Municipality Of Chatham-Kent

Infrastructure and Engineering Services

Information Report

To: Mayor and Members of Council

From: Thomas Kelly, P.Eng., MBA, General Manager

Date: April 28, 2021

Subject: Innovation Update – Infrastructure and Engineering Services

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This report is for the information of Council.

Background

The Infrastructure and Engineering Services (IES) Department is responsible for constructing and maintaining municipal infrastructure assets.

IES operations provide a broad range of services to Chatham-Kent residents including:

Public Works (operations and maintenance):

- Roads
- Sewers
- Sidewalks
- Snow removal
- Trees
- Weeds
- Municipal Airport

Engineering and Transportation:

- Design and development of capital and lifecycle construction projects (new, replacement and rehabilitation)
    - Roads, sidewalks, bridges, culverts, parking lots, watermains , sanitary and storm sewers
- Traffic control and signals
- Transit (Conventional, Inter-Urban and Accessible)
- Geospatial information for Municipal assets and management of maintenance Asset Management Plan
- Development applications and approvals
- Research and innovation on new and emerging technology and procedures in the construction field

Drainage, Asset and Waste Management

- Municipal drainage through the Drainage Act
- Fleet equipment and vehicles
- Garbage and recycling
    - curbside collection, transfer stations, leaf and yard depots
- Municipal buildings
- Social Housing assets
    - building maintenance and renovation

Parks and Recreation

- Active transportation and community trails
- Arenas
- Beaches
- Boat launches and docks
- Cemetery Services
- Clearville Park and Mitchell's Bay operations
- Community halls
- Community parks, playgrounds and amenities
- Dog Off-Leash Recreation Areas
- Natural Heritage Implementation Strategy
- Pools and splash pads
- Sports fields
- Tennis courts

In support of Council's priorities, IES staff have adopted a continuous improvement philosophy in order to provide the most cost effective means of service delivery for all areas of responsibility. The 2018-2022 Council term priorities include:

- Growth - Our population and economy is growing.
- Environmental Sustainability - Acting today for a better tomorrow.
- Community Wellness - Everyone is safe and able to thrive.
- Growth – Improve transportation, public transit and active transportation options
- Community Engagement - The voice of the community is reflected in municipal decision-making.

Comments

Review of innovative processes and products is a continuous endeavor within the IES department as technology is constantly changing. Administration expands their exposure to innovation by:

- Attending conferences and workshops
- Contacting and collaborating with other municipalities, provincial bodies and universities
- Investigating new proposals from vendors
- Reviewing print material available in technology-specific magazines

Due to the geographic size of the Municipality, along with its large asset value of $5 billion, Chatham-Kent is a recognized leader in infrastructure works and innovation. New concepts and ideas are typically proven out on a pilot basis to ensure the stated technological benefits can be confirmed through empirical data. Attached is a list by division of innovations implemented or that are currently in-process (Appendix A).

The innovation return on investment is quantified in terms of:

- Improving service life expectancy
- Reducing up-front capital costs, on-going maintenance or operational costs
- Improving customer service response times
- Reducing the environmental footprint; reducing Green House Gas (GHG) emissions
- Improving the overall quality of the asset
- Optimizing asset utilization
- Reducing asset wear and tear and thereby increasing life
- Improving the administrative efficiency of internal municipal resources and external contractors
- Improving emergency response times
- Improving route cycle times in the case of transit buses
- Enhancing compliance to Minimum Maintenance Standards
- Reducing the run-time of equipment thereby extending the life of the asset
- Improved accessibility for all Chatham-Kent residents
- Improved communication and convenience to residents via smart phone apps and web site upgrades

Consultation

IES staff and suppliers were consulted in the innovations listed in the report. A draft copy of the report has been shared with members of the Infrastructure Committee.

Financial Implications

Return on investment and service benefits are noted in Appendix A. Specific financial savings by project are typically reported in project's Report to Council.

Prepared by:

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Thomas Kelly, P.Eng., MBA
General Manager, Infrastructure and Engineering Services

Attachments: Appendix A - Infrastructure and Engineering Services – Innovations
Appendix B – Council Presentation Highlights

REF:

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation Division	Engineering (Roads)	Fiber Reinforced Asphalt Pavement	Fiber Reinforced Asphalt Pavement is the process where aramid fibers are blended with the hot mix at the plant. In 2019 two (2) sections of roadway were completed as trial sections (Oxley Drive and Countryview Line). In 2020, Chatham-Kent used in four (4) new applications: Bloomfield, Centre Side Road, Fairview Road and Faubert Drive.	Strengthens asphalt to reduce rutting and reflective cracking improving service life expectancy.
Engineering & Transportation Division	Engineering (Roads)	Cold In-Place Recycling	Cold In-Place Recycling with Expanded Asphalt Material (CIREAM) is a process in which the existing hot mix is milled, sized, treated with a foamed asphalt cement, relayed and compacted in one stage. Once completed and the binder is cured an asphalt overlay is placed on the mat. Chatham-Kent has been using this technology for a number of years now with examples including Charing Cross Road, Talbot Trail, Longwoods Road, Electric Line and Queens Line.	Mitigates reflective cracking and is environmentally friendly as it eliminates haulage and disposal by using existing asphalt pavement as a binder course.
Engineering & Transportation Division	Engineering (Roads)	Reclamite Asphalt Rejuvenation	Reclamite is a maltene rejuvenation emulsion that is sprayed on existing asphalt making it have more resiliency and flexibility to extend the life of asphalt pavement. In 2019 three (3) road sections were completed as trials and will be continued to be monitored to measure its effectiveness. These roads are Longwoods Road, Florence Road and Prince Albert Road.	Extends asphalt pavement life by rejuvenating the asphalt cement and seals the pavement preventing water penetration.
Engineering & Transportation Division	Engineering (Roads)	Fiber Reinforced Surface Treatment	Fiber Reinforced Surface Treatment combines a polymer modified asphalt emulsion with chopped fiberglass strands and trap rock. Chatham-Kent has been using the technology for a number of years now with examples including McKee Road, Harwich Road, Lindsay Road, Roy Street, River Line and 3rd Concession Line to name a few.	Extends the surface treatment life making it resilient to reflective and alligator cracking

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation Division	Engineering (Roads)	Reinstatement Tape	In 2018 Reinstatement Tape was placed on King Street between Third and William as a trial. This product is a cold polymer modified bituminous strip that replaces the conventional tack coating (emulsion) applied between the curb and new asphalt pavement.	Provides a waterproofing joint between the face of the curb and new asphalt pavement preventing water from penetrating into the joint and thereby extending life.
Engineering & Transportation Division	Engineering (Roads)	Proposed new technologies and procedures - 2020	The Municipality is investigating the use of Hot-in-Place asphalt and Micro-surfacing road maintenance in 2021. Both technologies are noted to save money through operations as well as extending lifespans.	Benefits remain under investigation
Engineering & Transportation	Engineering (Bridges/ Culverts)	Composite Bridge	A fiberglass composite bridge deck consists of glulam timber beams encapsulated with epoxy resin and wrapped with a fiberglass material. The manufacturer claims this product is impervious to water infiltration due to the epoxy resin while concrete bridge decks absorb water, which can lead to corrosion of steel reinforcing. The product is installed in sections thereby reducing downtime. Chatham-Kent has one bridge within their inventory on Snobelen Line in 2013. Inspectors have noted premature cracking of the wearing surface and heavy leakage through the joints and the deck causing undercutting of the structural coating. Further investigation as to the root cause is underway.	The manufacturer claims extended life over typical structure and reduced on-going maintenance. Both increases and decreases in up-front capital costs have been witnessed across Ontario. The techonology is currently only offered by one supplier, which may explain the significant price variation. Supplier is no longer in business.

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation	Engineering (Bridges/ Culverts)	Review hydraulic needs for structures	Evaluate capacity flow requirements of existing concrete structure and replace where possible with smaller polymer coated Corrugated Steel Pipe (CSP) once hydraulic needs confirmed. Examples include: • Kenesserie Road over Abray Drain • Oldfield Line over Maxwell Creek Drain (East) • Baldoon Road over O'Mara and 14th Concession Drain • New Scotland Line over Holdaway Drain • 5th Concession Line over Horton Drain • Middle Line over Flook & Hinton Drain • Middle Line over 18 & 19 Sideroad Drain • Middle Line over Government 1 Drain	Up-front capital savings observed by moving from concrete to steel structures. Life expectancy may be compromised compared to concrete dependent upon the environment.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Review structure types	Replacing an existing concrete structure with a polymer coated CSP (examples above) with same hydraulic capacity.	Completed through the roster list, which saved construction costs and Municipal staff time.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Slip-lining in round culverts	Lining (pipe inside a pipe) if the invert and hydraulic opening will allow. This technique was used at various locations for Public Works and Drainage projects for smaller diameter culverts.	Trenchless technology saves on installation time and effort from contractor. Cost effective solution to extend lifespan.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Resin-type relining	Currently looking into a trial structure for resin-type relining strategy for the Marsh Street over Harrison Drain. Large CSPs or pipe arches. It is a spray-on structural liner.	Under investigation

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation	Engineering (Bridges/ Culverts)	Rehabilitation instead of replacement.	Rehabilitation is the first option that is considered as using existing elements can reduce capital cost. For example, repairing existing abutments and adding new girders and new deck versus full replacement of all the elements. Some recent examples include: • Maple Leaf Cemetery Bridges (2) • Lambton Line Bridge over Sydenham River • Lord Selkirk Bridge over Sydenham River • Fifth St Bridge over Thames River • Third St Bridge over Thames River • Clachan Road Bridge over Thames River • Townline Road Bridge over Rivard Drain • Pond Road Bridge over Otter Creek • Middleton Line Bridge over Two Creeks • Dawn Mills Road Bridge over Longs Creek • Kent Line Bridge over Longs Creek • Esterville Line Bridge over Longs Creek • Pollard Line Bridge over Government Drain #1	If components of bridge are salvageable with good remaining life expectancy, rehabilitation will extend the lifespan of a bridge at a significant reduction in cost.
Engineering & Transportation Division	Engineering (Bridges/ Culverts)	Tender flexibility	Allow a 2-year window in tenders to allow contractors more flexibility in schedules. Also allows for more contractors to submit bids and a more aggressive market as a result. This is a best practice that has now been copied by other Municipalities.	This allows better pricing because a contractor may already have the first year filled with projects so they can price work for the 2nd year, which naturally allows for more aggressive pricing. C-K has experienced savings upwards to $1M compared to previous tenders without this option.

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Engineering & Transportation	Engineering (Bridges/ Culverts)	Pre-cast structures	Specify whenever possible pre-cast / pre-fabricated products (e.g. – concrete deck panels). Some recent examples include: • Tramway Road Bridge over Mollys Creek • Wheatley Road Bridge over Campbell Sideroad Drain • Bear Line over Little Bear Creek • McDougall Line Bridge over Government Drain #1 • Gleeson Line Bridge over McDougall Drain • Blind Fourth Line over Hartwick Drain • Little John Road over McCollum Drain • Finn Line over Mancell Drain	Reduces on-site time and cost; reduces downtime.

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation	Engineering (Bridges/ Culverts)	Design width consideration (ROW limit to ROW limit) for cost savings	The mid to smaller sized replacement structures are installed longer Right of Way (ROW) approaches to eliminate guiderail initial costs and maintenance costs. Due to longer length, riprap sloped end treatments can be used versus expensive retaining wall systems. Some recent examples include: • Prince Albert Road over Arnold Creek Culvert Replacement • 5th Concession Line over Horton Drain Culvert Replacement • Baldoon Road over O'Mara and 14th Concession Drain Culvert Replacement • Blind Fourth Line over Hartwick Drain Culvert Replacement • Finn Line over Mancell Drain Culvert Replacement • Kenesserie Road over Abray Drain Culvert Replacement • Little John Road over McCollum Drain Culvert Replacement • New Scotland Line over Holdaway Drain Culvert Replacement • New Scotland Line over Ross Drain Culvert Replacement	Savings result through the use of riprap slopes in place of retaining wals. Specific cost savings explained in detailed Reports to Council.

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation	Engineering (Bridges/ Culverts)	Coring of bridge decks	Coring of bridge deck to enhance drainage and reduce corrosion. Some recent examples include: • Sixteenth Line Bridge over 18 & 19 Sideroad Drain • 5th Concession Line Bridge over Government #4 Drain	Life extension of structure by addressing drainage/ponding water concerns
Engineering & Transportation	Engineering (Bridges/ Culverts)	Moving vs fixed span bridges	Assessing whether moving bridges are still required or if fixed span bridges can be used. Some examples include: • Completed: Parry Bridge (Keil Drive over Thames River), Fifth St Bridge over Thames River. Third St Bridge over Thames River • To be considered: Dundas Bridge over Sydenham River, Murray Street Bridge over Sydenham River	Cost savings result due to less maintenance and operational costs estimated at $385,000 per year for two bridges in C-K. Nov/20 proposal on-hold per Council direction.

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation	Engineering (Purchasing)	Project bundling	Bundle bridge/culvert projects in a single tender for construction and consulting engineering services. Some recent examples include: • Kent Line Bridge over Longs Creek & Esterville Line Bridge over Longs Creek • Bluewater Line Bridge over Running Creek & Bluewater Line Bridge over Skinner Outlet • Pollard Line Bridge over Government Drain #1 & Cooper Road Bridge over Government Drain #1 • Gleeson Line Bridge over Government Drain #1 & Gleeson Line Bridge over McDougall Drain • Pollard Line Bridge over King and Whittle Drain & Queens Line Bridge over King and Whittle Drain • Jacob Road Bridge over Rivard Drain & Belle Rose Line Bridge over Rivard Drain • Brooke Line Bridge over Big Creek & Claymore Line over Big Creek & Caledonia Road over Big Creek • Wheatley Road Bridge over Burgess Drain Bridge & Wheatley Road Bridge over Government Drain #4	Savings in labour, mobilization and costs for materials. Target use is similar projects located within close proximity.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Use of in-house staff	Utilize in-house staff to deliver 10-15 projects per year. In-house projects for structures up to as large as 5.5m spans (in the past it was mostly only up to 3 m spans). Many Species at Risk mitigation plans are completed by in-house Environmental Technologist.	Saving achieved in consulting fees, contract administration, and inspection.

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Engineering & Transportation	Engineering (Bridges/ Culverts)	CK retaining sub-consultants	Municipal staff are managing sub-consultants for studies and paying those fees directly instead of going through the general consultant and paying markups and handling fees.	Costs savings achieved by grouping multiple structures together under a separate municipal contract.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Load post structures – defer repair	Load post structures to use up as much remaining life that is left and use as much remaining life as possible before a rehabilitation. Some recent examples include: • Third Street Bridge over Thames River • Jacob Road Bridge over Rivard Drain • Booth Road Bridge over Otter Creek • Brook Line Bridge over Big Creek • Dashwheel Road Bridge over Forbes Drain • Dauphin Road Bridge over Dauphin Internal Drain • McDougall Line Bridge over Government Drain #1	Savings achieved through life extension; offset is limited vehicle passage. This is a requirement to manage within Asset Management Plan budgets.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Consider rehabilitation timing	Upgrade only certain components of structures at the appropriate time to extend life. For instance, waterproof and pave so that water infiltration does not further deteriorate the concrete deck. This same applies for expansion joints; replace to prevent deterioration of the ends of the girders. Some recent examples include: • Gray Line Bridge Over Government #2&3 Drain – waterproof and asphalt to prolong life • Tilbury West & Romney Rd Bridge Over Government # 4 Drain – waterproof and asphalt to prolong life • Rose Beach Line Bridge Over Ross Drain – waterproof and asphalt to prolong life	Savings achieved through life extension; working closely with bridge inspectors to determine appropriate time spans to rehabilitate before too late.

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Engineering & Transportation	Engineering (Bridges/ Culverts)	Divest	Divestment opportunities where it causes the least impact to residents. There are currently 7 structures that remain on the divestment list as approved by Council: • Crow Road over McFarlane Relief Drain • Ouellette Road over Main Drain • Owen Road over Rankin Creek Drain • Dashwheel Road over Forbes Internal Drain • Mint Line over Baptiste Creek • Kennedy Road over Rankin Creek north • Kennedy Road over Rankin Creek south	Lifecycle savings by reducing bridges in the inventory. Proposal to divest McDougall Line bridge was declined by Council. This is a requirement to manage within existing Asset Management Plan budgets.
Engineering & Transportation	Engineering (Bridges/ Culverts)	Options at tender stage	Provide design alternatives for contractors when tendering projects.	Provides opportunities for alternative design equivalents at more competitive pricing.
Engineering & Transportation Division	Engineering (Sewers)	Storm and Sanitary Sewer Spot Repairs	Sewer repairs at various locations in the Municipality have been performed using trenchless technology. These spot repairs are minimally invasive. The inside of the pipe is routed out and re-sealed with a polymer spray liner.	Reduced operational costs. Reduced greenhouse gases. All work is completed without excavation or replacement of granular and asphalt. Reduces the amount of abandoned underground infrastructure.

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Engineering & Transportation Division	Engineering (Sewers)	Storm and Sanitary Sewer Re-lining	Sewer re-lining at various locations in the Municipality have been performed using trenchless technology. The re-ling process involves a cured-in-place plastic pipe or slip-lining that will provide structural integrity to the old sewer as well as reduce operational and maintenance issues.	Reduced operational costs. Reduced greenhouse gases. All work is completed without excavation or replacement of granular and asphalt. Reduces the amount of abandoned underground infrastructure.
Engineering & Transportation Division	Engineering (Sewers)	Storm and Sanitary Maintenance Hole Re-lining	Maintenance Hole re-lining at various locations in the Municipality have been performed using trenchless technology. The re-lining process involves a polymer spray lining that seals the maintenance hole from the interior. Helps prevent structural failures and ground water infiltration.	Reduced greenhouse gases. All of this work is completed without excavation or replacement of granular and asphalt. Reduces the amount of abandoned underground infrastructure.
Engineering & Transportation Division	Engineering (Watermain)	Watermain Re-lining	Watermain re-lining has occurred at river crossings using the process of cure-in-place plastic pipe trenchless technology. This new liner extends the life of the existing watermain in the same location with minimal disruption.	Reduced greenhouse gases. All of this work is completed without excavation or replacement of granular and asphalt. Reduces the amount of abandoned underground infrastructure.

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Engineering & Transportation Division	Engineering (Sewer/ Watermain)	Sewer and Watermain Installation by Directional Drilling	Sewers, watermains and service connections have been installed by horizontal directional drilling. It involves creating a tunnel underground and pulling of the new pipe through the cavity. Used to reduce restoration and at critical junctions in conflict with the prescribed work, busy or new roads or bodies of water.	Reduced greenhouse gases. All of this work is completed without excavation (outside of the drilling and receiving pits) or replacement of granular and asphalt. Reduces the strain on the environment versus open-cut method of excavation.
Engineering & Transportation Division	Transportation	LED Lamps for Signal Indications	Continual upgrade of lamps to LED from incandescent. New signals are constructed with these specified and older signal locations can be retrofitted	Reduced electricity use; longer lifespan for reduced maintenance costs.
Engineering & Transportation Division	Transportation	New Pedestrian Crossovers (PXO)	New PXO designs have been installed that use LED rapid flashers and LED street lighting in place of incandescent and low-pressure sodium-vapour lamps.	Reduced electricity use; longer lifespan for reduced maintenance costs; less capital cost compared to traditional crossovers.
Engineering & Transportation Division	Transportation	Cold Plastic Pavement Markings	Use of cold plastic pavement marking materials in both used in place of traffic paint. The material can be applied with a screed or by a spray application. Cold plastic material is used on stop bars, arrows, crosswalk lines, parking stalls, etc. Cold plastic is specified on all new asphalt projects.	Longer lifespan than modern traffic paint.
Engineering & Transportation Division	Transportation	Opticom Vehicle Pre-emption System	Opticom is a system that provides a green traffic signal indication for fire and transit vehicles. Same system works for both vehicle types.	Reduces call time to the emergency location for fire vehicles. Reduces route cycle times for transit buses. Increases fuel efficiency and reduces greenhouse gas emissions.

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Drainage, Asset and Waste Management	Fleet Services	Corporate AVL	In 2015 the corporation began phase 1 of installing AVL (Automated Vehicle Locators) on 174 vehicles. Since that time the number has increased to over 260 units. This is used for vehicle tracking, Wi-Fi applications in the field and various reporting tools such as salt management and plow tracker for the public to name 2.	The reports that can be downloaded from AVL systems can be used for salt management reports to confirm compliance to Minimum Maintenance Standards, vehicle location, winter control equipment functionality and proof in the event of legal liability challenges.
Drainage, Asset and Waste Management	Fleet Services	New Fleet Garage	In 2019 council approved the funding to merge facilities and staff in Wallaceburg and Chatham in to a New Fleet Garage located at 50 Siemens Drive Chatham, an existing property of the Municipality.	There are several financial, logistical and environmental positives to this initiative. Economies of scale with staff at one location for administration purposes and cost savings with a more efficient energy saving building as opposed to two outdated facilities and thus reduction in green house gases.
Drainage, Asset and Waste Management	Public Housing		Chatham-Kent currently administers a housing base of 1,592 units. The Social Housing Reform Act and subsequent legislation under the Housing Services Act, requires that Chatham-Kent have 63 accessible units in its housing stock. In 2019 a unit at 500 Albert St., Wallaceburg was renovated into a barrier free fully modified unit.	Accessibility for residents that require assistance.
Drainage, Asset and Waste Management	Public Housing	Energy Efficiencies	Enbridge recently presented a cheque to Public Housing for $103,888.51 through their company's affordable housing conservation program. The money will be used to fund more energy efficiency programs through housing services	Reduced operational and green house gases

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Drainage, Asset and Waste Management	Drainage Services	Drone	The drone will provide a birds-eye view of municipal drains where it is difficult and time consuming for staff to access/walk. It can also be used for shoreline erosion issues and infrastructure inspections.	Saves labor, improves safety and the data can be saved and shared.
Drainage, Asset and Waste Management	Drainage Services	Pre-cast structure vs Gabion Baskets	Use of pre-cast structure in place of gabion baskets	Reduced investment, tighter tolerances and longer life
Drainage, Asset and Waste Management	Drainage Services		Several innovative culvert technologies covered under E&T Section are used to manage municipal drains.	
Drainage, Asset and Waste Management	Drainage Services	Two-Stage Ditching	Two-stage ditching refers to the creation of a “low flow” smaller channel along the bottom centre of the drain. The existing sides as well as the bottom edges of the drain are not excavated and allowed to vegetate. They are only flooded during high flow peak storm events.	Less frequent and expensive cleanout costs, enhanced environmental benefits, improved pump reservoir efficiency
Drainage, Asset and Waste Management	Waste & Recycling Services	RecycleCoach	RecycleCoach is an app that provides specific information pertaining to our curbside garbage/recycling collection program. It can be programmed to remind residents when to put their garbage/recycling at the curb, provide holiday reminders as well as be a great resource for how/what can be placed at the curb. It currently has 4,759 subscribers and had 14,112 resident interactions in the month of February 2020	Improves communication; saves employee time by reducing calls and e-mails received by residents

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Public Works Division	Gravel Roads	Alternative Dust Suppressant	Traditional salt-based dust suppressant is a huge cost for PW and has limitations. An alternative dust suppressant was tried on 4 km of gravel road made from starch and sugars. Performance was similar in nature but application challenges and cost (currently 10x regular brine) made the test unsuccessful.	Cost prohibitive at this time; ideally a better solution than salt based productions could reduce grading/ save on gravel/ provide better performance
Public Works Division	Gravel Roads	De-Birmers	Public works has been successfully implementing de-birming units to retrieve gravel from the edges of roads as well as improve drainage off the traveled portion. CK had 2 units and in 2020 has purchased 2 new units. 2021 would ideally see a unit for every division as the process is very weather dependant and sharing between garages is impractical.	Less than one-year pay back; costs for units were paid for by re-claiming gravel from ditches. Improved drainage reduces grading and improves ride quality.
Public Works Division	Gravel Roads	Gravel Drags	Public works uses drags that perform better during springtime than fully grading a road. We have re-organized resources in house to double the number of drags in Chatham Township as a test to see if more drags in a shop improves overall gravel road ride quality. If successful more drags may be purchased	Drags pulled by tractors are potentially more cost effective than graders. The speed of the operation also lets more km of road be done per day which would improve ride quality and reduce grader costs
Public Works Division	Record Keeping	Road Patrol Software	Public Works has GPS tracking of all vehicles however, our road patrol sheets are paper based which are our main defense in minimum maintenance standards claims against the municipality. Digital road patrol software will improve the quality of our records and save the patrollers time in the field.	Quality records will reduce the liability and help defend potential claims against the municipality. Performing road patrols faster allows the supervisors to focus on maintenance issues

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Public Works Division	Maintenance access	Maintenance Hole Cover Rehabilitation	Conventional maintenance covers (also called manhole covers) are constructed of a ridged metal material supported by a brick base. In Chatham-Kent's typical climate, a freeze thaw cycle occurs, often more than once through the fall, winter and spring seasons. During freeze thaw cycles, the asphalt surrounding the cover will heave moving the cover and often separating the supporting brickwork below. This cycle repeats itself and eventually the brick base will fail requiring repair or replacement of the entire base and cover. In 2017, Public Works tested an innovative design where the product is a two-piece sliding unit which self adjusts to the frost heave of the road base; the locations were on a highly travelled roadway (St. Clair Street, Chatham) within the wheel track. The test was successful as no maintenance has been required on these covers during the testing period, which is atypical for maintenance covers at these types of locations. This new technology will be used for the upcoming maintenance hole cover repair and replacement project.	Two-piece maintenance covers increase ride-ability as the manhole covers give due to more flexibility than conventional covers; mitigating damage from continuous traffic impact. Reduction in frequency of manhole repairs and replacements;

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Parks & Rec	Rec Facilities	LED Lighting	All lighting throughout the building/facility has been converted to LED – Dresden Arena, Ridgetown area recreational facilities (interior and exterior), Tilbury Tennis and Multi-purpose courts, Sydenham Pool, All lighting except lighting over ice surface has been changed to LED – Bothwell Arena, Ridgetown Arena, Tilbury Arena, Wheatley Arena, Wallaceburg Arena, Lighting over the Gable Rees Rotary Pool has been converted to LED.	Reduced operational costs. Increased security at exterior facilities. Reduced greenhouse gases. Improved lighting. Funded through the Save on Energy grant.
Parks & Rec	Rec Facilities	Lighting Sensors	All rooms have motion sensors for on off operation – Dresden Arena, Ridgetown Arena, Tilbury Arena, Wheatley Arena, Wallaceburg Arena, Blenheim Arena, Chatham Memorial Arena, Erickson Arena, Thames Campus Arena	Reduced operational costs. Reduced greenhouse gases. All of this was done through the Save on Energy grant.
Parks & Rec	Rec Facilities	Energy Efficient Lighting	Installed energy efficient lighting on the building – Glen Mickle Park (Wallaceburg); Tilbury Pool Installed energy efficient controls on the Blenheim Arena ice surface lights, can have 2, 4, or 6 bulbs on in each fixture depending on use.	Reduce energy costs

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Parks & Rec	Rec Facilities and Parks and Open Spaces	Remotely controlled lighting upgrades	Installed remote control lighting for the soccer pitches, tennis courts and ball diamonds. Wallaceburg - Steinhoff Park Chatham - Keil Drive Soccer Fields, Doug Allin Tennis Courts, Turner Ball Fields Wheatley Baseball Diamonds Blenheim Baseball Diamonds	Reduce run time and are energy efficient reducing costs Able to control lights remotely from computer or phone – address customer and neighbour complaints
Parks & Rec	Rec Facilities	HVAC	All HVAC units are on Ecobee programmable thermostats and can be controlled from cell phone. – Dresden Arena All New HVAC units are replaced with energy efficient units. – Tilbury Arena, Wheatley Arena Replaced Gable Rees Rotary Pool mail pool HVAC unit with an energy efficient unit.	Reduced operational costs. Reduced greenhouse gases. Reduced run times on the plant.
Parks & Rec	Rec Facilities	Heater Upgrades	Installed a Desupra heater to claim waste heat from compressors to heat water for ice flooding. – Dresden Arena Reinstalled a Mullier heater to reclaim waste heat from compressors to heat water for ice flooding and dressing room and shower areas. – Tilbury Arena, Wheatley Arena, Heat reclaim system from HVAC unit to pool water. – Sydenham Pool	Reduced operational costs. Reduced greenhouse gases. Reduced run times on the plant

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Parks & Rec	Rec Facilities	Refrigeration plant upgrades	Refrigeration plant is the most efficient in the Municipality. It is controlled by CIMCO 6000E controller and permits scheduled programing, provides ability to set back temperatures at night and non-peak times. All motors are energy efficient rated and have soft starts and VFD's on condenser motors. This system has the capability to operate from your phone. – Dresden, Chatham Memorial, Thames Campus CIMCO controller allows for set back temperatures at night and non-peak use times. – Wallaceburg Arena Honeywell controller allows for set back temperatures at night and non-peak use times – Blenheim Arena	Reduced run times on the plant. Reduced green house gases Reduced operational costs.
Parks & Rec	Rec Facilities	Motor efficiencies	Soft starts, energy efficient, variable frequency drives on motors – Ridgetown Arena, Tilbury Arena, Wheatley Arena, Wallaceburg Arena, Tilbury Pool, Blenheim Arena, Chatham Memorial Arena, Thames Campus Arena, Erickson Arena Installed auto-leveling system on Olympia, which resulted in more consistent ice thickness. This means the refrigeration compressors do not have to work as long to freeze thicker ice.	Lower operating costs, reduce energy, grant available.
Parks & Rec	Rec Facilities	Washrooms	Replaced and installed all low flow toilets and hands free water faucets throughout the facility. – Tilbury Arena, Blenheim Arena, Blenheim Pool, Chatham Memorial Arena Automatic urinals/toilet flush – Chatham Memorial Arena, Erickson Arena, Thames Campus Arena	Reduced water usage and lower operational costs

Division	Operational Area	Heading	Details	Savings / Efficiencies realized (benefits)
Parks & Rec	Rec Facilities	Compressor Upgrades	Installed the first eco friendly Mycom compressor, in Canada, at the Wheatley Arena. Energy saving on this unit is estimated at 20 to 40%.	Reduce operational costs and reduce greenhouse gases to save energy.
Parks & Rec	Rec Facilities	Water usage reduction measures	Installed new low flow water nozzles on equipment. – Tilbury/ Wheatley Splash Pads Installed an automatic water leveler to control the amount of water required to keep levels safe without wasting water. – Tilbury Pool Installed 12 low flow shower heads in Blenheim Arena dressing rooms Installed push button shower timers to reduce water waste. – Tilbury Pool Installed an on demand hot water system. – Tilbury Pool	Lower operating costs (water & electricity), reduce energy use.
Parks & Rec	Rec Facilities	Naturalized areas	Installation of naturalized areas – Thames Grove, Maple Leaf Cemetery	Enviromental benefits; reduced maintenance costs and increased pollination points
Parks & Rec	Rec Facilities and Parks and Open Spaces	Fitness equipment	Installed outdoor fitness equipment. Blenheim, Chatham, Dresden, Ridgetown, Tilbury, Wallaceburg	Increase fitness opportunities for wide demographic
Parks & Rec	Rec Facilities and Parks and Open Spaces	Waste Reduction	Installation of water bottle filling stations in arenas and parks. – CK wide	Save thousands of plastic bottles from entering the landfill
Parks & Rec	POS	Thames Grove, Maple Leaf Cemetery	Installation of naturalized areas	Reduced maintenance costs and increase pollination points