

Roads 101

Roads Task Force

September 19, 2024

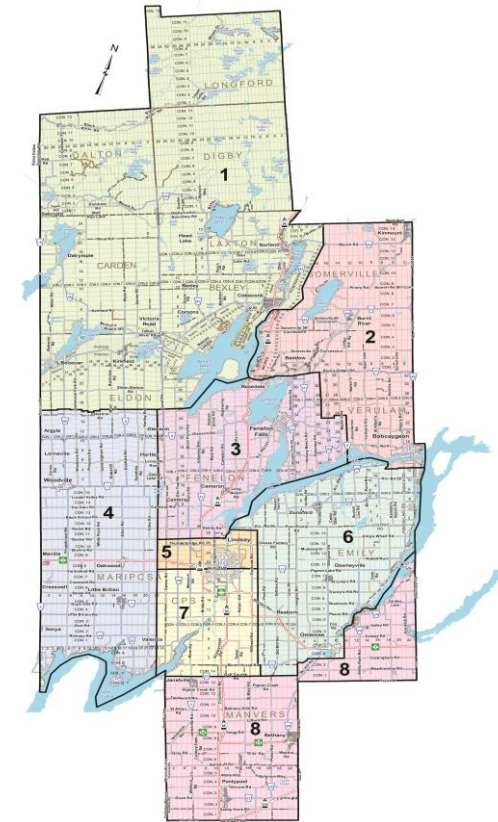
City of Kawartha Lakes

Geographic Size:

- 6th largest in Canada
- 2nd largest in Ontario

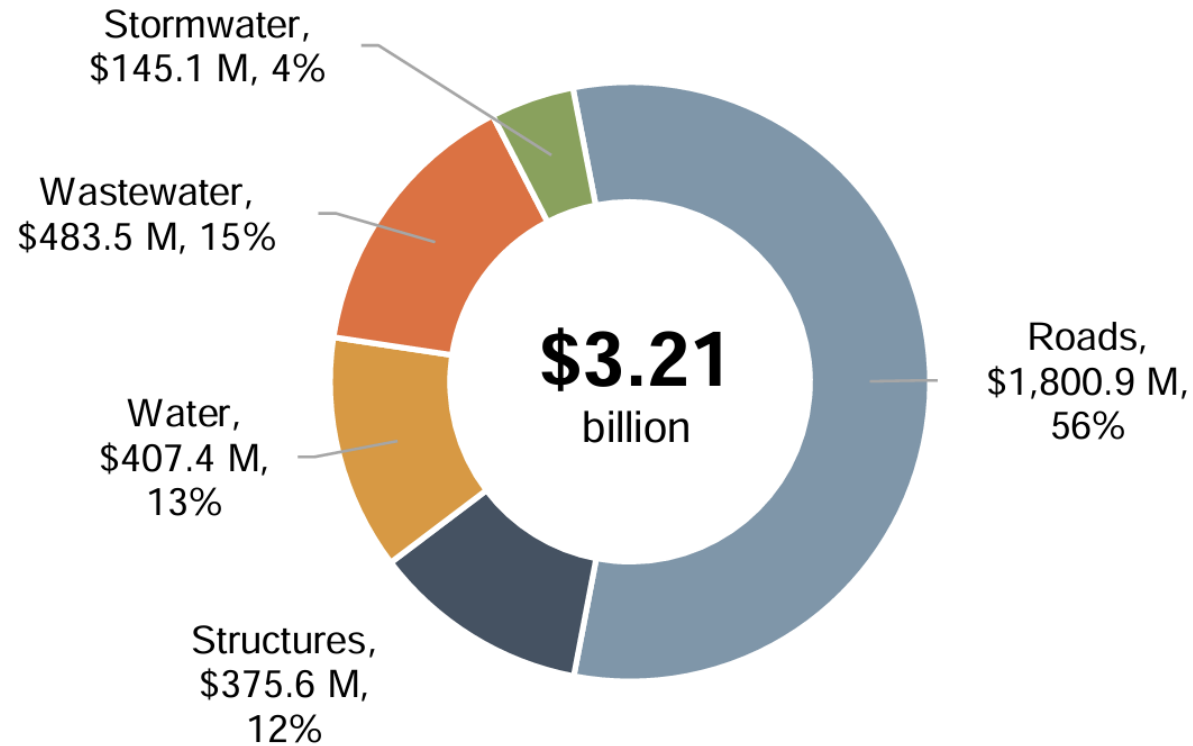
Population:

- 73rd largest City in Canada
- 25th largest City in Ontario

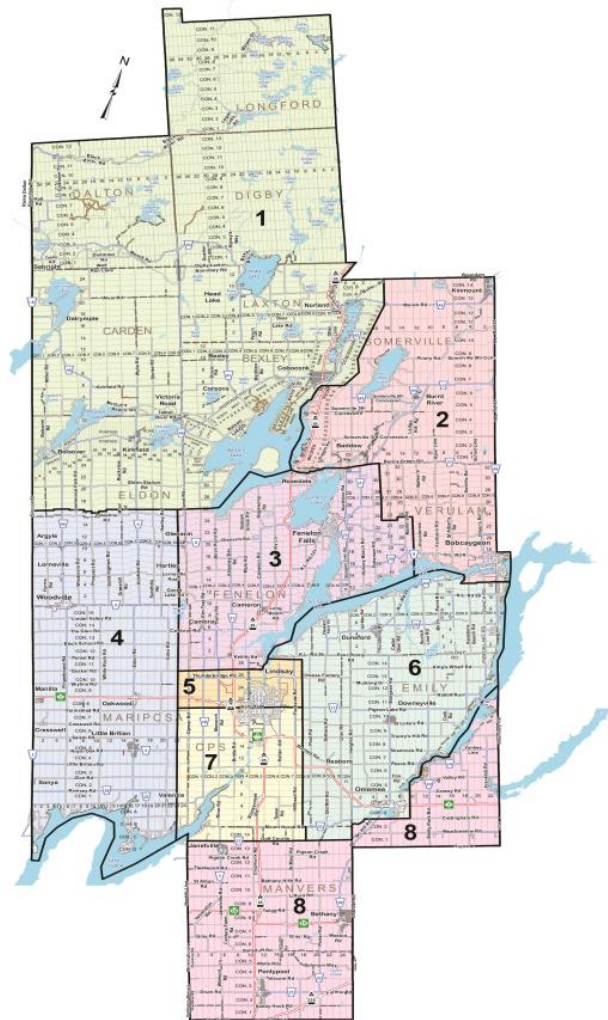


City Assets

Total Assets of \$3.21 billion



Road Network



City of
Kawartha
Lakes:

~ 5,400 lane
km of roads



Households per lane km of roads



City of Toronto has ~ 100 households per lane km

Households per lane km of roads



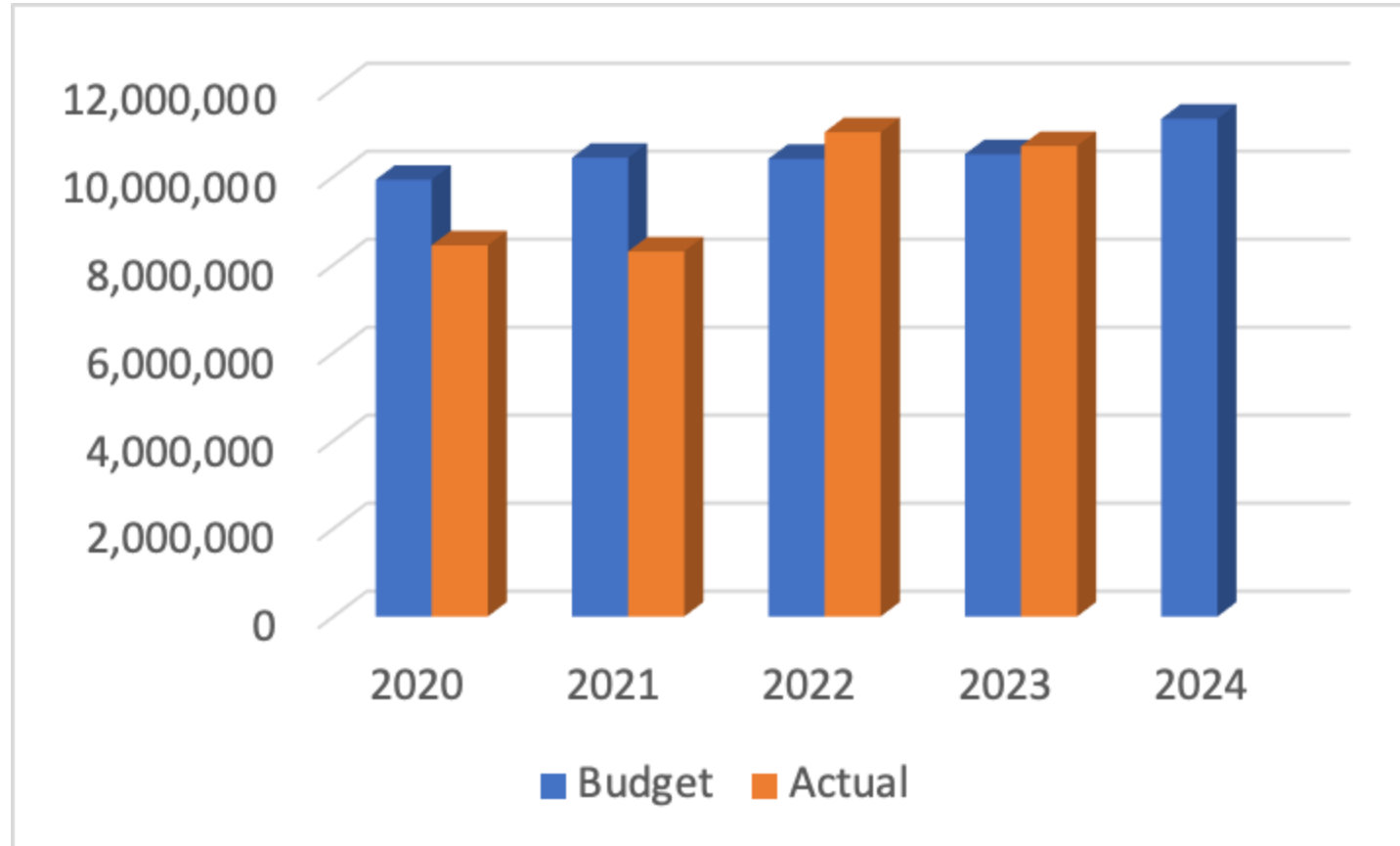
City of Peterborough has ~ 37 households per lane km

Households per lane km of roads



City of Kawartha Lakes has ~ 7 households per lane km

Winter Control Costs



Financial Summary - Roads

- Maintenance costs are growing beyond the rate of inflation
- Increase in weather related events
- Long Range Financial Plan update will need to consider the increasing financial pressure of roads maintenance



Building our Roads



Engineering and Corporate Assets

Implementation of Roads Capital Programs are primarily managed in the follow two divisions:

Infrastructure

Design & Construction

- Manager (1)
- Supervisor (2)
- Senior Engineering Tech (3)
- Engineering Tech (3)
- Construction Tech (0.5) - seasonal 6 month period
- Students (2)

Technical Services

- Manager (1)
- Supervisor (1)
- Senior Engineering Tech (2)
- Engineering Tech (2)
- Municipal Drainage Superintendent (1)
- Construction Tech (0.5) - seasonal 6 month period
- Students (3)

Engineering and Corporate Assets

In addition, the following Divisions provide support:

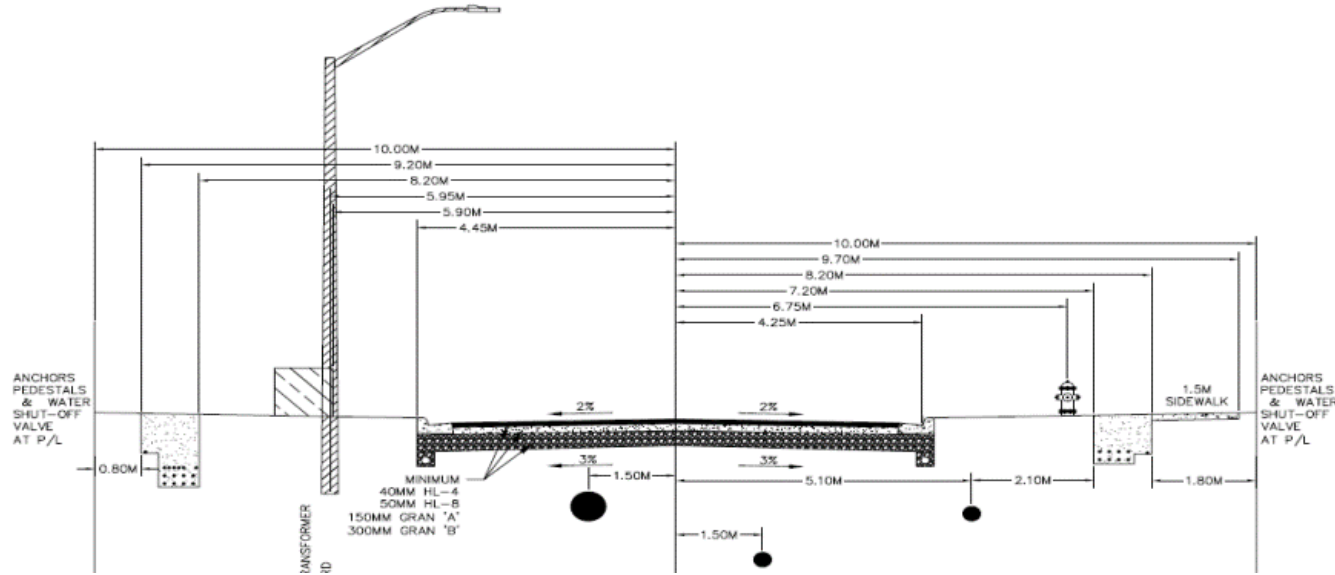
Development Engineering

Oversees and manages the implementation of private development, which includes plans of subdivision and development of unopened road allowances. Conducts review of and provides approval for capital design on behalf of the Ministry of Environment, Conservation and Parks.

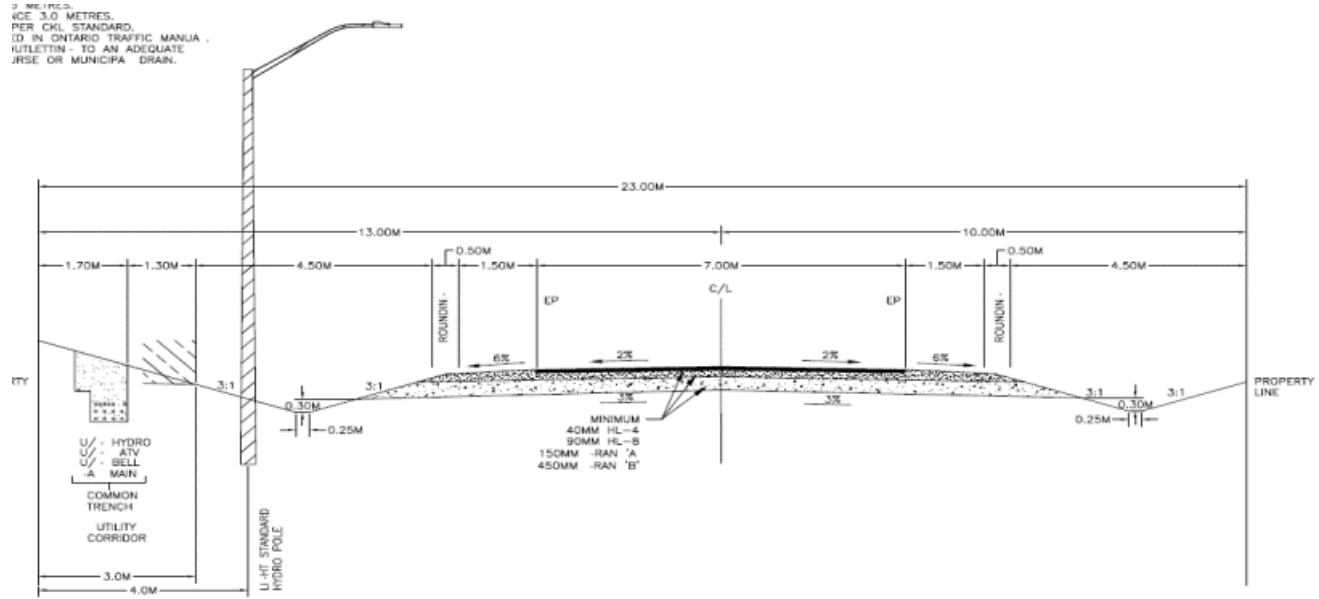
Corporate Assets

Provides asset management support for roads assets, determines sustainable long-term capital expenditure and funding levels, and develops long-term financial plans and annual capital budgets.

Road Types – Urban Road Standard



Road Types – Rural Road Standard



Asphalt
Surface



Road Types – Rural Road Standard



Hi-Float Surface



Gravel Surface

Roads Classifications

Under O. Reg 239/02 (Minimum Maintenance Standards), highways fall into classes 1-6 based on speed and volume.

- AADT means Annual Average Daily Traffic. It is derived from the total volume of vehicular traffic on the road divided by 365 days.

		Speed							
		Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
		Average Daily Traffic (number of motor vehicles)	91 - 100 km/h speed limit	81 - 90 km/h speed limit	71 - 80 km/h speed limit	61 - 70 km/h speed limit	51 - 60 km/h speed limit	41 - 50 km/h speed limit	1 - 40 km/h speed limit
AADT	53,000 or more	1	1	1	1	1	1	1	1
	23,000 - 52,999	1	1	1	2	2	2	2	2
	15,000 - 22,999	1	1	2	2	2	3	3	3
	12,000 - 14,999	1	1	2	2	2	3	3	3
	10,000 - 11,999	1	1	2	2	3	3	3	3
	8,000 - 9,999	1	1	2	3	3	3	3	3
	6,000 - 7,999	1	2	2	3	3	4	4	4
	5,000 - 5,999	1	2	2	3	3	4	4	4
	4,000 - 4,999	1	2	3	3	3	4	4	4
	3,000 - 3,999	1	2	3	3	3	4	4	4
	2,000 - 2,999	1	2	3	3	4	5	5	5
	1,000 - 1,999	1	3	3	3	4	5	5	5
	500 - 999	1	3	4	4	4	5	5	5
	200 - 499	1	3	4	4	5	5	6	6
	50 - 199	1	3	4	5	5	6	6	6
	0 - 49	1	3	6	6	6	6	6	6

Roads Classifications

Based on the provincial and the City's classification systems, the City's road network is distributed as follows:

MMS Class of Roads	Roads Needs Classification	Kms	Example
1	Arterial	0	401
2		45	CKL 36
3	Collector	517	Kent St West
4		1394	Hartley Road
5	Local	358	Avery Point Road
6		386	Woodcock Line
Total		2700	

Roads Needs Assessment (Year?)

- A Roads Needs Study provides an overview of the overall condition of the road system and is a working tool for budgeting and determining which roads to improve and when
- The assessment of the City's road inventory is done every 5 years, where roads are prioritized based on condition rating, traffic volume and classification by local, collector and arterials status

5 Year Roads Plan 2023-2027

www.kawarthalakes.ca/fiveyear-roadsplan

Road Surface Type

Surface Type	Centreline-kms	Average Age (years)	Replacement Cost (2022\$)
High-class bituminous (HCB)	965	30.2	\$947,300,000
Low-class bituminous (LCB)	848	18.3	\$454,300,000
Gravel	891	5.5	\$399,200,000
Total	2,704	18.3	\$1,800,800,000

Asset Management Plan

- In the Asset Management Plan, useful life by road surface assumes lifecycle management interventions occur. |

General Useful Lives for Road Surfaces		
Road Surface Type	Roads Needs Study: Without Lifecycle Management	Asset Management Plan: With Lifecycle Management
Gravel	10 Years	10 Years*
Hi-Float (LCB)	12 Years	15 Years
Asphalt (HCB)	20 Years	30 Years

*High-volume gravel roads have a 5-to-7-year lifecycle.

Lifecycle Management Program

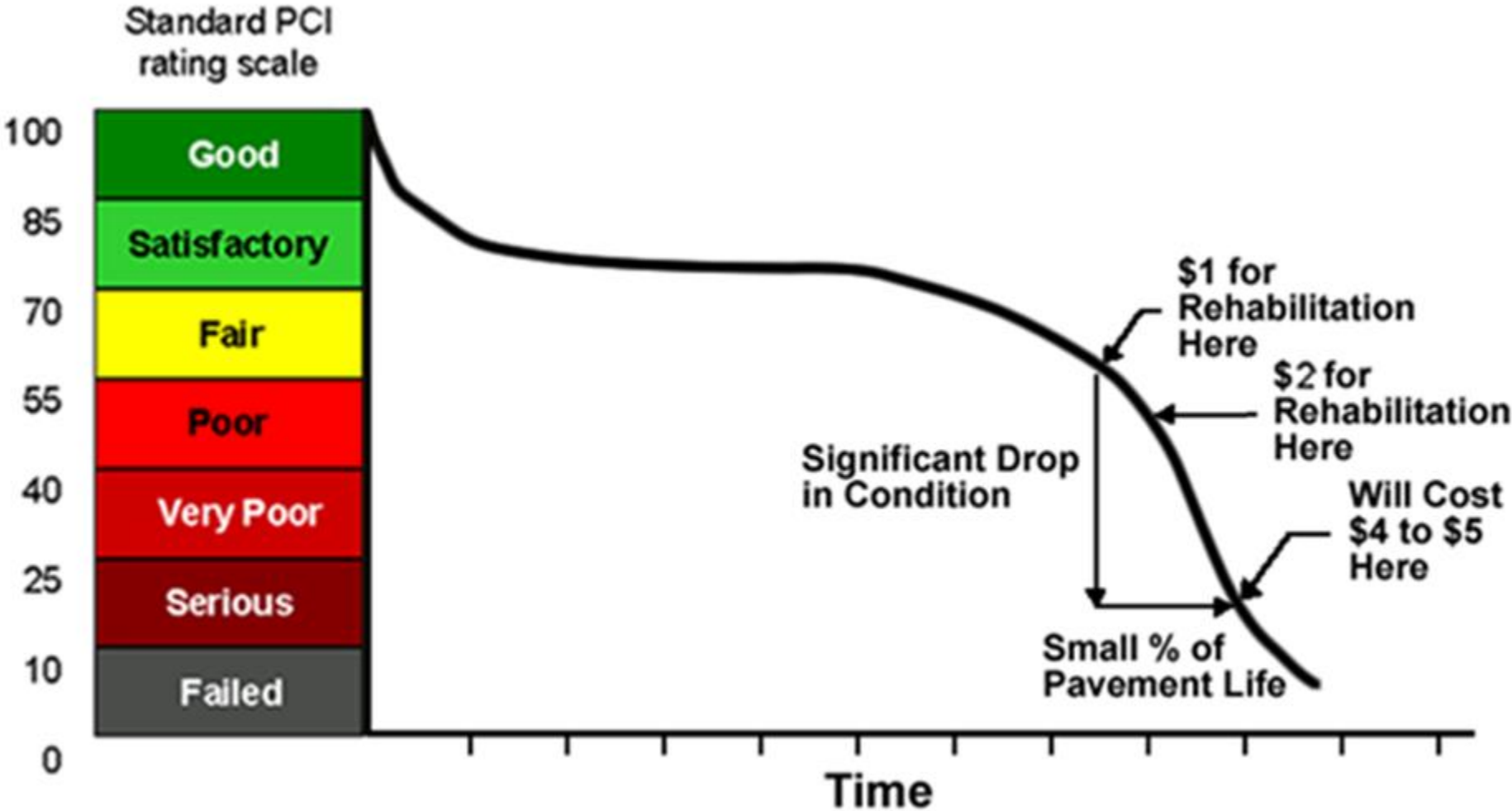
In order to keep the good roads good (and off the capital improvements list), they have to be resurfaced and treated regularly before they become significantly distressed.

The Lifecycle Management Program utilizes interventions such as:

- Crack sealing
- Single surface treatment
- Slurry sealing
- Micro resurfacing
- Asphalt overlays
- Drainage improvements



Lifecycle Management Program



“Keep the Good Roads Good”

Urban/Rural Reconstruction Program

Complete reconstruction of existing roadways to an urban standard, including:

- All removals
- Trenching
- New storm sewer
- Water main
- Sanitary sewer construction
- Placement of new base material and pavement
- Curb and gutter
- Sidewalk installation
- Also includes the cost for the design, utility relocates and property acquisition
- **2024 Budget: \$7,783,000**



Urban/Arterial Resurfacing Program

- The resurfacing of arterial roads and urban streets within towns, villages and hamlets with hot mix asphalt pavement to provide safe, accessible, maintainable and sustainable roads.
- Projects are prioritized through the asset management plan with a focus on roads with high traffic volumes and/or those in a stage of their lifecycle where resurfacing will extend useful life.
- **2024 Budget: \$8,490,000**



Rural Resurfacing Program

Low-volume rural road resurfacing includes:

- Pulverization of existing surface treatment
- Placement of granular material
- Application of a double surface treatment
- Base repair and culvert replacement as needed
- **2024 Budget: \$6,439,000**



Gravel Resurfacing Program

- This program identifies gravel road that need maintenance and repair
- High volume gravel roads have an average lifecycle of 5 to 7 years
- This program aims to extend that to 10 years
- **2024 Budget: \$2,026,000**

Maintaining our Roads



Public Works – Roads Operations

Roads Operations division includes:

- Area Manager (3)
 - Supervisor (10)
 - Roads Crew Leader (12)
 - Road Patrol (3)
 - Heavy Equipment Operator (20) (Graders, backhoes)
 - Equipment Operator (54)
 - Damage Prevention Technician (3)
 - Utility Maintenance Electrician Operator (1)
 - Utility Maintenance Operator (1)
 - Senior Engineering Technician (1)
 - Engineering Tech (1)
 - Labourers (10)
 - Summer Students
- Indirectly:
- Administrative Assistant (9)

Depots and Locations

East Operating Area

- Manvers
- Emily
- Bobcaygeon
- Burnt River
- Sturgeon Point *(Satellite)*
- Ops *(Winter Operations)*

West Operating Area

- Oakwood
- Fenelon Township
- Eldon
- Coboconk
- Lindsay
- Carden *(Satellite)*

Roads Maintenance

- Road, Bridge & Building Maintenance
- Winter Control
- Traffic and Streetlight Maintenance
- City Wide Operational Programs
- Utility Locates for municipal infrastructure
- Customer Service
- Unplanned Work (flooding, dumping)



Municipal Highways

Minimum Maintenance Standards

- Minimum Maintenance Standards (MMS) are identified under the Municipal Act, Regulation 239/02, as amended by O. Reg. 366/18.
- Minimum maintenance standards were developed to provide municipalities with a defense against liability from actions arising with regard to levels of care on roads and bridges.
- Regulation 239/02 came into force on November 1, 2002. Most recent amendment was filed May 3, 2018.
- The Regulation is a living document and has received several updates.

Minimum Maintenance Standards

MMS Standards are based on the classification of highways.

The regulation applies to Class 1-5 roads, it does not apply to Class 6 roads

Based on Road Classification, Minimum Standards are established for:

- Road Patrol (summer and winter)
- Winter Operations
- Potholes on paved and non-paved surfaces
- Shoulder Drop-offs
- Regulatory and Warning Signs

Roads Inventory

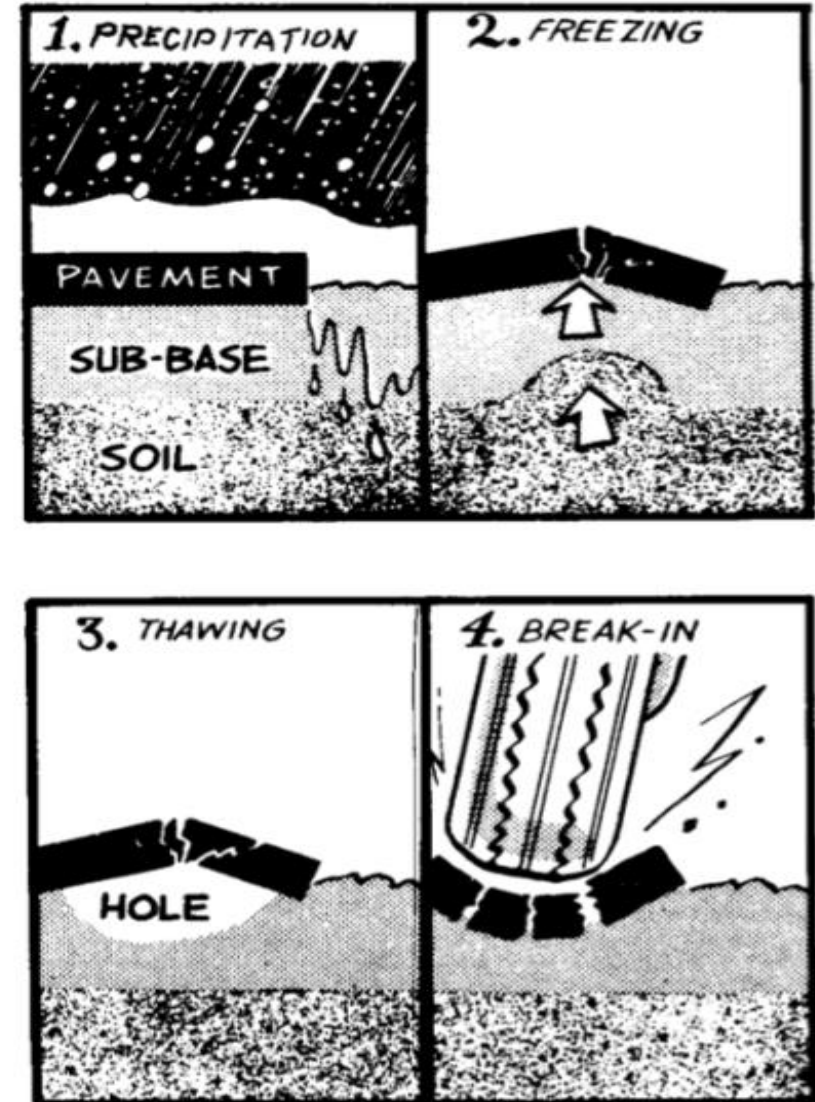
- Database of 4428 road segments (growing)
- Continuing to confirm road status – assumed, unassumed, private, forced
- Confirming current maintenance activities provided – summer, winter or fully maintained
 - 1683 segments assumed by by-law (need to be confirmed)
 - 2160 require confirmation of ownership because service was provided prior to 2003

Roads – Spring, Summer, Fall

- Grade roads and shoulders
- Clean and maintain bridges
- Patch pot holes
- Repair ditching and drainage issues
- Repair and replace: culverts, guideposts, signs, streetlights, traffic signals
- Grass cutting
- Noxious weed control program
- Road patrol (year round)
- Dust control
- Brushing and ditching
- Line painting
- Sidewalk repairs
- Gravel placement
- Entrance permits
- Catch basin repairs & cleaning
- Street sweeping
- Emergency support services (accidents, flooding, illegal dumping)
- Customer Service

Pot Holes – what causes them?

- A pot hole is caused by water in the underlying soil structure and traffic passing over the area
- The water weakens the soil, then traffic breaks the road surface
- Continued traffic forces the surface material and underlying soil out to create a pot hole
- Climate Change: Increased freeze-thaw cycles and extreme weather events accelerates the deterioration process



Pot Holes - Repair

Prevention

- Drainage improvements
- Preventative maintenance (lifecycle extension)
- Utility cut management

Repairs

- Temporary cold patching
- Semi-permanent repair
- Hot patching (asphalt)
- Da-Lee – Instarmac



Replacement

- Localized resurfacing program
- Urban and Arterial resurfacing program
- Rural Resurfacing program

Pot Hole Patching

Potholes on paved surface of roadway

O. Reg. 239/02, s.6, Table 1



Class of Highway	Surface Area	Depth	Time
1	600 cm ²	8 cm	4 days
2	800 cm ²	8 cm	4 days
3	1000 cm ²	8 cm	7 days
4	1000 cm ²	8 cm	14 days
5	1000 cm ²	8 cm	30 days

Pot Hole Patching

Potholes on non-paved surface of roadway

O. Reg. 239/02, s.6, Table 2



Class of Highway	Surface Area	Depth	Time
3	1500 cm ²	8 cm	7 days
4	1500 cm ²	10 cm	14 days
5	1500 cm ²	12 cm	30 days

Road and Shoulder Grading

- ✓ Loose top road grading 3 – 5+ times a year
- ✓ Shoulder grading 3 – 4 times a year

Cause and Effect

- Pot holes form based on the same principles as hard-topped roads
- Precipitation and weather are contributing causes and affect the grading schedule
- Good road/shoulder grades: road 4-6%; shoulders are 65
- Calcium Chloride prevents dust and helps gravel bind together



Roadside Brushing

Roadside Mechanical Brushing is a necessary activity. It is completed to remove vegetation within the City owned right-of-way to:

- Allow the road to receive sun which helps with winter operations
- Improves sight lines at intersections and driveways
- Improves road drainage
- Reduces damage to city owned equipment
- Reduces insurance claims for vehicle damage

Winter Maintenance

The City of Kawartha Lakes Winter Maintenance activities are governed by:

- Minimum Maintenance Standards
- City of Kawartha Lakes Level of Service Policy
- City of Kawartha Lakes Winter Maintenance Operating Guidelines



Winter Maintenance

- From November 1 to April 15 roads employees patrol, plow, sand and salt roads, sidewalks and parking lots
- Roads are usually cleared within 6-8 hours after a storm, depending on the severity

Winter Maintenance Operating Guidelines

- Equipment readiness, housekeeping, best practices, response to events
- City of Kawartha Lakes Salt Management Plan

“Somebody always has to be first and somebody always has to be last!”

Winter Patrol

- 24 hours a day, 7 days a week coverage
- 3 patrol areas – north, east and west

Responsible for:

- Monitoring road conditions
- Weather monitoring
- Dispatch of resources
- MMS compliance



Winter Plow Routes

Total Plow Routes = 71

West Operating Area = 32 (including Lindsay)

East Operating Area = 30

Arterial Contracted Routes = 9

*There are also 6 contracted Secondary Routes where smaller or specialized equipment is necessary

*Every employee is assigned to a route. The ditching staff (6) can offer some redundancy if necessary.

Winter Maintenance Materials

Salt (130 kg/km of two-lane highway)

- **Used only on asphalt roads**
- Temperatures -12C and rising (traffic and sun assist)
- Aid in making the roads surface bare
- Applied down the center of the road
- Rock salt doesn't melt the snow, the brine does

Sand (570 kg/km of two-lane highway)

- Used on arterial roads -12C and colder night time
- Secondary roads and gravel roads
- Sand acts as an abrasive and provides immediate traction

Winter Events

- Staff record events for maintenance tracking
- Average full call out for winter event was \$125,000 in 2019
- Budget allows for approximately 50 average events
- Events can range from \$50,000 to \$500,000+
- Single event in April 2018 cost approximately \$420,000 (response only, not including clean up)

Factors: Duration of event, type of precipitation, temperature, forecast, volume of precipitation, event time of day, weekends, wind

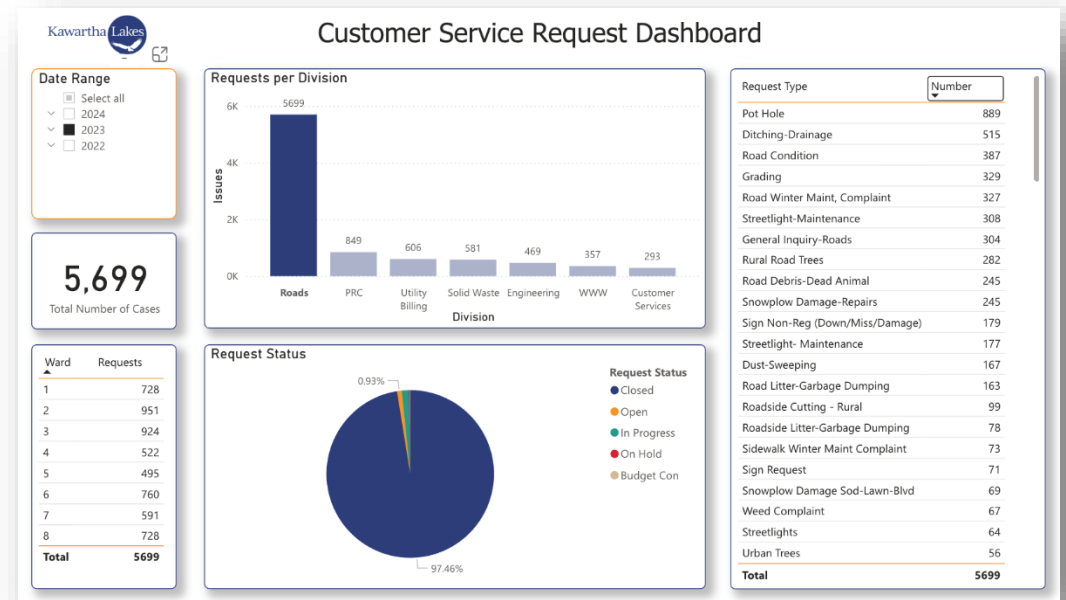
Winter Control Costs



Municipality	Lane (km)	Population (2021 data)	2024 Winter Control Budget	Cost Per KM	Cost per Capita
Kawartha Lakes	5400	79,247	\$ 8,162,145	\$ 2,095	\$ 142.79
Clarington	1800	101,427	\$ 4,812,000	\$ 2,673	\$ 47.44
City of Peterborough	960	83,651	\$ 4,797,370	\$ 4,997	\$ 57.35
Durham Region	2087	696,992	\$ 12,205,000	\$ 5,848	\$ 17.51
District of Muskoka	1460	66,674	\$ 4,527,742	\$ 3,101	\$ 67.91
Brant County	2200	39,474	\$ 3,061,634	\$ 1,392	\$ 77.56
Greater Sudbury	3592	166,004	\$ 25,107,516	\$ 6,989.84	\$ 151.25

Roads Case Management

- Roads staff respond to customer issues received through Report It on the municipal website and through the Service Centres
- Staff work to communicate with the public to resolve issues and close cases
- There were **5699 cases** assigned to Public Works in 2023



Questions?

