



# Asset Management Plan

**Township of Zorra**  
*December 2020*

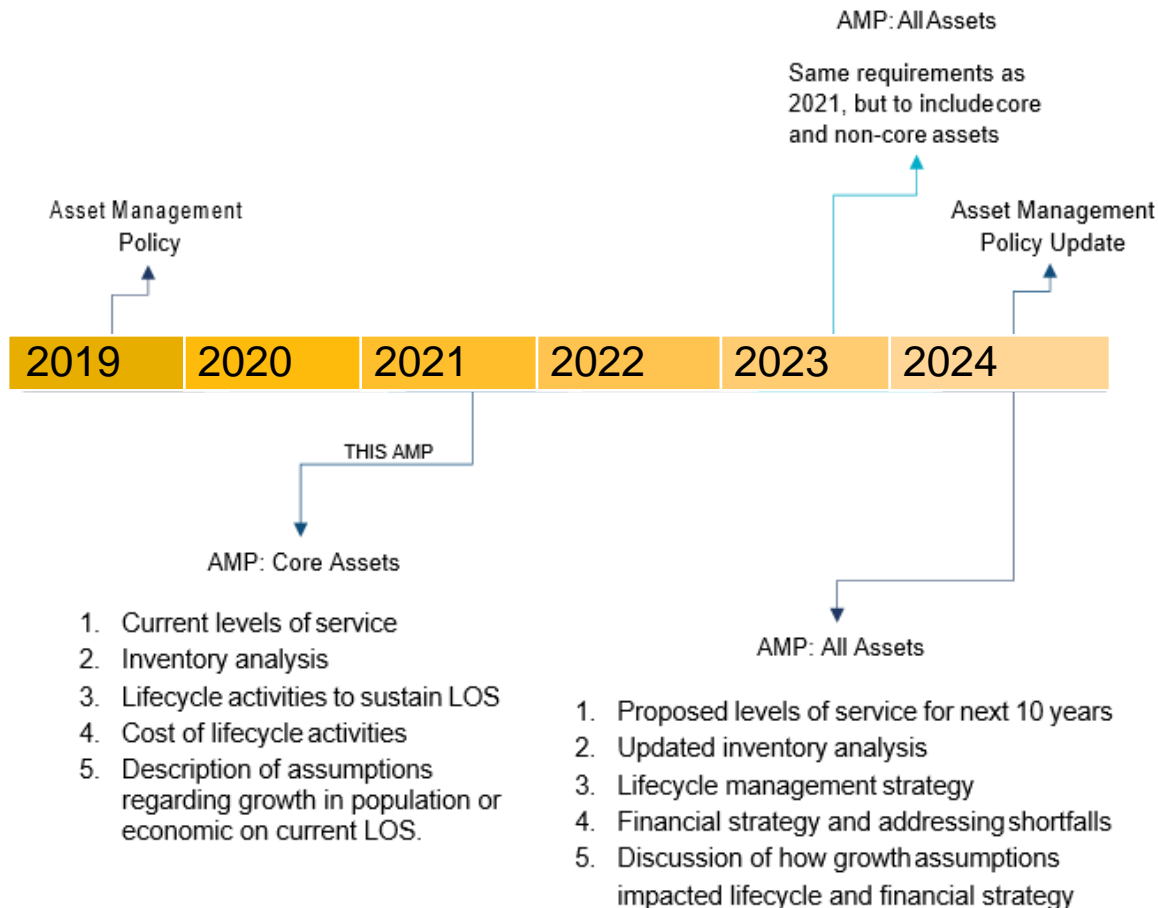


## Precursor

In 2012, the Province of Ontario published “Building Together: Guide for Municipal Asset Management Plans” (AMP) to encourage and support municipalities in Ontario to develop AMP(s) in a consistent manner.

In 2015, Ontario passed the Infrastructure for Jobs and Prosperity Act, which affirmed the role that municipal infrastructure systems play in supporting the vitality of local economics. After a year-long industry review, the Province created Ontario Regulation 588/17 – Asset Management Planning for Municipal Infrastructure under the Infrastructure for Jobs and Prosperity Act. O. Reg. 588/17 further expands on the Building Together guide, mandating specific requirements for municipal Asset Management Polices and Asset Management Plans, phased in over a five-year period.

O. Reg. 588/17 has a phased approach in the development of Strategic Asset Management Policy **and** Municipal Asset Management Plan.



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## Introduction

This Asset Management Plan (AMP) is the second iteration produced through the Township of Zorra's AMP Program. It builds upon the first AMP published in December 2013, following the same overall approach while now also complying with new Provincial regulatory landscape.

This Asset Management Plan (AMP) has been built based on the strategic goals, objectives and direction contained within the Township of Zorra's Policy No. 500-04, Strategic Asset Management Policy.

The 2020 Asset Management Plan for the Township of Zorra has been endorsed by the Chief Administrative Officer (CAO) of the municipality and has been approved by resolution at a meeting held on December 2, 2020.

The Asset Management Planning process will be reviewed on an annual basis in conjunction with the municipal capital budget and long-term capital planning process; starting the year after the Township's AMP is fully complete in accordance with O. Reg, 588/17 July 1, 2024 deadline.

The AMP and Strategic Asset Management Policy can be viewed on the municipal website ([www.zorra.ca](http://www.zorra.ca)) or in person at the municipal office at 274620 27<sup>th</sup> line, Ingersoll Ontario.



## **Benefits of an Asset Management Plan**

A properly prepared and effective Asset Management Plan provides numerous benefits for a municipality:

- ✓ It will allow for better decision making on asset replacement priorities;
- ✓ It will improve capital budget and long-term forecast preparation;
- ✓ It will ensure that critical assets are replaced at the appropriate time;
- ✓ It will ensure better management of risk to the municipality;
- ✓ It will reduce lifecycle costs of assets;
- ✓ It will improve financial planning;
- ✓ It will ensure continued eligibility for infrastructure grant opportunities; and
- ✓ It will assist in maintaining sustainable Levels of Service for the general public.

## Components of an Asset Management Plan

In order for a plan to be considered a complete asset management program, it should include all of the following components:

- a) State of Local Infrastructure;
- b) Current Levels of Service;
- c) Current Performance Levels;
- d) Asset Lifecycle Management Strategy;
- e) Risk Management Strategies;
- f) Funding Strategies

Each of these components will be examined in more detail below.



### **A) State of Local Infrastructure**

For each Asset Category, the State of the Local Infrastructure section includes the following information:

1. A summary of the assets in that category including quantities.
2. An estimated replacement value of the assets.
3. A summary of the average age and an age distribution as a proportion of estimated useful life of the asset.
4. Information available on the condition of the assets in the category.
5. A description of the data sources used to populate the State of Local Infrastructure information, including any relevant condition assessment policies/practices

## B) Current Levels of Service

A level of service (LOS) is a measure of what the municipality is providing to the community and the nature and quality of that service. Within each asset class in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the municipality as worth measuring and evaluating. The municipality measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

**Table 1. Current Levels of Service (Explanatory Table).**

	Community Levels of Service	Technical Levels of Service
Description	Community levels of service provide a simple, plain language description or measure of how the community receives or experiences the services that the municipality provides.	Technical levels of service provide a quantitative measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures.
Core Assets	For <b>core</b> asset categories (Roads, Bridges & Culvert and Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.	For <b>core</b> asset categories (Roads, Bridges & Culverts, and Stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.
Non-core Assets	For <b>non-core</b> asset categories, the Township will develop the qualitative descriptions that will be used to determine the community level of service provided. This will be determined and reported on prior to the July 1, 2023 deadline.	For <b>non-core</b> asset categories, the Township will develop the technical metrics that will be used to determine the technical level of service provided. This will be determined and reported on prior to the July 1, 2023 deadline.



### C) Current Levels of Performance

Currently, the Township of Zorra measures the performance of their core assets based on meeting the standards established by legislative and regulatory requirements. These requirements prevent levels of service from declining below a certain standard. (i.e. Minimum Maintenance Standards for municipal highways).

Developing realistic LOS using meaningful key performance indicators (KPIs) can be instrumental in managing citizens expectations, identifying areas requiring higher investments, driving organizational performance and securing the highest value for money from public assets. The key objective is to develop and track only those KPIs that are relevant and insightful and reflect the priorities of the municipality. The development of well defined KPIs for core and non-core assets will be defined in future updates of the AMP.



## D) Asset Lifecycle Management Strategy

The asset lifecycle management strategy is the set of planned actions that will enable the assets to provide the desired level of service in a sustainable way, while managing risk, at the lowest lifecycle cost. This AMP considers lifecycle activities over the next 10 years to maintain the current levels of service.

These planned actions and/or activities are the range of actions funded through significant operating and capital budget on each of the asset categories. Asset lifecycle activities are generally grouped into the categories as show in Table 2.

**Table 2. Typical Asset Lifecycle Activities**

Lifecycle Activity	Description	Examples
<b>Non-Infrastructure</b>	Actions or policies that can lower costs or extend asset life	Better integrated infrastructure planning and land use planning, demand management, process optimization, managed failures
<b>Maintenance</b>	Servicing assets on a regular basis in order to fully realize the original service potential. Maintenance will not extend the life of an asset or add to its value.	Fixing potholes
<b>Rehabilitation</b>	Significant treatments designed to extend the life of the asset.	Road resurfacing
<b>Replacement</b>	Activities that are expected to occur once an asset has reached the end of its useful life and renewal/ rehabilitation is no longer an option	Vehicles replacement, road reconstruction
<b>Disposal</b>	Activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality	Sale of equipment
<b>Growth/Service Improvement</b>	Planned activities required to extend or expand municipal services to accommodate the demands of growth.	New recreation centre to service new subdivision

## E) Risk Management Strategies

While the timing of asset replacement is generally closely related to an asset's condition assessment, a number of other factors such as financial costs, frequency of use, and criticality to the operations, should be considered when determining when an asset needs to be replaced.

It is also important to recognize the risk associated with the Township's ability to deliver the plan while recognizing that any deviation may affect the overall ability to deliver service. Table 3 below provides a summary of the identified risks, potential impacts and mitigating actions associated with the asset management program.

**Table 3. Summary of Corporate Risks Associated with Asset Management Plans.**

Corporate Risks to the Plan		
Identified Risk	Potential Impact	Mitigating Action
<b>Failed Infrastructure</b>	<ul style="list-style-type: none"> <li>• Delivery of service</li> <li>• Asset and equipment damage</li> </ul>	<ul style="list-style-type: none"> <li>• Repair and rehabilitate as necessary</li> <li>• Increase investment</li> <li>• Non-infrastructure solutions.</li> </ul>
<b>Inadequate funding</b>	<ul style="list-style-type: none"> <li>• Delivery of service</li> <li>• Increased risk of failure</li> <li>• Shorten asset life</li> <li>• Defer funding to future generations</li> </ul>	<ul style="list-style-type: none"> <li>• Reductions of service</li> <li>• Find additional revenue sources</li> </ul>
<b>Regulatory Requirements</b>	<ul style="list-style-type: none"> <li>• Non-compliance</li> <li>• Mandatory investments</li> <li>• Increased costs</li> </ul>	<ul style="list-style-type: none"> <li>• Find additional revenue sources</li> <li>• Lobby actions</li> </ul>
<b>Plan is not followed</b>	<ul style="list-style-type: none"> <li>• Reduced asset life</li> <li>• Inefficient investments</li> <li>• Prioritization process failure</li> <li>• Failure to deliver service</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor and review</li> <li>• Create asset management network</li> <li>• Implement processes</li> </ul>

Risk factors for each asset category will be determined and assigned to either "probability" or "consequence" and then weighted in relation to their importance. Using an algorithm that considers these elements, a risk rating can be calculated for each asset. This risk rating should be then be utilized as a guide to prioritize assets that require attention first and which capital works can be deferred.

$$\text{Risk Rating} = \text{Probability of Failure} \times \text{Consequence of Failure}$$

The risk rating calculation can be visually modelled as a risk matrix as shown below to display where all assets fall in terms of their criticality. The risk matrix is broken into five major risk ratings:

- An overall risk rating of 1-5 for an asset indicates Very Low Risk (Green)
- An overall risk rating of 5-10 for an asset indicates Low Risk (Blue)
- An overall risk rating of 10-15 for an asset indicates Moderate Risk (Yellow)
- An overall risk rating of 15-20 for an asset indicates High Risk (Orange)
- An overall risk rating of 20-25 for an asset indicates Very High Risk (Red)

**Table 4. Sample Risk Rating Calculation Matrix.**

		2	3	4	5
5	0 Assets \$0	0 Assets \$0	2 Assets \$7,642,537	0 Assets \$0	1 Asset \$1,011
4	2 Assets \$2,156,188	2 Assets \$1,450,568	0 Assets \$0	1 Asset \$0	0 Assets \$0
3	16 Assets \$5,219,342	30 Assets \$11,005,566	8 Assets \$2,833,009	1 Asset \$26,038	2 Assets \$12,544
2	29 Assets \$6,440,582	28 Assets \$26,580,070	1 Asset \$22,165	4 Assets \$555,383	7 Assets \$2,257,100
1	35 Assets \$27,000,484	1 Asset \$59,000,060	33 Assets \$6,375,227	20 Assets \$1,321,520	39 Assets \$915,765
		2	3	4	5
		Probability			

The risk rating criteria or metrics that the Township will be utilizing are identified and weighted in the tables on the following page and are subject to change and refinement if new data points are collected against the infrastructure assets.



**Risk Rating:**

**Table 5. Probability of Failure**

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Consequence of Failure Score
All	Condition <sup>1</sup>	100%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5

**Table 6. Consequence of Failure**

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Consequence of Failure Score
Road Network (Paved Roads)	Criticality Rating	10%	Asset Class	1-5
	Traffic Count (AADT)	60%	2500 +	5
			2000-2499	4
			1000-1999	3
			500-999	2
			1-499	1
	Replacement Cost	30%	\$1,000,000 and above	5
			\$750,000 - \$999,999	4
			\$500,000 - \$749,999	3
			\$250,000 - \$499,999	2
\$249,999 and below			1	
Bridges and Culverts	Criticality Rating	10%	Asset Class	1-5
	Traffic Count (AADT)	60%	2500 +	5
			2000-2499	4
			1000-1999	3
			500-999	2
			1-499	1
	Replacement Cost	30%	\$1,000,000 and above	5
			\$750,000 - \$999,999	4
			\$500,000 - \$749,999	3
			\$250,000 - \$499,999	2
\$249,999 and below			1	

<sup>1</sup> Where assessed condition is not available, age-based condition will be used.

## F) Growth and Demand

Growth is a critical infrastructure demand driver for most infrastructure services. As growth-related assets are constructed or acquired, they should be integrated into the Township's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.



The Township completed a Development Charges Background Study with Watson & Associates Economists Ltd in 2019. This study included a residential and non-residential growth forecast over a 20-year planning period. As illustrated in the Table 7 on the next page, the Township's population is anticipated to reach approximately 8,849 by 2029 and 9,525 by 2041, resulting in an increase of approximately 490 persons and 1,170 persons, respectively, over the 10-year and longer-term forecast periods.

Population changes will require the Township to determine the impact to expected levels of service and if any changes to the existing asset inventory may be required.

**Table 7. Township of Zorra Residential Growth Forecast Summary.**

Year		Excluding Census Undercount				Housing Units						Person Per Unit (P.P.U.): Total Population/ Total Households
		Population (Including Census Undercount) <sup>1</sup>	Population	Institutional Population	Population Excluding Institutional Population	Singles & Semi- Detached	Multiple Dwellings <sup>2</sup>	Apartments <sup>3</sup>	Other	Total Households	Equivalent Institutional Households	
Historical	1	8,350	8,125	105	8,020	2,730	35	80	35	2,880	95	2.821
		8,280	8,058	23	8,035	2,760	20	80	81	2,941	21	2.740
		8,360	8,138	23	8,115	2,855	25	95	100	3,075	21	2.647
Forecast	Mid 2019	8,580	8,356	23	8,333	2,939	31	101	100	3,171	21	2.635
	Mid 2024	8,850	8,618	33	8,585	3,043	35	111	100	3,289	30	2.620
	Mid 2029	9,090	8,849	40	8,809	3,123	41	127	100	3,391	37	2.610
	Mid 2031	9,210	8,962	44	8,918	3,164	44	137	100	3,445	40	2.601
	Mid 2041	9,790	9,525	66	9,459	3,308	45	170	100	3,623	60	2.629
Incremental	Mid 2006 – Mid 2011	-70	-67	-82	15	30	-15	0	46	61	-74	
	Mid 2011 – Mid 2016	80	80	0	80	95	5	15	19	134	0	
	Mid 2016 – Mid 2019	220	218	0	218	84	6	6	0	96	0	
	Mid 2019 – Mid 2024	270	262	10	252	104	4	10	0	118	9	
	Mid 2019 - Mid 2029	510	493	17	476	184	10	26	0	220	16	
	Mid 2019 - Mid 2031	630	606	21	585	225	13	36	0	274	19	
	Mid 2019 - Mid 2041	1,210	1,169	43	1,126	369	14	69	0	452	39	

Source: Derived from County of Oxford - Phase One Comprehensive Review, Population, Housing and Employment Forecasts and Area Municipal Growth Allocations (Updated), January, 2019, by Watson & Associates Economists Ltd., 2019.

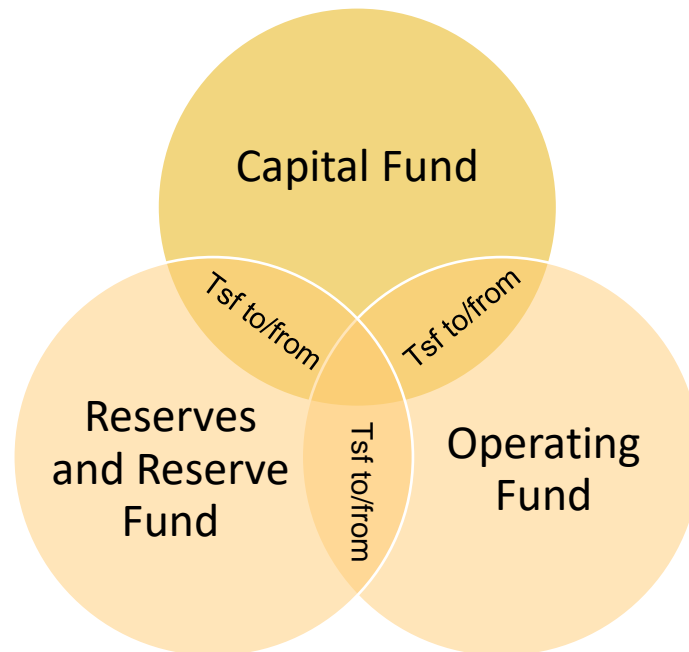
<sup>1</sup> Census undercount estimated at approximately 2.7%. Note: Population including the undercount has been rounded.

<sup>2</sup> Includes townhouses and apartments in duplexes.

<sup>3</sup> Includes bachelor, 1-bedroom and 2-bedroom+ apartments.

## G) Financing Strategies

A financial plan is a critical component of the AMP and brings the plan into action. A sound financial plan demonstrates that the Township has integrated the asset management plan with the financial planning and long-term budgeting and that it has utilized all available funding tools. The diagram below illustrates how the different funds work together to help achieve the optimum funding strategy.



There are numerous sources of financing that can be utilized to fund the Township's Asset Management Plan. The major sources are tax revenues, reserves, debt financing, user fees, development charges, and capital grants from the Provincial and Federal Governments.

Each asset class will have its own characteristics, which often dictate the type of financing that best lends itself to funding its replacement program.

The majority of asset classes will see a combination of tax revenue and reserve strategies utilized as the preferred financing methodology.

Debt financing is best utilized for assets with a longer useful life such as buildings or bridges, so that payments can be spread over the life of the asset; but this type of financing can only be used sparingly, as it will start to have adverse effects on annual budget requirements if over-used.



In the event that the AMP identifies funding shortfalls in any of the asset categories, the Building Together Guide and specifically Ontario Regulation 588/17 requires by July 1, 2024 the AMP indicates the impacts of the shortfall and how the impact will be managed are to be included in the plan. The action plan may include any of the following approaches:

1. Reduce levels of service which will effectively reduce the funding requirement; and
2. Employ asset management and financial strategies, such as:
  - a. Use of debt; and
  - b. Increase or introduce user fees.

When evaluating asset funding requirements and shortfalls, it is important to consider intergenerational equity which refers to the fairness between generations. From an asset perspective, this speaks to who should pay for the assets that have long term benefits. For assets such as fleet and equipment with short useful lives, 10 years or less, the current generation receives the full benefit of the asset and should be responsible for the asset's financing. For assets with longer lives, multiple generations will receive the benefit and establishing fairness for the asset financing is more difficult.

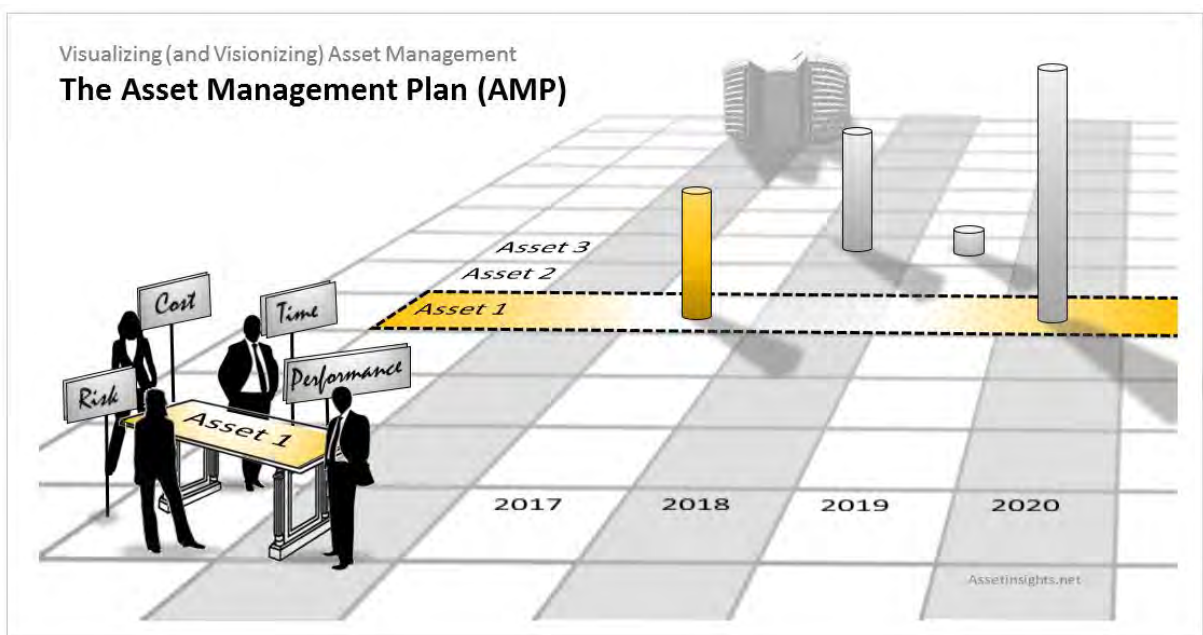
### Annual Requirement

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs. For core asset categories the annual requirement will be calculated based on total replacement costs at the end of their service life based on 2019 dollars.



## Asset Management Plan by Asset Category

- A) Bridge and Culverts;
- B) Paved and Unpaved Roads; and
- C) Stormwater Management Systems.



## A) Bridges and Culverts

### Core Asset



	ASSET	BRIDGE AND CULVERTS															
State of Local Infrastructure	Inventory	Total of 69 structures of which 42 are considered bridges and 27 are culverts.															
	Integrated Assets	Roads, Storm Sewers, Sidewalks															
	Total \$'s to Replace Entire Asset Category	<p><b>\$85,293,000.</b></p> <p><i>The replacement cost was developed in conjunction with the 2019 Biennial Municipal Structure Inspections Report prepared by Keystone Bridge Management Corp.</i></p>															
	Average Age of Assets in Category	<p>54.2 years old</p> <p><i>Three structures have been replaced in the past 20 years. A cohort of 34 structures are between 50 and 60 years. There are 15 structures that are more than 60 years old. The oldest structure is 110 years old.</i></p>															
	Current Condition of Assets	<p>A total of 82.6% of the inspected structures have a Bridge Condition Index (BCI) greater than 70.</p> <p>Total number of Structures: 69</p> <table border="1"> <thead> <tr> <th>BCI Value</th> <th>Rating</th> <th># of Structures</th> </tr> </thead> <tbody> <tr> <td>85-100</td> <td>Excellent</td> <td>1</td> </tr> <tr> <td>70-85</td> <td>Good</td> <td>56</td> </tr> <tr> <td>50-69</td> <td>Fair</td> <td>12</td> </tr> <tr> <td>Below 50</td> <td>Poor</td> <td>0</td> </tr> </tbody> </table>	BCI Value	Rating	# of Structures	85-100	Excellent	1	70-85	Good	56	50-69	Fair	12	Below 50	Poor	0
	BCI Value	Rating	# of Structures														
85-100	Excellent	1															
70-85	Good	56															
50-69	Fair	12															
Below 50	Poor	0															
Description of Data Sources	<p>The condition of all 69 structures in this class were assessed in 2019 as mandated by provincial statute in Ontario requiring biennial inspection of bridges and culverts with a span equal to or exceeding 3.0 metres.</p> <p>Individual condition assessments for each structure are show in Appendix A1 as assessed by Keystone Bridge Management Corp.</p> <p>The calculation of BCI requires inspection following the OSIM Excellent-Good-Fair-Poor (EGFP) rating system.</p>																
Current Level of Services	Community	<p><u>Scope:</u> Description of traffic that is supported by municipal bridges.</p> <p>Heavy transport, farm, emergency and motor vehicles are supported. As well as cyclists and pedestrians.</p> <p>See Appendix A2 for Map showing locations of the Bridge/Culvert Structures in the Township.</p>															
		<p><u>Quality:</u> Description or images of condition of bridges and culverts and how this would affect use of these structures.</p> <p>See Appendix A3 for images.</p>															
	Technical	<p><u>Scope:</u> Percentage of bridges in the municipality with loading or dimensional restrictions.</p> <p>The Township has only one Bridge structure Bridge Site Id 0580 on Domtar Line that has loading limit of 10 ton. Bridge has very limited traffic and will not be economical to replace.</p>															



		<p><u>Quality</u>: the average BCI for bridges and culverts in the Township is 72.2.</p> <p><i>Data source "2019 Biennial Municipal Inspections Report" prepared by Keystone Bridge Management Corp.</i></p>
<b>Performance Level</b>	<b>Current Performance</b>	<p>Ontario Regulation 104/97 as amended specifies the requirements for a biennial Bridge Needs Study and Ontario Regulation 239/02 specifies the Maintenance standards for Bridge Decks. The detailed biennial Bridge Inspection Report details the performance of the structures within the Township.</p> <p>Zorra is 2.6% ahead of the MTO's goal of maintaining at least 80% of its structures with a BCI greater than or equal to 70.</p>
<b>Asset Lifecycle Activities</b>	<b>Planned Actions On-going Maintenance</b>	<p>A grand total of \$8,144,000 is the projected capital need from the present to 2034. There are 38 capital projects identified over the 15-year planning period. Three bridges and one culvert are recommended for replacement. Nineteen bridges require deck rehabilitation. Most of these bridges will require a concrete overlay on their decks.</p> <p>Common maintenance needs are identified as:</p> <ul style="list-style-type: none"> <li>• Brushing out trees</li> <li>• Cleaning bridge surfaces</li> <li>• Remove debris</li> </ul> <p>The average annual capital need over 15 years is \$543,000</p> <p><i>The "Capital Needs Report" was developed in conjunction with the 2019 Biennial Municipal Structure Inspections Report prepared by Keystone Bridge Management Corp.</i></p>
<b>Risk Management Strategies</b>	<b>Risk = Probability x Consequence</b>	<p><b>Risk Factors:</b> Current conditional assessment (<i>probability</i>), Traffic Count (AADT) (<i>consequence</i>), Replacement Cost (<i>consequence</i>), Criticality (<i>consequence</i>).</p> <p><b>Result:</b> Average Risk rating for Bridge and Culverts is: 6.2 (Low) See Appendix A4 for Risk Matrix for this category.</p>
<b>Financial Strategies</b>	<b>Replacement and Funding Strategies</b>	<p>The "Biennial Municipal Structure Inspections" will be updated every 2 years and will be used as a document of principles and guidelines that will serve the Township in future road needs decisions. The report provides recommendations and prioritization for planned capital improvements based on condition ratings and demands on each structure.</p> <p>Annual Federal Gas Tax funding and MNR Aggregate Royalties will be used to supplement the tax revenue/reserve strategy. Every year the 5-year capital budget will be reviewed to determine the recommended capital tax levy dollars required to fund the recommended improvements.</p>
	<b>Annual Requirement \$ To Fund Replacement Program</b>	<b>\$1,481,400.00</b>

## Appendix A1 - Township of Zorra Bridges/Culverts Capital Needs Plan

Structure ID	Name	Route	Preliminary Improvement Type Recommendation	Length	Width	Year	Bridge Condition Index (BCI)
<b>1- 5 Year Needs</b>							
0470	Thames Middle Br.	Road 74	Misc Concrete Repairs, WP&P, Guide Rail	53.4	10.4	1965	72.3
0485	Culvert	Cobble Hills Road	Replace by Others	4.3	12.8	1970	60.5
0520	Rigid Frame Culvert	23rd Line Road	Overlay & Waterproofing	18	4.3	1950	66.5
0160	Bridge Culvert	31st Line Road	O'Lay, B/Wall, Guide Rail	7.4	7.3	1950	69.8
0260	Bridge Culvert	29 Line Road	Misc Concrete Repairs, O'Lay, WP&P, B/Wall, Misc Repair	6.9	9.3	1956	68.1
0540	Thames R. Mid. Br.	Road 64	Misc Concrete Repairs, O'Lay, WP&P, B/Wall, X-Jnt, Brgs, Guide Rail, Deck Drains	41.1	9.1	1973	70.2
0640	John N. Meathrell Bridge	25th Line Road	O'Lay, WP&P, X-Jnt, Brgs, Guide Rail, Drains	54.6	10	1970	70.2
0020	Trout Creek Bridge	Perth-Oxford Road	Misc Concrete Repairs, O'Lay, B/Wall, Guide Rail	15.1	8.5	1965	74.2
0120	Wildwood Lake Bridge West	29th Line Road	O'Lay, X-Jnt	45.2	10.5	1965	72.3
0130	Wildwood Lake Bridge East	31st Line Road	O'Lay, X-Jnt	45.2	10.5	1965	70.2
0280	Waffle Slab Bridge	Zorra-Tavistock Line	Misc Concrete Repairs, X-Jnt	19.5	10.4	1965	67.6
0330	Concrete Rigid Frame	Road 78	O'Lay, WP&P, B/Wall, Deck Drains	22.5	10.4	1960	72.6
0060	Rigid Frame Culvert	Cobble Hills Road	Guide Rail	16.5	7.8	1960	71.3
0070	Rigid Frame Bridge	Cobble Hills Road	Misc Concrete Repairs, Deck Drains, Rip Rap	19.7	9	1950	73.1
0180	Concrete Rigid Frame	Road 92 (Cassel Side Rd.)	O'Lay	13.3	10.2	1960	71.3
0220	Concrete Slab Culvert	13th Line Road	Waterproof, Footing Repair	16.2	6.1	1960	70.9
0230	Rigid Frame Bridge	Road 88 (Oliver Dr.)	Misc Concrete Repairs, O'Lay, WP&P, Guide Rail	19.8	9.3	1950	72.1
0320	Concrete Rigid Frame	23rd Line Road	Misc Concrete Repairs, O'Lay, Guide Rail, Bank Stabilization Re & Re Wing Walls	20.8	10.3	1960	69.5
0380	Thames R. Mid. Br. 7	27th Line Road	Misc Concrete Repairs, O'Lay, X-Jnt, Guide Rail	39.4	9.2	1970	73.3
0400	Thames R. Mid. Br. 5	31st Line Road	X-Jnt, Deck Drains	27.1	9.8	1960	73.8
0200	Rigid Frame Bridge	43rd Line Road	O'Lay, B/Wall, Guide Rail	7.3	8.6	1958	74.7
0210	Rigid Frame Bridge	45th Line Road	Misc Concrete Repairs, O'Lay, B/Wall, Guide Rail	8.2	7.9	1950	71.5
0250	North Branch Creek Bridge	Road 84 (Braemar side Rd)	Misc Concrete Repairs, WP&P, Guide Rail, Deck Drain, Curb Rep	24.7	9.9	1960	73.3
0340	Concrete Slab Culvert	Road 78	Bridging Slab	24.2	4.4	1950	66.5
0345	Rigid Frame Culvert	35th Line Road	Guide rail	15.8	4.3	1970	73.2
0450	Concrete Rigid Frame Culvert	Road 74 (Evlyn Dr.)	Guide rail	18.1	4	1963	75.0
0270	Concrete Ridge Fram	45th Line road	Guide Rail	23.5	8.9	1978	74.7
0360	Rigid Frame Bridge	Cobble Hills Road	O'Lay, WP&P, B/Wall	18.4	10.5	1960	74.3
0420	Thames R. Mid. Br. 3	35th Line Road	X-Jnt, Guide Rai	35.9	10.3	1967	73.6
<b>6-15 Year Needs</b>							
0140	Trout Creek Bridge	33rd Line Road	O'Lay, B/Wall, Guide Rail	27.2	8.9	1970	72.6
0440	Thames R. Mid. Br. 1	43rd Line	WP&P, X-Jnt, Guide Rail	33	10.1	1970	62.3
0370	Thames R. Mid. Br. 8	25th Line	X-Jnt, Guide Rail	53.4	10.4	1980	74.2
0410	Thames R. Mid. Br. 4	33rd Line	Misc Concrete Repairs, Brgs, Guide Rail	34.1	9.2	1974	71.8
0600	Bridge Culvert	Road 82	Replace	3	8.2	1950	71.6
0240	Concrete Rigid Fram	Cobble Hills Road	Misc Concrete Repairs, B/Wall	21.6	9.3	1958	73.1
0110	Bridge Culvert	15th Line Road	Replace	5.7	9.3	1960	68.8
0100	Bridge Culvert	Road 96 Allen St	Replace	3.4	9	1960	67.0

Structure ID	Name	Route	Preliminary Improvement Type Recommendation	Length	Width	Year	Bridge Condition Index (BCI)
<b>15+ Year Needs</b>							
0010	Concrete Rigid Frame Bridge	Perth-Oxford Road		24.5	9.7	1965	75.3
0030	Concrete Culvert	Perth-Oxford Road		12.2	4.3	1950	70.9
0040	Bridge Culvert	Zorra-Tavistock Line	Guide Rail in 2019	13.6	9.8	1960	74.6
0050	Slab on Wall Culvert	15th Line Road		14	3.7	1963	72.2
0080	Rigid Frame Culvert	13th Line Road		20	5.3	1960	70.7
0090	Rigid Frame Culvert	13th Line Road		15	6.1	1960	71.7
0150	Rigid Frame Culvert	33rd Line Road		18.3	4.9	1972	72.4
0170	Rigid Frame Culvert	15th Line Road		17.7	5.6	1960	72.4
0190	CSP- Soil-Steel Pipe	Road 92 (Caseel Side Road)		19.7	1.8	1990	70.1
0290	Concrete Rigid Frame Culvert	Road 78		15.3	6.1	1950	71.5
0300	Concrete Slab Culvert	23rd Line Road		17.1	3.7	1960	74.8
0310	Slab on Concrete Beam	Road 78		28.2	9.5	2008	85.9
0350	Rowland Rutherford Bridge	Road 80		36.3	9.2	1975	75.4
0390	Thames R. Mid. Br. 6	29th Line Road		40.5	9.5	2003	79.3
0430	Thames R. Mid. Br. 2	41st Line Road		33.1	9.1	1965	76.5
0460	Concrete Rigid Frame Culvert	Road 74		18.5	4.6	1960	74.7
0480	Bridge Culvert	Cobble Hills Road		6.5	8.3	1960	74.5
0490	Rigid Frame Concrete Culvert	15th Line Road		15.6	5.5	1960	74.6
0500	Concrete Rigid Frame Culvert	15th Line Road		17.7	5.3	1960	74.8
0510	Rigid Frame Culvert	15th Line Road		17.6	6.2	1960	73.1
0530	Railroad Subway	23rd Line Road		15	6.2	1909	70.9
0550	CSP-Soil-Steel Pipe	21st Line Road		19.1	2.4	2000	69.7
0560	Concrete Rigid Frame Culvert	Road 64		14	4.3	1960	74.5
0580	CPR Overhead	Domtar Line		30.5	7.1	1950	61.1
0590	Baigent/Knox Bridge	Road 62		54	9.3	1995	74.2
0610	Concrete Slab Culvert	Road 62		17.3	3.7	1960	72.1
0620	Railroad Subway	Hunt Road		10	4	1986	74.1
0630	Thames R. Mid. Branch	Road 60		45.4	8.4	1960	73.2
0650	Henderson Creek Culvert	North Town Line		18	3	2011	71.6
0095	Rigid Frame Culvert	15th Line Road		5.5	17.4	1970	71.3
0125	Rigid Frame Culvert	29th Line Road		23.6	4.5	1980	74.8
0255	CPS-Soil-Steel Pipe	Road 84		21.2	5	1980	75.0

# Township of Zorra



## Community Levels of Service – Quality

The calculation of Bridge Condition Index (BCI) requires inspection following the OSIM Excellent-Good-Fair-Poor (EGFP) rating system. Up to 55 structural elements are considered in the calculation.

Keystone Bridge Management Corporation who inspected the Township of Zorra's bridges and culverts followed its proprietary Triple-D approach instead of the EGFP method of rating a bridge.

To translate the Triple-D method to EGFP the following approach is observed. Anything considered Damaged in Triple-D format is mapped 1:1 as Poor in EGFP format. All bridge components transition from Excellent to Good in a straight-line decay function over a 20-year period. Thus, a new component becomes 10% Excellent and 90% Good after ten years of service. The determination of Fair is based on the percent Defects and considers the percent Damage loosely following OSIM philosophy and is performed following an algorithm implicit to KBMS. The percent Good is determined as 100% less the percent Excellent, Fair, and Poor. Excellent, Good, Fair, and Poor are weighted 1.00, 0.75, 0.40, and 0.0 respectively in the BCI calculations following the published MTO methods of July 2009.

BCI Value	Rating
85-100	Excellent
65-85	Good
50-65	Fair
Below 50	Poor



The images below provide illustrations on how the bridge and culvert conditions relate to their BCI.

**Image A.1 Bridge Structure #31 with a BCI of 85.9 (Excellent)**



*West abutment*



*Downstream soffit*

**Image A.2 Concrete Rigid Frame Culvert #045 with a BCI of 75.00 (Good)**



*Structure*



*Upstream soffit*

**Image A.3 Concrete Rigid Frame Bridge #0010 a BCI of 75.3 (Good)**



*Structure image*



*North deck drain and soffit delamination*

**Image A.4 Solid Steel Culvert #0485 with a BCI of 60.5 (Fair)**



*Image of structure*



*NW wingwall disintegration*

**Image A.5 Slab on Prestress Girder Bridge #0440 with a BCI of 62.3 (Fair)**



*Image of structure*



*Expansion joints*

**Image A.6 concrete culvert with a BCI of 48.0 (Poor)**



## Appendix A4 - Bridges and Culverts Risk Matrix Graph 2019

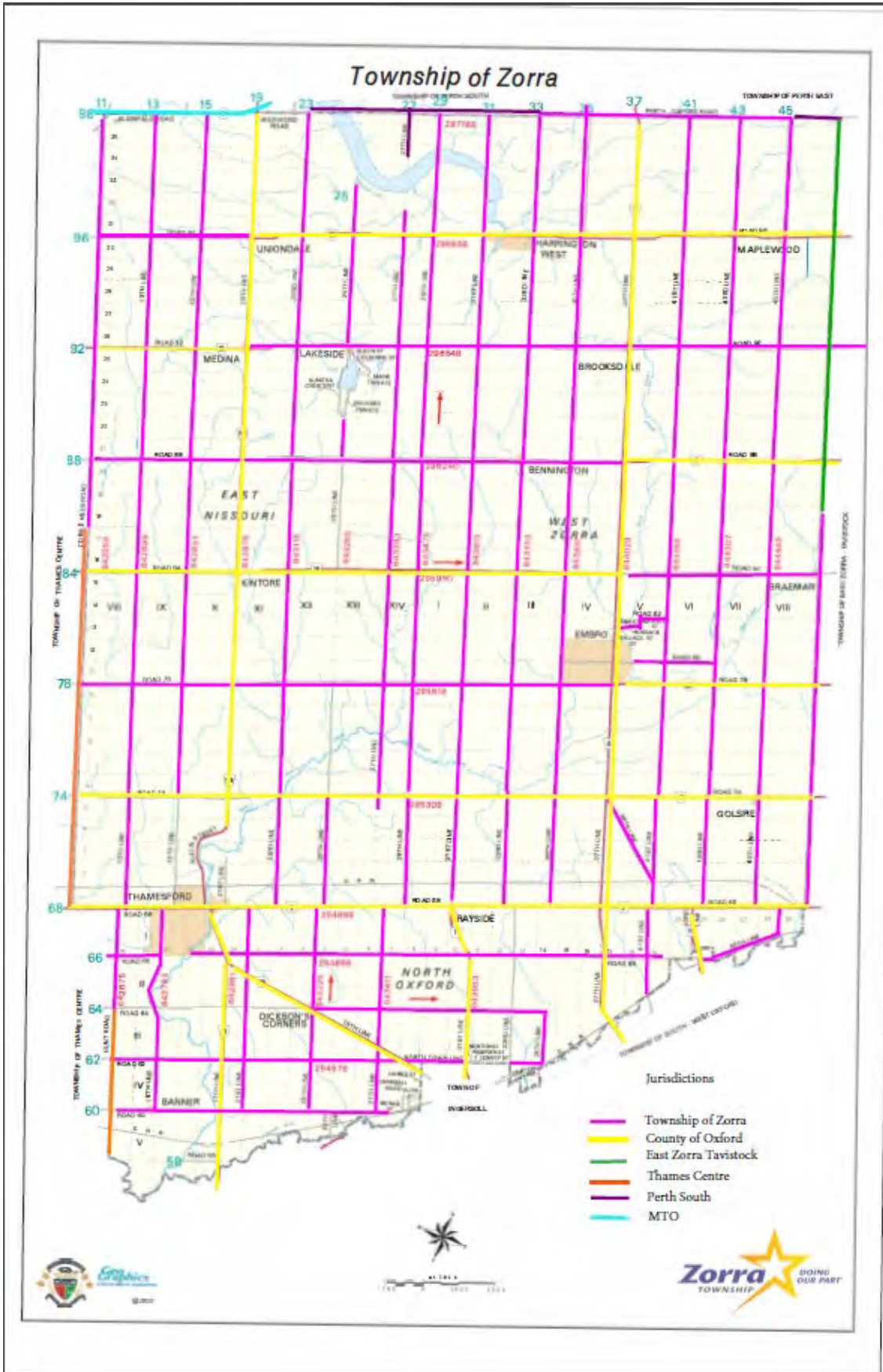
Consequence	1	2	3	4	5
5	0 Assets - \$0.00	1 Asset 265.58 m2 \$1,477,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
4	0 Assets - \$0.00	5 Assets 1,460.70 m2 \$11,013,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
3	1 Asset 267.90 m2 \$1,419,000.00	27 Assets 5,038.48 m2, unit(s) \$37,622,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
2	0 Assets - \$0.00	30 Assets 4,860.59 m2, unit(s) \$32,587,000.00	1 Asset - unit(s) \$374,000.00	0 Assets - \$0.00	0 Assets - \$0.00
1	0 Assets - \$0.00	4 Assets 157.84 m2, unit(s) \$801,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	1	2	3	4	5
	Probability				



## B) Paved and Unpaved Roads

### Core Asset







	ASSET	PAVED ROADS
State of Local Infrastructure	Inventory	130.5 km of paved roads; 122.7 km of HCB (high class bituminous) + 7.8 km of LCB (low class bituminous).
	Integrated Assets	Bridges and Culverts, Storm Sewers, Sidewalks
	Total \$'s to Replace Entire Asset Category	<b>\$32,374,000</b> <i>The replacement cost was developed in conjunction with the 2019 Road Needs Study prepared by D.M. Wills Associates Ltd.</i>
	Average Age of Assets in Category	16.7 years old <i>Estimated asset life HCB 20 years LCB 15 years</i>
	Current Condition of Assets	For paved roads, the average condition rating is 79.149.
	Description of Data Sources	The condition of all paved road sections in this class were assessed in 2019 through the municipal " <b>Road Needs Study</b> ". This study contained forecasted condition ratings for each road segment and are shown in Appendix "B1"  Condition Rating: a holistic rating that sums points rating from alignment, surface condition, surface width, level of surface, structural adequacy, drainage and maintenance demands. Rated on a scale of 1 to 100.
Current Level of Services	Community	<u>Scope:</u> All road sections are considered to be " <b>Local Roads</b> " according to <i>Ontario Regulation 239/02</i> .  See Appendix "B2" for Maps showing the current inventory of paved road sections in the municipality.  <u>Quality:</u> Number of lane-kilometres of each of arterial, collector and local roads as a proportion of square kilometres of land area of the municipality.  Number of lane-kilometres of local roads in Zorra is 948.4 kilometres. Square kilometres of land area in Zorra is 529 square kilometres  <b>Result is: 1.79 lane km per square km of land area.</b>
	Technical	<u>Scope:</u> Images that illustrate the different levels of road class pavement condition (PCI). Rated on a scale of 1 to 100.  See Appendix "B3" for images.  <u>Quality:</u> the average PCI for hard top surfaces/paved in the Township is 78.9.  <i>Data source "2019 Road Needs Study" prepared by D.M. Wills Associates LTD.</i>
	Current Performance	Ontario Regulation 366/18 specifies the Minimum Maintenance Standards for Municipal Highways. It covers such items as, but not limited to, patrolling frequency, snow accumulation, potholes and regulatory/warning signs and traffic signals.  The Township performance is tracked through Road Patrol Software and the we are in compliance with the standards set out in this Regulation.

Asset Lifecycle Activities	<b>Planned Actions On-going Maintenance</b>	<p>Regular maintenance activities include asphalt patching, sweeping and, line painting.</p> <p>“2019 Road Needs Study” states that based on typical degradation rates for surface treatment and hot mix, a recommended <b>annual</b> resurfacing program budget would be \$1,759,350.</p>
Risk Management Strategies	<b>Risk = Probability x Consequence</b>	<p><b>Risk Factors:</b> Current conditional assessment (<i>probability</i>), Traffic Count (AADT) (<i>consequence</i>), Replacement Cost (<i>consequence</i>), Criticality (<i>consequence</i>).</p> <p><b>Result:</b></p> <p>Average Risk rating for Paved Roads is: 4.5 (Very Low)</p> <p>See Appendix B4 for Risk Matrix for this category</p>
Financial Strategies	<b>Replacement and Funding Strategies</b>	<p>The “Road Needs Study” will be updated every 5 years and will be used as a document of principles and guidelines that will serve the Township in future road needs decisions. The report provides recommendations and prioritization for planned capital improvements based on condition ratings and traffic demands on each road section.</p> <p>Annual Federal Gas Tax funding and MNR Aggregate Royalties will be used to supplement the tax revenue/reserve strategy. Every year the 5-year capital budget will be reviewed to determine the recommended capital tax levy dollars required to fund the recommended improvements.</p>
	<b>Annual Requirement \$ To Fund Replacement Program</b>	<p><b>\$1,475,120.00</b></p>

	ASSET	UNPAVED ROADS
State of Local Infrastructure	Inventory	343.7 km of gravel roads.
	Integrated Assets	Bridges and Culverts, Storm Sewers, Sidewalks
	Total \$'s to Replace Entire Asset Category	<b>\$35,508,910</b> <i>The replacement cost was developed in conjunction with the 2019 Road Needs Study prepared by D.M. Wills Associates Ltd.</i>
	Average Age of Assets in Category	All unpaved/gravel roads are resurfaced with new gravel on a two to three years cycle. Improvements to road bases for unpaved roads are identified based on condition assessments and where such work improves maintenance and traffic safety. Age of unpaved roads system is irrelevant to the management of the unpaved road infrastructure, so it is not tracked/reported.
	Current Condition of Assets	For unpaved roads, the average condition rating is 76.1.
	Description of Data Sources	The condition of all unpaved road sections in this class were assessed in 2019 through the municipal " <b>Road Needs Study</b> ". This study contained forecasted condition ratings for each road segment and are shown in Appendix "B1"  Condition Rating: a holistic rating that sums points rating from alignment, surface condition, surface width, level of surface, structural adequacy, drainage and maintenance demands. Rated on a scale of 1 to 100.
Current Level of Services	Community	<u>Scope:</u> All road sections are considered to be " <b>Local Roads</b> " according to <i>Ontario Regulation 239/02</i> . See Appendix "B2ii" for Maps showing the current inventory of unpaved road sections in the municipality.  <u>Quality:</u> Number of lane-kilometres of each of arterial, collector and local roads as a proportion of square kilometres of land area of the municipality.  Number of lane-kilometres of local roads) in Zorra is 948.4 kilometres. Square kilometres of land area in Zorra is 529 square kilometres  <b>Result is: 1.79 lane km per square km of land area.</b>
	Technical	<u>Scope:</u> For unpaved roads in the municipality, the average surface condition is 76.1 (good).  <i>* data source "2019 Road Needs Study" prepared by D.M. Wills Associates Ltd.</i>
Performance Level	Current Performance	Ontario Regulation 239/02 specifies the Maintenance Standards for Municipal Highways. It covers such items as, but not limited to, patrolling frequency, snow accumulation, potholes and regulatory/warning signs and traffic signals.  The Township performance is tracked through Road Patrol Software and we are in compliance with the standards set out in this Regulation.

Asset Lifecycle Activities	<b>Planned Actions</b> <b>On-going Maintenance</b>	<p>Regular maintenance activities include regular grading and reapplication of new gravel. Add dust suppressant to tighten surface, retain aggregate and reduce dust. Ditching and brushing of rights-of-ways to improve roadbed drainage and safety.</p> <p><i>"2019 Road Needs Study"</i> recommended <b>annual</b> gravel budget program would be \$1,375,200.</p>
Risk Management Strategies	<b>Risk =</b> <b>Probability x</b> <b>Consequence</b>	<p><b>Risk:</b> Unpaved road sections will rarely be compromised to a point where the addition of gravel and/or grading cannot rectify the issue. Any repairs can be accomplished in a relatively short period of time.</p>
Financial Strategies	<b>Replacement and Funding Strategies</b>	<p>The <i>"Road Needs Study"</i> will be updated every 5 years and will be used as a document of principles and guidelines that will serve the Township in future road needs decisions. The report provides recommendations and prioritization for planned capital improvements based on condition ratings and traffic demands on each road section.</p> <p>Annual Federal Gas Tax funding and MNR Aggregate Royalties will be used to supplement the tax revenue/reserve strategy. Every year the 5-year capital budget will be reviewed to determine the recommended capital tax levy dollars required to fund the recommended improvements.</p>
	<b>Annual Requirement \$ To Fund Replacement Program</b>	<p><b>\$1,375,200.00</b></p> <p><i>"2019 Road Needs Study"</i> recommended <b>annual</b> gravel budget program would be \$1,375,200.</p>

## Appendix B1 - Township of Zorra Road Needs - Capital Construction Plan

Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
<b>NOW Needs</b>								
116	Hampden St.	From Cemetery Gates To North Town Line	ST2A - Double Surface Treatment with Granular A	0.2	75	4	5	43
98	25 <sup>th</sup> Line	From Road 92 To CPR Crossing	PP1 - Pulverize and Pave 1 Lift	0.2	250	6	7	55
97	Colborne St. Lakeside	From CPR Crossing To Queen St.	PP1 - Pulverize and Pave 1 Lift	0.2	100	6	6	48
99	Queen St. Lakeside	From King St. To Dead End At South	PP1 - Pulverize and Pave 1 Lift	0.3	75	5	6	47
297	Road 80	From End of Commissioner (East) to 0.4 km East	PP1 - Pulverize and Pave 2 Lift	0.4	200	5	5	62
100	Sunova Cres.	From Road 92 To 25 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.6	500	6	9	53
11	31 <sup>st</sup> Line	From Road 78 To Road 84	Recon 1R - Full Reconstruction + 1 Lift	3.1	1250	6	8	69
12	31 <sup>st</sup> Line	From Road 84 To Road 88	Recon 1R - Full Reconstruction + 1 Lift	3.1	550	6	9	70
<b>1-5 Year Needs</b>								
53	Road 96	From 13 <sup>th</sup> Line To 15 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.4	825	6	7	64
54	Road 96	From 15 <sup>th</sup> Line To 19 <sup>th</sup> Line	PP1 - Pulverize and Pave 2 Lift	1.4	825	7	11	74
52	Road 96	From Cobble Hills Road To 13th Line	PP1 - Pulverize and Pave 2 Lift	1.4	800	7	11	74
45	Road 84	From 45 <sup>th</sup> Line To 47 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.4	900	7	11	74
69	Delatre St. E	From Mills Street To 21 <sup>st</sup> Line	Recon 1S - Full Reconstruction + 1 Lift	0.3	250	5	7	52
64	Sullivan	From Washington St. E. To Road 68	Recon 1S - Full Reconstruction + 1 Lift	0.2	75	4	5	44
8	15 <sup>th</sup> Line	From Road 68 To Road 74	PP1 - Pulverize and Pave 2 Lift	2.5	600	5	6	64
837	Bates Lane	From 19 <sup>th</sup> Hwy. To End Of Road	PP1 - Pulverize and Pave 1 Lift	0.3	50	5	6	48
839	Young Crescent	From 19 <sup>th</sup> Hwy. To End Of Road	PP1 - Pulverize and Pave 1 Lift	0.3	50	6	7	50
62	Milton St.	From Washington St. E. To Road 68	PP1 - Pulverize and Pave 1 Lift	0.2	75	6	10	55
48	Road 92	From 29 <sup>th</sup> Line To 31 <sup>st</sup> Line	PP1 - Pulverize and Pave 2 Lift	1.4	1000	7	12	76
112	Embros St. Beachville	From Queen St. To 43 <sup>rd</sup> Line	PP1 - Pulverize and Pave 1 Lift	0.5	250	3	4	42
113	Piovesan St.	From Embros St. To Embros St.	PP1 - Pulverize and Pave 1 Lift	1	75	4	5	45
161	25 <sup>th</sup> Line	From Thames River To Road 60	PP1 - Pulverize and Pave 2 Lift	0.7	100	6	7	69
58	Perth-Oxford Road	From 35 <sup>th</sup> Line To 37 <sup>th</sup> Line	PP1 - Pulverize and Pave 2 Lift	0.7	350	6	7	68
57	Perth-Oxford Road	From 33 <sup>rd</sup> Line To 35th Line	PP1 - Pulverize and Pave 2 Lift	0.7	350	6	10	72
55	Perth-Oxford Road	From 29 <sup>th</sup> Line To 31 <sup>st</sup> Line	PP1 - Pulverize and Pave 2 Lift	0.7	350	7	11	74
56	Perth-Oxford Road	From 31st Line To 33 <sup>rd</sup> Line	PP1 - Pulverize and Pave 2 Lift	0.7	350	7	11	74
27	Road 64	From Hunt Road To 15 <sup>th</sup> Line	PP1 - Pulverize and Pave 2 Lift	1.1	1300	7	12	73
17	35 <sup>th</sup> Line	From Road 68 To Road 74	PP1 - Pulverize and Pave 2 Lift	3.1	900	6	10	71
723	Road 78	From 35 <sup>th</sup> Line the 37 <sup>th</sup> Line	PP1 - Pulverize and Pave 2 Lift	1.4	650	6	6	67
722	Road 78	From 31st Line to 33rd Line	PP1 - Pulverize and Pave 2 Lift	1.4	700	6	8	70
41	Road 78	From 33 <sup>rd</sup> Line To 35 <sup>th</sup> Line	PP1 - Pulverize and Pave 2 Lift	1.4	700	7	11	74
46	Road 92	From 25 <sup>th</sup> Line To 27 <sup>th</sup> Line	Recon 1R - Full Reconstruction + 1 Lift	1.4	800	5	6	63
<b>6-10 Year Needs</b>								
117	Davey St.	From Dead End North to North Town Line	ST2A - Double Surface Treatment with Granular A	0.2	125	6	7	49
110	Mcnab St.	From Road 60 To Road 60 (U SHAPE)	Recon 1S - Full Reconstruction + 1 Lift	0.7	125	6	7	50



Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
107	Newton St.	From 31 <sup>st</sup> Line To North Town Line	Recon 1S - Full Reconstruction + 1 Lift	0.3	75	5	6	51
724	Road 92	From 19 <sup>th</sup> Line To 23rd Line	PP1 - Pulverize and Pave 1 Lift	1.42	950	7	11	74
19	35 <sup>th</sup> Line	From Road 78 To Road 84	PP1 - Pulverize and Pave 1 Lift	3.1	50	7	11	74
32	Road 74	From 15 <sup>th</sup> Line To 19 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.4	1200	7	12	74
725	Road 92	FROM 23 <sup>rd</sup> Line TO 25 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.42	1000	7	12	75
25	Road 60	From 25 <sup>th</sup> Line To 27 <sup>th</sup> Line	PP1 - Pulverize and Pave 1 Lift	1.9	300	6	12	73
23	Road 60	From 17 <sup>th</sup> Line To 21 <sup>st</sup> Line	PP1 - Pulverize and Pave 1 Lift	0.6	200	7	12	75
<b>&gt; 10 Year Needs</b>								
266	ROAD 66	From HUNT ROAD To 15TH LINE	G - Gravel (50mm)	1.25	800	7	14	61
33	ROAD 74	From 19TH LINE To 23RD LINE	RMP1 - Mill & Pave, 1 Lift	1.4	1350	7	13	69
726	Sunova Cres	From ROAD 92 To 25TH LINE	G - Gravel (50mm)	0.3	500	7	14	61
139	15TH LINE	From ROAD 62 To ROAD 64	G - Gravel (50mm)	1.4	800	7	14	67
300	ROAD 82	From 37TH LINE To 41ST LINE	G - Gravel (50mm)	1.9	150	7	14	53
834	Hunt Road	From ROAD 60 To CN RAIL	G - Gravel (50mm)	0.7	150	6	10	53
138	15TH LINE	From ROAD 60 To ROAD 62	G - Gravel (50mm)	1.5	800	8	16	70
818	North Town Line	19TH LINE To INGERSOLL BOUNDARY	Preventative Maintenance	0.4	800	9	17	70
63	St Patrick St	From BROCK ST To ROAD 68	Preventative Maintenance	0.2	600	8	16	68
101	Cornelia St.	From ROAD 96 To DEAD END	G - Gravel (50mm)	0.2	75	6	10	53
744	Elizabeth St. Harrington	From COUNTY RD. 28 To 152 M SOUTH-DEAD END	G - Gravel (50mm)	0.2	75	6	10	53
171	25TH LINE	From ROAD 96 To WILDWOOD ROAD	G - Gravel (50mm)	1.4	100	6	12	56
10	31ST LINE	From ROAD 74 To ROAD 78	RO1 - Hot Mix Overlay, 1 Lift	3.1	2200	8	15	79
115	Cobble Hills Road	From ROAD 78 To ROAD 84	ST1 - Single Surface Treatment	1.6	1800	7	14	78
28	ROAD 64	From 15TH LINE To 17TH LINE	RMP1 - Mill & Pave, 1 Lift	2	1300	8	14	77
746	Albert St. Harrington	From ROAD 96 To VICTORIA ST	G - Gravel (50mm)	0.2	200	8	16	65
182	27TH LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	1.9	75	7	14	58
1	Cobble Hills Road	From ROAD 68 To ROAD 74	Preventative Maintenance	1.6	1800	9	17	79
111	Haines St.	From INGERSOLL W. BOUNDARY To WEST To DEAD END +- 8.3M	RMP1 - Mill & Pave, 1 Lift	0.2	75	7	14	59
108	Pemberton St.	From NORTH TOWN LINE To CNR TRACKS	Preventative Maintenance	0.5	600	10	20	74
833	ROAD 62	From 33RD To 35TH LINE	G - Gravel (50mm)	0.9	150	7	14	65
745	Victoria St. Harrington	From ROAD 96 To EAST ST	G - Gravel (50mm)	1.1	200	8	16	67
119	Ralph St	From 37TH LINE To END OF ROAD	G - Gravel (50mm)	0.4	50	7	13	58
106	North Town Line	From 33RD LINE To 31ST LINE	Preventative Maintenance	0.6	800	10	20	76
819	North Town Line	INGERSOLL BOUNDARY To 31ST LINE	Preventative Maintenance	1.2	800	10	20	76
330	Perth-Oxford Road	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.4	350	6	13	71
2	Cobble Hills Road	From ROAD 84 To SKEE-HI RESORT ENTRANCE	RMP1 - Mill & Pave, 1 Lift	1.55	1025	7	14	78
336	Perth-Oxford Road	From 37TH LINE To 41ST LINE	G - Gravel (50mm)	0.7	300	6	13	71
337	Perth-Oxford Road	From 41ST LINE To 43RD LINE	G - Gravel (50mm)	0.7	350	6	13	72

Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
118	Charles St	From 37TH LINE To END OF ROAD	G - Gravel (50mm)	0.1	50	7	14	60
5	Cobble Hills Road	From ROAD 96 To ELGINFIELD	RO1 - Hot Mix Overlay, 1 Lift	1.7	1675	8	15	81
176	27TH LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	0.5	100	7	14	65
181	27TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	125	8	15	66
272	ROAD 66	From 33RD LINE To 37TH LINE	G - Gravel (50mm)	2.5	175	7	14	69
36	ROAD 74	From 27TH LINE To 29TH LINE	RO1 - Hot Mix Overlay, 1 Lift	0.8	1400	8	15	81
37	ROAD 74	From 29TH LINE To 31ST LINE	RO1 - Hot Mix Overlay, 1 Lift	1.3	1400	8	15	81
109	Cemetery Lane	From PEMBERTON ST. To CEMETERY GATES	RO1 - Hot Mix Overlay, 1 Lift	0.3	50	8	15	62
114	Cobble Hills Road	From ROAD 74 To ROAD 78	ST1 - Single Surface Treatment	1.6	1725	8	16	82
180	27TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	75	8	15	64
43	ROAD 84	From 41ST LINE To 43RD LINE	RMP1 - Mill & Pave, 1 Lift	1.4	900	8	13	79
44	ROAD 84	From 43RD LINE To 45TH LINE	RMP1 - Mill & Pave, 1 Lift	1.4	900	8	13	79
4	Cobble Hills Road	From ROAD 92 To ROAD 96	RO1 - Hot Mix Overlay, 1 Lift	1.6	1350	8	15	81
225	43RD LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	75	7	13	65
322	ROAD 92	From 37TH LINE To 41ST LINE	G - Gravel (50mm)	1.4	400	8	15	75
323	ROAD 92	From 41ST LINE To 43RD LINE	G - Gravel (50mm)	1.4	400	8	15	75
16	33RD LINE	From ROAD 66 To ROAD 68	RMP1 - Mill & Pave, 1 Lift	1.3	650	7	14	78
31	ROAD 74	From 13TH LINE To 15TH LINE	RO1 - Hot Mix Overlay, 1 Lift	1.4	1200	8	15	81
331	Perth-Oxford Road	From 27TH LINE To 29TH LINE	G - Gravel (50mm)	0.25	350	7	14	75
30	ROAD 74	From COBBLE HILLS ROAD To 13TH LINE	RO1 - Hot Mix Overlay, 1 Lift	1.4	1100	8	15	81
160	23RD LINE	From ROAD 96 To WILDWOOD ROAD	G - Gravel (50mm)	3.4	150	7	13	71
325	ROAD 92	From 45TH LINE To ZORRA/EAST ZORRA TAVISTOCK LINE	G - Gravel (50mm)	1.4	150	6	13	71
338	Perth-Oxford Road	From 43RD LINE To 45TH LINE	G - Gravel (50mm)	0.7	350	7	14	76
339	Perth-Oxford Road	From 45TH LINE To ZORRA/EAST ZORRA-TAVISTOCK LINE	G - Gravel (50mm)	0.7	350	7	14	76
170	25TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	200	7	14	73
39	ROAD 74	From 33RD LINE To 35TH LINE	Preventative Maintenance	1.4	1450	9	16	83
42	ROAD 84	From 37TH LINE To 41ST LINE	RO1 - Hot Mix Overlay, 1 Lift	1.4	900	8	15	81
271	ROAD 66	From 31ST LINE To 33RD LINE	G - Gravel (50mm)	1.2	175	8	16	73
287	ROAD 78	From 13TH LINE To 15TH LINE	G - Gravel (50mm)	1.4	325	7	14	76
288	ROAD 78	From 15TH LINE To 19TH LINE	G - Gravel (50mm)	1.4	325	7	14	76
38	ROAD 74	From 31ST LINE To 33RD LINE	Preventative Maintenance	1.4	1400	9	16	83
273	ROAD 66	From 37TH LINE To LOT 19/20	G - Gravel (50mm)	1.2	100	7	15	70
13	31ST LINE	From ROAD 88 To ROAD 92	RMP1 - Mill & Pave, 1 Lift	3.1	700	8	14	80
244	Zorra/East Zorra-Tavistock Line	From ROAD 88 To ROAD 92	G - Gravel (50mm)	1.6	150	6	13	72
232	45TH LINE	From ROAD 66 To ROAD 68	G - Gravel (50mm)	2.7	125	8	14	71
195	31ST LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	200	6	13	74
324	ROAD 92	From 43RD LINE To 45TH LINE	G - Gravel (50mm)	1.4	200	7	15	74

Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
14	33rd line	From ROAD 62 To ROAD 64	RO1 - Hot Mix Overlay, 1 Lift	1.5	800	8	15	81
207	35TH LINE	From ROAD 62 To ROAD 64	G - Gravel (50mm)	1.4	50	8	16	67
157	23RD LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	225	8	15	75
24	ROAD 60	From 21ST LINE To 25TH LINE	RMP1 - Mill & Pave, 1 Lift	1.8	300	7	14	77
15	33RD LINE	From ROAD 64 To ROAD 66	RO1 - Hot Mix Overlay, 1 Lift	1.4	675	8	15	81
269	ROAD 66	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.9	100	8	16	72
166	25TH LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	425	8	15	79
218	41ST LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	275	8	16	77
308	ROAD 88	From 19TH LINE To 23RD LINE	G - Gravel (50mm)	1.4	150	7	14	74
268	ROAD 66	From 21ST LINE To 25TH LINE	G - Gravel (50mm)	1.8	100	8	15	72
293	ROAD 78	From 29TH LINE To 31ST LINE	G - Gravel (50mm)	1.4	725	8	16	82
40	ROAD 74	From 35TH LINE To 37TH LINE	Preventative Maintenance	1.4	1475	9	17	85
267	ROAD 66	From 15TH LINE To 21ST LINE	G - Gravel (50mm)	1.4	100	8	16	73
310	ROAD 88	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.4	100	6	12	73
286	ROAD 78	From COBBLE HILLS ROAD To 13TH LINE	G - Gravel (50mm)	1.4	100	7	14	73
188	29TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	325	8	15	79
253	ROAD 62	From HUNT ROAD To 15TH LINE	G - Gravel (50mm)	1.25	200	7	14	77
299	ROAD 80	From 41ST LINE To 43RD LINE	G - Gravel (50mm)	1.4	200	8	15	77
3	Cobble Hills Road	From ROAD 88 To ROAD 92	Preventative Maintenance	1.55	1250	9	17	85
270	ROAD 66	From 27TH LINE To 31ST LINE	G - Gravel (50mm)	2.4	75	8	15	73
311	ROAD 88	From 27TH LINE To 29TH LINE	G - Gravel (50mm)	0.8	100	8	16	74
274	ROAD 66	From 41ST LINE To 43RD LINE	G - Gravel (50mm)	0.7	100	8	16	74
22	ROAD 60	From 15TH LINE To 17TH LINE	RMP1 - Mill & Pave, 1 Lift	1.8	200	7	14	78
152	21ST LINE	From ROAD 66 To ROAD 68	G - Gravel (50mm)	1.3	75	8	17	74
155	23RD LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	100	7	15	75
168	25TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	100	7	13	75
309	ROAD 88	From 23RD LINE To 25TH LINE	G - Gravel (50mm)	1.4	100	8	15	75
21	ROAD 60	From HUNT ROAD To 15TH LINE	RMP1 - Mill & Pave, 1 Lift	1.1	300	8	14	80
130	Hunt Road	From ROAD 66 To ROAD 68	G - Gravel (50mm)	0.6	150	8	15	77
165	25TH LINE	From ROAD 66 To ROAD 68	G - Gravel (50mm)	1.3	150	7	14	77
167	25TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	150	8	15	77
215	39TH LINE	From 37TH LINE To 41ST LINE	G - Gravel (50mm)	2.7	75	7	14	74
217	41ST LINE	From ROAD 66 To ROAD 68	G - Gravel (50mm)	1.4	75	8	16	74
189	29TH LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.3	225	8	15	79
7	15TH LINE	From ROAD 66 To ROAD 68	Preventative Maintenance	1.3	1300	9	18	86
298	ROAD 80	From 0.4km EAST of END OF COMMISSIONER (EAST) To 41ST LINE	G - Gravel (50mm)	0.4	200	8	16	79
172	27TH LINE	From ROAD 60 To ROAD 62	G - Gravel (50mm)	1.4	100	7	13	76

Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
220	41ST LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	100	7	14	76
314	ROAD 88	From 33RD LINE To 35TH LINE	G - Gravel (50mm)	1.4	100	8	15	76
758	ROAD 88	From 31ST LINE To 33RD LINE	G - Gravel (50mm)	1.4	100	8	16	76
158	23RD LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	250	8	17	80
823	ROAD 78	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.4	400	8	16	82
824	ROAD 78	From 27TH LINE To 29TH LINE	G - Gravel (50mm)	0.8	400	8	16	82
239	45TH LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.4	125	7	14	77
233	45TH LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	125	8	16	77
219	41ST LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	150	8	15	78
243	Zorra/East Zorra-Tavistock Line	From ROAD 84 To ROAD 88	G - Gravel (50mm)	1.6	150	8	16	78
245	Zorra/East Zorra-Tavistock Line	From ROAD 92 To ROAD 96	G - Gravel (50mm)	1.6	150	7	14	78
835	Zorra/East Zorra-Tavistock Line	From ROAD 96 To PERTH- OXFORD Road	G - Gravel (50mm)	1.6	150	7	14	78
153	21ST LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	1.2	75	8	16	75
206	33RD LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.4	50	7	13	74
6	15TH LINE	From ROAD 64 To ROAD 66	Preventative Maintenance	1.5	750	9	17	85
826	ROAD 60	From 27TH LINE To INGERSOLL BOUNDARY	Preventative Maintenance	1.3	1875	10	20	88
154	23RD LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	100	7	15	77
164	25TH LINE	From ROAD 64 To ROAD 66	G - Gravel (50mm)	1.4	100	7	14	77
235	45TH LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	125	8	15	78
796	ROAD 78	From 19TH LINE To 23RD LINE	G - Gravel (50mm)	1.4	325	8	16	82
805	ROAD 78	From 23RD LINE To 25TH LINE	G - Gravel (50mm)	1.4	325	8	16	82
131	13TH LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3	75	7	14	76
137	13TH LINE	From ROAD 96 To ROAD 98	G - Gravel (50mm)	3.4	75	7	14	76
179	27TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	7	15	76
263	ROAD 64	From 27TH LINE To 31ST LINE	G - Gravel (50mm)	2.4	75	8	15	76
128	Hunt Road	From ROAD 62 To ROAD 64	G - Gravel (50mm)	0.7	150	8	15	79
129	Hunt Road	From ROAD 64 To ROAD 66	G - Gravel (50mm)	0.7	150	8	15	79
144	15TH LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	150	8	15	79
143	15TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	225	8	16	81
196	31ST LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.2	75	7	14	77
228	43RD LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	15	77
224	41ST LINE	From ROAD 96 To ROAD 98	G - Gravel (50mm)	3.2	125	8	15	79
20	ROAD 58	From 17TH LINE To END OF ROAD	RO1 - Hot Mix Overlay, 1 Lift	1.1	150	8	15	80
127	Hunt Road	From ROAD 60 To ROAD 62	G - Gravel (50mm)	0.7	150	8	15	80
231	43RD LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.2	150	7	16	80
242	Zorra/East Zorra-Tavistock Line	From ROAD 78 To ROAD 84	G - Gravel (50mm)	1.6	150	8	16	80
18	35TH LINE	From ROAD 74 To ROAD 78	RO1 - Hot Mix Overlay, 1 Lift	3.1	175	8	15	81

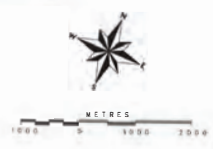
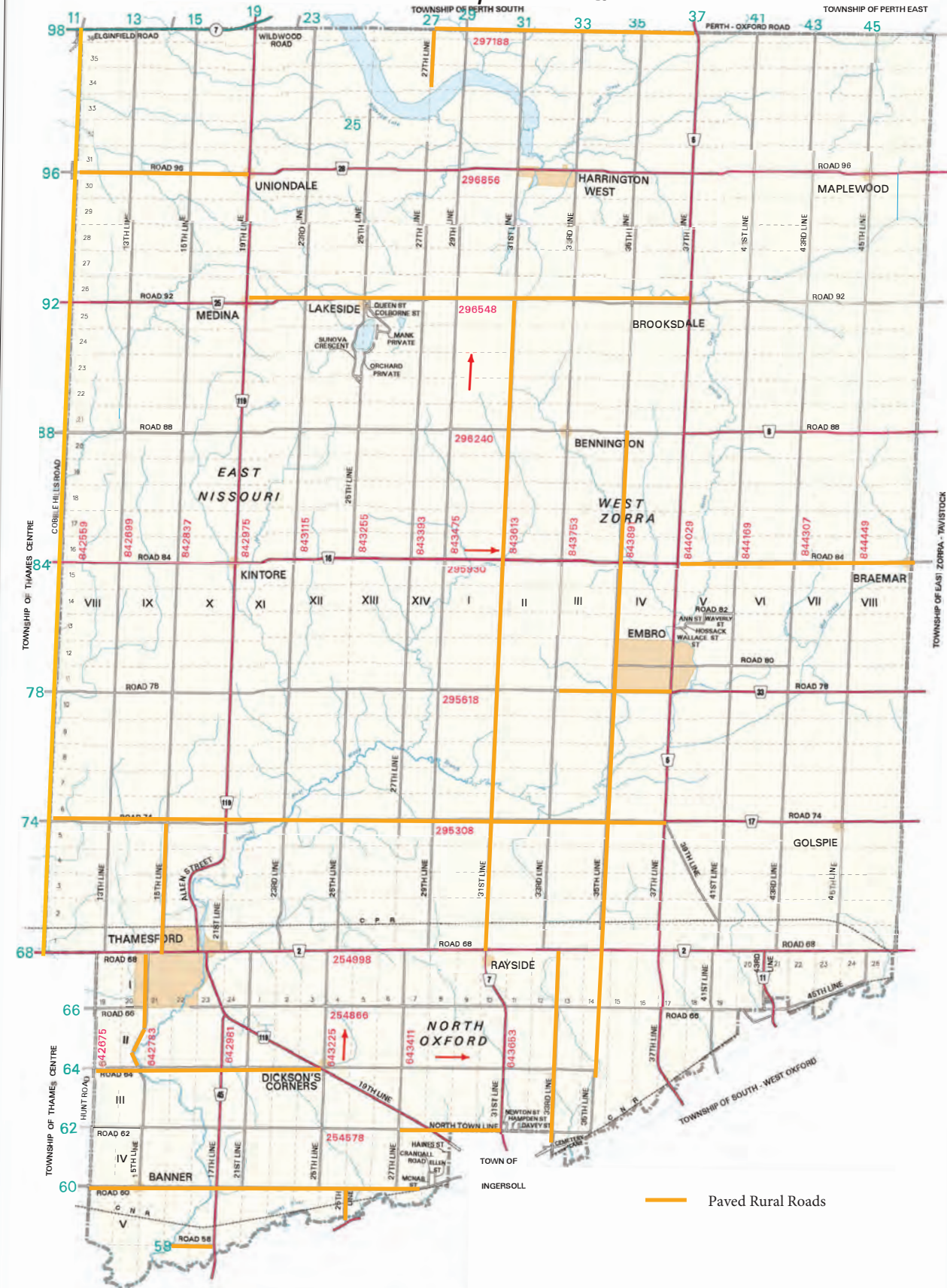
Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
315	ROAD 88	From 35TH LINE To 37TH LINE	G - Gravel (50mm)	1.4	225	8	16	82
757	Road 92	35TH LINE To 37TH LINE	Preventative Maintenance	1.4	925	9	18	87
148	15TH LINE	From ROAD 96 To ELGINFIELD	G - Gravel (50mm)	3.4	100	7	15	79
201	33RD LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	100	8	15	79
234	45TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	125	8	16	80
200	33RD LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	200	8	16	82
205	33RD LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	50	7	15	77
329	Wildwood Road	From 19TH LINE To 23RD LINE	G - Gravel (50mm)	1.4	50	7	14	77
169	25TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	1.5	150	8	16	81
236	45TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	150	8	16	81
241	Zorra/East Zorra-Tavistock Line	From ROAD 74 To ROAD 78	G - Gravel (50mm)	1.6	150	8	17	81
177	27TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	25	7	14	75
216	41ST LINE	From DOMTAR LINE To ROAD 66	G - Gravel (50mm)	1.1	75	8	16	79
756	Road 92	33RD LINE To 35TH LINE	Preventative Maintenance	1.4	800	9	18	87
755	Road 92	31ST LINE To 33RD LINE	Preventative Maintenance	1.4	775	9	18	87
162	25TH LINE	From ROAD 60 To ROAD 62	G - Gravel (50mm)	1.4	100	8	15	80
262	ROAD 64	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.9	100	8	16	80
185	29TH LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	75	8	15	79
186	29TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	16	79
223	41ST LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	75	8	15	79
227	43RD LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	75	8	16	79
221	41ST LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	125	8	16	81
791	ROAD 74	From 23RD LINE To 25TH LINE	Preventative Maintenance	1.3	1400	10	19	89
792	ROAD 74	From 25TH LINE To 27TH LINE	Preventative Maintenance	1.4	1400	10	19	89
265	ROAD 64	From 33RD LINE To 35TH LINE	G - Gravel (50mm)	0.9	50	7	14	78
156	23RD LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	150	8	16	82
255	ROAD 62	From 21ST LINE To 25TH LINE	G - Gravel (50mm)	1.8	150	8	16	82
256	ROAD 62	From 25TH LINE To 27TH LINE	G - Gravel (50mm)	1.9	150	8	16	82
260	ROAD 64	From 19TH LINE To 27TH LINE	G - Gravel (50mm)	0.1	150	8	16	82
307	ROAD 88	From 15TH LINE To 19TH LINE	G - Gravel (50mm)	1.4	150	8	16	82
822	ROAD 64	From 17TH LINE To 21ST LINE	Preventative Maintenance	0.6	1300	10	19	89
226	43RD LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	75	8	16	80
135	13TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	100	8	16	81
136	13TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	100	8	16	81
163	25TH LINE	From ROAD 62 To ROAD 64	G - Gravel (50mm)	1.4	100	8	16	81
173	27TH LINE	From ROAD 62 To ROAD 64	G - Gravel (50mm)	3	100	8	16	81
174	27TH LINE	From ROAD 64 To ROAD 66	G - Gravel (50mm)	1.4	100	8	16	81



Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
175	27TH LINE	From ROAD 66 To ROAD 68	G - Gravel (50mm)	1.3	100	8	16	81
183	29TH LINE	From ROAD 68 To ROAD 74	G - Gravel (50mm)	3.1	100	8	15	81
222	41ST LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	100	8	16	81
238	45TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	100	8	16	81
804	33RD LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	100	8	16	81
9	31ST LINE	From ROAD 68 To ROAD 74	Preventative Maintenance	3.1	1200	10	19	89
740	ROAD 64	From 21ST LINE To 19TH LINE	Preventative Maintenance	1.7	1200	10	19	89
214	35TH LINE	From ROAD 96 To PERTH COUNTY ROAD 21	G - Gravel (50mm)	3.3	50	8	15	79
257	ROAD 62	From 27TH LINE To 19TH LINE	G - Gravel (50mm)	0.8	125	8	16	82
132	13TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	75	8	16	81
133	13TH LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	75	8	16	81
134	13TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	16	81
145	15TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	16	81
203	33RD LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	16	81
212	35TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	75	8	16	81
237	45TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	75	8	16	81
146	15TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	100	8	16	82
147	15TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	100	8	16	82
825	ROAD 88	From 29TH LINE To 31ST LINE	G - Gravel (50mm)	1.4	100	8	16	82
159	23RD LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	50	8	16	80
204	33RD LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	50	8	16	80
240	Zorra/East Zorra-Tavistock Line	From ROAD 68 To ROAD 74	G - Gravel (50mm)	1.6	150	8	17	84
47	ROAD 92	From 27TH LINE To 29TH LINE	Preventative Maintenance	0.8	800	10	19	89
230	43RD LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	75	8	17	82
149	21ST LINE	From ROAD 60 To ROAD 62	G - Gravel (50mm)	1.4	75	8	17	82
150	21ST LINE	From ROAD 62 To ROAD 64	G - Gravel (50mm)	1.4	75	8	17	82
151	21ST LINE	From ROAD 64 To ROAD 66	G - Gravel (50mm)	1.4	75	8	17	82
178	27TH LINE	From ROAD 78 To ROAD 84	G - Gravel (50mm)	3.1	75	8	16	82
211	35TH LINE	From ROAD 84 To ROAD 88	G - Gravel (50mm)	3.1	75	8	16	82
305	ROAD 88	From COBBLE HILLS ROAD To 13TH LINE	G - Gravel (50mm)	1.4	75	8	16	82
306	ROAD 88	From 13TH LINE To 15TH LINE	G - Gravel (50mm)	1.4	75	8	16	82
184	29TH LINE	From ROAD 74 To ROAD 78	G - Gravel (50mm)	3.1	100	9	16	83
213	35TH LINE	From ROAD 92 To ROAD 96	G - Gravel (50mm)	3.1	50	8	16	82
254	ROAD 62	From 15TH LINE To 21ST LINE	G - Gravel (50mm)	2.4	50	8	16	82
264	ROAD 64	From 31ST LINE To 33RD LINE	G - Gravel (50mm)	1.2	50	8	16	82
187	29TH LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	75	9	17	84
229	43RD LINE	From ROAD 88 To ROAD 92	G - Gravel (50mm)	3.1	50	8	17	83

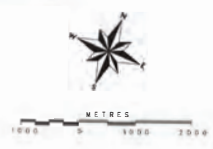
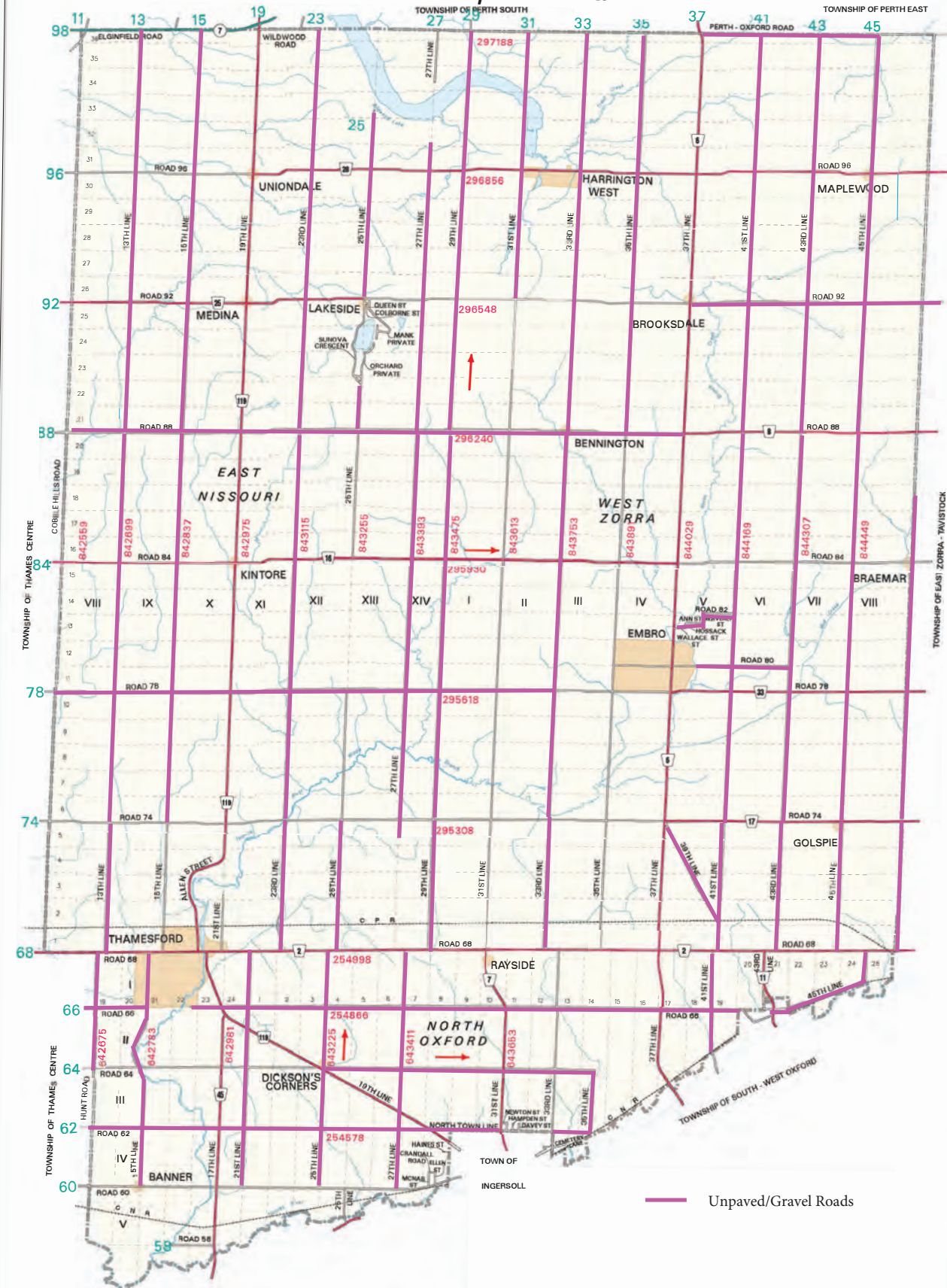
Sect. No.	Road Name	From - To	Preliminary Improvement Type Recommendation	Length (km)	AADT	Surface Condition	Structural Adequacy	Condition Rating
59	Stanley St. N.	From LOT 1/2 To ROAD 68	Preventative Maintenance	0.6	800	8	16	92
78	Brock St	From STANLEY ST. To ST. PATRICK ST.	Preventative Maintenance	0.8	400	6	16	91
61	George St.	From CPR ROW To ROAD 68	Preventative Maintenance	0.6	500	8	16	92
67	Washington	From STANLEY ST. To ALLEN STREET	Preventative Maintenance	0.8	250	8	16	92
73	Stanley St. S.	From BANNER ROAD To ROAD 68	Preventative Maintenance	0.8	800	9	17	95
76	Middleton	From SLOAN DR To ROAD 68	Preventative Maintenance	1.1	450	9	17	95
95	Commissioners St	From 35TH LINE To ToWN LIMIT	Preventative Maintenance	1.9	1000	9	18	96
65	Mc Carty St.	From STANLEY ST. To ALLEN STREET	Preventative Maintenance	0.8	300	9	17	95
81	Alison Rd.	From STANLEY ST. To SELDON	Preventative Maintenance	0.4	300	9	17	95
60	Church St.	From MC CARTY To ROAD 68	Preventative Maintenance	0.5	250	9	17	95
66	Byron St.	From STANLEY ST. To ALLEN STREET	Preventative Maintenance	0.8	250	9	17	95
82	Seldon	From STANLEY ST. To MIDDLEToN	Preventative Maintenance	0.5	250	9	17	95
70	Finlayson Dr.	From STANLEY ST. To STANLEY	Preventative Maintenance	0.5	200	9	17	95
79	Elizabeth St.	From STANLEY ST. To MIDDLEToN	Preventative Maintenance	0.4	200	9	17	95
68	Delatre St. W	From STANLEY ST. To ALLEN STREET	Preventative Maintenance	0.8	150	9	17	95
77	Andrew St	From BROCK ST To DUNDAS ST W	Preventative Maintenance	0.1	150	9	17	95
90	John St	From ROSS To SUTHERLAND	Preventative Maintenance	0.7	250	9	18	96
71	Conway Ct.	From TURNING CIRCLE To STANLEY	Preventative Maintenance	0.2	75	9	17	95
72	Minler Rd.	From TURNING CIRCLE To FINLAYSON	Preventative Maintenance	0.2	75	9	17	95
74	Pamela Ct	From ALISON To TURNING CIRCLE	Preventative Maintenance	0.2	75	9	17	95
88	St. Andrews St	From 37TH LINE To THAMES	Preventative Maintenance	0.4	200	9	18	96
75	Boyd Blv	From SLOAN DR To SLOAN DR	Preventative Maintenance	0.4	400	10	19	99
92	Elgin St	From CPR ROW To JOHN	Preventative Maintenance	0.5	300	10	19	99
93	Argyle St	From HALLADY To JOHN	Preventative Maintenance	0.6	200	10	19	99
80	Linda Lane	From STANLEY 15th LINE To BOYD BVL.D.	Preventative Maintenance	0.4	175	10	19	99
87	Union St	From DEAD END AT WEST To 37TH LINE	Preventative Maintenance	0.3	150	10	19	99
94	Thames St	From ST. ANDREWS To COMMISSIONERS	Preventative Maintenance	0.1	150	10	19	99
96	Sutherland_St	From COMMISSIONERS To JOHN	Preventative Maintenance	0.1	150	10	19	99
85	James St	From DEAD END AT WEST To 37TH LINE	Preventative Maintenance	0.2	125	10	19	99
86	Kincardine St	From 37TH LINE To ARGYLE ST.	Preventative Maintenance	0.2	125	10	19	99
84	Hallady St	From 37TH LINE To ARGYLE ST.	Preventative Maintenance	0.2	100	10	19	99
89	Wallace Crescent	From COMMISSIONERS To COMMISSIONERS	Preventative Maintenance	0.2	100	10	19	99
91	Ross St	From ROAD 80 To JOHN	Preventative Maintenance	0.2	100	10	19	99
83	Sloan	From 15th LINE To MIDDLEToN	Preventative Maintenance	0.7	400	10	20	100

# Township of Zorra





# Township of Zorra



## Community Levels of Service – Quality

The below images provide illustrations on how the road conditions relate to their PCI.

PCI Value	Rating
80-100	Excellent
60-79	Good
40-59	Fair
20-39	Poor
0-19	Critical

***Image B.1 Rural Road with a PCI of 92.9 (Excellent)***



***Image B.2. Rural Road with a PCI of 73.7 (Good)***



***Image B.3. Urban Road with a PCI of 49.5 (Fair)***





## Appendix B4 - Roads Risk Matrix Graph 2019

Consequence	5	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	4	1 Asset 3.10 km \$737,187.75	2 Assets 6.20 km \$1,450,567.50	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	3	15 Assets 19.55 km, km2 \$5,043,250.13	30 Assets 48.99 km \$11,500,771.51	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	2	23 Assets 16.50 km \$5,398,555.50	16 Assets 19.00 km \$4,475,296.88	3 Assets 2.80 km \$577,498.51	0 Assets - \$0.00	0 Assets - \$0.00
	1	14 Assets 5.10 km \$1,413,572.63	4 Assets 4.80 km \$887,551.26	12 Assets 4.20 km, km2 \$862,883.75	1 Asset 0.20 km \$26,540.00	0 Assets - \$0.00
		1	2	3	4	5
		Probability				

# Stormwater Systems

## Core Asset



	ASSET	STORMWATER MANAGEMENT ASSETS
State of Local Infrastructure	Inventory	<p>Stormwater Infrastructure will be defined into three categories:</p> <ol style="list-style-type: none"> <li>1. Rural Roadside Ditching = 915 km</li> <li>2. Urban Storm drain system = 36 km</li> <li>3. Stormwater Management Ponds = 9.26 acres</li> </ol>
	Integrated Assets	Roads, Bridges and Sidewalks
	Total \$'s to Replace Entire Asset Category	Included in replacement cost of the Roads. (Paved and Unpaved)
	Average Age of Assets in Category	Not available.
	Current Condition of Assets	Deemed to be similar to the condition of the Primary Road.
	Description of Data Sources	<p>There is no routine condition assessment in process in place for stormwater infrastructure.</p> <p>Assessments are carried out in combination with other capital projects. (roads, water, sanitary etc.)</p>
Current Level of Services	Community	<p><u>Scope:</u> Description, which may include maps, of the areas of the municipality that are protected from flooding.</p> <p>See Appendix C1 for Flood mapping provided by the County of Oxford GIS and with flood lines obtained from Conservation Authorities having jurisdiction.</p>
	Technical	<p><u>Scope:</u> Percentage of properties in the municipality resilient to a 100-year storm.</p> $\% \text{ of Resilient Properties} = \frac{\# \text{ of resilient properties}}{\text{Total \# of properties}}$ <p><b>Result is: 97.4% = <u>3766 resilient properties</u> 3867 properties</b></p> <p><u>Scope:</u> Percentage of the municipal stormwater management system resilient to a 5-year storm.</p> $\text{Resilient Ditches} = \frac{\text{total length of ditches designed to convey runoff from a 5 year storm}}{\text{total length of ditches in the municipality}}$ <p><b>100% of the 915 km of roadside ditches are designed for a 5-year storm</b></p> <p><u>% Resilient Storm Sewer</u></p> $= \frac{\text{total length of stormsewers designed to convey runoff from a 5 year storm}}{\text{total length of storm sewers in the municipality}}$

Performance Levels		<p><b>100% of the 36 km of urban storm sewers are designed for a 5 year storm</b></p> $\% \text{ Resilient SWM Facilities} = \frac{\text{total number of SWM Facilities designed to a 5 year storm minimum}}{\text{total number of SWM Facilities in the municipality}}$ <p><b>100% of the 3 storm water management ponds are designed for a 5 year storm</b></p>
	<b>Current Performance</b>	Township storm water management systems follow standard design criteria established under the Drainage Act.
Asset Lifecycle Activities	<b>Planned Actions On-going Maintenance</b>	<p>Maintenance activities routinely completed to maintain the stormwater management assets include such activities as:</p> <p>Roadside ditching; grass cutting in ponds, and catch basin cleaning to ensure that stormwater can flow from the surface into stormwater mains without obstructions.</p> <p>Many Roadside ditches are part of Municipal drains systems and maintenance is performed under the Drainage Act. Reconstruction projects are completed only when they can be combined with planned road rehabilitation or reconstruction projects.</p>
Risk Management Strategies	<b>Risk = Probability x Consequence</b>	<p><b>Rick Factors:</b> Current conditional assessment (<i>probability</i>), Traffic Count (AADT) (<i>consequence</i>), Replacement Cost (<i>consequence</i>), Criticality (<i>consequence</i>).</p> <p>Deemed to be similar to the risk rating of the Primary Road.</p>
Financial Strategies	<b>Replacement and Funding Strategies</b>	<p>The “<i>Road Needs Study</i>” will be updated every 5 years and will be used as a document of principles and guidelines that will serve the Township in future road needs decisions. The report provides recommendations and prioritization for planned capital improvements based on condition ratings and traffic demands on each road section.</p> <p>Annual Federal Gas Tax funding and MNR Aggregate Royalties will be used to supplement the tax revenue/reserve strategy. Every year the 5-year capital budget will be reviewed to determine the recommended capital tax levy dollars required to fund the recommended improvements.</p>
	<b>Annual Requirement \$ To Fund Replacement Program</b>	Included in replacement cost of the Roads. (Paved and Unpaved)

# Appendix C1- Township of Zorra Stormwater Asset Management Support Map

