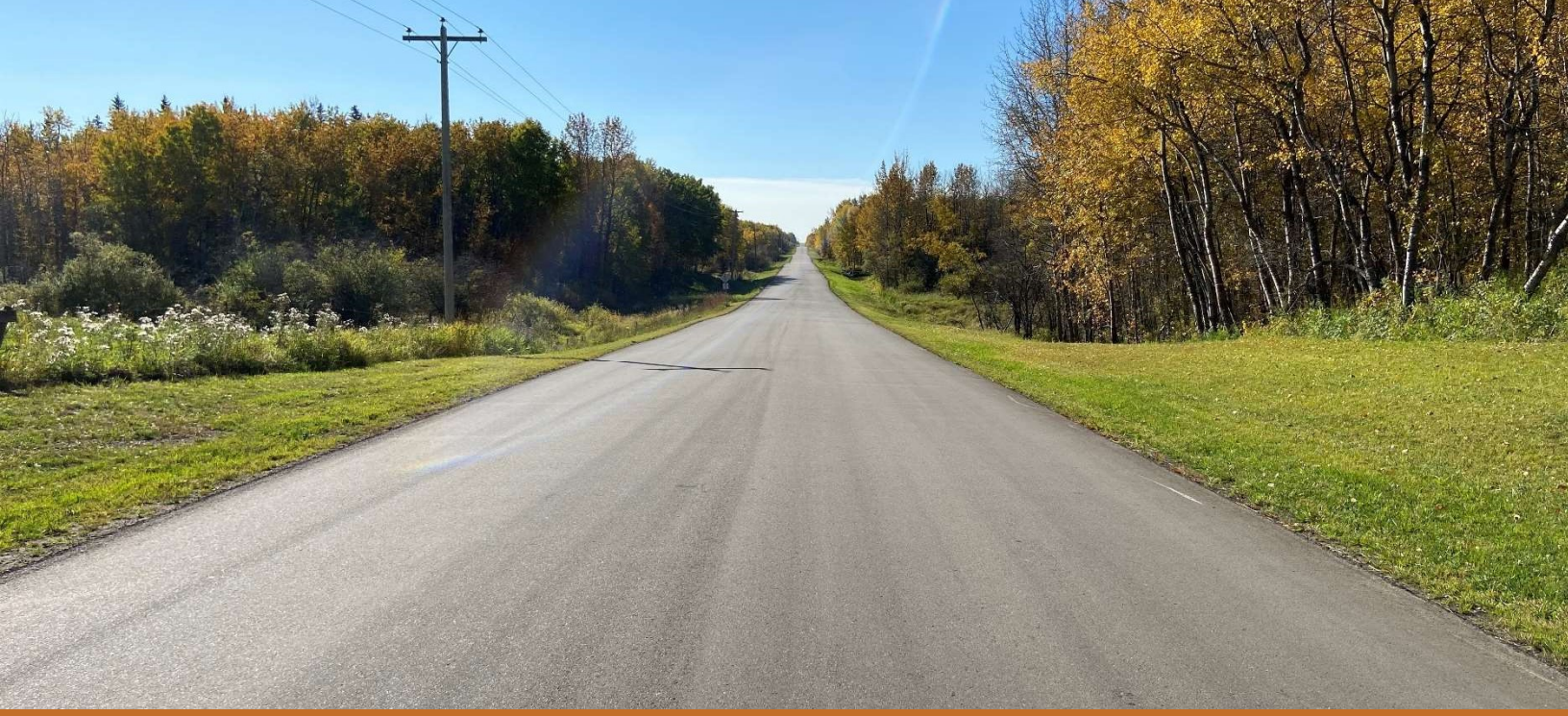

Strathcona County
Sustainable Rural Roads Master Plan

August 2021

Prepared for: STRATHCONA COUNTY

Prepared by:

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August 20, 2021 File: 1197-00

Strathcona County
2001 Sherwood Drive
Sherwood Park, AB T8A 3W7

Attention: Ryan Wilson, CET
Manager, Transportation Operations

Re: Sustainable Rural Roads Master Plan 2021
Final Submission

We are pleased to submit our Final Report of the Sustainable Rural Roads Master Plan 2021. The report summarizes our formal review and recommendations. We invite the opportunity to discuss the contents of the report with the Strathcona County staff and make any adjustments necessary prior to our final submission.

If there are any questions or concerns with the document, please contact the undersigned.

Regards,
Al-Terra Engineering Ltd.

Fred Greenhough, P.Eng., RSP2I

Enclosures

CORPORATE AUTHORIZATION

This report entitled **Strathcona County Rural Roads Master Plan 2021** was prepared by Al-Terra Engineering Ltd., under authorization and exclusive use of the Strathcona County.

The recommendations put forward reflect Al-Terra's best judgment with the information available. Any use of this information in a manner not intended or with the knowledge that situations have changed shall not be the responsibility of Al-Terra Engineering Ltd.

Prepared by:
Fred Greenhough, P.Eng., RSP_{2I}

Reviewed by:
Sheldon Hudson, P.Eng., MBA

PERMIT TO PRACTICE
AL-TERRA ENGINEERING LTD
RM SIGNATURE: _____
RM APEGA ID #: M59002
DATE: August 20, 2021
PERMIT NUMBER: P002104
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Corporate Permit

EXECUTIVE SUMMARY

Overview

The objective of the Sustainable Rural Roads Master Plan is to guide how Strathcona County's rural road network is maintained and rehabilitated. The rural road network consists of 1314km of grid roads, including range roads and township roads, rural residential subdivision roads and roads within rural hamlets.

In the Fall of 2019, Strathcona County retained Al-Terra Engineering Ltd. to review the Sustainable Rural Roads Master Plan 2010 and to develop the Sustainable Rural Roads Master Plan 2021. To develop the report and recommendations the following key tasks were undertaken:

- Technical review committee was assembled that was comprised of the project team and key County staff. The objective of the committee was to provide information regarding the current transportation maintenance and rehabilitation strategies, assist in the study planning process, provide advice, review technical challenges, and assist in formulating the study recommendations.
- Current state analysis of the existing road network was conducted. This involved reviewing the current design standards, budget allocations and analyzing the existing road condition database for traffic volumes, road width, and surface type.
- A review of the current maintenance and rehabilitation practices was completed. The review looked at the current practices being utilized by the County for the various road surface types.
- Road safety program was reviewed, and short and long-term options were provided for collision mitigation strategies.
- A public engagement program was developed to guide the process for engaging residents and stakeholders. Public engagement consisted of two phases. The goal of the first phase, held at the beginning of the project, was to engage the rural residents and stakeholders at a "Listen and Learn" level to gain an understanding of how residents felt about the rural road network, current maintenance and rehabilitation practices and road safety. Data gathered from the public engagement help inform the project team to understand the local conditions and experiences of the users that travel the roads each day. The second phase was held near the completion of the project and consisted of reporting back what was heard during the first phase and to gauge the level of support of the presented draft recommendations.
- A value analysis workshop was held and was attended by the project team, County staff, staff from neighboring municipalities, and experts from outside consultants and contractors. The goal of the workshop was to identify innovative ways to develop, maintain, rehabilitate, and upgrade the rural roads in the County and provide the project team with options for further investigation. The key ideas that were developed were evaluated and several were incorporated into the recommendations.

Recommendations

The Sustainable Rural Roads Master Plan identifies several strategic actions that will assist Strathcona County in continuing to manage an effective rural transportation network. A summary of the key recommendations is listed below.

Preservation of Investment

- Continue to invest in timely routine interim maintenance practices to increase the design life of existing roads.
- Develop a formal process for trialing new products or construction methods.
- Site specific engineering and geotechnical work should be performed to identify the proper rehabilitation or maintenance treatment.
- A cost benefit analysis should be used to evaluate the life cycle cost of proposed improvements and maintenance.
- Technology should be used to capture a richer data set when completing traffic counts.
- Industry partners should be engaged about directing their employees to use specific routes for employees and trucks.
- County staff should develop a regular communication and information sharing program with neighboring municipalities.

Safety Measures

- A brushing program should be implemented where trees are cleared at intersections to increase sightlines.
- Continue to collect the most comprehensive data available for collisions.
- Implement guidelines for additional safety measures at rural stop-controlled intersections.
- Consider rural roundabouts as potential intersection treatments.
- Keep the right-of-way mowed and clear of trees in animal corridors to reduce animal collisions.
- Intersecting roadways that have a gravel or dust-abated gravel surface should have asphalt. paved a minimum of 30m from edge of roadway to allow for winter maintenance.

Rural Road Functional Classification and Design Standards

- Update road classification nomenclature.
- Update road classifications to divide the Class II roads into a Rural Major Collector and Rural Minor Collector.
- Develop a functional classification plan based on the long-term network traffic model.
- Develop a formal Rural Industrial Road functional class.

Develop Rehabilitation Design Guidelines

- Develop rehabilitation design guidelines is to provide lower cost and lower impact design options to sustainably extend the service life of the existing infrastructure.

Funding Requirements

- To address the backlog in the existing infrastructure deficit the capital budget will need to be significantly increased.

1.0 Project Overview

1.1 Introduction

Strathcona County has been one of the fastest growing communities in Alberta and has experienced a wide diversity of development over the last decade. To continue to accommodate the anticipated future demand Strathcona County is updating its Sustainable Rural Roads Master Plan (SRRMP) that was last updated in 2010. Regular updates to the SRRMP are important to capture and address changes in development patterns, population growth and budget priorities.

The purpose of the SRRMP is to guide how rural roads are maintained and rehabilitated in Strathcona County. The SRRMP encompasses 1,314km of roadways that include range roads and township roads, roads within rural residential subdivisions and roads within rural hamlets. Provincial highways and Sherwood Park urban roadways are excluded as they are maintained and upgraded outside of the scope of this document. In the Fall of 2019, the County retained Al-Terra Engineering Ltd. (Al-Terra) to review the SRRMP 2010 and to develop the Sustainable Rural Roads Master Plan 2021.

The governing concept for the work completed by Al-Terra on the SRRMP 2021 was to consider sustainability in the role economic prosperity, social responsibility, and environmental stewardship plays in the long-term management of the rural road network. This was accomplished by providing tools to focus resources on priorities that provide the highest value for the dollars spent, recommending strategies to provide a transportation system that follows the "Safer Systems" approach to reducing the risk and severity of collisions, and updating design standards and rehabilitation methods to reduce the environment footprint.

1.2 Methodology

The County's principle guiding document is the Strategic Plan. The current Strategic Plan was approved by Council in April 2013 and refined in May 2018. The Strategic Plan provides guidance for governance, community development, infrastructure, and program and service delivery. It serves as the foundation on which the County's corporate business plan, department business plans, master plans, and budgets are developed and approved.

Within the Strategic Plan, sustainability is defined as a primary goal. From the Strategic Plan:

> *A community's vitality and long-term sustainability are linked to its ongoing investment in critical infrastructure. To ensure our economy remains competitive, long-term, we consciously invest in efficient and effective municipal infrastructure to meet the needs of our growing community. We also optimize and rehabilitate existing investments to ensure Strathcona County's infrastructure is in good repair, and development programs are adequately funded.*

The Strategic Plan originally included three complimentary frameworks designed to sustainably manage the growth of Strathcona County and to guide decision making. These frameworks are:

- Social Sustainability Framework (2007) – Guides Strathcona County's approach to supporting a caring and connected community. The Social Sustainability Framework (2007) has since been updated to the Social Framework (2017).
- Environmental Sustainability Framework (2009) – Guides Strathcona County's approach to protecting and conserving the natural environment. The Environmental Sustainability Framework (2009) has since been updated to the Environmental Framework (2021)
- Economic Sustainability Framework (2011) – Guides Strathcona County's approach to encouraging economic prosperity.

The County's Municipal Development Plan (MDP) is the tool for decision making pertaining to growth in the County and is a comprehensive document for sustainability planning. It describes sustainability as:

> *Developing in a manner that meets the needs of the present without compromising the ability of future generations to meet their own needs, while striking a balance between economic prosperity, social responsibility, and environmental stewardship.*

To guide transportation and infrastructure decision making, The County has several levels of legislation and planning documents. The Transportation Systems Bylaw 2-2017 (TSB) is the primary legislation, and it establishes the classification of all roads within the County. The Integrated Transportation Master Plan (ITMP) is the highest-level transportation planning document within the County, and it guides how the County manages and invests in the entire transportation network including urban and rural roads, sidewalks, trails, and transit. The current ITMP was issued in 2012 and an update to the plan was initiated in 2021. The SRRMP is below the ITMP in the planning document hierarchy. There are other planning documents which impact transportation decision making in the County including:

- Traffic Safety Strategic Plan
- Alberta Industrial Heartland Transportation Study
- Transit Master Plan
- Agriculture Master Plan

The SRRMP provides direction and guides decision making in the maintenance, rehabilitation, and improvements of the County's rural road network. The rural road network is categorized into 6 functional classes that are covered in this plan. These classes are:

- Class I (Arterial)
- Class II (Collector)
- Class III (Local)
- Class IV (Local)
- Rural Residential Subdivision
- Rural Hamlet Roads

The primary tasks that were conducted include:

- Review and analysis of the principles and recommendations from the SRRMP 2010
- Establish a technical review committee to ensure study is meeting County objectives
- Develop a public engagement program to better understand the local conditions and experiences of the road users
- Host a value analysis session with outside experts
- Current state analysis of the existing rural road network
- Review of current maintenance practices and techniques
- Develop criteria for the rural road classification system
- Review road safety program
- Provide recommendations for the prioritization of upgrades and rehabilitation

1.2.1 Data Sources

The primary source of data was Strathcona County, which provided the following form various internal sources:

- Pavement Management Data from Road Matrix Database
- Collision Data
- GIS Mapping
- Budget information

2.0 Road Safety

2.1 Traffic Safety Strategic Plan 2020

In 2014 the County implemented the Traffic Safety Strategic Plan 2020 (TSSP 2020) with the objective to serve as an internal guiding document for the County's decision-making processes related to traffic safety through the year 2020. The TSSP 2020 is based on the Safe System philosophy. The Safe System philosophy is based on the belief that responsibility for road safety is shared between road users, designers, and regulators. Safe transport is recognized as the most important outcome of the road network. Although a Safe System requires alert, compliant and responsible road users, it also acknowledges that humans are prone to making errors, and advocates for vehicles and roads that are forgiving of human error.

Recognizing that the County would not be able to implement the full adoption of the Safe System approach, the County has adopted a "Safer Systems" approach, which incorporates the Safe System concepts without fully committing to the very significant investment that would be necessary to bring the entire road network into compliance. New transportation system improvements are to consider the safer systems approach into their designs.

The strategic plan covered both rural and urban roadways within the County. The guiding principles of the TSSP 2020 are:

> *Vision – No one is seriously injured or killed while travelling on Strathcona County's road network.*
>
> *Mission – Strathcona County is committed to the proactive implementation of integrated, evidence based and collaborative road safety strategies to create an increasingly safe and sustainable transportation environment.*

The goals of the plan were:

> *1. For roads that are owned and maintained by Strathcona County, the average annual rate of combined fatal and major injury collisions per 100,000 population from 2018 to 2020 will be reduced by 15 percent compared to the average rate from 2011 to 2013. The average number of fatal and major injury collision from 2018 to 2020 will be reduced by 15 percent combined to the average number of collisions from 2011 to 2013.*
>
> *2. For roads that are within the borders of the County but that are owned and maintained by the Province of Alberta: Strathcona County will work cooperatively with Alberta Transportation staff to improve traffic safety and help meet Provincial safety targets*

There were 13 strategies identified as having the greatest potential to impact traffic safety within the County. These strategies ranged from already implemented and ongoing strategies to planned strategies, short term strategies and long-term strategies. The 13 identified strategies were:

- Strategy 1: Traffic Safety Data Collection, Analysis and Management Program
- Strategy 2: Road Network Screening Program
- Strategy 3: Integrated Safety-Focused Enforcement Program
- Strategy 4: Integrated Public Education and Social Marketing Program
- Strategy 5: In-Service Road Safety Review Program
- Strategy 6: Neighbourhood Traffic Safety Strategy
- Strategy 7: Road Safety Audit Program
- Strategy 8: Intersection Safety Strategy
- Strategy 9: Rural Road Safety Strategy

- Strategy 10: Work Zone Safety Strategy
- Strategy 11: MARD/Older Adults Traffic Safety Strategy
- Strategy 12: Safe Vehicles Strategy
- Strategy 13: Corporate Traffic Safety Strategy

The County has been making progress on the implementation of these strategies with Strategies 1-8 and 10 having been implemented as of 2021, with Strategy 9 is actively being planned. Strategies 10-13 are still outstanding.

2.2 Safety Measures

Considering the Safer Systems Approach, recommendations that the County can implement to reduce the risk of collisions on the rural networks and to assist with rural road safety program have been developed and are included in **Section 10.2**. Included in these recommendations are the potential use of mini-rural roundabouts and the implementation of guidelines for additional safety measures at rural stop condition intersections. Addition information on these recommendations is provided in **Section 2.3 Rural Stop Controlled Safety Enhancements** and **Section 2.4 – Mini Rural Roundabouts**.

2.3 Rural Stop-Control Safety Enhancements

The basic treatment for a two-way stop control (TWSC) intersection along a two-lane undivided road typically includes a minimum of 600mm x 600mm stop signs for the minor road approaches. For more complex roads with higher traffic volumes and where operational and safety concerns are being observed, a hierarchal system of signing, markings, and other mitigation measures should be considered in developing appropriate intersection treatments. The use of a hierarchal system will help maintain the effectiveness of these treatments and prevents the overuse of traffic control devices.

Alberta Transportation's "Safety Measures at Rural Stop-Controlled Intersections" and "Stop Sign Recommended Practices" were reviewed which have aided in the development of these guidelines.

2.3.1 Stop Condition Measures Hierarchy

Level 1 – Oversize Stop Signs

- 900mm x 900mm – Upgrading the stop sign to a 900mm x 900mm should be considered if an intersection has been identified as a high collision location with three or more collisions or near misses involving stop sign violations in five years.
- 1200mm x 1200mm – If an intersection has been identified as a high collision location with three or more collisions involving stop sign violations in five years and a 900mm x 900mm stop sign has been installed and has proven ineffective, the installation of an oversize 1200mm x 1200mm stop sign should be considered.

Level 2 – Stop Ahead Sign

- A "Stop Ahead" sign could be introduced along stop-controlled approaches where stop sign violations are frequently observed. Implementing this sign could be considered at intersections where oversize stop signs have proven to be ineffective.
- Other instances where a "Stop Ahead" sign could be considered would be along roadways where sight distance is restricted, the roadway alignment rapidly changes, or the visual environment is complex which may divert the focus of a driver.

Level 3 – Supplementary Pavement Markings

Supplementary pavement markings such as "Stop" or "Stop Ahead" pavement messages could be considered at intersections where there are observed safety and operational concerns due to complex roadway geometry, or where the previous control and warning devices in Level 1 and 2 have proven to be ineffective. These pavement messages would be used as enhancements to the existing stop-control and warning devises such as an oversize stop sign and stop ahead sign. This would only be applicable to hot mix surfaced roads.

Level 4 – Flashing Red Lights and Rumble Strips

Flashing red lights and transverse rumble strips are the highest level of safety enhancement to a stop-controlled intersection and should only be considered at locations where safety would be significantly improved and where oversize "Stop" signs, "Stop Ahead" signs, and pavement markings in the previous levels have proven to be ineffective in preventing collisions related to stop sign violations.

Flashing red lights are usually not cost effective on low volume roads as the potential for collisions is typically lower than roads with 500 vpd or more. The placement of transverse rumble strips needs to be site specific as there are noise concerns with their placement.

2.3.2 Other Mitigation Measures

Reflective Stop Sign Pole

To increase the visibility of a stop sign, especially at unilluminated rural intersections, a reflective stop sign post could be considered. As per the Manual of Uniform Traffic Control Devices, the colour of the reflective strip should match the colour of the sign.

Durable Stop Bar

On paved minor roads approaching a stop condition, durable stop bars could be considered to indicate the point at which a vehicle is required to stop. Durable stop bars are typically between 300mm and 600mm wide. Durable stop bars can aid in increasing driver awareness, and when combined with stop signs and pavement messages, it can act as an additional reminder for motorists to stop prior to proceeding. Increasing the width can provide additional emphasis.

Narrowed Stop Approach with Paint Lines

Narrowing a stop-controlled approach through physical grading work or with paint lines creates a pinch point for vehicles, which can encourage drivers to slow down. Adjusting the paint lines to narrow the road width can influence a driver's perception and can result in them reducing their speed.

This improvement applies to paved roads only. The narrowing of an existing paved road with paint lines would be a more feasible and cost-effective solution opposed to performing grading work.

Narrowed Stop Approach with Minor Road Splitter Island

The Federal Highway Administration (FHWA) Office of Safety has discussed some safety concepts for two-way stop-controlled rural intersections that could be considered for rural roads within the County. One of the concepts is providing a splitter island along the stop-controlled minor road with two stop signs on the minor road, one installed on the median splitter island and another on the right-hand side of the stopped vehicle. This concept increases intersection awareness by providing additional signage and encourages vehicles to reduce their speed along the stop-controlled approach. Installing a concrete splitter island could potentially become an obstruction for snowplows in the winter.

Transverse Pavement Markings

Transverse pavement markings can be placed on the roadway to give the driver the impression that their speed is increasing. They can be used on approaches to curves, approaches to intersections, or along tangential segments, varying from side hatching to bars spanning across the entire lane width. This is a generally inexpensive application; however, line painting will need to be maintained.

2.4 Mini Rural Roundabouts

Left turn collisions at rural two-lane highways can be a safety concern as vehicles may misjudge the gaps or speed of vehicles in the oncoming lane, resulting in severe injury or fatal collisions. Roundabouts eliminate this risk as there is no need to turn left across oncoming traffic. Vehicles entering the intersection must yield to traffic already in the circle and proceed when there is a safe gap, in a reduced speed environment. Roundabouts also provide traffic calming benefits by lowering speeds through a corridor and reducing incidents of shortcutting. The application of mini rural roundabouts is very site specific and should only be implemented at intersections after a detailed engineering assessment has been conducted to determine the site suitability. The siting and design of roundabouts can have an impact on the passage of large vehicles, specifically agricultural equipment.

Roundabouts have the effect of reducing the number of high-speed collisions at rural intersections. The roundabout geometry is designed with raised channelization, reduced turning radii, and a raised circular island so that drivers must navigate through the intersection at speeds of 25km/hr to 40km/hr. Roundabouts require vehicles to yield and navigate around a raised, circular island which reduces the possibility of angle collisions. The Federal Highway Administration reports that roundabouts on rural two-lane highways have eliminated 83% of angle-type crashes and reduced overall crashes by up to 68% and injury crashes by up to 88%.

Smaller inscribed roundabout diameters help maintain lower travel speeds and therefore are preferred for overall safety. Mini roundabouts also have the least land impacts and require less right-of-way purchase and therefore, would have a lower overall cost compared to larger or multi-lane roundabouts. The Federal Highway Administration states that mini-roundabouts are typically designed with a 13-25m inscribed circle diameter, and the recommended maximum entry design speed is 25km/hr. Generally, the larger the roundabout inscribed diameter, the more flexibility there is to improve the approach geometry to reduce vehicle approach speeds. Larger inscribed diameters allow for reduced entrance angles between entering vehicles and circulating vehicles which leads to reduced entering-circulating crash rates.

3.0 Existing Data Inventory

The following section outlines the review of the background information and data regarding the various aspects of the County's rural road network based on the current roadway classifications and design standards. The criteria include:

- Existing road classification and standards
- Traffic volumes
- Surface types
- Road widths

3.1 Existing Roadway Classification Criteria and Standards

The TSB approves the rural road classifications and defines the urban and rural service areas and the classification of each road. The Strathcona County Design and Construction Standards provides the specific design criteria and cross sections for each classification. The most up to date design standards are accessible at the following website:

https://www.strathcona.ca/files/files/tpe-strathcona-county-design-and-construction-standards.pdf

The details of the design standards for each functional road classification, including right-of-way, cross-section, structure (embankment, pavement, etc.), and other elements are described within the standards. The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads is referred to for horizontal and vertical alignment and clear zone requirements. Design speeds are provided for grid roads, but for rural hamlet and rural residential roads, only minor reference is made to the posted speed limit. The County's standard cross-sections for rural roads are included in **Appendix A** and photographic examples are shown in **Appendix B**. A map showing the classification of rural roads is shown in **Figure 1**.

A summary of the design standards is described below:

Class I – Hot Mix Asphaltic Concrete Roadway:

- Typically carry over 1,000 vehicles per day (vpd)
- Structural design life of 20 years
- 9.0m top width, sideslopes minimum of 4:1
- Surfacing standard is hot mix asphalt
- Right-of-way of 40.0m

Class II - Cold Mix Asphaltic Concrete Roadway:

- Typically carry between 250 vpd and 1,000 vpd
- Structural design life of 10 years
- 7.5m top width, sideslopes of 4:1
- Surfacing standard is cold mix asphalt. The use of cold mix has been mostly discontinued and replaced with hot mix as it is more economical, easier to construct, and easier to control quality.
- Standard right-of-way of 30.0m with additional backsloping agreements when required, recommended right-of-way of 40m to avoid backsloping agreements and facilitate transition to Class I

Class III Dust Abated Gravel Roadway:

- Typically carry less than 250 vpd
- 7.5m top width
- Current surface standard is dust abated gravel surface consisting of oil bound gravel
- Standard right-of-way of 30.0m with additional backsloping agreements when required

Class IV – Gravel Roadway:

- Typically carry less than 250 vpd
- 7.5m top width
- Current surface standard is gravel surface, with spot residential dust abatement for 150m at residences
- Standard right-of-way of 30.0m with additional backsloping agreements when required

Rural Residential Subdivision (RRS) Roads:

- No traffic volume requirement
- 8.5m or 7.5m top width
- Current surface standard is hot mix asphalt
- Standard right-of-way of 30.0m with additional backsloping agreements when required

Rural Hamlet Roads:

Located within the boundaries of rural hamlets, they are subdivided into two categories: roads in “high density parcel development” follow the urban service standards and shall have 9.0m gutter-to-gutter width, and 18.0m right-of-way; while roads in “low density parcel development” (also described as country residential or rural density) have 8.5m top width, and a 30.0m right-of-way. There is no typical traffic volume requirement for rural hamlet roads, and the current surface standard is hot mix.

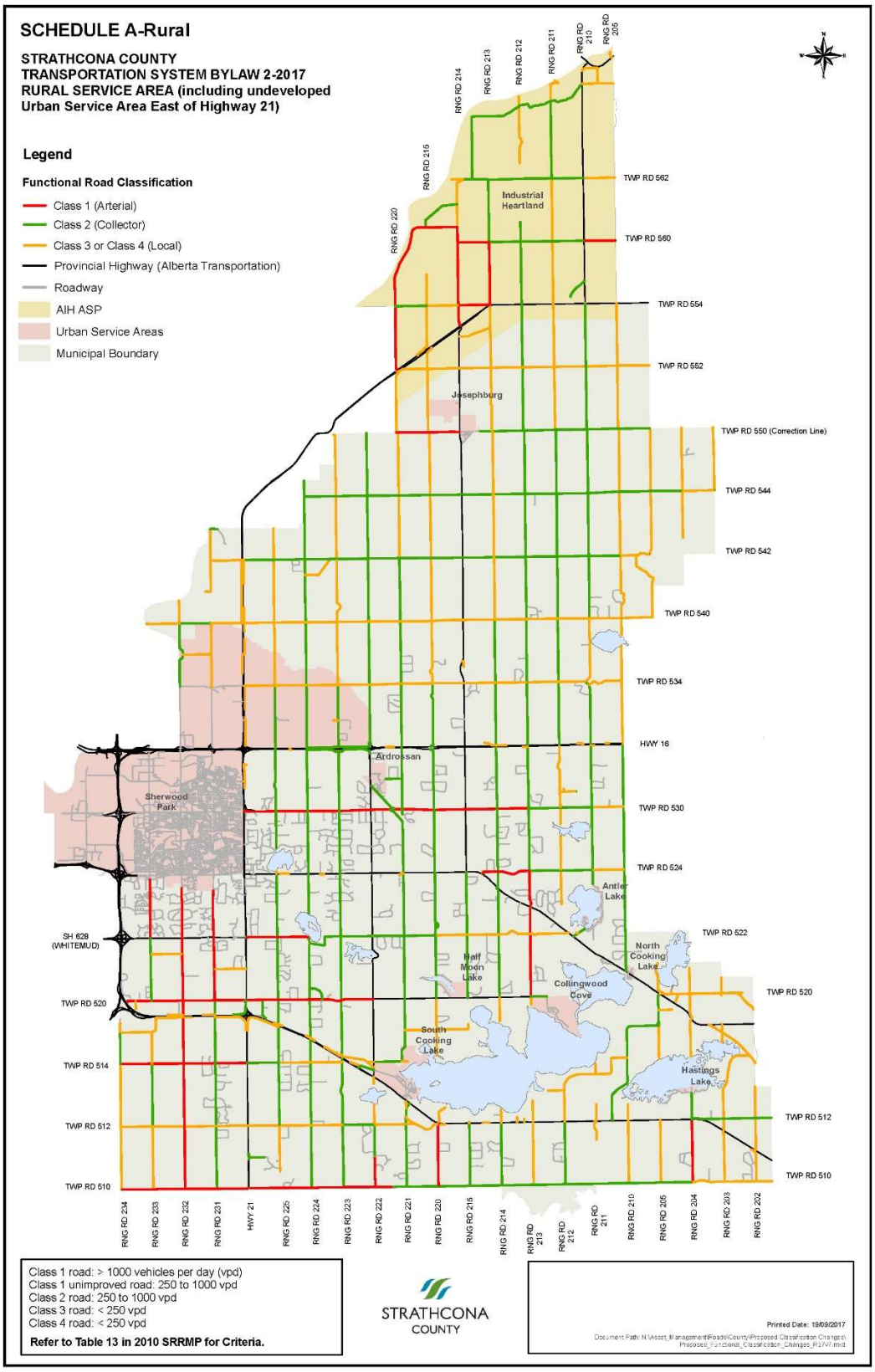


Figure 1 – TSB Road Classification

3.2 Traffic Volume Inventory

One of the primary determinants for the classification, design criteria and surfacing standards of the County's roadways is traffic volume. Traffic volumes are described in terms of vehicles per day (vpd), but current data does not classify vehicles between light duty (cars/pickups) and heavy duty (buses/semi-trucks). Traffic volumes are collected in three-year cycles with a different region of the county (south / central / north) being counted each year. Once collected, the counts are added to the database. **Table 1** provides a more detailed breakdown of the traffic count volumes within each class of grid road (Class I, Class II, Class III, and Class IV). **Figure 2** shows a map of road network with traffic volume versus road class capacity. Traffic data was analyzed from 2020 as it is more representative than traffic data from 2021 due to the public health measures that were in place in 2021.

A review of the data shows that the average traffic volumes on Class I roads are 2120 vpd, 550 vpd on Class II, 160 vpd on Class III, and 50 vpd on Class IV. This equates to Class I roads being the arterial roadway of the rural network, Class II roads the collectors, and Class III and Class IV the local roads.

6.9% (31km) of Class II roads have traffic volumes over 1000 vpd and based on existing criteria would be considered for improvements to Class I. 8.5% (23km) of Class III roads have over 250 vpd and based on existing criteria would be considered for upgrades to Class II. 4.1% (5km) of Class IV roads have over 250 vpd and based on existing criteria would be considered for upgrades to Class III or II. 38% (51km) of Class I roads are under 1000 vpd and 9.0% (12km) are under 500 vpd. 25% (109km) of Class II roads are under 250 vpd, and 5.2% (23km) are under 100 vpd. Roads that are under the minimum traffic volume for the class should have their position within the overall network evaluated and should have current traffic counts completed, during various seasons, prior to consideration for class downgrade.

Table 1 - Traffic Volume Ranges by Road Class

RURAL GRID ROADS Km of Road in Given Vehicle Per Day Range							
Vehicle Per Day Range	**0-100**	**101-250**	**251-500**	**501-1000**	**1001-2000**	**2001+**	**Total km**
Class I (km)	0.00	6.22	5.66	38.85	53.29	28.00	132.02
%	0.0%	4.7%	4.3%	29.4%	40.4%	21.2%	100.0%
Class II (km)	23.07	85.83	158.74	145.79	21.39	9.27	444.09
%	5.2%	19.3%	35.7%	32.8%	4.8%	2.1%	100%
Class III (km)	111.32	132.60	15.54	3.27	1.08	2.63	266.44
%	41.8%	49.8%	5.8%	1.2%	0.4%	1.0%	100%
Class IV (km)	103.98	8.70	4.87	0.00	0.00	0.00	117.54
%	88.5%	7.4%	4.1%	0.0%	0.0%	0.0%	100%
Total Class I to IV (km)	**238.37**	**233.34**	**184.81**	**187.91**	**75.76**	**39.90**	**960.10**
%	**24.8%**	**24.3%**	**19.2%**	**19.6%**	**7.9%**	**4.2%**	**100%**

Notes: Data obtained from Road Matrix 03-20-20

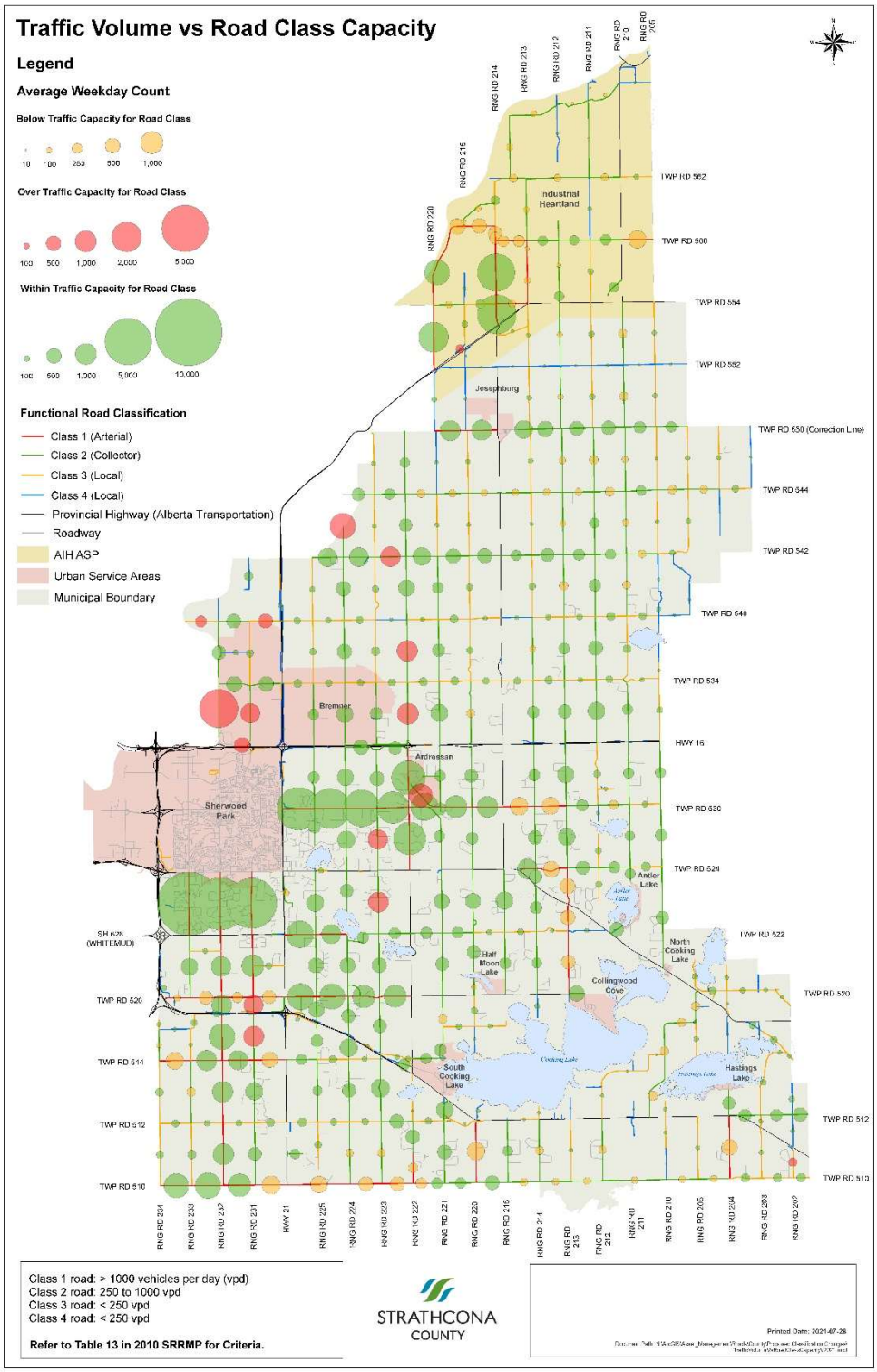


Figure 2 - Traffic Volume vs Road Capacity

3.3 Surfacing Inventory

There are four different road surface types used within the County:

- Hot mix asphalt concrete pavement
- Cold mix asphalt concrete pavement
- Dust abated gravel
- Gravel

Table 2 shows the averages and ranges of traffic volumes for each of the six classes of rural roadways and the corresponding surface types.

Table 2 - Surface Type by Road Class

Functional Road Classification	Vehicles/day Average (Range)	Kilometres by Existing Surface Type (%)				
		Paved Hot Mix Asphalt (km)	Paved Cold Mix Asphalt (km)	Dust-Abated Gravel (km)	Gravel (km)	TOTAL
Class I Grid	2,120 (100 - 20,100)	78.29 (59.3%)	50.47 (38.2%)	2.46 (1.9%)	0.81 (0.6%)	132.03 (100%)
Class II Grid	550 (5 - 7,050)	67.57 (15.2%)	348.25 (78.5%)	26.36 (5.9%)	1.62 (0.4%)	443.80 (100%)
Class III Grid	160 (10 - 3,750)	5.90 (2.2%)	40.79 (15.2%)	221.63 (82.6%)	0	268.32 (100%)
Class IV Grid	50 (10 - 430)	1.67 (1.4%)	0.67 (0.6%)	5.20 (4.5%)	109.05 (93.5%)	116.59 (100%)
Subtotal Class I to IV Grid Roads		**153.43 (13.6%)**	**440.18 (46.9%)**	**255.65 (27.7%)**	**111.48 (11.8%)**	**960.74 (100%)**
Rural Residential	180 (10 - 620)	262.72 (82.4%)	56.12 (17.6%)	0	0	318.84 (100%)
Rural Hamlet	230 (10 - 1070)	29.79 (84.6%)	2.44 (7.0%)	1.91 (5.8%)	1.03 (2.6%)	35.02 (100%)
TOTAL RURAL ROADS		**445.94 (33.9%)**	**498.74 (37.9%)**	**257.56 (19.6%)**	**112.51 (8.6%)**	**1314.75 (100%)**

Notes: Data obtained from Road Matrix 07-19-21

Based on the current roadway classifications and design standards, the following observations are made from **Table 2**.

- 41% (54km) of Class I roads would need improvement in surface type, as the existing surface type is cold mix asphalt pavement or dust abated gravel, and the classification is for a hot mix asphalt concrete pavement.
- 6% (28km) of Class II roads would require improvement for surface type.
- No surface type improvements are required for the Class III or Class IV network. All Class III and Class IV roads meet their respective minimum surface type per their classification.

- 18% (56km) of rural residential subdivision roads would require improvement for surface type, as they have a surface type of cold mix asphalt concrete pavement while the classification calls for hot mix asphalt concrete pavement.
- 15% (5.4km) of rural hamlet roads require improvement for surface type as they have a surface type of cold mix asphalt concrete pavement while the classification calls for hot mix asphalt concrete pavement.

3.4 Road Width Inventory

Table 3 shows the breakdown of road surface type within each road classification. Within the road network, based on the current roadway classifications and design standards, there is a large percentage of roadways that do not meet the current road width standard for the class of roadway. One of the reasons is that many of the County's rural roads were originally constructed prior to the development of standardized road classifications and have never been rebuilt. Another reason is that as roads are resurfaced the surface width decreases with each successive overlay to maintain consistent sideslopes. Refer to **Figure 3** for the overall County map for rural road grid roads.

Table 3 - Road Surface Width Distribution Within Each Road Class

Road Class	Current Design Road-top Width (m)	Current Design Road-top Width (m)											
		Less than 5.0 m	5.0-5.4 m	5.5-5.9 m	6.0-6.4 m	6.5-6.9 m	7.0-7.4 m	7.5-7.9 m	8.0-8.4 m	8.5-8.9 m	9.0-9.9 m	10.0 or more m	Total Km
Class I (km)	9.0	0.0	0.0	0.0	3.3	26.4	21.0	20.9	5.2	4.9	24.7	25.6	132.0
%		0.0%	0.0%	0.0%	2.5%	20.0%	15.9%	15.8%	3.9%	3.7%	18.7%	19.4%	100.0%
Class II (km)	7.5	0.1	8.4	34.4	114.5	153.3	66.2	38.7	22.5	0.8	2.3	2.4	443.8
%		0.0%	1.9%	7.8%	25.8%	34.6%	14.9%	8.7%	5.1%	0.2%	0.5%	0.5%	100.0%
Class III (km)	7.5	0.3	3.1	26.3	77.8	99.2	30.2	11.6	13.8	3.1	2.9	0.0	268.3
%		0.1%	1.1%	9.8%	29.2%	37.0%	11.3%	4.3%	5.1%	1.1%	1.1%	0.0%	100.0%
Class IV (km)	7.5	9.2	16.6	23.2	28.7	14.8	12.8	4.7	2.4	3.5	0.8	1.2	117.5
%		7.8%	14.1%	19.7%	24.4%	12.6%	10.9%	4.0%	2.0%	3.0%	0.7%	1.0%	100.0%
Total Class I to IV (km)		**8.3**	**28.1**	**83.9**	**224.3**	**293.7**	**130.2**	**75.9**	**43.9**	**12.3**	**30.7**	**29.2**	**960.5**
%		**0.9%**	**2.9%**	**8.7%**	**23.4%**	**30.6%**	**13.6%**	**7.9%**	**4.6%**	**1.3%**	**3.2%**	**3.0%**	**100.0%**
CRS (km)	8.5	1.2	0.0	0.4	3.6	101.6	82.9	92.6	18.5	15.9	1.9	0.1	318.8
%		0.4%	0.0%	0.1%	1.1%	31.9%	26.0%	29.0%	5.8%	5.0%	0.6%	0.0%	100.0%
Hamlet (km)	9.0	1.0	2.4	2.4	1.9	1.0	3.3	17.8	0.3	0.1	4.2	1.0	35.2
%		3.0%	6.8%	6.8%	5.3%	2.7%	9.4%	50.5%	0.7%	0.2%	11.9%	2.7%	100.0%
TOTAL RURAL ROADS		**10.6**	**30.5**	**86.7**	**229.8**	**396.3**	**216.4**	**186.3**	**62.7**	**28.2**	**36.8**	**30.3**	**1314.6**
%		**0.8%**	**2.3%**	**6.6%**	**17.5%**	**30.1%**	**16.5%**	**14.2%**	**4.8%**	**2.1%**	**2.8%**	**2.3%**	**100.0%**

Notes: Data obtained from Road Matrix 07-19-21

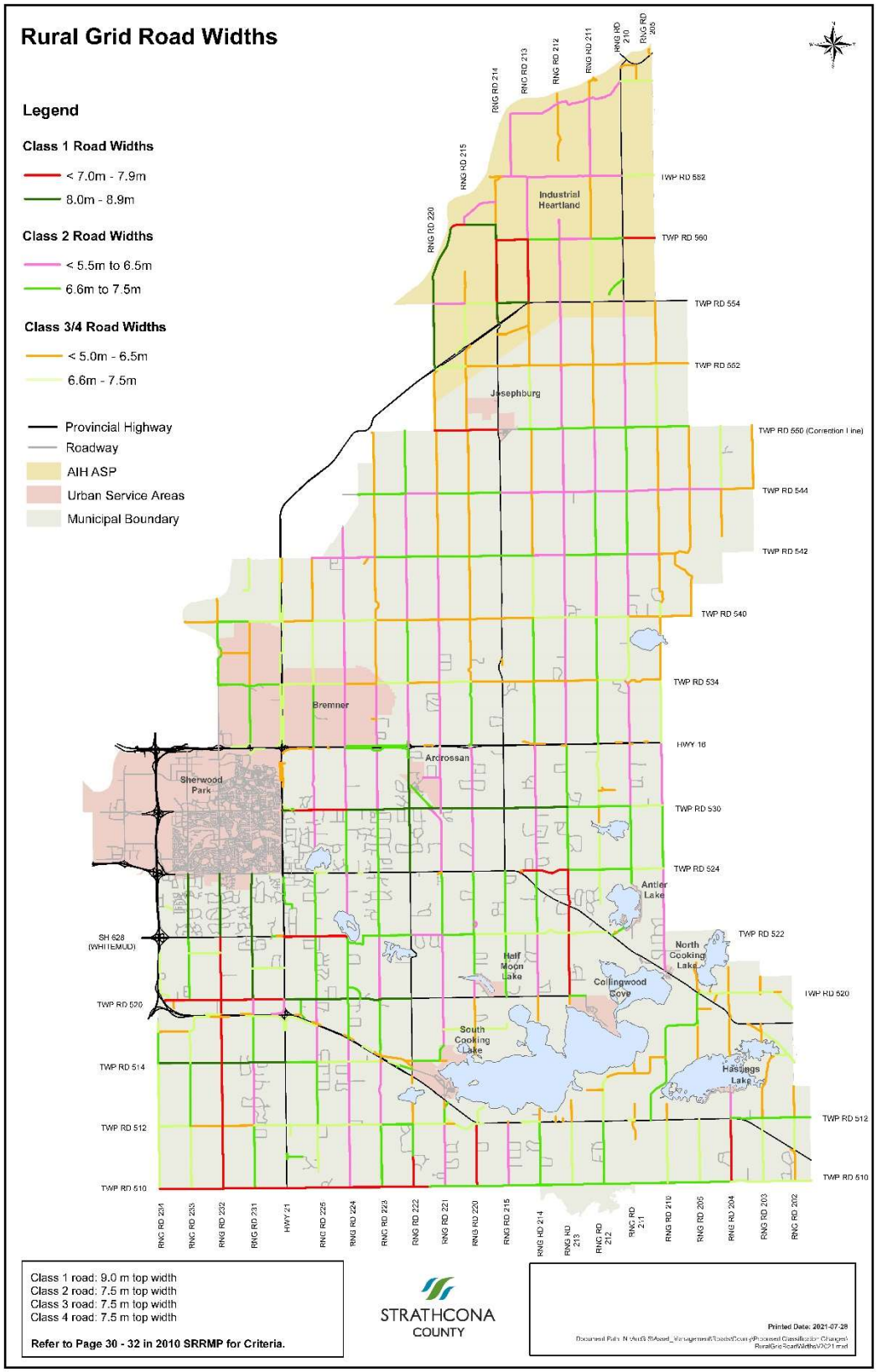


Figure 3 - Rural Grid Road Widths

Based on the current roadway classifications and design standards, a review of the data in **Table 3** allows the following points to be drawn:

- 62% (82km) of Class I roads are narrower than the width standard of 9.0m. 55% (72km) are more than 1m narrower, and 23% (30km) are greater than 2m narrower than the 9.0m design standard.
- 85% (377km) of Class II roads are narrower than the width standard of 7.5m. 36% (157km) are more than 1m narrower, and 2% (9km) are greater than 2m narrower than the 7.5m design standard.
- 89% (237km) of Class III roads are narrower than the width standard of 7.5m. 40% (107km) are more than 1m narrower, and 1.2% (3km) are greater than 2m narrower than the 7.5m design standard.
- 89% (104km) of Class IV roads are narrower than the width standard of 7.5m. 66% (76km) are more than 1m narrower, and 21% (25km) are greater than 2m narrower than the 7.5m design standard.
- 94% (301km) of Rural Residential roads are narrower than the width standard of 8.5m. 60% (190km) are more than 1m narrower, and 1.7% (5km) are greater than 2m narrower than the 8.5m design standard.

4.0 Historical Practices

This section provides an overview of the current maintenance methods utilized by the County. To monitor and inspect all the County roads and pathways, two inspectors are utilized. Each inspector will typically complete the inspection in four weeks, with each road and pathway monitored every two weeks.

Roadways within future development areas including Bremner, North of Yellowhead and the Alberta Industrial Heartland are included in the regular maintenance program. These roadways, however, are not being considered for future upgrades due to the proposed future developments.

4.1 Hot Mix Asphalt Roads

The roadways within the network that have hot mix asphalt surface require limited maintenance. This surface type is utilized on roads within the Class I, Class II, Rural Hamlet, Rural Residential Subdivision, and Industrial networks. Regular maintenance involves crack filling, spray patching and seal coats. The hot mix asphalt roadways are performing well, with the entire network having a fair or higher rating.

4.2 Cold Mix Asphalt Roads

Cold mix asphalt roads are generally in the Class II network, with some roads in the Class I and Class III networks. The cold mix asphalt roadways require a higher level of maintenance than hot mix asphalt. The maintenance methods employed include:

- Blade patching is utilized when areas start to show heaving or alligator cracking, but the base has not entirely failed. Crews will spread hot mix asphalt over the full width of the roadway, at the location of the failure, at a depth of approximately 25mm. The asphalt is spread with a grader and compacted with a combination smooth drum/rubber tire compactor.
- Base repair is utilized for areas less than 60m^2 when there is complete base failure. These locations are usually identified early in spring during the freeze-thaw cycles. Heaving, rutting, and alligator cracking are typical signs of the failures. Repairs involve excavating the asphalt and gravel base to approximately 300mm depth. The bottom of the excavation is then compacted. Plant mix soil cement is placed to a depth of 200mm and compacted. A 100mm lift of hot mix asphalt is placed on top with a skid steer and is levelled and compacted with a combination smooth drum/rubber tire compactor.
- Pulverize / stabilize and pave is a treatment used when the base repair area is greater than 60m^2 and there is a complete base failure or base failure over the majority of the area. The failed area is pulverized to a depth of 300mm and a minimum 18kg/m^2 of Portland cement powder is added to stabilize the base. The area is allowed to cure for a minimum of 24 hours prior to a roll test. The repaired area is overlaid typically with 100mm hot mix asphalt.

4.3 Gravel and Dust Abated Gravel Roads

The dust abated gravel roads generally consist of roads in the Class III network and the gravel roads generally consist of roads in the Class IV network. The maintenance methods employed include:

- Gravel blading is used to maintain the surface condition of gravel and dust abated gravel roads. The gravel road network is divided into four zones. Each zone is assigned a grader that monitors and blades the Class III and IV roads based on the scheduled rotation. Each road segment in the zone is covered once every two weeks. Areas that the inspectors consider a liability will be completed before the scheduled road section.
- Spot base stabilization is used to address areas of localized failure. Base stabilization is determined by visual inspection. Treatment selection is prioritized by severity, vpd and

scheduling logistic. Typically, base stabilization consists of pulverizing and stabilizing 150mm, with a 18kg/m^2 of cement powder. Some areas within the County have required further cement, depending on the base material. Some smaller areas with moderate or minor base failure have been repaired by placement and compaction of 63mm recycle concrete crush.

- Dust control is provided to all gravel roads with 100-250 vpd, any resident living on a road with 100 or less vpd will have 153m of dust control in front of the occupied residences. The typical application rate is 0.5L/m2 of SC250 oil for gravel roads with residual oil. Treatment is based on visual inspection or the gravel road network. The application of the product is determined by visual inspection of the surface. Any location that has unraveled or is producing dust will have the product applied during the season.
- Re-gravel has moved from a fixed five-year rotation to priority based on road inspection, existing gravel depth and traffic volume. Typically, crews will add 1000t per mile of 20mm crush gravel when required.
- Reshape and stabilization is based on a weighted system. Traffic volume, road conditions, road width and ditch slope determine which roads are selected. This is a contract service and typically consists of pulverizing the road, widening the road to achieving a 7m road top, base stabilization and 50mm of SC250 gravel overlay.

Since 2020, the County has changed its practice of rehabilitating the dust abated gravel roads. Previously, the dust abated surface was constructed by preparing the gravel on a road and using a distributor truck to spread oil on the surface of the gravel. The gravel was then mixed with a grader and compacted. The new method through County contracted services involves using oil bound gravel that is produced in an asphalt plant and placed on the road with an asphalt paver. The road base under the surface is typically prepared by pulverizing the existing surface and mixing it with 15-20kg/m^2 of cement powder to stabilize it. Plant-mixed oil-bound gravel is a material similar in properties to cold mix asphalt. The switch to this method was made to increase the quality control and consistency of the placement and the product.

A concern with this construction method is with the design life. The product is being utilized with the expectation of achieving a seven-year design life, however, this may be difficult to achieve due to the use of a stiffer surface material, plant-mixed oil-bound gravel, on a weaker base, stabilized subgrade. The subgrade base is generally inconsistent and is a mix of the existing road surface, typically a combination of gravel, sand, and clay. The lack of a consistent base can lead to base weakness and the premature failure of the top surface.

Another concern with this technique, is that the public perception of this surface type is that it is similar to a hot mix asphalt due to its appearance and method of construction being very similar, however, the life expectancy, maintenance requirements and performance of the oil bound gravel is not at all similar to hot mix asphalt. This misconception has resulted in public complaints.

5.0 Historical Budget Spending

To determine the County's historical spending on rural roads data was obtained for the 10 last years from 2011-2020. The budget allocation for rural roads from 2011-2020 is presented in **Table 4**. The expenditures are divided between the operating (maintenance) budget and the capital (construction) budget and are compared to the overall County operating and capital budgets.

The operating budget for rural roads has ranged from $5.36 million to $10.03 million with a 10-year average of $6.86 million or 2.0% of the overall County operating budget. The rural road operating budget had consistent increases between 2011 to 2018 going from $5.36 million to $6.77 million, and then there was a significant increase in 2019 to $9.8 million. In the capital budget the expenditures have ranged from $5.13 million to $8.83 million with a 10-year average of $6.62 million or 9.8% of the overall County capital budget. The rural road capital budget also saw a significant increase in 2019, increasing approximately 25% from $6.78 million to $8.50 million. It should be noted that the overall capital budget for the County had a significant increase in 2020, increasing almost 12%.

Table 4 - Historical Budgets as % of Total Budgets

Historical Budgets as % of Total Budgets (Millions of $)									
Fiscal Year	Operating Budget			Capital Budget			Total Budget		
	Rural Roads	Overall County	Rural Roads as % of County	Rural Roads	Overall County	Rural Roads as % of County	Rural Roads	Overall County	Rural Roads as % of County
2020	$10.03	$377.20	2.7%	$8.83	$110.70	8.0%	$18.85	$487.90	3.9%
2019	$9.78	$372.40	2.6%	$8.50	$64.50	13.2%	$18.28	$436.90	4.2%
2018	$6.77	$361.30	1.9%	$6.78	$69.20	9.8%	$13.54	$430.50	3.1%
2017	$6.48	$354.70	1.8%	$7.45	$65.60	11.4%	$13.94	$420.30	3.3%
2016	$6.75	$349.10	1.9%	$6.15	$94.60	6.5%	$12.90	$443.70	2.9%
2015	$6.13	$336.90	1.8%	$6.36	66.00	9.6%	$12.50	$402.90	3.1%
2014	$5.83	$323.50	1.8%	$6.00	100.60	6.0%	$11.80	$424.10	2.8%
2013	$5.80	$312.50	1.9%	$5.71	129.60	4.4%	$11.50	$442.10	2.6%
2012	$5.66	$301.10	1.9%	$5.34	101.00	5.3%	$11.0	$402.10	2.7%
2011	$5.36	$349.10	1.9%	$5.13	52.70	9.7%	410.5	$334.90	3.13%
Average	**$6.86**	**$337.09**	**2.0%**	**$6.62**	**$85.45**	**9.8%**	**$13.48**	**$422.54**	**3.2%**

The historical spending on the Operating Budget by the County by road classification was obtained and is presented in **Table 5** for the years 2011-2020.

Table 5 - Rural Road Operating Budget Per Road Class

Rural Road Operating Budget Per Road Class (Millions of $)							
Fiscal Year	Operating Budget						
	Class I	Class II	Class III/IV	RRS	Hamlet	Misc.*	Total
2020	$0.15	$3.21	$5.74	$0.26	$0.10	$0.57	$10.03
2019	$0.15	$3.16	$5.54	$0.26	$0.10	$0.57	$9.78
2018	$0.15	$2.96	$2.59	$0.26	$0.10	$0.70	$6.77
2017	$0.15	$2.70	$2.57	$0.26	$0.10	$0.70	$6.48
2016	$0.15	$2.62	$2.86	$0.31	$0.10	$0.71	$6.75
2015	$0.15	$1.82	$3.09	$0.42	$0.10	$0.56	$6.13
2014	$0.14	$1.62	$3.06	$0.37	$0.09	$0.55	$5.83
2013	$0.13	$1.52	$3.16	$0.36	$0.09	$0.54	$5.80
2012	$0.11	$1.63	$2.98	$0.38	$0.09	$0.48	$5.66
2011	$0.11	$1.55	$2.76	$0.37	$0.08	$0.49	$5.36
Average	**$0.14**	**$2.28**	**$3.43**	**$0.33**	**$0.09**	**$0.59**	**$6.86**

* Includes drainage, ditches, and rural parking lots

A summary of the average historical spending from 2011-2020 is further broken down by road class and expenditure by kilometer is shown in **Table 6**:

Table 6 - Rural Road Operating Budget per Road Class Per Kilometer

Rural Road Operating Budget Per Road Class Per Kilometer				
Road Classification	Network Length (km)	Average Operating Budget (Millions $)	Average Expenditure per year (%)	Average Expenditure per year ($ per (km)
Class I	132	$0.14	2.0%	$1,060
Class II	444	$2.28	33.2%	$5,135
Class III/IV	384	$3.43	50.0%	$8,932
Rural Residential	319	$0.33	4.8%	$1,034
Rural Hamlet	35	$0.09	1.4%	$2,571
Misc.*	n/a	$0.59	8.6%	n/a

* Includes drainage, ditches, and rural parking lots

The observations from the existing budget data presented in **Tables 4, 5 and 6** are:

- Operating budget for Class I roads increased between 2011 and 2015 and has been consistent since.
- Operating budget for Hamlet roads has been consistent through the 10-year period.
- Operating budget for RRS roads has decreased through the 10-year period.
- Class III/IV roads operating budget allocation more than doubled starting in 2019.
- The majority of spending in the operating budget is directed to Class II and Class III/IV roads with 83.2% of expenditures with only 8% of the operating budget allocated to Class I, RRS and rural Hamlet roads.

6.0 Public Engagement

There were two phases to the public engagement. The first phase occurred in November and December of 2019 and was designed to engage rural residents and stakeholders at a "Listen and Learn" level regarding traffic safety and road maintenance concerns. The input from this phase was used to gain an understanding of how residents felt about the rural road network, the review and assessment of maintenance practices, classification, and prioritization criteria. The second phase of the public engagement was delayed due to public health measures related to COVID-19, with an online engagement occurring in April and May of 2021. During this phase of engagement, we reported back to the public on the 2019 SRRMP engagement, what was heard and how it was used to inform recommendations.

6.1 Public Engagement Goals

The goals of the public engagement were to:

- Provide an open and accessible environment for two-way dialogue.
- Provide multiple opportunities to gather input / local knowledge.
- Create and understanding of the SRRMP, how it has been developed, why it is being updated, how it will be used in the future, and how the public can provide their feedback.
- Gather local knowledge and input about current road maintenance and safety concerns.
- Gather local knowledge and input about effectiveness of current treatments that are used.
- Gather local knowledge and input about priorities for road maintenance and safety (do residents have primary concerns about road width, sightlines, road conditions, maintenance, snow clearing?).
- Gather local knowledge and input about corridor priorities.
- Share how the resident feedback will be used to develop the Rural Road Safety Strategy.
- Share information on the County's other initiatives, include the Traffic Safety Strategic Plan 2020.
- Be open and transparent to build trust and confidence in the engagement process and how the feedback will be used.

The following principals were implemented in the public engagement process:

- **Proactive:** it is initiated early for participants to make informed decisions and impact outcomes.
- **Relevant and Effective:** the process is planned, effectively communicated, and implemented to encourage appropriate public participation and contribution.
- **Equitable:** Members of the public are provided with a reasonable opportunity to contribute, developing a balanced perspective.
- **Clear and Focused:** The County and the public understand their respective roles and level of involvement in a public engagement process and how input will be used to inform decisions.
- **Inclusive:** It uses a range of methods to engage various audiences to maximize participation and improve the quality of feedback.
- **Increases Understanding:** Mutual understanding is increased through two-way interaction, where the information presented is easily understood by the intended audience.
- **Responsive and Ongoing:** Public engagement has an ongoing focus on relationship building, active listening, and increased understanding.
- **Builds Capacity:** Staff, public and stakeholders are better equipped for future engagement.
- **Accountable and Transparent:** public engagement outcomes are measured, evaluated, and reported in a timely manner.

Citizens and stakeholders were engaged to provide input into local issues and decisions. The public engagement process involves the public to clarify issues, identify solutions or alternatives and partner in decision making. The public engagement process helps create sustainable decisions that balance perspectives.

6.2 2019 "Listen and Learn"

6.2.1 Public Engagement Information Gathering

Two methods were made available for the public to get involved in the decision-making process. First was the online survey that was made available from November to December 2019. The survey was available through the County's Online Opinion Panel (SCOOP) platform, with a link to the survey on the County's SRRMP webpage. The second method was the public engagement open houses. A total of six open houses were held in the following locations:

- South Cooking Lake – November 20, 2019
- Strathcona Olympiette Center – November 21, 2019
- Antler Lake – November 25, 2019
- Hastings Lake – November 27, 2019
- Ardrossan Memorial – December 2, 2019
- Josephburg Hall – December 4, 2019

The public was informed of the survey and open houses from roadside message boards, postcards sent to residents, newspaper advertisements, and social media, among others.

The open houses gave the public an opportunity to coordinate directly with the County, as well as the design engineers (Al-Terra) and provide in-person feedback on the current state of the rural roads within the County through the participant's eyes.

6.2.2 Summary of Findings

The online survey and open houses posed multiple questions to the survey participants that gathered information on where the participants lived within the County, how satisfied and safe the participants felt, prioritization for improvements and maintenance, and anything additional that the participants wanted to share with the County regarding rural roads. The information provided by the public through the online surveys and open houses were combined and assessed to identify themes of public opinion on where they felt the most important areas for improvement were. The sample size for each question varies, as some questions asked for multiple inputs and some participants did not fully complete the survey.

The following is a summary of the most common themes heard across all engagement activities and participant groups during step one of the plan generation process. These themes are discussed in further detail in the following sections.

- The public generally felt satisfied and safe on the road network throughout the County.
- When applying class of road travelled on with satisfaction levels and feeling of safety, the majority of unsatisfied/unsafe respondents primarily drive on Class II roadways.
- Condition of road, amount of traffic and road width were reported as the top three criteria to consider for improvements and maintenance.
- Widen narrow roads, improve intersection sightlines, and improve steep sideslopes were reported as the top three criteria for improvement priority.
- Maintenance and lifecycle of patches and pothole repairs is a concerning topic for the survey participants.
- Size and visibility of stop signs is a concern of the survey participants.
- The survey participants felt that increasing the frequency of law enforcement vehicles on the County's rural roads will reduce the amount of speeding observed.
- Although outside of the scope of this report, the public expressed concern with the condition and feeling of safety on provincial highways, most notably Highway 824 between Highway 14 and Highway 630.

Below is a summary of each of the questions asked in the questionnaires a summary of the results.

6.2.2.1 Residing Locations within the County

The first question asked to the online survey participants was their residing location within the County. The highest residing location for participants that completed the survey was Ward 7. Ward 5 – West and Ward 5 – East were also a common location for residents that completed the survey.

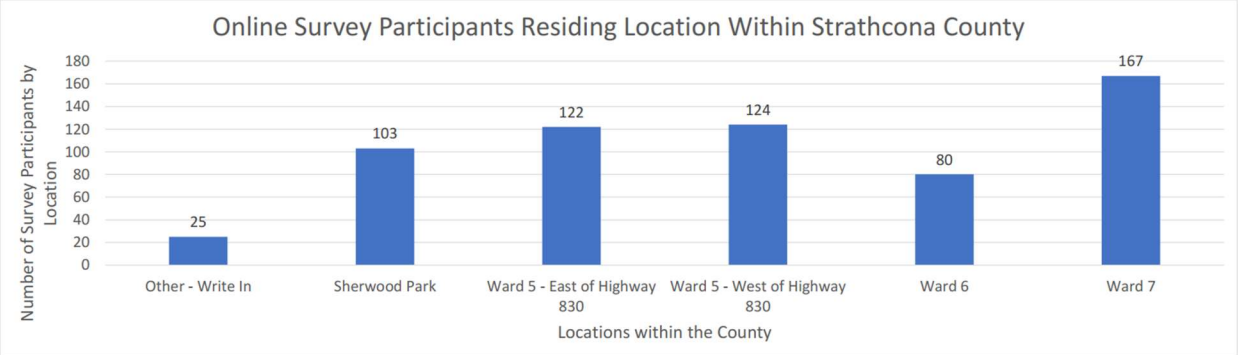


Figure 4 - Online Survey Participants Residing Location Within Strathcona County

This question was not asked at the open houses. However, below is a distribution of the attendance at each open house by location.

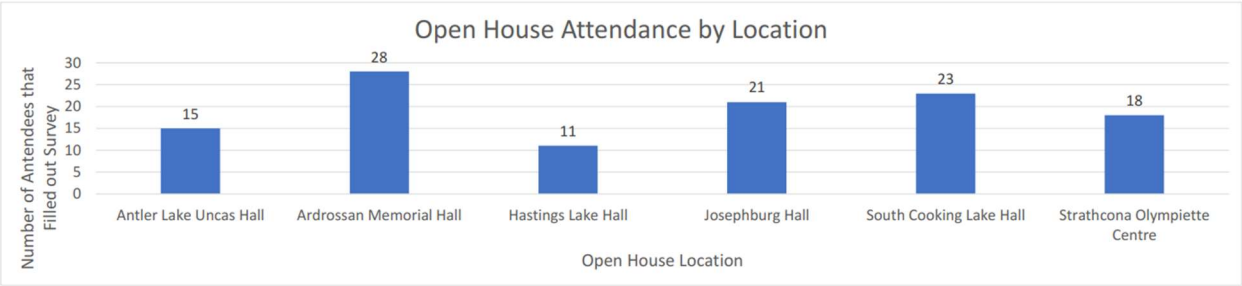


Figure 5 - Open House Attendance by Location

6.2.2.2 Satisfaction and Feeling of Safety

The second question asked on the survey was a multi-part question. The question asked the residents and stakeholders their feeling of overall satisfaction and level of safety when travelling on these roadways. Overall, the public generally felt satisfied and safe on the County's rural road network. Regarding satisfaction levels, only 21.3% of participants noted dissatisfaction with the current rural road network. Regarding feelings of safety, only 33.4% of participants noted feeling unsafe on the current road network.

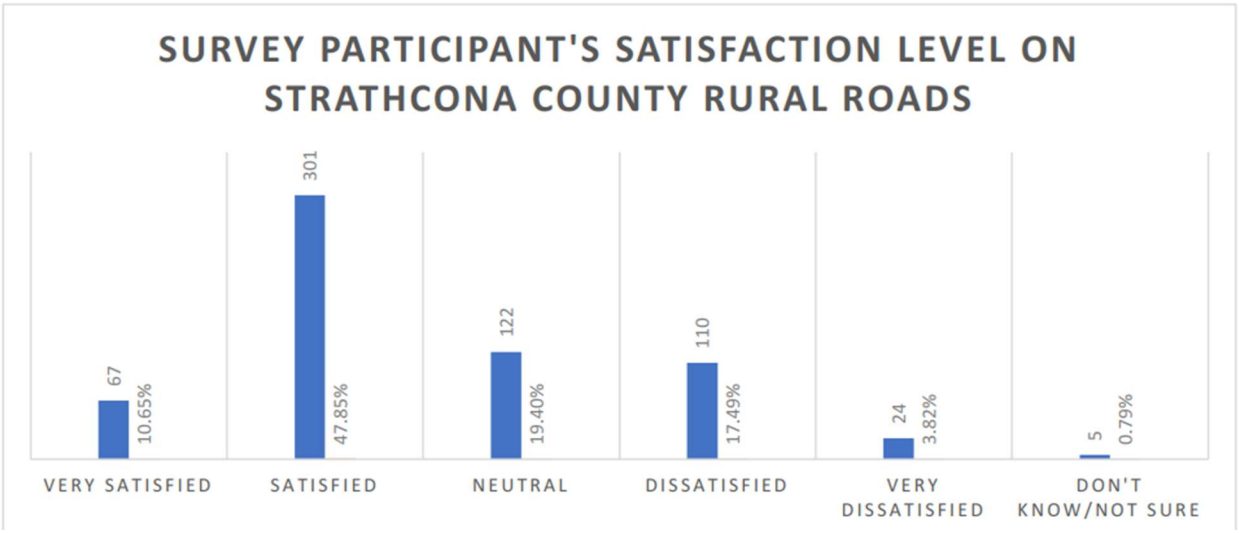


Figure 6 - Satisfaction Level with County Rural Roads

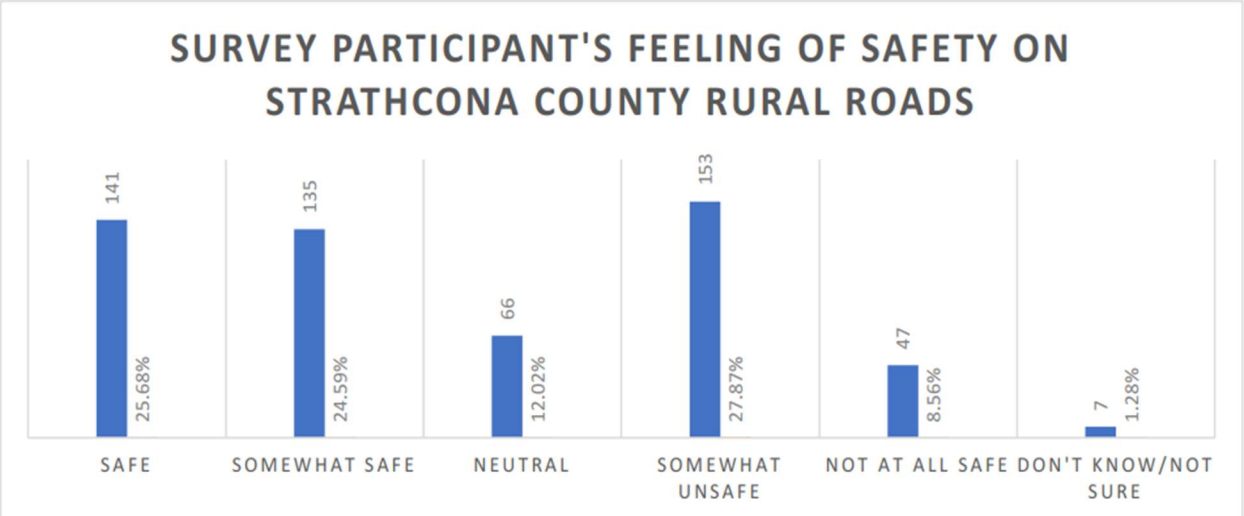


Figure 7 - Feeling of Safety on County Rural Roads

Further breaking down these survey responses, the participants provided the roads they travelled on frequently along with their feeling of safety and satisfaction with the rural road network. In reviewing this data, it became evident that the majority of dissatisfaction originated from survey participants that drove on Class II roadways. Additionally, Class III and IV roadways were a topic of concern with the participants. The sample size in this breakdown is larger than the overall satisfaction and safety question, as this question allowed participants to provide feedback on their three most travelled roadways within the County.

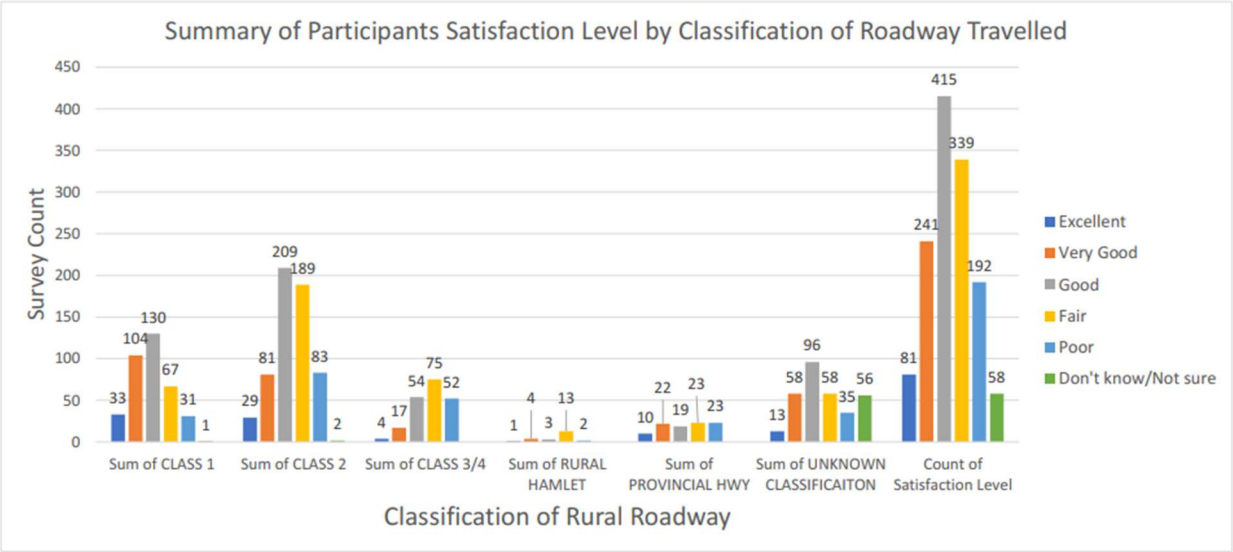


Figure 8 - Satisfaction Level by Classification Level

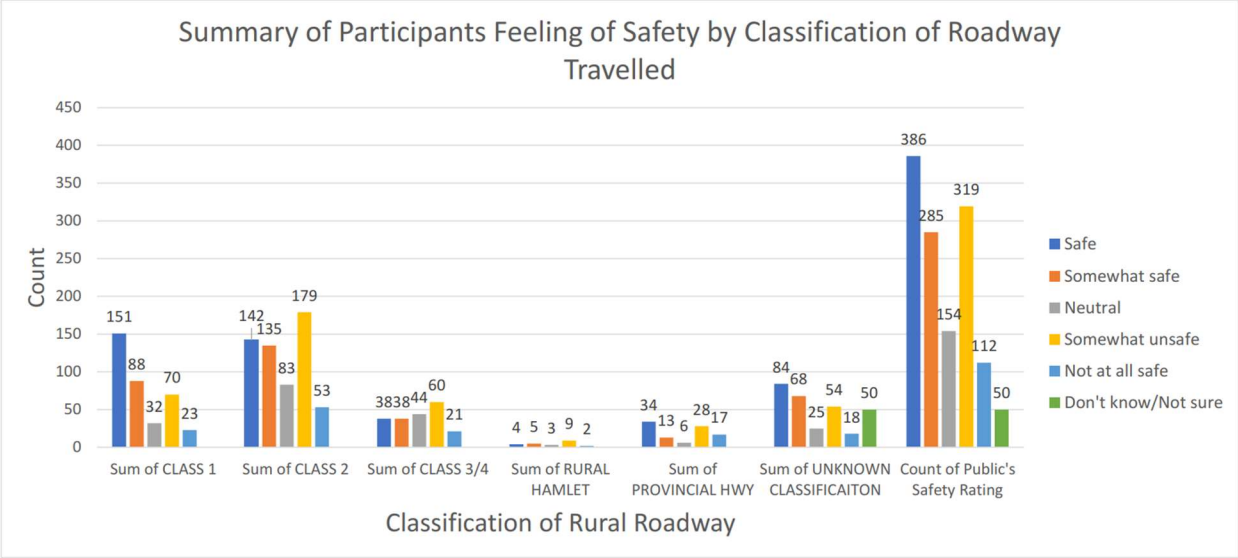


Figure 9 - Feeling of Safety by Classification of Roadway Traveled

The third and fourth questions asked on the survey were for the public to provide their input on which items should be the top priority when considering improvements. The question was posed in two ways. The first asked the public to assign a priority for the following when the County considers upgrades to the roads: condition of road, amount of traffic, road width, number of collisions, the roads as a link in the overall network, number of bad curves and hills, and number of public complaints. The survey participants noted the top three prioritization focuses for improvements were condition of road, amount of traffic and road width.

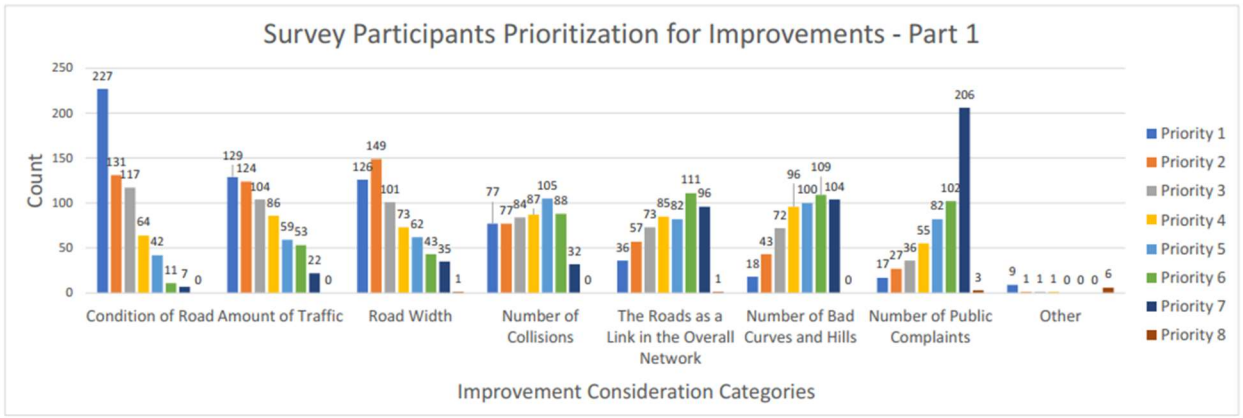


Figure 10 - Prioritization for Improvements (Part 1)

The second improvement prioritization question asked the participants to prioritize the following areas of concern when considering upgrades: widen narrow roads, improve intersection sightlines, improve steep sideslopes, improve horizontal sightlines, upgrade to asphalt, upgrade to dust controlled gravel, and improve vertical sightlines. The survey participants noted that the top three prioritizations for areas of concern were widening narrow roads, improve intersection sightlines and improve steep sideslopes.

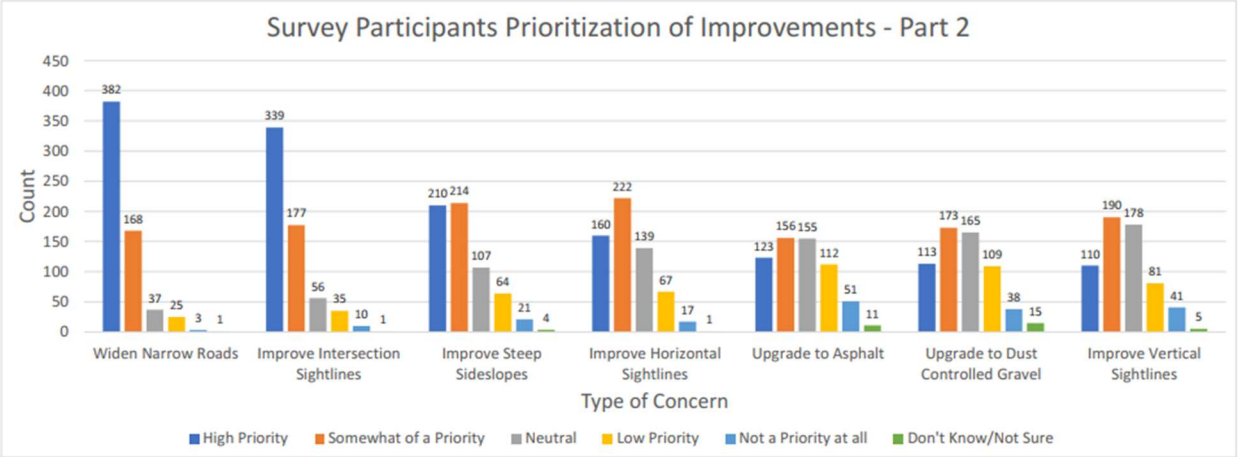


Figure 11 - Prioritization for Improvements (Part 2)

6.2.2.3 Other Considerations

Finally, the survey participants were asked to provide any additional comments, considerations or concerns that were not included in the previous questions. The responses to these two questions varied considerably and produced 65 unique themes when grouping all responses. There were evident trends in the data that should be noted.

Snow clearing, maintenance, signage, large vehicles, and the condition of provincial highways were common themes. Additionally, combining the concerns of speed limits and enforcement escalates this concern to a common theme. Road width, steep sideslopes and condition will not be discussed in this section as they have previously been illustrated as the high priority items by the survey participants when considering improvements.

- Snow clearing – Snow clearing was one of the most common topics in the online surveys. The survey participants generally felt that improvements in the snow clearing techniques and speed of clearing after a snowfall could be improved. Some of the improvements suggested were techniques of clearing when crossing driveways and minimizing snow ridges, increased priority of clearing on the subdivision/rural hamlet roadways and providing a wider cleared area when clearing the rural roads.
- Maintenance – The public was generally dissatisfied with the quality of temporary repairs, such as pothole or patch repairs. Their concerns generally related to the short lifespan a patch or pothole repair has on the rural roads within the County. It was also noted in this topic that the participants were concerned with the quality of grading/resurfacing of the rural roads, most notably the continual overlays creating ridges at the driveway that are creating an increasing uneven transition into the resident's driveways.
- Signage – The participants were concerned with signage. The majority of signage related concerns was the visibility and size of stop signs within the County. They feel that at important intersections signage should be larger to draw the attention of the driver. Additionally, comments

noted increased reflective markings on the stop signs would increase driver attention to the stop condition.

- Large vehicles – The participants were generally concerned with the number of large vehicles on the County's rural roads. With the industrial heartland and a large agricultural presence in the County, there are a considerable number of larger vehicles on the roadway which can create difficulty and an unsafe feeling when these vehicles are met on a narrow rural roadway.
- Condition of provincial highways – Although outside of the scope of the SRRMP, a common theme in both the online surveys and open houses was the condition of provincial highways, most notably the condition of Highway 824 and the stop condition on Highway 830 at Township Road 550. The overall condition of Highway 824 has become a topic of concern for the participants. The deteriorating conditions is beginning to shift traffic to using adjacent range roads to bypass Highway 824 on their commutes. This creates added stress on the adjacent rural road network for the County to upgrade and maintain. The stop condition at Highway 830 and Township Road 550 is another topic of concern with the participants. It is counterintuitive to have the stop condition on Highway 830, when intersecting with a township road. Typically, in Alberta, the highway would have right-of-way through an intersection with a township road.
- Speed limit and enforcement – The public was generally concerned with the number of speeding vehicles on the rural road network within the County. Survey participants and attendants at the open houses noted they felt increasing the frequency of law enforcement vehicles on the rural road network would improve the compliance to the speed limit.
- It was noted that classifying roadways should not only consider AADT but vehicle class distribution on the roadways.
- Continued overlay of paved rural roadways are creating difficulty for residents to maintain the grass adjacent to the road and creating ridges at driveways.
- Trees are limiting visibility on rural roads.
- Railway crossings within the County were a safety concern for the public.
- Cyclist conflict with motor vehicles sharing the road was a common topic of concern (for both the cyclists and the motor vehicle drivers).

6.3 2021 "Report Back"

The goal of this phase of engagement was to report back to the public on the 2019 SRRMP engagement, to understand the level of stakeholder support for the draft recommendations and identify any gaps in understanding of the draft recommendations by stakeholders.

The key messages heard in the 2019 SRRMP that were communicated in this round of engagement was that 78% of residents felt neutral, satisfied, or very satisfied with the County's rural road network and the primary concerns residents had, related to the condition of the road surface, the volume of traffic and the existing road width. The feedback from the 2019 engagement helped guide the development of the draft recommendations by helping the design team to better understand the issues that the road users are experiencing. The level of satisfaction indicated that the rural road network was functioning well, however, there were areas that need to be improved.

The draft recommendations that were presented in the 2021 public engagement were:

- Create framework for sustainability and budget allocation
- Redefine roadway classifications
- Develop rehabilitation standards to align with redefined classifications
- Review of maintenance methods and alternative methods
- Create a framework for prioritizing need

Due to the public health measures put in place because of COVID-19, in person open houses were not possible; therefore, an online slide presentation with the ability for user feedback was utilized. The online presentation was hosted on the County's website in April and May 2021 and information postcards directing residents to the online presentation were mailed out in early April 2021 to all rural residents prior to the presentation going live.

6.3.1 Summary of Findings

The online presentation provided the participants the opportunity to leave feedback. Comments were reviewed and questions raised by the participants were answered in email responses.

The following is a summary of the comments that were received from the online presentation feedback form. A total of 19 comments were provided and a summary of the themes are listed below. Some responses had multiple comments which have been separated and listed in multiple themes:

- 6 participants made comments regarding the need to upgrade specific roads.
- 7 participants commented on the need to accommodate cyclists and pedestrians.
- 5 participants had general comments on the SRRMP update.
- 3 participants commented on the narrow width of existing roads.
- 1 participant commented on the need to channel traffic away from local roads.
- 1 participant commented on maintenance operation.
- Although outside of the scope of this report, 2 comments expressed concern with the condition of provincial highways.

The responses received in the "Report Back" phase followed the similar themes during the "Listen and Learn" phase. The majority of the comments received relate to items that are being address in the SRRMP 2021 or will be addressed in the ITMP update. There were no comments indicating opposition to any of the proposed recommendations or indicating topics that were missed. Overall, the level of engagement, the comments provided, and the lack of objection to the recommendations helps to validate the current direction of the project.

7.0 Value Analysis Session

Updating the existing SRRMP is expected to garner significant public attention, therefore it was important that our process not only engage the public but expand our collective knowledge to access unique and innovative ideas that will address the functional requirements of the rural road network while addressing concerns from the local residents and stakeholders.

To create a transparent and defendable approach to the SRRMP update process, a formal (VA) session was completed. A VA session has the elements of a "focus group" but also includes technical expertise to create the necessary balance between competing interests.

The VA workshop was held on April 15 and 16, 2021. The workshop was held remotely through video conferencing and an online whiteboard collaboration. The workshop was hosted by Al-Terra Engineering and facilitated by SMA Consulting. Participants included staff from Strathcona County, Al-Terra Engineering, Leduc County, Parkland County, Sturgeon County, Park Paving, Carmack Enterprises, Thurber Engineering, and external experts. The goal of the workshop was to identify innovative ways to develop, maintain, rehabilitate, and upgrade the rural roads in the County. This also includes the refinement of classification and appropriate prioritization of upgrades.

7.1 Methodology

The methodology used in the workshop aligns with SAVE International's standards for VA sessions. The workshop began with an introduction by Al-Terra's Project Manager, Fred Greenhough, followed by SMA's overview of the VA process. The project team presented a summary of the history and current state of the completed work. Participants then performed Function Analysis through function brainstorming and moved to small groups for a Creative Phase breakout session to identify new potential options. The workshop concluded with the Evaluation Phase, which involved a collaborative exercise to review and score the options and recommendations generated from the creative phase.

7.2 Information Phase

The information phase involved informing the participants of the history of the current SRRMP and the role it plays in guiding how rural roads are maintained and improved in the County. A presentation was made outlining the existing SRRMP, the existing state of the rural roads, and outlining the work that has been completed on the project. The presentation was followed with a Q and A session between the project team and the participants.

7.3 Function Analysis Phase

Following the Information phase, the participants were encouraged to come up with a list of functions that pertain to the delivery of the project. Key functions were identified and then were evaluated. The key functions were then used as trigger words during the creative phase to help generate as many ideas as possible. The key functions identified were:

- Assign Priority
- Develop Classification
- Develop Standards
- Accommodate Volume
- Rehabilitate Road
- Upgrade Road

7.4 Creativity Phase

Once the Information and Function Analysis phases were complete, the Creativity phase began. During the Creativity phase, participants were divided into two groups based on their areas of expertise and background. Each group had individuals from the County, Al-Terra, experts from other counties, contractors, and consultants. A technique called “World Café" was used to increase the number of ideas generated. Each facilitator worked with a group for about an hour on each of the six major functions identified: Develop Standards, Develop Classification, Assign Priority, Accommodate Volume, Rehabilitate Road, and Upgrade Road. The facilitators rotated along with the two groups to generate more ideas for all six functions.

7.5 Evaluation Phase

During the Creativity phase, the ideas were captured using sticky notes on the online whiteboard. Participants were invited to evaluate the ideas and vote on the ones that they believed were worth further exploration. Using the 1-10 value index, participants scored the ideas for feasibility and benefit to the project. Ideas that were considered a seven and above were given a green dot, ideas that were three and below were given a red dot.

The session generated 80 ideas. The top nine key ideas that were thought to have the most potential included:

1. Explore economic efficiencies of scale on activities such as brushing, micro-surfacing, and others among municipalities and save cost by combining contracts.

2. Establish a program for sharing innovation and learnings among municipalities. Attend conferences such as the Regional Roads Forum held by Leduc County and WSP in late 2019/early 2020 and Alberta Municipal Supervisors Association (AMSA) Convention.

3. Trial projects for different applications through a project-based selection of technology, followed by revisit and documentation. Pilot projects in certain areas with specific products and methods before wide adoption, calculate the return on usage, and consider the risks involved for immediate repair. Improve and standardize piloting programs to allow for follow-ups and long-term studies, include signage and communication to the public. Be willing to test different technologies and accept some risk for potential success or failures.

4. Develop subclasses and allow flexibility in the criteria with local considerations to support realistic operation needs. Identify local context for roads that may not meet the standards but meet the needs of the local users. For example, gravel surface roads with Class III dust control in front of local farms would be insufficient for farm equipment. Balance the standards and bylaws with cost and flexibility.

5. Maintain collaboration and communication with contractors and be open to innovative improvements. Allow contractors to bring forward innovative ideas with transparent risk discussions and focus on the end result and road longevity. Consider contracting strategies that will make this easier such as integrated product delivery (IPD). Pursue up-front cost thinking prior to construction. Continue to work to develop relationships between the County and contractors.

6. Consider reducing right-of-way width to reduce land needs on Class I and II roads while keeping the backslopes at a good profile. Consider traffic volume and use. Standard right-of-way for 9m roads is 34m in Leduc County and 30m in Parkland County.

7. Consider site specific design for specific uses/needs, geotechnical conditions vary across the county. Design the roadways in industrial areas specifically catering to heavy load and frequent use. Find an appropriate balance.

8. Plan upgrades and design to channel traffic to intended roads, and especially to avoid creating duplicate routes. Consider reducing Class I roads and having a robust network of Class II directing traffic to provincial highways. Take emergency access routes and highly populated areas into account.

The VA session was a valuable component of the design process. The VA session was able to validate some of proposed recommendations that had previously been developed by having experts with different roles within the transportation industry look at the challenges being addressed by this project and try to provide innovative ideas to solve them. The key ideas that were developed were evaluated and most have been incorporated into the recommendations. One of the themes that showed up in couple of the key ideas that were newly considered were the suggestions of greater collaboration between the regional municipalities. The sharing of information between municipalities has very little cost but the ability to learn from 'lessons learned' by others can have significant value in both dollars and time.

The Value Analysis Summary Report is included in **Appendix D.** The summary report includes the full list of value ideas beyond the top nine listed above. The full list includes many ideas that could provide additional value to the County. Some of these ideas include:

- Educate the public on the different feels and looks of roads with different surface and on rural road qualities. For example, not all paving methods will result in a black surface, which can cause problems and complaints due to the lack of understanding from the public. In addition, urban residents who are driving in a rural setting may have unrealistic expectations. Educate and inform nonresident drivers and users when it comes to driving on rural roadways.
- Improve wayfinding to specific rural destination to keep urban/infrequent users on the right roads. Explore methods to communicate with Google Maps and other wayfinding and mapping software to set up proper wayfinding for rural destinations

8.0 Review of Prioritization Matrix

Current practice within the County for prioritizing projects is a process where candidate roads are evaluated based on the pavement condition, cross section, traffic volume, collision history, importance within the network and other factors. The concern with the current method is there are subjective elements, and it may not be optimally weighting the different factors. A method to improve the selection process is the use of a prioritization matrix. A prioritization matrix is a tool that, using specific criteria, is used to objectively compare potential projects and thus determine which projects should receive priority for funding.

Outlined below is a potential framework for a priority matrix that can assist in rating road segments to determine which candidate road segment should be rehabilitated. The matrix consists of 11 factors that each candidate road segment could be evaluated on, consisting of both importance factors and road condition factors. The importance factors relate to the role that the road segment plays within the overall road network and the condition factors relate to the quality and geometrics of the existing road segment. The factors used within the matrix can be developed overtime with the addition of new factors or removal of existing factors to optimize the matrix to the needs of the County.

Each factor is rated individually on a scale from 1-5, with 5 being the highest priority and 1 the lowest. Each factor can also be given a weighting so that specific factors can have a higher or lower importance than other factors within the matrix. The weighting of the factors can be determined as the matrix is refined.

8.1 Importance Factors

The importance factors are used to evaluate the value of the road in relation to the network and as described by the road classifications in the TSB and the recommended network model-based classification plan. These factors are constructed to provide a higher priority to roads that perform important roles within the network, such as providing access to municipalities, serving businesses, and carrying higher volumes of traffic. There are five importance factors included in the matrix consisting of:

- Proximity to Parallel Road of Higher Classification
- Continuity within Network
- Traffic Volumes
- Industry/Commercial Users
- % Trucks

8.1.1 Proximity to Parallel Road of Higher Classification

This factor is used to rate where a road is spatially located in relation to other roads within the network. If there is a parallel road of higher classification in close proximity, it is desirable that traffic should be channeled and encouraged to use the higher classified road as it would be constructed to a higher design standard and designed to handle larger volumes of traffic. The closer the road segment is to a parallel road of higher classification, the lower the priority.

8.1.2 Continuity Within the Network

This factor is used to rate the importance of the road segment within the overall network and if it serves a role in connecting communities or roads of higher classification. This is a subjective rating, with roads providing a Provincial level continuity, such as between two provincial highways, given the higher priority, and roads providing limit access to properties given a lower priority.

Refer to **Table 7** for the importance factor rating criteria.

Table 7 - Priority Matrix Importance Factors

Priority Matrix Importance Factors					
Proximity to Parallel Route of Higher Classification	**Network Level Continuity**	**Traffic Volume (vpd)**	**Industrial/ Commercial Users**	**% Truck**	**Rating**
>4 Miles (6.4km)	Provincial	<2000	High Importance to Multiple Industrial/Commercial Users	>20%	5
<4 Miles (4.8-6.4km)	Regional	1000-2000	High Importance to Single Industrial/Commercial User	10-20%	4
<3 Miles (3.2-6.4km)	Municipal	200-1000	Low Importance to Single Industrial/ Commercial User	5-10%	3
<2 Miles (3.2-6.4km)	Local	50-200	Limited Industrial/ Commercial users	2-5%	2
<1 Miles (3.2km)	Short	<50	No Industrial/Commercial users	<2%	1

8.1.3 Traffic Volumes

This factor is used to rate the volume of traffic on a road segment. Traffic volume is an important determinant in the classification, geometric design, and structural design of a road. Road segments that carry higher traffic volumes are given a higher priority.

8.1.4 Industry/Commercial Users

This factor is used to rate the importance of the road in providing access to industry and commercial businesses. Industrial and commercial business are generally higher generators of traffic. A road segment that is of high importance to multiple industrial or commercial business is given a higher priority, and road segments that do not serve any industrial or commercial business are given a lower priority.

8.1.5 % Truck Traffic

This factor is used to rate the volume of truck traffic on a road segment. High volumes of truck traffic impact the operation and the structural requirements of the roadway. Roads with higher volumes of truck traffic are given a higher priority.

8.2 Road Condition Factors

The road condition factors are used to evaluate the quality and condition of the existing road infrastructure. These factors give higher priority to roads which have a lower condition rating and have geometrics which are further below design standards. There are six road condition factors included in the matrix consisting of:

- Structure Condition
- Road Width
- Vertical Alignment
- Horizontal Alignment
- Side Slope
- Safety Issues

8.2.1 Structure Condition

This factor is used to rate the condition of the pavement structure. The County uses the Road Matrix database to manage pavement assets and each road segment is evaluated on various factors to produce a pavement quality index (PQI) value. The structural rating is to be evaluated from the PQI value. A higher PQI value would indicate a lower priority, and lower value a higher priority.

8.2.2 Road Width

This factor is used to rate the width of the existing road. Road width is a factor in road users feeling of safety and narrow roads can lead to higher collision risk when associated with higher traffic volumes, higher truck traffic, and poor road geometrics. The road width is evaluated based on existing design standards with higher priority given to roadways that are most narrow.

8.2.3 Vertical Alignment

This factor is used to rate how the existing geometry compares to design standards. The vertical alignment refers to the sharpness of vertical curves and relates to available sightlines, safety and driving comfort. Roads with a higher number of vertical curves that do not meet design standards are given a higher priority.

8.2.4 Horizontal Alignment

This factor is used to rate how the existing geometry compares to design standards. The horizontal alignment refers to the sharpness of horizontal curves and relates to safety and driving comfort. Roads with a higher number of horizontal curves that do not meet design standards are given a higher priority.

8.2.5 Side Slope

This factor is used to rate the steepness of the slope of the road adjacent to the pavement compared to the design standards. The steepness of the sideslope impacts the ability of a vehicle to recover if it leaves the road. Steeper sideslopes have a higher collision risk and are given a higher priority.

8.2.6 Safety Issues

This factor is used to rate the road segment on identified safety issues. Safety issues can be identified through identifying trends in the collision data or from public comments. Roads with identified safety issues are given a higher priority.

Table 8 - Priority Matrix Road Condition Factors

Priority Matrix Road Condition Factors						
Structure (PQI)	**Road Width**	**Vertical Alignment**	**Horizontal Alignment**	**Side Slopes**	**Safety Issues**	**Rating**
Less than 40	Greater Than 1.5m Below Design Standards	Greater Than 3 Locations/km Below Design Standards	Greater Than 3 Locations/km Below Design Standards	Less than 100% of Road Greater than 3:1 Slopes	Major Safety Issues	5
40-55	Greater Than 1.0m Below Design Standards	3 Locations/km Below Design Standards	3 Locations/km Below Design Standards	100% of Road Greater Than 3:1 Slopes		4
55-70	Less Than 1.0m Below Design Standards	2 Locations/km Below Design Standards	2 Locations/km Below Design Standards	50% of Road Greater Than 4:1 Slopes	Minor Safety Issues	3
70-85	Less Than 0.5m Below Design Standards	1 Location/km Below Design Standards	1 Location/km Below Design Standards	75% of Road Greater Than 4:1 Slopes		2
85-100	Meets Design Standards	Meets Design Standards	Meets Design Standards	100% of Road Greater Than 4:1 Slopes	No Safety Issues	1

8.3 Applying the Matrix

The matrix should be applied once candidate road segments have been selected. The candidate road segments would be placed in the matrix shown in **Table 9**. Each road segment would be assess based on the ranking criteria presented in **Tables 7 and 8** with a weighting and rating assigned for each importance and condition factor.

The factor weighting determines the relative importance of each factor. A larger weighting value is given to factors that are considered to be of higher importance and a lower factor is given to factors of lower importance. The base value for weighting would be 1.0. For example, when comparing roadways of a higher road classification, the width of the road may be deemed more critical than the % Trucks. In this instance a weighting of 2.0 may be given to the Road Width and 0.5 to % Trucks, and a weighting of 1.0 for the remaining factors. The weighting values are subjective and are dependent on the specific roads being analyzed. The weighting criteria can be developed as the priority matrix is refined.

The output from the priority matrix would be the Priority Number. A road segment with a higher Priority Number would be evaluated as the higher priority.

TABLE 9 - DRAFT PRIORITIZATION MATRIX

Road Information							Traffic Volume	Rating	Weighted Rating	% Trucks	Rating	Weighted Rating	Proximity to Parallel Road of Higher Class	Rating	Weighted Rating	Continuity	Rating	Weighted Rating	Industrial/ Commercial Users	Rating	Weighted Rating	Structural Condition	Rating	Weighted Rating	Road Width	Rating	Weighted Rating	Vertical Alignment	Rating	Weighted Rating	Horizontal Alignment	Rating	Weighted Rating	Side Slope	Rating	Weighted Rating	Safety Issues	Rating	Weighted Rating	Priority Score
Section #	Road	Start	Finish	Length	Classification	Surface Type	Weighting		1.0	Weighting		1.0	Weighting		2.0	Weighting		0.5	Weighting		1.0	Weighting		1.0	Weighting		1.0	Weighting		1.0	Weighting		1.0	Weighting		1.0	Weighting		1.0	

<2000 vpd	5	>20%	5	>4 Miles (6.4km)	5	Provincial	5	High Importance to Multiple Commerical Users	5	PQI Less than 40	5	Greater Than 1.0m Below Design Standards	5	Greater Than 3 Locations/km Below Design Standards	5	Greater Than 3 Locations/km Below Design Standards	5	Less than 100% of Road Greater than 3:1 Slopes	5	Major Safety Issues	5	
1000-2000 vpd	4	10-20%	4	<4 Miles (4.8-6.4km)	4	Regional	4	High Importance to Single Commercial User	4	PQI 40-55	4	Less Than 1.0m Below Design Standards	4	Greater Than 2 Locations/km Below Design Standards	4	Greater Than 2 Locations/km Below Design Standards	4	100% of Road Greater Than 3:1 Slopes	4		4	
200-1000 vpd	3	5-10%	3	<3 Miles (3.2-6.4km)	3	Municipal	3	Low Importance to Single Commercial User	3	PQI 55-70	3	Less Than 0.5m Below Design Standards	3	2 Locations/km Below Design Standards	3	2 Locations/km Below Design Standards	3	50% of Road Greater Than 4:1 Slopes	3	Minor Safety Issues	3	
50-200 vpd	2	2-5%	2	<2 Miles (3.2-6.4km)	2	Local	2	Limited Commerical users	2	PQI 70-85	2	Meets Rehabilitation Guidelines	2	1 Location/km Below Design Standards	2	1 Location/km Below Design Standards	2	75% of Road Greater Than 4:1 Slopes	2		2	
<50 vpd	1	<2%	1	<1 Miles (3.2km)	1	Short	1	No Commerical users	1	PQI 85-100	1	Meets Design Standards	1	Meets Design Standards	1	Meets Design Standards	1	100% of Road Greater Than 4:1 Slopes	1	No Safety Issues	1	

9.0 Review of Network Model Based Functional Classification Plan

Identifying and defining a hierarchy of roadway classifications is an integral part of transportation planning. It allows for clear identification of the future roadway network and how road users will be able to move around. Roads should not be classified solely by traffic volumes, but by the intended role within the overall road network. To do this the functional classification of roads should instead be based on a network model, which accounts for factors such as the role of the road within the overall network, development of corridors to channel traffic away from local roads to roads of higher classification, providing connections to municipalities and connections to the provincial highway network. The development of the TSB took into consideration the role of network connectivity and other factors in assigning road classifications. The network model based functional classification plan will complete the work started in the TSB.

The County has developed a long-range traffic model of the rural road network that models the future traffic demand from future growth areas such as Bremner, North of Yellowhead, Ardrossan, and highway expansions including Highway 16 and Highway 15. The network model incorporates the existing road capacities and existing and future traffic generators to provide insight as to where future upgrades will be required. This long-range traffic model should be used in developing a future rural road functional classification plan.

The rural road functional classification plan should outline where the future arterial and collector roadways will be required to meet the long-term requirements of the County. This will benefit the prioritization process by taking a long-range view and focusing improvements on the parts of the network that will provide the best long-term value, and to identify areas of the County where improvements are required to complete the rural road network and complete transportation links.

For this study the existing provincial highway network and Class I networks were reviewed at a high level with the goal of identifying deficiencies in the network. To fully develop the functional classification plan further study will be required to fully define the Class I and Class II network. The study should look at the existing road classifications of the entire network to determine the most appropriate classifications for the future.

9.1 Review of the Class I Network Based on Traffic Model

The network of provincial highways in the County is the backbone of the transportation system which primarily moves people and goods quickly around the County and into the capital region. The provincial highway network is typically served by higher speed highway facilities including high volume divided highways, that can move people quickly and efficiently. The Class I network compliments the provincial highway network by providing roads capable of carrying higher volumes in areas not served by the Provincial network.

The County's network traffic model was used to review the existing Class I road network. The network model was reviewed at the long-term scenario (full build-out of MDP) and did not include the impact of the potential Northeast River Crossing project. There were two primary objectives. The first was to identify corridors that are expected to have high future traffic demands and would be candidates to be classified as Class I roads. The second objective was to identify a network plan that provided all County properties access to either a provincial highway or a Class I road to within four miles.

Today the provincial highway network and the Class I network provides extensive coverage over the higher density areas of the County south of Highway 16. South of Highway 16, the only location that should be considered for upgrades would be Township Road 530, from Range Road 213 to Range Road 211, and Range Road 211, from Highway 16 to Township Road 530. These upgrades would provide a connection from existing Class I network at Township Road 530 and Range Road 213 to the planned interchange at Highway 16 and Range Road 211.

North of Highway 16 there are several areas that will require upgrades to provide a complete network. The only existing north-south highway or Class I corridors are Highway 21 and Highway 830. East of Highway 830 there will be demand for an additional north-south corridor. Range Road 210/211 would be the likely candidate. At the south end, there is a planned interchange at Highway 16, and at the north end it would join the north-south Highway 830 and intersect the east-west Highway 15. The road name changes at Township Road 550 due to the correction line. Due to the correction line, the corridor is named Range Road 210 north of Township 550 and Range Road 211 to the south. The corridor is continuous.

Between Highway 16 and Highway 15 there are no east-west provincial highways and there is only a short section of Township Road 550 designated as a Class I road. There are 14 miles between Highway 16 and Highway 15 and would likely need two east-west corridors to complete the network. Continuing Township Road 550 to the east County boundary as a Class I road would be viable option as it provides access into the City of Fort Saskatchewan. The model does not indicate that the traffic demand will exist east of Highway 830; however, it would provide a northern connection between Range Road 210 and Highway 830. To complete the network there would need to be an additional east-west corridor at either Township Road 542 or 540. Either location would be acceptably spaced between Highway 16 and Township Road 550. The model does not indicate that the traffic demand will exist east of Highway 830, however, it would complete the Class I network and would provide a connection to the future Bremner Development.

The future development area of Bremner presents challenges in predicting the future road requirements. The road network between Bremner and the City of Fort Saskatchewan will require significant upgrades to handle the expected traffic volumes as some roads are predicted to have over 10,000 vpd. For this area recommendations have not been provided as they are highly dependent on the future area structure plan.

The Industrial Heartland also presents challenges in planning the road network. Specific recommendations were not made for the Industrial Heartland area as the developments are typically very large and traffic demand is highly dependent on where the development occurs and where the access points are and therefore need to be addressed as development occurs.

10.0 Recommendations

To meet the County's sustainability and safety goals, strategies are needed to guide the efficient use of resources for both the capital and operating budgets. To meet these goals, the following recommendation were developed and are outlined in the following sections. The key areas for recommendations are:

- Preservation of Investment
- Safety Measures
- Roadway Classification and Design Standards
- Development of Rehabilitation Design Standards
- Funding Requirements

10.1 Recommendation - Preservation of Investment

The County provides its residents a highly developed rural road network. Resources for the expansion and maintenance of the network is limited; therefore, it is important to allocate available resources in the most efficient and sustainable manner possible. The following recommendations are proposed to address the overall network. The recommendations are generally high-level recommendations and County staff and Council will need to have flexibility to address specific situations that may arise or are not identified within this plan.

1. The County has made significant investment over the years to construct the network that currently exists. The most cost-effective way to maintain that investment is timely and effective maintenance. Proper maintenance can help delay the more expensive rehabilitation methods, such as overlays and reconstruction, and is therefore key in maintaining a sustainable road network. It is recommended to continue to invest in timely routine interim maintenance practices to increase the design life of existing roads.

2. Develop a prioritization matrix, using defined importance and condition factors, to assist in rating road segments to determine which candidate road segment should be rehabilitated. The importance factors relate to the role that the road segment plays within the overall road network and the condition factors relate to the quality and geometrics of the existing road segment. The benefit of the prioritization matrix is that it is a subjective way to evaluate potential projects.

3. Develop a formal process for trialing new products or construction methods. A formal process with specific public program goals, public communication, and long-term testing and evaluation schedules will allow for better assessment. Within the current system new products and construction methods are being utilized but without scheduled long-term follow up and evaluation it is difficult to confirm the actual design life and life cycle costs. Public communication is critical when implementing a trial section. The public needs to be informed of the process so that they can be aware of the possible outcomes.

4. Each road is unique and has specific soil and surface conditions, and the 'one size fits all' approach could lead to some roads not meeting expectation of the road users. Site specific engineering and geotechnical work should be performed to identify the proper rehabilitation or maintenance treatment and to design a surface that will be able meet the expected traffic uses.

5. Use a cost benefit analysis to evaluate the life cycle cost of proposed improvements and maintenance. Cost savings could be realized by analyzing different rehabilitation and maintenance method costs versus their expected design life. Some construction methods may have large upfront costs but by analyzing them over the entire design life and factoring in long-term maintenance costs, the economics may be competitive.

6. Use technology to capture a richer data set when completing traffic counts. Video analysis can be used for completing traffic counts which also allows for determining the composition of traffic (passenger vehicles, trucks, buses, etc.) and for determining the peak volume periods. This additional information. Trucks and heavy vehicles have a significant impact on the pavement structures of roads and additional information will allow for better pavement designs. Funding should also be provided to acquire additional traffic counts for all roads that are being considered for upgrade, and multi seasonal counts should be completed for roadways that are being considered for downgraded. The regular collection of traffic counts will be necessary to maintain an up-to-date network traffic model.

7. There are roads within the County that are experiencing higher volumes due to shortcutting. The County should talk to industry partners about directing their employees to use specific routes for employees and trucks. Shortcutting leads to higher traffic volumes and higher speeds on lower class roadways that are not designed for those levels of traffic. the County can also communicate with traffic mapping software companies, such as Apple and Google, to direct routing to major roadway and avoid the minor roads.

8. County staff should develop a regular communication and information sharing program with neighboring municipalities. The challenges faced by the County to maintain their road network is similar to other municipalities and there are opportunities to learn from each other.

9. With the potential of changing weather patterns there is an increased risk in extreme weather events occurring including rain events with higher precipitation and more extreme temperatures variations. These increased risks can impact existing infrastructure. Increased frequency and severity of rain events can result in an increased risk of flooding, soil erosion, and soil instability. Greater temperature extremes can result in an increase in stress to asphalt structures resulting in a decrease in service life and increase in maintenance costs. To have a transportation system that is sustainable it is important for infrastructure to be designed and constructed to be resilient to environmental impacts.

10.2 Recommendation – Safety Measures

Considering the Safer Systems Approach, listed below are recommendations that the County can implement to reduce the risk of collisions on the rural networks and to assist with rural road safety program.

1. A common theme that was noted from the public engagement sessions was concerns about sightlines at intersections. The County has large areas that are generally forested and if roads have a narrow right-of-way, sightlines can be compromised by vegetation. A brushing program should be implemented where trees are cleared at intersections to increase sightlines. Adjacent landowners should also be approach if trees need to be cleared on private property.

2. Good data collection and analysis is critical in being able to evaluate the safety performance of transportation infrastructure. Accurate and comprehensive data helps to understand the nature and causes of vehicle collisions and allows for the implementation of effective countermeasures. The County should continue to collect the most comprehensive data available for collisions.

3. In the five-year period between 2015 and 2019, approximately 40% of fatal and injury collisions on rural roads in the County occurred at intersections. To reduce the number of collisions due to stop sign violations, the County should implement guidelines for additional safety measures at rural stop-controlled intersections. Alberta Transportation's "Safety Measures at Rural Stop-Controlled Intersections" is an effective guideline and is outlined in Section 8.3.

4. Current County practice is to install centerline and edge line painting on a road specific basis. Line painting should be expanded to include roads of any functional classification that have a hot mix asphalt surface, width over 8.5m and over 500 vpd.

5. Mini rural roundabouts can be an effective countermeasure for reducing the severity of collisions at intersections by reducing the number of high-speed collisions. They can also be effective at reducing speeding and reducing shortcutting. The application of mini rural roundabouts is very site specific and should only be implemented at intersections after a detailed engineering assessment has been conducted to determine the site suitability. The design and siting of mini rural roundabouts is critical as they can have an impact on the passage of large vehicles, specifically agricultural equipment. The County has numerous roundabouts in the urban and urban fringe areas so most drivers should be familiar with navigating them. If a suitable site is identified, the County should consider a trial project with a mini rural roundabout. Additional information on mini rural roundabouts is included in Section 8.4.

6. There is a high rate of animal collisions within the County. In the 5-year period between 2015 and 2019, approximately 40% of collisions on rural roads were animal collisions. The most effective treatments to reducing the number of animal collisions is to keep the right-of-way mowed and clear of trees. If specific and problematic wildlife corridors are identified, warning signs should be installed.

7. When roads are being upgraded to a hot mix asphalt surface, intersecting roadways that have a gravel or dust-abated gravel surface should have asphalt paved a minimum of 30m from edge of roadway to facilitate road sanding and salting during winter maintenance. A gravel or dust abated gravel road surface is damaged if salt or sand is applied.

10.3 Recommendation - Rural Road Functional Classification and Design Standards

The County's existing functional road classification system is defined in the TSB and further described in the design standards which are broadly outlined in **Section 3**. A review of the functional classification system and design standards was completed with the goal of identifying if there were any areas to recommend for improvement. Within the functional classification system and design standards several items for improvement were identified. These items are:

1. Inconsistent Road Classification System Nomenclature – Roadways are typically classified by the function they serve within the transportation system. The industry standard classification system divides roadways into three categories: arterial, collector and local. The current functional classification system nomenclature used in the County for the rural road network are the terms Class I, Class II, Class III, and Class IV which describe what are essentially arterial, collector and local roads. This nomenclature is inconsistent with what is used within the County for urban roadways, neighboring municipalities, and Transportation Association of Canada, which use the arterial, collector, local road nomenclature. The use of standard and descriptive naming conventions allows for clearer communication and understanding of the road classes when comparing to other jurisdictions or design standards. The TSB has included the use of arterial, collector and local in conjunction with Class I-IV and it is recommended that the County fully adopt the changes shown in **Table 10** which is better aligned with industry standards.

Table 10 - Proposed Road Classification Nomenclature

Current Nomenclature	Proposed Nomenclature
Class I	Rural Arterial
Class II	Rural Major Collector/ Rural Minor Collector
Class III	Rural Local - Dust Abated
Class IV	Rural Local - Gravel
Rural Residential Subdivision	Rural Residential Subdivision
Rural Hamlet	Rural Hamlet
Industrial Collector	Rural Industrial Collector
Industrial Local	Rural Industrial Local

2. Revised Road Classifications - In reviewing the functional road classifications and design standards it was noted that there is a significant difference in the minimum design standards between the Class I and Class II functional classes. Class I roads are intended for roads with traffic volumes over 1000 vpd and Class II roads for traffic volumes of 250-1000 vpd; however, the geometric standards for the Class II roads are more similar to the Class III and Class IV roads, which are local roads with traffic volumes under 250 vpd. The design requirements for the roads that experience volumes approaching 1000 vpd are quite different than roads with traffic volumes of 250 vpd and require different design criteria to meet the needs of the road users.

   The Class II network acts as the collector roads within the County's rural road network and serve a wide variety of roles within the overall network; however, the existing design standards are not able to accommodate this. From the public engagement it was noted that the Class II road network had the greatest levels of dissatisfaction among residents of the functional road classes. There are likely several factors that play into this, including the overall size of the network and the variable traffic volumes, road conditions, cross sections and surfacing types that exist within the class. The Class II network is the largest road class with 444km of road and 46% of the entire rural road network, and almost 40% of Class II roads have traffic volumes over 500 vpd.

   The County should consider changes to the Class II road classification criteria by developing an additional classification by splitting the Class II network into two different classifications. These two new classifications would serve the role of a Major Collector and a Minor Collector. The Major Collector classification would be applicable for the higher volume Class II roads, and Minor Collectors would cover the lower volume roads of the existing Class II classification.

   The Rural Major Collector road classification would be applicable for roadways between 500 vpd and 1000 vpd, with a pavement width of 8.5m. The increase in pavement width will better accommodate the traffic volumes, provide a safer road for the higher traffic volumes, and would allow for future asphalt overlays without narrowing the road below an acceptable width.

   The Rural Minor Collector road classification would be applicable to roadways between 200 vpd and 500 vpd with a pavement width of 8.0m. The increase in pavement width from the existing 7.5m standard will better accommodate the traffic volumes, will provide a safer road, and will allow for future asphalt overlays without narrowing the road below an acceptable width.

The Rural Local–Dust Abated classification would replace the existing Class III classification and would be applicable to roadways between 50 and 200 vpd with a width of 7.5m. The design criteria would be similar to the existing Class III criteria with the exception of the reduced volume range.

The Rural Local–Gravel classification would replace the Class IV classification and would be applicable to roadways between 0 and 50 vpd with a road surface width of 7.0m. The road surface width is reduced from the existing Class IV design criteria. This reflects the lower traffic limits of this class and reflects the role this class would serve in the overall network.

The Rural Industrial Collector classification is a new classification. This classification would be applicable for roadways with high truck traffic in the range of 20% and primary purpose is to provide traffic movement and access to local properties.

The Rural Industrial Local classification is a new classification. This classification would be applicable for roadways with high truck traffic in the range of 20% and primary purpose is to provide access to local properties.

Refer to **Table 11** for a breakdown of the proposed classification criteria and proposed design standards.

3. Network Model Based Classification Plan – The County has developed a long-range traffic model of the rural road network that models the future traffic demand from future growth areas such as Bremner, North of Yellowhead, Ardrossan, and improvements to provincial highways. The network model incorporates the existing road capacities and existing and future traffic generators to provide insight as to where future upgrades will be required. This long-range traffic model should be used in creating a future County wide rural road functional classification plan.

4. Rural Industrial Road Functional Road Classification – In the 2010 SRRMP report a recommendation was provided to create a new classification to deal with heavy industrial traffic. The Alberta Industrial Heartland Transportation Study developed some design criteria and cross sections for that area. The Strathcona County Design and Construction Standards also include cross sections for industrial road however, the cross sections are inconsistent. A formal, consistent rural industrial road classification should be developed.

TABLE 11: PROPOSED CLASSIFICATION SYSTEM CRITERIA										
Factor or Characteristic	**Existing Description**	**Class I**	**Class II**	**Class II**	**Class III – Dust-Abated**	**Class IV - Gravel**	**Rural Residential Subdivision Roadway**	**Rural Hamlet Roads**		
	Proposed Description	**Rural Arterial**	**Rural Major Collector**	**Rural Minor Collector**	**Rural Local - Dust Abated**	**Rural Local-Gravel**	**Rural Residential Subdivision**	**Rural Hamlet**	**Rural Industrial Collector**	**Rural Industrial Local**
Traffic Volume and Type	Traffic volume (vpd) and proportion of truck traffic.	Greater than 1,000 vpd, moderate to high proportion of truck (SUT and MUT) traffic.	500 vpd to 1,000 vpd, moderate proportion of truck (SU and TT) traffic.	200 vpd to 500 vpd, moderate proportion of truck (SU and TT) traffic.	Less than 50-200 vpd, expect low proportion of truck (SU and TT) traffic .	Less than 50 vpd, expect low proportion of truck (SU and TT) traffic .	Up to 500 vpd Very low proportion of truck (SU and TT) traffic .	Up to 500 vpd Very low proportion of truck (SU and TT) traffic.	Traffic volumes vary, but expect a high proportion of truck (SU and TT) traffic (greater than 20%) in all volumes.	Traffic volumes vary, but expect a high proportion of truck (SU and TT) traffic (greater than 20%) in all volumes.
Road Width	Design width of finished road surface	9.0m	8.5m	8.0m	7.5m	7.0m	7.5m to 8.5m	See Urban Design Standards Vol. 1 Sec 4.1, Roads	11.5	9.5
Right-of Way Width	Minimum right of width	40m	30m	30m	30m	20m	30m	30m	30m	30m
Function	Primary purpose of functional road class	Ttraffic movement	Traffic movement and access have similar importance	Traffic movement and access have similar importance	Access to adjacent properties	Access to adjacent properties	Access to adjacent properties	Access to adjacent properties	Traffic movement and access have similar importance	Access to adjacent properties
Spatial Hierarchical System	Description of the primary purpose fo the road and the role that it serves within the overall road network	Provides connection from lower class roadways to a provincial highway or to an urban center	Provides connection from lower class roadways to a provincial highway or to an urban center	Provides connection from local roads to an arterial roadway or provincial highway.	Provides access from properties to higher class roadways.	Provides access from properties to higher class roadways.	Provides connection from rural subdivisions to the main rural road network.	Provides connection from local hamlet road network to the to the main rural road network.	Provides access to the industrial subdivision from a higher classification of road.	Provides connection to other internal industrial subdivision roads and properties

Notes: vpd - Vehicles per day
SUT - Single Unit Truck
MUT - Tractor Trailer Truck

10.4 Recommendation – Develop Rehabilitation Design Guidelines (3R/4R)

One of the challenges in maintaining the existing road network is the high cost of reconstructing roads. To provide flexibility to road designers when rehabilitating roadways, the County should develop rehabilitation design guidelines. The goal of rehabilitation design guidelines is to provide lower cost and lower impact design options to sustainably extend the service life of the existing infrastructure as major reconstruction projects are cost and time intensive and are not required for every roadway.

The rehabilitation design guidelines could be developed similar to Alberta Transportations 3R/4R guidelines or Transportation Association of Canada's 3R/4R Guidelines. 3R/4R refers to projects the involve resurfacing, restoration, or rehabilitation (3R) or some limited reconstruction (4R). The rehabilitation guidelines would formalize the County's current practices on rehabilitating and maintaining roads in which roads are rehabilitated to criteria that are below the new construction standards. The guidelines would provide flexibility when rehabilitating a roadway to consider design parameters that would satisfy best practices but may not meet the higher standards required in existing design standards for new construction. This would be specifically applicable on roadways where land acquisition may present challenges. Some design criteria that could be considered to have lower minimums than the new construction standards, while still meeting engineering best practices, include narrower pavement widths, narrower right of way widths, and reduced vertical and horizontal curve minimums. **Table 12** shows which improvements would be completed using the rehabilitation design guidelines and which would be completed using new construction standards.

Table 12 – Improvement Matrix

Road Surface	Operating Budget Improvements (Rehabilitation Design Guidelines)			Capital Budget Improvements (New Construction Design Standards)
	Regular Maintenance	Minor Repair (Localized repairs)	Rehabilitation	Reconstruction
Hot Mix Asphalt	Crack filling, spray patching, seal coats	Base repair – remove and replace with soil cement and asphalt	Asphalt overlay, full depth reclamation (foamed asphalt, cement stabilization)	Full rebuild, grade widening
Cold Mix Asphalt	Blade patching	Base repair – remove and replace with soil cement and asphalt	Pulverize and cement stabilize base	
Gravel and Dust Abated	Gravel blading – 2-week cycle	Spot base stabilization, remove and replace with 63mm recycled concrete	Cement stabilize base and re-gravel	

10.5 Recommendation – Funding Requirements

To get a scope of the budget implications of the current expenditures a review of the existing road data was completed in **Section 3**. This review shows that a very large infrastructure deficit exists in the County. Accounting for only the roads that are deficient in width there are over 1100km of roadway that are below new construction design standards. In budget terms, at a cost of $1.5 million per km for reconstruction, that results in a deficit of $1.650 billion dollars. If you only look at the roads that are greater than 1.0m narrower compared to the new construction design standard, which would compare to a rehabilitation design standard, that still leaves over 610km of roads that are deficient in width. In budget terms, at a cost of $1.5 million per km for reconstruction, that still results in a deficit of $915 million dollars.

Table 4 shows the operating and capital budgets for the rural road network. Over the last five years the average capital budget has been $7.5 million per year, with the most recent year of 2020 at $8.83 million. The current capital budgets are not sufficient to address the infrastructure deficit. To address the backlog in the existing infrastructure deficit over the next 20 years, to just the roads that would fall under the 3R/4R design guidelines, the capital budget will need to be increased by a factor of five. This does not take into account capital expenditures that will be required for future growth.

The increase in spending on the capital budget should have positive impacts on operating budget. In **Table 6** the total expenditure per road class is shown. From this table it is evident that the higher road classifications, which typically have a higher quality surface are requiring less budget to maintain. As roads are reconstructed and have their surface types improved this will result in lower operating cost for those improved roads.

11.0 Conclusion

11.1 Summary of Recommendations

This section summarizes the key recommendations presented in this report. For detailed information regarding the recommendations refer to **Section 10**.

Preservation of Investment

- Maintenance should be kept up on the road sections that may appear to be candidates for overlays.
- Develop a formal process for trialing new products or construction methods.
- Site specific engineering and geotechnical work should be performed to identify the proper rehabilitation or maintenance treatment.
- A cost benefit analysis should be used to evaluate the life cycle cost of proposed improvements and maintenance.
- Technology should be used to capture a richer data set when completing traffic counts.
- Industry partners should be engaged about directing their employees to use specific routes for employees and trucks.
- County staff should develop a regular communication and information sharing program with neighboring municipalities.

Safety Measures

- A brushing program should be implemented where trees are cleared at intersections to increase sightlines.
- Continue to collect the most comprehensive data available for collisions.
- Implement guidelines for additional safety measures at rural stop-controlled intersections.
- Consider rural roundabouts as potential intersection treatments
- Keep the right-of-way mowed and clear of trees in animal corridors reduce animal collisions
- Intersecting roadways that have a gravel or dust-abated gravel surface should have asphalt paved a minimum of 30m from edge of roadway to allow for winter maintenance.

Rural Road Functional Classification and Design Standards

- Update road classification nomenclature.
- Update road classifications to divide the Class II roads into a Rural Major Collector and Rural Minor Collector.
- Develop a functional classification plan based on the long-term network traffic model.
- Develop a formal Rural Industrial Road functional class.

Develop Rehabilitation Design Guidelines

- Develop rehabilitation design guidelines is to provide lower cost and lower impact design options to sustainably extend the service life of the existing infrastructure.

Funding Requirements

- To address the backlog in the existing infrastructure deficit the capital budget will need to be significantly increased.

11.2 Closure

In conclusion, Al-Terra Engineering believes that the analysis and recommendations provided in the Sustainable Rural Roads Master Plan 2021 provides the tools and direction for Strathcona County to successfully manage the rural road network in a manner compatible with economic, social, and environmental sustainability.

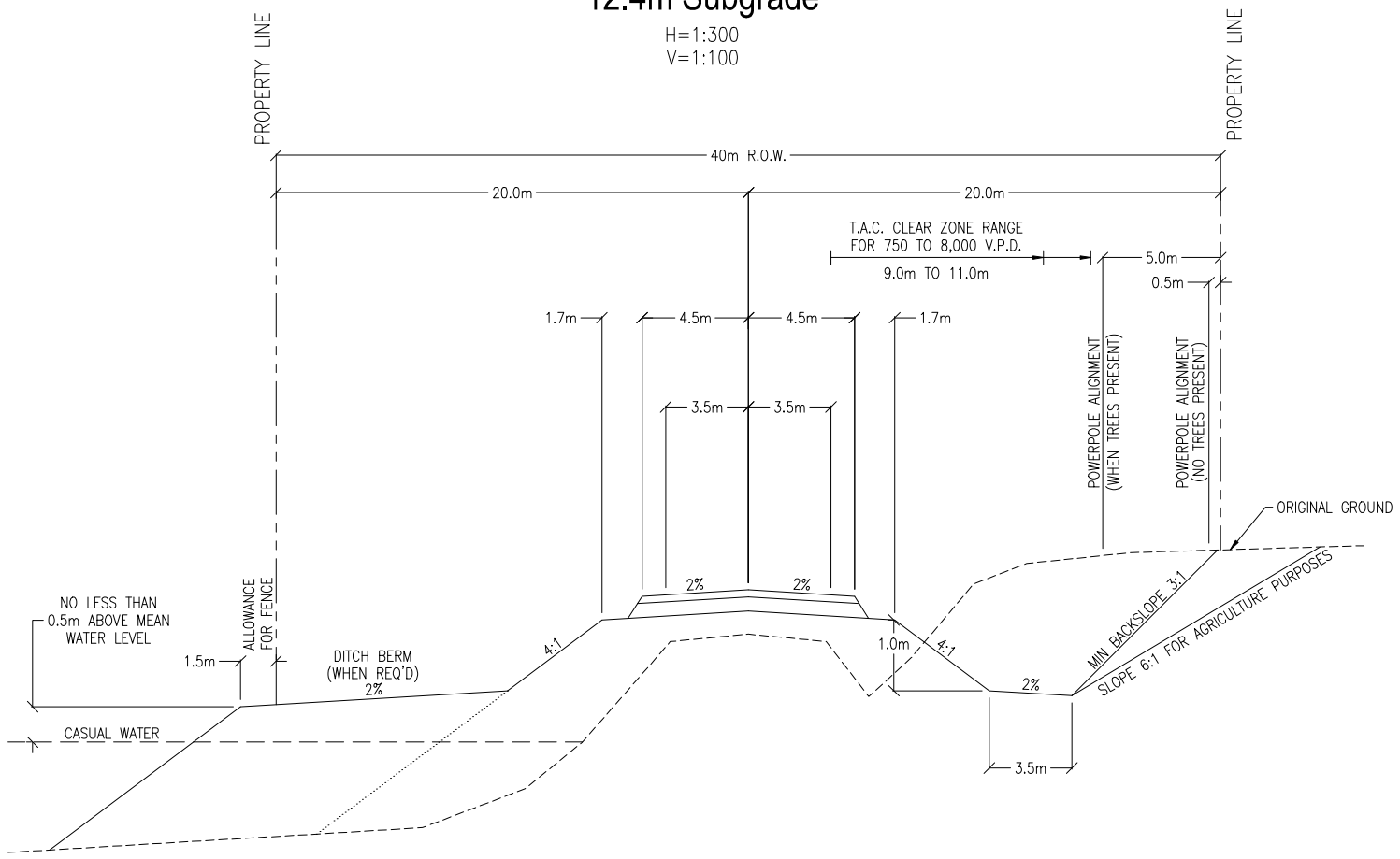
Appendix A

Standard Details for County Roads

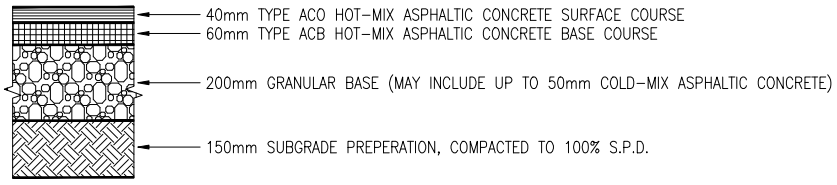
Al-Terra Engineering Ltd.

Class I Rural Road
9.0m Finished Top
12.4m Subgrade

H=1:300
V=1:100



MINIMUM ROAD STRUCTURE



NOTES:
1. STANDARD ALIGNMENT OF POWERPOLES IS 0.5m FROM PROPERTY LINE WHEN NO TREES ARE PRESENT. IF PRESENT, THE REQUIRED 5.0m OFFSET BETWEEN POWERLINES AND TREE CANOPY IS MET WITH A 5.0m POWERPOLE OFFSET WITHIN THE RIGHT-OF-WAY.
2. GEOTECHNICAL CONSULTANT TO CONFIRM SUITABILITY OF CROSS-SECTION STRUCTURE.
3. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.3%, DESIRABLE 0.6%.
4. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
5. DESIRED 4:1 BACKSLOPING (MINIMUM 3:1), WITH PROVISION FOR 6:1 FOR AGRICULTURAL PURPOSES.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	REVISED DRAWING NUMBERS	O. Butt
2006/01/19	Final Revisions for Approval	R. Dekker

Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

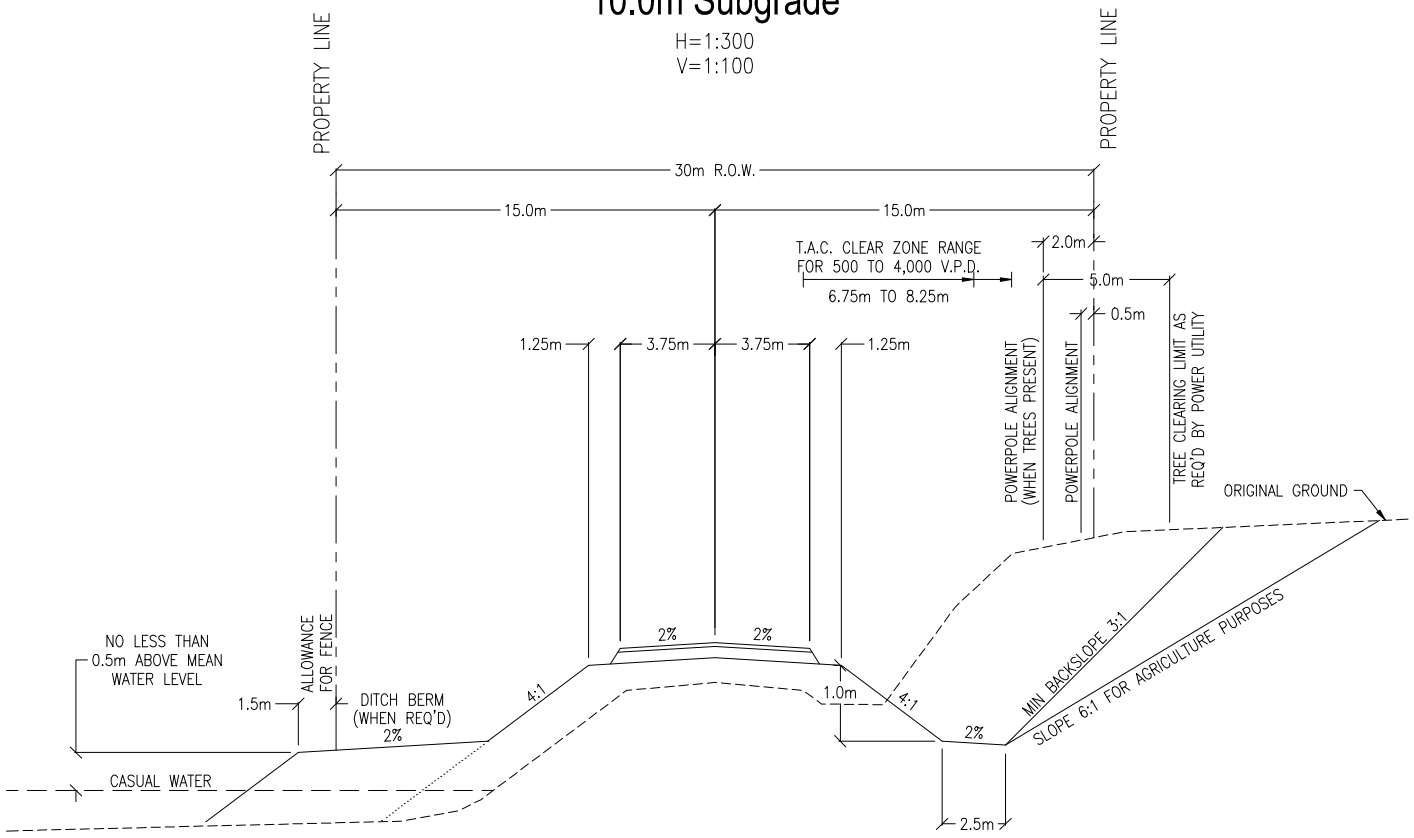
Class I (Hot-Mix Asphaltic Concrete) Rural Grid Road
40.0m Right-of-Way, 9.0m Finished Top, 12.4m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 1995/01/16 | Scale: AS NOTED | Drawn: Richard Dekker, R.E.T.

Drawing Number: 51101
Capital Planning & Construction Department

Class II Rural Road
7.5m Finished Top
10.0m Subgrade

H=1:300
V=1:100



MINIMUM ROAD STRUCTURE

NOTES:

1. TYPICAL 30.0m ROAD RIGHT-OF-WAY WTIH BACKSLOPING AGREEMENTS.
2. STANDARD ALIGNMENT OF POWERPOLES IS 0.5m FROM PROPERTY LINE WHEN NO TREES ARE PRESENT. IF PRESENT, THE REQUIRED 5.0m OFFSET BETWEEN POWERLINES AND TREE CANOPY (AS REQUIRED BY THE POWER UTILITY COMPANY) IS MET WITH A 2.0m POWERPOLE OFFSET WITHIN THE RIGHT-OF-WAY AND 3.0m OF TREE CLEARING WITHIN PRIVATE PROPERTY.
3. RECOMMENDED 40.0m ROAD RIGHT-OF-WAY TO ALLEVIATE NEED FOR BACKSLOPING AGREEMENTS, POWER UTILITY COMPANY TREE CLEARING, AND TO FACILITATE FUTURE TRANSITION TO A CLASS-I ROADWAY.
4. GEOTECHNICAL CONSULTANT TO CONFIRM SUITABILITY OF CROSS-SECTION STRUCTURE.
5. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.3%, DESIRABLE 0.6%.
6. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
7. DESIRED 4:1 BACKSLOPING (MINIMUM 3:1), WITH PROVISION FOR 6:1 FOR AGRICULTURAL PURPOSES.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2006/01/19	Final Revisions for Approval	R. Dekker

Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Class II (Cold-Mix Asphaltic Concrete) Rural Grid Road
30.0m Right-of-Way, 7.5m Finished Top, 10.0m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 1995/01/16 | Scale: AS NOTED | Drawn: Richard Dekker, R.E.T.

Drawing Number: 51102

Capital Planning & Construction Department

Class III Rural Road
7.5m Finished Top
10.0m Subgrade

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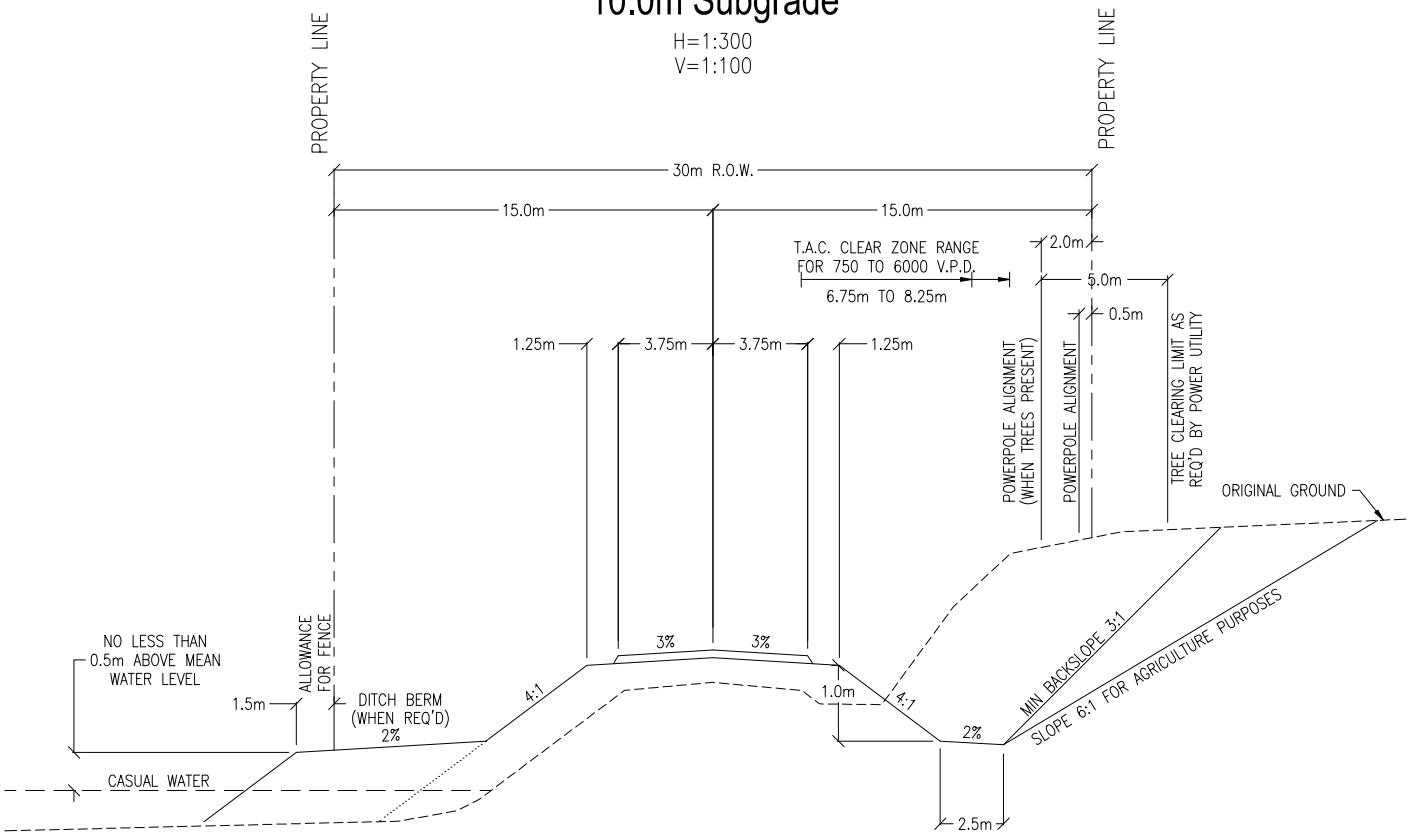
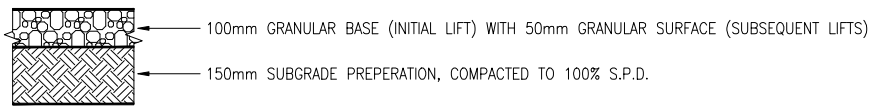


MINIMUM ROAD STRUCTURE



NOTES:

1. TYPICAL 30.0m ROAD RIGHT-OF-WAY WTIH BACKSLOPING AGREEMENTS.
2. STANDARD ALIGNMENT OF POWERPOLES IS 0.5m FROM PROPERTY LINE WHEN NO TREES ARE PRESENT. IF PRESENT, THE REQUIRED 5.0m OFFSET BETWEEN POWERLINES AND TREE CANOPY (AS REQUIRED BY THE POWER UTILITY COMPANY) IS MET WITH A 2.0m POWERPOLE OFFSET WITHIN THE RIGHT-OF-WAY AND 3.0m OF TREE CLEARING WITHIN PRIVATE PROPERTY.
3. CLASS IV RURAL GRID ROAD AS ABOVE BUT SURFACE TREATED WITH DUST ABATEMENT MATERIAL.
4. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.3%, DESIRABLE 0.6%.
5. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
6. DESIRED 4:1 BACKSLOPING (MINIMUM 3:1), WITH PROVISION FOR 6:1 FOR AGRICULTURAL PURPOSES.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2006/01/19	Final Revisions for Approval	R. Dekker

Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Class III (Gravelled) Rural Grid Road
30.0m Right-of-Way, 7.5m Finished Top, 10.0m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.

Checked: D.L. Schilbe, P.L. (Eng)

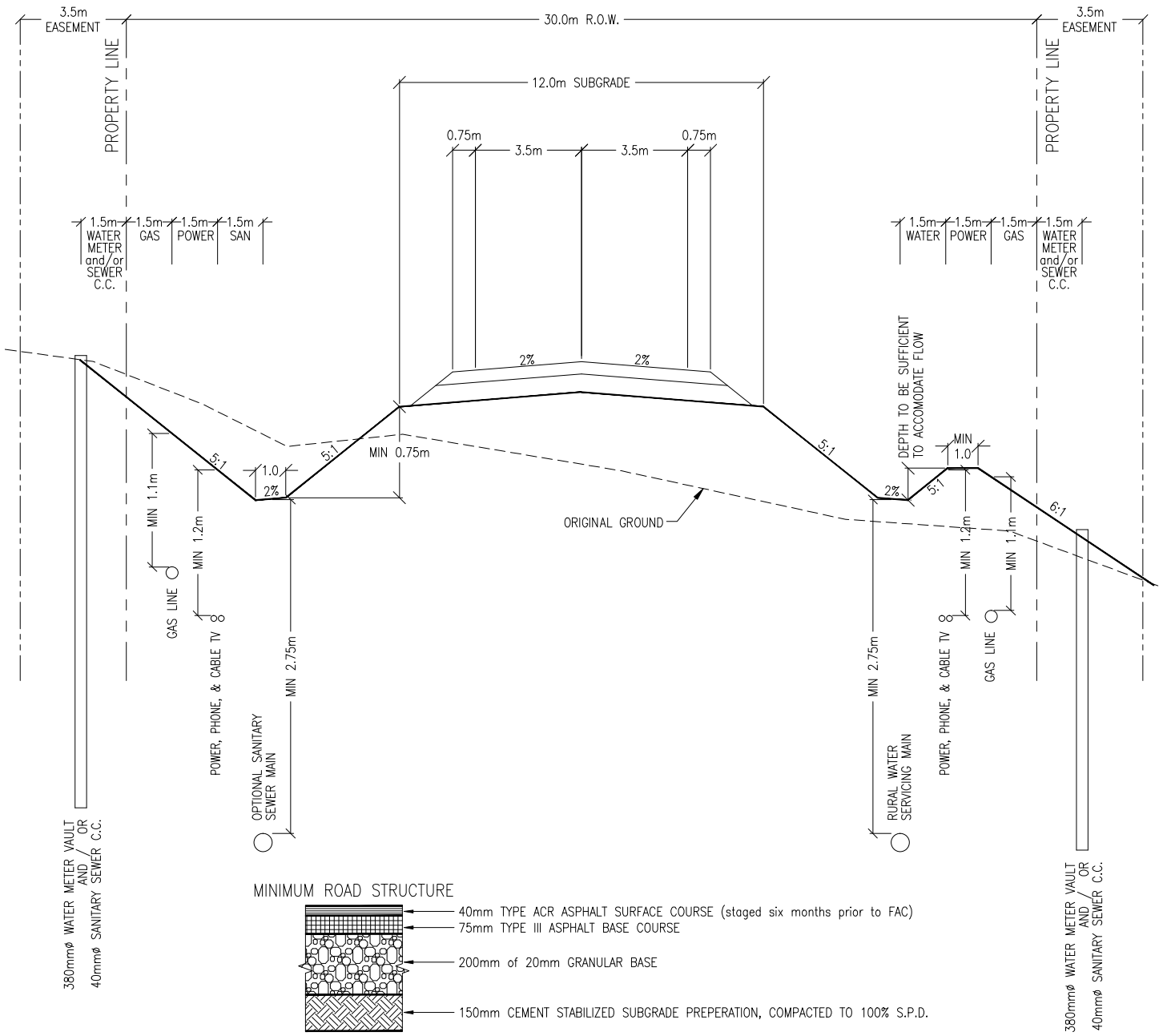
Date: 1989/09/11 | Scale: N.T.S. | Drawn: Richard Dekker, R.E.T.

Drawing Number: 51103

Capital Planning & Construction Department

Country Residential Subdivision Road
8.5m Finished Top on 12.0m Subgrade

H=1:200
V=1:50



MINIMUM ROAD STRUCTURE

NOTES:
1. PROVISION FOR 7.5m FINISHED TOP AND 11.0m SUBGRADE ON CUL-DE-SAC ROADS PER LOT NUMBER AND SECOND ACCESS REQUIREMENTS.
2. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.
3. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
4. DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.
5. MINIMUM ROAD STRUCTURE SUBJECT TO REVISION BY GEOTECHNICAL REPORT RECOMMENDATIONS.
6. ALL TRENCHES IN ROAD OR SIDESLOPE REQUIRE COMPACTION TO 98% STANDARD PROCTOR DENSITY.
7. ALL TRENCHES IN DITCH BOTTOM OR BACKSLOPE TO 95% STANDARD PROCTOR DENSITY.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2006/01/19	Minimum Structure & Final Revisions for Approval	R. Dekker
2005/03/30	Minimum Structure	R. Dekker

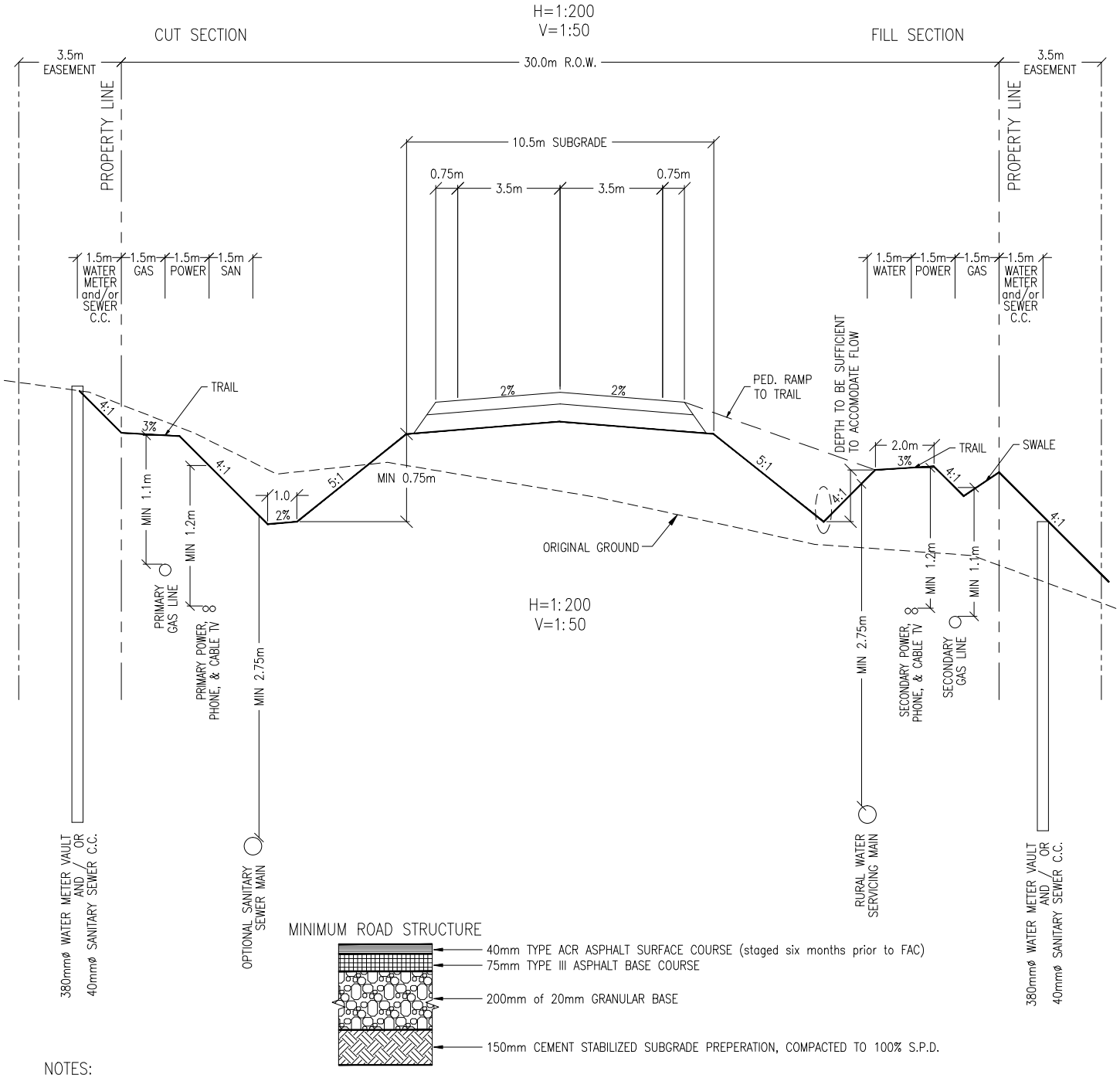
Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Country Residential Subdivision Roadway
30.0 m Right-of Way, 8.5m Finished Top, 12.0m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 1991/02/12 | Scale: AS NOTED | Drawn: Richard Dekker, R.E.T.

DWG. NO.
51104
Capital Planning & Construction Department

Country Residential Subdivision Roadway with Trail
8.5m Finished Top on 10.5m Subgrade



MINIMUM ROAD STRUCTURE

NOTES:
1. PROVISION FOR 7.5m FINISHED TOP AND 9.5m SUBGRADE ON CUL-DE-SAC ROADS PER LOT NUMBER AND SECOND ACCESS REQUIREMENTS.
2. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.
3. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
4. DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.
5. MINIMUM ROAD STRUCTURE SUBJECT TO REVISION BY GEOTECHNICAL REPORT RECOMMENDATIONS.
6. ALL TRENCHES IN ROAD RIGHT-OF-WAY REQUIRE COMPACTION TO 95% STANDARD PROCTOR DENSITY.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2006/01/19	Final Revisions for Approval	R. Dekker

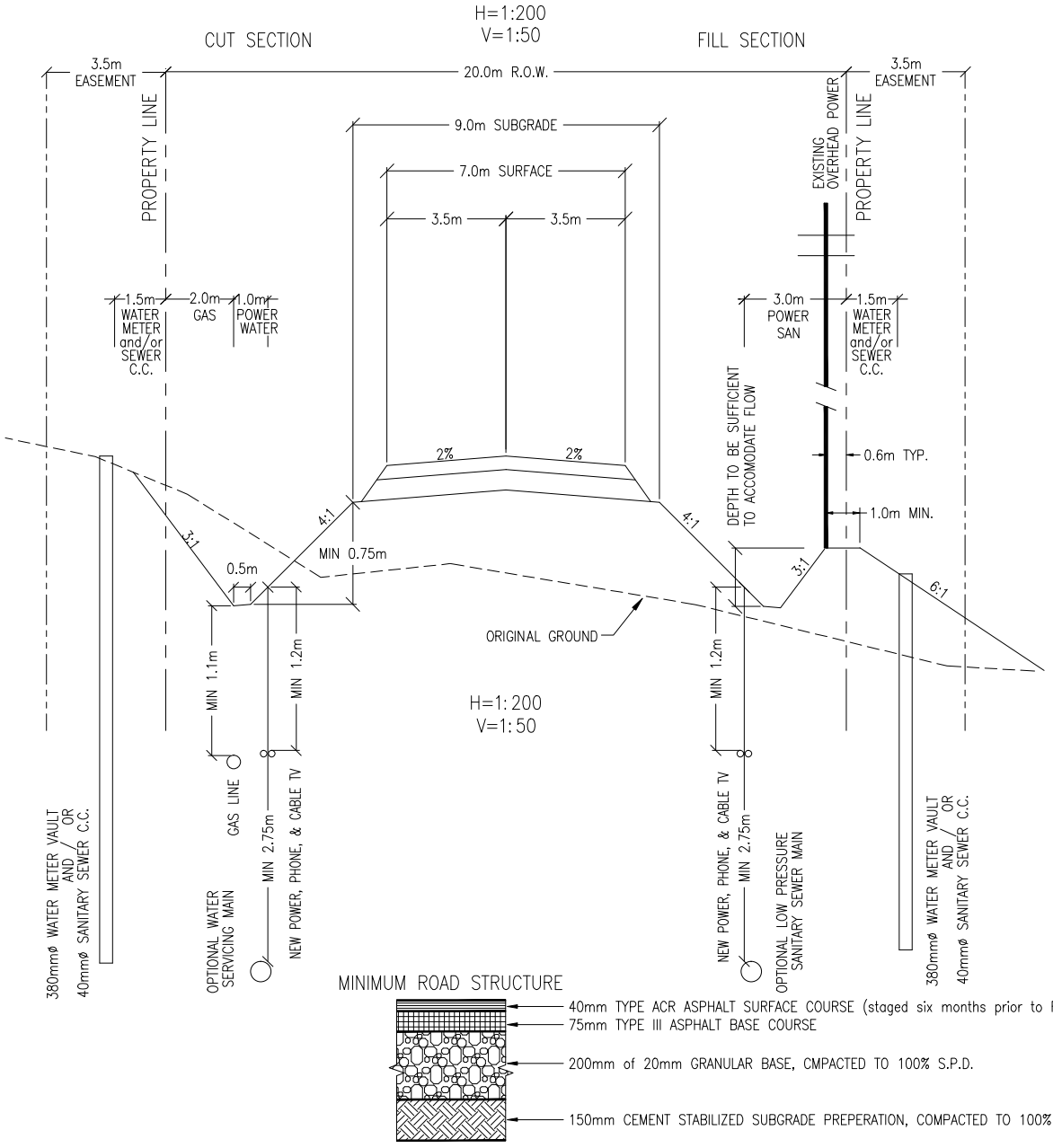
Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Country Residential Subdivision Roadway - With 1 Trail
30.0 m Right-of Way, 8.5m Finished Top, 10.5m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 2004/06/25 | Scale: AS NOTED | Drawn: Jason Eggen, C.E.T.

DWG. NO.
51105
Capital Planning & Construction Department

Country Residential Subdivision Roadway - Redevelopment Only
7.0m Finished Top on 9.0m Subgrade



MINIMUM ROAD STRUCTURE

NOTES:

1. VALID ONLY FOR NW & SW 15-53-22-W4, NW 30-53-21-W4, AND SW 05-52-22-W4, AS PER MAP #1, 2007 MDP.
2. ALL NEW ROAD CONSTRUCTION SHALL INCLUDE UNDERGROUND POWER INSTALLATION.
3. CONSTRUCTION OF NEW, NON-CONNECTED ROADWAYS SHALL BE PER DETAIL DRAWINGS 51004 and 51105.
4. BACKSLOPING AGREEMENTS AND LOT GRADING TO ACCOMMODATE DRAINAGE ARE REQUIRED.
5. INSTALLATION OF WATER AND SANITARY SERVICES AFTER THE SHALLOW UTILITIES HAVE BEEN INSTALLED SHALL BE BY HORIZONTAL DRILLING.
6. WATER VALVING, SANITARY SEWER APPURTENANCES, AND PHONE & CABLE PEDESTALS TO BE INDIVIDUALLY ASSESSED AND LOCATED.
7. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.
8. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
9. DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.
10. MINIMUM ROAD STRUCTURE SUBJECT TO REVISION BY GEOTECHNICAL REPORT RECOMMENDATIONS.
11. ALL TRENCHES IN ROAD RIGHT-OF-WAY REQUIRE COMPACTION TO 95% STANDARD PROCTOR DENSITY.
12. CUL-DE-SAC DESIGN REQUIRES 24.75m BULB AND RETURN RADII.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2009/07/22	Revision to Include Cul-de-sac Design Radii	K. Haggerty T.T.
2009/06/30	Approved by Council	
2009/06/24	Final Revisions for Approval	K. Haggerty, T.T.

Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Country Residential Subdivision Roadway - Redevelopment Only
20.0 m Right-of Way, 7.0m Finished Top, 9.0m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.

Checked: D.L. Schilbe, P.L. (Eng)

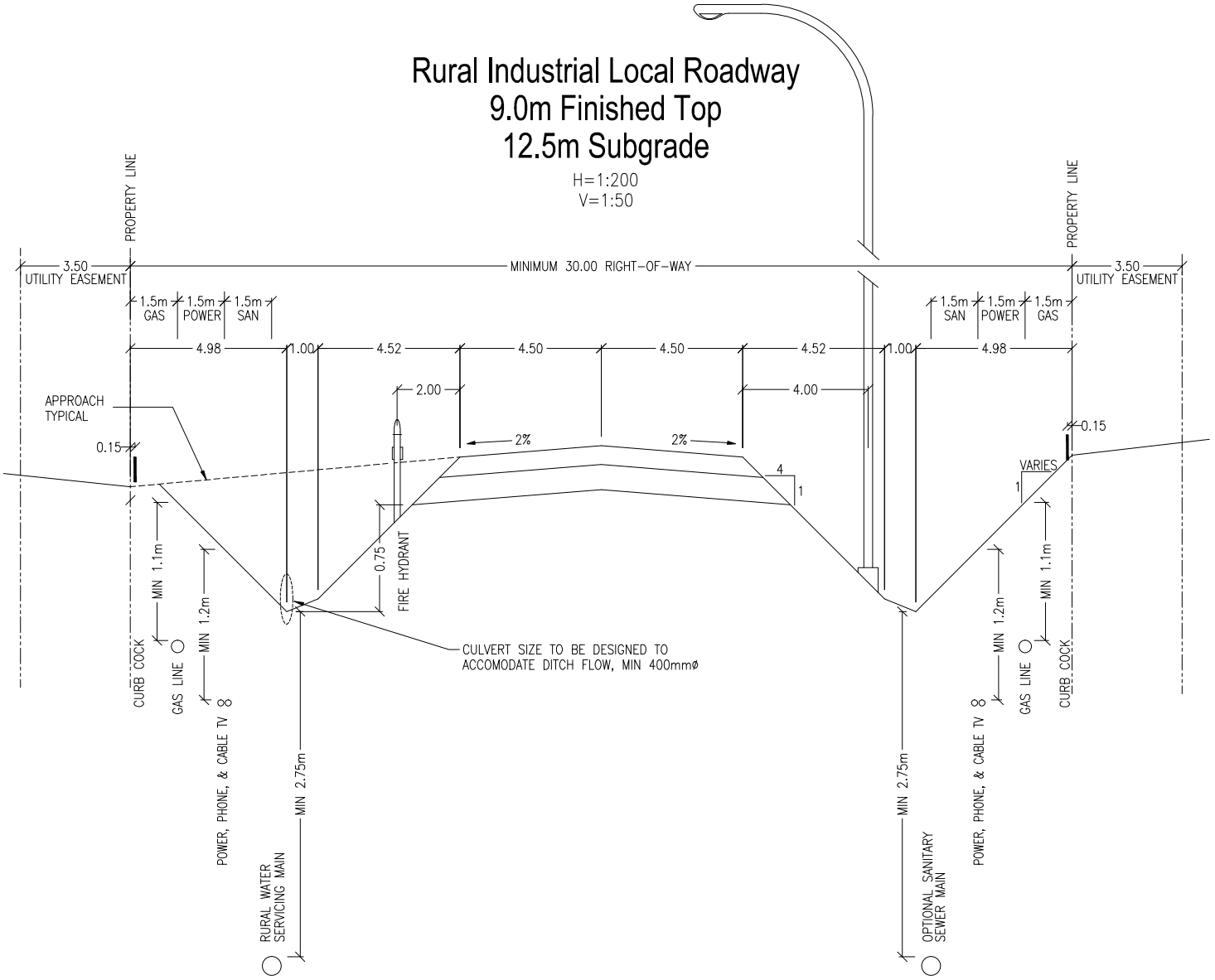
Date: 2009/03/06 | Scale: AS NOTED | Drawn: Karolina Haggerty, T.T.

DWG. NO. 51106

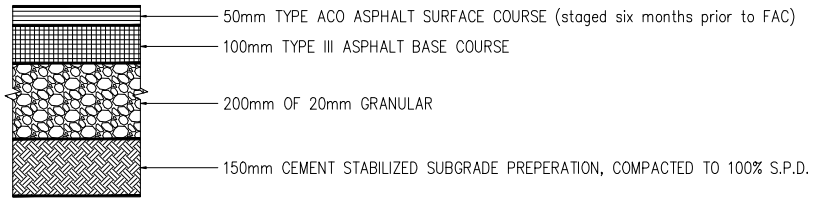
Capital Planning & Construction Department

Rural Industrial Local Roadway
9.0m Finished Top
12.5m Subgrade

H=1:200
V=1:50



MINIMUM ROAD STRUCTURE



NOTES:
1. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.
2. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
3. DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.
4. MINIMUM ROAD STRUCTURE SUBJECT TO REVISION BY GEOTECHNICAL REPORT RECOMMENDATIONS.
5. ALL TRENCHES IN ROAD OR SIDESLOPE REQUIRE COMPACTION TO 98% STANDARD PROCTOR DENSITY, IN DITCH BOTTOM OR BACKSLOPE, 95% S.P.D. IS ACCEPTABLE.

REVISIONS

Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2005/01/19	Final Revisions for Approval	J. Edgington

Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

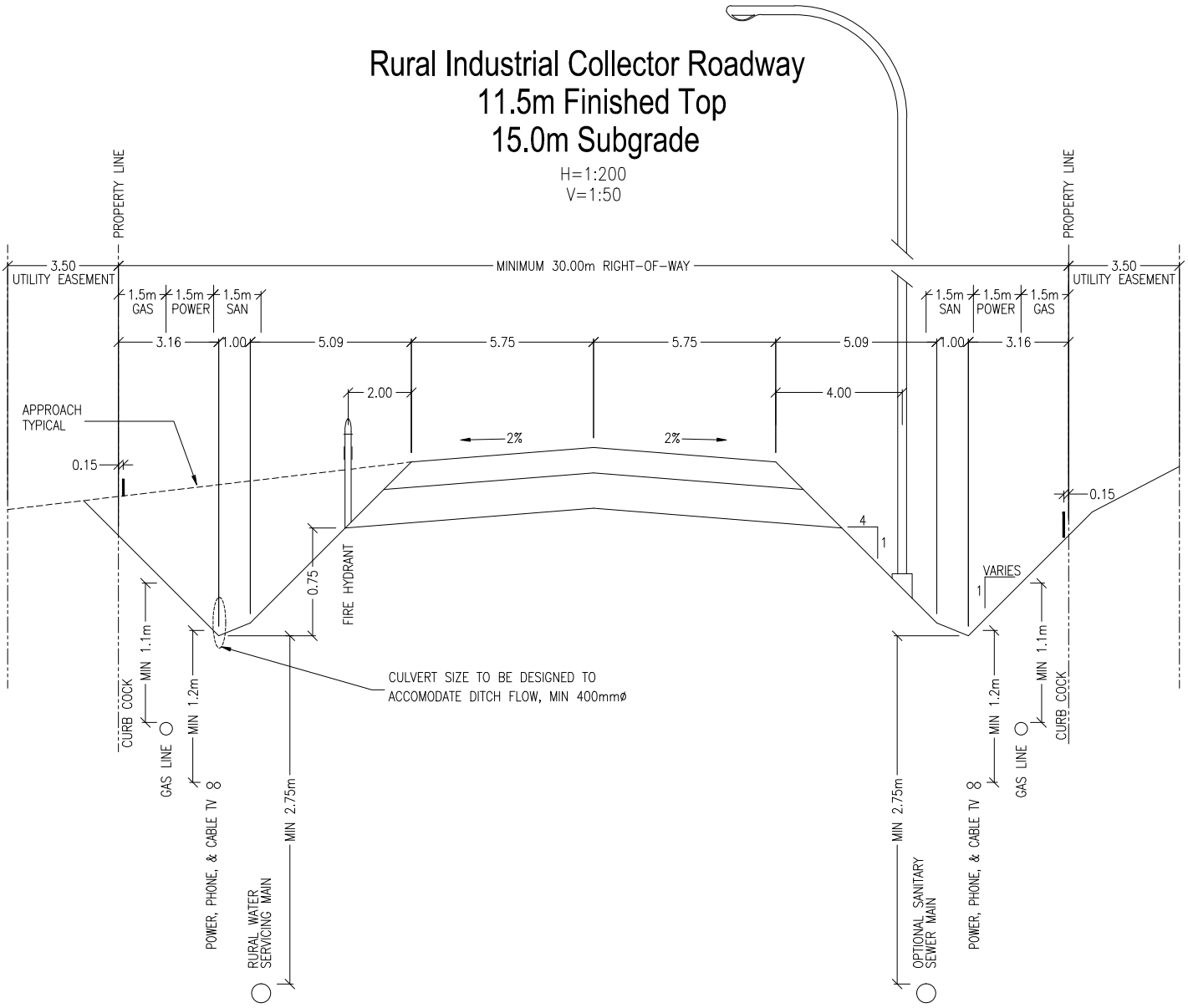
Industrial Local Roadway
30m Right-of-Way, 9.0m Finished Top, 12.5m Subgrade

Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 1999/06/21 | Scale: 1:200 | Drawn: Devin Boudreau, C.Tech.

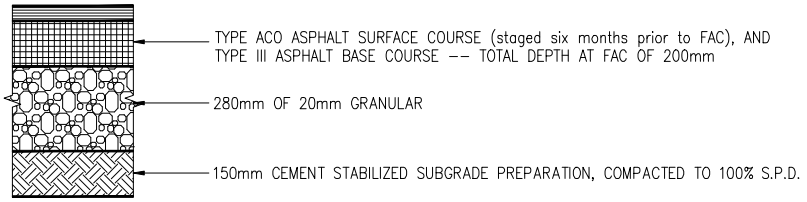
Drawing Number:
51107
Capital Planning & Construction Department

Rural Industrial Collector Roadway
11.5m Finished Top
15.0m Subgrade

H=1:200
V=1:50



MINIMUM ROAD STRUCTURE



NOTES:
1. MINIMUM LONGITUDINAL GRADE FOR ROAD AND DITCH TO BE 0.6%.
2. POSITIVE DRAINAGE IS TO BE MAINTAINED AT ALL LOCATIONS.
3. DITCH DEPTH TO BE CONFIRMED BY GEOTECHNICAL REPORT.
4. MINIMUM ROAD STRUCTURE SUBJECT TO REVISION BY GEOTECHNICAL REPORT RECOMMENDATIONS.
5. ALL TRENCHES IN ROAD OR SIDESLOPE REQUIRE COMPACTION TO 98% STANDARD PROCTOR DENSITY, IN DITCH BOTTOM OR BACKSLOPE, 95% S.P.D. IS ACCEPTABLE.

REVISIONS		
Date	Details	Drawn
11/05/02	REVISED DRAWING NUMBERS	J. ORR
11/02/10	Revised Drawing Numbers	O. Butt
2006/01/19	Final Revisions for Approval	J. Edgington

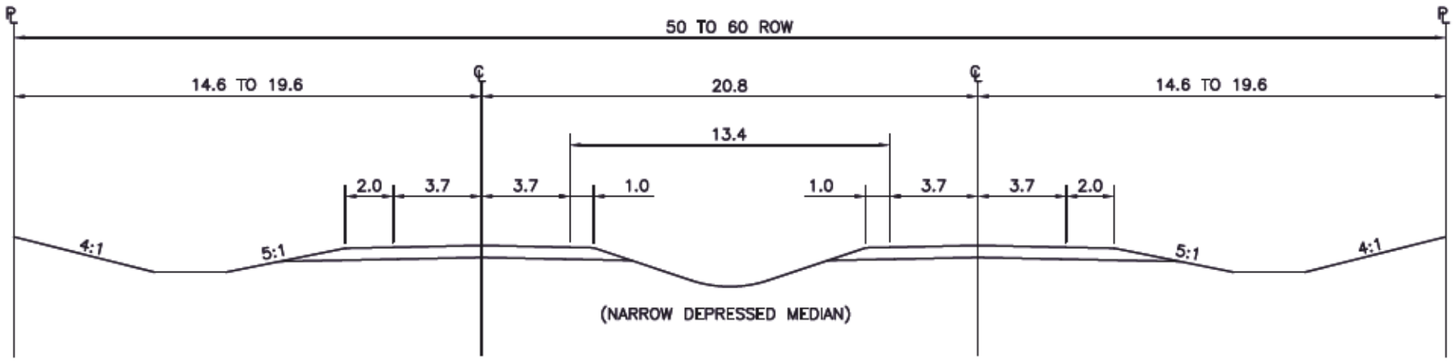
Strathcona County
2001 Sherwood Drive, Sherwood Park
Alberta, T8A 3W7, CANADA

Industrial Collector Roadway
30.0m Right-of-Way, 11.5m Finished Top, 15.0m Subgrade

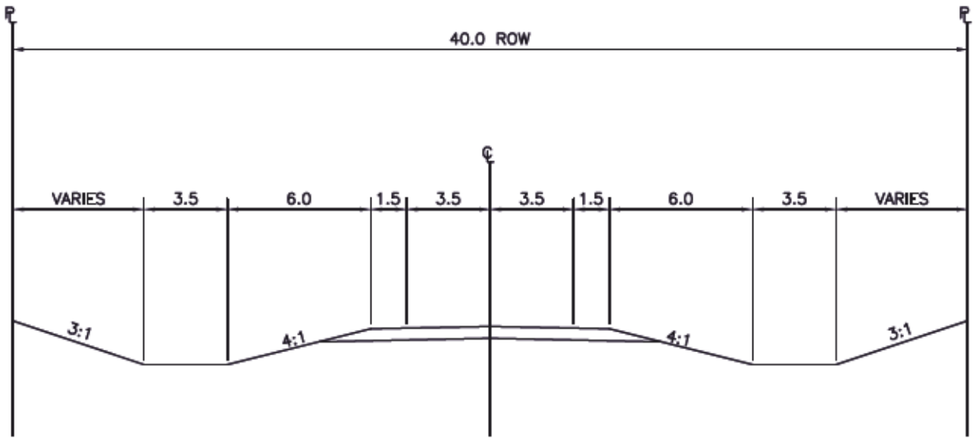
Approved: M. MacGarva, M.Eng, P.Eng.
Checked: D.L. Schilbe, P.L. (Eng)
Date: 1999/06/21 | Scale: 1:200 | Drawn: Devin Boudreau, C.Tech.

Drawing Number:
51108
Capital Planning & Construction Department

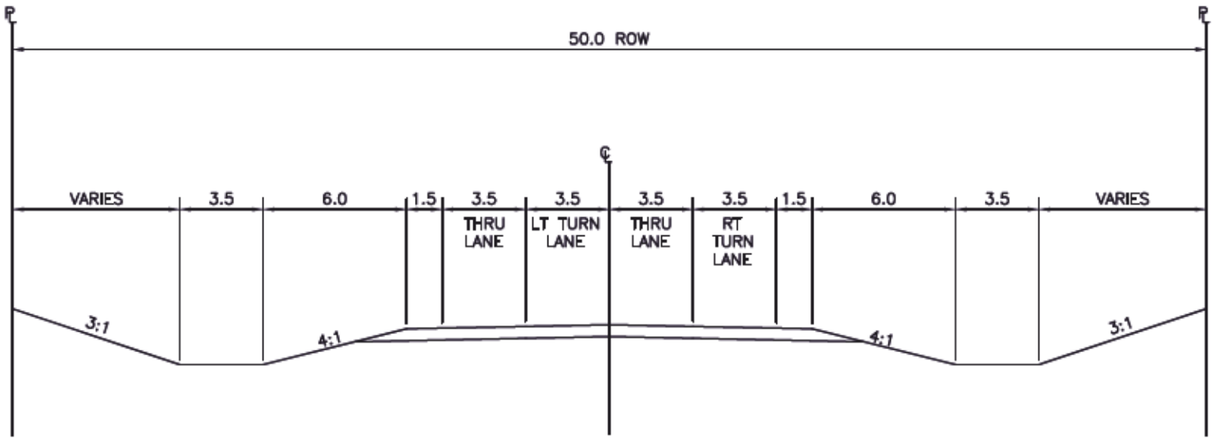
Figure 4.2 Typical Cross Sections



TYPICAL CLASS 1A DIVIDED CROSS–SECTION



TYPICAL CLASS 1B CROSS–SECTION



TYPICAL CLASS 1B CROSS–SECTION
(AT TEE INTERSECTION)

NOTE: BACKSLOPING BEYOND PROPERTY LINES MAY BE REQUIRED IN SPECIAL CASES.

04/2016
113511661

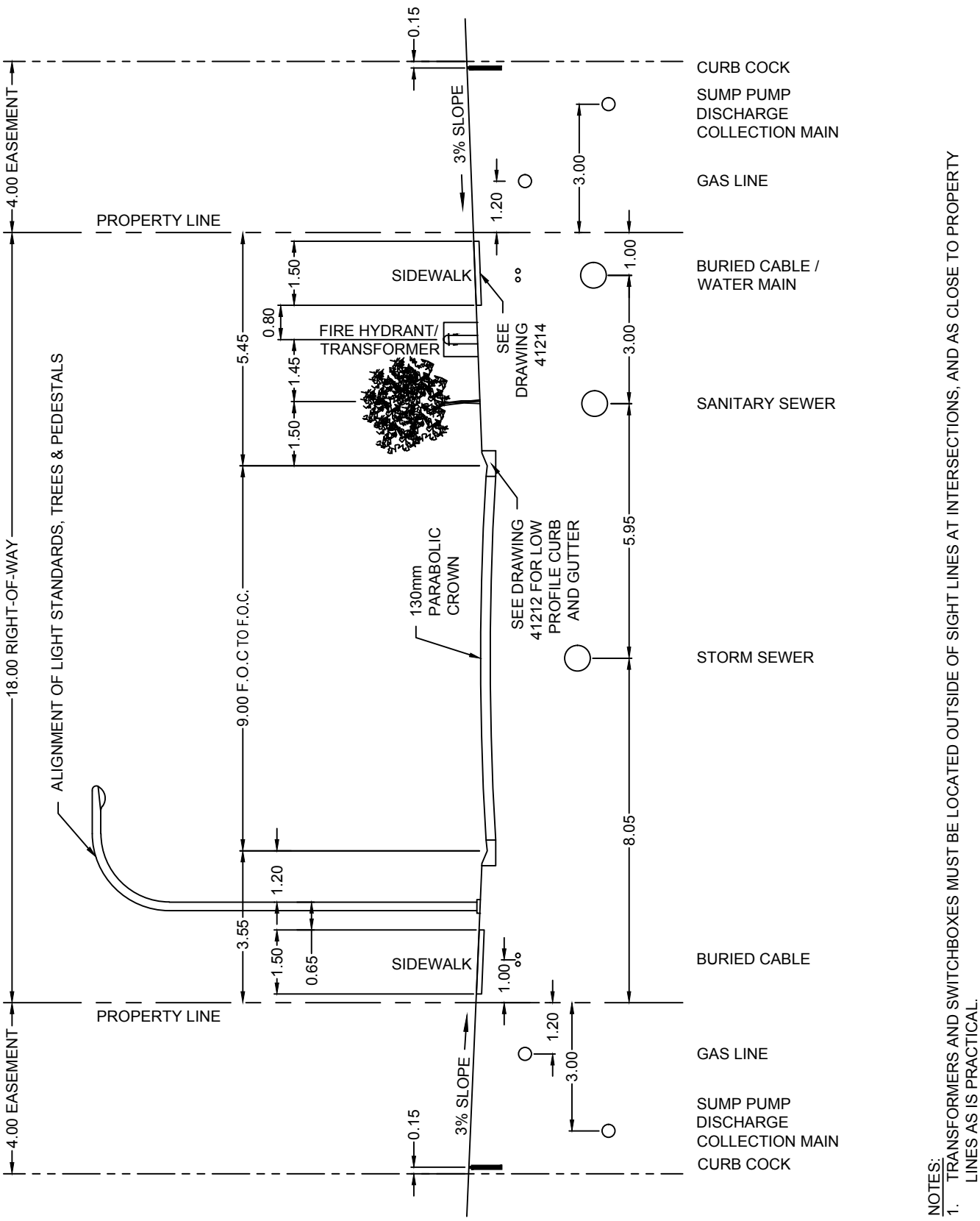
Stantec

10160 - 112th Street
Edmonton AB
www.stantec.com

Client/Project
STRATHCONA COUNTY
2016 ALBERTA INDUSTRIAL HEARTLAND TRANSPORTATION STUDY UPDATE

Figure No.
FIGURE 4.2

Title
TYPICAL CROSS-SECTIONS



NOTES:
1. TRANSFORMERS AND SWITCHBOXES MUST BE LOCATED OUTSIDE OF SIGHT LINES AT INTERSECTIONS, AND AS CLOSE TO PROPERTY LINES AS IS PRACTICAL.
2. FOR ROAD STRUCTURE AND WICK DRAIN DETAILS SEE DRAWING 41108.
3. ALL DIMENSIONS ARE IN METRES (m), UNLESS OTHERWISE NOTED.

REVISIONS

DATE	DETAILS	DRAWN
13-SEP-2018	REVISED DRAWING NUMBERS	S. ENGLEDER
26-APR-2018	WICK DRAIN LOCATION, REMOVED 50mm CONDUIT	S. ENGLEDER
12-JAN-2017	REVISED ROAD STRUCTURE	D. LEGROW
21-DEC-2015	REVISED ROAD STRUCTURE	S. ENGLEDER
09-OCT-2015	ADDED 50mm CONDUIT, WICK DRAIN NOTE	D. LEGROW

STRATHCONA COUNTY
2001 SHERWOOD DRIVE, SHERWOOD PARK
ALBERTA, T8A 3W7, CANADA

LOCAL RESIDENTIAL ROADWAY
18.0m RIGHT-OF-WAY, 9.0m SURFACE, SEPARATE SIDEWALK

APPROVED: K. COLE, P. ENG.

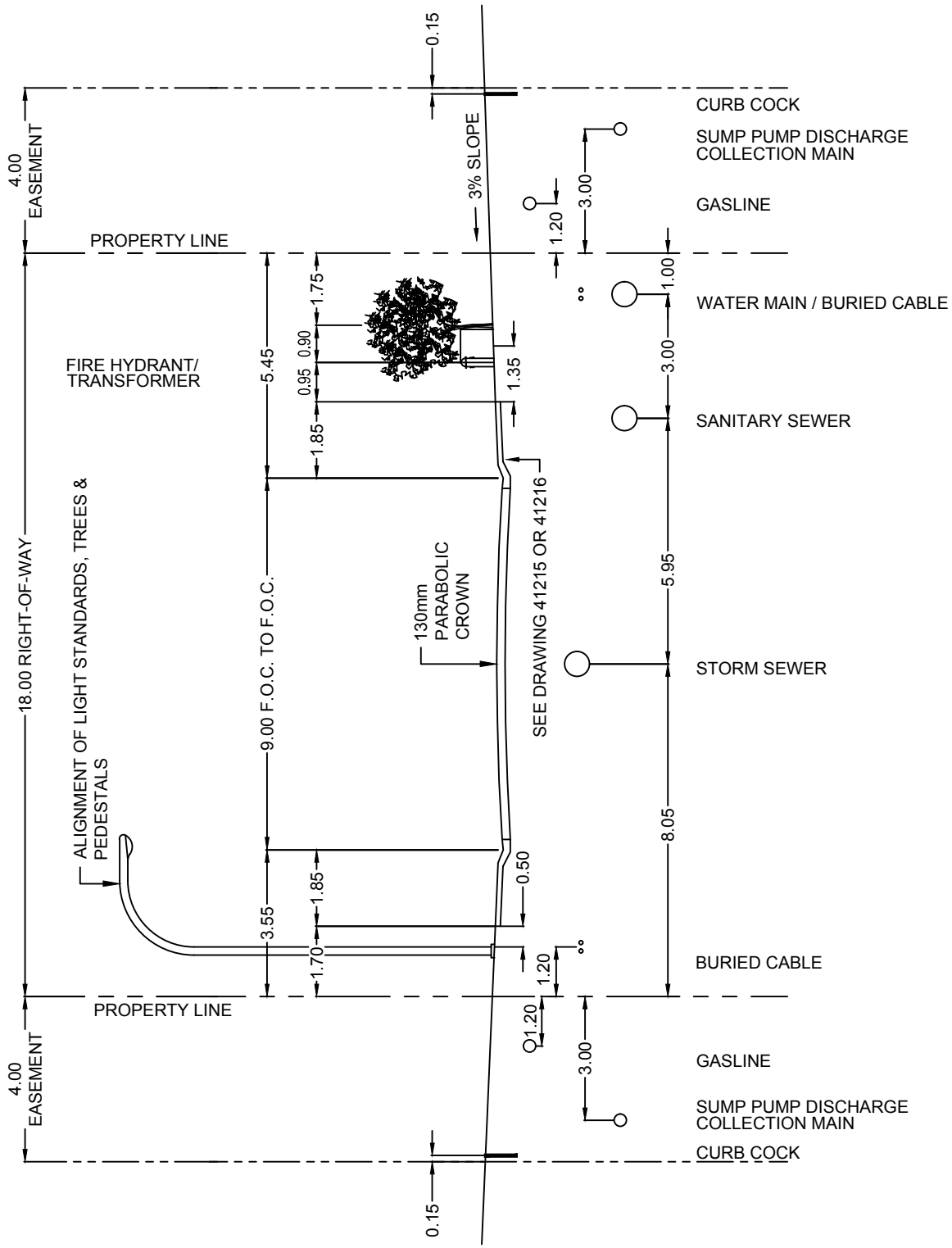
CHECKED: S. JOHNSON, P.TECH. (ENG.)

DATE: 08-JAN-1997 | SCALE: N.T.S. | DRAWN: R. DEKKER, C.E.T.

DRAWING NUMBER

41102

TRANSPORTATION PLANNING & ENGINEERING DEPARTMENT



NOTES:
1. TRANSFORMER TO BE CENTERED 1.35m AWAY FROM BACK OF WALK.
2. ALIGNMENT OF LIGHT STANDARDS AND UTILITY PEDESTALS TO BE MINIMUM 0.50m AWAY FROM BACK OF WALK.
3. ALL DIMENSIONS ARE IN METRES (m), UNLESS OTHERWISE NOTED.
4. FOR ROAD STRUCTURE AND WICK DRAIN DETAILS SEE DRAWING 41108.

REVISIONS

DATE	DETAILS	DRAWN
13-SEP-2018	REVISED DWG NUMBERS, ADDED REF. TO DWG 41216	S. ENGLEDER
01-AUG-2018	WICK DRAIN LOCATION, REMOVED 50mm CONDUIT	S. ENGLEDER
30-NOV-2016	CORRECTED MONOWALK DRAWING REFERENCE, REVISED ROAD STRUCTURE	D. LEGROW
21-DEC-2015	REVISED ROAD STRUCTURE	S. ENGLEDER
09-OCT-2015	ADDED 50mm CONDUIT, WICK DRAIN NOTE	D. LEGROW

STRATHCONA COUNTY
2001 SHERWOOD DRIVE, SHERWOOD PARK
ALBERTA, T8A 3W7, CANADA

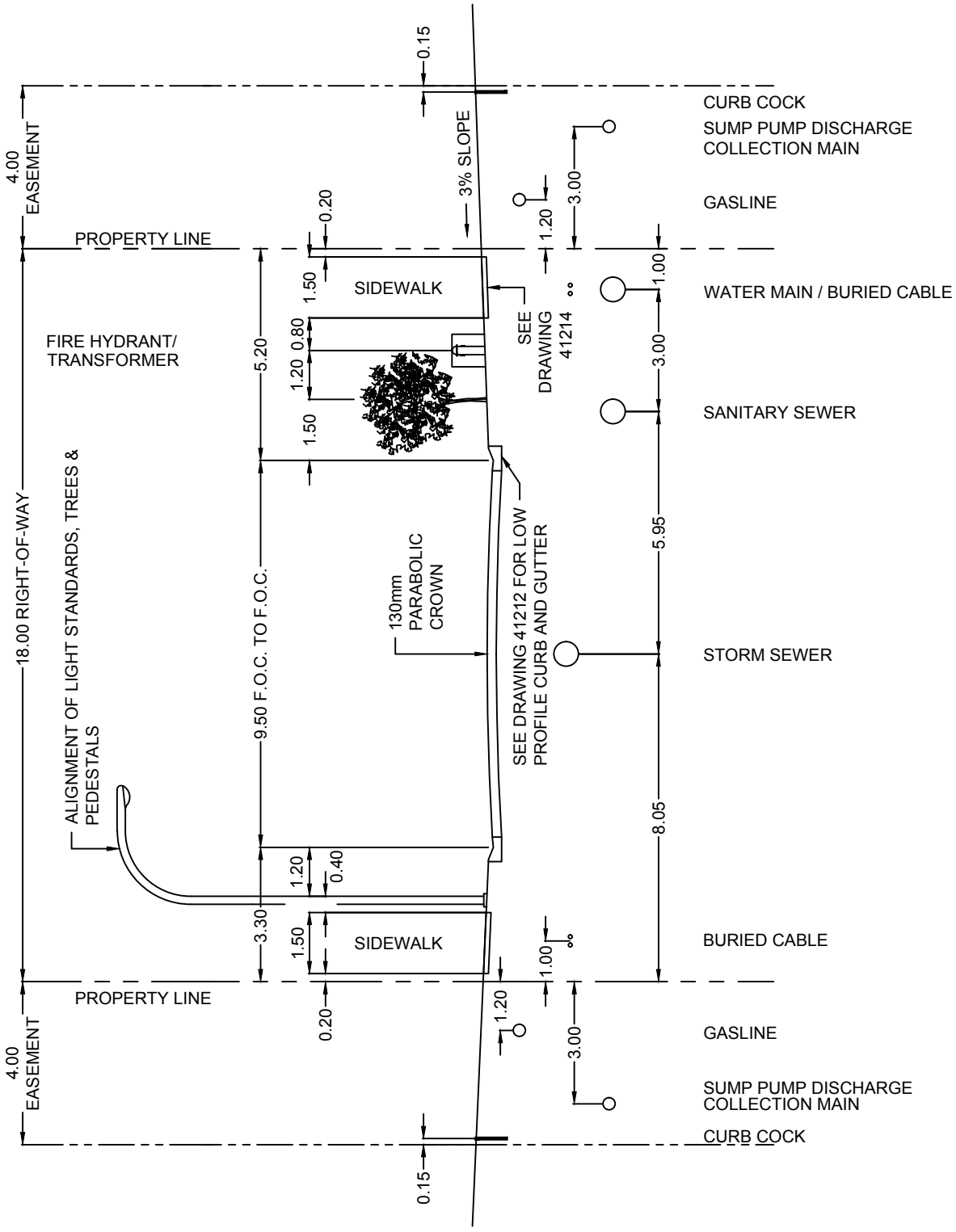
LOCAL RESIDENTIAL ROADWAY
18.0m RIGHT-OF-WAY, 9.0m SURFACE, MONOLITHIC SIDEWALK

APPROVED: K. COLE, P. ENG.

CHECKED: S. JOHNSON, P.TECH. (ENG.)

DATE: 01-AUG-1997 | SCALE: N.T.S. | DRAWN: R. DEKKER, C.E.T.

DRAWING NUMBER
41103
TRANSPORTATION PLANNING & ENGINEERING DEPARTMENT



NOTES:
1. TRANSFORMERS AND SWITCHBOXES MUST BE LOCATED OUTSIDE OF SIGHT LINES AT INTERSECTIONS, AND AS CLOSE TO PROPERTY LINES AS IS PRACTICAL.
2. ALL DIMENSIONS ARE IN METRES (m), UNLESS OTHERWISE NOTED.
3. FOR ROAD STRUCTURE AND WICK DRAIN DETAILS SEE DRAWING 41108.

REVISIONS

DATE	DETAILS	DRAWN
14-SEP-2018	REVISED DRAWING NUMBERS	S. ENGLEDER
01-AUG-2018	WICK DRAIN LOCATION, REMOVED 50mm CONDUIT	S. ENGLEDER
12-JAN-2017	REVISED ROAD STRUCTURE	D. LEGROW
21-JAN-2015	REVISED ROAD STRUCTURE	S. ENGLEDER
09-OCT-2015	ADDED 50mm CONDUIT, WICK DRAIN NOTE	D. LEGROW

STRATHCONA COUNTY
2001 SHERWOOD DRIVE, SHERWOOD PARK
ALBERTA, T8A 3W7, CANADA

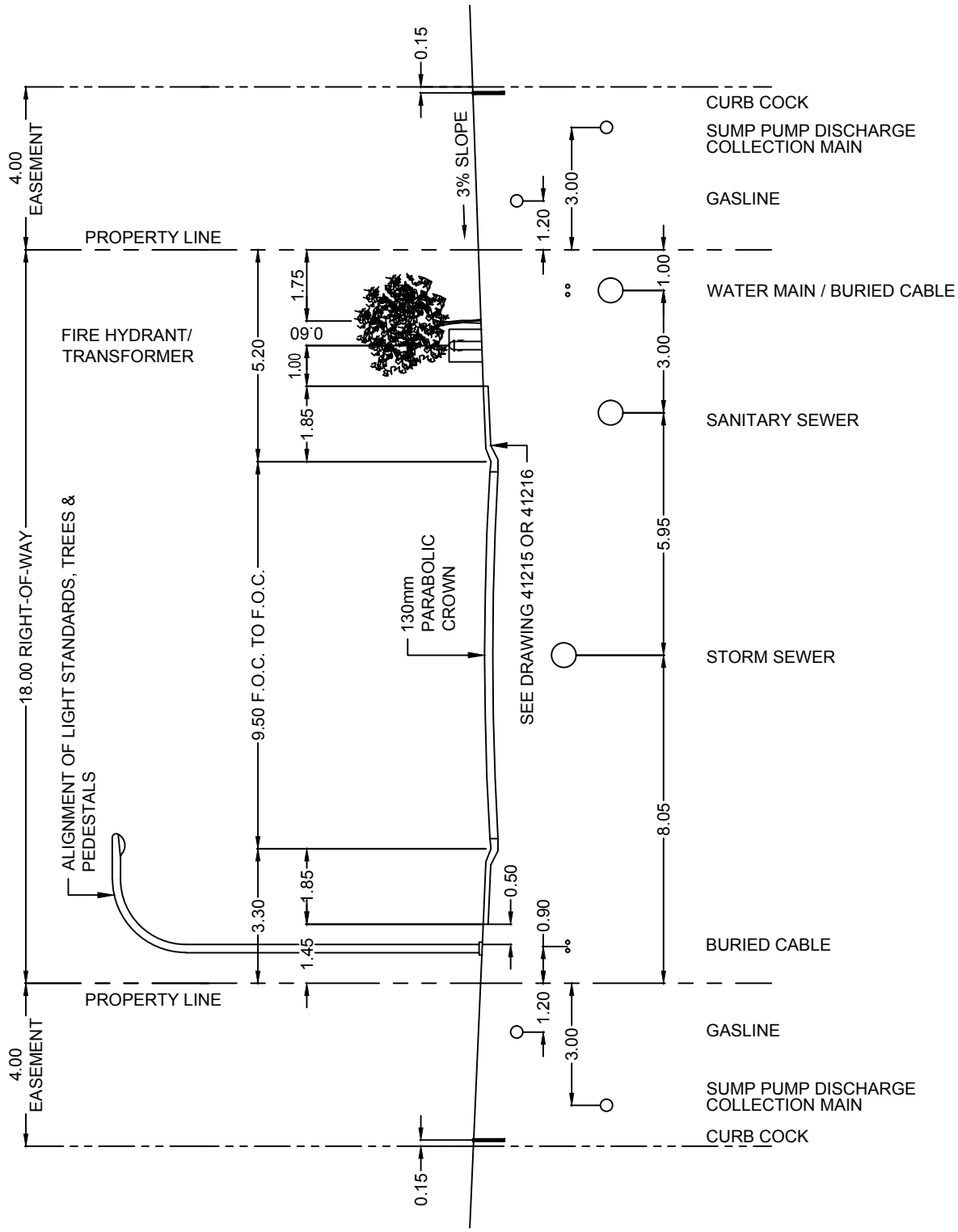
LOCAL RESIDENTIAL ROADWAY
18.0m RIGHT-OF-WAY, 9.5m SURFACE, SEPARATE SIDEWALK

APPROVED: K. COLE, P. ENG.

CHECKED: S. JOHNSON, P.TECH. (ENG.)

DATE: 01-AUG-1997 | SCALE: N.T.S. | DRAWN: R. DEKKER, C.E.T.

DRAWING NUMBER
41104
TRANSPORTATION PLANNING & ENGINEERING DEPARTMENT



NOTES:
1. TRANSFORMER TO BE CENTERED 1.00m AWAY FROM BACK OF WALK.
2. ALIGNMENT OF LIGHT STANDARDS AND UTILITY PEDESTALS TO BE 0.50m AWAY FROM BACK OF WALK.
3. ALL DIMENSIONS ARE IN METRES (m), UNLESS OTHERWISE NOTED.
4. FOR ROAD STRUCTURE AND WICK DRAIN DETAILS SEE DRAWING 41108.

REVISIONS

DATE	DETAILS	DRAWN
14-SEP-2018	REVISED DWG NUMBERS, ADDED REF. TO DWG 41216	S. ENGLEDER
08-AUG-2018	WICK DRAIN LOCATION, REMOVED 50mm CONDUIT	S. ENGLEDER
12-JAN-2017	REVISED ROAD STRUCTURE	D. LEGROW
21-JAN-2015	REVISED ROAD STRUCTURE	S. ENGLEDER
09-OCT-2015	ADDED 50mm CONDUIT, WICK DRAIN NOTE	D. LEGROW

STRATHCONA COUNTY
2001 SHERWOOD DRIVE, SHERWOOD PARK
ALBERTA, T8A 3W7, CANADA

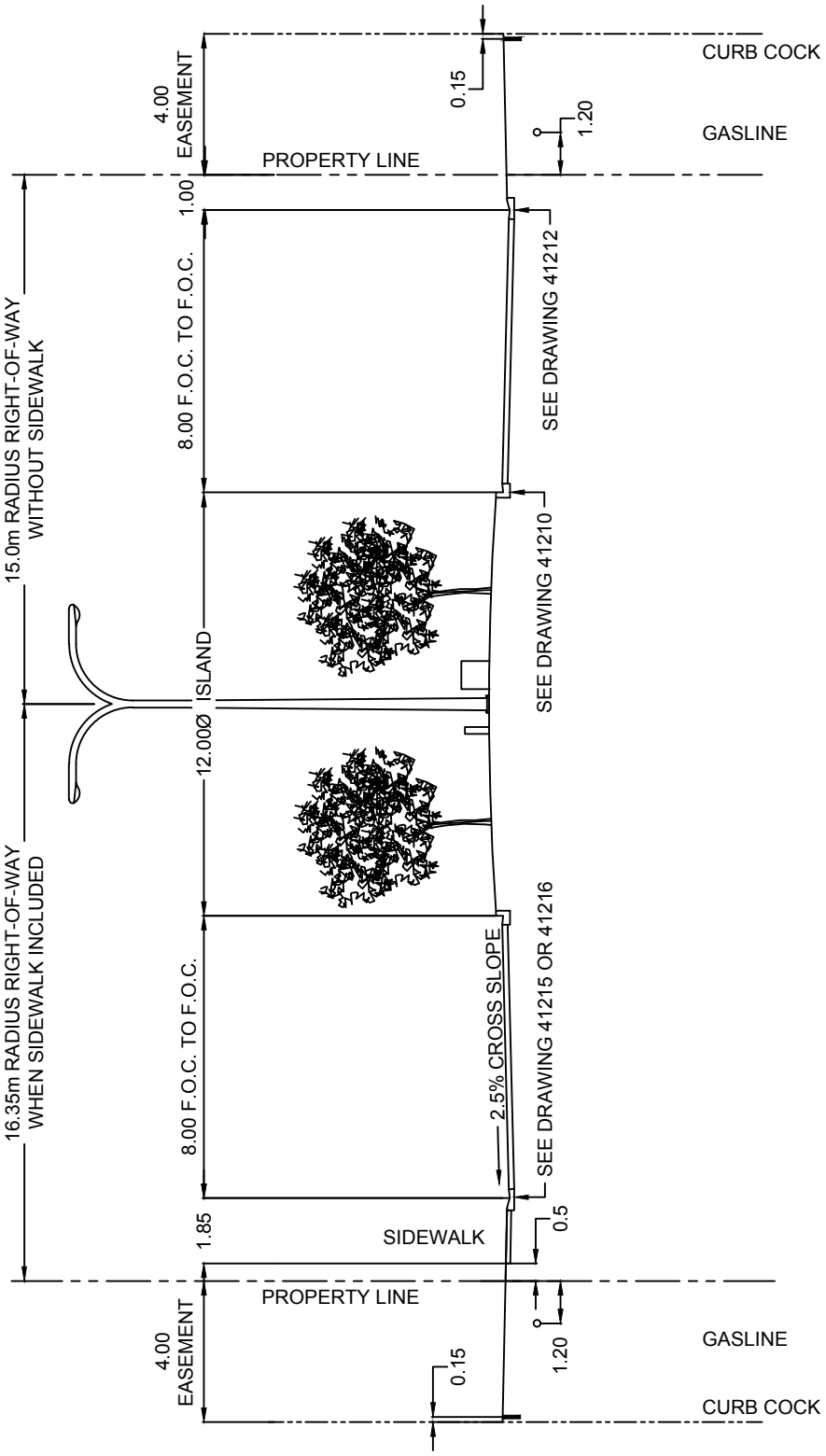
LOCAL RESIDENTIAL ROADWAY
18.0m RIGHT-OF-WAY, 9.5m SURFACE, MONOLITHIC SIDEWALK

APPROVED: K. COLE, P. ENG.

CHECKED: S. JOHNSON, P.TECH. (ENG.)

DATE: 05-OCT-1997 | SCALE: N.T.S. | DRAWN: R. DEKKER, C.E.T.

DRAWING NUMBER
41105
TRANSPORTATION PLANNING & ENGINEERING DEPARTMENT



NOTES:

1. LIGHT STANDARD AND UTILITY PEDESTALS/TRANSFORMERS ARE TO BE LOCATED IN THE ISLAND.
2. POWER, CABLE TV, AND TELEPHONE LINES TO RADIATE OUTWARD FROM ISLAND TO EACH RESIDENTIAL LOT IN CONDUIT.
3. WHEN CUL-DE-SAC BULB CONNECTS TO A P.U.L. WITH A WALKWAY/TRAIL, ENSURE THAT A SIDEWALK EXTENDS TO THE WALKWAY/TRAIL, AND PROPERTY AND GAS LINES MAINTAIN PROPER CLEARANCE FROM SIDEWALK. IF THERE IS NO P.U.L., OR IF THE P.U.L. DOES NOT CONTAIN A WALKWAY/TRAIL, THE SIDEWALK SHALL TERMINATE AT/AROUND THE MID-POINT OF THE RETURN RADIUS OF THE CUL-DE-SAC BULB. SEE DRAWINGS 41012 AND 41013 FOR MORE DETAILS.
4. FOR ROAD STRUCTURE AND WICK DRAIN DETAILS SEE DRAWING 41108.
5. ALL DIMENSIONS ARE IN METRES (m), UNLESS OTHERWISE NOTED.

REVISIONS

DATE	DETAILS	DRAWN
14-SEP-2018	REVISED DRAWING NUMBERS, CHANGED TITLE, ADDED REFERENCE TO DWG 41216	S. ENGLEDER
29-MAR-2017	UPDATED DRAWING REFERENCES	D. LEGROW
22-DEC-2016	DOUBLE - HEAD LIGHT STANDARD IN ISLAND	D. LEGROW
21-DEC-2015	ADDED SIDEWALK AND NOTE	S. ENGLEDER
21-APR-2011	REVISED DRAWING NUMBERS	J. ORR

STRATHCONA COUNTY
2001 SHERWOOD DRIVE, SHERWOOD PARK
ALBERTA, T8A 3W7, CANADA

LOCAL RESIDENTIAL ROADWAY
CUL-DE-SAC BULB - CROSS SECTION

APPROVED: K. COLE, P. ENG.

CHECKED: S. JOHNSON, P.TECH. (ENG.)

DATE: 05-JUN-2003 | SCALE: N.T.S. | DRAWN: R. DEKKER, C.E.T.

DRAWING NUMBER
41106
TRANSPORTATION PLANNING & ENGINEERING DEPARTMENT

Appendix B

Photo Examples of Functional Road Classes

Al-Terra Engineering Ltd.

Class I road with old hot mix surface

Class II road with old cold mix surface

Class III road with new dust abated surface

Class IV road with loose gravel surface

Rural residential rubdivision road with hot mix asphalt surface

Rural hamlet road with hot mix asphalt surface

Appendix C

Public Engagement Summary Report

Al-Terra Engineering Ltd.

Sustainable Rural Roads Master Plan

Public Engagement Summary Report

July 2021

Prepared for: Strathcona County

Prepared by:

Al-Terra Engineering Ltd.

5307 - 47 Street NW,
Edmonton, Alberta T6B 3T4
T: 780.440.4411
F: 780.440.2585
al-terra.com

TABLE OF CONTENTS

Page No.

1.0 Project Overview

Strathcona County's Transportation and Agriculture Services (TAS) branch is updating the 2010 Sustainable Rural Roads Master Plan.

The Sustainable Rural Roads Master Plan (SRRMP) guides how rural roads are maintained and rehabilitated in Strathcona County. The Master Plan encompasses approximately 1,300km or roadways that include range and township (grid) roads, roads within country residential subdivisions and roadways within rural hamlets. Provincial highways within Strathcona County and Sherwood Park roadways are not included in this master plan, as they are maintained and upgraded outside of the scope of the SRRMP.

In the Fall of 2019, Strathcona County engaged Al-Terra Engineering to update the SRRMP. As a part of this project, it is important to understand the local conditions and experiences of the users that travel the roads each day. The public engagement program engaged rural residents and stakeholders at "Listen and Learn" level regarding all traffic safety and road maintenance concerns. The input received will be used in the review and assessment of maintenance practices, treatment options, classification and prioritization criteria as well as in the development of a broader rural roads safety strategy.

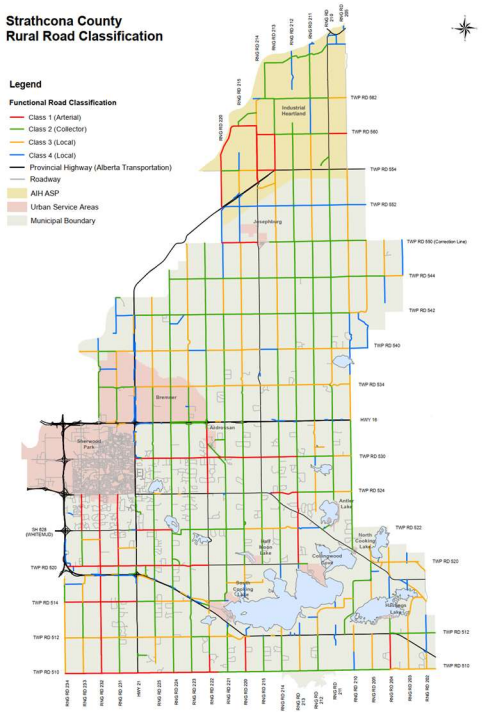


Figure 1 – Project Boundary Map

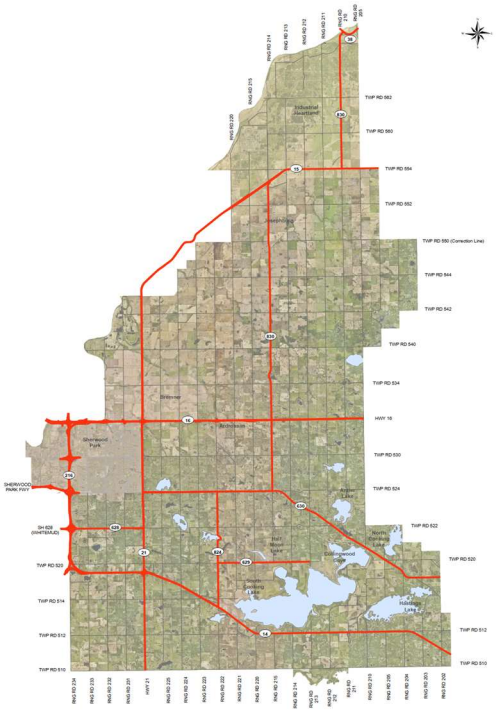


Figure 2 – Provincial Highways – Shown in Red

2.0 Public Engagement

2.1 Public Engagement Introduction

There were two phases to the public engagement. The first phase occurred in the November and December of 2019 and was designed to engage rural residents and stakeholders at a "Listen and Learn" level regarding all traffic safety and road maintenance concerns. The input from this phase was used to gain an understanding of how residents felt about the rural road network and in the review and assessment of maintenance practices, classification and prioritization criteria. The second phase of the public engagement was delayed due to public health measures related to COVID-19, with an online engagement occurring in April and May of 2021. During this phase of engagement, we reported back to the public on the 2019 SRRMP engagement, what was heard and how it was used to informed recommendations.

The goals of the public engagement were to:

- Provide an open and accessible environment for two-way dialogue.
- Provide multiple opportunities to gather input / local knowledge.
- Create and understanding of the SRRMP, how it has been developed, why it is being updated, how it will be used in the future and how the public can provide their feedback.
- Gather local knowledge and input about current road maintenance and safety concerns.
- Gather local knowledge and input about effectiveness of current treatments that are used
- Gather local knowledge and input about priorities for road maintenance and safety (Do residents have primary concerns about road width, sightlines, road conditions, maintenance, snow clearing?).
- Gather local knowledge and input about corridor priorities.
- Share how the resident feedback will be used to develop the Rural Road Safety Strategy.
- Share information on the County's other initiatives, include the Traffic Safety Plan 2020.
- Be open and transparent to build trust and confidence in the engagement process and how the feedback will be used.

The following principals were implemented in the public engagement process:

- **PROACTIVE:** it is initiated early for participants to make informed decisions and impact outcomes.
- **RELEVANT and EFFECTIVE:** the process is planned, effectively communicated and implemented to encourage appropriate public participation and contribution.
- **EQUITABLE**: Members of the public are provided with a reasonable opportunity to contribute, developing a balanced perspective.
- **CLEAR and FOCUSED:** The County and the public understand their respective roles and level of involvement in a public engagement process and how input will be used to inform decisions.
- **INCLUSIVE:** It uses a range of methods to engage various audiences to maximize participation and improve the quality of feedback.
- **INCREASES UNDERSTANDING:** Mutual understanding is increased through two-way interaction, where the information presented is easily understood by the intended audience.
- **RESPONSIVE and ONGOING:** Public engagement has an ongoing focus on relationship building, active listening, and increased understanding.
- **BUILDS CAPACITY:** Staff, public and stakeholders are better equipped for future engagement.
- **ACCOUNTABLE and TRANSPARENT:** public engagement outcomes are measured, evaluated and reported in a timely manner.

Citizens and stakeholders were engaged to provide input into local issues and decisions. The public engagement process involves the public to clarify issues, identify solutions or alternatives and partner in decision making. The public engagement process helps create sustainable decisions that balance perspectives.

The resident and local stakeholder input was gathered and will be used to help inform the development of a broader Rural Road Safety Strategy. Resident understanding of the SRRMP will be critical to resident and Council support.

3.0 2019 "Listen and Learn"

3.1 Public Engagement Information Gathering

Two methods were made available for the public to get involved in the decision making process. First was the online survey that made available from November to December 2019. The survey was available through Strathcona County's Online Opinion Panel (SCOOP) platform, with a link to the survey on Strathcona County's Sustainable Rural Roads Master Plan webpage. The second method was the public engagement open houses. A total of 6 open houses were held in the following locations:

- South Cooking Lake – November 20, 2019
- Strathcona Olympiette Center – November 21, 2019
- Antler Lake – November 25, 2019
- Hastings Lake – November 27, 2019
- Ardrossan Memorial – December 2, 2019
- Josephburg Hall – December 4, 2019

The public was informed of the survey and open houses from roadside message boards, postcards sent to residents, newspaper advertisements, and social media, among others.

The open houses gave the public an opportunity to coordinate directly with the County, as well as the design engineers (Al-Terra) and provide in-person feedback on the current state of the rural roads within Strathcona County through the participant's eyes.

3.2 Summary of Survey Participants Input

The online survey and open houses posed multiple questions to the survey participants that gathered information on where the participants lived within the county, how satisfied and safe the participants felt, prioritization for improvements and maintenance, and anything additional that the participants wanted to share with the county regarding rural roads. The information provided by the public through the online surveys and open houses were combined and assessed to identify themes of public opinion on where they felt the most important areas for improvement were. The sample size for each question varies, as some questions asked for multiple inputs and some participants did not fully complete the survey.

The following is a summary of the most common themes heard across all engagement activities and participant groups during step one of the plan generation process. These themes are discussed in further detail in the following sections.

Common Themes:

- The public generally feels satisfied and safe on the road network throughout Strathcona County.
- When applying class of road travelled on with satisfaction levels and feeling of safety, the majority of unsatisfied/unsafe respondents primarily drive on Class 2 roadways.
- Condition of road, amount of traffic and road width were reported as the top three criteria to consider for improvements and maintenance.
- Widen narrow roads, improve intersection sightlines, and improve steep sideslopes were reported as the top three criteria for improvement priority.
- Maintenance and lifecycle of patches and pothole repairs is a concerning topic for the survey participants.
- Size and visibility of stop signs is a concern of the survey participants.
- The survey participants feel that increasing the frequency of law enforcement vehicles on Strathcona County's rural roads will reduce the amount of speeding observed.
- Although outside of the scope of this report, the public expressed concern with the condition and feeling of safety on Provincial Highways, most notably Highway 824.

3.3 Residing Locations Within the County

The first question asked to the online survey participants was their residing location within the county. The highest residing location for participants that completed the survey was Ward 7. Ward 5 – West and Ward 5 – East were also a common location for residents that completed the survey.

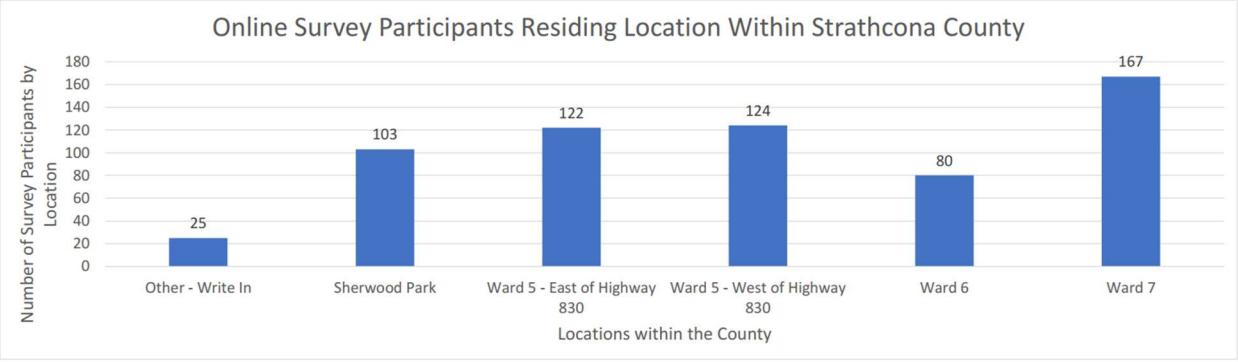


Figure 3 - Online Survey Participants Residing Location Within Strathcona County

This question was not asked at the open houses. However, below is a distribution of the attendance at each open house by location.

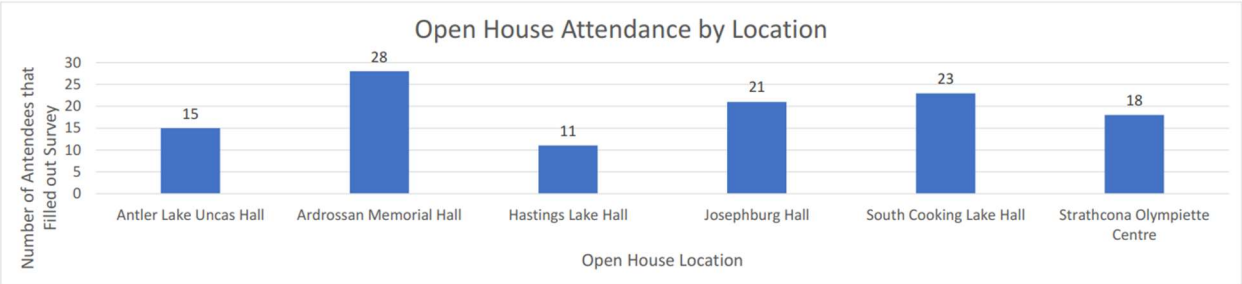


Figure 4 - Open House Attendance by Location

3.4 Satisfaction and Feeling of Safety

The second question asked on the survey was a multi-part question. The question asked the residents and stakeholders their feeling of overall satisfaction and level of safety when travelling on these roadways. Overall, the public felt generally satisfied and safe on the County's rural road network. In regard to satisfaction levels, only 21.3% of participants noted dissatisfaction with the current rural road network. In regard to feeling of safety, only 33.4% of participants noted feeling unsafe on the current road network.

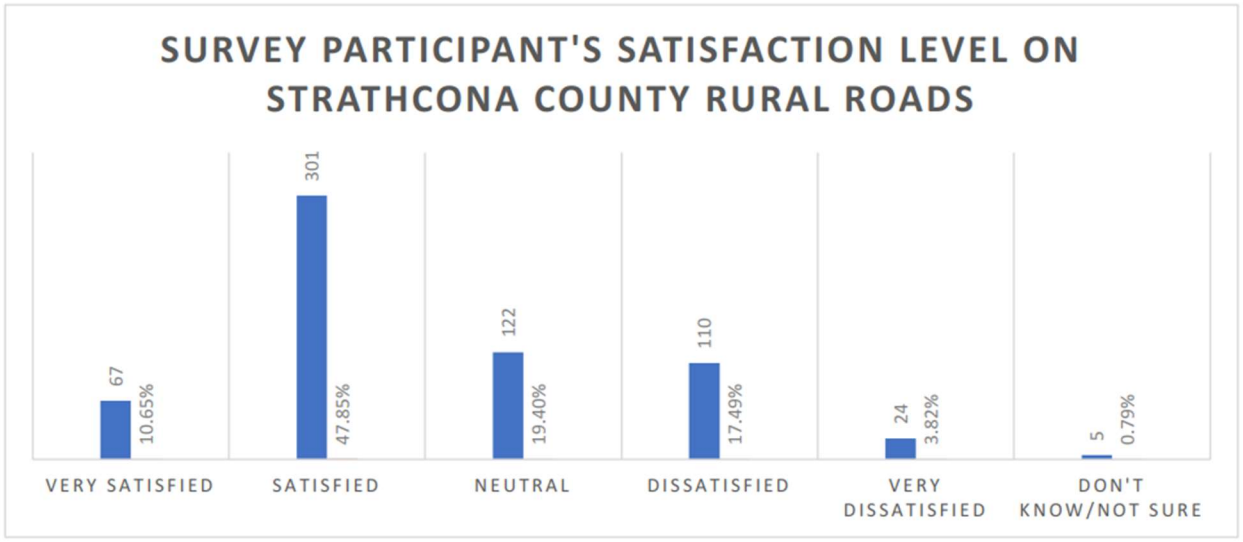


Figure 5 – Survey Participant's Satisfaction Level on Strathcona County Rural Roads

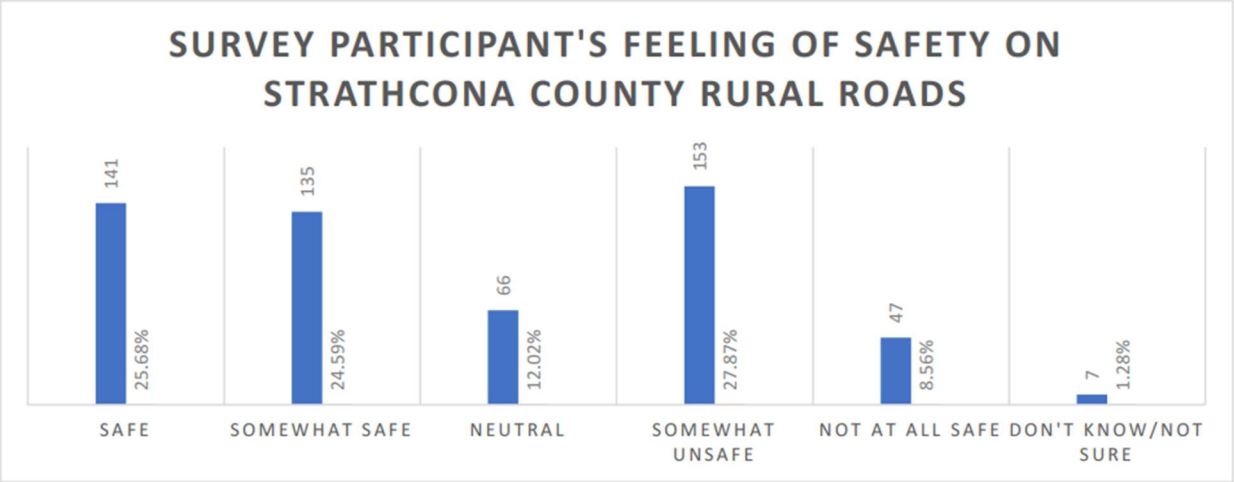


Figure 6 - Survey Participant's Feeling of Safety on Strathcona County Rural Roads

Further breaking down these survey responses, the participants provided the roads they travelled on frequently along with their feeling of safety and satisfaction with the rural road network. In reviewing this data, it became evident that the majority of dissatisfaction originated from survey participants that drove on Class 2 roadways. Additionally, Class 3/4 roadways were a topic of concern with the participants. The sample size in this breakdown is larger than the overall satisfaction and safety as this question allowed participants to provide feedback on their three most travelled roadways within the county.

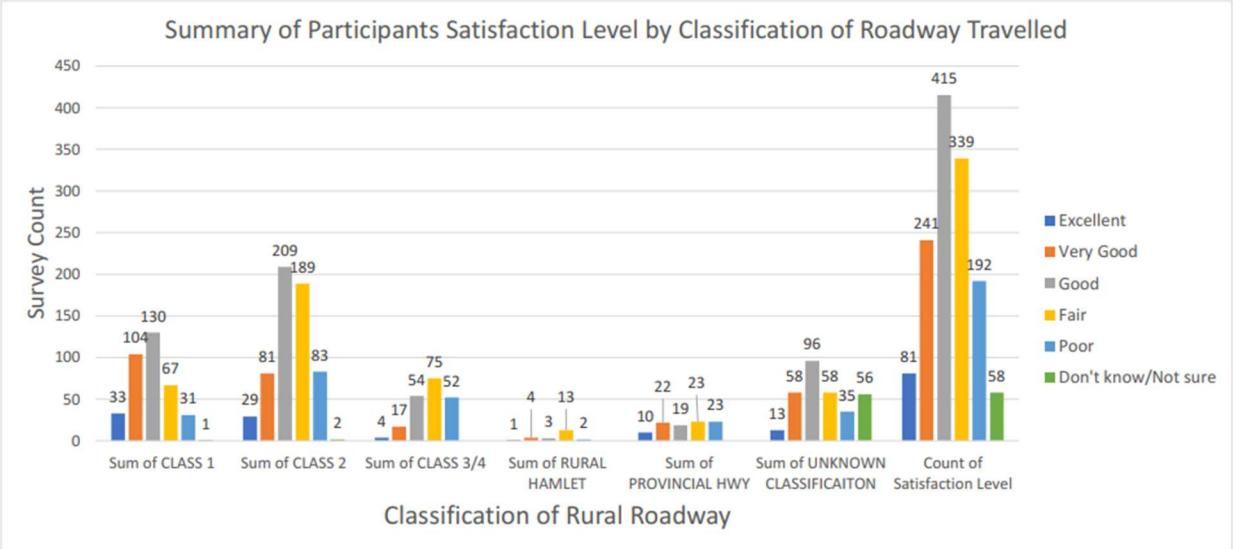


Figure 7 - Summary of Participant's Satisfaction Level by Classification of Roadway Travelled

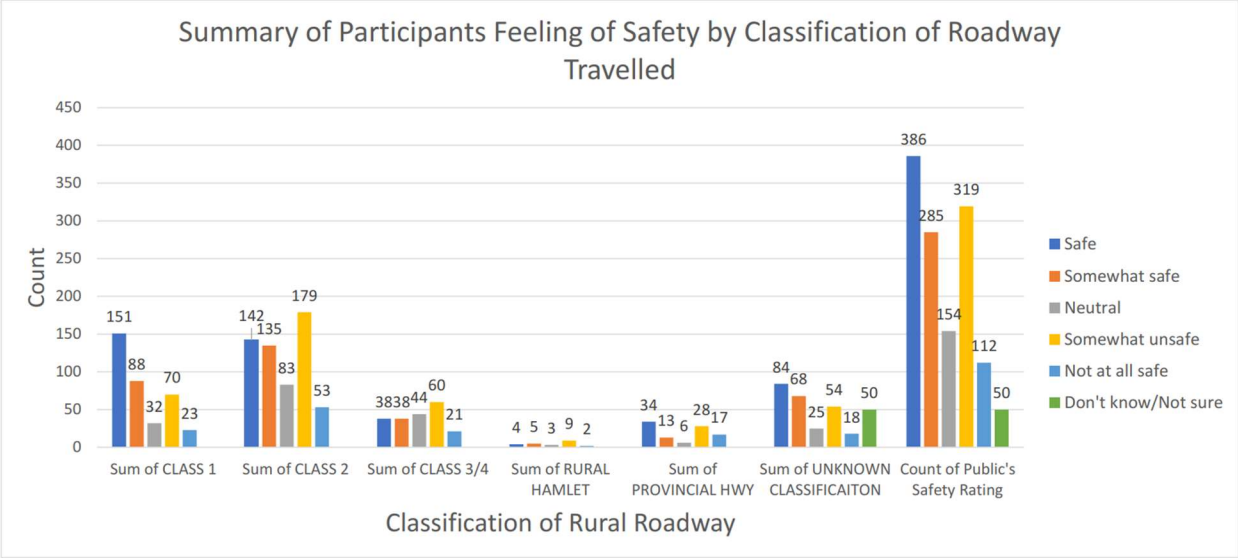


Figure 8 - Summary of Participant's Feeling of Safety by Classification of Roadway Travelled

3.5 Improvement Prioritization

The third and fourth question asked on the survey was for the public to provide their input on which items should be the top priority when considering improvements. The question was posed in two ways. The first asked the public to assign a priority for the following when Strathcona County considers upgrades to the roads: condition of road, amount of traffic, road width, number of collisions, the roads as a link in the overall network, number of bad curves and hills, and number of public complaints. The survey participants noted the top three prioritization focuses for improvements were condition of road, amount of traffic and road width.

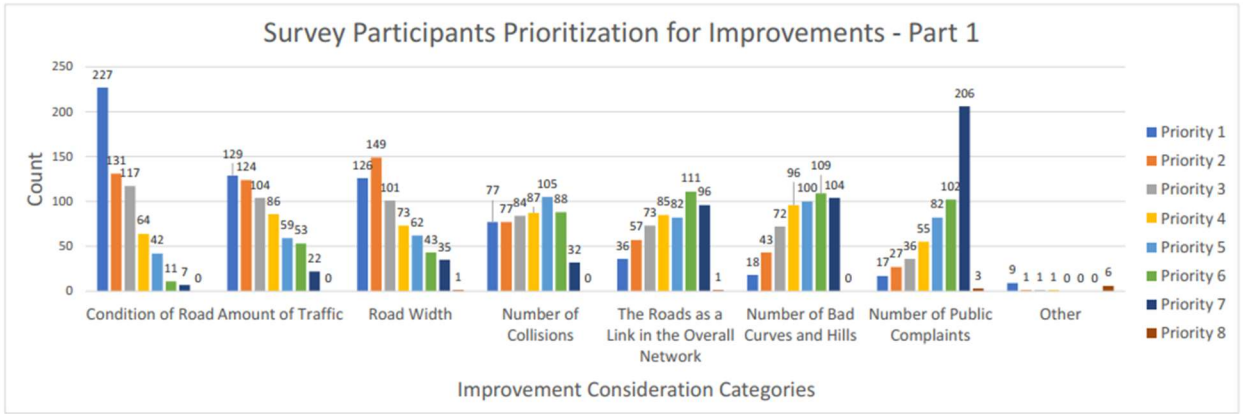


Figure 9 - Survey Participants Prioritization for Improvements – Part 1

The second improvement prioritization question asked the participants to prioritize the following areas of concern when considering upgrades: widen narrow roads, improve intersection sightlines, improve steep sideslopes, improve horizontal sightlines, upgrade to asphalt, upgrade to dust controlled gravel, and improve vertical sightlines. The survey participants noted that the top three prioritizations for areas of concern were widening narrow roads, improve intersection sightlines and improve steep sideslopes.

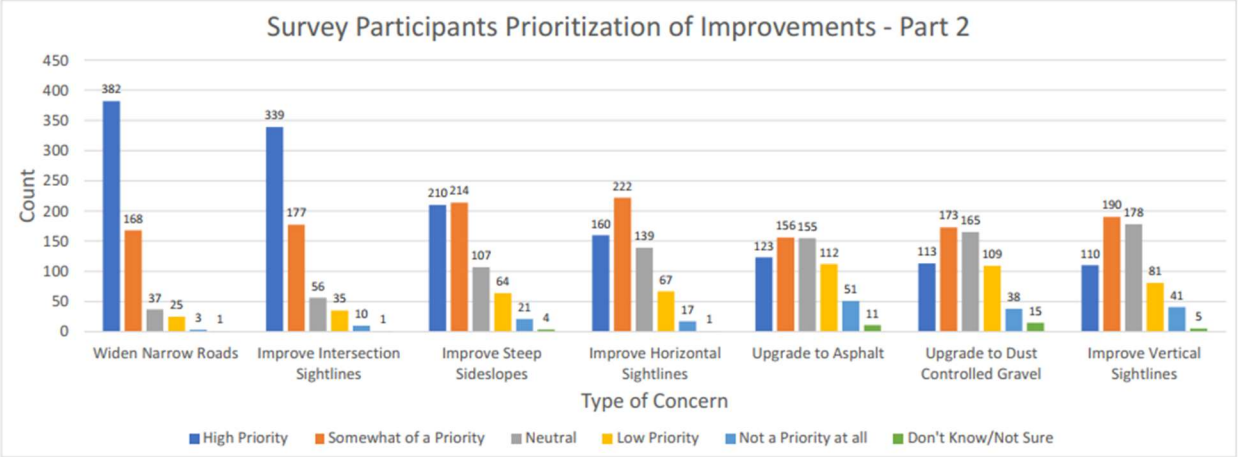


Figure 10 - Survey Participants Prioritization for Improvements – Part 2

3.6 Other Considerations

Finally, the survey participants were asked to provide any additional comments on considerations or concerns that were not included in the previous questions. The responses to these two questions varied considerably and produced 65 unique themes when grouping all responses. There were evident trends in the data that should be noted. Below are three tables that illustrate the responses the participants provided.

Table 1 – Topic of Concern – In-Person Map Comments

Row Labels	Count of Topic of Concern
Condition of Provincial Highways	38
Road Width	37
Road Condition	28
Speeding	13
Road Maintenance	11
Cyclists	11
Intersection Sightline	10
Signage	9
Lighting	8
Snow Clearing	7
Steep Sideslopes	7
Vertical Sightline	6
Intersection Improvements	5
Large Vehicles	4
Railway Crossing	4
Pavement Markings	3
Pedestrian Conflict	3
Quality Control	2
Consistency of Roadways	2
Traffic Increase	2
Alternative Roads	2
Tree Clearing	1
Other	1
General Comment	1
Roadway removal	1
Pavement Edges	1
Quality of Maintenance/Repairs	1
Roadside Hazard	1
Enforcement	1
Pro-Roundabouts	1
Grand Total	**221**

Table 2 - Other Important Considerations

Topics	Count of Topic Related Concerns
Snow Clearing	28
Maintenance	18
Road Width	16
Signage	16
Large Vehicles	16
Condition of Provincial Highways	14
Speed Limits	11
Steep Sideslopes	11
Tree Clearing	10
Lighting	9
Sightlines	9
Condition	9
Quality Control	9
Safety	7
Pavement Markings	7
Railway Crossings	7
Bus Routes	7
Increasing Traffic	6
Enforcement	6
Upgrade Roadway	3
Intersections	3
Stop-control measures	2
Noise	2
Compliment	2
Consistent Road Surface	2
Class 1 Focus	2
Dust Control	1
Public Education	1
Sanding	1
Public Transportation	1
Public Informance	1
Littering	1
Wetland Impact	1
Loss of land	1
Property Development	1
Peeing in public	1
Grand Total	**242**

Table 3 - Participant's Additional Comments

Topics	Count of Topic Related Concerns
Maintenance	29
Road Width	23
Compliment	22
Condition	16
Snow Clearing	14
Condition of Provincial Highways	9
Steep Sideslopes	8
Enforcement	8
Intersections	8
Signage	6
Upgrade Class	6
Stop-control measures	5
Safety	5
Excessive Snow Clearing	4
Quality Control	4
Driveways	4
Tree Clearing	4
Public Education	4
Pavement Markings	4
Cyclists	3
Speed Limit	3
Line Paintings	3
Public Informance	2
Snow Removal	2
Post-Construciton Clean-up	2
Sanding	2
Rural improvements neglected	2
Class 2/3/4 Focus	2
Mail Boxes	1
Traffic diversion	1
Over Salting	1
Driver Education	1
Provide Rest Area	1
Railway Crossings	1
Unhappy	1
Road Bans	1
Improved Planning	1
Wildlife Crossings	1
De-Icing Alternatives	1
Maintenace	1
Dissimilar surface material	1
Over-sweeping	1
Twinning	1
Business Driven Upgrades	1
Maintain Status Quo	1
Alternate Classification Methods	1
Condition of Rail Crossings	1
Roundabouts	1
Build a SSRMP	1
Pedestrian/Cycling Use	1
Grand Total	**226**

As shown in the above tables, snow clearing, maintenance, signage, large vehicles and condition of provincial highways were common themes. Additionally, combining the concerns of speed limits and enforcement escalates this concern to a common theme. Road width, steep sideslopes and condition will not be discussed in this section as they have previously been illustrated as the high priority items by the survey participants when considering improvements.

- Snow Clearing - Snow clearing was one of the most common topics in the online surveys. The survey participants generally felt that improvements in the snow clearing techniques and speed of clearing after a snowfall could be improved. Some of the improvements suggested were techniques of

clearing when crossing driveways and minimizing snow ridges, increased priority of clearing on the subdivision/rural hamlet roadways and providing a wider cleared area when clearing the rural roads.

- Maintenance - The public is generally dissatisfied with the quality of temporary repairs, such as pothole or patch repairs. Their concerns generally related to the short lifespan a patch or pothole repair has on the rural roads within the county. It was also noted in this topic that the participants were concerned with the quality of grading/resurfacing of the rural roads, most notably the continual overlays creating ridges at the driveway that are creating an increasing uneven transition into the resident's driveways.
- Signage - The participants are concerned with signage. The majority of signage related concerns was the visibility and size of stop signs within the county. They feel that at important intersections signage should be larger to draw the attention of the driver. Additionally, comments noted increased reflective markings on the stop signs will increase driver attention to the stop condition.
- Large Vehicles - The participants are generally concerned with the number of large vehicles on Strathcona County's rural roads. With the industrial heartland, and a large agricultural presence in Strathcona County, there are a considerable number of larger vehicles on the roadway which can create difficulty and an unsafe feeling when these vehicles are met on a narrow rural roadway.
- Condition of Provincial Highways - Although outside of the scope of the Sustainable Rural Roads Master Plan, a common theme in both the online surveys and open houses was the condition of provincial highways, most notably the condition of Highway 824 and the stop condition on Highway 830 at Township Road 550. The overall condition of Highway 824 has become a topic of concern for the participants. The deteriorating conditions is beginning to shift traffic to using adjacent Range Roads to bypass Highway 824 on their commutes. This creates added stress on the adjacent rural road network for Strathcona County to upgrade and maintain. The stop condition at Highway 830 and Township Road 550 is another topic of concern with the participants. It is counterintuitive to have the stop condition on Highway 830, when intersecting with a Township Road. Typically, in Alberta, the Highway would have right-of-way through an intersection with a Township Road.
- Speed Limits and Enforcement - The public is generally concerned with the number of speeding vehicles on the rural road network within Strathcona County. Survey participants and attendants at the open houses noted they felt increasing the frequency of law enforcement vehicles on the rural road network would improve the compliance to the speed limit.
- It was noted that classifying roadways should not only consider AADT but vehicle class distribution on the roadways.
- Continued overlay of paved rural roadways are creating difficulty for residents to maintain the grass adjacent to the road and creating ridges at driveways.
- Trees are limiting visibility on rural roads.
- Railways crossings within the County are displacing and creating safety concerns for the public.
- Cyclist conflict with motor vehicles sharing the road was a common topic of concern (for both the cyclists and the motor vehicle drivers).

4.0 2021 "Report Back"

The goal of this phase of engagement was to report back to the public on the 2019 SRRMP engagement, to understand the level of stakeholder support for the draft recommendations and identify any gaps in understanding of the draft recommendations by stakeholders.

The key messages heard in the 2019 SRRMP that were communicated in this round of engagement was that 78% of residents felt neutral, satisfied, or very satisfied with Strathcona County's rural road network and the primary concerns residents had related to the condition of the road surface, the volume of traffic and the existing road width. The feedback from the 2019 engagement helped guide the development of the draft recommendations by helping the design team to better understand the issues that the road users are experiencing. The level of satisfaction indicated that the rural road network was functioning well, however there were areas that need to be improved. The draft recommendations that were presented in the public engagement were:

- Create framework for sustainability and budget allocation
- Redefine roadway classifications
- Develop rehabilitation standards to align with redefined classifications
- Review of Maintenance methods and alternative methods
- Create a framework for prioritizing need

Due to the public health measures put in place because of COVID-19, in person open houses were not possible; therefore, an online slide presentation with the ability for user feedback was utilized. The online presentation was hosted on Strathcona County's website in April and May 2021 and information postcards directing residents to the online presentation were mailed out in early April 2021 to all rural residents prior to the presentation going live.

4.1 Summary of Findings

The online presentation provided the participants the opportunity to leave feedback. Comments were reviewed and questions raised by the participants were answered in email responses.

The following is a summary of the comments that were received from the online presentation feedback form. A total of 19 comments were provided and a summary of the themes are listed below. Some responses had multiple comments which have been separated and listed in multiple themes:

- 6 participants made comments regarding the need to upgrade specific roads.
- 7 participants commented on the need to accommodate cyclists and pedestrians.
- 5 participants had general comments on the SRRMP update.
- 3 participants commented on the narrow width of existing roads.
- 1 participant commented on the need to channel traffic away from local roads.
- 1 participant commented on maintenance operation.
- Although outside of the scope of this report, 2 comments expressed concern with the condition of provincial highways.

The responses received in the "Report Back" phase followed the similar themes during the "Listen and Learn" phase. The majority of the comments received relate to items that are being address in the SRRMP 2021 or will be addressed in the ITMP update. There were no comments indicating opposition to any of the proposed recommendations or indicating topics that were missed. Overall, the level of engagement, the comments provided, and the lack of objection to the recommendations helps to validate the current direction of the project.

Appendix D

Value Analysis Summary Report

Al-Terra Engineering Ltd.

DATE
2021-05-07

PREPARED BY
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Strathcona County Sustainable Rural Roads Master Plan Update

Strathcona County

Value Analysis Workshop Documentation Report

Statement of Limitations

- SMA warrants that its services were rendered with the degree of care, skill, and diligence normally provided on work of similar nature. The results of SMA's assessment of likely outcomes of a risk assessment should not be taken to indicate certainty of actual future outcomes; new information may arise which would invalidate prior assumptions and low-probability events may occur.
- The Client agrees that it retains full responsibility for acting upon any of the suggestions or information that may arise from this assignment. The Client agrees to indemnify and save harmless SMA Consulting from any and all actions arising from the execution of any and all of the suggestions or information that may arise from the assignment.

Executive Summary

The Strathcona County Sustainable Rural Roads Master Plan (SRRMP) Update Value Analysis (VA) Workshop was held on April 15 and 16, 2021. The workshop was held remotely through the use of video conferencing and the online whiteboard tool Miro. Industry experts from various municipalities, consultants, and contractors attended the workshop, which was facilitated by SMA Consulting. The goal of the VA session was to review, validate, and refine the pre-existing SRRMP and plan for its update. Discussions were carried out surrounding the classification of the rural road standards, innovative new paving technology, the potential for future partnerships, and other ideas to improve the SRRMP in its upcoming update. Ideas were generated to develop the standards, refine the classification, accommodate the volume of traffic, discuss methods of road rehabilitation and upgrading, and assign priorities. A total of 184 ideas were developed during the session. After removing duplicates and synthesizing the information, 79 ideas were gathered and organized by appropriate categories. There are 30 priority ideas with two votes or more to be explored in further detail.

Table of Contents

Introduction

The Strathcona County Sustainable Rural Roads Master Plan (SRRMP) Update Value Analysis Workshop was held on April 15 and 16, 2021. The workshop was held remotely through video conferencing and online whiteboard collaboration. The workshop was hosted by Al-Terra Engineering and facilitated by SMA Consulting. Participants include Strathcona County, Al-Terra, Leduc County, Parkland County, Sturgeon County, Park Paving, Carmack Enterprises, and other external experts. The goal of the workshop was to identify innovative ways to develop, maintain, rehabilitate, and upgrade the rural roads in Strathcona County. This also includes the refinement of the classification, strategy to channel traffic, and appropriate prioritization of upgrades. Appendix A includes the workshop prepackage, the list of participants, and an overview of the value analysis methodology. Appendix B includes details of the information phase discussion, with an informal Q&A. Appendix C includes the full list of ideas generated during the workshop along with diagrams and participant evaluation.

Project Overview

The Strathcona County Sustainable Rural Roads Master Plan (SSRMP) documents the guidelines by which the County develops, maintains, rehabilitates, and upgrades the approximately 1300 km of rural roads in its jurisdiction. The SSRMP was last updated in 2010 and is due for an update to capture the current conditions of existing roads and the planning of future developments.

The goals of the update include:

- Create framework for sustainability and budget allocation
- Review current maintenance practices and techniques and develop guidance for treatments, standards, and guidelines
- Develop criteria for the rural road classification system as well as their priority including recommendations on funding allocation and review
- Create a framework for the prioritization of need
- Develop rehabilitation standards to align with the redefined road classifications

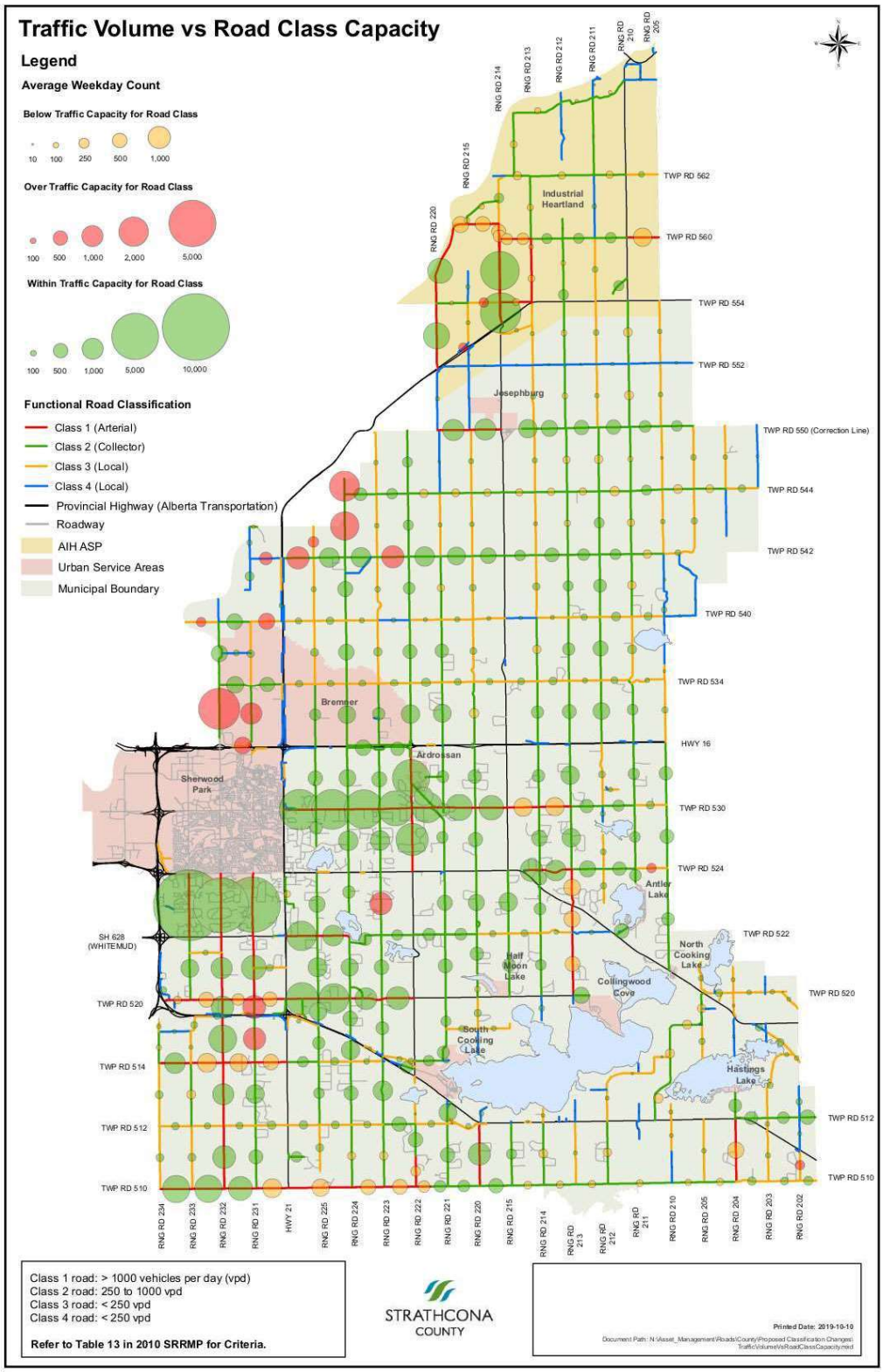


Figure 1. Draft of Current Traffic Volume vs. Road Class Capacity (courtesy Al-Terra Engineering)

Public engagement findings from Q4 2019 to Q2 2020 show that approximately 60% of the respondents are satisfied or very satisfied with the current state of the rural roads, and that more than 50% of the respondents felt safe or somewhat safe on these roads. The top three priorities are road conditions, traffic volume, and road width. The majority of the public dissatisfaction comes from respondents who primarily drive on Class II roadways with high volumes and unimproved surface and width. The upgrades to be considered include:

- Widen narrow roads
- Improve intersection sightlines
- Improve steel side slopes
- Maintenance and lifecycle patches and pothole repairs

The current classification standards are presented below in Table 1.

Table 1. Strathcona County Rural Road Classes

Classification	Vehicles Per Day (vpd)	Top Width (m)	Surface Standard	Standard Right-of-Way (m)
Class I - Hot Mix Asphaltic Concrete Roadway	1000	9.0	Hot Mix	40.0
Class II - Cold Mix Asphaltic Concrete Roadway	250 - 1000	7.5	Cold Mix	40.0 (30.0 minimum)
Class III - Dust Abated Gravel Roadway	< 250	7.5	Dust Abated Gravel Surface	30.0
Class IV - Gravel Roadway	< 250	7.5	Gravel Surface	30.0

Value Analysis Methodology

The methodology used in the workshop aligns with SAVE International's standards for Value Analysis sessions. An overview of the process and methodology used is presented in Appendix A.

The workshop began with an introduction by Al-Terra's Project Manager Fred Greenhough, followed by SMA's overview of the Value Analysis process. The Strathcona County SRRMP update project team presented a summary of the history and current state of the plan. Participants then performed Function Analysis through function brainstorming and moved to small groups for a Creative Phase breakout session to identify new potential options. The workshop concluded with the Evaluation Phase, which involves a collaborative exercise to review and score the options and recommendations generated from the creative phase.

Information Phase

The Sustainable Rural Roads Master Plan (SRRMP), which was last updated in 2010, guides how rural roads are maintained and improved in Strathcona County. The Plan includes all range roads, township roads, and grid roads within residential areas.

In November 2019, public engagement had begun for the next round of the SRRMP update. In 2020, the public engagement results went through technical review and were reported back to the public. The key areas of focus for the upcoming SRRMP update includes:

- Analysis of current state
- Develop criteria for classification
- Review alternatives for special maintenance and short term upgrade
- Review current maintenance practices and techniques

COMMENTS & QUESTIONS

Additional discussions were carried out following the presentation, which included an informal Q&A between the participants and the SRRMP update project team. See Appendix B for full details.

SRRMP Development & Classification

The current system divides roads into four classes with upgrades determined by vehicles per day. Costs for upgrade are driven largely by land acquisition; many Class II-IV roads already do not have the full right of way for their class type. The classification is described in the 2017 Strathcona County Transportation Systems Bylaw. Previous prioritization focused more on specific roads, rather than a “system” approach, but given the work that has been done since the last SRRMP this may be changing. Upgrading to Class I is costly, approximately $3.4M per mile. Rebuilding Class I roads is approximately $2M+ per mile, reconstruction is approximately $600k - $1.5M per mile, and minor rehabilitation is approximately $250k per mile.

Safety Concerns

There is a safety concern with regards to road width with all classes, as a viable shoulder is necessary on higher speed roads to maintain traffic volume while allowing some vehicles to be pulled over. 7.5 m width with two-way traffic will be difficult to allow for vehicles to be pulled over on the shoulder. 9 m wide roads are 100 kph roads per Alberta provincial law; however, as a municipality, the speed limit is lowered to 80 kph. This does mean that some users perceive that Class I roadways are meant for a 100 kph speed limit.

Traffic Channeling

Participants discussed the “urban” approach to traffic, which is to plan for channeling traffic to higher-traffic roads, rather than upgrading on a usage basis. There may be quite a bit of benefit

in taking a more system-wide approach to upgrades, considering cut-through traffic and intended uses, and planning to upgrade roads and intersections in such a way to drive traffic toward existing provincial highways. For example, Range Road 222 is currently being used as a "secondary highway" with less than desirable road conditions. It would also be useful to generate a "break even" number for vehicles per day for construction and maintenance costs, from a lifecycle costing perspective.

Traffic Counts

Current rural traffic counts are done at a three-year cycle (north, central, and south portions of the County) with current resources. Any change would require a capital outlay of increase to equipment and/or manpower.

Road Conditions, Usage, and Other Considerations

- Currently, bridges on gravel roads are not always built to handle farm equipment.
- Drainage is a major concern when it comes to paving. On rural roads, there are a lot of low-lying roads that are difficult to establish drainage due to environmental constraints. Having the pavement structure free of water or building a french drainage system, aside from culverts, could be considered. There are innovative systems that are being used on golf courses that could be adopted.
- Changes in farming equipment will impact the roads, for example, water haulers have impacted the roads significantly as they are being run 100% now in winter.
- More mixed-use is being observed during the COVID-19 pandemic

Paving and Surface Treatment Technologies

There was general discussion around paving and surface treatment technologies.

- For gravel roads at the dust control stage, the County used to use a bound surface spray with three-wheeled path, which works well from a maintenance perspective but not from a customer perspective.
- The performance of cold mix roads has been good.
- Hot mix is sometimes used instead of cold mix based on performance and cost. Establishing a hard-bound service that the County does not have to touch for four to five years is difficult. Hot mix reduces the risks of rainy weather ruining the surface and the hot mix surface that was put down last year is performing well.
- Graded aggregate is used sometimes on higher volume rural roads, some are used as a double chipsealed approach on gravel roads. Parkland County is leveraging a grant to put forward graded aggregate/chipseal use.
- For dust control, the current methods are not very satisfactory. Volatile organic compounds from oil and oil byproducts are typically no longer used for environmental reasons.
- For the surface material selection, there is a tradeoff between harder and more durable materials and the ability to maintain and replace through lift and replace. Hot Mix or Cold Mix gravel roadways sometimes end up with potholes due to their material properties.

- Different soil will require different treatments. A cross-section across the County is easy to determine; however, geotechnical conditions are much more specific to the road condition. Site-specific design is done on some roads while others receive generic treatments. Falling weight deflectometer (FWD) tests are conducted on some roads. There are efforts to evolve from one-size-fits-all solutions.

Public and Political Considerations

Strathcona County faces some unique challenges as Sherwood Park is relatively urban, while the remainder of the county is rural. This can lead to issues with levels of acceptance from Council or from urban residents who move out into the county. For example, a “three-wheel” gravel road is a practical solution that is not currently politically acceptable. In general, signage and communication to the public is important, and the County tries to indicate where specific road types are chosen for specific reasons that might not be immediately apparent, e.g. a truck route that needs a higher class of road. However, public perception remains an issue and the visible example of “paved” remains a challenge -- residents complain when recycled products that do not show up as black are used. In addition, some residents do not want upgrades due to the potential for increased traffic or speeding.

Future Changes

The longer-term effects of the COVID-19 pandemic remain to be seen. The need for infrastructure growth in the capital region has been reduced due to local residents working from home, but the need for better rural internet connectivity has become apparent.

Lessons Learned and Collaboration Opportunities With Other Municipalities

The workshop included representation from Parkland County as well as Leduc County. Collaborations between Counties and sharing results and learnings across regional partners could be greatly beneficial for all parties.

- Parkland County sets aside a budget for innovation. Piloting with trail projects is sometimes done.
- Rehabilitation methods used at Parkland County are largely a function of the type of road. Strathcona County would largely be classified as Type I roads with Asphalt Concrete Overlay (ACP). Mill and overlay is typically done for gravel roads in Parkland County.
- Parkland County uses the Pavement Preservation and Recycling Alliance website (roadresource.org) to determine the appropriate surface treatment.
- Municipalities should triage some of the shared concerns and create partnerships to resolve problems. Pilot projects collaboratively and set everyone up for success. Standardized testing and other measures across municipalities would help ease the process.

Function Analysis Phase

Following the Information phase, the participants were encouraged to come up with a list of functions that pertain to the delivery of the project. Key functions were identified and are shown in bold, and then the high-cost functions were evaluated, using stars to approximate cost, where more stars indicate higher cost. The key functions were then used as trigger words during the creative phase to help generate as many ideas as possible. The list of functions is presented below with the key functions bolded:

- Improve Network
- Manage Network
- Engage Public
- Minimize Maintenance
- Support Development
- Develop Program
- Recommend Funding
- **Assign Priority**
- **Develop Classification**
- Forecast Use
- Analyze Use
- Develop System
- **Develop Standards**
- Accommodate Vehicles (Weight)
- Accommodate Vehicles (Width, Length)
- **Accommodate Volume**
- Improve Safety
- Manage Drainage
- Identify Conditions
- Address Treatment
- Maintain Road
- **Rehab Road**
- **Upgrade Road**

Creative Phase

Once the Information and Function Analysis phases were complete, the Creativity phase began. During the Creativity phase, participants were divided into two groups based on their areas of expertise and background. Each group has individuals from Strathcona County, Al-Terra, experts from other counties, contractors, and consultants. A technique called “World Café" was used to increase the number of ideas generated. Each facilitator worked with a group for about an hour on each of the six major functions identified: Develop Standards, Develop Classification, Assign Priority; and Accommodate Volume, Rehab Road, and Upgrade Road. The facilitators rotated along with the two groups to generate more ideas for all six functions. The full list of ideas post organization can be found in Appendix C.

EXPERIENCES FROM OTHER MUNICIPALITIES

Leduc County

The standard ROW width at Leduc County is 34 m for road top width of 9 - 10 m. The width of the roads are sometimes adjusted based on traffic volume and user needs. Road development strategies will vary when it comes to local farm roads, major arterials, fair weather roads, industrial roads, and country residential roads. Bridges are found to be challenging.

Currently, cold mix asphalt is being phased out at Leduc County and hot mix asphalt is used instead for the full rehabilitation projects that are being planned. The cold mix can be mixed into the cement stabilizer to be used in the subgrade or stored and used for minor repair work.

Leduc has successfully trialed the use of cement stabilizer on gravel road bed followed by a full geogrid, granular base course (GBC), then ACP over the topsoil -- this technique helps to prevent reflective cracking and does not require extensive reconstruction.

Techniques such as microcracking are used to extend the project lifetime. Calcium treatments are used on gravel roads for dust. The lifecycle of the surface treatment is dependent on the truck traffic volume. Upgrades that are being considered in the County include improving the side slope profiles by making them flatter. Drainage improvements include using cross drainage tubes in very wet areas to avoid settlement issues. Large cell products such as geocells are being used on marshy lands, which has yet to yield much success.

Leduc County has hired trainers for the grader operators for rural gravel roads to achieve better camber. This initiative has achieved significant success and improved drainage and soft spot issues on rural roads. Leduc County's Rural Road Gravel Initiatives is a great program for spot fixing and maintaining gravel roads. The Regional Roads Forum (Leduc County and WSP in late 2019/early 2020) is a great opportunity to learn about innovative paving and surface treatment technologies and to engage with industry experts. Alberta Municipal Supervisors Association (AMSA) has hold conventions on road maintenance and upgrades.

Parkland County

Parkland County's standard is 10 m width for main roads and 8.5 m width for rural collector roads, with 30 m for the ROW for both. Parkland has used both cold mix and emulsion, and uses cold mix as part of base strengthening. Rural collector roads start with cold mix, while some are Asphalt Concrete Pavement (ACP). Typically, Asphalt Stabilized Based Course (ASBC) with overlay is done. Chipseal for gravel surface is an intermediate option as per Parkland County's experience

Currently, dust control is sprayed on and mixed with a grader blade; however, this program will be terminated and Parkland County is going back to calcium. There is an "innovation budget" to explore innovative technologies and prototyping and Parkland County has plans to trial microsurfacing instead of chipseal.

Evaluation Phase

During the creative phase, the ideas were captured using sticky notes on the online whiteboard. Participants were invited to evaluate the ideas and vote on ideas that they believed were worth further exploration. Using the 1-10 holistic value index (Appendix A) and the "Dotmocracy" method, participants scored the ideas for feasibility and benefit to the project. Ideas that were considered a 7 and above were given a green dot, ideas that were 3 and below were given a red dot. Table 1 presents the ideas and their respective scoring.

Table 2. Value Ideas Organized by Category and Number of Votes

Category	Value Ideas	
Collaboration - Outreach	Explore economic efficiencies of scale on activities such as brushing, microsurfacing, and others among municipalities and save cost by combining contracts.	*
Collaboration - Outreach	Establish a program for sharing innovation and learnings among municipalities. Attend conferences such as the Regional Roads Forum held by Leduc County and WSP in late 2019/early 2020 and Alberta Municipal Supervisors Association (AMSA) Conventions.	*
Technologies	Trial projects for different applications through a project based selection of technology, followed by revisit and documentation. Pilot projects in certain areas with specific products and methods before wide adoption, calculate the return on usage and consider the risks involved for immediate repair. Improve and standardize piloting programs to allow for follow-ups and long term studies, include signage and communication to the public. Be willing to test different technologies and accept some risk for potential success or failure.	9
Design standards - flexible	Develop subclasses and allow flexibility in the criteria with local considerations to support realistic operation needs. Identify local context for roads that may not meet the standards but meet the needs of the local users. For example, gravel surface roads with Class III dust control in front of local farms would be insufficient for farm equipment. Balance the standards and bylaws with cost and flexibility.	8
Collaboration - contractors	Maintain collaboration and communication with contractors and be open to innovative improvements. Allow contractors to bring forward innovative ideas with transparent risk discussions and focus on end result and road longevity. Consider contracting strategies that will make this easier such as IPD. Pursue up-front cost thinking prior to construction. Continue to work to develop relationships between the County and contractors.	7
Design standards	Consider reducing ROW width to reduce land needs in Class I and II roads while keeping the backslopes at a good profile. Consider traffic volume and use. Standard ROW for 9m roads is 34m in Leduc County and 30m in Parkland County.	7
Design standards	Consider site specific design for specific uses/needs, geotechnical conditions vary across the county. Design the roadways in industrial areas specifically catering to heavy load and frequent use. Find an appropriate balance.	7
Prioritization methods - Traffic channeling	Plan upgrades and design to channel traffic to intended roads, and especially to avoid creating duplicate routes. Consider reducing Class I roads and having a robust network of Class II directing traffic to Provincial highways. Take emergency access routes and highly populated areas into account.	6

Category	Value Ideas	
Prioritization methods	Stage upgrades and improvements with consideration of getting the best quality of service from the dollar value to accommodate traffic needs.	5
Technologies - Microsurfacing	Adopt reclaimed asphalt pavement (RAP) with bituminous additives. Prototype of microsurfaced 100% RAP product with a bitumen mix lasted 14 years without the need for resurfacing.	5
Budget	Defer upgrading and commit to a brushing program to clear tree encroachment for better sightlines and road safety, which will significantly improve user experience at reduced costs	4
Design standards - flexible	Plan for more investigations during road upgrades to allow for nuance within each classification.	4
Design standards - flexible	Add Class II-A and Class II-B classifications to allow for upgrades that do not meet Class I criteria. Expand the classification to include standards for lower class road upgrades.	4
Prioritization methods	Rehabilitation should be driven by surface condition, safety, traffic volume, road width, collision data, and drainage if the road is selected.	4
Communication and Education	Work to establish mutual understanding of stakeholder wants and needs, County priorities and limitations, and political desires, to be referenced during design. Determine expectations from public and Council and work to "sell the story" for rural roads.	3
Communication and Education	Educate the public on the different feels and looks of roads with different surface and on rural road qualities. For example, not all paving methods will result in a black surface, which can cause problems and complaints due to the lack of understanding from the public. In addition, urban residents who are driving in a rural setting may have unrealistic expectations. Educate and inform non-resident drivers and users when it comes to driving on rural roadways.	3
Operator training	Establish training initiatives to help transfer knowledge from experienced operators for succession planning. Many experienced operators are reaching retirement age. Explore other types of specialized training for operators and consider sharing with other municipalities. Leduc experience: hired a trainer for grader operators on rural gravel roads to achieve better camber and performance.	3
Prioritization methods - Traffic channeling	Creative use of road ban and dictate weight restrictions to avoid heavy use in areas that are not prioritized for preservation	3
Prioritization methods - Traffic channeling	Use the network model when considering upgrades for similar condition/safety roads, and consider future planned land development.	3
Technologies	Adopt innovative/progressive methods for development, maintenance and rehabilitation, such as microcracking or using a second lift of asphalt.	3

Category	Value Ideas	
Technologies - Microsurfacing	Microsurfacing on top will protect paved material from cracking and oxidation. However, it is important to note that microsurfacing, cold mix or emulsion roads/ mixed matrix with higher voids are more susceptible to moisture. Microsurfacing may be more tolerable than chipseal. Strathcona County has used it on hard surface and Parkland County has plans to trial microsurfacing.	3
Data collection	Perform regular inspection on gravel roads; currently the rural area inspections are done every two weeks and there is a map used to capture road status and information.	2
Design standards	Have different strategies categorizing and focusing on local farm roads, major arterial, fair weather roads, industrial roads, and country residential roads.	2
Design standards	The major challenges for ROW upgrade are land availability and price	2
Design standards	Improve side slopes and make them flatter where possible and build open, wider ROW and clear zones.	2
Design standards	Consider using backslope agreements or easements instead of actual land acquisiton for ROW. Backsloping and easements were done historically but have fallen out of favour due to competing interest and issues from different groups. The downside of backsloping agreements is that they may cause drainage issues.	2
Pilot studies	Develop a systematic approach for piloting innovation and testing through partnerships. Set a specific budget for innovation to explore new technologies.	2
Preservation	Explore preservation treatments, such as those that keep moisture out to extend the life of the paving. Stretch maintenance and rehab dollars by looking into methods to extend the lives of different surface pavings.	2
Prioritization methods	Gravel roads are the easiest to maintain and have the potential for upgrades.	2
Technologies	Explore opportunities on using emulsion vs. cutback for different performances. Not that different types of oils are used in Class III. There are different emulsions (e.g. Norway) that can be used, with mix-in-place options available. Consider cold mix with cutback or emulsion. Cutback is typically softer with more movability, while emulsions are stiffer and harder and could lead to potholes.	2

** These ideas were highlighted and discussed during the wrap-up discussion of the workshop. The participants identified and agreed upon the importance and feasibility of these ideas after the scoring exercise.*

After the evaluation phase, a follow-up discussion was carried out to determine the one takeaway from the workshop. The Strathcona County SRRMP update team identified that a brushing program to clear tree encroachment should be carried out. This is a simple upgrade measure that greatly improves sightlines and safety on rural roads, it will also significantly improve user experience. For economic efficiencies on brushing, microsurfacing, and other upgrade activities, municipalities could consider combining contracts to save on cost. The municipalities should also consider establishing a program to share innovations and learnings with one another, this includes partnering on pilot projects and attending conferences and conventions to share experiences.

Presentation Phase

After the workshop, the facilitation team organized the ideas into categories to help remove any duplicates information. The 184 ideas have been collected, combined, and synthesized into 79 ideas. The list of organized value ideas has been collated and presented in Appendix C. The SRRMP update team at Strathcona County will use these ideas and their evaluation scores to identify options that are worth exploring.

Conclusion and Next Steps

The Value Analysis workshop for the Strathcona County SRRMP brought experts in rural road development, rehabilitation, and upgrading to discuss the issues regarding the classification of the rural road standards, innovative new paving technology, the potential for future partnerships, and other ideas to improve the SRRMP in its upcoming update. The workshop was centered around generating ideas for the development of classifications and standards, assigning priority to maintenance and upgrades, finding ways to measure and accommodate traffic volume, and innovative technologies to be used in road upgrades and rehabilitation. The next step will involve further discussion of the high-scoring value ideas and feasibility of carrying them out, as well as the inclusion of the ideas into the next SRRMP update.

Appendix A

Workshop Prepackages & List of Participants

STRATHCONA COUNTY SUSTAINABLE RURAL ROADS MASTER PLAN UPDATE VALUE ANALYSIS WORKSHOP PREPACKAGE

Topics

01 Workshop Location

- + *Workshop Location*
- + *Workshop Time*
- + *Workshop Agenda*
- + *Workshop Goals*

02 Project Background

- + *Project Background*
- + *Project Goals*

03 Value Analysis Process

- + *Value Analysis Process*

WORKSHOP LOCATION & TIME

When:

1pm – 5pm, Thursday, April 15, 2021 &

8:30am - 12pm, Friday, April 16, 2021

Where:

Online Teams Meeting, Room link provided in invite

You are cordially invited to attend the upcoming Value Analysis workshop sessions for the Strathcona County Sustainable Rural Roads Master Plan Update Project. This workshop series is being undertaken by the Strathcona County and Al-Terra and facilitated by SMA.

If you have any further questions or comments, please do not hesitate to contact me. We look forward to a productive session.

Holly Parkis, CVS, PMP

Facilitator

WORKSHOP OVERVIEW

Workshop Goals & Agenda

The goal of the workshop session is to perform a Value Analysis session to review, refine and evaluate the strategy. Al-Terra will present a number of areas of focus for updates to the Sustainable Rural Road Master Plan.

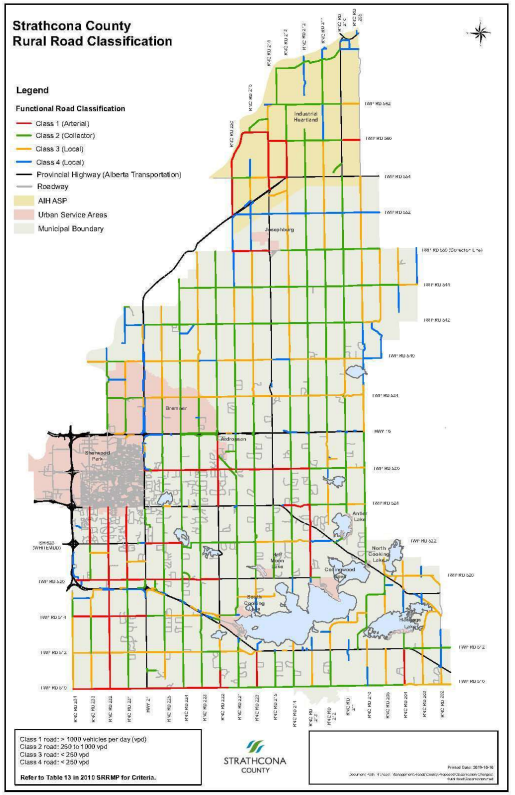
The workshop will determine the most favorable plan options to carry forward for further investigation given the functions and goals required. The options will be compared during the workshop sessions through the value methodology with a focus on key functions and the evaluation criteria.

Attached design information follows; please review the information and ensure you are familiar with the project background in preparation for the workshops. Further detailed information about the strategy and the key areas for discussion is included with the attached package from Al-Terra.

Value Analysis Workshop Agenda:

For details on the workshop methodology, please see the attached VA process sheet

1. Participant Introduction
2. VA Process Introduction
3. Design Presentation of the Current Status
4. Q&A Session
5. Function Analysis Phase
6. Creativity Phase
7. Evaluation Phase
8. Closeup & Next Steps Discussion



Draft Strathcona County Rural Road Classification Map. Image Courtesy of Al-Terra

PROJECT BACKGROUND

Township Road 534, an example of a Rural Road in Strathcona County. Image Courtesy of Google Maps

About the Rural Roads Master Plan

The Strathcona County Sustainable Rural Roads Master Plan (SSRMP) is a document that guides how the County maintains and rehabilitates the approximately 1300 km of rural roads in its jurisdiction.

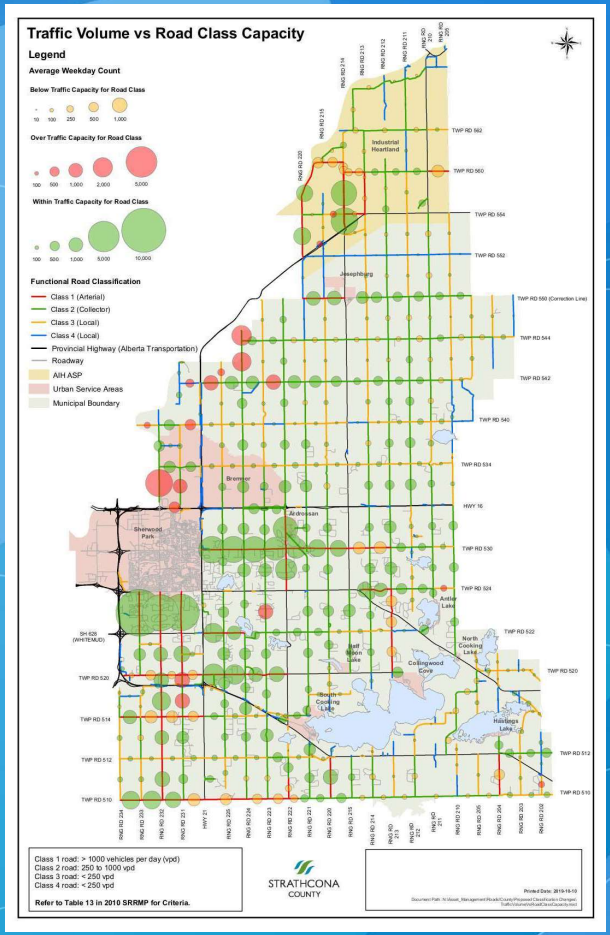
Past Work

The SSRMP was last updated in 2010 and will require updates to encompass current conditions and potential future planned developments.

Current Condition

The project was initiated in 2020 by engaging the public to better understand their concerns. This helped to guide the technical work that has been progressing on the report. The Value Engineering session will help to expand our collective knowledge by engaging the experience from local experts outside of the design team.

PROJECT GOALS



Draft Current Traffic Volume vs Road Class Capacity. Image provided by Al-Terra

1. *Create framework for sustainability and budget allocation*
2. *Review current maintenance practices and techniques and develop guidance for treatments, standards, and guidelines*
3. *Develop criteria for the rural road classification system as well as their priority including recommendations on funding allocation and review*
4. *Create a framework for the prioritization of need*
5. *Develop rehabilitation standards to align with the redefined road classifications*

VALUE ENGINEERING/VALUE ANALYSIS PROCESS

*The **Information Phase** involves understanding the current state of the project: the opportunities and constraints that will influence decision making. Common activities include reviewing and discussing project data, determining project and workshop objectives, and discussing stakeholders, project issues, and key constraints. A successful information phase brings the team to a common understanding of the project.*

*The **Function Analysis Phase** is targeted at understanding the "solution:" what must a project accomplish to be successful? Common activities include discussing and classifying functions, developing function models and FAST diagrams, and dimensioning functions with cost and risk (that is, determining how much it costs to deliver a given function).*

*The **Creativity Phase** is where the team uses their understanding of the project and of the functions required to brainstorms potential solutions to deliver those functions more effectively and with less cost. This phase may involve group breakout sessions or other activities. The goal is to work collaboratively to develop a large quantity of solutions, with no pre-judgment of ideas.*

*During the **Evaluation Phase**, the ideas which have been produced are discussed and prioritized for future development. Common activities may include filtering with a scale such as the "gut feel index" (GFI), performance of differential risk analysis, or development of weighted evaluation criteria and scoring of options in detail.*

*The **Development Phase** consists of taking those options which were selected for future development and analyzing them further. This may involve modeling, research, cost/benefit analysis, development of schedules or life cycle costing, or feasibility studies. Further evaluation may occur after this phase once additional information has been gathered.*

*Finally, during the **Presentation Phase** the selected value suggestions are presented to decision-makers for implementation. This phase concludes with a formal report.*

Value Engineering or Value Analysis (VE or VA) is defined by SAVE International as a globally recognized structured process for improving the function and optimizing the cost of projects, processes, or products. A multidisciplinary team uses the process to understand key project functions, generate creative ideas, and evaluate suggestions to determine the optimal approach. VE/VA is also a very effective decision support methodology. The same structured process is used in all cases: preparation prior to the workshop, a six-step Job Plan during the workshop, and post-workshop analysis and reporting.

List of Participants

Strathcona County Sustainable Rural Roads Master Plan Update Value Engineering
April 15-16, 2021

#	Name	Organization
1	Amro Kotb	Leduc County
2	Branden Gotobed	Park Paving
3	Brian Hughes	Carmack Enterprises
4	Bruce Paterson	Strathcona County
5	Cody Thordarson	Strathcona County
6	Corry Broks	Al-Terra Engineering
7	Fred Greenhough	Al-Terra Engineering
8	Holly Parkis	SMA Consulting
9	John Mac Donald	Park Paving
10	John Nguyen	Strathcona County
11	Joseph Luca	Al-Terra Engineering
12	Karolina Haggerty	Strathcona County
13	Khushnud Yousafzai	Leduc County
14	Leonard Dunn	Independent Consultant
15	Lily Ren	SMA Consulting
16	Richard Dekker	Strathcona County
17	Rob de Kleer	Parkland County
18	Ryan Anders	Strathcona County
19	Ryan Wilson	Strathcona County
20	Scott Sillers	Strathcona County
21	Ted Nestor	Sturgeon County

Appendix B

Information Phase Discussion and Q&A

SRRMP Development & Classification

- Develop the SRRMP with the most value for money. Find out why higher volume roadways are higher in volume. Is there a regional perspective to finding a central roadway to be improved to carry the majority of traffic in that area?
- Separate Class III and dust control. Reduce classification in certain areas to push the use of higher classification roadways through traffic channeling.
- **Q:** Is Class III the focus for upgrades or are we looking at all classes?
  A: We are looking at all classes. Previous versions of the SRRMP have focused on Class I roads, which have been built out well and do not need as much attention. Class III and Class IV are facing major problems. Only 2 miles of Class I has been upgraded since 2010. The cost is now up to approximately $3.4M / mile on Class II to Class I upgrade. The next Class I upgrade project is stalled in the budget.
- **Q:** What are the factors that drive the cost behind Class I road upgrades to be $3.4M / mile?
  A: The upgrade requires approximately 20m of additional land for ROW. Are there any engineered cost reductions to be explored? Currently, the County is not looking at reconstruction, more focusing on rehabilitation and maintenance.
- In terms of system development, take into account the prioritization within the system and what the specifications (e.g. width, surface type) would be.
- The Class I structure is currently sufficient, with Class II to IV to be stabilized, but little is engineered. Class IV surface is gravel with 150m of dust abatement in front of the occupied approaches.
- The 2017 Strathcona County Transportation Systems Bylaw can be found here and it shows the rural classification network.
- The cost to rebuild Class I roads is approximately $2M+ per mile, reconstruction is approximately $600k - $1.5M per mile, and minor rehabilitation is approximately $250k per mile.
- In the Heartland Region, there is a Class I road with a 10 m top width and an even larger ROW, but this is currently not in the standards.
- Class I roads saw a considerable increase in the 2010s when it comes to regional connections and major corridors to primary highways. A lot of improvements have been made for connectivity and movement potential. Alberta Transportation's future changes for highway closures are being considered. Functional studies for any and all future developments are seeing the threshold being triggered for access. Some roads are not going to be upgraded if their access to the highway is going to be closed. Standards in the 2010 master plan speak to potential evolutions, which were unfortunately stricken.

Considerable amounts of work were done to the update since the 1994 initial master plan.

Safety Concerns

- Consider users who typically drive in rural areas versus those who typically drive in urban areas. It is potentially unexpected road conditions for those who are not used to the rural level of service.
- There is a safety concern with regards to road width, as a viable shoulder is necessary on higher speed roads to maintain traffic volume while allowing some vehicles to be pulled over. 7.5 m width with two-way traffic will be difficult to allow for vehicles to be pulled over on the shoulder. 9 m wide roads are 100 kph roads per Alberta provincial law; however, as a municipality, the speed limit is lowered to 80 kph. Some user perceives that Class I roadways are meant for a 100 kph speed limit.

Traffic Channeling

- **Q:** Road upgrade is up to debate as a break-even number is needed between the total initial construction cost and maintenance costs. What is the break-even number of vehicles per day (vpd) to justify the upgrade?
  A: There is no exact number as per policy. The break-even number is approximately 400 vpd. It would be a good idea to calculate the numbers to determine where does the County break-even for construction/maintenance costs and using lifecycle costing to determine value.
- Consider cut-through traffic and intended users. The model may need to be modernized with some urban user perspective.
- Consider the intersection type or the design of a route on a shortcutting route.
- Current rural traffic counts are done at a three-year cycle (north, central, and south portions of the County) with current resources. Any change would require a capital outlay of increase to equipment and/or manpower.

Road Conditions and Considerations

- Range Road 222 is currently being used as a secondary highway with less than desirable road conditions.
- Currently, bridges on gravel roads are not always built to handle farm equipment.
- Drainage is a major concern when it comes to paving. On rural roads, there are a lot of low-lying roads that are difficult to establish drainage due to environmental constraints. Having the pavement structure free of water or building a french drainage system, aside from culverts, could be considered. There are innovative systems that are being used on golf courses that could be adopted.

- Changes in farming equipment will impact the roads, for example, water haulers have impacted the roads significantly as they are being run 100% now in winter.
- Falling weight deflectometer (FWD) tests are conducted on some roads. There are efforts to evolve from one-size-fits-all solutions.

Paving and Surface Treatment Technologies

- **Q:** Other than cost, is there a reason for preferring cold mix over hot mix, and with what intention?
  A: For gravel roads at the dust control stage, it used to be a bound surface spray with three-wheeled path, which works well from a maintenance perspective but not from a customer perspective. The performance of cold mix roads has been good. Hot mix is sometimes used instead of cold mix based on performance and cost. Establishing a hard-bound service that the County does not have to touch for four to five years is difficult. Hot mix reduces the risks of rainy weather ruining the surface and the hot mix surface that was put down last year is performing well.
- **Q:** Are graded aggregate or chipseal being used?
  A: Graded aggregate is used sometimes on higher volume rural roads, some are used as a double chipsealed approach on gravel roads. Parkland County is leveraging a grant to put forward graded aggregate/chipseal use. Volatile organic compounds from oil and oil byproducts are typically no longer used as they are sometimes frowned upon by the municipalities.
- For the surface material selection, harder and more durable materials are typically preferred. However, they might be more difficult to maintain and replace through lift and replace. In this case, the more pliable materials are preferred. Hot Mix or Cold Mix gravel roadways sometimes end up with potholes due to their material properties.
- Foamed asphalt with chipseal may last up to four years.
- Lifecycle on ACP subdivision roads will be able to do microsurfacing. May try to introduce graded aggregate mix in subdivision roads to allow for microsurfacing rehabilitation.
- Consider cold mix with cutback or emulsion. Cutback is typically softer with more movability, while emulsions are stiffer and harder and could lead to potholes.
- Any clay pulled up into foamed asphalt would render it useless. The County needs to avoid picking the wrong treatment for the right road with regards to design. The County goes from clay to good clay till in the southern portion, which requires a different support system.
- Different soil will require different treatments. A cross-section across the County is easy to determine; however, geotechnical conditions are much more specific to the road

condition. Site-specific design is done on some roads while others receive generic treatments.

Public and Political Considerations

- **Q:** What are the potential political constraints?
  A: The level of acceptance from the Council is different than rural user's expectations and requests. E.g. the three-wheeled path is a practical solution that is not currently politically acceptable.

- Strathcona County is unique in that it has both urban and rural components. Preserving existing infrastructure to extend its lifecycle is typically not acceptable in urban settings. The city of Edmonton has done microsurfacing in their neighbourhoods, unsure what level of engagement was done to get resident approval. Strathcona County might want to look into preservation measures that are effective and are accepted by the public.

- More mixed-use is being observed during the COVID-19 pandemic

- Due to local residents working from home during the COVID-19 pandemic in rural areas, the need for infrastructure growth in the capital region has been reduced. Currently, the effects and needs of rural internet support and telecommuting are being explored.

- Public perception will not be kind to poorly designed systems. The visible example of what is a paved road is fixed in public perception. Education of the public is difficult. For example, recycled products that do not show up black (show up grey due to lower levels of bitumen) are not believed to be paved properly and had to be redone.

- Signage and communication to the public would be valuable.

- There have been urban Strathcona County residents who move into rural areas where there is no asphalt to their front door and infrequent snow plowing. The difference in service presents a challenge when it comes to managing expectations.

- **Q:** Is there feedback from residents regarding not wanting road improvements due to new pavement impacting traffic?
  A: Paving will bring the speed of the road up to 80 - 100kph from 60kph on gravel roads. Some residents do not want paved roads or changes that will introduce more traffic at higher speeds. There are some segments of the rural road that have been held back one classification for this specific reason. Recent upgrades to introduce asphalt in a rural area, the residents mentioned that the benefits of better safety and increased maintenance to the road. Any impacts of speeding or higher traffic volume have yet to be reported/quantified.

Lessons Learned From and Collaboration Opportunities With Other Municipalities

- Parkland County sets aside a budget for innovation. Piloting with trail projects is sometimes done. Collaborations between Counties and sharing results and learnings across regional partners could be greatly beneficial for all parties.

- Rehabilitation methods used at Parkland County are largely a function of the type of road. Strathcona County would largely be classified as Type I roads with Asphalt Concrete Overlay (ACP). Mill and overlay is typically done for gravel roads in Parkland County.
- Parkland County uses roadsource.org to determine the appropriate surface treatment.
- Municipalities should triage some of the shared concerns and create partnerships to resolve problems. Pilot projects collaboratively and set everyone up for success. Standardize testing and other measures across municipalities would help ease the process.

Appendix C

Value Analysis Idea Register

Category	Value Ideas	
Collaboration - Outreach	Explore economic efficiencies of scale on activities such as brushing, microsurfacing, and others among municipalities and save cost by combining contracts.	*
Collaboration - Outreach	Establish a program for sharing innovation and learnings among municipalities. Attend conferences such as the Regional Roads Forum held by Leduc County and WSP in late 2019/early 2020 and Alberta Municipal Supervisors Association (AMSA) Conventions	*
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Design standards - flexible	Develop subclasses and allow flexibility in the criteria with local considerations to support realistic operation needs. Identify local context for roads that may not meet the standards but meet the needs of the local users. For example, gravel surface roads with Class III dust control in front of local farms would be insufficient for farm equipment. Balance the standards and bylaws with cost and flexibility.	8
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Communication and Education	Work to establish mutual understanding of stakeholder wants and needs, County priorities and limitations, and political desires, to be referenced during design. Determine expectations from public and Council and work to "sell the story" for rural roads.	3
Communication and Education	Educate the public on the different feels and looks of roads with different surface and on rural road qualities. For example, not all paving methods will result in a black surface, which can cause problems and complaints due to the lack of understanding from the public. In addition, urban residents who are driving in a rural setting may have unrealistic expectations. Educate and inform non-resident drivers and users when it comes to driving on rural roadways.	3
Operator training	Establish training initiatives to help transfer knowledge from experienced operators for succession planning. Many experienced operators are reaching retirement age. Explore other types of specialized training for operators and consider sharing with other municipalities. Leduc experience: hired a trainer for grader operators on rural gravel roads to achieve better camber and performance.	3
Prioritization methods - Traffic channeling	Creative use of road ban and dictate weight restrictions to avoid heavy use in areas that are not prioritized for preservation	3
Prioritization methods - Traffic channeling	Use the network model when considering upgrades for similar condition/safety roads, and consider future planned land development.	3
Technologies	Adopt innovative/progressive methods for development, maintenance and rehabilitation, such as microcracking or using a second lift of asphalt.	3

Category	Value Ideas	
Technologies - Microsurfacing	Microsurfacing on top will protect paved material from cracking and oxidation. However, it is important to note that microsurfacing, cold mix or emulsion roads/ mixed matrix with higher voids are more susceptible to moisture. Microsurfacing may be more tolerable than chipseal. Strathcona County has used it on hard surface and Parkland County has plans to trial microsurfacing.	3
Data collection	Perform regular inspection on gravel roads; currently the rural area inspections are done every two weeks and there is a map used to capture road status and information.	2
Design standards	Have different strategies categorizing and focusing on local farm roads, major arterial, fair weather roads, industrial roads, and country residential roads.	2
Design standards	The major challenges for ROW upgrade are land availability and price	2
Design standards	Improve side slopes and make them flatter where possible and build open, wider ROW and clear zones.	2
Design standards	Consider using backslope agreements or easements instead of actual land acquisiton for ROW. Backsloping and easements were done historically but have fallen out of favour due to competing interest and issues from different groups. The downside of backsloping agreements is that they may cause drainage issues.	2
Pilot studies	Develop a systematic approach for piloting innovation and testing through partnerships. Set a specific budget for innovation to explore new technologies.	2
Preservation	Explore preservation treatments, such as those that keep moisture out to extend the life of the paving. Stretch maintenance and rehab dollars by looking into methods to extend the lives of different surface pavings.	2
Prioritization methods	Gravel roads are the easiest to maintain and have the potential for upgrades.	2
Technologies	Explore opportunities on using emulsion vs. cutback for different performances. Not that different types of oils are used in Class III. There are different emulsions (e.g. Norway) that can be used, with mix-in-place options available. Consider cold mix with cutback or emulsion. Cutback is typically softer with more movability, while emulsions are stiffer and harder and could lead to potholes.	2
Budget	Identify if the current budget is adequate for the development, operation, maintenance, and upgrade for rural roads at $18M capital and $7.5 operations and maintenance. The perception is that there is not enough funding for all the rehabilitation and upgrading activities.	1
Budget	Establish a Rural Road Gravel Initiative for spot fixing as per Leduc County experience.	1
Collaboration - outreach	Some of these challenges are because the County is experiencing significant growth. Reach out to older municipalities such as the	1

Category	Value Ideas	
	Greater Toronto Area or in Midwest US to obtain lessons learned regarding how this type of growth was handled over the past thirty to forty years.	
Communication and Education	Educate the decision makers and consider shifting capital budget towards operation and maintenance to keep a level of service.	1
Communication and Education	Put up signage for variances, such as higher weight roads, for to inform the public.	1
Communication and Educatio	Engage more parties during ROW discussions, such as the land management services group, utilities, transportation planning and engineering, and other County groups to address this multifaceted issues.	1
Data collection	Collect information from maintenance staff who drive out to the roads regarding key areas for maintenance and upgrades, as they have valuable knowledge of areas that have drainage issues, areas that are more prone to cracking or settlement, behavior at different times of year, and so on.	1
Data collection	Use collision history to determine areas that require safety related upgrades.	1
Design standards	Classification and standards need to make sense from an equity perspective to the public and to Council	1
Design standards	Bridges are a challenge for rehabilitation/maintenance and may need separate consideration.	1
Design standards	Develop performance standards to help inform the selection of the right product (e.g. emulsion vs. cutback).	1
Drainage upgrades	Target drainage upgrades to critical areas with issue for preventative maintenance. Consider cross-drainage tubes (e.g. French drain style) to avoid settlement issues where culverts are not appropriate. This type of drainage is used on golf courses instead of culverts and other products may be available as well.	1
Drainage upgrades	Need to consider staging for long term strategies. Drainage issues for roads being paved need to be considered. Construction fatigue for residents is a consideration, but a long term product will be more sustainable.	1
Prioritization methods	Use different factors such as Passenger-Kilometres (PKM) and crowdedness on the road to determine and forecast volume. Examine the ways in which volume types are accommodated and get a better understanding of how to work around them. Identify if the driving factor behind accommodation needs is traffic volume or resident input.	1
Prioritization methods	Prioritize upgrades based on user needs, e.g. investment of surface updates to 6m wide roads will not solve the issues users have with the width. In particular, identify whether the need is to accommodate load rather than volume.	1
Prioritization methods	Prioritize unimproved Class I with narrow width and high traffic volume.	1

Category	Value Ideas		
Technologies	Use roadresource.org to help make decisions regarding surface treatment (currently done in Parkland).	1	
Technologies	Revisit the lift thickness of Class I structures to obtain better performance with new Superpave mixes.	1	
Communication and Education	Put up signage to inform the users of the different feels and looks of roads with different surface.		1
Communication and Education - Wayfinding	Improve wayfinding to specific rural destination to keep urban/infrequent users on the right roads. Explore methods to communicate with Google Maps and other wayfinding and mapping software to set up proper wayfinding for rural destinations.		
Data collection	Asset tracking and asset management to document the history of what was done to the roads in the past and monitor for any performance issues of future pavings.		
Data collection	Radar counters can be used to track vehicle length.		
Design standards	Use gravel shoulders wherever possible		1
Design standards	For roads with a good base, use cold mix recycling to expand the width.		
Design standards	Consider a wider Class II road classification like Parkland County.		
Design standards	Consider compromising on the side slopes in favour of ROW width.		
Design standards - flexible	Define and develop specific rehabilitation strategies for different classes of roads. E.g. Class I - hard surface road with hotmix typically has alligator cracks or potholes that need specific rehabilitation measures		
Design standards - flexible	Consider acceptable hazards with limited ROWs for roads with primarily local drivers as safety improvements require more land.		
Design standards - flexible	Avoid designing the roads for singular events and singular use. Design for day to day use with vehicle per day, vehicle type, peak volume, and total volume considerations.		
Land acquisition	Establish easements for contractor worksite.		
Land acquisition	Put ditches on private property for ROW.		2
Land acquisition	Consider other contract structures for establishing a land agreement, such as a 100-year lease		2
Plan update	In previous updates the SRRMP, the 2010 update focused on changes to the network while 2017 focused on revisions to the bylaws. Combine both intentions in the upcoming update regarding decisions going forward.		
Prioritization methods	Focus on upgrading Class III to Class II roads with easy improvements. Focus on base structure development and backsloping in with the ROW staying the same. Minimize Class I roads as investment was focused more on major Class I roadways in the 2010 plan.		
Prioritization methods	Get ahead of industrial or residential changes in land use to forecast and/or determine the change in classification.		

Category	Value Ideas	
Prioritization methods	Prioritize rehabilitation and upgrades based on budget. The current focus is on resurfacing and road maintenance as opposed to rebuilding.	
Prioritization methods	Look to separate acquiring width from upgrades.	
Subgrade	Leduc experience for building without replacing the subgrade. Use cement stabilizer on gravel road bed followed by a full geogrid, granular base course (GBC), then ACP over the topsoil -- thi technique helps to prevent reflective cracking and does not require extensive reconstruction. However, larger geocell products on marshland have not performed well.	
Subgrade	Need to consider the layer underneath surface aggregates and the amount of aggregates that exist on the bottom surface. Staged and incremental upgrading is important, with cost, time, maintenance, and lifecycle cost considerations. Aggregates can be expensive. The focus on base stabilization through cement stabilizers has performed well. Cold mix can be mixed into cement stabilizers in the subgrade or used for minor repair work. Can also be used as a part of base strengthening.	
Subgrade	Perform FWD test on Class II roads to make sure that subgrade structure is sound.	
Subgrade	Develop methods for building on top of organic material.	1
Technologies	Consider foamed asphalt surface course with chipseal. Use foam and/or chipseal to extend the life of cold mix surfaces. Foamed asphalt with chipseal may last up to four years. Use chipseal on gravel surface as an intermediate option.	
Technologies	Both Leduc and Parkland County use calcium on the roads, but this is not preferred by Strathcona County users. Calcium treatment remains wet until it soaks in and is best applied on loose gravel roads, but presents a challenge when used on clay liner. The life cycle also depends on truck traffic volume.	1
Technologies	Plant mix has performed well.	
Technologies	Change the rehabilitation process for Asphalt Concrete Pavement (ACP) vs. Asphalt Stabilized Base Course (ASBC)	
Technologies	Consider the use of cold mix, ACP, ASBC with overlay, and emulsions as per Parkland County's experience	
Technologies	Phase out cold mix and switch to hot mix with full rehabilitation.	
Technologies	Apply microcracking techniques to extend the project life of their roads.	
Technologies - Microsurfacin	Lifecycle on ACP subdivision roads will be able to do microsurfacing. May try to introduce graded aggregate mix in subdivision roads to allow for microsurfacing rehabilitation.	