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Enclosure 1

South Strathcona County Functional Planning Study

Final

Prepared for:

Strathcona County Transportation Planning & Engineering

STRATHCONA COUNTY

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Permit to Practice

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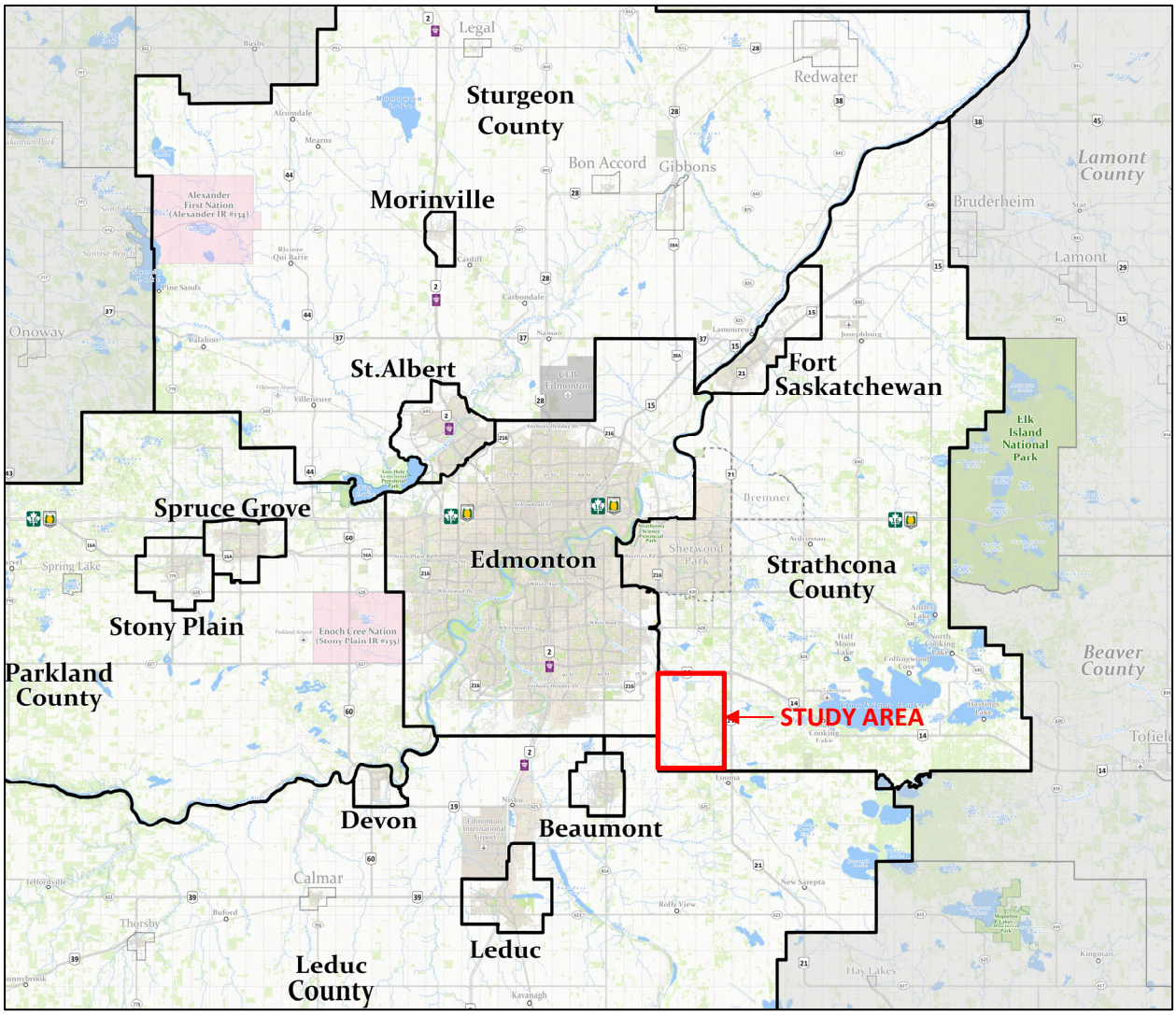
Executive Summary

Strathcona County is a 1,170.65 km^2 specialized municipality located in the Edmonton Metropolitan region, in Alberta, Canada. Strathcona County includes the urban service area of Sherwood Park, where approximately 73% of its population resides, while the remainder of the County remains mostly rural.

Strathcona County identified the need for the South Strathcona County Functional Planning Study in response to the current growth being observed in southeast Edmonton, Leduc County, Beaumont, and the adjacent rural areas in southwest Strathcona County. The goal of the study was to investigate the effect of regional growth on the long-term usage of the township and range roads within the County and to create a plan that would protect the rights-of-ways required for that road network. The Study had to consider the needs of all roadway users, including drivers, pedestrians, and cyclists. The study area location, and its context within the Edmonton Metropolitan region is shown in Summary Figure 1 below.

Summary Figure 1- Study Area Context



The Functional Planning Study includes a detailed review of the existing road network and traffic volumes, land ownership, land use, and collision history within the study area. The study also provides a review of the County's traffic model, the City of Edmonton's traffic model, the Edmonton Metropolitan Region Board priorities, Alberta Transportation priorities, and discussion on how these different perspectives will impact growth, traffic, and the long-term road network in the study area.

Three separate public engagement sessions were completed while preparing the study; one to understand existing conditions and obtain public input, one to present design options, and one to present the final plan to the public. The results of the public engagement sessions, and their impacts on the Functional Plan area described in the study. Geotechnical, Environmental, and Historical Resources Overviews were completed to provide context for the Study and the Plan, and the findings of these overviews are summarized in the Study.

The completed Functional Plan provides functional design drawings for proposed improvements to roadway alignments, configurations, widths, and profiles within the study area, along with localized road rights-of-way widenings for a 30+ year design horizon.

- With consideration of public input, the roadway network presented in the Functional Plan has only 2 lane roadways throughout the study area, with proposed rights-of-way widening to potentially allow for future lane additions on Township Road 512 and sections of Range Road 232.

- Vertical profile adjustments have been identified on many roads in the study area to provide, at minimum, sight distance for an 80 km/h design speed.

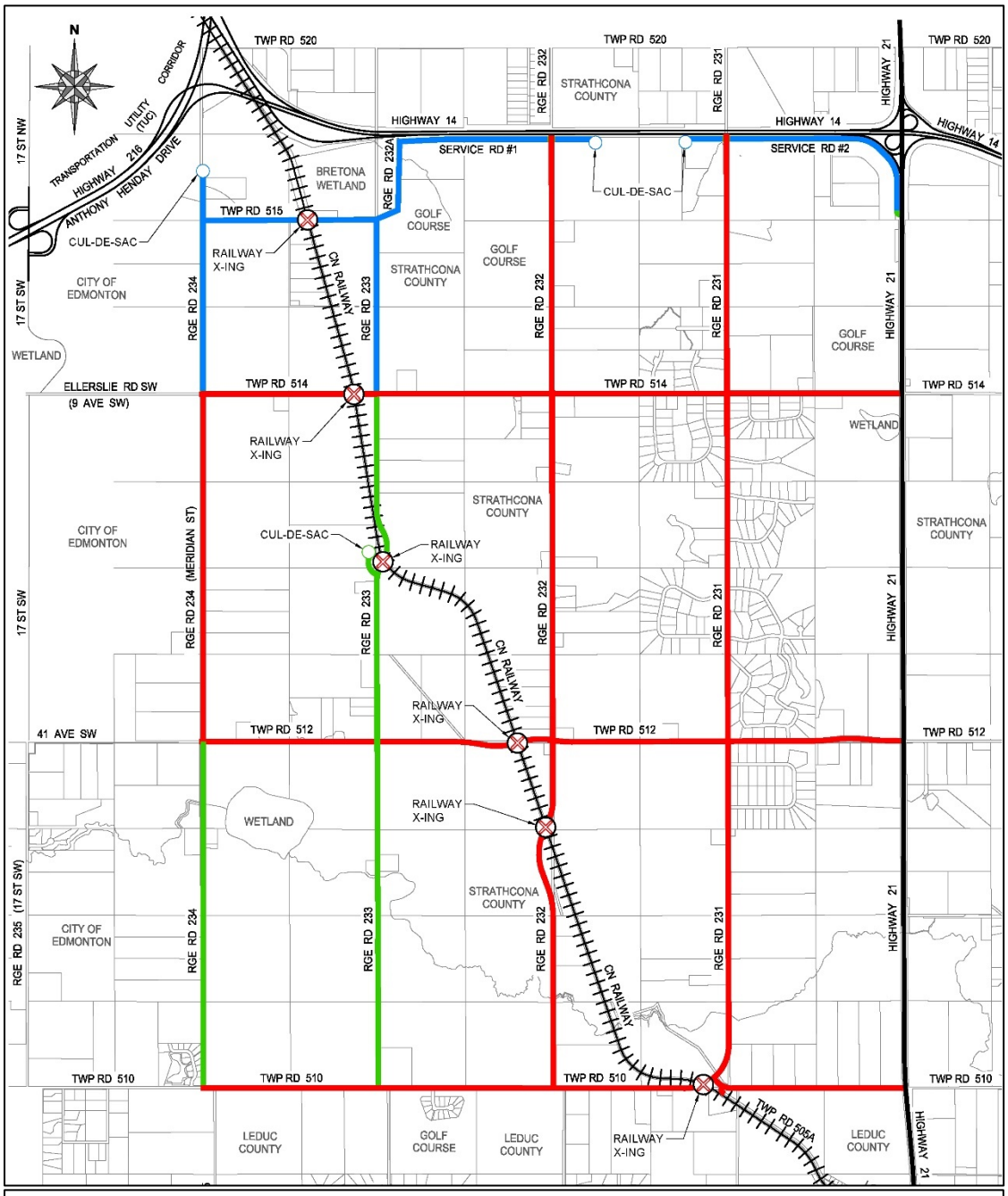
- Traffic modeling and geometric analysis indicate that there are no warrants for the provision of turning bays at any of the intersections within the study area. Two-way stop controls are anticipated to be sufficient at all intersections within the study area. However, to meet County Standards, deceleration and acceleration tapers are included as improvements for country residential local road intersections with Class 1 County grid roads.

- In many cases, additional right-of-way may be required from adjacent landowners. The plans identify the standard road rights-of-way required, which vary depending on road classification. Locations where significant road widening, profile changes, or new alignments are identified, the plans show the proposed right-of-way boundaries for these improvements. Additionally, there are a few locations where adjacent topography may require further study and/or additional review during construction – these locations are identified on the plans to have 'potential backsloping outside of standard ROW'.

- Safety improvements have been identified at many rail crossings. These changes include horizontal road alignment changes to achieve better sightlines at these skewed intersections. Realignments to accommodate the railway crossings are along Range Road 232, Range Road 233, and Township Road 512. The rail crossing at Township Road 510 improvements also include network improvements to connect Township Road 510 with Range Road 231 to the north.

The Plan is summarized in the Roadway Classification Plan in Summary Figure 2 below and the roadway cross-sections in Summary Figures 3 through 5.

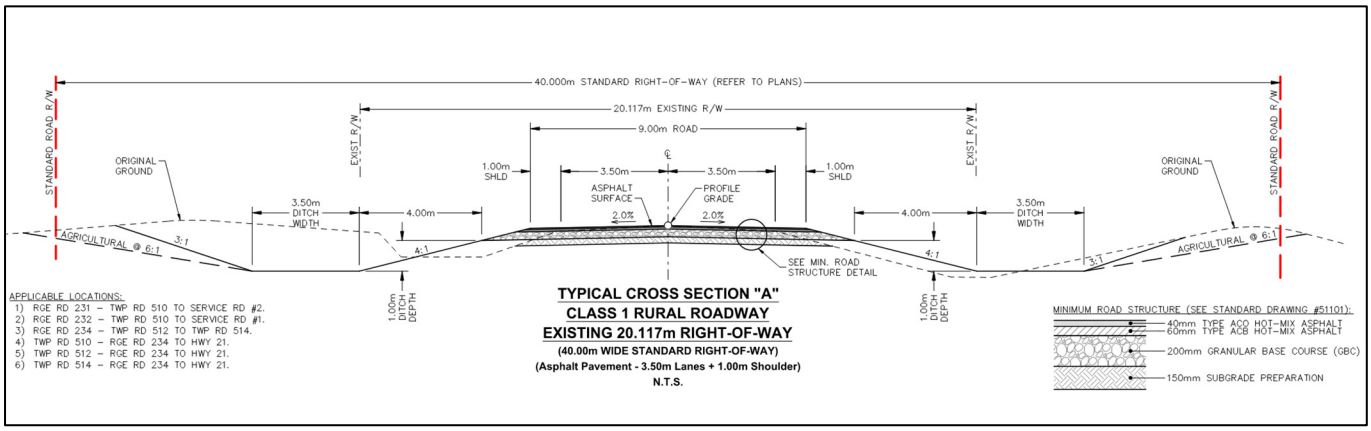
Summary Figure 2- Roadway Classification Plan



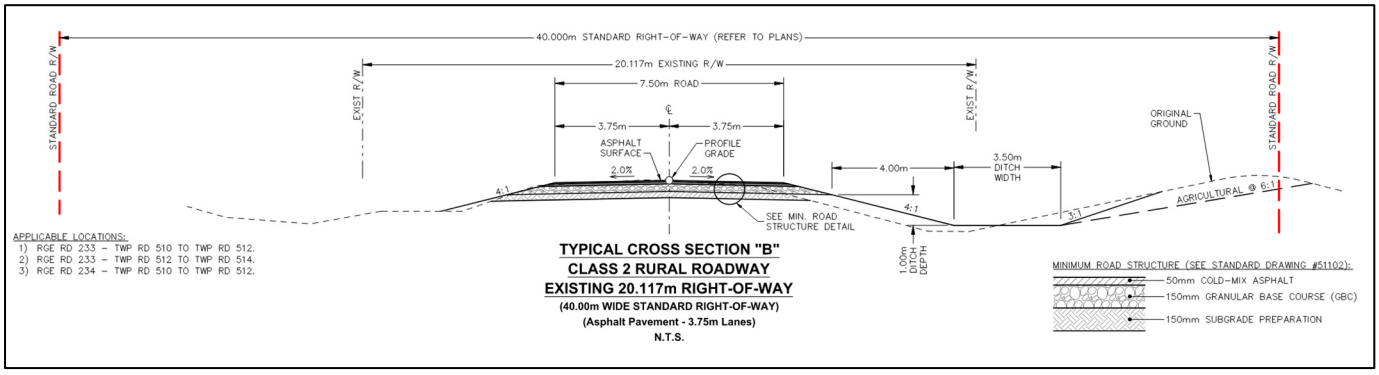
ROADWAY CLASSIFICATION LEGEND:

- CLASS 1 ROADWAY - ASPHALT SURFACE - 3.50m LANES + 1.00m WIDE SHOULDERS
- CLASS 2 ROADWAY - ASPHALT SURFACE - 3.75m LANES
- CLASS 3 ROADWAY - GRAVEL SURFACE - 3.50m LANES
- PROVINCE OF ALBERTA / ALBERTA TRANSPORTATION HIGHWAY

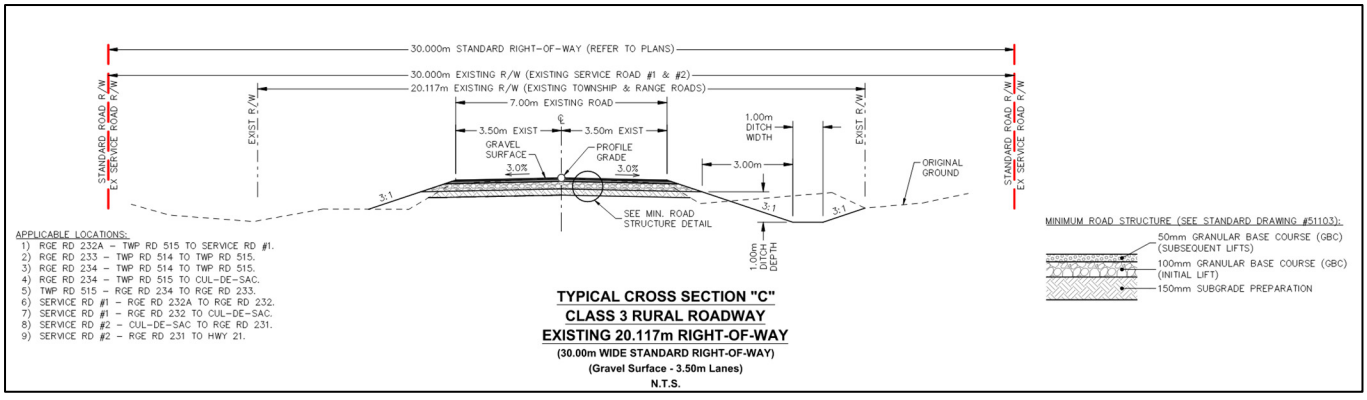
Summary Figure 3 – Class 1 (Paved) Cross Section A



Summary Figure 4 – Class 2 (Paved) Cross Section B



Summary Figure 5 – Class 3 (Gravel) Cross Section C



The improvements that are proposed in the Functional Plan rely on the existing network arrangement within the study area and on its periphery. Alberta Transportation does not have plans currently (2023) to substantially change any highway intersections near the study area, however, there are priority planning documents available from Alberta Transportation that indicate interchanges may be constructed in the future. Should any of the highway intersections be upgraded or removed, or plan to be, this

functional planning study will have to be reviewed and likely updated to reflect the resulting changes in traffic movement.

The construction of the projected roadway network described in the functional plan was estimated and is expected to cost in the range of $97.7M. This estimate includes construction components and a 50% contingency for 60.4 km of County roadway. The estimate does not include engineering design, construction administration, materials testing, or land acquisition costs.

1 Introduction

Scheffer Andrew Ltd. was retained by Strathcona County through a Request for Proposal process to complete a Functional Planning Study for a number of roadways in southwest Strathcona County. The project began in Summer 2019 and progressed through Winter 2022.

1.1 Project Purpose and Scope

This Functional Planning Study was identified by Strathcona County in response to the current growth being observed in southeast Edmonton. The goal was to determine its effect on the long-term usage of the township and range roads within the study area in southwest Strathcona County. A major driver for the planning study is anticipated development in the region, including Sherwood Park, southeast Edmonton, Leduc County, Beaumont and the rural area within and adjacent to the study area – and the potential impact that development could have on the County's roadways. The study area boundary is described in detail in Section 1.2 below.

The overarching scope of this Functional Planning Study is the preparation of functional design drawings covering all scoped roadways. They indicate proposed improvements to roadway alignments, configurations, widths, and profiles. Standard road right-of-way, based on road classification, are identified to accommodate the proposed design for a 30+ year design horizon. The study considered the needs of all roadway users, including drivers, pedestrians, and cyclists.

The existing conditions of the study roadways were included in the scope to ascertain specific current and potential future needs. The project team evaluated design options that will meet the needs and expectations of future multi-modal users of the local roadway network.

To support development of the functional plan, Public Engagement was undertaken. Three separate sessions were held. For this project, the first session was held in-person using traditional engagement techniques. This session helped to establish the general environment in the scope area with respect to public stakeholders' perceptions of positive and negative factors within the area. The second and third sessions were held online, due to Covid-19 gathering restrictions. Design options were presented in the second session to gather feedback on the draft functional plan. The third session was used to present the final design.

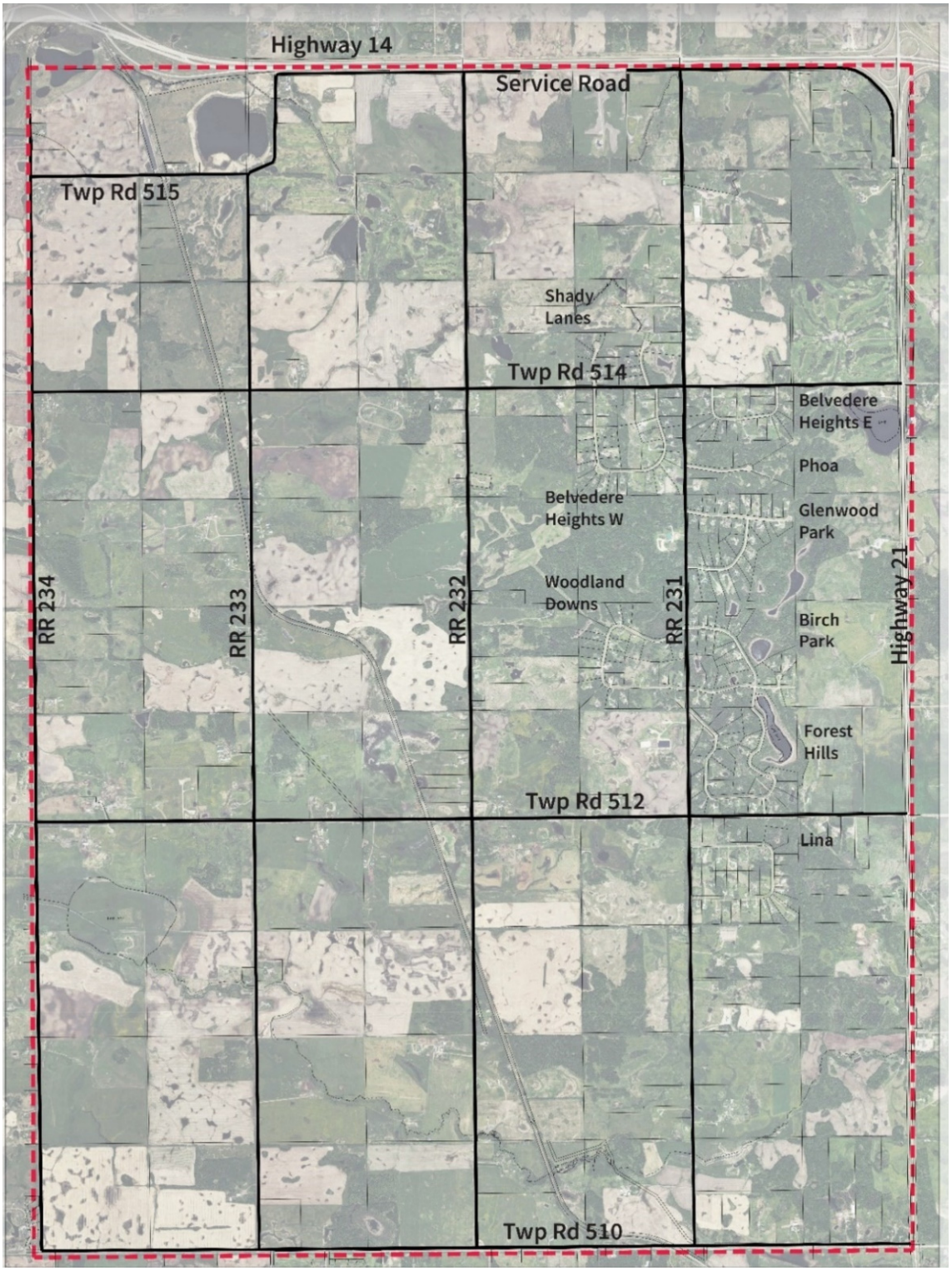
Additional tasks undertaken to support the development of the functional plans included providing a Geotechnical Overview, Environmental Overview, and a Historical Resources Overview.

1.2 Study Area

The study area is bounded by Strathcona County's boundary with the City of Edmonton to the west (Range Road 234/Meridian Street), the boundary with Leduc County to the south (Township Road 510), Highway 21 to the east, and Highway 14 to the north. The study area is shown in Figure 1 and includes the following roadways:

- Township Roads:
  - Township Road 510 [Range Road 234 to Highway 21]
  - Township Road 512 (City of Edmonton's 41 Avenue SW) [Range Road 234 to Highway 21]
  - Township Road 514 (City of Edmonton's Ellerslie Road) [Range Road 234 to Highway 21]
  - Township Road 515 [Range Road 234 to Highway 21]
- Range Roads:
  - Range Road 231 [Township Road 510 to Highway 14]
  - Range Road 232 [Township Road 510 to Highway 14]
  - Range Road 232A [Township Road 515 to Service Road 1]
  - Range Road 233 [Township Road 510 to Township Road 515]
  - Range Road 234 [Township Road 510 to cul-de-sac north of Township Road 515]
- Service Roads:
  - Service Road #1 [Range Road 232A to east of Range Road 232]
  - Service Road #2 [west of Range Road 231 to Highway 21]

Figure 1 - Study Area



1.3 Background Documentation

In the preparation of this Functional Planning Study, several reference documents were reviewed. The listing below indicates the primary sources referenced.

- Strathcona County Traffic models: 2030, 2044 and Long-Term (2019 and 2020 update)
- Edmonton Travel Model (2019)
- Edmonton Metropolitan Region Board (EMRB) policies and priorities
- Collision data – (Provided by the County spanning from 1994 to 2019)
- As-built drawings for Rural Water Distribution Range Road 231 and Township Road 514
- Various subdivision and development plans
- Bridge Files: 1205, 8608, 73296, 85251
- Blackmud/Whitemud Creek Surface Water Management Study – Final Report (Associated Engineering)

1.4 Project Team

The project team was led by Strathcona County's Transportation Planning and Engineering department. Tony Maghee was the County's project manger, and Ryan Anders provided senior guidance and support. Anne Coffin, formerly of the County, also provided insights and analysis throughout much of the plan development and public engagement phases.

A major contribution from the County to the overall success of the study came from the County's communications and public engagement specialists. The three public engagement sessions were supported by Jennifer Moncion and Sarah Geisler. Notably, the engagement process changed during the project timeline due to Covid-19 pandemic restrictions. The first engagement session in 2019 was a traditional drop-in, in-person open house while the second and third engagement sessions were held virtually. Even though this method of public engagement was quite new to the industry, the County's communications and public engagement specialists provided a seamless experience, hosting virtual engagement sessions through online message boards that were able to reach a significant number of respondents and helped to shape the final product.

The Scheffer Andrew team was led by project manager Shawn Benbow and supported by Darrin Penney who provided additional transportation advice.

The Environmental Overview was undertaken by Spencer Environmental Management Services Ltd. As part of Spencer's report, they also provided the Historical Resource Overview through their subconsultant Circle CRM Group. These reports are provided in **Appendix A**.

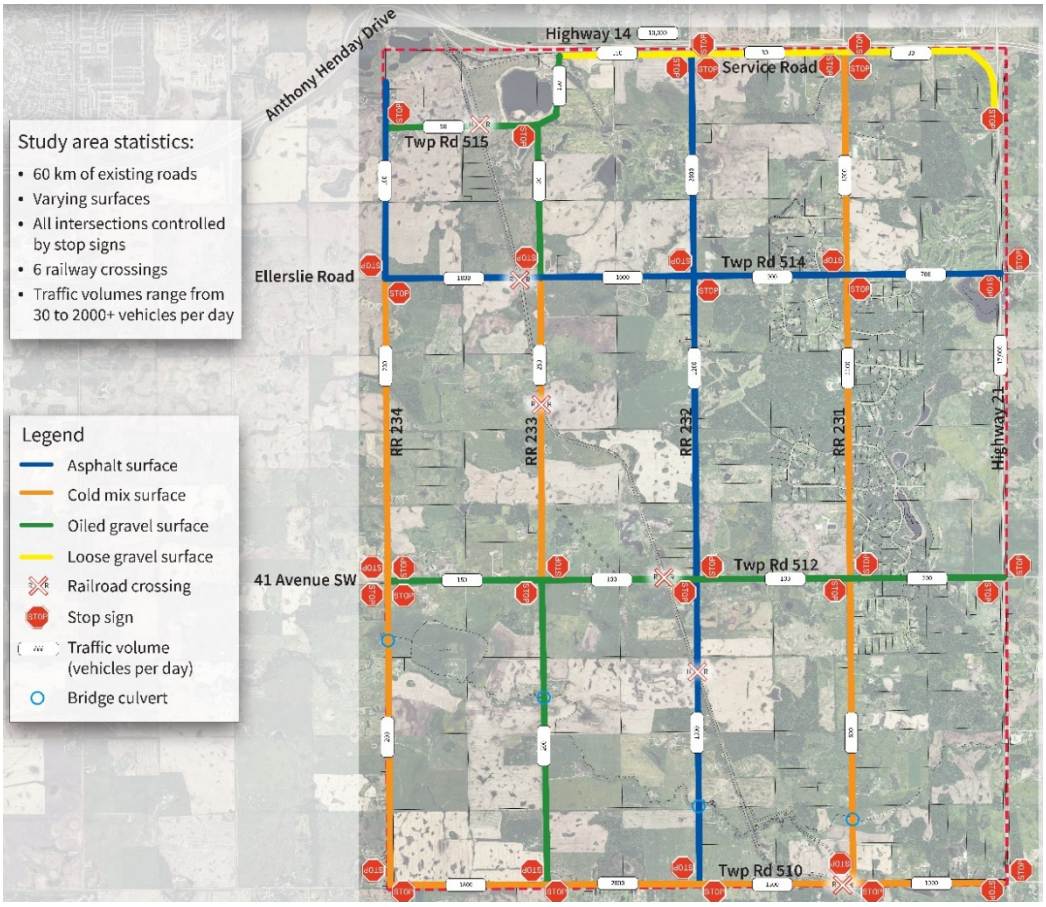
Geotechnical support for the study was provided by Thurber Engineering Ltd. They completed a desktop study of the area and presented findings in their report included in **Appendix B.**

2 Existing Conditions

Through desktop investigation and on-site reconnaissance, the existing conditions of the roadways were studied. Figure 2 shows the existing surface treatments, intersection controls, daily traffic volumes, rail crossings, and major culvert locations. The surface treatments range from gravel to asphalt surface.

Topographic LiDAR data collected from the County was used to better understand the drainage patterns and vertical geometry observed during site visits. There were numerous roadways within the study area that were identified to have substandard vertical curves and where the existing vertical alignments do not provide adequate stopping sight distance for their design speed. A notable exception is Township Road 514 which does appear to have been designed for a 90 km/h design standard.

Figure 2 - Existing Conditions



2.1 Land Ownership

Generally, the existing roadways are located within road rights-of-way with the exception of a small portion of Township Road 515 within SE34-51-23-4 that appears to have been constructed by Alberta Transportation on private property. The existing road rights-of-way are bounded by private lots that have a variety of residential, agricultural, and commercial uses.

2.2 Land Use

As noted in the previous section, the land uses along the road alignments include acreage residential and agricultural / commercial uses. The entire study area is identified in Strathcona County's Municipal Development Plan as a rural services area governed by the County's Agricultural Small Holdings Policy.

The general usage of the area dates back many decades with multi-generational families calling the area home. The nature of the area's usage has not changed notably in that time, although there has been a progression of acreage developments as well as individual country residential type lots.

Small scale commercial development is permitted within the Policy area, with operations such as horse and elk breeding stables.

A notable fact is that some two thirds of the study area is located in the UNESCO Biosphere Reserve related to the Beaver Hills moraine which supports a wealth of natural features such as wetlands, woodlands and small watercourses. The Environmental Overview included in **Appendix A** provides more information on this Reserve area.

2.3 Collision History

The collision information reviewed for the Functional Planning Study was provided by the County and spans a time frame of approximately 10 years beginning in 2009.

The causes of recorded collisions are varied with the most common collision type in the study area involving vehicle to animal collisions. There were 2 recorded fatalities during the time frame reviewed. One of those resulted from a vehicle running off the road and rolling over on Township Road 514 mid block between the intersections of Range Roads 231 and 232. The other incident resulting in a fatality was at the intersection of Range Road 231 and Township Road 512. Collision data indicates that both collisions occurred during daylight hours and without any adverse weather – and with little other details.

It was noted that collisions were concentrated along three main corridors with the highest number occurring on Range Road 232. Township Road 514 had the second highest number of collisions followed by Range Road 231. Generally, the data shows the collisions are clustered near intersections.

With the highest collision rate occurring between vehicles and animals, the proposed changes to the roadway profiles to meet current design standards will help to mitigate these types of collisions by improving sight distance.

Intersection improvements that include widening of the rights-of-way, such as at corner cuts, will help to improve sight lines and help mitigate intersection collisions. Adding stop signs with stop ahead signs in some instances, in the orientation to better address the anticipated future traffic volumes, will also assist in improving intersection safety.

3 Traffic Models

3.1 Available Information

As part of our preliminary review of background supporting information, the project team gathered a number of traffic forecasts for roads within the study area that were considered relevant in estimating long-term traffic volumes in the study area. Specifically, three separate sources were reviewed to provide estimates for traffic volumes on some or all study area roads. These included:

- Strathcona County existing traffic volumes database
- Strathcona County Traffic Model
- City of Edmonton Traffic Model

In addition to traffic counts and forecast models, Edmonton Metropolitan Region Board (EMRB) and Alberta Transportation policies and priorities were reviewed to provide guidance for how traffic patterns may change in the future.

3.2 Strathcona County Existing Traffic Volumes

Strathcona County has a traffic count program that reports link volumes on many of the County's roads each year. The most current volume information was available from 2019 counts. **Exhibit 1** summarizes the daily link volumes available for roads in the study area. The exhibit also shows the existing road classifications and intersection controls.

Note that all Exhibits are also provided in **Appendix C** in a larger format.

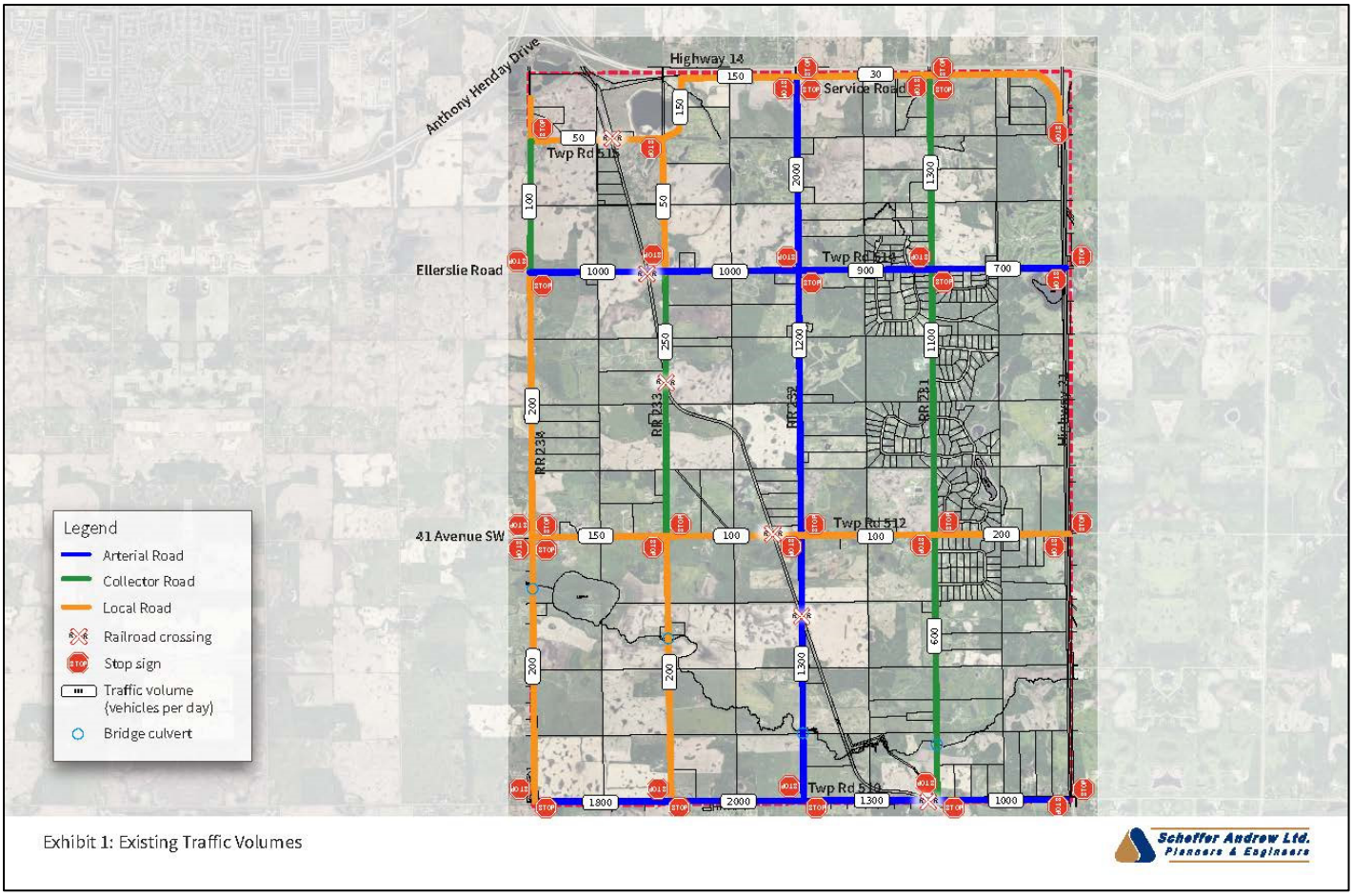


Exhibit 1: Existing Traffic Volumes

3.3 Design Approach – Traffic Models and Interchanges

Strathcona County maintains a county-wide traffic model that estimates future traffic on County roads. The model uses estimated population and employment data along with estimated road network configurations to project future traffic volumes. Strathcona County provided data from their travel model with horizons of 2030 (10 year), 2044 (15 year) and 'Long-Term' (which has been considered to be +/- 30 years). The Strathcona County traffic model was run in 2019 and the adjusted in 2020 to reflect information and feedback gathered through the project. The assumptions and results of the two model runs are described below.

2019 Strathcona County Model Run

A portion of the output of the County's Long-Term model that was run in 2019 is provided in **Appendix D**. The model included service interchanges at Highway 14 at Range Road 232 and Highway 21 at Township Road 514 and Township Road 510. Other significant road network, population and employment assumptions that were used in this model include:

- All roads within the study area are identified to have one travel lane in each direction.

- Township Road 510, Township Road 514, Range Road 232, and Range Road 234 were identified as higher-class roads.
- There was no connection between Highway 14 and Range Road 231 or Range Road 233.
- There was no connection between Highway 21 and Township Road 512.
- All roads in the study area were assumed to have an operating speed of 80km/h except for the service roads along Highway 14 which are identified as 50km/h.
- There were not significant differences in population and employment within the study area between existing conditions and the future projections.

Because the model output only provided PM peak link volumes, the two-way daily link volumes were estimated by multiplying two-way PM peak link volumes by a factor of 10. **Exhibit 2** below illustrates the projected long-term daily link volumes based on the 2019 County model. The exhibit also shows the assumed road classifications used in the model.

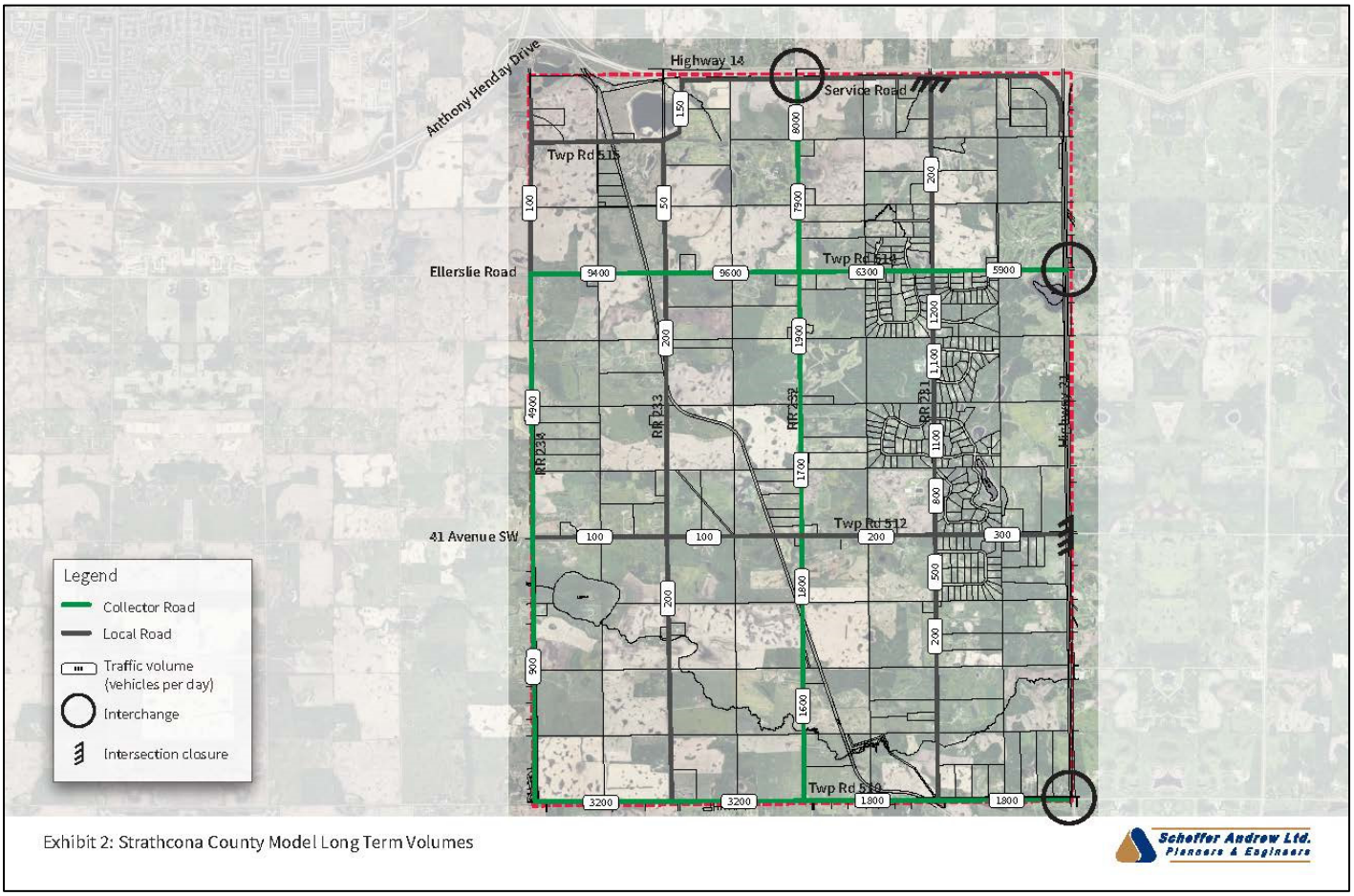


Exhibit 2: Strathcona County Model Long Term Volumes

After this model was reviewed with input from Alberta Transportation with respect to future interchange locations, it was recognized that the County's assumption of interchanges at both Township Roads 514 and 510 with Highway 21 was not likely to occur. Rather, only one interchange on Highway 21 would be

considered, most likely at Township Road 512, while the intersections with Township Roads 514 and 510 would likely eventually be closed. This future design for the interchange location was corroborated with the City of Edmonton's Traffic Model and EMRB recommendations. A major criterion for placement of interchanges is the distance between them. Because of Alberta Transportation's long-term plans for a systems interchange at Highway 14 and Highway 21, Township Road 514 will be too close (2.4km) to the major interchange to the north and will likely not be feasible for an all-directional access or an interchange. Typically, spacing between interchanges is often more than 3km, with spacing between a systems interchange and a service interchange desired to be about 5km.

However, the timing of interchange construction is unknown and is not assumed to be within the 30 year horizon of this study.

Further south on Highway 21, although a potential Township Road 510 interchange may be feasible from a minimum spacing perspective between Highway 14 and a potential interchange at Highway 625, but the surrounding area's low density and relatively low traffic volumes would likely not support two interchanges on Highway 21 between Highway 14 and Highway 625. The project team has assumed that Township Road 510 would dead-end near Highway 21 in the long-term, and not provide access to/from the highway. However, the intersection of Highway 21 and Township Road 510 is expected to be remain open during the 30 year horizon of this study.

The interchange identified for Highway 14 at Range Road 232 is about 3.2km from the future systems interchange, which likely just meets minimum interchange spacing requirements. Furthermore, this interchange would be located approximately halfway between Anthony Henday Drive and Highway 21, and therefore there is no other more desirable location for north-south traffic to access the highway network. We therefore assumed that there will be a future interchange on Highway 14 at Range Road 232, however again, the timing of interchange construction is unknown and is not assumed to be within the 30 year horizon of this study.

With these acknowledgements, our project team manually adjusted the 2019 modelling data to reflect one interchange on Highway 21, located at Township Road 512. This revised 2019 data was projected to result in the need for 4 lane improvements to Township Road 512 and the portion of Range Road 232 north of Township Road 514.

This roadway network was presented in the second public engagement in the draft functional plan.

2020 Strathcona County Model Run

As the concept development progressed it became apparent through project team discussions with the County, and with no expectation of any Alberta Transportation study to confirm interchange locations within the foreseeable future, that there would not likely be any highway service interchanges developed within the project's projected 30 year horizon. This information, coupled with public feedback on the requirement for 4 lanes on certain roadways led to updates reflected in the 2020 model that identified the existing network arrangement within the study area. The significant differences from the 2019 model are:

- No service interchange at Highway 14 and Range Road 232; changed to the current stop-controlled at-grade intersection.

- Added existing stop-controlled intersection on Highway 14 at Range Road 231 (2019 model had shown this intersection closed).
- No Service interchange at Highway 21 and Township Road 514; changed to existing stop-controlled at-grade intersection.
- No Service interchange at Highway 21 and Township Road 510; changed to existing stop-controlled at-grade intersection.
- The connection to Highway 21 at Township Road 512 remains at existing stop-controlled at-grade intersection.

The results of the 2020 model update are provided in **Appendix E**. With the existing highway connections remaining in the model (no new interchanges), traffic volumes within the study area traffic are dispersed and traffic for the 30 year horizon can be accommodated by 2 lane roadways on all corridors. This 2 lane concept design was presented at the third and final public engagement.

Ultimately this functional plan is constrained by lack of financial commitment from the province in the 30 year horizon for highway improvements in the region. The Functional Plan should account for the future interchanges that are reasonably expected, however, without known timelines and approved planning documents, the models used in this functional plan were set up to represent the existing network configuration (ie. no road closures or new intersections). If the timing of interchange construction (and adjacent intersection closures) is confirmed, the recommendations of this function plan may have to be revised.

3.4 City of Edmonton Traffic Model

The City of Edmonton maintains a regional traffic model that includes Edmonton and parts of the surrounding municipalities, including much of Strathcona County. Scheffer Andrew contacted the City of Edmonton to obtain a recent model run that included the project study area, and were provided with a version of the model that appears to have been run in June 2019. The model identifies long-term traffic projections in southeast Edmonton and includes about one third of the project study area. Because the model appears to assume full buildout of the Decoteau neighbourhood in southeast Edmonton, we understand that the horizon is likely 30+ years, which is similar to Strathcona County's model.

Significant road network assumptions that were used in the City of Edmonton's model include:

- Roads shown within the study area have one lane in each direction except for short portions of Range Road 234 and Range Road 233 approximately 800m long south of Township Road 512 which are identified as two lanes in each direction.

- A new road is shown approximately halfway between Township Road 510 and Township Road 512 between Range Road 234 and Range Road 233. This road is identified as two lanes in each direction between Range Road 234 and Range Road 233, and one lane in each direction between Range Road 233 and Range Road 232.

- Based on projected traffic volumes, it appears that an interchange is likely included on Highway 21 only at Township Road 512.

- The posted speeds for roads shown within the study area are all 80km/h.

Exhibit 3 summarizes the projected long-term daily link volumes derived from the City of Edmonton traffic model. Additional detail from the City's model output is provided in **Appendix F.**

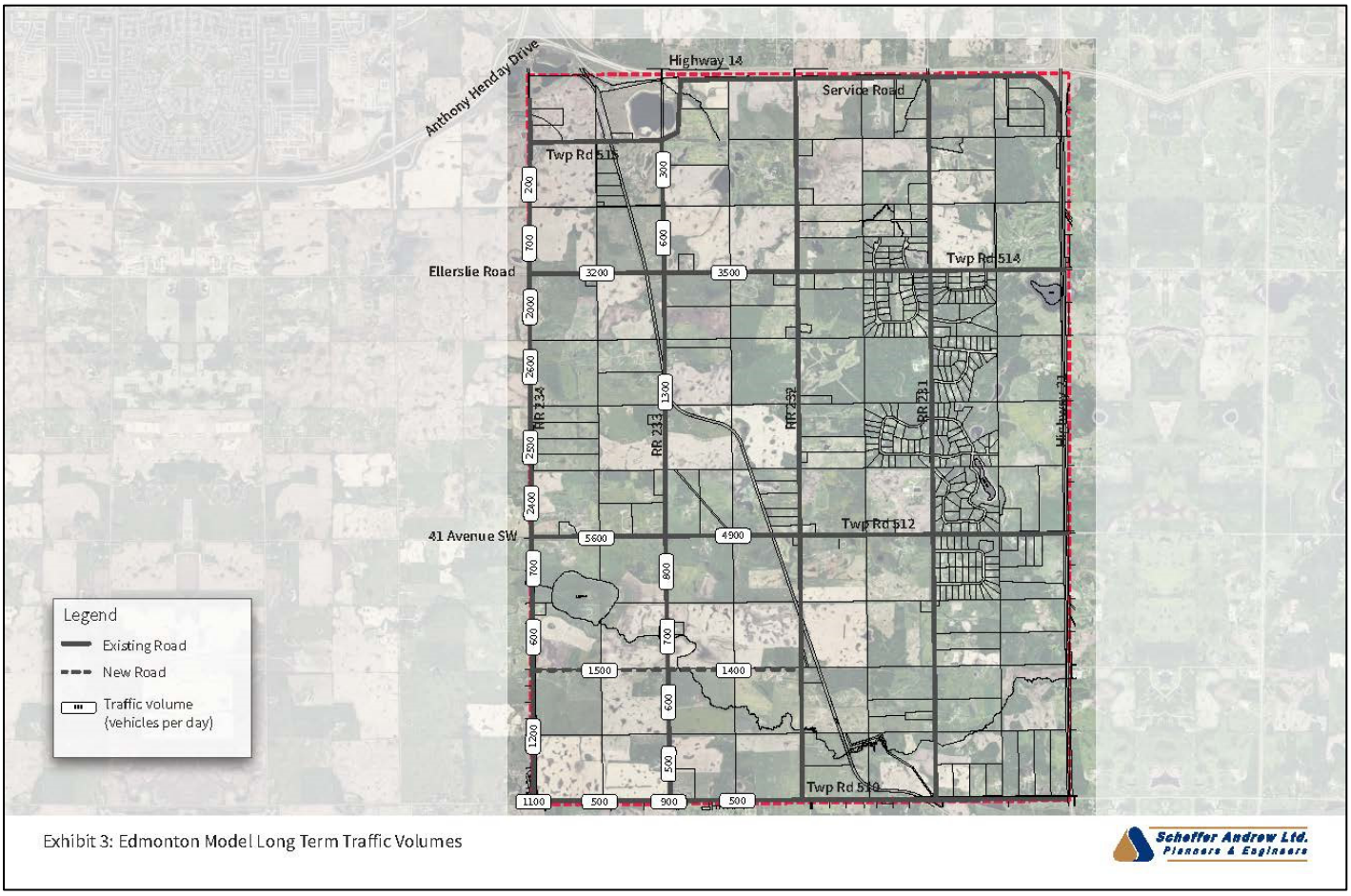


Exhibit 3: Edmonton Model Long Term Traffic Volumes

3.5 Edmonton Metropolitan Region Board Priorities

The Edmonton Metropolitan Region Board (EMRB) completed a study and published a report titled *2018 Priority Regional Transportation Projects* (updated in 2021). This study reviewed regionally significant transportation projects for roads classified as arterials, expressways, or freeways, that are expected to improve transportation within the Edmonton region.

Within the project area, the EMRB report identifies one regional transportation priority. Township Road 512 (City of Edmonton's 41 Avenue SW) is identified as a major regional connection that requires upgrading between 50 Street and Highway 21. To date, 41 Avenue SW in the City of Edmonton has been planned as a major expressway facility between 50 Street and 170 Street and has been partially constructed. Based on the EMRB's identification that the east extension is a regional priority, we have

assumed that a similar expressway designation would continue to Highway 21 on the Township Road 512 alignment.

Exhibit 4 illustrates the EMRB regional transportation priorities in the study area.

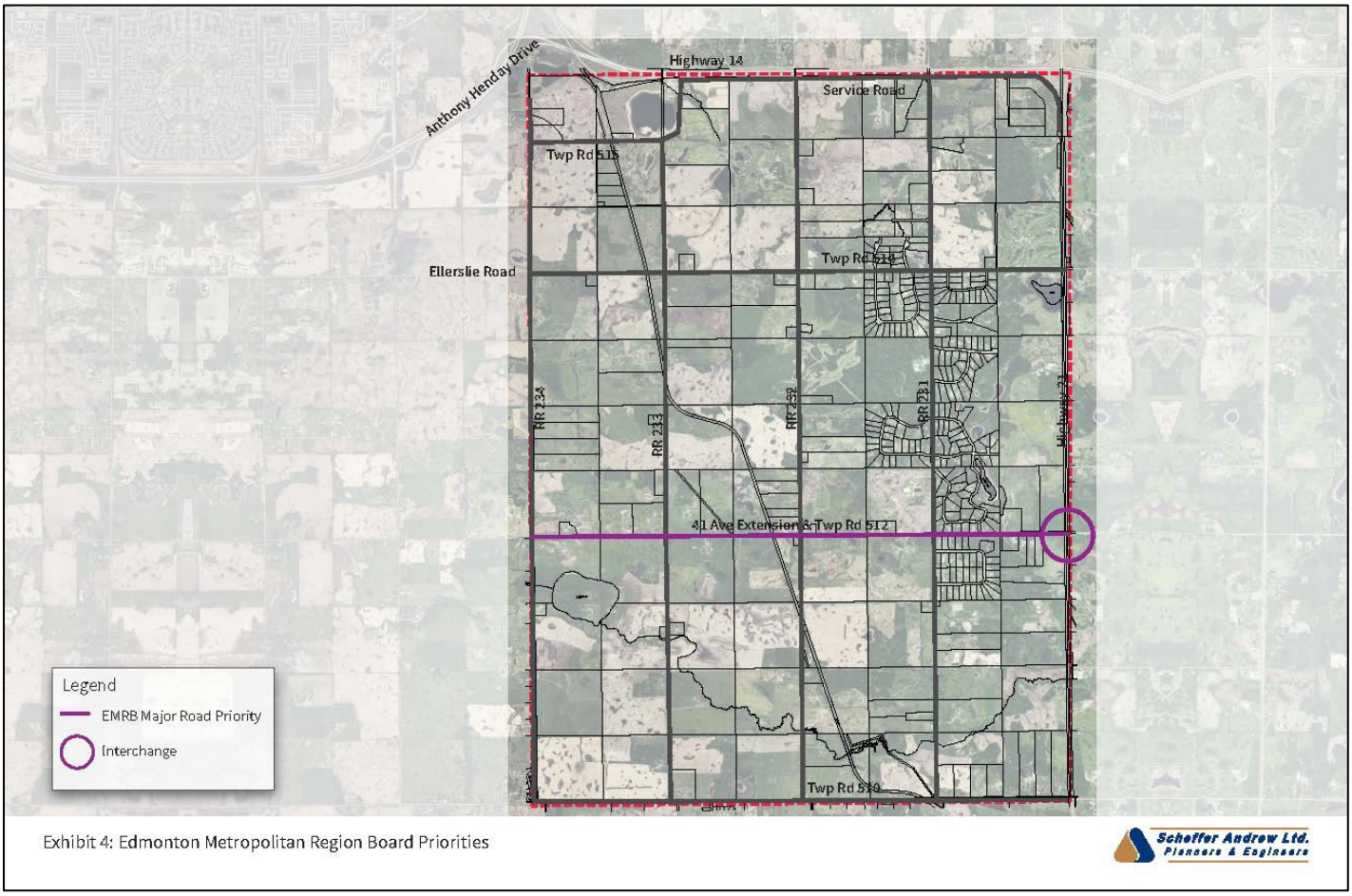


Exhibit 4: Edmonton Metropolitan Region Board Priorities

3.6 Alberta Transportation Priorities

The Scheffer Andrew project team contacted Alberta Transportation to obtain their future plans near the study area – specifically along Highway 14 and Highway 21.

Their response was that there are currently no projects identified for design or construction on Highway 14 or Highway 21, along the study area boundary. However, Alberta Transportation did identify that both Highway 14 and Highway 21 near the study area are expected to be improved to freeways in the long-term, which would result in access to and from these highways being restricted to interchanges. Through a project team discussion with Alberta Transportation, they indicated long-term plans for a future major systems interchange at Highway 14 and Highway 21, and future service interchanges on Highway 14 at Range Road 232, and Highway 21 at Township Road 512. However, there are no approved planning

documents at these locations. It is understood that Alberta Transportation does not have funding or a timeline assigned to these future interchanges.

Exhibit 5 illustrates Alberta Transportation's priorities in our study area.

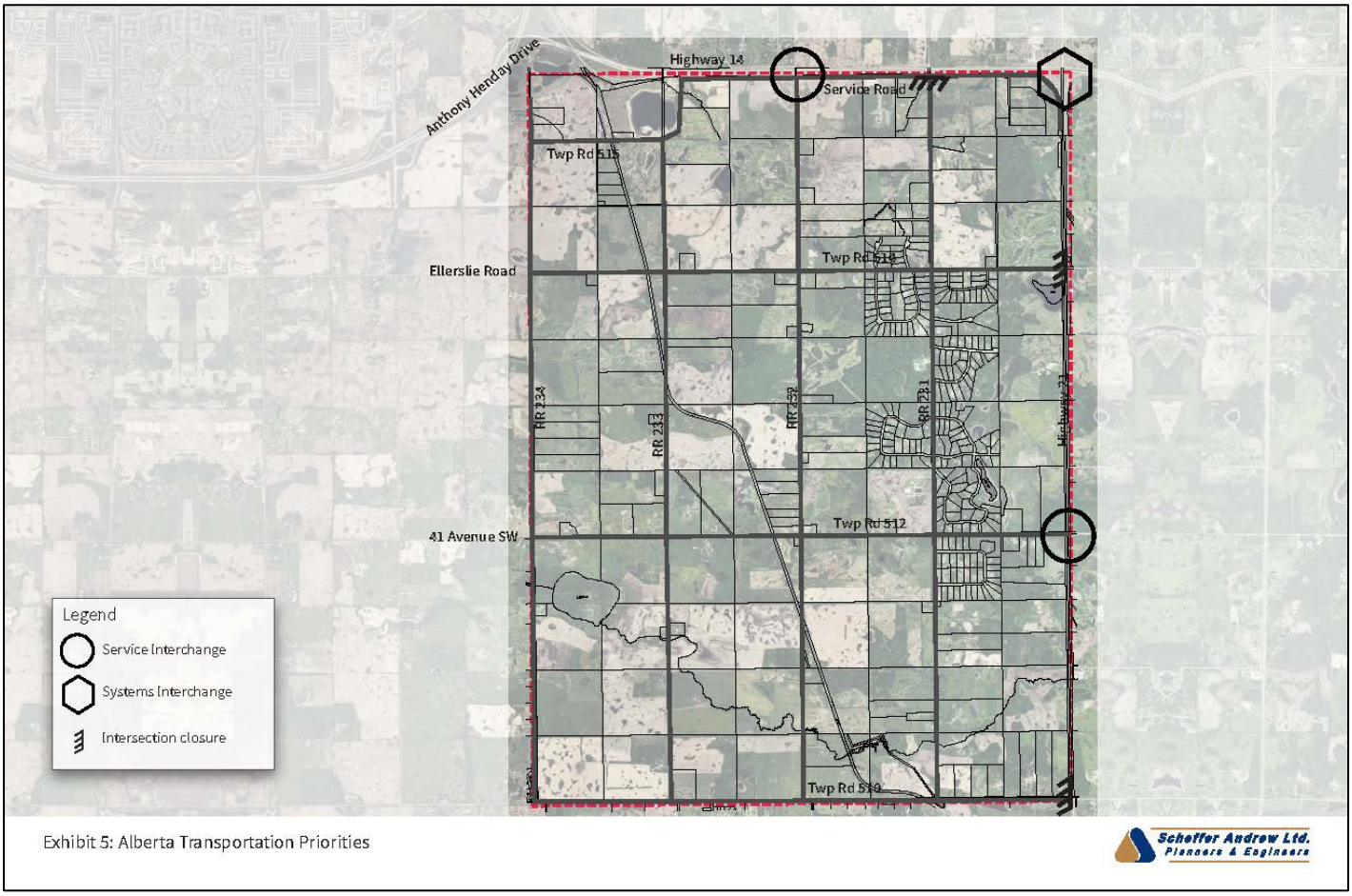


Exhibit 5: Alberta Transportation Priorities

3.7 Discussion and Considerations

As described above, both Strathcona County and the City of Edmonton have modelled road networks and traffic forecasts within the study area. In addition, EMRB and Alberta Transportation have priorities that will affect the long-term road network and traffic patterns within the study area. Discussion of the notable similarities and differences between the plans, and impacts on the functional plan is provided in the following sections.

3.7.1 Road Classification

The original 2019 Strathcona County traffic model identified two major east-west routes within the study area: Township Road 510 and Township Road 514. The County's traffic model used these routes as connectors to two expected service interchanges at Highway 21. Similarly Range Road 232 was identified as the north-south major route connecting to Highway 14 at an interchange in that model. The 2019 model was updated to reflect a single interchange on Highway 21 at Township Road 512. Then, because Alberta Transportation was unable to provide a timeline for the construction of the future interchanges, the model was updated again in 2020 to reflect the existing road network and connections to Hwy 21 and Hwy 14 (no interchanges).

Township Road 512 becomes the major east-west route in the study area, because it is a continuation of 41 Avenue SW in the City of Edmonton. As such, it is recommended to be designated a Class 1 roadway with a protected 40 metre right-of-way to increase long-term flexibility.

Township Road 514 will carry significant traffic in the revised model and is also recommended to be Class 1. Furthermore, as Township Road 514 ties into the Ellerslie Road (9 Avenue SW) in Edmonton, this east-west road connection is the first significant east-west connection south of Anthony Henday Drive between Highway 2 and Highway 21. As growth continues in the southeast Edmonton region, Township Road 514/Ellerslie Road has the potential to carry significant regional traffic, including some that may be diverted from existing routes along Anthony Henday Drive. This scenario will likely continue until the interchange at Highway 21 and Range Road 512 is constructed at which time, the Township Road 514 intersection at Highway 21 would be closed causing a severe change in traffic patterns.

Township Road 510, adjacent to Leduc County, will also carry sufficient traffic to warrant a Class 1 designation, as long as the connection to Highway 21 remains.

Range Road 232 is the major north-south route through the study area in both the County model and Alberta Transportation's long-term plans, with or without a future interchange in place at Highway 14. As such, the roadway is recommended to be designated a Class 1 roadway.

Range Road 231, while maintaining a connection to Highway 14 in the 2020 model, is also recommended to be a Class 1. When the planned interchange is constructed on Highway 14 at Range Road 232, the intersection at Range Road 231 and Highway 14 is proposed to be closed and will likely result in a significant reduction in traffic.

Range Road 234, between Township Road 510 and north of Township Road 514, forms the eastern boundary of the growing Decoteau neighbourhood in Edmonton, which identifies it as a major road abutting the east side of the neighbourhood (Meridian Street). Traffic volumes are greatest just south of Township Road 514 (Ellerslie Road). Therefore, a portion of Range Road 234 between Township Road 512 and Township Road 514 is recommended to be a Class 1 roadway. Other sections of Range Road 234 are recommended to be a lower classification due to less volume. South of Township Road 512 a Class 2 designation is recommended while north of Township Road 514 a Class 3 designation is recommended.

Range Road 233 would carry lower volumes and is recommended for Class 2 designation for all but the section north of Township Road 514, where a Class 3 designation is recommended.

Service Roads, and the short section of Township Road 515 in the study area, are not expected to change usage in the 30 year horizon and will continue to have low traffic volumes warranting a recommended designation of Class 3.

With respect to road classification, the above discussions focus on a combination of functional classification and volumes. Functional Classification describes how each road is expected to be used (Arterial/Class 1, Collector/Class 2, and Local/Class 3). However, Strathcona County currently identifies traffic volumes as the major criteria to determine roadway classification. While there is some relationship between roadway classification and traffic volumes, they are not the same. We do understand that the County is undertaking a comprehensive review of road classifications throughout the County.

The Functional Plan indicates recommended classifications as does Figure 5 in Section 7.1.

3.7.2 Cycle Routes

The County's traffic models do not account for cyclists, and the County's current plans for trails and non-vehicular transportation modes does not identify any significant facilities within the study area. Through the public consultation, we heard decisively that there is a perceived need for dedicated facilities to better accommodate cyclists on many roads in the study area. Both cyclists and vehicle drivers identified that there are safety concerns with the current roadway conditions – particularly with respect to sightlines and narrow road widths. A common desire was to, at minimum, provide a wide shoulder or painted bicycle lane on a wider roadway that would allow vehicles to pass slower cyclists in a safer manner.

As a best practice, the project team reviewed the future roadway connectivity recommendations, traffic volumes, and road classifications, and considered comments from the public consultation to develop the set of cycle routes identified in **Exhibit 6,** below, for consideration. The cycle routes for consideration include a connection to Sherwood Park along Range Road 232, connections to Edmonton via Township Road 512 and Township Road 514, and Range Road 231 (which was the road most discussed during public consultation).

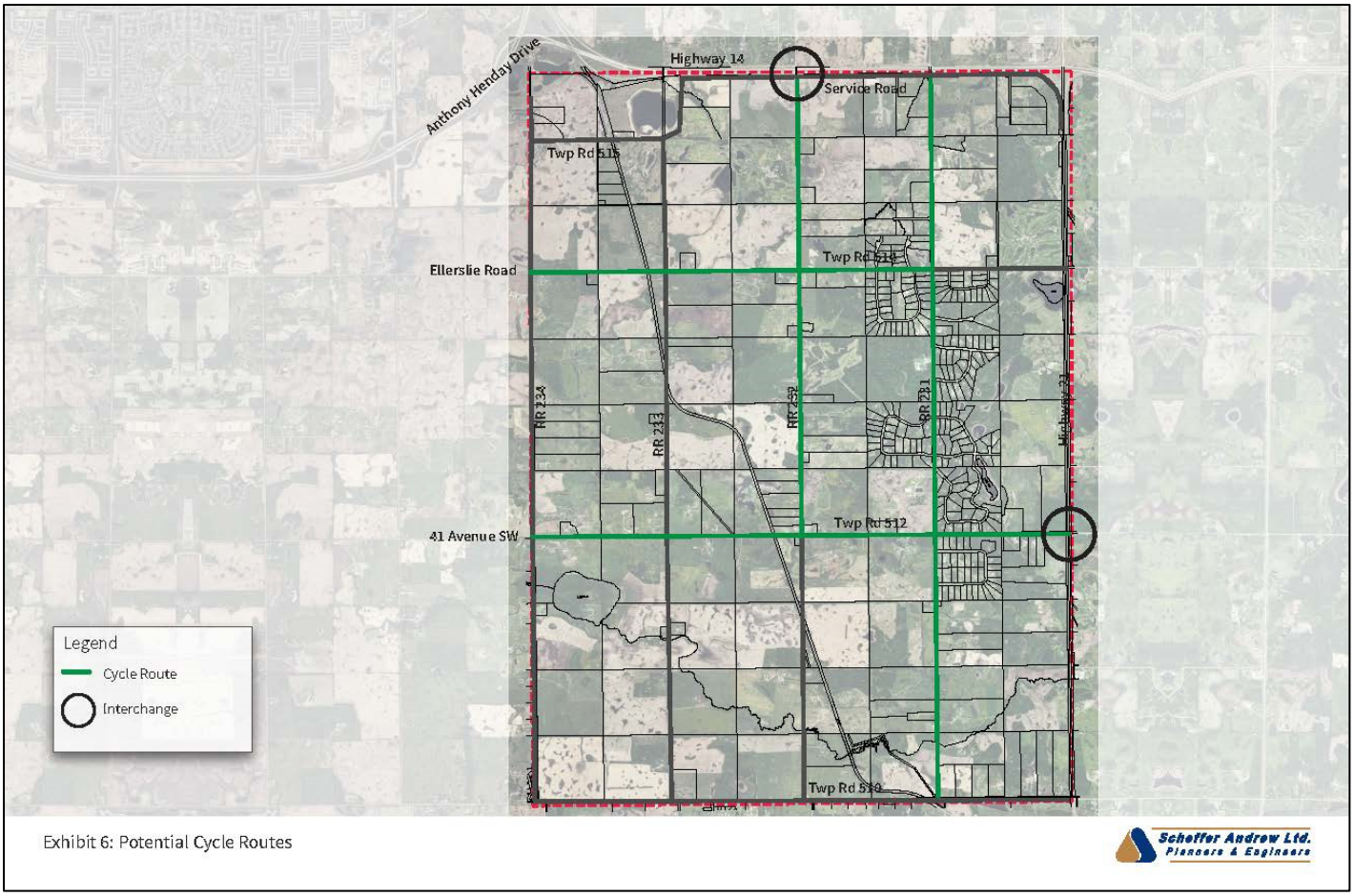


Exhibit 6: Potential Cycle Routes

3.7.3 Road Volumes

We have reviewed various traffic volume estimates provided by both the Strathcona County and City of Edmonton models. As with any traffic forecasting, variations in input data such as employment and population estimates, variations in road classification and connectivity, modelling parameters, and many other factors will influence the forecasts. Our project team has reviewed the available information and has used engineering judgement to estimate approximate long-term traffic volumes on roads within the study area.

This original analysis was completed using the original long-term network assumptions where access to Highway 14 and Highway 21 were via interchanges at Range Road 222 and Township Road 512 only. We ranked the roads within the study area based on the following approximate criteria. A classification map is included as **Exhibit 8** and in **Appendix C**:

- Future volumes less than 1,000 ADT (low volume local roads)
- Future volumes between 1,000 and 4,000 ADT (moderate volume local roads/collectors)
- Future volumes between 4,000 and 8,000 ADT (higher volume collectors)

- Future volumes between 8,000 and 10,000 ADT (high volume arterials) – consider protecting for 4-lane roads
- Future volumes over 10,000 ADT (high volume regional arterials) – protect for minimum 4-lane roadway

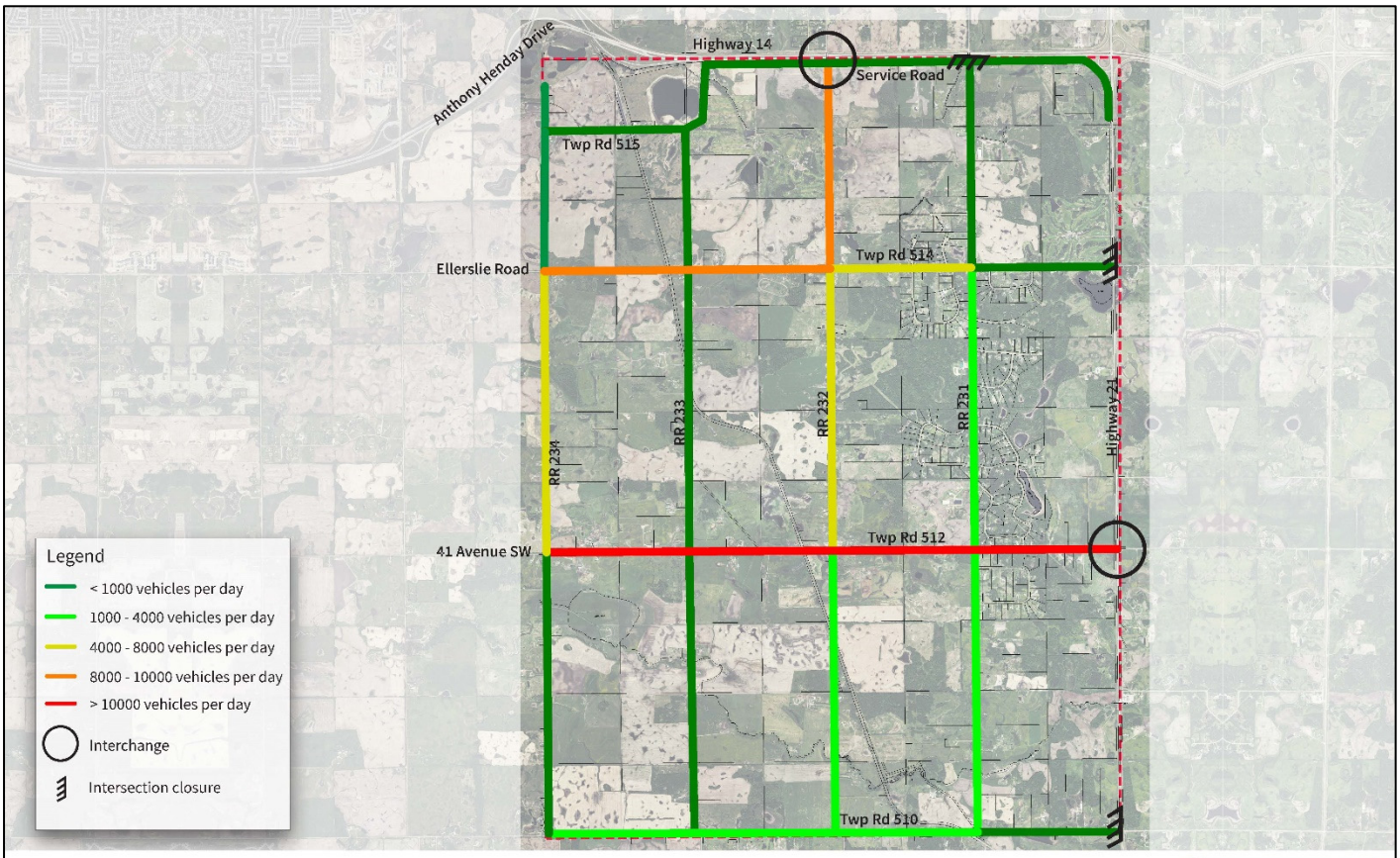


Exhibit 8: Predicted Long Term Daily Traffic

4 Public Engagement

Three separate public engagement opportunities were provided throughout the study. The first session was held to gather input on the existing conditions, existing issues, and items for consideration when proceeding with the planning study. The second session presented a draft functional plan for review and comment, and the third session presented the final functional plan for review and consideration.

The first engagement session was held in-person in 2019. Due to the Covid-19 pandemic, the second and third engagement sessions were held online. With each engagement session a 'What We Heard' report was prepared to capture the feedback and input from the engaged public stakeholders. The What We Heard reports were posted on the County's project web page.

4.1 Process

The first of three public engagement sessions was held in-person on October 3, 2019. The overall engagement spanned October 3-18, 2019. Typical techniques were employed to notify the public, including the use of mail-outs, newspaper ads, flyers, and on-site temporary road signage. The County provided a web link for project information and included an online survey. Approximately 120 individuals attended the Session 1 open house, and 29 responses were received from the online survey.

Sessions two and three were held through virtual engagement. Due to the Covid-19 pandemic, it was not possible to hold in-person meetings. Techniques for notifying the public were essentially the same as for Session 1 with the addition of more emphasis on social media outlets and e-newsletter distribution. The County's communications group headed up the task to present the project material in the County's on-line portal (SCOOP) to receive public feedback. The County's SCOOP (Strathcona County Online Opinion Panel) was utilized and allowed interested parties to review the concept plan at their leisure and provide written comment directly on specific sections of roadway that were of interest. A message board format allowed other users to review the comments of others along with responses and additional information provided by the project team on the message boards. All comments were anonymous and any personal information was redacted so other users could not identify authors of individual comments.

The two online sessions provided a window of approximately 10 days each, including two weekends, for review and commenting. During that time, project team members were able to review the comments being received and respond in real-time or with little delay. Through this very successful process, on-line discussions were possible to address specific concerns with individuals making the comments.

The Session 2 virtual open house was held from September 21-29, 2020 and received comments from 52 individuals. The project's web site was available from September 21 until November 5, 2020 and received 741 views during that time.

Session 3 virtual open house was held from June 18-29, 2021 and received over 70 comments from 30 individuals.

4.2 Session 1

The intent of this public engagement session held October 3-18, 2019, was to obtain background information, existing issues, and ideas and considerations of stakeholders that should be reviewed through the project. In speaking with residents and people who travel through the study area, we were able to learn about some site-specific issues and considerations that we brought forward through the study.

The What We Heard report is provided in **Appendix G**. This report includes all material presented at the open house, and feedback received.

A brief summary of issues and considerations that arose from Session 1 include:

- Increased traffic has been noticed especially on Range Road 231 and Range Road 232. There is the perception that traffic is using these routes to avoid congestion on Highways 14 and 21.
- The existing road designs do not effectively accommodate cyclists. Suggestions from stakeholders were to include widening of roads or separated trails for increased cycling safety.
- Stakeholders noted that speeding was an issue and suggested increased police enforcement, traffic lights, and stops signs with flashing lights.
- We heard that some roads within the study area are perceived as being too narrow for the type and volume of traffic. Suggested improvements included painting center lines and widening roads.
- Stakeholders generally believed that the intersections in and around the periphery of the study area (at Highway 14 and Highway 21) have become increasingly unsafe and reported many unsafe maneuvers occurring including running stop signs, U-turns, and passing on the shoulder.

The information collected through the first phase of engagement assisted the project team by identifying local issues and considerations that were reviewed and investigated throughout the project. Scheffer Andrew Ltd. used this feedback in conjunction with other technical and non-technical considerations to develop the concept plans for the study area roads.

4.3 Session 2

Sessions 2 was held through virtual engagement from September 21-29, 2020. Due to the Covid-19 pandemic, it was not possible to hold in-person meetings. Techniques for notifying the public were essentially the same as for Session 1 with the addition of more emphasis on social media outlets and e-newsletter distribution. Project material was hosted on the County's website, and an online message board was set up on SCOOP (Strathcona County Online Opinion Panel). This allowed interested parties to review the concept plan at their leisure and provide written comment directly on specific sections of roadway that were of interest. A message board format allowed other users to review others' comments, and responses and additional information provided by the project team on the message boards. All

comments were anonymous and any personal information was redacted so other users could not identify authors of individual comments.

The What We Heard report is provided in **Appendix H**. This report includes all material presented at the open house, and feedback received. A short summary of the findings from Session 2 include:

- We heard that residents are concerned with the impact to their property including changes to the look and feel of the rural residential areas due to increased traffic, construction, and noise. We note that there is particular concern from residents adjacent to Range Road 232 and Township Road 512.

- We also heard that road expansion or realignment of roadways and railway crossings should minimize land requirements from private landowners where possible.

- We heard that residents are concerned with safety in the project area due to speeding, impeded sightlines, and overall increased traffic on the narrow roadways.

- Some residents desire an increased traffic control system including traffic lights. We heard concern for movements at the following intersections in particular:
    - Highway 14 and Range Road 232
    - Highway 21 and Township Road 512

  * Note that improvements at Highway 14 and Highway 21 would be the responsibility of Alberta Transportation.

- There were expressed concerns regarding the design of the existing highways around the study area including Highway 21, Highway 14 and Anthony Henday Drive with a desire to see improvements made to these roadways. However, these roadways are not within the scope of this project as they are under the jurisdiction of Alberta Transportation.

- We heard that residents have concern regarding increased traffic on Range Road 232 and Township Road 512 due to the proposed upgrades and future potential interchanges.

The information collected through phase two of the public engagement assisted the project team in preparing the final recommendations. Scheffer Andrew Ltd. used this feedback in conjunction with other technical and non-technical considerations to finalize the future plans for these roads.

4.4 Session 3

Sessions 3 was held through virtual engagement from June 18-29, 2021. Due to the Covid-19 pandemic, it was not possible to hold in-person meetings. Techniques for notifying the public were essentially the same as for Session 1 and 2 with the addition of more emphasis on social media outlets and e-newsletter distribution. Project material was hosted on the County's website, and an online message board was set up on SCOOP (Strathcona County Online Opinion Panel). This allowed interested parties to review the concept plan at their leisure and provide written comment directly on specific sections of roadway that were of interest. A message board format allowed other users to review others' comments, and responses and additional information provided by the project team on the message boards. All comments were

anonymous and any personal information was redacted so other users could not identify authors of individual comments.

The What We Heard report is provided in **Appendix I**. This report includes all material presented at the open house, and feedback received. A short summary of the finding from Session 3 include:

- There were numerous comments in opposition to roadway upgrades or widening in the study area. Many of these comments focused on the existing low traffic volumes on the local roads and low projected growth in the study area, and that most traffic being generated is from outside the study area, thus the perception that their tax dollars are being used to benefit others.

- There are both comments in support of, and in opposition of, the roadway improvements in-regards to the overall roadway network connectivity. Those in support mention issues such as the increased volumes warranting the upgrades. Others in support mention that the traffic volume increases in the region are inevitable and that much money has been invested in other areas of Strathcona County to the north, yet little has been invested in roadways within this study area. Those in opposition mention issues such as there would be too many high-volume, high-speed, east-west and north-south thoroughfares in the study area. Others in opposition mentioned that these upgraded roads will only serve to cater to the needs of road users and commuters from outside the study area, and will encourage shortcutting through the area, versus directing regional traffic onto the surrounding provincial highways or along the Township Road 510 boundary road with Leduc County.

- There are both comments in support of, and in opposition of, recommended roadway improvements regarding safety. We heard that residents in support of the improvements are concerned with safety in the project area for all road users including pedestrians, cyclists, and motorists alike due to speeding, impeded site lines, and overall increased traffic on the narrow roadways. Those that are opposed to the proposed improvements are also concerned with safety, however they question how these particular modifications to the geometric design and making the roads capable of a higher volume and faster moving traffic will accomplish that goal.

- Some residents, as with Session 2, expressed a desire for an enhanced traffic controls including traffic lights at highway intersections due to the increased traffic volumes.

- We heard that residents are concerned with the impact to their property including changes to the look and feel of the rural residential areas due to increased traffic, construction, and noise. We note that there is particular concern from residents adjacent to Range Road 232 and Township Road 512.

- We also heard that road expansion or realignment of roadways and railway crossings should prioritize minimizing land requirements from private landowners where possible. We did note that any land requirements and/or access relocations will be confirmed during the detailed design stage and include additional consultation with landowners.

- There were several environmental concerns about mature tree removals, waterbodies, natural drainage courses/creeks and altered drainage patterns.

- We heard that many residents, as with Session 2, have concerns regarding the current design and operational issues of Highway 21, Highway 14 and Anthony Henday Drive and want to see improvements made to these roadways.

- We heard that residents have concern regarding increased traffic on Range Road 232 and Township Road 512 due to the proposed upgrades and future potential interchanges.

- There were a few comments directed at improvements to the Range Roads within Leduc County that connect into Strathcona County at the boundary along Township Road 510. Other comments mentioned other alternatives to the roadway geometry that would cross the boundary and associated cost sharing of these roads with Leduc County.

- There were comments concerning communication of the project to residents and the use of an online open house vs an in-person open house format. Some people felt than an in-person open house would have been preferred. However, due to COVID-19 restrictions, this was not possible.

The information collected through phase three of the public engagement assisted the project team in preparing the final recommendations. Scheffer Andrew Ltd. has used this feedback in conjunction with other technical and non-technical considerations to finalize the functional plans for these roads.

5 Design Considerations

The following sections outline existing conditions and design considerations that were used in the development of design options and the final functional plans.

5.1 Access

The project roadways have existing direct accesses to adjacent properties along each of the alignments. To modify the existing roadways will require adjustments to these existing accesses. On a case-by-case basis, the removal of some accesses should be considered to improve the overall safety aspects of the roadway, provided adequate alternative access is still available to each private lot.

Modifications to the roadway to improve vertical alignment as well as revising the cross sections to meet current standards will likely require regrading of the access approaches and extension, reconstruction, or addition of culverts where ditch flow is to be maintained.

5.2 Rail Crossings

Canadian National Railway has a rail line running diagonally through the study area intersecting the township and range roads. Four out of the five crossings are in areas of notable traffic flow and intersect at skewed angles not meeting current design standards.

Transport Canada Grade Crossing Standards (2019) provide the following criteria:

- Maximum 2% road grade within 8 metres of railway crossing and maximum 5% road grade for an additional 10 metres.
- Crossing angle between rail and road should be between 30 degrees and 150 degrees.

The summary memo of the investigation into these four crossings is presented in **Appendix J**. The proposed functional design to improve these crossings includes alignment changes to the crossing roadways to better meet the current design standards. While crossing angles within the desired range much closer to 90 degrees could not be practically or feasibly provided at the locations of the most severely skewed crossings, the proposed crossings designs improve upon the existing geometry, increasing safety.

Table 1 below shows the existing crossing angles at the four railway crossings and the proposed crossing angles that are recommended in the final concept design.

Table 1: Railway Crossing Angles

Crossing Location	Existing crossing angle (degrees)	Proposed crossing angle (degrees)
Range Road 232 south of Township Road 512	18	43
Range Road 233 south of Township Road 514	10	58
Township Road 510 west of Range Road 231 (affecting both the township and range roads)	30	50
Township Road 512 east of Range Road 232	70	90

The realignment of the roadways to provide the improvements will require land acquisitions from private landowners.

5.3 Buried Utilities (Major and Minor)

An in-depth analysis of the type and location of existing utilities is not within the scope of this report. However, it has been noted that there are existing overhead and shallow buried utilities along the roadways, identified by signage and visible surface equipment. The Functional Plan does indicate rights-of-ways for the major utilities in the vicinity of the existing roadways.

Proposed profile adjustments have considered existing utilities. Where there are known major buried utilities within utility rights-of-way or easements, all profile adjustments have been designed to cross the utilities at the existing elevations or slightly above, so as to not require cuts near existing buried pipelines.

However, some of the shallow utilities that may run alongside existing roads within road rights-of-way may be impacted by road widening or profile adjustments. These impacts will need to be assessed on a case-by-case basis during detailed design.

Any new utility installations should be carefully approved based on considerations of the existing road design and profile along with the proposed adjustments, to help minimize potential impacts to any newly installed utilities in the future.

5.3.1 Power and Telecommunication

Power and Telecommunication facilities are present within the project area, both buried and on overhead pole lines within the existing road rights-of-way. Any recommended improvements within the rights-of-way will have to consider coordination with the utility owners for potential relocation and possible upgrading opportunities.

5.3.2 Gas Utility

It was noted that ATCO Gas does have various distribution lines within the scope area to service the existing building infrastructure. Some alignments are noted to be in the existing road rights-of-way but most appear not to be in the rights-of-way of the Township and Range Roads.

5.3.3 Streetlights

There is no street lighting infrastructure within the scope area. There is street lighting at the major intersections of Highways 21 and 14 and at Range Road 232 and Highway 14. Recommendations related to these locations are not within the scope of the project and there is no recommendation to install future lighting within the study area.

5.3.4 Storm Drainage

Storm drainage for the scope area relies on existing roadside ditching that drains to a number of creeks crossing through the region, notably Irvine Creek, Mill Creek, and their respective tributaries.

Upgrades to rural roadways within the study area are planned to utilize existing surface drainage features and follow existing overland flow routes. There are no plans to provide dedicated stormwater management facilities as part of roadway upgrades.

It would be prudent to review the existing drainage patterns at the time of preliminary and detailed designs to ensure any proposed changes to the existing roadways, and related ditching, do not conflict with established drainage patterns. If there are conflicts with potential impacts, the design may need to incorporate upgrades to existing culverts, as necessary.

5.3.5 Sanitary Drainage

There is no municipal infrastructure related to sanitary sewerage within the project area.

5.3.6 Water

The only existing water mains in the study area are the rural water distribution mains on Range Road 231 and on Township Road 514. These are potable water mains and are Strathcona County owned.

5.4 Traffic Signals, Pedestrian Signals, and Crosswalks

No facilities are present in the scope area. Analysis identified no need for signals within the study area.

5.5 Pedestrian & Cyclist Safety and Connectivity

Through the public engagement process, there were several comments related to the presence of pedestrians and cyclists using the roadways within the scope area. Pedestrian use was noted to be very limited, but cycling was noted to be significant and a cause of concern for safety. The County believes that cyclists within the study area are primarily recreational and not commuters.

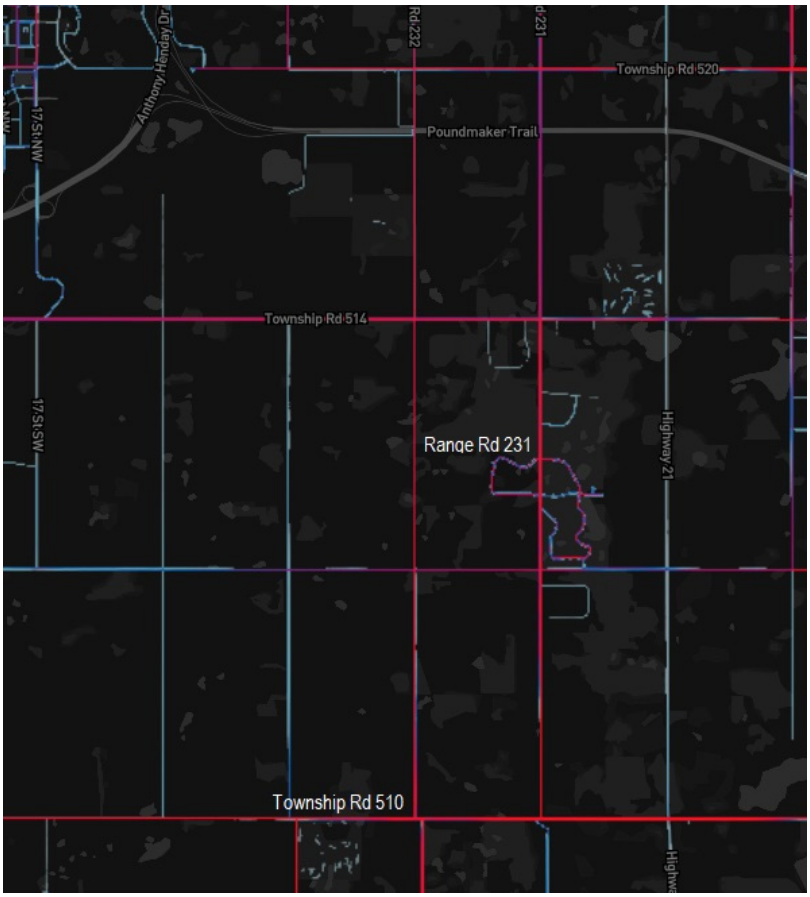
Strava, a fitness application used worldwide, produces heatmaps indicating cycling, running, and other activities. Our project team has used this data on several projects to help identify commonly-used routes for people who cycle or travel in non-vehicular modes. It is important to note that there is a bias in this data – for instance, it only accounts for trips made by people who use a GPS tracking unit (bike computer, smart watch, smartphone, etc.) and upload to Strava. However, it does provide a generalized understanding of how people cycle and travel through the study area.

Strava's 2021 heat map indicating cycling usage was reviewed. It indicates Range Road 231, Township Roads 510 and Township Road 514 as the more heavily used cycling routes within the scope area, but it

also shows that cycling occurs throughout the study area. The blue colour on the roadways in Figure 3 represents roads with lower cycling frequency while purple and red indicate roads with higher cycling usage. The data provided by the Strava application provides a general overview as the application has inherent limitations due to End User License Agreements for the application that prevents the release of specific information. The aggregate data is generated from users / subscribers of the application, not the cycling community as a whole and is thus representative without detailed analysis.

A significant number of cyclists appear to be using the corridor as a link from the south Edmonton and Beaumont areas to Sherwood Park and vice versa. Higher cycling use was also noted in the residential areas as Forest Hills Country Estates and Woodland Downs loops, straddling Range Road 231, appear to be popular cycling loops. Range Road 231, located adjacent to the more densely populated regions of the study area, was the most discussed during public consultation regarding cycling activities.

Figure 3 - Cycling Heat Map



5.6 Environmental

Spencer Environmental have provided the Environmental Overview as well as the Historical Resources Overview for the project. Their reports are provided in **Appendix A**.

Spencer Environmental has noted that the study area includes numerous wetlands, watercourses, and two quarter sections recognized provincially as environmentally sensitive areas. Improvements proposed have the potential to impact some of those areas. Such impacts have the potential to trigger permitting requirements pursuant to provincial and federal environmental regulations. Future planning and design of individual road improvement projects that are initiated as a result of this study must continue to carefully consider potential impacts to environmentally sensitive areas and identify environmental permitting triggers early in the process to help ensure successful delivery.

Regarding historical resources, there was only one specific location identified to be aware of during future detailed design and construction. The site, FiPh-14, is located along the Highway 14 Service Road approximately 600 metres west of Range Road 232 and south of the Service Road carriageway. The site is located outside of any potential future 40 metre right-of-way and is thus of low concern. As such, awareness of the site and its location is the only recommendation from the historical resource overview.

5.7 Geotechnical Assessment

Thurber Engineering has provided the Geotechnical Overview desktop study for the project area. Their report is provided in **Appendix B.** In addition to the overview of existing conditions within the project area, their report provides general recommendations pertaining to future construction techniques as well as guidance for further investigation related to detailed design.

In general, Thurber supports cross section designs utilizing side slopes of 4 Horizontal: 1 Vertical for the Class 1 and Class 2 roadway alignments, with provision for 6H:1V for agricultural purposes. Back-slopes will be further reviewed at detailed design and will typically require back-sloping agreements. They also support side slopes of 3H:1V for the Class 3 proposed alignments. They do qualify this support by limiting the height of the slopes to 3 metres. Should higher slopes be required, the specific area would require a more detailed investigation.

Thurber did note that their report has been prepared for use in developing concept designs and on-site investigation would be required to help support preliminary and detailed designs in the future, including the placement of standpipes to establish groundwater levels and excavating test holes to better determine existing soil characteristics.

6 Design Option Development

After obtaining and reviewing background information and feedback from Public Engagement Session 1, the Scheffer Andrew project team identified a number of potential upgrade methodologies for roads within the study area. The following section outlines the process our project team used, in collaboration with Strathcona County, to develop options for consideration.

6.1 Design Criteria for Option Development

The project generally followed the design guidelines set forth in the Strathcona County Design Standards. Design criteria is supplemented as required by the Transportation Association of Canada (TAC)'s Geometric Design Guide for Canadian Roads (2017).

Highlights of major design items are included below with a brief description of rationale for the options. The criteria and cross sections indicated below were discussed and developed initially with the project team and were reviewed and discussed with County staff during several project progress meetings. A number of these elements were refined or removed in the development of the Functional Plan that is described in Section 7.

6.1.1 Roadway Speeds

In Alberta, all rural roadways have a default speed limit of 80km/h unless otherwise posted or there is a municipal bylaw specifying otherwise. Within this study area, all township and range roads are considered to have an 80km/h speed limit. Some are posted whereas others do not currently have speed limit signs and are assumed to be the default 80km/h.

From a design perspective, our project team had initially identified a design speed of 90km/h. However, in line with current industry practices to use a design speed equal to the posted speed, we did consider, in constrained areas, potential for a design speed of 80km/h if it had an impact on land acquisition or costs.

Design Speed = 90 km/h or 80km/h
Posted Speed = 80 km/h

6.1.2 Cross Sections

Several cross-sections were initially considered to investigate the impacts and differences between various improvements. Consideration was given to various improvement options ranging from negligible (asphalt overlay only) to major (upgrade to 4-lane divided cross-section). These options were used to understand the land impact, cost impact, and operational differences of potential improvements. The initial options developed were labeled 0 and A through D. These options are outlined below.

Option 0: (asphalt overlay only)
The intent of this option was to provide a base-case, or 'do almost nothing' condition. This option is basically equivalent to resurfacing the existing roadways.

- Standard Lane width = 3.50m
- No shoulder (minimum 7.0 m road surface)
- Sideslope = as existing
- Backslope = as existing

Option A: (Adjust profile – use existing 7.0m width)
The intent of this option was to provide a scenario where there was no identified road widening, but the vertical profile would be adjusted so the curves met, at minimum, an 80km/h design speed. This would ensure adequate sight distance along the roadways.

- Standard Lane width = 3.50m
- No shoulder (7.0 m road surface)
- Sideslope = 3H:1V
- Backslope = 3H:1V
- Ditch = 1.0 m bottom (1.0m deep) – minimal ditch work

Option B: (Adjust profile and use County standard)
The intent of this option was to provide a scenario that utilized a standard Class 1 County road cross-section. Vertical profiles would be improved to meet, at minimum, and 80km/h design speed to ensure adequate sight distance along the roadways.

- Standard Lane width = 3.50m
- Shoulder = 1.0m (9.0 m road surface),
- Sideslope = 4H:1V
- Backslope = 3H:1V (6H:1V in agricultural areas)
- Ditch = 3.5 m bottom (1.0m deep)

Option C: (Adjust profile and use County standard with 2.0m shoulders)
The intent of this option was to provide a scenario that utilized an upgraded Class 1 County road cross-section. In this option, the shoulders would be 2.0m wide with the intent to provide this additional space for cyclists traveling along the county roads. Vertical profiles would be improved to meet, at minimum, and 80km/h design speed to ensure adequate sight distance along the roadways.

- Standard Lane width = 3.50m
- Shoulder = 2.0m (11.0 m road surface)
- Sideslope = 4H:1V
- Backslope = 3H:1V (6H:1V for agricultural land use)
- Ditch = 3.5 m bottom (1.0m deep)

Option D: (4 lane with center median – anticipated high-volume roads only)
The intent of this option was to provide a scenario for high-volume roadways within the study area. This cross-section is identified as a hybrid semi-urban cross-section with a concrete median and ditch drainage. Two lanes would be provided in each direction, and a left turn bay could be developed in the median at major intersection. This option was

developed because, based on the preliminary traffic projections received, the project team anticipated that some roadways would require more capacity than a standard 2-lane cross-section could provide.
Standard Lane width = 3.70m
Median lane = 3.95m (including 0.25m gutter)
Shoulder = 2.0m
Turn bay = 3.40m
Median = 4.50m (to face of curb)

6.1.3 Pedestrian and Cyclists

Based on public feedback, it is generally accepted that there is a very low volume of pedestrian traffic on the subject roadways but there is a notable presence of cyclists. As such, the typical design measures to address pedestrians and cyclists would be limited to adding shoulders or providing a separated 3m Shared-Use Path (SUP) on one side of the carriageway. Due to maintenance considerations involving drainage, snow clearing, and long-term maintenance, the option of adding a SUP was not pursued and variations in the shoulder width of 0m, 1.0m and 2.0m were considered.

6.1.4 Grades

Vertical grades = 0.6% to 6.0%
Vertical curve required when grade change >1.0%
SUP grades = 0.6% to 5.0%

6.1.5 Horizontal Alignment

Follow TAC design guidelines.

6.1.6 Vertical Alignment

Minimum K value: 40 for both sag and crest curves

6.1.7 Vertical Clearance

Minimum 5.40m vertical clearance to any obstruction.

6.1.8 Design/Control Vehicles

Design Vehicle: B-12 as per guidelines.

Control Vehicle: WB-21.

6.1.9 Intersection treatment

Generally, simple corner radii of 15 metres at all intersections within the study area. Highway intersections were not within the scope.

6.1.10 Utility Offsets

Generally, utility offsets follow Section 7, Rural Service Area Standard Drawings of the County's design and construction standards for any new construction. Coordination with individual utility owners will be required during preliminary and detailed design to address any conflicts with existing utilities.

6.1.11 Street Lighting

No Street lighting is proposed.

6.1.12 Traffic Signals

No Traffic signals are proposed as traffic analysis identified that stop controlled intersection were sufficient at all intersections in the study area.

6.2 Design Options Comparison

The different design options were reviewed with respect to land and cost impacts as described in the following sections.

6.2.1 Land Impacts

The project team developed high-level plan/profile drawings for each option along all roads in the project area to determine the potential changes and upgrades that each option would have on private lands outside of existing road rights-of-way.

Generally, Option 0 would have limited, if any, land impacts.

Option A and Option B generally have similar, and relatively minor, impacts on adjacent lands. Our high-level review identified that these impacts could likely be addressed with backslope agreements or with modifications to the ditch sizing and design sloping in constrained areas.

Option C generally had more moderate impacts on adjacent lands. Similar to Option A and Option B, the project team felt that most of the land impacts could likely be addressed with backslope agreements or design modifications, though there may be some critical areas with larger cuts or fills that may require land acquisition.

Option D has the most significant impacts on adjacent lands. Right-of-way acquisition would be required wherever this cross-section would be identified. A conceptual right-of-way width of about 55m was identified as the approximate impact.

6.2.2 Cost Impacts

The project team completed cost comparisons between the various identified options to understand the cost impacts of the differing criteria. Cost estimates were developed using major construction components, including grading impacts, plus a 50% contingency at this functional planning level. Potential land acquisition costs were not included, as the direction from the county at the time was to utilize backslope agreements rather than land acquisition, as a starting point. Areas with major potential

impacts, such as significant profile/grade changes, or significant widening, would still require land acquisition from adjacent private properties.

The intent of these cost estimates was to review comparative costs between different cross-section options during the design option development phase.

The following is a generalization and comparison of the costs required for the different design options for the roads within the study area:

- Option 0 (asphalt overlay) was used as the base case cost.
- Option A (reprofile to meet vertical design criteria, maintain existing 7m road widths) is about 650% (6.5 times) the cost of Option 0.
- Option B (reprofile to meet vertical design criteria, use County standard cross-section with 9m road with) is about 20% more than the cost of Option A.
- Option C (reprofile to meet vertical design criteria, use County standard cross-section with wider shoulders for 11m road width) is about 15% more than the cost of Option B.
- Option D (for Township Road 512 only, reprofile to meet vertical design criteria and develop semi-urban 4-lane cross-section) is about 50% more than the cost of Option C.

A table providing a more detailed breakdown of probable construction costs by roadway is included in **Appendix K.** This shows the comparative costs of the different design options reviewed. Township Road 514 currently has a 9m road width, generally meets the vertical design criteria, and is basically already developed as Option B. For this reason, the costs shown for Township Road 514 improvements for Options 0, A, and B are somewhat inconsistent with the rest of the roads in the study area.

6.3 Draft Design Development

As the project moved through various stages, the project team selected different options for different roads in the study area based on projected/estimated traffic volumes, and accommodation for mode types, connectivity to the greater road network, potential land impacts, and County policies and preferences.

A draft functional plan was developed based on the 2019 traffic projections and future development assumptions available at that time, as discussed in detail in Section 2 of this report. The Draft Functional Plan road network was initially based on 2019 modelling and long-term plans for interchanges on Highway 14 at Range Road 232, and on Highway 21 at Township Road 512. All other county roads were assumed to dead-end at Highway 14 and Highway 21. These volume estimates were used to identify capacity needs, and therefore the number of lanes required, along all roadways. Based on this analysis, it was determined that most roads within the study area would operate acceptably with a 2-lane cross-section in the long-term scenario. The noted exceptions included Township Road 512 from Range Road 234 to Highway 21 (the entire length), and Range Road 232 from Township Road 514 to Highway 14. These two road segments were identified as potentially requiring 2 travel lanes in each direction, and as such were identified to be protected for larger rights-of-way.

The project team had numerous discussions with Strathcona County regarding the potential to provide space for people cycling on several roads within the study area. Ultimately, direction was given to direct people on bikes to 'share the road' with drivers, and to not identify any additional facilities (Shared-Use Paths, bike lanes, or wider shoulders) within the study area, as most cyclists seem to be recreational users along the Township and Range Roads. Strathcona County does not have a widened shoulder standard for cyclists.

Ultimately, there were three different cross-sections identified in the draft functional plans. A 7.5m paved road surface (similar to the County's Class 2 road standard) was identified where roads were anticipated to have under 1,000 vehicles per day in the long-term. A 9.0m road surface (similar to the County's Class 1 road standard) was identified where long-term traffic volumes were anticipated to be between 1,000 and 10,000 vehicles per day. A 4-lane semi-urban cross-section was identified where long-term traffic volumes were anticipated to be approaching 10,000 vehicles per day or greater.

Several horizontal re-alignments were considered and recommended in the draft functional plans. Four of these locations are related to railway crossings (to improve sightlines and crossing angles), and one area was due to grade/profile changes adjacent to nearby residences (to minimize impacts). These realignments are summarized below:

- Range Road 233 between Township Road 512 and Township Road 514 at CN Railway track – realignment was identified to improve sightlines at the skewed railway crossing. Realignment was identified on the east side of the existing road right-of-way based on the existing railway geometry. This also minimized land impacts and costs.

- Range Road 232 between Township Road 510 and Township Road 512 – realignment was identified to improve sightlines at the skewed railway crossing. Realignment was identified on the east side of the existing right-of-way to mitigate land impacts and costs.

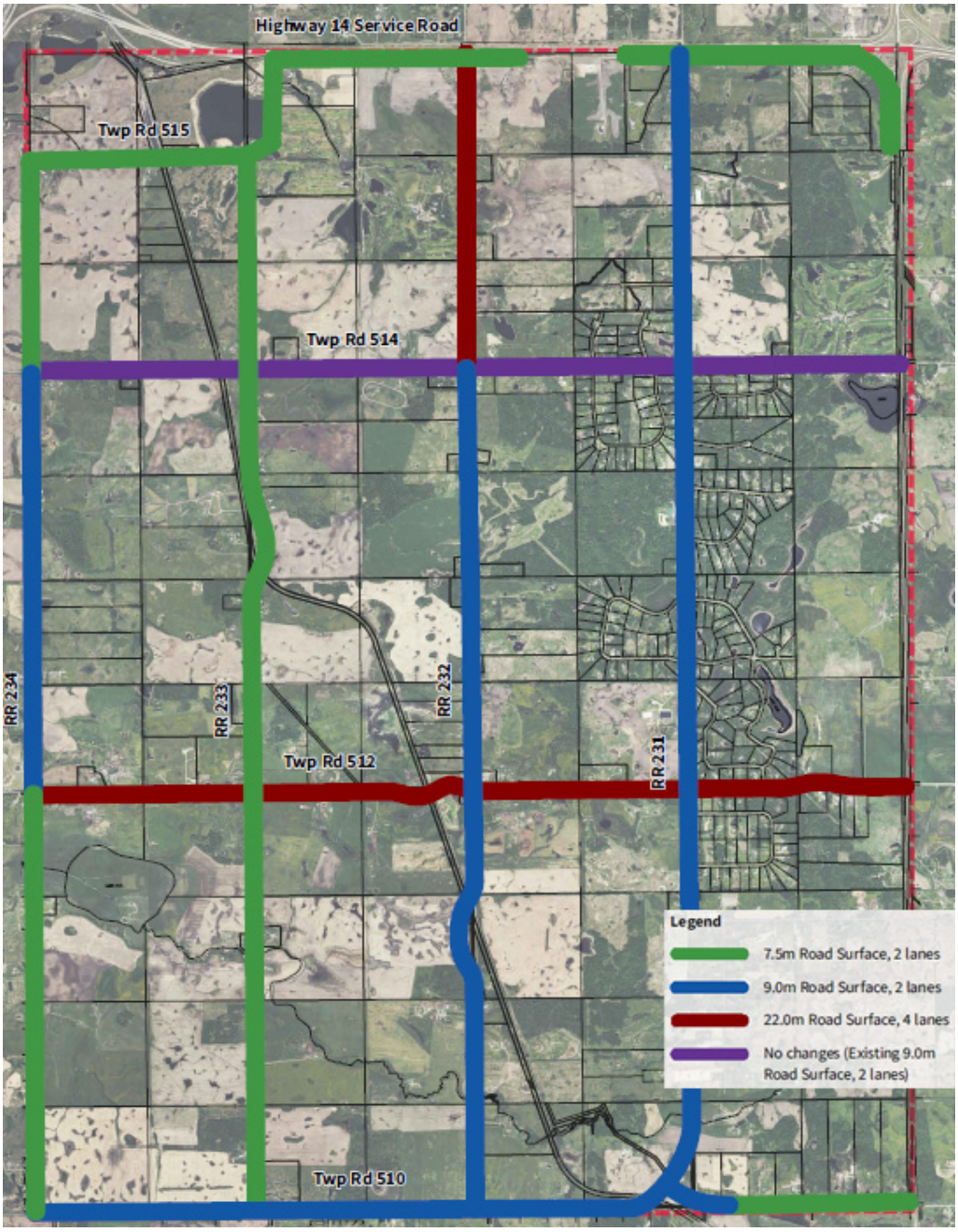
- Township Road 510 at Range Road 231 – realignment was identified to improve sightlines at the skewed railway crossing and to adjust the road network. Several options were reviewed. Ultimately, the design to reconfigure the through traffic from the west to north resulted in lower land impacts, costs, and environmental impacts. Traffic impacts were reviewed, and found that this proposed configuration was also favourable from a traffic flow perspective.

- Township Road 512 between Range Road 233 and Range Road 232 – realignment was identified to improve sightlines at the skewed railway crossing. A slight realignment on both sides of the railway was chosen to minimize land impacts and costs.

- Township Road 512 between Range Road 231 and Highway 21 – realignment was identified on the grade dropping toward Highway 21. Township Road 512 was identified to be realigned slightly north of the existing alignment to minimize land impacts due to road fills in the front yards of several residences.

The proposed road network configuration, as developed for the draft functional plan, is illustrated in Figure 4 . The draft functional plan is also illustrated in more detail in the What We Heard document for Public Engagement Session 2 in **Appendix H**.

Figure 4 - Proposed Road Network for Draft Functional Plan



The Draft Functional Plan was presented at Public Engagement Session 2, to obtain feedback from residents and the general public. Public feedback, along with additional technical information obtained after the draft plan was developed, resulted in some changes to the draft functional plan. These changes are detailed further in the next section.

7 Functional Plan

7.1 Design

As described within this report, the final design of the Functional Plan, provided in **Appendix L**, has evolved over the project duration. It has been shaped through several processes and to meet specific criteria and constraints. The initial design options as presented in the previous sections of this report were developed based on engineering practice and existing design standards, along with discussions with County staff to gain an understanding of project specific needs.

Outside agencies, such as the City of Edmonton and Alberta Transportation, were contacted for input related to traffic modelling with regards to anticipated growth in the region. Discussions included topics related to potential future highway improvements that may affect the study area. Specific discussions with Alberta Transportation centered on highway intersections present on the north and east boundaries of the study area. Alberta Transportation provided information related to long-term planning that indicated future service interchanges on Highway 21 at Township Road 512 and on Highway 14 at Range Road 232. Exhibit 5 in Section 3.6 and in **Appendix C** provides an illustration of these potential interchange locations. Construction of those interchanges would result in closure of Township Road 514 and Township Road 510 at Highway 21, and Range Road 231 at Highway 14.

These assumptions of new interchanges, and associated intersection closures, were used to develop the Draft Functional Plan described in Section 6. But, after presentation of the Draft Functional Plan, the project team and Strathcona County had additional discussions with Alberta Transportation related to the timing and staging of changes to both Highway 14 and Highway 21. Alberta Transportation identified that there are no current approved plans, nor is there any funding to develop plans, designs, or construction of any changes to Highway 14 or Highway 21. Based on these facts, the project team and Strathcona County determined that the functional plans should be updated based on the assumption that no significant improvements would be constructed along either of the boundary highways. It was noted that some minimum improvements would likely be required, such as installing signals at intersections along both highways as traffic volumes increase, but that these would be funded and constructed by Alberta Transportation and are outside of the scope of this study. The final base assumption for network connectivity in the Functional Plan was that no additional interchanges would be constructed, and therefore no existing intersection with either Highway 14 or Highway 21 would be closed.

It is important to note that should Alberta Transportation develop approved plans or designs for upgrades to Highway 14 or Highway 21 that include interchanges or road closures within the study area, this Functional Planning Study will have to be revisited and updated to reflect the resulting traffic pattern changes.

A major theme heard during Public Engagement Session 2 were concerns regarding the proposed 4 lane roadway sections for Township Road 514 and Range Road 232. Perception was that these roadways would become heavily travelled highways through their residential areas creating unwanted disturbance. There was also concern about the amount of private property that would be dedicated as road right-of-way for widening to 4 lanes. To acknowledge and respond to these strongly voiced concerns, the final Functional Plan has been modified to remove the proposed sections of four lanes and to only indicate the extents of added right-of-way needed for possible future widening to standard County road rights-of-way.

Another factor shaping some minor changes that were made to the to the Draft Functional Plan for Range Road 232 is the existing Country Side Golf Course. The golf course property extends to the west property line of the range road. The intent of the design for this section of Range Road 232, between Township Road 514 and Highway 14, is to provide a standard 40 metre wide right-of-way to protect for potential widening within the proposed right-of-way, should they become warranted. The final functional plan indicates a two-lane roadway will be sufficient, however bringing this road up to a County Standard Class 1 roadway would require widening. Planning for future widening on both sides of the existing right-of-way would require acquisition of golf course property. A costing study was completed related to the potential widening. The result of the study indicated that due to the significant cost to reconfigure portions of the golf course to allow a rights-of-way widening, it is more cost effective to shift the alignment of the range road to the east along the boundary of the golf course. Doing so would require the acquisition of a similar right-of-way area along properties to the east but would likely be much less costly than widening to the west along the golf course.

Other significant drivers for revisions to the draft plan included feedback from the Public Engagement, and feedback from the County maintenance and operations teams such as maintenance and snow clearing concerns for separate cycling facilities. Other drivers included general budget uncertainty with respect to future development in the scope area and surrounding areas pertaining to transportation infrastructure and connectivity.

A repeated concern voiced during public engagement sessions was for the safety of pedestrians and cyclists using the roadways in the study area. The concerns stemmed from a lack of proper sight distance along the county roads, and a lack of physical space on the roadways to permit safe spaces for road users of all mode types.

To help alleviate the space concern, engagement feedback suggested to provide either a bike lane along the more travelled roads or create a separate shared path to create the additional space in the area of the ditch side slopes. These suggestions were reviewed with the project team and County departments for feasibility. Internal discussions provided concerns regarding maintenance of a shared facility. The County identified that maintenance costs would be prohibitive due to the location and potential quantity of shared paths involved. Also, with respect to winter clearing, there were concerns that a shared path would not be able to drain properly due to its elevation relative to the roadway and the roadside ditching – windrows would impede drainage. Options were reviewed that could provide larger shoulders (2 metre instead of 1 metre shoulders) that could allow safer passing of cyclists by drivers. However, the County does not currently identify any bike routes within this study area, and determined that no additional widening would be provided for cyclist accommodation.

However, the concern related to sight distance is addressed by the design, through the vertical profile adjustments proposed for the roads to meet or exceed stopping sight distance for an 80 km/h design speed. Currently the undulations in the profile of many roadways limit sight distance to substandard levels. The only roadway that currently meets the minimum design criteria for vertical profiles is Township Road 514. This is the extension of Ellerslie Road from the City of Edmonton, and it appears to have been designed to a 90 km/h highway standard.

Through the design process, the existing at-grade railway crossings were reviewed. Contact was made with CN Rail to discuss the crossings with respect to possible plans for improvements. The existing

crossings are currently signed with crossbucks, and most crossings have a warning system consisting of flashing lights and bells. The crossing on Township Road 515 is controlled with a stop sign on the roadway. All crossings except for the one on Township Road 515 are on a skewed angle – some are very extremely skewed. To address substandard crossing angles noted in Section 5.2 Rail Crossings, and to improve sightlines for vehicle drivers and train drivers, the design options and the Functional Plan present revised roadway alignments to improve rail crossing safety.

Traffic model data did not provide intersection turning movement projections, which is consistent with models of this nature. However, the project team developed some conceptual estimates based on the daily traffic and PM peak hour link volumes. These conceptual intersection estimates were evaluated to determine if there were operational improvements that may be required at major intersections. The evaluation determined that turn lanes would not be required at intersections within the study area. All intersections were reviewed with 2-way stop controls and appeared to be able to provide adequate service levels with the long-term traffic projections. The final functional plans indicate the locations of the stop conditions at each intersection. We note that at a few locations, the stop conditions have been switched from the existing condition, based on the future volume projections – stop conditions are generally located on the road with lower volumes. Therefore, traffic volumes should be monitored at all intersections within the study area and re-evaluated periodically based on current traffic volumes.

Intersection treatments for the Functional Plan generally consists of simple corner radii of 15 metres at all intersections within the study area. Highway intersections were not within the scope, but the County roads have been illustrated to tie-in to the Highways with simple radii. Alberta Transportation's future designs for any highway improvements would supersede these functional plans.

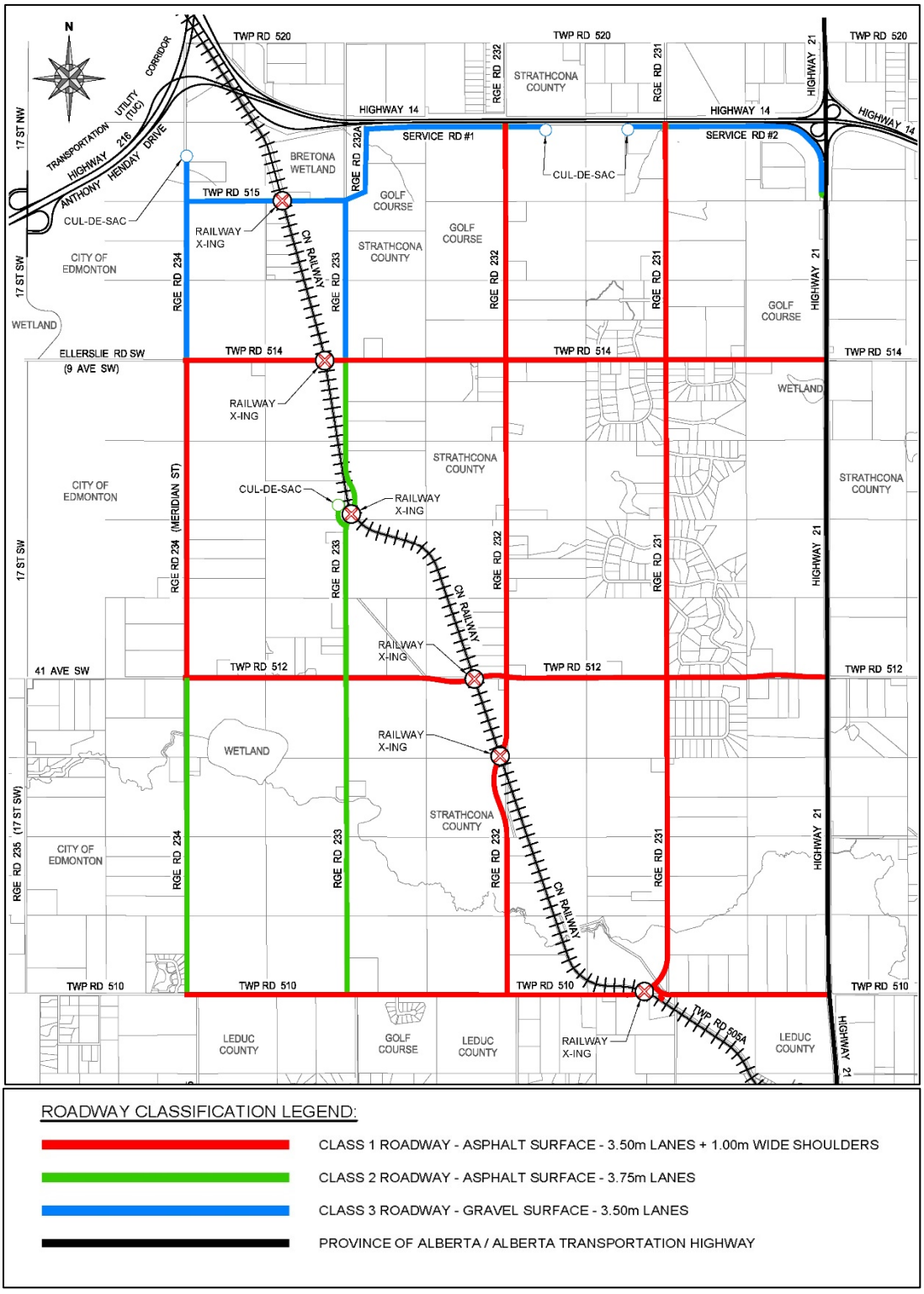
Existing country residential local roads intersecting the Township Roads and Range Roads within the study area generally have simple radii at the intersections. Current County policy is to provide a standard intersection taper at all local road intersections with Class 1 County grid roads, and the County directed these tapers to be included in the functional plans. Generally, these tapers do not provide operational capacity, but rather a slightly wider pavement area that may allow for limited passing movements on the main roads. The standard taper detail is provided in the County design standards as drawing 51001. The detail provides acceleration and deceleration tapers and indicates 15 metre radii edge of asphalt at the intersections.

As part of the right-of-way widening review throughout the study area, in accordance with current County practice and discussions with County staff, right-of-way widening is indicated at all intersections within the study area to provide a minimum 10m by 10m corner cut where not existing.

Other potential land impacts have been indicated on the functional plans. To accommodate potential land impacts, both Class 1 and Class 2 roadways are proposed to be protected for a 40 metre standard right-of-way. Class 3 roadways are proposed to be protected for a 30 metre standard right-of-way.

The combination of all input sources led to the final version of the Functional Plan as provided in **Appendix L**. The Road Classification Plan from the Functional Plan set is provided below along with specific cross section elements for ease of reference.

Figure 5 - Roadway Classification Plan



Functional Plan cross sections:

Figure 6 - Cross Section A – Class 1 Rural Roaway (Paved)

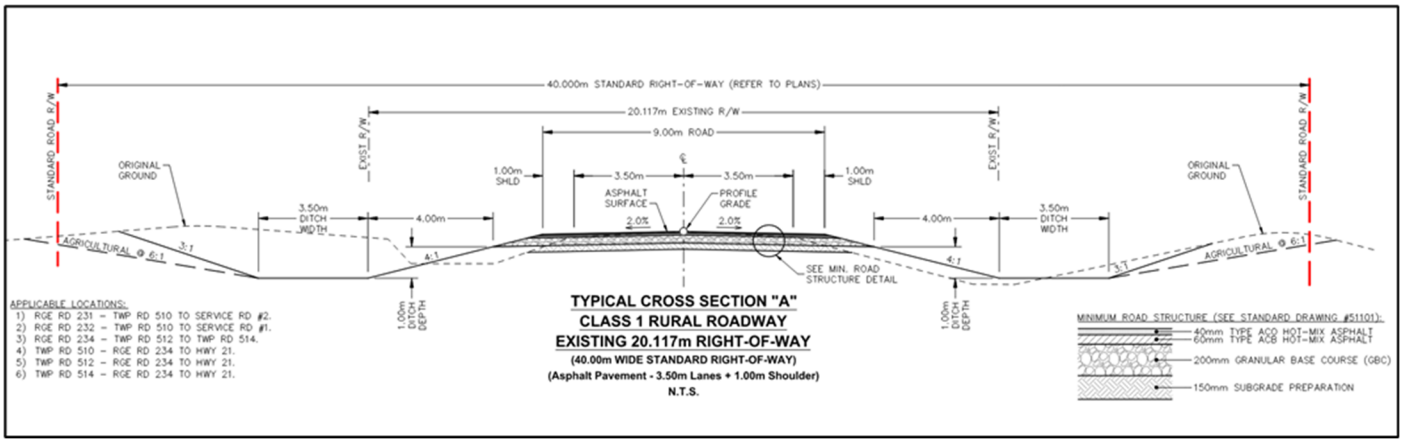


Figure 7 - Cross Section B – Class 2 Rural Roadway (Paved)

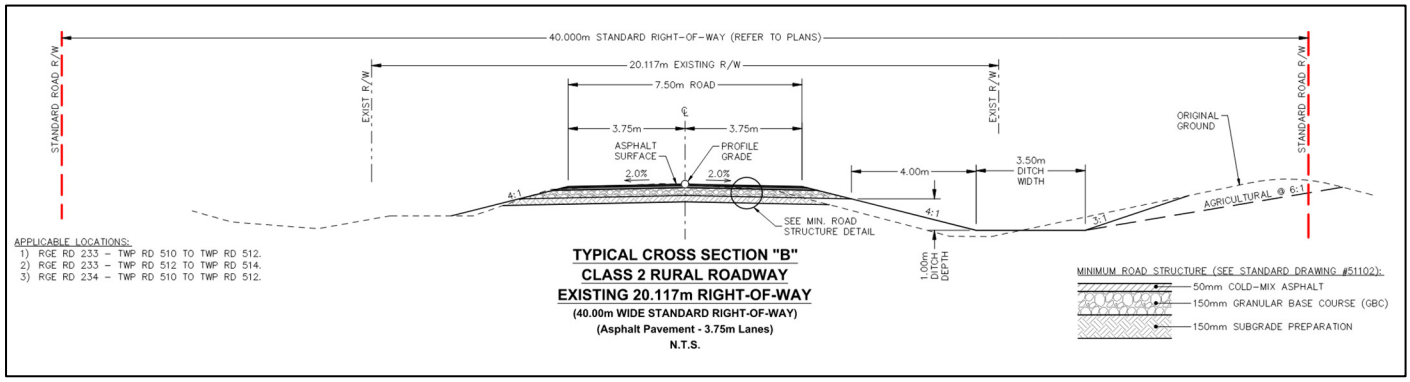
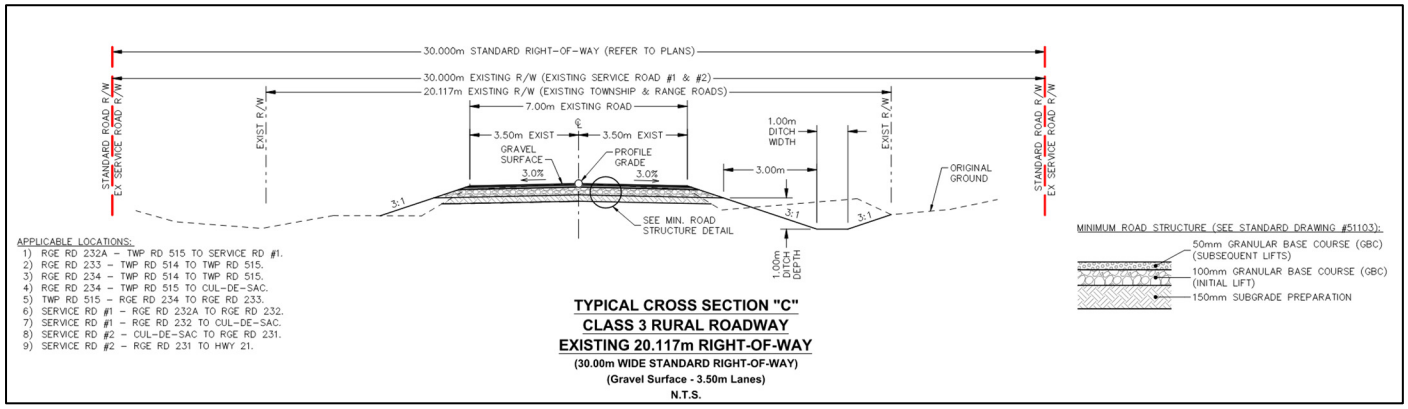


Figure 8 - Cross Section C – Class 3 Rural Roadway (Gravel)



7.2 Property Requirements

The Functional Plan indicates a varying amount of property will need to be acquired to accommodate the cuts and fills needed to establish the proposed cross sections. Generally, the wider the carriageway and ditching, the more cutting and filling required. Adjustments to the elevation of the roadway to improve sightlines and stopping sight distances also impact the magnitude of cuts and fills, and therefore property impacts. For instance, where a crest vertical curve must be lowered so users can better see 'over the hill', there will need to be back-sloping cuts, especially in areas already in cut due to the construction of the existing road.

Due to the uneven nature of the topography in the area with numerous hills and small ravines, back sloping was identified to be potentially required up to 20 metres beyond the existing road right of way in a few select areas. There were concerns in one location on Township Road 512, that the back-sloping extent may be within close proximity of existing structures, including houses. In that location, the Functional Plan has been adjusted in the horizontal as well as the vertical alignment of the roadway to mitigate the impact to private property. In most cases, improved roadways should fit within the standard County road rights-of-way (40.0m for Class 1 and 2, and 30.0m for Class 3). However, there are a few select locations that have been identified on the plans where additional right-of-way, backsloping agreements, or modifications to ditch design may need to be considered in detailed design.

In addition to addressing cuts and fills, additional property will be required to accommodate the changes proposed in roadway alignments to improve rail crossings. These include railways crossings at Range Road 232, Range Road 233, and Township Road 514. Notably, the railway crossing on Township Road 510 has also been combined with a further network realignment with Range Road 231 to improve the railway crossing and several closely spaced intersections with poor sightlines near the railway crossing.

Where private lots are affected, land purchase will have to be considered in the evaluation process at the preliminary and detailed design phases. Standard County cross-section widths were used to identify potential right-of-way requirements along all roadways within the plan area.

8 Cost Summary

The opinion of probable costs in the following summary table provides a budget reference related to the proposed Functional Plan designs that have been shaped through public engagement and stakeholder interaction. The option for 4 lanes along Township 512, explored early in the project, caused concern to public respondents, was not favoured, and was ultimately removed as a design option through discussion with the County and with changes to technical background assumptions. The final designs, and costing, reflect providing 2 lanes for Township Road 512 as well as for all other roadways within the study area. The opinion of probable costs includes construction components only and a 50% contingency. Engineering design, construction administration and materials testing, as well as possible land acquisition costs, are additional.

Figure 9 - Functional Plan Cost Estimate

Roadway	Road Class	Total lanes width (m)	Shoulder width (m)	Total asphalt width (m)	X-Section	Length (m)	Cost (rounded, +/-50%)
TP 510	1	7.0	1.0	9.0	A	6,500	$ 10,930,000
TP 512	1	7.0	1.0	9.0	A	6,500	$ 11,220,000
TP 514	1	7.0	1.0	9.0	A	6,500	$ 10,880,000
TP 515	3	7.0	0.0	7.0	C	1,600	$ 2,250,000
RR 231	1	7.0	1.0	9.0	A	8,850	$ 15,360,000
RR 232	1	7.0	1.0	9.0	A	8,850	$ 14,710,000
RR 233	2	7.5	0.0	7.5	B	6,400	$ 9,620,000
RR 233	3	7.0	0.0	7.0	C	2,400	$ 3,470,000
RR 234	1	7.0	1.0	9.0	A	3,200	$ 5,360,000
RR 234	2	7.5	0.0	7.5	B	3,200	$ 4,810,000
RR 234	3	7.0	0.0	7.0	C	2,100	$ 3,040,000
Serv Rd West	3	7.0	0.0	7.0	C	1,800	$ 2,600,000
Serv Rd East	3	7.0	0.0	7.0	C	2,500	$ 3,490,000
					TOTALS	60,400	**$ 97,740,000**

9 Conclusions and Recommendations

9.1 Conclusions

The Functional Planning Study for South Strathcona County was completed over a period of approximately three years beginning in 2019. There were a number of challenges presented to the project team in the completion of the study. A significant challenge was the presence of Covid-19. The Public Engagement sessions had to be modified to meet restrictions placed on society with respect to in-person gatherings. Even with that unique challenge, there was significant and poignant public feedback that had a direct impact on the final designs.

The final designs were also shaped by the provincial forecast regarding the future development of highway interchanges on the periphery of the study area, along Highway 14 and Highway 21. Not having confirmation of interchange plans or construction within the study's scoped 30 year horizon meant that the initial traffic modelling had to be revised in the final iterations to ignore any potential new interchanges on these boundary highways.

The final traffic analysis for the 30 year horizon provided support for the improvements as indicated herein. The widening of Township Road 512 and sections of Range Road 232 to 4 lane roadways was supported by the initial modelling runs. However, with consideration of public engagement feedback, and incorporating Alberta Transportation's priority planning regarding interchange construction, the model was revised to maintain the existing highway intersections. The roadway network resulting from the model revision, as presented in the final functional plans, has only 2 lanes maintained on all roadways throughout the study area. But potential additional widening of those rights-of-way to protect for future lane additions, if/as they become necessary, remains a study recommendation.

Traffic modeling and geometric analysis indicate that there are no warrants for the provision of turning bays at any of the intersections within the study area. Two-way stop controls are anticipated to be sufficient at all intersections within the study area. However, to meet County Standards, acceleration and declaration tapers are included as improvements for country residential local road intersections with Class 1 County grid roads. Note that intersections with Highway 14 and Highway 21 are not within the scope of this study and are shown on plans with typical simple radii. Any changes or upgrades to the highway intersections will be the responsibility of Alberta Transportation.

Vertical profile adjustments have been identified on many roads in the study area to provide, at minimum, sight distance for an 80 km/h design speed. This will increase safety for all road users traveling along these roads. Some roads are also identified for widening to a standard Strathcona County Class 1 roadway with a 9.0 m asphalt surface, based on projected traffic volumes and operations. In some cases, additional right-of-way may be required from adjacent landowners. Typical County right-of-way widths are identified along all roadways within the plan area, including at all realignment locations.

Safety improvements have been identified at many rail crossings. These changes include horizontal road alignment changes to achieve better sightlines at these skewed intersections. Alignments have been selected to balance sightline improvements, land impacts, and costs. Simple realignments to accommodate the railway crossings are along Range Road 232, Range Road 233, and Township Road 512.

The rail crossing at Township Road 510 improvements also include network improvements to connect Township Road 510 with Range Road 231 to the north. This realignment improves sightlines at the railway crossing, simplifies the multiple closely-spaced intersections with poor sight distance near the railway, and minimizes the environmental impacts to the adjacent watercourse and environmentally sensitive areas.

The improvements proposed rely on the existing network arrangement within the study area and on its periphery. The existing highway intersections were included in the final modeling analysis as-is. Alberta Transportation does not currently have plans or funding to study or construct any interchanges near the study area. However, there are priority planning documents available from Alberta Transportation that indicate interchanges may be constructed in the future at the intersections of Range Road 232 and Highway 14 and at Township Road 512 and Highway 21. With the potential construction of these interchanges, other intersections may be closed. The intersections of Township Road 510 and Township Road 514 at Highway 21 would likely be closed with development of an interchange at Township Road 512. As well, the intersection of Range Road 231 at Highway 14 is likely to be closed if an interchange is developed on Range Road 232.

Should any of the highway intersections be upgraded or removed as described above, or plan to be, this functional planning study will have to be reviewed and likely updated to reflect the resulting changes in traffic movement.

9.2 Recommendations

It is recommended that the County adopt this Functional Planning Study as a template for roadway and intersection improvements in the study area for a timeline spanning approximately 30 years – the time horizon set for the traffic modeling. This recommendation is subject to changes to the highways and highway intersections near the study area. Any changes proposed by Alberta Transportation to the highways on the periphery of the study area will require a review and possible updating of this Functional Planning Study.

The functional plans identify standard County road rights-of-way (40.0m for Class 1 and 2, and 30.0m for Class 3). In locations where realignments are proposed, it is recommended that the County prioritize these locations for land acquisition and road reconstruction to improve safety at the railway crossings. In other locations, land acquisition could be approached on a case-by-case basis as adjacent properties redevelop or become subdivided, so as to reduce acquisition effort when roadways are scheduled for reconstruction.

When upgrades are scheduled to any of the county roads, it is recommended that the county begin the land purchase process as soon as possible to minimize potential delays due to issues arising from land purchasing.

It is recommended that the County continue discussions with CN Rail with respect to CN Rail's schedule for implementing their own planned at-grade crossing improvements. As well, further communication is warranted with respect to intersection improvements for cost sharing opportunities with CN Rail.