

**McINTOSH
PERRY**



Road Needs Study

Prepared for:

Township of Norwich
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EXECUTIVE SUMMARY

The Township of Norwich's Road Network includes a single earth road, loose top, surface treated and hot-mix paved roads with varying traffic volumes. Presented in this report are recommended Ten Year Plans for the Township's loose top and hard surface roads. These plans have been developed based on forecast budget values provided by Township staff. These plans are intended to be a tool for Municipal Staff and Council during decision making.

It is important to note that despite the municipality's intent to spend nearly \$10 million during the next ten years, the road system condition will deteriorate without a greater financial commitment (Section 6.3). Not only is the current quality of the roads at stake, but the loss of the underlying gravel base in the pavement structure is also threatened by inadequate spending levels for road restoration and maintenance.

The proposed hard surface ten year plan was developed using the following key criteria, given the limited available resources:

- Higher traffic roads are given priority over lower traffic volume roads;
- A balanced approach at maintaining not only the Township's rural roads, but also the Township's urban roads;
- For asphalt roads: overlay projects provide the best value for dollar, followed by pulverize and pave/partial depth reconstruction and lastly, full depth reconstruction.
- For surface treated: single surface treatment provides the best value for dollar, followed by partial depth reconstruction works and finally full depth reconstruction as this provides the best value with limited funding available;
- Projects that are geographically close to each other are planned in the same year where feasible.

It is integral that the Township continue to upgrade their high volume surface treated roads and maintain their road infrastructure. Timely rehabilitation remains the most cost-efficient strategy for the municipality and its ratepayers. A proactive approach including regular condition rating assessment studies will provide meaningful management information for decision making.

Included in this report is a recommendation for a ten year program based on the level of spending available to the Township. In order to maintain the current condition ratings it is estimated that approximately an additional \$9.7 million would need to be spent above the budgeted \$9.8 million for the next ten years.

Funding opportunities, such as government grants, may be considered to help offset the additional cost. However, the Township should also explore a variety of procurement methods to ensure the most economical allocation of the Municipality's resources.

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1.0 INTRODUCTION

The Township recognizes that in order to sustain services for its residents and for the competitiveness of its businesses, agriculture and industry, it must manage the Municipality's assets cost effectively. For this reason, the Municipality has initiated a Road Needs Study. The Study will provide the Municipality with a capital plan in order to manage the road network over the next ten years.

The purpose of the Road Needs Study is to inventory and assess the road network within the Municipality from which a financial program for capital improvements can be derived. This report should be read in conjunction with the Township's Asset Management Plan as well as any proposed 10-year plans for capital expenditure, such as reports prepared for the watermain and sewers maintained by the County.

The Road Needs Study will:

- Inform Council on the existing conditions and needs of their road system.
- Formulate the most cost-effective long term construction strategy within current/proposed budgetary limitations.
- Provide a projection of the future adequacy of the road systems.
- Provide a suggested year by year work plan for Council (extending 10 years).

The study contains the following:

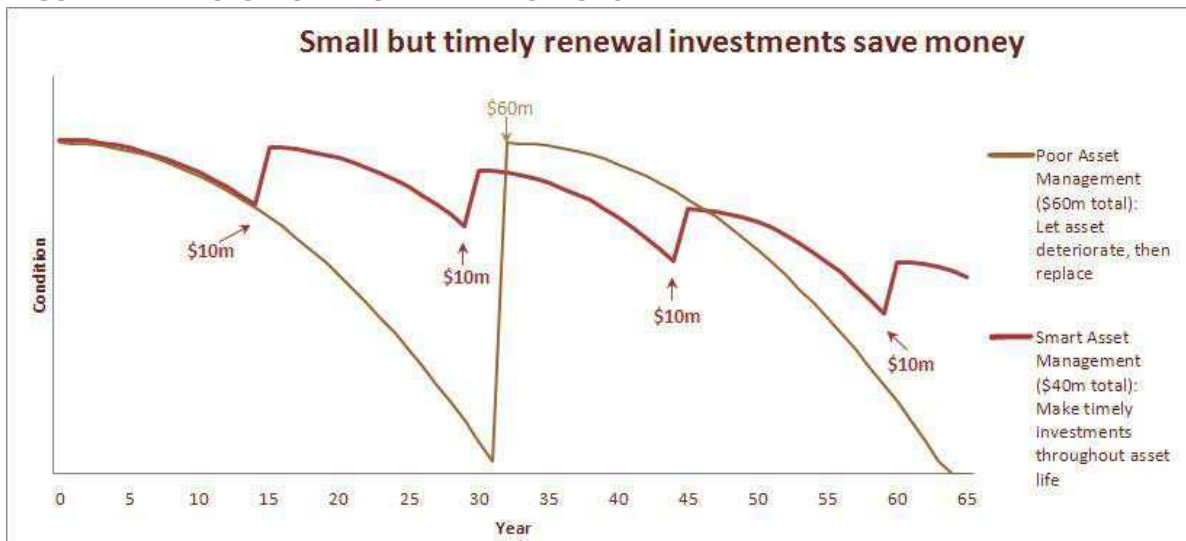
- Updates to the number of kilometers within the Municipality's Road System.
- Identifies and itemizes the existing condition of the roadways.
- Details recommended improvements to deficient roadways.
- Formulates cost-effective long-term capital construction policies within limited budgetary expenditures.
- A complete up-to-date detailed map and table of the Township's roadway systems for future reference.
- Itemizes a year by year "suggested" work plan for the Township to use as a frame of reference for future resource allocations.
- Recommended 10-year Capital Improvement Plan using current budget expenditures.
- Identifies capital construction requirements that cannot be realized within the current budget expenditure levels.

Some of the major benefits of conducting a Road Needs Study are:

- A. Systematic Approach
 - Roads prioritized based on needs.
 - Limited resources allocated to cost-effective projects.
 - Council can justify why a road was or was not selected for improvements.
- B. Long Term Strategy
 - Tax dollars will be spent strategically.
 - Ten Year Plan spans between terms of Council.
 - In the long run, saves Council and staff time in formulating capital program each year.
- C. Benchmark
 - Can project future adequacy of the road system.
 - Can compare with other Municipalities.
 - Justification for tax increase and/or shifting priorities to address spending shortfalls.

This Road Needs Study and the associated 10-year plan have been developed with an emphasis on timely capital repairs in order to best preserve the asset, while maintaining the desired levels of service to the public. The plan takes a long view perspective on managing the asset through life cycle cost analysis in which timely rehabilitation can save money in the long term. For example, Figure 1 shows two ways to manage an asset. The first option is to allow the asset to deteriorate until it needs to be replaced, while the second option shows timely rehabilitation. At the end of the 64-year life cycle, Option 1 costs \$120 million (the initial investment plus the cost to replace the asset) and Option 2 costs \$100 million. Note that the asset’s condition in Option 2 is in far better shape than in Option 1.

FIGURE 1 – LIFE-CYCLE OF TWO RENEWAL OPTONS



(Resource from “Building Together, Guide for Municipal Asset Management Plans”, Ministry of Infrastructure, Ontario)

2.0 STUDY METHODOLOGY

The Ministry of Transportation of Ontario “Inventory Manual for Municipal Roads for Small Lower Tier Municipalities” has been used in preparing this study and is briefly outlined in the sections below.

1. All road sections are listed and their condition rating by road type:
 - a) Earth Roads (Listed in inventory but not rated. Typically, these roads have little or no maintenance, only used seasonally.)
 - b) Gravel Roads
 - c) Surface Treated or Low Class Bituminous (LCB) Roads
 - d) Hot Mix Paved or High Class Bituminous (HCB) Roads
2. Future condition ratings are calculated for each road and from this, predicted capital expenditures can be produced. Newly reconstructed roads have a 10 point condition rating, and roads requiring partial reconstruction are assigned 3 points. Roads should not be allowed to go below 3 points due to the severity of the road conditions, e.g. very poor ride, difficult to maintain, usually a safety hazard.

Traffic volumes within the Township of Norwich vary significantly. Based on the variance in traffic volumes, different longevity considerations were applied to the road network dependent on the noted traffic volumes. It has been assumed that where traffic volumes are less than 600 AADT (annual average daily traffic), asphalt roads will need to be reconstructed in 30 years. For traffic volumes between 600 and 999 AADT, roads will need to be reconstructed every 22 years. And finally, where traffic volumes are greater than 1000 AADT, the asphalt road will need to be reconstructed every 14 years. Note that one cannot perpetually resurface and at some point the road must be reconstructed. It has been assumed that a surface treated road has a life expectancy of approximately 15 years before reconstruction is required.

The above noted life cycle assumptions should not have a great impact on the overall assessment of the road network, but some roads may experience slower or faster rates of deterioration. The capital program may need to be adjusted (e.g. A street scheduled for reconstruction in year 10 may have to be moved up in the ten year capital program and vice versa, a street scheduled for year 3 could be pushed back since its condition has not deteriorated as fast as earlier predicted) to account for this and other factors such as variations in pavement structure, sub-surface conditions, drainage, and truck traffic.

Through regularly measuring the performance of its road system (e.g. Roads Needs Study every 5 years, ongoing traffic counts, etc.), the Municipality will be able to better predict the deterioration rates of individual segments and therefore the overall network.

The condition rating for each road type will decrease every year unless maintenance and/or rehabilitation are performed. For gravel roads it is assumed that the condition of the road will be maintained with regular gravel resurfacing. As noted above, hard surface roads with no maintenance and/or rehabilitation (which is not recommended) will need reconstruction within fifteen (15) years for surface treated roads and every fourteen (14) to thirty (30) years (depending on AADT) for asphalt roads. The following calculations show the rate of deterioration of the three surface types:

Asphalt (AADT <600): $\frac{10 \text{ point condition rating} - 3 \text{ point condition rating}}{30 \text{ year life cycle for reconstructing}} = 0.23/\text{year}$

Asphalt (AADT 601<999): $\frac{10 \text{ point condition rating} - 3 \text{ point condition rating}}{22 \text{ year life cycle for reconstructing}} = 0.32/\text{year}$

Asphalt (AADT>1000): $\frac{10 \text{ point condition rating} - 3 \text{ point condition rating}}{14 \text{ year life cycle for reconstructing}} = 0.50/\text{year}$

Surface Treatment: $\frac{10 \text{ point condition rating} - 3 \text{ point condition rating}}{15 \text{ year life cycle before reconstructing}} = 0.47/\text{year}$

Gravel: No change in rating with regular maintenance.

Based on the foregoing discussion, Table 1 provides an example of how the condition rating is forecasted for each surface type. In this example, it is assumed that for each road type the road was reconstructed in 2015.

TABLE 1 - FORECASTING CONDITION RATING EXAMPLE

SURFACE TYPE	2015	2016	2017	2018	2019	2020
GRAVEL ¹	10.00	10.00	10.00	10.00	10.00	10.00
SURFACE TREATMENT	10.00	9.53	9.07	8.60	8.13	7.67
ASPHALT (AADT<600)	10.00	9.77	9.53	9.30	9.07	8.83
ASPHALT (AADT 601<999)	10.00	9.68	9.36	9.05	8.73	8.41
ASPHALT (AADT >1000)	10.00	9.50	9.00	8.50	8.00	7.50

¹Gravel Roads have a stable unchanging life expectancy, as long as routine loose top maintenance is performed. Gravel roads will remain this way until improvements are made.

- The average condition rating is determined for each road type by summing the product of length multiplied by the condition rating and then dividing by the total length of the road system. This will result in an average condition rating for the three road surface types. An example is demonstrated in Table 2 below.

TABLE 2 - AVERAGE CONDITION RATING BY SURFACE TYPE EXAMPLE

STREET	LENGTH (L) (Km)	CONDITION RATING (CR)	PRODUCT L x CR
1	1.00	7.00	7.00
2	2.00	3.00	6.00
3	3.00	5.00	15.00
TOTAL	6.00		28.00

$$\text{Average Condition Rating} = \frac{28.00}{6.00} = 4.67$$

By combining the three surface types an overall condition rating can be calculated for the total Municipal system. Table 3 is a measure of the condition of the road system.

TABLE 3 – SYSTEM CONDITION

AVERAGE CONDITION RATING	SYSTEM CONDITION
8 to 10	Good structural condition.
	Some local improvements may be needed.
5 to 7	Average structural condition.
	Some continued improvement may be needed.
Less than 5	Poor structural condition.
	Substantial improvement needed throughout total road system.

- The above noted analysis will determine if or when a road requires improvements within the next ten years.
- In developing the priority of road improvements, the first consideration for the available funds is for asphalt resurfacing projects, i.e. those road sections with a study year condition rating of 5. This will upgrade those roads at a reasonable cost that if not improved, will continue to deteriorate to a point where only major and costly improvements will restore the structural strength of the road.

If funds are available after addressing the needs of the roads with a condition rating of 5, they should be applied to the road improvements that would provide the best cost/benefit return. The method used in this study reviews the cost of reconstruction versus the Average Annual Daily Traffic (AADT).

As an example, if one street is a Dead End and one street is a minor collector, and both cost the same per kilometer to reconstruct, then the minor collector would be selected over the dead end, since it serves more commuters.

Other factors that may have to be considered are safety, truck traffic, development, economics, social implications, and scheduling construction with other infrastructure works, e.g. County projects. It is understood that underground services (sewers and watermain) are maintained by the County. In

preparing this report, attempts were made to obtain the County's 10-year plan for proposed underground service replacement works within the Municipality's boundary (i.e. within Norwich, Otterville, Burgessville, Springford and Eastwood), however the plan was not made available. As such, the Township should be advised that the 10-year plan may require adjustments to capital spending projects to accommodate works proposed by the County. Should the County's plan become available at a later date, the Municipality should consider accommodating the proposed works when revisiting the 10-year plan and preparing an updated Road Needs Study in 2020.

6. To determine the cost of construction, benchmark costs are used and are associated with the type of capital improvement. Average unit costs have been developed based on local construction costs.

Fixed costs are costs associated with maintenance of the existing road system and include overhead, salaries, etc. Fixed costs are generally met from the Township's budget prior to capital construction funds being allocated. Fixed costs for forecast requirements were derived from historical expenditures.

This report presents historical information with no adjustment for inflation. For future capital expenditures, the report presents cost estimates in 2015 dollars. At the time of budgeting, the Municipality should adjust capital expenditure by an appropriate cost of inflation.

7. The ten year capital program presented in this report is a tool for Municipal Staff and Council in selecting the ten year program. As mentioned above, there may be other factors that must be considered and/or adjusted in order to reflect changes not foreseen at the time of writing this report.

3.0 ROAD STANDARDS

Most municipalities in Ontario either adopt or utilize the following manuals in developing their design and construction standards:

- Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads,
- Ontario Provincial Standards (OPS) for Roads and Municipal Services,
- Ontario Traffic Manual, and
- Ministry of Transportation of Ontario, Drainage Management Manual.

Ministry of Transportation of Ontario's Directive B-36, October 1985, applied to municipalities that were applying for subsidies. This directive no longer applies, but its brief format is easy to use and is summarized on the following page. It is McIntosh Perry's recommendation that these standards be followed.

TABLE 4 – GEOMETRIC DESIGN STANDARDS FOR RURAL TWO-LANE ROADS

DESIGN YEAR AADT	DESIGN SPEED (Km/hr)	MAX. GRADE (%)	WIDTH (m)	
			LANE	SHOULDER ³
2,000 to 1,000	90	6-8	3.25	2.00
	80	6-8	3.25	2.00
	70	6-12	3.00	1.00
	60	6-12	3.00	1.00
1,000 to 400	80	8	3.25 ¹	1.00 ²
	70	12	3.00	1.00 ²
	60	12	3.00	1.00 ²
	50	12	3.00	1.00 ²
Less than 400	80	8	3.25 ¹	1.00 ²
	70	12	3.00	1.00 ²
	60	12	3.00	1.00 ²
	50	12	2.75	1.00 ²

¹A 3.0m lane width may be acceptable where type size and volume of trucks are not significant.

²0.5m shoulders permitted where there is no foreseeable possibility of the road being paved within a 20-year period. Note: 1.0m shoulder must be used where guide rail is installed.

³Shoulder width may be reduced by 0.5m if paved. Shoulder width does not incl. rounding (0.5m).

TABLE 5 – ALIGNMENT STANDARDS

DESIGN SPEED	MINIMUM ¹ CURVE RADIUS	MINIMUM STOPPING DISTANCE	MINIMUM ² CREST CURVE	MINIMUM ² SAG CURVE	MINIMUM ³ SAG CURVE ILLUMINATED AREAS
(Km/hr)	(m)	(m)	K (m)	K (m)	K (m)
40	55	45	4	8	4
50	90	65	8	12	5
60	130	85	15	18	8
70	190	110	25	25	12
80	250	135	35	30	15
90	340	160	50	40	20

¹Minimum curve radius based on maximum super elevation of 0.06 m/m.

²Minimum curve parameter based on stopping distance

³Minimum curve parameter based on comfort criteria. Utilize in illuminated areas only when stopping sight distance requirements are met.

TABLE 6 – GEOMETRIC DESIGN STANDARDS FOR TWO-LANE URBAN ROADS

DESIGN YEAR	DESIGN SPEED	LANE WIDTH	PARKING LANE WIDTH	MIN. CURB TO CURB DISTANCE	MAXIMUM GRADE
AADT	(Km/hr)	(m)	(m)	(m)	(%)
2,000 to 1,000	60-70	3.25	2.50 - 3.00	9.5	6 - 12
	50	3.00	2.50 - 3.00	9.0	8 - 12
Less than 1,000	40-50	2.75 - 3.00	2.50 - 3.00	8.5	8 - 12

Note: The desirable minimum sidewalk width is 1.5m

Table 7 shows the recommended surface type based on AADT.

TABLE 7 – SURFACE TYPE STANDARDS FOR RURAL ROADS

AADT AT TIME OF CONSTRUCTION	SURFACE TYPE ¹
0 - 400	Gravel
400 - 700	Low Class Bituminous ²
700 - 1,000	50mm of Hot Mix

¹The grade upon which the surface type is to be applied is assumed to be structurally adequate. Typically, the base is 150mm Granular 'A' and 300mm Granular 'B', Type II.

²Apply surface treatment 0.25m wider than lane width, e.g. for 3.0m lane width, apply 3.25m wide.

Table 8 on the following page lists other criteria that should be reviewed when selecting road surface type. Urban roads are typically constructed as asphalt roads, however rural roads have various options depending on various factors. These factors have been summarized in the following table.

TABLE 8 – SUITABILITY OF SURFACE TYPE FOR RURAL ROADS

PARAMETER	GRAVEL	SURFACE TREATMENT	ASPHALT
AADT			
0 - 400	X	X	X
400 - 1,000		X	X
1,000 - 2,000			X
Above 2,000			X
TRUCK TRAFFIC			
0 - 5%	X	X	X
5 - 15%		X	X
Above 15%			X
HIGHWAY CLASSIFICATION			
Local	X	X	X
Collector			X
Arterial			X
Urban			X
ADJACENT LAND USES			
Agricultural	X		X
Commercial			X
Forestry	X	X	X
Industrial			X
Institutional			X
RESIDENTIAL			
5+ Acre Lots	X	X	X
CLUSTER DEVELOPMENT OF 2 - 5 ACRE LOTS			
Front Yard Set Back 15m of less			X
Front Yard Set Back 15m of more		X	X
2 Acre Lot Subdivisions			X

4.0 BENCHMARK COSTS

Benchmark costs are costs associated with capital improvements to the Township's roads. These costs can also be for new road construction or capital expenditure to improve a road to a higher standard. For example, upgrading a gravel road to a surface treated or paved road. Average unit costs have been developed based on local construction costs.

The estimated cost for identified improvements to the Township's Road System are calculated on an approximate basis, using average benchmark costs for various items. These costs have been averaged using unit cost information obtained locally. Unit prices are shown in Table 9 below and costs are summarized by construction type in Tables 10, 11 and 12. These costs are based on 2015 dollars and adjustments should be made for inflation for each budget year.

TABLE 9 – UNIT PRICES

ITEM	2015 unit price	
Earth Excavation, Grading	\$ 13.00	per cubic metre
Earth Excavation, Ditching	\$ 20.00	per metre
Road Widening per Shoulder	\$ 35.00	per metre
Removal – Pulverize	\$ 1.35	per square metre
Removal – Asphalt	\$ 5.50	per square metre
Removal – Mill Wear Course	\$ 5.50	per square metre
Removal – Concrete Curb	\$ 7.50	per metre
Removal – Concrete Sidewalk	\$ 22.00	per square metre
Remove and Replace 16m x 600mm Diameter CSP	\$ 6,550.00	each
Granular A	\$ 16.00	per tonne
Granular B	\$ 15.00	per tonne
Single Surface Treatment (SST)	\$ 4.00	per square metre
Double Surface Treatment (DST)	\$ 8.00	per square metre
Asphalt – Wear Course	\$ 120.00	per tonne
Asphalt – Base Course	\$ 120.00	per tonne
Rout & Seal	\$ 3.00	per metre
Rejuvenating Oil	\$ 2.00	per square metre
Microfil	\$ 11.00	per metre
Micro-Surfacing	\$ 5.50	per metre
Ultrathin Resurfacing (scratch coat & surface coat)	\$ 7.00	per metre
Thin Overlays	\$ 12.00	per square metre
Dense Graded Cold Mix	\$ 14.00	per square metre
RAP Cold Mix	\$ 8.00	per square metre
Tack Coat	\$ 1.35	per square metre
Iron Adjustment	\$ 650.00	each
Concrete Sidewalk	\$ 110.00	per square metre
Concrete Barrier Curb	\$ 98.00	per metre
Topsoil & Sod	\$ 19.00	per square metre
Topsoil & Seed	\$ 7.00	per square metre

TABLE 10 – SURFACE TREATMENT OR LOW COST BITUMINOUS (LCB)

CODE	DESCRIPTION	UNIT PRICE (\$ per km)
LCB-R1	Resurfacing Single surface treatment 6.0m wide	\$32,145
LCB-R2	Partial Depth Reconstruction Pulverize or scarify, 50-150mm G.A., double surface treatment, 10% spot drainage improvements, culvert replacement & 10% contingency	\$132,000
LCB-R3	Full Depth Reconstruction Earth exc., 150mm G.A., 300mm G.B., DST, culvert replacement, engineering, geotechnical and 10% contingency	\$559,000

TABLE 11 – ASPHALT OR HIGH COST BITUMINOUS (HCB) RURAL ROADS

CODE	DESCRIPTION	UNIT PRICE (\$ per km)
HCB-R1	Resurfacing 40mm lift of HL3 asphalt by 6.0m and 10% contingency	\$81,000
HCB-R2	Pulverize and Pave (1 Lift) Pulverize, 50mm lift of HL4 asphalt, shouldering, 10% spot drainage improvements, culvert replacement & 10% contingency	\$100,000
HCB-R3	Pulverize and Pave (2 Lifts) Pulverize, 90mm (2 lifts) of HL4 asphalt, shouldering, 10% spot drainage improvements, culvert replacement & 10% contingency	\$199,000
HCB-R4	Partial Depth Reconstruction Pulverize, 50-150mm G.A., 50mm lift of HL4 asphalt, shouldering, 10% spot drainage improvements, culvert replacement & 10% contingency	\$176,000
HCB-R5	Full Depth Reconstruction Remove asphalt, earth exc., 150mm G.A., 450mm G.B., 50mm Lift of HL4 asphalt, shouldering, culvert replacement, engineering, geotechnical and 10% contingency	\$626,000
HCB-R6	Micro surfacing A slurry composed of polymer modified emulsion, aggregate (often premium friction resistant), and cement	\$36,000

TABLE 12 – ASPHALT OR HIGH COST BITUMINOUS (HCB) URBAN ROADS

CODE	DESCRIPTION	UNIT PRICE (\$ per km)
HCB-U1	Resurfacing 40mm Lift of HL3 asphalt by 8.5m wide, adjust iron, milling and 10% contingency	\$161,000
HCB-U2	Pulverize and Pave - With Sidewalk and Curb Pulverize asphalt, 10% sidewalk and curb repairs, 50mm lift of HL4 asphalt, adjust iron and 10% contingency	\$191,000
HCB-U3	Pulverize and Pave - With Sidewalk, No Curb Pulverize asphalt, 10% sidewalk repairs, 50mm lift of HL4 asphalt, adjust iron and 10% contingency	\$180,000
HCB-U4	Pulverize and Pave - No Sidewalk or Curb Pulverize asphalt, 50mm lift of HL4 asphalt, adjust iron and 10% contingency	\$158,000
HCB-U5	Pulverize and Pave - No Sidewalk or Curb - 2 Lifts Pulverize asphalt, 40mm lift of HL3 asphalt, 50mm lift of HL4 asphalt, adjust iron and 10% contingency	\$268,000
HCB-U6	Full Depth Reconstruction - With Sidewalk and Curb Remove asphalt, sidewalk and curb, earth exc., 150mm G.A., 450mm G.B., 50mm lift of asphalt, adjust iron, sidewalk, curb, tie-in driveways and lawns, geotechnical, engineering and 10% contingency	\$1,303,000
HCB-U7	Full Depth Reconstruction - With Sidewalk, No Curb Remove asphalt and sidewalk, earth exc., 150mm G.A., 450mm G.B., 50mm lift of asphalt, adjust iron, sidewalk, tie-in driveways and lawns, geotechnical, engineering and 10% contingency	\$1,033,000
HCB-U8	Full Depth Reconstruction - No Sidewalk or Curb Remove asphalt, earth exc., 150mm G.A., 450mm G.B., 50mm lift of asphalt, adjust iron, tie-in driveways and lawns, geotechnical, engineering and 10% contingency	\$779,000
HCB-U9	Full Depth Reconstruction - With Sidewalk Both Sides (No Curb) Remove asphalt and sidewalk, earth exc., 150mm G.A., 450mm G.B., 50mm lift of asphalt, adjust iron, sidewalk, tie-in driveways and lawns, geotechnical, engineering and 10% contingency	\$1,556,000

5.0 HISTORICAL CAPITAL SPENDING

Roads Needs Studies typically consider maintenance and capital budgets separately. Maintenance activities are routinely performed and maintain the road at the current level of service. Capital expenses improve Township assets (i.e. road structure, bridges, etc.) and replace major pieces of equipment. The Township's equipment and maintenance needs have been reviewed separately by the Township as part of their Asset Management Plan, and as such, this report focusses solely on capital expenditures relating to the roads. The ten year plan for 2016 through 2025 has been developed only for roads. Historical capital spending for the past five (5) years is summarized below:

TABLE 13 – 2011 TO 2015 BUDGETS

CATEGORY	2011	2012	2013	2014	2015
ROAD CONSTRUCTION	\$769,000	\$787,000	\$910,000	\$1,200,000	\$947,000

Gravel resurfacing only temporarily adds strength to the road structure, but over time the material is lost to the roadside through winter plowing, traffic, etc. To replace the loss of gravel, material is added bi-annually or every five (5) years. The historical gravel resurfacing budget has been approximately \$212,610. Spending levels for gravel roads are lower than what one would normally expect given the number of lane kilometres of gravel roads, however the overall condition rating for loose top roads within the Township is adequate. At this time, we are not recommending any changes to the gravel resurfacing program but would suggest that the budget be re-evaluated in five (5) years when the next study is completed.

The operational and maintenance budget should be adjusted each year to account for growth and inflation. Note that the right type of growth can produce efficiencies in providing services. For example, densification where there is adequate infrastructure.

Capital spending values forecasted for the next ten (10) years were provided by the Township's Treasurer and have been used in developing the ten year plan as discussed in the following section of this report. Budgets were instructed as follows:

TABLE 14 – 2016 TO 2025 BUDGETS

CATEGORY	2016	2017	2018	2019	2020
CAPITAL	\$1,266,750*	\$891,750	\$906,750	\$921,750	\$936,750

CATEGORY	2021	2022	2023	2024	2025
CAPITAL	\$951,750	\$966,750	\$981,750	\$996,750	\$1,011,750

*Proposed spending in 2016 includes a budget of \$876,750 + \$390,000 carried from 2015 for John Street, Norwich which was delayed in 2015 and now scheduled for 2016 construction.

6.0 TEN YEAR CAPITAL PLAN FOR ROADS

This section has three sub-sections. The first deals with the existing condition of the road network. The second presents a recommended Ten Year Capital Plan for Roads. The last section analyzes the adequacy of current spending levels on the road system, and estimates required spending in order to maintain the existing average condition rating.

6.1 Condition of Existing Road System

Table 15 presents the length and weighted average condition rating for Gravel Roads, Low Class Bituminous (LCB or surface treatment) and High Class Bituminous (HCB or asphalt) in 2015. Forty-one percent (41%) or 151.10km of the Township's roads are gravel and have an overall average condition rating of 6.53. For gravel roads, the condition rating should be between 6.0 and 7.0. As such, the condition of the gravel roads is satisfactory and the Municipality's goal should be to maintain this rating.

The optimum overall condition rating for Low Class Bituminous (LCB or surface treatment) roads based on available pavement preservation treatments and lifecycle analysis is between 6.0 and 6.5. Similarly, for High Class Bituminous (HCB or asphalt) the optimum condition rating is between 6.5 and 7.0. Based on the foregoing, for hard surface roads, a blended average condition rating should be between 6.3 and 6.8. A rating below the above mentioned ranges is an indication that the hard surfaced roads are underfunded. The Township's current blended average weighted condition rating for all LCB and HCB roads is 5.48. As ratings drop below a 5.0, it is likely the Township will receive complaints due to a noticeable decrease in level of service.

TABLE 15 – 2015 WEIGHTED AVERAGE CONDITION RATING

CATEGORY	2015	
	Km	CR
EARTH	0.70	-
GRAVEL	151.10	6.53
LOW CLASS BITUMINOUS	76.65	3.85
HIGH CLASS BITUMINOUS	138.38	6.38
ALL HARD SURFACE ROADS	215.03	5.48

The following bar charts summarize the overall percentage of roads based on their existing condition where "Very Poor" represents a condition rating equal to or less than 2, "Poor" is a condition rating of 3 or 4, "Fair" is a condition rating of 5 or 6, "Good" is a condition rating of 7 or 8 and "Excellent" is a condition rating greater than 8.

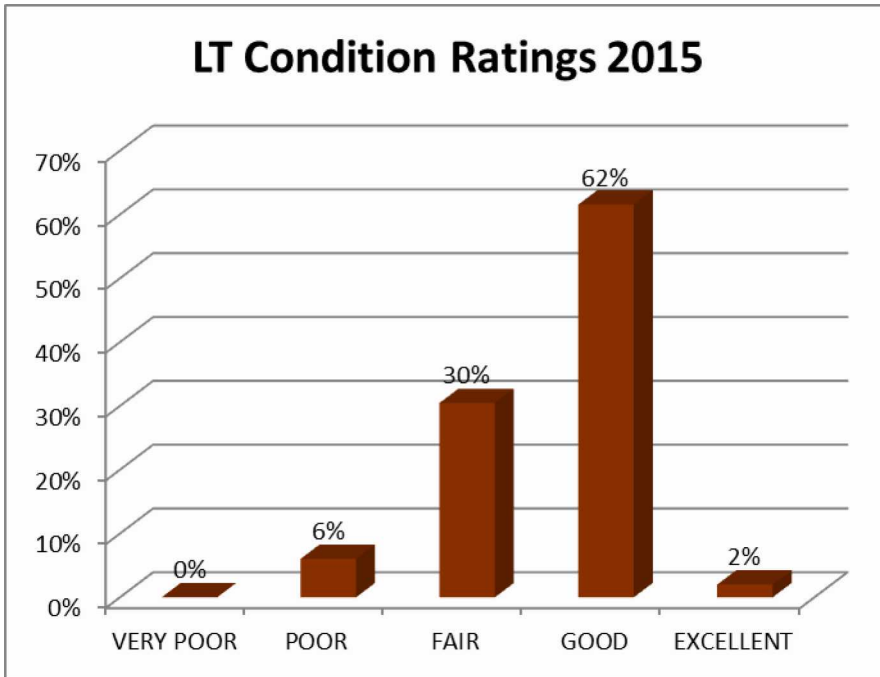


Chart 1 (Left): Loose Top Condition Rating. Sixty-four (64%) percent of the gravel roads have a condition rating of a 7 or higher. This suggests the Township’s gravel roads are generally being well maintained.

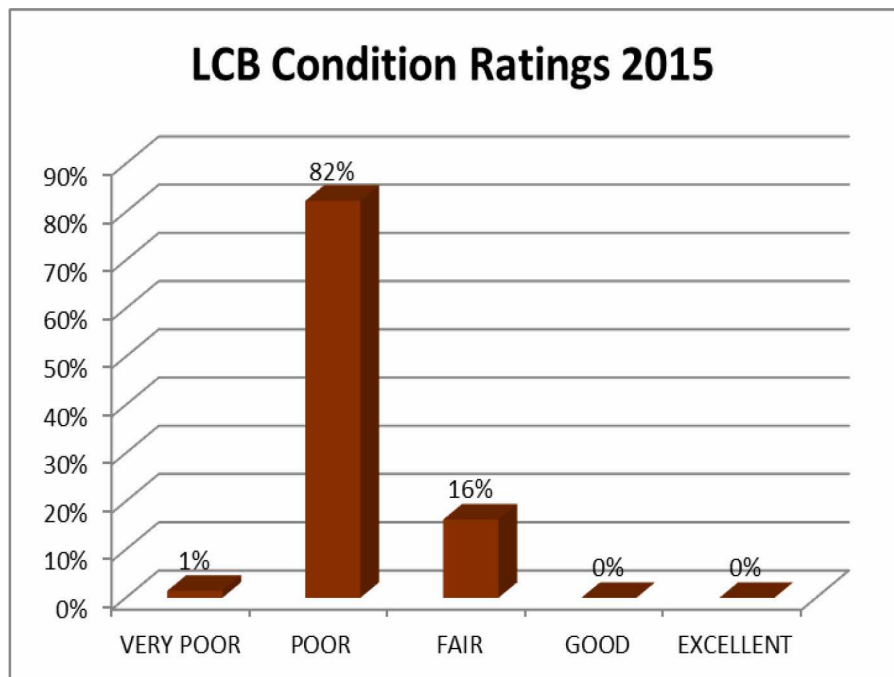


Chart 2 (Right): LCB Condition Rating. Eighty-three (83%) percent of the surface treated roads have a condition rating of a 4 or lower. This suggests that the Township’s surface treated roads require increased capital spending.

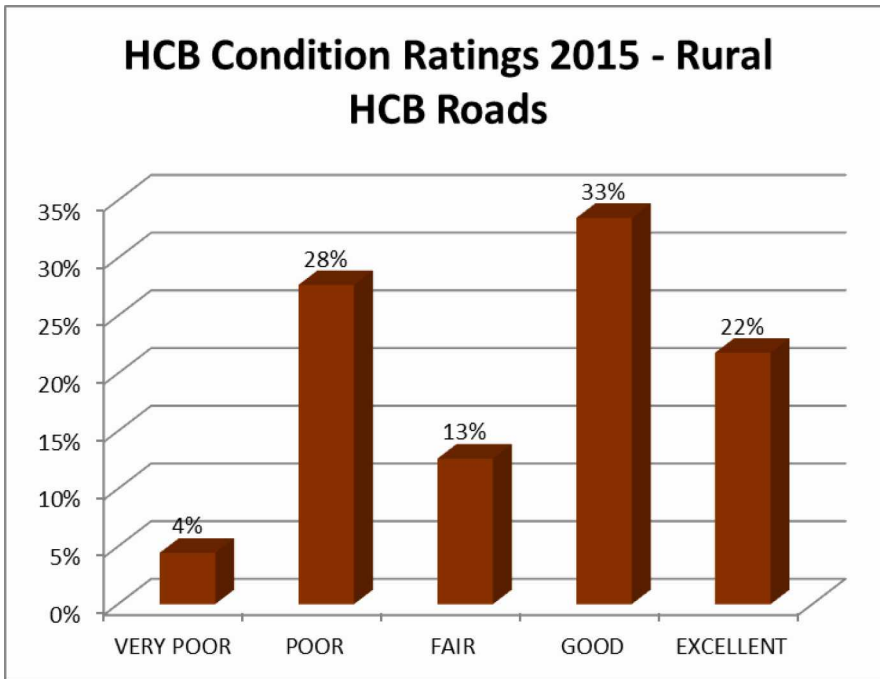


Chart 3 (Left): HCB Condition Rating – Rural Roads (Excludes roads in Norwich, Burgessville, Otterville, Springford and Eastwood). Forty-five (45%) percent of the Township’s rural roads have a condition rating less than the desired optimum condition rating.

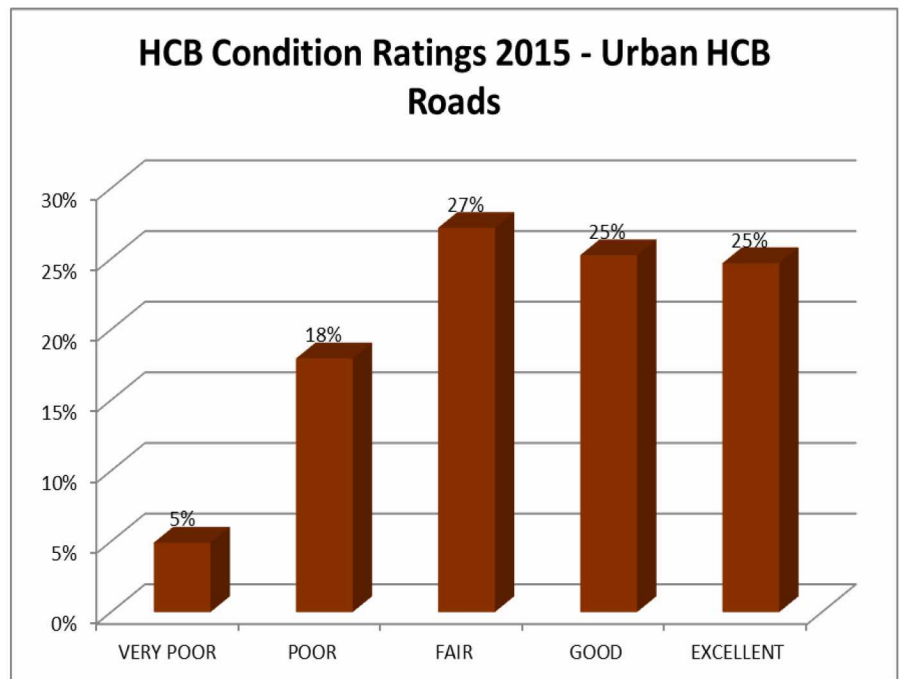


Chart 4 (Right): HCB Condition Rating – Urban Roads (Includes roads in Norwich, Burgessville, Otterville, Springford and Eastwood). Fifty (50%) percent of the Township’s town roads have a condition rating less than the desired optimum condition rating.

Appendix A provides a complete assessment of each road segment. Maps 1 and 2 provide an overview of the surface type of the existing roads, while maps 3 and 4 provide a depiction of the now deficient roads (i.e. rating <5).

6.2 Ten Year Capital Plan

The Ten Year Program for hard surface roads is presented in Table 16A and Table 16B and is generally based on the annual spending levels outlined in Table 14.

A life cycle analysis was used to predict the year of resurfacing or reconstruction for Hot Mix and Surface Treated Roads. Due to spending constraints, the following strategy was developed in an effort to best allocate limited resources:

- Higher traffic roads are given priority over lower traffic volume roads.
- For asphalt roads, overlay projects provides the best value for the dollars spent followed by Pulverize and Pave/Partial Depth Reconstruction and then lastly, Full Depth Reconstruction
(i.e. *Overlay > Partial Depth > Full Depth Reconstruction*)
- For surface treated roads: Roads requiring Partial Depth Reconstruction are given priority over Full Depth Reconstruction, since this provides the best value with limited funds available.
- Projects that are geographically close to each other are planned in the same year where feasible. This is more cost effective.

Please note that roads with higher than average traffic volumes or with large volume of truck traffic may deteriorate at a faster rate, and the Township should be prepared to adjust the program accordingly. The figures are in 2015 dollars (\$1,000's), so the Municipality should account for construction inflation each budget year.

A summary of the effect on the condition ratings has been provided in Appendix B while maps 5 and 6 in Appendix C provide a visual of the proposed 10-year plan.

Similarly, a Ten Year Program for the loose top roads has been provided in Table 16C and recommends resurfacing every five years. Dollar figures have been developed as a percentage of the historical gravel resurfacing budget value based on the length of the road. For example:

Section 003 – Towerline Road, 3.30km

Total lane kilometres of work proposed in 2019: 22.10km

Percentage = $3.30\text{km}/22.10\text{km} = 14.93\%$

Percentage of budget = $14.93\% \times \$212,610 = \$31,747$

A map (map 7) depicting the 10-year gravel roads plan has been provided in Appendix C.

Table 16A: 10 Year Capital Plan for Hard Surface Roads - Rural Roads (\$1,000s)

Section #	Length (km)	Road Name	Proposed Treatment	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
002	1.00	Subway Line	Pulverize and Pave	\$ 100.00									
009	1.00	Old Stage Road	Overlay							\$ 81.00			
010	1.00	Old Stage Road	Overlay							\$ 81.00			
011	3.80	Old Stage Road	Overlay									\$ 307.80	
016A	0.50	Old Stage Road	Overlay								\$ 40.50		
031	1.80	Beaconsfield Road	Overlay										\$ 145.80
032	1.80	Beaconsfield Road	Overlay										\$ 145.80
045B	2.10	Quaker Street	Pulverize and Pave									\$ 210.00	
046	0.60	Quaker Street	Pulverize and Pave, Overlay		\$ 60.00						\$ 48.60		
051A	2.70	Airport Road	Partial Depth Reconstruction, Overlay	\$ 475.20						\$ 218.70			
051B	0.90	Airport Road	Overlay								\$ 72.90		
053	0.60	Airport Road	Pulverize and Pave, Overlay			\$ 60.00						\$ 48.60	
070	1.00	Cornell Road	Pulverize and Pave, Overlay				\$ 100.00						\$ 81.00
071	2.60	Cornell Road	Pulverize and Pave, Overlay		\$ 260.00						\$ 210.60		
072	2.50	Cornell Road	Pulverize and Pave, Overlay				\$ 250.00						\$ 202.50
073	3.60	New Road	Overlay						\$ 291.60				
078	1.90	Mall Road	Overlay						\$ 153.90				
079	1.90	Mall Road	Partial Depth Reconstruction, Single Surface Treatment		\$ 250.80							\$ 61.08	
082	3.70	Mall Road	Single Surface Treatment	\$ 118.94				\$ 118.94					
083	2.10	Mall Road	Single Surface Treatment			\$ 67.50							
087	0.30	Subway Line	Pulverize and Pave	\$ 30.00									
088	0.30	Greenly Line	Pulverize and Pave			\$ 30.00							
089A	1.00	Middletown Line	Overlay			\$ 81.00							
089B	0.50	Middletown Line	Overlay				\$ 40.50						
090	1.40	Middletown Line	Overlay								\$ 113.40		
091	1.30	Middletown Line	Overlay					\$ 105.30					
105A	2.80	Middletown Line	Overlay					\$ 226.80					
105B	3.20	Middletown Line	Overlay							\$ 259.20			
106A	2.30	Slant Road	Pulverize and Pave				\$ 230.00						
106B	2.30	Slant Road	Pulverize and Pave			\$ 230.00							
106C	0.70	Slant Road	Partial Depth Recontsruction			\$ 123.20							
107	5.50	Base Line	Overlay									\$ 445.50	
109	1.70	Middletown Line	Pulverize and Pave, Overlay		\$ 170.00						\$ 137.70		
127	1.50	Middletown Line	Single Surface Treatment		\$ 48.22						\$ 48.22		
129	0.60	Middletown Line	Single Surface Treatment		\$ 19.29						\$ 19.29		
131	1.30	Furnace Road	Partial Depth Reconstruction				\$ 171.60						
132A	2.00	Coal Line	Single Surface Treatment	\$ 64.29									
132B	0.40	Coal Line	Overlay				\$ 32.40						
137	1.40	Summerville Line	Single Surface Treatment	\$ 45.00					\$ 45.00				
139	1.20	Windham Line	Single Surface Treatment	\$ 38.57									

Table 16B: 10 Year Capital Plan for Hard Surface Roads - Urban Roads (\$1,000s)

Section #	Length (km)	Road Name	Proposed Treatment	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
NORWICH													
207B	0.30	South Court Street East	Urban Overlay					\$ 48.30					
210B	0.15	Elgin Street West	Urban Overlay								\$ 24.15		
214B	0.30	Carman Street	Full Depth Reconstruction (Curb + S/W)										\$ 390.90
214C	0.27	Carman Street	Urban Overlay										\$ 43.47
216	0.20	South Street	Urban Overlay									\$ 32.20	
219	0.10	Robson Street	Urban Overlay									\$ 16.10	
222A	0.20	Pitcher Street	Urban Overlay									\$ 32.20	
225	0.30	Florence Street	Full Depth Reconstruction (incl. S/W)							\$ 309.90			
228B	0.30	Phebe Street	Pulverize and Pave - 2 Lifts			\$ 80.40							
229	0.60	Spring Street	Urban Overlay				\$ 96.60						
232	0.50	John Street	Carried over from 2015	\$ 390.00									
240	0.40	Victoria Street	Full Depth Reconstruction (incl. S/W)						\$ 413.20				
241B	0.40	Cook Street	Full Depth Reconstruction (incl. S/W)					\$ 413.20					
244	0.20	Palmer Street E.	Pulverize and Pave (incl. cul-de-sac) - 1 Lift			\$ 51.00							
OTTERVILLE													
254B	0.08	John Street	Pulverize and Pave - 1 Lift			\$ 12.80							
256C	0.40	Queen Street	Pulverize and Pave - 1 Lift							\$ 63.20			
258	0.30	Albert Street	Pulverize and Pave - 1 Lift								\$ 47.40		
262	0.80	John Street	Pulverize and Pave - 1 Lift			\$ 126.40							
BURGESSVILLE													
272	0.40	McNab Street	Urban Overlay								\$ 64.40		
273B	0.10	Nichol Lane	Urban Overlay								\$ 16.10		
SPRINGFORD													
277A	0.16	Church Street	Overlay			\$ 13.12							
277B	0.16	Wood Street West	Overlay			\$ 12.96							
EASTWOOD													
280	0.40	East Street	Pulverize and Pave - 1 Lift								\$ 63.20		
UPDATE ROAD NEEDS STUDY								\$ 25.00					\$ 25.00
Total Spending				\$ 1,262.00	\$ 808.30	\$ 888.38	\$ 921.10	\$ 937.54	\$ 903.70	\$ 1,013.00	\$ 906.45	\$ 1,153.48	\$ 1,034.47
Weighted Condition Rating				5.31	5.15	4.96	4.86	4.69	4.54	4.46	4.38	4.35	4.27
Budget				\$ 1,266.75	\$ 891.75	\$ 906.75	\$ 921.75	\$ 936.75	\$ 951.75	\$ 966.75	\$ 981.75	\$ 996.75	\$ 1,011.75
Difference (Budget - Spending)				\$ 4.75	\$ 83.45	\$ 18.37	\$ 0.65	-\$ 0.79	\$ 48.05	-\$ 46.25	\$ 75.30	-\$ 156.73	-\$ 22.72

Table 16C: 10-Year Plan for Gravel Roads (\$1,000's)

Section #	Length (km)	Road Name	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
003	3.30	Towerline Road				\$ 25.79					\$ 25.79	
005	3.60	Pattullo Avenue	\$ 27.83					\$ 27.83				
006	1.80	Pattullo Avenue				\$ 14.07					\$ 14.07	
007	1.80	Pattullo Avenue				\$ 14.07					\$ 14.07	
013A	0.80	Oxford Centre Road				\$ 6.25					\$ 6.25	
014	3.30	Oxford Centre Road				\$ 25.79					\$ 25.79	
015	3.50	Oxford Centre Road				\$ 27.36					\$ 27.36	
016B	3.10	Old Stage Road	\$ 23.97					\$ 23.97				
017	3.50	Firehall Road			\$ 27.77					\$ 27.77		
019	3.70	Firehall Road	\$ 28.61					\$ 28.61				
020	3.90	Old Stage Road	\$ 30.15					\$ 30.15				
021A	3.80	Curries Road		\$ 30.03					\$ 30.03			
022	1.80	Gunn's Hill Road					\$ 16.50					\$ 16.50
023	3.40	Gunn's Hill Road			\$ 26.97					\$ 26.97		
024	3.40	Gunn's Hill Road			\$ 26.97					\$ 26.97		
025	3.60	Gunn's Hill Road			\$ 28.56					\$ 28.56		
026	1.80	Substation Road					\$ 16.50					\$ 16.50
027	3.60	Substation Road					\$ 32.99					\$ 32.99
028	3.60	Substation Road		\$ 28.45					\$ 28.45			
029	1.80	Substation Road		\$ 14.23					\$ 14.23			
030	1.80	Substation Road		\$ 14.23					\$ 14.23			
033A	3.30	Beaconsfield Road			\$ 26.18					\$ 26.18		
034	3.60	Beaconsfield Road		\$ 28.45					\$ 28.45			
035A	3.60	Beaconsfield Road		\$ 28.45					\$ 28.45			
036	3.70	Evergreen Street	\$ 28.61					\$ 28.61				
041	3.70	Evergreen Street					\$ 33.91					\$ 33.91
047	3.00	Quaker Street				\$ 23.45					\$ 23.45	
048A	0.80	Caley Road		\$ 6.32					\$ 6.32			
049	3.70	Pleasant Valley Road				\$ 28.92					\$ 28.92	
054	3.60	Maple Dell Road					\$ 32.99					\$ 32.99
055	3.90	Maple Dell Road					\$ 35.74					\$ 35.74
056	3.60	Maple Dell Road		\$ 28.45					\$ 28.45			
059	3.80	Milldale Road			\$ 30.15					\$ 30.15		
060	1.50	Milldale Road			\$ 11.90					\$ 11.90		
066	3.60	Ninth Road	\$ 27.83					\$ 27.83				
093A	1.50	Cedar Line		\$ 11.86					\$ 11.86			
095A	0.50	Vandecar Line	\$ 3.87					\$ 3.87				
095B	2.40	Vandecar Line	\$ 18.56					\$ 18.56				
096A	1.10	Cedar Line		\$ 8.69					\$ 8.69			
097A	1.30	Oriel Line				\$ 10.16					\$ 10.16	
097B	1.30	Oriel Line				\$ 10.16					\$ 10.16	
100A	1.00	Vandecar Line	\$ 7.73					\$ 7.73				
100B	2.00	Vandecar Line	\$ 15.46					\$ 15.46				
101	1.60	Zenda Line			\$ 12.69					\$ 12.69		
103	3.40	McCready Line				\$ 26.58					\$ 26.58	
104A	2.70	Zenda Line			\$ 21.42					\$ 21.42		
111	1.70	Hanmer Line		\$ 13.44					\$ 13.44			
114	4.80	Pick Line					\$ 43.99					\$ 43.99

6.3 Overall Weighted Average Condition Rating

On average, it is estimated that approximately \$1,954,000 per year for roads would be required in order to maintain the current level of service at the current condition ratings, which is above current spending limits provided by the Township. On average, this represents a shortfall of \$970,000 per year for the proposed work in the ten year plan. This is evidence that the Township's roads are severely underfunded, particularly as the current level of service does not yet meet the preferred level of service (i.e. rating of >6 for LCB, and >6.5 for HCB).

Table 17 shows the overall weighted average condition rating by year after applying the proposed capital works shown in Tables 16A, 16B and 16C. It is further evident that the Municipality's roads are underfunded.

TABLE 17 – WEIGHTED AVERAGE CONDITION RATING SUMMARY

CATEGORY	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CONDITION RATING (OVERALL)	5.91	5.81	5.72	5.61	5.55	5.45	5.36	5.31	5.26	5.25	5.20
CONDITION RATING (HARD SURFACE ONLY)	5.48	5.31	5.15	4.96	4.86	4.69	4.54	4.46	4.38	4.35	4.27
CONDITION RATING (GRAVEL ONLY)	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53

APPENDIX A

2015 ROAD APPRAISALS

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
001	0.50	30	HCB	8	Old Highway 2	Highway 2	Dead End
002	1.00	589	LCB	5	Subway Line	Highway 2	Oxford 55
003	3.30	101	LT	7	Towerline Road	Oxford 55	Muir Road North
004	1.10	759	HCB	3	Pattullo Avenue	1.1km West of Middletown Line	Middletown Line
005	3.60	119	LT	7	Pattullo Avenue	Middletown Line	Oxford 14
006	1.80	122	LT	7	Pattullo Avenue	Oxford 14	Oxford 55
007	1.80	122	LT	7	Pattullo Avenue	Oxford 55	Muir Road North
008	1.20	151	LCB	4	Horn Road	Sweaburg Road	Old Stage Road
009	1.00	1253	HCB	8	Old Stage Road	Sweaburg Road	Horn Road
010	1.00	1253	HCB	8	Old Stage Road	Horn Road	Oxford 59
011	3.80	445	HCB	7	Old Stage Road	Oxford 59	Middletown Line
013A	0.80	38	LT	7	Oxford Centre Road	Dead End	0.3km West of Middletown Line
013B	0.30	38	HCB	6	Oxford Centre Road	0.3km West of Middletown Line	Middletown Line
014	3.30	78	LT	6	Oxford Centre Road	Middletown Line	Oxford 14
015	3.50	56	LT	7	Oxford Centre Road	Oxford 14	Oxford 55
016A	0.50	86	HCB	7	Old Stage Road	Middletown Line	0.5km East of Middletown Line
016B	3.10	86	LT	7	Old Stage Road	0.5km East of Middletown Line	0.3km West of Oxford 14
016C	0.30	86	HCB	2	Old Stage Road	0.3km West of Oxford 14	Oxford 14
017	3.50	49	LT	7	Firehall Road	Oxford 59	Middletown Line
019	3.70	49	LT	8	Firehall Road	Middletown Line	Oxford 14
020	3.90	125	LT	7	Old Stage Road	Oxford 14	Muir Road South
021A	3.80	136	LT	6	Curries Road	Oxford 14	Muir Road South
021B	1.80	307	HCB	3	Curries Road	Cedar Line	Oxford 59
022	1.80	73	LT	5	Gunn's Hill Road	Cedar Line	Oxford 59
023	3.40	155	LT	7	Gunn's Hill Road	Oxford 59	Middletown Line
024	3.40	77	LT	7	Gunn's Hill Road	Middletown Line	Oriel Line
025	3.60	52	LT	7	Gunn's Hill Road	Oriel Line	Muir Road South
026	1.80	118	LT	6	Substation Road	Cedar Line	Oxford 59
027	3.60	92	LT	7	Substation Road	Oxford 59	Middletown Line
028	3.60	119	LT	5	Substation Road	Middletown Line	Oxford 14
029	1.80	116	LT	8	Substation Road	Oxford 14	Vandecar Line
030	1.80	116	LT	8	Substation Road	Vandecar Line	Muir Road South
031	1.80	812	HCB	8	Beaconsfield Road	Zenda Line	Cedar Line
032	1.80	812	HCB	8	Beaconsfield Road	Cedar Line	Oxford 59
033A	3.30	149	LT	7	Beaconsfield Road	Oxford 59	0.3km West of Middletown Line
033B	0.30	149	HCB	10	Beaconsfield Road	0.3km West of Middletown Line	Middletown Line
034	3.60	89	LT	8	Beaconsfield Road	Middletown Line	Oxford 14
035A	3.60	65	LT	8	Beaconsfield Road	Oxford 14	Muir Road South
035B	3.60	1086	HCB	5	New Durham Road	Oxford 59	Muir Road South
036	3.70	82	LT	7	Evergreen Street	Zenda Line	Oxford 13
037	3.70	127	LCB	5	Evergreen Street	Oxford 13	Middletown Line
038	3.60	298	HCB	5	Evergreen Street	Middletown Line	Oxford 59
041	3.70	130	LT	6	Evergreen Street	Oxford 59	Base Line
042A	0.20	158	LT	7	11th Concession Road	Base Line	Twp Boundary

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
042B	0.20	158	LCB	5	Hatchley Road	Base Line	Twp Boundary
042C	0.20	158	LT	8	13th Concession Road	Base Line	Twp Boundary
043	3.70	235	HCB	2	Quaker Street	Zenda Line	Oxford 13
044	3.80	235	HCB	10	Quaker Street	Oxford 13	Middletown Line
045A	1.40	796	HCB	10	Quaker Street	Middletown Line	1.4 East of Middletown Line
045B	2.10	796	HCB	6	Quaker Street	1.4 East of Middletown Line	Oxford 59
046	0.60	1832	HCB	4	Quaker Street	Oxford 59	Slant Road
047	3.00	95	LT	10	Quaker Street	Slant Road	Base Line
048A	0.80	224	LT	6	Caley Road	Hamner Line	0.6km West of Windham Line
048B	0.60	224	LCB	3	Caley Road	0.6km West of Windham Line	Windham Line
049	3.70	127	LT	6	Pleasant Valley Road	Zenda Line	Oxford 13
050	3.70	439	LCB	3	Pleasant Valley Road	Oxford 13	Middletown Line
051A	2.70	1804	LCB	3	Airport Road	Middletown Line	0.9km West of Oxford 59
051B	0.90	1804	HCB	9	Airport Road	0.9km West of Oxford 59	Oxford 59
052	3.90	1247	HCB	8	Airport Road	Oxford 59	Base Line
053	0.60	1247	HCB	4	Airport Road	Base Line	Windham Line
054	3.60	34	LT	7	Maple Dell Road	Zenda Line	Oxford 13
055	3.90	171	LT	7	Maple Dell Road	Oxford 13	Middletown Line
056	3.60	130	LT	7	Maple Dell Road	Middletown Line	Oxford 59
057	4.50	271	LCB	3	Maple Dell Road	Oxford 59	Windham Line
058	3.60	564	HCB	8	Milldale Road	Zenda Line	Oxford 13
059	3.80	107	LT	8	Milldale Road	Oxford 13	Middletown Line
060	1.50	169	LT	8	Milldale Road	Middletown Line	Pick Line
061	2.00	189	LCB	4	Milldale Road	Pick Line	Oxford 59
062A	0.50	51	LT	6	Vanash Road	Oxford 59	Dead End
062B	0.15	32	LCB	5	7th Road	Oxford 59	Dead End
062C	0.30	5	LT	7	Oddy Road	Oxford 59	Dead End
063	3.80	82	LCB	4	Milldale Road	Oxford 59	Base Line
064	3.70	63	LCB	5	Ninth Road	Zenda Line	Oxford 13
066	3.60	35	LT	8	Ninth Road	Oxford 13	Middletown Line
067	1.70	167	LCB	3	Ninth Road	Cornell Road	Oxford 59
068	1.60	192	LT	7	Ninth Road	Dead End	Base Line
069	1.00	192	LCB	3	Ninth Road	Base Line	Twp Boundary
070	1.00	1753	HCB	5	Cornell Road	Oxford 13	Oatman Line
071	2.60	1753	HCB	4	Cornell Road	Oatman Line	Middletown Line
072	2.50	1753	HCB	5	Cornell Road	Middletown Line	Dover Street
073	3.60	740	HCB	7	New Road	Zenda Line	Oxford 13
074	3.60	291	LCB	4	New Road	Middletown Line	Oxford 59

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
074B	1.60	291	LCB	4	Middletown Line	New Road	Potters Road
075	3.70	231	LCB	4	New Road	Oxford 59	Base Line
076	1.10	634	LCB	4	New Road	Base Line	Twp Boundary
077	0.15	30	LT	7	Cecilia Street	Dead End	Base Line
078	1.90	1874	HCB	8	Mall Road	Westtown Line	1.9km West of Oxford 13
079	1.90	1874	LCB	4	Mall Road	1.9km West of Oxford 13	Oxford 13
080	1.60	776	LCB	4	Mall Road	Oxford 13	1.6km East of Oxford 13
081	1.60	776	LCB	4	Mall Road	1.6km East of Oxford 13	Middletown Line
082	3.70	1223	LCB	3	Mall Road	Middletown Line	Summerville Line
083	2.10	1027	LCB	4	Mall Road	Summerville Line	Oxford 59
084	3.10	1066	HCB	3	Mall Road	Oxford 59	Twp Boundary
085	1.60	432	LCB	4	Summerville Line	Potters Road	Mall Road
086	1.20	426	HCB	4	Base Line	Wendy's Road	Mall Road
087	0.30	409	LCB	5	Subway Line	Oxford 55	Towerline Road
088	0.30	295	HCB	4	Greenly Line	Pattullo Ave	Oxford 59
089A	1.00	940	HCB	7	Middletown Line	Towerline Road	1.0km South of Towerline Road
089B	0.50	940	HCB	6	Middletown Line	1.0km South of Towerline Road	1.5km South of Towerline Road
089C	0.50	940	HCB	3	Middletown Line	1.5km South of Towerline Road	Pattullo Ave
090	1.40	994	HCB	8	Middletown Line	Pattullo Ave	Oxford Centre Road
091	1.30	994	HCB	7	Middletown Line	Oxford Centre Road	Firehall Road
092A	0.80	19	HCB	2	Old 14 Line	Oxford Centre Road	0.8km south of Oxford Centre Road
092B	0.50	19	LT	7	Old 14 Line	0.8km south of Oxford Centre Road	Firehall Road
093A	1.50	176	LT	7	Cedar Line	Sweaburg Road	0.4km North of Curries Road
093B	0.40	176	HCB	4	Cedar Line	0.4km North of Curries Road	Curries Road
094A	1.50	351	HCB	7	Middletown Line	Firehall Road	1.5km South of Firehall Road
094B	1.40	351	HCB	9	Middletown Line	1.5km South of Firehall Road	Gunn's Hill Road
095A	0.50	30	LT	5	Vandecar Line	Old Stage Road	0.5km South of Old Stage Road
095B	2.40	30	LT	7	Vandecar Line	0.5km South of Old Stage Road	Gunn's Hill Road
096A	1.10	106	LT	4	Cedar Line	Curries Road	Gunn's Hill Road
096B	1.30	106	LT	4	Cedar Line	Gunn's Hill Road	Substation Road
097A	1.30	13	LT	6	Oriel Line	Curries Road	Gunn's Hill Road
097B	1.30	13	LT	5	Oriel Line	Gunn's Hill Road	Substation Road
098	1.90	154	LT	4	Cedar Line	Substation Road	Beaconsfield Road
099	3.50	620	HCB	9	Middletown Line	Gunn's Hill Road	Beaconsfield Road
100A	1.00	28	LT	5	Vandecar Line	Gunn's Hill Road	Substation Road
100B	2.00	28	LT	7	Vandecar Line	Substation Road	Beaconsfield Road
101	1.60	400	LT	6	Zenda Line	Beaconsfield Road	Salford Road
102A	0.20	698	HCB	9	Middletown Line	Beaconsfield Road	0.2km South of Beaconsfield Road
102B	1.10	698	HCB	8	Middletown Line	0.2km South of Beaconsfield Road	0.3km North of Oxford 59
103	3.40	27	LT	6	McCready Line	Beaconsfield Road	Evergreen Street
104A	2.70	400	LT	6	Zenda Line	Salford Road	0.5km North of Quaker Street
104B	0.50	400	HCB	3	Zenda Line	0.5km North of Quaker Street	Quaker Street
105A	2.80	1641	HCB	8	Middletown Line	0.4km South of Oxford 59	Quaker Street
105B	3.20	1641	HCB	8	Middletown Line	Quaker Street	Airport Road
106A	2.30	1119	HCB	4	Slant Road	New Durham Road	Evergreen Street

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
106B	2.30	1119	HCB	4	Slant Road	Evergreen Street	0.7km North of Quaker Street
106C	0.70	1119	LCB	4	Slant Road	0.7km North of Quaker Street	Quaker Street
107	5.50	1230	HCB	9	Base Line	New Durham Road	Norwich Road
108	3.20	187	LT	5	Zenda Line	Quaker Street	Pleasant Valley Road
109	1.70	1712	HCB	4	Middletown Line	Airport Road	Maple Dell Road
110	0.40	400	LCB	4	Utility Line	Quaker Street	Oxford 59
111	1.70	69	LT	6	Hanmer Line	Norwich Road	Airport Road
112	0.80	316	LCB	4	Windham Line	Caley Road	Airport Road
113	1.60	229	LT	4	Zenda Line	Pleasant Valley Road	Maple Dell Road
114	4.80	51	LT	6	Pick Line	Norwich Road	Milldale Road
115	1.60	99	LCB	3	Hanmer Line	Airport Road	Maple Dell Road
116	6.50	1131	HCB	10	Base Line	Norwich Road	Otterville Road
117	0.70	504	LCB	4	Windham Line	Airport Road	Maple Dell Road
118	1.60	229	LT	4	Zenda Line	Maple Dell Road	Milldale Road
119	3.20	1374	HCB	4	Middletown Line	Maple Dell Road	Otterville Road
121	4.00	504	LCB	4	Windham Line	Maple Dell Road	Otterville Road
122	1.60	229	LT	4	Zenda Line	Milldale Road	Otterville Road
123A	1.10	128	LCB	4	Pick Line	Milldale Road	0.3km North of North Street West
123B	0.30	128	HCB	4	Pick Line	0.3km North of North Street West	North Street West
124	1.60	134	LCB	4	Csont Line	Milldale Road	Otterville Road
125	1.50	771	HCB	3	Zenda Line	Otterville Road	Ninth Road
127	1.50	683	LCB	5	Middletown Line	Otterville Road	Ninth Road
128	1.50	771	HCB	3	Zenda Line	Ninth Road	New Road
129	0.60	683	LCB	5	Middletown Line	Ninth Road	Cornell Road
130	1.30	25	LT	6	Middletown Line	Cornell Road	New Road
131	1.30	228	LCB	5	Furnace Road	Cornell Road	New Road
132A	2.00	602	LCB	4	Coal Line	Cornell Road	New Road
132B	0.40	602	HCB	7	Coal Line	New Road	Oxford 59
133	3.00	765	HCB	3	Base Line	Otterville Road	New Road
134	0.40	15	LCB	3	Zenda Line	New Road	0.4km South of New Road
135	1.70	157	LCB	3	Rock Mill Line	Oxford 13	Potters Road
136	2.30	16	LT	7	Neidert Line	Potters Road	Middletown Line
137	1.40	631	LCB	4	Summerville Line	Oxford 59	Potters Road
138	1.00	599	HCB	4	Base Line	New Road	Wendy's Road
139	1.20	504	LCB	4	Windham Line	New Road	Wendy's Road
140	1.10	263	LCB	2	Westown Line	Potters Road	Mall Road
141	1.60	182	LCB	4	Middletown Line	Potters Road	Mall Road
142	0.20	64	LT	6	Pleasant Valley Road	0.2km East of Zenda Line	Zenda Line
143	0.20	97	LT	8	Old School Line	0.2km North of Gunn's Hill Road	Gunn's Hill Road
144	0.70	4	Earth	0	Oatman Line	Ninth Road	Oxford 13
145	0.20	104	LCB	3	Second Road	Base Line	New Durham Road

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
NORWICH							
201A	0.40		HCB	3	Brock Street West	Dead End	Washington Street
201B	0.13		HCB	3	Brock Street West	Washington Street	Stover Street N (Oxford 59)
202A	0.15		HCB	6	Brock Street East	Stover Street N (Oxford 59)	Victoria Street
202B	0.10		HCB	10	Brock Street East	Victoria Street	Poldon Drive
203A	0.60		HCB	3	North Court Street West	Centre Street	Clyde Street
203B	0.30		HCB	8	North Court Street West	Clyde Street	Stover Street N (Oxford 59)
204	0.35		HCB	8	North Court Street East	Stover Street N (Oxford 59)	Lossing Drive
205	0.10		HCB	6	Mary Street	Spring Street	Centre Street
206	0.30		HCB	4	South Court Street West	Clyde Street	Stover Street N (Oxford 59)
207A	0.10		HCB	3	South Court Street East	Stover Street N (Oxford 59)	Albert Street
207B	0.30		HCB	6	South Court Street East	Albert Street	Dead End
208	0.10		HCB	5	Elgin Street East	George Street	Cook Street
209	0.10		HCB	6	Elgin Street	Centre Street	Spring Street
210A	0.35		HCB	3	Elgin Street East	Cook Street	Washington Street
210B	0.15		HCB	7	Elgin Street West	Washington Street	Clyde Street
211	0.20		HCB	5	George Street	Main Street East	Dead End
212A	0.20		HCB	6	Front Street	Avery's Lane	Church Street
212B	0.12		HCB	2	Front Street	Church Street	Pitcher Street
212C	0.18		HCB	9	Front Street	Pitcher Street	Stover Street S (Oxford 59)
213A	0.13		HCB	6	Church Street	Main Street West	Tidey Street
213B	0.05		HCB	4	Church Street	Tidey Street	Dead End
213C	0.12		HCB	7	Tidey Street	Church Street	Pitcher Street
213D	0.18		HCB	5	Tidey Street	Pitcher Street	Stover Street S (Oxford 59)
214A	0.20	316	HCB	9	Carman Street	Stover Street S (Oxford 59)	Pitcher Street
214B	0.30	316	HCB	4	Carman Street	Pitcher Street	Avery's Lane
214C	0.27	316	HCB	6	Carman Street	Avery's Lane	Marshall Drive
215A	0.20		HCB	5	Palmer Street West	Stover Street S (Oxford 59)	Pitcher Street
215B	0.20		HCB	4	Palmer Street West	Pitcher Street	Dufferin Street
216	0.20		HCB	7	South Street	Dufferin Street	Pitcher Street
217	0.20		HCB	9	South Street	Pitcher Street	Stover Street S (Oxford 59)
218	0.20		HCB	6	Jerdon Street	Pitcher Street	Stover Street S (Oxford 59)
219	0.10		HCB	7	Robson Street	Dufferin Street	Stover Street S (Oxford 59)
220	0.70	379	HCB	8	Dufferin Street	Robson Street	Carman Street
222A	0.20		HCB	7	Pitcher Street	Jerdon Street	Palmer Street West
222B	0.10		HCB	3	Pitcher Street	Palmer Street West	Carman Street
222C	0.20		HCB	6	Pitcher Street	Carman Street	Tidey Street

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
222D	0.05		HCB	9	Pitcher Street	Tidey Street	Front Street
222E	0.05		HCB	4	Pitcher Street	Front Street	Main Street West
223	0.40		HCB	5	Otter Street	Jerdon Street	Dead End
224	0.50		HCB	8	Marshall Drive	Cayley Street	Dead End
225	0.30	316	HCB	3	Florence Street	Main Street West	Carman Street
228A	0.10		HCB	7	Sutton Street	Main Street East	Dead End
228B	0.30		HCB	6	Phebe Street	Main Street East	Dead End
229	0.60		HCB	7	Spring Street	Main Street West	Dead End
230A	0.20	392	HCB	6	Centre Street	Dead End	North Court Street West
230B	0.20	392	HCB	3	Centre Street	North Court Street West	Elgin Street
230C	0.20	392	HCB	7	Centre Street	Elgin Street	Main Street West
231	0.50	303	HCB	9	Clyde Street	Main Street West	Brock Street West
232	0.50		HCB	2	John Street	Dead End	Elgin Street
233	0.20		HCB	8	John Street	Elgin Street	Main Street West
234A	0.20		HCB	10	Washington Street	North Street West	Brock Street West
234B	0.10		HCB	5	Washington Street	Dead End	North Street West
235A	0.35		HCB	7	Victoria Street	North Court Street East	North Street East
235B	0.25		HCB	10	North Street	Washington Street	Poldon Drive
236	0.20		HCB	8	Washington Street	Brock Street West	South Court Street West
237A	0.10		HCB	4	Washington Street	Elgin Street	Main Street West
237B	0.10		HCB	7	Washington Street	South Court Street West	Elgin Street
238	0.40		HCB	10	Albert Street	Dead End	North Court Street East
239	0.30		HCB	3	Albert Street	South Court Street East	Main Street East
240	0.40		HCB	2	Victoria Street	North Court Street East	Main Street East
241A	0.40	276	HCB	9	Cook Street	North Court Street East	South Court Street East
241B	0.40	276	HCB	2	Cook Street	South Court Street East	Main Street East
242	0.30		HCB	7	Avery's Lane	Main Street West	Carman Street
243	0.30		HCB	9	Moore Crescent	Marshall Drive	Cayley's Street
244	0.20		HCB	5	Palmer Street E.	Stover Street S (Oxford 59)	Dead End
245	0.10		LT	7	Union Street	Stover Street S (Oxford 59)	Dead End
246	0.10		HCB	7	Bailey Street	Spring Street	Centre Street
247	0.20	311	HCB	9	Lossing Drive	North Court Street East	Dead End
249	0.10		HCB	9	Carroll Street	Marshall Drive	Florence Street
249B	0.20		HCB	9	Cayly Street	Carman Street	Dead End
249C	0.10	311	HCB	5	Pollard Street	Mashall Drive	Dead End
250	0.20		HCB	8	Irving Drive	Cayley Street	Dead End
251	0.60	311	HCB	9	Poldon Drive	Lossing Drive	Dead End
252		311	HCB	0	Bushel Court (not assumed)		

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
OTTERVILLE							
250A	0.40	88	HCB	9	North Street West	Church Street (Pick Line)	Dead End
250B	0.10		HCB	9	Grove Street	North Street West	Main Street West
251	0.10		HCB	9	Maple Street	North Street West	Main Street West
252	0.20	344	HCB	3	Church Street	Main Street West	0.2km North of Main Street West
253	0.20		HCB	3	North Street West + Bullock Street	Main Street West	Paxton Street
254A	0.08		HCB	2	Paxton Street	Main Street West	North Street
254B	0.08		HCB	6	John Street	North Street East	Main Street East
254C	0.12		HCB	8	Bond Street	North Street East	Main Street East
254D	0.12		HCB	8	Cedar Street	North Street East	Main Street East
254E	0.12		HCB	5	York Street	North Street East	Main Street East
254F	0.77	140	HCB	5	North Street East	Paxton Street	York Street
255A	0.10		HCB	9	Pine Street	Main Street West	Mill Street West
255B	0.10		HCB	9	Cherry Street	Main Street West	Mill Street West
255C	0.30		HCB	9	Mill Street West	Cherry Street	Otterview Drive
256A	0.20		HCB	6	Mill Street	John Street	Dover Street
256B	0.10		HCB	3	Mill Street	Dover Street	Albert Street
256C	0.40		HCB	5	Queen Street	John Street	Albert Street
257	0.30		HCB	3	Oxford Street	Mill Street East	Wellington Street
258	0.30		HCB	5	Albert Street	Mill Street East	Norfolk Street
259	0.40		HCB	3	Wellington Street	John Street	Dead End
260	0.30		HCB	5	Norfolk Street	Dover Street	Dead End
261	1.20	815	HCB	10	Dover Street (incl. John to Cornell Road)	Cornell Road	Main Street West
262	0.80	684	HCB	6	John Street	Dover Street	Main Street West
263A	0.30		HCB	5	Mill Street	John Street	Buchan Street
263B	0.10		HCB	5	Buchan Street	Mill Street East	Main Street East
264	0.80		HCB	9	James Street	Main Street West	Dead End
265	0.20	401	HCB	9	Otterview Drive	Main Street West	Dead End
266	0.36		HCB	10	River Oaks Drive	Dover Street	Dead End

Section #	Length (km)	AADT	Current Surface Type	Condition Rating	Road Name	From	To
BURGESSVILLE							
270	0.30		HCB	8	Middletown Line (Main Street) N.	0.3km North of Oxford 59	Oxford 59
271	0.40		HCB	8	Middletown Line (Main Street) S.	Oxford 59	0.4km South of Oxford 59
272	0.40	63	HCB	7	McNab Street	Main Street North	Smith's Lane
273B	0.10		HCB	7	Nichol Lane	McNab Line	Oxford 59
273C	0.60	174	HCB	3	Burgess Street	Oxford 59	Dead End
274	0.10		LT	7	Smith's Lane	McNab Line	Oxford 59
275A	0.20	110	HCB	3	Deer Crescent	Oxford 59	0.1km North of Oxford 59
275B	0.60	110	HCB	8	Deer Crescent	0.1km North of Oxford 59	0.1km North of Oxford 59
276	0.10		HCB	8	Snyder Court	Deer Crescent	Dead End
21C	0.34		HCB	4	Kitchen Court (off of Curries Road)	Curried Road	Dead End
SPRINGFORD							
277A	0.16	156	HCB	5	Church Street	Otterville Road	Wood Street West
277B	0.16	156	HCB	5	Wood Street West	Church Street	Oxford 13
277C	0.33		HCB	5	Wood Street East	Oxford 13	Dead End
277D	0.25		HCB	5	Water Street	Otterville Road	Dead End
278	0.30	182	HCB	7	Son's Street	Oxford 13	Dead End
EASTWOOD							
279A	0.10		HCB	4	Main Street	Hwy 2	John Street
279B	0.20		HCB	3	John Street	Dead End	Dead End
280	0.40		HCB	5	East Street	Hwy 2	Oxford 55

APPENDIX B

FORECAST CONDITION RATINGS BY YEAR (PROPOSED 10-YEAR PLAN)

Condition Rating Forecast by Year - High Class Bitumous Surface (HCB)

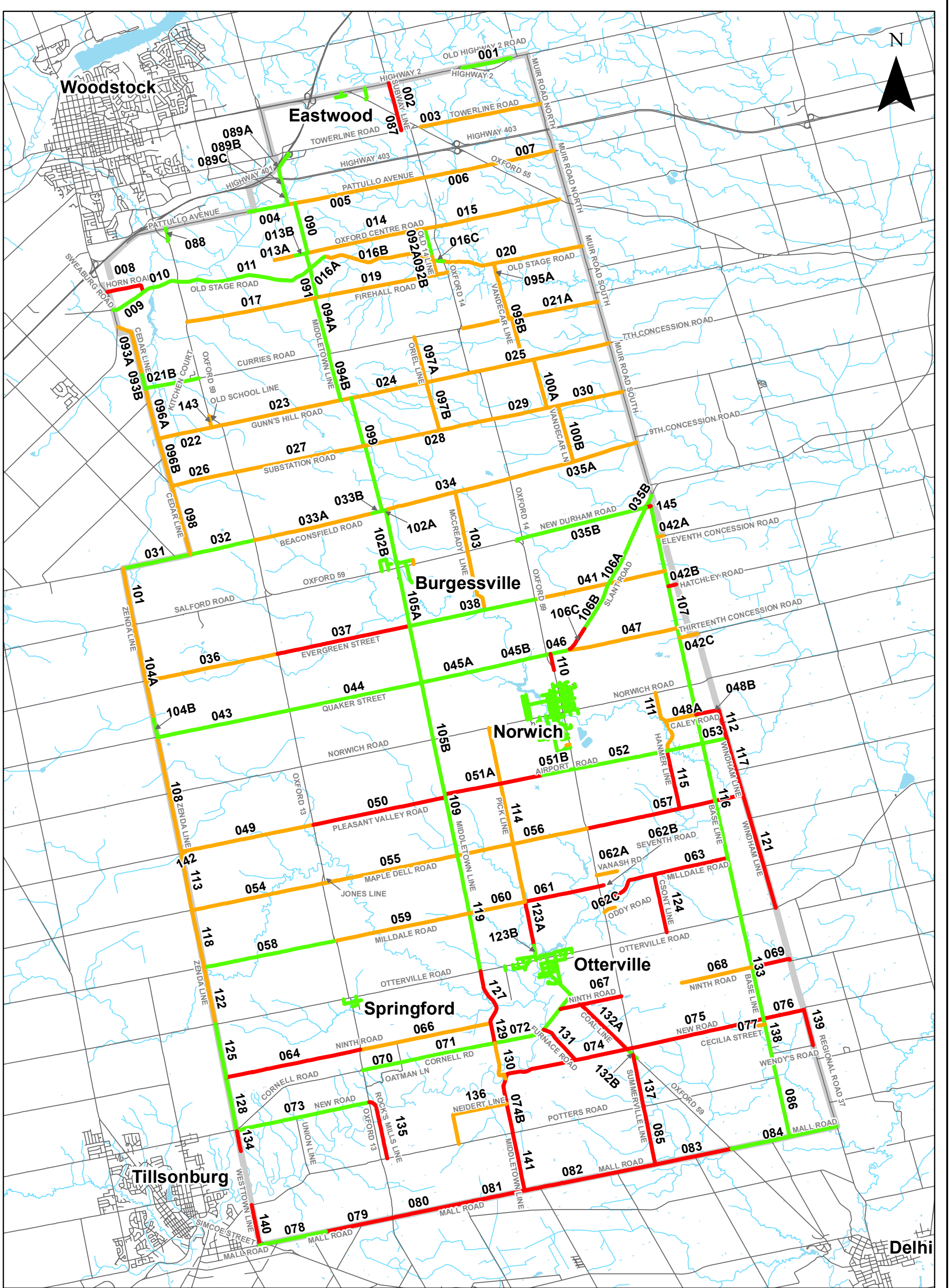
Section #	Road Name	Current Condition Rating 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
001	Old Highway 2	8	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90	5.67
002	Subway Line	-	8.00	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90
004	Pattullo Avenue	3	2.68	2.36	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00
009	Old Stage Road	8	7.50	7.00	6.50	6.00	5.50	5.00	8.00	7.50	7.00	6.50
010	Old Stage Road	8	7.50	7.00	6.50	6.00	5.50	5.00	8.00	7.50	7.00	6.50
011	Old Stage Road	7	6.77	6.53	6.30	6.07	5.83	5.60	5.37	5.13	8.40	8.17
013B	Oxford Centre Road	6	5.77	5.53	5.30	5.07	4.83	4.60	4.37	4.13	3.90	3.67
016A	Old Stage Road	7	6.77	6.53	6.30	6.07	5.83	5.60	5.37	8.63	8.40	8.17
016C	Old Stage Road	2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
021B	Curries Road	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
031	Beaconsfield Road	8	7.68	7.36	7.05	6.73	6.41	6.09	5.77	5.45	5.14	8.32
032	Beaconsfield Road	8	7.68	7.36	7.05	6.73	6.41	6.09	5.77	5.45	5.14	8.32
033B	Beaconsfield Road	10	9.77	9.53	9.30	9.07	8.83	8.60	8.37	8.13	7.90	7.67
035B	New Durham Road	5	4.50	4.00	3.50	3.00	2.50	2.00	2.00	2.00	2.00	2.00
038	Evergreen Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
043	Quaker Street	2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
044	Quaker Street	10	9.77	9.53	9.30	9.07	8.83	8.60	8.37	8.13	7.90	7.67
045A	Quaker Street	10	9.68	9.36	9.05	8.73	8.41	8.09	7.77	7.45	7.14	6.82
045B	Quaker Street	6	5.68	5.36	5.05	4.73	4.41	4.09	3.77	3.45	8.00	7.68
046	Quaker Street	4	3.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50	8.00	7.50
51A	Airport Road	-	8.50	8.00	7.50	7.00	6.50	6.00	9.00	8.50	8.00	7.50
051B	Airport Road	9	8.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50	8.00	7.50
052	Airport Road	8	7.50	7.00	6.50	6.00	5.50	5.00	4.50	4.00	3.50	3.00
053	Airport Road	4	3.50	3.00	8.00	7.50	7.00	6.50	6.00	5.50	8.50	8.00
058	Milldale Road	8	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90	5.67
070	Cornell Road	5	4.50	4.00	3.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50

Section #	Road Name	Current Condition Rating 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
071	Cornell Road	4	3.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50	8.00	7.50
072	Cornell Road	5	4.50	4.00	3.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50
073	New Road	7	6.68	6.36	6.05	5.73	5.41	8.59	8.27	7.95	7.64	7.32
078	Mall Road	8	7.50	7.00	6.50	6.00	5.50	8.50	8.00	7.50	7.00	6.50
084	Mall Road	3	2.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
086	Base Line	4	3.77	3.53	3.30	3.07	2.83	2.60	2.37	2.13	2.00	2.00
087	Subway Line	-	8.00	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90
088	Greenly Line	4	3.77	3.53	8.00	7.77	7.53	7.30	7.07	6.83	6.60	6.37
089A	Middletown Line	7	6.68	6.36	9.55	9.23	8.91	8.59	8.27	7.95	7.64	7.32
089B	Middletown Line	6	5.68	5.36	5.05	8.23	7.91	7.59	7.27	6.95	6.64	6.32
089C	Middletown Line	3	2.68	2.36	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00
090	Middletown Line	8	7.68	7.36	7.05	6.73	6.41	6.09	5.77	8.95	8.64	8.32
091	Middletown Line	7	6.68	6.36	6.05	5.73	8.91	8.59	8.27	7.95	7.64	7.32
092A	Old 14 Line	2	1.77	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
093B	Cedar Line	4	3.77	3.53	3.30	3.07	2.83	2.60	2.37	2.13	2.00	2.00
094A	Middletown Line	7	6.77	6.53	6.30	6.07	5.83	5.60	5.37	5.13	4.90	4.67
094B	Middletown Line	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
099	Middletown Line	9	8.68	8.36	8.05	7.73	7.41	7.09	6.77	6.45	6.14	5.82
102A	Middletown Line	9	8.68	8.36	8.05	7.73	7.41	7.09	6.77	6.45	6.14	5.82
102B	Middletown Line	8	7.68	7.36	7.05	6.73	6.41	6.09	5.77	5.45	5.14	4.82
104B	Zenda Line	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
105A	Middletown Line	8	7.50	7.00	6.50	6.00	9.00	8.50	8.00	7.50	7.00	6.50
105B	Middletown Line	8	7.50	7.00	6.50	6.00	5.50	5.00	8.00	7.50	7.00	6.50
106A	Slant Road	4	3.50	3.00	2.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00
106B	Slant Road	4	3.50	3.00	8.00	7.50	7.00	6.50	6.00	5.50	5.00	4.50
106C	Slant Road	-			9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50
107	Base Line	9	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00	8.00	7.50
109	Middletown Line	4	3.50	8.00	7.50	7.00	6.50	6.00	5.50	8.50	8.00	7.50
116	Base Line	10	9.50	9.00	8.50	8.00	7.50	7.00	6.50	6.00	5.50	5.00
119	Middletown Line	4	3.50	3.00	2.50	2.00	2.00	2.00	2.00	2.00	2.00	2.00
123B	Pick Line	4	3.77	3.53	3.30	3.07	2.83	2.60	2.37	2.13	2.00	2.00
125	Zenda Line	3	2.68	2.36	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00
128	Zenda Line	3	2.68	2.36	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00
132B	Coal Line	7	6.68	6.36	6.05	9.23	8.91	8.59	8.27	7.95	7.64	7.32
133	Base Line	3	2.68	2.36	2.05	2.00	2.00	2.00	2.00	2.00	2.00	2.00
138	Base Line	4	3.77	3.53	3.30	3.07	2.83	2.60	2.37	2.13	2.00	2.00

Section #	Road Name	Current Condition Rating 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
OTTERVILLE												
250A	North Street West	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
250B	Grove Street	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
251	Maple Street	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
252	Church Street	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
253	North Street West + Bullock Street	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
254A	Paxton Street	2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
254B	John Street	6	5.77	5.53	8.80	8.57	8.33	8.10	7.87	7.63	7.40	7.17
254C	Bond Street	8	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90	5.67
254D	Cedar Street	8	7.77	7.53	7.30	7.07	6.83	6.60	6.37	6.13	5.90	5.67
254E	York Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
254F	North Street East	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
255A	Pine Street	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
255B	Cherry Street	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
255C	Mill Street West	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
256A	Mill Street	6	5.77	5.53	5.30	5.07	4.83	4.60	4.37	4.13	3.90	3.67
256B	Mill Street	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
256C	Queen Street	5	4.77	4.53	4.30	4.07	3.83	3.60	8.00	7.77	7.53	7.30
257	Oxford Street	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
258	Albert Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	8.00	7.77	7.53
259	Wellington Street	3	2.77	2.53	2.30	2.07	2.00	2.00	2.00	2.00	2.00	2.00
260	Norfolk Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
261	Dover Street (incl. John to Cornell Road)	10	9.68	9.36	9.05	8.73	8.41	8.09	7.77	7.45	7.14	6.82
262	John Street	6	5.68	5.36	8.55	8.23	7.91	7.59	7.27	6.95	6.64	6.32
263A	Mill Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
263B	Buchan Street	5	4.77	4.53	4.30	4.07	3.83	3.60	3.37	3.13	2.90	2.67
264	James Street	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
265	Otterview Drive	9	8.77	8.53	8.30	8.07	7.83	7.60	7.37	7.13	6.90	6.67
266	River Oaks Drive	10	9.77	9.53	9.30	9.07	8.83	8.60	8.37	8.13	7.90	7.67

APPENDIX C

MAPS



LEGEND

- Gravel (LT)
- Asphalt (HCB)
- Surface Treatment (LCB)
- Road (not maintained by Norwich Township)
- Norwich Township
- Waterbody
- Watercourse

REFERENCE

OBM data provided by the Ontario Ministry of Natural Resources, 2015.

4 2 0 4

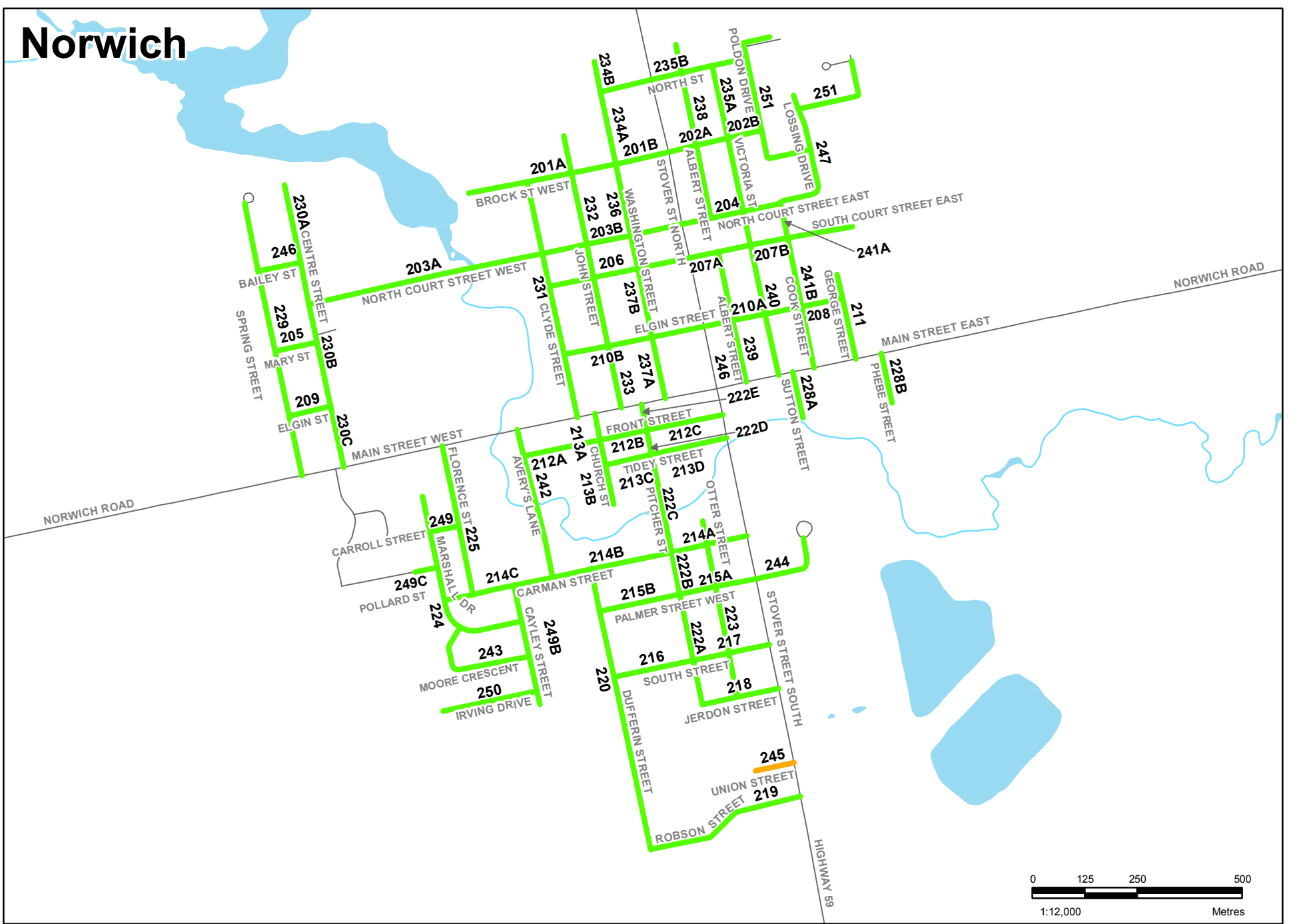
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CLIENT:	NORWICH TOWNSHIP	
PROJECT:	ROAD NEEDS STUDY	
TITLE:	SURFACE TYPE MAP	
	PROJECT NO: PM15-9590	FIGURE:
	Date: Oct. 21, 2015	1
	Checked By: MS	

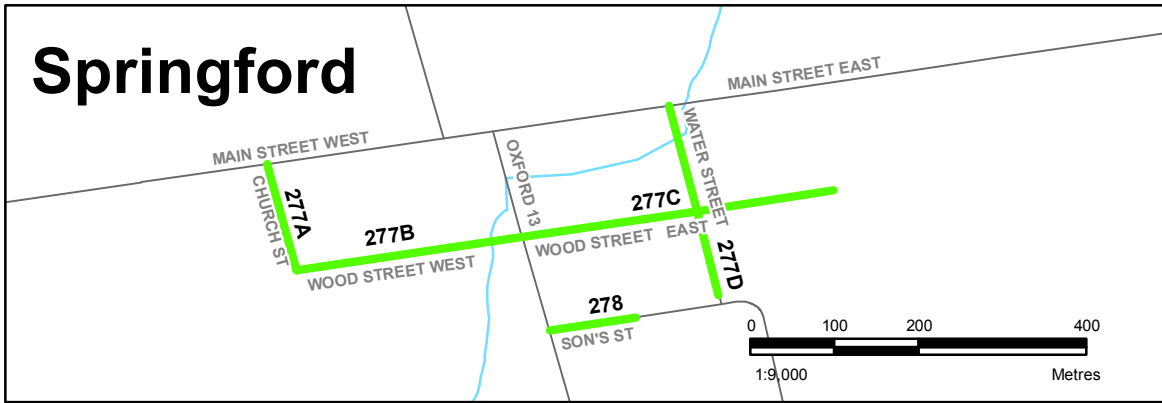
115 Walgreen Rd., RR#3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742

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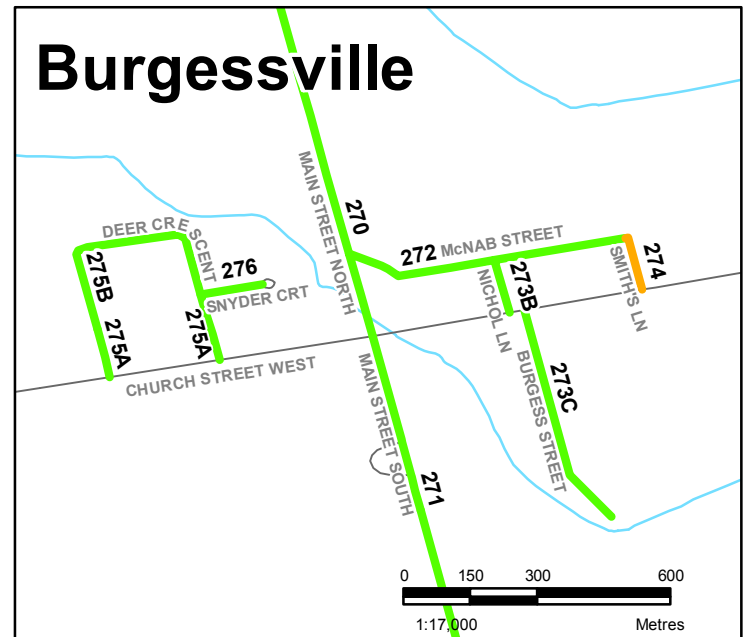
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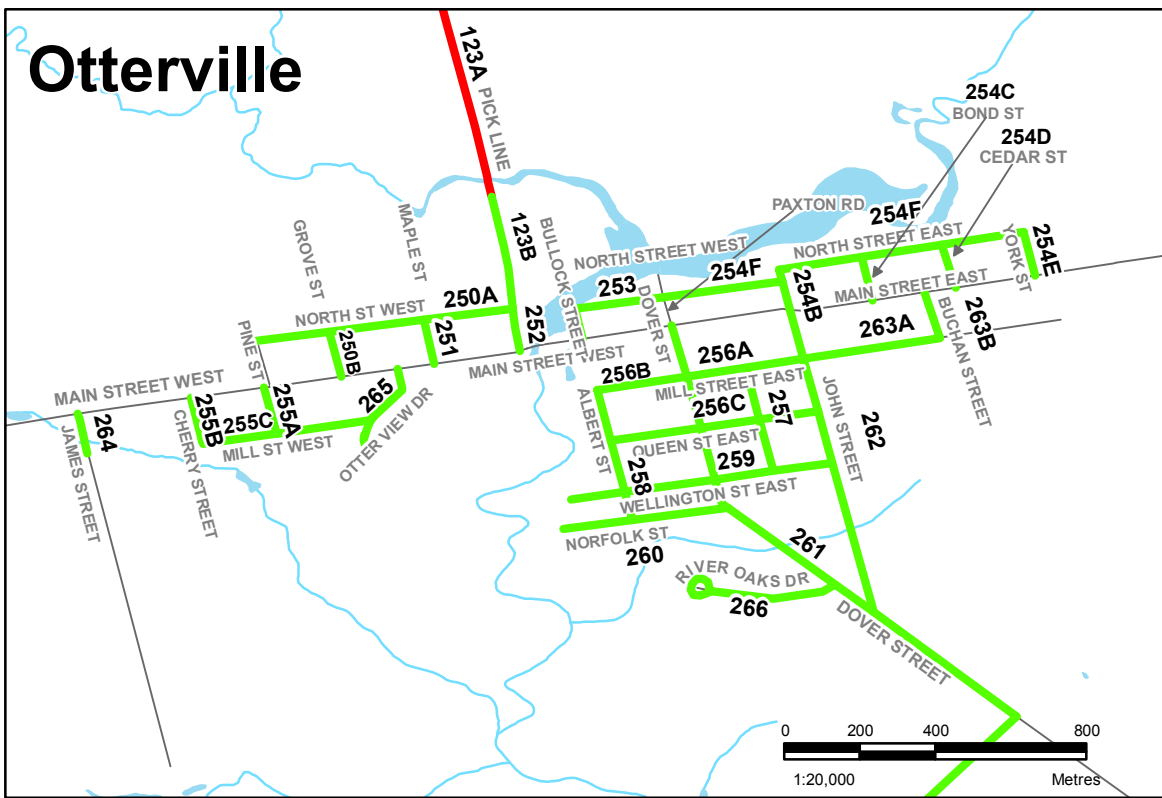
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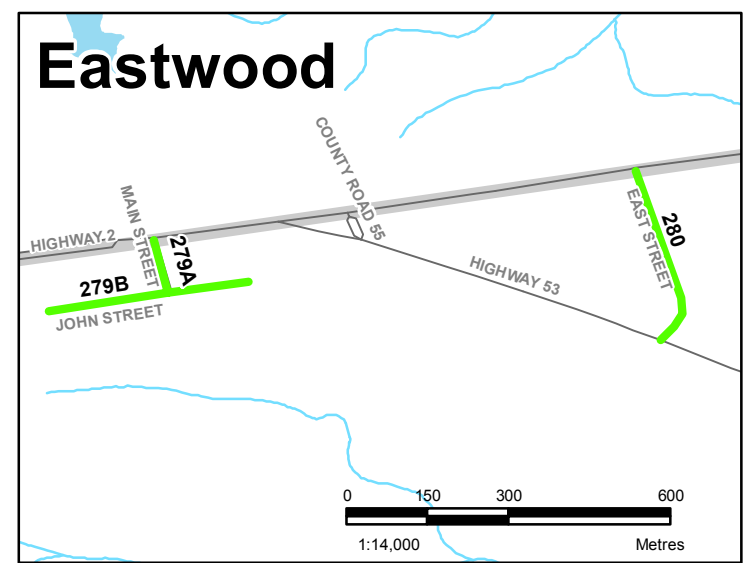
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Otterville



Eastwood



LEGEND

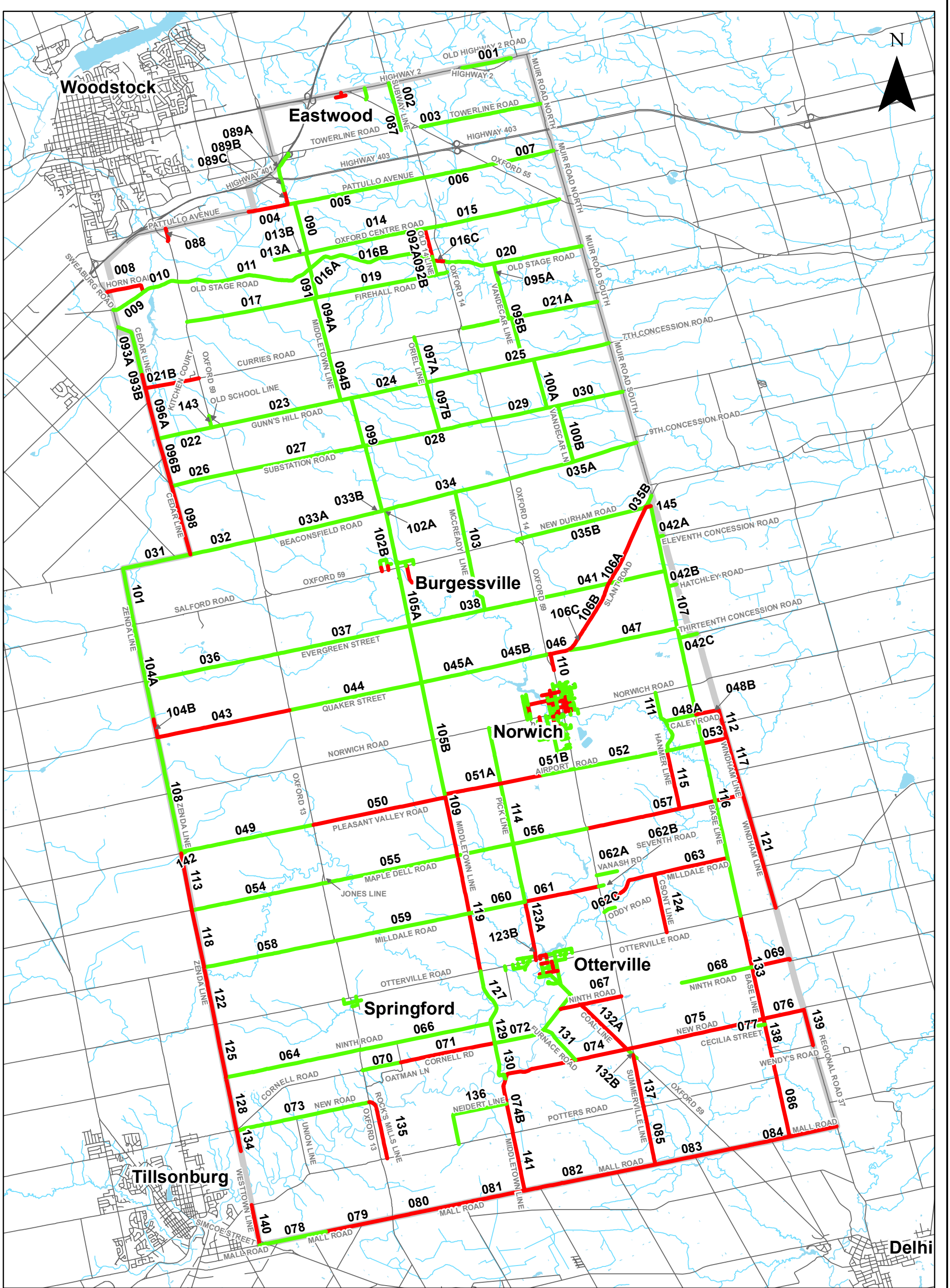
- Gravel (LT)
- Asphalt (HCB)
- Surface Treatment (LCB)
- Road (not maintained by Norwich Township)
- Norwich Township
- Waterbody
- Watercourse

REFERENCE

OBM data provided by the Ontario Ministry of Natural Resources, 2015.



CLIENT:	NORWICH TOWNSHIP	
PROJECT:	ROAD NEEDS STUDY	
TITLE:	SURFACE TYPE MAP	
	PROJECT NO: PM15-9590	FIGURE:
	Date: Oct. 21, 2015	2
	GIS: SK/JD	
Checked By: MS		



- LEGEND**
- Deficient (Condition Rating < 5)
 - Sufficient (Condition Rating >= 5)
 - Road (not maintained by Norwich Township)
 - Norwich Township
 - Waterbody
 - Watercourse

REFERENCE
 OBM data provided by the Ontario Ministry of Natural Resources, 2015.

4 2 0 4

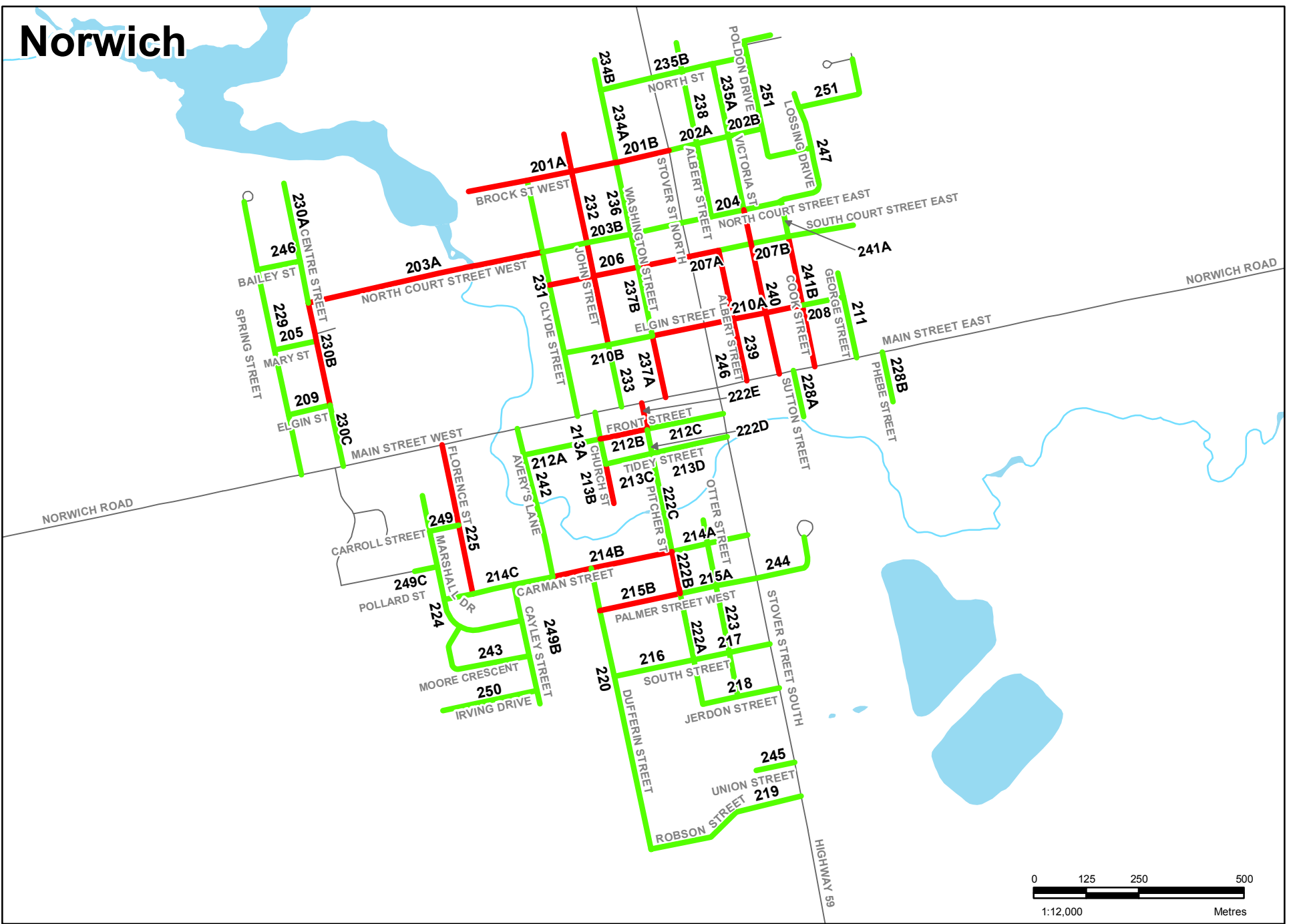
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TITLE:	NOW DEFICIENT ROADS	
	PROJECT NO: PM15-9590	FIGURE:
	Date: Oct. 21, 2015	3
	GIS: SK/JD	
Checked By: MS		

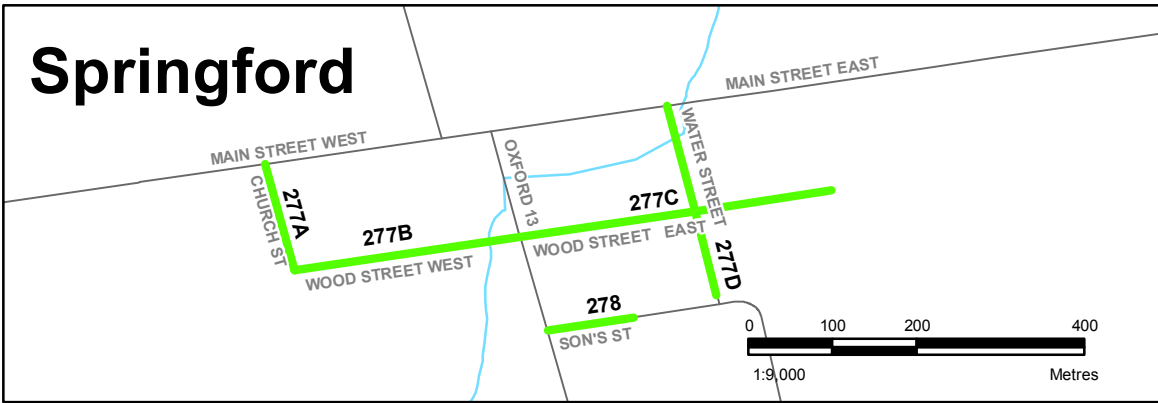
115 Walgreen Rd., RR#3, Carp, ON K0A1L0
 Tel: 613-836-2184 Fax: 613-836-3742

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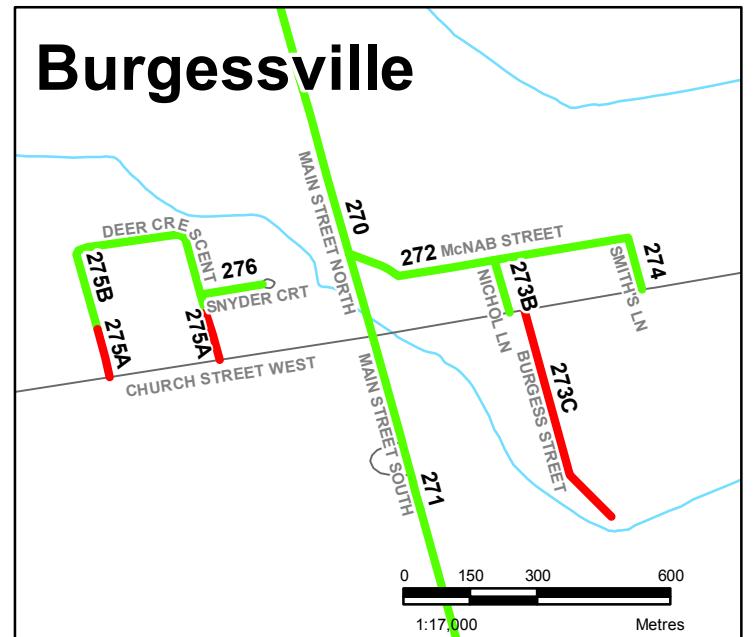
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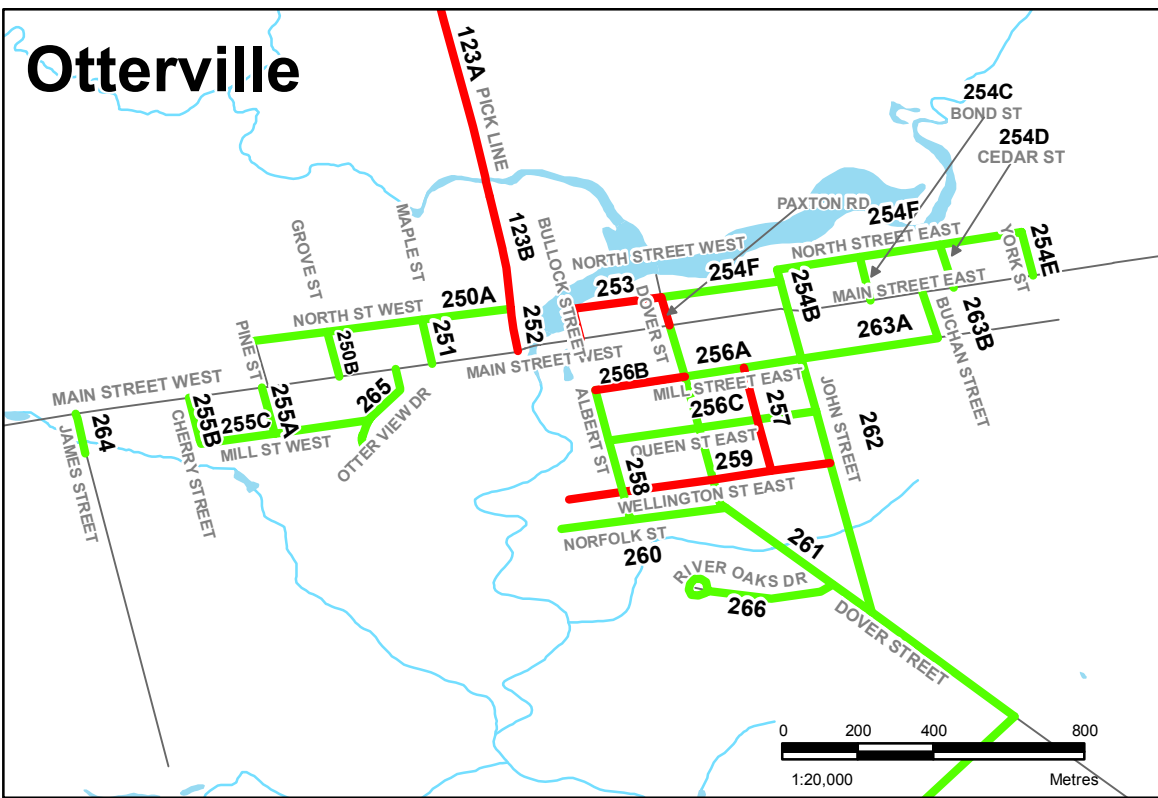
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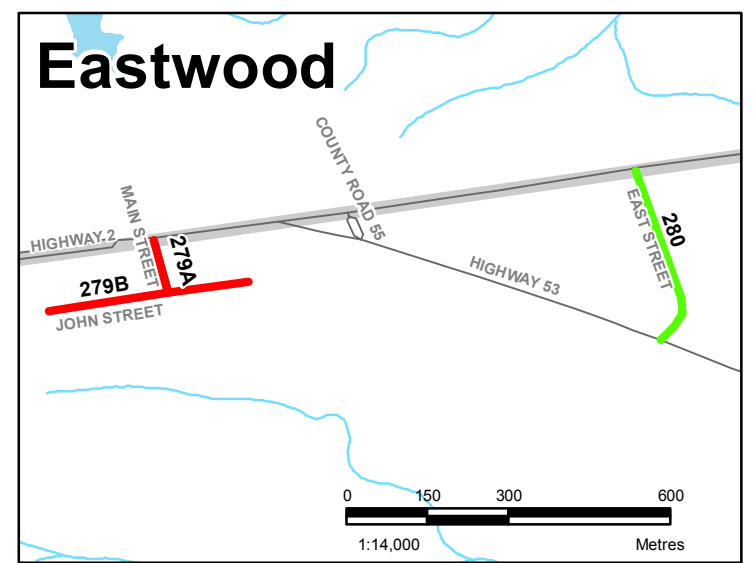
Burgessville



Otterville



Eastwood



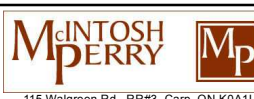
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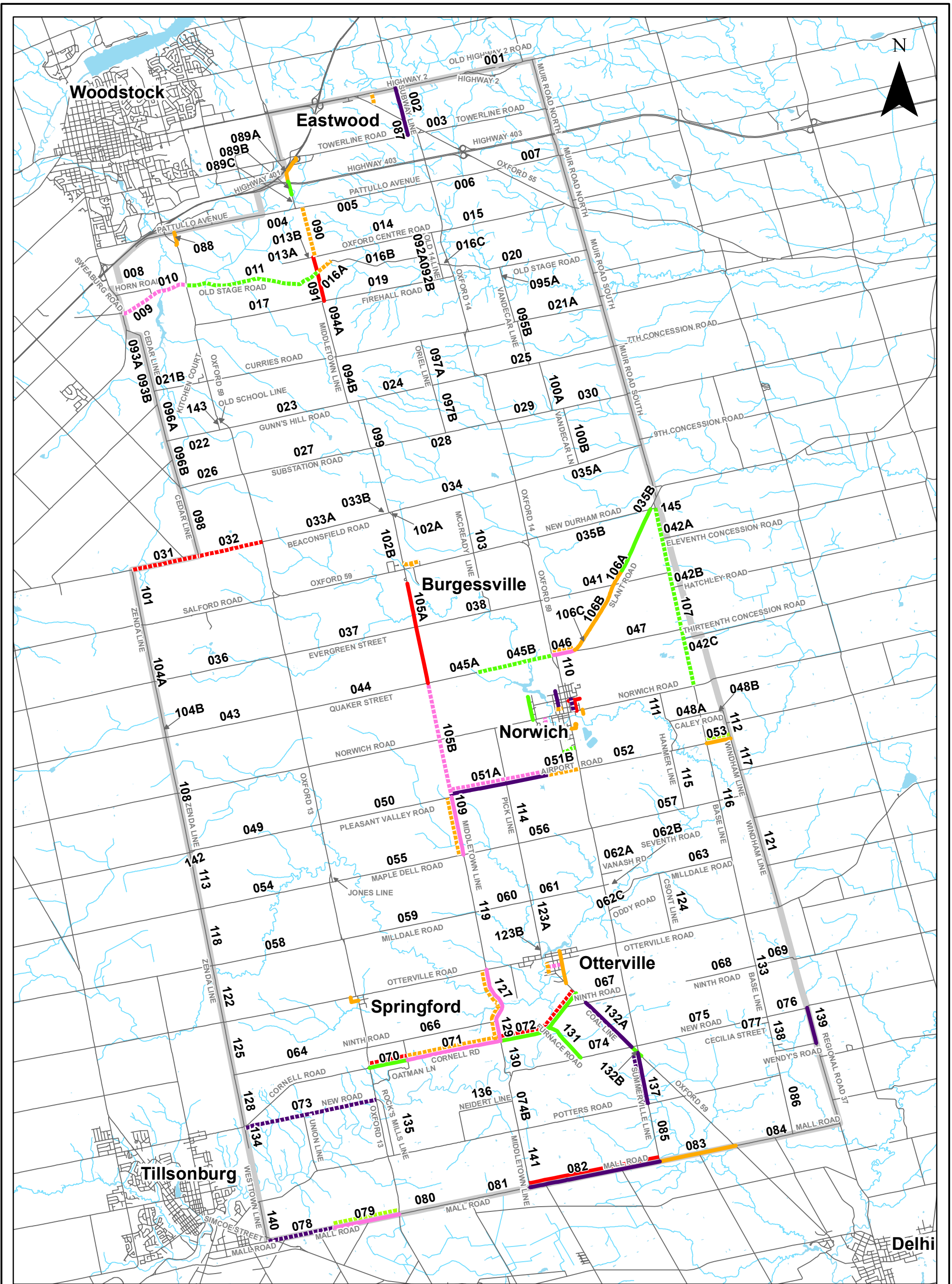
- Deficient (Condition Rating < 5)
- Sufficient (Condition Rating >= 5)
- Road (not maintained by Norwich Township)
- Norwich Township
- Waterbody
- Watercourse



REFERENCE

OBM data provided by the Ontario Ministry of Natural Resources, 2015.

CLIENT:	NORWICH TOWNSHIP		
PROJECT:	ROAD NEEDS STUDY		
TITLE:	NOW DEFICIENT ROADS		
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Checked By:	MS		

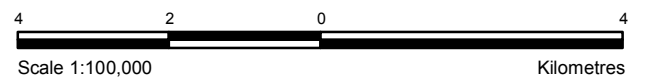


LEGEND

- Year 1 - 2016 — Year 6 - 2021 — Road (not maintained by Norwich Township)
- Year 2 - 2017 — Year 7 - 2022 — Norwich Township
- Year 3 - 2018 — Year 8 - 2023 — Waterbody
- Year 4 - 2019 — Year 9 - 2024 — Watercourse
- Year 5 - 2020 — Year 10 - 2025

REFERENCE

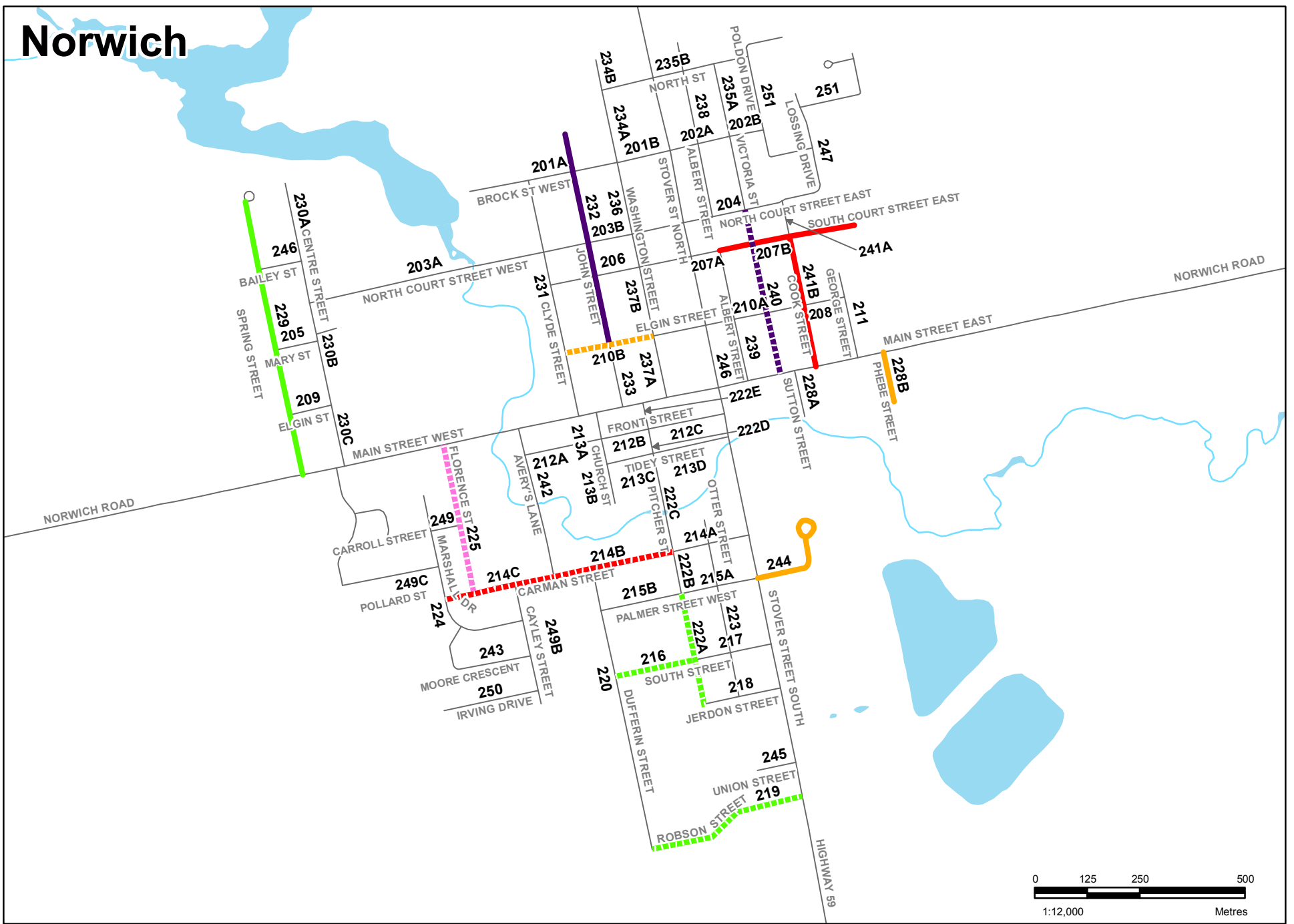
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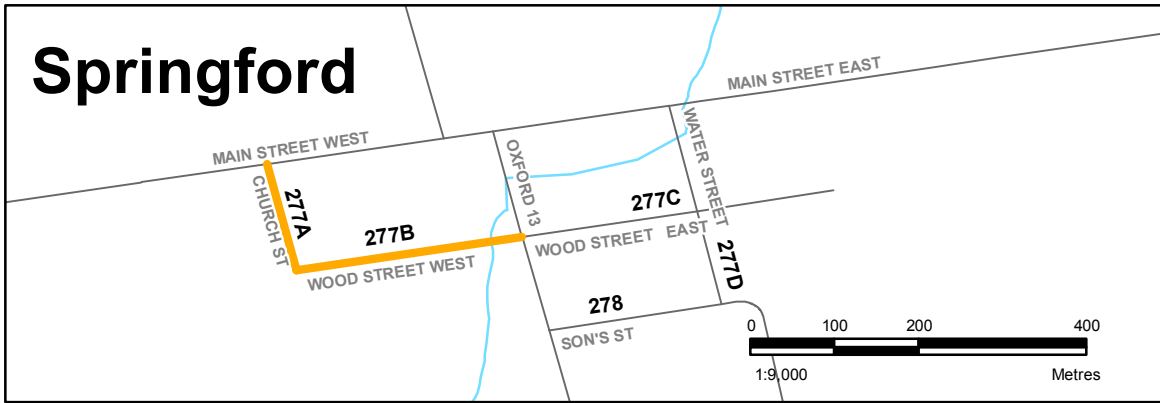
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TITLE:	TEN YEAR PLAN		
	PROJECT NO: PM15-9590	FIGURE:	5
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Checked By	MS		

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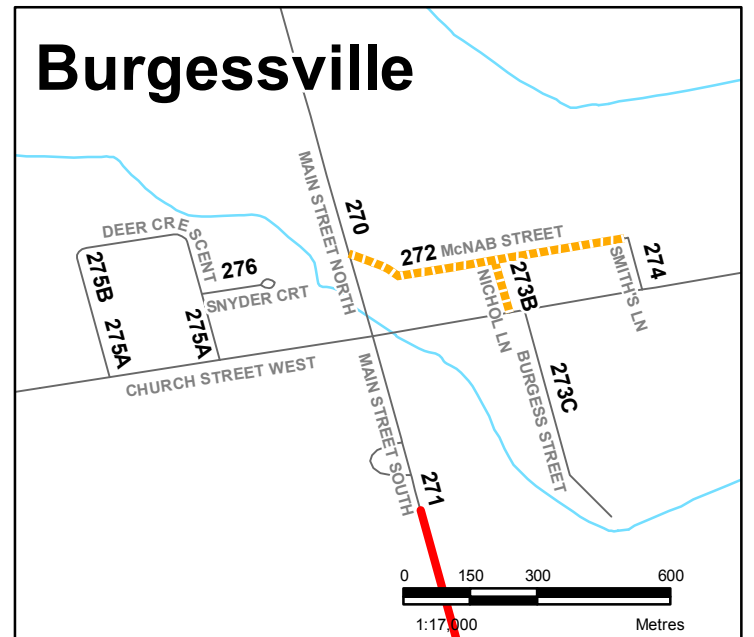
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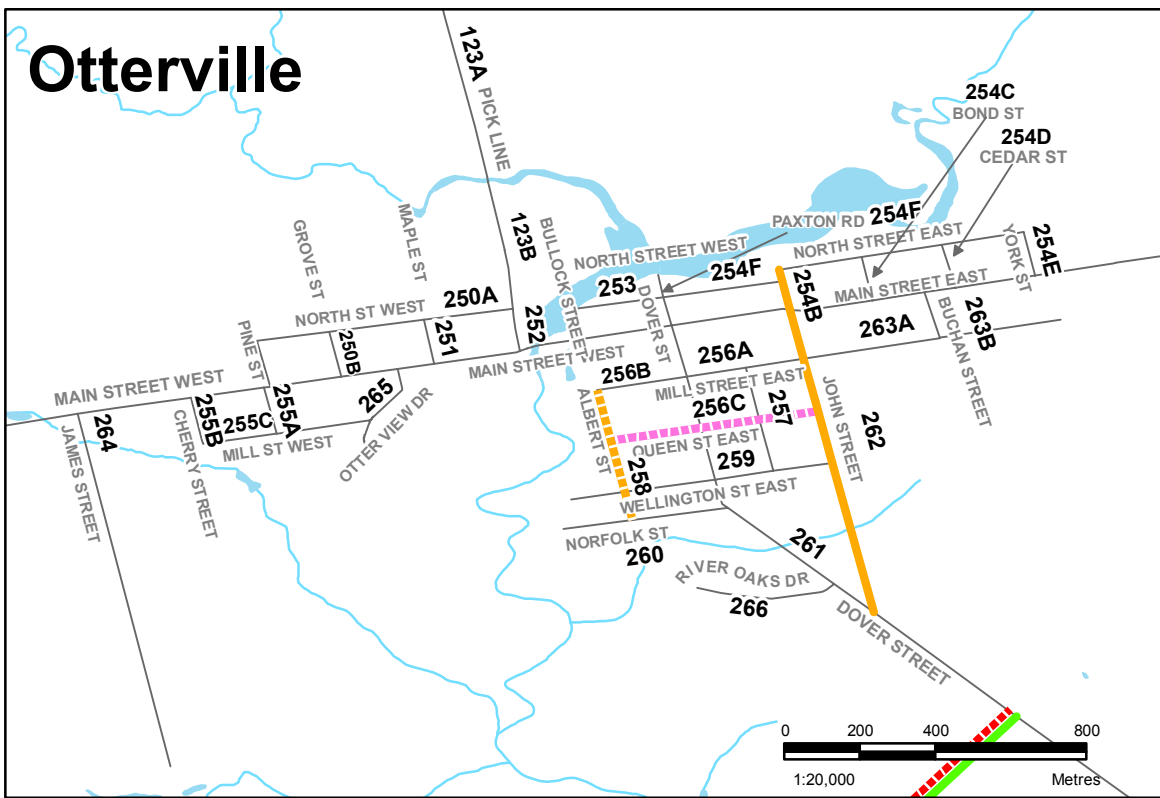
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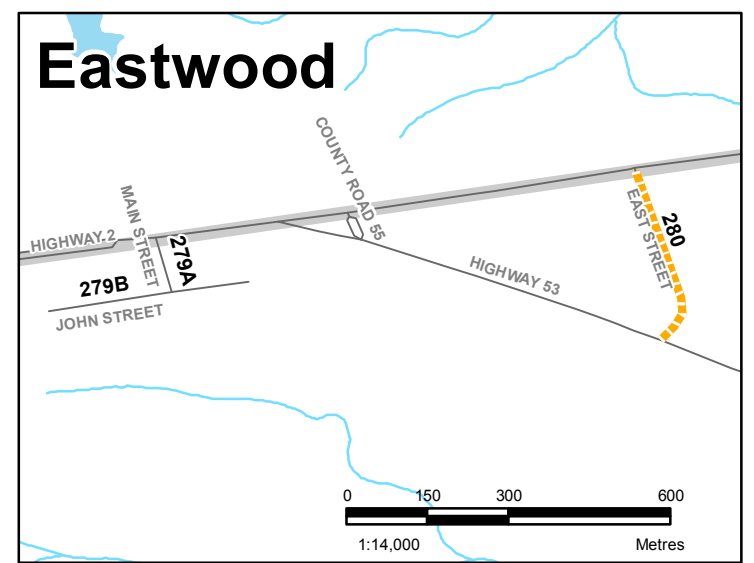
Burgessville



Otterville



Eastwood



LEGEND

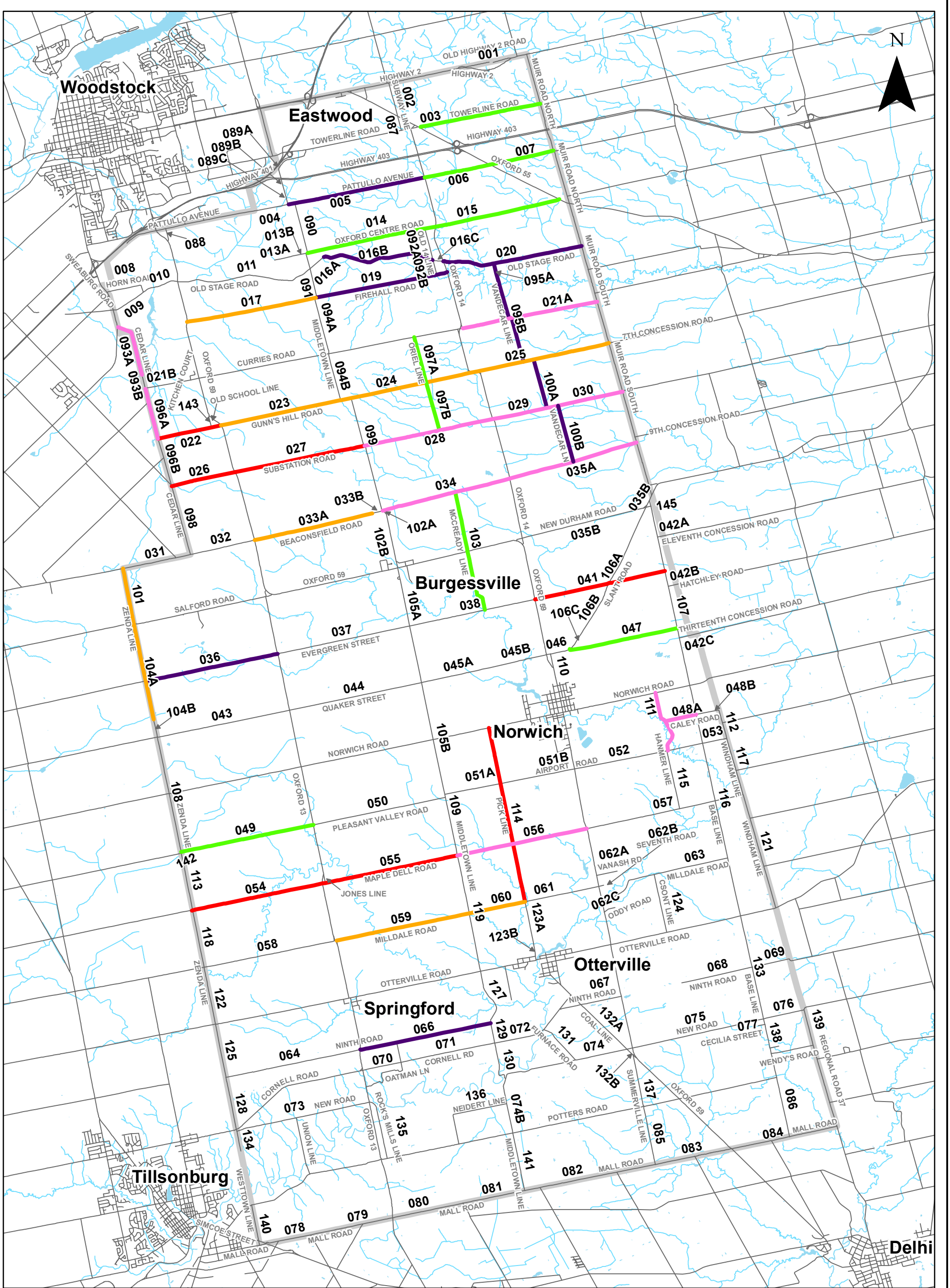
- Year 1 - 2016
- Year 2 - 2017
- Year 3 - 2018
- Year 4 - 2019
- Year 5 - 2020
- - - Year 6 - 2021
- - - Year 7 - 2022
- - - Year 8 - 2023
- - - Year 9 - 2024
- - - Year 10 - 2025
- Road (not maintained by Norwich Township)
- Norwich Township
- Waterbody
- Watercourse



REFERENCE

OBM data provided by the Ontario Ministry of Natural Resources, 2015.

CLIENT:	NORWICH TOWNSHIP	
PROJECT:	ROAD NEEDS STUDY	
TITLE:	TEN YEAR PLAN	
	PROJECT NO: PM15-9590	FIGURE:
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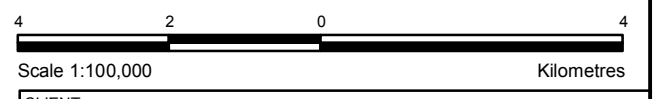


LEGEND

- Year 1 - 2016 & Year 6 - 2021
- Year 2 - 2017 & Year 7 - 2022
- Year 3 - 2018 & Year 8 - 2023
- Year 4 - 2019 & Year 9 - 2024
- Year 5 - 2020 & Year 10 - 2025
- Road (not maintained by Norwich Township)
- Norwich Township
- Waterbody
- Watercourse

REFERENCE

OBM data provided by the Ontario Ministry of Natural Resources, 2015.



CLIENT:	NORWICH TOWNSHIP	
PROJECT:	ROAD NEEDS STUDY	
TITLE:	TEN YEAR PLAN FOR GRAVEL ROADS	
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