LOCAL ROAD HIGHWAY ACCESS PLAN – Onoway Area

Project Number: H5347 - 2021 Date: Mar. 15, 2022

Project: LOCAL ROAD HIGHWAY ACCESS PLAN – Onoway Area
Highway 43:22 & Highway 37:02, North & West of Onoway
Within Lac Ste. Anne County & Town of Onoway

Background: Alberta Transportation completed a Functional Planning Study of Highway 43 in June of 2013 and illustrated various Highway 43 and 37 improvements north and west of the Town of Onoway. These improvements suggested local road changes with the future highway improvements, realignments and connections. At this time, there was very little land use planning completed in the areas surrounding the highways and hence local road alignments and connections were not fully realized and therefore are now not conducive to municipality development requirements.

Overview: This document provides more thorough review of the land use planning and local road requirements in the areas surrounding Highway 43 & 37 in conjunction with the improvement phasing of the Functional Planning Study of Highway 43. This plan presents projection on how the municipalities will grow and how specific highway improvements will be required to facilitate this growth.

1. BACKGROUND

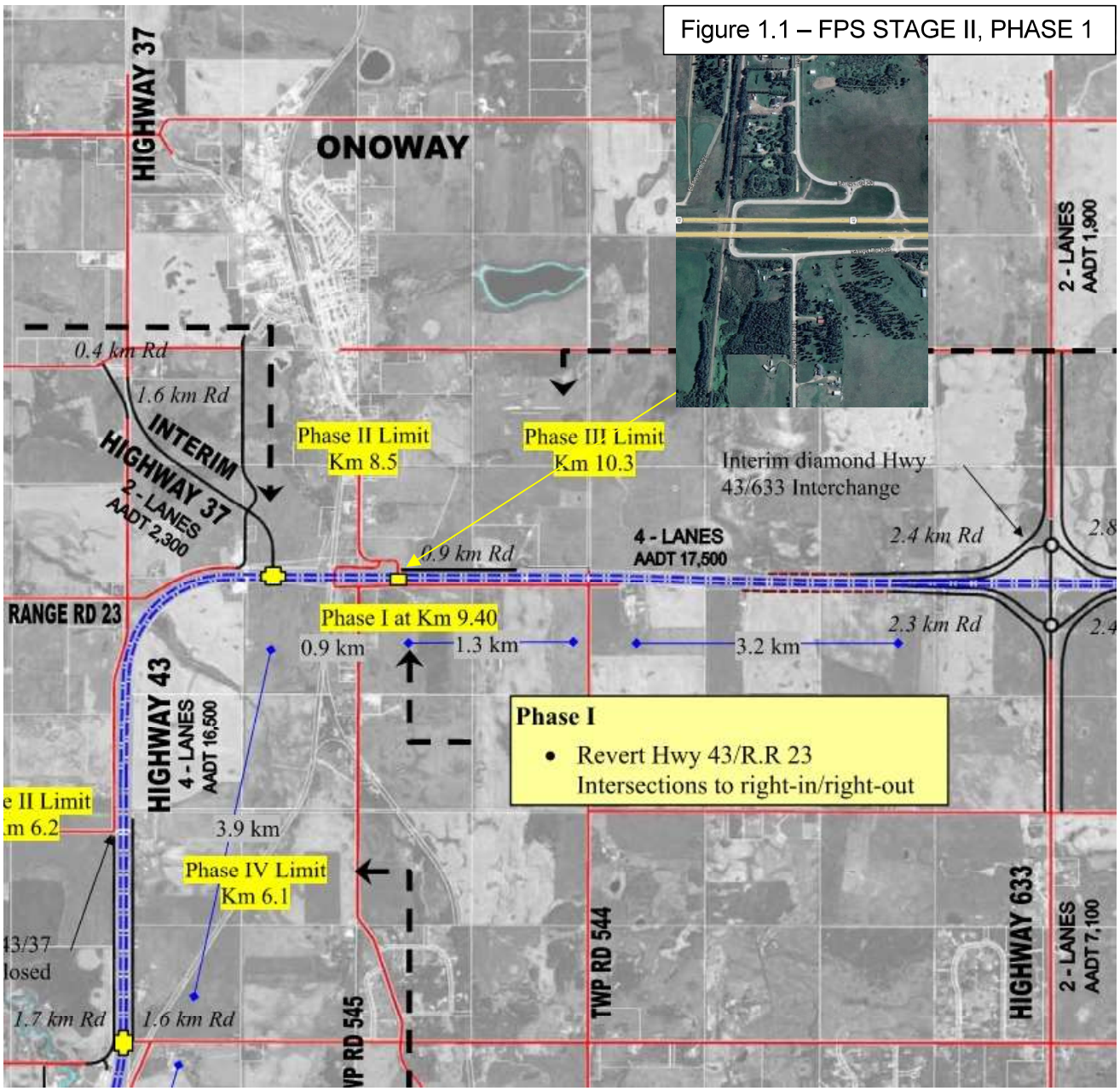
In June of 2013, Alberta Transportation formalized their preparation of the "Highway 43 (North of Highway 16 to Highway 33) Functional Planning Study, Alberta Transportation", prepared by CastleGlenn Consultants Inc. Of specific interest in this report is the how the future interchange with Highway 43 and Highway 37 will be phased in over the years. Highway 43 is classified as a Level 1 highway under the National Highway System and Highway 37 is classified as a Level 2 highway under Arterial Classification. Improvements are identified for the area from a Stage I "Immediate", to a Stage II "Interim" change to the final Stage III "Long Range" implementation strategy in order to safely accommodate growing traffic volumes along Highways 43 & 37. Phasing improvements, within each stage, are also identified within the Functional Planning Study that provide more detail. These improvements are likely to be made in conjunction with other phase improvements per Stage within the study area between North of Highway 16 to Highway 33. It is noted that presently some STAGE I improvements have already been made to date and some have not been made yet. Staging and Phasing details for the Onoway area are briefly

summarized below. There are no improvements required in the Onoway area for STAGE I.

STAGE II – Phase 1

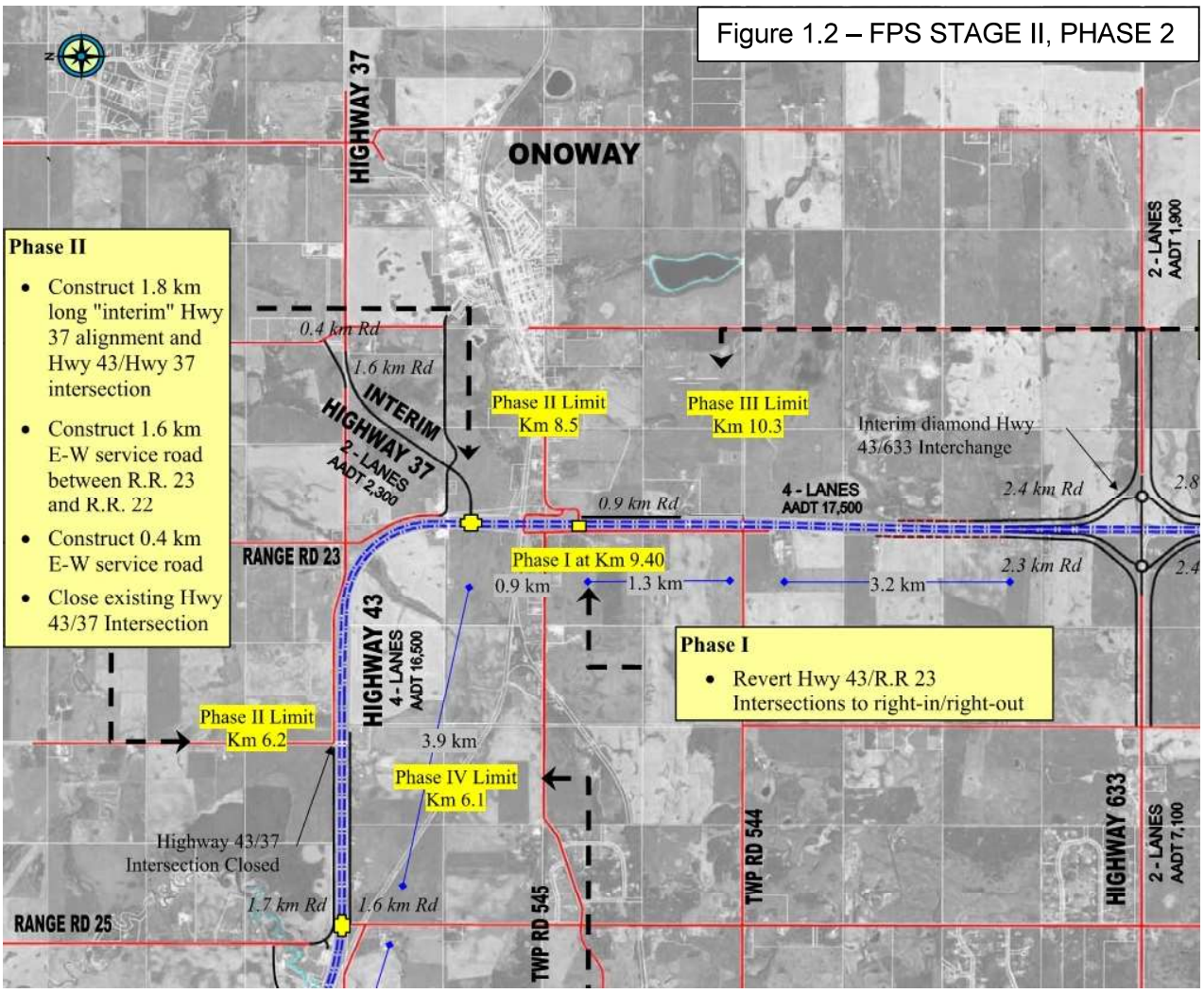
In this Phase 1 of the Functional Planning Study, the only improvement/change noted to be required is the partial closure of the Range Road 23 (Twp. Rd. 545) intersection to disallow left turns in or out. This improvement was made between 2014 and 2019 and is now only right-in right-out intersection in both directions along Highway 43. See below.

Figure 1.1 – FPS STAGE II, PHASE 1



STAGE II – Phase 2

Phase 2 of the Functional Planning Study proposes much more extensive changes to both the highway connectivity as well as the land use impact. The main change will be a 1.8 km of Highway 37 being realigned through two quarter sections of land directed west of Onoway to form a new intersection with Highway 43, north of Twp. Rd. 545 and north of the railway cross-over. See below. This realignment will also necessitate the addition of 2.0 km of new service roads to be constructed in order to connect existing local roads to the realigned Highway 37. This realignment is noted to be only an interim measure until STAGE III when a new interchange will be built. In addition to the Hwy. 37 re-alignment, Range Road 22 is being proposed for closure.

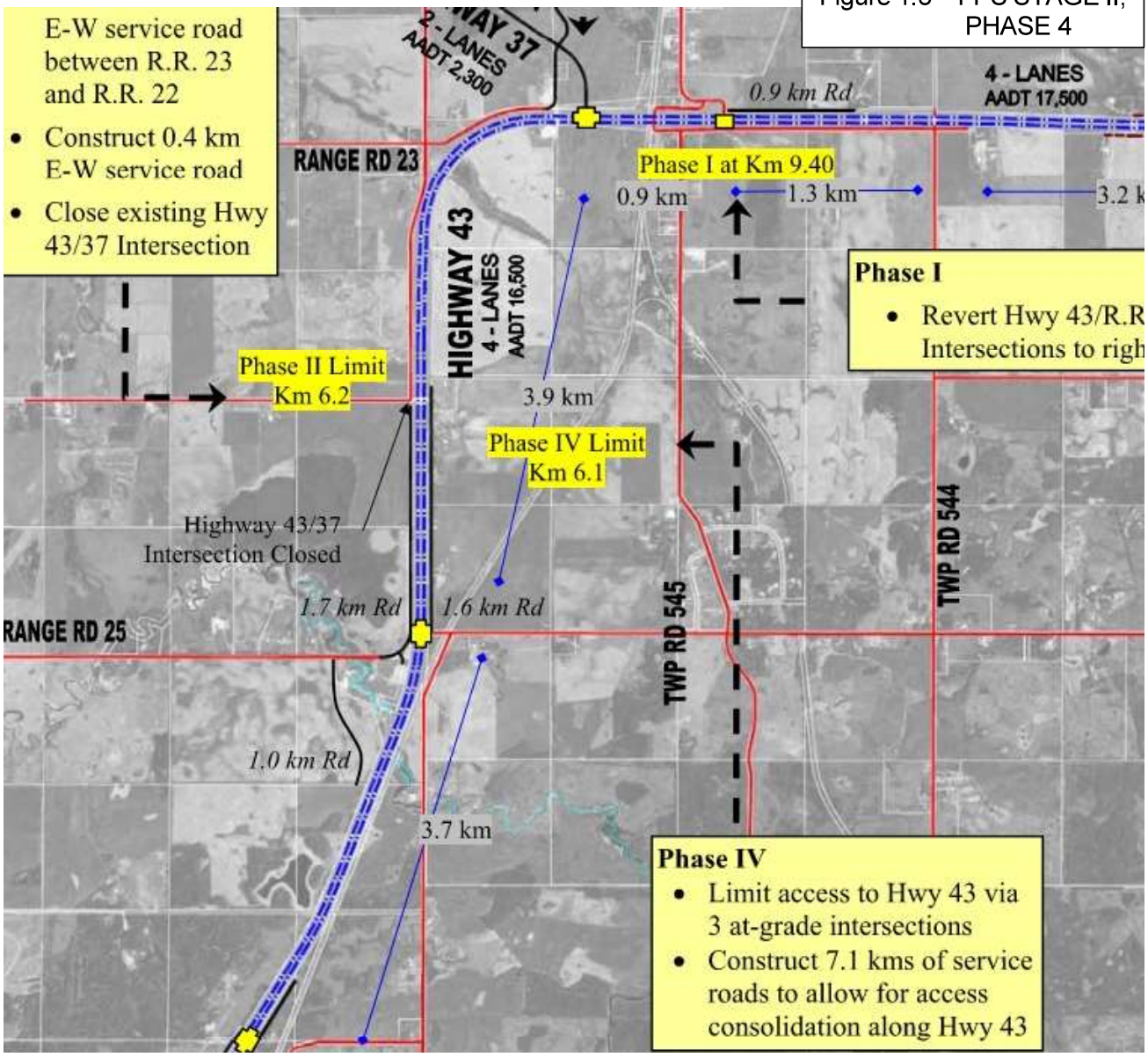


Further to the west, since Highway 37 has new connection elsewhere, the old existing Highway 37 and Highway 43 intersection at Range 24 can be closed. It is unclear at this time whether the Highway 37 intersection would just be de-gazetted with the intersection to Hwy. 43 remaining to be open for rural local road traffic on Rge. Rd. 24/Twp. Rd. 550, or completely closed. Overall, these changes are significant to area development.

STAGE II – Phase 4

Phase 4 involves the induction of access management in the area along Highway 43 in order to reach an Expressway level standard. For the Onoway area of interest, this includes closure of the Range Road 24 intersection with Highway 43 on both north and south sides. In conjunction with these closures, new service roads would be constructed to the west and connect to Range Road 25.

Figure 1.3 – FPS STAGE II, PHASE 4

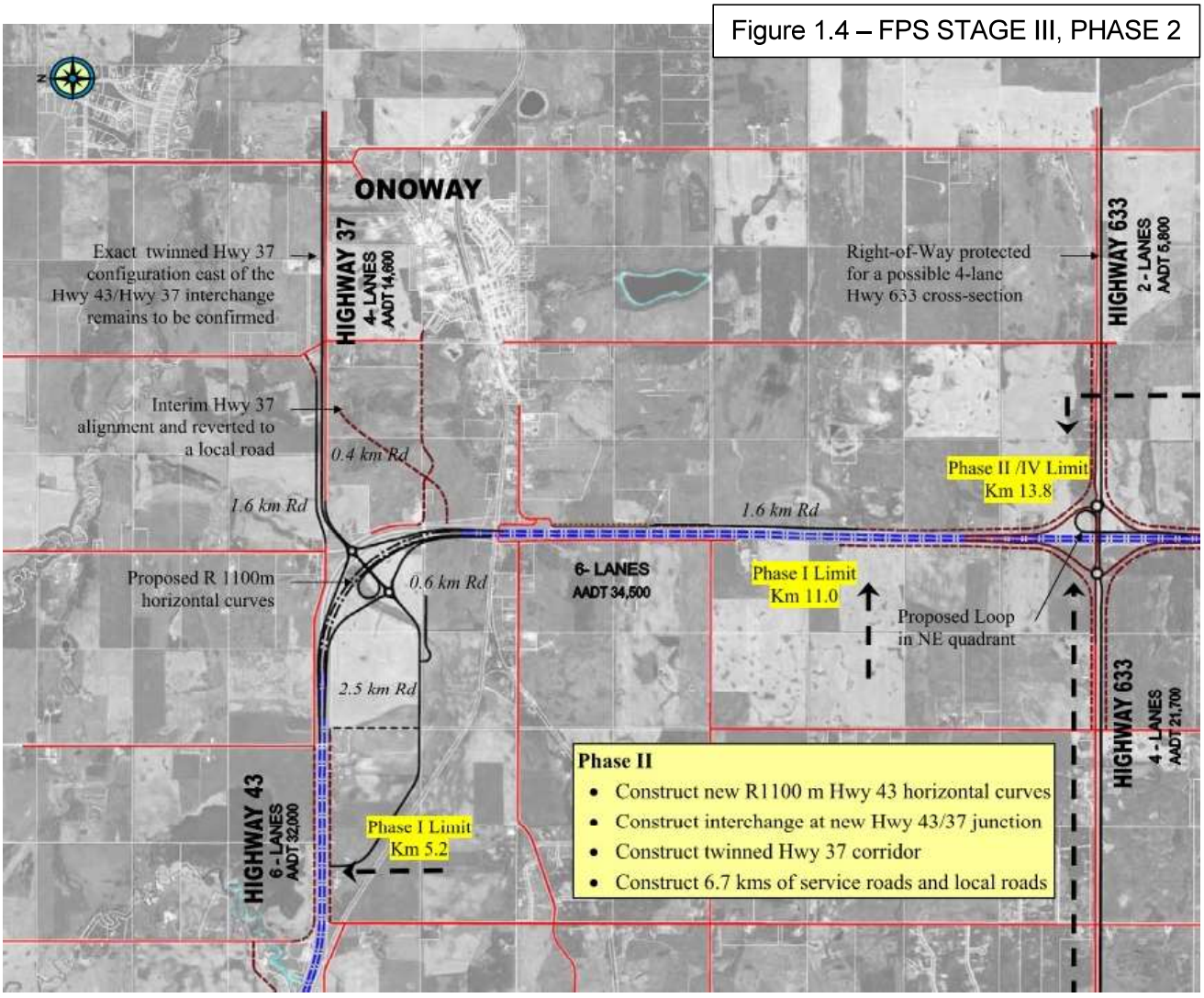


At this point, it is important to note that there will only be two access points available to the north and west Onoway area, Highway 37 and Range Road 25, and only two access points along Highway 37, Range Road 23 and the Timber Mart intersection. This will have significant affect on future development and how access to these developments can be made.

STAGE III – Phase 2

In STAGE III, the long-term component of the Functional Planning Study has been reached, with significant growth of traffic on Highway 43 and Highway 37. Timing of this can only be estimated to occur in 25 – 40 years. Phase II of this Stage, indicates construction of a new grade separated parclo interchange (with roundabouts) with flattened radii for Highway 43 and four-laning Highway 37. Highway 37 will be partially reverted back to its original alignment making the interim Hwy. 37 alignment turned back to the municipalities as a local road.

Figure 1.4 – FPS STAGE III, PHASE 2



In addition to the new interchange, several new service roads and local roads will be required to maintain connectivity. This includes local roads to the north of Highway 37 and local roads west of the new interchange.

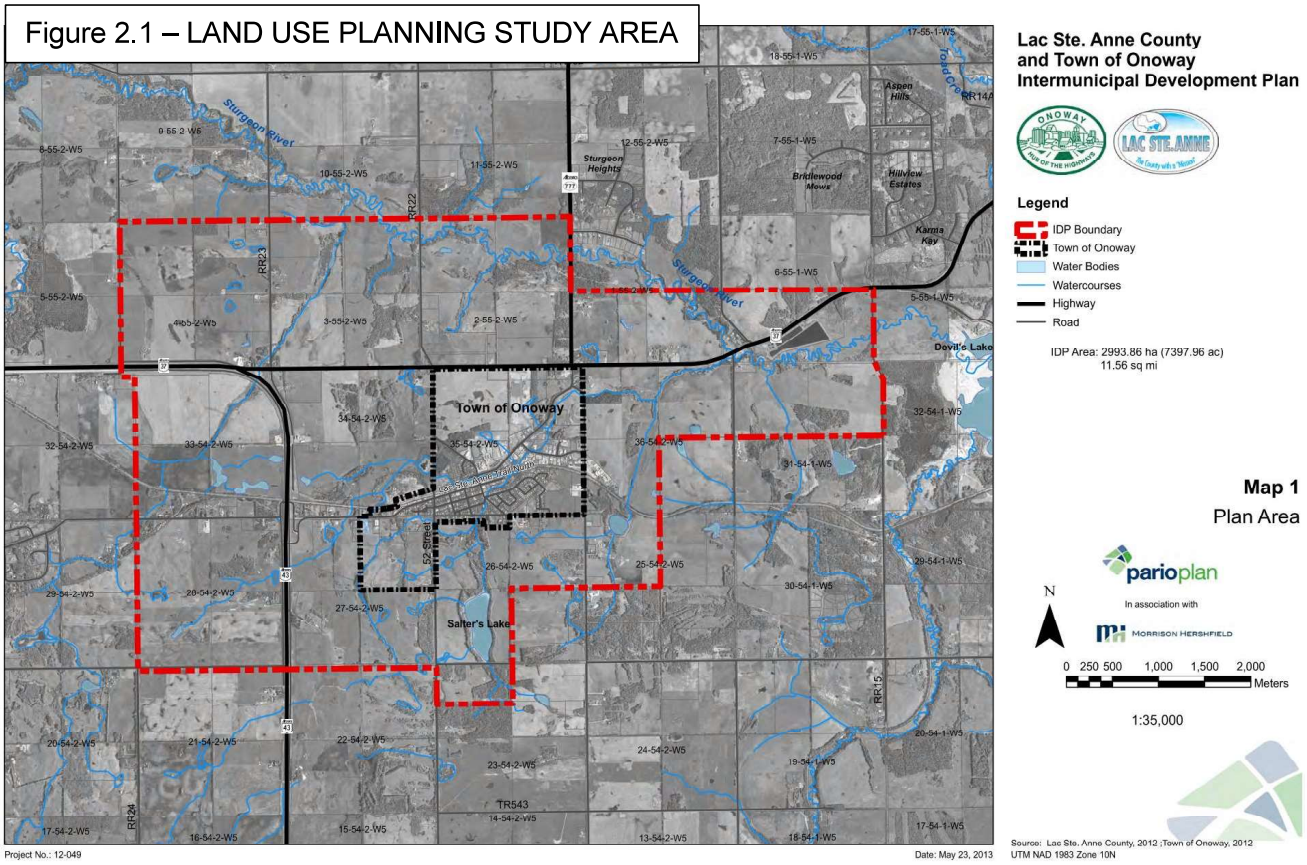
SUMMARY

These improvements have been based on how Alberta Transportation envisions the future to maintain its highways to an appropriate level of service for the growing traffic in the area. It is important to understand this plan and possibly build the greater surrounding area together in partnership and in conjunction with new development.

2. LAND USE PLANNING

Lac Ste. Anne County and the Town of Onoway completed an Intermunicipal Development Plan dated May 27, 2013. The plan area of review is shown below:

Figure 2.1 – LAND USE PLANNING STUDY AREA



The Town of Onoway also completed a new Municipal Development Plan dated September 202.

The Intermunicipal Development Plan addresses the proposed development land uses in the areas immediately adjacent to Highway 43 and Highway 37. The plans take into account existing infrastructure, natural features and some overall future transportation features.

Future land use plans from both documents are shown below:

Figure 2.2 – IDP FUTURE LAND USE CONCEPT

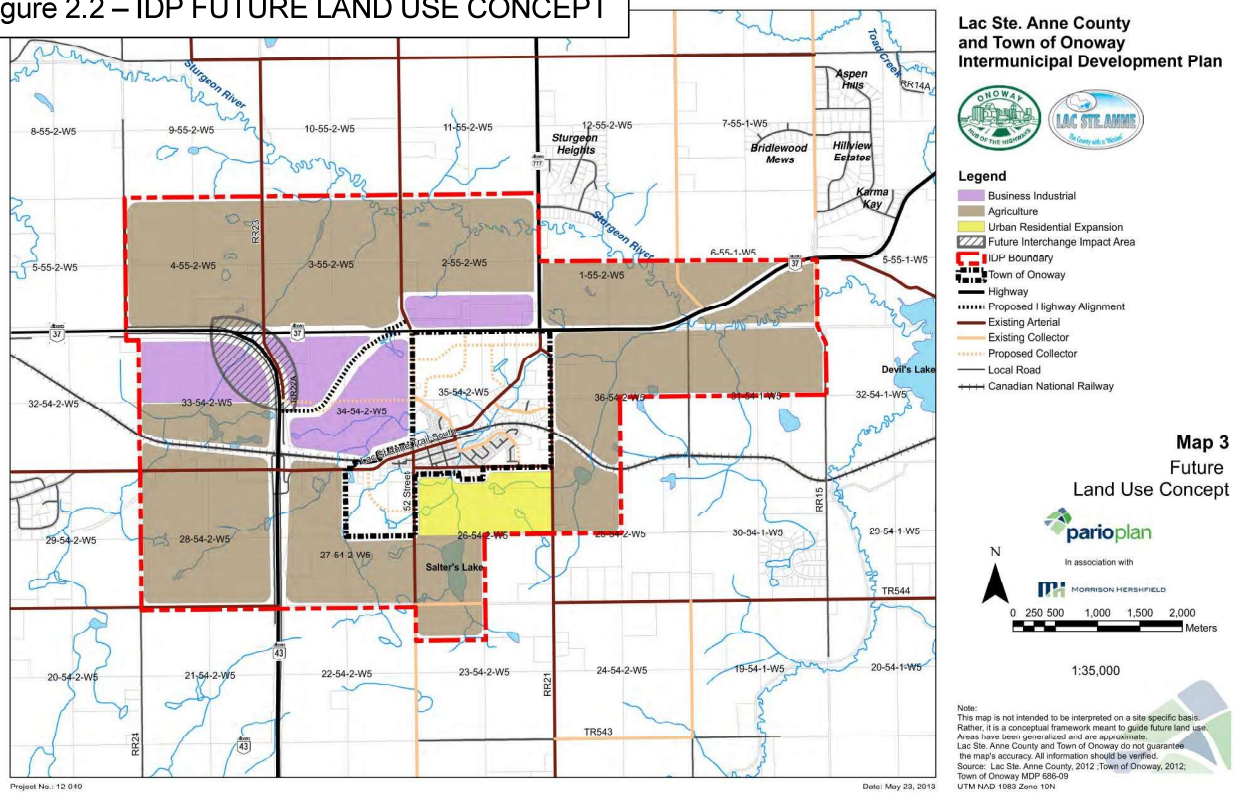
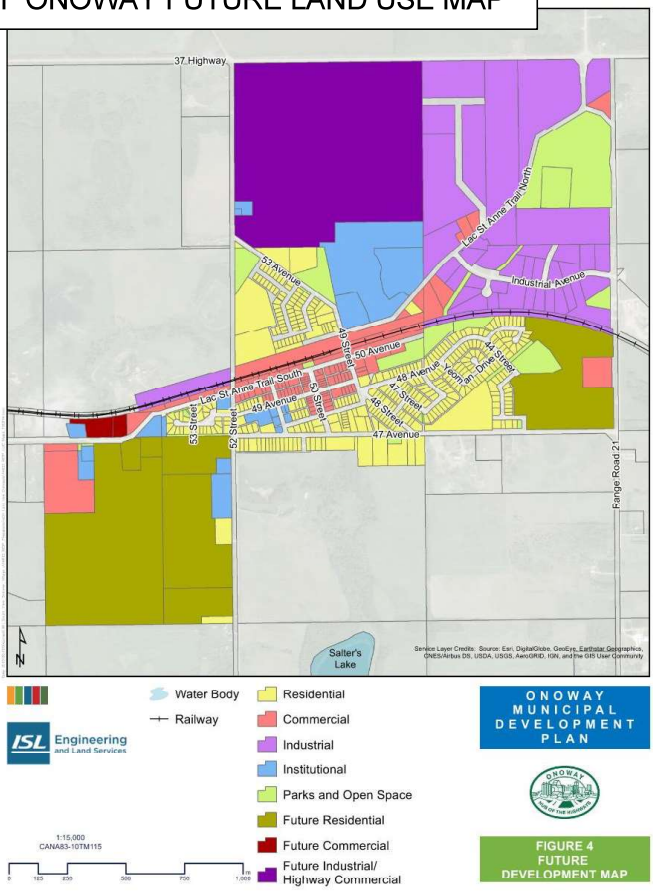


Figure 2.3 – TOWN OF ONOWAY FUTURE LAND USE MAP



In both plans, the land on the north and south sides of Highway 37 is being planned for "Business Industrial" and/or "Future Industrial/Highway Commercial" use. This is suggesting that Highway 37 from Hwy. 777 to the junction of Highway 43, will be a major corridor for Business, Commercial and Industrial traffic.

To the west of Highway 43, the area immediately adjacent to the highway will also have the potential for significant development during STAGE II and STAGE III of the Functional Planning Study.

Land use trip generation rates for these uses can be estimated as follows from examples:

Industrial

Daily Trip Generation:	15.00 trips/day/acre
AM Peak Hour:	1.60 trips/hour/acre
PM Peak Hour:	1.40 trips/hour/acre

Highway Commercial

Daily Trip Generation:	275.0 trips/day/acre
AM Peak Hour:	26.0 trips/hour/acre
PM Peak Hour:	24.0 trips/hour/acre

Business (50% of Highway Commercial)

Daily Trip Generation:	137.5 trips/day/acre
AM Peak Hour:	13.0 trips/hour/acre
PM Peak Hour:	12.0 trips/hour/acre

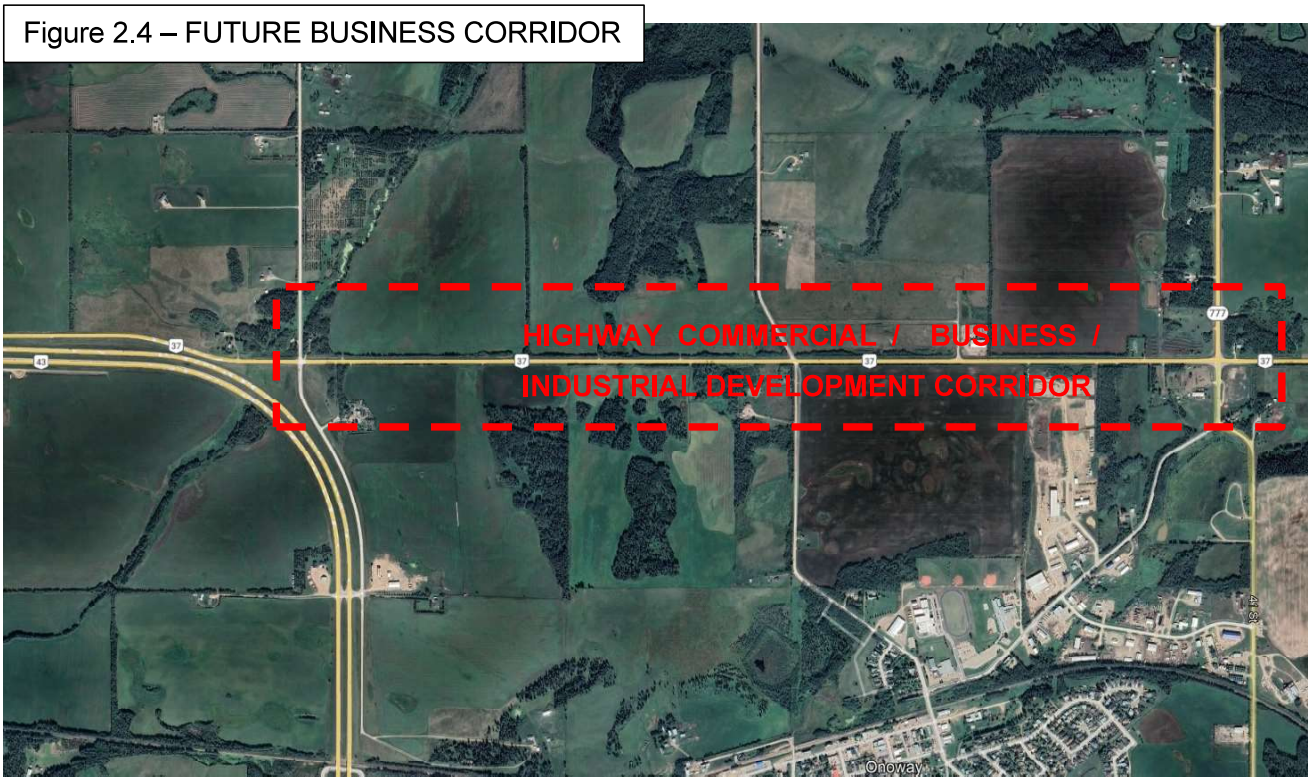
The area surrounding Highway 37 with this potential type of development is estimate to include approximately 350 – 400 ha (865 – 990 acres) which is estimate to produce the follow traffic volumes:

930 acres X 80% x 15.00 trips/day/acre =	11,200 trips /day
930 acres X 5% x 275.00 trips/day/acre =	12,800 trips /day
930 acres X 15% x 137.50 trips/day/acre =	19,200 trips /day
TOTAL:	43,200 trips/ day

Presently, the AADT on Highway is approximately 11,000 south of Twp. Rd. 545 and 2,000 on Highway 37.

These projections illustrate the need for **consideration of a special area or "Business Corridor" through the section of Highway 37** from Highway 777 to the junction of Highway 43 in the future. See below:

Figure 2.4 – FUTURE BUSINESS CORRIDOR



Regardless of the STAGE or Phase of the Functional Planning Study, this development area will need more access than what is shown in the Study as it is being promoted to grow by both municipalities and is prime focus for land development for the greater area. This will be discussed further in the following sections in regards to speed limits, intersection locations, intersection spacing and intersection treatments.

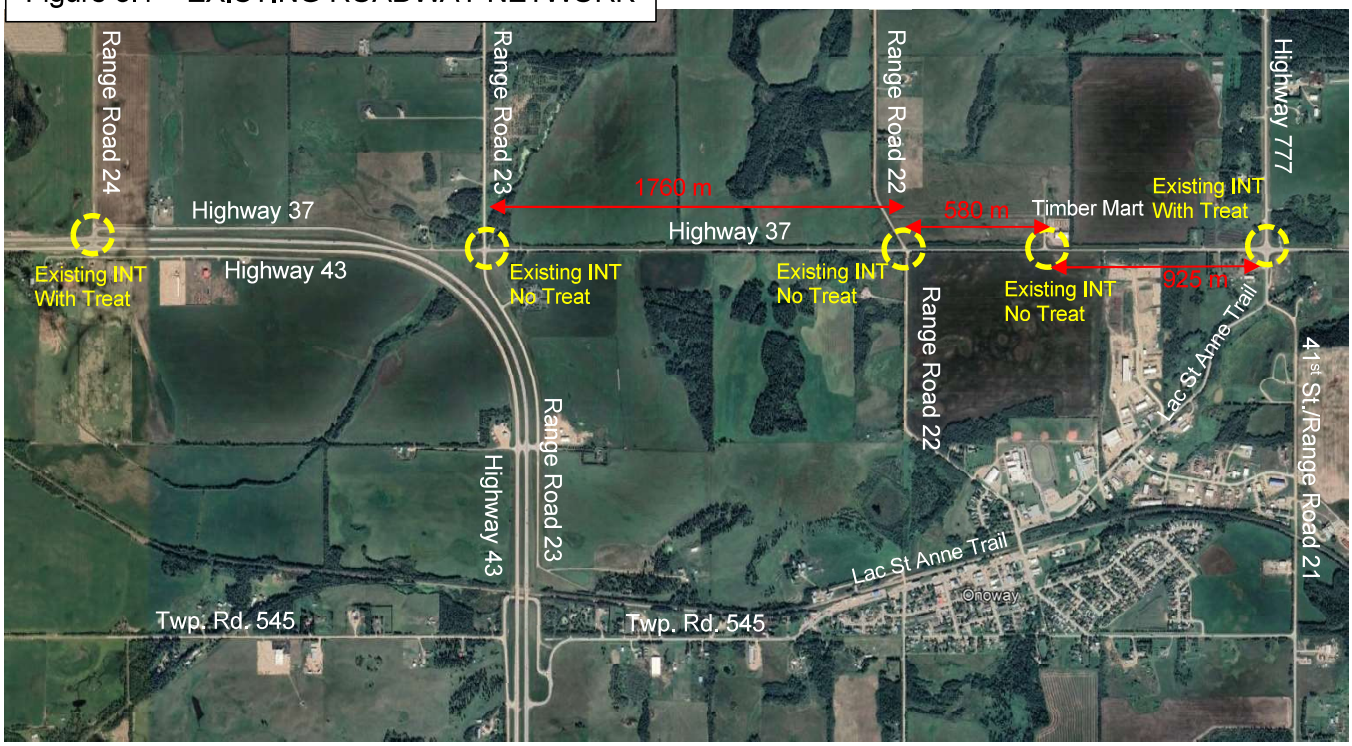
3. EXISTING ROADWAY NETWORK

The existing roadway network surrounding the proposed Business Corridor (Highway Commercial / Business / Industrial Development) comprises of the existing two-lane Highway 37 (Twp. Rd. 550).

In order to provide access to the Timber Mart development between Hwy. 777 and Rge. Rd. 22, an intersection was previously allowed onto Highway 37. This has created an intersection spacing of only 580m to the west to Rge. Rd. 22 and 925m to the east to Hwy. 777.

Alberta Transportation's standard for development intersectional spacing for a Rural Arterial highway is ideally 1,600m (Table 1.5 Access Management By Design Classification). This is basically allowing an intersection at every range road crossing on Highway 37. This will likely be challenging for the type of development planned for this area.

Figure 3.1 – EXISTING ROADWAY NETWORK



Alberta Infrastructure
HIGHWAY GEOMETRIC DESIGN GUIDE AUGUST 1999

Table I.5 Access Management by Design Classification

Access Type	Design Classification						
	Freeways	Major Expressways	Expressways	Major Arterials	Minor Arterials	Collectors	Local Roads
Public Road	Full access control is required on freeways. No at-grade intersections are allowed.	Allow existing intersections to remain on temporary basis. Remove when upgrading highway. Discourage new intersections. Minimum spacing 1.6 km.	Consider new access based upon demonstrated need. Minimum spacing 1.6 km.	Maintain minimum spacing of 1.6 km.	Desirable spacing between accesses is 1.6 km.	If a development is bordered by two roadways of different classifications, access should be provided from the lower classification roadway. The desirable spacing between public road intersections is 1.6 km. One access per ¼ section (800 m) is desirable but some situations may warrant a maximum of two. Private means of access should be located at least 400 m from a major intersection (an intersection with another collector or higher classification roadway). A spacing of 800m between approaches is desirable. The distance between approaches should be at least 150 m. Utilizing a joint access should be considered. Attempts should be made to remove all redundant field approaches.	The main function of a local road is land access. A maximum of two accesses per ¼ section is desirable. If more than two accesses are requested, joint accesses should be utilized. Proliferation of accesses should be avoided. Offset intersections should be avoided. Geometric standards should be considered when locating access points. For roads carrying traffic with speeds >60 km/h a maximum of two accesses per ¼ section is desirable. For speeds ≤ 60 km/h a higher number of access points may be allowed.
Highway Commercial	Highway exit and entrance ramps considered. No at-grade intersections are allowed.	Developments <1.6 km from existing or future interchange, access via interchange from minor road only. Developments >1.6 km from existing or future interchange may operate independently. Must be served by one-way highway exit and entrance ramps.	Avoid development at intersection of major public road with expressway unless it is a confirmed interchange location. Encourage development to access minor road only. May consider right-in/right-out access in conjunction with minor road access. Minimum spacing is	Access must be compatible with future access management plans. All requests for access shall be referred to Executive Director, Planning Services Branch.	Do not allow access within 400 m of a public road allowance to allow for adequate intersection spacing (see Figure I.5.5.2). Allow maximum of two accesses per development (minimum spacing of 150 m) subject to design considerations.		
Rural Industrial	Full access control is required on freeways. No at-grade intersections are allowed.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads. Discourage spot development in favor of industrial parks.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads. Discourage spot developments in favor of industrial parks.	Existing access may remain on temporary basis. Remove when upgrading highway. Provide indirect access for new developments by existing public roads. Discourage spot development in favor of industrial parks.	Existing access may remain on temporary basis. May remove when upgrading highway. Provide indirect access by existing public roads. Discourage spot development in favor of industrial parks.		
Rural Recreational	Full access control is required on freeways. No at-grade intersections are allowed.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads. See Figure I.5.1.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. provide indirect access by existing public roads.	Existing access may remain on temporary basis. Remove when upgrading highway. Provide indirect access for new developments by existing public roads.	Existing access may remain on temporary basis. May remove when upgrading highway. Preferably, should provide indirect access by existing public roads. May allow direct access but not within 400 m from a public road intersection. Development tends to be site		
Multi Country Residential	Full access control is required on freeways. No at-grade intersections are allowed	Existing access may remain on temporary basis. Remove when up upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads	Existing access may remain on temporary basis. Remove when upgrading highway. Provide indirect access for new developments by existing public roads.	Existing access may remain on temporary basis. May remove when upgrading highway. Provide indirect access by existing public roads.		
Farmstead	Full access control is required on freeways. No at-grade intersections are allowed.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new farmsteads. Provide indirect access by existing public roads.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit new direct access for new farmsteads. Provide indirect access by existing public roads or may consider joint use of existing direct access.	Existing access may remain on temporary basis. May remove when upgrading highway. Encourage indirect access via public road system. Limit of one direct access per ¼ section is permissible if lack of alternate local road access. May consider joint use of existing direct	Limit of one access per ¼ section is desirable. Accesses should be >400 m from the public road intersection or another access. New access should not be allowed where farmstead exists on ¼ section. Should consider access via local road or joint use of existing direct access.		
Field	Full access control is required on freeways. No at-grade intersections are allowed.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads.	Existing access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new developments. Provide indirect access by existing public roads.	Access from field should be via the public road system. Do not convert existing accesses to other uses. Try to remove redundant field accesses. May consider new approaches where there is a demonstrated need (e.g., where physical barriers such as creeks or ravines exist).	Access from field should be via the public road system whenever possible. Do not convert existing accesses to other uses. Try to remove redundant field accesses. May consider new approaches where there is a demonstrated need (e.g., where physical barriers such as		
Utility	Full access control is required on freeways. No at-grade intersections are allowed	Existing direct access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new utility installations. Provide indirect access by existing public roads.	Existing direct access may remain on temporary basis. Remove when upgrading highway. Do not permit direct access for new utility installations. Provide indirect access by existing public roads. May considered a right-in/right-out access.	Existing direct access may remain on temporary basis. Remove when upgrading highway. Provide indirect access for new developments by existing public roads. May permit direct access if traffic is limited and infrequent. May consider joint use of existing access.	Access should be via the public road system or use on existing access. May permit direct access if traffic is limited and infrequent.		
Resource	Full access control is required on freeways. No at-grade intersections are allowed.	Provide indirect access by existing public roads. May consider temporary means of access. Developer may be required to provide access compatible with freeway/expressway standards.	Should provide indirect access by existing public roads. May consider temporary means of access. Developer may be required to provide access compatible with expressway standards.	May permit temporary access. Permanent access should be off the local road and be compatible with future expressway/freeway plans and standards.	May permit a new access but should consider access to a lower category roadway or joint use of an existing access. May permit temporary access during site preparation and drilling. If development becomes permanent, developer must relocate access.		

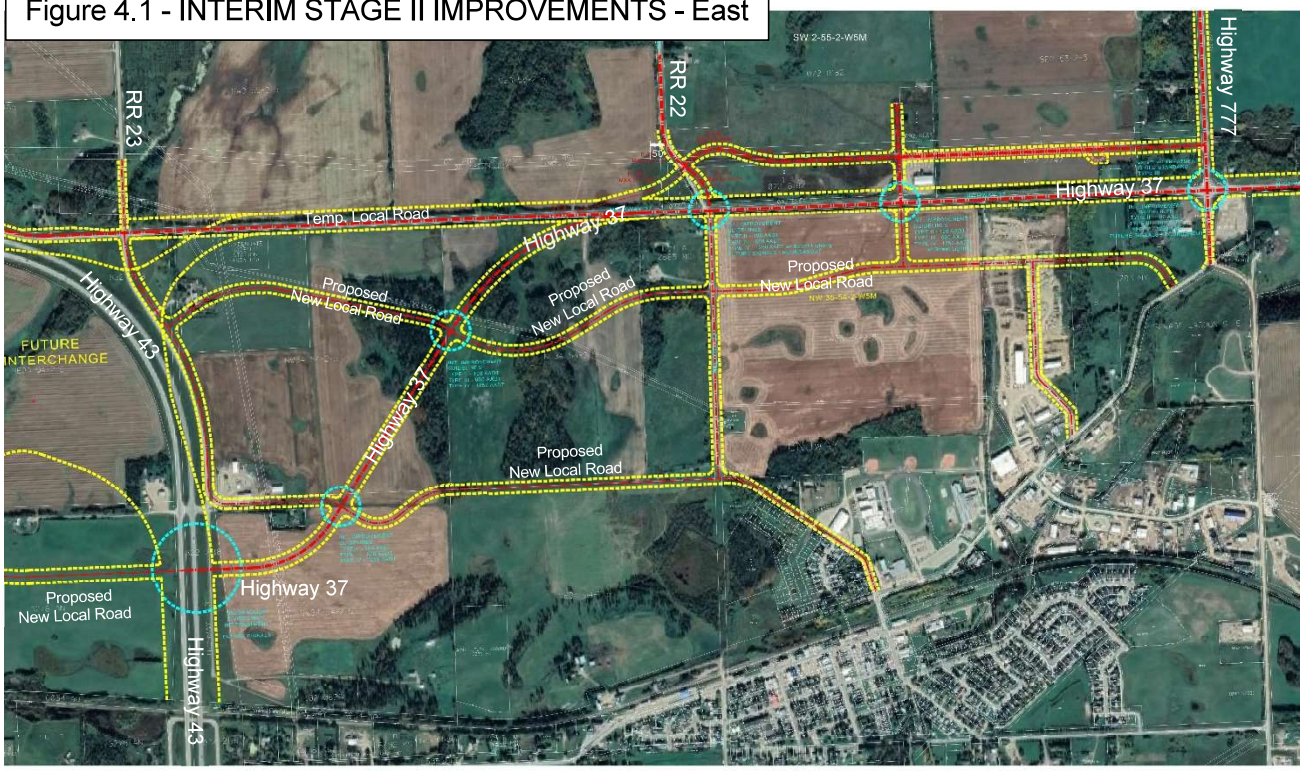
ACCESS MANAGEMENT GUIDELINES I-31

4. FUTURE ROADWAY NETWORK

Alberta Transportation is proposing to implement improvements to Highway 37 and Highway 43 in multiple stages and phases. There are two stages that significantly affect the proposed development area; STAGE II, an interim stage that includes re-alignment of Highway 37 with Highway 43 and STAGE III, an ultimate stage that includes a new grade separated interchange between Highway 37 and Highway 43. These conceptual changes are shown in the Figures below.

Along with the Highway re-alignments, the municipalities are also considering local road connections to the highways during each of these highway improvement stages and phases. These are also shown below in conjunction.

Figure 4.1 - INTERIM STAGE II IMPROVEMENTS - East



With the proposed Highway 37 re-alignment through the N½ of 34-54-2-W5M, future access onto Highway 37 will change during this stage. The above proposed new local roadway network is only conceptual (by the County and Town) and not approved by Alberta Transportation yet. Alberta Transportation's conceptual Functional Planning drawings do not allow for any local road intersections between Rge. Rd. 23/Twp. Rd. 545 and the Timber Mart intersection. The Range Road 22 intersection was under considered to be closed. However, this new local roadway network shown above is to be submitted to Alberta Transportation for review as proposed by Lac Ste. Anne County and the Town of Onoway. The area between Highway 43 and Highway 777 is being considered as a "**Business Corridor**" in which there is merit for speed reductions and increased number of intersections due to the

higher density of development and traffic volumes. This area will resemble more of a semi-urban highway segment that is adjacent to a major juncture with a future Expressway and Freeway in Highway 43. It can provide servicing to the travelling public on both Highway 43 and Highway 37. This "Business Corridor" can be an important service point for travellers and the local economy that is consolidated to in one location that has access to full infrastructure services.

Below is the interim local roadway planning to the west of the future Highway 43 interchange. In this area, access is already restricted to the south due to the railway running in an east-west direction. This limits local road connectivity especially if the Range Road 24 and 25 intersections to Highway 43 are closed. This in return will require an extensive addition and realignment of local roads in the area, along with relocated railway crossings. There is also a significant portion of land that will need to be protected for the future interchange which will change how development can occur in and around the future interchange. The Figure below illustrates a local road network that can be utilized during both the Interim Stage II improvements and the Long-Range Stage III improvements. The timing of the closure of Range Road 24 will impact the area significantly and will need to be coordinated so that the service road to the west is built first to allow traffic to access Highway 43 from Rge. Rd. 25.

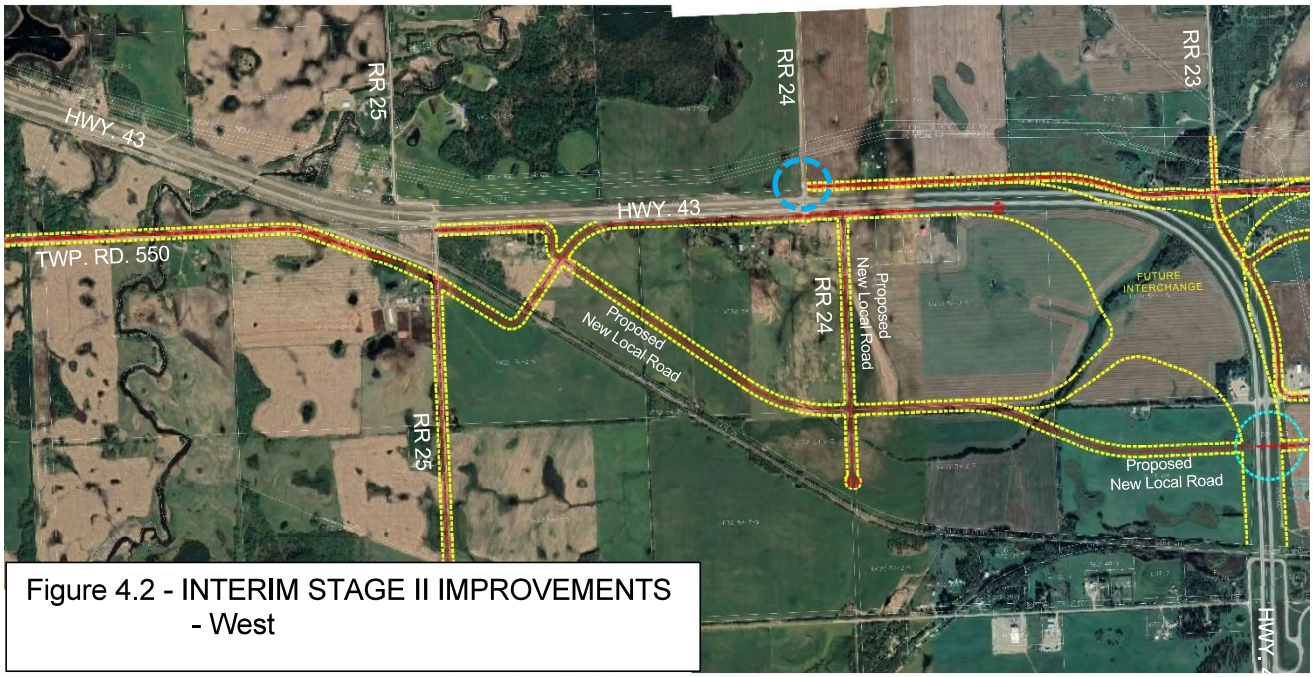


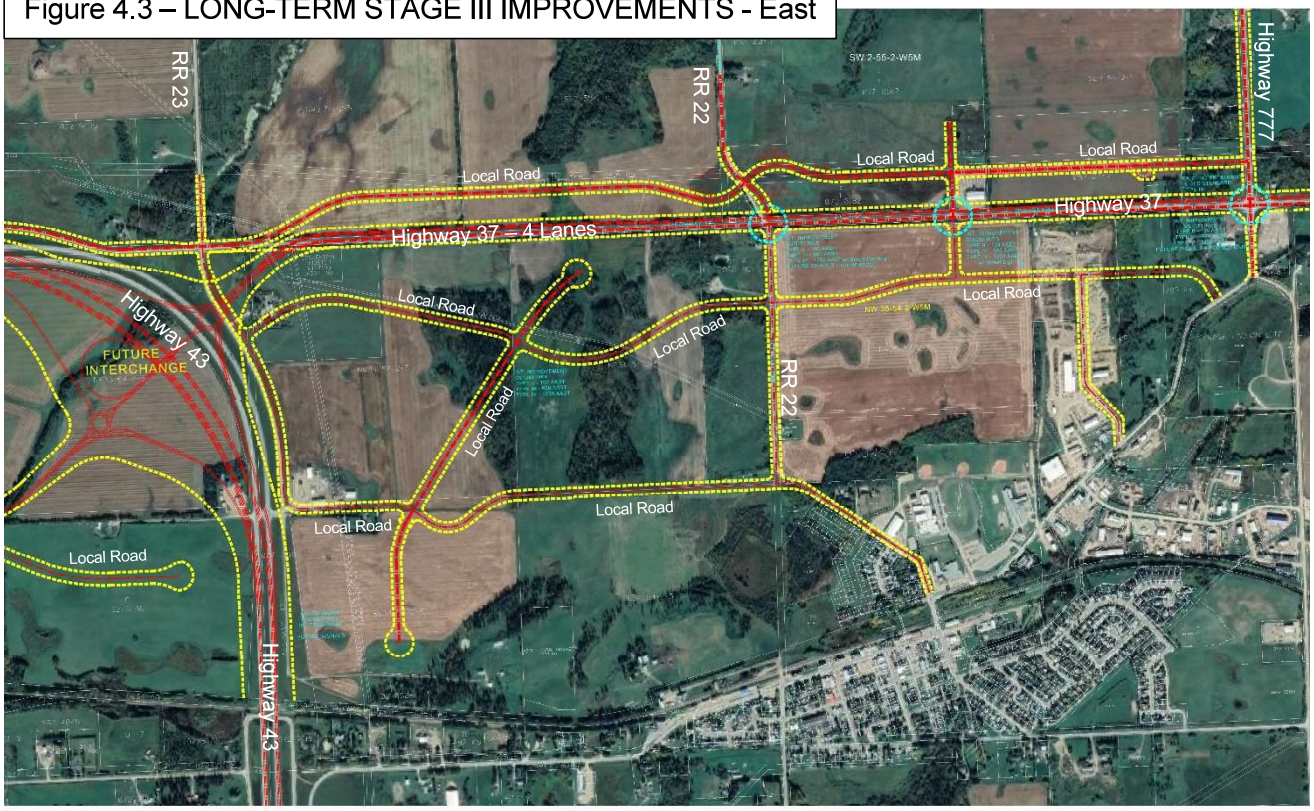
Figure 4.2 - INTERIM STAGE II IMPROVEMENTS - West

Long Range staging by Alberta Transportation includes a new grade separated interchange with roundabouts at the top of east and west ramps. In this Ultimate Stage, the old Highway 37 alignment to the north is reverted back to its original alignment, which again will affect the area and access to the "Business Corridor". See Figures below.

It is important when planning for this area north and west of Onoway, that the Ultimate footprint of the interchange and highway/roadway connections be considered and protected during future development. Some areas that are required temporarily for the Interim Stage will become available for development once the Ultimate Stage has been implemented.

In review of the "Business Corridor" operation, if the Range Road 22 intersection onto Highway 37 is removed, the only access to the "Business Corridor" area will only be from the Timber Mart intersection which is approximately 2.5 km away from the future interchange. This would make it quite difficult for accessing this proposed business, commercial and industrial area and hence hamper development opportunities as well as lower attraction to businesses and customers driving by.

Figure 4.3 – LONG-TERM STAGE III IMPROVEMENTS - East



Ultimately, the Range Road 22 junction will become the most frequently used intersection within this "Business Corridor" local road network system. For this reason, it is strongly proposed that Range Road 22 be maintained as an intersection to Highway 37 in the interim and long term of Alberta Transportation's planning.

The next access point to the west to the north side of the "Business Corridor" will be located at Range Road 25 or the Highway 33 interchange. Again, this is a significant distance of travel to access the proposed "Business Corridor" by Onoway. See Figure below.

These Figures illustrate how the interim local roadway network will be integrated with long range local roadway network with the future Highway 43 interchange.

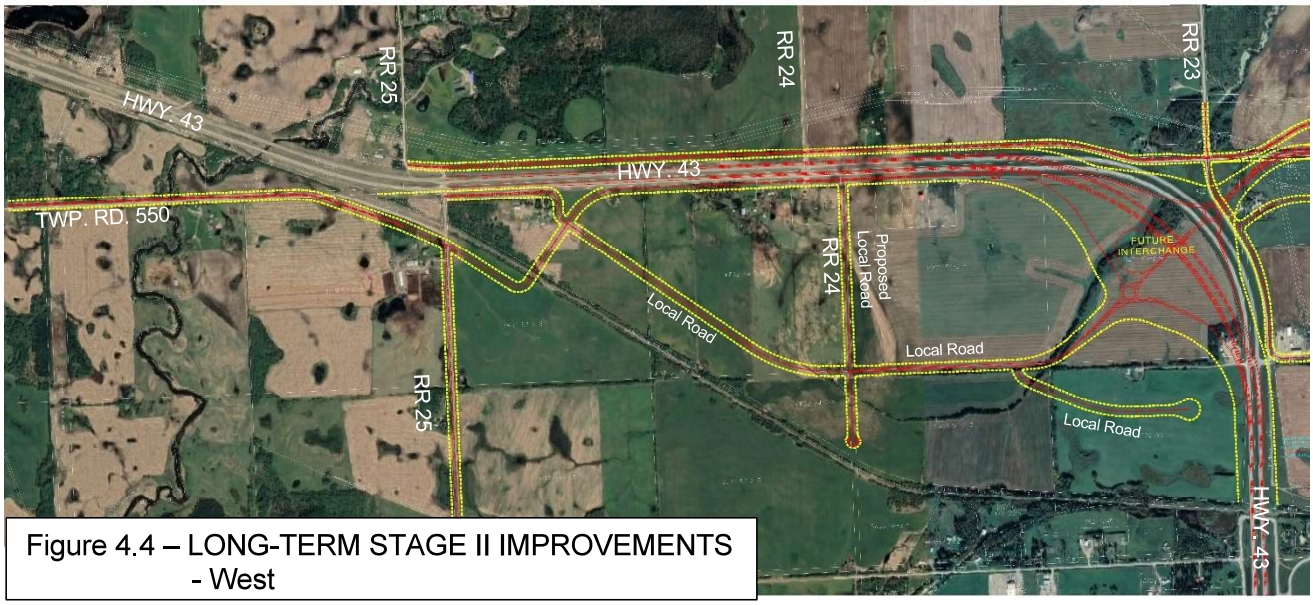


Figure 4.4 – LONG-TERM STAGE II IMPROVEMENTS - West

5. URBAN HIGHWAY STANDARDS

The section of Highway 37:02 from Hwy. 777 to Hwy. 43 is being proposed as a "Business Corridor" that will contain a higher-than-normal density of industrial, highway commercial and business type of development for both sides of the highway. Since the location is immediately adjacent to the Town of Onoway, full infrastructure servicing (water, sewer, power, etc.) is available to this area and is being presented as a key focus point of both municipalities (Lac Ste. Anne County and Town of Onoway) for future economic development.

For these reasons, this segment should be considered as a semi-urban to urban type of highway. Alberta Transportation has published a supplement to their Highway Geometric Design Guide for Urban Highways in the province. This Urban Supplement indicates that for Major Arterial Urban Highways that a design speed of 60-100 km/h can be used, traffic volumes in the range of 5,000 – 30,000 veh/day, and the minimum intersection spacing of 400m. See Table U.A.1 below.

Further to this, the Table indicates that on Divided Arterials, a right-in right-out intersection without a median opening may be permitted at a minimum distance of 100m from an adjacent all-direction intersection.

Table U.A.1 Typical Characteristics of Urban Roadways for New Construction

	Freeways	Expressways	Arterials		Collectors		Locals	
			Major	Minor	Residential Indust./Comm.		Residential Indust./Comm.	
Highway Service Classification	Class 1A Class 1B	Class 1A Class 1B	Class 1A Class 1B Class 2	Class 1B Class 2 Class 3	Class 2 Class 3		Not applicable	
Traffic service function	Optimum mobility	Traffic movement	Traffic movement	Traffic movement	Traffic movement and land access of equal importance		Traffic movement secondary consideration	
Land service / access	No access	No access	Rigid access control	Some access control	Traffic movement and land access of equal importance		Land access primary function	
Traffic volume (veh/day) (typical)	>20,000	>10,000	5,000-30,000	3,000-20,000	<8,000	1,000-12,000	<1,000	<3,000
Flow characteristics	Free-flow (grade separated)	Uninterrupted flow except at signals	Uninterrupted flow except at signals and crosswalks		Interrupted flow		Interrupted flow	
Design speed (km/h)	80-130	80-130	60-100	50-80	50-70		30-60	
Average running speeds (km/h) (off-peak)	70-110	60-90	50-90	40-60	30-70		20-40	
Vehicle type	All types up to 20% trucks	All types up to 20% trucks	All types up to 20% trucks	All types	Passenger and service vehicles	All types	Passenger and service vehicles	All types
Desirable connections	Grade Separated Only	Arterials, expressways. freeways	Collectors, arterials, expressways, freeways		Locals, collectors, arterials		Public lanes, locals, collectors	
Transit service	Express buses only	Express buses only	Express and local buses permitted		Permitted		Generally avoided	
Accommodation of cyclists	None	No separate bikeway	Lane widening or separate facilities desirable		No restrictions or special facilities		No restrictions or special facilities	
Accommodation of pedestrians	None	No separate walkway	Sidewalks may be provided with separation from traffic lanes preferred		Sidewalks provided both sides	Sidewalks provided where required	Sidewalks normally on one or both sides	Sidewalks provided where required
Parking (typically)	Prohibited	Prohibited	Prohibited	Peak hour restrictions	Few restrictions other than peak hour		No restrictions or restrictions one side only	
Min. intersection spacing[1] (m)	3,200 (between interchanges)	800	400[4]	200[4]	60		60	
Right-of-way width (m) (typically)	>60[3]	>45[3]	20[2] - 45[3]		20-24		15-22	
Number of Basic Lanes	≥4 for LOS	≥4 for LOS	2-4		≤6,000 AADT – 2 >6,000 AADT – 4		2	

Notes:
1. Designers should refer to Alberta Transportation's Access Management Guidelines for determination of the allowable spacing for each classification.
2. Arterial rights-of-way 20 m in width applicable to retrofit conditions only.
3. Wider rights-of-way are often required to accommodate other facilities such as utilities, noise mitigation installations, bikeways, and landscaping. For new streets, the immediate provision of wider rights-of-way may be considered to accommodate such facilities.
4. On divided Arterials, a right-in, right-out intersection without a median opening may be permitted at a minimum distance of 100 m from an adjacent all-direction intersection.

Since this Urban Standard has been made published by Alberta Transportation, this standard should make for strong consideration for the proposed "Business Corridor".

6. CONCLUSION

6.1 Summary

Lac Ste. Anne County and the Town of Onoway are proposing significant industrial, highway commercial and business development north and west of Onoway, along Highway 37 and to the west of Highway 43 called the "Business Corridor". A future conceptual local road network has been prepared for submission to Alberta Transportation for further communication of access management and how the local road network will transition with Alberta Transportation's Functional Planning Study proposed staged improvements for the area.

Of particular concern is lack of future access to this "Business Corridor" of which both municipalities have set as one of their key economic development growth areas. Without adequate access, the potential of this area will not be realized and hence limit the opportunities for this important rural area to grow and negate a future waypoint for long distance travellers along this national highway system.

In this report, is has been suggested that the Range Road 22 intersection, along with the Timber Mart intersection be maintained as all-directional accesses to the Long-Term Stage of the Functional Planning Study using Urban Highway Design Standards that reduces the posted speed in the area as well as allows a reduced spacing of all-directional intersections.

In summary, the municipalities are requesting for this allowance of an Urban Standard to be used on Highway 37:02 between Highway 777 and Highway 43, along with the local road network being proposed.

6.2 Closure

We trust the information provided meets your present requirements. Should any questions arise, please contact our office at your convenience.

Darcy O. Paulichuk, P. Eng.

June 13, 2022

APEGGA Permit to Practice Number: P12132
D&A Paulichuk Consulting Ltd.

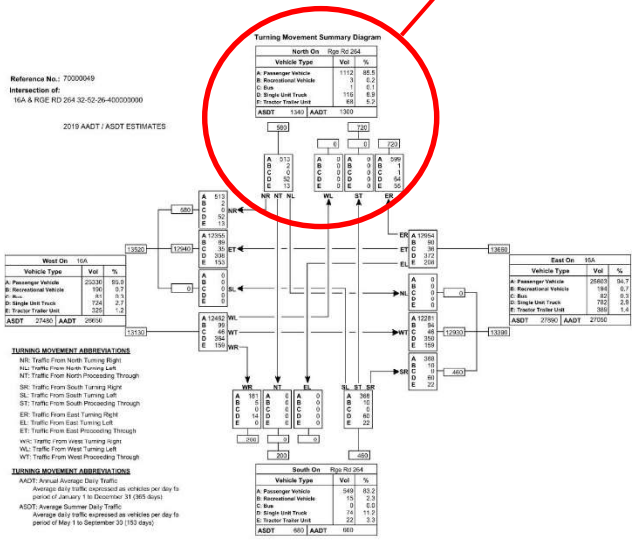
APPENDIX A

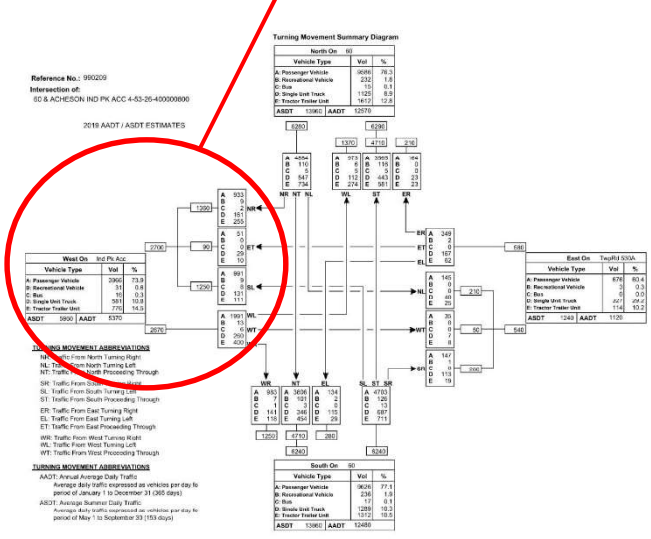
TRIP GENERATION RATE CALCULATION EXAMPLES

INDUSTRIAL TRIP GENERATION – Typical Simulation Example

The following locations can be used to determine appropriate trip generation rates for this land used.

Acheson Industrial Park (Ellis Industrial Park area) that is already developed as follows:





Daily Trip Generation = 6670 trips/day / 547.0 acres = 12.2 trips/day/acre (50% In/50% Out)

AM Peak Hour Trip Generation = 932 trips/hour / 547.0 acres = 1.70 trips/hour/acre (75% In/25% Out)

PM Peak Hour Trip Generation = 876 trips/hour / 547.0 acres = 1.60 trips/hour/acre (25% In/75% Out)

East Edson Industrial Park – See Appendix B for details

Daily Trip Generation = 2160 trips/day / 138.4 acres = 15.61 trips/day/acre
(50% In/50% Out)
AM Peak Hour Trip Generation = 207 trips/hour / 138.4 acres = 1.50 trips/hour/acre
(51% In/49% Out)
PM Peak Hour Trip Generation = 236 trips/hour / 138.4 acres = 1.71 trips/hour/acre
(58% In/42% Out)

Red Deer Junction Industrial Park – See Appendix B for details

Daily Trip Generation = 1378 trips/day / 252.0 acres = 5.5 trips/day/acre
(50% In/50% Out)
AM Peak Hour Trip Generation = 216 trips/hour / 252.0 acres = 0.86 trips/hour/acre
(85% In/15% Out)
PM Peak Hour Trip Generation = 119 trips/hour / 252.0 acres = 0.47 trips/hour/acre
(30% In/70% Out)

Drayton Valley West Industrial Park – See Appendix B for details

Daily Trip Generation = 1530 trips/day / 90.73 acres = 16.9 trips/day/acre
(50% In/50% Out)
AM Peak Hour Trip Generation = 188 trips/hour / 90.73 acres = 2.07 trips/hour/acre
(46% In/54% Out)
PM Peak Hour Trip Generation = 146 trips/hour / 90.73 acres = 1.61 trips/hour/acre
(34% In/66% Out)

It summary, it appears reasonable to use the average of the above four examples as results as follows:

Daily Trip Generation = 6670 trips/day / 547.0 acres = 12.2 trips/day/acre
(50% In/50% Out)
AM Peak Hour Trip Generation = 665 trips/hour / 547.0 acres = 1.316 trips/hour/acre
(50% In/50% Out)
PM Peak Hour Trip Generation = 564 trips/hour / 547.0 acres = 1.116 trips/hour/acre
(50% In/50% Out)

Allowing for variances, some contingencies and the estimation technique used above, the following trip generation rates will be used:

INDUSTRIAL

For the **Daily Trip Generation** a rate of **15.0 trips/day/acre** will be used with a 50% In/50% Out split which is above the average of the four above local Alberta examples (average = 12.6 trips/day/acre).

For the **AM Peak Hour**, a rate of **1.60 trips/hour/acre** will be used which is above the average of the four above values (average = 1.53 trips/hour/acre) with a 70% In/30% Out split.

For the **PM Peak Hour**, a rate of **1.40 trips/hour/acre** will be used which is above the average of the four above values (average = 1.35 trips/hour/acre) with a 30% In/70% Out split.

COMMERCIAL TRIP GENERATION – Typical Simulation Example

There is little available data for Commercial type land use developments since these locations are usually mixed with other business, industrial and residential development in the near area or on connecting roadways. For this reason, it is more practical to formulate a collection of likely type of commercial developments within an arbitrary area and calculate reasonable trip generation rates from this conglomeration. This is detailed as follows:

Typical Types of Commercial Development in the Mayerthorpe Area is assumed below:

Tractor Supply Store	700m2 (7,500 ft2)
Construction Equipment Rental Store	740m2 (8,000 ft2)
Building Materials and Lumber Store	600m2 (6,500 ft2)
Variety Store	510m2 (5,500 ft2)
Hardware/Paint Store	560m2 (6,000 ft2)
Automobile Sales (Used)	325m2 (3,500 ft2)
Automobile Parts Sales	600m2 (6,500 ft2)
Tire Store	650m2 (7,000 ft2)
Convenience Store with Gasoline Station:	280m2 (3,000 ft2)
Small Office Buildings (5 @ 4,000 ft2 each)	1860m2 (20,000 ft2)
Liquor Store:	280m2 (3,000 ft2)
Walk-in Bank	280m2 (3,000 ft2)
Hair Salon	230m2 (2,500 ft2)
Fast Casual Restaurant	370m2 (4,000 ft2)
Fast-Food Restaurant with Drive-Thru Window	370m2 (4,000 ft2)
TOTAL:	**8,360 m2 (90,000 ft2)**

Building coverage on the gross land area is estimated to be 25%. Using this percentage, the amount of gross land needed for the above developments is:

0.836 ha (2.066 acres) ÷ 25% coverage of building space ÷ 75% for roads/MR/PUL
= 4.459 ha (11.019 acres)

Calculations of the trip generation for the typical types of commercial developments is shown in the tables below. From the table calculations, the following trip generation rates are provided:

Daily Trip Generation = 3462 trips/day / 11.019 acres = 314.2 trips/day/acre
AM Peak Hour Trip Generation = 343 trips/hour / 11.019 acres = 31.13 trips/hour/acre
PM Peak Hour Trip Generation = 371 trips/hour / 11.019 acres = 33.67 trips/hour/acre

Allowing for variances, some contingencies and the estimation technique used above, the following trip generation rates will be used:

COMMERCIAL

For the **Daily Trip Generation** a rate of **315.0 trips/day/acre** will be used with a 50% In/50% Out split and 126.0 trips/hour/acre for Primary Traffic and 189.0 trips/hour/acre for Pass-By Traffic (40%/60% Split).

For the **AM Peak Hour**, a rate of **32.0 trips/hour/acre** will be used with a 60% In/40% Out split and 12.8 trips/hour/acre for Primary Traffic and 19.2 trips/hour/acre for Pass-By Traffic (40%/60% Split).

For the **PM Peak Hour**, a rate of **34.0 trips/hour/acre** will be used with a 40% In/60% Out split and 13.6 trips/hour/acre for Primary Traffic and 20.4 trips/hour/acre for Pass-By Traffic (40%/60% Split).

TABLE 4.3.2a Commercial Land Uses: TRIP GENERATION - Daily

LAND USE	ITE Land Use	NO.	Reduction from Large Urban to Small Urban	Primary Trip %	Pass-By Trip %	Daily				
						Rate	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
Tractor Supply Store	810 Tractor Supply Store	7,500 ft²	75%	100%	0%	14.0*	50% 50% 50%	40 40 0	50% 50% 50%	40 40 0
Construction Equipment Rental Store	811 Construction Equipment Rental	8,000 ft²	75%	100%	0%	10.22	50% 50% 50%	29 29 0	50% 50% 50%	29 29 0
Building Materials and Lumber Store	812 Building Materials & Lumber Store	6,500 ft²	100%	100%	0%	18.05	50% 50% 50%	59 59 0	50% 50% 50%	59 59 0
Variety Store	814 Variety Store	5,500 ft²	65%	100%	0%	63.47	50% 50% 50%	114 114 0	50% 50% 50%	114 114 0
Hardware/Paint Store	816 Hardware/Paint Store	6,000 ft²	100%	100%	0%	9.14	50% 50% 50%	28 28 0	50% 50% 50%	28 28 0
Automobile Sales (Used)	841 Automobile Sales (Used)	3,500 ft²	75%	100%	0%	27.06	50% 50% 50%	36 36 0	50% 50% 50%	36 36 0
Automobile Parts Sales	843 Automobile Parts Sales	6,500 ft²	35%	100%	0%	55.34	50% 50% 50%	63 63 0	50% 50% 50%	63 63 0
Tire Store	848 Tire Store	7,000 ft²	50%	100%	0%	28.52	50% 50% 50%	50 50 0	50% 50% 50%	50 50 0

Convenience Store with Gasoline Pumps	853 Convenience Store with Gasoline Pumps	3,000 ft²	25%	750%	25%	624.20	50% 50% 50%	234 176 58	50% 50% 50%	234 176 58
Small Office Buildings (5)	712 Small Office Building	20,000 ft²	100%	100%	0%	16.19	50% 50% 50%	162 162 0	50% 50% 50%	162 162 0
Liquor Store	899 Liquor Store	3,000 ft²	75%	100%	0%	101.49	50% 50% 50%	114 114 0	50% 50% 50%	114 114 0
Walk-In Bank	911 Walk-In Bank	3,000 ft²	50%	100%	0%	121.3**	50% 50% 50%	91 91 0	50% 50% 50%	91 91 0
Hair Salon	918 Hair Salon	2,500 ft²	100%	100%	0%	13.30*	50% 50% 50%	17 17 0	50% 50% 50%	17 17 0
Fast Casual Restaurant	930 Fast Casual Restaurant	4,000 ft²	50%	75%	25%	315.17	50% 50% 50%	316 237 79	50% 50% 50%	316 237 79
Fast-Food Restaurant with Drive-Thru Window	934 Fast-Food Restaurant with Drive-Thru Window	4,000 ft²	40%	50%	50%	470.95	50% 50% 50%	378 189 189	50% 50% 50%	378 189 189
TOTAL							**1731 / 1463 / 268**		**1731 / 1463 / 268**	
							3462 / 2926 / 536			

*Note: A Daily Rate for this Land Use was not available in the ITE Manual. Therefore, the Peak Hour of Adjacent Street Traffic between 7 – 9am and 4 – 6 pm were averaged and multiplied by 10 for the Daily Rate.

**Note: A Daily Rate for this Land Use and the Peak Hour of Adjacent Street Traffic between 7 – 9am were not available in the ITE Manual. Therefore, the Peak Hour of Adjacent Street Traffic between 4 – 6 pm was multiplied by 10 for the Daily Rate.

TABLE 4.3.2b Commercial Land Uses: TRIP GENERATION – Peak Hours

Land Use	Units	Reduction from Large Urban to Small Urban	AM Peak Hour							PM Peak Hour						
			Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)		Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
Tractor Supply Store	7,500 ft²	75%	1.40*	100%	0%	66%	5 5 0	34%	3 3 0	1.40*	100%	0%	48%	4 4 0	52%	4 4 0
Construction Equipment Rental Store	8,000 ft²	100%	0.99	100%	0%	73%	6 6 0	27%	2 2 0	0.99	100%	0%	32%	3 3 0	68%	5 5 0
Building Materials and Lumber Store	6,500 ft²	100%	1.57	100%	0%	63%	7 7 0	73%	4 4 0	2.06	100%	0%	47%	7 7 0	53%	7 7 0
Variety Store	5,500 ft²	65%	3.18	100%	0%	57%	8 8 0	43%	6 6 0	6.84	100%	0%	52%	8 8 0	48%	7 7 0
Hardware/Paint Store	6,000 ft²	100%	1.08	100%	0%	54%	4 4 0	46%	3 3 0	2.68	100%	0%	47%	8 8 0	53%	8 8 0
Automobile Sales (Used)	3,500 ft²	75%	2.13	100%	0%	76%	6 6 0	24%	2 2 0	3.75	100%	0%	47%	5 5 0	53%	5 5 0
Automobile Parts Sales	6,500 ft²	50%	2.59	100%	0%	55%	5 5 0	45%	4 4 0	4.91	100%	0%	48%	8 8 0	52%	8 8 0
Tire Store	7,000 ft²	50%	2.72	100%	0%	64%	6 6 0	36%	4 4 0	3.98	100%	0%	43%	6 6 0	57%	8 8 0
Convenience Store with Gasoline Pumps	3,000 ft²	25%	40.59	100%	0%	50%	16 16 0	50%	16 16 0	49.29	100%	0%	50%	19 19 0	50%	19 19 0
Small Office Buildings (5)	20,000 ft²	100%	1.92	100%	0%	83%	32 32 0	18%	7 7 0	2.45	100%	0%	32%	16 16 0	68%	33 33 0
Liquor Store	3,000	75%	16.37	100%	0%	50%	19	50%	19	16.37	100%	0%	50%	19	50%	19

Land Use	Units	Reduction from Large Urban to Small Urban	AM Peak Hour							PM Peak Hour						
			Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)		Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
	ft^2						19 0		19 0					19 0		19 0
Walk-In Bank	3,000 ft^2	50%	12.13*	100%	0%	56%	10 10 0	44%	8 8 0	12.13	100%	0%	44%	8 8 0	56%	10 10 0
Hair Salon	2,500 ft^2	100%	1.21	100%	0%	80%	2 2 0	20%	1 1 0	1.45	100%	0%	17%	1 1 0	83%	3 3 0
Fast Casual Restaurant	4,000 ft^2	100%	14.13	75%	25%	55%	31 23 8	45%	26 19 7	14.13	75%	25%	55%	31 23 8	45%	26 19 7
Fast-Food Restaurant with Drive-Thru Window	4,000 ft^2	50%	40.19	50%	50%	51%	41 21 20	49%	40 20 20	32.67	50%	50%	52%	34 17 17	48%	32 16 16
Total						**198 170 28**		**145 118 27**					**177 152 25**		**194 171 23**	
						343 288 55							**371 323 48**			

*Note: Using the same rate as Peak Hour of Adjacent Street Traffic between 4 – 6 pm since no Peak Hour of Adjacent Street Traffic between 7 – 9am rate available in ITE Manual.

HIGHWAY COMMERCIAL TRIP GENERATION – Typical Simulation Example

There is little available data for Highway Commercial type land use developments since these locations are usually mixed with other business, industrial and residential development in the near area or on connecting roadways. For this reason, it is more practical to formulate a collection of likely type of commercial developments within an arbitrary area and calculate reasonable trip generation rates from this conglomeration. This is detailed as follows:

Typical Types of Highway Commercial Development in the Mayerthorpe Area is assumed below:

Fast-Food Restaurant with Drive-Thru Window	370m2 (4,000 ft2)
Fast-Food Restaurant with Drive-Thru Window	370m2 (4,000 ft2)
Super Convenience Market/Gas Station:	280m2 (5,000 ft2)
Truck Stop	600m2 (12,000 ft2)
Automobile Care Center	510m2 (7,500 ft2)
Self-Service Car Wash	560m2 (6,000 ft2)
Tire Store	650m2 (6,000 ft2)
Liquor Store	280m2 (3,000 ft2)
Fast Casual Restaurant	370m2 (4,000 ft2)
Business Hotel	3700m2 (40,000 ft2)
Motel	2800m2 (30,000 ft2)
Quick Lubrication Vehicle Stop	370m2 (3,000 ft2)
TOTAL:	**11,570 m2 (124,500 ft2)**

Building coverage on the gross land area is estimated to be 20% due to large truck and tractor trailer usage. Using this percentage, the amount of gross land needed for the above developments is:

1.157 ha (2.860 acres) ÷ 20%*coverage of building space ÷ 75% for roads/MR/PUL
= 7.71 ha (19.067 acres)

Calculations of the trip generation for the typical types of highway commercial developments is shown in the tables below. From the table calculations, the following trip generation rates are provided:

Daily Trip Generation = 5206 trips/day / 19.067 acres = 273.0 trips/day/acre
AM Peak Hour Trip Generation = 488 trips/hour / 19.067 acres = 25.59 trips/hour/acre
PM Peak Hour Trip Generation = 444 trips/hour / 19.067 acres = 23.29 trips/hour/acre

Allowing for variances, some contingencies and the estimation technique used above, the following trip generation rates will be used:

*-

Note: 20% building space used since highway commercial lots tend to have more space due to large tractor trailer usage.

HIGHWAY COMMERCIAL

For the **Daily Trip Generation** a rate of **275.0 trips/day/acre** will be used with a 50% In/50% Out split and 82.5 trips/hour/acre for Primary Traffic and 192.5 trips/hour/acre for Pass-By Traffic (30%/70% Split).

For the **AM Peak Hour**, a rate of **26.0 trips/hour/acre** will be used with a 50% In/50% Out split and a 7.80 trips/hour/acre for Primary Traffic and 18.20 trips/hour/acre for Pass-By Traffic (30%/70% Split).

For the **PM Peak Hour**, a rate of **24.0 trips/hour/acre** will be used with a 50% In/50% Out split and a 7.20 trips/hour/acre for Primary Traffic and 16.80 trips/hour/acre for Pass-By Traffic (30%/70% Split).

TABLE 4.3.2a Highway Commercial Land Uses: TRIP GENERATION - Daily

LAND USE	ITE Land Use	NO.	Reduction from Large Urban to Small Urban	Primary Trip %	Pass-By Trip %	Daily				
						Rate	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
Fast-Food Restaurant with Drive-Thru Window	934 Fast-Food Restaurant with Drive-Thru Window	4,000 ft²	40%	20%	80%	470.95	50% 50% 50%	378 76 302	50% 50% 50%	378 76 302
Fast-Food Restaurant with Drive-Thru Window	934 Fast-Food Restaurant with Drive-Thru Window	4,000 ft²	40%	20%	80%	470.95	50% 50% 50%	378 76 302	50% 50% 50%	378 76 302
Super Convenience Market/Gas Station	960 Super Convenience Market/Gas Station	5,000 ft²	20%	20%	80%	837.58	50% 50% 50%	420 84 336	50% 50% 50%	420 84 336
Truck Stop	950 Truck Stop	8,000 ft²	30%	20%	80%	455.53	50% 50% 50%	547 110 437	50% 50% 50%	547 110 437
Automobile Care Center	942 Automobile Care Center	6,500 ft²	50%	50%	50%	26.80*	50% 50% 50%	44 22 22	50% 50% 50%	44 22 22
Self-Service Car Wash	947 Self-Service Car Wash	6 wash stalls	25%	50%	50%	108.00	50% 50% 50%	81 41 40	50% 50% 50%	81 41 40
Tire Store	848 Tire Store	7,000 ft²	50%	80%	20%	28.52	50% 50% 50%	50 40 10	50% 50% 50%	50 40 10
Liquor Store	899 Liquor Store	3,000 ft²	75%	50%	50%	101.49	50% 50% 50%	114 57 57	50% 50% 50%	114 57 57

Fast Casual Restaurant	930 Fast Casual Restaurant	4,000 ft^2	50%	50%	50%	315.17	50% 50% 50%	316 158 158	50% 50% 50%	316 158 158
Business Hotel	312 Business Hotel	60 rooms	100%	20%	80%	4.02	50% 50% 50%	121 24 97	50% 50% 50%	121 24 97
Motel	320 Motel	50 rooms	100%	20%	80%	3.35	50% 50% 50%	84 17 67	50% 50% 50%	84 17 67
Quick Lubrication Vehicle Stop	941 Quick Lubrication Vehicle Stop	4,000 ft^2	50%	50%	50%	69.57	50% 50% 50%	70 35 35	50% 50% 50%	70 35 35
TOTAL							**2603 / 740 / 1863**		**2603 / 740 / 1863**	
							5206 / 1480 / 3726			

*Note: A Daily Rate for this Land Use was not available in the ITE Manual. Therefore, the Peak Hour of Adjacent Street Traffic between 7 – 9am and 4 – 6 pm were averaged and multiplied by 10 for the Daily Rate.
**Note: A Daily Rate for this Land Use and the Peak Hour of Adjacent Street Traffic between 7 – 9am were not available in the ITE Manual. Therefore, the Peak Hour of Adjacent Street Traffic between 4 – 6 pm was multiplied by 10 for the Daily Rate.

TABLE 4.3.2b Highway Commercial Land Uses: TRIP GENERATION – Peak Hours

Land Use	Units	Reduction from Large Urban to Small Urban	AM Peak Hour							PM Peak Hour						
			Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)		Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
Fast-Food Restaurant with Drive-Thru Window	4,000 ft²	50%	40.19	20%	80%	51%	41 8 33	49%	40 8 32	32.67	100%	0%	52%	34 7 27	48%	32 6 26
Fast-Food Restaurant with Drive-Thru Window	4,000 ft²	50%	40.19	20%	80%	51%	41 8 33	49%	40 8 32	32.67	100%	0%	52%	34 7 27	48%	32 6 26
Super Convenience Market/Gas Station	5,000 ft²	20%	83.14	20%	80%	50%	42 8 34	50%	42 8 34	69.28	100%	0%	50%	35 7 28	50%	35 7 28
Truck Stop	8,000 ft²	30%	26.49	20%	80%	50%	32 6 26	50%	32 6 26	22.73	100%	0%	53%	29 6 23	47%	26 5 21
Automobile Care Center	6,500 ft²	50%	2.25	50%	50%	66%	6 3 3	34%	2 1 1	3.11	50%	50%	48%	5 3 2	52%	5 3 2
Self-Service Car Wash	6 bays	25%	5.54*	50%	50%	51%	5 3 2	49%	5 3 2	5.54	50%	50%	51%	5 3 2	49%	5 3 2
Tire Store	7,000 ft²	50%	2.72	80%	20%	64%	6 5 1	36%	4 3 1	3.98	80%	20%	43%	6 5 1	57%	8 6 2
Liquor Store	3,000 ft²	75%	16.37	50%	50%	50%	19 10 9	50%	19 10 9	16.37	50%	50%	50%	19 10 9	50%	19 10 9
Fast Casual Restaurant	4,000 ft²	100%	14.13	50%	50%	55%	31 16 15	45%	26 13 13	14.13	50%	50%	55%	31 16 15	45%	26 13 13
Business Hotel	60 rooms	100%	0.39	20%	80%	42%	10 2 8	58%	14 3 11	0.32	20%	80%	55%	11 2 9	45%	9 2 7

Land Use	Units	Reduction from Large Urban to Small Urban	AM Peak Hour							PM Peak Hour						
			Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)		Rate	Primary Trip %	Pass-By Trip %	In (Total) (Primary Trips) (Pass-By Trips)		Out (Total) (Primary Trips) (Pass-By Trips)	
Motel	50 rooms	100%	0.38	20%	80%	37%	7 2 5	63%	12 2 10	0.38	100%	0%	54%	11 2 9	46%	9 2 7
Quick Lubrication Vehicle Stop	4,000 ft^2	50%	5.80	50%	50%	75%	9 5 4	25%	3 2 1	8.70	50%	50%	42%	8 4 4	58%	10 5 5
Total						**249 76 173**		**239 67 172**					**228 72 156**		**216 68 148**	
						488 143 345							**444 140 304**			

*Note: Using the same rate as Peak Hour of Adjacent Street Traffic between 4 – 6 pm since no Peak Hour of Adjacent Street Traffic between 7 – 9am rate available in ITE Manual.