

Construction & Design

2017 Annual Report



City of
Saskatoon

Transportation & Utilities Department

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	4
2.0	OVERVIEW	5
2.1	Our Mission	6
2.2	Our Guiding Principles	6
2.3	Our Team	7
2.4	Our Corporate Values	9
2.5	Our Leadership Commitments	9
2.6	Strategic Goals.....	10
3.0	OUR CUSTOMERS.....	11
3.1	Customer Statistics	11
3.2	Customer Service.....	12
4.0	OUR PEOPLE	12
4.1	C&D Employees.....	12
4.2	Representative Workforce.....	13
4.3	Organizational Chart	14
4.4	Employee Safety	14
4.5	Employee Wellness & Engagement	14
5.0	OUR FINANCES	16
5.1	Operation Finances.....	16
6.0	OUR WORK	17
6.1	Caswell Hill Water Rehabilitation Project	19
6.2	Holiday Park Water Rehabilitation Project (CWWF2).....	23
6.3	Victoria Avenue & 10th Street East Water System Rehabilitation (CWWF 3A)	25
6.4	Buena Vista Water and Sewer System Improvements.....	27
6.5	Fletcher Road Sewer Upgrades	29
6.6	2017 Water Main CIPP Lining.....	31
6.7	CWWF 7 – CIPP Sanitary Sewer Lining	33
6.8	71 st Street and Highway 16 Intersection Improvement.....	35
6.9	Zimmerman Road Arterial	37
6.10	Collector Road Resurfacing	41
6.11	Fedoruk Drive Construction	43
6.12	Hudson Bay Industrial Area Grading.....	45

7.0	Modernization of Environmental Specifications and Development of Contractor Environmental Guidelines	47
7.1	Continuous Improvement	48
8.0	OUR CHALLENGES	49
9.0	SUMMARY OF 2017 ACHIEVEMENTS	49
9.1	Construction Project Forecast 2017	49
9.2	New Land Development	50
9.3	Preservation of Infrastructure	50
9.4	Technical Services	50
9.5	Communications	50
9.6	Health and Safety	51
10.0	CONCLUSION	52

MESSAGE FROM THE DIRECTOR

The City of Saskatoon (City), Transportation Department (TU), Construction & Design division (C&D) management and staff are committed to delivering high-quality, reliable, infrastructure and project services. These services are provided in the most economical and expedient way to improve the quality of life for all citizens of Saskatoon. This report describes our contributions to achieve the City's Strategic Plan. I am very pleased to present the *Construction & Design 2017 Annual Report* on behalf of our division.

Our team's biggest challenge is consistently revitalizing the infrastructure in our beautiful City. Whether it is personal commutes, business activities, or festivities and events, our intention is to complete projects efficiently with minimal disruption to services. The project teams anticipate upcoming activities and develop strategies such as, night work, trenchless technology and phasing, to ensure that residents' daily lives are minimally interrupted. The Construction & Design division has an exceptional team of professionals who manage a high volume of projects throughout Saskatoon with the objective to sustain the City's infrastructure in a dependable, well-groomed state.

Our emphasis on contractor management ensures the eligibility of highly qualified contractors to bid on projects. The result is an improved experience for citizens through minimizing costs, fewer schedule disruptions, safety awareness, and quality workmanship.

Our environment is very important to the Construction & Design division. We collaborate with internal and external resources on projects involving sediment control, migratory birds and wildlife. This ensures environmental factors are considered, and sustainable solutions are implemented.

Our team provides top-quality project services using our best practices through continuous improvement and project development initiatives.

Best regards,



Celene Anger, P.Eng.
Director, Construction & Design Division
Transportation & Utilities Department

1.0 EXECUTIVE SUMMARY

The City of Saskatoon (City), Transportation Department (TU), Construction & Design division (C&D) successfully accomplished a variety of municipal projects utilizing the following core services: project engineering, land development, drafting, inspections, surveying, and connections. *Working together*, the team efficiently executes municipal projects through collaboration with various internal and external clients. The C&D division works diligently towards achieving the strategic goals through living Our Mission, Our Guiding Principles, and Our Corporate Values; we take pride in Our Leadership Commitments.

The C&D division had 75 full-time equivalent employees, 17 seasonal and 17 temporary employees across six functional groups in 2017. C&D is responsible for delivering new capital and rehabilitation projects; project teams are responsible for drafting, tendering, scheduling, budgeting, decision making and coordinating with a number of clients. Through the project construction phases, C&D has developed tools to mitigate and regulate risk, therefore this ensures our adherence to specifications and compliance with local, provincial, and federal regulators.

Our main internal clients include the Land Branch, Transportation, Saskatoon Water, Preservation, Roadways Operation, Water & Waste Stream divisions. C&D is a steward of infrastructure for both, private and public sectors. Our services include design reviews, service agreements, applications, connections and regulatory oversight for private developments.

Many of the projects undertaken in 2017 are represented in this Annual Report; details are provided on the various challenges that arose with each project type. In addition to project execution, the C&D division continues to implement many improvements in the areas of health and safety management systems, contractor management, quality assurance, customer service and environmental management.

2.0 OVERVIEW

The C&D division provides technical and project services to deliver municipal infrastructure projects. The primary objective is to maintain infrastructure in the safest, most cost-effective manner for our citizens.



Utilizing internal resources the C&D division develops, maintains, and enforces City standard specifications and detailed drawings for roadway, sidewalk, lane, and water/sewer infrastructure. The C&D division produces and maintains comprehensive records and mapping of all infrastructure components. A city-wide network of benchmarks provide horizontal and vertical referencing for public and private construction purposes and are installed and maintained by the C&D division. Additional responsibilities include curb crossing inspections, commissioning new (public and private) potable water, sewer infrastructure and acting as a steward of City infrastructure for private developments.

C&D provides engineering support services for operations in the areas of compost depot operations, solid waste collection, landfill operations, water/sewer repair work, street sweeping, winter operations, dust palliation and roadway/sidewalk maintenance.

C&D provides municipal project services for asset preservation (water, sewer and roadways), new land development, municipal engineering and technical services.

Asset Preservation	Roadway and sidewalk preservation treatments, rehabilitation of water and sewer mains, streetscaping and short-service connections.
Land Development Project	New local, collector and arterial roads; new water, storm and sewer mains; and street construction (sidewalks, catch basins and back lanes).
Land Development Section	Services for new land development or redevelopment projects, servicing agreements, subdivision applications and discretionary use applications development and maintenance of all levies, capital budget, prepaid rates and the stewardship of several budget reserves.
Municipal Engineering Services	Engineering support for the Water & Waste Stream and Roadways & Operations divisions; assist with the delivery of public services such as waste collections, snow removal, water and sewer repair and street sweeping.
Technical Services	Registered plans, shallow utilities, encroachment agreements, private connection inspections and public inquiries.

2.1 Our Mission

The C&D division is a service provider to the City through:

- Delivering municipal infrastructure projects;
- Providing regulatory oversight;
- Maintaining infrastructure records; and
- Offering expertise, advice and guidance on municipal infrastructure.

2.2 Our Guiding Principles

The C&D division has a foundation of guiding principles based on the following:

- C&D is a technical service provider to provide goods and services to the citizens of Saskatoon that serves both internal and external clients alike;
- C&D adapts to fluctuating market conditions by embracing cross training, continuous improvement activities, and focuses on employee recruitment and retention;
- C&D team collaboration and communication are paramount to the success of our projects; and
- C&D is a strategic and innovative team of professionals who excel at accountability and time management to minimizing environmental impact and promote sustainability.

2.3 Our Team

Connections – Construction Services

The connections service desk provides inspection and commissioning services to licensed water and sewer contractors; to ensure private connections comply with City and regulatory standards. The connection team addresses general inquiries regarding water and sewer from the citizens of Saskatoon. All commercial building permit applications and shallow utility requests are reviewed and approved by the connection team. The connection team maintains the required documentation for local connections to comply with Watershed Authority Regulations.

Land Development

Land development delivers a coordinated service for new land development or redevelopment projects, servicing agreements, subdivision applications and discretionary use applications for the department. Through managing agreements between the City and private developers, land development ensures direct services are constructed to acceptable standards, levies are covered and construction of development areas proceed in an orderly fashion. Approximately 80 land development projects are monitored annually and include contract approvals, expenditures, project scope, and servicing concerns. Land development negotiates and manages utility services and contract agreements for all phases of development for both private and City lands. Development and maintenance of all levies, capital budgets, prepaid rates and stewardship of several reserves are also managed through land development.

Inspection – Construction Services

The inspection team consists of engineering technologists are responsible for providing quality assurance. Inspections services are provided throughout all project phases, on various types of infrastructure construction, new land development, streetscaping, roadway, and water and sewer rehabilitation projects. The inspectors perform regular inspections and audits on contractors to ensure adherence to contractual obligations, standards and specifications, and provincial safety regulations throughout the project to the final acceptance. Inspectors are involved in the commissioning of new infrastructure and ensure all deficiencies and warranty work meet requirements prior to final acceptance.

Survey – Construction Services

Surveyors provide services for a variety of divisions within the City of Saskatoon. They are leaders in survey technologies and ensure that infrastructure is constructed to the proper location and elevation specifications.

The survey teams' key areas of responsibility include:

Preliminary Surveys – perform preliminary topographic site surveys where construction will take place to support future design work.

Construction Surveys – transfer the design requirements using survey markers for field placement to assist contractors and city crews in project construction to design phases.

As-built Surveys – providing proper location and elevation records on the completed construction projects to drafting. These are stored in GIS for future mapping reference.

Municipal Engineering Services

The mandate of the C&D Municipal Engineering Services (MES) is to provide engineering support to the Water & Waste Stream (W&WS) division and the Roadways & Operations (R&O) division. The MES team is comprised of three sub-groups:

- Operations – R&O
- Operations – W&WS
- Projects

The operations team members provide support with planning, scheduling, and delivery of public services. A significant part of their contribution includes preparing and administering contracts for goods and services and developing efficient, manageable and cost effective contract specifications. The W&WS division team assists with compost depot operations, solid waste collection, landfill operations, and water and sewer repair work. The R&O division team supports street sweeping, winter operations, dust palliation, and roadway and sidewalk maintenance.

The MES project group is tasked with delivering a wide variety of projects, primarily process improvements, pilot trials and feasibility studies and unique capital projects. Examples include developing a snow storage user pay model, the Valve Application, storm pond dredging feasibility study, back lane dust palliation pilot project, Idylwyld Drive (primary water main repair) and the Circle Drive and Millar Avenue primary water main repair.

Project Engineering – Technical Services

Project engineering provides detailed construction design and project management services for new construction and rehabilitation of roadways, water and sewer systems, streetscaping and bridge structures. Delivery of projects on behalf of many internal City of Saskatoon divisions, the project team manages various aspects such as tendering, contract management, environmental, quality and safety management, communications and citizen engagement. Project engineers lead technical teams comprised of inspections, drafting and survey to ensure technical, financial and schedule requirements and deliverables are achieved.

Design and Drafting – Technical Services

The design and drafting team prepares construction drawings to assist in, or provide the estimation of quantities to ensure compliance with specifications for new development and expansion projects.

This team provides design and drafting services for all types of roadway and water & sewer projects, from the development of new neighborhoods to the rehabilitation of existing roadways and water and sewer infrastructure.

The team consults and provides technical assistance to engineers, field staff, surveyors, and internal divisions such as: Roadways & Operations, Water & Waste Stream, as well as inquiries from private citizens.

The design and drafting team are stewards of drawing control, providing proper retrieval and maintenance of internal drawings, Legal Registered Plans, and private development drawings in all stages from concept to as-built.

2.4 Our Corporate Values

Trust: We build trust with citizens and colleagues by providing accurate technical information, analysis and responses in a timely manner to honour commitments.

Integrity: We are accountable and lead by example, making the best decisions and striving to work beyond the scope of our positions; we own our work, continuously make improvements and identify solutions.

Respect: We are courteous and demonstrate mutual respect and practice fair, ethical treatment; to build on each other's strengths, respectfully acknowledging individual beliefs, diversity, and experiences even if they differ from our own.

Honesty: We encourage open, truthful and sincere conversations; we admit to errors and learn from them, we admit to errors and are genuine and open.

Courage: We take smart risks, make think through challenges, suggest innovative approaches and embrace change to enhance our level of service.

2.5 Our Leadership Commitments

Our employees support our leadership commitments in our day-to-day tasks through the following:

Integrity: Employees

- All communications are consistent, transparent and clear;
- Follow through with commitments; and
- Take responsibility - be accountable.

Courage: Health & Safety

- Training – work observations, procedures, safe work practises, and monthly safety meetings;
- Working towards full implementation of the Health & Safety Management System; and
- Full implementation of the pre-qualification system for contractors and continued contractor engagement.

Honesty/Trust: Customer Service

- Inform our citizens of all projects that may impact their lives using various communication methods (e.g. online maps, service announcements, twitter, paper notices and media); and
- Plan our efforts with high importance and consideration on the impact to citizen's safety and well-being.

Respect: Team Work

- Horizontal collaboration with other divisions such as: Saskatoon Land, Saskatoon Transit, Parks, Environmental and Corporate Initiatives, Transportation, Major Projects & Preservation, Water & Waste Stream, Roadways & Operations, and Saskatoon Water.

2.6 Strategic Goals

Quality of Life: C&D contributes to the quality of life by providing safe and reliable infrastructure through construction of new, or renewal of water and wastewater pipes, roadways, and sidewalks.

Continuous Improvement: C&D places a strong emphasis on quality customer service. Many new initiatives have been implemented to improve communications, contractor management, and safety policies.

Asset and Financial Sustainability: C&D maximizes the amount work for each dollar spent through the coordination of roadways, water and sewer work, new technologies and phasing.

Environmental Leadership: C&D collaborates with various environmental groups to ensure that migratory birds, wildlife and environments (i.e. wetlands or swales) are fully considered during project planning and implementation.

Sustainable Growth: C&D works closely with our clients to ensure that as projects are planned and implemented, City and growth and future plans are considered to maximize efficiency and minimize costs.

Moving Around: C&D constructs new roadways and sidewalks, as well as maintaining existing infrastructure, while minimizing traffic disruption.

Economic Diversity and Prosperity: C&D supports both private and City land developments through infrastructure construction and commercial/residential lot servicing.

3.0 OUR CUSTOMERS

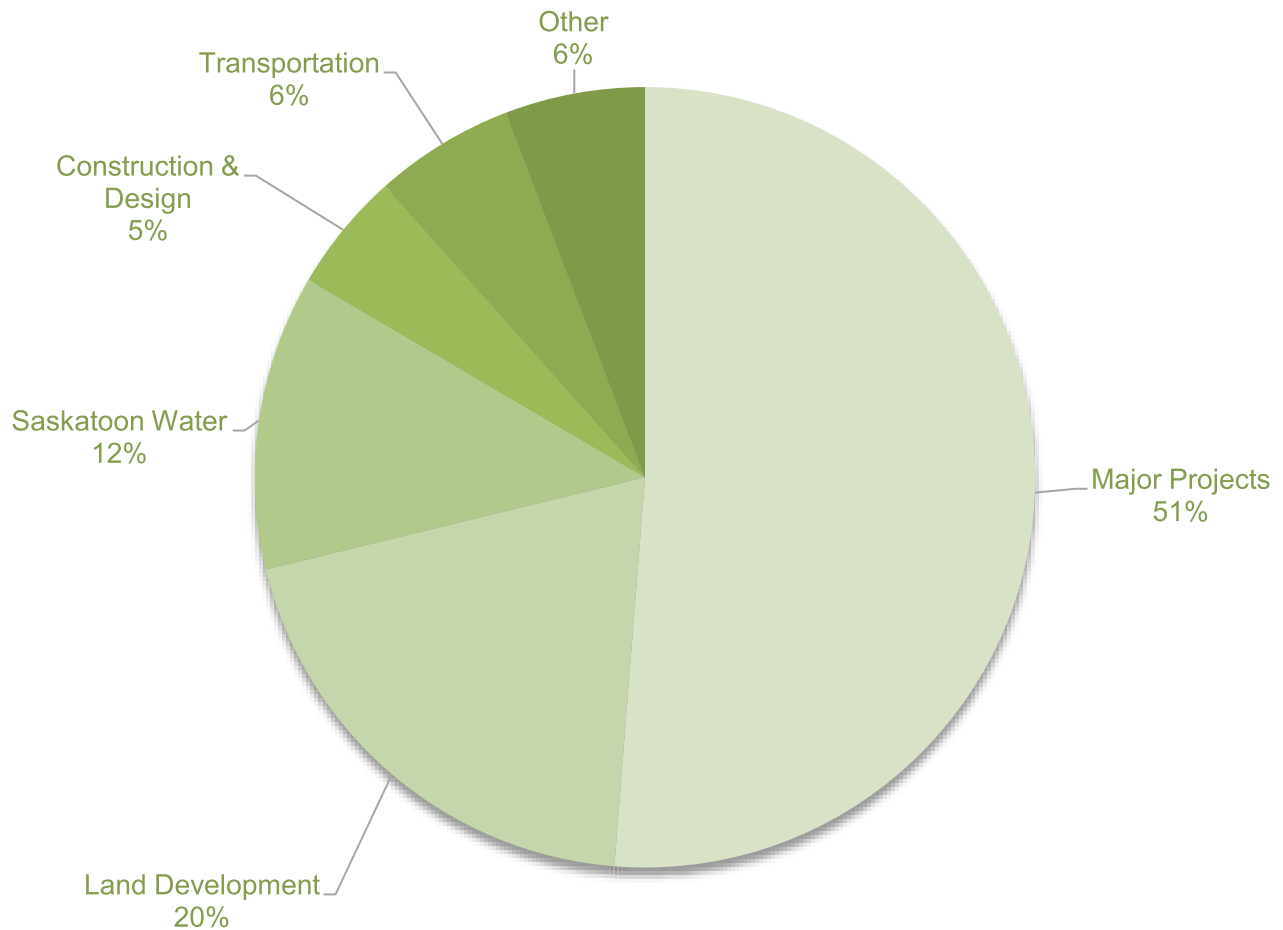
3.1 Customer Statistics

The C&D division delivers projects for various divisions within the city of Saskatoon. In doing so, C&D improves the lives of the citizens of Saskatoon by providing better roadways, sidewalks, and water and sewer infrastructure. The C&D division also delivers fully serviced lots for Saskatoon Land to assist in affordable housing in Saskatoon.

During 2017 C&D provided technical services for private developments, delivered approximately 115 internal projects to service Major Projects & Preservation, Urban Design, Transportation, Land Development, Water & Waste Stream, and Roadways & Operations with a value ranging from \$100K to \$12M.

The below chart demonstrates the salary distribution by customer in each division.

2017 CUSTOMERS BY SALARY DISTRIBUTION



The following table elaborates the accumulative expenditures of each project area in 2017.

Project Type	2017
Water & Sewer Preservation	\$43.8M
Roadways Preservation	\$44.0M
Land Development	\$26.7M
TOTAL	\$114.5M

3.2 Customer Service

In 2017, C&D added a customer service manager (CSM) to the team. This role was created to 'bridge the gap' between the work that C&D plans and provides and the tenets that Service Saskatoon is developing across the organization. Our CSM will work closely with project teams with the goal to develop processes and strategies that support a more customer focused approach daily.

As Service Saskatoon continues to promote an improved and more consistent customer experience through every City interaction, the CSM within C&D will assist in strategic development and implementation of processes.

4.0 OUR PEOPLE

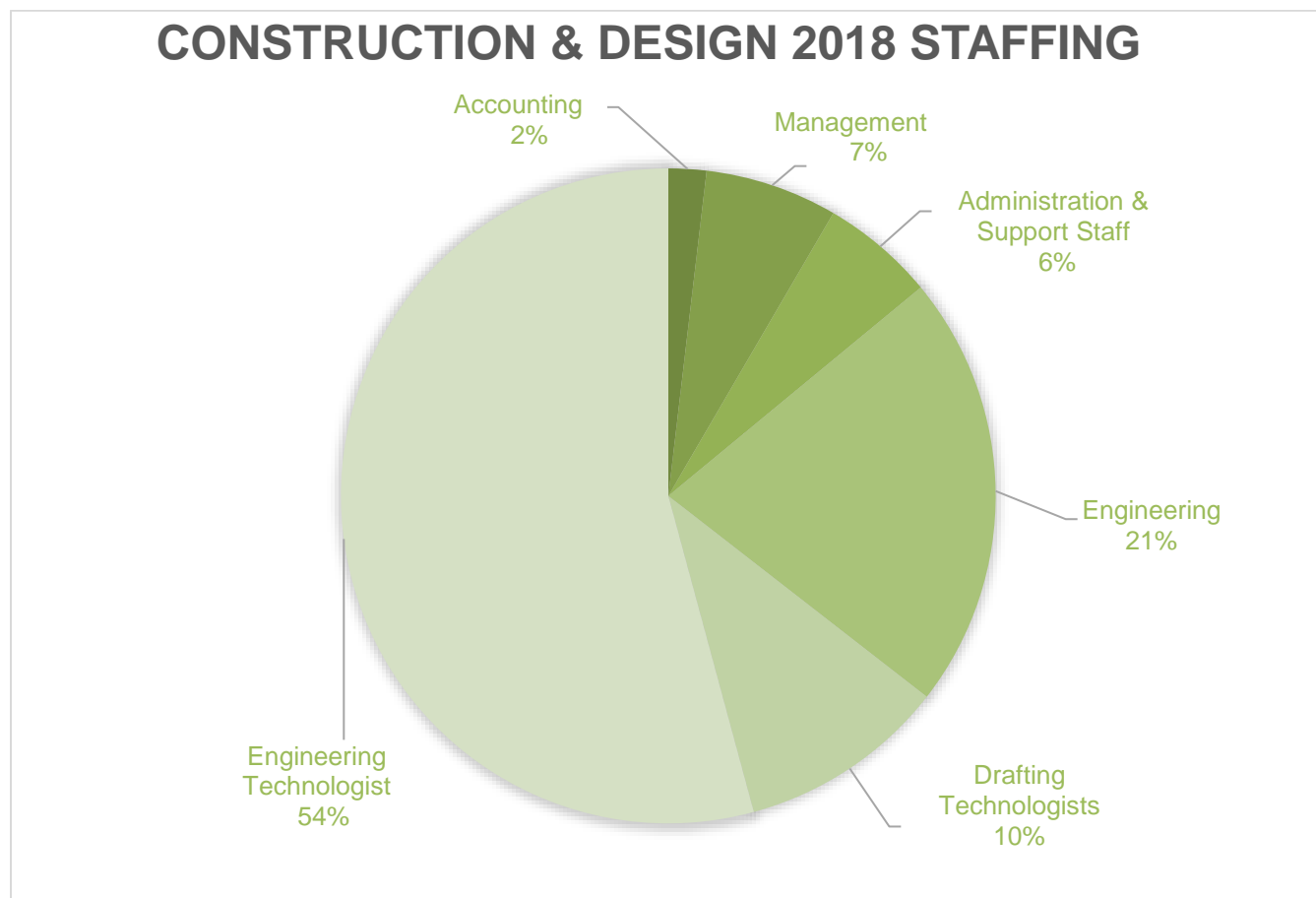
4.1 C&D Employees

In 2017, C&D employed 75 full-time equivalent employees, 17 seasonal and 17 temporary employees across six functional groups.

Below are four equity groups represented based on the City occupational groups as of July 31, 2017.

Technical – 35% Operating – 25% Professional – 41% Managerial – 25%

The chart below details the C&D 2017 staff allocations for each group.



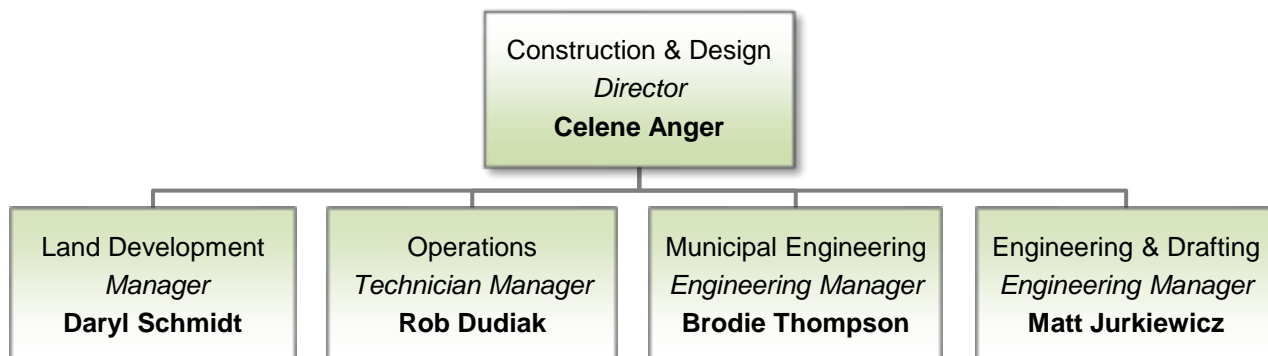
4.2 Representative Workforce

The C&D division participated in diversity programs with Employee Experience and Performance and other organizations to increase awareness among under-represented groups. The chart below is relative to goals set in 2014 by the Saskatchewan Human Rights Commission (SHRC) and adopted as corporate targets by the City. It provides the representation of employees who self-declared as an equity group in terms of the City's permanent workforce as at December 2017.

Equity Group	C&D	City of Saskatoon	SHRC Goals
Aboriginal Ancestry	3.2%	7.1%	14.0%
Visible Minority	14.8%	11.0%	11.0%
Person with Disability	1.1%	3.7%	12.4%
Female	20.1%	37.0%	46.0%

4.3 Organizational Chart

The organizational chart below shows a high level overview of the C&D division in 2017.



4.4 Employee Safety

The C&D division continues to improve the health and safety culture and performance for our employees and contractors. The division continues to implement the Health and Safety Management System, many successes in 2017 include:

- Zero lost-time injuries;
- Significantly reduced motor vehicle collisions;
- Implemented initial phase of contractor prequalification process;
- Defensive Driver Training for all field staff
- Internal health and safety audits; and
- Hazard identification control policy implementation.

Working safely is a key objective within the C&D division as the team focuses on personal safety with a particular focus on contractor safety management. The C&D team ensures that contractors working on City projects understand and meet the intent of the Saskatchewan Employment Act and, if applicable, fulfil prime contractor roles and responsibilities or regulations.

4.5 Employee Wellness & Engagement

Real Olympics

The Real Olympics is an annual event to highlight teamwork and positive interactions put on by C&D and is inclusive to all City employees. This after-hours activity was created by C&D employees and the goal of the event is to encourage active lifestyles and provide some friendly competition and team building between civic employees. Events include 60 m sprints, long jump, high jump, shot put, 1 km race and a team relay race to cap off the ‘competition’.



Representatives from Council and senior management are invited to attend each year and in past years both the Mayor (former and current) and general managers have attended to compete and assist in the award recognitions. This event is an excellent method to get to know people in other departments; C&D will continue to organize this event for the foreseeable future.

Conflict Resolution

In collaboration with the Ministry of Labour Relations, C&D employees were given a two-day course on resolving conflicts constructively. All employees participated in this educational session to assist in understanding conflicts and provide additional skills to better manage differences, respectfully, and mutually when communicating internally and externally.

5.0 OUR FINANCES

5.1 Operation Finances

C&D activities are typically funded by capital budgets; the base operation expenditures as of December 31, 2017 are shown in the below table.

Expenditures	Technical Services	Development Services	Survey Instruments
Salaries	\$239,423	\$151,688	\$64,384
Payroll Costs	35,120	22,184	9,225
Car Allowance	719	13,568	5,037
Special Services	47,968	20,100	4,900
Staff Training	5,860		217
Maintenance Building			725
V&E Rentals		\$4,710	
External Rentals			68,428
Computer Expenses	4,912	3,000	
Material and Supplies	1,364	7,911	
Fuel Lube Oil		(770)	
Cost Recovery	(610)		(51,977)
Program Totals	\$334,756	\$222,391	\$100,940

6.0 OUR WORK

The C&D division delivers a variety of projects including: new land development (water, sewer and roads), water and sewer main preservation, and roadway and sidewalk preservation. The C&D division also delivers on projects such as streetscaping, retaining walls, subdivision fencing, sound walls, and berm seeding. Team members add value to the organization by providing planning, scheduling, and contract management assistance for the delivery of a wide variety of core public services. The C&D Municipal Engineering Services (MES) team delivers process improvement projects and unique capital projects. Some of the MES support programs include street sweeping, snow removal, and emergency water and sewer repairs.

Many improvements have been implemented over the last two years including: communications to the citizens, minimizing traffic disruptions, safety awareness, contractor management and quality standards. C&D has applied the use of trenchless technology, detailed phasing of work, and night work to minimize traffic disruptions and improve the quality of life for citizens. The contractor prequalification process has steadily improved, and as a result there has been a notable improvement in safety and quality of service. Delivery of construction notices had increased from 15,000 in 2014 to 30,000 in 2016; in 2017, 70,462 notices were delivered to residents and businesses. This growth is due to a higher volume of projects, increased number of locations and a drive to improve customer service.

In 2017, the City was provided \$31.6M in federal and provincial funding through the CWWF, providing for a total of \$43.3M worth of water and sewer rehabilitation when including the Cities portion of funding. This funding was only applicable to work that was in addition to the current annual rehabilitation programs, and was originally required to be used by the deadline of March 31, 2018. There were seven major water and sewer rehabilitation projects undertaken in 2017 as a result of this funding, the major areas included Caswell Hill, Buena Vista, Holiday Park, and along Victoria Street. In combination with water main service connections and replacement upgrades (i.e., looping or upsizing) were also completed so that when the road was restored, the need to cut into the road in future was practically eliminated. In order to facilitate these underground infrastructure projects the roadway preservation program was adjusted to ensure a comprehensive and coordinated asset management approach was achieved.

A significantly large water main lining project was also implemented in 2017, lining is advantageous because it minimizes the impact to the road surface and is more cost effective. In previous years a typical length lined was 3 km with an estimated cost of \$3.6M. In 2017, the scope of work was increased to 7.3 km with an estimated cost of \$9M with CWWF reimbursing approximately \$7M of the total cost. A significant number of mandatory lead service line replacements was also achieved throughout the City in 2017, which was a great start to achieving the goal of replacing all lead service lines over a ten year timeframe.

Typical roadway preservation programs executed each season included roadway treatments, micro-surfacing, resurfacing and ultra-thin overlays which are preceded by patching and crack fill programs with approximately \$24M of roadway surfacing projects being tendered. Sidewalks adjacent to the roadway program were also replaced or maintained with approximately \$5M of sidewalk replacements and \$0.55M in sidewalk maintenance repairs tendered. In 2017, sound walls were constructed in the east and west areas of the City; other programs include channelization and intersection improvement projects. The City has undertaken a number of new land development projects with the majority of those developments occurring in the north east sector of the City.

Projects that were either completed or substantially completed by C&D include:

1. McOrmond Drive (Fedoruk Drive to the North East Swale): This project included the construction of a four lane arterial roadway interlinking Fedoruk Drive to the new North Commuter Parkway Project; the roadway is substantially complete and will be ready for the opening of the Parkway in 2018.
2. Fedoruk Drive: A two lane portion of Fedoruk Drive was also constructed that will result in a final connection between McOrmond Drive and Central Avenue.
3. Aspen Ridge B1A: Water, sewer and storm servicing was conducted along Dattani Way, McCrory Link, Kalra Street and Orban Way.
4. Evergreen D4: Construction of concrete sidewalks and asphalt streets occurred within the area along Orban Way and Payne Bend.
5. Kensington: Area grading transpired within the neighbourhood and the Hudson Bay Industrial area adjacent to 60th Street.
6. Marquis Industrial: Storm Outfall work progressed within the Marquis Industrial storm pond next to 64th Street as well as roadwork within the area.

To provide insight on the type of projects the C&D division has accomplished over the last year, signature projects are highlighted in this 2017 Annual Report. In addition to internal projects, the land development team provided regulatory oversight and support to private developments to ensure property inventory was maintained to meet public demand.

The following table illustrates the municipal services completed by land development in 2017.

	Number of Residential Lots Completed	Commercial/MF/Institute Completed (acres)	Industrial Parcels Completed (acres)
City Servicing	0	12	40
Private Servicing	483	49	0

Private developers signed servicing agreements in 2017 for completion of 483 residential lots as well as 49 acres of commercial/institutional and multifamily lands. C&D completed four parcels within Evergreen and 21 parcels of industrial lands within the Marquis Industrial Area; 40 acres total.

6.1 Caswell Hill Water Rehabilitation Project

Budget	\$7,500,000
Contractor	Hamm Construction
Project Sponsor	Major Projects

This was a comprehensive rehabilitation construction project that targeted 19 blocks within the Caswell Hill neighbourhood.

Multiple goals and objectives were outlined for this Project:

- Replace all existing lead water service connections and cast iron water mains
- Install additional water main to improve the reliability (looping) of the water network
- Install additional fire hydrants for the neighbourhood to meet current fire regulations
- Install additional sanitary sewer to improve the performance of the existing collection system
- Replace deteriorated storm sewer main
- Concrete sidewalk, ramp, and curb treatments
- Curb-to-curb asphalt restoration.

The highlights of the work accomplished include (not limited to):

- 115 service connections replaced
- 2,525 m of water main installed
- 13 additional new fire hydrants
- 108 m of new sanitary sewer main
- 5 new sanitary sewer manholes
- 95 m of storm sewer main
- 4 new storm sewer manholes
- 9 complete catch basin replacements
- 1,452 m of concrete curb and 1,030 m of concrete sidewalk was replaced
- 6 new pedestrian ramps
- 19 blocks of asphalt resurfacing

The scope of work also included landscape maintenance until the end of the season.

Challenges & Successes

Scale

This was the first project of this scale within the inner City limits in years, the quantity of work that was originally planned to be completed would span the entire construction season. The team developed a plan to minimize disruptions by limiting the interruptions to only one-instance per block.

Communications

Information sessions were held for the residents in the winter prior to construction starting. Ongoing communication with the affected residents over the entire 28-week construction duration was accomplished by providing frequent project updates through construction notices. Over 3,700 construction notices were delivered over the course of this project.

Old Records

As-built drawings from original water main installation, as well as the connection cards dated back to 1912, therefore accuracy was a concern. The team initiated pre-construction inspections and service connection daylighting in order to identify any potential unknowns. For example: during water main construction it was discovered that there was an undocumented Cable utility bank along the 900 and 1000 blocks of Avenue C North. The water main alignment had to be shifted to avoid conflicting with the utility bank.

Mandatory Connection Replacement Contracts

All lead water service connections within the construction zone were targeted for mandatory replacement. Each resident was contacted and sent information prior to construction starting. The team addressed resident's specific concerns through follow-up phone calls, emails, and house visits as required.

Grid Layout

The 19-block construction area was a grid format; streets and avenues. The grid proved to be more complex than anticipated as the original plan was to complete selected streets first, and then move into the avenues. This caused multiple challenges:

- Maintaining the original phasing plan while balancing the workload of the various work-type crews (connection replacement, water main installation, concrete, and asphalt paving) since work progressed at different rates; allowances were made for one or more crews to move ahead to the next construction area while work continued in a previous area.
- Water main installation, when tying into the existing infrastructure at intersections, a full closure was required (north-south and east-west).

Rail Car Tracks

During the project planning phase, it was discovered that part of the 1946 Saskatoon Municipal Railway route overlapped with the planned construction area. No information was available on the amount of rail tracks buried underground. Fortunately, only 195 m of rail car tracks were encountered and removed.

Pool

High priority was placed on maintaining access to Mayfair Pool during construction. Construction was phased so that one of the entrances of the Mayfair Pool parking lot were always open at all times.

School

Pedestrian, vehicular, and school bus access to Caswell Hill School needed to be maintained throughout this construction project. This was alleviated through scheduling, and strategically planned work zones to accommodate the schools requests.

Trees

Avoiding damage to trees in the Caswell Hill neighbourhood, which are very mature; upwards of 100 years old, required a meticulous design layout and careful construction practises while working around the abundant mature trees.



Water system flushing.



Caswell Hill inspection team.



Water main installation.



Water main network.



Both water and sewer main replacement.

6.2 Holiday Park Water Rehabilitation Project (CWWF2)

Budget	\$5,215,839
Contractor	Hamm Construction
Project Sponsor	Major Projects & Preservation

In Holiday Park Neighbourhood cast iron water mains required replacement along Spadina Crescent West from 11th Street to Spadina Crescent end, Schuyler

Street from Spadina Crescent to Avenue K South, Avenue K South from 11th Street to Schuyler Street, Dudley Street from Spadina Crescent to Avenue I South.

Multiple goals and objectives were outlined for this project:

- Replace all existing lead water service connections and cast iron water mains;
- Upsize and install additional water main to improve the reliability (looping) of the water network;
- Install additional sanitary sewer to improve the performance of the existing collection system;
- Concrete sidewalk, ramp, and curb treatments; and,
- Curb-to-curb asphalt restoration.

The highlights of the work accomplished include (not limited to):

- 58 service connections replaced;
- 1488 m of water main installed;
- 1.55 km of roadway full curb-to-curb resurfacing and reconstruction;
- 194 m of concrete curb and 969 m² of concrete sidewalk was replaced;
- 8 new pedestrian ramps; and,
- A circulated hut was installed to solve a pre-existing freezing problem on the existing 1,954 sewer pipe section originally installed with less than 1.7 m cover.

Challenges & Successes

The project team set up work phasing and milestones with bonuses and penalties to keep the project on schedule, minimized the impact on the affected residents and businesses, and local area traffic.

Early communication started with an open house with the residents and the Ward Councillor wherein the City team provided a power point presentation on all the CWWF projects. As construction season drew to a close notices were issued to update the residents on the schedule.

Safety of the residents was a high priority during construction, all open trench areas were surrounded by 1.8 m high metal fencing.

The project was complete ahead of schedule.



Spadina Crescent prior to construction.



Spadina Crescent West during water main Installation.



Spadina Crescent west after completion.

6.3 Victoria Avenue & 10th Street East Water System Rehabilitation (CWWF 3A)

Budget	\$4,197,354
Contractor	Mi-Sask Industries Ltd.
Project Sponsor	Major Projects & Transportation

This project consisted of three blocks of rehabilitation on 10th Street East from Broadway Avenue to McPherson Avenue as well as four blocks of Victoria

Avenue from 8th Street East to 11th Street East. There was nearly 1,000 m of water main replaced, 48 water and sewer connections replaced, and the complete resurfacing of 10th Street East. This project also included the construction of a re-designed Victoria Avenue to include new sidewalks, bike paths, curbs, and roadway. Since the sidewalks on Victoria Avenue were to be replaced as part of the restoration project, C&D worked with both Transportation and Major Projects to deliver the upgrades.

Challenges & Successes

Although the entire project was not completed in 2017; the water system rehabilitation portion of the project was completed. Construction of the roadway surface and pedestrian and cyclist amenities on Victoria Avenue from Main Street East to 11th Street East extended into 2018. The contract was originally expected to take five months, however, it is expected that the remaining surface infrastructure work on Victoria Avenue will take approximately two months to complete in 2018.

Challenges arose from redesigning Victoria Avenue as the original plan was to construct new pedestrian and cycling infrastructure while only resurfacing the roadway. The new design included narrowing the driving surface and increasing the width from the property line to the curb of the roadway to facilitate the new cycling lane. Once work started it was determined that the roadway would need to be reconstructed (new base and asphalt). The existing grade of the roadway was not maintainable to provide enough slope for the sidewalk and cycling lane for proper water drainage; this increased the cost of the project. On the resurfacing portion of this contract on 10th Street East called for milling the existing 40 mm of asphalt and to resurface the roadway with 40 mm of asphalt. Due to the lack of an existing crown on the road surface, a significant amount of additional asphalt was required to acquire proper roadway drainage.



Installation of new water service connection pipe to new water main.



Reconstruction of Victoria Avenue.



New sidewalk, cycle track, curb, and roadway surface on Victoria Avenue.

6.4 Buena Vista Water and Sewer System Improvements

Budget	\$4,630,309
Contractor	Hamm Construction
Project Sponsor	CWWF & Roadways Preservation

In one of Saskatoon’s oldest neighbourhoods (developed in 1911), Buena Vista was chosen by the City of Saskatoon’s Major Projects

division to receive Federal funding from the Canadian Water and Waste Water Fund (CWWF), 1053 m (200/250 mm) of new PVC Water Main was replaced (113 residential services completed). Locations for the work included the 300 block of 3rd Street, 200/300 block of 4th Street, 100/200 block of 5th Street, and 100/200 block of 6th Street. Additional lead lines were completed on 100/200/300 blocks of 7th Street. Each location received new curb to curb pavement resurface and concrete spot repairs.

Challenges & Successes

There were many challenges with the Buena Vista project, a school zone to consider, parking was limited, unique servicing issues that had to be resolved, and contaminated



Service connections.

material that required environmental support. Due to the amount of work in the one construction season it was difficult to schedule the work around the school season. In order to ensure student safety, the project team was in constant communication with the school to ensure buses were re-routed around construction as the work phases changed. Overall this project was a success completing on time and within budget constraints.



City of Saskatoon and Contractor (HAMM) Buena Vista Team.

6.5 Fletcher Road Sewer Upgrades

Budget	\$1,893,793
Contractor	Acadia Construction
Project Sponsor	Saskatoon Water

This south-west industrial area of Saskatoon was reaching capacity of its existing sanitary services and required an upgrade. The scope of work included twinning the gravity sewer on Fletcher

Avenue (between Buckle Avenue and the lift station west of SaskPower), as well as to increase the existing force main to handle the increased capacity. Phase 1 of the project was to replace the force main running from the lift station to the sanitary manhole at the intersection of 11th Street West and Avenue W South (completed fall of 2016); Phase 2 consisted of the gravity sewer twinning (completed in Fall 2017). Construction improvements included over 1,000 m of new sanitary/force main install with insulation, multiple new manholes, replacement of catch basin leads, valve replacements, as well as complete reconstruction/resurfacing of all affected roadways.



New manhole at Fletcher Road and Buckle Avenue.

Challenges & Successes

During preliminary stages of the construction it was discovered the alignment of the proposed force main had to be shifted, the design had been based on historical drawing information that proved to be inaccurate. This also pertained to the utility information available for the area, construction was interrupted many times due to undocumented utilities being exposed. Due to the age of the infrastructure there were also many issues with main breaks, leaking valves and water infiltration which slowed construction. The project team worked with local businesses on maintaining access at all times. The project was successfully completed, however due to the many challenges the completion date was extended beyond the original date.



Installation of manhole at Buckle/Fletcher Road Intersection.



View after installation.



Installation of manhole close to Fletcher Road lift station.

6.6 2017 Water Main CIPP Lining

Budget	\$11,791,461
Contractor	Fer-Pal Construction Ltd.
Project Sponsor	Major Projects & Preservation

The 2017 Water Main Lining Project involved rehabilitating approximately 7.3 km of existing water main using the installation of cured-in-place-pipe (CIPP) liner.

After the CIPP liner was installed, all hydrants, valves, and other appurtenances were replaced and surface restoration of all excavated surfaces was completed.

The scope of work was broken down over several locations that spanned all over the City, some locations included: Richmond Crescent and locations north and south, Spadina Crescent East, Churchill Drive, McMillan Avenue & Avenue N North, Avenue W South, Avenue Y South, Avenue X North, Witney Avenue & Rusholme Road, Avenue C North & 40th Street Easement, Melrose Avenue, Young Crescent, McConnell Avenue, Glasgow Street, Hilliard Street West & St Patrick Avenue, Egbert Avenue & 115th Street West, Dunlop Street, Ewart Avenue & Ruth Street East, Louise Avenue & Leyden Crescent, and William Avenue.



Contractor setup for installing CIPP liner.

Using the CIPP lining method allows for a less invasive approach to rehabilitating existing water mains which is especially useful where other infrastructure close to the water main would make open trench replacement very expensive or time consuming.

Challenges and Successes

Successes for the 2017 water main lining project include the complete installation of 7.3 km of liner which is the largest quantity tendered by the City to date. There were several project locations that had roadway preservation work occurring either within the same limits or immediately adjacent to the water main lining limits. The water main lining work was successfully coordinated alongside the roadway preservation construction for certain locations; this allowed the City to minimize the disruption impact on local residents through synchronized projects. In addition, there were two locations where railway right-of-way's (ROWs) crossed City property within the project area. The CIPP method allowed for the rehabilitation of the water mains that existed under the railway ROWs, therefore, excavation of the railway ROWs was not required, which saved on budget and decreased the duration of the project.

Coordinating the work on the water main lining and the necessary roadway preservation also presented a challenge. This project was completed successfully through

communication and working closely with several groups within the City such as: transit, detour coordinators, water & waste stream and sign shop as well as by working with external groups like business improvement districts and school boards.



CIPP Liner being pulled into existing water main.



300 mm cast iron water main pre-lining.



300 mm cast iron water main post-lining.

6.7 CWWF 7 – CIPP Sanitary Sewer Lining

Budget	\$2,100,000
Contractor	Insituform Technologies Ltd.
Project Sponsor	Major Projects & Preservation

The 2017 CIPP Sanitary Sewer Lining project involved the rehabilitation of 10,804 of active sanitary sewer mains. The work was largely focused on the areas

of Caswell Hill, Holiday Park, Buena Vista, and other areas on the east side of Saskatoon. The project consisted of the installation of a resin-impregnated felt liner using a cured-in-place (CIPP) lining method.

Challenges and Successes

As this project was completed under the Federal Clean Water and Wastewater Fund (CWWF), time constraints were one of the main challenges facing this project. Most of the locations to be lined were in areas that had scheduled water main replacement work in the area, and sewer lining had to be completed before this could occur. To address this, the project was broken into phases with completion bonuses and penalties and was tendered for a winter construction schedule.

This project also consisted of the lining of several large diameter sewers that required a different set-up as well as an around the clock bypass on Taylor Street near Lorne Avenue. This work needed five days to complete and adequate planning to accommodate traffic while this work was completed was required.

As this rehabilitation work took place on largely deteriorated mains, dig repairs as well as water leaks often affected schedule. All repairs on sanitary and water mains were performed by city crews and lining took place after these were completed. There were instances where a source of a water leak could not be located, requiring the isolation of a section of water main during the liner curing process and a DWA being issued for the block affected.

Communication with the homeowners was an important aspect of this work during the initial preparation of the sewer lining. Ensuring homeowners knew what to expect during water outages, sewer preparation and lining was crucial to ensure that the residents were satisfied. In addition, two notices were sent by the City and the contractor delivered notices to the affected residents prior to the preparation stage and lining stage.

With these challenges the project was successfully completed.



200 mm sewer main CIPP liner insertion.



Curing CIPP liner.



Final CCTV inspection.

6.8 71st Street and Highway 16 Intersection Improvement

Budget	\$4,264,153
Contractor	Acadia Paving Ltd.
Project Sponsor	Transportation

The City and the RM of Corman Park agreed to the realignment of 71st Street entering Highway 16. The new intersection will also include street lighting and traffic lights to provide a safe controlled intersection. The

project also includes the construction of adjoining roads to 71st Street of the Biz Hub Industrial Park (Capital Circle West) and Range Road 3060.

Challenges and Successes

There were many challenges to this project. All the existing utilities required relocation; advanced planning with utility companies to obtain relocation plans and approvals. The majority of utilities were relocated but there was a delay in starting Phase 2 construction of 71st Street on the north side of Highway 16 due to a delayed relocation of fibre optic lines.

The second challenge was communication; the new intersection and roadway construction impacted many businesses that utilize the old intersection for access. C&D sent out regular updated construction notices discussions with the business owners continued as the project progressed. Detour plans were also communicated to businesses to ensure that they had reasonable access to their location.

The third challenge was traffic control, considering that the project work was adjacent to the highway, extra precautions for traffic control was implemented. Many detour signs were set up in advance of the construction to alert vehicle traffic of upcoming closures. The City utilized three sign boards, traffic pylons, cones, barricades, etc. to ensure safety of public and the workers. The project was successfully and completed on schedule.



Project Team at 71st Street & Highway 16.



Paving turn lane.



71st Street base gravel compaction.



71st Street base gravel compaction.



Finished Pavement at 71st Street and Highway 16.

6.9 Zimmerman Road Arterial

Budget	\$7,791,011
Contractor	Lafarge Construction
Project Sponsor	Saskatoon Land

The project scope was to upgrade Range Road 3044 (Zimmerman Road) to an arterial roadway from Highway 16 to the Hillcrest Memorial Road. The project included the construction of approximately

one kilometre of arterial roadway, complete with centre median, curb and gutter, adjacent walkway, bike pathway, storm system and ditch drainage, three major intersections controlled by traffic lighting and LED street lighting. Included in the scope was a major upgrade to the intersection at Highway 16 and Zimmerman Road that encompassed a 0.6 kilometre highway merge lane and three separated highway turn bays.

Challenges & Successes

There were a number of challenges involved with planning and construction of this project, one of which was the installation of the storm system around a primary high pressure Trans Gas line. The work involved a detailed design and permitting to install the storm system within the right of way of the utility. Another challenge was the heavy traffic adjacent to the construction zone. The Patience Lake Highway (Range Road 394) that intersected Zimmerman Road experienced heavy traffic and due to the road bans on all adjacent range roads in the area the Ministry of Highways and the RM of Corman Park required that Patience Lake Highway remain open at all times during the construction of the new arterial roadway. Therefore, a temporary roadway from the Patience Lake Highway to Highway 16 was built in order to direct traffic around the construction.

The construction was also divided into two phases, with the first phase being critical as the section of roadway from Highway 16 to Market Drive (the first major intersection) needed to be completed by July 2016 in order for construction on the new Commercial area to start. The project team met the timeline required.



Intersection of Zimmerman Road and Meadows Blvd. looking south.



Intersection of Zimmerman Road and Highway 16 looking north east.



Intersection of Zimmerman Road and Highway 16 looking west.



Zimmerman Road between Market Drive and Meadows Boulevard looking east.



Intersection of Market Drive and Zimmerman Road looking south.



Highway 16 looking west.



Intersection of Zimmerman Road and Highway 16 looking south.

6.10 Collector Road Resurfacing

Budget	\$2,757,669.77
Contractor	ASL Paving Ltd.
Project Sponsor	Maior Projects

This project involved replacing concrete and resurfacing the road. Approximately 850 lineal metres of curb were replaced, 1,400 square metres (m²) of sidewalk were replaced and

resurfacing with 9,430 tonnes of asphalt to the following locations:

- Avenue W North - 33rd Street West to Richardson Road
- Rusholme Road - Witney Avenue North to Avenue W North
- Boychuk Drive - Arnason Crescent to McKercher Drive
- Spadina Crescent West - Avenue G South to Avenue C South
- 16th Street West - Avenue H South to Avenue G South
- Redberry Road - Lenore Drive to Frobisher/Wathamman Crescent
- 39th St West - Avenue C North to Idylwyld Drive North
- Junor Avenue - Makaroff Road to 37th Street West
- Idylwyld Service Road - 51st Street to 53rd Street East

Challenges and Successes

This project was tendered late in the 2016 season and therefore carried over into the 2017 construction season. This project was completed on schedule and under budget with the exception of Rusholme Road which was delayed because of Water & Sewer work.



Concrete removal.



Concrete base preparation.



Tack coat following milling.

6.11 Fedoruk Drive Construction

Budget	\$2,791,487
Contractor	Prairie Paving Inc.
Project Sponsor	Saskatoon Land

The 2017 Fedoruk Drive Construction project consisted of constructing 2.4 lane kilometres of new arterial roadway, 2.4 kilometres of two metre wide asphalt bikeway, and 1.2 kilometres of 1.5 metre wide concrete

separate sidewalk between Feheregyhazi Boulevard and Lowe Road. Topsoil and hydroseed was placed over an area of 22,114 m² on either side of the roadway.

This project provides a direct connection between the Silverspring and Aspen Ridge subdivisions. The asphalt bikeway on both sides of Fedoruk is separate from the roadway which allows for bikers to enjoy the view of the Meewasin Northeast Swale at a safe distance away from vehicle traffic.



Site conditions at the start of construction.

The Meewasin Northeast Swale is a diverse network of rare native prairie and wetlands covering 26 kilometres long and 2,800 hectares. The 300 hectares that fall within City limits are bordered on the east and south by the communities of Aspen Ridge and Evergreen, respectively.

Challenges and Successes

Constructing this roadway next to the Meewasin Northeast Swale meant that certain precautions needed to be taken in order to ensure that the native prairie land was not compromised in any way. A unique seed mix that matches the natural vegetation growing in the swale needed to be used along the north side of Fedoruk Drive. Construction equipment and workers were not permitted on the swale for any reason; special considerations were made during construction between the north bikeway and the Meewasin Northeast Swale.

Pedestrian access and safety was a high priority given the project's close proximity to nearby homes in Evergreen. In recent years residents enjoyed the sound attenuation berm adjacent to the project for activities (i.e. walking their dogs, jogging) and the construction zone did not prevent them from continuing these activities.

Construction began later than anticipated which made completing construction of the entire project before winter one of the main challenges. The contractor was able to provide multiple crews working on different sections of the roadway to increase production. Traffic was detoured to Central Avenue during the final phase of the project. Ultimately, construction finished on time and Fedoruk Drive was opened for the public to enjoy throughout the winter.



Completed sidewalk and bikeway along the south side of Fedoruk Drive.



Asphalt paving on Fedoruk Drive.



Aspen Ridge Team.

6.12 Hudson Bay Industrial Area Grading

Budget	\$405,184.44
Contractor	Arnold Earthmoving Ltd.
Client	Saskatoon Land

The Hudson Bay Industrial Area Grading project involved excavating and hauling 63,000 cubic metres (m³) of topsoil from a stockpile located north of 71st Street. The topsoil was

placed and compacted to fill a clay borrow pit near the intersection of 58th Street and Lambert Crescent.

Once the borrow pit was filled, the 62,000 m² of field was graded towards a culvert going under 58th Street that drains into the nearby storm water retention pond. Rip rap and a filter blanket structure was placed at either end of the culvert to reduce the amount of migrating fines and debris traveling to the pond. The City plans to further develop this field into a park with three full-sized baseball diamonds.

Challenges and Successes

Although the finished result of this project exceeded expectations in terms of budget and schedule, there were a few challenges that needed to be overcome along the way. Ponding in the borrow pit left unsuitable foundation of material at the bottom of the pit after dewatering. The topsoil stockpile needed to be reshaped multiple times during construction in order to ensure a safe excavation and was found to be contaminated with large rocks which needed to be removed from each truck load at the borrow pit site.



The topsoil stockpile during construction.



Trucks dumping topsoil into the Hudson Bay borrow pit.



The Hudson Bay Borrow Pit after construction.

7.0 MODERNIZATION OF ENVIRONMENTAL SPECIFICATIONS AND DEVELOPMENT OF CONTRACTOR ENVIRONMENTAL GUIDELINES

Partnership between Construction & Design and Environmental & Corporate Initiatives

The City of Saskatoon undertakes many construction projects each year, most requiring contracted work. Construction projects may pose a significant danger to the environment, risking water pollution, natural

area damage and loss of wildlife. There are many Laws and Regulations related to the protection of the environment and the City must have up-to-date standards and specifications and effectively communicate to the contractors the requirements for compliance with all Laws and Regulations governing the work.

This partnership project has four distinct phases:

- a) Modernization of Standards and Specifications
- b) Development of Contractor Environmental Guidelines
- c) Training and Engagement
- d) Ongoing Implementation

Phase 1 – Modernization of Standards and Specifications - Complete

- a) A review of the current environmental specification was undertaken by the Project Team and included stakeholder engagement with other divisions.
- b) Based on collaboration between C&D and Environmental & Corporate Initiatives (E&CI) and feedback from stakeholders an update standard specification was drafted and vetted through the Specification and Product Review Committee and adopted in November, followed by the incorporation into the formal Specification at the start of 2018.



Example Contractor Environmental Guidelines Document

Phase 2 – Development of Contractor Environmental Guidelines (CEGs) - In Progress

- a) Development of the CEGs will demonstrate the City’s commitment to environmental protection and encourage contractors to take appropriate measures the safeguard the quality of our air, land and water.
- b) The purpose of the CEGs is to establish a program that will communicate to contractors the expected standard for environmental protection during construction projects.
- c) The program will include an annually reviewed and updated guidelines document, training sessions and scoping of potential secondary initiatives which may include further researching and piloting.

- d) A list of sections for the guidelines document has been developed and prioritized based on importance, effectiveness, cost and ability to implement. The document will be developed in a phased approach and released to the contracting community once training and engagement have been completed.

Phase 3 – Training and Engagement - In Progress

- a) An initial engagement session was held with C&D contractors in December to explain the project and present to road map for ongoing changes.
- b) The updated Environmental Specifications (Phase 1) were presented and CEGs examples were explained.
- c) Once the first phase of the CEGs document has been developed, additional engagement sessions will be held and feedback will be used to refine the document.

Phase 4 – Ongoing Implementation

- a) Phased Development and Implementation of CEGs.
- b) Phased Training and Engagement Sessions.
- c) Scoping and implementation of Erosion and Sediment Control Program.

Challenges and Successes

The modernization of the City's Environmental Standards and Specifications has an impact on a vast majority of City Stakeholders and Operations. Early in the project stakeholder engagement and involvement were deemed critical to the overall project success. As such, the extensive engagement with multiple divisions has led to increased time requirements and an overall delay to the implementation of the Phase 1 of the project. However, after several month of work Phase 1 was completed and implemented at the end of 2017.

Phase 2 of the project will comprise the majority of the work and will be resource and time intensive. E&CI will lead the development of the CEG document with extensive involvement from C&D. It will be challenging to dedicate resources for this work during the peak construction season (May to October) however, both teams are committed to moving this project forward for the benefit of the City.

7.1 Continuous Improvement

The C&D division pursues continual improvement opportunities to minimize environmental impacts associated with project delivery through:

1. Exploring opportunities for alternate materials and methodologies by:
 - Alternative bids (labour and/or materials);
 - Variance requests; and
 - Value engineering proposals.
2. Collaborating with industry to trial and evaluate new products and processes

- Stand-alone trial projects;
 - Test sections within existing projects; and
 - Lunch and Learn professional development opportunities.
3. Collaborating with Environmental and Corporate Initiatives on development and implementation of corporate programs for:
- Evaluation of environmental implications on projects;
 - Environmental Management Policies for construction;
 - Contractor Environmental Management System;
 - Updates Standards and Specifications
 - Contractor Environmental Guidelines
 - Criteria and metrics for prequalification activities; and
 - Assisting with, or managing the delivery of corporate environmental projects.

8.0 OUR CHALLENGES

C&D thrives on challenges and discovers innovative solutions every day. Some of our challenges to overcome include:

- Real-time information sharing and knowledge transfer;
- Minimizing the impacts of construction and through communication and improved customer service;
- Being aware shifts in funding and economic changes and impacts are immanent; utilizing resources efficiently considering our diverse project variance; and
- Delivering high quality infrastructure in a safe, sustainable, and cost-effective way while keeping pace with growth and changes in regulations and technologies.

9.0 SUMMARY OF 2017 ACHIEVEMENTS

In summary, we have provided C&D's achievements in 2017. Our division delivered approximately 115 internal projects that benefit the citizens of Saskatoon.

9.1 Construction Project Forecast 2017

In December 2017 C&D was host to an information session to include both contractor's and related internal City of Saskatoon clients. C&D presents this update on an annual basis to communicate upcoming projects forecasted for 2018 and for networking with the industry. C&D has received great feedback regarding this informative event and looks forward to future Construction Project Forecast events.

9.2 New Land Development

The table below summarizes new land development that occurred in 2017.

New Land Development	
18.5 lane-kms	Of new roadways
900 m	Of new water mains
786 m	Of new sanitary sewer mains
750 m	Of new storm sewer mains
273 m ³	Of area grading

9.3 Preservation of Infrastructure

The following table summarizes the preservation of infrastructure specific to areas that occurred in 2017.

Preservation of Infrastructure	
27 lane-kms	Of roadway preservation treatments (Water & Sewer)
150 lane-kms	Of roadway preservation treatments (Roadways)
37 kms	Of sidewalk rehabilitation (Roadways)
9,500 m	Of sidewalk rehabilitation (concrete rehab only)
14,687 m	Of water main rehabilitation
24,648 m	Of sanitary sewer rehabilitation
1,026	Existing short connections replaced
34,830	Sewer mains inspected

9.4 Technical Services

The table below summarizes technical service connections installed in 2017.

Technical Services	
670	New short-service connections installed
732	Property only connections
247	Full connections
774	Lead line and fiber sewer connections replaced
75	Water lines commissioned

9.5 Communications

The following table summarizes communications and methods of delivery for 2017.

Communications

70,462	Notices delivered to citizens
2	Community engagement presentations
491	Projects entered into ESRI
1	Contractor engagement session

9.6 Health and Safety

The table below summarizes the health and safety that occurred in 2017.

Health and Safety	
12	Divisional safety meetings throughout the year
2.65%	Employee absenteeism rate
500	Contractor compliance observations completed
388	Supervisor/employee compliance observations completed
342	Toolbox meetings held over eight construction months

10.0 CONCLUSION

The success of the C&D division is dependent on the dedication and skills of its employees and their efforts are greatly appreciated. Our knowledgeable team of engineers, technologists, technicians, administration and accountants play a crucial role in the delivery of the capital projects taken on each year. The guidance and support of the General Manager, City Manager and City Council is very much appreciated.

The C&D division and staff look forward to the future and all the challenges and opportunities that accompany our ever growing, dynamic City of Saskatoon.