City Council
Utility Committee

Meeting Agenda

Tuesday, May 12, 2020
10:00 am - 12:00 pm

This meeting will be held electronically. Residents interested in listening to the meeting should visit the City's website here to access to the meeting: louisvilleco.gov/government/city-council/city-council-meeting-agendas-packets-minutes#Other

The Committee will accommodate public comments as much as possible during the meeting. Anyone may also email comments to the Committee prior to the meeting at CPeterson@LouisvilleCO.gov.

I. Call to Order

II. Roll Call

III. Approval of Agenda

IV. Approval of Minutes from January 10th, 2020

V. Public Comments on Items Not on the Agenda

VI. Agenda Items and Date for Next Meeting

- Advance Agenda / Work Plan & Meeting Dates

VII. Dashboards

VIII. COVID-19

IX. Windy Gap Financing

X. Utility Carry Forward Requests

XI. 6-Year CIP Plan

XII. Update – Water Resources

- Water Supply Update

XIII. Good News

XIV. Upcoming Projects and Council Action

- Water Rights - Summer
-

XV. Adjourn 12:00 pm

Attachments: 01-10-20 Draft Minute
Work Plan
Dashboards
Water Consumption COVID-19 Impacts
Utility Rate Impacts
Windy Gap Finance Memo
Utility Carry Forward Table
6-Year CIP Plan
Water Supply Graphs
Biobot - Wastewater Results
TPO Article
Trenchless Technology Article

City of Louisville
COLORADO • SINCE 1878

City Council
Utility Committee

Draft - Meeting Minutes

Friday, January 10, 2020

COUNCIL CHAMBERS

I. Call to Order – *Councilmember Lipton* called the meeting to order at 2:00 p.m.

II. Roll Call was taken and the following members were present:

City Council: *Councilmember Lipton, Mayor Pro Tem Maloney, Councilmember Fahey and Mayor Stolzmann*

Staff Present: *Mrs. Balser, Mr. Kowar, Mr. Watson, Mr. Peterson, Mr. Ahrens*

Public*: None*

III. Approval of Agenda

Mayor Pro Tem Maloney motioned to approve the agenda and Councilmember Fahey seconded the motion. All approved the Agenda.

IV. Approval of the Minutes

Councilmember Lipton commented that there is a typo in Section 9 - 2020 Tap Fees about half way down, "recently utilized 2106" should be "recently utilized 2016". That correction was noted and Councilmember Lipton motioned to approve the October 30, 2019 meeting minutes. Mayor Pro Tem Maloney seconded the motion and all approved the minutes.

V. PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA

None

VI. Agenda Items and Date for Next Meeting

- Mr. Peterson outlined the Work Plan and highlighted the suggestion for monthly meetings for consideration of the work load. Mr. Peterson also noted that there was a desire to change the meeting day and time.

Councilmember Lipton suggested moving to Tuesdays to have all Council activities on the same day. Mayor Pro Tem Maloney agreed with Tuesdays but stated the Finance Committee meets on the same Tuesdays as City Council meetings and suggested the Utility Committee meet on the Tuesday following City Council meetings. Mrs. Balser noted that Tuesdays are typically full in preparation and updating Council items. The Committee discussed and requested staff to coordinate schedules to find the best day and time that will work.

- The Committee continued with the Work Plan by discussing the frequency of the Capital Project Progress Update and agreed to do quarterly unless there is something going on and/or an exception which will be reported as needed. Mr. Kowar commented that the capital project update would include the water rights market value update as well. Councilmember Lipton requested the Work Plan review be a more defined regular agenda item for future meetings. Councilmember Lipton inquired how the Work Plan was syncing up with the budget process. Mr. Kowar explained how the Work Plan is designed to allow the appropriate coordination with the budget process. Mayor Pro Tem Maloney asked about the Financial Policies listed in the third quarter and requested further detail. Mr. Kowar provide the background on this item from 2019 and suggested a review of existing policies for the April meeting. The Committee was in favor of adding this item. Mrs. Balser reminded the Committee of the upcoming agenda item for 2021 rates to be discussed around July. Mayor Pro Tem Maloney asked to explain the terminology on several agenda items. Mr. Peterson explained and started with February Meeting.
    - Finalize 2020 Rates – Review and discuss the final drafts of the Council packet for the 2020 rate increases.
    - Windy Gap Update – A routine update of Chimney Hollow Reservoir.
    - Intro 6-year CIP Plan – The draft 2021- 2026 Utility CIP Plan for the new budget cycle.
    - Asset Management Software Presentation – A review of a new software (Waterworth) that models utility rates and long-term impacts for complete asset replacement. Mr. Kowar explained Waterworth is a cloud software that's been developed over the last 3 years and the City is one of the first adopters. We have been advisors for them to build the software and will be moving our Excel spread sheets to this model. Councilmember Lipton stated that the decision to use a cloud space software or Excel should be up to staff. The rest of the Committee agreed. Mayor Stolzmann made a general comment regarding the software risk

and how we back up our information and asked what the likelihood is of being hacked, etc. and just wants us to be mindful. Mrs. Balser stated the project is in coordinated with I.T. and Finance and security is and will be one of the factors in selection.

- Louisville Pipeline Report – This item is for a review on the inspection of the raw water pipeline. The report will tell us the condition of the pipeline which may translate into a large capital project if it needs to be replaced and could require adding to the 6 year CIP plan.

- **March 2020 Meeting**
  - Final 6-year CIP Plan – Finalization of the CIP so we will be prepped for submittal for the 6 year budget.
  - Water Rights – An update on water rights leases and or acquisitions.

- **Third Quarter**
  - 2021 Rates and Tap Fees – This item is for the discussion and recommendation of any proposed changes in utility rates for 2021. Mr. Kowar clarified that there are two parts to this task: the typical process that aligns with the budget cycle (Operational Rates) and the possibility of a full Rate Study to change rate structure or system changes. Committee agreed to leave the review in May. Councilmember Lipton said we will look at putting at the end of each meeting to review.

VII. Dashboard

Mr. Kowar provided an overview of the dashboard covering 2019 that started off the year really wet and by September it was really hot. Water usage was different from previous years as result this change in weather. Finances lagged to the start the year but ended slightly below average. Tap fees we also under with a few larger developments being delayed. Councilmember Lipton asked why we operational expenses appeared low. Mr. Watson explained the reported values were on a cash basis through December 31st and did not included year end invoicing that will be processed in January, February and even March. Councilmember Lipton said he is interested in this and would like to look at turn backs at some point and incorporate it in our thinking for rates and budgeting. Mrs. Balser said there can be challenges with the level of precision and the timing being requested and the best information will be provide with the appropriate amount of context. Mayor Stolzmann added how we have x amount of money in the reserves that we could be budgeting differently and it would be fine. Councilmember Lipton agreed and said we will revisit again once we have

all the information. Committee continued discussing the Cumulative Billed Consumption Chart. Mr. Ahrens explained the cumulative difference and monthly difference and that these were added so you could see the seasonal effect. Mr. Kowar stated that we had a weird seasonal pattern and that Finance/Utility Billing and our Operations have been working together on overall impacts to the City. Mr. Watson passed out a graph that refers to the revenue explaining that's our current year's budget weighted based on a 10 year history of what we normally track. Mr. Watson said staff did lot of troubleshooting (meter audits and testing, manual reads, etc.) but were unsuccessfully in finding the cause with these measures. Further investigation into the billing software showed a slight slowing of the reading period by a few days. This slowing has been accumulating over several years and has resulted in reading data being delayed by as much as 30 days. The Committee discussed billing and corrective actions which includes tightening up the calendar. The Committee asked about the recent users that expressed concern that they had been mis-billed. Mr. Watson explained how staff reviewed their consumption and time frame for usage, etc. with each user that has made contact. Committee continued discussing and agreed there was never a bill more than 30 days old. In addition, the Committee asked what happens if the customer doesn't pay and what they can do. Mr. Watson said we have a leak application where they have 6 months to apply then there is a shut off notice after that. Mr. Watson stated the consumer has to pay their bill after we've done due diligence. Mr. Kowar asked what our next steps would be. Suggestions were:

- We can offer the Slow the Flow Program
- In the spring we could meet with the handful of customers we have while they turn their sprinklers on.
- Do a meter read

Mr. Watson said we will follow up on our procedures. Mayor Pro Tem Maloney then commented on the Dash Board and said we agreed to do quarterly so let's do them in the quarter when they are complete. The Committee agreed.

VIII. Utility Rate Structure

Mr. Kowar reviewed the prior rate structure that was developed as part of the 2013/2014 rate study. He went on to explain the current cost of service and rate design. At the conclusion, Mr. Kowar sought direction on whether to focus on cost of service or rate design. Mayor Stolzmann stated that both should be reviewed but would like to evaluate based more on usage than the specific customer type of residential or commercial. Mayor Pro Tem Maloney added that a lot of policies are imbedded in these and should be assessed at the same time. Councilmember Lipton suggested that this be designated as separate topics. Mr. Kowar offered the option of bringing in an outside consultant that could bring prospective of other utilities that can provide a broader context of options. Councilmember Lipton was open to this suggestion but wanted to get more of a baseline to determine if a change was needed prior to engaging a consultant. Mr. Kowar suggested to start with cost of service with emphasis on the customer

groupings with a separation between cost of service and rate design. Mayor Stolzmann added that the process should not be rushed to meet a certain deadline and strive to concentrate on a sound methodology for setting rates.

IX. 2020 Tap Fees

Mr. Kowar presented the final 2020 Water Tap Fees planned to go into effect February 15th. The policy approval is scheduled for City Council on January 21.

X. Update – Water Resources

- Water Supply Update - Mr. Peterson stated that supplies are doing relatively well. The Marshall Lake storage is down as this source is being more heavily used due to restrictions from a couple capital projects.
- Windy Gap Firming Project - Mr. Peterson said the project is still progressing but we continue to wait for resolution of the legal issues. Construction is planned for this summer.

XI. Upcoming Projects and Council Action

- CIP Update – Nothing major to report.
- Water Engineers Contract – This is for Water Rights Consulting for Spronk Engineers contract that will be going to the January 21st Council Meeting.
- Backflow Compliance – Mr. Kowar wanted to let the committee know that the City had a compliance issue with the Backflow and Cross Control Program. He explained during a routine inspection conducted on September 23, 2019 the CDPHE identified that the City violated requirements of the Backflow Prevention and Cross Connection Control Rule during the period of 2016 through 2018. Documentation of these violations were provided to the City on December 20, 2019. The compliance failures, requires a public notice to be sent within 30 days. He stated that the City is in compliance for 2019 and the City's water meets or exceeds all regulatory requirements. Councilmember Lipton asked if we will get fined. At this time any potential fines have not been determined by CDPHE.

XII. Adjourn

Councilmember Lipton motioned to adjourn and Mayor Pro Tem Maloney second the motion, all agreed and the meeting was adjourned at 4:00 p.m.

City of Louisville Colorado Utility Committee Work Plan – May 12th

Topics will be discussed in the quarter which they are listed. Items that are not complete will roll to the next quarter.

Goals:
Support staff during the pandemic
Operations and essential maintenance and upgrades to continue sustainability and efficiency of the Utility

Every Meeting:

- Capital Projects Progress
- Enterprise Dashboards: inclusive of KPI progress, water supply update, water use by customer class, revenue and expense by enterprise (and by customer class where appropriate), energy use by enterprise
- Tap Fee Review - CBT market value update

January 2020 Meeting

- ✓ Utility Rate Structure
- ✓ 2020 Tap Fees
- ✓ Finalize 2020 Rates

May Meeting

- COVID-19 Impacts
  - Operations
  - CIPs
  - Finances
- Windy Gap Update and Financing
- 6-Year CIP Plan
- Council Items (Water Rights) – Committee Confirm

July/August Meeting

- COVID-19 Impacts
  - Operations
  - CIPs
  - Finances
- Draft 2021 Rates
- Windy Gap Construction and Financing

October/November Meeting

- Final 2021 Rates

Parking Lot / Hold

- Rate Design & related Financial Policies
- Raw Water Study
-

City of Louisville
COLORADO • SINCE 1878

UTILITIES - WATER

January 1, 2020 To March 31, 2020

NOT A FINANCIAL STATEMENT. A SNAPSHOT OF KEY INDICATORS.

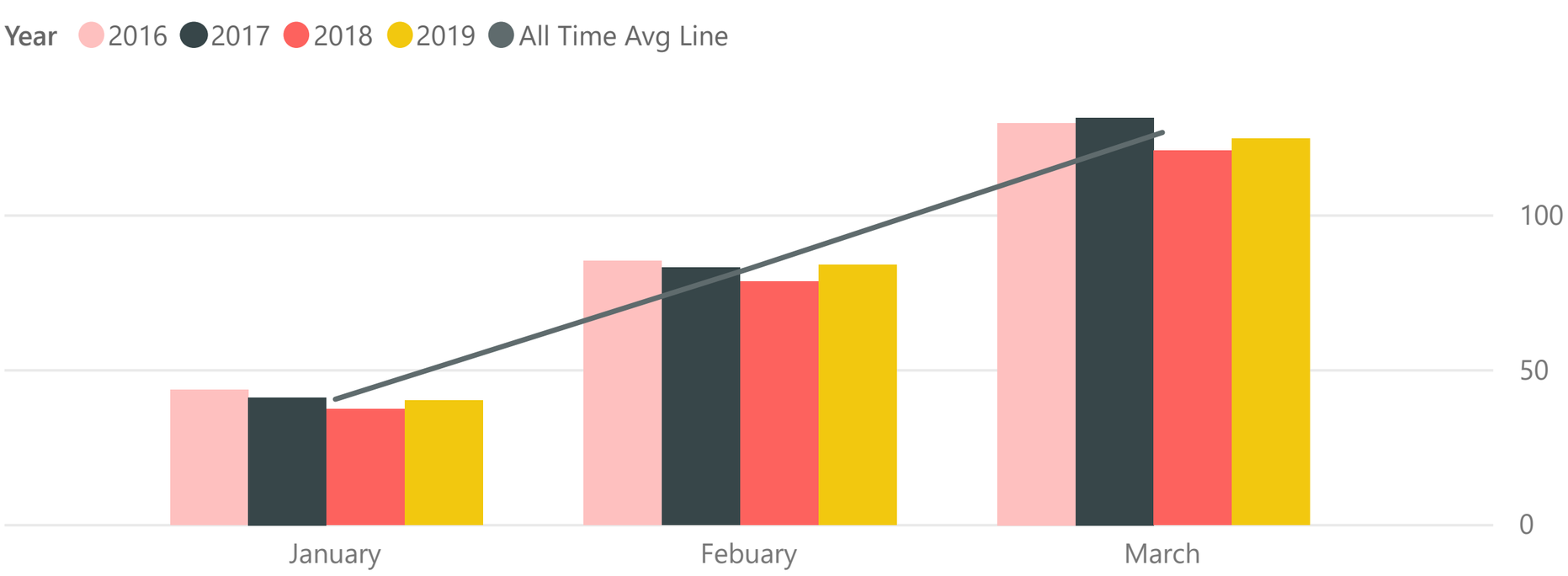
Revenue

Source	Balance	Budget	% Complete
Commercial Users Fee	$205,976	$2,394,000	9%
Residential User Fee	$508,413	$3,306,000	15%
Tap Fees	$579,213	$3,282,870	18%
Total	**$1,293,603**	**$8,982,870**	**14%**

Operating Expenses

Source	Balance	Budget	% Complete
Central Fund-Wide Charges	$136,960	$520,330	26%
Raw Water Operations	$86,470	$965,790	9%
Utility Billing	$18,804	$150,300	13%
Water Distribution	$90,903	$604,630	15%
Water Plant Operations	$187,483	$1,603,370	12%
Water Utility Engineering	$15,341	$74,260	21%
WTP Building Maintenance	$20,262	$306,620	7%
Total	**$556,222**	**$4,225,300**	**13%**

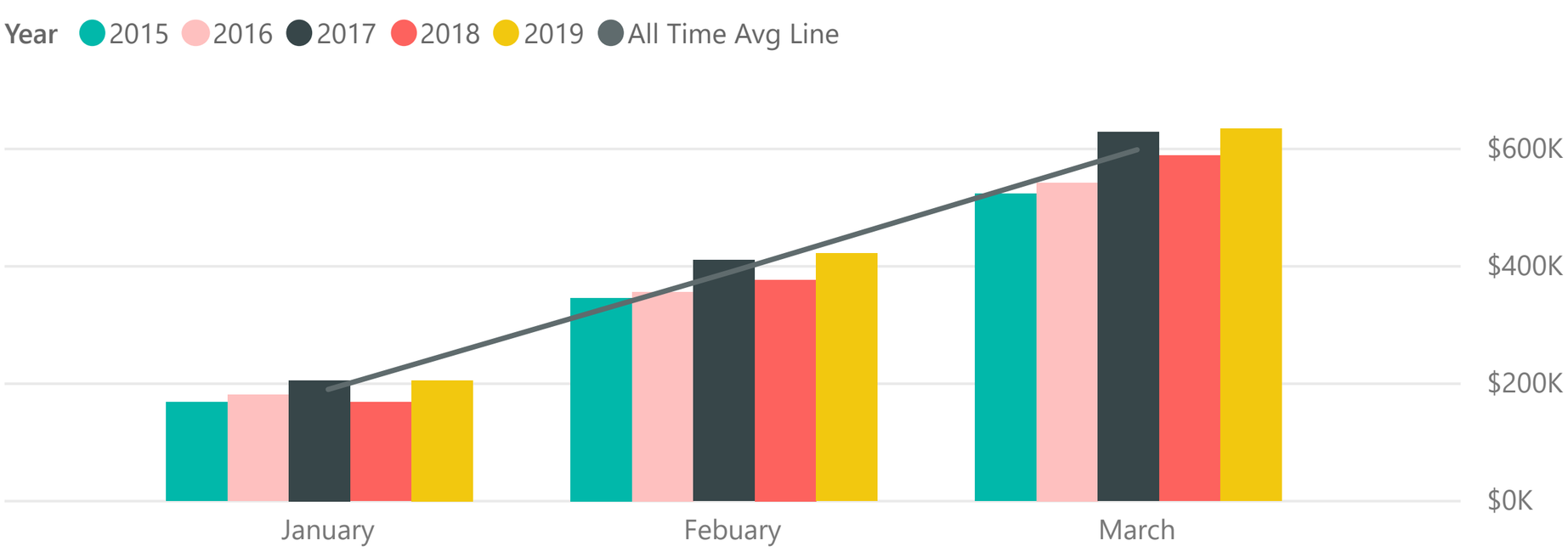
Cumulative Billed Consumption Year over Year (MG)



% Diff from 3 Yr Avg

Month	Cumulative % Diff	Monthly % Diff
January	1.5%	1.5%
Febuary	2.5%	3.4%
March	-0.7%	-6.6%

Cumulative Revenue Year over Year



% Diff from 3 Yr Avg

Month	Cumulative % Diff	Monthly % Diff
January	6.5%	6.5%
Febuary	4.8%	3.2%
March	2.8%	-0.9%

City of Louisville
COLORADO • SINCE 1878

UTILITIES - WATER Pg2

January 1, 2020 To March 31, 2020

NOT A FINANCIAL STATEMENT. A SNAPSHOT OF KEY INDICATORS.

Net Production and Billed Consumption (MG)

Production	January	February	March	**Total**
HBWTP Net Production	54.19	49.29	56.89	**160.37**
SCWTP Net Production	0.00	0.00	-1.18	**-1.18**
Total	**54.19**	**49.29**	**55.71**	**159.20**

Consumption	January	February	March	**Total**
CITY	1.08	2.01	1.42	**4.52**
COM	13.67	12.67	11.59	**37.94**
IRR	0.00	0.00	0.00	**0.00**
MF	6.68	6.31	6.26	**19.26**
RES	27.60	26.26	24.85	**78.71**
Total	**49.04**	**47.26**	**44.12**	**140.42**

Difference Between Net Production and Billed Consumption (MG)

	January	February	March	**Total**
	5.15	2.03	11.59	**18.78**

City of Louisville
COLORADO • SINCE 1878

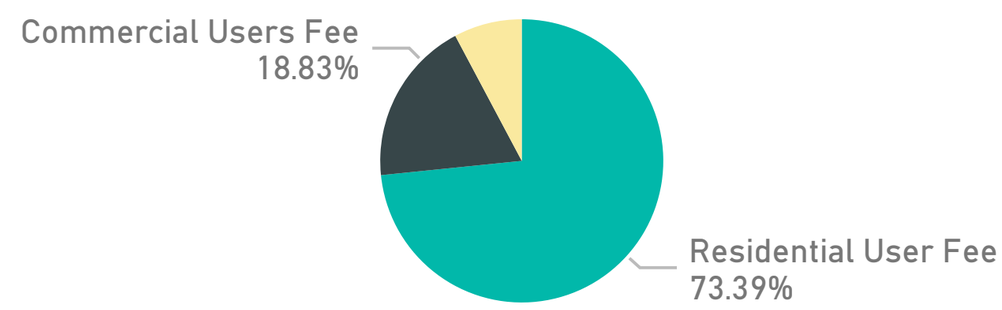
UTILITIES - WASTEWATER

January 1, 2020 To March 31, 2020

NOT A FINANCIAL STATEMENT. A SNAPSHOT OF KEY INDICATORS.

Revenue

Source	Balance	Budget	% Budget
Commercial Users Fee	$178,040	$932,580	19%
Residential User Fee	$694,042	$2,521,420	28%
Tap Fees	$73,600	$469,800	16%
Total	**$945,682**	**$3,923,800**	**24%**



Operating Expenses

Source	Balance	Budget	% Budget
Central Fund-Wide Charges	$127,012	$365,690	35%
Pretreatment	$3,193	$80,680	4%
Utility Billing	$16,914	$135,690	12%
Waste Water Util Engineering	$8,926	$146,500	6%
Wastewater Treatment Plant Ops	$124,333	$974,590	13%
WW Collections	$46,759	$279,840	17%
WWTP Building Maintenance	$25,999	$455,670	6%
Total	**$353,135**	**$2,438,660**	**14%**

City of Louisville
COLORADO • SINCE 1878

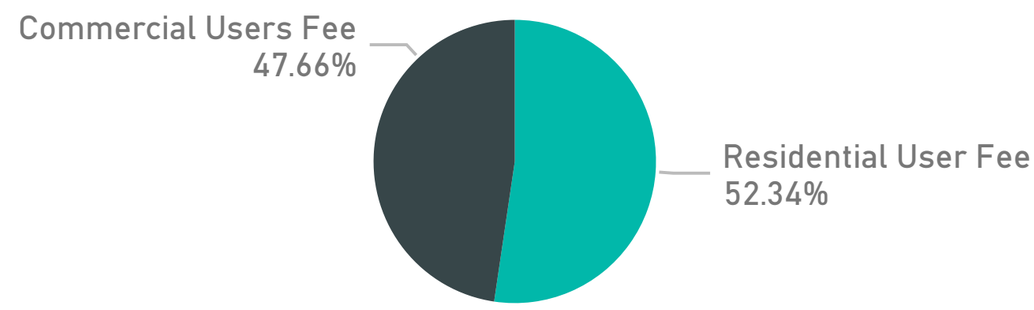
UTILITIES - STORM WATER

January 1, 2020 To March 31, 2020

NOT A FINANCIAL STATEMENT. A SNAPSHOT OF KEY INDICATORS.

Revenue

Source	Balance	Budget	% Budget
Commercial Users Fee	$117,240	$397,470	29%
Residential User Fee	$128,753	$430,600	30%
Total	**$245,994**	**$828,070**	**30%**



Operating Expenses

Source	Balance	Budget	% Budget
Central Fund-Wide Charges		$0	
Storm Water Admin & Operations	$48,876	$338,530	14%
Storm Water Util Engineering	$5,446	$35,920	15%
Total	**$54,322**	**$374,450**	**15%**

BILLED CONSUMPTION COMPARISON BY SERVICE TYPE

Comparison and Primary Year Indicated Below

Comparison Year

2018

Primary Year

2020

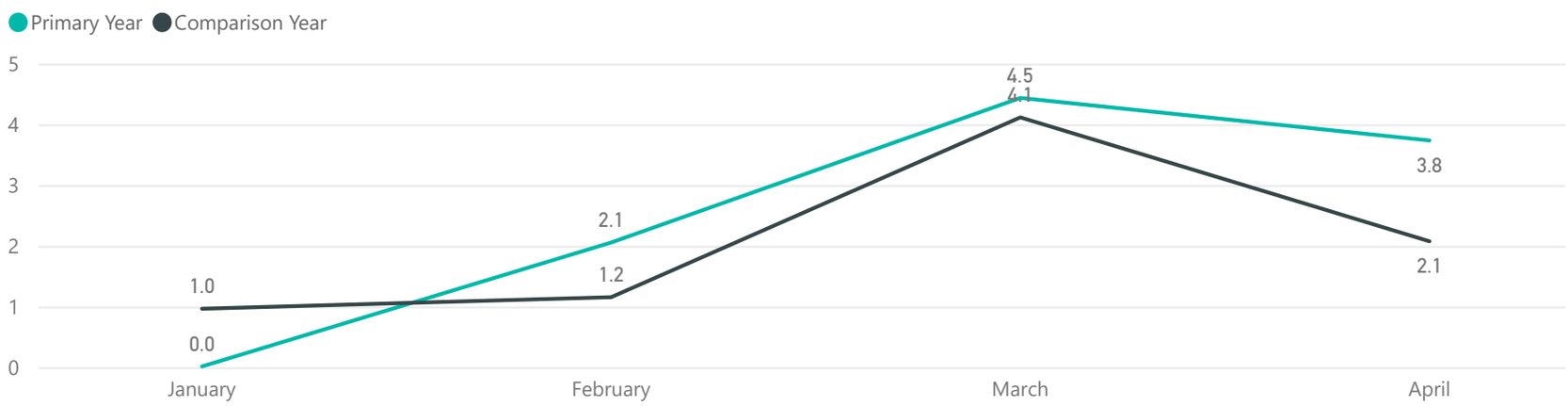
Consumption Totals (MG) by Service Type

Service User Type	CITY		COM		IRR		MF		RES		**Total**	
Month	Comparison	Primary	Comparison	Primary	Comparison	Primary	Comparison	Primary	Comparison	Primary	**Comparison**	**Primary**
January	2.16	1.08	9.55	13.67	0.02	0.00	4.67	6.68	21.15	27.60	**37.54**	**49.04**
February	2.20	2.01	10.51	12.67	0.01	0.00	5.15	6.31	23.32	26.26	**41.19**	**47.26**
March	2.07	1.42	10.84	11.59	0.01	0.00	5.97	6.26	23.31	24.85	**42.20**	**44.12**
April	2.02	2.18	11.15	8.43	0.12	0.06	4.55	6.66	25.14	28.01	**42.99**	**45.34**
Total	**8.45**	**6.69**	**42.05**	**46.37**	**0.16**	**0.06**	**20.34**	**25.92**	**92.92**	**106.72**	**163.93**	**185.75**

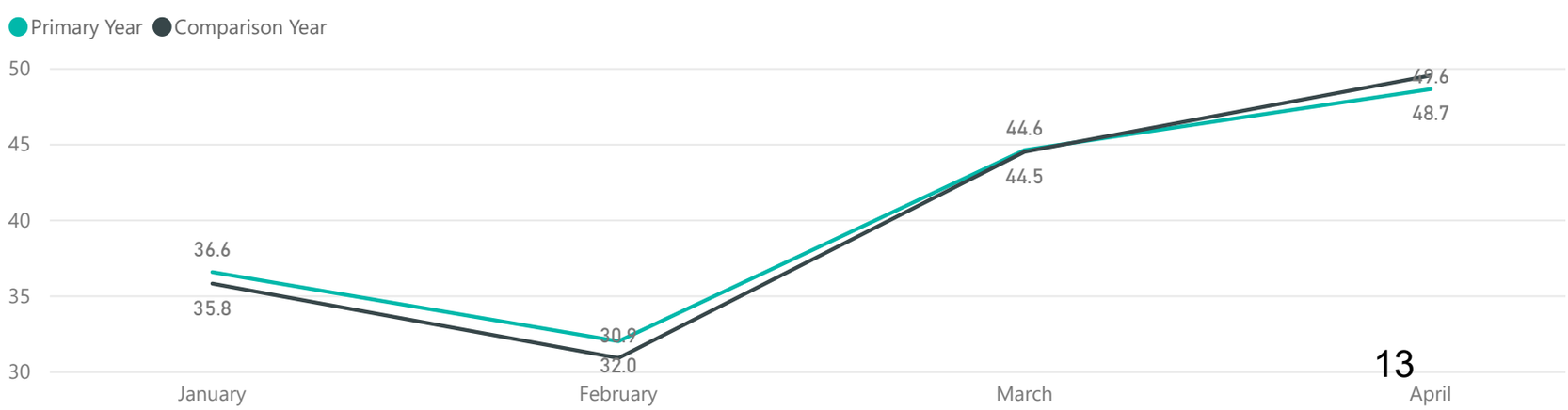
Precipitation and Temperature

Month	Comparison PRCP	Primary PRCP	Prcp Diff	Comparison Temp	Primary Temp	Temp Diff
January	0.98	0.03	-188.1%	35.84	36.60	2.1%
February	1.17	2.07	55.6%	30.93	32.03	3.5%
March	4.13	4.45	7.5%	44.53	44.65	0.3%
April	2.09	3.75	56.8%	49.57	48.67	-1.8%
Total	**8.37**	**10.30**	**20.7%**	**40.37**	**40.56**	**0.5%**

Precipitation



Temperature



BILLED CONSUMPTION COMPARISON BY SERVICE TYPE

Comparison and Primary Year Indicated Below

Comparison Year

2019

Primary Year

2020

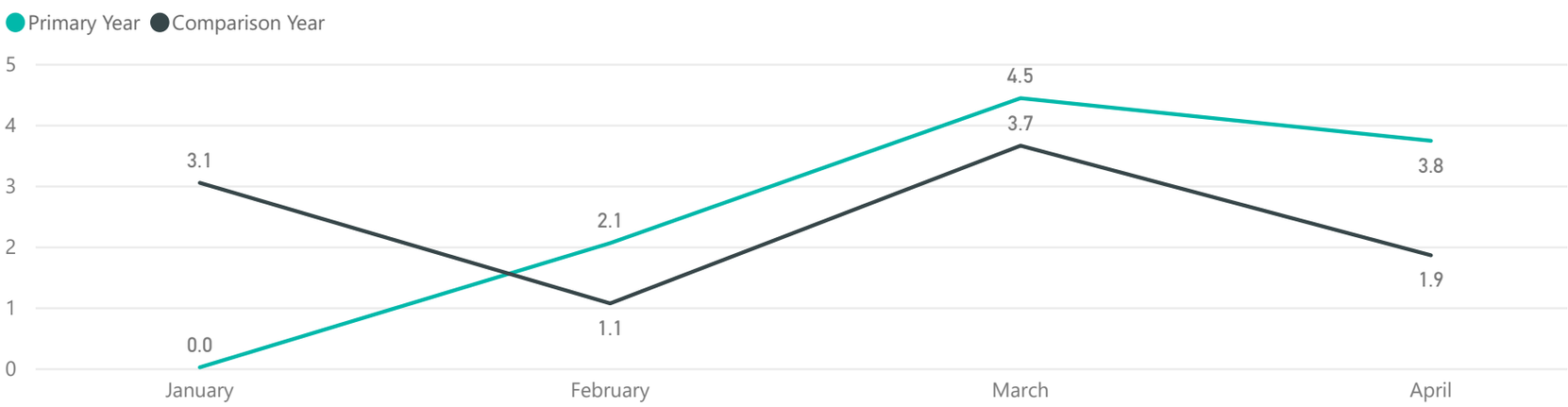
Consumption Totals (MG) by Service Type

Service User Type	CITY		COM		IRR		MF		RES		**Total**	
Month	Comparison	Primary	Comparison	Primary	Comparison	Primary	Comparison	Primary	Comparison	Primary	**Comparison**	**Primary**
January	2.54	1.08	9.51	13.67	0.00	0.00	5.06	6.68	23.14	27.60	**40.26**	**49.04**
February	4.56	2.01	10.95	12.67	0.00	0.00	5.38	6.31	22.86	26.26	**43.75**	**47.26**
March	2.53	1.42	11.20	11.59	0.00	0.00	4.89	6.26	22.31	24.85	**40.93**	**44.12**
April	2.53	2.18	10.84	8.43	0.01	0.06	5.26	6.66	22.63	28.01	**41.26**	**45.34**
Total	**12.15**	**6.69**	**42.51**	**46.37**	**0.01**	**0.06**	**20.59**	**25.92**	**90.94**	**106.72**	**166.19**	**185.75**

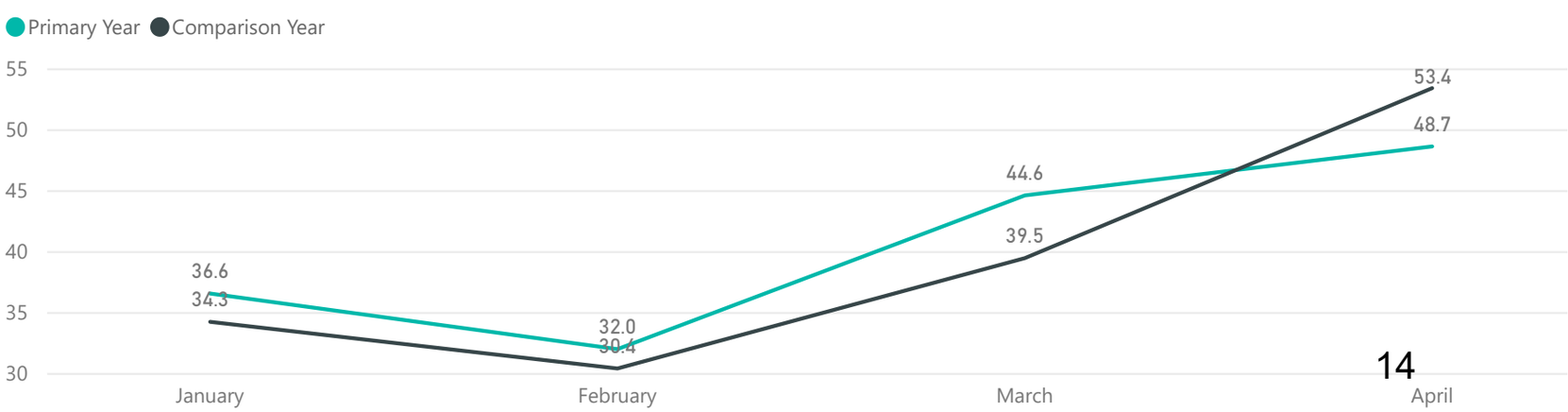
Precipitation and Temperature

Month	Comparison PRCP	Primary PRCP	Prcp Diff	Comparison Temp	Primary Temp	Temp Diff
January	3.06	0.03	-196.1%	34.27	36.60	6.6%
February	1.08	2.07	62.9%	30.45	32.03	5.1%
March	3.67	4.45	19.2%	39.50	44.65	12.2%
April	1.87	3.75	66.9%	53.45	48.67	-9.4%
Total	**9.68**	**10.30**	**6.2%**	**39.41**	**40.56**	**2.9%**

Precipitation



Temperature



UTILITY RATE INCREASE OPTIONS

BASED ON IDENTIFIED REDUCED TAP FEES FROM COVID-19 IMPACTS

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
2020 Rates (Approved 03/03 Council Meeting and Frozen at 04/07 Council Meeting)											
WATER	**0%**	1.5%	1.8%	1.8%	1.8%	1.8%	1.9%	1.9%	2.0%	2.0%	2.0%
SEWER	**0%**	4.5%	4.5%	4.5%	4.0%	4.0%	4.5%	4.5%	4.0%	4.0%	4.0%
STORM	**0%**	14.0%	5.0%	4.5%	4.0%	4.0%	4.0%	0.8%	0.8%	0.8%	0.8%
OPTION A - Reduced Tap Fees - New CIPs only											
WATER		4.0%	4.5%	4.5%	4.0%	1.8%	1.9%	1.9%	2.0%	2.0%	2.0%
Change		2.5%	2.7%	2.7%	2.2%	-	-	-	-	-	-
SEWER		4.5%	4.5%	4.5%	4.5%	4.5%	5.0%	4.5%	4.0%	4.0%	4.0%
Change		-	-	-	0.5%	0.5%	0.5%	-	-	-	-
STORM		14.0%	5.0%	4.5%	4.0%	8.5%	8.5%	3.0%	0.8%	0.8%	0.8%
Change		-	-	-	-	4.5%	4.5%	2.2%	-	-	-
ASSUMPTIONS: **• No Tap Fees for Three Model Years: 2021, 2022 & 2023 (actual years: 2020-$2.2M, 2021-$2.6M & 2022-** **• Full funding for 2021-2026 CIP Requests** **• No Cash Payment for Windy Gap (removed $2.5 million)** **• Delay both Meter Replacement and Lateral Piping CIPs by 2 years** **• Reduce the first 2-years of water rights purchases in half and extend 1-year to 2027** **• Excludes Overage Capital Projects (6 projects at $2.8M)**											
OPTION B - Option A including Projected Overages											
WATER		5.0%	5.0%	5.0%	5.0%	1.8%	1.9%	1.9%	2.0%	2.0%	2.0%
Change		3.5%	3.2%	3.2%	3.2%	-	-	-	-	-	-
SEWER		4.5%	4.5%	4.5%	5.0%	5.0%	5.0%	5.0%	4.5%	4.0%	4.0%
Change		0.0%	0.0%	0.0%	1.0%	1.0%	0.5%	0.5%	0.5%	-	-
STORM	No Change for Opt A										
ASSUMPTIONS: **• Same as Option A** **• Delay Lateral Piping by additional 2 years and Harper Pump Station by 5 years** **• Reduce the first 4-years of water rights purchases in half and extend 2-year to 2028** **• Includes Overage Capital Projects (6 projects at $2.8M)**											
OPTION C - Option B with Water Bond											
WATER		3.0%	3.0%	3.5%	3.0%	3.0%	1.9%	1.9%	2.0%	2.0%	2.0%
Change		1.5%	1.2%	1.7%	1.2%	1.2%	-	-	-	-	-
ASSUMPTIONS: **• Same as Option B** **• $5M Water Bond in 2021 for both SWSP and Lateral Pipelines** **• Delayed projects limited to Meter Replacement**											

City of Louisville
COLORADO ▪ SINCE 1878

Memorandum | Department of Public Works

To: City Council

Date: May 12, 2020

Re: Windy Gap Firming Project - Financing

2020 Update:
The purpose of this memo is to summarize the various options for financing of the Windy Gap Firming Project/Chimney Hollow Reservoir (WGFP). Staff are currently recommending participating in the group financing option. Following the financial discussion, three general sections that have been previously presented have been included for background.

Finances:
Staff, with the assistances of consultants, are evaluating two financing options. Each option can be further evaluated by varying potential interest rates, terms and the amount of any cash down payment. The two financing options are 1) joining the group financing with the other WGFP participants or 2) pursue individual financing. The following table shows the major benefits for each option.

GROUP FINANCING	INDIVIDUAL FINANCING
Access to low interest CWCB loan	Better credit rating (AAA) - lower interest rate
No debt coverage	Complete control of funding

To further the comparison, staff developed five scenarios at an assumed high rate of 3.5% and a low rate of 2.5% for an AA bonding rating. Each rate scenarios was then evaluated with either full financing or with a cash down payment of $2.5 million in efforts to lower the total amount of interest paid. The final 5th option, was an adjustment of the terms to 20 years that is currently only available for individually financing options. Both the calculated approximate value of the annual payment and total interest paid is provided in the table below.

SCENARIO	GROUP FINANCING			INDIVIDUAL FINANCING		
	AA Rate	Approx. Annual Payment ($ thousands)	Approx. Total Interest Paid ($ millions)	AAA Rate	Approx. Annual Payment ($ thousands)	Approx. Total Interest Paid ($ millions)
#1: 30 yrs, no down	3.5%	$959	$10.66	3.25%	$955	$10.52
#2: 30 yrs, $2.5M down	3.5%	$823	$9.08	3.25%	$823	$9.07
#3: 30 yrs, no down	2.5%	$858	$7.63	2.25%	$837	$6.99
#4: 30 yrs, $2.5M down	2.5%	$739	$6.55	2.25%	$722	$6.03
#5: 20 yrs, no down	N/A			2%	$1,108	$4.04

ASSUMPTIONS:
- Amount Financed: $18,120,000
- Individual interest rate 0.25% lower than group (AAA rating to AA rating)
- CWCB Loan: $2.8 million at 2.08%

As rates continue to compress at historical lows the difference between the credit ratings is reducing and having less impact in the analysis. If this market trend is sustained, it is possible this main advantage to individual financing will no longer be a factor. At the assumed higher 3.5% rate, the CWCB loan essentially compensates for the credit rating difference and as shown in the table the group and individual options are nearly equivalent. Therefore, there is only a small select set of circumstances that make the individual financing preferred. Given the likelihood that rates will be relatively the same, Staff are recommending group financing to take advantage of the historical practice of excluding this type of financing from the City debt coverage and preserve the City's ability to acquire addition bond or loan funds in the future.

Timing:
The municipal sub-district committee is looking for commitment from those participants interest in the joint financing in the next several months. Under this assumption, loan proceeds would be available this year and loan payments would start in 2021. The City's 2020 contributions could be limited to the $378,000 authorized in late 2019 for the 5th amendment or a higher optional amount depending on the desired cash down payment. Previous projection have estimated a $2.5 million cash payment. However, the cash payment is being reevaluated as full impacts from COVID-19 are unknown. Alternatively, if the loan is delayed until 2021, a 6th amendment is the amount of $100,000 to $200,000 in 2020 will be needed to maintain progress.

Project History:
The Windy Gap Project (WGP) was first proposed in 1967 by the cities of Boulder, Estes Park, Fort Collins, Greeley, Longmont and Loveland. Completed in 1985, WGP consists of a diversion dam at the confluence of the Colorado and Fraser Rivers, a pump plant and a 6-mile pipeline to Lake Granby. The WGP is capable of diverting 48,000 acre feet (AF) of water each year. Once stored in Lake Granby, water is delivered to water users via the Colorado-Big Thompson Project's (C-BT) East Slope distribution system. However, during wet cycles Lake Granby is often full, leaving little or no space for WGP water. Conversely, the water rights associated with the WGP are relatively junior and are less likely to be in priority preventing diversions during dry cycles.

Additional storage, contemplated since the WGP's inception, was proposed to provide more reliable WGP water deliveries. These efforts culminated in the Windy Gap Firming Project with the major component being the construction of a 90,000 AF reservoir at Chimney Hollow in the foothills west of Carter Lake. The formal federal permitting process was entered in 2003 with the final permits issued in 2016 and 2017. Project design wrapped up in 2019 and early stages of construction have started in 2020.

City Involvement:
In the early 1990s, Louisville developed and implemented a plan for the acquisitions of additional water rights to secure adequate supplies to meet demand. The major component of this plan was securing a secondary supply by utilizing C-BT and WGP. The City joined the Municipal Subdistrict Northern Colorado Water Conservancy District in 1996 and over timed acquired 2,067 units of C-BT and 9 units of WGP. Northern operates these projects in conjunction and participation in one requires the participation in the other. Participation levels are set by a 2:1 ratio for average yields.

Supply and Demand:

As delineated in the 2016 Municipal Water Management Plan, the City's firm yield of existing water supplies is estimated at 5,000 AF per year. Future buildout demands are calculated at 6,500 AF per year. Given the inefficiencies in the system and the uncertainty of climate change impacts, development and other possible unknown variables, the City increased this buildout demand to 6,700 AF for the acquisition strategy to provide a level of safety. A major component of the acquisition strategy is completion of the WGFP.

Budget Amendment Worksheet
Carryforward from 2019 to 2020 & New Appropriations

Account Number	Account Description	2019 Final Budget	2019 Total Spent	2019 Unspent Budget	Current 2020 Budget	Requested Amendment Carry-Forward	Requested Amendment New Budget	Proposed 2020 Budget
More than 50% complete								
Less than 50% complete								
Updated from May 1st Finance Committee								
Water Utility Fund:								
501462-540900	Prof Serv-Consulting	46,200	25,527	20,673	5,250	20,670		25,920
501463-540910	Prof Serv-Consulting	5,750	-	5,750	5,750	5,750		11,500
501498-640001	Machinery & Equipment (%)	9,650	1,498	8,152	-	4,600		4,600
501498-660182	Water Line Replacement	1,844,000	1,587,560	256,440	1,273,000	256,440		1,529,440
501498-660205	PRV Replacement	75,000	-	75,000	-	75,000		75,000
501498-660237	Water Tank Int Structure Maint	92,600	10,714	81,886	-	81,890		81,890
501498-660259	Fluoride Equipment Replacement	105,000	12,053	92,947	-	92,950		92,950
501498-640045	Meters	168,000	164,317	3,683	-	3,680	40,600	44,280
501499-640116	Water Plants Disinfection Eval	408,040	134,333	273,707	-	273,710		273,710
501499-660190	NCWCD-Windy Gap Firming Proj	2,500,000	315,000	2,185,000	747,000	179,000		926,000
501499-660211	Howard Diversion Upgrades	128,740	2,907	125,833	-	125,830		125,830
501499-660212	SCWTP Recycle Pond Maintenance	86,000	57,000	29,000	-	29,000		29,000
501499-660232	Cent/McCaslin Hi Zone Water Lp	22,230	-	22,230	-	22,230		22,230
501499-660236	SBR Ditch Lining	170,200	-	170,200	88,310	170,200		258,510
501499-660243	Louisville Pipeline Flow Control	417,930	287,921	130,009	-	130,010		130,010
501499-660245	SCWTP Upgrades	550,770	124,304	426,466	-	75,000		75,000
501499-660275	NCWCD SWSP Transmission Capacity	287,000	96,645	190,355	1,324,000	190,360		1,514,360
Total Water Utility Fund						1,736,320	40,600	
Wastewater Utility Fund:								
502473-540910	Profession Services - Consulting	26,000	89,683	(63,683)	-		95,000	95,000
502498-640001	Machinery & Equipment	9,650	1,498	8,152	-	4,600		4,600
502498-660183	Sewer Utility Lines	498,000	254,576	243,424	275,000	243,420		518,420
502498-660265	Reuse System Equipment Replacement	32,000	-	32,000	66,000	32,000		98,000
~~502499-630147~~	~~WWTP Digester and Reuse Lighting Improvements~~	40,000	77	39,923	-	-		-
502499-640132	WWTP Tractor	62,000	-	62,000	-	20,000		20,000
502499-640133	Portable Lift Station Pump	50,000	-	50,000	-	50,000		50,000
502499-660262	WWTP Additional Influent Pump	72,000	73	71,927	-	71,930		71,930

Account Number	Account Description	2019 Final Budget	2019 Total Spent	2019 Unspent Budget	Current 2020 Budget	Requested Amendment Carry-Forward	Requested Amendment New Budget	Proposed 2020 Budget
502499-660263	WWTP Asphalt Addition	50,000	-	50,000	-	20,000		20,000
~~502499-660264~~	~~WWTP Digester Control Improvements~~	100,000	114	99,886	-	-		-
~~502499-660266~~	~~WWTP Digester and Digester Lights~~	40,000	34	39,966	-	-		-
502499-660267	WWTP Aeration Basin & Reuse Mixers	150,000	8,286	141,714	-	141,710		141,710
502499-660268	WWTP Total Suspended Solids (TSS) Probes	45,000	-	45,000	-	45,000		45,000
502499-660269	WWTP Vac Dump Station	235,000	34	234,966	-	234,970		234,970
Total Wastewater Utility Fund						863,630	95,000	
Storm Water Utility Fund:								
503499-630096	Detention Pond Maintenance	118,500	1,472	117,028	121,500	117,030		238,530
503499-630150	Drainageway "A-1" Garfield/Cottonwood				500,000		360,000	860,000
503499-640001	Machinery & Equipment	4,620	-	4,620	-	1,570		1,570
~~503499-660251~~	~~Drainageway G Dillon Rd Crossing~~	150,000		150,000	-			-
503499-660273	Storm Water Quality Master Plan	100,000	58,577	41,423	150,000	41,420		191,420
503499-660273	Coal Creek Drainageway 7-1						500,000	500,000
Total Storm Water Utility Fund						160,020	860,000	

2021-2026 Utility CIP Request

Completed - carryforward

In process - carry forward

Project Overage - current estimate

Grant Funding

Project Name	Division	2020	2021	2022	2023	2024	2025	2026
Essential or Regulatory Projects								
NCWCD-Windy Gap Firming Project	Water	$ 926,000	$ 926,000	$ 926,000	$ 926,000	$ 926,000	$ 926,000	$ 926,000
NCWCD-SWSP Eastern Pump Station	Water	$ 152,559						
Water Line Replacement	Water	$ 1,529,440	$ 460,000	$ 391,000	$ 540,500	$ 724,500	$ 494,500	$ 241,500
Water Rights Acquisition	Water		$ 250,000	$ 250,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000
SWSP Transmission Capacity	Water	$ 1,514,360						
SWSP Transmission Capacity - Overage	Water	$ 1,200,000						
Marshall Lake Sediment Control	Water	$ 110,000	$ 600,000					
Water Plants Disinfection Evaluation	Water	$ 273,710						
Water Tank interior Structure Maintenance	Water	$ 81,890		$ 29,000				$ 26,000
Water Tank interior Structure - Overage	Water	$ 325,000						
Process Pipe Evaluation and Repairs	Water			$ 78,000	$ 47,000	$ 46,000	$ 45,000	
HBWTP Recycle Tank Cleaning and Repair	Water		$ 195,000					
Electrical Assessment	Water/Sewer	$ 65,000	$ 200,000	$ 200,000				
Sewer Utility Line Replacement	Sewer	$ 518,420	$ 368,000	$ 299,000	$ 437,000	$ 540,500	$ 632,500	$ 460,000
Solids Handling Upgrades	Sewer		$ 220,000	$ 1,430,000				
Influent Pump Addition	Sewer	$ 71,930						
Aeration Basin and Reuse mixers	Sewer	$ 141,710						
Aeration Basin and Reuse mixers - Overage	Sewer	$ 300,000						
Vac Dump Station	Sewer	$ 234,970						
Portable Lift Station Pump	Sewer	$ 50,000						
WWTP Painting	Sewer		$ 60,000					
Storm Sewer Detention Pond Maintenance	Storm	$ 238,530	$ 119,000	$ 158,000	$ 124,000	$ 150,000	$ 170,000	$ 174,000
Cottonwood Park Floodplain	Storm	$ 860,000						
Replacement Projects								
Pump Replacement/Rehab	Water		$ 84,000	$ 269,000	$ 16,000			
SBR Ditch Lining	Water	$ 258,510	$ 97,750	$ 218,500	$ 143,750			
Filter Media Replacement	Water				$ 586,000			
Facilities Painting	Water	$ 225,000						
Vehicle & Equipment Replacement	Water	$ 34,700			$ 76,000	$ 46,000		
PRV Replacement	Water	$ 75,000						
PRV Replacement	Water	$ 40,000						
WTP Instrumentation Upgrades	Water							$ 260,000

Cent/McCaslin Hi Zone Water Lp	Water	$ 22,230						
Louisville Pipeline Flow Control	Water	$ 130,010						
Meter replacement	Water	$ 44,280					$ 989,000	$ 965,000
Raw Water Quality Study	Water	$ 75,000						
Raw Water Valve	Water		$ 35,000					
HBWTP Drying Bed	Water						$ 200,000	
Utility Master Plan	Water/Sewer			$ 250,000				
Chemical Mixing Tanks	Water			$ 32,000				
Machinery & Equip	Water	$ 4,600						
Reuse System Equipment Replacement	Sewer	$ 98,000						
Vehicle & Equipment Replacement	Sewer	$ 57,000				$ 50,000		
Lift Station Painting	Sewer	$ 75,000						
TSS Probes & 2nd Treatment Probes	Sewer	$ 45,000	$ 105,000					
Trailers	Sewer	$ 4,600						
Asphalt	Sewer	$ 20,000						
Drainageway 7-1	**Storm**	**$ 500,000**						
Stormwater Quality Master Plan	**Storm**	**$ 191,420**	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Utility Trailer	Storm	$ 1,570						
Stormwater Improvement Master Plan	Storm					$ 120,000		
Delayable Projects								
Lateral Ditch Piping	Water					$ 2,536,000		
Howard Diversion Completion/Upkeep	Water	$ 125,830						
Lower Recycle Pond SCWTP	Water	$ 29,000						
Lower Recycle Pond SCWTP	Water	$ 676,000						
SCWTP Building Upgrades	Water	$ 75,000						
Fluoride Equipment Replacement	Water	$ 92,947						
Fluoride Equipment Replacement	Water	$ 234,000						
Harper Pump Station Rehab	Water		$ 95,000	$ 481,000				

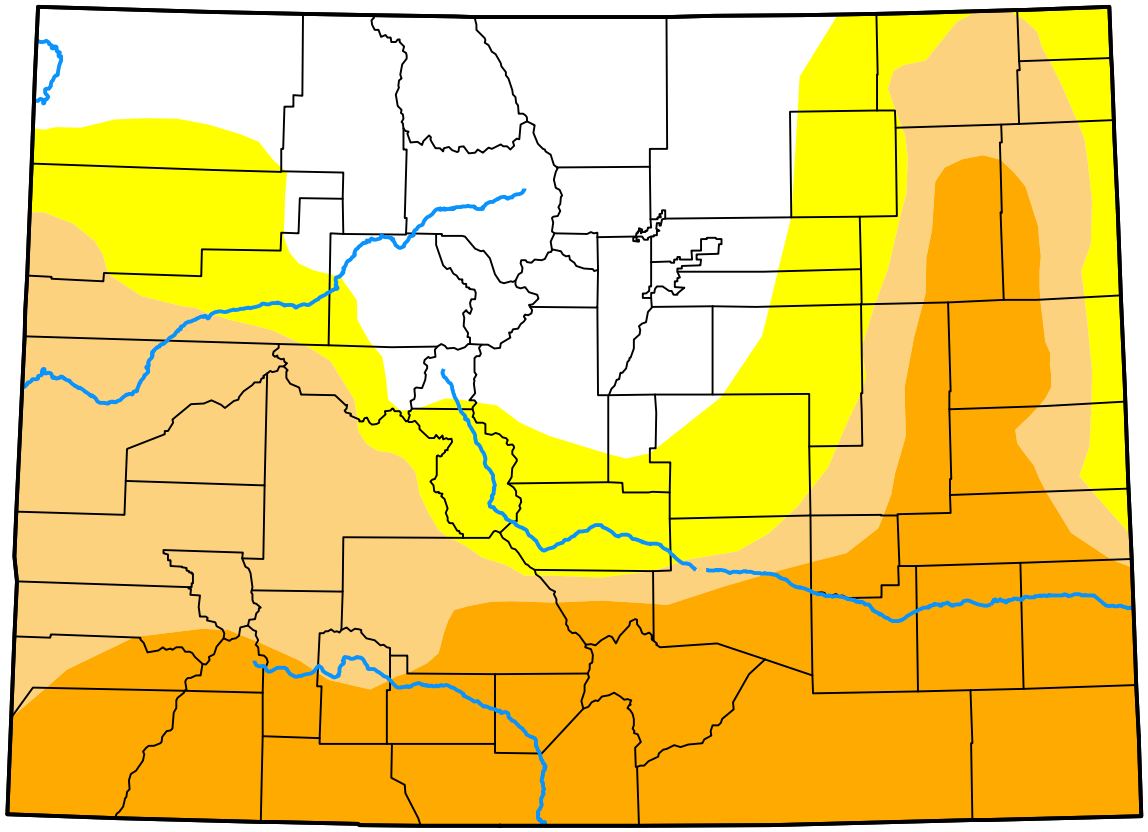
U.S. Drought Monitor

Colorado

April 28, 2020

(Released Thursday, Apr. 30, 2020)

Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.47	75.53	56.64	32.72	0.00	0.00
Last Week *04-21-2020*	33.26	66.74	53.58	28.51	0.00	0.00
3 Months Ago *01-28-2020*	22.39	77.61	51.19	3.30	0.00	0.00
Start of Calendar Year *12-31-2019*	31.72	68.28	51.19	20.11	0.00	0.00
Start of Water Year *10-01-2019*	30.14	69.86	27.53	0.00	0.00	0.00
One Year Ago *04-30-2019*	84.72	15.28	0.59	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

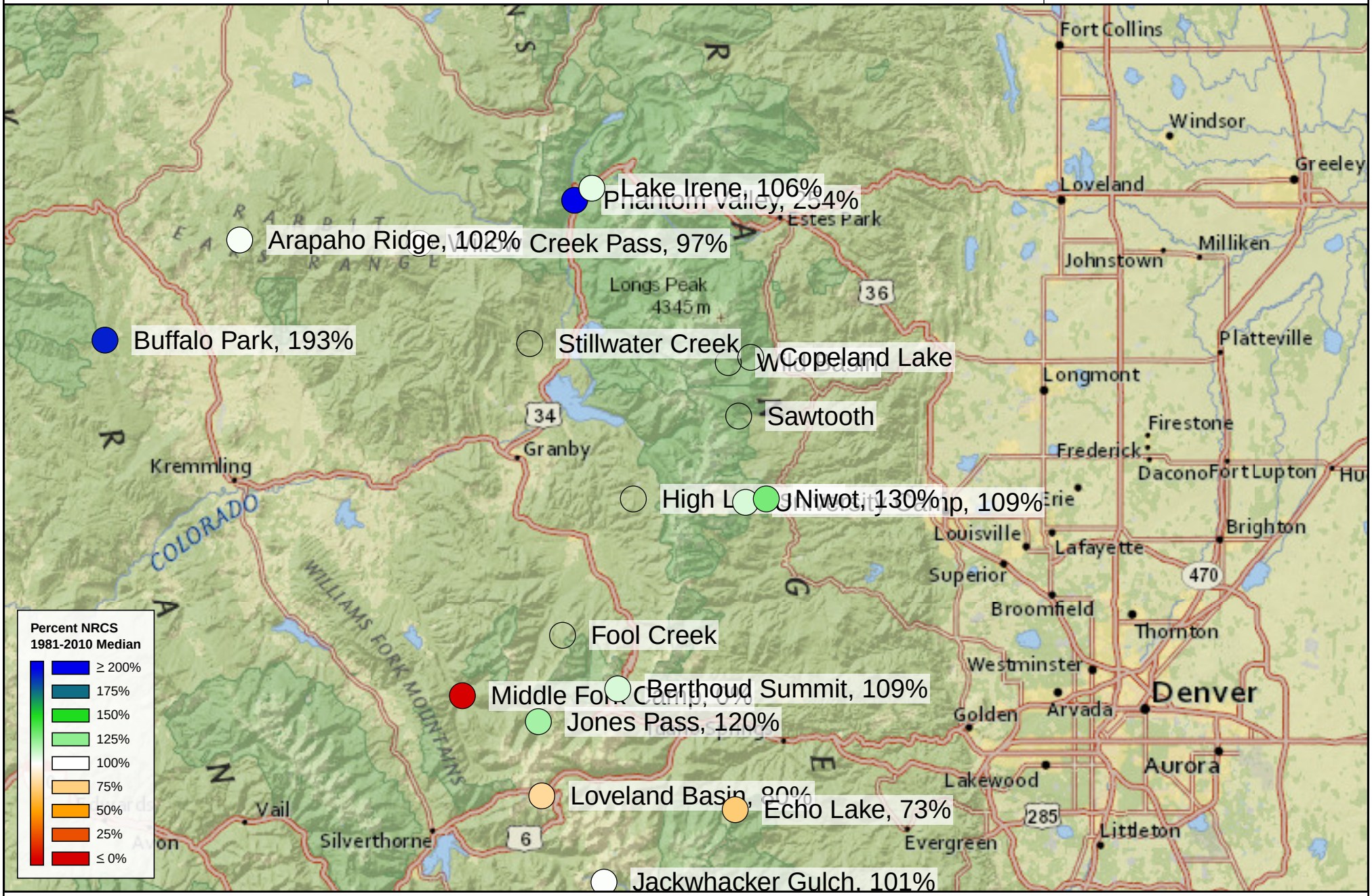
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

Deborah Bathke
National Drought Mitigation Center

droughtmonitor.unl.edu

Snow Water Equivalent	Percent NRCS 1981-2010 Median	May 5, 2020, end of day



USDA Natural Resources Conservation Service
United States Department of Agriculture

N

0 3 6 12 18 24 30 Miles

Created 5-06-2020

City of Louisville Wastewater

Sample collection date: **March 24, 2020**

COVID19 confirmed cases in Boulder County, CO

On of March 24, as reported by STATNews

New cases	Cumulative cases
2	**39**

SARS-CoV-2 virus in sewage

DETECTED

Virus concentration per liter of sewage

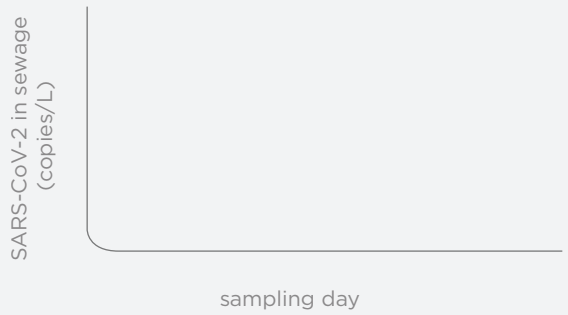
8,486 copies

Biobot COVID19 case estimate

85 cases

(0.39% of catchment popuation)

SARS-CoV-2 detection over time



Biobot estimates in context

As a point of comparison, a large metropolitan area in Massachusetts had **36,400 copies** of SARS-CoV-2 virus per liter of sewage. This translates to an estimated case prevalence of **2.8%**.

About the data

Our methods for detecting SARS-CoV-2 in sewage are available at www.biobot.io/covid19. Our approach relies on detecting genetic fragments of the virus that are excreted in stool, which does not determine if the virus is dead or active.

Biobot's COVID19 case estimate
We measure the SARS-CoV-2 virus in sewage by detecting its genetic signature. We convert our measurements into a COVID19 case estimate by using the flow rate and population data provided by the treatment facilities, as well as published rates of SARS-CoV-2 shedding in stool.

Our case estimates and confirmed clinical cases
Our COVID19 case estimates may not match the confirmed case numbers in the community for a variety of reasons. Clinical testing is limited and may not represent the entire infected population. Some COVID19 patients are asymptomatic or have mild symptoms and therefore do not seek out testing, but these patients may still be infectious. Our methods will continue to improve and get more accurate as we analyze more samples. In particular we are building a model to take into account person-to-person variability in SARS-CoV-2 shedding in stool. Learn more on our website, which includes links to our protocols and publications.

Data use
The Biobot COVID19 case estimates provide an alternative metric to guide responses to the outbreak. We recommend that you share this information with local public health officials, and see if there's a way to work together to respond to COVID19 in your community.

About Biobot's COVID19 sewage sampling campaign

In collaboration with researchers at MIT, Harvard, and Brigham and Women's Hospital, Biobot Analytics launched this *pro bono* campaign to analyze sewage from wastewater treatment facilities across the United States to estimate the prevalence of COVID19 infection.

Since launching on March 23, 2020, the campaign has reached capacity at over 100 treatment facilities in almost 25 states. We are currently working to increase our capacity.

For questions, email exec@biobot.io

BIO BOT

City of Louisville Wastewater

Sample collection date: **April 14, 2020**

COVID19 confirmed cases in Boulder County, CO

On of April 14, 2020, as reported by USAfacts.org

New cases	Cumulative cases
9	**293**

SARS-CoV-2 virus in sewage

DETECTED

Virus concentration per liter of sewage

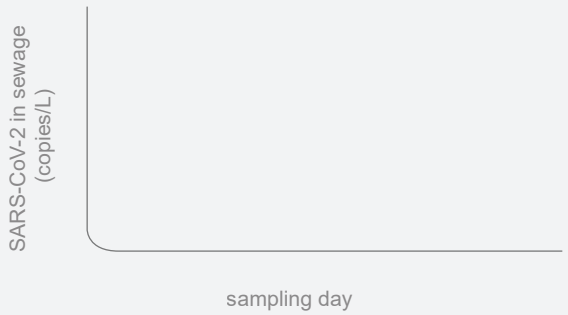
9,751 copies

Biobot COVID19 case estimate

100 cases

(0.44% of catchment popuation)

SARS-CoV-2 detection over time



Biobot estimates in context

As a point of comparison, a large metropolitan area in Massachusetts had **36,400 copies** of SARS-CoV-2 virus per liter of sewage. This translates to an estimated case prevalence of **2.8%**.

About the data

Our methods for detecting SARS-CoV-2 in sewage are available at www.biobot.io/covid19. Our approach relies on detecting genetic fragments of the virus that are excreted in stool, which does not determine if the virus is dead or active.

Biobot's COVID19 case estimate
We measure the SARS-CoV-2 virus in sewage by detecting its genetic signature. We convert our measurements into a COVID19 case estimate by using the flow rate and population data provided by the treatment facilities, as well as published rates of SARS-CoV-2 shedding in stool.

Our case estimates and confirmed clinical cases
Our COVID19 case estimates may not match the confirmed case numbers in the community for a variety of reasons. Clinical testing is limited and may not represent the entire infected population. Some COVID19 patients are asymptomatic or have mild symptoms and therefore do not seek out testing, but these patients may still be infectious. Our methods will continue to improve and get more accurate as we analyze more samples. In particular we are building a model to take into account person-to-person variability in SARS-CoV-2 shedding in stool. Learn more on our website, which includes links to our protocols and publications.

Data use
The Biobot COVID19 case estimates provide an alternative metric to guide responses to the outbreak. We recommend that you share this information with local public health officials, and see if there's a way to work together to respond to COVID19 in your community.

About Biobot's COVID19 sewage sampling campaign

In collaboration with researchers at MIT, Harvard, and Brigham and Women's Hospital, Biobot Analytics launched this pro bono campaign to analyze sewage from wastewater treatment facilities across the United States to estimate the prevalence of COVID19 infection.

Since launching on March 23, 2020, the campaign has reached capacity at over 100 treatment facilities in almost 25 states. We are currently working to increase our capacity.

For questions, email exec@biobot.io

BIO BOT

City of Louisville Wastewater

Sample collection date: **April 21, 2020**

COVID19 confirmed cases in Boulder County, CO

As of April 21, 2020, as reported by USAfacts.org

New cases	Cumulative cases
30	**390**

SARS-CoV-2 virus in sewage

DETECTED

Virus concentration per liter of sewage

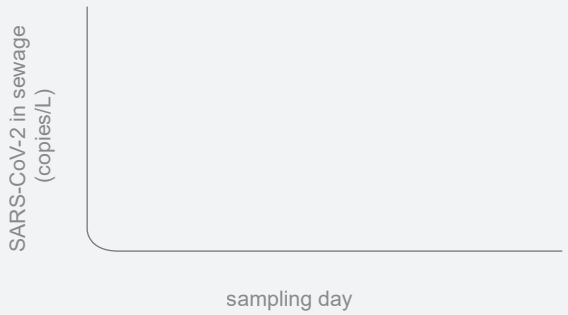
43,944 copies

Biobot COVID19 case estimate

570 cases

(2.6% of catchment popuation)

SARS-CoV-2 detection over time



Biobot estimates in context

As a point of comparison, a large metropolitan area in Massachusetts had **36,400 copies** of SARS-CoV-2 virus per liter of sewage. This translates to an estimated case prevalence of **2.8%**.

About the data

Our methods for detecting SARS-CoV-2 in sewage are available at www.biobot.io/covid19. Our approach relies on detecting genetic fragments of the virus that are excreted in stool, which does not determine if the virus is dead or active.

Biobot's COVID19 case estimate
We measure the SARS-CoV-2 virus in sewage by detecting its genetic signature. We convert our measurements into a COVID19 case estimate by using the flow rate and population data provided by the treatment facilities, as well as published rates of SARS-CoV-2 shedding in stool.

Our case estimates and confirmed clinical cases
Our COVID19 case estimates may not match the confirmed case numbers in the community for a variety of reasons. Clinical testing is limited and may not represent the entire infected population. Some COVID19 patients are asymptomatic or have mild symptoms and therefore do not seek out testing, but these patients may still be infectious. Our methods will continue to improve and get more accurate as we analyze more samples. In particular we are building a model to take into account person-to-person variability in SARS-CoV-2 shedding in stool. Learn more on our website, which includes links to our protocols and publications.

Data use
The Biobot COVID19 case estimates provide an alternative metric to guide responses to the outbreak. We recommend that you share this information with local public health officials, and see if there's a way to work together to respond to COVID19 in your community.

About Biobot's COVID19 sewage sampling campaign

In collaboration with researchers at MIT, Harvard, and Brigham and Women's Hospital, Biobot Analytics launched this pro bono campaign to analyze sewage from wastewater treatment facilities across the United States to estimate the prevalence of COVID19 infection.

Since launching on March 23, 2020, the campaign has reached capacity at over 100 treatment facilities in almost 25 states. We are currently working to increase our capacity.

For questions, email exec@biobot.io

Driven by Data

THE WATER TREATMENT TEAM IN LOUISVILLE, COLORADO, THRIVES ON RELIABLE LAB INFORMATION AND A NEW SCADA SYSTEM TO MAKE SOUND OPERATING DECISIONS

STORY: **Steve Frank**
PHOTOGRAPHY: **Carl Scofield**

Prerelease Version – NOT FOR REPRODUCTION

FACING PAGE: Louisville water plant staff members, from left, NEED NAMES AND TITLES, monitor the facility's new SCADA system.

Jocelyn Brink, NEED TITLE, takes water samples from the influent water basins. Changes in the operation have helped the facility rectify problems with algae in the source water.

Data increasingly guides water and wastewater treatment operating decisions. Numbers replace sight, sound, smell and dosing-and-retention-time guidance handed down from old timers. Plants and distribution and collections systems substitute calculations and facts for guesses and gut feelings.

A case in point is Louisville, Colorado, which has two water treatment plants and eight full-time operators for its population of 20,000-plus. The city, between Denver and Boulder, was founded as a coal mining town in the late 1870s. It became a bedroom suburb in the 1950s when the coal played out and the need for living space continued to grow.

Louisville's Sid Copeland Water Treatment Plant (North) can produce 8 mgd, and the Howard Berry Water Treatment Plant (South) can produce 5 mgd. Both are conventional dual-media sand filter plants using alum as the primary coagulant and chlorine dioxide as a preoxidant for manganese reduction and taste and odor control.

Both plants have undergone major construction and improvements over the last two years. Greg Venette, chief water plant operator, oversees both. "We recently completed construction of a new $3.2 million potable water pump station that had been on the books for 10 years and replaced an old pump station that had been in service since the 1970s," Venette says. The old pump station could deliver to only one of three distribution zones in the city: the high zone.

"With the new pump station, we added three pumps that can pump directly to the midzone," Venette says. "Previously, both plants would have to be operating to support all three zones, or valves in the distribution system would have to be adjusted manually every day."

BANDAGE FIXES FIXED

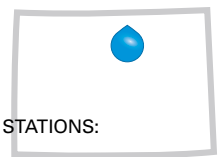
The old pump station was at about the same elevation as the storage tank it was built to pump to. It was a bad design made worse by bandage-type fixes applied over time. Operators Bob Carra, Glen Siedenburg and Herb Trickle are among those who kept things running even when times were tough.

"Lines would air-lock, and pumps would rattle. It was scary," Venette says. "And it was almost impossible to find spare parts for the pumps." The new pump station, completed in May 2018, includes modern Aurora split-case centrifugal pumps (Pentair), variable-frequency drives and monitoring equipment. "We also built in pressure relief valves that allow us to download water to different pressure zones in town and back-feed storage tanks," Venette observes.

The new system provides water to a pressure zone that never existed before. It can send water throughout the city in multiple ways and configurations. The project included replacement and upgrade of the emergency generator (Cummins Power Products) and switchgear (Eaton) and the backwash recycle system.

The project engineer, Rob Anderson with Mott MacDonald, also figured out how to tie waterlines into the plant cost-effectively to help "jump-start"

Louisville (Colorado) water treatment plants



TREATMENT FACILITIES:
8 mgd Sid Copeland (North Plant); 5 mgd Howard Berry (South Plant)

RAW WATER SOURCES:
El Dorado Springs; Carter Lake at Colorado-Big Thompson Project

RAW WATER STORAGE:
3 reservoirs

TREATMENT PROCESSES:
Conventional

PUMP STATIONS:
2

FINISHED WATER STORAGE:
8.5 million gallons

DISINFECTION:
North Plant, chlorine gas; South Plant, sodium hypochlorite

Prerelease Version – NOT FOR REPRODUCTION

Jeff Owens, operator, collects a filtered water sample. Plant operators who live in the city have been enlisted as early-warning taste and odor monitors.

> "We bought new lab equipment ... and implemented new testing procedures to better analyze and measure algae in our source water."
>
> **GREG VENETTE**

Operator Steven Daniels monitors the plant's variable-frequency drives (Eaton).

it under emergency conditions. The emergency interconnect, 200 feet of pipe and a couple of valves, ties the potable distribution line into the backwash influent line to let operators backwash filters using distribution system water and pressure. This provides a backup system so filters can be washed quickly and put back into service without damaging the media or potentially violating regulations.

BETTER SOURCE WATER

Data-driven decisions also helped at the Louisville Reservoir, one of three raw water reservoirs in the system. For about a decade, the reservoir had problems with algae blooms that led to taste and odor issues and widespread complaints from customers.

"It was a pretty serious issue," Venette says. "We bought new lab equipment including a Leica microscope, Vortex Mixer (Thermo Fisher Scientific), and centrifuge (Thermo Fisher Scientific) and implemented new testing procedures to better analyze and measure algae in our source water. Operator Thoa Pham became absolutely dedicated to and excels at understanding algae in the lab." She provides data that helps operators stay ahead of algae blooms.

The operators learned to identify the algae species so they could see the blooms coming. "We looked at algae data for the past 10 years," Venette says. "We found we could have higher levels of some and it wouldn't affect taste and odor, but the blue-green algae is what kills us. It causes the most issues."

Analysis showed that the blue-green algae arrived mostly through one specific supply line. Team members decided to tackle that problem in-house because of their knowledge of the system. "We began a new protocol using copper sulfate, an algaecide, to surface-treat our reservoir from a boat. And we added an in-line injection system that our operators designed and installed to treat our incoming water with copper sulfate."

HUMAN INSTRUMENTS

The staff also began using barley straw to control algae in the reservoir intake. The results were good. Venette, who holds Class A water, wastewater and industrial wastewater licenses in addition to Grade 4 collection and distribution licenses, says the use of barley straw was based on experience he had in a previous job where he used it in a wastewater lagoon to knock down ammonia and provide nitrification: "We buy it from a local farm and replace it every couple of weeks."

Prerelease Version – NOT FOR REPRODUCTION

The Louisville water treatment plant team includes, from left, Jeff Owens and David Cole, operators; Jocelyn Brink, NEED TITLE; Greg Venette, chief water plant operator; Nick Owens, NEED TITLE; Edmond Song, NEED TITLE; and Steven Daniels, operator. Not pictured: Matt Formandy, NEED TITLE; Thoa Pham, NEED TITLE; Glen Sidenberg, operator; and Terrell Phillips, superintendent.

The water treatment team also added a second SolarBee solar-powered mixer (Medora Corporation - SolarBee / GridBee) to the reservoir to help control algae. They installed an automated water-quality profiler (YSI, a Xylem brand) to provide real-time data on the entire water column. The profiler takes readings at preset depths and includes a probe that measures pH, conductivity, temperature and other parameters.

But instruments can only go so far in measuring subjective qualities such as taste and odor. Venette enlisted the city's Human Resources Department to help him ask some employees who live in the city to become early-warning taste and odor monitors. They, in turn, enlisted some of their neighbors.

Now the team has both hard data and sensitive human palates supporting efforts to deliver good-tasting water. "We've gone two years without any taste and odor complaints caused by algae," Venette reports.

COLLABORATIVE UPGRADE

In improving its water treatment, Louisville recently completed its first design-build utility project using local engineering and construction firms. The project included both the north and south plants. Cory Peterson, city engineer, directed the effort, which involved replacing existing infrastructure, upgrading equipment and appearances, constructing new systems and resolving nagging issues that are part of any 30-plus-year-old plant. A small

EMBRACING CONTINUOUS IMPROVEMENT

Businesses and government units like to say they go beyond complying with environmental laws and regulations. Yet few yardsticks are available that measure what that really means.

However, Colorado has developed an environmental compliance measurement. It's a structured approach to improvement called the Environmental Leadership Program (www.colorado.gov/pacific/cdphe/environmental-leadership-program).

The ELP defines what "beyond compliance" means and provides measurable standards by which organizations that voluntarily exceed compliance with state and federal environmental regulations can operate and be recognized.

The ELP has three levels: bronze, silver and gold. It offers benefits and incentives to member organizations that exceed requirements. Greg Venette, chief water plant operator in Louisville, discovered the ELP last year while looking for recognition for his staff's efforts to excel. He signed up and got started.

The ELP sees a quest for continuous improvement as a part of an organization's new culture. Venette says that's the culture his staff members embraced when they began using data to drive decisions. In Louisville's first year as an ELP member, the team achieved the bronze level. Now they have their eyes on the gold.

Prerelease Version – NOT FOR REPRODUCTION

Greg Venette, chief water plant operator

> "In two years, we went from all pen and paper for recordkeeping to fully digital: computer data entry, automated SCADA data collection and compliance reporting tools."
> **GREG VENETTE**

sampling of the capital improvement projects included cleaning up old electrical panels, replacing messy, old PLC cabinets, and remodeling valve vaults and adding lighting and ventilation.

The project involved the operations staff and was collaborative from beginning to end. "We completed over 100 individual items called out for resolution in scoping the project," Venette says. Operators helped identify problems and told the design-build team what was wrong. They put stickers on everything that needed work and kept and prioritized a list so that, as the project became better defined, they had both input and buy-in.

Some items were large and required the support and direction of Kurt Kowar, Public Works director, and approval from the Colorado Department of Public Health and Environment. One example was replacing a drain for the 600,000-gallon clearwell. It went on the design-build list, and when completed, it reduced the time to drain the tank from three to four weeks to three to four days.

ACROSS TOWN

The Howard Berry Water Treatment Plant (South), built in 1993, underwent major upgrades as well. The project replaced the filter media, underdrain nozzles and air scour system. Tube settlers were replaced with stainless steel plates; disinfection switched from chlorine gas to sodium hypochlorite using on-site MIOX generators.

The team also remodeled the HVAC system and installed drying beds for the sludge removed from the sedimentation basin. Together, these improvements made the plant more predictable and easier to keep running smoothly and consistently. "We increased filter runtimes by 12% and now use 2.5% less water for backwashes," Venette observes.

Under the guidance of Terrell Phillips, superintendent, the staff upgraded the SCADA system from two old Windows XP computers with manual disk backup (and daily prayers) to new SCADA servers, client computers, onsite automated backup, offsite backups and full redundancy for both plants.

Human-machine interfaces had to be completely overhauled to accommodate all the upgrades and changes. The city installed more than $150,000 in new instrumentation, such as turbidimeters, streaming current monitors and chlorine analyzers to replace outdated and obsolete equipment at both plants and laboratories.

"We replaced all of our diaphragm chemical feed systems with new Qdos peristaltic pumps (Watson-Marlow Fluid Technology Group) and integrated them into our SCADA system for flow control and feedback," Venette says. That change reduced system maintenance and made parts replacement much safer.

The Hach Water Information Management Solution, or WIMS, became the primary database for plant information. Operator Steven Daniels was instrumental in its implementation. "In two years, we went from all pen and paper for recordkeeping to fully digital: computer data entry, automated SCADA data collection and compliance reporting tools," Venette says.

"We are now rolling out our new asset management system, Lucity, to replace our old, manual preventive maintenance procedures with a streamlined, digital process." Operators Jeff Owens and David Cole have shepherded that project along.

CELEBRATING SUCCESS

The treatment staff celebrated the upgrades with a Water Day event they hosted for city employees and the public in 2018. It included plant tours and presentations on water use and conservation. Operators volunteered to tell visitors about the facilities. They prepared their own talking points and checked their information in the operations manuals.

The face of the entire operation has changed in a few short years, Venette says: "It took us from a conventional operation to a front-running, optimized, progressive team dedicated to sustaining health by removing water's impurities through positivity, dependability and data-driven decisions." tpo

featured products from:

Cummins Power Products
248-573-1600
www.cummins.com
(See ad page 00)

Eaton
877-386-2273
www.eaton.com
(See ad page 00)

Hach
800-227-4224
www.hach.com
(See ad page 00)

Lucity, Inc.
800-492-2468
www.lucity.com
(See ad page 00)

Medora Corporation - SolarBee / GridBee
866-437-8076
www.medoraco.com
(See ad page 00)

MIOX Corporation
800-646-9426
www.miox.com
(See ad page 00)

Pentair
888-416-9513
www.femyers.com
(See ad page 00)

Thermo Fisher Scientific
978-670-7460
www.thermofisher.com
(See ad page 00)

Watson-Marlow Fluid Technology Group
800-282-8823
www.wmftg.com
(See ad page 00)

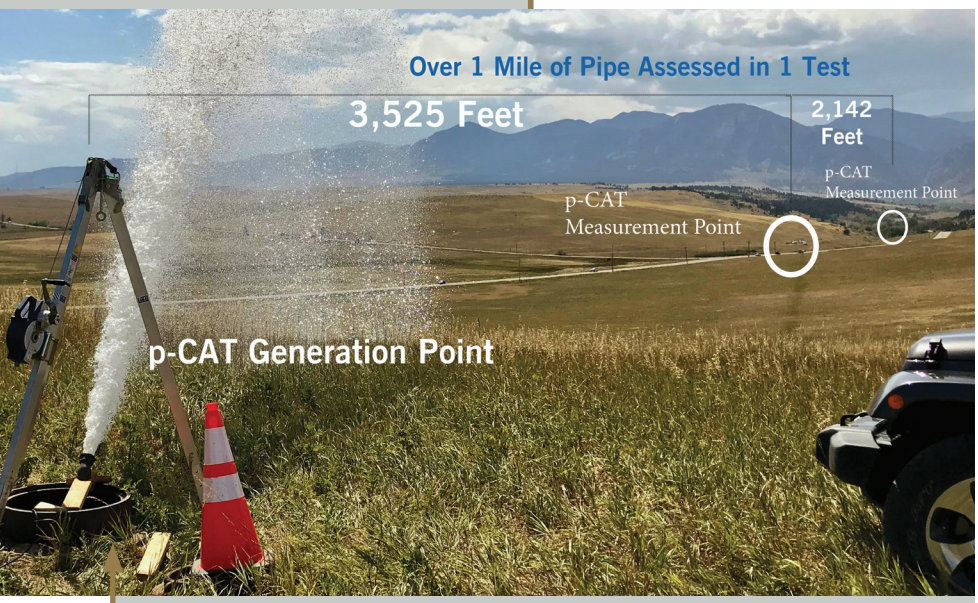
YSI, a Xylem brand
800-765-4974
www.ysi.com
(See ad page 00)

Prerelease Version – NOT FOR REPRODUCTION

Louisville, Colorado's Non-Invasive Condition Assessment Delays Replacement and Capital Expenditure

By Alex Sutton and Ramsey T. Hemaidan

Utilities looking to assess their aging buried infrastructure have historically had two options, invasive high-resolution technologies and their associated high cost or alternatively low-resolution non-invasive solutions and their associated reduced level of actionable data. Pipe condition assessment technology (p-CAT) provides a high level of actionable data while maintaining the low-cost structure and ease of deployment associated with non-invasive solutions to provide utilities and engineering firms with a verified assessment tool for their pressurized pipe condition assessment needs.



Pictured Above: A single p-CAT test covering more than one mile of pipe, Louisville, Colorado.

The Technology

p-CAT is a non-invasive pipe screening tool that utilizes the pressure of the pipe to measure and calculate the remaining wall thickness, gas pockets, material changes, obstructions and sealing status of valves. Originating in Australia, p-CAT utilizes a unique patented method of assessment in which a controlled inverse pressure transient of 5 to 8 psi is introduced into the pipe via a ≥ 2-inch access point (i.e. ARV, scour valve). This pressure transient propagates down the pipeline and is recorded on high speed pressure transducers capable of covering over a mile of pipe in a single test. The measured transient illustrates the various reflections and variations in the pipe wall strength as it travels between locations.

p-CAT has been refined over 17 years of research and development in partnership with Detection Services Ltd. and the University of Adelaide in Australia. p-CAT is suitable for a wide array of pipe diameters and materials including all metallic, asbestos cement and non-reinforced concrete pipelines. While each test taken with the p-CAT tool can cover more than one mile in length, the analysis of the pressure transient waves allow for sub-sectional analysis capable of identifying changes in the wall thickness as small as 0.007-in. along sections of pipe as short as 30-ft lengths. Compared to traditional averaging tools that measure between two test points, p-CAT provides a higher level of detailed analysis to empower engineers and owners to prioritize their rehabilitation and replacement budget.

Localized fault detection analysis also allows p-CAT to identify pipeline anomalies such as gas/air pockets, material and diameter changes, blockages, sealing issues with valves and other unknown pipeline features.

City of Louisville, Colorado

Founded as a small mining town in 1878, the City of Louisville Colorado has since grown to a population of more than 21,000 residents. Expanding from its first water treatment plant built in 1934 to its current operation of three treatment plants, Louisville supplies its businesses and residents with nearly 1.3 billion gallons per year via a distribution network of more than 120 miles of pipeline.

The Project

Originally installed in 1955 to provide the City of Louisville with its raw water needs, this critical aging pipeline now supplies nearly one third of the City's water needs. This "can" pipe was constructed of steel sheets that were rolled into cylinders then welded together and coated with a coal tar layer. Stretching nearly 8 miles from intake to reservoir and ranging in size from 14- to 18-in., this pipeline started showing its age in the 1980s as failures started to occur. Mainly caused by external corrosion, leaks started popping up along the length of the pipe. Early intervention with the installation of cathodic protection sites slowed the deterioration and in the following decades little improvements were made.

Realizing the implications if this pipeline failed, the City of Louisville, led by deputy director of utilities Cory Peterson, set out to better understand its current condition. Multiple assessment tools were studied including invasive technologies such as internal robotic camera inspection, tethered ultrasonic testing and internal leak survey. Each had their associated draw backs from cost, operational limitations and lack of pipe wall assessment. Ultimately, p-CAT was chosen as it fit within the planned budget and provided the necessary information including pipe wall thickness. According to Cory from the City of Louisville, the biggest advantages to p-CAT were "its ability to test long distances relatively quickly" and "keep the pipeline essentially live during the assessment."

The Verification

While p-CAT has been independently validated extensively overseas, the Louisville Colorado pipeline is the first validation study since the introduction of p-CAT technology to the U.S. market in 2017. To perform this validation study, Dewberry Engineers Inc.,

Pictured Above: A single p-CAT test covering more than one mile of pipe, Louisville, Colorado.

a firm familiar with verification studies, was contracted to independently establish the validity of the p-CAT inspection results. In order to perform this validation study, the City removed a 40-ft section of pipe that had previously been identified for replacement as part of a separate improvement project.

To evaluate the p-CAT assessment results, a higher resolution tool was utilized to provide accurate measurements. Consequently, Eddy Current technology was determined to be the best method given the pipeline variables and potential for asbestos within the coal tar lining. Dewberry selected JanX INCOTEST to provide the high-resolution Eddy Current Assessment. Sensors were spaced every 2.5 in. around the full circumference of the pipe. Capturing a reading every 0.941 in. along the entire length of the 40-ft section, nearly 10,000 data points were collected. The resulting data measured the pipe wall thickness along the assessed section to be 0.171 in. For the same stretch of pipe, p-CAT identified the wall thickness to be 0.17 in.

"The wall thickness that Hydromax USA's p-CAT reported was spot on with the eddy current wall thickness results," said Carl Bundschuh, P.E., senior associate at Dewberry Engineering.

Summary

Having verified data along at least one stretch of the assessed pipe has been extremely beneficial to the City of Louisville, Colorado. Peterson stated, "Prior to the assessment, the biggest challenge was not understanding what condition the pipe was in. With this project we were able to get a sense of the pipe's condition and push off the larger capital project that included the possibility of replacing whole sections of this pipeline."

p-CAT provided a high level of actionable data without the associated high price tag. Verification of the Louisville pipeline results exemplifies this.

The INCOTEST/Eddy Current Test and the Hydromax USA p-CAT analysis all found the average thickness of the removed pipe to be approximately 0.17 in.

Carl Bundschuh, P.E., had the following comment on p-CAT's results, "I was surprised the results were as accurate as they were, further validation would be great in a second location but overall p-CAT is a really nice assessment tool that can be used everywhere without having to excavate and expose large sections of the pipe. It's a relatively inexpensive assessment tool and assesses long reaches of pipeline rapidly."

Alex Sutton is operations manager is operations manager-water technologies and **Ramsey T. Hemaidan** is business development manager at Hydromax USA.

PinPointR Redefines GPR Utility Detection and Field Mapping Deliverables

ImpulseRadar known as a global innovator of ground penetrating radar (GPR) introduced the PinPointR utility GPR in 2019 with an essential goal of providing a system that specifically offers the best performance with the most features of any system for the utility locate professional.

Tech Makes the Difference

Checking the boxes to achieve these goals started with introducing the first real-time digital dual frequency system that produces unmatched resolution and depth penetration compared to older GPR technology. The advantages of the dual f system are clear. The higher 800 MHz frequency can detect service connections from water to small conduits of any material type. The lower frequency 400 MHz antenna provides maximum depth coverage for deeper targets.

The PinPointR antennas connect wirelessly to any Android device meaning there is no weak point from expensive cables that are easily damaged during day to day operation. The system is stingy when it comes to power consumption and that is the one area it is OK to be less than competing systems. One PinPointR battery can last up to 7-hours of continuous operation.

Instant GPS Enabled Google Map Reports from Field to Office

Using onboard advanced GPS receivers ImpulseRadar introduces a major addition to the simple to use but powerful, intuitive Android App. Using the touch screen marker functionality conforming to the APWA utility standard all marks are simultaneously displayed on a Google Map. The Google Map field sketches can be emailed immediately from the Android device after completion of the project to either a client as an automatic report or sent to the SUE project manager as a field sketch for reference to support information gathered from the professional surveyors. Markers can also be exported as KMZ/KML into Google Earth. For those that want survey grade mapping capability the PinPointR can connect to an RTK GPS system seamlessly.

Ergonomics and Reliability

What is remarkable is the compactness and weight of the system as GPR systems like EM locators are deployed in and out of vehicles frequently every day. The PinPointR has a collapsible handle system leaving the footprint of the system in the vehicle small enough to be stored in an ordinary car trunk.

Customer Response is What Matters

"Performance is what our customers are raving about" states Patrick O'Harold Vice President of Tracer Electronics a distributor and North American authorized service and support center located in Lebanon TN. "They are seeing utilities they could not see before it is that simple! This system performs much better it's like going from 4G to 5G it is a leap forward not just a claim. We are not nudging the bar we are way over it and customers want to see progress that verifiably leaps forward in the tech tools of their trade and the PinPointR delivers".

All ImpulseRadar systems come standard with a two-year limited warranty.

www.impulseradar.se