Nepenthe Association

Campus Commons
Water Meter Installation Study

January 2019

Prepared By:

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I. INTRODUCTION

The City of Sacramento (City) has implemented a water meter installation program to install water meters in all unmetered portions of their service area. Currently, the housing development managed by the Nepenthe Association (Association) within the Campus Commons neighborhood is provided water from the City from an estimated 79 unmetered connection points. The development includes a total of 590 residential units, three clubhouse facilities, and approximately 40 acres of irrigated common areas. The City is currently planning to begin installing water meters within the development in May 2019. The City has presented the Nepenthe Association with two options to consider when installing the meters.

Wood Rodgers, Inc. (Wood Rodgers) prepared this report as an analysis of the two options for water metering offered by the City of Sacramento. The analysis provides preliminary estimates of the total monthly water usage for the 590 units, three clubhouse facilities, and irrigation for the common areas in order to estimate the billing differences between the two options. The primary purpose of this report is to provide preliminary cost estimates for the two meter installation options to support the Association's decision making process.

II. WATER USE ESTIMATES

Wood Rodgers conducted an analysis to estimate the expected monthly water usage of the residences, clubhouse facilities and irrigation within the development. The analysis is based on the number of residential units, an equivalent number of residential units for the clubhouses, and the acreage for irrigation. In order to estimate the water usage within the Association development, Wood Rodgers met with the City of Sacramento and was provided with water usage records for two undisclosed developments with similar land uses that are within the City's service area. The data provided from the City can be viewed in **Appendix 1**. Monthly water usage data from January 2016 through September 2018 were reviewed for these two developments. One of these developments had two sets of meter data: one for internal water usage, and the other for the irrigated areas. It was determined that the development with two separate meters provided more accurate data to determine both the internal and external water usage factors.

From the data of the development with separate billing data, Wood Rodgers calculated monthly water usage factors per acre for irrigated areas and for internal residential uses on a per unit basis. The similar development has 286 units and 2.3 acres of irrigated common areas. It is noted that all residential units were treated equally. The resulting water usage factors from the similar development are shown below in **Table 1**.

Table 1 – Water Usage Factors			
Read Month	**Read Year**	**Landscape (gal/month/acre)**	**Residential (gal/unit/month)**
September	2018	381,267	3,015
August	2018	556,744	2,991
July	2018	495,041	2,865
June	2018	230,355	3,030
May	2018	102,621	3,108
April	2018	17,697	3,113
March	2018	22,500	3,030
February	2018	3,749	3,213
January	2018	48,318	3,303
December	2017	111,938	3,249
November	2017	262,360	3,104
October	2017	554,300	3,067
September	2017	[1]	2,926
August	2017	[1]	2,866
July	2017	[1]	2,964
June	2017	[1]	2,853
May	2017	[1]	2,910
April	2017	[1]	2,946
March	2017	[1]	2,906
February	2017	[1]	3,014
January	2017	[1]	2,901
December	2016	[1]	2,933
November	2016	[1]	3,072
October	2016	[1]	2,951
September	2016	27,379	2,954
August	2016	27,910	2,837
July	2016	19,966	2,833
June	2016	22,701	2,846
May	2016	12,750	2,871
April	2016	2,066	2,889
March	2016	253	2,816
February	2016	135	2,807

[1] Meter data not available.

For the 32 months of residential meter data provided, the average monthly water usage per unit was 2,975 gallons. The maximum monthly water usage was 3,303 gallons, which occurred in January of 2018. The irrigation usage varies significantly throughout the year depending upon weather. The peak month for irrigation water use was August 2018, which resulted in a monthly water demand of 556,744 gallons/acre. It is noted that approximately one (1) year of irrigation meter data was not available from October 2016 through September 2017. Therefore, the data from October 2017 through September 2018 was applied for those months with missing data. It is also noted that the type of landscaping and planting for the undisclosed similar development was more drought-tolerant and has a lower water usage. This was considered when predicting the Nepenthe Association landscape demand.

The Nepenthe Association has 590 residential units, three clubhouse facilities and approximately 40 acres of irrigated area. In order to determine the irrigated area, Wood Rodgers took the total area of the Association and subtracted the building footprints, the public right-of-way and other non-landscaped areas. For the purposes of this analysis, the clubhouses were each assumed to be an equivalent of two residential units for water usage, giving a total of 596 units. The landscape irrigation factor was increased for the Association from the undisclosed development by a factor of 1.66 in order to account for the higher water use landscaping within the Nepenthe Association. Multiplying the irrigated area and the total number of residential units by the monthly water usage factor from the similar development (Table 1), and the landscape peaking factor, results in a total estimated monthly water usage for the Nepenthe Association as summarized below in **Table 2**.

Table 2 – Nepenthe Monthly Water Usage Estimate

Read Month	Irrigation (gal/month)	Residential (gal/month)
January	3,216,000	1,969,000
February	250,000	1,915,000
March	1,498,000	1,807,000
April	1,178,000	1,856,000
May	6,830,000	1,853,000
June	15,330,000	1,807,000
July	32,944,000	1,767,000
August	37,050,000	1,783,000
September	25,372,000	1,797,000
October	36,887,000	1,828,000
November	17,460,000	1,851,000
December	7,450,000	1,937,000

III. METER INSTALLATION OPTIONS

The City of Sacramento presented two options to the Nepenthe Association for meter installation. Included are the improvements required for each option. (Section IV below provides cost estimates for each option.)

A. Option 1 – Install a water meter at each of the development's existing water service connection(s) to the City's distribution system.

In this option, the City will install a new water meter at all existing connections to the public water system. The meter will be the same size as the existing pipe diameter. It is estimated that the Association has 79 existing connections. See **Appendix 2** for the list of existing connections (provided by the City).

City Code Section 13.04.220 allows the association managing the development to assume responsibility for the metered water service. Therefore, the Association will receive a "master" water bill each month, with a summary of each of the 79 meters, detailing water usage within the development. The Association will need to recoup the water bill through a monthly assessment to its residents.

Under Option 1, the City will pay for all construction costs. After completion of the meter installation, the Association will receive monthly water meter records for one (1) year before actual billing changes occur.

B. Option 2 – Install water meters within the development's private water distribution system to serve separately-owned units.

For this option, the development may request the installation of individual water meters for each separately-owned unit. To implement this option, City Code Section 13.04.305 requires the development to satisfy the following conditions at no cost to the City:

1. Expose the pipeline at the proposed meter location for each new meter (approximately 613 locations) and perform any re-plumbing or other work on the development's private water lines.
2. Convey to the City the necessary easements allowing the City to install, operate, maintain, repair, and replace the individual meters.

Under Option 2, each individual homeowner will receive a monthly water bill directly from the City that they will be required to pay. There will still be monthly water usage for the common areas, clubhouses and landscaped areas, that the Association will need to pay and which can be recouped through association dues.

It is noted that if this option is selected, all on-site improvements will need to be completed prior to the installation of the meters by the City. The City will still bear the cost of the meter installations; however the Association will bear the cost of exposing the connection points, performing any other system improvements, and writing and processing the easement documents.

It is noted that, under Option 1, there is an opportunity for the Association to optimize the number and sizes of the water meters installed. If the Association would like to perform any downsizing, they would have to make a formal request by submission of a downsizing letter to the City. If there was the need to abandon a hydrant and connect to a different part of the main, the City would not be responsible for that connection. The City would, however, abandon the existing connection at no cost, if it was decided to do this during the metering program.

IV. COST ESTIMATES

Wood Rodgers developed a preliminary cost estimate for both meter installation options. The cost estimates include an estimate for the annual water bills (meter charge and water charge) and the initial capital cost that would be incurred by the Association (if any). The cost estimates are summarized below in **Table 3**, and are categorized to depict the total capital cost investment and annual cost for both options.

Table 3 – Cost Comparison – Option 1 versus Option 2

Cost Category	Option 1 - Existing Connections		Option 2 - Individual Connections		Cost Savings of Option 1	
Construction Cost	$ - 0 -	Capital	$589,900 [1]	Capital	$589,900	Capital
Water Bill	$561,600	Annual	$582,400	Annual	$20,800	Annual

[1] It is noted that this cost is an estimate, and could increase dramatically based on the pipe condition when exposed.

For Option 1, capital costs are considered zero because the City is responsible for any infrastructure improvements to existing connections. Annual costs are the costs of the water usage per volume and the monthly meter service charge. A full cost breakdown for Option 1 is included in **Appendix 3**. The Nepenthe Connection List (as of October 5, 2018) is included in Appendix 2.

For Option 2, capital costs include the individual connection points. With 590 residential units, three clubhouse meters, and an assumed 20 irrigation meters, a total of 613 meter would need to be installed. The Association would be required to cover the cost to expose each connection point, perform any upgrades to the existing waterlines and any unforeseen

construction projects involved with exposing the lines, and the cost to prepare an easement document for each connection. A 25 percent contingency was added as a lump sum of other miscellaneous costs, including engineering and administration support. This results in a projected $589,900 in capital costs for the Association to proceed with Option 2. Annual costs are the cost per volume of water usage and the monthly meter service charge (which for Option 2 is estimated to be 613 one-inch meters) resulting in an annual cost that is approximately $20,000 more than the 79 meters of Option 1. A full cost breakdown is included in Appendix 3.

APPENDIX

Nepenthe Association

Campus Commons
Water Meter Installation Study

Appendix 1 – Water Usage Data

Appendix 2 – Nepenthe Point of Service Connections

Appendix 3 – Cost Estimates

January 2019

Appendix 1 – Water Usage Data

January 2019

APPENDIX 1A - METER DATA

PBY (Meter Constant = 1)			MNL (Meter Constant =100)			
Read Date/Time	**Read Difference**	**Read multiplied by constant (1)**	**Read Date/Time**	**Read Difference**	**Read multiplied by constant (100)**	**Total Consumption (PBY + MNL)**
09/14/2018 5:59AM	114,255.00	114,255.00	09/14/2018 5:59AM	70	7,000.00	114,325.00
08/13/2018 5:59AM	111,030.00	111,030.00	08/13/2018 5:59AM	55	5,500.00	111,085.00
07/13/2018 7:59AM	107,120.00	107,120.00	07/13/2018 7:59AM	45	4,500.00	107,165.00
06/12/2018 9:59AM	118,180.00	118,180.00	06/12/2018 9:59AM	75	7,500.00	118,255.00
05/10/2018 12:59PM	105,265.00	105,265.00	05/10/2018 12:59PM	80	8,000.00	105,345.00
04/11/2018 11:59AM	101,555.00	101,555.00	04/11/2018 11:59AM	80	8,000.00	101,635.00
03/14/2018 9:59AM	107,260.00	107,260.00	03/14/2018 9:59AM	70	7,000.00	107,330.00
02/12/2018 6:59AM	119,210.00	119,210.00	02/12/2018 6:59AM	100	10,000.00	119,310.00
01/11/2018 9:59AM	108,735.00	108,735.00	01/11/2018 9:59AM	75	7,500.00	108,810.00
12/14/2017 7:59AM	110,435.00	110,435.00	12/14/2017 7:59AM	80	8,000.00	110,515.00
11/15/2017 5:59AM	128,055.00	128,055.00	11/15/2017 5:59AM	85	8,500.00	128,140.00
10/11/2017 11:59AM	94,215.00	94,215.00	10/11/2017 11:59AM	60	6,000.00	94,275.00
09/15/2017 8:59AM	107,990.00	107,990.00	09/15/2017 8:59AM	60	6,000.00	108,050.00
08/15/2017 7:59AM	117,465.00	117,465.00	08/15/2017 7:59AM	50	5,000.00	117,515.00
07/12/2017 1:59PM	121,145.00	121,145.00	07/12/2017 1:59PM	55	5,500.00	121,200.00
06/08/2017 5:59AM	102,090.00	102,090.00	06/08/2017 5:59AM	55	5,500.00	102,145.00
05/09/2017 5:59AM	97,420.00	97,420.00	05/09/2017 5:59AM	50	5,000.00	97,470.00
04/11/2017 5:59AM	115,680.00	115,680.00	04/11/2017 5:59AM	65	6,500.00	115,745.00
03/09/2017 4:59AM	96,775.00	96,775.00	03/09/2017 4:59AM	55	5,500.00	96,830.00
02/09/2017 1:52AM	103,365.00	103,365.00	02/09/2017 1:52AM	65	6,500.00	103,430.00
01/11/2017 12:26PM	114,800.00	114,800.00	01/11/2017 12:26PM	55	5,500.00	114,855.00
12/09/2016 12:45PM	108,265.00	108,265.00	12/09/2016 12:45PM	60	6,000.00	108,325.00
11/08/2016 12:47PM	101,595.00	101,595.00	11/08/2016 12:47PM	65	6,500.00	101,660.00
10/11/2016 8:31AM	97,855.00	97,855.00	10/11/2016 8:31AM	60	6,000.00	97,915.00
09/13/2016 10:38AM	115,005.00	115,005.00	09/13/2016 10:38AM	75	7,500.00	115,080.00
08/11/2016 8:20AM	102,485.00	102,485.00	08/11/2016 8:20AM	45	4,500.00	102,530.00
07/12/2016 12:10PM	109,440.00	109,440.00	07/12/2016 12:10PM	45	4,500.00	109,485.00
06/10/2016 10:36AM	94,645.00	94,645.00	06/10/2016 10:36AM	55	5,500.00	94,700.00
05/13/2016 8:38AM	98,160.00	98,160.00	05/13/2016 8:38AM	65	6,500.00	98,225.00
04/14/2016 7:48AM	120,590.00	120,590.00	04/14/2016 7:48AM	65	6,500.00	120,655.00
03/10/2016 11:39AM	94,605.00	94,605.00	03/10/2016 11:39AM	45	4,500.00	94,650.00
02/11/2016 7:30AM	96,825.00	96,825.00	02/11/2016 7:30AM	55	5,500.00	96,880.00
01/13/2016 11:25AM	102,120.00	102,120.00	01/13/2016 11:25AM	50	5,000.00	102,170.00

APPENDIX 1B - METER DATA

Meter Constant = 10		
Read Date/Time	**Read Difference**	**Total Consumption (Read multiplied by constant of 10)**
09/14/2018 6:59AM	12,508.00	125,080.00
08/13/2018 6:59AM	17,694.00	176,940.00
07/13/2018 8:59AM	15,733.00	157,330.00
06/12/2018 10:59AM	2,385.00	23,850.00
06/06/2018 12:00AM	967	9,670.00
06/04/2018 12:00AM	5,904.00	59,040.00
05/10/2018 1:59PM	3,051.00	30,510.00
04/11/2018 11:59AM	508	5,080.00
03/14/2018 9:59AM	692	6,920.00
02/12/2018 7:59AM	123	1,230.00
01/11/2018 9:59AM	1,387.00	13,870.00
12/14/2017 8:59AM	3,328.00	33,280.00
11/15/2017 6:59AM	9,414.00	94,140.00
10/11/2017 12:59PM	14,775.00	147,750.00
09/15/2017 8:59AM	74,351.00	743,510.00
09/26/2016 12:00AM	416	4,160.00
09/13/2016 12:01PM	814	8,140.00
08/15/2016 12:54PM	887	8,870.00
07/15/2016 9:05AM	655	6,550.00
06/13/2016 10:08AM	768	7,680.00
05/11/2016 12:38PM	366	3,660.00
04/13/2016 10:56AM	72	720.00
03/10/2016 12:26PM	7	70.00
02/12/2016 9:42AM	4	40.00
01/14/2016 9:35AM	0	0.00

APPENDIX 1C - METER DATA

PBY (Meter Constant = 10)			MNL (Meter Constant =100)			
Read Date/Time	**Read Difference**	**Read multiplied by constant (10)**	**Read Date/Time**	**Read Difference**	**Read multiplied by constant (100)**	**Total Consumption (PBY + MNL)**
09/14/2018 12:00AM	14,825.00	148,250.00	09/14/2018 12:00AM	617	61,700.00	209,950.00
08/14/2018 12:00AM	13,760.00	137,600.00	08/14/2018 12:00AM	799	79,900.00	217,500.00
07/13/2018 12:00AM	14,635.00	146,350.00	07/13/2018 12:00AM	763	76,300.00	222,650.00
06/13/2018 12:00AM	12,130.00	121,300.00	06/13/2018 12:00AM	443	44,300.00	165,600.00
05/11/2018 12:00AM	12,005.00	120,050.00	05/11/2018 12:00AM	197	19,700.00	139,750.00
04/11/2018 12:00AM	7,750.00	77,500.00	04/11/2018 12:00AM	16	1,600.00	79,100.00
03/14/2018 12:00AM	10,015.00	100,150.00	03/14/2018 12:00AM	22	2,200.00	102,350.00
02/13/2018 12:00AM	9,540.00	95,400.00	02/13/2018 12:00AM	21	2,100.00	97,500.00
01/12/2018 12:00AM	9,560.00	95,600.00	01/12/2018 12:00AM	21	2,100.00	97,700.00
12/14/2017 12:00AM	10,945.00	109,450.00	12/14/2017 12:00AM	27	2,700.00	112,150.00
11/14/2017 12:00AM	12,495.00	124,950.00	11/14/2017 12:00AM	448	44,800.00	169,750.00
10/12/2017 12:00AM	12,055.00	120,550.00	10/12/2017 12:00AM	672	67,200.00	187,750.00
09/14/2017 12:00AM	15,490.00	154,900.00	09/14/2017 12:00AM	901	90,100.00	245,000.00
08/11/2017 12:00AM	15,610.00	156,100.00	08/11/2017 12:00AM	792	79,200.00	235,300.00
07/12/2017 12:00AM	9,765.00	97,650.00	07/12/2017 12:00AM	429	42,900.00	140,550.00
06/12/2017 12:00AM	14,904.00	149,040.00	06/12/2017 12:00AM	543	54,300.00	203,340.00
05/15/2017 12:00AM	10,846.00	108,460.00	05/15/2017 12:00AM	391	39,100.00	147,560.00
04/13/2017 12:00AM	11,720.00	117,200.00	04/13/2017 12:00AM	165	16,500.00	133,700.00
03/13/2017 12:00AM	11,190.00	111,900.00	03/13/2017 12:00AM	47	4,700.00	116,600.00
02/14/2017 9:34AM	10,255.00	102,550.00	02/14/2017 9:34AM	20	2,000.00	104,550.00
01/12/2017 9:22AM	9,395.00	93,950.00	01/12/2017 9:22AM	16	1,600.00	95,550.00
12/12/2016 11:42AM	10,275.00	102,750.00	12/12/2016 11:42AM	21	2,100.00	104,850.00
11/09/2016 9:29AM	11,130.00	111,300.00	11/09/2016 9:29AM	168	16,800.00	128,100.00
10/11/2016 11:15AM	12,540.00	125,400.00	10/11/2016 11:15AM	293	29,300.00	154,700.00
09/15/2016 9:47AM	16,800.00	168,000.00	09/15/2016 9:47AM	395	39,500.00	207,500.00
08/12/2016 1:45AM	13,660.00	136,600.00	08/12/2016 1:45AM	587	58,700.00	195,300.00
07/14/2016 8:45AM	14,900.00	149,000.00	07/14/2016 8:45AM	845	84,500.00	233,500.00
06/13/2016 12:11PM	11,390.00	113,900.00	06/13/2016 12:11PM	278	27,800.00	141,700.00
05/16/2016 9:38AM	12,520.00	125,200.00	05/16/2016 9:38AM	258	25,800.00	151,000.00
04/14/2016 11:22AM	9,086.00	90,860.00	04/14/2016 11:22AM	67	6,700.00	97,560.00
03/11/2016 12:00AM	4,232.00	42,320.00	03/11/2016 12:00AM	9	900.00	43,220.00
02/12/2016 6:00AM	9,770.00	97,700.00	02/10/2015 6:00AM	44	4,400.00	102,100.00
01/13/2016 6:00AM	10,815.00	108,150.00	01/09/2015 12:00AM	19	1,900.00	110,050.00

Appendix 2 – Point of Service Connection Table

January 2019

APPENDIX 2

Nepenthe Point of Service Connections

No.	Valve No	Valve Location	Size	Meter Location	Notes
1	510	Colby Court	6"	Median (verify easement)	
2	811	Adelphi Court	6"	Median (verify easement)	
3	823	2273 Swathmore Dr	6"	Landscape (tight space?)	
4	825	2266 Swathmore Dr	6"	Driveway	
5	822	2241 Swathmore Dr	6"	Driveway	
6	824	2264 Swathmore Dr	6"	Driveway	
7	205	2315 Swathmore Dr	6"	Landscape	
8	210	1355 Commons Dr	8"	Landscape	Not a looped system
9	218	1371 Commons Dr	8"	Abandon	Does not provide water service. Shut-off.
10	227	Vanderbilt Way & Commons Dr	6"	Median (tight?, sign)	
11	666	1306 Vanderbilt Way	6"	Driveway	Could not verify irrigation
12	220	1292 Vanderbilt Way	6"	Driveway	Verified irrigation off private main
13	110	1182 Vanderbilt Way	6"	Driveway	Not a looped system
14	111	1066 Vanderbilt Way	6"	Driveway	Pipe is offset; Not a looped system
15	112	1045 Vanderbilt Way	8"	Median (tight?, sign)	
16	229	1287 Vanderbilt Way	6"	Driveway	Not a looped system
17	231	1185 Vanderbilt Way	6"	Driveway	Not a looped system
18	405	1207 Vanderbilt Way (end of Ct)	8"	Landscape	1 meter before the T
19	-	1207 Vanderbilt Way (end of Ct)	1.5" IRR	Landscape	Verify in construction/relocate?
20	-	Vanderbilt Way (Ct)	1" IRR		Verify water in median
21	511	1426 Commons Dr	8"	Landscape (ivy)	
22	524	1425 Commons Dr	8"	Abandon	Does not provide water service. Shut-off.
23	514	1112 Dunbarton Cir	8"	Greenscape/circular median	
24	-	1112 Dunbarton Cir	1" IRR		Verify in construction/relocate?
25	515	816 Elmhurst Cir	8"	Greenscape/circular median	
26	607	318 Elmhurst Cir	8"	Median (buried)	Off University Ave
27	618	807 Dunbarton Cir	6"	Median (buried)	Off University Ave
35		8 backflows off University Ave	1.5" IRR		Near 1443, 1449, 1479, 1497, 1551, 1593, 1611, 1653 University Ave
36		Clubhouse	1.5"		
39		3 Clubhouse Irrigation	1.5" IRR		3 connections
75		39 units off University Ave	1"		
76	605	Tennis Courts off University Ave	CONFIRM	CONFIRM	

The above is an estimate only and is subject to change pending futher verification.

Appendix 3 – Cost Estimates

January 2019

Cost Option 1 - Monthly, Annual, and Capital Cost

Read Month	Read Year	Irrigation (gal/month)	Irrigation Cost	Residential (gal/month)	Residential Cost	Irrigation and Residential (gal/month)	Irrigation and Residential Cost	Irrigation and Residential Cost (including monthly basic service charge)
September	2018	25,371,904	$ 49,475.17	1,796,888	$ 3,503.93	27,218,267	$ 53,075.57	$ 73,309.68
August	2018	37,049,256	$ 72,245.98	1,782,573	$ 3,476.01	38,904,075	$ 75,862.87	$ 96,096.98
July	2018	32,943,142	$ 64,239.06	1,707,464	$ 3,329.55	34,714,845	$ 67,693.88	$ 87,927.99
June	2018	15,329,271	$ 29,892.05	1,806,024	$ 3,521.74	17,165,187	$ 33,472.08	$ 53,706.19
May	2018	6,829,036	$ 13,316.61	1,852,119	$ 3,611.63	8,694,471	$ 16,954.20	$ 37,188.31
April	2018	1,177,663	$ 2,296.44	1,855,434	$ 3,618.09	3,035,392	$ 5,919.01	$ 26,153.12
March	2018	1,497,270	$ 2,919.67	1,806,110	$ 3,521.91	3,306,299	$ 6,447.28	$ 26,681.39
February	2018	249,500	$ 486.52	1,914,773	$ 3,733.80	2,164,760	$ 4,221.28	$ 24,455.39
January	2018	3,215,390	$ 6,270.00	1,968,567	$ 3,838.70	5,190,226	$ 10,120.93	$ 30,355.04
December	2017	7,449,043	$ 14,525.62	1,936,660	$ 3,776.48	9,400,228	$ 18,330.43	$ 38,564.54
November	2017	17,459,078	$ 34,045.17	1,850,166	$ 3,607.82	19,343,290	$ 37,719.38	$ 57,953.49
October	2017	36,886,658	$ 71,928.91	1,827,808	$ 3,564.22	38,786,395	$ 75,633.40	$ 95,867.51
September	2017	25,371,904	$ 49,475.17	1,743,718	$ 3,400.25	27,165,097	$ 52,971.89	$ 73,206.00
August	2017	37,049,256	$ 72,245.98	1,708,065	$ 3,330.72	38,829,567	$ 75,717.58	$ 95,951.69
July	2017	32,943,142	$ 64,239.06	1,766,365	$ 3,444.41	34,773,745	$ 67,808.74	$ 88,042.85
June	2017	15,329,271	$ 29,892.05	1,700,677	$ 3,316.32	17,059,840	$ 33,266.66	$ 53,500.77
May	2017	6,829,036	$ 13,316.61	1,734,594	$ 3,382.46	8,576,947	$ 16,725.03	$ 36,959.14
April	2017	1,177,663	$ 2,296.44	1,755,729	$ 3,423.67	2,935,688	$ 5,724.59	$ 25,958.70
March	2017	1,497,270	$ 2,919.67	1,732,139	$ 3,377.67	3,232,328	$ 6,303.03	$ 26,537.14
February	2017	249,500	$ 486.52	1,796,522	$ 3,503.21	2,046,509	$ 3,990.69	$ 24,224.80
January	2017	3,215,390	$ 6,270.00	1,728,713	$ 3,370.99	4,950,373	$ 9,653.22	$ 29,887.33
December	2016	7,449,043	$ 14,525.62	1,747,925	$ 3,408.45	9,211,494	$ 17,962.40	$ 38,196.51
November	2016	17,459,078	$ 34,045.17	1,830,707	$ 3,569.87	19,323,830	$ 37,681.43	$ 57,915.54
October	2016	36,886,658	$ 71,928.91	1,758,898	$ 3,429.85	38,717,485	$ 75,499.02	$ 95,733.13
September	2016	1,821,971	$ 3,552.84	1,760,399	$ 3,432.77	3,585,923	$ 6,992.54	$ 27,226.65
August	2016	1,857,279	$ 3,621.69	1,691,114	$ 3,297.67	3,552,014	$ 6,926.42	$ 27,160.53
July	2016	1,328,637	$ 2,590.84	1,688,486	$ 3,292.54	3,019,714	$ 5,888.44	$ 26,122.55
June	2016	1,510,645	$ 2,945.76	1,696,065	$ 3,307.32	3,209,656	$ 6,258.82	$ 26,492.93
May	2016	848,473	$ 1,654.52	1,711,410	$ 3,337.25	2,561,537	$ 4,994.99	$ 25,229.10
April	2016	137,458	$ 268.04	1,721,926	$ 3,357.75	1,859,652	$ 3,626.32	$ 23,860.43
March	2016	16,829	$ 32.82	1,678,451	$ 3,272.98	1,695,313	$ 3,305.86	$ 23,539.97
February	2016	8,953	$ 17.46	1,673,227	$ 3,262.79	1,682,198	$ 3,280.28	$ 23,514.39

Note - Missing Data filled with irrigation readings from October 2017-September 18

	1" meters	1.5" meters	6" meters	8" meters
# Connections	42	13	15	9
Meter Service / Month	$ 35.72	$ 67.29	$ 635.25	$ 1,013.87

Usage				
	$ 1.4587	cost per 100 cubic feet	capital cost	$ -
	$ 0.0019	cost per gallon	yearly cost	$ 561,600.00
	$ 20,234.11	monthly basic service charge		

Cost Option 2 - Monthly, Annual, and Capital Cost

Read Month	Read Year	Irrigation (gal/month)	Irrigation Cost	Residential (gal/month)	Residential Cost	Irrigation and Residential (gal/month)	Irrigation and Residential Cost	Irrigation and Residential Cost (including monthly basic service charge)
September	2018	25,371,904	$ 49,475.17	1,796,888	$ 3,503.93	27,218,267	$ 53,075.57	$ 75,039.22
August	2018	37,049,256	$ 72,245.98	1,782,573	$ 3,476.01	38,904,075	$ 75,862.87	$ 97,826.52
July	2018	32,943,142	$ 64,239.06	1,707,464	$ 3,329.55	34,714,845	$ 67,693.88	$ 89,657.53
June	2018	15,329,271	$ 29,892.05	1,806,024	$ 3,521.74	17,165,187	$ 33,472.08	$ 55,435.73
May	2018	6,829,036	$ 13,316.61	1,852,119	$ 3,611.63	8,694,471	$ 16,954.20	$ 38,917.85
April	2018	1,177,663	$ 2,296.44	1,855,434	$ 3,618.09	3,035,392	$ 5,919.01	$ 27,882.66
March	2018	1,497,270	$ 2,919.67	1,806,110	$ 3,521.91	3,306,299	$ 6,447.28	$ 28,410.93
February	2018	249,500	$ 486.52	1,914,773	$ 3,733.80	2,164,760	$ 4,221.28	$ 26,184.93
January	2018	3,215,390	$ 6,270.00	1,968,567	$ 3,838.70	5,190,226	$ 10,120.93	$ 32,084.58
December	2017	7,449,043	$ 14,525.62	1,936,660	$ 3,776.48	9,400,228	$ 18,330.43	$ 40,294.08
November	2017	17,459,078	$ 34,045.17	1,850,166	$ 3,607.82	19,343,290	$ 37,719.38	$ 59,683.03
October	2017	36,886,658	$ 71,928.91	1,827,808	$ 3,564.22	38,786,395	$ 75,633.40	$ 97,597.05
September	2017	25,371,904	$ 49,475.17	1,743,718	$ 3,400.25	27,165,097	$ 52,971.89	$ 74,935.54
August	2017	37,049,256	$ 72,245.98	1,708,065	$ 3,330.72	38,829,567	$ 75,717.58	$ 97,681.23
July	2017	32,943,142	$ 64,239.06	1,766,365	$ 3,444.41	34,773,745	$ 67,808.74	$ 89,772.39
June	2017	15,329,271	$ 29,892.05	1,700,677	$ 3,316.32	17,059,840	$ 33,266.66	$ 55,230.31
May	2017	6,829,036	$ 13,316.61	1,734,594	$ 3,382.46	8,576,947	$ 16,725.03	$ 38,688.68
April	2017	1,177,663	$ 2,296.44	1,755,729	$ 3,423.67	2,935,688	$ 5,724.59	$ 27,688.24
March	2017	1,497,270	$ 2,919.67	1,732,139	$ 3,377.67	3,232,328	$ 6,303.03	$ 28,266.68
February	2017	249,500	$ 486.52	1,796,522	$ 3,503.21	2,046,509	$ 3,990.69	$ 25,954.34
January	2017	3,215,390	$ 6,270.00	1,728,713	$ 3,370.99	4,950,373	$ 9,653.22	$ 31,616.87
December	2016	7,449,043	$ 14,525.62	1,747,925	$ 3,408.45	9,211,494	$ 17,962.40	$ 39,926.05
November	2016	17,459,078	$ 34,045.17	1,830,707	$ 3,569.87	19,323,830	$ 37,681.43	$ 59,645.08
October	2016	36,886,658	$ 71,928.91	1,758,898	$ 3,429.85	38,717,485	$ 75,499.02	$ 97,462.67
September	2016	1,821,971	$ 3,552.84	1,760,399	$ 3,432.77	3,585,923	$ 6,992.54	$ 28,956.19
August	2016	1,857,279	$ 3,621.69	1,691,114	$ 3,297.67	3,552,014	$ 6,926.42	$ 28,890.07
July	2016	1,328,637	$ 2,590.84	1,688,486	$ 3,292.54	3,019,714	$ 5,888.44	$ 27,852.09
June	2016	1,510,645	$ 2,945.76	1,696,065	$ 3,307.32	3,209,656	$ 6,258.82	$ 28,222.47
May	2016	848,473	$ 1,654.52	1,711,410	$ 3,337.25	2,561,537	$ 4,994.99	$ 26,958.64
April	2016	137,458	$ 268.04	1,721,926	$ 3,357.75	1,859,652	$ 3,626.32	$ 25,589.97
March	2016	16,829	$ 32.82	1,678,451	$ 3,272.98	1,695,313	$ 3,305.86	$ 25,269.51
February	2016	8,953	$ 17.46	1,673,227	$ 3,262.79	1,682,198	$ 3,280.28	$ 25,243.93

Note - Missing Data filled with irrigation readings from October 2017-September 18

	1" meters	1.5" meters	6" meters	8" meters
# Connections	613	-	-	-
Meter Service / Month	$ 35.72	$ 67.29	$ 635.25	$ 1,013.87
	$ 21,963.65	monthly basic service charge		
	590	units		20
	3	clubhouse meters	irrigation meters (assumed)	
Usage	$ 1.4587	cost per 100 cubic feet		
	$ 0.0019	cost per gallon		

Capital Costs

613	sum of meters to install
$ 500.00	Average cost to expose each connection point
$ 25.00	Cost to prepare each easement documents
$ 150,000.00	Repairs to water lines, unforseen construction costs
$ 471,900.00	Cost to for all exposures, easement documents, and repairs
$ 118,000.00	Construction contingency (including engineering and administration support)
$ 589,900.00	total capital cost

capital cost	$ 589,900.00
yearly cost	$ 582,400.00