General Government Capital Projects	2017 Actuals ($000's)	2017 CarryForward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
General Government							
Policy, Communications & Econ Dev							
3000-5-6304 Destination Marketing Organization	403	-	220	165	**-**	-	-
3000-5-6570 Post- Secondary Feasibility /Econ. Impacts Study	-	-	50	50	**-**	-	-
3000-5-6571 Revitalization Strategy for Downtown	-	-	75	75	**-**	-	-
Total Policy, Communications & Econ Dev	403	-	345	290	**-**	-	-
Corporate Services							
4000-5-7907 Dispatch Services	8	313	-	313	**-**	-	-
4200-5-7611 Electronic Tendering	-	-	20	20	**-**	-	-
4200-5-7670 Cold Storage Shelter	-	-	140	140	**-**	-	-
4400-5-9999 Generated by Cap to Op posting	-	-	-	-	**-**	50	-
4401-5-7600 Disk Expansion	-	-	100	50	**-**	-	-
4402-5-7600 Network Infrastructure	48	-	52	52	**93**	103	109
4403-5-7670 Server & Storage Infrastructure	55	-	53	53	**59**	59	59
4404-5-7600 Client Hardware Renewals	-	-	-	-	**220**	225	230
4407-5-7670 Printers & Multifunction Devices	37	-	53	53	**56**	56	56
4410-5-7611 GIS Enhancements	26	-	46	46	**-**	-	-
4410-5-7670 Data Collection & Verification	19	-	19	19	**-**	-	-
4413-5-7600 Public Safety In-Car Computers	-	-	34	28	**-**	-	-
4415-5-7670 Plotter Replacement	-	-	15	15	**-**	-	-
4416-5-7670 Class Replacement	13	134	-	134	**-**	-	-
4421-5-7670 Phone System	-	-	40	40	**320**	-	-
4430-5-7600 Budget Management	107	27	-	27	**-**	-	-
4435-5-7611 Door Access Control	7	-	-	-	**-**	-	50
4436-5-7600 Computer Aided Dispatch	-	-	75	75	**-**	-	-

CAPITAL FUND - 2019 Capital Projects

General Government Capital Projects	2017 Actuals ($000's)	2017 CarryForward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
4436-5-7615 Stanton Equipment Relocation	-	50	-	50	**100**	-	-
4436-5-7670 Communication Infrastructure Renewal	40	-	20	20	**-**	-	-
4439-5-7670 Public Safety In-Car Cameras	-	-	-	-	**-**	56	-
4440-5-7611 Website / Online Services Renewal	-	-	32	32	**-**	-	-
4447-5-7670 Security Cameras	18	-	21	21	**-**	-	-
4449-5-7670 Secondary Site & Data Replication	15	-	12	12	**-**	-	-
4450-5-7611 Virtualization	26	-	-	-	**-**	-	-
4451-5-7611 Wireless Infrastructure	-	-	-	-	**-**	-	75
4452-5-7600 Webcasting	-	-	-	-	**-**	75	-
4453-5-7600 One-Stop Shopping	-	50	-	50	**-**	-	-
4453-5-7670 Voice Radio Support Equipment	-	75	-	75	**-**	-	-
Total Corporate Services	419	649	732	1,325	**848**	624	579
Total General Government	822	649	1,077	1,615	**848**	624	579

General Government Capital Projects	2019 Budget ($000's)	Formula Funding ($000's)	IT Reserve ($000's)
General Government			
Corporate Services			
44027600 Network Infrastructure	93	-	(93)
44037670 Server & Storage Infrastructure	59	-	(59)
44077670 Printers & Multifunction Devices	56	-	(56)
44217670 Phone System	320	(320)	-
44367615 Stanton Equipment Relocation	100	-	(100)
44047600 Client Hardware Renewals	220	-	(220)
Total Corporate Services	848	(320)	(528)
Total General Government	**848**	**(320)**	**(528)**

Department GG General Government **Division** Information Technology
Project 44027600 Network Infrastructure

Budget

	2019	2020	2021
	$	$	$
Expenditures	**93,000**	**103,000**	**109,000**
Funding			
Reserves	93,000	103,000	109,000
Total Funding	**93,000**	**103,000**	**109,000**

Description

Purpose

To sustain the City's planned and incremental investment in its network, so that it can continue to meet the increasing demands placed on it as functions throughout the organization turn to technology to streamline workloads and improve services.

Background

The City's Information Technology infrastructure is essential for effective service delivery and the network that provides connectivity among its computers, laptops, servers, printers, cameras, mobile devices, telephones, traffic lights, SCADAmonitors, and emergency voice radios is vital to the City's operations. As shown in Gallery 1, the City's network employs ethernet, leased and city-owned fiber, wireless, and microwave technologies to create connections among fourteen sites. Within each site the network connects numerous devices, ensuring that staff, citizens, and stakeholders have consistent and reliable access to applications, data, printers, and the internet.
In 2016, the network expanded to provide connectivity to every traffic light in order to streamline traffic control management within the Public Works department; as depicted in Gallery 2, this initiative alone added 63 network devices to the City's infrastructure. With additional traffic lights and cameras on the horizon, this complement will continue to grow. There was a substantial network expansion again in 2018 when wireless connectivity was established to the City's Pumphouses and Liftstations. This replaced a mixture of outdated, unsupported leased lines, modems, and cellular connections with standard, robust, and reliable microwave connections and will result in considerable cost savings. However, it also added another 23 network devices to the City's infrastructure (Gallery 3).

In addition to connectivity, the network also plays a key role in protecting the City's information technology infrastructure and the corporate data assets stored within it (Gallery 4). The network's firewall and other protective mechanisms routinely deny more than 100 unauthorized access attempts per minute while its spam filter rejects almost 85% of the email directed at the organization.

As employees and stakeholders increasingly turn to technology to maintain and expand service levels, demands and reliance on the network continue to grow. In recent years, the City implemented Computer-Aided Dispatch; adopted enterprise solutions such as CityWorks, CityView, and City Explorer; installed industry-standard communications infrastructure; introduced traffic cameras; expanded online service offerings; deployed mobile solutions; provided public internet access; increased its reliance on security cameras; established traffic light connectivity; and enhanced its Customer Service functions. All of these data-intense applications create increasingly heavy demands on the network, both in terms of capacity and reliability. As well, the increased reliance on specialty applications such as SCADA and computer-based Dispatch consoles has introduced unique network security and dependability challenges. It is therefore critical that network capacity and reliability keep expanding at a comparable pace through regular, ongoing enhancements.

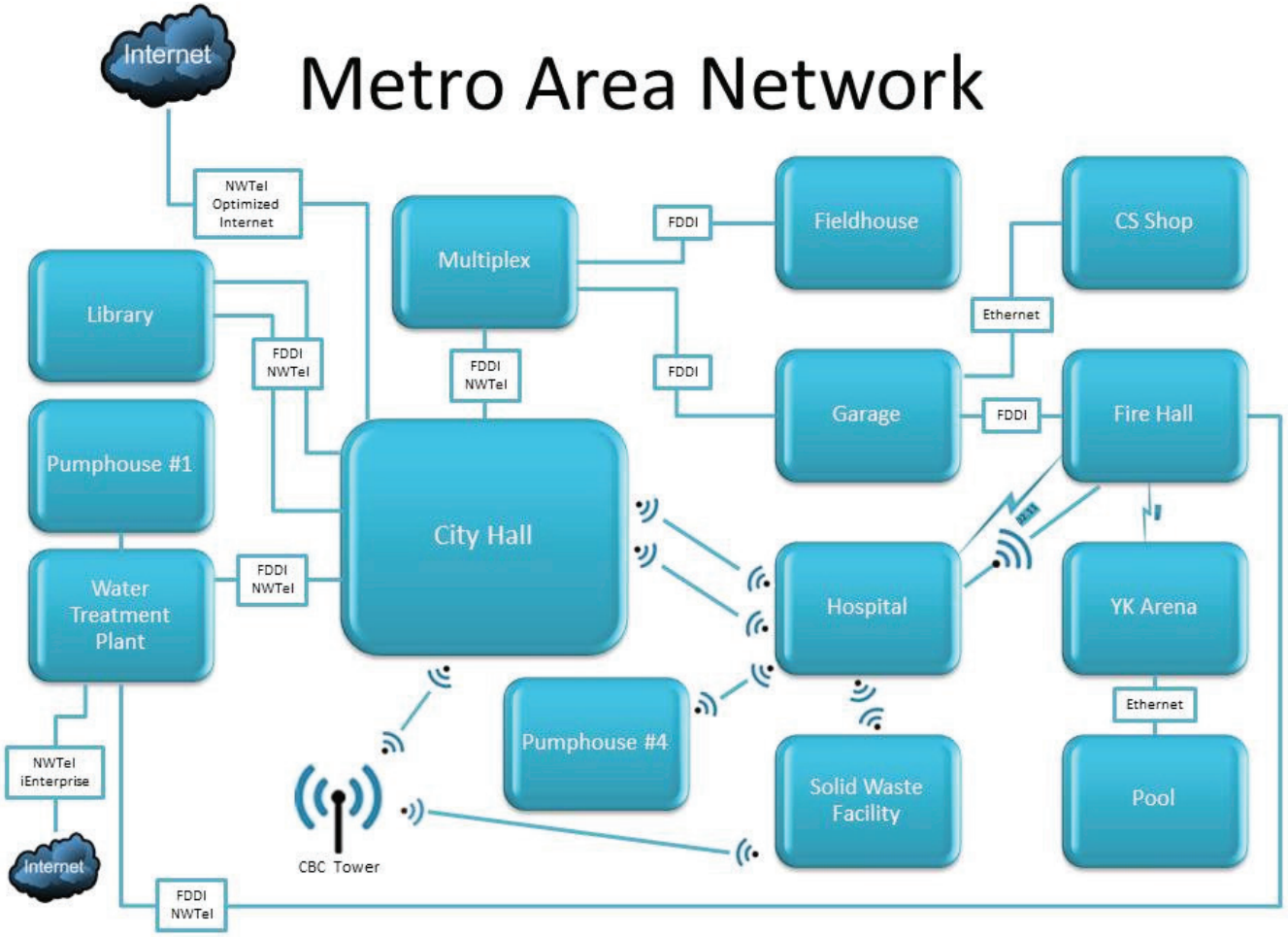
Over the term of this budget, there will continue to be a strong focus on security because threats – both internal and external – are becoming increasingly sophisticated and pervasive. Recommended initiatives include ongoing cyberthreat awareness campaigns to help staff become more knowledgeable and mindful users, continual refinement of security configurations to mitigate risks from all sources, and enhanced and more granular monitoring of network activity.
Another priority will be to repatriate network connectivity solutions. Some equipment is already in place and configured, and City-owned and operated connections have been established between several sites. As the reliability and performance of these connections are confirmed the City will gradually terminate leased services, thus reducing its reliance on third party fiber services and in turn lowering overall network operating costs.
Other work will include replacing key network equipment at sites proactively to replace obsolete gear, reduce unplanned outages, and prepare for future technologies and growth.

Operational Impact

The City's network is vital to its operations and even short service interruptions have significant impacts on service delivery and employee productivity. It will be more cost effective – and present a lower risk to the City – to replace and enhance this equipment in a planned and orderly fashion than to experience problems that require excessive troubleshooting and repair, or failures that create service outages.
If this project does not proceed, it will negatively impact the organization's ability to sustain its network. In the short-term, network congestion will reduce service delivery to staff, citizens, and stakeholders, and there will be no opportunity to expand services to meet new requirements. Over time, there will be increasingly frequent service disruptions when equipment fails. These failures will interrupt many aspects of City operations, including most internal staff activities as well as external citizen and stakeholders services.

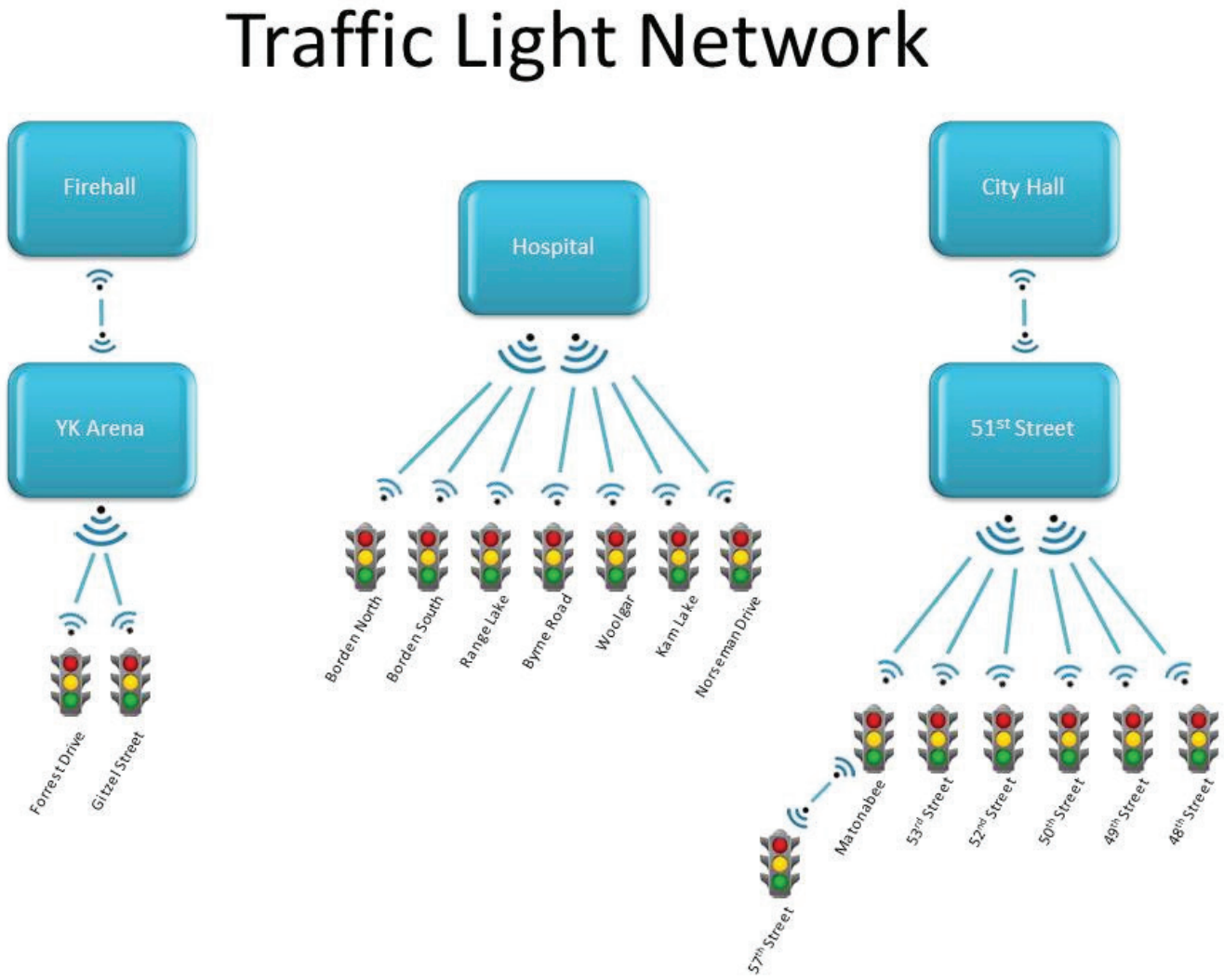
Gallery

Gallery 1



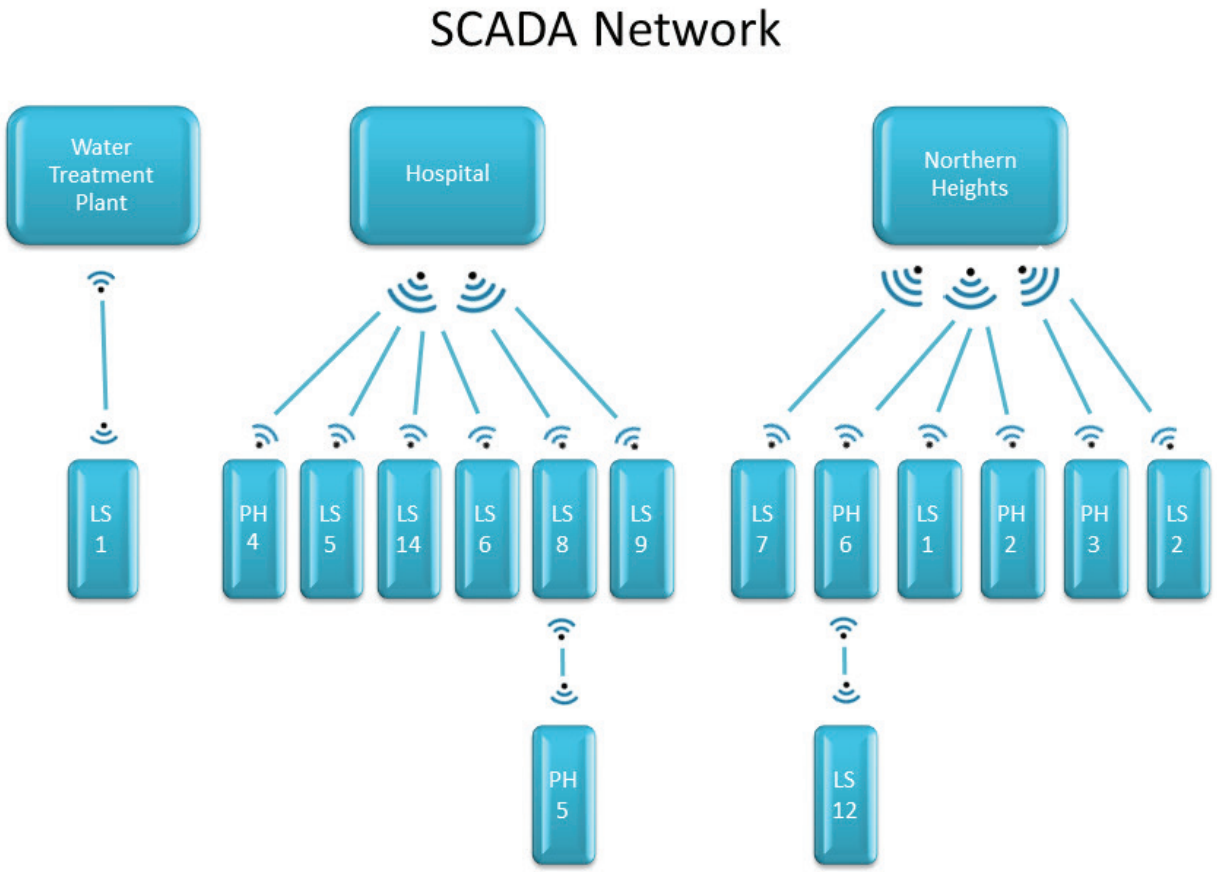
Gallery

Gallery 2



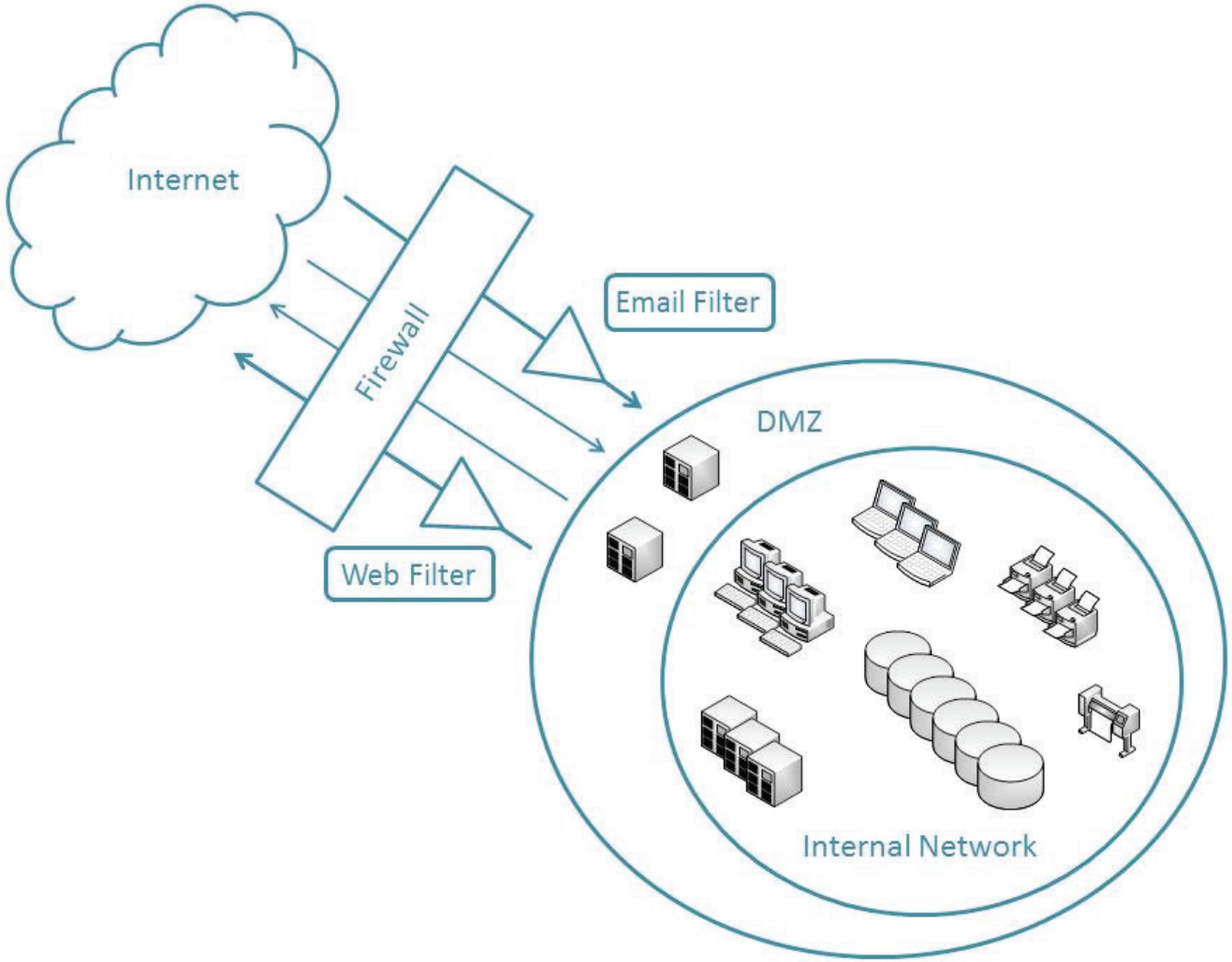
Gallery

Gallery 3



Gallery

Gallery 4



Department GG General Government **Division** Information Technology
Project 44037670 Server & Storage Infrastructure

Budget

	2019	2020	2021
	$	$	$
Expenditures	**59,000**	**59,000**	**59,000**
Funding			
Reserves	59,000	59,000	59,000
Total Funding	**59,000**	**59,000**	**59,000**

Description

Purpose

To continue the City's planned and incremental investment in its server fleet and file storage infrastructure to help meet the growing requirements being placed on it.

Background

The Information Technology Division maintains physical and virtual servers to support a wide range of services to staff, citizens, and stakeholders. It also maintains a redundant file storage system to house and protect the City's burgeoning collection of data and documents that are essential to its day-to-day operations.

The City's dependence on its server fleet intensifies with each activity that is automated. In addition to traditional financial applications, staff and stakeholders are adopting increasingly sophisticated solutions to meet diverse needs including emergency services dispatch, mapping, work management, elections, transit, permit processing, problem reporting, security cameras, building access, pellet boilers, solar panels, voice radio control, bulk water billing, and black/green cart management. To keep pace with these demands, the servers need to remain current and reliable, and the number of servers must continue to grow. (Gallery 1)

In late 2007, the Information Technology Division adopted a virtualization strategy as a way to meet accelerating demands. This technique essentially partitions one physical server into several virtual servers, so instead of buying and maintaining several small servers, funds are invested in acquiring and supporting large, powerful units that are allocated and re-allocated as requirements dictate. This provides the flexibility to quickly deploy additional servers as needs arise. However, there are still limits to what can be accommodated within a single physical server and so growth in demand must be matched by growth in capacity. During the term of this budget, the Information Technology Division will use the allocated funds to grow the capacity of this environment, redeploy server equipment that is nearing the end of its life expectancy, and sustain a reasonable inventory of spare parts to ensure

replacements are readily available when failures occur.

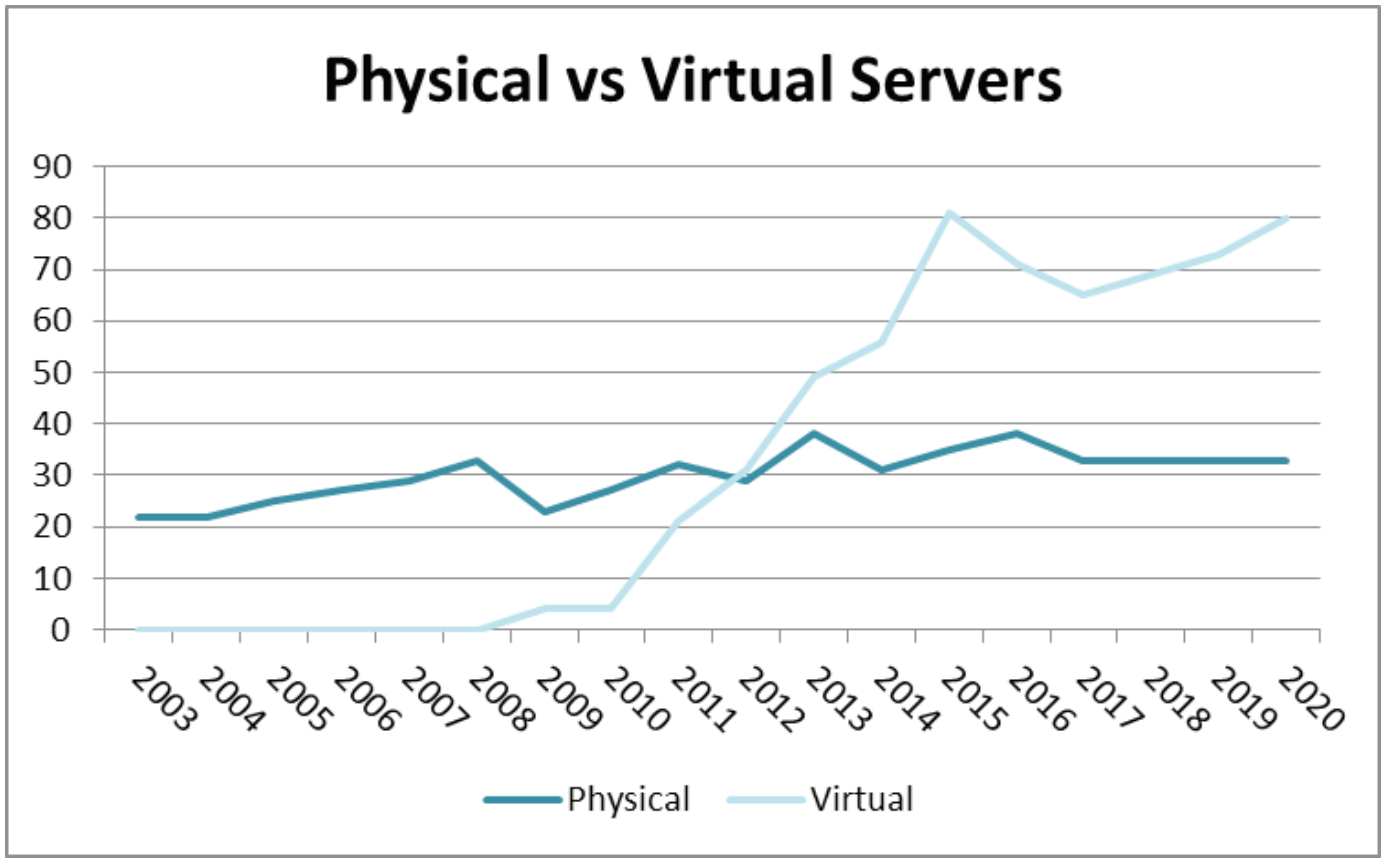
As with the demand for server capacity, the organization's need for storage continues to grow. For example, the City now has the ability to capture aerial images and thus provide much needed up-to-date information for tasks ranging from sewage lagoon management to assessment reviews, but a lack of disk space has left staff scrambling to find room to house the images. In 2017 and 2018 significant progress was made in expanding disk space capacity, allowing the City to move towards industry standard backup practises. However, storage demands continue to expand rapidly and the City must constantly invest in its infrastructure to ensure adequate capacity. Over the next three years, part of this budget allocation will be used to incrementally increase the disk storage capacity and backup services offered by the Information Technology Division.

Operational Impact

When servers are appropriately matched to the work that needs to be done and sufficient disk space is available, services can be delivered more reliably and at a lower cost than when resources must be constantly manipulated and reallocated, often in response to failures.
If this project does not proceed, the Division will not be able to meet escalating server requirements or acquire much-needed additional storage capacity. In the short-term, this will negatively impact overall infrastructure performance and thus degrade service delivery to both internal and external clients, and over time it will lead to more frequent system outages and necessitate increased support efforts and costs.

Gallery

Gallery 1



Department GG General Government **Division** Information Technology

Project 44077670 Printers & Multifunction Devices

Budget

	2019	2020	2021
	$	$	$
Expenditures	**56,000**	**56,000**	**56,000**
Funding			
Reserves	56,000	56,000	56,000
Total Funding	**56,000**	**56,000**	**56,000**

Description

Purpose

To continue the organization's incremental approach to implementing and maintaining multifunction devices throughout the organization so that printing, scanning and copying requirements can be met in the most cost-effective manner possible.

Background

In 2014, the City issued a request for proposals for multifunction device management and entered into a long-term arrangement with the successful proponent. The vendor conducted an initial inventory and assessment of the City's existing printer/copier/fax/multifunction device fleet and then met with key stakeholders to ascertain current and future user requirements. Based on this information the vendor prepared a multi-year Plan with the goals of reducing costs and realizing maintenance and support efficiencies.

The Plan identified three tiers of devices and all subsequent acquisitions have been selected from one of these tiers. This has minimized the variety of devices installed throughout the organization, streamlined consumables management, and reduced costs.

The Plan also identified end-of-life and high-cost, low-usage devices and these have incrementally been removed from service. As well, several units have been reallocated to better meet varied needs within the organization.

Operational Impact

Most staff members rely on scanning, printing, and copying services during their day-to-day activities. If these services are not readily available or are not dependable, it negatively impacts their productivity and their ability to provide services.

Department	GG General Government	**Division**	Information Technology
Project	44217670 Phone System		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**320,000**		
Funding			
Formula Funding	320,000		
Total Funding	**320,000**		

Description

Purpose

To replace the City's telephone infrastructure.

Background

The City's current telephone system is a hybrid of NorthwesTel services to the door and City-owned Toshiba equipment within each facility. The exact vintage of the City-owned infrastructure is uncertain as it predates current staff and the existing financial system.

In 2017, Mitel acquired Toshiba and in 2018 announced a phase-out schedule for Toshiba products and support: equipment will not be sold after October 2019 and support will cease as of November 2021. Given the City's reliance on telephone communications, it cannot rely on a system without replacement parts or technical support. Therefore it will be prudent to find and implement an alternative solution.

The 2018 budget contains an allocation for preliminary work to identify potential solutions for the City. The 2019 budget allocation will be used to acquire and implement the system that is deemed to be the most efficient and cost-effective for the City.

Operational Impact

It will be more cost effective and will present a lower risk to the City to acquire, configure, and maintain its telephone infrastructure in a planned and orderly fashion than to experience unplanned and possibly extended service outages.

Department GG General Government **Division** Information Technology
Project 44367615 Stanton Equipment Relocation

Budget

	2019	2020	2021
	$	$	$
Expenditures	**100,000**		
Funding			
Reserves	100,000		
Total Funding	**100,000**		

Description

Purpose

To facilitate the relocation of existing Information Technology and Communications Infrastructure equipment from the Stanton Territorial Hospital to the new hospital building.

Background

The City has a long-standing agreement with Stanton management that has enabled it to locate key pieces of infrastructure within the hospital penthouse and on the building roof. It began with voice radio equipment and gradually expanded to include wireless Information Technology infrastructure and, most significantly, the City's Communication Infrastructure system that provides radio services to emergency personnel.

The Government of the Northwest Territories has confirmed that the existing Stanton Hospital building will be re-purposed and that the City will not be able to leave equipment there past April of 2019. Therefore, once the new hospital building is complete, the City's radio and communication equipment must be transferred to it. An equipment room is being readied for this purpose and in early 2019 Information Technology staff will ensure all necessary accommodations are made to the room and associated roof space, and coordinate the very time-sensitive and delicate task of relocating the equipment.

This project is necessary for continued operation of the City's communication and wireless infrastructure. There is no other suitable site within the city for the equipment, and it is critical to the delivery of emergency voice radio communications and many other city services.

Department GG General Government **Division** Information Technology
Project 44047600 Client Hardware Renewals

Budget

	2019	2020	2021
	$	$	$
Expenditures	**220,000**	**225,000**	**230,000**
Funding			
Reserves	220,000	225,000	230,000
Total Funding	**220,000**	**225,000**	**230,000**

Description

Purpose

To continue the City's planned and incremental investment in its client hardware.

Background

In 2003 the Information Technology division instituted regular investments in all components of the City's technology infrastructure. This replaced the previous reactionary approach - which created funding peaks and valleys and often resulted in outages and delays - with predictable costs, planned updates and upgrades, and more reliable service. A decade and a half of this approach has proven its success, and underlines the importance of sustaining it.

Since 2003 the ongoing renewal of client facing hardware has been funded from several O&M and Capital budget allocations. Beginning with Budget 2019 these allocations have been amalgamated as a single Capital budget item to reflect the consideration that collectively they represent a very valuable and significant City asset, and to provide more consistency and transparency with both the budgeting and management processes.

This allocation will be used to renew and augment all client facing hardware components that require replacement on a regular basis. This includes widely deployed elements like workstations, laptops, cell phones, desk sets, and radios, as well as more special purpose equipment like digital cameras, conference phones, and projectors.

Operational Impact

Appropriately maintaining client facing hardware components will minimize downtime and enable effective services for both staff and stakeholders. It will also reduce troubleshooting and support efforts within the IT Division as replacements can be done in a planned and scheduled manner to minimize operational impact.

Community Services Capital Projects	2017 Actuals ($000's)	2017 Carryforward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
Community Services							
Directorate							
5000-5-7610 Cigarette Butt Receptacles in Downtown	10	-	-	-	**-**	-	-
5003-5-6570 Accessibility Audit/Implementation	21	34	-	34	**584**	581	567
Total Directorate	31	34	-	34	**584**	581	567
Arenas							
5152-5-7670 Multiplex Upgrade	-	-	160	160	**-**	-	-
Total Arenas	-	-	160	160	**-**	-	-
Parks & Trails							
5300-5-6571 Bristol Freighter Repainting	-	-	55	55	**-**	-	-
5302-5-6571 Bike Park	-	-	50	50	**45**	20	-
5304-5-6571 Tommy Forrest Ball Park Upgrades	-	-	200	200	**200**	200	-
5305-5-6571 Sculpture Installation/ Painting	3	42	-	42	**-**	-	-
5317-5-6001 Yellowknife Rotary Park Trail Extension	19	1	-	1	**-**	-	-
5323-5-6570 Frame Lake Trail Upgrades	255	-	-	-	**-**	-	-
5323-5-6571 Trail Enhancement & Connectivity	-	-	25	25	**-**	450	-
5327-5-6571 Tennis Court Resurfacing	161	-	-	-	**-**	-	-
5328-5-6570 Park Development	-	-	90	90	**-**	-	-
5352-5-6570 Cemetery Expansion/Irrigation	147	11	-	11	**-**	-	-
5353-5-6570 Columbarium Park	-	-	-	-	**-**	100	200
FC0008 Folk on the Rocks Rehabilitation	-	-	-	-	**200**		
FC0011 Range Lake Trail Upgrade	-	-	-	-	**-**		210
Total Parks & Trails	585	54	420	474	**445**	770	410

CAPITAL FUND - 2019 Capital Projects

Community Services Capital Projects	2017 Actuals ($000's)	2017 Carryforward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
Fieldhouse							
5800-5-6571 Fieldhouse Climbing Wall	99	61	-	95	**-**	-	-
5801-5-6570 Fieldhouse Upgrades	-	-	100	-	**-**	-	-
Total Fieldhouse	99	61	100	95	**-**	-	-
City Hall							
5601-5-6570 City Hall Upgrades	94	-	210	210	**175**	-	-
Total City Hall	94	-	210	210	**175**	-	-
Programs & Recreation							
5400-5-7640 Commercial Christmas Tree Replacement	-	-	30	30	**-**	-	-
Total Programs & Recreation	-	-	30	30	**-**	-	-
Pool							
5500-5-6570 New Aquatic Centre	-	-	75	75	**1,750**	28,830	19,220
5505-5-6570 Pool Upgrades	-	-	20	20	**-**	-	-
5505-5-7611 Exterior Wall Siding	-	-	100	125	**-**	-	-
Total Pool	-	-	195	220	**1,750**	28,830	19,220
Library							
5201-5-6570 Library Washroom Development	49	-	-	-	**-**	-	-
Total Library	49	-	-	-	**-**	-	-
Total Community Services Capital	858	149	1,115	1,223	**2,954**	30,181	20,197

Community Services Capital Projects	2019 Budget ($000's)	Formula Funding ($000's)	Other Grants ($000's)
Community Services			
Directorate			
50036570 Accessibility Implementation	584	(504)	(80)
Total Directorate	584	(504)	(80)
Parks & Trails			
53026571 Bike Park	45	(20)	(25)
53046571 Tommy Forrest Ball Park Upgrades	200	(60)	(140)
FC0008 Folk on the Rocks Rehabilitiation	200	(100)	(100)
Total Parks & Trails	445	(180)	(265)
City Hall			
56016570 City Hall Upgrades	175	(175)	-
Total City Hall	175	(175)	-
Pool			
55006570 New Aquatic Centre	1,750	(1,750)	-
Total Pool	1,750	(1,750)	-
Total Community Services	**2,954**	**(2,609)**	**(345)**

Department CS Community Services **Division** Directorate

Project 50036570 Accessibility Implementation

Budget

	2019	2020	2021
	$	$	$
Expenditures	**583,920**	**580,920**	**566,580**
Funding			
Formula Funding	503,920	500,920	486,580
Other Grants	80,000	80,000	80,000
Total Funding	**583,920**	**580,920**	**566,580**

Description

Purpose

The Accessibility Audit of the City's Facilities, Trails, Parks and Playgrounds identified key areas where barrier removal is required. A prioritized implementation strategy has been developed to ensure the City moves towards full accessibility in these key areas.

Background

Council provided funding in the 2017 Budget for the development of an Accessibility Audit. The scope of work included auditing the City of Yellowknife facilities and infrastructure, specifically for structural design of facilities as well as functional usability based on accessibility needs of individuals with a wide range of challenges including mobility, visual, hearing, cognitive and sensory disabilities.

The audit identified a number of projects for a variety of facilities that will assist Council in achieving their stated Community and Corporate Vision of an inclusive City.

The details of the audit have included approximately $5 M to be completed over a ten year period to strategically remove barriers on a priority based approach. Through the budgeting process, a 6 year implementation plan has been identified to deal with all short and mid-term needs.

Operational Impact

There will be no additional O/M impact.

Department CS Community Services **Division** Parks & Trails
Project 53026571 Bike Park

Budget

	2019	2020	2021
	$	$	$
Expenditures	**45,000**	**20,000**	
Funding			
Formula Funding	20,000	20,000	
Other Grants	25,000		
Total Funding	**45,000**	**20,000**	

Description

Purpose

To develop, in partnership with the Yellowknife Mountain Bike Club, a mountain bike skills development park located adjacent to the Bristol Pit.

Background

In Budget 2018 Council approved a contribution of up to $25,000 towards the development of a Bike Park, conditional on matching dollars from the Yellowknife Mountain Bike Club. The Club matched the funding and in 2018, $50,000 was available the Club to proceed with the design portion of the project.

In response to a presentation from the Club, Council has allocated $20,000 to the Club contingent upon the funding being matched by the Club in the amount of $25,000 and the development of a Memorandum of Understanding addressing the land tenure issue and the ongoing Operational and Maintenance costs.

The Park will be designed in a manner that is welcoming to new users while still being fun and rewarding for expert level riders. The Park will provide users the ability to develop mountain biking skills as well as challenge users in an environment specifically designed for the purpose.

Operational Impact

The City will enter into a Memorandum of Understanding with the Mountain Bike Club for the Club that will address the ongoing operational and maintenance costs.

Department	CS Community Services	**Division**	Parks & Trails
Project	53046571 Tommy Forrest Ball Park Upgrades		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**200,000**	**200,000**	
Funding			
Formula Funding	60,000	60,000	
Other Grants	140,000	140,000	
Total Funding	**200,000**	**200,000**	

Description

Purpose

To partner with the Yellowknife Men's Fastball Association for the continued development of the Tommy Forrest Ball Park.

Background

Following a presentation from the Yellowknife Men's Fastball Association, Council established a partnership with the Association for the continued development of the Tommy Forrest Ball Park as a community park.

In Budget 2018, Council allocated $60,000 to the project in each of 2018, 2019, and 2020, contingent upon the Association contributing $140,000 each year. The funding will help develop amenities that include a playground, protective screening, historic display, proper field drainage, and bleachers.

In 2018 the following projects were completed:

- Removal of old bleachers
- Installation of new bleachers
- Backstop replacement

The following projects are slated for 2019:

- New umpire/bathroom building
- New park/play area
- Picnic table area
- Protective screening

There are no direct financial benefits for the City under this partnership, however it will provide an opportunity for the Association to further develop the sport in Yellowknife and provide the opportunity to explore Sport Tourism by seeking out regional and national events.

Operational Impact

There are no anticipated operational costs associated with this partnership arrangement.

Department CS Community Services **Division** Parks & Trails
Project FC0008 Folk on the Rocks Rehabilitiation

Budget

	2019	2020	2021
	$	$	$
Expenditures	**200,000**		
Funding			
Formula Funding	100,000		
Other Grants	100,000		
Total Funding	**200,000**		

Description

Purpose

To carry out a retrofit to the Main Stage at the Folk on the Rocks site to ensure the stage is structurally sound.

Background

In April of 2018 an issue regarding the integrity of the Folk on the Rocks Main Stage was identified by the designer of the stage. The issues identified were related to the structural integrity of the stage and that an assessment by a qualified engineer was recommended.

A structural engineer was contracted to carry out an assessment in May of 2018 to ascertain the structural integrity of the stage. There were many issues identified that will necessitate a large scale retrofit to the Stage is necessary to ensure that the facility is structurally sound and safe to host the various events hosted at the park, particularly the Folk on the Rocks Festival. The issues are related to the original arched roof and side stage structures, the newer arched roof structure, and the main stage itself. The main issue revolves around the integrity of the stage foundation.

The continuation of the Folk on the Rocks Festival will require that the work identified by the structural engineer be carried out in a timely manner. The City and the Folk on the Rocks organization will enter into a cost sharing agreement where the City will provide funding to a maximum of $200,000 with the organization repaying $100,000 back to the City over a 5 year period.

Operational Impact

There will be no operational impact.

Department	CS Community Services	**Division**	City Hall
Project	56016570 City Hall Upgrades		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**175,000**		
Funding			
Formula Funding	175,000		
Total Funding	**175,000**		

Description

Purpose

To carry out the necessary repairs and remediation of the areas within City Hall that have been affected by the recent flooding.

Background

City Hall was constructed in 1975 and has served as the administrative for the City since that time. There have been many positive changes and renovations over these years and to ensure that the building continues to meet the requirements of the community and staff in a safe and comfortable continued work is required.

The 2018 budget included an $210,000 capital project to replace the main entrance steps to City Hall. The design portion of the project was carried out through a Request for Proposal call at a cost of just over $21,000. Several options were provided for review and the most cost effective design was selected. Following the architectural and design phase being complete, the budget for the completion of the project was $253,216. With the available funds just over $188,740 the project was put on hold. To complete the project in 2019 additional funding in the amount of $90,000 is required, accounting for a cost escalation factor.

With the various renovations and restoration work being carried out over the past few years in the upper floor, and to a lesser extend to the lower floor, much of the asbestos abatement has been addressed. There are still a large area within the lower floor that requires asbestos removal. It is estimated that the removal of the affected drywall, disposal and restoration work in the lower portion of City Hall is $85,000.

Operational Impact

It is anticipated that this project will not affect the current O&M budget.

Department CS Community Services **Division** Pool
Project 55006570 New Aquatic Centre

Budget

	2019	2020	2021
	$	$	$
Expenditures			
Architectural/Engineering	1,750,000		
Construction		28,830,000	19,220,000
Total Expenditures	**1,750,000**	**28,830,000**	**19,220,000**
Funding			
Formula Funding	1,750,000		
Other Grants		8,138,250	4,750,500
Reserves		3,120,000	
Debt Funding		17,571,750	14,469,500
Total Funding	**1,750,000**	**28,830,000**	**19,220,000**

Description

Purpose

The development of an Aquatic Centre is a multi-year project that started in 2018 with the establishment of the Aquatic Centre Advisory Committee (ACAC) which carried out the public consultation portion of the project. Council has recently adopted the Aquatic Centre Pre-Design Plan (the Plan) as recommended by the ACAC. Funding in 2019 will be directed to securing the services of qualified firms to carry out the required geo-technical evaluation of the proposed sites as well as to advance the design of the Centre.

Funding in 2019 will be required to engage the services of a qualified Architectural and Engineering team to complete the detailed design of the facility as approved by Council and to prepare the tender documents.

Subsequent year funding will include the construction costs of the Aquatic Centre which will likely commence in 2020 with completion in 2021. The total funding requirement is shown in Gallery 1.

Background

The Plan highlights the work that was carried out by the ACAC including a comprehensive public consultation plan, a review of a number of sites and a review of current trends in aquatic facilities. The Plan also details various components and configurations of a proposed aquatic centre that ultimately resulted in the ACAC completing their mandate by making a recommendation to Council.

The recommended facility includes a 52m lap pool, a warm water leisure pool complete with a lazy river and various play features, spectator viewing, diving boards, hot tub, steam room, canteen, multipurpose rooms, storage and office space for youth groups as well as the required change room space and staff space.

These components are detailed at the conceptual level within the Plan. Funding in 2019 will be required to engage the services of a qualified Engineering firm team to complete a geo-technical evaluation of the sites identified in the Plan. Funding will also be required to advance the planning of the Centre pending Council's approval of the construction methodology as well as the development of an Aquatic Centre Advisory Committee.

Operational Impact

It is anticipated that the project will be completed in 2021 with the full impact of the operational costs to be in effect in 2022. It is estimated that the net operational cost of the facility will be $3.2M.

Gallery

Gallery 1

Year	Phase	Cost ($)	BCF ($)	City ($)
2018	Public Consultation	75,000	11,250	63,750
2019	Architectural/ Engineering	1,750,000	0	1,750,000
2020	60% Construction	28,830,000	8,138,250	20,691,750
2021	40% Construction	19,220,000	4,750,500	14,469,500
Total		49,875,000	12,900,000	36,975,000

CAPITAL FUND - 2019 Capital Projects

Public Safety Capital Projects	2017 Actuals ($000's)	2017 CarryForward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
Public Safety							
Directorate							
6500-5-7611 Wildland Fire Mitigation Emergency Measures	75	65	125	190	-	-	-
Total Directorate	75	65	125	190	-	-	-
Fire & Ambulance -Emergency Operations							
6300-5-6430 Portable Radios	-	132	141	273	-	-	-
6300-5-7611 Fire Safety Helmets	12	-	9	9	-	-	-
6300-5-7670 FDM Software	-	10	27	37	-	-	-
FD0003 Dispatch Console	-	-	-	-	**130**	-	-
6304-5-6571 Fire Hall Improvement/Study	-	-	39	39	**50**	-	-
6310-5-7615 Additional Firefighter Outfitting Costs	16	24	40	64	-	-	-
6310-5-7670 Bunker Gear	20	-	10	10	-	-	-
6311-5-7670 Aggressor Jackets	21	-	-	-	-	-	-
6313-5-7670 Self-Contained Breathing Apparatus	-	-	-	-	**225**	225	-
6317-5-6571 Paving & Foundation Repairs	-	97	-	97	-	-	-
6318-5-7670 Automatic External Defibrillators	105	-	-	-	-	-	-
6322-5-7670 Propane-Fueled Fire Trainer	-	-	90	90	-	-	-
6324-5-7600 Fire Hall Emergency Generator	-	100	100	200	-	-	-
Total Fire & Ambulance -Emergency Operations	174	363	456	819	**405**	225	-
Municipal Enforcement							
6400-5-7610 Mobile Radar Replacement	5	-	-	-	-	-	-
Total Municipal Enforcement	5	-	-	-	-	-	-
Total Public Safety	**254**	**428**	**581**	**1,009**	**405**	**225**	-

Public Safety Capital Projects	2019 Budget ($000's)	Formula Funding ($000's)
Public Safety		
Fire & Ambulance -Emergency Operations		
63046571 Fire Hall Study	50	(50)
63137670 Self-Contained Breathing Apparatus	225	(225)
FD0003 Dispatch Console	130	(130)
Total Fire & Ambulance -Emergency Operations	405	(405)
Total Public Safety	**405**	**(405)**

Department PS Public Safety **Division** Fire & Ambulance
Project 63046571 Fire Hall Study

Budget

	2019	2020	2021
	$	$	$
Expenditures	**50,000**		
Funding			
Formula Funding	50,000		
Total Funding	**50,000**		

Description

Purpose

To conduct a Fire Hall Building Capacity Study to inform the deliberations of a planning committee struck to determine Fire Hall specifications and whether re-design or replacement is the most feasible option to recommend based upon established Levels of Service and response times.

Background

Yellowknife Fire Division (YKFD) staff complement has doubled since the new Fire Hall first opened in 1989. At the same time, the City has expanded its public, commercial and residential infrastructure. This infrastructure expansion has resulted in a requirement for more resources to meet the increased calls for service which leads to a requirement for increased Fire Hall capacity to stage apparatus and fire fighting equipment.

The configuration of the existing Fire Hall does not enable YKFD to meet current National Fire Protection Association (NFPA) standards governing response times as well as the NFPA standard containing minimum requirements for the organization and deployment of fire department, emergency medical response and special operations. There are also other requirements for storage, decontamination practices, decontamination areas and safety.

The current Fire Hall has many deficiencies which make this study an important first step in determining future options. The existing building system controls are unable to be significantly modified to accommodate any future expansion of the Fire Hall so any expansion would need to accommodate an enhanced HVAC capacity. The support area has been reduced by past design changes and the present configuration restricts staff's ability to effectively maintain equipment and tools. Maintaining a 24/7 staff rotation in an emergency service creates special requirements for laundering, janitorial and equipment/materials storage.

Current staff levels are creating pressures on existing staff support facilities and any additional increases will only exacerbate the current problem. There is no ability to expand the current capacity of the existing Fire Hall to provide adequate space for training and planning meetings although the requirement for each of these functions continues to expand. Housing the Dispatch Centre in the Fire Hall's existing configuration creates challenges for providing this service out of this facility. It also impacts the ability of the Dispatch Centre to function effectively in providing efficient dispatch

services and providing staff with an adequate work environment.
The Fire Hall cannot accommodate additional 24/7 staff requirements and the limited space for personal storage could become a labour relations issue if improvements are not made in this area. Restroom and shower facilities are inadequate for the current staff complement and the addition of the Dispatch Centre adds new pressures to this existing deficiency.

This summary illustrates why the existing facility and building systems are not adequate to meet YKFD requirements in providing the emergency services expected by the citizens and businesses of Yellowknife.

Operational Impact

There are no O&M implications in conducting a study on the functionality of the Fire Hall. It is anticipated that future changes to the facility resulting from this study will not create significant increases in O&M costs as greater efficiencies in operating costs would always be a main priority in any Fire Hall design project.

Department PS Public Safety **Division** Fire & Ambulance
Project 63137670 Self-Contained Breathing Apparatus

Budget

	2019	2020	2021
	$	$	$
Expenditures	**225,000**	**225,000**	
Funding			
Formula Funding	225,000	225,000	
Total Funding	**225,000**	**225,000**	

Description

Purpose

To replace outdated Self-Contained Breathing Apparatus (SCBA) used by the City of Yellowknife Fire Division (YKFD).

Background

The currently used Self-Contained Breathing Apparatus are becoming outdated and maintenance costs are beginning to increase. The YKFD has already experienced frequent breakdowns and increased wear and tear on the units. There are 20 complete units, 51 spare cylinders and 64 face pieces.

These are not pieces of equipment that get replaced when they break down; they need to be replaced before anticipated failures. The current SCBA's are used when fire personnel are in immediately dangerous to life and health (IDLH) environments and are a very important part of the Personal Protection Equipment of each individual.

Operational Impact

The YFKD does have an O&M budget to maintain personal protective equipment, thus the purchase of new SCBA's will not affect that particular budget.

Department PS Public Safety **Division** Fire & Ambulance
Project FD0003 Dispatch Console

Budget

	2019	2020	2021
	$	$	$
Expenditures	**130,000**		
Funding			
Formula Funding	130,000		
Total Funding	**130,000**		

Description

Purpose

To replace outdated equipment and technology used by the City's Dispatchers when answering calls and communicating during emergency incidents. The new system will replace the outdated telephone system and will provide the appropriate platform for a more efficient server-based telephone solution.

Background

Current equipment used in the dispatch area for receiving and communicating calls received has become outdated and replacement parts are not readily available. Server-based systems are less reliant on mechanical and electronic components and offer a higher level of computer integration and robust features which can enhance the system's capabilities.

The dispatch center is a significant part of YKFD operations and as failures in communications equipment cannot be anticipated, we must regularly upgrade equipment to mitigate against potential equipment failures.

Operational Impact

YKFD does have an O&M budget for maintaining dispatch equipment, so the purchase of the console equipment will not negatively affect YKFD's O&M budget.

CAPITAL FUND - 2019 Capital Projects

Planning & Development Capital Projects	2017 Actuals ($000's)	2017 Carryforward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)
Planning & Development							
Directorate							
6000-5-6575 50 St Revitalization/Downtown Multi-Purpose Building Study	2	75	-	75	**-**	-	-
6000-5-6576 Twin Pine Hill Trail Development	154	347	-	347	**-**	-	-
6001-5-6571 Streetscaping	3	-	-	-	**-**	-	-
6003-5-6570 Smart Growth/Harbour Plan Initiatives	2	-	-	-	**-**	-	-
6003-5-6571 Wiley Road Improvement (Smart Growth/Harbour Plan)	58	-	-	-	**-**	-	-
6003-5-6575 Kam Lake Rd. Improvement (Smart Growth/Harbour)	2	-	-	-	**-**	-	-
6004-5-6570 Land Development Fund Capital Projects	3,860	-	1,250	1,250	**2,860**	2,000	2,000
6005-5-6570 School Draw Parking Lot Improvement	18	232	-	232	**-**	-	-
6006-5-6570 General Plan Review	-	-	100	100	**-**	-	-
Total Directorate	**4,099**	**654**	**1,350**	**2,004**	**2,860**	**2,000**	**2,000**
Planning & Lands							
6100-5-6570 50th Street Streetscaping	3	-	-	-	**-**	-	-
PD0001 Frame Lake West Area Development Plan	-	-	-	-	**-**	-	50
PL0002 Implementation of 50/50 Recommendations	-	-	-	-	**25**	-	-
Total Planning & Lands	3	-	-	-	**25**	-	50
Total Planning & Development	**4,102**	**654**	**1,350**	**2,004**	**2,885**	**2,000**	**2,050**

Planning & Development Capital Projects		2019 Budget ($000's)	Formula Funding ($000's)
Planning & Development			
Planning & Lands			
PL0002	Implementation of 50/50 Recommendations	25	(25)
Total Planning & Lands		25	(25)
Total Planning & Development		**25**	**(25)**

Department PD Planning & Development **Division** Planning & Lands
Project PL0002 Implementation of 50/50 Recommendations

Budget

	2019	2020	2021
	$	$	$
Expenditures	**25,000**		
Funding			
Formula Funding	25,000		
Total Funding	**25,000**		

Description

Purpose

To implement the July 2018 Theia Partners Report recommendations.

Background

In 2018 Administration retained the services of Theia Partners for an exploratory site visit and to meet with some key local people on opportunities from a revitalization perspective. Based on this initial visit, the consulting team provided Administration with a proposal to undertake the additional work that could help frame the revitalization work within the context of Council's Goals and Objectives, specifically Goal #2 Downtown Revitalization, including the presentation of 50th Street revitalization concepts, providing direction on the long and short term plan for public lands on 50th Street, development of a critical path document and updating the strategic plan annually.

On July 9, 2018 Theia Partners presented the report at a Municipal Services Committee meeting. Committee requested that Administration bring forward an implementation plan, which was prepared in October 2018 for consideration. This plan (pending approval) identifies 12 recommendations related to the City's Community Plan, the 50/50 lot, Downtown, as well as Parking and Active Transportation. This budget allocation will be used to implement the recommendations.

Operational Impact

While the majority of the recommendations involves work by Administration, there are key recommendations requiring resources. These items are listed under "Specific Action" in the Implementation Plan.

Gallery

Gallery 1 - Theia Partners Report Implementation Plan

Theme	Specific Action	Timeline	Lead	Cost
Community Plan				
1.	Reflect direction of the Theia report in Community Plan recommendations for Council review.	Q3 2019	PD	Accommodated within existing budget
Make Economic Development a priority				
2.	Using an economic development lens on memorandums to committee, funding applications and City priorities.	Ongoing	PCED	Accommodated within existing budget
50/50				
3.	Review and where applicable discharge caveats ensure the bulk of the site is developable	Q4 2018	PCED	Accommodated within existing budget
4.	Zoning By-law Amendment (density/upzoning/etc.)	Q4 2019	PD	Accommodated within existing budget
5.	Animate the site/ Leverage the arts/Invest in public realm	Q1 2018	PCED	Accommodated within existing budget
6.	Develop an events package for the site (and downtown in general) in consultation with arts groups	Q2 2019	CS	Accommodated within existing budget
Downtown				

Gallery

Gallery 1 - Theia Partners Report Implementation Plan

7.	Amend the Development Incentive By-law to implement the Theia Report	Q4 2019	PD	Accommodated within existing budget
8.	Implement a Façade Improvement Program	Q4 2019	PD	Program recommendations may result in budget considerations
9.	Retail Revitalization Strategy	ON HOLD	PCED	Accommodated within existing budget
10.	See a Business Improvement District	ON HOLD	PCED	Pending CanNor (or other) funding application
Parking and active transportation changes				
11.	Determine the best approach to parking and active transportation in order for Yellowknife's downtown to thrive.	Q4 2019	PD	Accommodated within existing budget
12.	Launch a parking and active transportation campaign based on current walking/biking/transit time to downtown areas from all Yellowknife neighborhoods.	Q1 2010 (winter) Q3 2019 (summer)	PCED	Accommodated within existing budget

	2017 Actuals ($000's)	2017 CarryForward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)	Note
Public Works & Engineering								
Engineering & Garage								
7000-5-7600 Survey Equipment & AutoCAD Software	8	9	-	9	-	-	-	
PW0003 Design and Construction Standards	-	-	-	-	**75**	-	-	
Total Engineering & Garage	**8**	**9**	**-**	**9**	**75**	**-**	**-**	
Public Transit								
7200-5-6570 Transit Upgrades (Federal)	98	115	213	329	-	-	-	
PT0002 Public Transit Review	-	-	-	-	**50**	-	-	
Total Public Transit	**98**	**115**	**213**	**329**	**50**	**-**	**-**	
Fleet Management								
7150-5-7800 Light Duty Vehicles (Class 2)	112	110	-	112	-	-	-	
7150-5-7801 Annual Fleet Replacement Program	-	-	1,127	1,127	**1,207**	1,326	1,335	
7150-5-7802 Street Sweeper	366	-	-	-	-	-	-	
7150-5-7815 Ford Van	35	-	-	-	-	-	-	
7150-5-7822 Snowmobiles	-	26	-	36	-	-	-	
7150-5-7827 Municipal Enforcement Vehicles (Class 7)	57	-	-	62	-	-	-	
7150-5-7843 Large Vehicle Hoist	3	-	-	-	-	-	-	
7150-5-7859 Heavy Duty Vehicles (Class 4)	-	159	-	159	-	-	-	
7150-5-7860 Emergency Equipments & Vehicles (Class 8)	-	250	-	250	-	-	-	
7150-5-7863 Mobile Tractors (Class 6)	-	332	-	425	-	-	-	
7151-5-7801 Ford Cyclone Aerial	823	-	-	-	-	-	-	
7151-5-7856 Mower(s)	21	-	-	-	-	-	-	
FM0001 Preventative Maintenance for Multi-Facility Generator	-	-	-	-	**65**	-	-	
Total Fleet Management	**1,417**	**877**	**1,127**	**2,171**	**1,272**	**1,326**	**1,335**	
Roads & Sidewalks								
7300-5-6575 Intersections Widening & New Traffic Lights	324	-	500	71	**200**	-	-	
7307-5-6571 McMeekan Causeway Abutment Stabilization	-	-	450	75	-	-	-	
7380-5-7611 Traffic Lights Video Detection Equipment	64	16	80	100	**80**	-	-	
7520-5-6570 Drainage Improvements	-	-	50	-	-	-	-	
7615-5-6570 Annual Paving Program	2,986	325	3,925	4,250	**2,785**	-	2,850	
7615-5-6571 Paving Block 501	349	700	-	700	-	-	-	
RS0003 Public Works Garage Upgrades	-	-	-	-	**50**	-	50	
Total Roads & Sidewalks	**3,723**	**1,041**	**5,005**	**5,196**	**3,115**	**-**	**2,900**	
Solid Waste Management								
8000-5-6500 Site Restoration	12	201	-	201	-	-	-	
8000-5-6540 Waste Audit & Long-Term Planning Study	45	30	-	30	-	-	-	
8000-5-6571 Baling Facility Upgrades	-	100	-	100	-	-	-	
8003-5-6570 New Landfill/ Landfill Expansion	86	62	-	62	-	-	-	
8003-5-6571 Transfer Station & Cell Access Improvement	-	-	200	140	-	-	-	
8005-5-7670 Bailing Facility- Mechanical Upgrades	1	47	-	47	-	-	-	
8006-5-7670 Weigh Out Station At SWF	-	-	300	-	-	-	-	
8008-5-6570 Landfill Fire Control & Risk Reduction Plan	-	25	-	25	-	-	-	
8011-5-6570 Monitoring Well Installation	-	-	200	150	-	-	-	
8204-5-7670 Ban Commercial Cardboard	-	25	-	25	-	-	-	
8205-5-6570 Centralized Composting Program	119	74	150	224	-	-	-	
SW0004 Solid Waste Facility Upgrades	-	-	-	-	**100**	-	-	
Total Solid Waste Management	**263**	**564**	**850**	**1,004**	**100**	**-**	**-**	

CAPITAL FUND - 2019 Capital Projects

	2017 Actuals ($000's)	2017 CarryForward ($000's)	2018 Budget ($000's)	2018 Forecast ($000's)	2019 Budget ($000's)	2020 Budget ($000's)	2021 Budget ($000's)	Note
Community Energy Plan (CEP) Initiatives								
7004-5-6200 CEP Community Outreach	-	-	20	20	-	-	-	
7004-5-6540 CEP Waste Strategic Plan	-	-	50	50	-	-	-	
7004-5-6555 Sustainability Coordinator	109	-	100	100	-	-	-	
7004-5-6571 CEP Interior LED Lighting	-	-	100	100	-	-	-	
7004-5-6575 CEP City Hall Boiler Design	-	-	130	130	-	-	-	
7004-5-7670 Community Energy Plan Projects	1,376	1,467	-	1,467	-	-	-	
7004-5-7675 CEP Transportation Initiatives	-	-	-	75	-	-	-	
CP0003 Community Energy Plan Projects	-	-	-	-	**470**	1,770	120	
Total Community Energy Plan (CEP) Initiatives	**1,485**	**1,467**	**400**	**1,942**	**470**	**1,770**	**120**	
Water & Sewer								
9002-5-6540 Water Source Selection Study	104	-	-	15	-	-	-	
9002-5-7600 SCADA Upgrades (Federal)	124	376	650	800	-	-	-	
9011-5-6570 Pump Replacement and New Plant	111	-	-	-	-	-	-	
9040-5-6570 PH#4 Right-Hand Only Exit	11	-	-	-	-	-	-	
9061-5-7610 Pump Replacement Program	23	38	-	38	**100**	100	100	
9062-5-7670 PHs & LSs- Water Meter Replacement	10	4	-	4	-	-	-	
9063-5-7670 PHs- New Piping	40	222	1,313	1,878	-	-	-	
9112-5-6570 Reservoir Inspection & Repairs	388	209	-	-	-	-	-	
9300-5-7670 Backup Power Liftstation Generator Installation	-	90	-	30	-	-	-	
9355-5-7670 Lift Stations Exhaust Fans/Capital Upgrade	40	2	-	2	-	-	-	
9400-5-6570 Lagoon Control Structure Replacement	-	-	-	-	**50**	250	-	
9440-5-6540 Lagoon Phosphorus Study	59	-	-	-	-	-	-	
9615-5-6570 Water & Sewer Infrastructure Replacement	2,734	229	5,435	4,664	**3,840**	4,895	3,028	
9615-5-6571 CMP/W&S Federal Funded	10,544	296	6,000	6,296	-	-	-	
9615-5-6573 CMP/W&S Federal Funded - PAVING	965	296	-	296	-	-	-	
9701-5-6570 Submarine Line Contracted Costs	-	-	80	80	-	-	-	
9703-5-6570 W&S- Service Repairs	11	12	-	12	-	-	-	
WS0001 Federally Funded Capital Projects	-	-	-	-	**425**			
WS0002 Submarine Intake Line Replacement	-	-	-	-	-	14,000	14,000	
WS0006 Pumphouse and Liftstation Upgrades	-	-	-	-	**50**	-	-	
WS0008 Back-up Power Upgrades (Generators)	-	-	-	-	**350**	200	200	
WS0009 Pumphouse 1 Infrastructure Upgrades	-	-	-	-	**500**	-	-	
WS0010 Potable Water Reservoir Repairs	-	-	-	-	**750**	-	-	
WS0012 Sewage Force Main Twinning	-	-	-	-	**250**	-	-	
WS0013 Lagoon Sludge Removal	-	-	-	-	**500**	800	800	
WS0017 Water and Sewer Piped Services Expansion Study	-	-	-	-	**70**	-	-	
Total Water & Sewer	**15,164**	**1,774**	**13,478**	**14,115**	**6,885**	**20,245**	**18,128**	
Total Public Works & Engineering	**22,158**	**5,847**	**21,073**	**24,766**	**11,967**	**23,341**	**22,483**	

Public Works & Engineering Capital Projects	2019 Budget ($000's)	Formula Funding ($000's)	Gas Tax Rebate ($000's)	Other Grants ($000's)	Community Public Infrastructure Funding ($000's)	Mobile Equipment Replacement Reserve ($000's)	User Fees ($000's)
Public Works & Engineering							
Engineering & Garage							
PW0003 Design and Construction Standards	75	(75)	-	-	-	-	-
Total Engineering & Garage	75	(75)	-	-	-	-	-
Public Transit							
PT0002 Public Transit Review	50	(50)	-	-	-	-	-
Total Public Transit	50	(50)	-	-	-	-	-
Fleet Management							
71507801 Annual Fleet Replacement Program	1,207	-	-	-	-	(1,207)	-
FM0001 Preventative Maintenance for Multi-Facility Generator	65	(65)	-	-	-	-	-
Total Fleet Management	1,272	(65)	-	-	-	(1,207)	-
Roads & Sidewalks							
73006575 Intersections Widening & New Traffic Lights	200	(160)	-	(40)	-	-	-
73807611 Traffic Light Upgrades	80	(80)	-	-	-	-	-
76156570 Annual Paving Program	2,785	(575)	-	-	(2,210)	-	-
RS0003 Public Works Garage Upgrades	50	(50)	-	-	-	-	-
Total Roads & Sidewalks	3,115	(865)	-	(40)	(2,210)	-	-
Solid Waste Management							
SW0004 Solid Waste Facility Upgrades	100	(100)	-	-	-	-	-
Total Solid Waste Management	100	(100)	-	-	-	-	-
Community Energy Plan (CEP) Initiatives							
CP0003 Community Energy Plan Projects	470	(220)	(250)	-	-	-	-
Total Community Energy Plan (CEP) Initiatives	470	(220)	(250)	-	-	-	-
Water & Sewer							
90617610 Pump Replacement Program	100	-	(100)	-	-	-	-
94006570 Lagoon Control Structure Replacement	50	-	(50)	-	-	-	-
96156570 Annual Water & Sewer Replacement	3,840	-	(3,840)	-	-	-	-
WS0001 Federally Funded Capital Projects	425	-	-	(319)	-	-	(106)
WS0006 Pumphouse and Liftstation Upgrades	50	-	-	-	-	-	(50)
WS0008 Back-up Power Upgrades (Generators)	350	-	(350)	-	-	-	-
WS0009 Pumphouse 1 Infrastructure Upgrades	500	-	(500)	-	-	-	-
WS0010 Potable Water Reservoir Repairs	750	-	(420)	-	-	-	(330)
WS0012 Sewage Force Main Twinning	250	-	-	-	-	-	(250)
WS0013 Lagoon Sludge Removal	500	-	-	-	-	-	(500)
WS0017 Water and Sewer Piped Services Expansion Study	70	-	-	-	-	-	(70)
Total Water & Sewer	6,885	-	(5,260)	(319)	-	-	(1,306)
Total Public Works & Engineering	**11,967**	**(1,375)**	**(5,510)**	**(359)**	**(2,210)**	**(1,207)**	**(1,306)**

Department	PW Public Works & Engineering	**Division**	Directorate & Engineering
Project	PW0003 Design and Construction Standards		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**75,000**		
Funding			
Formula Funding	75,000		
Total Funding	**75,000**		

Description

Purpose

To update the City's land development, design and construction standards.

Background

The City's current design standards were adopted in 1987 specifically for Public Works projects, and are out of date. Since 1987, the City has informally updated its standards for developments, parks, trails, green spaces, roadways, sidewalks, water, sewer and storm infrastructure.

This project will gather these changes into a formal document that can be provided to developers, contractors and consultants. The final document will include standards for design values, construction requirements and drawing/drafting requirements as well as process documentation on how to develop land within the City of Yellowknife. Creating the document will require participation from all departments in order to ensure data and documentation being standardized meets the requirements of all departments. This project will also include professional development and electronic document creation to produce a refined final product for public dissemination.

Having updated standards in place will also aid in reducing document preparation for tenders (as tenderers will be referred to the standards), reducing questions from developers on the City's requirements for new developments, and in standardizing record drawing files received from consultants and developers so that information can be easily transferred into the City's Geographic Information System (GIS) databases and integrated into City Explorer.

Operational Impact

This project will update, organize and formalize information from multiple departments. This should help increase staff efficiency as well as reduce public frustration, as all information will be in a single-point resource document.

Department PW Public Works & Engineering **Division** Public Transit
Project PT0002 Public Transit Review

Budget

	2019	2020	2021
	$	$	$
Expenditures	**50,000**		
Funding			
Formula Funding	50,000		
Total Funding	**50,000**		

Description

Purpose

To determine if another model of public transportation will better suit the needs of Yellowknife.

Background

The City provides both conventional and accessible transit services through contracted services. Since 2006, three separate studies have been performed on the conventional transit services. These were:

2006 - Transit Marketing Study
2007 - Transit Route Analysis
2015 - Transit Route Reliability Study

Each of the studies looked at different aspects of the transit system and provided insight on improvements that could be implemented to improve overall transit service. The City has worked to implement the recommended improvements, which have greatly improved the conventional transit services.

With Yellowknife being a relatively small community, there are other quasi-transit options that may be feasible instead of a conventional transit system. This study will identify alternative transit models that could be used alongside or instead of the conventional transit system.

Operational Impact

The study itself will have negligible impacts on operations. However, the results or recommendations of the study may provide alternative ways of administering the City's transit systems. Depending on decisions made as a result of this study, this may have a positive or negative impact on transit operational budgets.

Department PW Public Works & Engineering **Division** Fleet Management
Project 71507801 Annual Fleet Replacement Program

Budget

	2019	2020	2021
	$	$	$
Expenditures	**1,206,790**	**1,326,156**	**1,334,650**
Funding			
Reserves	1,206,790	1,326,156	1,334,650
Total Funding	**1,206,790**	**1,326,156**	**1,334,650**

Description

Purpose

To continue replacing fleet units according to the City's Fleet Management practices.

Background

The mobile equipment fleet has a replacement value of $16.2 million and must be maintained to meet the service levels expected by residents. The City has a fleet of 148 pieces of heavy-duty and mobile equipment that support Fire and Ambulance, Road Maintenance, Water and Sewer Maintenance, Solid Waste, Parks, Arenas and Administrative functions, as well as 26 stationary engines for emergency power generation and fire pumping capacity.

Fleet management practices allow the City to properly budget and plan the replacement of all fleet vehicles on a regular basis. These policies and practices help to mitigate risk and repair costs associated with aged vehicles. As vehicles and equipment get older, the operation and maintenance costs of those vehicles increase, with limited resources available for maintenance and repairs. These vehicles should be replaced on a scheduled basis to reduce downtime due to repairs or failures, which could negatively impact the delivery of City services such as snow removal or water/sewer repairs.

Summary of Units:

Small Equipment – 30 units
Small equipment includes miscellaneous equipment required by City departments to do their work. Included are: riding mowers, snowmobiles (Municipal Enforcement Division), All-Terrain Vehicles (Fire Fighters), light trailers (Community Services and Public Works), line-painters, crack sealing equipment, trailer mounted water pumps, and ground thawing equipment. Equipment in this group has a varied life expectancy and

replacement cost.

Light-Duty Trucks – 41 units
According to the City of Yellowknife Fleet Management practices, these vehicles should be reviewed for replacement after seven years and replaced after ten years. The City currently has 41 pickup trucks and vans in the fleet. The ages vary from one year to more than ten years.

Medium-Duty Trucks – 8 units
According to the City of Yellowknife Fleet Management practices, these vehicles should be reviewed for replacement after six years and replaced after ten years. The City currently has 8 medium-duty trucks in the fleet.

Heavy Trucks – 15 units
The 15 heavy-duty trucks and trailers include trailers, tandem tractors, and dump trucks. The heavy trucks are to be replaced every twelve years. Trucks are used for City projects and snow removal in the winter. The cost of operating these vehicles rather than hiring contractors is approximately half. Each truck is operated for approximately 1,000 hours per year, saving the City $45,000 a year for each truck it operates, rather than contracting out. Trailers are reviewed when aged out. If practical, the trailer is refurbished and returned to service. The dump trailer (due to more use and normal wear and tear) is replaced when aged out.

Heavy Equipment – 10 units
The heavy equipment is to be replaced every 12 years, except specialty equipment, which is explained under that heading. Each piece of heavy equipment is operated for approximately 1,000 hours per year, saving the City $45,000 a year for each piece of heavy equipment it operates. As heavy equipment gets older, increased maintenance and repairs are required, such as replacing motors and transmissions at a cost of $30,000 and $20,000 respectively. Breakdowns inevitably occur when equipment is needed, resulting in a cost to the City to engage contractors.

Mobile Tractors – 9 units
This includes zambonis, skid steers, compactors, and forklifts. The anticipated life span of these units is ten years.

Municipal Enforcement Vehicles – 4 units
These are to be replaced every four years or 100,000 kilometres. Due to high usage, Municipal Enforcement vehicles require a high amount of maintenance (nearly five times that of similar vehicles in the fleet). For this reason, it is important to maintain the replacement cycles of these vehicles. One Municipal Enforcement vehicle must be replaced yearly to maintain the City standards and in order to reduce O&M costs and labour requirements.

Emergency Vehicles – 10 units
This includes fire trucks, ambulances and water trucks. Due to increased demand, the replacement life cycle standard was re-evaluated by Public Works and the Fire Division, and the standard for replacement was reduced from 30 years to 20 years for most fire fighting equipment. Ambulances are now replaced on a 12-year cycle due to the high amount of use and reliability issues with ambulances as they get older. The City has three ambulances and one is replaced every four years. The newest is placed on “first out the door” service and the oldest is surplus.

Seasonal Vehicles -- 18 Units
Once a vehicle such as a light duty pick-up truck is removed from its primary use, it is placed into a lower priority use, such as vehicle used for summer student work activities. If the repair costs of a summer vehicle exceed an estimated cost of $500, the vehicle may be removed from service at the discretion of the Director of Public Works and Engineering.

Stationary Engines – 26 Units
The City's fleet mechanics also maintain and service 26 stationary engines. These include standby generators for City water and sewer supply and City facilities (City Hall, Fire and Ambulance Division, Multiplex / Fieldhouse). The stationary engines provide standby electricity for water and sewer services in times of power outage or natural disaster. The estimated value of the stationary engines is approximately $4.8 million. Many of the existing engines are older: five are over 30 years old, twelve are over 20 years old, fourteen are over 10 years old, and only seven are under 10 years old. Parts are often unavailable for engines over 20 years old. Although these engines get little use, even small breakdowns may lead to lengthy repairs.

The Mobile Equipment Reserve Fund (MERF) is not used to replace stationary engines even though the Fleet resources are used to maintain them. It is recommended to departmental managers that the older stationary engines be replaced, and that one engine a year be replaced until all stationary engines are less than 20 years old.

Specialty Equipment – 9 Units
These pieces of equipment fall into their own category due to their level of importance to City operations. They are graders, street sweepers and vactor trucks. These are replaced more frequently because vital City operations would suffer due to prolonged breakdowns or repairs, which would have a direct impact on residents, vehicular traffic, emergency vehicle routes and the City’s transit system.

Operational Impact

The total O&M costs of the units to be replaced are shown in the attached table. (Gallery 1)

Gallery

Gallery 1

2019 Fleet Replacement Schedule

Unit #:	Description:	Year:	Class:	Replace Year:	Estimated Budget:	*O&M To Date:	Hours:	Kilometers:	End Use:
1002-05	F-250 W/Service Box	2005	2	2015	65,500.00	11,360.35	226	82,081	Auction
1016-07	Ram 2500	2007	2	2017	65,500.00	13,950.35	7,918	120,021	Auction
1021-08	4X2 Ranger	2008	2	2018	35,550.00	8,015.98	3,798	64,856	Repurpose to Seasonal Use
1025-08	4X4 Ranger	2008	2	2018	36,800.00	21,868.66	303	163,328	Repurpose to Seasonal Use
1075-07	Dodge ram 1500 4X4	2007	2	2018	37,800.00	17,959.16	4,550	97,362	Trade in/estimated $1500- $2000
1123-14	Ford Explorer	2014	7	2018	63,340.00	22,270.95	5,812	82,276	Repurpose to CS Pool Division
1160-05	60" Exmark Mower	2005	1	2018	18,300.00	1,117.58	N/A	N/A	Auction
2011-07	226B Cat Skid Steer	2007	5	2019	90,000.00	99,067.79	4,474	N/A	Trade in/estimated 10-12K
2031-06	LT8500 Sterling dump truck	2006	4	2018	165,500.00	96,307.98	10,529	164,648	Trade in/Estimated 25-35K
2032-06	LT8500 Sterling dump truck	2006	4	2018	165,500.00	56,909.22	12,157	215,518	Trade in/Estimated 25-35K
2060-06	Cat M318C Excavator	2006	5	2018	270,000.00	155,558.60	9,293	N/A	Trade in/Estimated 35-45K
2189-11	Freightliner M2 106 Roll-Off	2011	4	2023	193,000.00	143,225.72	10,300	126,265	Trade in/Estimated 25-35K
					$ 1,206,790.00	$ 647,612.34			

City of Yellowknife Fleet Replacement Cycle Guidelines Summary:

Class:	Description:	Examples:	Life Cycle:
1	Small Equipment	Riding mower, ground thaw, line painter, snowmobiles, ATVs, etc.	Different replacement cycles dependant on use.
2	Light Duty	Cars, vans, half ton trucks, 3/4 ton trucks	Review after 7 years, replace after 10yrs then repurposed fore seasonal use.
3	Medium Duty	One ton to 5 ton trucks, includes Zambonis	Review after 6 years or 100,00kms, replace after 10 years.
4	Heavy Duty	Trucks/Trailers unused for sanding, snow removal, waste removal, etc.	Review after 6 years or 6000 hrs, replace after 12 years.
5	Heavy Equipment	Loades, dozers, excavators, backhoes, plows, skid steer, etc.	Review after 8 years or 10,000 hrs, replace after 12 years. Skid Steer review after 10 yrs. replace after 12 yrs.
6	Mobile Tractors	Heavy rollers, sander bodies, steamers, etc.	Review after 8 years or 10,000 hrs, replace after 10 years.
7	Municipal Enforcement	Cars, trucks, SUV ("sport utility vehicle").	Replace after 4 years or 100,000 kms.
8	Emergency Equipment	Fire trucks, tankers, aerial ladder, ambulance, etc.	Replaced based on industry standards and NFPA requirements.
9	Seasonal Vehicles	Any vehicle replaced but still serviceable, summer trucks, etc.	Not replaced, removed disposed of if repair costs exceed $500.
10	Stationary Engines	Used to pump water, sewage, produce emergency power.	Review after 15 years, replacement after 20 years.
11	Critical Equipment	Graders, street sweepers, vactor trucks, etc.	Graders replaced every 6 years with expected trade-in of $150K. Vactor trucks reviewed after 6 years, replaced after 12 years. Street sweepers reviewed after 6 years, replaced after 12 years.
12	Specialty Equipment	5 Ton trucks equipped with boiler/steamer, ground thaw equip, picker, water pumps, light duty trailers	Cab & chassis reviewed after 15yrs replaced after 20 yrs. (Boilers and steamers replaced under O&M budget)
13	Hybrid Vehicles		Review after 12 yrs. replace after 15 yrs.

*Note: Vehicles that are repurposed for seasonal use will remain with the fleet for approximately 20 years (total use).

*Note: All maintenance costs are 2013 - 2018 From 'City Works' Maintenace Work Order System

Department PW Public Works & Engineering **Division** Fleet Management
Project FM0001 Preventative Maintenance for Multi-Facility Generator

Budget

	2019	2020	2021
	$	$	$
Expenditures	**65,000**		
Funding			
Formula Funding	65,000		
Total Funding	**65,000**		

Description

Purpose

To complete the five-year preventative maintenance program as recommended by the manufacturer.

Background

The City of Yellowknife follows the CSA Emergency Electrical Power Supply for Buildings Standards, C282-09. To be compliant, our largest generator has to be taken off line to perform the recommended preventative maintenance tasks as defined by the manufacturer.

The majority of the cost for this project is for a rental generator that is required to provide temporary back-up power while the City generator is out of service for maintenance. The City has two estimates (2018) from local contractors for approximately $65,000.00. This is the anticipated cost of the project.

Operational Impact

Should the City not keep up with the recommended maintenance on generators, we risk failure at critical moments, ultimately causing costly environmental spills and downtime in key facilities.

This project is in line with asset management principles.

Department PW Public Works & Engineering **Division** Roads & Sidewalks

Project 73006575 Intersections Widening & New Traffic Lights

Budget

	2019	2020	2021
	$	$	$
Expenditures	**200,000**		
Funding			
Formula Funding	159,600		
Other Grants	40,400		
Total Funding	**200,000**		

Description

Purpose

To complete road and intersection improvements at the 44 Street - Franklin Avenue intersection, including the installation of a signalized intersection to better accommodate the flow of traffic in the area.

Background

Traffic at the intersection of 44 Street and Franklin Avenue (Gallery 1) has increased over the last few years due to increased development in the area.

In 2011 and 2015, traffic studies were conducted for the intersection as a result of the Twin Pine Hill development. The results of this study indicated that while the intersection of 44 Street and Franklin Avenue did not meet the Transportation Association of Canada (TAC) requirements for a signalized intersection, it should be monitored due to the increase in side street traffic entering the intersection from 44 Street.

This intersection forms part of Yellowknife Transit's Routes A, B and C. During peak periods, Route A, which is the only route that turns left from 44 Street onto Franklin Avenue, can experience up to a five minute delay due to traffic volumes on Franklin Avenue.

In addition to increases in vehicular traffic at this intersection, there has been an increase in pedestrian traffic due to the new development. The current signalized crosswalk at 44 Street and Franklin Avenue was installed using the best equipment available for the site conditions. However it is difficult to see due to the volume of street signs and overhead power lines in the area.

Installation of traffic lights at the intersection will include:

- Moving power lines at the intersection from overhead to underground
- Moving communication lines from overhead to underground
- Making improvements to the intersection approach from 44 Street by St. Patrick High School
- Installing traffic lights with communication and video detection equipment
- Installing pedestrian countdown timers

This project was expected to be done in 2018, however the actual costs for this project came in much higher than the anticipated budget of $500,000. Based on the pricing received to date, it is now anticipated that the cost to install these traffic lights will be $700,000, $200,000 more than originally expected. The City has already purchased the equipment for the traffic lights, including the poles, in the anticipation of this project moving forward in 2019.

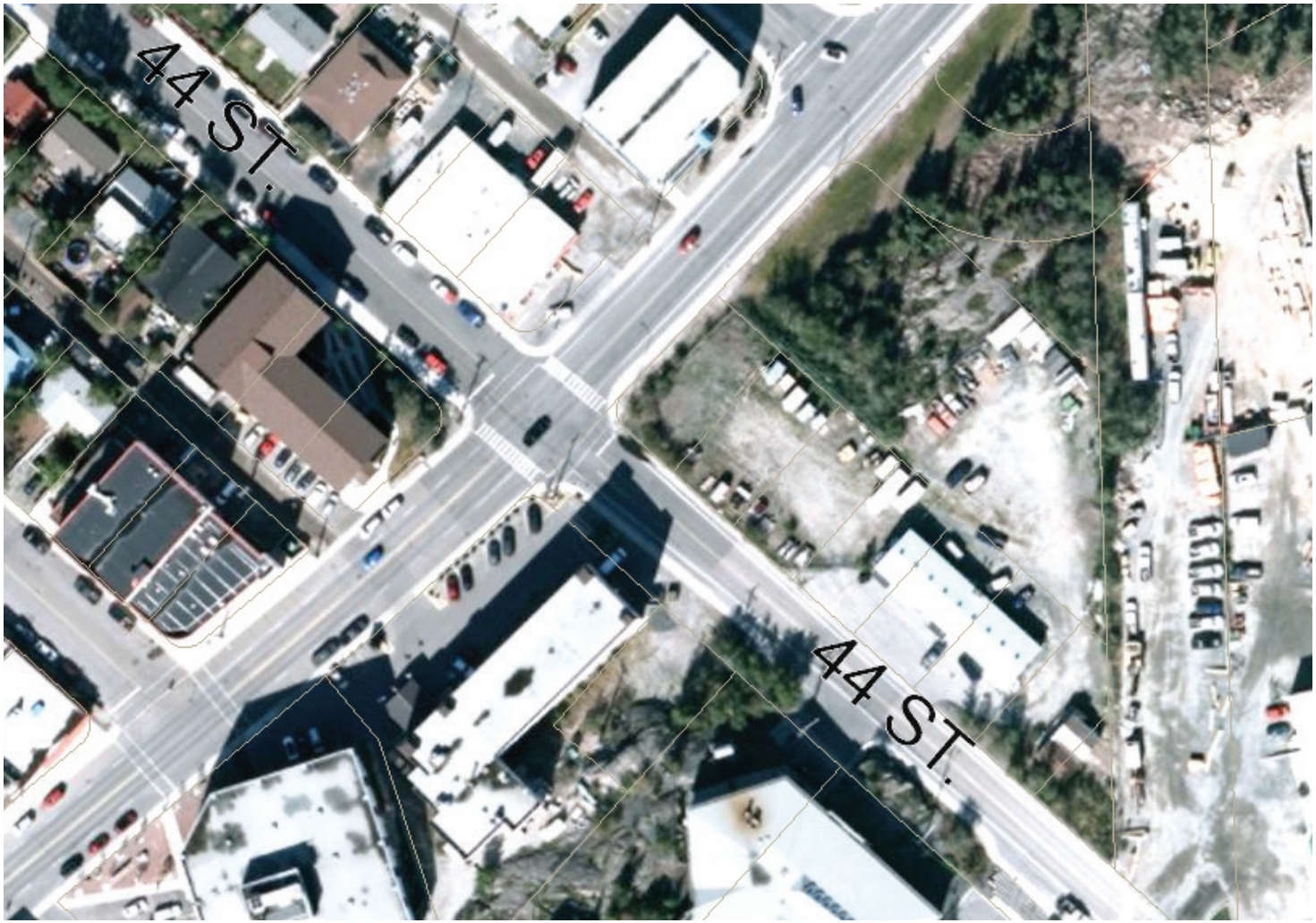
The cost of this project is split between the City and the Twin Pine Hill developer with the developer contributing 20.2% of the full cost of the traffic light. With the expected cost of $700,000 for the installation, the developer's contribution will be $141,400 with the remaining $558,600 coming from the City.

Operational Impact

The project will increase the number of traffic controlled intersections to 20, which is approximately a 6% increase in the operational budget for traffic light maintenance as well as traffic light power costs.

Gallery

Gallery 1: Aerial photo of the 44 Street/Franklin Avenue intersection. The new Twin Pine Hill development is to the right.



Department PW Public Works & Engineering **Division** Roads & Sidewalks
Project 73807611 Traffic Light Upgrades

Budget

	2019	2020	2021
	$	$	$
Expenditures	**80,000**		
Funding			
Formula Funding	80,000		
Total Funding	**80,000**		

Description

Purpose

To improve traffic lights at signalized intersections by introducing technology that makes the intersections safer for vehicular and pedestrian traffic.

Background

There are nineteen intersections which rely on traffic lights for reliable vehicular flow. In recent years, the City has begun installing equipment that uses different technologies to aid in traffic flow. These technologies include video detection and countdown pedestrian timers.

Video Detection Equipment
The video detection equipment (Gallery 1) is the new standard in detection and data collection and is easy to install and program. This equipment has a proven field detection accuracy of 98% according to the manufacturer's specifications; this also includes motorcycles and bicycles. The cameras can also capture traffic data, such as traffic counts of cars, trucks and pedestrians, as well as vehicle speeds. However, vehicle speed data can only be used for design methods and not as a method of speed enforcement.

Most intersections will require four cameras, one for each direction of traffic. Intersections along Franklin Avenue in the downtown core use vehicle detection for cross streets only, which will require the installation of only two cameras per intersection. Additional cameras will be installed along Franklin Avenue for data collection.

Countdown Pedestrian Timers
In 2017 when new traffic lights were installed at the intersection of Finlayson Drive and Kam Lake Road, countdown pedestrian timers were included in the installation. This equipment uses the typical pedestrian crossing signals alongside a numerical countdown that ends when the light turns yellow (Gallery 2). The use of this type of signal allows pedestrians to know how much time they have to cross the intersection.

See Gallery 3 for anticipated remaining investments, not in any order of priority.

This project has been ongoing since 2013 in order to improve vehicle detection at intersections with traffic lights. To date, video detection equipment has been installed at eight intersections and countdown timers at two intersections. It has been the City's goal to install video detection equipment at two intersections per year. Public Works recommends continuing with this project in order to improve the overall flow of traffic in Yellowknife. The recommended annual budget is shown in Gallery 4.

Operational Impact

The video detection will collect data such as traffic counts, which would otherwise require a person counting vehicles, to be used for timing and coordination patterns. The countdown timers will aid in informing pedestrians of the time they have to safely cross the intersection.

Gallery

Gallery 1: Autoscape Video Detection Equipment.

Gallery

Gallery 2: Countdown Pedestrian Signal.

Gallery

Gallery 3: Traffic Light Intersection Estimates.

Intersection	Estimate
48 Street	$25,000.00
49 Street	$25,000.00
50 Street	$25,000.00
51 Street	$25,000.00
52 Street	$25,000.00
53 Street	$25,000.00
54 Street	$25,000.00
Franklin/Old Airport Road	$60,000.00
Byrne Road	$60,000.00
Range Lake Road	$60,000.00
Total Estimate:	**$355,000.00**

Gallery

Gallery 4: Recommended Annual Budget for Traffic Light Upgrades.

Year	Recommended Budget
2019	$80,000
2020	$90,000
2021	$90,000

Note:
The 2020 and 2021 recommended budget were deferred due to the City's limited resources.

Department PW Public Works & Engineering **Division** Roads & Sidewalks
Project 76156570 Annual Paving Program

Budget

	2019	2020	2021
	$	$	$
Expenditures			
Old Airport Road (Norseman to end of RLR left turn	935,000		
49 Street (49 Ave to end of City Property)	300,000		
Forrest Drive (51A Ave to Reservoir Rd)	800,000		
Northlands -Phase 2	650,000		
Borden Drive Right Turn Lane at Old Airport Road	100,000		
45 Street (49 Ave to Franklin)			700,000
School Draw Avenue (46 St to 44 St)			800,000
Con Road (Rycon to Con Place)			700,000
52 Street (Franklin to 51 Ave)			650,000
Total Expenditures	**2,785,000**		**2,850,000**
Funding			
Formula Funding	575,000		640,000
Community Public Infrastructure Funding	2,210,000		2,210,000
Total Funding	**2,785,000**		**2,850,000**

Description

Purpose

To repair or replace asphalt, concrete and other appurtenances on City streets as required, including storm water infrastructure (Gallery 1). This project also installs concrete, asphalt and landscaping (if specified) on newly developed streets in the City.

Background

The typical design life of pavement is generally between 20 and 25 years, but it will vary significantly due to various factors such as traffic volumes, vehicle types, geotechnical conditions, construction practices, and adequate maintenance. The design life of 20 to 25 years applies to most city streets, except for the Kam Lake Industrial Subdivision (Gallery 2), where the roads were historically paved with no base reconstruction. This construction practice has changed and all roads in Yellowknife now receive the same base preparation prior to paving (Gallery 3).

The construction of new roads generally coincides with the development of new subdivisions. The replacement of roads generally follows the

replacement of water and sewer infrastructure. Otherwise, paving is scheduled for reconstruction when a road is in poor condition and may be a danger to the public or when maintenance and repairs are no longer cost-effective. The paving of roads may be done in the same year as water and sewer infrastructure replacement or may be delayed a year or two to allow for settlement, depending on the ground conditions.

As streets are reconstructed, the City works with Northland Utilities Limited to ensure that street lighting levels are evaluated and increased to comply with national standards. Additional underground duct work is being coordinated in this work with Northland Utilities Ltd., NorthwesTel Inc. and NorthwesTel Cable Inc. to answer present and future needs.

As new areas of Yellowknife are developed and constructed, the road asphalt and concrete infrastructure must also be installed. There are two new areas of the City that require new road construction, they are:

Northlands Area, which includes Stinson Road, Fairchild Drive, Bellanca Avenue, Norseman Drive, Catalina Drive, and Anson Drive. Phase 1, which included Anson Drive, Catalina Drive, and Norseman Drive was completed in 2018. The remaining streets are scheduled to be done in 2019.

Hall Crescent, which will be done in three paving phases with the first two phases having been done in 2017 and 2018, and the final phase to be done in 2022, and includes Gibbon Drive.

Considerations when determining areas of reconstruction include:

Condition and age of asset
Reoccuring maintenance costs
Priority level of roadway
Number of impacted residents and services
Underground infrastructure requirements.

Gallery 4 shows the budgeted paving program and Gallery 5 and Gallery 6 show the recommended paving program.

Operational Impact

Aging infrastructure has an operational cost of between two and four percent of replacement costs. Replacing this infrastructure will allow the department to focus operational and maintenance activities on other roads, sidewalks and storm water appurtenances in the City.

Gallery

Gallery 1: Example of failing concrete and storm infrastructure.

Gallery

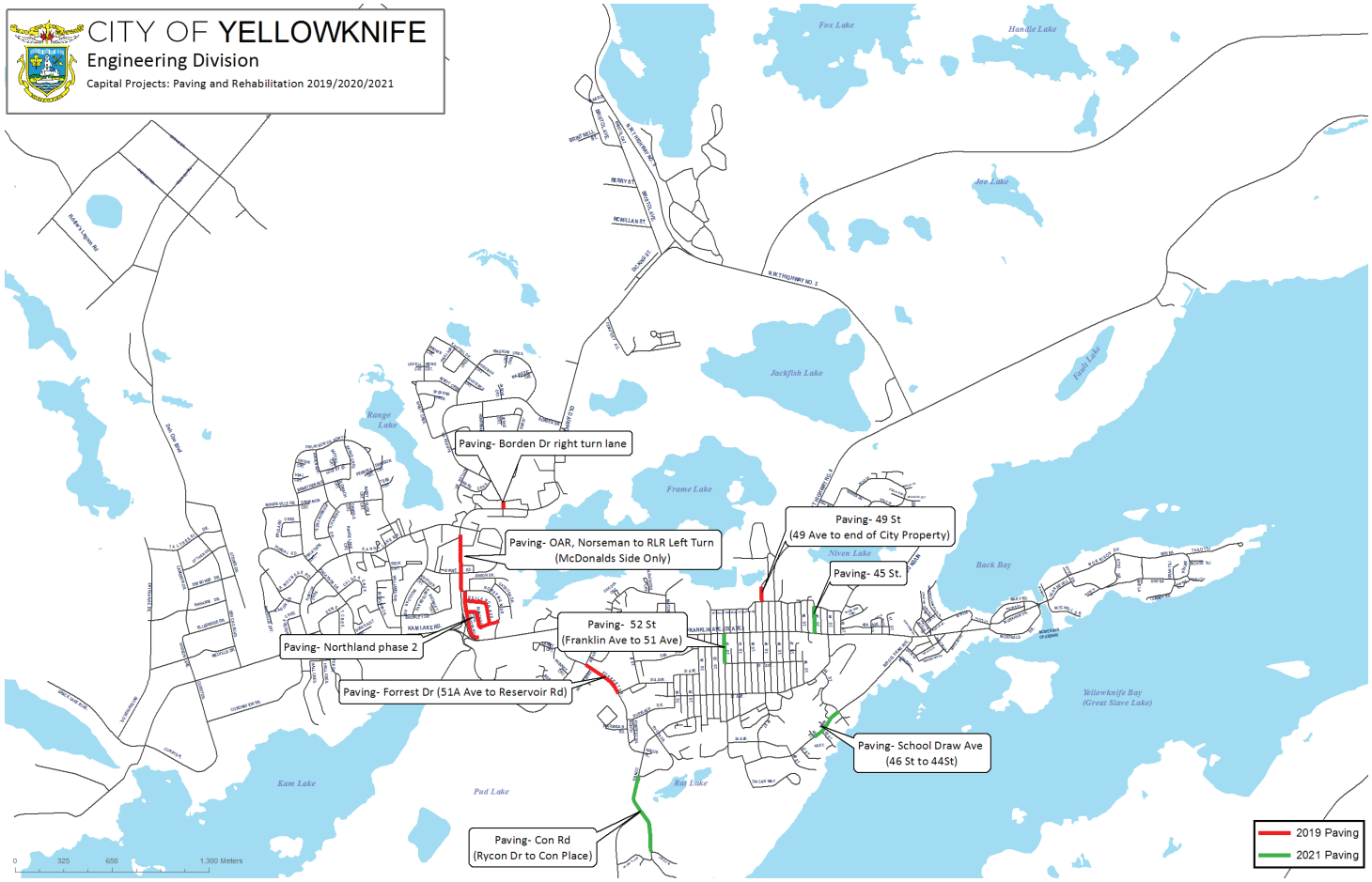
Gallery 2: Paving contractor on Utsingi Drive in Kam Lake.

Gallery

Gallery 3: Paving contractor on Kam Lake Road.

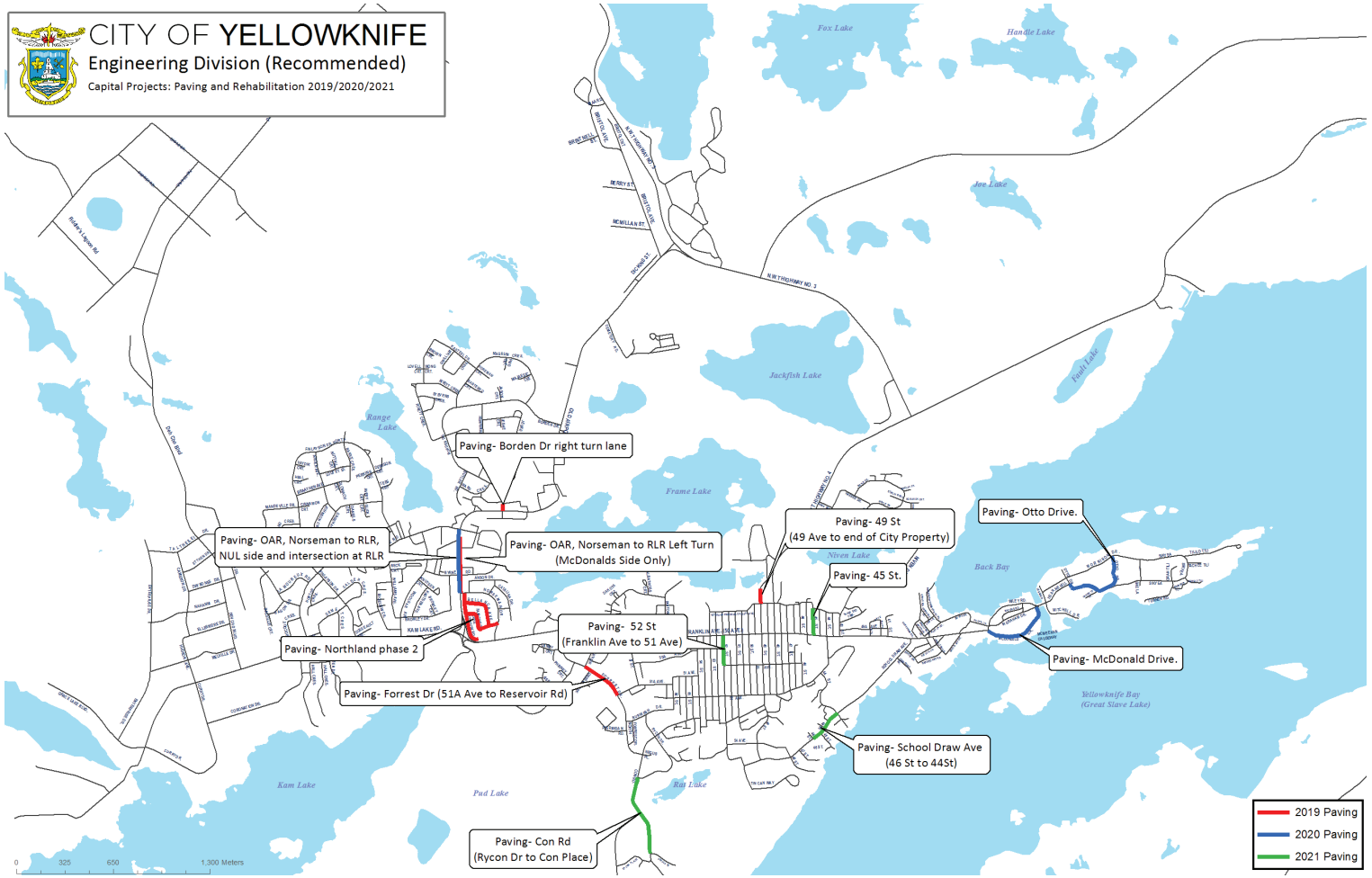
Gallery

Gallery 4: 2019 to 2021 Paving Program Budget.



Gallery

Gallery 5: 2019 to 2020 Recommended Paving Program.



Gallery

Gallery 6: Recommended Annual Paving Program.

Recommended Annual Paving Program	2019	2020	2021
Old Airport Road (Norseman to end of RLR left turn lane, McDonald's Side only)	$935,000		
49 Street (49 Ave to end of City Property)	$300,000		
Forrest Drive (51A Ave to Reservoir Rd)	$800,000		
Northlands -Phase 2	$650,000		
Borden Drive Right Turn Lane at Old Airport Road (Walmart)	$100,000		
Otto Drive		$700,000	
McDonald Drive		$800,000	
Old Airport Road (Norseman to RLR, NUL side plus RLR intersection)		$1,800,000	
45 Street (49 Ave to Franklin)			$700,000
School Draw Avenue (46 St to 44 St)			$800,000
Con Road (Rycon to Con Place)			$700,000
52 Street (Franklin to 51 Ave)			$650,000

Note:
The 2020 recommended budget were deferred due to the City's limited resources.

Department PW Public Works & Engineering **Division** Roads & Sidewalks
Project RS0003 Public Works Garage Upgrades

Budget

	2019	2020	2021
	$	$	$
Expenditures	**50,000**		**50,000**
Funding			
Formula Funding	50,000		50,000
Total Funding	**50,000**		**50,000**

Description

Purpose

To continue ongoing repair and maintenance of the Public Works Garage facility.

Background

The City Garage houses a large portion of the City's fleet, valued at approximately $18 M, on a floor area of 1,971 square meters. The building is essential to the City's response to both daily and emergency circumstances. The yard at the garage includes storage areas and buildings, fuel pumps, energized parking stalls and other items that require upgrades when problems are discovered.

Over the past several years, upgrades have been done on the Garage as required by both an occupational health and safety audit and a technical assessment. Annual repairs and maintenance of a capital nature must continue in order to maintain the asset.

The work plan for 2019 includes window replacement. The windows along the longest wall of the main garage bay are old and are a major source of heat loss. Only every second window will be replaced. Every other window will be removed, the hole re-insulated and siding replaced.

The City recommends this project be an annual project in order to keep up with the maintenance requirements of the buildings in this complex. The recommended annual budget for this project is shown in Gallery 1.

Operational Impact

Water from condensation on the windows will damage the electrical panels located below and is a source of heat (energy) loss for the building. This project is consistent with standard asset management principles.

Gallery

Gallery 1: Recommended Annual Budget for Public Works Garage Upgrades.

Year	Recommended Budget
2019	$50,000
2020	$50,000
2021	$50,000

Note:
The 2020 recommended budget was deferred due to the City's limited resources.

Department	PW Public Works & Engineering	**Division**	Solid Waste
Project	SW0004 Solid Waste Facility Upgrades		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**100,000**		
Funding			
Formula Funding	100,000		
Total Funding	**100,000**		

Description

Purpose

To complete ongoing upgrades of Solid Waste Facility assets.

Background

This project will complete upgrades to the Solid Waste Facilities that cannot otherwise be completed by City staff as routine operation and maintenance activities.

The equipment currently in use at the Baling Facility consists of a dust collector unit, heating, ventilation and air conditioning (HVAC) burners, overhead doors, fire pump and sprinkler system, fire alarm system, electrical components, air compressor and boilers for in-floor heating.

Previous items completed under this budget allocation include:

hydraulic ram replacement on the baler
overhead door replacement
fire suppression pump replacement

Proposed work for 2019 includes a new boiler for the baling building.

The City recommends this project be an annual project in order to keep up with the maintenance requirements of the Solid Waste Facility. The recommended annual budget for this project is shown in Gallery 1.

Operational Impact

These projects will have positive operational impacts in regards to repair and maintenance costs and are consistent with standard asset management principles.

Gallery

Gallery 1: Recommended Annual Budget for Solid Waste Facility Upgrades.

Year	Recommended Budget
2019	$100,000
2020	$100,000
2021	$100,000

Note:
The 2020 and 2021 recommended budget were deferred due to the City's limited resources.

Department	PW Public Works & Engineering	**Division**	Community Energy Plan
Project	CP0003 Community Energy Plan Projects		

Budget

	2019	2020	2021
	$	$	$
Expenditures			
Sustainability Coordinator	120,000	120,000	120,000
Centralized Biomass Boiler (City Hall)	250,000	1,550,000	
SWMP Implementation	100,000	100,000	
Total Expenditures	**470,000**	**1,770,000**	**120,000**
Funding			
Formula Funding	220,000		120,000
Gas Tax Rebate	250,000	615,000	
Community Public Infrastructure Funding		1,155,000	
Total Funding	**470,000**	**1,770,000**	**120,000**

Description

Purpose

To implement projects in line with the CIty's Community Energy Plan (CEP) and Waste Management Plans.

Background

This project contains three items that relate to the City's Community Energy Plan and Waste Management Plans.

Sustainability Projects Coordinator

The Sustainability Projects Coordinator (previously titled the Energy Coordinator), was made a permanent position with the City in 2009. The primary duties of this position are:

Researching, developing and implementing policies and projects that fall within the environmental sustainability portfolio including the Community Energy Plan and Waste Diversion Projects
Participating in the CEP Implementation Committee
Developing policy recommendations for the implementation of solid waste management and waste diversion techniques

This position has grown in its scope of work and has been instrumental in implementing the Community Energy Plan and waste diversion strategies throughout the City.

Centralized Boiler/District Heating (City Hall)

The City's Community Energy Plan sets out ambitious targets for greenhouse gas emissions, renewable energy use, and increased energy efficiency. One way to meet these targets is to implement centralized boiler systems that are used to heat numerous buildings, such as the one that was recently installed to heat the Multiplex, Fieldhouse, Fire Hall, City Garage, and Community Services Shop.

In 2018 the City, together with representatives from the RCMP, the Department of National Defence, and the Government of the Northwest Territories worked together on the initial steps for designing and building a centralized boiler system to heat the represented party buildings in downtown Yellowknife. The timeline for this project is anticipated as follows:

2018	Design and operational options; feasibility of options
2019	System design
2020	Construction

At the completion of this project, five buildings will be heated using a centralized boiler system including City Hall, the Legislative Assembly, the Museum, the RCMP Station and the DND building.

Strategic Waste Management Plan

In 2018, the City developed a Strategic Waste Management Plan (SWMP) which provides several recommendations on ways to decrease costs, increase landfill longevity, and maximize waste diversion. It builds on the waste reduction goals of the Corporate and Community Energy Plan and previous waste composition studies, composting projects, and waste management plans to provide environmentally responsible waste management solutions that are cost-effective and address concerns and expectations of the public and stakeholders.

The SWMPincludes thirty-one recommended options across the following seven broad categories:

Education andPromotion
Residential Waste Reduction andDiversion
Industrial, Commercial, and Institutional Waste Reduction
Infrastructure and Operating Enhancements

Regulatory Options
Residuals Management
Monitoring and Reporting

Initial implementation of some of these recommendations has begun and this project will continue the implementation efforts. The plan will allow the City to work towards the recommended goal of reducing waste generated to 500 kilograms per capita by 2030 from the current estimate of between 1,000 and 1,200 kilograms per capita. This would be a approximately a 58% reduction in generated waste being landfilled.

Proposed 2019 Work incudes:
Weigh-scale design and implementation $300,000 (2018 carryover)
Branding $25,000
Expanded residential organics collection (multi-family) $25,000
Waste diversion assistance $25,000
Differential tipping fees $10,000
Community Engagement $10,000
Zero Waste Public Events $5,000

The recommendations from this report will require numerous years to implement.

Operational Impact

These projects will have positive operational impacts in regards to fuel and power cost savings as well as prolonging the life of the current landfill. They are also consistent with standard asset management principles.

Department PW Public Works & Engineering **Division** Water & Sewer
Project 90617610 Pump Replacement Program

Budget

	2019	2020	2021
	$	$	$
Expenditures	**100,000**	**100,000**	**100,000**
Funding			
Gas Tax Rebate	100,000		100,000
Community Public Infrastructure Funding		100,000	
Total Funding	**100,000**	**100,000**	**100,000**

Description

Purpose

To continue replacing pumps at City of Yellowknife pumphouses and liftstations on a regularly scheduled basis.

Background

The City of Yellowknife has 14 liftstations (Sewer) and six pumphouses (Water).In each of these stations there are multiple large pumps which run long hours and work hard. In total, the City has 35 sewage pumps and 31 water distribution pumps, not including the various chemical pumps used for water treatment and membrane filter cleaning. The City's also has eight communitors, which are large sewage shredding machines.

Pumps and grinders must be maintained in order to ensure a continuous supply of water and discharge of sewage for residents. Failure of pumps or grinders at any liftstation can result in a sewage overflow, which has occurred in the past, resulting in sewage entering people's homes. In 2003, a sewage overflow at liftstation #6 cost the City $25,000 for remediation.

Pump rebuilding costs about $7,000 to $25,000 per pump, while replacement costs $10,000 to $35,000 per pump. The costs to rebuild or replace a communitor are $30,000 and $80,000, respectively. Larger pumps, used in liftstations #5 and #6, cost between $30,000 and $40,000 to replace.

Based on standard industry procedure and the experience of Public Works and Engineering staff, pumps are to be replaced after approximately 25 years of operation. Pumps and communitors have been installed at different times, so the replacement dates of these items will be spread out. The high number of components and the high cost of repairs justify a capital expenditure that can be allocated to repair and replacement of these pumps and communitors.

Public Works and Engineering estimates that the total replacement value of the pumps is approximately $1.6 M, and proposes to spend about $100,000 per year for pump replacements and monitoring to continue the orderly replacement of pumps that are in poor condition.

Operational Impact

Without a capital fund for pump replacements, operational budgets at stations with failed pumps will experience large financial variances. This project falls in line with standard asset management principles.

Gallery

Gallery 1: Typical pump arrangement in a City pumphouse.

Department PW Public Works & Engineering **Division** Water & Sewer
Project 94006570 Lagoon Control Structure Replacement

Budget

	2019	2020	2021
	$	$	$
Expenditures	**50,000**	**250,000**	
Funding			
Gas Tax Rebate	50,000		
Community Public Infrastructure Funding		250,000	
Total Funding	**50,000**	**250,000**	

Description

Purpose

To replace failing control structures on Trapper's Lake to divert flow away from the Fiddler's Lake sewage lagoon.

Background

The Fiddler's Lake Sewage Lagoon System was built in 1980. As part of the system, the drainage pathways for Trapper's Lake were altered to divert them from the sewage lagoon area (Galleries 1 and 2). This ensured water from Trapper's Lake was not flowing into the lagoon which would increase the volume of effluent entering the lagoon and affect its capacity.

In order to divert the flow from Trapper's Lake, a series of earthen dykes and dams were built in low-lying areas along the shoreline. A concrete and earth control structure was built in the location chosen for flow from the lake into the designated drainage area. As part of the City's water licence requirements, these dams, dykes and control structure must be inspected every four years. During the last inspection, it was noted that these structures are no longer performing as intended and require rebuilding.

Rebuilding of the dams, dykes and control structure will stop the flow from Trapper's Lake to Fiddler's Lake sewage lagoon, which will help to reduce the total amount of runoff entering the lagoon system, thus increasing the overall capacity of the lagoon.

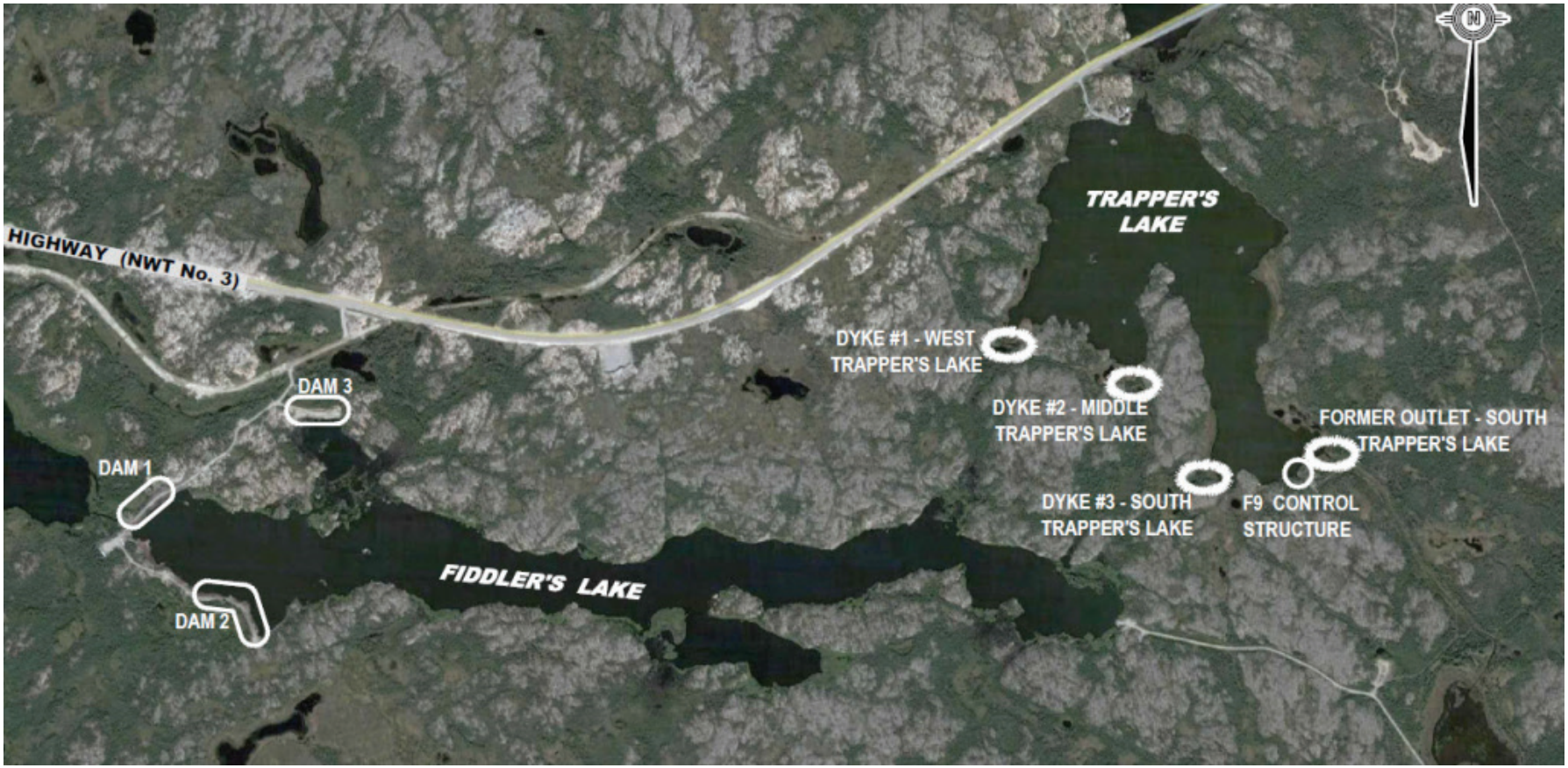
This is a multi-year project which will have engineering work done in 2019; rebuilding of the dams, dykes and control structures will take place in 2020.

Operational Impact

This project has negligible direct effect on operations. Maintenance of control structures at Trapper's Lake is a requirement of the City's water licence and is consistent with good asset management principles.

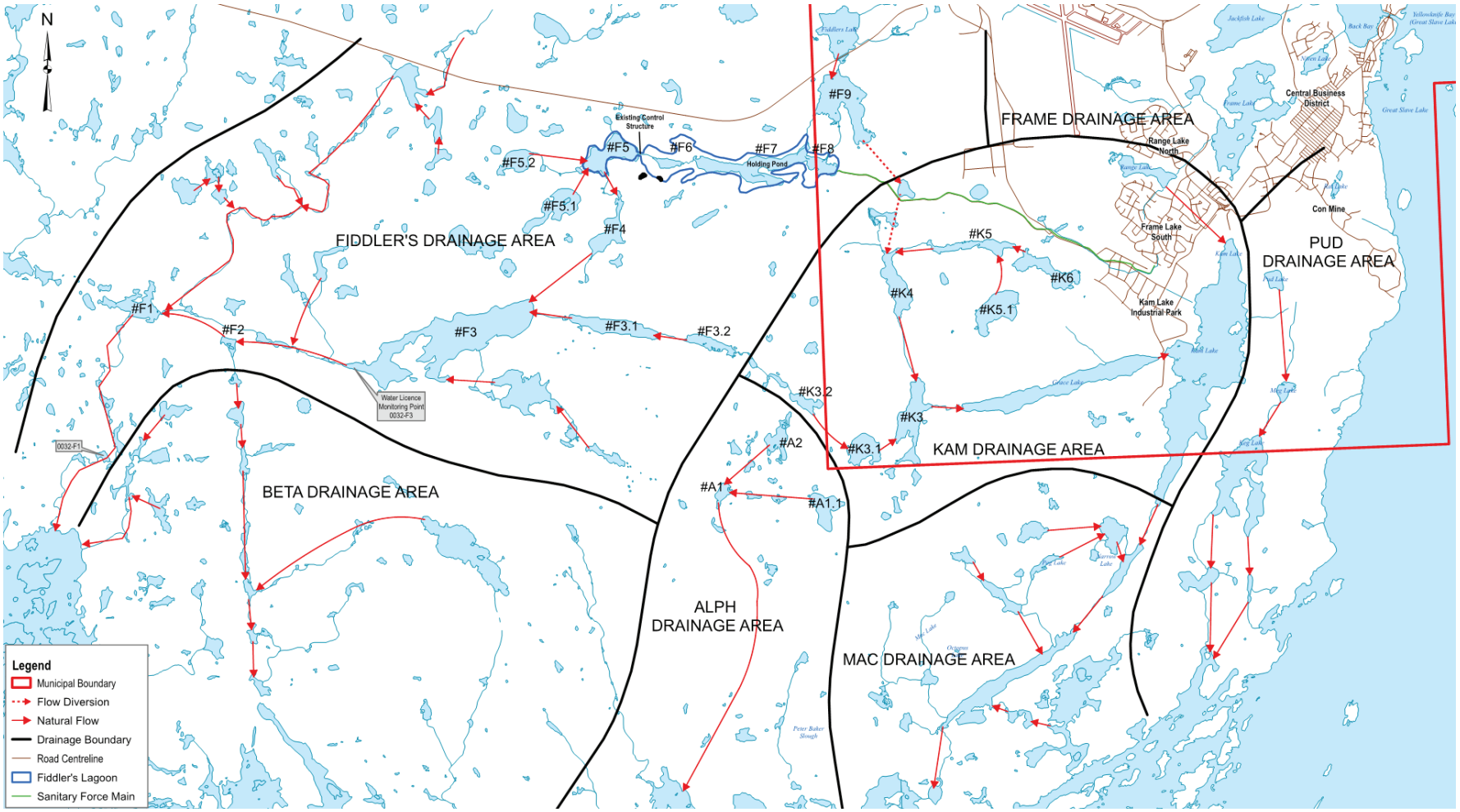
Gallery

Gallery 1: Trapper's Lake Control Structures.



Gallery

Gallery 2: Fiddler's Lake Drainage Area and Surrounding Watersheds.



Department PW Public Works & Engineering **Division** Water & Sewer
Project 96156570 Annual Water & Sewer Replacement

Budget

	2019	2020	2021
	$	$	$
Expenditures			
Dagenais Drive (Paving - RLR to Daniels Court)	890,000		
Dagenais Drive (Daniels Court to Finlayson)	2,000,000		
54 Avenue (49 St to School Draw Ave)	950,000		
Dagenais Drive (Paving - Daniels Court to Finlayson)		950,000	
54 Avenue (Paving - 49 St to School Draw Ave)		945,000	
Hordal Road (Finlayson to Spence Rd)		3,000,000	
Hordal Road (Spence Rd to RLR)			2,270,000
Hordal Road (Paving - Finlayson to Spence Rd)			758,000
Total Expenditures	**3,840,000**	**4,895,000**	**3,028,000**
Funding			
Gas Tax Rebate	3,840,000	4,895,000	3,028,000
Total Funding	**3,840,000**	**4,895,000**	**3,028,000**

Description

Purpose

To replace failing underground water and/or sewer infrastructure (Gallery 1) on a planned and prioritized basis to reduce reactive maintenance costs.

Background

In the late 1940s, the City began providing piped water and sewer services in the present downtown area. Pumphouse #1 was constructed during this time to draw water from Great Slave Lake and distribute it to the downtown residents of Yellowknife. By 1977, the sewer mains had degraded to the point of entire sections of the city's piped system failing. The water and sewer mains were comprised of cast iron and corrugated metal pipe (CMP) respectively, and were predominantly uninsulated. The pipe material, combined with no insulation in the freeze/thaw layer, resulted in high maintenance and repair costs that the City continues to deal with today.

The City has since changed pipe material standards to insulated, ductile iron pipe. With these changes to City standards, the life expectancy of water and sewer mains can be as much as 50 years. However, prevailing ground conditions and permafrost presence can impact the life span of any pipe installation.

The following are currently included in the annual Water & Sewer Infrastructure Replacement (Galleries 2 and 3) plans:

Replacement of existing corrugated metal pipe sewer mains with ductile iron pipe
Replacement of concrete sewer manholes
Replacement of existing cast iron water mains with appropriately sized insulated ductile iron pipe
Replacement of in-line hydrants, valves with hydrants and valves located in insulated concrete vaults with manhole access
Replacement of individual lot water and sewer services where deemed necessary
Road stabilization and reconstruction with crushed rock backfill
Completion of the project with concrete sidewalks and a paved roadway

Considerations when determining areas of reconstruction include:

Condition and age of asset
Recurring maintenance costs
Priority level of roadway
Number of impacted residents and services

Operational Impact

Aging infrastructure has an operational cost of between two and four percent of replacement costs. Replacing this infrastructure will allow the department to focus operational and maintenance activities in other areas of the water and sewer systems.

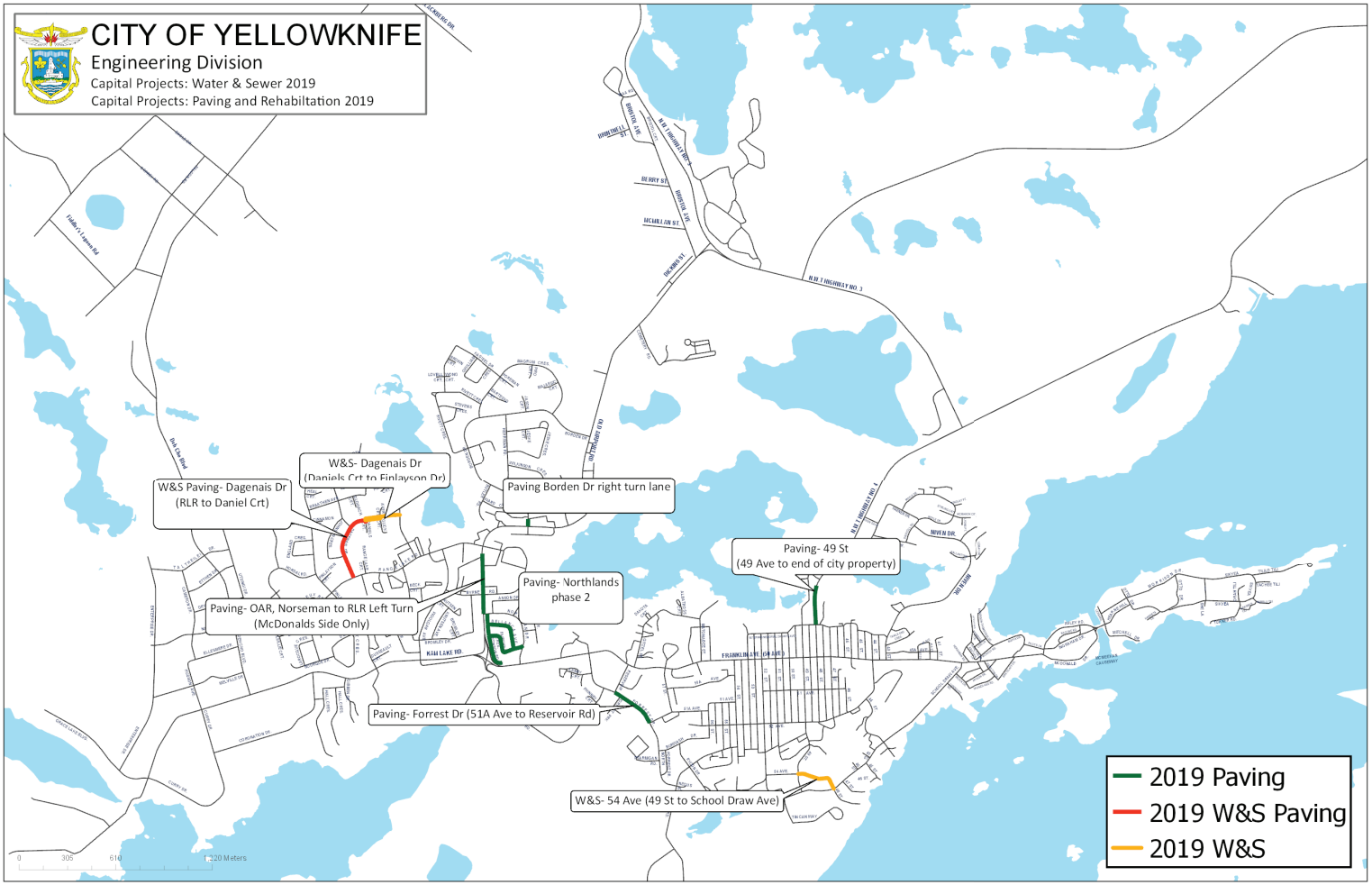
This project is consistent with good asset management principles.

Gallery

Gallery 1: Failed CMP sewer main showing on bottom left in the pipe.

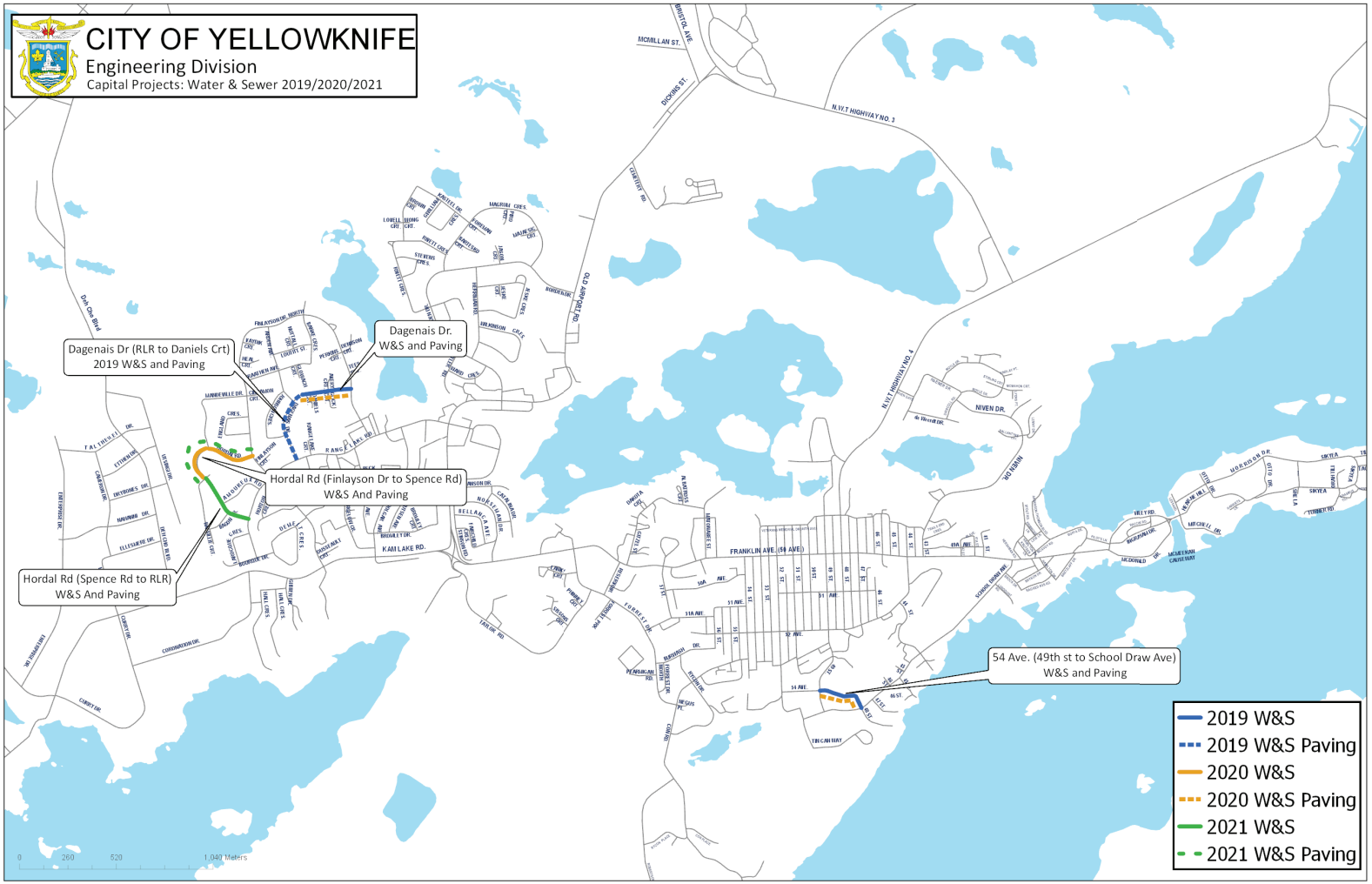
Gallery

Gallery 2: 2019 Water, Sewer and Paving Projects.



Gallery

Gallery 3: 2019 to 2021 Water and Sewer Upgrades



Department	PW Public Works & Engineering	**Division**	Water & Sewer
Project	WS0001 Federally Funded Capital Projects		

Budget

	2019	2020	2021
	$	$	$
Expenditures			
CMP/W&S	200,000		
LS#5 Piping	175,000		
SCADA Upgrades	50,000		
Total Expenditures	**425,000**		
Funding			
Other Grants	318,750		
User Fees	106,250		
Total Funding	**425,000**		

Description

Purpose

To complete approved projects under the Clean Water and Wastewater Fund (CWWF) and Public Transportation Infrastructure Fund (PTIF) announced by the Government of Canada.

Background

The 2016 Federal Government Budget 2016 announced new infrastructure funding that will be rolled out in two phases. The first phase has been announced with the Northwest Territories receiving $51.7 million in funding for the communities of the Territory.

The federal objective of the funding is to “accelerate short term municipal investments, while supporting either new or rehabilitation of water, waste water and storm water infrastructure, and the planning and design of future facilities or upgrades to existing systems. The goal is to accelerate projects that would not occur in the next three years if this funding was not available.”

The Federal Government listed several criteria that have to be met in order to qualify for CWWF and PTIF funding;

Schedule: Due to auditing requirements and CWWF program reporting requirements, NWT communities should plan to have their approved projects substantially completed and “operational” before March 31, 2019.
Incrementality: A project that would not otherwise have been undertaken in 2016/17, 2017/18 or 2018/19 and/or a project that would not have been

undertaken without federal funding.
Funding: Municipality must contribute 25% matching funding and have the capacity (cash flow) to outlay cash payments which are then reimbursed quarterly with progress reports to Municipal and Community Affairs (MACA).
City Council Endorsement: Project applications must have an attached resolution of Council support for the project and the commitment to the 25% matching funding criteria over the next 2.5 years.

The City of Yellowknife submitted applications for a total funding amount of $17,382,500, unanimously supported by Council Motion #0211-16. The final approved amount was $16,257,500.

As shown in Gallery 1, this required the City to commit an additional $5,419,166.67 to the annual capital budget over two fiscal years (2017-18 and 2018-19). This is the required 25% funding to match the federal contribution.

The budget allocations for 2019 have been committed under the initial contract award for these projects. The remaining budgets are for project close out.

Project descriptions:

A. Transit Upgrades: The City's transit service is contracted to a third party; therefore the options for capital upgrades are limited. The City proposes replacing bus shelters (approximately $50,000), creating accessible bus stops with proper sidewalk, wheel chair ramps and curb drops (approximately $150,000), and creating bus pull out areas to establish safe pull over areas for buses removed from lanes of travel (approximately $200,000). This project will include the addition of a two metre asphalt sidewalk on Borden Drive between Jason Court and Old Airport Road.

B. Corrugated Metal Pipe/Water and Sewer Replacement: Five additional areas are in need of immediate repair: Franklin Avenue (Gitzel to Norseman), Finlayson Drive (south), Lamoureux Road, Calder Crescent, and Forrest Park. These five areas are in addition to Williams Avenue and Dagenais Drive that are already in the capital plan.

C. Pipe Replacement at Liftstation #5: The pipe at Liftstation #5 has deteriorated to the point that it is now 40% of its original thickness. Average thickness at elbow bends is 50% of original thickness and most straight-run pipes are 60% to 65% of original thickness (A.D. Williams Engineering, November 2004). Leaks require repair approximately every two months. If pipe replacement is completed, it is inevitable that a main pipe break will occur resulting in the City being unable to remove sewage. Liftstation #5 is the main liftstation for the city. All but one of the other liftstations in the city pump sewage to this facility and from there it is pumped to Fiddler’s Lake Lagoon.

D. Supervisory Control and Data Acquisition (SCADA) System Upgrades: This project will help to modernize the City's SCADA system, which monitors and controls the City's pumphouses and liftstations. Many parts are now obsolete, and with the advancement of computer technology, some replacement parts are no longer available and upgrades are required.

Operational Impact

Aging infrastructure has an operational cost of between two and four percent of replacement costs. Replacing this infrastructure will allow the department to focus operational and maintenance activities on other areas of the water and sewer systems, and is consistent with standard asset management principles.

Gallery

Gallery 1: Approved projects.

Project	Total	Federal (75%)	City (25%)
Transit Upgrades	426,666.67	320,000.00	106,666.67
CMP/W&S	18,300,000.00	13,725,000.00	4,575,000.00
LS#5 Pipe Replacement	1,750,000.00	1,312,500.00	437,500.00
SCADA Upgrades	1,200,000.00	900,000.00	300,000.00
TOTAL	21,676,666.67	16,257,500.00	5,419,166.67

Department PW Public Works & Engineering **Division** Water & Sewer
Project WS0006 Pumphouse and Liftstation Upgrades

Budget

	2019	2020	2021
	$	$	$
Expenditures	**50,000**		
Funding			
User Fees	50,000		
Total Funding	**50,000**		

Description

Purpose

To continue ongoing upgrades to the City's six pumphouses and 14 liftstations,

Background

The pumphouses and liftstations are aging and some require increased architectural care and maintenance. The buildings have worn-out exterior cladding and inefficient windows, and it is recommended that insulation and windows be upgraded to reduce heating costs. This, in conjunction with new siding and roofing, will reduce operating costs for the buildings and help them to blend better with the surrounding neighborhood. The amount of work that can be completed is budget-dependent.

In addition to the architectural upgrades, mechanical and electrical upgrades are required for the heating and ventilation systems, which are all standard upgrades associated with building maintenance. The upgrades include installation of energy-efficient furnaces and boilers, double-walled or self-contained fuel storage tanks and upgrades to air handling units.

The City recommends this project be an annual project in order to keep up with the maintenance requirements of these buildings. The recommended annual budget for this project is shown in Gallery 1.

Operational Impact

Improving insulation and replacing the siding, roofing and windows will reduce heating costs and eliminate the need to paint every three to four years. Replacement of fuel tanks will reduce the risk of spilling environmental contaminants. These tasks are consistent with standard asset management principles.

Gallery

Gallery 1: Recommended Annual Budget for Pumphouse and Liftstation Upgrades.

Year	Recommended Budget
2019	$50,000
2020	$50,000
2021	$50,000

Note:
The 2020 and 2021 recommended budget were deferred due to the City's limited resources.

Department PW Public Works & Engineering **Division** Water & Sewer
Project WS0008 Back-up Power Upgrades (Generators)

Budget

	2019	2020	2021
	$	$	$
Expenditures	**350,000**	**200,000**	**200,000**
Funding			
Gas Tax Rebate	350,000		200,000
Community Public Infrastructure Funding		200,000	
Total Funding	**350,000**	**200,000**	**200,000**

Description

Purpose

To implement backup power generators that help ensure the City is able to provide water distribution and sewage pumping capabilities during utility power outages.

Background

The City of Yellowknife has generators that are over 30 years old in the pumphouses and liftstations.It is difficult to source replacement parts for aging generators and as a result, older generatorsbecome unreliable over time and more expensive to maintain.

The City has three liftstations that do not have backup power, two in the Niven Lake Subdivision and one in Northlands Trailer Park. A written order from an Environmental Health Officer in July 2018 requires that the City of Yellowknife take steps to ensure all liftstations have backup power to prevent sewage overflows.

The 2019 capital funding will be used for the engineering, purchase and installation of a generator for Liftstation #12 located on Lemay Drive. This is the highest priority location due to its close proximity to Back Bay on Great Slave Lake. This project will include the transfer switch, generator, and building enclosure.

Operational Impact

WIthout backup power, there is a risk of sewage overflows into neighborhoods and/or nearby water bodies. Environmental clean-up efforts are extremely time consuming and expensive. The risk of spills can be minimized with reliable back-up power generators. This project is an addition to the City's capital assets and will require maintenance consistent with standard asset management principles.

Department	PW Public Works & Engineering	**Division**	Water & Sewer
Project	WS0009 Pumphouse 1 Infrastructure Upgrades		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**500,000**		
Funding			
Gas Tax Rebate	500,000		
Total Funding	**500,000**		

Description

Purpose

To replace aging infrastructure at the City's oldest pumphouse.

Background

Pumphouse #1 was constructed in 1948 and added to piece-by-piece from 1968 through the mid -1980's. In addition to its pumphouse functionality, it also currently serves as the backup Emergency Dispatch Centre for the City of Yellowknife.

There are three building systems that require replacement:

Building Heating System
Recently there was a failure of the oil fired steam boiler used to heat the building, and City staff had to set up a frost-fighter midway through the winter season as a backup heat source. Under the previous arrangement, the steam boiler provided heat to the building and the pellet boiler provided a means of tempering the potable water supply for freeze protection. This project will combine the systems and replace the steam boiler with a hydronic system which will share heating loads with the previously installed pellet boiler.

Backup Power Generator
The backup generator at Pumphouse #1 is an installation from the 1980's and has reached the end of its useful life. This project will complete the replacement of the generator.

Sprinkler and Fire Alarm Upgrades
Recent professional inspections indicate that upgrades are required for the sprinkler and fire alarm systems at Pumphouse #1. Concerns have been

identified with the main valve for the sprinkler system, and it requires replacement. Due to the age of the building, there is a high likelihood that asbestos is present in the drywall and drywall compound so an asbestos assessment and abatement program will be required prior to this work taking place.

Operational Impact

The steam boiler and generator are the greatest concerns and both are overdue for replacement. As stated above, it is best to abandon the steam system to achieve heating efficiencies with hydronic heating loops, and utilize pellet fired heat. All these upgrades are consistent with standard asset management principles.

Department PW Public Works & Engineering **Division** Water & Sewer
Project WS0010 Potable Water Reservoir Repairs

Budget

	2019	2020	2021
	$	$	$
Expenditures	**750,000**		
Funding			
Gas Tax Rebate	420,000		
User Fees	330,000		
Total Funding	**750,000**		

Description

Purpose

To conduct water reservoir repairs to stop chlorinated water from entering Great Slave Lake, to comply with Federal and Territorial regulatory authorities, and to contain treated water produced by the Water Treatment Plant.

Background

In 2013 the City of Yellowknife completed repairs on Reservoir #3 due to the presence of ice formation on the slope directly adjacent to the reservoir. This ice provided strong indication that there was some leaking from the concrete reservoir. The reservoir was drained and inspected for cracking, which was confirmed. The City subsequently awarded the repair work, which was deemed urgent, to repair cracks in the walls and floor of the reservoir with a compound known as Xypex, an industry approved repair material for concrete, suitable for placement in potable drinking water reservoirs.

Public Works staff observed similar ice formation at the toe of the slope adjacent to the City's water treatment plant in January 2017 and initiated a review and inspection of Reservoir #1.It was built in 1991 and forms the foundation for the Water Treatment Plant.The leak does not affect the quality of drinking water produced at the Water Treatment Plant. A contract was awarded to apply a similar method of repair that was comparable to the Xypex solution employed in 2013 due to its success in repairing the leaks at that time.

In 2018, ice formation adjacent to the reservoir was still present, indicating the continued presence of a leak. At this time it is unknown if the repairs were successful or if this is a new leak in the structure(s). Also in 2018, the City was given notice from Federal and Territorial regulatory authorities that action must be taken to stop the potable water leak into Great Slave Lake. The Canadian Fisheries Act deems potable water to be a deleterious substance harmful to aquatic life due to its chlorine content.

This project will review previous methods employed and research alternatives in consultation with industry experts. Consideration must be given to the complex nature of the work as the City must maintain potable water reserves while also isolating areas of the reservoir necessary to complete the work.

Operational Impact

A continued release of potable water has an operational impact related to production costs as well as the cost to repair the leak. Staff time will be required to properly phase the project and isolate respective reservoir cells during the work. This project is consistent with standard asset management principles.

Department	PW Public Works & Engineering	**Division**	Water & Sewer
Project	WS0012 Sewage Force Main Twinning		

Budget

	2019	2020	2021
	$	$	$
Expenditures	**250,000**		
Funding			
User Fees	250,000		
Total Funding	**250,000**		

Description

Purpose

To create redundancy for the City's sewage force main to allow for better maintenance and increased capacity of the force main.

Background

In 2018, the City experienced a significant break on the force main that carries sewage from Liftstation #5 to the Fiddler's Lake Sewage Lagoon. The resulting repair and clean-up resulted in substantial unexpected costs to the City.

The City has one force main that carries sewage from Liftstation #5 to the Fiddler's Lake Sewage Lagoon (Gallery 1). This line was installed in 1979 with an expected 50 year lifespan. As the force main nears the end of its life, increased maintenance and the potential for additional leaks can occur.

In order to address the issues with the existing force main it is necessary to twin it, which requires the installation of a second force main that follows roughly the same route as the existing force main. This will allow for either force main to be isolated in order to complete maintenance or repairs as required.

This project will require significant design and planning to determine the best route and overall construction costs. The work plan for 2019 is to complete the design phase of this project.

Operational Impact

Twinning of the force main will aid in fewer spills due to breaks in the force main and will allow one force main to be taken offline in order for repairs or replacement to be completed when necessary.

Gallery

Gallery 1: Sewage Force Main.

Department PW Public Works & Engineering **Division** Water & Sewer
Project WS0013 Lagoon Sludge Removal

Budget

	2019	2020	2021
	$	$	$
Expenditures	**500,000**	**800,000**	**800,000**
Funding			
Formula Funding			800,000
Community Public Infrastructure Funding		505,000	
User Fees	500,000	295,000	
Total Funding	**500,000**	**800,000**	**800,000**

Description

Purpose

To remove sludge build up from the bottom of the Fiddler's Lake sewage lagoon.

Background

The Fiddler's Lake Sewage Lagoon has been in service since the mid 1980's. Since that time, solids in the raw sewage entering the lagoon have been accumulating at the bottom of the lagoon.

In June 2018, a survey was performed on the sludge layer to determine the approximate quantity of sludge currently in the lagoon. Gallery 1 shows the depths of the sludge throughout the lagoon. Based on the survey, it is estimated that roughly 226,000 cubic metres of sludge need to be removed from the lagoon.

Removal of the sludge can be done using several methods. Further investigation is required to determine the best method of removal.

The City's water licence requires the creation of a sludge management plan. Part of that plan includes the removal of sludge built up in the lagoon. By removing the sludge, the overall holding volume of the lagoon will increase and the chemical and biological process that occur in the lagoon will be able to take place in a more effective manner.

Operational Impact

There is no direct operational impact, however it will ensure continued performance of the FIddler's Lake lagoon system.It is also a requirement of the City's water licence. This project is consistent with standard asset management principles.

Gallery

Gallery 1: Fiddler's Lake Sewage Lagoon Sludge Depths.

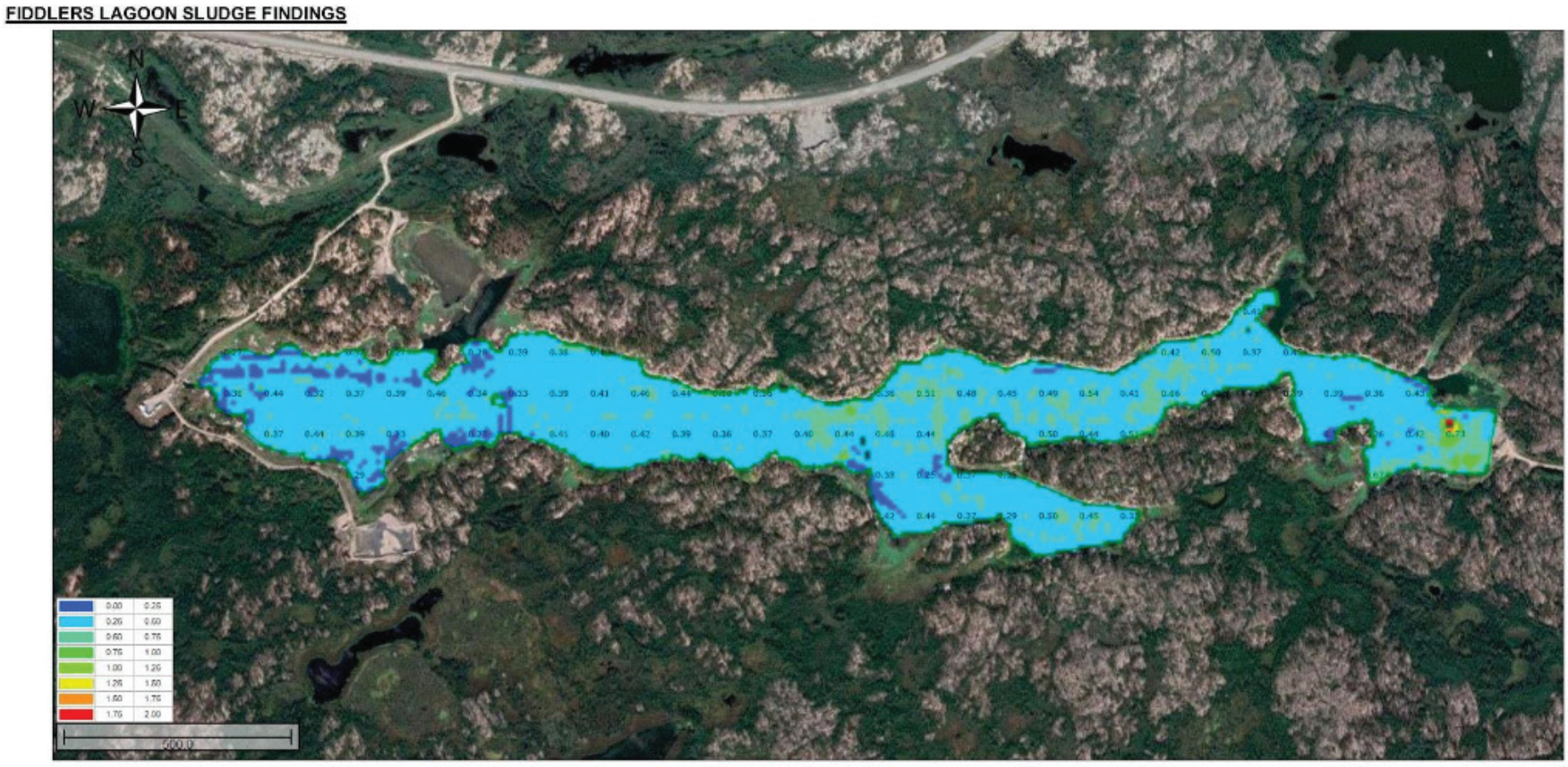


Figure 2 Fiddlers Lagoon sludge thicknesses (m)

Department PW Public Works & Engineering **Division** Water & Sewer
Project WS0017 Water and Sewer Piped Services Expansion Study

Budget

	2019	2020	2021
	$	$	$
Expenditures	**70,000**		
Funding			
User Fees	70,000		
Total Funding	**70,000**		

Description

Purpose

To determine the feasibility of expanding piped water and sewer services into areas of Yellowknife currently receiving trucked services.

Background

The City currently provides trucked water and sewer services to residents in six areas of the City including:

Engle Business District
Grace Lake
Kam Lake
Old Airport Road
Con Road
Old Town

This study will look at the overall capacity of the City's water and sewer systems and determine potential impacts, upgrades or additional facilities required if underground piped services are to extend into these areas of the City.

Operational Impact

The operational impact of this study is minimal. However, it is vital to complete an overall assessment of the City's water and sewer infrastructure prior to planning major expansion efforts. This will ensure that the City has approached potential expansion properly and from all angles. This project will contribute to the City's asset management practices.

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