interim water source options and back up water source options. This attachment summarizes all costs by option along with rating each Option by the four criteria outlined above.

**Attachment 2:** entitled City of Flint Water Supply Options, has the cost categories utilized to calculate an option cost along with various notes and comments regarding an options requirements.

**Attachment 3:** entitled Flint Water Treatment Plant Capital and Operating Costs, highlights various cost assumptions and ties those cost assumptions back to various options where the cost assumption was utilized. This is the raw data assumptions used to compile final projected costs by option.

**Attachment 4:** entitled Rates Used in Net Present Value calculations, highlights the various assumptions used for inflation and discount rates. This attachment also highlights the cost per unit for various GLWA and GCDC estimated costs of purchased water from GLWA and GCDC.

**Attachment 5:** entitled Net Present Value for Each Cost Category, is the actual twenty-year calculation of actual costs and net present value (NPV) costs for each cost category with a total NPV cost presented by category. These costs are added together by option. By looking at the cost categories on Attachment Two (2) or Attachment Three (3) and then adding the costs calculated on Attachment Five (5) you then are able to tie into the twenty year cost totals projected on Attachment One (1).

## STAFF REVIEW – WATER SUPPLY OPTIONS

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### Financial Implications:

Option Four (4) is the recommendation of the Mayor. This is the lowest net present value cost at \$269 Million over a twenty year period and provides the best option for Public Health concerns, Water System Reliability and has the lowest estimated implementation time. Option Four (4) has GLWA as the primary source of water with GCDC being the back-up water supply.

Within Option 4, the City will re-obtain ownership of the 72 inch water transmission line that was sold to Genesee County in June 2014, to insure a treated water supply to the City from GLWA in Wayne County at no cost to the City.

The back-up water supply will deliver approximately 500,000 gallons per day to the City of Flint through a proposed five mile pipe coming from the north into the Flint water distribution system. Said pipe is proposed to be in service at the end of calendar 2019 and funded by federal WIIN dollars.

The City's share of the Karegnondi Water Authority (KWA) is 18 Million Gallons per Day or (18 MGD) and Genesee County's share of KWA is 24 MGD of the KWA. The City will sell to GLWA approximately 17.46 MGD of Flint's share of the KWA. In exchange for the sale of 17.46 MGD to GLWA the City will receive a monthly water credit from GLWA on our wholesale water invoice that will be equal to the monthly debt payment paid by the City to KWA. This annual water credit, to be spread monthly, is estimated to be between \$1.7 million (FY2044 Payment) and \$7.0 million (FY2018 and forward payments) annually over the course of thirty (30) years of debt payments to be made by Flint to the KWA bond holders. Once all of the debt payments are made, GLWA will have ownership of the 17.46 MGD of the KWA.

Flint will maintain an approximate .54 MGD stake in KWA due to debt payments made to KWA by the City between November 2016 and May 2017. GLWA would have the first right of refusal on any raw water sale to be made by the City in regards to this .54 MGD stake in KWA.

In addition, the City will change from a short-term customer of GLWA to a long-term customer of GLWA. GLWA's long-term customer rate charge will include a GCDC pass through of water costs once the northern seven mile pipe is built. This northern pipe will deliver approximately 500,000 gallons per day of water to the City. This change in customer status will drop the City of Flint's wholesale water costs by approximately 7% to 13%. This is equivalent to an estimated annual savings of \$1.0 to \$1.8 million per year.

Further, the City will avoid a significant water rate increase (estimated at 42% to 48%) by obtaining a wholesale water credit equivalent to the KWA debt payment and receiving a wholesale water rate reduction by becoming a long-term (30-year) wholesale water customer of GLWA. It is anticipated that water rates may be reduced in the future through the reduction of the non-revenue water which includes, theft, loss of water through pipes and operation and City water meters slowing down. Further, the City Finance Department is currently working with an independent contractor through the State of Michigan to perform a water rate study to document how the City is charging for water and to determine if there is a need to adjust water rates in the future.

## STAFF REVIEW – WATER SUPPLY OPTIONS

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### Other Implications (i.e., collective bargaining):

The Option Four (4) scenario does not utilize the Flint Water Plant to be the primary or back-up water supply option for the City. Therefore, it will be necessary to downsize staff at the Water Plant due to the lack of operation activity at the Water Plant. An estimated wage and fringe benefit cost savings of approximately \$220,000 to \$700,000 may be achieved in the Water Fund. Additional operational cost savings due to the downsizing of Water Plant operations is estimated to be an additional \$125,000 to \$150,000 annually.

### Other Implications – Intended Use Plan – WIIN:

With the selection of Option Four (4), this allows the City to reprogram approximately \$58 million dollars of federal WIIN dollars (Out of the \$120 million WIIN total) that was once going to improve the Water Plant can now be utilized to replace badly outdated water-main and water pump infrastructure within the City.

Budgeted Expenditure?      Yes   No      Please explain if no:   Not Applicable

Account No.:   Not Applicable

Pre-encumbered?    Req #   Not Applicable.

Mayor/Staff Recommendation:   Approval of the Option Four (4) Scenario.

Approval:  \_\_\_\_\_

City of Flint  
Water Supply Option Analysis

Option	Interim Source	Primary Source	Back-Up Source	Cost NPV – 20yr.	Public * Health	Cost	Risk/ ** Reliability	Time (Primary Source)
1	GCDC	Flint WTP w/ WWTP residual discharge	Raw Water Reservoir; Distribution Storage	\$323M	3	4	3	3
2	GCDC	GCDC	GCDC	\$311M	2	3	2	2
3A;3B	GCDC	A.Flint WTP w/ on-site residual processing	GCDC	\$313M	3	2	2	3
		B. Flint WTP w/ WWTP residual discharge of residuals		\$303M				
4	GLWA	GLWA	GLWA (GCDC)	\$269M	1	1	1	1
5	GLWA	GLWA (until July, 2018) then	GCDC	\$335M	2	6	1	2
		GCDC						
6A;6B	GLWA	A.Flint WTP with on-site residual processing	GLWA	\$364M	2	7	1	3
		B.Flint WTP with WWTP discharge of residuals		\$354M				
7A;7B	GLWA	A.Flint WTP with on-site residual processing	GCDC	\$337M	2	5	1	3
		B.Flint WTP with WWTP discharge of residuals		\$327M				
8	GLWA	GCDC	Flint WTP	\$456M	3	8	1	2
9	GLWA	GLWA	Flint WTP	\$482M	1	9	1	1

\*reflects number of required water source changes; not indicative of the quality of any individual water source

\*\* Indication of reliable capacity available for Flint

**City of Flint**  
**Water Supply Options**

Option	Interim Source	Primary Source	Back-Up Source	Comments	Cost Categories
1	GCDC	Flint WTP w/ WWTP residual discharge	Raw Water Reservoir; Distribution Storage	Requires all raw water line repairs to be completed within 3 days to maintain service; complete 36" connector for raw water supply to reservoir/plant	P1C, P2C, P3, P4, P5B, P6, P7A, P8C, P9, P10, F1, C1
2	GCDC	GCDC	GCDC	Primary supply through existing 72" line (only 13MGD guarantee until July, 2018); DORT pumping station construction required and distribution storage needed for peak day demands; back-up interconnection from GCDC through northern route (1 MGD maintenance flow); 36"connector not required	P9, F1, C1, C2, C3, C6, C7
3A;3B	GCDC	A.Flnt WTP w/ on-site residual processing B.Flnt WTP w/ WWTP residual discharge of residuals	3C. GCDC	Requires continuous purchase from GCDC to maintain quality in 72" interconnection (3MGD) for back-up; complete 36" connector to supply raw water to plant; Revise KWA raw water delivery Agreement and pump station design to provide maximum day demands; same interim supply risk as No.1 and 2	(3A) P1B, P2B, P3, P4, P5A, P6, P7B, P8A, P9, P10,F1, C1, C4, C5  (3B) P1A, P2A, P3, P4, P5A, P6, P7A, P8A, P9, P10, F1, C1, C4, C5
4	GLWA	GLWA	GLWA	COF obtains ownership of 72" line; GCDC reinforces GC system to account for loss of 72" line; Back-up finished water supply provided through GCDC northern route; GLWA assumes COF's position in KWA; 36" connector not required	F2, F3, F4, G1, G3,

5	GLWA	GLWA (until July, 2018) then  GCDC	GCDC	GCDC reinforces GC system to account for loss of 72" line; 72" line provides interim supply from GLWA; GCDC supplies COF through 72" line after July, 2018; Back-up through GCDC northern route; 36" connector not required	P9, G3, C2, C3, C6, C7
6A;6B	GLWA	A. Flint WTP with on-site residual processing B. Flint WTP with WWTP discharge of residuals	GLWA	COF obtains ownership of 72" line to provide interim GLWA supply; Back-up purchase from GLWA requires minimum flow to maintain quality in 72" interconnection (3MGD)); complete 36" connector to supply raw water to plant; Revise KWA raw water delivery Agreement and pump station design to provide maximum day demands to WTP	(6A) P9, P10, F2, F3, P1B, P2B, P3, P4, P5A, P6, P7B, P8A, G2, G3  (6B) P9, P10, F2, F3, P1A, P2A, P3, P4, P5A, P6, P7A, P8A, G2, G3
7A;7B	GLWA	A. Flint WTP with on-site residual processing B. Flint WTP with WWTP discharge of residuals	GCDC	GCDC reinforces system to allow GLWA interim supply until WTP completion; GCDC retains ownership of 72" line; GCDC provides back-up through 72" line (northern route back-up is also an option)	(7A) G3, C4, C5, P9, P1B, P2B, P3, P4, P5A, P6, P7B, P8A,  (7B) G3, C4, C5, P9, P1A, P2A, P3, P4, P5A, P6, P7A, P8A
8	GLWA	GCDC	Flint WTP	Same as No. 5 except 36" connector constructed and back-up from GCDC not required	P9, P10, G3, C2A, C3A, P1A, P2A, P3, P4
9	GLWA	GLWA	Flint WTP	Same as No. 4 except northern route back-up not required.	F2, F3, P10, G3, G1, P1A, P2A, P3, P4, P9



## Flint Water Treatment Plant Capital and Operating Costs

### Initial Capital Costs (completion September, 2019)

Option	2017	2018	2019	Total
P1A. Flint WTP with WWTP discharge of residual solids	\$7.0M	\$27.5M	\$24.3M	\$58.8M
P1B. Flint WTP with on-site residual solids handling	\$12.5M	\$30.0M	\$25.4M	\$67.9M
P1C. Flint WTP with raw water reservoir and WWTP discharge of residual solids	\$12.5M	\$51.5M	\$44.0M	\$108M

### Maintenance Capital Costs (beginning 2021)

P2A. With WWTP discharge of residual solids = \$0.95M/yr.

P2B. With on-site residual solids handling = \$1.1M/yr.

P2C. With raw water storage and WWTP solids discharge = \$1.1M/yr.

### Labor Costs

#### Assumptions:

- Production staff increases by 19 positions to operate WTP
- Compensation (12 - \$60,000/yr.; 6 - \$45,000/yr.; 1 - \$90,000/yr.)
- Six \$60,000/yr. employees in DB plan
- 10% overtime for union personnel
- \$15,700 contribution per employee for health care
- 9% of base and overtime for direct fringes
- 176% of base of DB benefit
- 10% of base for hybrid plan
- \$1500/yr. to healthcare saving plan

P3. Total Wages/Overtime/Benefits = \$2.4M/yr. (2017)

= \$1.8M/yr. (2017 dollars) in 2027 due to all employees

being in hybrid plan

### Other Annual Operating Costs

Supplies (non-chemical)	\$300,000
Professional Services	60,000
Miscellaneous/ Education	18,000
Vehicles	200,000
Repair & Maintenance	<u>130,000</u>
	\$708,000/yr. (P4)

### Energy Costs

P5A. Flint WTP without raw water reservoir = \$370,000/yr.

P5B. Flint WTP with raw water storage and pump station = \$430,000/yr.

### Chemical Costs

P6. \$360,000/yr.

### Residual Solids Handling and Disposal

P7A. Disposal to Flint WWTP = \$250,000/yr.

P7B. On-site processing and landfill disposal= \$185,000/yr.

### KWA Raw Water

\$0.25 per CCF (\$334.22/MG)

P8A. 10MGD = \$1.22M/yr.

P8B. 12MGD = \$1.46M/yr.

P8C. 13MGD = \$1.59M/yr.

### KWA Bond Obligation

\$7.02M/year (P9)

### 36" Raw Water Connector Pipeline

\$0M (2017) (P10)



"Temporary" DORT Pumping Station

\$3.0M (2017) (F1)

Transfer of 72" line from GCDC to City of Flint

\$0M (2017) (F2)

Maintenance of 72" line = \$100,000/yr. (beginning in 2018) (F3)

Northern Route "Back-Up" Pipeline

\$7.0M (2018) (F4)

GLWA Purchased Water

Long-term Continuation of Current Water Source (using 72" line)

G1. 13MGD @\$1.05M/month (primary with GLWA/GCDC agreement for back-up)

Back-Up/Emergency Water Source (using 72" line)

G2. 3MGD @ \$250,000/month

Short-term Water Source

G3. \$1.05M/month

GCDC Purchased Water

Interim Supply (until July 1, 2018)

C1. \$264,000/month for 13MGD (only 13MGD maximum flow guaranteed; reliability may not be adequate) plus \$133,000/month for KWA raw water

Long-term Water Source using 72" line (beginning July 1, 2018)

Volumetric = \$668/MG

C2. 12MGD \$2.93M/yr. plus \$1.46M/yr. (KWA) = \$4.39M/yr.

C2A. 13MGD \$3.17M/yr. plus \$1.59M/yr. (KWA) = \$4.76M/yr.

Monthly Fixed Fee (\$7.90 to \$11.10 per mcf) say \$9/mcf (based on cost of 15 mgd plant expansion, 100MG raw water storage and increased transmission main capacity from GCDC WTP)

C3. Fixed Charge = \$5.3M/yr. (12MGD)

C3A. Fixed Charge = \$5.7M/yr. (13MGD)

Back-up/Emergency Water Source (using 72" line)

C4. Volumetric (3MGD) \$731,000/yr. plus \$366,000/yr. (KWA) = \$1.097M/yr.

C5. Fixed Charge = \$600,000/yr.

Back-up/Emergency Water Source using northern route (36")

C6. Volumetric (1MGD) \$ 244,000/yr. plus \$122,000/yr. (KWA) = \$366,000/yr.

C7. Fixed Charge = \$1.2M/yr.

City of Flint			
Water Supply Options			
Rates Used in Net Present Value Calculation			
April 10, 2017			
Inflation and Discount Rates			
Category	Annual Increase (Percent)		
Labor Cost	2.000%		
Power Cost	5.000%		
Chemical Cost	3.000%		
Purchased Water Cost	4.000%		
All Other Commodities	2.400%		
Discount Rate	3.610%		
Cost of Purchased Water - GLWA			
Scenario	Cost	Units	Comments
Short-Term (G3)	\$ 1,050,000	per Month	Revised to \$1M, based on GLWA Discussion
Back-Up/Emergency Water Source (Using 72" Line) (G2)	\$ 242,308	per Month	Based upon 3 MGD at current GLWA rates)
Long-Term (G1)	\$ 1,050,000	per Month	Revised to \$1M, based on GLWA Discussion
Cost of Purchased Water - GCDC			
Scenario	Cost	Units	Comments
Interim Supply (until July 1, 2018) (C1)	\$ 397,000	per Month	
Long-Term Water Source Using 72" Line (beginning July 1, 2018) - Volumetric 12 MGD (C2)	\$ 4,390,000	per Year	
Long-Term Water Source Using 72" Line (beginning July 1, 2018) - Volumetric 13 MGD (C2A)	\$ 4,760,000	per Year	
Long-Term Water Source Using 72" Line (beginning July 1, 2018) - Fixed Charge 12 MGD (C3)	\$ 5,300,000	per Year	
Long-Term Water Source Using 72" Line (beginning July 1, 2018) - Fixed Charge 13 MGD (C3A)	\$ 5,700,000	per Year	
Back-up/Emergency Water Source (Using 72" Line) Volumetric (3 MGD) (C4)	\$ 1,097,000	per Year	
Back-up/Emergency Water Source (Using 72" Line) Fixed Charge (C5)	\$ 600,000	per Year	
Back-up/Emergency Water Source (Using Northern Route - 36") Volumetric (1 MGD) (C6)	\$ 366,000	per Year	
Back-up/Emergency Water Source (Using Northern Route - 36") Fixed Charge (C7)	\$ 1,200,000	per Year	



City of Flint  
Water Supply Options  
Net Present Value for Each Cost Category  
April 10, 2017

Cost Category	Description	Cost Type	2017	2034	2035	2036	Total NPV
P1A	Flint WTP with WWTP Discharge of Residual Solids	Actual	\$7,000,000	\$0	\$0	\$0	
		NPV	\$7,000,000	\$0	\$0	\$0	\$56,178,009
P1B	Flint WTP with On-Site Residuals Solids Handling	Actual	\$12,500,000	\$0	\$0	\$0	
		NPV	\$12,500,000	\$0	\$0	\$0	\$65,115,586
P1C	Flint WTP with Raw Water Reservoir and WWTP Discharge of Residual Solids	Actual	\$12,500,000	\$0	\$0	\$0	
		NPV	\$12,500,000	\$0	\$0	\$0	\$103,192,929
P2A	Maintenance Capital Costs - WWTP Discharge of Residual Solids	Actual	\$2,293,073	\$1,324,107	\$1,355,885		
		NPV	\$707,611	\$699,347	\$691,180		\$12,095,131
P2B	Maintenance Capital Costs - On-Site Residuals Solids Handling	Actual	\$1,497,242	\$1,533,176	\$1,569,972		
		NPV	\$819,339	\$809,771	\$800,314		\$14,004,889
P2C	Maintenance Capital Costs - Raw Water Storage and WWTP Solids Discharge	Actual	\$1,497,242	\$1,533,176	\$1,569,972		
		NPV	\$819,339	\$809,771	\$800,314		\$14,004,889
P3	Labor Costs (Differential to Operate a WTP)	Actual	\$2,400,000	\$2,520,435	\$2,570,843	\$2,622,260	
		NPV	\$2,400,000	\$1,379,263	\$1,357,830	\$1,336,731	\$36,747,339
P4	Other Annual Operating Costs (Supplies, Professional Services, Miscellaneous/Eduction, Vehicles, Repair & Maintenance)	Actual	\$708,000	\$1,059,577	\$1,085,007	\$1,111,047	
		NPV	\$708,000	\$579,835	\$573,063	\$566,371	\$12,693,834
P5A	Energy Costs - Flint WTP Without Raw Water Reservoir and Pump Station	Actual	\$370,000	\$848,047	\$890,449	\$934,972	
		NPV	\$370,000	\$464,078	\$470,304	\$476,614	\$8,423,560
P5B	Energy Costs - Flint WTP With Raw Water Reservoir and Pump Station	Actual	\$430,000	\$985,568	\$1,034,846	\$1,086,589	
		NPV	\$430,000	\$539,334	\$546,570	\$553,903	\$9,789,543
P6	Chemical Costs	Actual	\$360,000	\$595,025	\$612,876	\$631,262	
		NPV	\$360,000	\$325,617	\$323,700	\$321,794	\$6,811,174
P7A	Residual Solids Handling and Disposal - Disposal to Flint WWTP	Actual	\$250,000	\$374,144	\$383,124	\$392,319	
		NPV	\$250,000	\$204,744	\$202,353	\$199,990	\$4,482,286
P7B	Residual Solids Handling and Disposal - On-Site Processing and Landfill Disposal	Actual	\$185,000	\$276,867	\$283,512	\$290,316	
		NPV	\$185,000	\$151,510	\$149,741	\$147,992	\$3,316,892
P8A	KWA Raw Water - 10 MGD	Actual	\$1,220,000	\$1,220,000	\$1,220,000	\$1,220,000	
		NPV	\$1,220,000	\$667,623	\$644,362	\$621,911	\$17,787,571
P8B	KWA Raw Water - 12 MGD	Actual	\$1,460,000	\$1,460,000	\$1,460,000	\$1,460,000	
		NPV	\$1,460,000	\$798,959	\$771,121	\$744,254	\$21,286,765
P8C	KWA Raw Water - 13 MGD	Actual	\$1,590,000	\$1,590,000	\$1,590,000	\$1,590,000	
		NPV	\$1,590,000	\$870,099	\$839,783	\$810,523	\$23,182,162
P9	KWA Bond Obligation	Actual	\$7,020,000	\$7,020,000	\$7,020,000	\$7,020,000	
		NPV	\$7,020,000	\$3,841,569	\$3,707,720	\$3,578,535	\$102,351,431
P10	36" Raw Water Connector Pipeline	Actual	\$0	\$0	\$0	\$0	
		NPV	\$0	\$0	\$0	\$0	\$0
F1	"Temporary" Dorr Pumping Station	Actual	\$3,000,000	\$0	\$0	\$0	
		NPV	\$3,000,000	\$0	\$0	\$0	\$3,000,000
F2	Transfer of 72" Line from GCDC to City of Flint	Actual	\$0	\$0	\$0	\$0	
		NPV	\$0	\$0	\$0	\$0	\$0
F3	Maintenance of 72" Line	Actual	\$146,150	\$149,658	\$153,250		
		NPV	\$79,978	\$79,044	\$78,121		\$1,653,237
F4	Northern Route "Back-Up" Pipeline	Actual	\$0	\$0	\$0	\$0	
		NPV	\$0	\$0	\$0	\$0	\$6,756,105
G1	GLWA Purchased Water - Long-Term Continuation of Current Water Source (Using 72" Line)	Actual	\$24,543,546	\$25,525,288	\$26,546,300		
		NPV	\$13,431,016	\$13,481,572	\$13,532,318		\$226,449,401
G2	GLWA Purchased Water - Back-Up/Emergency Water Source (Using 72" Line)	Actual	\$2,907,623	\$5,663,895	\$5,890,451	\$6,126,069	
		NPV	\$2,907,623	\$3,099,465	\$3,111,132	\$3,122,843	\$60,281,101
G3	GLWA Purchased Water - Short-Term Water Source	Actual	\$12,600,000	\$0	\$0	\$0	
		NPV	\$12,600,000	\$0	\$0	\$0	\$34,402,501
C1	GCDC Purchased Water - Interim Supply (Until July 1, 2018)	Actual	\$4,764,000	\$0	\$0	\$0	
		NPV	\$4,764,000	\$0	\$0	\$0	\$7,154,966
C2	GCDC Purchased Water - Long-Term Water Source Using 72" Line (Beginning July 1, 2018) - 12 MGD Volumetric	Actual	\$4,938,153	\$4,938,153	\$4,938,153		
		NPV	\$2,702,316	\$2,608,161	\$2,517,287		\$64,320,239
C2A	GCDC Purchased Water - Long-Term Water Source Using 72" Line (Beginning July 1, 2018) - 13 MGD Volumetric	Actual	\$9,272,006	\$9,642,887	\$10,028,602		
		NPV	\$5,073,939	\$5,093,038	\$5,112,209		\$91,533,437
C3	GCDC Purchased Water - Long-Term Water Source Using 72" Line (Beginning July 1, 2018) - 12 MGD Fixed Charge	Actual	\$10,323,873	\$10,736,828	\$11,166,301		
		NPV	\$5,649,554	\$5,670,820	\$5,692,165		\$101,917,482
C3A	GCDC Purchased Water - Long-Term Water Source Using 72" Line (Beginning July 1, 2018) - 13 MGD Fixed Charge	Actual	\$1,103,033	\$11,547,154	\$12,009,040		
		NPV	\$6,075,936	\$6,098,806	\$6,121,763		\$109,609,367
C4	GCDC Purchased Water - Back-Up/Emergency Water Source (Using 72" Line) - 3 MGD Volumetric	Actual	\$1,097,052	\$2,136,847	\$2,222,321	\$2,311,214	
		NPV	\$1,097,052	\$1,169,351	\$1,173,753	\$1,178,171	\$22,742,560
C5	GCDC Purchased Water - Back-Up/Emergency Water Source (Using 72" Line) - Fixed Charge	Actual	\$600,000	\$1,168,740	\$1,215,490	\$1,264,110	
		NPV	\$600,000	\$639,572	\$641,980	\$644,396	\$12,438,957
C6	GCDC Purchased Water - Back-Up/Emergency Water Source (Using Northern Route 36") - 1 MGD Volumetric	Actual	\$366,000	\$712,932	\$741,449	\$771,107	
		NPV	\$366,000	\$390,139	\$391,608	\$393,082	\$7,587,764
C7	GCDC Purchased Water - Back-Up/Emergency Water Source (Using Northern Route 36") - Fixed Charge	Actual	\$1,200,000	\$2,337,481	\$2,430,980	\$2,528,219	
		NPV	\$1,200,000	\$1,279,144	\$1,283,959	\$1,288,792	\$24,877,915