

Utility Billing Analysis: 32/30 and Unbilled Arrearage



Agenda



- **Quick Overview of 32/30 that's underway and Its Budgetary Implications**
- **How Staff Measured the Unbilled Amount (eg: the arrearage)**
- **Q&A**
- **Next Steps**

The 32/30 Solution and Its Budgetary Implications



- **Purpose**

- 32/30 plan is the council's chosen solution to delayed billing and is working as planned to resolve the gap between read date and bill date

- **Impact**

- The plan reduce the gap between read date and bill date of each cycle by 2 days for every bills.

- **Peak Arrearage**

- Looking at cycle 11 (Largest number of accounts):
- On 6/11/2020, at peak arrearage of 71 days, cycle 11 was 3 bill in arrears:

- **Current Status**

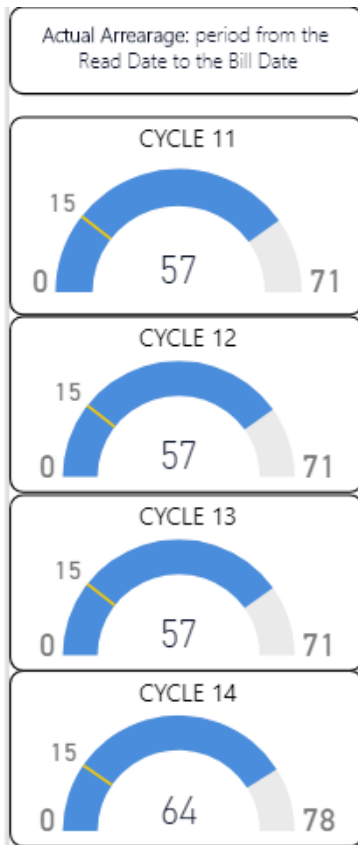
- For Cycle 11:
- On 2/13/2020, Cycle 11 had 2 bill in arrears:



32/30 and Its Implications (cont.)

Current Status (cont.)

- Arrearage days are publicly displayed on our website
- Gap between reads and billing has been cut to 47-64 days at present



32/30 milestones

- Arrearage days are publicly displayed on our website

Date	Milestone
3/5/2021	All Cycles will be 2 bills (64 days or less) in arrears
3/16/2022	Cycle 12 is the first cycle that has only 1 bill (32 days or less) in arrears
6/28/2022	All Cycles will be 1 bills (32 days or less) in arrear
3/25/2023	All Cycles will reach a target arrearage of 15 days or less

Utility Billing Dashboard



Department of Finance
Utility Billing:
32/30 Progress

The Report Page depicts the progress of the 32/30 plan.
Solid line: Arrearage between Read Date and Bill Date by Cycle.
Dashed line: Planned Arrearage between Read Date and Bill Date by Cycle.
Our goal is to close the Arrearage between 10 to 15 days from Read Date to Bill Date.
Scroll down the read more regarding 32/30 plan and Utility billing arrearage:

Year

2019

2021

Page Name

32/30 Progress

Go to Page

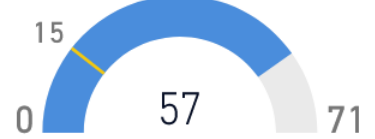


Actual Arrearage: period from the Read Date to the Bill Date

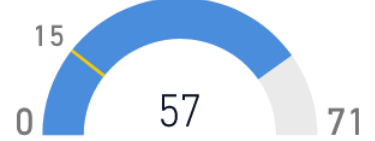
CYCLE 11



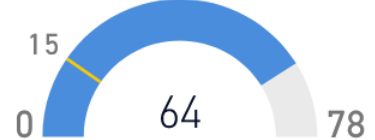
CYCLE 12



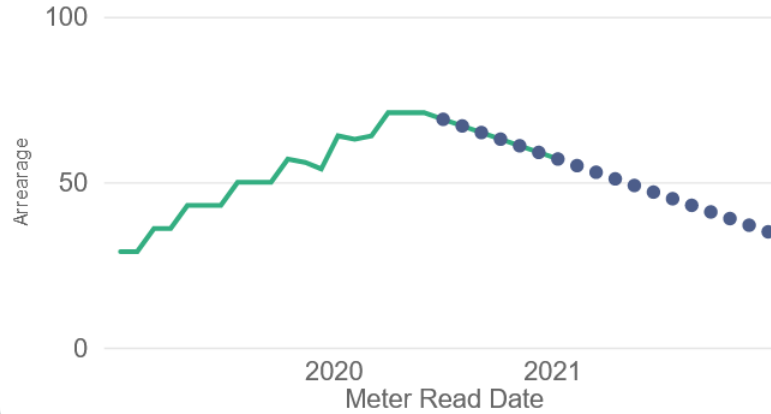
CYCLE 13



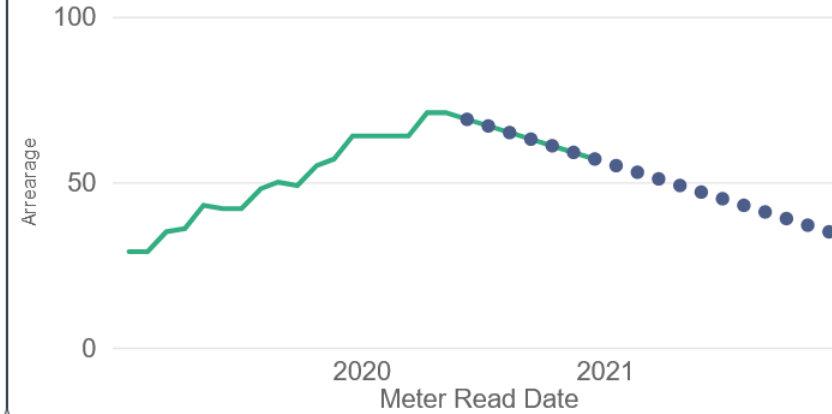
CYCLE 14



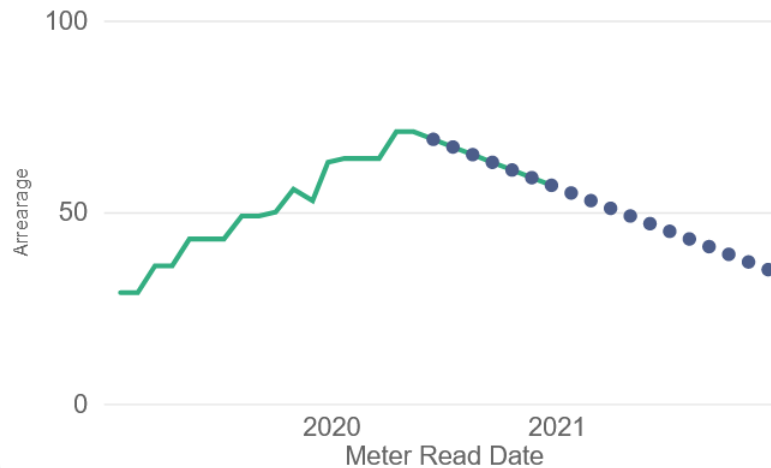
CYCLE 11



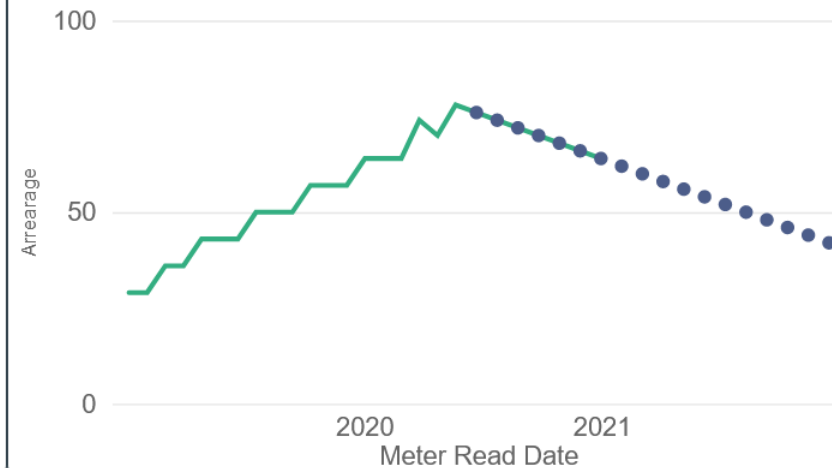
CYCLE 12



CYCLE 13



CYCLE 14





The Question

**How much is the
current arrearage?**



Methods

Step 1 – Get Water Consumption Data



- Used the Automated Meter Reading (AMR) drive-by readings from December, January, and February to bill the 37,000+ accounts and identify by account types
- On 2/13/2021, we had the unbilled AMR readings from following read dates:

Cycle	Arrear Month 1	Arrear Month 2
11	1/11/2020	2/13/2021
12	2/17/2020	1/18/2021
13	12/24/2020	1/25/2021
14	12/31/2020	2/1/2021

*Cycle 11 Month 2 Reading Period will be manually adjusted to the 32nd date, 2/12/2021
In this calculation, we were not able to pull final readings

Step 2 – Handling Low Outliers



Treating Negative Consumption

- A bill can have a negative consumption when a read is missing a digit, previous month read had an extra error digit, or meter had an incorrect manual read from previous month
- In the data it looks like this

Meter Number	Latest Billed Month	Latest Billed Read	Latest Billed Con	Month 1	Month 1 Read
180192783	12/10/2020	1,242	2,300	1/11/2021	28

Step 2 – Handling Low Outliers



- There were 141 (0.18%) out of 77,938 bills with a negative consumption figure
 - On actual bills that are sent out, negative consumption is audited by sending out public work to do a manual read and a meter profile.
- We separated out the ones with any negative usage over the past two unbilled months
 - Example: If an account had a negative usage in November, however had a positive usage in December, the November usage for this account was placed into this separate group, but not the December usage.
 - The negative usages were replaced with the most recent billed usage to the account as a replacement value;
 - There is no perfect data interpolation method for missing values, but since we are generating the total amount this method should lead to a relatively accurate total arrearage because the errors can be assumed to be normally distributed and cancel out in the aggregate. This method also takes seasonality into account, whereas other methods would not. This is also relatively small number of accounts being adjusted (141), so its impact on the total arrearage is limited.
 - Why not use 12 month average? Replacing usage with a 12 months average will contaminate the data with the difference of 28 days to 32 days reading.

Step 3 – Handling High Outliers



A bill can have an abnormally high consumption when a read had an extra digit, previous month missed a digit, or meter had an incorrect manual read from previous month

Nov Read	Nov Usage	Dec Read	Dec Usage	Dec - Nov	Feb Read	Feb Usage	Dec - Feb
44	500	999,997	99,995,300	99,994,800	999,997	-	(99,995,300)

- **23 (0.03%) out of 77,938 bills had abnormally high consumption**
 - Before bills are actually sent out, negative consumption is audited by sending out public work to do a manual read and a meter profile. These 23 cases were caused by meter changeouts.

Step 3 – Handling High Outliers



Treating Abnormally High Consumption

Nov Read	Nov Usage	Dec Read	Dec Usage	Dec - Nov	Feb Read	Feb Usage	Dec - Feb
44	500	999,997	99,995,300	99,994,800	999,997	-	(99,995,300)

- By sorting Dec – Nov (5th column) by descending order, and then manually verifying the correct consumption amount.
- For this analysis, staff viewed the customer’s billed consumption and applicable work orders to input the appropriate reading, which calculated the consumption. These figures were then used in our analysis.
- Staff continue to review each account monthly month usage for the until consecutive accounts show no discrepancy between billed and unbilled, which was approximately the top 300 accounts with the highest discrepancy between billed and unbilled

Step 5 – A Clean Dataset



We now have a clean dataset that has no negative or abnormally high consumption

What is a Base Rate?



- It's not a connection fee
- It's a volumetric usage cost + a meter size cost



What would the arrearage be with no base consumption and at the lower tiered rate?



Step 6 – Calculate unbilled consumption with no base charges

We backed out the water base and sewer base charges for each month according to the account type. This was done for every account type.

	Residential	Commercial	Sprinkler
Water	2290	2290	2290
Sewer	2000	2290	No Sewer

Example: A residential account has a monthly consumption of 3,000 gallons

Consumption Type	Calculation	Consumption without Base Charges
Water	$3000 - 2290 = 710$	710
Sewer	$3000 - 2000 = 1000$	1,000



Step 6 – Calculate unbilled consumption with no base charges

After this calculation, some of the lower consumption accounts can reflect a negative usage. Since you can't have negative usage, these accounts were set to zero.

	Residential	Commercial	Sprinkler
Water	2290	2290	2290
Sewer	2000	2290	No Sewer

Example: A residential account has a monthly consumption of 100 gallons

Consumption Type	Calculation	Consumption without Base Charges	Consumption after settings negatives to zero
Water	$100 - 2290 = -2190$	-2190	0
Sewer	$100 - 2000 = -1900$	-1900	0

Step 6 – Calculate unbilled consumption with no base charges



Next we needed to multiply each accounts usage by the appropriate rate

a. There are two rate types: Inside the City and Outside the City

a. These tables reflect the lowest tier rate for each account type

b. Inside City Rate (\$ per thousand gallon)

Rates per 1,000 gallons	Residential	Commercial	Sprinkler
Water	\$4.06	\$5.09	\$6.11
Sewer	\$5	\$5	No sewer

a. Outside City Rate (\$ per thousand gallon)

Rates per 1,000 gallons	Residential	Commercial	Sprinkler
Water	\$6.09	\$7.64	\$9.17
Sewer	\$7.50	\$7.50	No sewer

Step 6 – Calculate unbilled consumption with no base charges



- Example:
 - Calculating the unbilled consumption for the house (inside the City) used in the last example
 - Inside the City rates

Rates per 1,000 gallons	Residential	Commercial	Sprinkler
Water	\$4.06	\$5.09	\$6.11
Sewer	\$5	\$5	No sewer

Usage-Residential inside	Usage	Cost per 1000 Gallons	Cost per Gallon	Calculating the Cost	Total Cost
Water Usage No Base	710	\$4.06	\$4.06/1000 gallons = \$0.00406 per gallon	\$0.00406 * 710	\$2.88
Sewer Usage No Base	1,000	\$5.00	\$5.00/1000 gallons = \$0.005 per gallon	\$0.005 * 1000	\$5.00
Total Unbilled Consumption					\$7.88



We ran the data a second time,
but included base rates and tiered
usage



Step 7 Measuring the Full Arrearage

Having calculated the unbilled consumption amount (gallons) with base and usage tiers we then applied the public water and sewer rate to the consumption

	Usage	Base	Tier 1 Gallons	Tier 2 Gallons
Consumption	3,000			
Water Usage		2,290	710	0
Sewer Usage		2,000	1,000	0

- a. Then we applied the appropriate base charge based on Meter Size and multiplied the tiers by the appropriate rates
- b. Finally, we summed the Base Charge and Tiered Charges for final dollar amount in arrears
- c. Base rate is part of volumetric usage

Step 7 Measuring the Full Arrearage



- Example: A residential account using a 5/8" meter and a monthly consumption of 3,000 gallons

	Base Water: 0-2290 gal Sewer: 0-2000 gal	Tier 1 Gallons Water: 2291-6860 gal Sewer: +2000 gallon	Tier 2 Gallons Water: 6861-17,150
Water Usage	2,290	710	0
Sewer Usage	2,000	1,000	0
Water Charge	\$15.78 (flat)	$710 * 0.00406 = \$2.88$	$0 * 0.00509 = \$0$
Sewer Charge	\$22.74 (flat)	$1,000 * 0.005 = \$5.00$	
Total Unbilled Water and Sewer Charge:			$15.78 + 22.74 + 2.88 + 5 = \mathbf{\$46.40}$



Now we have two results to share with you

- 1) Total arrearage with base and tiers
- 2) Total arrearage with no base and lowest tiers

Current Arrearage



With Base Charges and Tiered Rates

With Base and Tier						
Service		Residential	Commerical	Irrigation	Multi-Unit	Total
Water Portion	Base	1,165,211	237,731	107,660	96,226	\$ 1,606,829
	Volumetric	1,163,622	424,655	267,699	174,459	\$ 2,030,435
	Water Total	2,328,834	662,386	375,359	270,685	\$ 3,637,264
Sewer Portion	Base	1,679,127	342,510	-	96,226	\$ 2,117,864
	Volumetric	1,397,006	417,144	-	174,694	\$ 1,988,844
	Sewer Total	3,076,134	759,654	-	270,920	\$ 4,106,707
Combined Totals	Base	2,844,339	580,241	107,660	192,453	\$ 3,724,692
	Volumetric	2,560,629	841,799	267,699	349,152	\$ 4,019,279
	Grand Total	\$ 5,404,967	\$ 1,422,040	\$ 375,359	\$ 541,605	\$ 7,743,971



No Base Charges and Using Lowest Tiers

No Base Lowest Tier						
Service		Residential	Commerical	Irrigation	Multi-Unit	Total
Water Portion	Base	-	-	-	-	\$ -
	Volumetric	1,059,464	424,655	267,699	174,459	\$ 1,926,277
	Water Total	1,059,464	424,655	267,699	174,459	\$ 1,926,277
Sewer Portion	Base	-	-	-	-	\$ -
	Volumetric	1,397,006	417,144	-	174,459	\$ 1,988,609
	Sewer Total	1,397,006	417,144	-	174,459	\$ 1,988,609
Combined Totals	Base	-	-	-	-	\$ -
	Volumetric	2,456,470	841,799	267,699	348,917	\$ 3,914,886
	Grand Total	\$ 2,456,470	\$ 841,799	\$ 267,699	\$ 348,917	\$ 3,914,886



Staff Figures Compared to Raftelis Figures



Raftelis used a different methodology to estimate the arrearage

Using billing data provided by the City from 10/4/2019 through 11/9/2020, Raftelis calculated the average monthly billing amount for each account based on service line size. Raftelis then subtracted monthly base charges from this amount, which results in the average monthly amount each account pays for consumption alone. The amount was divided by 30 days to generate an estimated daily consumption charge, as illustrated in the table below.

Table 8: Estimated Average Daily Consumption Charges by Meter Size

Meter Size (Inches)	Est. Average Water and Sewer Charges per Month	Monthly Base Charge Amounts	Est. Average Consumption Charges per Month	Est. Average Daily Consumption Charges
5/8 ⁶	\$74.79	\$38.52	\$36.27	\$1.21
1	\$192.54	\$96.31	\$96.23	\$3.21
1.5	\$406.53	\$192.62	\$213.91	\$7.13
2	\$924.97	\$308.19	\$616.78	\$20.56
3	\$2,097.82	\$577.85	\$1,519.97	\$50.67
4	\$2,433.21	\$963.09	\$1,470.12	\$49.00
6	\$7,105.17	\$1,926.17	\$5,179.00	\$172.63
8	\$9,093.54	\$3,081.88	\$6,011.66	\$200.39
10	\$14,978.65	\$4,430.20	\$10,548.45	\$351.62

Staff Figures Compared to Raftelis Figures



Compare to Raftelis Analysis.

On 1/1/2021, the average lag between meter reads and bills will be approximately 58.25 days across all billing cycles. The estimated average daily consumption charge was multiplied by 58.25 days to estimate the total value of unbilled consumption for individual accounts based on service line size. Next, the per account average was multiplied by the number of active accounts to estimate the total value of unbilled consumption, as illustrated below.

Table 9: Estimated Value of Unbilled Consumption by Meter Size

Meter Size (Inches)	Est. Average Daily Consumption Charges	Est. Total Unbilled Consumption per Account	Number of Accounts	Est. Total Value of Unbilled Consumption
5/8	\$1.21	\$70.43	36,256	\$2,553,449.41
1	\$3.21	\$186.85	1,333	\$249,075.99
1.5	\$7.13	\$415.34	93	\$38,626.60
2	\$20.56	\$1,197.58	1,264	\$1,513,741.63
3	\$50.67	\$2,951.27	67	\$197,735.09
4	\$49.00	\$2,854.48	42	\$119,888.02
6	\$172.63	\$10,055.89	18	\$181,005.98
8	\$200.39	\$11,672.63	8	\$93,381.04
10	\$351.62	\$20,481.58	2	\$40,963.16
Total				\$4,987,841.61

Q&A



Why does the Raftelis report \$5 million in arrears versus the \$7.7 million reported in the recent memo?

- Largest difference is that Raftelis calculated their amounts using the *average yearly* consumption
- Staff calculated amounts using each account instead of an average

Q&A



What should the arrearage normally be? What's normal?

- An ideal arrearage dollar figure is perhaps the wrong way to look at this issue as the total amount can change due to seasonality, population increase, and the gap (days) between reading and billing. Ideally, the City would be at a 15 -day gap between reading and billing and the dollar amount would be what it is at that timeframe.

Q&A



Are there any costs associated with the \$7.7M arrearage that can be considered losses?

- No
- There is no lost city income because staff expect to be able to collect nearly all of the outstanding arrearage. Billings are two months behind, not two years behind so the arrears are fairly new. This means it can be assumed the vast majority of the outstanding balance will be collected. Any interest that would have been earned on this amount is negligible due to extremely low interest rates and low market returns.

Q&A



Has the City ever borrowed money because of the arrearage?

- No
- The City's growth, the relatively small amount of time involved, a healthy fund balance, and the action taken to stop the arrearage from growing (and now decreasing) all contribute to not needing to borrow money.

Q&A



Why does the multi-year forecast show fund balance (“cash equivalents”) decreasing?

- The vast majority of the draw-down is due to planned transfers to the WS Debt Fund necessary to pay for capital improvement projects like wastewater treatment plants and the surface water plant. The advantage and use of multi-year budgeting is to anticipate and plan for such financing.
- FY21 Adopted Budget – Multi Year Forecast – Page 43
 - “Transfers to WS Debt Fund”. Can be found right above the “Total Expenditures” line.

Q&A



What revenue increases are assumed in the multi-year forecast?

- The multi-year forecast was built with the following assumed revenue increases:
 - FY21 (what we are currently in) – 0% rate increase adopted by council
 - 17.3% for FY22
 - 13.6% for FY23
- From Adopted Budget “Multi Year Forecast” section - page 43. Listed under the % Revenue change line.

Q&A



Why do you have a fund balance (“cash equivalents”) in the Enterprise Fund?

- All Enterprise Funds carry a balance which can be interpreted as money that has come in but has not yet been spent. Some of those funds are restricted for debt service payments and capital projects. The City's financial policies require the City maintains sufficient operating reserves to cover the costs of operations in the event of emergencies and revenue shortfalls. Larger reserves help the City's credit rating, allowing the “business” of the municipal utility to borrow at lower interest rates.
- This money can be used to:
 - Pay for capital projects with cash instead of borrowing money
 - Offset rate increases
 - Provide funding for emergencies

Q&A



Can you transfer money into the Enterprise Fund from other Funds?

- No, except for paying for other City Department's water bills.
- Sometimes impact fee revenue can be transferred into specific projects.
- You do transfer money out of the Enterprise Fund to pay the General Fund for things like accounting services provided by General Fund staff which are expenses to the Enterprise Fund.

Next Steps



- Working to get Committee updated multi-year fund projections.
- Will be contracted out to speed up work and provide the benefits of a 3rd party's assessment.
- Looking at end of April to have the company present to the committee. We will keep you in the loop.