Christopher C. Branch, P.E.
Director of Public Works

Memorandum

To: Chris Branch, Director of Public Works

From: Nancy Gallinaro, Water Resources Manger

Date: December 28, 2018

RE: Request of additional staffing for Water Resources field crews

Water Resources Division is requesting to add four (4) Maintenance Worker I positions to the sewer and stormwater Operations and Maintenance (O&M) Section. The supporting data and narrative will show that with increased knowledge of the system, coupled with demands outside of Water Resources specific tasks (such as winter operations) we are falling short on the day to day O&M requirements of an aging sewer and stormwater system.

Current staffing level include: 15 Maintenance Workers in wastewater, four (4) Maintenance Workers in stormwater, three (3) Supervisors, and one (1) O&M Coordinator. This leaves Water Resources with 19 non-supervisorial workers to perform all O&M services. Although the data shows a need for as many as 10 new positions in O&M, four (4) will be sufficient if coupled with policy changes and an evaluation of contracted services. Water Resources would then be able to field 23 Maintenance Workers.

This analysis covers the scheduled core services currently provided by Water Resources O&M staff - to be distinguished from non-scheduled core services, work outside of the core scope, or scheduled core work with insufficient data:

- Street Sweeping
- Catch basin cleaning, repair, and inspecting
- CCTV work, both scheduled and emergency
- Sewer and Stormwater pipe, manhole, and ditch maintenance
- Right-of-Way maintenance and clearing
- Digsafe connection investigation and correction
- Vactor operations (sewer cleaning)
- Pump station O&M

Based on data from Cityworks, and the O&M Coordinator's daily dispatch sheets tracking work performed in 2018, the estimated hours needed to do scheduled core services is **43,036**. The hours actually available to perform the work with current staff is **28,021**, a deficit of **15,015** hours.

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Figure 1

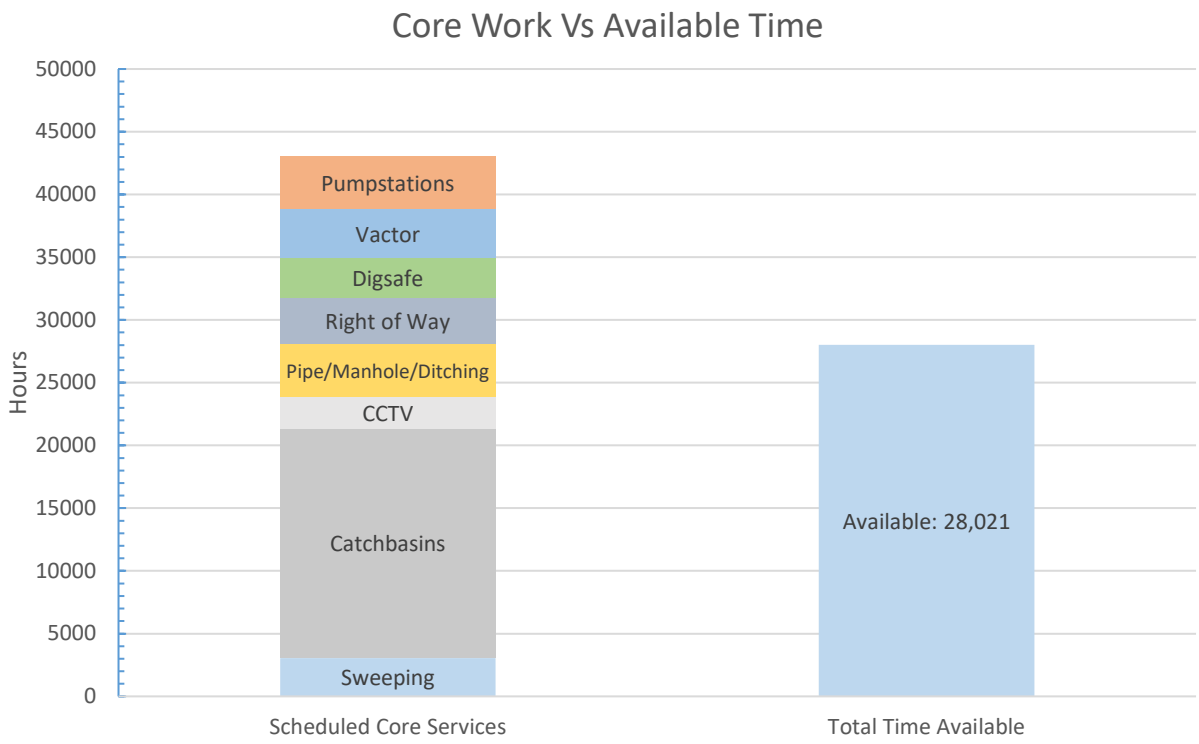

Figure 1 details the pieces of the **Scheduled Core Services**, compared to the **Total Time Available**. **Scheduled Core Services**: the scheduled core services analyzed in this document. **Total Time Available**: the total time to be used for actual Water Resources work.

It is important to note that this analysis does not include non-scheduled core services, work outside of the core scope, or scheduled core work with insufficient data These include:

- Citywide flood response, including wetweather flood and traffic management
- CCTV inspection requests from other sources; non-emergency, not scheduled
- Spill, sewer backup, and illicit discharge responses (24/7)
- Household sewer back ups and flooding – public health issue
- Winter Operations
- Dead Animals (called off the job anytime by pager)

The deficit in available hours (detailed in **Figure 2**) is due to the hours spent on winter operations, employee earned time off, sick time, and holidays. A significant proportion of the vacation, compensatory, and personal time being taken between the months from May to October further adds to the deficit. Winter Operations shifts time management from the Water Resources Coordinator to the Winter Operations Coordinator. Once winter shifts are in force, all time off is approved by the Winter Coordinator. These approvals are limited either by union contract or winter storm conditions. Spring and summer season productivity is impacted when "time off" requests are compressed into a 6 month period.

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Figure 2

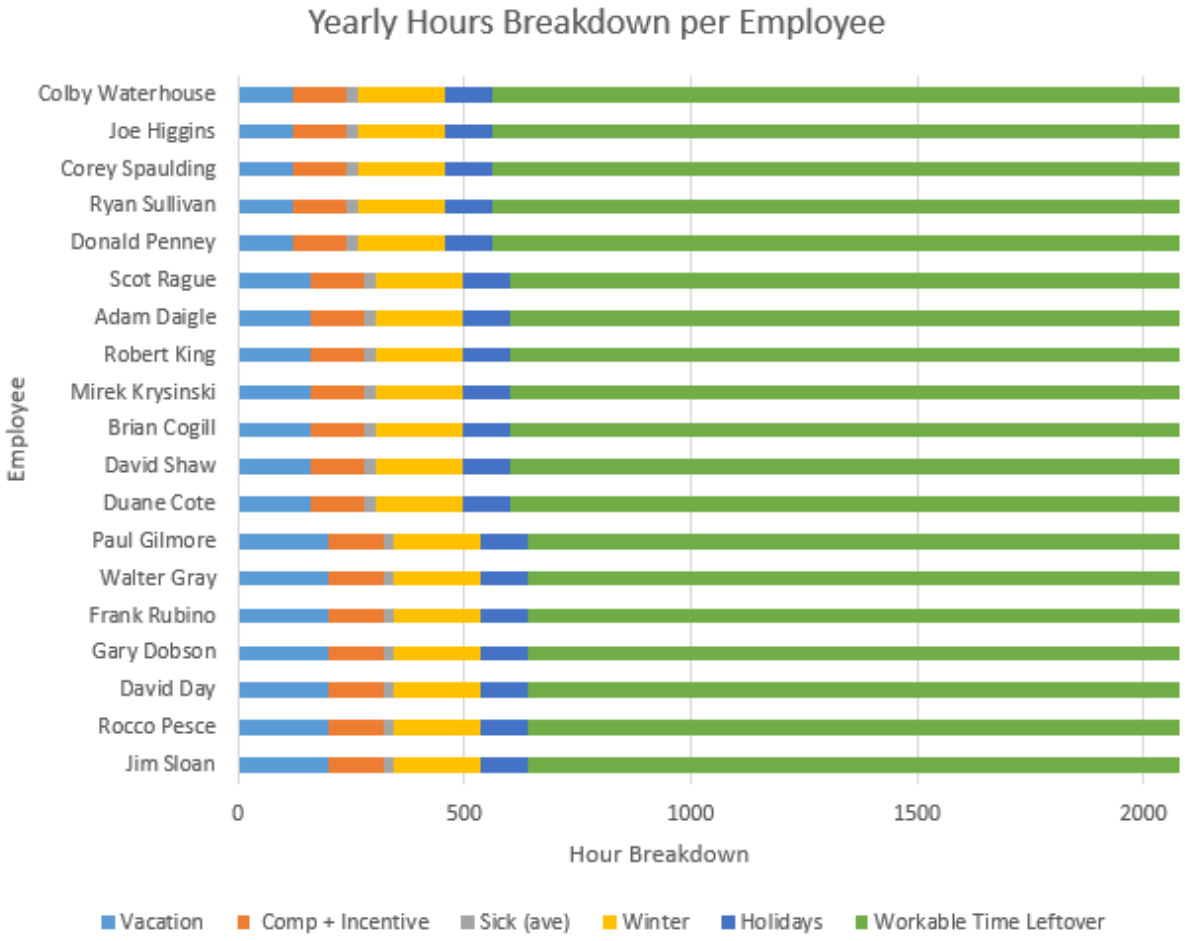

Figure 2 represents the spread of hours per each Water Resources Maintenance worker. **Vacation**: employee vacation hours are determined by years employed and the Labor & Trades contract, and is increased as years of service increase. **Comp + Incentive**: each employee earns an average of 80 hours comp time per year, the max is 100 hours. Incentive time was considered to be the max of 40 hours per year. **Sick (ave)**: average sick time was determined by adding up all sick time used in 2018 and dividing by number of employees. **Winter**: Public Works plans for 12 storms a year, this analysis uses the same estimation. It is estimated that on average each storm uses 16 regular hours per employee. **Holidays**: 8 hours per 13 holidays a year. **Workable Time Leftover**: these are the hours left over once you subtract the previous fields from the standard 2080 hour work year.

The labor analysis detailed in **Figure 2** reveals an average of **1474** hours per each employee. A deficit of **15,015** hours is then calculated to be equivalent to 10 employees.
Contractors can fill in for pieces of the missing work, however, given the highly specific nature of the work required, it is necessary to field a staff equipped with their grade 4 Collections Systems Certification and NASSCO Certification.

The analysis of the Scheduled Core Services shown in **Figure 1** is derived from a mix of FY2019 and calendar year 2018 recorded data, and in some cases an extrapolation based on quantity data and known times to complete a task.

Street Sweeping

Day sweeping hours were calculated using events from Oct 2017 to Oct 2018 with data from the LIGOS GPS sweeping app, and documentation collected by the Utilities Coordinator. From this data the days sweeping per person was calculated and converted into hours sweeping.

Employee	Days	Hours
Brian Cogill	22	176
Duane Cote	3	24
Adam Daigle	35	280
Dani Day	2	16
Dave Day	24	192
Gary Dobson	5	40
Paul Gilmour	23	184
Walter Gray	8	64
Joe Higgins	16	128
Bob King	14	112
Mirek Krysinski	26	208
Don Penney	11	88
Rocco Pesce	30	240
Scott Rague	39	312
Frank Rubino	3	24
Dave Shaw	4	32
Corey Spaulding	6	48
Ryan Sullivan	29	232
Colby Waterhouse	17	136
Total	317	**2536**

For night sweeping/overtime sweeping a 2 month period, 2 nights a week is used as a minimum. Using this minimum, and an average of 4 people per night sweeping event, the total night sweeping hours were calculated. Night sweeping operations have been reduced by winter operations and parking restrictions on the peninsula to 2 months of the year, May and October.

Nights/week	Weeks/year	People Ave	Hours
2	8	4	**512**

Sweeping hours: **3,048** hours.

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Catch Basins

Catch basin work is broken up into three (3) separate categories: elbow/trap installation, clean/inspections, and repairs/maintenance.

The number of traps needed was determined by searching through the FY2019 completed inspections within Cityworks. The number of needed traps was then multiplied by a three-person (3) crew, at a time of half an hour per trap. As only 20% of the system has been inspected in FY2019, this is an extremely low estimate for catch basins without traps, and thus a low estimate for hours needed to install traps through the whole system.

Work	Amount	Hours
Elbow/Trap Install	988	**1482**

The goal is to clean and inspect 3,000 catch basins a year. Each catch basin takes an average of 45 minutes to clean and inspect.

Work	Amount	Hours
Clean/ Inspect	3000	**2250**

Repairs and maintenance calculations are more involved, further breaking down into an analysis of the repairs needed based on the FY2019 inspections completed thus far, and reported by Cityworks.

Inspections Completed	1229
% of system Inspected	20.48
Catch basin Repairs Needed	
Replace Frame and Cover	
Frame Condition = 3	239
Frame Condition = 4 and 5	2
Cover Condition = 3	249
Cover Condition = 4 and 5	2
Catch basin General Repair	
Ring Condition = 3	198
Ring Condition = 4 and 5	13
Basin Condition = 3	201
Basin Condition = 4 and 5	8
Overall Condition = 3	320
Overall Condition = 4 and 5	11

The repairs needed are determined by the condition of catch basin frames, covers, rungs, basins, and overall. To calculate the hours' worth of work represented an analysis then considers the current quantity of repairable assets, and the percentage of the system currently inspected. Since only 20% of the system has been inspected, the totals were extrapolated out to an estimate that reflects the whole system.

Work on condition four (4) and five (5) that require immediate repairs/rebuilds. The Replace Frame and Cover types and the General Repair types have been grouped together for this analysis.

Condition 4 and 5 Work	Quantity	Extrapolated Quantity	Repair Hours per Asset	Total Hours
Replace Frame and Cover	4	19	36	**703**
General Repair	32	156	48	**7500**

Work on condition three (3) ratings that will require 5% of work each year for the next two (2) decades. This is considered to be a low number. Within two (2) decades these condition three's (3) will have degraded significantly. Operator insight into the ratings reveals a serious need to begin maintaining these assets immediately.

Condition 3 Work	Quantity	Extrapolated Quantity	Repair Hours per Asset	Total Hours	5% every year
Replace Frame and Cover	488	2382	36	85781	**4289**
General Repair	719	3510	48	168515	**8425**

Since it is not always realistic to repair everything, a Total FY2019 Min was calculated (which ignores the condition 3s), and a Total FY2019 max was calculated. These were then averaged to give a conservative estimate of hours that need to be put into catch basins each year to prevent long-term failures.

Total FY2019 Max (repair/rebuild, traps, clean/inspect)	24649
Total FY2019 Min (repair/rebuild, traps, clean/inspect)	11935
Average Total Hours	**18292**

Catch basin O&M hours: **18,292**

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CCTV Work

Water Resources is mandated by the EPA to CCTV 6% of the sanitary sewer system each year. There is a stricter in-house standard of 10% of the system each year, which amounts to around 150,000 feet per year.

There are two (2) CCTV trucks in service, a CUES truck and an IBAK truck. Each truck requires two (2) people to operate. The IBAK truck has a panorama camera primarily for standard yearly inspections, while the CUES truck is geared more towards emergency and exploratory events. Both CCTV trucks can inspect approximately 1,000' per day. In order to reach the 150,000 linear foot per year goal, 1200 person-hours per year would be required. Emergencies account for, on average 10 days of work or 160 hours.

Type of Work	Feet/day	Days of work	Hours
CUES Truck	1000	75	1200
IBAK Truck	1000	75	1200
Emergencies		10	160
		Total	**2560**

CCTV work hours: **2560**

Pipe, Manhole, and Ditch Maintenance

Proper O&M of these manholes, pipes, and ditches requires a four (4) person crew out daily doing ditching, culvert, and pipe maintenance through the six (6) month construction season.

Crew Size	Hours per person	Total
4	1040	**4160**

Pipe, Manhole, Ditch Maintenance hours: **4160**

Right-of-Way

Right-of-Way maintenance hours were determined through the analysis of previous Cityworks-based tracking. Three (3) months of data from FY2019 was collected for a typical crew size of one (1). This was then extrapolated to a three (3) person crew, and then further extrapolated out to 6 months. Three (3) people all summer are required to meet the O&M Coordinator's 20,000 feet per year goal. Previous work tracked with WO 48063.

Analysis	Hours
3 months of FY2019	620
Full Crew hours 3 months	1860
Full Crew hours 6 months	**3720**

Right-of-Way hours: **3720**

Digsafe Connection Investigation and Correction

One (1) employee is required all year, with an additional employee needed in the summer month. This was determined by an analysis of Cityworks Service Requests requiring Digsafe inspections.

Digsafe/Locate	Hours
1 Employee All Year	2080
1 Extra Employee in Summer	1040
Total	**3120**

Digsafe hours: **3120**

Vactor Operations

Vactor work is done for emergencies, standard cleaning, and precleaning work for CCTV. Vactoring takes longer than CCTV work, so to calculate vactor hours specific to CCTV work, CCTV hours were multiplied 1.3. The goal is to vactor before every inspection. Estimated time to complete root emergencies and standard cleaning was gathered from removal/backup Work Orders and data collected by the O&M Coordinator.

Work	Hours CCTV	Vactor Coef	Time Vactoring
CUES Vactor	1200	1.3	1560
IBAK Vactor	1200	1.3	1560
Root Removal/Backups			856
		Total	**3976**

Vactor work hours: **3976**

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Pump station O&M

Based on pump station Work Order records, 1 person has only been sufficient for tending to urgent issues. Two (2) employees are required to handle all of the tasks central to pump stations and the Baxter North storage tanks. Within 2 years Baxter South will be operational, further adding to the workload.

Crew	Hours per Person	Total
2	2080	**4160**

Pump station O&M hours: **4160**

In looking at the different pieces of analyzed core work, it becomes apparent how less action now can result in serious issues down the road. Catch basin O&M today requires an estimated **18,292** hours of work per year, equaling to roughly 12 people when accounting for winter ops, vacations, holidays. Water Resources currently has the staff to dedicate six (6) people, with other employees being required to work on CCTV, pump stations, Digsafe, Vactor operations, pipe/manhole/ditch maintenance, and right-of-way work. Without necessary staffing increases to tackle this gap, costly reactionary O&M will in all likelihood be done through contractors. At an average cost of $4500 per basin, depending on the type of work, future contract work then becomes the less desirable option. Hiring more employees will end up saving money in the long run.