Summer Village of Sunset Point

PROVINCE OF ALBERTA

BYLAW 337

A BYLAW TO CONTROL LAND USE AND ESTABLISH AN AREA STRUCTURE PLAN

WHEREAS Part 17, Section 633 (1) of the Municipal Government Act, being Chapter M-26.1, Division 5 provides, for the purpose of providing a framework for subsequent subdivision and development of an area of land within a municipality, that a council may by bylaw adopt an area structure plan,

AND WHEREAS the Council of Sunset Point has decided to consider and adopt the Sunset Point RV Area Structure Plan as a means to facilitate recreational use in the Summer Village of Sunset Point.

NOW THEREFORE the Council duly assembled hereby enacts as follows:

1. That the Sunset Point RV Area Structure Plan attached as Appendix 1 is hereto and forming part of this bylaw is hereby adopted.

2. That this Bylaw comes into full force and effect upon third reading of this Bylaw.

First Reading carried the 1st day of June, A.D. 2022.

_____

Mayor (Seal)

_____

CAO (Seal)

Second Reading carried the 3rd day of May 2023.

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Mayor (Seal)

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CAO (Seal)

Third Reading carried the 3rd day of May 2023.

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Mayor (Seal)

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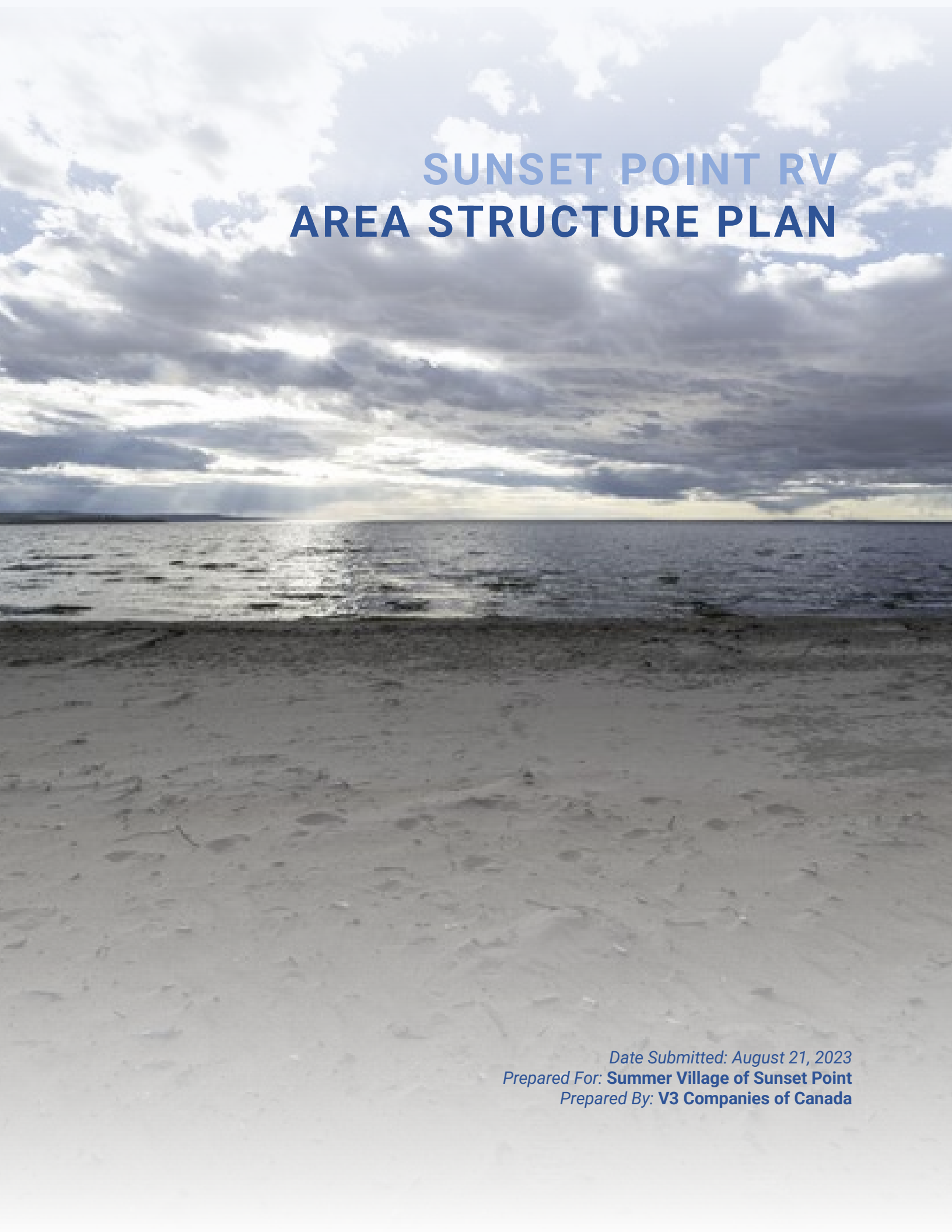
CAO (Seal)



SUNSET POINT RV
AREA STRUCTURE PLAN

Date Submitted: August 21, 2023
Prepared For: **Summer Village of Sunset Point**
Prepared By: **V3 Companies of Canada**

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OVERVIEW

The Sunset Point RV Area Structure Plan (herein referred to as the "Sunset Point RV ASP" or "the Plan") provides the framework to guide development of 15.4 acres of land in the Summer Village of Sunset Point (herein referred to as "the Summer Village"). The Plan area is located in the southwest corner of the Summer Village, directly bordering Lac Ste. Anne County to the east and the Summer Village of Alberta Beach to the south. Policies of the Plan intend to establish a framework for efficient, coordinated development that reflects the Summer Village's Municipal Development Plan and is mindful of existing residents.

A VISION FOR GROWTH

At build-out, the Sunset Point RV ASP will provide a suitable location for the development of a seasonal recreational vehicle park and cabin lodging that will contribute to supporting existing infrastructure and the local economy.

INTERPRETING THE PLAN

Figures

All symbols, locations, and boundaries shown in the figures of the Plan are intended to be interpreted as conceptual unless otherwise stated in the document, or where they coincide with clearly recognizable physical or fixed features within the Plan area. Locations of infrastructure and other fixed elements should be independently confirmed.

Policies

All policy statements containing "shall" are mandatory and must be implemented. Where a "shall" policy proves impractical, an applicant may apply to amend the Plan. All policy statements containing "should" are an advisory statement and indicate the preferred objective, policy and/or implementation strategy of the Development Authority. If the "should" statement is not followed because it is impractical or impossible, the intent of the policy may be met through other agreed-upon means. Where "may" is used in a policy it denotes a choice in applying the policy, creating discretionary compliance or the ability to vary the requirements to achieve the intent of the vision and objectives of the Sunset Point RV ASP. All reference to "Approving Authority" in this document is considered to be the Summer Village of Sunset Point.

NAVIGATING THE DOCUMENT

01 Context and Process	Describes the context for the plan including: regulatory framework, description of the planning area, and guiding policies.
02 Existing Conditions	Describes the Plan area's existing land use conditions as well as adjacent land uses.
03 Land Use Strategy	Describes the vision for future development of the Plan area including the land use concept and related policies.
04 Infrastructure	Sets out the transportation and servicing concepts, including related topics.
05 Implementation	This section describes the development staging, and the amendment procedures and monitoring of the Sunset Point ASP.

01 : CONTEXT AND PROCESS

1.1 PURPOSE

To provide a general policy framework to guide the future development of a cabin and recreational vehicle site within the Plan area, pursuant to Section 633 of the Municipal Government Act.

The Plan outlines a strategy related to land use, projected density, access, municipal servicing, and phasing of development. On the basis of technical evaluation and public consultation, this Plan provides direction for the efficient growth of the Summer Village's residential land base, while balancing the interests of the community as a whole, in accordance with existing planning policies.

1.2 LOCATION

The Summer Village of Sunset Point is located along the southeast shore of Lac Ste. Anne, bordering Lac Ste. Anne County to the east and north, and Alberta Beach to the South. The majority of developed lands in the Summer Village feature single dwelling residential units, predominately in the form of cottage dwellings. Much of the population base in the Summer Village are seasonal dwellers, with a portion also calling the Summer Village their permanent residence.

The Plan area itself is bound by the Alberta Beach Golf resort to the east (located in Lac Ste. Anne County), Sunset Drive and low-density residential dwellings to the west, 42nd Street to the south (dissected by the Alberta Beach Border), and undeveloped lands to the north. It occupies portions of the NE ¼ of Sec-22-54-3-W5M and NW ¼ of Sec-23-54-3-W5M.

▼ **Figure 1:** Sunset Point Area Structure Plan Location

1.3 GUIDING POLICIES & STUDIES

1.3.1 Municipal Government Act

The Municipal Government Act (herein referred to as "the MGA") is a statutory Provincial document that sets out the legislative framework to guide how municipalities operate in Alberta. Under this framework, municipalities may adopt statutory plans (such as this one) to guide future land use planning and growth through policy. All statutory plans must be consistent with each other.

The Sunset Point RV ASP has been adopted through a bylaw passed by Council in accordance with the MGA, Section 633:

633(1) For the purpose of providing a framework for subsequent subdivision and development of an area of land, a Council may by bylaw adopt an area structure plan.

(2) An area structure plan

a. Must describe

i. the sequence of development for the proposed area,

ii. the land uses proposed for the area, either generally or with respect to specific parts of the area,

iii. the density of population proposed for the area either generally or with respect to specific parts of the area,

iv. the general location of major transportation routes and public utilities, and

b. may contain any other matters the Council considers necessary.

1.3.2 Subdivision and Development Regulation

Pursuant to S. 694(1) of the MGA, the Subdivision and Development Regulation is a statutory document that outlines the conditions and general requirements for subdivision and development within the Province. It also outlines required setbacks from active landfill and oil well sites from sensitive uses including residential dwellings, food establishments, schools, and hospitals. At the time this plan was prepared, no existing or abandoned wells, or active or non-active landfills are located within or near the boundary.

1.3.3 Regional Planning Area

The Summer Village of Sunset Point is located within the Upper Athabasca Region, as determined by the Province within the regional planning framework. In total, there are seven regional plans within Alberta. Regional plans are developed for each of the planning area for the purposes of setting out land use objectives and providing the context for land use decision making within the region. At the time this Plan was prepared, the development of the Upper Athabasca Regional Plan had not been completed.

1.3.4 Intermunicipal Development Plan

The Summer Village is a member of the Alberta Beach Regional Inter-Municipal Development Plan (IDP), first in effect August 1st, 2008. The purpose of the IDP is to provide the framework for the future urban growth, provision of inter-municipal services, growth within an urban expansion area and conflict management. The subject site is not within the IDP area and therefore policies within the IDP are not applicable to the site

1.3.5 Municipal Development Plan

The Municipal Development Plan Bylaw 261 (herein referred to as "the MDP"), first adopted in April 2007, is a high-level statutory municipal document that sets out the general policy framework for how growth and development is to occur within the Summer Village. The following provides a narrative to how the vision, objectives, and policies defined in the Sunset Point RV ASP align with the relevant policies contained in the MDP.

RELEVANT MDP POLICY		SUNSET POINT RV ASP ALIGNMENT
4.1 Residential		
4.1.2	Prior to the development of a new or expansion of an existing residential area, an area structure plan must be approved by Council. This area structure plan must address land use, reserve dedications, projected residential density, access, sanitary servicing, potable water supply, storm water management, and any other matter considered necessary by Council.	To enable the future development of a residential area in the form of a recreational vehicles and cabins, the Sunset Point RV ASP has been prepared to satisfy MDP Policy 4.1.2. The Sunset Point RV ASP has provisions relating to land use, reserve dedications, projected residential density, access, sanitary servicing, potable water supply, and stormwater management. No other matters were determined to be necessary components of the Plan.
4.1.7	Where new residential neighbourhoods are developed in proximity to existing neighbourhoods, new residential design should provide an acceptable transition to the existing neighbourhood by creating a building form that is similar in height, massing and architectural character.	The entrance to the Sunset Point RV ASP area is buffered by vegetation and transitions into cabin dwellings that are similar in height, massing and architectural character of the existing cabin/cottage dwellings in the Summer Village. These cabin dwellings transition into RV lots, which are also anticipated to be smaller in scale than the existing dwellings. The entire site will be buffered by vegetation/trees to create a transition from single residential dwellings into the cabin/RV park.
4.5 Environmental		

RELEVANT MDP POLICY		SUNSET POINT RV ASP ALIGNMENT
4.5.2	All developed lots will be required to connect to the Tri-Village Regional Sewer Service.	The Sunset Point RV ASP contains provisions that require the future development to be connected to the Village Regional Sewer Service. Similarly, Figure 4 – Water and Sanitary Services provides a conceptual design of where the future connections to the existing service are to occur.
4.6 Parks, Recreation, Open Space and Community Services		
4.6.4	Undevelopable land (a swamp, natural drainage course or water body, land subject to flooding) will be acquired as environmental reserve, not as part of the required municipal reserve.	As indicated in the Biophysical Assessment (herein referred to as 'the BA') supporting the development of the Sunset Point ASP, there is a shrubby swamp located in the Plan area. The BA suggests that the shrubby swamp be retained as environmental reserve. As such, the Plan has been developed to respect the location of the shrubby swamp, with the conceptual plan avoiding any alteration to the swamp in its exiting form. Policy has been added to the Plan to suggest that the Summer Village retain the shrubby swamp as environmental reserve.
5.2 Sanitary Sewer		
5.2.2	On-site discharge of sanitary waste, including grey water, will be prohibited.	The Plan area has provisions that disallow the on-site discharge of sanitary waste, including grey water. Refer to Figure 4 – Water and Sanitary Services that indicates the movement of all sanitary waste into the Village wastewater system.
5.2.3	All developed lots will be required to connect to the Tri-Village Sewer Service.	The Sunset Point RV ASP contains provisions that require the future development to be connected to the Village Regional Sewer Service. Similarly, Figure 4 – Water and Sanitary Services provides a conceptual design of where the future connections to the existing service are to occur that connect into the Village Sanitary system.
5.3 Storm Water Management		

RELEVANT MDP POLICY		SUNSET POINT RV ASP ALIGNMENT
5.3.1	All proposals for redistricting and/or subdivision approval within the Plan Area shall be supported by a storm water management plan prepared by a qualified professional to the satisfaction of the municipality.	A servicing report was submitted concurrently with this Plan and can be found in Appendix D.
5.3.2	All storm water management plans shall utilize methods that seek to retain as much of the natural runoff characteristics of the storm water system as possible. These methods can include, but are not limited to, such practices as grassed swales, wet ponds, dry ponds or engineered wetlands.	A servicing report was submitted concurrently with this Plan and can be found in Appendix D. The stormwater management report seeks to retain as much of the natural runoff characteristics as possible.
5.3.3	Storm water management plans shall address and resolve on-site and off-site storm water management issues.	A servicing report was submitted concurrently with this Plan and can be found in Appendix D. The storm water management report seeks to address and resolve on-site and off-site storm water management issues.
5.4 Shallow Utilities		
5.4.1	New developments shall be required to provide underground power, cable, and phone servicing.	The Sunset Point RV ASP contains policy that requires new developments within the Plan area to provide underground utilities to service the development.

1.3.6 Land Use Bylaw

The Land Use Bylaw (herein referred to as “the LUB”) is a non-statutory document that guides planning and development within a municipality, and is used by the Summer Village to implement policies of the MDP and ASPs. Presently, the entirety of the Plan area is districted as Urban Reserve. In order to facilitate the proposed land use of this Plan, rezoning of the Plan area will be required.

1.4 PLANNING PROCESS

The preparation of the Plan was a multi-phased approach that included community engagement to gather information, opinions, and to present findings and concept so the public.

The background review included an analysis of existing technical studies, relevant legislation governing the area, and an analysis of how existing and surrounding land features may affect development with the Plan area. Using this information, along with input from Summer Village administration, and Council, a land use concept and policy regulations were created.

1.4.1 Community Consultation

As a part of the development of the Sunset Point ASP, a public open house was held to gain feedback and comment from adjacent landowners, community stakeholders and the general public on the draft ASP. The public house was held on Wednesday, August 25th, 2021 with a total of **85** participants. Verbatim comments and responses can be found in Appendix A.

The overall feedback from the Open House was not supportive of the proposed development. The majority of comments received concerned the following which has been addressed in the responses found in Appendix A:

- Increase in population in the area;
- Traffic and parking impacts in the area
- Vehicle access to the development;
- Impact on property values of existing dwellings;
- Impact of the development on taxes in the community; and,
- Impact of increased demand on the existing capacity of waste water infrastructure.

The feedback obtained from the engagement has resulted in updating the concept plan to provide greater parking and a reduced number of trailer sites. Based on the reasons provided in response to the comments – coupled with the proposed policies contained within this document – it is recommended the ASP be approved by Council.

02 : EXISTING CONDITIONS

This section addresses the existing natural and manmade features that will influence development.

2.1 EXISTING LAND USES

Currently, the site is an undeveloped parcel of land within the Summer Village. It is districted through the Sunset Point LUB as being Urban Reserve. The majority of the land is comprised of deciduous forest and meadows, with a small portion of land considered as a disturbed yard, which is immediately adjacent to residential buildings in the southwest corner of the site.

2.2 OIL AND GAS FACILITIES

At the time this Plan was prepared, no active or non-active gas wells are located within or near the Plan boundary.

2.3 ADJACENT LAND USES

Bordering the Plan to the west, and a portion of the northern and southern border is residential development, predominately in the form of single-detached dwellings, lakeside cabins, and roadways. Bordering the site to the north is undeveloped land, mostly covered by deciduous forest. Bordering the east of the Plan area is a railroad right-of-way that is now used as a trail, and the Alberta Beach Golf Resort. The Plan site is approximately seventy-five (75) metres from Lac Ste. Anne.

2.4 WETLANDS AND WATERCOURSE

One wetland was identified through the Biophysical Assessment (herein referred to as 'the BA'), which can be found in entirety in Appendix B. It is located in the northeast quadrant of the parcel and is approximately 0.095 ha. This wetland has been classified as a seasonal shrubby swamp, and is expected to be fed by overland flows and/or marginally influenced by groundwater. There was no observed inlet or outlet to the wetland.

Although infill of the shrubby swamp is possible, any alterations to the wetland require a Water Act approval, and compensation payments to Alberta Environment and Parks (AEP). As a result, the Sunset Point RV ASP has been developed to avoid any alternation to the state of the shrubby swamp. Findings from the 'BA' determined that the wetland is not Crown claimable, however, it is suggested that the Summer Village should claim the land as environmental reserve.

2.5 TECHNICAL STUDIES

As a part of the preparation and policy development of this Plan, technical studies were completed in its support, which include a Traffic Impact Assessment, Biophysical Assessment, Geotechnical Investigation, and a Servicing Report. These studies can be found in Appendix A, B, C, and D, respectively.

03 : LAND USE STRATEGY

This section describes the land use strategy for the Sunset Point RV ASP by determining the vision, principles, and land use statistics. Additionally, this section sets out policies that will guide land development to achieve the vision for development and the objectives of this plan.

3.1 VISION

The future land use concept for the Plan area is established by Figure 3 – Land Use Concept. Development is anticipated to generally conform to the concept illustrated in this figure. Implementation of the Plan will generally follow Figure 6 – Development Staging, however more detailed implementation will be determined by the developers. The vision for development articulates how development will take place in order to guide the objectives and policies of the plan, and to address stakeholder and public input.

VISION

At build-out, the Sunset Point RV ASP will provide a suitable location for seasonal cabin and RV dwellings within the Village of Sunset Point. This development will enable an increased residential dwelling choice for those who wish to inhabit the Summer Village and enjoy the natural and local amenities and atmosphere. The development will seek to maintain and enhance the character of the existing neighbourhood, and the addition of new residents will further contribute to the social and economic viability of the Summer Village and surrounding municipalities.

3.2 PRINCIPLES FOR DEVELOPMENT

Principles for development are strategic drivers that help achieve the vision when they are delivered. The objectives outlined in the following sections align with development of the principles and direct development in the Plan area to achieve the vision for growth.

INTEGRATE INTO AND ENHANCE THE EXISTING COMMUNITY

- Incorporate land uses that transition sensitively to the existing community.
- Provide for additional residential dwelling opportunities.
- Provide safe and efficient access to the Plan area that connects with existing infrastructure.

MAINTAIN ENVIRONMENTAL INTEGRITY

- Maintain ecologically sensitive areas and existing tree coverage, where possible.
- Reduce the impact of development on existing wildlife populations and habitat.

INTEGRATE SERVICES EFFICIENTLY

- Provide efficient and effective servicing that integrates into the existing network.

3.3 LAND USE STATISTICS

The following table provides a breakdown of the land use statistics for the site:

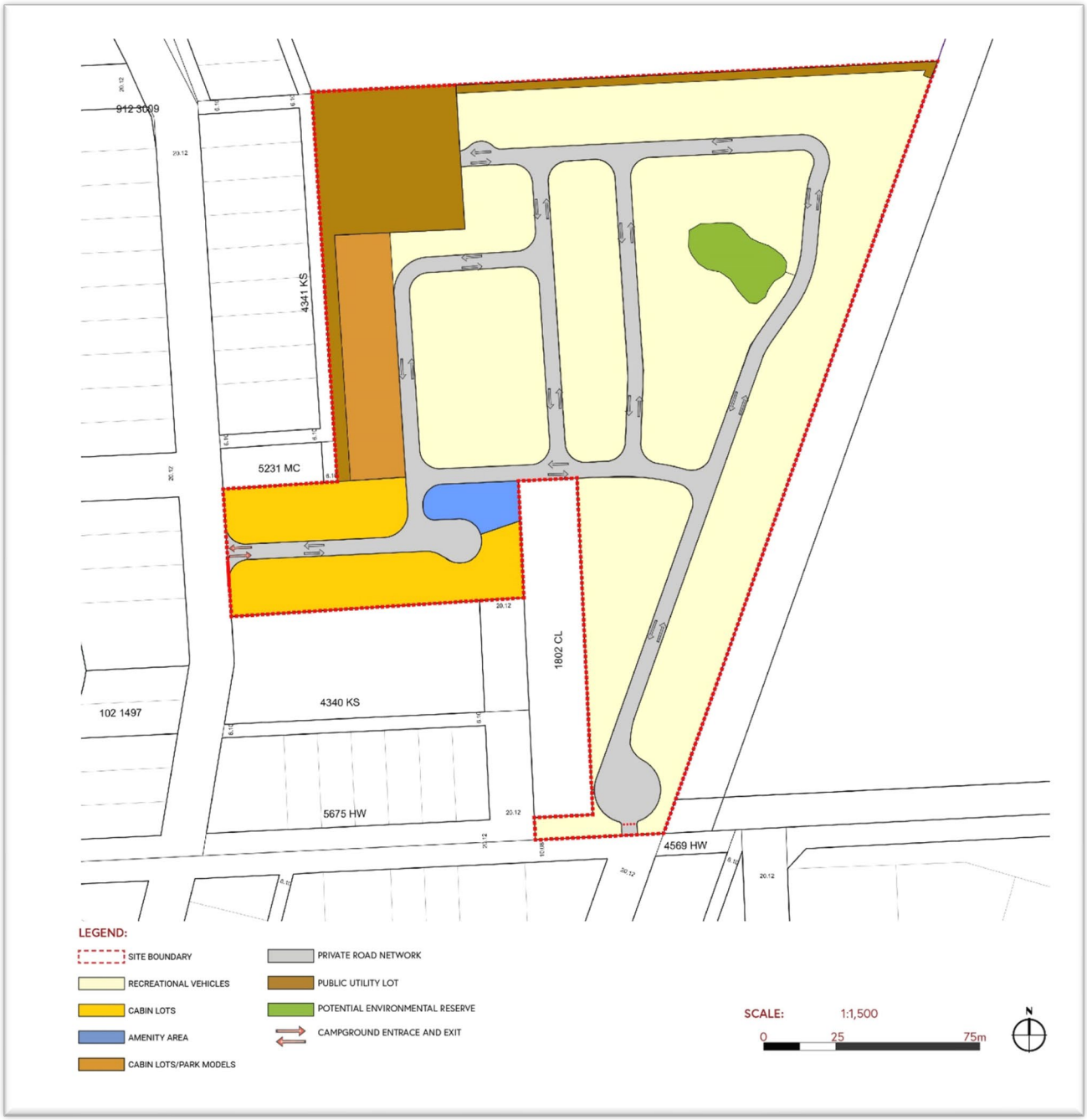
Land Uses	Area (Acres)	Percentage (%)
Gross Area	15.38	100%
Environmental Reserve	0.23	1.50%
PUL (*Includes Stormwater Management Facility)	1.19	7.74%
Roads	2.11	13.72%
Recreational Vehicles	9.48	64.39%%
Cabin Lots/Park Models	2.18	11.42%%
Amenities	0.19	1.23%

Figure 2: Concept Plan

3.4 LAND USE CONCEPT

The entirety of the development relates to creating a cabin and RV park comprised of RV lots and cabin lots. This mix provides a choice in housing accommodation that is similar to existing residential dwellings in the Summer Village of Sunset Point, and encourages development that is respectful and similar to the scale and massing, of the adjoining neighbourhood.

▼ **Figure 3:** Land Use Concept



3.4.1 Development Policies and Objective

OBJECTIVE: To provide the framework for orderly development of the Plan area consistent with the general intent and purpose of the Summer Village of Sunset Point's Municipal Development Plan.

Policy 3.4.1.1 The location of land uses **shall** be generally consistent with Figure 3 – Land Use Concept.

Policy 3.4.1.2 Development **should** generally follow Figure 3 – Land Use Concept. The Land Use Concept is provided as a guideline and while deviation from this concept is anticipated once detailed design commences, the development **shall** allow for the future development of cabin and RV lots, and overall infrastructure provisions to the satisfaction of the Development Authority.

Policy 3.4.1.3 All development **shall** be provided with full municipal services.

i. Temporary private servicing alternatives **may** be permitted at the sole discretion of the Development Authority in order to facilitate development that is not contiguous to services where the Summer Village deems it to be in their best interest.

Policy 3.4.1.4 As a condition of development, a Historic Resource Impact Assessment (HRIA) **shall** be prepared by a qualified professional prior to construction.

Policy 3.4.1.5 The development **shall** be established as a single condominium corporation.

3.4.2 Environment Policies and Objective

OBJECTIVE: To appropriately plan for and mitigate adverse effects of development within the Plan area on the natural environment and wildlife.

Policy 3.4.2.1 Buffers of wetland **shall** comply with appropriate provincial policy *Stepping Back from the Water: A Beneficial Management Practices Guide from New Development Near Water Bodies in Alberta's Settled Region*.

Policy 3.4.2.2 Wetlands and watercourses, and setbacks to wetlands and watercourses **may** be identified and retained by the municipality as Environmental Reserve at the time of development as indicated in Figure 3 – Land Use Concept.

Policy 3.4.2.3 During the detailed design of the Plan area, considerations **should** be given to protecting and preserving as much of the existing deciduous forest as possible. During the construction phase of the future development, tree protection methods **should** be used to mitigate any harmful impacts construction may have on the existing trees being retained.

Policy 3.4.2.4 Fencing in between the Plan area and adjoining lands, RV lots and/or cabins **should** be avoided to maintain ecological connectivity to within and beyond the subject parcel. If fencing is used, the fencing **should** only be wildlife permeable fencing.

04 : INFRASTRUCTURE

This section describes the framework for transportation and servicing concepts, including related topics. The road network plays an important role in how vehicles move within, through and beyond the site. The road network is developed based on the road classification system that determines the right of way width. Local roads feed into collector roads that feed into arterial road networks and is based on their carrying capacity from forecast traffic volumes.

The Sunset Point MDP contains provisions that require the connection of development to sanitary/sewer services, access to potable water, plans to address storm water management, and provisions relating to the onsite connection to shallow utilities.

4.1 TRANSPORTATION AND ACCESS

At present, access to the Plan area is provided through one local private road with the provision of an emergency breakaway. To facilitate the future development of the Plan area, an internal roadway network will be constructed in accordance with Figure 3 – Land Use Concept.

4.1.1 Transportation and Access Policies and Objective

OBJECTIVE: To provide appropriate infrastructure for the safe and efficient movement of traffic in and out of the Plan area.

Policy 4.1.1.1 Access to the Plan area **shall** be the location indicated within Figure 3 – Land Use Concept. The access along 42 Street **shall** be used for emergency purposes only.

Policy 4.1.1.2 Internal traffic **shall** move as indicated in Figure 3 – Land Use Concept.

Policy 4.1.1.3 The site entrance **should** be constructed with a simple intersection treatment with a corner radius designed to accommodate a recreational vehicle.

Policy 4.1.1.4 During the construction phase, the Plan area **should** have additional street lighting installed at the entrance and exit access location.

4.1.2 Road Network Policies and Objective

OBJECTIVE: To develop an internal road network that supports the traffic capacity arising from within the Plan area and connects with the existing Summer Village of Sunset Point's Road network.

Policy 4.1.2.1 Roads within the Plan area **shall** be generally be consistent with Figure 3 – Land Use Concept.

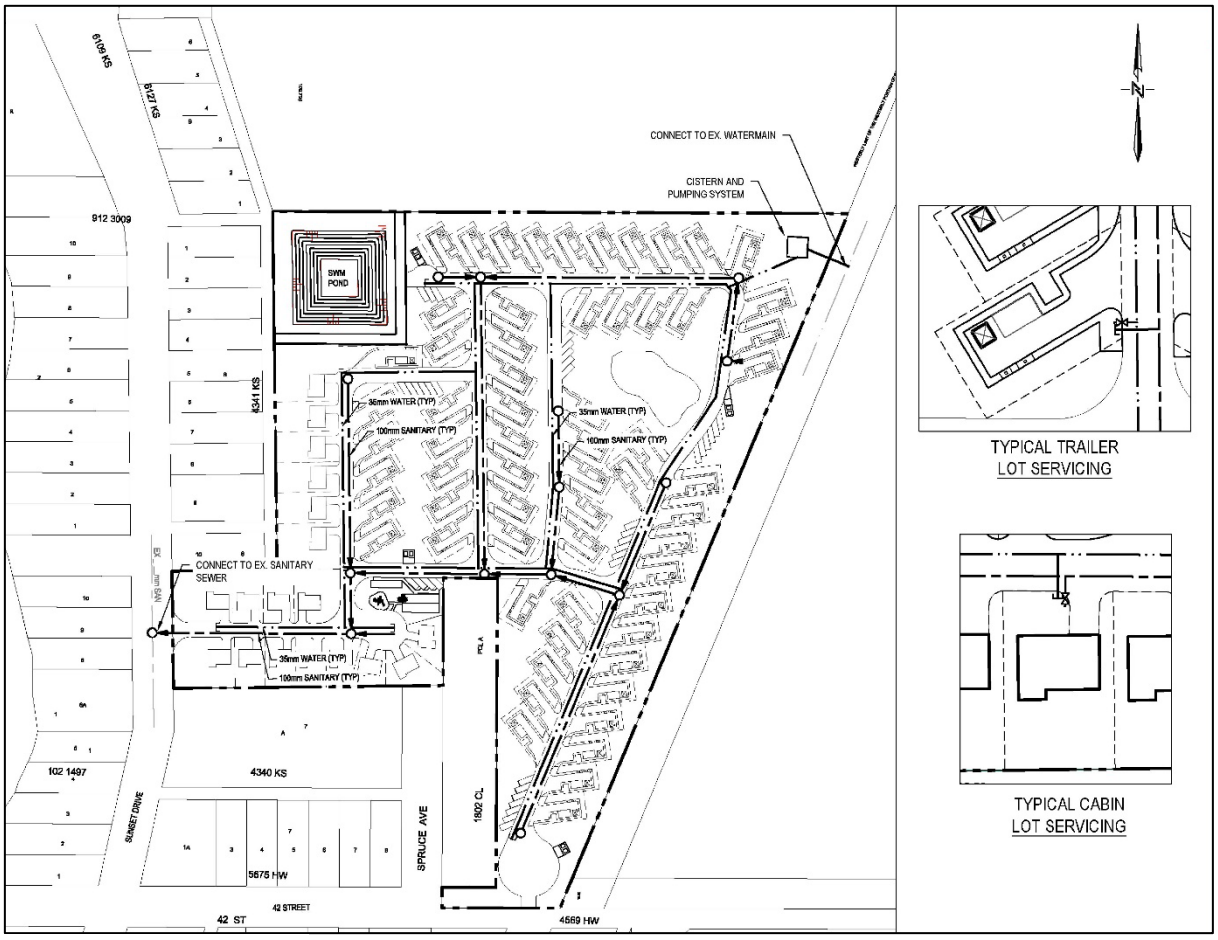
Policy 4.1.2.2 The road **shall** be maintained and managed through a condominium corporation.

Policy 4.1.2.3 The construction of internal roads shall use cold mix or other similar application, for surfacing to prevent dust.

4.2 WATER DISTRIBUTION

Figure 4 – Water and Sanitary Services provides a conceptual layout and sizing for the proposed extension of the water distribution system to service the proposed Sunset Park RV development.

▼ **Figure 4:** Water and Sanitary Services



4.2.1 Water Distribution Policies and Objective

OBJECTIVE: To provide a public water distribution system that services the Plan area, and provides adequate capacity for domestic use.

Policy 4.2.1.1 The future development **shall** provide for potable water onsite, in general accordance with Figure 4 – Water and Sanitary Services.

Policy 4.2.1.2 The water system **shall** be designed and constructed in compliance with the engineering standards set by the Development Authority.

Policy 4.2.1.3 The developer **shall** collaborate with Village administration to provide a water connection valve at the connection point to the watermain.

Policy 4.2.1.4 The developer shall provide a minimum of a 3-metre easement as indicated in Figure 4 to contribute to providing a future public water connection to the community. The Village would need to obtain another 3-metre easement from the adjoining property. An access easement will be created for the Village to enable an access to the water infrastructure.

4.3 SANITARY SERVICES

Figure 4 – Water and Sanitary Services provides the conceptual routing and sizing of the sanitary sewer collection system within Sunset Point RV ASP.

4.3.1 Sanitary Services Policies and Objective

OBJECTIVE: To provide sanitary sewer infrastructure that connects to the Village of Sunset Point's public system and provides service to the Plan area.

Policy 4.3.1.1 Any future development within the Plan area **shall** connect to the Tri-Village Sewer Service in general accordance with Figure 4 – Water and Sanitary Services.

Policy 4.3.1.2 The internal sanitary collection system as shown in Figure 4 **shall** be a shallow seasonal design with a shut off valve installed where it connects to deep sanitary system construction to the satisfaction of the Development Authority. Should a deep sanitary system be installed for servicing the proposed cabin units and Park Models an easement shall be provided for access to the deep sanitary system by the Development Authority to provide a year-round service.

Policy 4.3.1.3 Any activity that alters, impacts, occupies, or crosses the natural waterbody within the Plan area, as indicated in Figure 3 – Land Use Concept, will require permission under the Public Lands Act.

4.4 STORMWATER MANAGEMENT

▼ **Figure 5:** Stormwater Management

4.4.1 Stormwater Management Policies and Objective

OBJECTIVE: To manage stormwater that mitigates the potential for flooding or direct run off into receiving natural watercourses.

Policy 4.4.1.1 Any future development within the Plan area **shall** manage stormwater that is generally in accordance with Figure 5 – Stormwater Management through the condominium corporation.

Policy 4.4.1.2 The stormwater management plan **shall** be general accordance with the V3 Stormwater Management report titled "Servicing Report" and dated October 22nd, 2020, found in Appendix D.

Policy 4.4.1.3 Any activity that alters, impacts, occupies, or crosses the natural waterbody will require permission under the Public Lands Act.

Policy 4.4.1.4 A trail connection may be installed within the Public Utility Lot (PUL) as indicated in Figure 5, providing a pedestrian access to the public road.

4.5 SHALLOW UTILITIES

4.5.1 Shallow Utilities Policies and Objective

OBJECTIVE: To provide underground distribution for telecommunications, power, and natural gas utilities to service the Plan area.

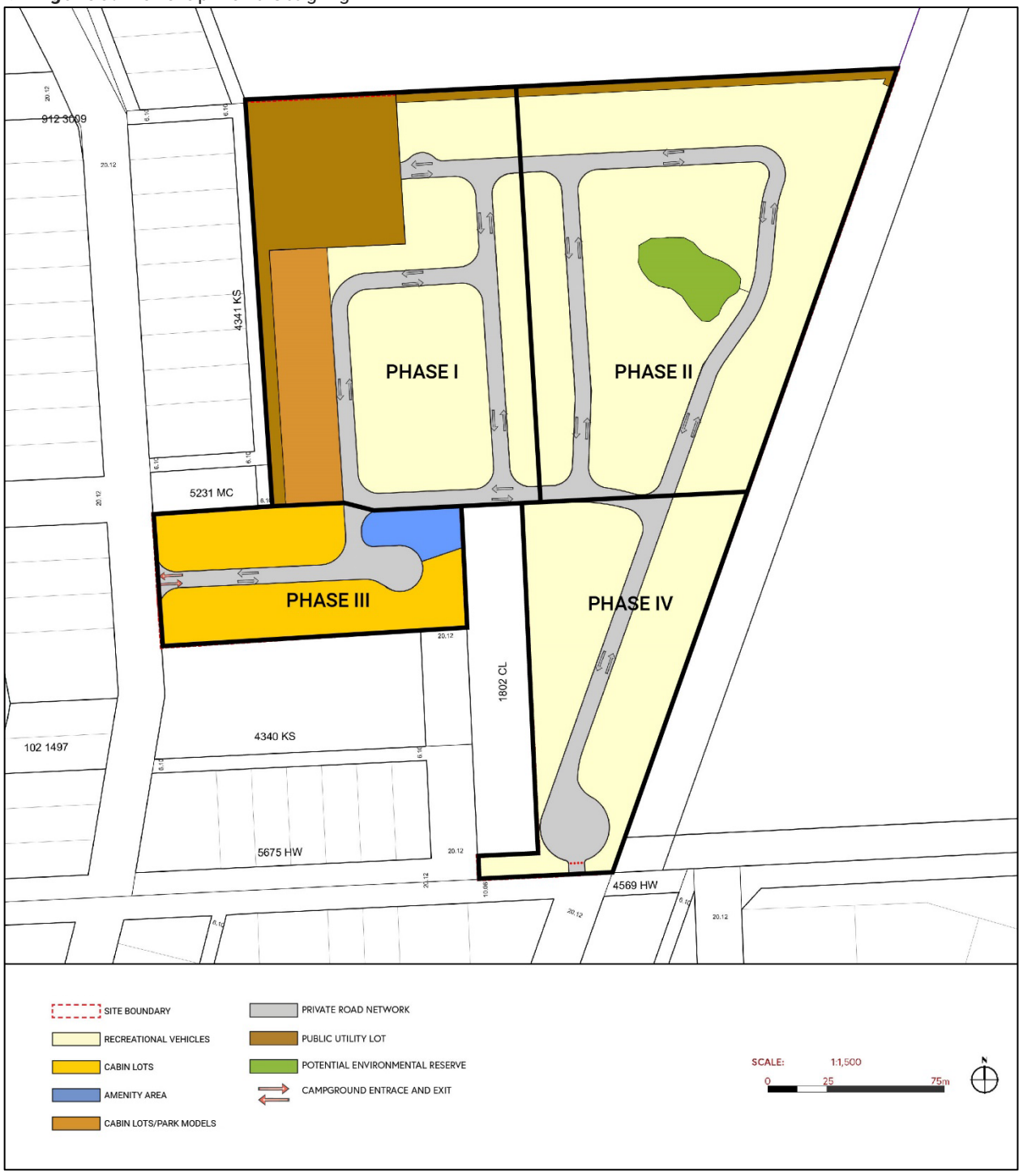
Policy 4.5.1.1 The future development of the Plan area **shall** include utility services to meet the needs of its residents.

Policy 4.5.1.2 The location of shallow utilities **shall** be in accordance with the Summer Village of Sunset Point's and utility operators' requirements, and will be determined during the detailed design stage.

05 : IMPLEMENTATION

This section describes the development staging, and the amendment procedures and monitoring of the Sunset Point ASP.

▼ **Figure6:** Development Staging



5.1 DEVELOPMENT STAGING

The Sunset Point RV ASP has been prepared on the basis of contiguous phasing of development over time that is reflected in Figure 6 – Development Staging.

5.1.1 Development Staging Policies and Objective

OBJECTIVE: To enable the development to move forward in accordance with the phasing while providing flexibility to enable the development to respond to market conditions.

Policy 5.1.1.1 Development **should** unfold in general accordance with the phasing plan indicated in Figure 6 – Development Staging.

Policy 5.1.1.2 Development **should** be carried out in accordance with meeting the Summer Village's, Provincial, or Federal regulations that are applicable to the development.

Policy 5.1.1.3 Development **shall** be in general accordance with the land use concept plan outlined in Figure 3 – Land Use Concept.

5.2 AMENDMENT PROCEDURES AND MONITORING

The following section provides a framework for monitoring and amending the Sunset Point RV ASP.

5.2.1 Amendment Procedures and Monitoring Policies and Objective

OBJECTIVE: To provide a clear and consistent approach to amending this Plan.

Policy 5.2.1.1 This Plan **shall** be adopted through a bylaw pursuant to Section 633 of the Province of Alberta's Municipal Government Act. Development proposals that do not meet the policies and guidelines in this Plan **shall** require a Plan amendment to be adopted by Council.

Policy 5.2.1.2 In reviewing proposals for a Plan amendment, Council **shall** consider the following:

i. How well the proposed amendment supports this Plan's vision and its goals for development.

ii. The potential impacts from the proposed changes on the environment and existing development.

iii. The ability of municipal infrastructure to support the type of development envisioned.

iv. The public's opinion gathered through a consultation program.

Policy 5.2.1.3 Policies, text, and mapping information contained in this document **may** be amended from time to time by a Council approved Bylaw. These Bylaw Amendments **shall** ensure the ASP responds to and remains current with planning and development policies and trends that affect development.

Policy 5.2.1.4 Any amendments to the Sunset Point RV ASP involving policies, text, or mapping should be completed in accordance with the Municipal Government

Act, the Municipal Development Plan, and all other applicable bylaws, policies, and procedures of the Approving Authority.

Appendix A
Traffic Impact Assessment

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Appendix B
Biophysical Assessment

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Appendix C
Geotechnical Investigation

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Appendix D
Servicing Report

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Appendix E
ASP Maps

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Appendix A

Traffic Impact Assessment

V3 COMPANIES OF CANADA LTD.

SUNSET POINT RV PARK

TRAFFIC IMPACT ASSESSMENT

MAY 24, 2023

SUNSET POINT RV PARK

TRAFFIC IMPACT ASSESSMENT

V3 COMPANIES OF CANADA LTD.

PROJECT NO.: 191-06412-00
DATE: MAY 2023

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REVISION HISTORY

VERSION	DATE	DESCRIPTION
1	June 21, 2019	Draft For Client Review
2	February 4, 2020	Draft for Review
3	May 24, 2023	Final Report

SIGNATURES

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EXECUTIVE SUMMARY

WSP Canada Inc. was retained by V3 Companies of Canada Ltd. to complete a Traffic Impact Assessment (TIA) for a proposed RV Park in support of the development permit application with the Summer Village of Sunset Point. The proposed RV Park is located west of and adjacent to Sunset Drive and north of 42 Street in the Summer Village of Sunset Point.

The purpose of this study is to identify and assess the potential traffic impacts on the study intersections and roadways associated with the proposed development, and to suggest required mitigation measures to allow the adjacent roadways to safely accommodate traffic generated by the proposed development.

The proposed RV Park is located on the east side of Lac Ste. Anne, north of Alberta Beach in the Summer Village of Sunset Point. The RV Park is bounded by Alberta Beach Golf Resort to the east, Sunset Drive and residential dwellings to the west, 42 Street to the south, and undeveloped lands to the north.

Based on the proposed site concept plan, the RV Park will include 18 cabin lots and 63 RV lots. One access will be provided for the proposed RV Park on Sunset Drive. One emergency access is located on 42 Street to the south. The proposed RV Park concept plan is attached in Appendix B. The RV Park is expected to be built out in 2021.

Primary vehicular access to the proposed RV Park will be obtained via Sunset Drive. The following intersections were analyzed in this study:

— Sunset Drive / 42 Street, and
— Sunset Drive / Proposed Site Access.

Sunset Drive is a two-lane undivided collector road that runs along the eastern shore of Lac Ste. Anne. Sunset Drive presents a typical rural road cross section with paved shoulders within the Summer Village of Sunset Point corporate limits with no pedestrian sidewalks or trails alongside it. Private residential driveways are directly located on Sunset Drive. Sunset Drive is posted at 40 km/h and banned at 75% load restriction in the vicinity of the proposed RV Park.

The existing Sunset Drive / 42 Street intersection is currently controlled by one stop sign on 42 Street with free flow conditions on Sunset Drive. The west leg of this intersection is a boat launch road to the shore of the lake without any traffic control devices (i.e., stop sign). This intersection presents a simple intersection treatment without any tapers and auxiliary lanes.

In this study, a 2% annual traffic growth rate was used to estimate the future background traffic volumes.

The following conclusions and recommendations were reached:

TRIP GENERATION

— It is anticipated that the proposed RV Park would generate approximately 270 new trips a day in summer season with 20 trips in the AM peak hours and 33 trips in the PM peak hours.

SUNSET DRIVE / 42 STREET

— All traffic movements at Sunset Drive / 42 Street intersection are expected to operate at an acceptable level of service (LOS) B or better during both the AM and PM peak hours up to the 20-year horizon. The existing intersection treatment at the Sunset Drive / 42 Street intersection will be capable of accommodating the forecasted future traffic. No intersection geometric improvements will be required.

— A sidewalk is recommended to be constructed along Sunset Drive on the east side in the Summer Village of Sunset Point corporate limits. Pedestrian crosswalks with appropriate signs are recommended to be provided on Sunset Drive at the locations where pedestrians desire to cross Sunset Drive accessing the shore of Lac Ste. Anne. It should be noted

that the recommended sidewalk is based on the existing roadway conditions and pedestrian connectivity consideration, and is not a result of the proposed development.

SUNSET DRIVE / PROPOSED SITE ENTRANCE

- It is recommended that a simple intersection treatment be provided for the proposed Site Access on Sunset Drive. The corner radius of the intersection should be designed to accommodate the design vehicle turning path (e.g., Recreational Vehicle). A stop sign is recommended to be installed on the Site Access Road.
- All traffic movements at the Sunset Drive / Proposed Site Access intersection are expected to operate at LOS A during both the AM and PM peak hours up to the 20-year horizon. The proposed intersection treatment at the Sunset Drive / Site Access intersection will be capable of accommodating the forecasted future traffic.
- The intersection sight distances along Sunset Drive are adequate at the proposed site access location.
- The proposed site access location meets the TAC's minimum intersection spacing requirement.
- It is recommended that additional lighting be provided at the proposed RV Park Access.

SUNDET DRIVE CORRIDOR

- The trips that would be generated by the proposed RV Park are not anticipated to significantly impact the traffic operational performance on Sunset Drive.
- To provide an efficient transportation network which accommodates vehicular and pedestrian traffic efficiently and safely, it is recommended that a Functional Planning Study be conducted for the Sunset Drive corridor. Pedestrian and bicycle facilities (e.g., trails and bike lanes) should be considered as the major infrastructure improvement program.

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1 INTRODUCTION

WSP Canada Inc. was retained by V3 Companies of Canada Ltd. to complete a Traffic Impact Assessment (TIA) for a proposed RV Park in support of the development permit application with the Summer Village of Sunset Point. The proposed RV Park is located west of and adjacent to Sunset Drive and north of 42 Street in the Summer Village of Sunset Point. The subject site location is shown in Figure 1.1.

1.1 STUDY PURPOSE

The purpose of this study is to identify and assess the potential traffic impacts on the study intersections and roadways associated with the proposed development, and to suggest required mitigation measures to allow the adjacent roadways to safely accommodate traffic generated by the proposed development.

1.2 SITE AND VICINITY DESCRIPTION

1.2.1 SITE DESCRIPTION

The proposed RV Park is located on the east side of Lac Ste. Anne, north of Alberta Beach in the Summer Village of Sunset Point. The RV Park is bounded by Alberta Beach Golf Resort to the east, Sunset Drive and residential dwellings to the west, 42 Street to the south, and undeveloped lands to the north.

Based on the proposed site concept plan, the RV Park will include 18 cabin lots and 63 RV lots. One access will be provided for the proposed RV Park on Sunset Drive. One emergency access is located on 42 Street to the south. The proposed RV Park concept plan is attached in Appendix B. The RV Park is expected to be built out in 2021.

1.2.2 TRANSPORTATION NETWORK

Primary vehicular access to the proposed RV Park will be obtained via Sunset Drive. The following intersections were analyzed in this study:

— Sunset Drive / 42 Street, and

— Sunset Drive / Proposed Site Access.

Sunset Drive is a two-lane undivided collector road that runs along the eastern shore of Lac Ste. Anne. Sunset Drive presents a typical rural road cross section with paved shoulders within the Summer Village of Sunset Point corporate limits with no pedestrian sidewalks or trails alongside it. Private residential driveways are directly located on Sunset Drive. Sunset Drive is posted at 40 km/h and banned at 75% load restriction in the vicinity of the proposed RV Park. The current Average Summer Daily Traffic (ASDT) on Sunset Dive north of 42 Street are estimated to be approximately 1,730 vehicles per day.

42 Street is a two-lane local road that provides access to Alberta Beach Golf Resort and the residences alongside it. 42 Street is the south municipal boundary of the Summer Village of Sunset Point.

The **Sunset Drive / 42 Street** intersection is currently controlled by one stop sign on 42 Street with free flow conditions on Sunset Drive. The west leg of this intersection is a boat launch road to the shore of the lake without any traffic control devices (i.e., stop sign). This intersection presents a simple intersection treatment without any tapers or auxiliary lanes.

Figure 1.1: Site Location

1.3 ANALYSIS HORIZONS

Three analysis horizons were established in this study:

- Base Year conditions (2019),
- Full Build Out (2021), and
- 20-year horizon (2039).

1.4 SCOPE OF WORK

The scope of this study includes the following:

- Determine current traffic operating conditions for the study intersections.
- Forecast background traffic volumes at the analysis horizons based on the anticipated traffic growth rate.
- Determine the number of trips generated by the proposed RV Park.
- Distribute the generated trips to different geographic areas (origins and destinations).
- Assign the generated trips to specific routes to and from the development.
- Forecast post-development (combined) traffic volumes at the study intersections for each analysis horizon.
- Propose appropriate intersection treatment and traffic control (if needed) for the study intersections.
- Determine roadway and intersection improvements as required to provide acceptable levels of service and safety while mitigating impacts due to the development.

1.5 METHODOLOGY

In order to meet the study objectives and accomplish the works stated above, the following methodology was used:

- Review available relevant transportation studies from the Summer Village of Sunset Point, the Village of Alberta Beach, and Lac Ste. Anne County.
- Conduct continuous traffic counts on Sunset Drive and 42 Street in the vicinity of the proposed RV Park during the Vitoria Day long weekend (Friday – Tuesday) using automatic tube counters (MetroCount).
- Estimate the current traffic volumes on Sunset Drive and 42 Street and at the Sunset Drive / 42 Street intersection.
- Estimate total trips generated by the development based on ITE *Trip Generation Manual (10th Edition)* and the proposed RV Park concept plan.
- Analyze the delay, level of service (LOS) and queue lengths of the study intersections for the analysis horizon traffic using Synchro Studio 10 (Synchro) software.
- Identify any improvements necessary for the intersection and roadways to accommodate the forecasted traffic volumes.

2 TRAFFIC ANALYSIS

This section analyzes the base year (2019), full build out (2021), and 20-year horizon (2039) traffic conditions for the study intersections. A 2% linear traffic growth rate was used to forecast the future background traffic volumes.

2.1 EXISTING TRAFFIC

WSP conducted continues traffic counts on Sunset Drive and 42 Street during the Victoria Day long weekend from May 17 to May 21, 2019 using automatic traffic counters (MetroCount). The current traffic volumes on Sunset Drive and 42 Street were estimated based on the long weekend traffic counts. The existing AM and PM peak hour traffic turning movements at the Sunset Drive / 42 Street intersection were estimated based on the assumptions that 70% of traffic on 42 Street will travel from/to the south and 30% of traffic will travel from/to the north along Sunset Drive. Based on the traffic counts, the AM peak hour occurs between 10:45 and 11:45 and the PM peak hour occurs between 12:15 and 13:15.

The current AM and PM peak hour traffic turning movements at the study intersections and the estimated average summer daily traffic volumes on Sunset Drive and 42 Street are shown in Figure 2.1.

2.2 TRAFFIC GROWTH

In the 2016 Census of Population conducted by Statistics Canada, the Summer Village of Sunset Point recorded a population of 169 living in 74 of its 337 total private dwellings, a −23.5% change from its 2011 population of 221.

The traffic growth history for Sunset Drive was estimated based on Alberta Transportation's (AT's) historical traffic counts at the highway intersections that provide access to the summer villages. These intersections include the Highway 633 / Range Road 33, Highway 633 / Range Road 32, and Highway 43 / Range Road 32 intersections. Table 2.1 summaries the traffic counts on Range Road 32 and Range Road 33 at the three intersections.

Table 2.1 Traffic Count History

YEAR	RR 32 AT HWY 633		RR 33 AT HWT 633		RR 32 AT HWY 43	
	AADT	ANNUAL GROWTH	AADT	ANNUAL GROWTH	AADT	ANNUAL GROWTH
2003	1610	-	N/A	-	1690	-
2009	1610	0.0%	560	-	1510	-2.0%
2013	1670	0.9%	540	-0.9%	2000	6.1%
2018	1700	0.4%	760	5.8%	2260	2.3%
9 Year Annual Average (2009– 2018)	-	0.6%	-	2.9%	-	3.7%
15 Year Annual Average (2003 – 2018)	-	0.4%	-	N/A	-	1.7%

AT's traffic counts show that the weighted average annual traffic growth rates for the summer villages area are 2.2% in the past 5 years, 2.4% in the past 9 years, 1.1% in the past 15 years. In this study, a 2% annual traffic growth rate was used to estimate the future background traffic volumes.

2.3 SURROUNDING FUTURE DEVELOPMENT

In consulting with the Summer Village of Sunset Point, it was noted that a 30-unit residential subdivision is under development north of the Summer Village in Lac Ste. Anne County, approximately 2 km north of the proposed RV Park near Castle Island. The

trips that would be generated by the 30-unit residential subdivision were estimated based on ITE trip generation rates for Single Family Detached Housing (code: 210). The anticipated trips that would be generated by the residential subdivision are illustrated in Table 2.2.

Table 2.2 Trip Generation – Residential Subdivision

UNITS: 30	DAILY			AM PEAK HOUR			PM PEAK HOUR		
	TOTAL	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**
Directional Distribution	100%	50%	50%	100%	25%	75%	100%	63%	37%
Rates (Trips / Unit)	9.44	4.72	4.72	0.74	0.19	0.56	0.99	0.62	0.37
Total Trips	283	142	142	22	6	17	30	19	11

For the purpose of this study, it was assumed that 70% of trips generated by the 30-unit residential subdivision will travel from/to the south and 30% of traffic will travel from/to the north along Sunset Drive.

2.4 BACKGROUND TRAFFIC

Background traffic (non-site traffic) is the traffic that exists without the addition of trips generated by the proposed RV Park.

The background traffic volumes at the study intersections were derived by applying the 2% annual growth rate to the 2019 traffic plus the anticipated trips generated by the future surrounding development at the analysis horizons.

The forecasted 2021 and 2039 background traffic volumes in terms of AM and PM peak hour traffic at the study intersections are presented in Figures 2.2 and 2.3.

Figure 2.1: Base Year (2019) Traffic

Figure 2.2: 2021 Background Traffic

Figure 2.3: 2039 Background Traffic

2.5 TRIP GENERATION

The trips that would be generated by the proposed RV Park were estimated based on ITE *Trip Generation Manual (10th Edition)*, Land Use: Campground / Recreational Vehicle Park (Code: 416). In a conservative manner, the weekday AM and PM peak hour of generator trip generation rates were used in this study. Since the daily trip generation rate for RV Park was not provided in the ITE *Trip Generation Manual,* the daily trip generation rate was estimated by multiplying the sum of AM and PM peak hour trip generation rates by five (5) (i.e., daily trip rates = 5 x (AM+PM)).

The trips that would be generated by the proposed RV Park (81 lots) are illustrated in Table 2.2. It is anticipated that the proposed RV Park would generate approximately 270 new trips in a day with 20 and 33 new trips during the AM and PM peak hours, respectively.

Table 2.3 Trip Generation – RV Park

LOTS: 92	DAILY			AM PEAK HOUR			PM PEAK HOUR		
	TOTAL	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**	**TOTAL**	**IN**	**OUT**
Directional Distribution	100%	50%	50%	100%	36%	64%	100%	62%	38%
Rates (Trips / Lot)	3.30	1.65	1.65	0.25	0.09	0.16	0.41	0.25	0.16
Total Trips	267	134	134	20	7	13	33	21	13

2.6 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distributions for the proposed RV Park were estimated based on the relative locations of surrounding populated areas and the road network in the vicinity of the RV Park.

Figure 2.4 illustrates the trip distribution for the proposed RV Park. The resultant trip assignments are shown in Figure 2.5.

2.7 COMBINED TRAFFIC

Combined traffic volumes (post-development traffic) include both background traffic and the traffic generated by the proposed development. Combined traffic volumes were calculated by superimposing the trips generated by the proposed development onto the future background traffic volumes. The resulting combined AM and PM peak hour traffic volumes at the study intersections at each analysis horizon are shown in Figures 2.6 and 2.7.

Figure 2.4: Trip Distribution

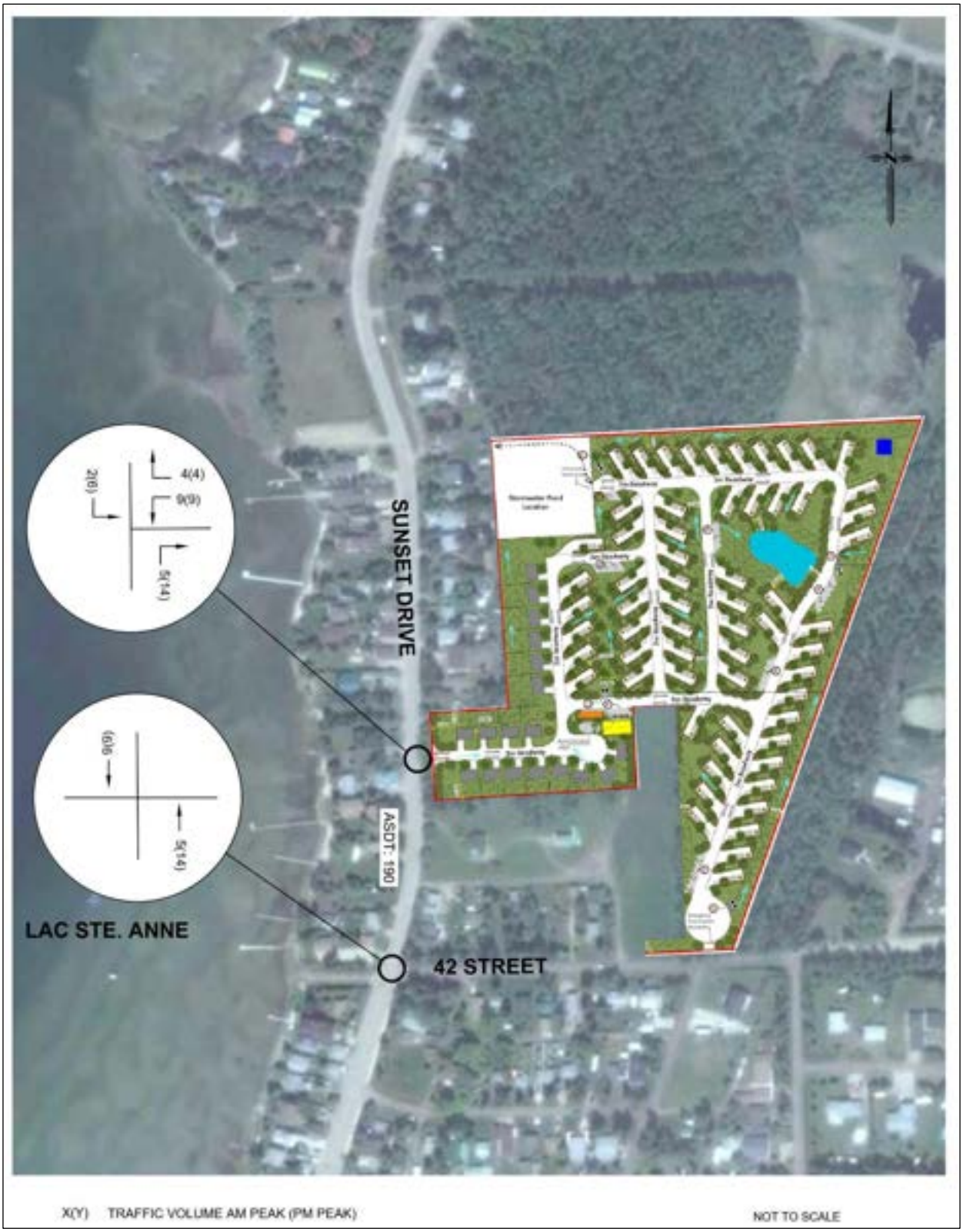

Figure 2.5: Trip Assignment

Figure 2.6: 2021 Combined Traffic

Figure 2.7: 2039 Combined Traffic

3 CAPACITY ANALYSIS

This section describes the method used for the capacity analysis and evaluates the operating level of service of the study intersections under the analysis horizon traffic conditions.

3.1 METHODOLOGY

To determine the operating conditions of an intersection or roadway, the concept of level of service (LOS) is generally used. The LOS of an intersection is a qualitative measure of capacity and operating conditions and is directly related to vehicle delay. LOS is given a letter designation from A to F, with LOS A representing very short delays and the best operating conditions, and LOS F representing very long delays and failure of a movement. LOS D is typically considered the limit of acceptable operation because excessive delays tend to occur beyond this threshold.

For this study, WSP developed Synchro Studio 10 (Synchro) intersection simulation models for the study intersections. Synchro 10 follows the Highway Capacity Manual, 2010 (HCM 2010) LOS criteria that are listed in Table 3.1. For two-way stop controlled intersections, the delay is typically calculated for the movements at the minor approaches only, since the major roads are considered to be operating at free flow conditions.

Table 3.1 Level of Service Criteria for Intersections (HCM 2010)

SIGNALIZED CONTROL DELAY (S)	UNSIGNALIZED CONTROL DELAY (S)	LOS BY VOLUME-TO-CAPACITY RATIO	
		v/c ≤ 1.0	*v/c* > 1.0
≤ 10	≤ 10	A	F
> 10 and ≤ 20	> 10 and ≤ 15	B	F
> 20 and ≤ 35	> 15 and ≤ 25	C	F
> 35 and ≤ 55	> 25 and ≤ 35	D	F
> 55 and ≤ 80	> 35 and ≤ 50	E	F
> 80	> 50	F	F

Source: Highway Capacity Manual 2010 (Transportation Research Board).

3.2 CAPACITY ANALYSIS RESULTS

Synchro models were created for the study intersections under the combined traffic conditions. The capacity analysis was based on the existing and proposed intersection treatment lane configurations.

3.2.1 SUNSET DRIVE / 42 STREET

The Sunset Drive / 42 Street intersection is a four-legged intersection with the west leg being a boat launch access. This intersection is currently controlled by one stop sign on 42 Street with free flow conditions on Sunset Drive.

The traffic operational performance at this intersection under the analysis horizon traffic conditions are summarized in Tables 3.2 to 3.5. The detailed Synchro outputs are attached in Appendix D.

Table 3.2 Capacity Analysis: Base Year (2019) Traffic – Sunset Drive / 42 Street

TRAFFIC MOVEMENTS	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	LOS	*V/C*	95th Queue Length (m)	Delay (s)	LOS	*V/C*	95th Queue Length (m)
EBLTR	10.1	B	0.01	0.1	10.6	B	0.01	0.1
WBLTR	10.1	B	0.03	0.7	10.9	B	0.05	1.2
NBL	7.5	A	0.00	0.0	7.5	A	0.00	0.0
SBL	7.5	A	0.00	0.1	7.6	A	0.01	0.1
INT Summary	1.1	A	0.03	-	1.1	A	0.05	-

Table 3.3 Capacity Analysis: 2021 Post-Development Traffic – Sunset Drive / 42 Street

TRAFFIC MOVEMENTS	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	LOS	*V/C*	95th Queue Length (m)	Delay (s)	LOS	*V/C*	95th Queue Length (m)
EBLTR	10.3	B	0.01	0.1	11.1	B	0.01	0.1
WBLTR	10.3	B	0.03	0.7	11.5	B	0.06	1.3
NBL	7.5	A	0.00	0.0	7.6	A	0.00	0.0
SBL	7.5	A	0.00	0.1	7.7	A	0.01	0.1
INT Summary	0.9	A	0.03	-	1.0	A	0.06	-

Table 3.4 Capacity Analysis: 2039 Post-Development Traffic – Sunset Drive / 42 Street

TRAFFIC MOVEMENTS	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	LOS	*V/C*	95th Queue Length (m)	Delay (s)	LOS	*V/C*	95th Queue Length (m)
EBLTR	10.9	B	0.01	0.1	12.2	B	0.01	0.1
WBLTR	11.1	B	0.05	1.1	13.0	B	0.09	2.2
NBL	7.6	A	0.00	0.0	7.7	A	0.00	0.0
SBL	7.6	A	0.01	0.1	7.9	A	0.01	0.2
INT Summary	1.0	A	0.05	-	1.1	A	0.09	-

The above capacity analysis reveals that all traffic movements at Sunset Drive / 42 Street intersection are expected to operate at an acceptable LOS B or better during both the AM and PM peak periods up to the 20-year horizon. The existing intersection treatment at the Sunset Drive / 42 Street intersection will be capable of accommodating the forecasted future traffic. No intersection geometric improvements will be required.

3.2.2 SUNSET DRIVE / PROPOSED SITE ENTRANCE

The proposed site access is located on Sunset Drive, approximately 140 m north of 42 Street. It is recommended that a simple intersection treatment without any tapers or auxiliary lanes be provided for this intersection. The corner radius of the intersection should be designed to accommodate the design vehicle turning path (e.g., Recreational Vehicle). A stop sign is recommended to be installed on the Site Access Road.

The traffic operational performance at this intersection at each analysis horizon are summarized in Table 3.5. The detailed Synchro outputs are attached in Appendix D.

Table 3.5 Capacity Analysis: 2021 Post-Development Traffic – Sunset Drive / Proposed Site Entrance

TRAFFIC MOVEMENTS	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	LOS	*V/C*	95th Queue Length (m)	Delay (s)	LOS	*V/C*	95th Queue Length (m)
WBLR	9.9	A	0.03	0.6	9.4	A	0.01	0.5
NBTR	0.0	A	0.08	0.0	0.0	A	0.13	0.0
SBL	7.5	A	0.00	0.0	7.7	A	0.01	0.1
INT Summary	0.7	A	0.08	-	0.5	A	0.13	-

Table 3.6 Capacity Analysis: 2039 Post-Development Traffic – Sunset Drive / Proposed Site Entrance

TRAFFIC MOVEMENTS	AM PEAK HOUR				PM PEAK HOUR			
	Delay (s)	LOS	*V/C*	95th Queue Length (m)	Delay (s)	LOS	*V/C*	95th Queue Length (m)
WBLR	9.1	A	0.01	0.7	9.8	A	0.01	0.6
NBTR	0.0	A	0.10	0.0	0.0	A	0.17	0.0
SBL	7.6	A	0.00	0.0	7.9	A	0.01	0.1
INT Summary	0.5	A	0.10	-	0.4	A	0.13	-

The above capacity analysis reveals that all traffic movements at the Sunset Drive / Proposed Site Entrance intersection are expected to operate at LOS A during both the AM and PM peak hours up to the 20-year horizon. The proposed intersection treatment at the Sunset Drive / Proposed Site Entrance intersection will be capable of accommodating the forecasted future traffic.

4 ADDITIONAL CONSIDERATIONS

This section is intended as a general overview of a number of site aspects. Some additional issues have been identified for consideration.

4.1 SIGHT DISTANCE

The intersection sight distances along Sunset Drive at the 42 Street intersection were checked utilizing Google Earth based on the sight distance requirements in TAC's *Geometric Design Guide for Canadian Roads*. It was found that the available sight distances along Sunset Drive at the proposed site access location are approximately 165 m to the south and 200 m to the north. TAC requires that the minimum intersection sight distance for a combination truck (WB-20, larger than a recreational vehicle) is 160 m based on a 50 km/h design speed. Thus, the intersection sight distances along Sunset Drive are adequate at the proposed site access location.

4.2 INTERSECTION SPACING

Based on TAC's *Geometric Design Guide for Canadian Roads*, the minimum required intersection spacing along a collector road is 60 m. The proposed Site Entrance is located approximately 80 m from 44 Avenue at the south and approximately 200 m from the existing road access at the north. Thus, the proposed site access location meets the TAC's minimum intersection spacing requirement.

4.3 PEDESTRIAN FACILITIES

South of 42 Street, Sunset Drive presents an urban road cross section with curbs and gutters. A concrete sidewalk is provided along the east side. North of 42 Street within the Summer Village of Sunset Point corporate limits, Sunset Drive presents a typical rural road cross section with paved shoulders with no pedestrian sidewalks or trails alongside it.

To make Sunset Drive more pedestrian friendly, a sidewalk is recommended to be constructed along Sunset Drive in the Summer Village corporate limits. Pedestrian crosswalks with appropriate signs are recommended to be provided on Sunset Drive at the locations where pedestrians desire to cross Sunset Drive accessing the shore of Lac Ste. Anne.

4.4 SUNSET DRIVE CORRIDOR

Sunset Drive serves as a primary road that links the summer villages along the east/south shore of Lac Ste. Anne. To the south, Sunset Drive goes through the Village of Alberta Beach, the Summer Village of Val Quentin, and back into Lake Ste. Anne County. To the north, Sunset Drive goes through the Summer Village of Sunset Point, the Summer Village of Castle Island, and the hamlet of Gunn and connects to Highway 43.

Currently, commercial development is located along Sunset Drive (50 Avenue) between 47 Street and 51 Street in the Alberta Beach downtown. Parking and traffic during summer months has been identified as a problem in the downtown core of Alberta Beach. The assessment of the traffic operational performance in the Alberta Beach downtown area is out of the scope of work of this TIA. Considering the amount of trips that would be generated by the proposed RV Park, it is not anticipated that the traffic operational performance on Sunset Drive would be significantly impacted by the RV Park traffic. To provide an efficient transportation network which accommodates vehicular and pedestrian traffic efficiently and safely, it is recommended that a Functional Planning Study be conducted for the Sunset Drive corridor. Pedestrian and bicycle facilities (e.g., trails and bike lanes) should be considered as the major infrastructure improvement program.

4.5 ILLUMINATION

Lighting is currently provided along Sunset Drive and 42 Street in the vicinity of the proposed RV Park. It is recommended that additional lighting be provided at the proposed RV Park Access.

5 CONCLUSIONS AND RECOMMENDATIONS

This study has examined the traffic impacts associated with the proposed RV Park located west of and adjacent to Sunset Drive and north of 42 Street in Summer Village of Sunset Point. The conclusions and recommendations are summarized below:

TRIP GENERATION

— It is anticipated that the proposed RV Park would generate approximately 270 new trips a day in summer season with 20 trips in the AM peak hours and 33 trips in the PM peak hours.

SUNSET DRIVE / 42 STREET

— All traffic movements at Sunset Drive / 42 Street intersection are expected to operate at an acceptable level of service (LOS) B or better during both the AM and PM peak hours up to the 20-year horizon. The existing intersection treatment at the Sunset Drive / 42 Street intersection will be capable of accommodating the forecasted future traffic. No intersection geometric improvements will be required.

— A sidewalk is recommended to be constructed along Sunset Drive on the east side in the Summer Village of Sunset Point corporate limits. Pedestrian crosswalks with appropriate signs are recommended to be provided on Sunset Drive at the locations where pedestrians desire to cross Sunset Drive accessing the shore of Lac Ste. Anne. It should be noted that the recommended sidewalk is based on the existing roadway conditions and pedestrian connectivity consideration, and is not a result of the proposed development.

SUNSET DRIVE / PROPOSED SITE ENTRANCE

— It is recommended that a simple intersection treatment be provided for the proposed Site Access on Sunset Drive. The corner radius of the intersection should be designed to accommodate the design vehicle turning path (e.g., Recreational Vehicle). A stop sign is recommended to be installed on the Site Access Road.

— All traffic movements at the Sunset Drive / Proposed Site Access intersection are expected to operate at LOS A during both the AM and PM peak hours up to the 20-year horizon. The proposed intersection treatment at the Sunset Drive / Site Access intersection will be capable of accommodating the forecasted future traffic.

— The intersection sight distances along Sunset Drive are adequate at the proposed site access location.

— The proposed site access location meets the TAC's minimum intersection spacing requirement.

— It is recommended that additional lighting be provided at the proposed RV Park Access.

SUNDET DRIVE CORRIDOR

— The trips that would be generated by the proposed RV Park are not anticipated to significantly impact the traffic operational performance on Sunset Drive.

— To provide an efficient transportation network which accommodates vehicular and pedestrian traffic efficiently and safely, it is recommended that a Functional Planning Study be conducted for the Sunset Drive corridor. Pedestrian and bicycle facilities (e.g., trails and bike lanes) should be considered as the major infrastructure improvement program.

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APPENDIX

A ABBREVIATION AND UNITS

APPENDIX

ABBREVIATION	DESCRIPTION
ITE	Institute of Transportation Engineers
AADT	Average Annual Daily Traffic
ASDT	Average Summer Daily Traffic
ATR	Automatic Traffic Recorder
V/C	Volume to Capacity Ratio
LOS	Level of Service
LT	Left Turn
TIMS	Transportation Infrastructure Management System
INT	Intersection
EBL	Eastbound Left
WBL	Westbound Left
NBL	Northbound Left
SBL	Southbound Left
NBLR	Northbound Left and Right
EBLTR	Eastbound Left, Through and Right
WBLTR	Westbound Left, Through and Right
HCM	Highway Capacity manual
TAC	Transportation Association Canada
s	Second
m	Meter
km/h	Kilometers per hour

APPENDIX

B PROJECT INFORMATION

- Development Concept Plan
- Emails with the Summer Village of Sunset Point


Stormwater Pond Location
7m Roadway
7m Roadway
7m Roadway
7m Roadway
7m Roadway
7m Roadway
7m Roadway
7m Roadway
PLAYGROUND AREA
Sunset Dr.
4343 KS
5231 MC
4340 KS
44 Ave
5675 HW
42 St.
1802 CL
4560 HW
Existing Railway ROW
SITE BOUNDARY
LOT LINE
PROPOSED CABIN
WASHROOMS/LAUNDRY FACILITY
MULTIPURPOSE FACILITY
EXISTING TREED AREA
STORM WATER FLOW
SHRUBBY SWAMP BOUNDARY
EQUIPMENT STORAGE AREA
WATER TANK
PROPOSED NON-WHEELED DUMPSTER
PROPOSED VISITOR PARKING
PROPOSED SITE ENTRANCE AND EXIT
PROPOSED TRAIL
NOTES:
TOTAL PROPOSED CABIN LOTS = 18
TOTAL PROPOSED RV LOTS = 63
TOTAL GREEN AREA (Includes shrubby swamp area) = 9.72 AC (56.5%)
TOTAL PROPOSED GRAVEL AREA (ROADS, RV PADS AND PARKING) = 5.66 AC (36.8%)
SCALE: 1:1,500
0
75
75m

Sun, James

From: Matthew Ferris <office@sunsetpoint.ca>
Sent: May-14-19 7:17 PM
To: Sun, James
Subject: RE: TIA - RV Park in Summer Village of Sunset Point

Single family homes. You would need to do an information request thru Lac Ste. Anne County. As it is in there jurisdiction.

Matthew Ferris
CAO

From: Sun, James <James.Sun@wsp.com>
Sent: Tuesday, May 14, 2019 9:00 AM
To: Matthew Ferris <office@sunsetpoint.ca>
Subject: RE: TIA - RV Park in Summer Village of Sunset Point

Thank you Matthew for your prompt response. Yes, we will look at the road network. Do you have any traffic information for the roadways? Any traffic studies have been done before? Regarding the 30 unit subdivision, is it single-family detached residential or other type of development?

Thanks

James Sun, MSc., P.Eng., PTOE, RSP1
C 780-233-0757

From: Matthew Ferris [mailto:office@sunsetpoint.ca]
Sent: May-13-19 9:32 PM
To: Sun, James <James.Sun@wsp.com>
Subject: RE: TIA - RV Park in Summer Village of Sunset Point

Hi James thanks for the info.
Please also consider the road network further into Alberta Beach as well. I have concerns they may pose some difficulties.

There is a 30 unit subdivision proposed north in Lac ste anne county about 2km under development. Its near Castle Island.

Matthew Ferris
CAO

From: Sun, James <James.Sun@wsp.com>
Sent: Monday, May 13, 2019 1:23 PM
To: office@sunsetpoint.ca
Subject: TIA - RV Park in Summer Village of Sunset Point

Dear Development Officer,

We were retained by V3 Companies of Canada to prepare a Traffic Impact Assessment for a RV park located east of Sunset Drive and north of 42 Street in Summer Village of Sunset Point. The proposed RV park will contain 13 cabin lots and 78 RV lots (see attached). For the purpose of the TIA preparation, we would like to touch base with you regarding the TIA methodology and work scope:

- This TIA will be prepared in accordance with Alberta Transportation's Traffic Impact Assessment Guidelines.
- The following intersections will be analyzed in our TIA:
    - Sunset Drive / 42 Street, and
    - Sunset Drive / Proposed Site West Access (enter only).
- We will carry out a 3-day continuous automatic tube traffic count on Sunset Drive and 42 Street on a weekend (Friday to Monday) to capture the existing traffic information.
- ITE Trip Generation Manual (10th Edition) will be used for the Trip generation rates of the proposed RV park.
- Please advise the anticipated future traffic growth rate for Sunset Drive and any planned development in the vicinity of the site you want us to consider.

Please let me know if you have any other concerns that you want us to address in the TIA. It would be greatly appreciated if you could reply to me at your earliest convenience.

Thanks

James Sun, MSc., P.Eng., PTOE, RSP1
Senior Transportation Engineer
Transportation Engineering, Transportation West

T 587-489-0161
C 780-233-0757

Suite 1200, 10909 Jasper Avenue
Edmonton, Alberta T5J 3L9
www.wsp.com

APPENDIX

C TRAFFIC ANALYSIS

- MetroCount Traffic Count
- Traffic Turning Movement Diagram

MetroCount Traffic Executive
Daily Classes by Direction

DayClassSplit-0 -- English (ENC)

Datasets:

Site:	**[Sunset Drive] North of 44 Ave.**
Attribute:	1
Direction:	5 - South bound A>B, North bound B>A. **Lane:** 0
Survey Duration:	10:00 May-17-19 => 10:18 May-23-19,
Zone:	
File:	Sunset Drive 0 2019-05-23 1019.EC0 (Plus)
Identifier:	KK92G9JV MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v4.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**10:00 May-17-19 => 10:18 May-23-19 (6.01318)**
Included classes:	1, 2, 3, 4, 5
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound), P = North, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 100 metre
Name:	Default Profile
Scheme:	Vehicle classification (AT-5)
Units:	Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile:	Vehicles = 7502 / 7640 (98.19%)

Daily Classes by Direction

DayClassSplit-0
Site: Sunset Drive.0.1SN
Description: **North of 44 Ave.**
Filter time: **10:00 May-17-19 => 10:18 May-23-19**
Scheme: Vehicle classification (AT-5)
Filter: Cls(1-5) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

May-13-19

	1	2	3	4	5	Total
Mon*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Tue*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Wed*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Thu*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Fri*	879	27	76	227	30	1239
(%)	70.9	2.2	6.1	18.3	2.4	
AB	202	2	75	214	15	508
AB%	23.0	7.4	98.7	94.3	50.0	41.0
BA	677.0	25.0	1.0	13.0	15.0	731.0
BA%	77.0	92.6	1.3	5.7	50.0	59.0
Sat	1471	31	74	431	24	2031
(%)	72.4	1.5	3.6	21.2	1.2	
AB	467	6	73	421	13	980
AB%	31.7	19.4	98.6	97.7	54.2	48.3
BA	1004.0	25.0	1.0	10.0	11.0	1051.0
BA%	68.3	80.6	1.4	2.3	45.8	51.7
Sun	1726	13	67	489	24	2319
(%)	74.4	0.6	2.9	21.1	1.0	
AB	610	1	66	477	17	1171
AB%	35.3	7.7	98.5	97.5	70.8	50.5
BA	1116.0	12.0	1.0	12.0	7.0	1148.0
BA%	64.7	92.3	1.5	2.5	29.2	49.5

Average daily volume

Entire week

	1599	22	71	460	24	2175
(%)	73.5	1.0	3.2	21.1	1.1	
AB	539	4	70	449	15	1076
AB%	33.7	15.9	98.6	97.6	62.5	49.4
BA	1060.0	18.5	1.0	11.0	9.0	1099.5
BA%	66.3	84.1	1.4	2.4	37.5	50.6

Weekdays No complete days.
Weekend

	1599	22	71	460	24	2175
(%)	73.5	1.0	3.2	21.1	1.1	
AB	539	4	70	449	15	1076
AB%	33.7	15.9	98.6	97.6	62.5	49.4
BA	1060.0	18.5	1.0	11.0	9.0	1099.5
BA%	66.3	84.1	1.4	2.4	37.5	50.6

Daily Classes by Direction

DayClassSplit-0
Site: Sunset Drive.0.1SN
Description: **North of 44 Ave.**
Filter time: **10:00 May-17-19 => 10:18 May-23-19**
Scheme: Vehicle classification (AT-5)
Filter: Cls(1-5) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

May-20-19

	1	2	3	4	5	Total
Mon	1087	16	63	358	27	1551
(%)	70.1	1.0	4.1	23.1	1.7	
AB	470	2	58	348	18	896
AB%	43.2	12.5	92.1	97.2	66.7	57.8
BA	617.0	14.0	5.0	10.0	9.0	655.0
BA%	56.8	87.5	7.9	2.8	33.3	42.2
Tue	231	7	30	85	9	362
(%)	63.8	1.9	8.3	23.5	2.5	
AB	90	1	27	80	8	206
AB%	39.0	14.3	90.0	94.1	88.9	56.9
BA	141.0	6.0	3.0	5.0	1.0	156.0
BA%	61.0	85.7	10.0	5.9	11.1	43.1
Wed	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Thu*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Fri*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Sat*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Sun*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0

Average daily volume

Entire week

	439	8	31	148	12	638
(%)	68.9	1.2	4.9	23.2	1.9	
AB	187	1	28	143	9	367
AB%	42.5	13.0	91.4	96.6	72.2	57.6
BA	252.7	6.7	2.7	5.0	3.3	270.3
BA%	57.5	87.0	8.6	3.4	27.8	42.4

Weekdays

	439	8	31	148	12	638
(%)	68.9	1.2	4.9	23.2	1.9	
AB	187	1	28	143	9	367
AB%	42.5	13.0	91.4	96.6	72.2	57.6
BA	252.7	6.7	2.7	5.0	3.3	270.3
BA%	57.5	87.0	8.6	3.4	27.8	42.4

Weekend No complete days.

MetroCount Traffic Executive
Daily Classes by Direction

DayClassSplit-9 -- English (ENC)

Datasets:

Site:	**[42 St] East of Sunset Drive**
Attribute:	2
Direction:	6 - West bound A>B, East bound B>A. **Lane:** 0
Survey Duration:	10:00 May-17-19 => 10:24 May-23-19,
Zone:	
File:	42 St 0 2019-05-23 1024.EC0 (Plus)
Identifier:	CJ86Q6EK MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v4.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**10:00 May-17-19 => 10:24 May-23-19 (6.01675)**
Included classes:	1, 2, 3, 4, 5
Speed range:	10 - 160 km/h.
Direction:	North, East, South, West (bound), P = East, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 100 metre
Name:	Default Profile
Scheme:	Vehicle classification (AT-5)
Units:	Metric (metre, kilometre, m/s, km/h, kg, tonne)
In profile:	Vehicles = 966 / 1011 (95.55%)

Daily Classes by Direction

DayClassSplit-9
Site: 42 St.0.1WE
Description: **East of Sunset Drive**
Filter time: **10:00 May-17-19 => 10:24 May-23-19**
Scheme: Vehicle classification (AT-5)
Filter: Cls(1-5) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

May-13-19

	1	2	3	4	5	Total
Mon*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Tue*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Wed*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Thu*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Fri*	110	1	2	29	1	143
(%)	76.9	0.7	1.4	20.3	0.7	
AB	66	0	2	6	0	74
AB%	60.0	0.0	100.0	20.7	0.0	51.7
BA	44.0	1.0	0.0	23.0	1.0	69.0
BA%	40.0	100.0	0.0	79.3	100.0	48.3
Sat	193	1	1	44	0	239
(%)	80.8	0.4	0.4	18.4	0.0	
AB	106	1	0	13	0	120
AB%	54.9	100.0	0.0	29.5	0.0	50.2
BA	87.0	0.0	1.0	31.0	0.0	119.0
BA%	45.1	0.0	100.0	70.5	0.0	49.8
Sun	267	0	0	56	0	323
(%)	82.7	0.0	0.0	17.3	0.0	
AB	156	0	0	18	0	174
AB%	58.4	0.0	0.0	32.1	0.0	53.9
BA	111.0	0.0	0.0	38.0	0.0	149.0
BA%	41.6	0.0	0.0	67.9	0.0	46.1

Average daily volume

Entire week

	230	1	1	50	0	281
(%)	81.9	0.2	0.2	17.8	0.0	
AB	131	1	0	16	0	147
AB%	57.0	100.0	0.0	31.0	0.0	52.3
BA	99.0	0.0	0.5	34.5	0.0	134.0
BA%	43.0	0.0	100.0	69.0	0.0	47.7

Weekdays No complete days.
Weekend

	230	1	1	50	0	281
(%)	81.9	0.2	0.2	17.8	0.0	
AB	131	1	0	16	0	147
AB%	57.0	100.0	0.0	31.0	0.0	52.3
BA	99.0	0.0	0.5	34.5	0.0	134.0
BA%	43.0	0.0	100.0	69.0	0.0	47.7

Daily Classes by Direction

DayClassSplit-9
Site: 42 St.0.1WE
Description: **East of Sunset Drive**
Filter time: **10:00 May-17-19 => 10:24 May-23-19**
Scheme: Vehicle classification (AT-5)
Filter: Cls(1-5) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

May-20-19

	1	2	3	4	5	Total
Mon	144	0	4	64	0	212
(%)	67.9	0.0	1.9	30.2	0.0	
AB	86	0	3	18	0	107
AB%	59.7	0.0	75.0	28.1	0.0	50.5
BA	58.0	0.0	1.0	46.0	0.0	105.0
BA%	40.3	0.0	25.0	71.9	0.0	49.5
Tue	38	0	1	10	0	49
(%)	77.6	0.0	2.0	20.4	0.0	
AB	15	0	1	5	0	21
AB%	39.5	0.0	100.0	50.0	0.0	42.9
BA	23.0	0.0	0.0	5.0	0.0	28.0
BA%	60.5	0.0	0.0	50.0	0.0	57.1
Wed	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Thu*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Fri*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Sat*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0
Sun*	0	0	0	0	0	0
(%)	0.0	0.0	0.0	0.0	0.0	
AB	0	0	0	0	0	0
AB%	0.0	0.0	0.0	0.0	0.0	0.0
BA	0.0	0.0	0.0	0.0	0.0	0.0
BA%	0.0	0.0	0.0	0.0	0.0	0.0

Average daily volume

Entire week

	61	0	2	25	0	87
(%)	69.7	0.0	1.9	28.4	0.0	
AB	34	0	1	8	0	43
AB%	55.5	0.0	80.0	31.1	0.0	49.0
BA	27.0	0.0	0.3	17.0	0.0	44.3
BA%	44.5	0.0	20.0	68.9	0.0	51.0

Weekdays

	61	0	2	25	0	87
(%)	69.7	0.0	1.9	28.4	0.0	
AB	34	0	1	8	0	43
AB%	55.5	0.0	80.0	31.1	0.0	49.0
BA	27.0	0.0	0.3	17.0	0.0	44.3
BA%	44.5	0.0	20.0	68.9	0.0	51.0

Weekend No complete days.

Turning Movement Summary Diagram

Reference No.: 65530

Intersection of:
633 & RGE RD 32 10-54-3-500000000

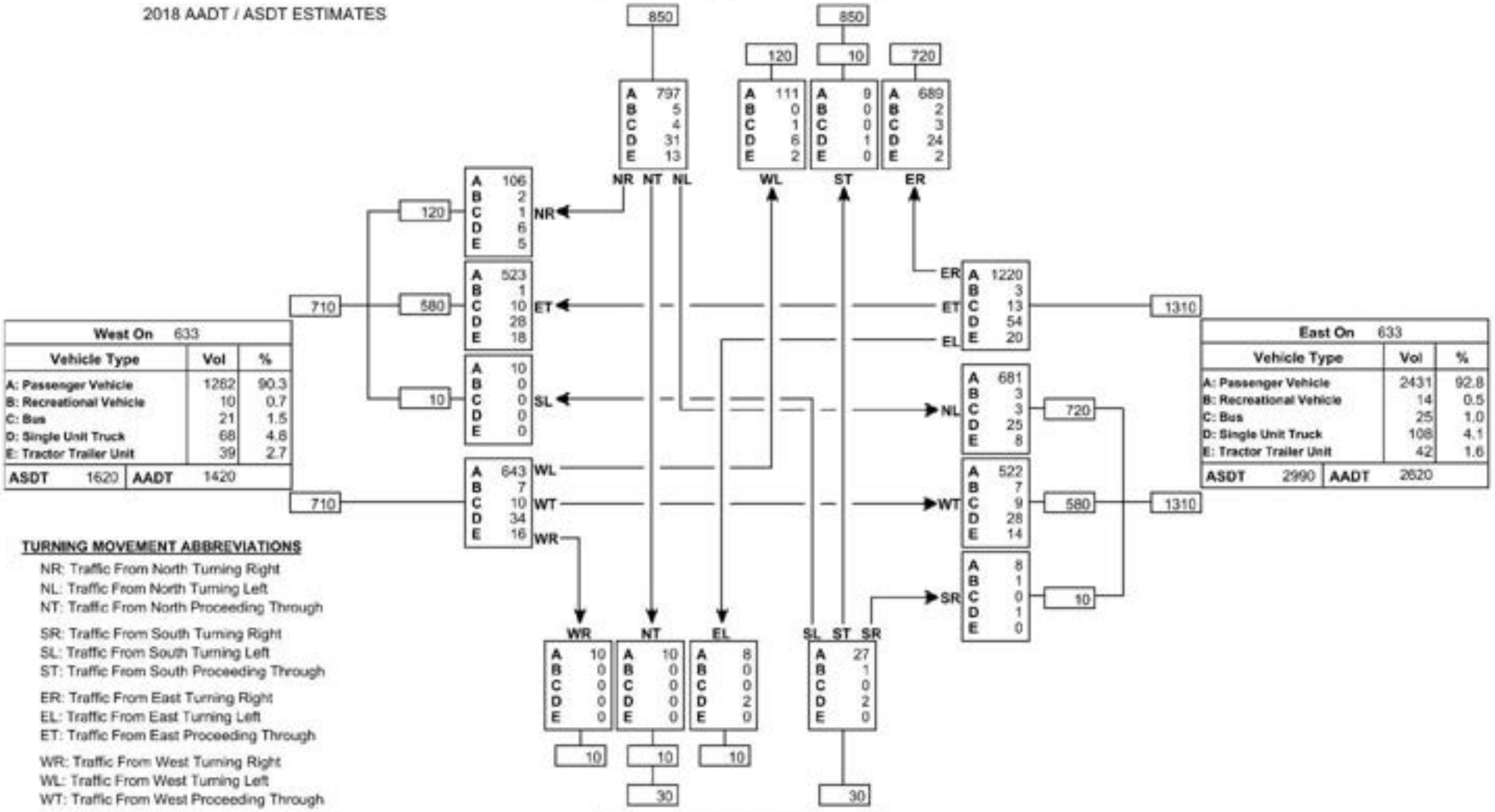
2018 AADT / ASDT ESTIMATES

North On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1606	94.5
B: Recreational Vehicle	7	0.4
C: Bus	8	0.5
D: Single Unit Truck	62	3.6
E: Tractor Trailer Unit	17	1.0
ASDT 1940	**AADT** 1700	

West On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1282	90.3
B: Recreational Vehicle	10	0.7
C: Bus	21	1.5
D: Single Unit Truck	68	4.8
E: Tractor Trailer Unit	39	2.7
ASDT 1620	**AADT** 1420	

East On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2431	92.8
B: Recreational Vehicle	14	0.5
C: Bus	25	1.0
D: Single Unit Truck	108	4.1
E: Tractor Trailer Unit	42	1.6
ASDT 2990	**AADT** 2620	

South On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	55	91.7
B: Recreational Vehicle	1	1.7
C: Bus	0	0.0
D: Single Unit Truck	4	6.7
E: Tractor Trailer Unit	0	0.0
ASDT 70	**AADT** 60	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
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Turning Movement Summary Diagram

Reference No.: 65530

Intersection of:
633 & RGE RD 32 10-54-3-500000000

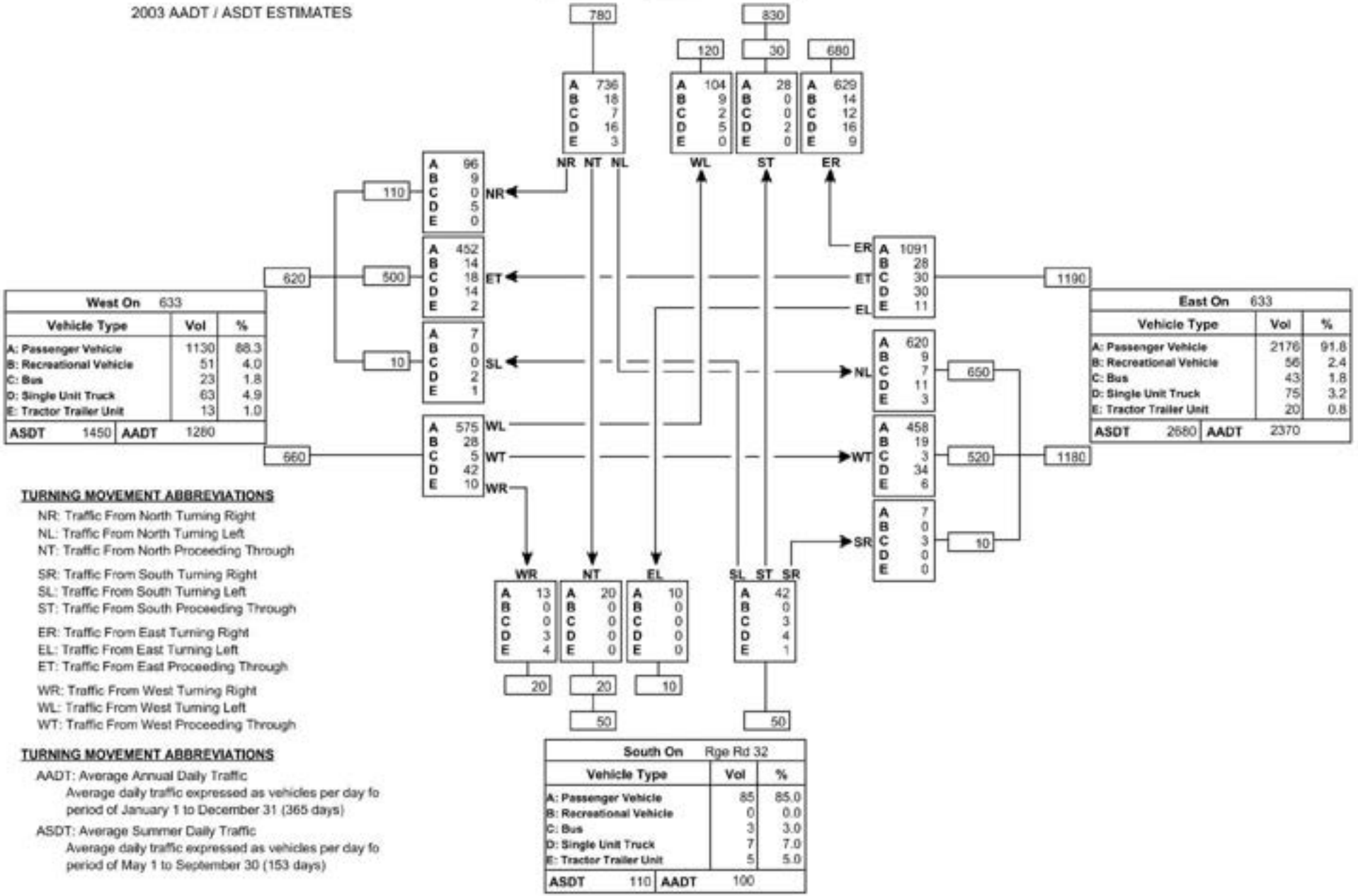
2003 AADT / ASDT ESTIMATES

North On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1497	93.0
B: Recreational Vehicle	41	2.5
C: Bus	21	1.3
D: Single Unit Truck	39	2.4
E: Tractor Trailer Unit	12	0.7
ASDT 1820	**AADT** 1610	

West On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1130	88.3
B: Recreational Vehicle	51	4.0
C: Bus	23	1.8
D: Single Unit Truck	63	4.9
E: Tractor Trailer Unit	13	1.0
ASDT 1450	**AADT** 1280	

East On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2176	91.8
B: Recreational Vehicle	56	2.4
C: Bus	43	1.8
D: Single Unit Truck	75	3.2
E: Tractor Trailer Unit	20	0.8
ASDT 2680	**AADT** 2370	

South On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	85	85.0
B: Recreational Vehicle	0	0.0
C: Bus	3	3.0
D: Single Unit Truck	7	7.0
E: Tractor Trailer Unit	5	5.0
ASDT 110	**AADT** 100	



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Reference No.: 65530

Intersection of:
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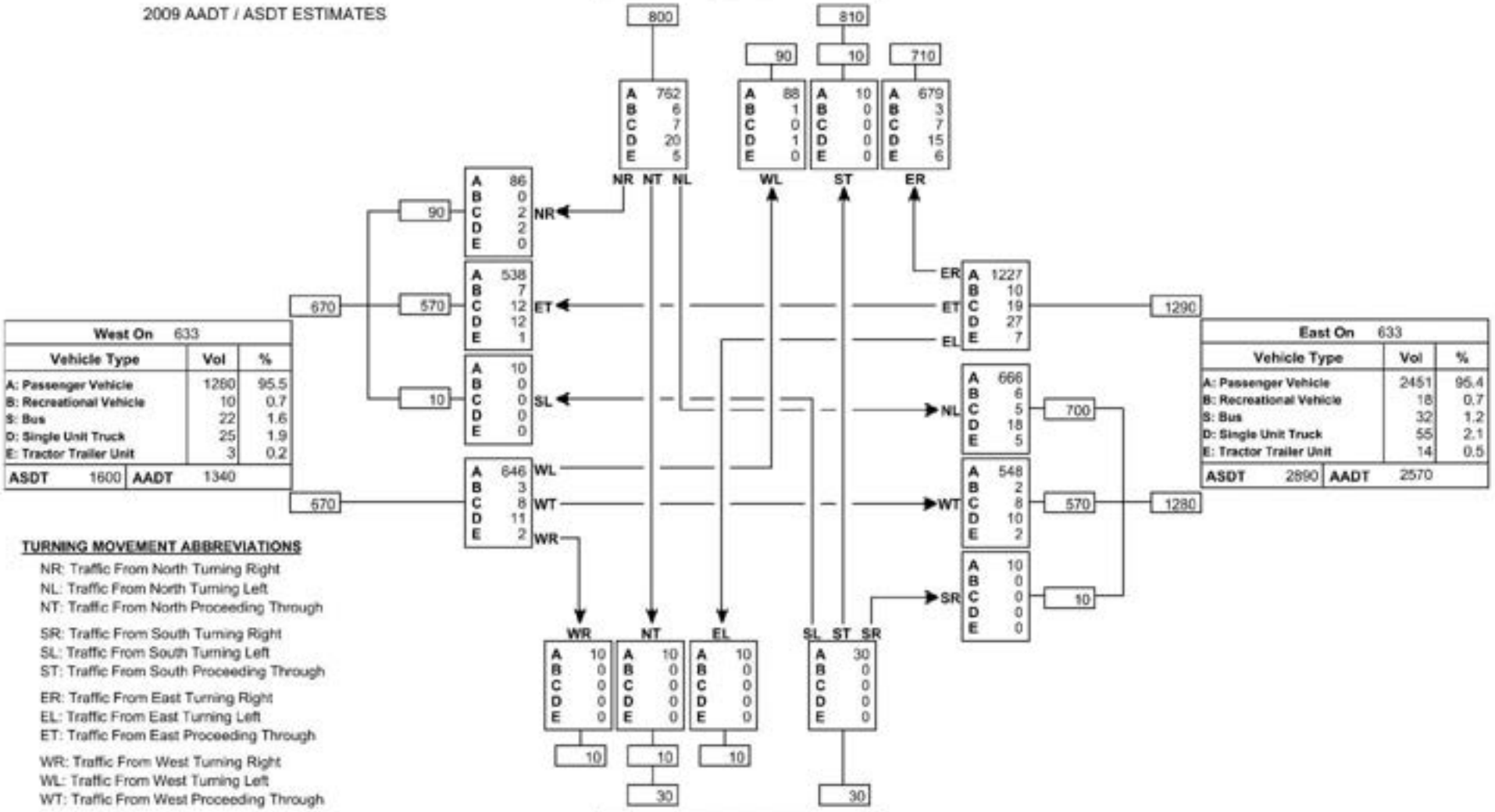
2009 AADT / ASDT ESTIMATES

North On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1539	95.6
B: Recreational Vehicle	10	0.6
S: Bus	14	0.9
D: Single Unit Truck	36	2.2
E: Tractor Trailer Unit	11	0.7
ASDT 1930	**AADT** 1610	

West On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1280	95.5
B: Recreational Vehicle	10	0.7
S: Bus	22	1.6
D: Single Unit Truck	25	1.9
E: Tractor Trailer Unit	3	0.2
ASDT 1600	**AADT** 1340	

East On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2451	95.4
B: Recreational Vehicle	18	0.7
S: Bus	32	1.2
D: Single Unit Truck	55	2.1
E: Tractor Trailer Unit	14	0.5
ASDT 2890	**AADT** 2570	

South On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	60	100.0
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	0	0.0
ASDT 70	**AADT** 60	



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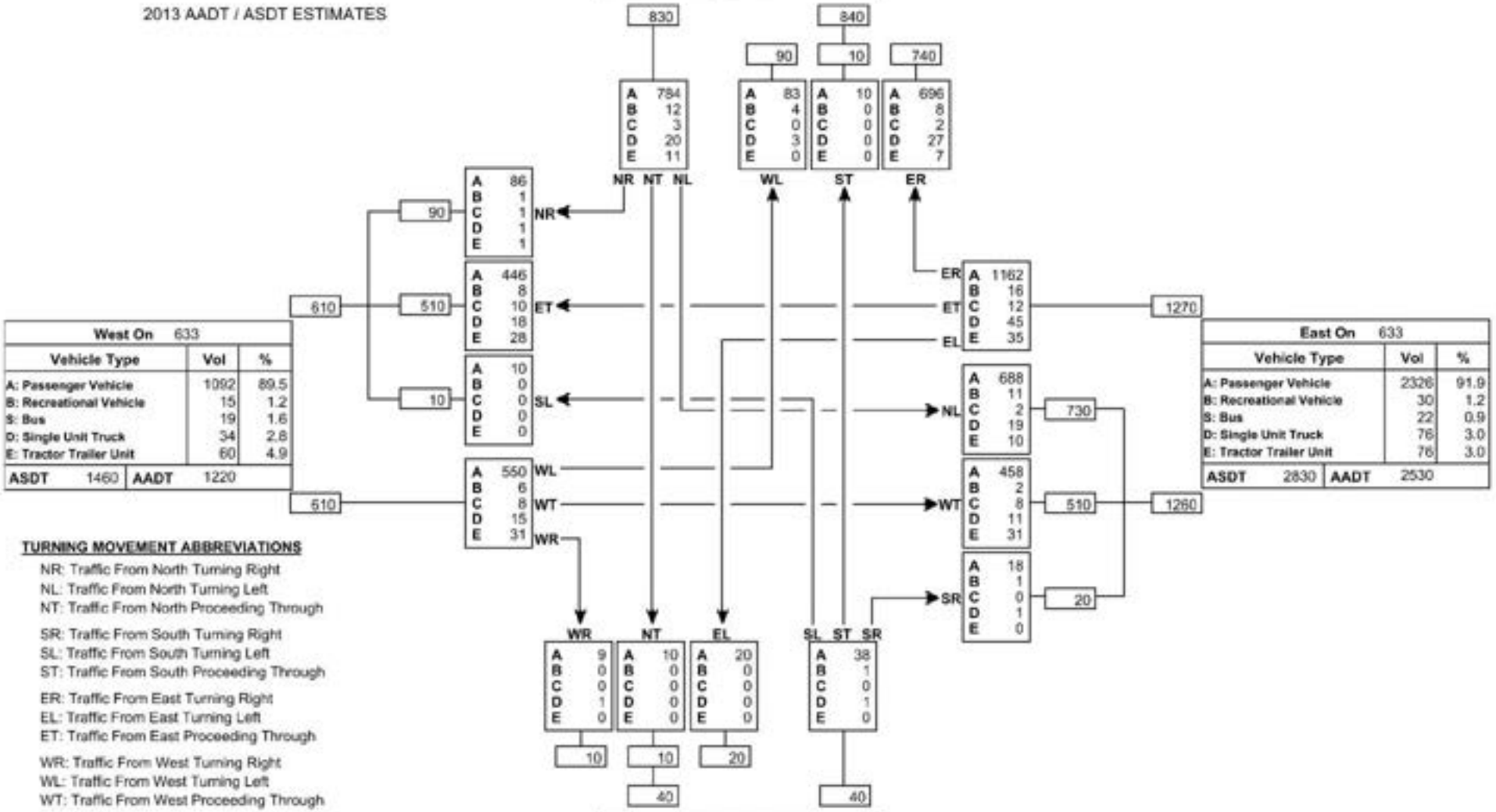

North On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1573	94.2
B: Recreational Vehicle	24	1.4
S: Bus	5	0.3
D: Single Unit Truck	50	3.0
E: Tractor Trailer Unit	18	1.1
ASDT 2000	**AADT** 1670	

West On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1092	89.5
B: Recreational Vehicle	15	1.2
S: Bus	19	1.6
D: Single Unit Truck	34	2.8
E: Tractor Trailer Unit	60	4.9
ASDT 1460	**AADT** 1220	

East On 633		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2326	91.9
B: Recreational Vehicle	30	1.2
S: Bus	22	0.9
D: Single Unit Truck	76	3.0
E: Tractor Trailer Unit	76	3.0
ASDT 2830	**AADT** 2530	

South On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	77	96.3
B: Recreational Vehicle	1	1.3
S: Bus	0	0.0
D: Single Unit Truck	2	2.5
E: Tractor Trailer Unit	0	0.0
ASDT 100	**AADT** 80	

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Turning Movement Summary Diagram

Reference No.: 66548

Intersection of:
43 & GUNN CORNER ESSO 10-55-3-500001200

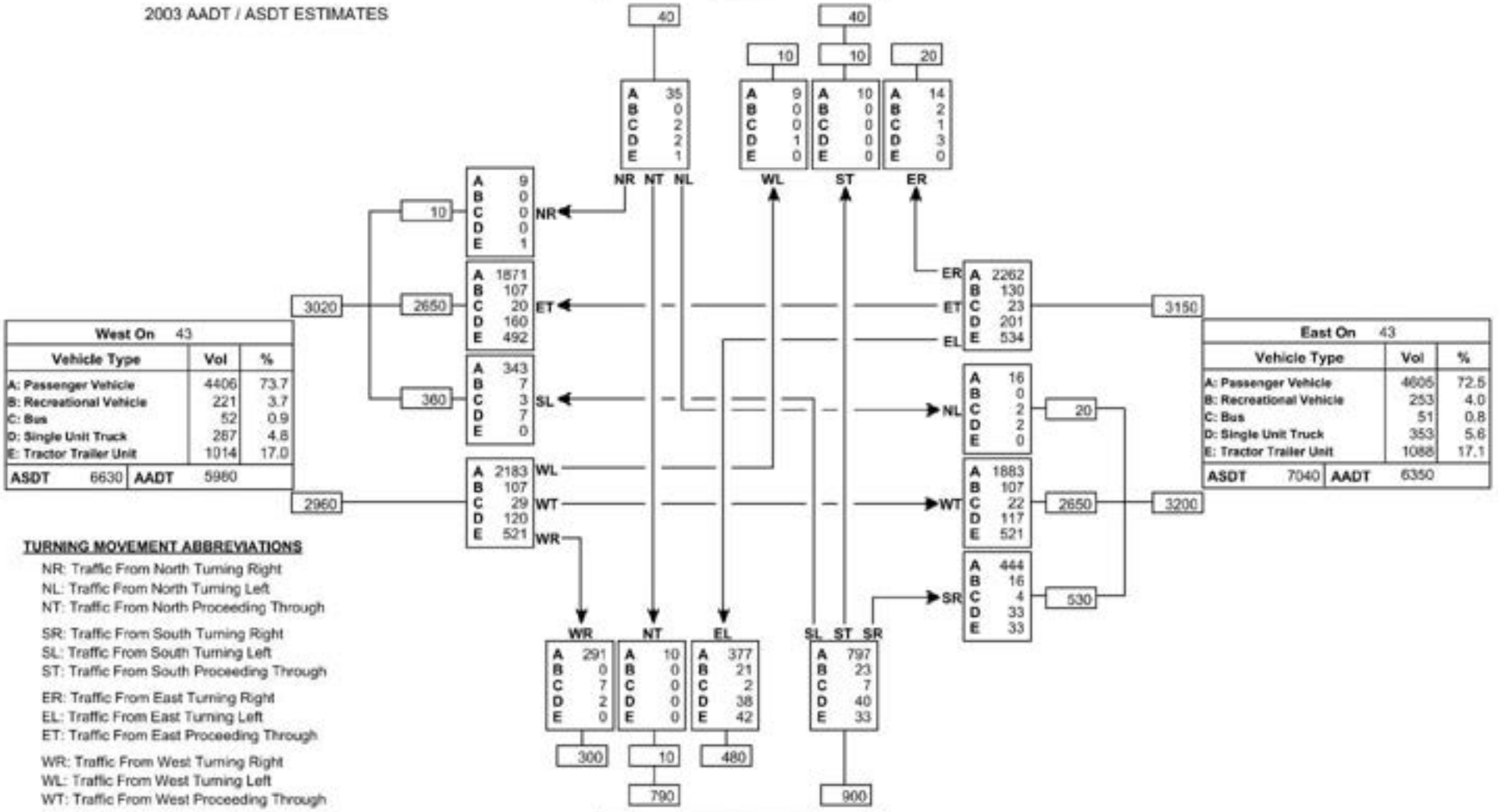
2003 AADT / ASDT ESTIMATES

North On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	68	85.0
B: Recreational Vehicle	2	2.5
C: Bus	3	3.8
D: Single Unit Truck	6	7.5
E: Tractor Trailer Unit	1	1.3
ASDT 90	**AADT** 80	

West On 43		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	4406	73.7
B: Recreational Vehicle	221	3.7
C: Bus	52	0.9
D: Single Unit Truck	287	4.8
E: Tractor Trailer Unit	1014	17.0
ASDT 6630	**AADT** 5980	

East On 43		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	4605	72.5
B: Recreational Vehicle	253	4.0
C: Bus	51	0.8
D: Single Unit Truck	353	5.6
E: Tractor Trailer Unit	1088	17.1
ASDT 7040	**AADT** 6350	

South On Local Rd		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1475	87.3
B: Recreational Vehicle	44	2.6
C: Bus	16	0.9
D: Single Unit Truck	80	4.7
E: Tractor Trailer Unit	75	4.4
ASDT 1870	**AADT** 1690	



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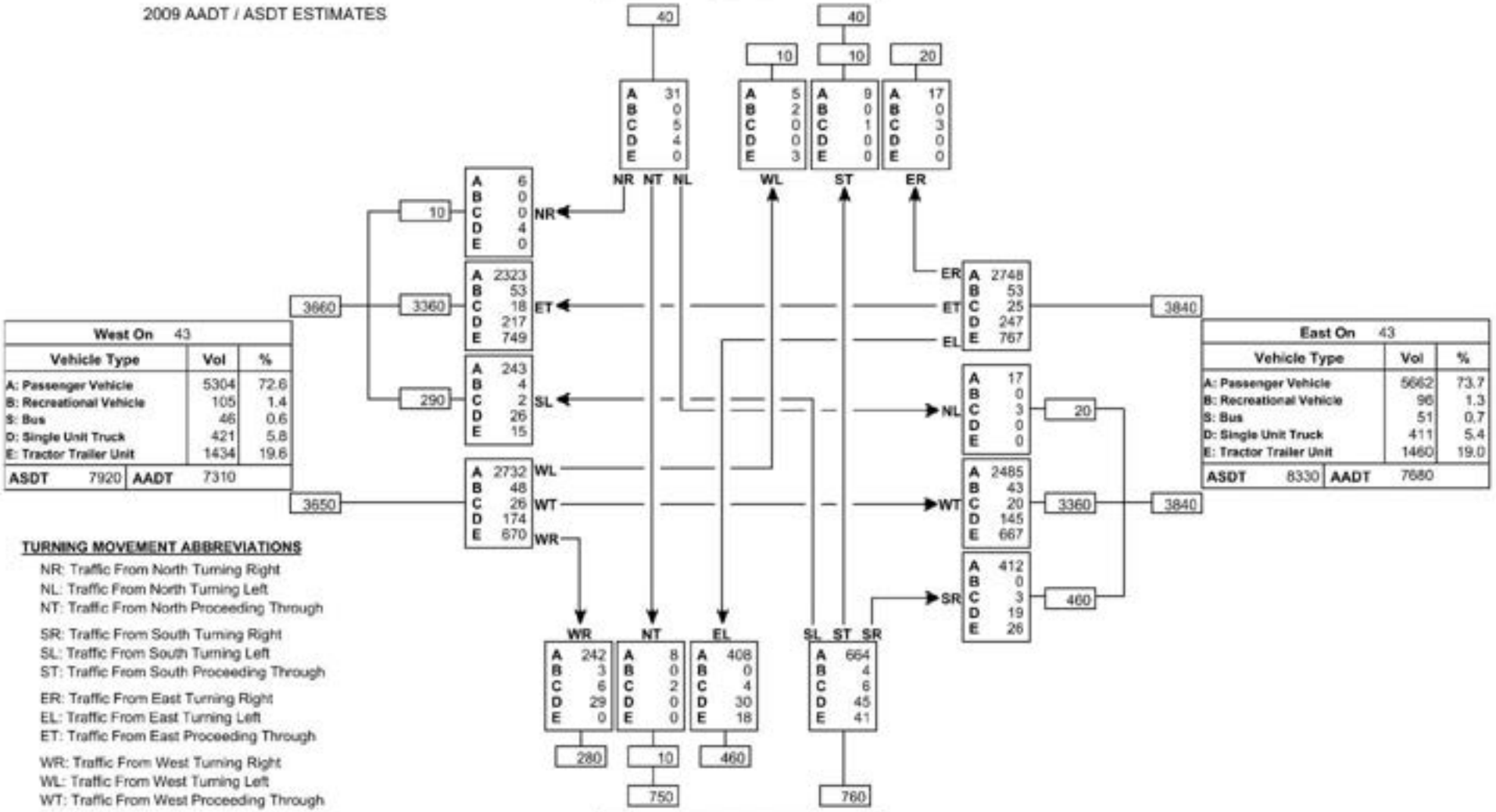

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Intersection of:
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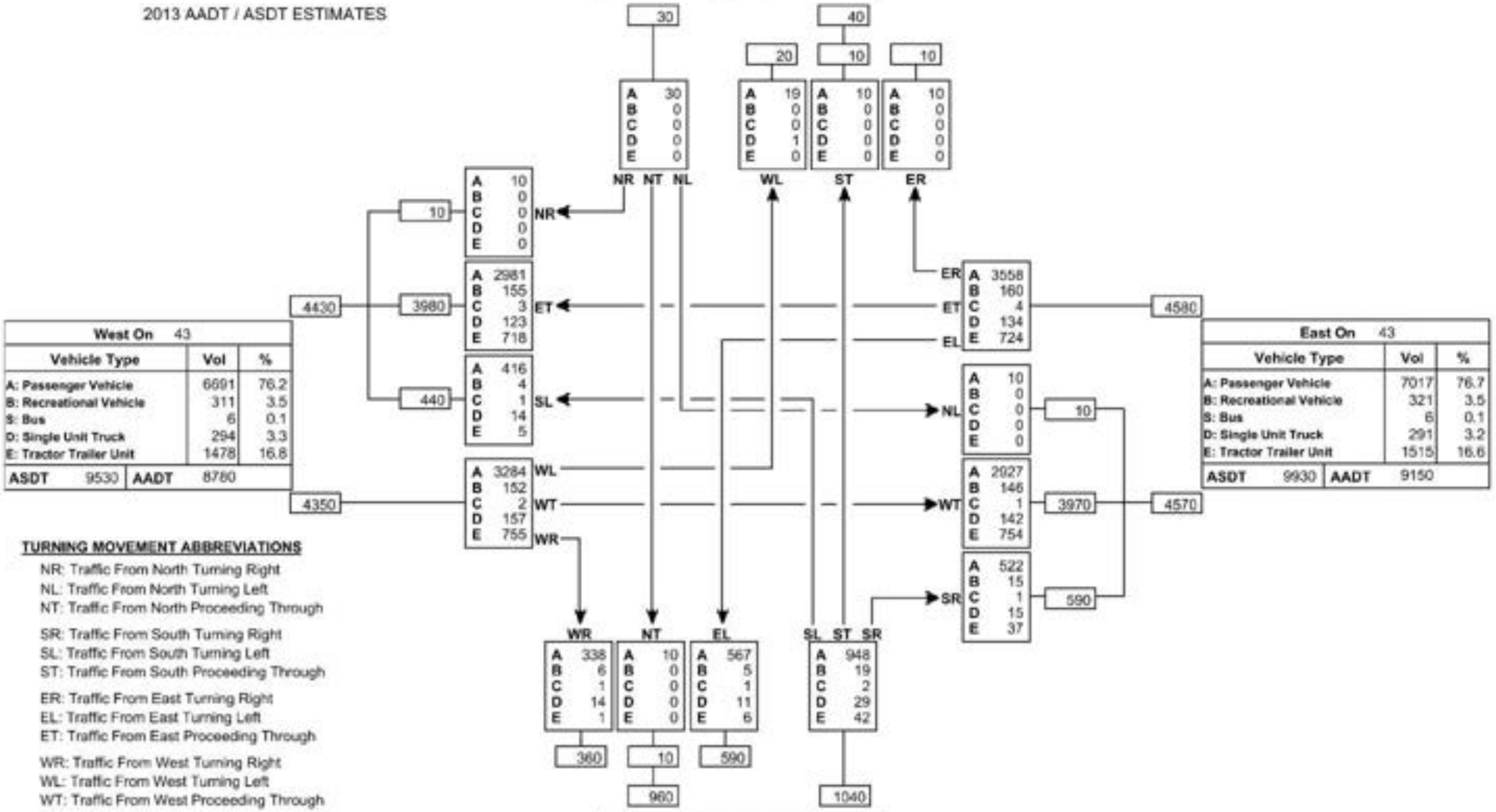
2013 AADT / ASDT ESTIMATES

North On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	69	98.6
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	1	1.4
E: Tractor Trailer Unit	0	0.0
ASDT 80	**AADT** 70	

West On 43		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	6691	76.2
B: Recreational Vehicle	311	3.5
S: Bus	6	0.1
D: Single Unit Truck	294	3.3
E: Tractor Trailer Unit	1478	16.8
ASDT 9530	**AADT** 8780	

East On 43		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	7017	76.7
B: Recreational Vehicle	321	3.5
S: Bus	6	0.1
D: Single Unit Truck	291	3.2
E: Tractor Trailer Unit	1515	16.6
ASDT 9930	**AADT** 9150	

South On Rge Rd 32		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1863	93.2
B: Recreational Vehicle	30	1.5
S: Bus	4	0.2
D: Single Unit Truck	54	2.7
E: Tractor Trailer Unit	49	2.5
ASDT 2170	**AADT** 2000	



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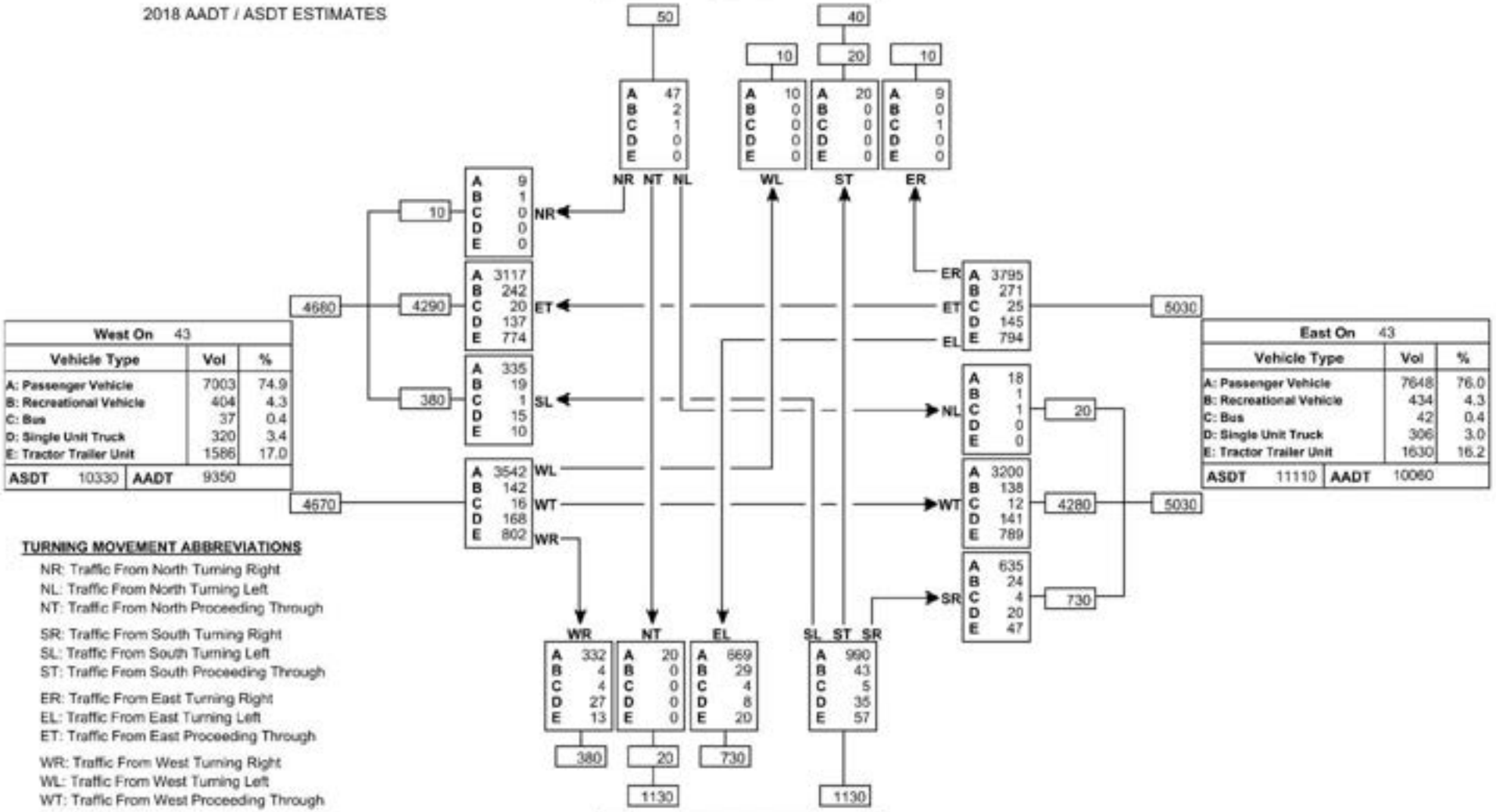

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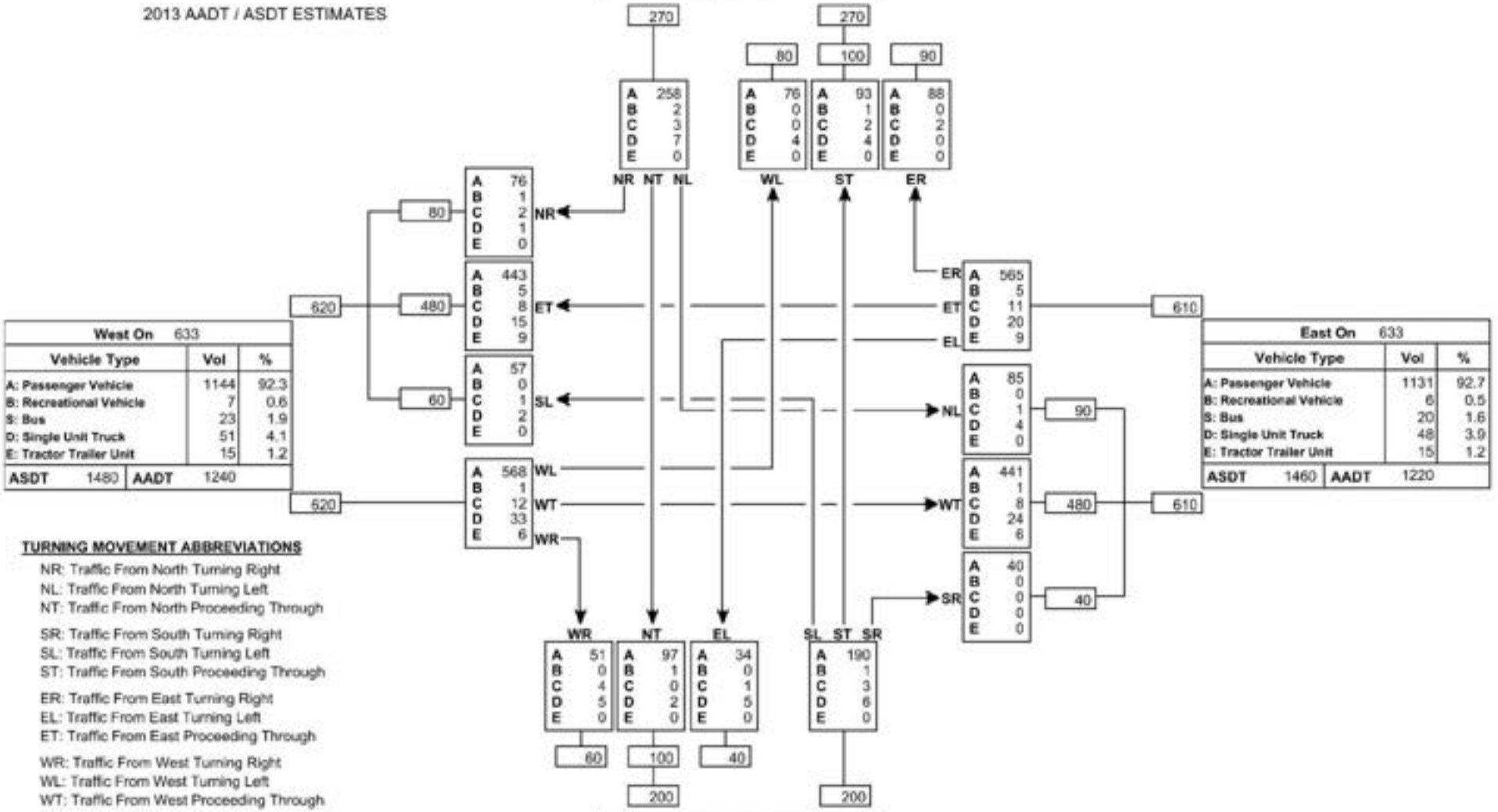
2013 AADT / ASDT ESTIMATES



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Intersection of:
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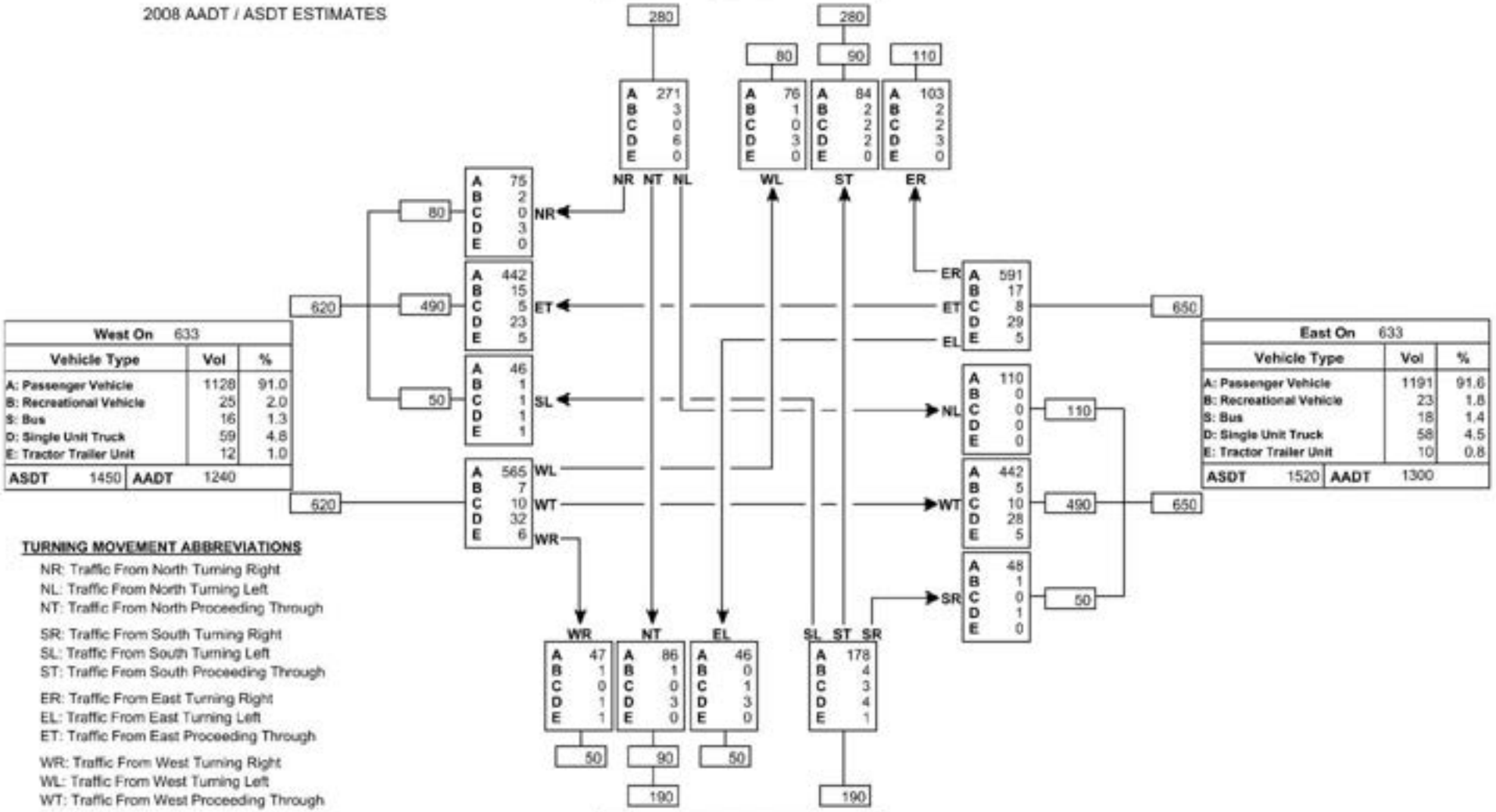
2008 AADT / ASDT ESTIMATES



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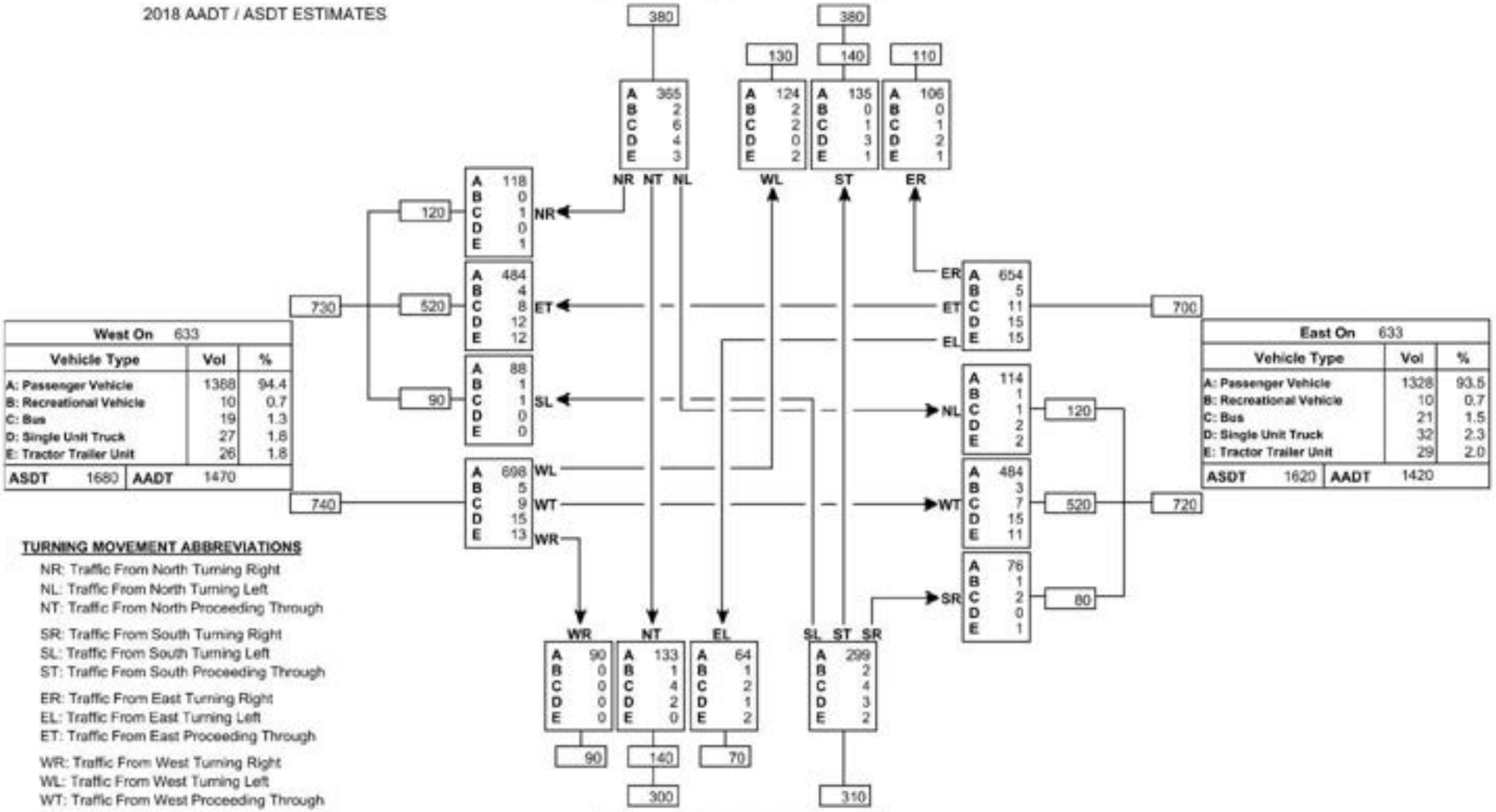

North On Rge Rd 33

Vehicle Type	Vol	%
A: Passenger Vehicle	730	96.1
B: Recreational Vehicle	4	0.5
C: Bus	10	1.3
D: Single Unit Truck	9	1.2
E: Tractor Trailer Unit	7	0.9
ASDT 870	**AADT** 760	

West On 633

Vehicle Type	Vol	%
A: Passenger Vehicle	1368	94.4
B: Recreational Vehicle	10	0.7
C: Bus	19	1.3
D: Single Unit Truck	27	1.8
E: Tractor Trailer Unit	26	1.8
ASDT 1680	**AADT** 1470	

East On 633

Vehicle Type	Vol	%
A: Passenger Vehicle	1328	93.5
B: Recreational Vehicle	10	0.7
C: Bus	21	1.5
D: Single Unit Truck	32	2.3
E: Tractor Trailer Unit	29	2.0
ASDT 1620	**AADT** 1420	

South On Rge Rd 33

Vehicle Type	Vol	%
A: Passenger Vehicle	586	96.1
B: Recreational Vehicle	4	0.7
C: Bus	10	1.6
D: Single Unit Truck	6	1.0
E: Tractor Trailer Unit	4	0.7
ASDT 700	**AADT** 610	

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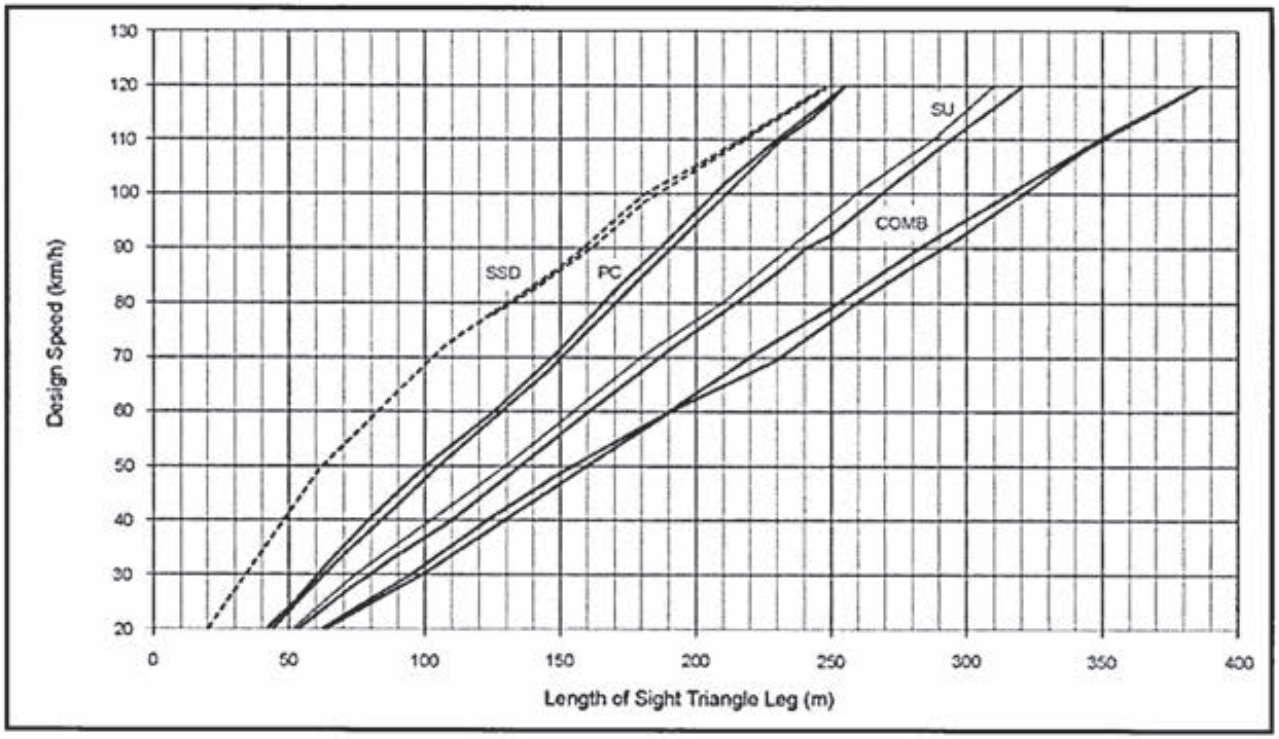

Figure 9.9.4: Intersection Sight Distance – Case B1, Left Turn from Stop (Calculated and Design Values Plotted)

If the design vehicle can be stored in the median with adequate clearance to the through lanes, a departure sight triangle to the right for left turns should be provided for that design vehicle turning left from the median roadway. Where the median is not wide enough to store the design vehicle, a departure sight triangle should be provided for that design vehicle to turn left from the minor-road approach.

The median width should be considered in determining the number of lanes to be crossed. The median width should be converted to equivalent lanes. For example, a 7.2-m median should be considered as two additional lanes to be crossed in applying the multilane highway adjustment for time gaps in **Table 9.9.3**. Furthermore, a departure sight triangle for left turns from the median roadway should be provided for the largest design vehicle that can be stored on the median roadway with adequate clearance to the through lanes. If a divided highway intersection has a 12 m median width and the design vehicle for sight distance is a 22 m combination truck, departure sight triangles should be provided for the combination truck turning left from the minor-road approach and through the median. In addition, a departure sight triangle should also be provided to the right for a 9 m single unit truck turning left from a stopped position in the median.

Case B2 – Right Turn from the Minor Road

A departure sight triangle for traffic approaching from the left like that shown in **Figure 9.9.2** should be provided for right turns from the minor road onto the major road. The intersection sight distance for right turns is determined in the same manner as for case B1, except that the time gaps (t_g) in **Table 9.9.3** should be adjusted. Field observations indicate that, in making right turns, drivers generally accept gaps that are slightly shorter than those accepted in making left turns.[70]

APPENDIX

D CAPACITY ANALYSIS

— Synchro Output

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	11	1	5	1	86	8	4	104	1
Future Vol, veh/h	1	1	1	11	1	5	1	86	8	4	104	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	14	1	6	1	108	10	5	130	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	260	261	131	257	256	113	131	0	0	118	0	0
Stage 1	141	141	-	115	115	-	-	-	-	-	-	-
Stage 2	119	120	-	142	141	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	693	644	919	696	648	940	1454	-	-	1470	-	-
Stage 1	862	780	-	890	800	-	-	-	-	-	-	-
Stage 2	885	796	-	861	780	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	685	641	919	691	645	940	1454	-	-	1470	-	-
Mov Cap-2 Maneuver	685	641	-	691	645	-	-	-	-	-	-	-
Stage 1	861	777	-	889	799	-	-	-	-	-	-	-
Stage 2	877	795	-	855	777	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10	10	0.1	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1454	-	-	730	746	1470	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	0.028	0.003	-	-
HCM Control Delay (s)	7.5	0	-	10	10	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	19	1	8	1	160	18	7	141	1
Future Vol, veh/h	1	1	1	19	1	8	1	160	18	7	141	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	21	1	9	1	178	20	8	157	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	369	374	158	365	364	188	158	0	0	198	0	0
Stage 1	174	174	-	190	190	-	-	-	-	-	-	-
Stage 2	195	200	-	175	174	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	588	557	887	591	564	854	1422	-	-	1375	-	-
Stage 1	828	755	-	812	743	-	-	-	-	-	-	-
Stage 2	807	736	-	827	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	578	553	887	586	560	854	1422	-	-	1375	-	-
Mov Cap-2 Maneuver	578	553	-	586	560	-	-	-	-	-	-	-
Stage 1	827	750	-	811	742	-	-	-	-	-	-	-
Stage 2	797	735	-	820	750	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	10.9	0	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1422	-	-	643	643	1375	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	0.048	0.006	-	-
HCM Control Delay (s)	7.5	0	-	10.6	10.9	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	11	1	5	1	99	8	4	130	1
Future Vol, veh/h	1	1	1	11	1	5	1	99	8	4	130	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	14	1	6	1	124	10	5	163	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	309	310	164	306	305	129	164	0	0	134	0	0
Stage 1	174	174	-	131	131	-	-	-	-	-	-	-
Stage 2	135	136	-	175	174	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	643	605	881	646	608	921	1414	-	-	1451	-	-
Stage 1	828	755	-	873	788	-	-	-	-	-	-	-
Stage 2	868	784	-	827	755	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	635	602	881	641	605	921	1414	-	-	1451	-	-
Mov Cap-2 Maneuver	635	602	-	641	605	-	-	-	-	-	-	-
Stage 1	827	752	-	872	787	-	-	-	-	-	-	-
Stage 2	860	783	-	821	752	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	10.3	0.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1414	-	-	686	701	1451	-	-
HCM Lane V/C Ratio	0.001	-	-	0.005	0.03	0.003	-	-
HCM Control Delay (s)	7.5	0	-	10.3	10.3	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	5	99	6	2	124
Future Vol, veh/h	11	5	99	6	2	124
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	6	124	8	3	155

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	289	128	0	0	132	0
Stage 1	128	-	-	-	-	-
Stage 2	161	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	702	922	-	-	1453	-
Stage 1	898	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	701	922	-	-	1453	-
Mov Cap-2 Maneuver	701	-	-	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	866	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	758	1453	-
HCM Lane V/C Ratio	-	-	0.026	0.002	-
HCM Control Delay (s)	-	-	9.9	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	20	1	8	1	196	19	7	164	1
Future Vol, veh/h	1	1	1	20	1	8	1	196	19	7	164	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	22	1	9	1	218	21	8	182	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	435	440	183	431	430	229	183	0	0	239	0	0
Stage 1	199	199	-	231	231	-	-	-	-	-	-	-
Stage 2	236	241	-	200	199	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	531	511	859	535	518	810	1392	-	-	1328	-	-
Stage 1	803	736	-	772	713	-	-	-	-	-	-	-
Stage 2	767	706	-	802	736	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	521	507	859	530	514	810	1392	-	-	1328	-	-
Mov Cap-2 Maneuver	521	507	-	530	514	-	-	-	-	-	-	-
Stage 1	802	731	-	771	712	-	-	-	-	-	-	-
Stage 2	757	705	-	794	731	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.1	11.5	0	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1392	-	-	593	585	1328	-	-
HCM Lane V/C Ratio	0.001	-	-	0.006	0.055	0.006	-	-
HCM Control Delay (s)	7.6	0	-	11.1	11.5	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	4	188	16	7	162
Future Vol, veh/h	10	4	188	16	7	162
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	209	18	8	180

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	414	218	0	0	227	0
Stage 1	218	-	-	-	-	-
Stage 2	196	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	595	822	-	-	1341	-
Stage 1	818	-	-	-	-	-
Stage 2	837	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	591	822	-	-	1341	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	831	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	822	1341	-
HCM Lane V/C Ratio	-	-	0.005	0.006	-
HCM Control Delay (s)	-	-	9.4	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	15	1	7	1	130	11	6	168	1
Future Vol, veh/h	1	1	1	15	1	7	1	130	11	6	168	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	19	1	9	1	163	14	8	210	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	404	406	211	400	399	170	211	0	0	177	0	0
Stage 1	227	227	-	172	172	-	-	-	-	-	-	-
Stage 2	177	179	-	228	227	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	557	534	829	560	539	874	1360	-	-	1399	-	-
Stage 1	776	716	-	830	756	-	-	-	-	-	-	-
Stage 2	825	751	-	775	716	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	548	530	829	555	535	874	1360	-	-	1399	-	-
Mov Cap-2 Maneuver	548	530	-	555	535	-	-	-	-	-	-	-
Stage 1	775	712	-	829	755	-	-	-	-	-	-	-
Stage 2	815	750	-	768	712	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	11.1	0.1	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	610	623	1399	-	-
HCM Lane V/C Ratio	0.001	-	-	0.006	0.046	0.005	-	-
HCM Control Delay (s)	7.6	0	-	10.9	11.1	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	5	131	6	2	163
Future Vol, veh/h	11	5	131	6	2	163
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	0
Peak Hour Factor	80	80	80	80	80	80
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	6	164	8	3	204

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	378	168	0	0	172	0
Stage 1	168	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	624	876	-	-	1405	-
Stage 1	862	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	623	876	-	-	1405	-
Mov Cap-2 Maneuver	623	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	823	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	876	1405	-
HCM Lane V/C Ratio	-	-	0.007	0.002	-
HCM Control Delay (s)	-	-	9.1	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	1	1	27	1	11	1	253	25	10	215	1
Future Vol, veh/h	1	1	1	27	1	11	1	253	25	10	215	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	2	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	1	30	1	12	1	281	28	11	239	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	566	573	240	560	559	295	240	0	0	309	0	0
Stage 1	262	262	-	297	297	-	-	-	-	-	-	-
Stage 2	304	311	-	263	262	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	435	430	799	439	438	744	1327	-	-	1252	-	-
Stage 1	743	691	-	712	668	-	-	-	-	-	-	-
Stage 2	705	658	-	742	691	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	423	425	799	434	433	744	1327	-	-	1252	-	-
Mov Cap-2 Maneuver	423	425	-	434	433	-	-	-	-	-	-	-
Stage 1	742	684	-	711	667	-	-	-	-	-	-	-
Stage 2	692	657	-	732	684	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	13	0	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1327	-	-	503	492	1252	-	-
HCM Lane V/C Ratio	0.001	-	-	0.007	0.088	0.009	-	-
HCM Control Delay (s)	7.7	0	-	12.2	13	7.9	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.3	0	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	4	248	16	7	215
Future Vol, veh/h	10	4	248	16	7	215
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	2	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	276	18	8	239

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	540	285	0	0	294	0
Stage 1	285	-	-	-	-	-
Stage 2	255	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	503	754	-	-	1268	-
Stage 1	763	-	-	-	-	-
Stage 2	788	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	499	754	-	-	1268	-
Mov Cap-2 Maneuver	499	-	-	-	-	-
Stage 1	763	-	-	-	-	-
Stage 2	782	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	754	1268	-
HCM Lane V/C Ratio	-	-	0.006	0.006	-
HCM Control Delay (s)	-	-	9.8	7.9	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Appendix B

Biophysical Assessment

Biophysical Assessment in Support of Proposed Development in the Summer Village of Sunset Point

Occupying portions of :
NE ¼ of Sec-22-54-3-W5M and NW ¼ of Sec-23-54-3-W5M

Final Report

Prepared for:

V3 Companies of Canada Ltd.
Edmonton, Alberta

Prepared by:

Spencer Environmental Management Services Ltd.
Edmonton, Alberta

Project Number (EP-830)

June 2019

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1.0 INTRODUCTION

1.1 Background

V3 Companies of Canada Ltd. (V3) is preparing an Area Structure Plan for a 6.2 ha parcel of land situated at the south end of the Summer Village of Sunset Point. The majority of the property lies within the NE ¼ of Sec-22-54-3-W5M, and the northeast portion lies within the NW ¼ of Sec-23-54-3-W5M. In support of the development process, Spencer Environmental Management Services Ltd. (Spencer Environmental) was retained to prepare a Biophysical Assessment (BA) of the subject parcel, relying on a desktop assessment supplemented by one reconnaissance site visit.

The following report provides an overview of the proposed development, for context, outlines the BA methods, describes the existing biophysical conditions of the subject parcel and provides conservation considerations and recommendations.

1.2 Proposed Development

The proponent is proposing to develop the subject parcel into a Recreational Vehicle (RV) park (Appendix A). The park will comprise 78 RV sites and 13 cabin lots. Internal roadways will be 7 m wide. Existing trees will be retained as feasible to provide for privacy and aesthetics.

1.3 BA Study Area

The study area for this BA was defined as the proposed subject parcel (Figure 1), 6.2 ha, but the discussion of ecological connectivity and wildlife movement considers a more regional context beyond the immediate BA study area.

The study area/subject parcel is bounded on the south and west by residential developments and roadways (42 Street, Sunset Drive), on the east by a railway right-of-way (ROW) and Alberta Beach Golf Resort and on the north by a undeveloped lands (forest and wetland). The parcel is located approximately 75 m away from the west shore of Lac Ste. Anne and just north of the community of Alberta Beach. Most adjacent lands are developed, comprising lakeside cabins and related amenities and a golf course.

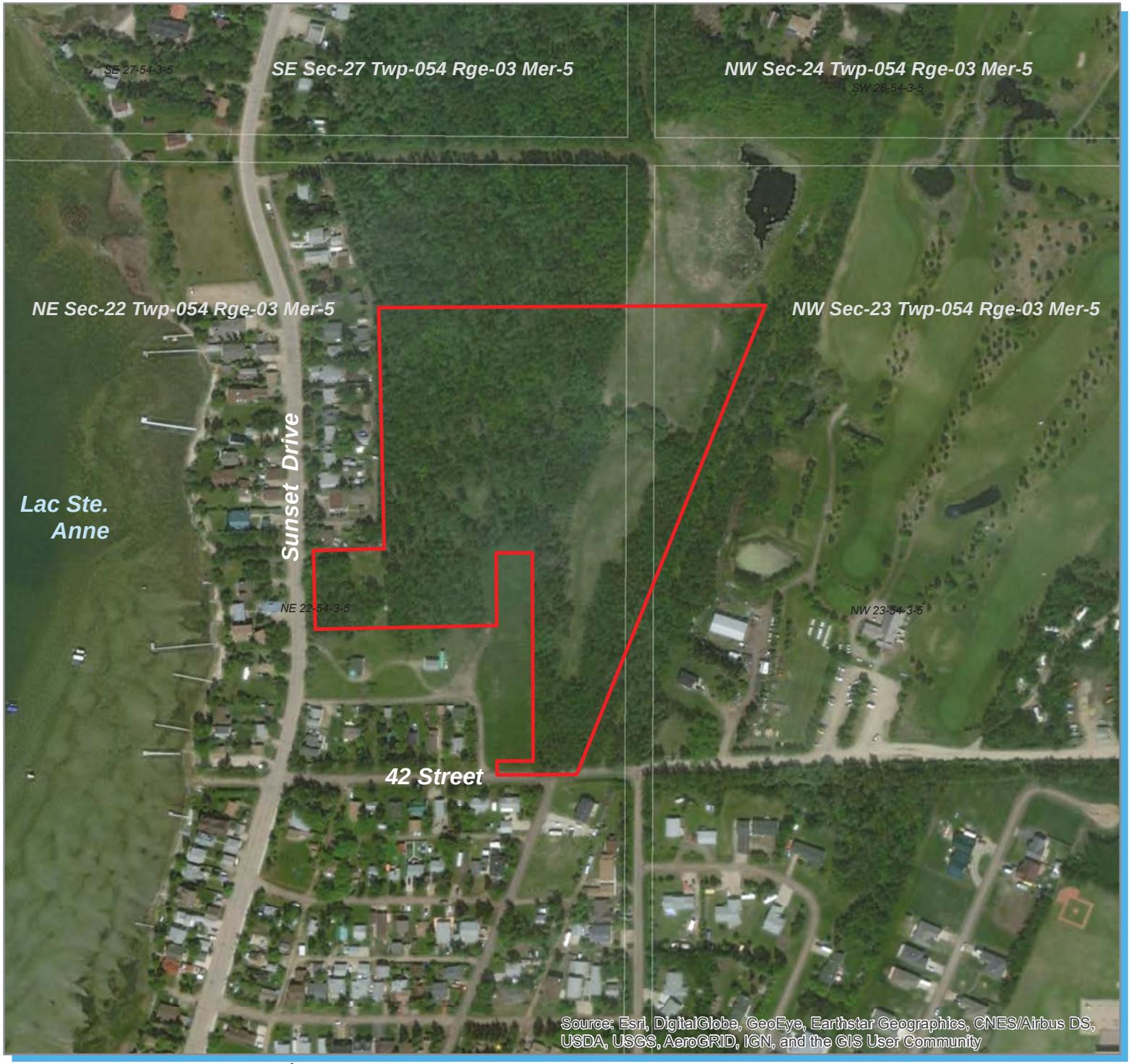

Figure 1.1. Study Area

Legend

Study Area

1:4,000

0 25 50 100 Meters

N

Date Map Created: 22 May 2019

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1.4 BA Objectives

It is our understanding that the Summer Village of Sunset Point has not provided any specifics regarding the scope of the required biophysical assessment. Accordingly, the objectives and scope of this BA were based on the proponent's guidance but also on the following factors: Spencer Environmental's experience preparing similar documents for various municipalities in central Alberta; the size of the subject parcel; the land use context of surrounding lands; and environmental legislation requirements. Using this approach, the following objectives were identified for this BA:

- Identification of environmentally significant areas;
- Coarse description of topography and soils;
- Wetland inventory and characterization;
- Upland vegetation characterization;
- Consideration for provincial records for special status species (species of concern);
- Consideration of watercourses;
- Consideration of wildlife movement and ecological connectivity; and
- Development of conservation recommendations.

2.0 METHODS

2.1 General

In support of this BA, Spencer Environmental undertook the following investigations:

- Review of the Lac Ste. Anne MDP (2016) to determine if identified priority conservation areas or environmentally significant areas occur within the study area/subject parcel or nearby lands.

- Review of Environmentally Significant Areas in Alberta: 2014 Update (Fiera Biological Consulting Ltd. 2014).

- A search of the Agricultural Regions of Alberta Soil Inventory Database (AGRASID) using the Alberta Soil Information Viewer (Alberta Agriculture and Forestry 2016) to identify the landform type and the dominant soil class within the study area.

- Review of recent and historical aerial photographs representative of wet and dry years, with particular emphasis on late summer and fall imagery in accordance with Alberta Environment and Parks (2016) *Guide for Assessing Permanence of Wetland Basins*. Photographs from the following years were reviewed: 1974, 1984, 1992, 1993, and 2000. A selection of these photographs is provided in Appendix B. As a supplement, we also reviewed publicly available imagery from Google.

- Desktop review of the Alberta Merged Wetland Inventory followed by a field-based wetland survey on 16 May 2019, in accordance with the Alberta Wetland

Identification and Delineation Directive (AEP 2015a) and the Alberta Wetland Classification System (AEP 2015). Detailed methods are described in Section 2.2.

- A general reconnaissance of upland vegetation on 16 May 2019 to identify, map and broadly characterize upland plant communities within the study area. Detailed methods are described in Section 2.3.

- Documentation of all observed wildlife and sign of wildlife use during the 16 May 2019 field investigation.

- A search of the Fish and Wildlife Management Information System (FWMIS; AEP 2018a) using the Fish & Wildlife Internet Mapping Tool (FWIMT) to identify special status wildlife species present within or near the study area. The search covered a radius of 1 km extending from the centre of the subject parcel. FWMIS was also reviewed to identify any named or unnamed water bodies or watercourses on the study area.

- Consideration of wildlife species provincial distributions and habitat suitability to assess potential wildlife species occurrence.

- A search of Alberta Conservation Information Management System (ACIMS; AEP 2018b) for recorded special status plant species in the study area. The search was performed for the study area only.

2.2 Wetland Investigations

In advance of field investigations, potential wetlands within the parcel were identified through a review of the Alberta Merged Wetland Inventory and desktop assessment of current and historical aerial photography. Each potential wetland was then subject to further assessment by a professional biologist and wetland Authenticating Professional during field investigations on 16 May 2019. Wetland presence was verified through the observation of wetland indicator plant species. Sites determined not to meet any wetland criteria were eliminated from further wetland assessment. Delineation of wetland boundaries was based on observed wetland indicator plant species in accordance with the Alberta Wetland Identification and Delineation Directive (AEP 2015). Classification of wetlands followed the Alberta Wetland Classification System (AWCS; AEP 2015c).

2.3 Upland Plant Community Investigations

In advance of the field investigations, available aerial imagery was used to delineate and classify upland vegetation cover types following the Alberta Vegetation Inventory (AVI; 2005). Each of these areas was then subject to further assessment by a vegetation specialist during a field investigation on 16 May 2019. Vegetation/cover types were refined using a combination of species composition, tree age and observed moisture characteristics to arrive at the identified plant community classifications described in Section 3.4.1. Field-identified distinct changes in plant species composition was used to inform plant

community boundaries. Travelling a meandering survey within each community and traversing the majority of the community, dominant and abundant plant species were noted for each of the observed plant community strata (i.e. canopy, shrub, herbaceous).

2.4 Limitations

The following limitations pertain to the field investigations completed in support of this BA:

- Biophysical field investigations were limited to a single reconnaissance level site visit early in the growing season (16 May 2019).
- Taxa-specific wildlife surveys were not completed in support of this BA.
- There were no surveys targeting the detection of special status plant or animal species.
- This BA includes a description of existing conditions and provides general conservation recommendations but does not include analysis of potential environmental impacts related to the proposed development.

3.0 EXISTING BIOPHYSICAL CONDITIONS

3.1 Environmentally Significant Areas

The Lac Ste. Anne County MDP addresses conservation at the County level and maps natural assets without recognizing summer village boundaries. That plan identifies the study area as containing portions of a Priority Vegetation Conservation Area (Figure 3.1). Such areas comprise large intact blocks of natural vegetation. The County encourages developers to preserve these lands to the greatest extent possible to the satisfaction of the development authority (Lac Ste. Anne County 2016). As the lands are within the Summer Village of Sunset Point, the Lac Ste. Anne MDP and resource mapping has no jurisdiction over this property.

Figure 3.1. Lac Ste. Anne County MDP identifies much of the subject parcel (red polygon) as a Priority Vegetation Conservation Area (green polygon).

3.2 Topography

Alberta Agriculture and Forestry (2016) identifies the study area as within a larger area having a landform topography that is undulating with low relief. As expected, overall, the parcel slopes gently toward the lake. Elevation ranges from 733.65 m above sea level (ASL) along the parcel's east boundary to 725.13 m ASL along the west boundary of the parcel; a topographic variation of 8.52 m. The parcel's east boundary is a steep abandoned railway embankment, which may account for approximately 3 m of elevation gain. The open meadow on the east side of the parcel had slightly undulating topography, while the remaining forested area was relatively flat.

3.3 Soil

Coarse scale sources (Alberta Agriculture and Forestry 2016) indicate that the soils in the general vicinity of the study area vary with slope position. Soils on upper slope positions are moderately fine textured and well drained Dark Gray Luvisols of the Uncus series comprising sand clay loams, clay loams and silty clay loams. Soils on mid slope positions are moderately fine textured, poorly drained Orthic Humic Gleysols of the Onoway series. Soils found in depressions are moderately fine textured, very poorly drained Rego Humic Gleysols of the Kerensky series.

Based on field observations on other sites in the area, and proximity to the lake, soils on the parcel may be relatively sandy in texture. Soils in the wetland are expected to be poorly drained gleysols.

3.4 Plant Communities

The study area is situated in the Dry Mixedwood Natural Subregion, a component of the Boreal Forest Natural Region (Natural Regions Committee 2006). Vegetation within the study area was generally typical of native vegetation in that natural subregion. The 6.2 ha parcel comprises mostly upland deciduous forested land with a cleared meadow area comprising approximately one third (1/3) of the parcel (Figure 3.2). Within a depression in the meadow, one wetland was identified (see section 3.4.2). A very small portion of the parcel on the west boundary, near a residential development, was identified as being a disturbed yard. The following sections provide further description of those observed communities in early seasonal growth conditions.

3.4.1 Upland Plant Communities

Deciduous Forest

The majority of the subject parcel supported a native, relatively undisturbed, mesic, deciduous forest (Figure 3.2). Within this community there was variation in structure and species composition. Within the forest interior, trees were mature and quite large with a diameter at breast height (DBH) of 30 to 40 cm and a well-developed understorey. Along the perimeter of the cleared meadow, trees were much younger and smaller with an open understorey. Depending on the area within the forest, the dominant canopy tree species was either trembling aspen (*Populus tremuloides*) or balsam poplar (*Populus balsamifera*). In each case, these areas were sufficiently small and integrated within the larger deciduous forest community to be considered unmappable as distinct communities. In addition, throughout much of the forest, trembling aspen and balsam poplar were broadly co-dominant (Plate 1). White spruce (*Picea glauca*) was extremely sparse in the forest and mostly occurred on the east edge of the parcel. The forest canopy was closed in the mature interior (approx. 2.5 ha) and open along the edges in an early successional stage (Plate 2). Snags were relatively common within the forest interior.

The understory of the interior forest comprised a diverse abundance of shrubs. Wild red raspberry (*Rubus idaeus*), common wild rose (*Rosa acicularis*) and red osier dogwood (*Cornus stolonifera*) were the most dominant shrub species. Other native shrub species

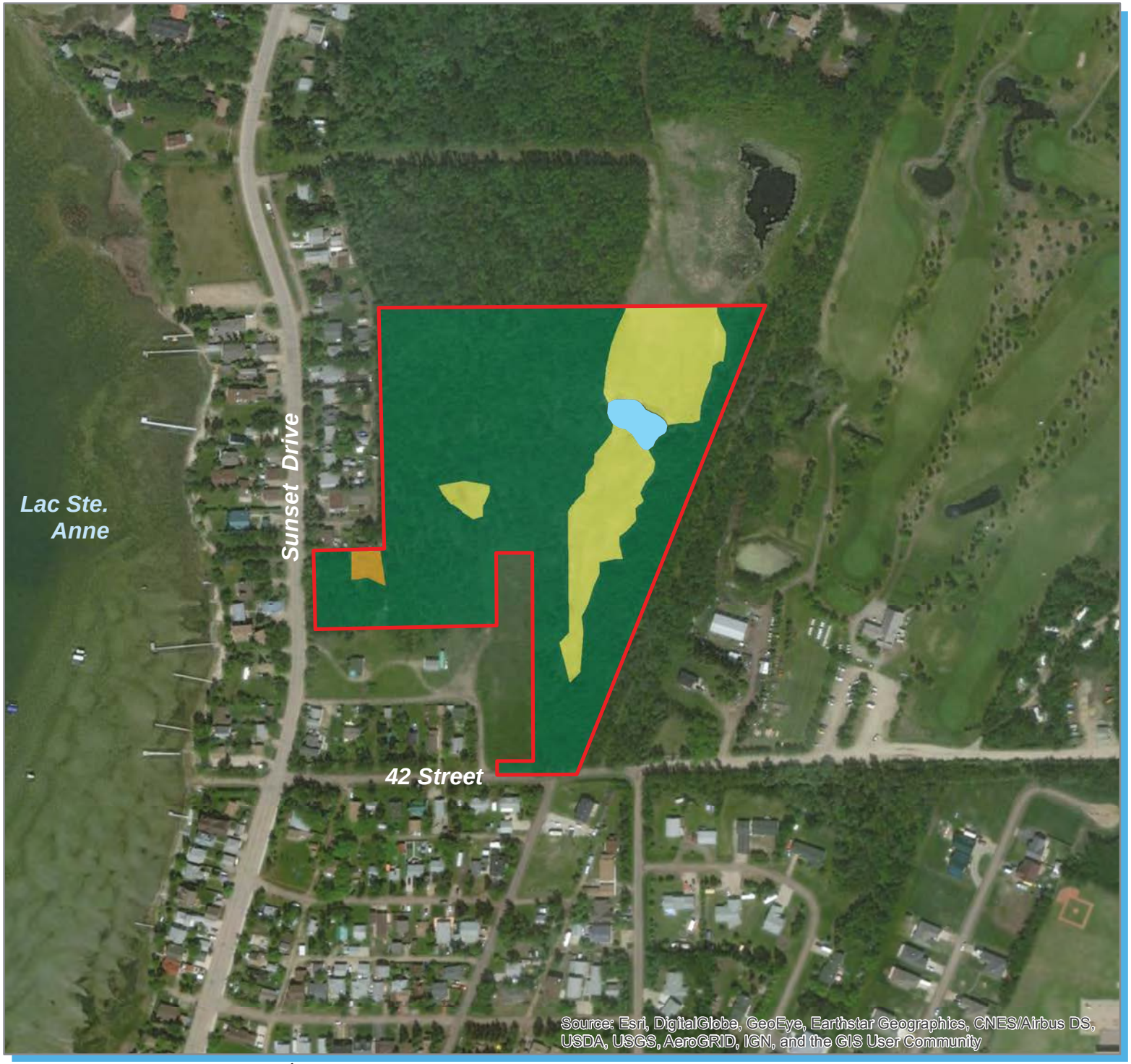

Figure 3.2. Upland Plant Communities and Wetlands in Study Area

Legend

- Study Area

Upland Plant Communities

- Deciduous Forest
- Meadow
- Disturbed Yard

Wetlands

- Shrubby Swamp

1:4,000 0 25 50 100 Meters N

Date Map Created: 22 May 2019

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observed included northern gooseberry (*Ribes oxyacanthoides*), wild red currant (*Ribes triste*), beaked hazelnut (*Corylus cornuta*), bracted honeysuckle (*Lonicera involucrate*) and common snowberry (*Symphoricarpos albus*). The herbaceous layer consisted primarily of pink wintergreen (*Pyrola asarifolia*), wild strawberry (*Fragaria vesca*), common horsetail (*Equisetum arvense*), all native species, and, the non-native clover (*Trifolium sp.*).

Plate 1. Deciduous Forest of trembling aspen and balsam poplar characterized the majority of the subject parcel (16 May 2019).

Plate 2. Early successional outer edge around the meadow of the deciduous forest (16 May 2019).

Meadow

The larger meadow community extended as a linear feature from the northeast corner of the parcel to near the south edge of the parcel, continuously narrowing to the south and intersected by a wetland. A small clearing within the interior of the forest was also categorized as a meadow community. The community comprised disturbance-tolerant,

non-native grass species, dominated by brome (*Bromus sp.*) (Plate 3). A few small shrubs were also found scattered throughout the meadow, species included the native common wild rose and red osier dogwood and the exotic caragana (*Caragana arborescens*). Small forb species were found in areas were grass was thin and included wild strawberry, and non-native common dandelion (*Taraxacum officinale*) and clover. No signs of grazing were present in the meadow communities.

Plate 3. Meadow Community of disturbance tolerant grasses occupying about one third of the parcel (16 May 2019).

Disturbed Yard

The disturbed yard community comprised a very small section of the parcel near the far western edge of the parcel, immediately adjacent to residential buildings. The community was dominated by a manicured lawn comprising of exotic grass species interspersed with exotic forbs clover and common dandelion (Plate 4). The area was completely cleared of trees and shrubs.

Plate 4. In background, disturbed yard community of manicured exotic grass species comprising a very small portion of the parcel. In foreground, a small portion of the deciduous forest community where the understory had been cleared (16 May 2019).

3.4.2 Wetlands

One wetland was identified within the subject parcel (Figure 3.2 and 3.3). This wetland was located in the northeast quadrant of the parcel and measured 0.095 ha (947 m^2), approximately 6 times the size of a single RV site. Based on the dominance and extensive cover of willow (*Salix sp.*) shrubs, the abundance of sedge cover in the understorey and the presence of substantial standing water, this wetland was classified as a seasonal shrubby swamp. At the time of the field investigation, shallow standing water was present throughout much of the wetland. Deeper water – at least 45 cm in depth – was present in a few small pools. The willow shrub canopy was relatively tall for a shrubby swamp, measuring approximately 8 m in height. Other observed native shrub species included red-osier dogwood, wild red currant, wild red raspberry and northern gooseberry. Abundant sedge was the only herbaceous wetland indicator plant species noted at the time of the site investigation. There was no observed inlet or outlet to the wetland. The wetland is expected to be fed by overland flows; however, it could be marginally influenced by groundwater. This is not a crown claimable wetland.

Plate 5. Seasonal shrubby swamp (supporting willow and sedge species) in the subject parcel's northeast quadrant (16 May 2019).

3.4.3 Special Status Plant Species

No site rare plant survey was completed. The ACIMS (2019b) search of 22-54-3-W5M and 23-54-3-W5M refined to the study area returned one historic record of a special status plant species (Appendix C): fox sedge (*Carex vulpinoidea*). The last observation of this species was from 1968. Fox sedge has an S-Rank of S3, a rank indicating that the taxon is "known from 100 or fewer occurrences, or somewhat vulnerable due to other factors, such as restricted range, relatively small population sizes, or other factors" (AEP 2018b).

The Rare Vascular Plants of Alberta (Kershaw et al. 2001) states that fox sedge is typically found in swamps and wet meadows that are permanently wet but with some drainage. The wetland comprises a suitable fox sedge habitat, however, fox sedge could not be verified as present or absent owing to the early stage of vegetation development at the time of the field investigation.

The Province does not afford any legislative or policy protection to S3 species.

Figure 3.3. Shrubby Swamp in Study Area

Legend

- Study Area
- Shrubby Swamp Boundary

1:1,854 0 10 20 40 Meters

Date Map Created: 22 May 2019

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3.5 Wildlife

3.5.1 Observed Wildlife and Wildlife Sign

Wildlife surveys were not undertaken on site; however, during the brief site reconnaissance on 16 May 2019, moose (*Alces alces*), scat was observed throughout the property and deer tracks were observed along the east edge of the parcel. Mule deer (*Odocoileus hemionus*) and white-tail deer (*Odocoileus virginianus*) may both be present. These two or three ungulate species are likely frequent visitors to the parcel, using it year round as part of a larger range. No other mammalian species were seen on site. There was no evidence of past beaver or muskrat use at the wetland.

Despite the early-season site inspection date a diverse suite of bird species was observed on site either by sight or sound: white-throated sparrow (*Zonotrichia albicollis*), clay-coloured sparrow (*Spizella pallida*), Lincoln's sparrow (*Melospiza lincolnii*), yellow warbler (*Setophaga petechia*), black-and-white warbler (*Mniotilta varia*), purple finch (*Haemorhous purpureus*), American robin (*Turdus migratorius*), American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*) and yellow-bellied sapsucker (*Sphyrapicus varius*). These species were mainly but not solely observed in the forest.

No herptiles were observed. There are no fish-bearing waterbodies within the study area.

None of the observed species are species of special status or conservation concern.

The subject parcel's deciduous forest and forest/meadow ecotone has the potential to support small populations of many other wildlife species that regularly occur in central Alberta's dry mixedwood subregion. Potential wildlife use and habitat is discussed below.

3.5.2 Special Status Species

The FWMIS search (AEP 2018a) did not yield any known records of special status wildlife species within the search area (1 km from the center of the subject parcel) (Appendix C).

The FWMIS database is reliant on data submissions from past surveys. Because the subject parcel has been under private ownership it has likely not been subject to much survey effort that could result in the detection of special status species. The lack of records is, therefore, not surprising.

3.5.3 Wildlife Habitat and Potential Wildlife Use

Habitat

The site's deciduous forest and forest meadow ecotone is high-quality habitat for both mammals and birds. The forest is healthy, and because it is vertically complex, comprises young, mature, and moribund trees, includes some snags and includes an unfragmented ~5.0 ha rectangular block, the forest habitat is rich and diverse. In addition, the parcel also provides approximately 1.0 ha of forest interior habitat – central habitat removed from the influence of forest edges and open habitats (LandOwner Resource Centre 2000;

Bannerman 1998) that is sought by disturbance-intolerant species. The meadow and swamp add to the site habitat diversity.

Mammals

Additional mammalian species considered moderately or highly likely to reside in or move through the site, based on abundance, habitat and provincial distribution include: coyote (*Canis latrans*), porcupine (*Erethizon dorsatum*), red squirrel (*Tamiasciurus hudsonicus*) northern flying squirrel (*Glaucomys sabrinus*), redbacked vole (*Myodes gapperi*), deer mouse (*Peromyscus maniculatus*) and snowshoe hare (*Lepus americanus*). The small shrubby swamp in the study area likely does not support resident beaver or muskrat because of the small area of open water and lack of inlet and outlet. Bat species, including little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*), are likely present during the growing season, roosting in mature trees and foraging over Lac Ste. Anne.

Birds

The study area habitat holds high potential to serve as foraging, breeding or migrating stopover habitat for a large number of avian migrant species, central Alberta breeding species and year-round resident species, with the highest quality habitat found in the forest. The following species are expected to commonly make use of the forest habitat: great horned owl (*Bubo* virginianus), northern saw-whet owl (*Aegolius acadicus*), red-tailed hawk (*Buteo jamaicensis*) and northern goshawk (*Accipiter gentilis atricapillus*), yellow-rumped warbler (*Setophaga coronate*), Baltimore oriole (*Icterus galbula*), rose-breasted grosbeak (*Pheucticus ludovicianus*), white-breasted nuthatch (*Sitta carolinensis*). The presence of snags likely attract cavity nesters such as pileated woodpecker (*Colaptes pileatus*) and hairy woodpecker (*Dryobates villosus*). Potentially present bird species preferring interior habitat, include veery (*Catharus fuscescens*), Swainson's thrush (*Catharus ustulatus*), black-and-white warbler (*Mniotilta varia*) and ovenbird (*Seiurus aurocapilla*).

The meadow provides an area of suitable foraging habitat for many bird species, such as red-tailed hawk and ruffed grouse (*Bonasa umbellus*) and suitable nesting habitat for birds such as clay-colored sparrow (*Spizella pallida*). Shrubby swamp provides habitat for shrub-nesting songbirds such as song sparrow (*Melospiza melodia*) and swamp sparrow (*Melospiza georgiana*).

Amphibians and Reptiles

There is high potential for the shrubby swamp located in the parcel to support small populations of breeding boreal chorus frogs (*Pseudacris maculate*) and wood frogs (*Lithobates sylvaticus*), as there was shallow surface water present at the time of the site investigation. The shrubby swamp also holds moderate potential to support western (boreal) toads (*Anaxyrus boreas*). The only reptile expected to be found in the area is the common garter snake (*Thamnophis sirtalis*).

3.6 Wildlife Movement and Ecological Connectivity

At a local scale, the subject parcel consists largely of relatively intact natural habitat that is highly permeable to wildlife. There is only a small amount of barbed wire (a permeable fence type) and chain link fencing (less permeable) and there was no other anthropogenic infrastructure present that could potentially impede wildlife movement. Accordingly, wildlife movement within the study area is expected to be largely unrestricted.

Beyond the study area, the woodland cover that is present within the subject parcel is connected to other large expanses of woodlands to the east, northeast and southeast after passing through minor human disturbances (Figure 3.4). The near continuous forest cover likely functions as a highly valuable movement corridor for wildlife moving in and out of Lac Ste. Anne County. Small residential roads, range roads and township roads do fragment this extensive woodland area and could function as movement barrier for certain wildlife species, however, because they are narrow roadways, they are likely very permeable to large-bodied wildlife, whereas for small mammal and amphibian species the roads may be a less permeable barrier. Alberta Beach Golf Resort is a large disturbance that separates the subject parcel from the extensive woodlands to the east; however, with intermittent tree patches present, many wildlife species could easily navigate those lands, especially during the night. Lands immediately to the north and south of the study area are developed and comprise the Summer Village of Sunset Point, Alberta Beach. These developments likely discourage or deflect movement along the lake of some but not all species. Because Sunset Village and Alberta Beach are both relatively small settlements many species could still move through them and beyond, especially during nocturnal movements.

Notable, larger wildlife species likely to move through the region and around the lake infrequently as transients include lynx (*Lynx canadensis*), cougar (*Puma concolor*), fisher (*Martes pennant*) and black bear (*Ursus americanus*).

Figure 3.4. Ecological Connectivity

Legend

- Study Area
- Key Landscape Linkage

1:15,000 0 95 190 380 Meters N

Date Map Created: 22 May 2019

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4.0 CONSERVATION/DEVELOPMENT CONSIDERATIONS AND RECOMMENDATIONS

4.1 Considerations

The subject parcel largely comprises intact, mature, native deciduous forest with fairly strong ecological connectivity to other habitats beyond its boundaries. For these reasons, much of the habitat within the study area is of conservation interest. The Lac Ste. Anne MDP (Lac Ste. Anne County 2016) validates this characterization with the mapping of the site's forest as part of a Priority Vegetation Conservation Area. However, the county does not have jurisdiction within the Summer Village of Sunset Point, and the summer village does not have policies specifically protecting non-lakeshore habitat. In a 2007 land use concept design for the Summer Village, the study area is listed for use as future residential development. The Summer Village of Sunset Point does have a Parks, Recreation, Open Space and Community Services policy that allows the summer village to acquire any undevelopable land as an environmental reserve. The shrubby swamp in the parcel has potential to qualify as environmental reserve.

The conservation/development recommendations set out in this BA respect the Summer Village's intent that this land be developed but recognize the ecological value of the parcel.

4.2 Recommendations

In an attempt to maintain some ecological value post-development, it is recommended that the proposed development consider adopting the following conservation objectives:

- Retain as much deciduous forest as possible.
- Maintain ecological connectivity within and beyond the subject parcel.
- Consult with the Village administration regarding the potential for the shrubby swamp to be taken as environmental reserve.

Retain Deciduous Forest

In a RV park, such as the concept proposed for the subject parcel, retaining large blocks of undeveloped forest is not possible, however, retention of existing trees on individual, RV and cabin lots, while respecting the need to provide for wildfire safety measures will provide some habitat and wildlife connectivity for disturbance-tolerant species.

Maintain Ecological Connectivity

Fencing between individual private lots should be minimized and, where fencing is needed, only wildlife permeable fencing (e.g., three-strand barbed wire or wooden rail fences; not page-wire, chain-link or picket fences) should be installed. To maintain connectivity beyond the subject parcel, the perimeter should remain unfenced if possible, or wildlife permeable fencing used.

Consideration of the Shrubby Swamp as an Environmental Reserve

It is possible that the Summer Village will wish to take the shrubby swamp within the study area as an environmental reserve. If that is the case, the shrubby swamp would need to be retained and incorporated into the RV park's design. It may be relevant to investigate whether the swamp is surface or groundwater fed. If the shrubby swamp is not taken as ER, and development of the swamp is desired, approval to remove/modify the wetland must be sought from Alberta Environment (see section 5.2.1).

5.0 POTENTIAL ENVIRONMENTAL REGULATORY AND PERMITTING REQUIREMENTS

The following statutes are relevant to this development.

5.1 Federal Legislation Requirements

5.1.1 Migratory Birds Convention Act

Environment Canada administers the *Migratory Birds Convention Act (MBCA),* which prohibits the disturbance of active nests of birds covered under the *Act*. With respect to construction, the *Act* provides guidelines for enforcement only; it is not linked to formal approvals. Violation of the *Act* may, however, result in penalties. To minimize the potential for contravention of this *Act*, construction plans associated with the proposed development should schedule all habitat clearing activities (e.g., tree clearing, wetland grading) to avoid the primary bird nesting season of 20 April to 20 August.

5.1.2 Species at Risk Act

The *Species at Risk Act* (SARA), administered by Environment Canada, prohibits disturbance to listed species and, in some instances, listed species' habitat on federal lands. On private lands, the Act applies to disturbance to listed aquatic species and migratory birds. The SARA emphasizes guidelines for enforcement, and harming a Schedule 1 species is prohibited. Although no approvals or permits are required, violation of the SARA may result in penalties. There is some native vegetation in the study area, which may have potential to support habitat for federally-listed migratory birds. In this case, complying with the above-noted clearing windows should ensure compliance with SARA.

5.2 Provincial Regulatory and Permitting Requirements

5.2.1 Alberta Water Act

All surface and groundwater resources in the province are owned by the Province of Alberta. Alberta's *Water Act*, administered by AEP, is the principle piece of legislation governing the use and management of Alberta's water resources, including water held in permanent and temporary wetlands, irrespective of land ownership. The *Act* regulates many activities that may impact water and the aquatic environment, including installation of stormwater infrastructure and draining, filling or altering a wetland. The *Alberta Wetland Policy* applies where development activities have the potential to impact wetlands.

The policy stipulates avoidance and minimization as the preferred courses of action; however, when impacts to wetlands cannot be avoided or minimized, permanent wetland loss can be authorized. Wetland replacement may be required. Applications for approval require supporting information collected following all relevant directives pursuant to the *Alberta Wetland Policy.* This Act will apply to any disturbance to the shrubby swamp.

5.2.2 Alberta Wildlife Act

The Alberta *Wildlife Act* prohibits disturbance to a nest or den of designated wildlife species. Although permitting is not required under the *Act*, violations may result in fines. Projects that require clearing of natural vegetation have potential to contravene the *Act*. To minimize the potential for contravention of this *Act*, construction plans associated with the proposed development should schedule all habitat clearing activities (e.g., tree clearing, wetland grading) to avoid the primary bird nesting season of 20 April to 20 August. Considering the extensive, mature woodland cover within the study area, clearing of any forest should also avoid the additional period of 01 March to 20 April to avoid the period during which owls may be actively nesting.

6.0 SUMMARY

The proponent is proposing an RV park development located within the Summer Village of Sunset Point, east of Lac Ste. Anne. The parcel is currently predominantly naturally vegetated by deciduous forest. Smaller areas of meadow and wetland are also present. The parcel is assessed to currently have high ecological value and to be highly permeable to wildlife. There are no records of special status species on the subject parcel. The parcel is also part of a larger area of mostly continuous high-quality wildlife habitat that serves as a regional movement corridor connecting to forested areas to the east, north and south. Although this subject parcel is of ecological value, there are no municipal policies requiring protection of resources, with the exception of potentially retention of the wetland as ER. The provincial *Water Act* also affords protection to the wetland. Required provincial environmental permitting would be limited to approval to remove a wetland and possibly stormwater infrastructure permitting. There should be no need for federal environmental approvals.

If development proceeds, we recommend the following measures:

- Retain as much deciduous forest as possible.
- Maintain ecological connectivity within and beyond the subject parcel.
- Consider taking the shrubby swamp as an environmental reserve.

7.0 REFERENCES

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Appendix A. Concept Development Plan

KEY PLAN:

Sunset Point - RV Park
Site Area 15.4 Ac

LEGEND:

- SITE BOUNDARY
- LOT BOUNDARY
- EXISTING TREED AREA
- PROPOSED SITE ENTRANCE
- PROPOSED SITE EXIT

NOTES:

TOTAL PROPOSED CABIN LOTS = 13

TOTAL PROPOSED RV LOTS = 78

TOTAL LINEAR METER OF ROADWAY = 1188 M

ONE RV PAD AREA = 153.75 M^2

MULCH AREA AROUND EACH RV PAD = 71 M^2

CUL-DE-SAC AREA = 503.2 M^2

CABIN LOT ONE DRIVEWAY AREA = 27.8 M^2

DRAFT

DATA SOURCES:
Altalis Ltd.
ArcGIS Online
Natural Resources Canada - Open Data

CLIENT:
LAKOTA HOLDINGS

TITLE:
SUNSET POINT - RV PARK CONCEPT PLAN

PROJECT: C19-022 DATE: 04/26/2019

DESIGNED: Aman Jhawer

CHECKED: Nick Pryce

SCALE: 1:1,500

0 25 75m

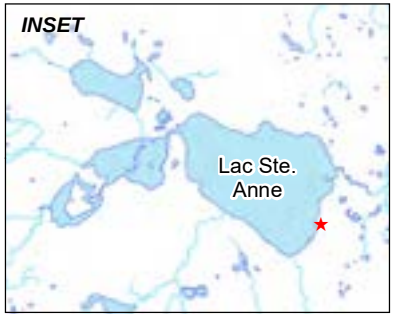
V3 Companies of Canada Ltd.
Suite 200, 9945-50 Street NW
Edmonton, Alberta T6A OL4
780.482.3700

Appendix B. Historical Aerial Photographs

1984 Aerial Photo

Legend

Study Area



Aerial Photo from:
Alberta Environment and Parks Aerial Photo Library

Date Map Created: 11 June 2019

1:3,300

0 20 40 80 Meters

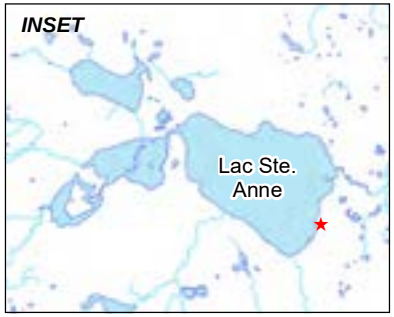
N

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD

1992 Aerial Photo

Legend

Study Area



Aerial Photo from:
Alberta Environment and Parks Aerial Photo Library

Date Map Created: 11 June 2019

1:3,300 0 20 40 80 Meters

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD

1993 Aerial Photo

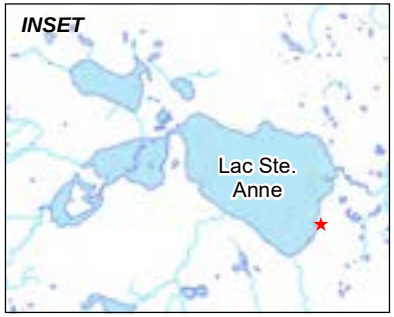
Legend

Study Area

1:3,300

0 20 40 80 Meters

N



Aerial Photo from:
Alberta Environment and Parks Aerial Photo Library

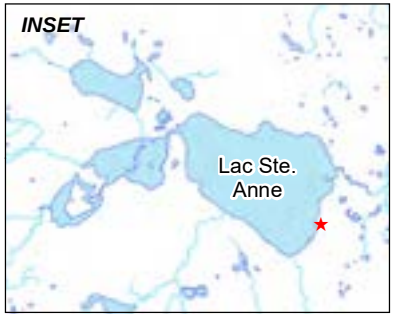
Date Map Created: 11 June 2019

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD

2000 Aerial Photo

Legend

Study Area



Aerial Photo from:
Alberta Environment and Parks Aerial Photo Library

Date Map Created: 11 June 2019

1:3,300 0 20 40 80 Meters

SPENCER ENVIRONMENTAL
MANAGEMENT SERVICES LTD

Appendix C. Special Status Species Searches

Search ACIMS Data

Date: 6/5/2019
Requestor: Consultant
Reason for Request: Environmental Assessment
SEC: 22 **TWP:** 054 **RGE:** 03 **MER:** 5

Alberta Parks

Non-sensitive EOs: 1 (*Data Updated:October 2017*)

M-RR-TTT-SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
5-03-054-22	12314	PMCYP03EN0	S3	Carex vulpinoidea	fox sedge	1968-09-08

Next Steps: See FAQ

Sensitive EOs: 0 (*Data Updated:October 2017*)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ

Protected Areas: 0 (*Data Updated:October 2017*)

M-RR-TTT-SS	PROTECTED AREA NAME	TYPE	IUCN

No Protected Areas Found

Crown Reservations/Notations: 0 (*Data Updated:October 2017*)

M-RR-TTT-SS	NAME	TYPE

No Crown Reservations/Notations Found

.

Search ACIMS Data

Date: 6/5/2019
Requestor: Consultant
Reason for Request: Environmental Assessment
SEC: 23 **TWP:** 054 **RGE:** 03 **MER:** 5

Alberta Parks

Non-sensitive EOs: 1 (*Data Updated:October 2017*)

M-RR-TTT-SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D
5-03-054-23	12314	PMCYP03EN0	S3	Carex vulpinoidea	fox sedge	1968-09-08

Next Steps: See FAQ

Sensitive EOs: 0 (*Data Updated:October 2017*)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ

Protected Areas: 0 (*Data Updated:October 2017*)

M-RR-TTT-SS	PROTECTED AREA NAME	TYPE	IUCN

No Protected Areas Found

Crown Reservations/Notations: 0 (*Data Updated:October 2017*)

M-RR-TTT-SS	NAME	TYPE

No Crown Reservations/Notations Found

.

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Created: 6-May-2019 09:59

Species present within the current extent :

Fish Inventory	Wildlife Inventory	Stocked Inventory
BURBOT	No Species Found in Search Extent	No Species Found in Search Extent
LAKE WHITEFISH		
NORTHERN PIKE		
SPOTTAIL SHINER		
WALLEYE		
WHITE SUCKER		
YELLOW PERCH		

Buffer Extent

Centroid (X,Y):	Projection	Centroid: (Qtr Sec Twp Rng Mer)	Radius or Dimensions
543127, 5946184	10-TM AEP Forest	NE 22 54 3 5	1 kilometers

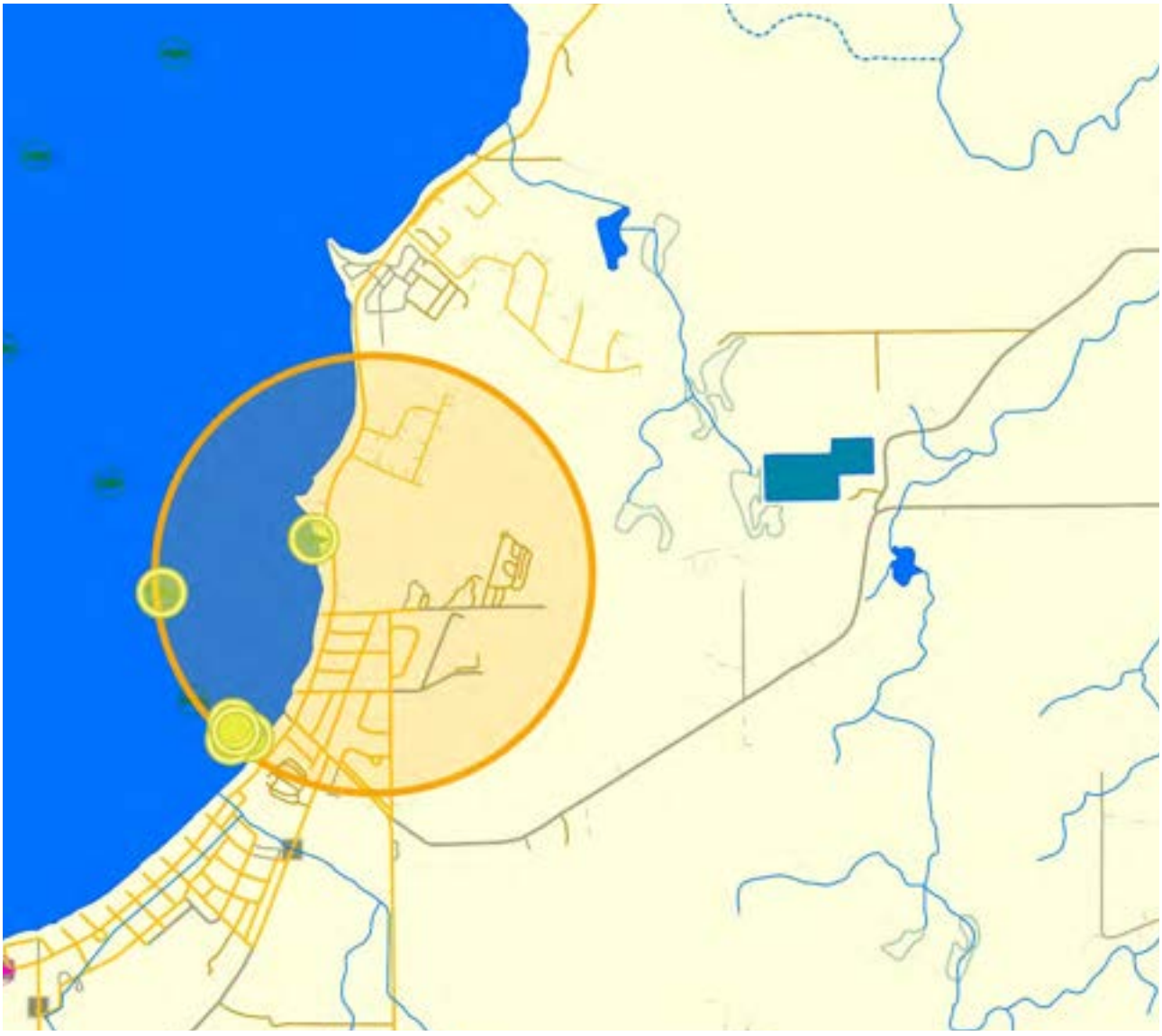
Contact Information

For contact information, please visit:

http://aep.alberta.ca/about-us/contact-us/fisheries-wildlife-management-area-contacts.aspx

6-May-2019 09:59

Map Results



Appendix C

Geotechnical Investigation

Geotechnical Investigation
Summer Village of Sunset Point – RV Resort
4424 Sunset Drive
Summer Village of Sunset Point, Alberta

Prepared For:

V3 Companies of Canada Ltd.

File No. 1-21550R01

August 2019

Prepared By:

Shelby Engineering Ltd.
9632 54 Avenue NW
Edmonton, AB T6E 5V1
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www.shelbyeng.ca

Geotechnical ***Environmental*** ***Materials*** ***Forensic*** ***Radon*** ***Construction Testing***

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APPENDICES

1.0 INTRODUCTION

Shelby Engineering Ltd. (Shelby) has completed a Geotechnical Investigation for a proposed RV resort development to be located in the Summer Village of Sunset Point, Alberta.

The scope of the investigation detailed herein was provided in our proposal (#18274) dated April 16, 2019. Mr. Nick Pryce, MCIP, RPP, of V3 Companies of Canada Ltd. authorized this investigation on April 29, 2019.

2.0 DESCRIPTION OF SITE AND PROPOSED DEVELOPMENT

The site includes the land legally described as Parcel A, Plan 1802CL and a portion of the land legally described as Block HB, Plan LACSTEA, and is municipally identified as 4424 Sunset Drive, Summer Village of Sunset Point, Alberta. It is located on the north side of 42 Street and east of Sunset Drive.

The site is an undeveloped, generally flat land that includes both treed areas and cleared areas. It is bound by Alberta Beach Golf Course to the east, undeveloped more forest/cleared areas to the north, residential properties and Sunset Drive to the west, and Spruce Avenue to the southwest.

It is understood that the subject property will be subdivided as RV lots with a network of internal roadways. The proposed RV lots will host large travel trailer/motorhome style units or park model homes and the lots serviced with communal water and sewer. The park model homes will most likely be supported on helical piles. The internal roadways will most likely comprise a rural cross-section with ditches on either side.

3.0 INVESTIGATION METHODOLOGY

The field investigation, supervised by Shelby staff, was conducted on May 17, 2019 and entailed drilling six test holes using a truck mounted drill rig equipped with solid stem augers. The test holes were drilled to a depth of 5.8m below existing grade. The test holes were advanced at the locations shown on the site plan enclosed as Figure 7, Appendix II.

Disturbed soil samples were obtained at 300mm below existing grade and thereafter at regular depth intervals of 0.75m. Standard Penetration Tests (SPTs) were conducted at selected depth intervals in the deeper test holes.

All samples were returned to our laboratory for visual classification and determination of insitu moisture content. Additional laboratory tests to determine Atterberg limits and concentrations of water soluble sulphate salts were also conducted on select samples.

3.1 SUBSURFACE CONDITIONS

The general stratigraphy encountered at the test hole locations was comprised of surficial topsoil/fill underlain by clay followed by clay till.

The consistency and extent of the various soil strata evidenced at test hole locations will vary between the test hole locations and in areas of the site that have not been explored.

All depths indicated below are referenced to surface grades as existed at the time of this investigation.

Test hole logs detailing the subsurface conditions and laboratory test results are enclosed as Figures 1 to 6, Appendix II.

3.1.1 Topsoil/Fill

Surficial topsoil was encountered at all test hole locations and extended to depths ranging from 75mm to 200mm below grade. The topsoil was generally described as silty, peaty and black.

At one test hole location (TH-5), the surficial topsoil was underlain by sand fill, which extended to a depth of 2.3m below grade. The sand fill was generally described as gravelly, loose to compact and moist to wet.

Differing thickness of fill/organics may be present in areas of the site between and apart from the test hole locations. As such, for the purpose of determining stripping volumes, the client should be aware that stripping volumes may differ from those calculated using the thicknesses encountered at the test hole locations. If the client wishes to mitigate the potential of discrepancies, additional investigation using shallow test pits or hand augered probe holes could be considered.

3.1.2 Native Clay

Native clay was encountered beneath the topsoil at three test hole locations (TH-1, TH-2 and TH-3) and extended to depths ranging from 750mm to 1.35m below grade. The clay is silty, moist and medium to high plastic. The consistency of the clay generally ranges from soft to firm, as evidenced by SPT ‘N’ values ranging from 3 to 5 blows per 300mm of penetration. Atterberg limits tests determined that a selected sample of the clay is medium plastic, with a liquid limit of 49 and a plastic limit of 25.

3.1.3 Clay Till

Glacial clay till was encountered beneath the topsoil, fill or clay at all test hole locations, and extended to the maximum depth of drilling (i.e., at least 5.80m below grade). The clay till is silty and sandy with variable stiff to very stiff consistency as evidenced by SPT 'N' values ranging from 9 to 24 blows per 300mm of penetration.

Discontinuous, water-bearing sand lenses were encountered within the clay till.

Although not visually confirmed, cobbles or boulders are typically randomly present within glacial till deposits and may be present within the clay till matrix on the subject site.

3.2 GROUNDWATER AND SLOUGHING OBSERVATIONS

Groundwater seepage conditions were encountered during the field drilling program.

The table below provides a summary of slough and groundwater measurements taken upon completion of drilling, and groundwater measurements taken 11 days after standpipe installation (each relative to surface grades at the time of drilling). Slough and groundwater conditions measurements are also recorded on the test hole logs enclosed in Appendix II.

Table 3.1: Slough and Groundwater Accumulations

Test Hole Location	Depth Below Grade (m)		
	On Completion of Drilling		Water Level After 11 Days
	Slough	Water	
TH-1	4.85	3.65	1.49
TH-2	None	3.05	0.98
TH-3	None	5.0	1.23
TH-4	None	Dry	Dry
TH-5	3.0	2.1	4.83

Based on these readings, the current stabilized groundwater table on the subject site appears to be at or below a depth of approximately 1.0m from grade.

Groundwater levels fluctuate seasonally and in response to precipitation. Variation on the order of 1m or more is possible within any given year, with higher groundwater levels expected

in spring and summer months. As such, different groundwater levels may be encountered at the time of construction.

4.0 RECOMMENDATIONS

The following sections contain recommendations related to site grading, deep foundations, subsurface utility installation, and the design of pavements.

Unless otherwise noted, the recommendations assume that the final grades for the proposed development will be coincident with surface grades existing at the time of this investigation. Appropriate adjustments must be made to the referenced depths/elevations with consideration to any difference between the referenced grades and final grades. Shelby must be advised of any grade changes so that we may assess the effect, if any, of grade changes on the recommendations.

4.1 SITE GRADING

Organic soils (topsoil) were encountered at the surface at all test hole locations, extending to depths ranging from 75mm to 200m below grade. Organic soils may be present to deeper depths than those encountered at the test hole locations in areas that were not drilled.

4.1.1 Stripping

Prior to placement of engineered site grading fill (where site grades are low), the development areas of the site should be stripped by removing all vegetation, topsoil, organics or other unsuitable material, exposing the underlying native inorganic soils. Surficial organic soils can be left in place (without excavating) in landscaped areas.

In higher areas of the site, the exposed subgrade should be subcut to the design subgrade elevation. The inorganic soils removed during subcutting may be stockpiled on site for re-use.

Qualified Geotechnical personnel should inspect the subgrade upon completion of stripping to ensure all topsoil, organics or unsuitable material has been removed.

4.1.2 Fill Placement

After removal of surficial organics/unsuitable material, the subgrade should be reconditioned prior to placement of new engineered fill. Reconditioning should include scarifying to a depth of 150mm and compaction to 95% (in landscaped areas) or 98% (in development areas such as roadways) of the standard Proctor maximum dry density at or slightly over optimum moisture

content if subgrade soil is clay (at or slightly below optimum moisture content if subgrade is sand).

Inorganic soil cut from high areas may be used as engineered fill in the low areas. The fill should be compacted to a minimum of 95% (98% for development areas) of the standard Proctor maximum dry density at or slightly over optimum moisture content in lifts not exceeding 150mm in compacted thickness. Moisture conditioning will be required to facilitate compaction in some areas of the site.

Surface drainage should be properly designed for any site development to ensure that precipitation and other surface water does not penetrate, soften, and weaken the subgrade soils around buildings, roads or other structures.

4.2 FOUNDATIONS

The following deep foundation types are believed to be feasible at this site considering the Geotechnical conditions encountered. Mixing of different foundation types is not recommended.

4.2.1 Cast-in-Place Concrete Skin Friction Piles

Cast-in-place concrete friction piles may be designed using the following skin friction parameters:

Table 4.1: Cast-in-Place Concrete Skin Friction Pile Design Parameters

Depth Below Grade (m)	Ultimate Skin Friction (kPa)	Factored ULS Skin Friction (kPa)
0.0 to 2.3	0	0
Below 2.3	48	19

The factored ULS skin friction values above include a geotechnical resistance factor of 0.4 (for resistance to axial compressive load) applied to the ultimate skin friction. For assessing resistance to structural uplift loads, a geotechnical resistance factor of 0.3 must be applied to the ultimate skin friction values to calculate the appropriate factored ULS friction values.

The serviceability limit state (SLS) is not applicable to skin friction piles in most cases.

In unheated areas the skin friction resistance along the upper 2.3m of the pile length (or the portion of the pile in contact with fill, if greater) should be ignored.

Concrete piles installed in areas exposed to frost conditions should be designed to withstand adfreeze uplift forces in order to prevent frost jacking. For the purposes of determining adfreeze forces (and the required pile length below the depth of frost penetration to counteract these forces), an adfreeze stress of 65kPa should be applied to the pile shaft area located within the depth of frost penetration (i.e., within 2.3m from grade) to calculate the adfreeze force. The dead load on the pile, the self-weight of the pile and shaft resistance below the frost penetration depth can be considered to act together to counteract the adfreeze force. As frost heave would be a serviceability concern, the ultimate shaft resistance values provided in Table 3.1 above may be utilized when determining the minimum pile embedment to resist the adfreeze force.

Reinforcement within the pile should be sufficient to prevent adverse effects from seasonal frost penetration or moisture content variations. For piles subjected to frost action during construction, the reinforcement should extend to a minimum length of 6m below the lowest elevation of the structure exposed to freezing conditions.

Concrete should be placed as soon as possible after drilling of the pile excavation. The upper 3m of concrete should be vibrated to consolidate the concrete at the top of the pile.

Groundwater seepage and sloughing conditions were encountered during fieldwork. Casing should be on site and utilized as necessary to prevent seepage or sloughing from having a detrimental effect on the pile installation.

The Alberta Building Code specifies full time continuous field review, by a suitably qualified individual, during installation of all deep foundation elements.

4.2.2 Helical Piles

Helical piles can be considered to support the proposed structures on the subject site.

For helical piles, standard local practice dictates that the design and installation recommendations be provided by the supplier/designer. The test hole log(s) attached in Appendix II should be provided to pile supplier/designer for their interpretation of the subsurface conditions.

Helical piles exposed to frost during and after construction should be designed to withstand adfreeze uplift forces in order to prevent frost jacking. Adfreeze forces may be determined using an adfreeze stress of 100kPa applied to the pile shaft area located within the depth of frost penetration (i.e., within 2.3m from grade).

The sustained unfactored structural dead load on the pile, the self-weight of the pile, uplift resistance of the helical plates and shaft resistance below the frost penetration depth can be

considered to act together to counteract the adfreeze force. Uplift loads from adfreeze should be considered separately from uplift loads applied by the structure.

Applicable compressive resistance values and adfreeze uplift resistance values, including interpretation of design parameters, will be the responsibility of the pile designer. The pile designer/installer will have the final responsibility with respect to the design and performance of the piles, and thus would be required to sign the relevant geotechnical sections of Schedules A, B and C of the Alberta Building Code.

4.3 GRADE BEAMS AND PILE CAPS

A crushable void filler material should be placed beneath all grade beams, and any pile cap that extends beyond the perimeter of an underlying pile, to accommodate soil expansion due to frost action or seasonal soil moisture variations. The void filler should be non-degradable and pest resistant with no pest nutrient value (Beaver Plastics “Frost Cushion”, or equivalent). The appropriate thickness of the void filler should be determined by the manufacturer. The grade beams and pile caps should be designed to withstand upward forces equivalent to the crushing strength of the void filler material.

An adfreeze bond-breaker must be applied to the sides of grade beams and pile caps in areas of the proposed development that will be exposed to frost conditions (i.e. within the depth of frost penetration) at any time during or after construction.

Water ponding within the void filler under grade beams and pile caps could result in frost jacking of the grade beam or pile caps in areas exposed to freezing. Fill placed against the interior face of grade beams and against pile caps should thus be comprised of low to medium plastic inorganic clay or clay till. The clay or clay till should be placed in lifts with compacted thickness of 150mm, at a minimum of 98% of standard proctor maximum dry density at or slightly above optimum moisture content.

4.4 SUBSURFACE UTILITIES

Subsurface utilities referred to in this section include underground water and sewer services. It is assumed that these utilities will be installed at depths ranging from approximately 2m to 5m below final subgrade elevation. Franchise utilities (telephone, cable, natural gas, electricity, etc.) are typically installed in shallow trenches in accordance with the requirements of the individual utility owner.

Installation of subsurface utilities, pipe bedding and backfill should be undertaken in accordance with the requirements of the local municipal authority.

4.4.1 Trench Excavations

Trench excavations must conform to the guidelines in the Alberta Occupational Health and Safety Act. Temporary trench side slopes (open for less than 7 days) of 1 vertical to 1 horizontal may be used to a depth of 1.5m above the base of the excavation. Shallower side slopes may be required if significant groundwater seepage or sand is encountered. Steeper excavations may be considered if engineered safety cages or shored/braced construction is used. All trenches should be monitored regularly for seepage and sloughing, especially after periods of precipitation.

Surcharges, such as material excavated from the trench, should be placed/stockpiled at least 3.0m (or one trench depth, whichever is greater) away from the top edge of the trench. Vehicle traffic should not be allowed within 1.0m of the top edge of the trench.

Every effort should be made to ensure trenches are excavated and backfilled on the same day (at least to a height sufficient to resist buoyant uplift).

Water accumulation was recorded on completion of drilling at depths ranging from 2.1m to 5.0m below grade in five test holes. The ingress of groundwater into trench excavations should be anticipated during trenching, and as such de-watering equipment should be available on site prior to excavation. Groundwater should not be allowed to pond on the base of the excavation. Surface water flow should be directed away from trenches and must not be allowed to pond near the edge of the excavation.

The base of the trench excavations will likely be founded in either native inorganic clay till. Trench bases founded on the clay or clay till should be relatively stable. Trench bases founded on silt or sand may be easily disturbed. If the trench base softens as a result of groundwater infiltration or heavy rainfall, or becomes disturbed during excavation, stabilization of the base may be required before placing the pipe. Stabilization of the trench base should consist of over excavating to a depth of 600mm, placing a woven Class 2 geotextile on the subcut base, and backfilling to the original base elevation with washed rock. The washed rock should be wrapped in the geotextile to provide a base for placement of the pipe bedding.

4.4.2 Pipe Bedding

The type and placement requirements for pipe bedding material should adhere to the specifications of the local municipal authority. In the absence of placement requirements, pipe bedding material should be compacted to a minimum of 95% of Standard Proctor maximum dry density at or slightly below (0% to 2%) its optimum moisture content.

4.4.3 Backfill and Compaction

Native inorganic material excavated from a trench may be reused to backfill the trench provided the required degree of compaction can be obtained. These materials should be replaced in the same vertical sequence as they were encountered while in place. Moisture conditioning of excavated soils may be required, before reuse, in order to achieve the required compaction. Topsoil and other organic soils are not acceptable as trench backfill material.

Trench backfill placement requirements issued by the local municipal authority should be followed. In the absence of local specifications, utility trench backfill should be comprised of native material placed in 150mm lifts compacted to 95% of Standard Proctor maximum dry density from the pipe zone to within 1.5m of the final subgrade elevation, and 98% of Standard Proctor maximum dry density within the upper 1.5m. The uppermost 150mm of the subgrade (final lift) should be compacted to 100% of Standard Proctor maximum dry density at or slightly above the optimum moisture content. All compaction must be verified by density testing.

4.4.4 Frost Protection of Shallow Utilities

Non-insulated buried water lines, sewer lines containing water or fire water lines must have a minimum frost cover of 3.3m below final grade in areas where granular fill is used to backfill the trench. For trenches backfilled using cohesive fill, the depth of frost cover should be at least 2.7m below final grade.

Pipes buried with less than the recommended soil cover must be protected with insulation to prevent frost effects. High strength extruded polystyrene (e.g., Dow Highload 40 or equivalent) could be considered as an insulation option. The local municipal authority's insulation requirements should be followed. In the absence of local specification, the insulation manufacturer's recommendations for placement and thickness of insulating material for protection of shallow utilities should be followed.

For trenches underlying roadways, the insulation should have a minimum depth of cover of 600mm. A 100mm thick sand layer is recommended directly over and underlying the insulation for cushioning. In areas with insulation, the thickness of soil cover overlying the top of pipe zone backfill should be at least 1.0m.

For other buried utilities which are not sensitive to frost-related movement, such as electrical conduits, there are no depth restrictions due to frost. However, such utilities placed within the frost zone must be capable of accommodating seasonal movements on the order of 50mm. If these utilities are not capable of accommodating movements due to frost, they should either be installed below the frost penetration depth or insulated.

As an alternative to extruded polystyrene, cellular concrete may be considered for frost protection. In a trench application, the final design of the cellular concrete should be carried out by the supplier as it is a function of surface cover and other factors.

4.5 CEMENT TYPE

No significant concentrations of soluble sulphates were measured in tested soil samples recovered from this site. Type GU, GUb or equivalent Portland cement may be used for production of concrete in contact with the existing onsite soils.

Concrete having a minimum 28-day compressive strength of 25 MPa is acceptable for foundation concrete. Concrete exposed to freeze-thaw cycles and/or de-icing chemicals may have different strength requirements as well as air entrainment and water-to-cementitious-materials ratio requirements. Shelby may be able to provide further direction upon request.

Any imported fill that will be in contact with concrete should be tested for soluble sulphates before use, and the above recommendations for cement type re-evaluated.

4.6 SEISMIC SITE CLASSIFICATION

Based on the results of the field investigation, combined with our experience in the area and a review of published geological information pertaining to the region, the Seismic Site Classification for the site shall be taken as “D”.

4.7 ACCESS ROADS

It is assumed that the roads will be developed as gravel surfaced, two lane rural residential roads. Alternate asphalt surfacing recommendations are also provided in case the client decides to use asphalt surfacing for the roadway.

The anticipated traffic for the roadways will be passenger vehicles and RVs with occasional delivery trucks.

The roadbed should be crowned in the centre with a cross slope of 0.03 m/m. It is recommended that the ditch bottoms be 1.25m wide and have a minimum depth of 1.0m below top of subgrade. The desirable side slope of the road and the back slope of the ditch is 1 vertical to 3 horizontal and 1 vertical to 4 horizontal respectively; both slopes should not exceed 1 vertical to 2 horizontal.

4.7.1 Clearing and Stripping

The entire road right of way shall be cleared of all vegetation, including removal of all tree roots and stumps. These materials shall be removed from the site for disposal at sites approved by the municipal authority. Organic and other unsuitable material shall then be stripped within the roadway, ditch and back slope portion of the new construction. Stripping material is expected to be primarily topsoil, which can be stockpiled at approved locations and used to re-surface ditches and back slopes.

4.7.2 Subgrade Preparation

Subsequent to completion of stripping, the roadway areas should be shaped and graded to design subgrade elevation. The roadways will be ditched both sides and material excavated from the ditches can be used to raise the grade of the roadbed.

Any low areas of the roadways that have to be filled or raised to design subgrade elevation should be scarified, moisture conditioned and compacted to 98% of the standard Proctor maximum dry density at or slightly over optimum moisture content prior to filling.

Inorganic material excavated from the drainage ditches or cut from high areas of the road can then be used to raise the grade of the road. Additional fill, if required to further raise low areas of the road may be comprised of clean inorganic clay or clay till burrowed from other areas of the site.

All fill material (whether imported or sourced on site) should be placed in uniform lifts not exceeding 150mm in compacted thickness and compacted to a minimum of 98% of the Standard Proctor maximum dry density at or slightly over optimum moisture content.

The final lift (upper 150mm) of the subgrade should be compacted to 100% of the Standard Proctor maximum dry density at or slightly over optimum moisture content. The upper surface of the prepared subgrade should be shaped to mirror the final grade of the overlying asphalt pavement.

4.7.3 Pavement Surfacing (Gravel)

The roadway surfacing requirements for the roads should adhere to the specifications of the local municipal authority. In the absence of surfacing requirements, the following recommendations may be followed:

- Surface Aggregate – Des 4 Class 20 material @ 230 cubic metres/km.

Appropriate laboratory and field-testing and inspection must verify the acceptability of all compacted materials both native and imported. To ensure a high level of performance from pavement sections, the subgrade must not be allowed to dry and/or become wetted prior to or subsequent to construction.

4.7.4 Maintenance (Gravel)

Routine maintenance will be required for the gravel surfacing. Uninterrupted drainage is critical for the proper performance of a road. Any rutting or localized depressions that may develop and lead to ponding water should be repaired by the addition of more gravel and re-grading as necessary.

4.7.5 Pavement Structure (Asphalt)

The pavement structure requirements for the roadways should adhere to the specifications of the local municipal authority. In the absence of such requirements, the following recommendations may be followed:

The pavement structure design is based on an assumed traffic volume of 1.8×10^4 Equivalent Single Axle Loads (ESALs) for local residential roads containing passenger vehicles and RVs with occasional delivery trucks over a 20-year design period. A California Bearing Ratio (CBR) of 2.0 has been estimated for the subgrade if prepared as outlined in Section 5.2 above.

The minimum proposed road section is as follows:

Table 4.2: Pavement Structure

Structural Layer	Residential Road
Asphalt Concrete	90mm ACP
Base (20mm crushed gravel)	200mm Crushed Gravel

It should be noted that the above-noted structure is based on the assumed traffic volume noted above. If a higher traffic volume is anticipated for the road, Shelby should be notified to assess the effect, if any, of traffic volume changes on our recommendations.

Depending on site specific conditions encountered at the time of construction, the subgrade may require stabilization. Options for stabilization, if required, can only be provided at the time

of construction, and could include scarifying and drying, subcutting and replacement, or cement stabilization.

The granular materials (20mm maximum sized crushed gravel) and asphalt concrete should meet the specifications outlined by Alberta Transportation (A.T.), with ACP being A.T. Type M1. The crushed gravel should be compacted to 100% of the Standard Proctor maximum dry density in 150mm lifts. The ACP should be compacted to a minimum of 98% of Marshall density.

Appropriate laboratory and field testing inspection must verify the acceptability of all compacted materials both native and imported. To ensure a high level of performance from pavement sections, the subgrade must not be allowed to dry and/or become wetted prior to or subsequent to construction.

4.7.6 Maintenance (Asphalt Pavement)

Cracks that normally occur in asphalt pavement structures with time should be sealed on a regular basis as part of a scheduled road maintenance program. This will extend the life of the asphalt pavement structure and minimize the potential for water to infiltrate the subgrade.

5.0 CONSTRUCTION TESTING AND MONITORING

Appropriate laboratory and field testing and monitoring by qualified geotechnical personnel is recommended during any earthworks (i.e., site grading, excavating, backfilling, pavement subgrade preparation) and placement of all engineered fill and base or subbase materials, to ensure that suitable site conditions are prepared and that materials consistent with the recommendation herein are used.

The Alberta Building Code specifies full time continuous field review, by a suitably qualified individual, during installation of all deep foundation elements.

6.0 CLOSURE

All services provided by Shelby Engineering Ltd. are subject to our Standard Terms and Conditions, which are attached in Appendix I.

Respectfully Submitted,
SHELBY ENGINEERING LTD.
APEGA Permit to Practice P3580

Aug. 13, 2019

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Encl.

File No. 1-21550R01
August 2019

APPENDIX I

Standard Terms and Conditions

STANDARD TERMS AND CONDITIONS FOR THE PROVISION OF SERVICES BY SHELBY ENGINEERING LTD.

1. "The services ("the Services") performed for the client (the "Client") by Shelby Engineering Ltd. ("Shelby") described in the report to which these Standard Terms and Conditions are attached (the "Report") have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the engineering profession currently practicing in the jurisdiction in which the Services have been provided."

2. In consideration of the provision of the Services, the Client agrees to the limitation of liability provisions herein contained, both on its own behalf, and as agent on behalf of its employees and principals.

3. The total amount of all claims the Client may have against Shelby with respect to the Services, including, without limitation, claims in tort or contract, shall be strictly limited to the amount of the fee charged to the Client by Shelby for the Services. Shelby shall not be liable for loss, injury or damage caused by delays beyond Shelby's control, or for any indirect, economic or consequential loss, injury or damage incurred by the Client, including, without limitation, claims for loss of profits, loss of contracts, loss of use, loss of production or business opportunity, loss of contracts or continued overhead expense. No claim shall be brought by the Client against Shelby more than two (2) years after completion of the Services or termination of the agreement to provide the Services.

4. The Client shall have no right to set off against any amounts owed to Shelby with respect to the Services.

5. The Client agrees that Shelby's employees and principals shall have no personal liability with respect to the Services and the Client shall make no claim or bring any proceedings of any kind whatsoever whether in contract, tort or any other cause of action in law or equity, against Shelby's employees and principals in their personal capacity.

6. The Client acknowledges that the Services entail an investigation which by its nature involves the risk that certain conditions between points investigated will not be detected, and that certain other conditions may change with time after provision of the written report of the Services. The Client acknowledges and accepts such risk and is aware that the Report can only provide for the conditions at the investigated points at the time of investigation. Extrapolation between the investigated points is at the Client's risk. If the Client requires additional or special investigations outside the scope of the Report, the Client must request such additional investigations from Shelby.

7. The Report has been prepared for a specific site and in light of the specific purposes communicated to Shelby by the Client. Shelby accepts no responsibility for the findings contained in the Report if applied to a different site, or if there is a material change in the purposes communicated to Shelby by the Client. The information and opinions described in the Report are provided solely for the benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THE WRITTEN CONSENT OF SHELBY. The Client shall maintain confidentiality of the Report and ensure that the Report is not distributed to third parties. The Client hereby agrees to indemnify Shelby for any claims brought against Shelby by third parties and arising out of the Client's failure to maintain the confidentiality required under this paragraph.

8. Except as stipulated in the Report, Shelby has not been retained to address, investigate or consider, and has not addressed, investigated or considered environmental or regulatory issues with respect to the site on which the Services have been performed. Notwithstanding the foregoing, Shelby may be required to disclose to regulatory bodies certain hazardous conditions discovered through provision of the Services, and the Client shall not make any claim against Shelby for such disclosure.

July 2005Revised

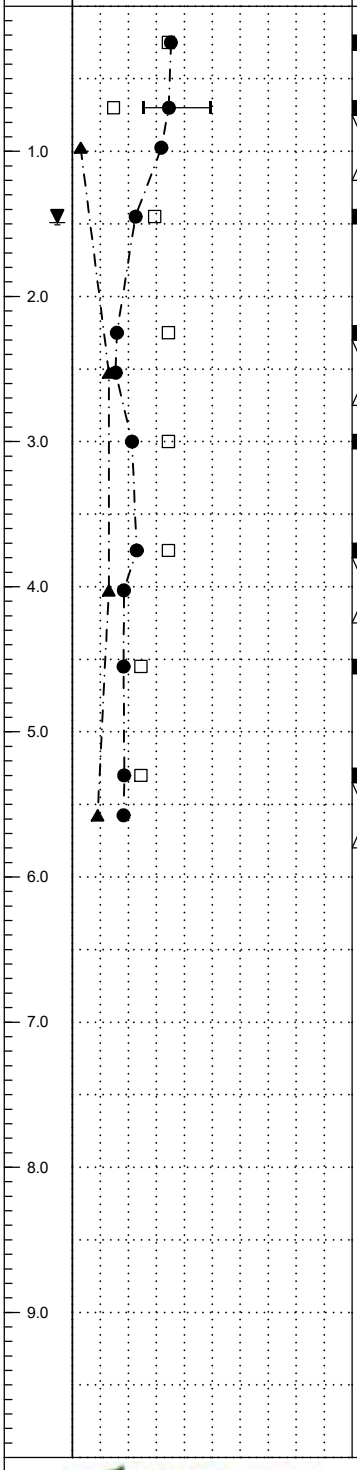
APPENDIX II

Figures

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-1
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



Depth (m)	Sample Type	Sample No.	SPT (N)	SOIL DESCRIPTION	USC	Soil Symbol	Additional Testing	Elevation (m)
				TOPSOIL: Silty, black to 100mm depth.	OR			
		1		CLAY: Silty, stiff, high plastic, moist, greyish brown, trace oxide.	CH			
		2		-silty to and silt, firm, medium to high plastic from 450mm depth.	CI-CH		SO4=0%	
1.0		3	3	-and silt, soft from 750mm depth.	CI			
		4		CLAY TILL: Silty, sandy, stiff, medium plastic, moist, brown, trace gravel, oxide, coal, grey streaks.			Water level @ 1.49m after 11 days	
2.0		5						
		6	13	-trace gravel, oxide, red streaks, grey streaks.				
3.0		7		-trace gravel, oxide, coal, grey streaks. -free water on auger.				
		8			TILL			
4.0		9	13					
		10		-grey.				
5.0		11						
		12	9					
6.0				DEPTH OF TEST HOLE 5.8 METRES WATER @ 3.65m UPON COMPLETION SLOUGH TO 4.85m UPON COMPLETION STANDPIPE INSTALLED				
7.0								
8.0								
9.0								

SHELBY ENGINEERING
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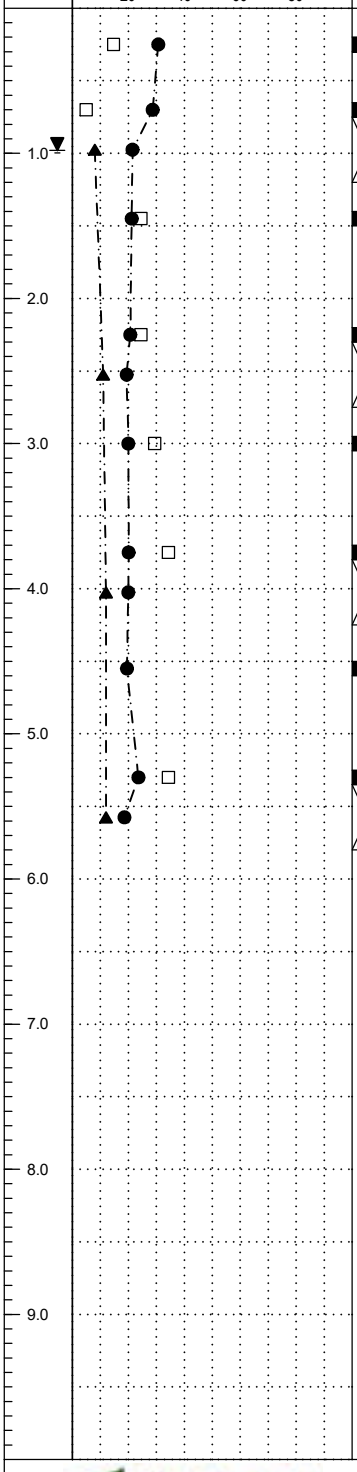
EDMONTON, AB
T6E 5V1

LOGGED BY: TD	COMPLETION DEPTH: 5.80 m
REVIEWED BY: SD	COMPLETION DATE: 5/17/19
FIGURE NO.: 1	Page 1 of 1

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-2
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



Depth (m)	SAMPLE TYPE	SAMPLE NO.	SPT (N)	SOIL DESCRIPTION	USC	SOIL SYMBOL	ADDITIONAL TESTING	Elevation (m)
		1		TOPSOIL: Silty, peaty to 125mm depth.	OR			
		2		CLAY (TILL LIKE): Silty, firm, medium to high plastic, moist to wet, greyish brown, trace to some sand, trace oxide, coal.	CI			
1.0		3	8	-soft, wet from 600mm depth.			Water level @ 0.98m after 11 days	
		4		CLAY TILL: Silty, sandy, stiff, moist, brown, trace gravel, oxide, grey streaks.				
2.0		5						
		6	11	-grey and brown.				
3.0		7		-brown. -Free water on auger.	TILL			
		8						
4.0		9	12	-greyish brown.				
		10		-grey.				
5.0		11		-trace gravel, clay shale, bentonite.				
		12	12					
6.0				DEPTH OF TEST HOLE 5.8 METRES WATER @ 3.05m UPON COMPLETION NO SLOUGH UPON COMPLETION STANDPIPE INSTALLED				
7.0								
8.0								
9.0								

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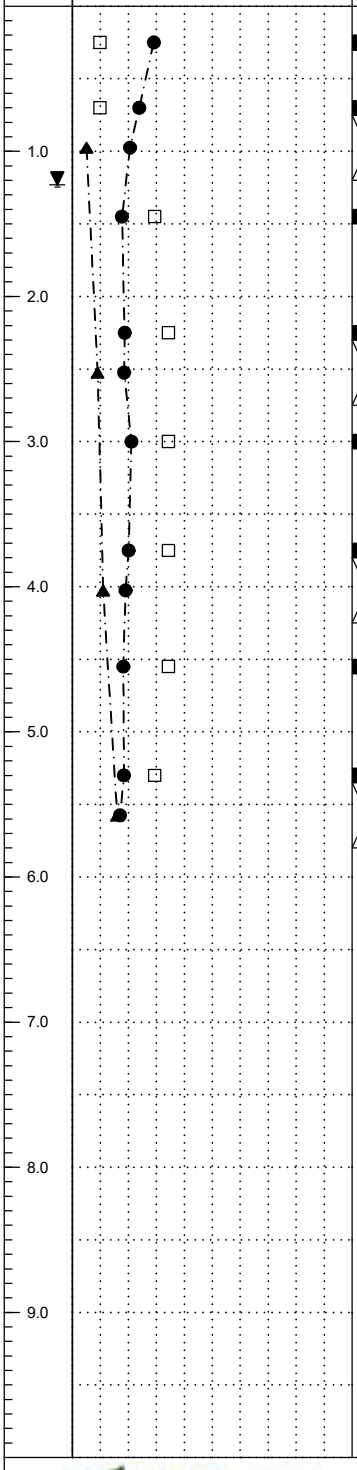
REVIEWED BY: SD	COMPLETION DATE: 5/17/19
FIGURE NO.: 2	Page 1 of 1

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-3
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



Depth (m)	SAMPLE TYPE	SAMPLE NO.	SPT (N)	SOIL DESCRIPTION	USC	SOIL SYMBOL	ADDITIONAL TESTING	Elevation (m)
		1		TOPSOIL: Silty, peaty, black to 200mm depth.	OR			
		2		CLAY: Silty, firm, medium to high plastic, moist to wet, greyish brown.	CI-CH			
1.0		3	5					
		4		CLAY TILL: Silty, sandy, stiff, medium plastic, moist to wet, brown, trace gravel, oxide, coal, grey streaks.			Water @ 1.23m after 11 days	
2.0		5						
		6	9				SO4=0%	
3.0		7		-trace gravel, oxide, coal.	TILL			
		8						
4.0		9	11	-grey. -free water on spt.				
		10		-trace gravel, coal.				
5.0		11						
		12	16	-trace sand lenses, gravel, coal.				
6.0				DEPTH OF TEST HOLE 5.8 METRES WATER @ 5.0m UPON COMPLETION NO SLOUGH UPON COMPLETION STANDPIPE INSTALLED				
7.0								
8.0								
9.0								

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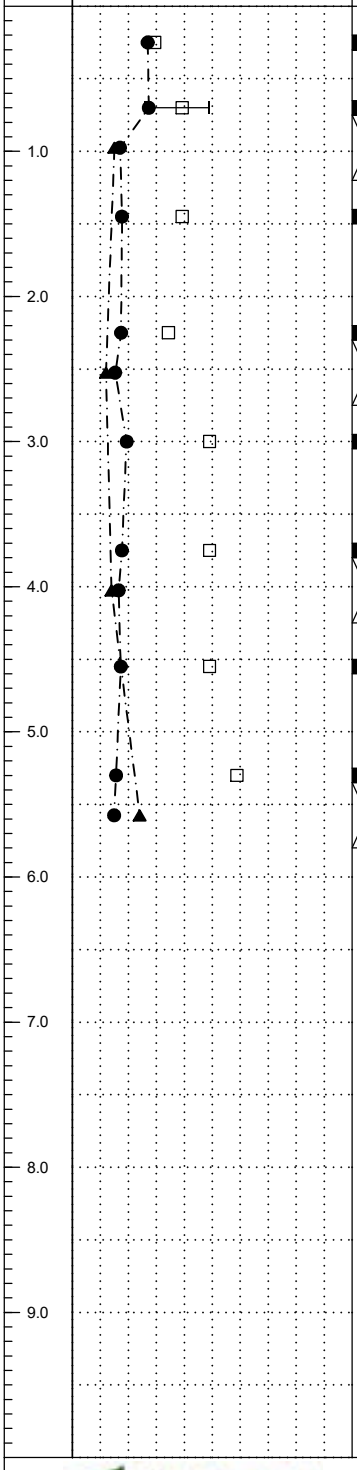
LOGGED BY: TD	COMPLETION DEPTH: 5.80 m
REVIEWED BY: SD	COMPLETION DATE: 5/17/19
FIGURE NO.: 3	Page 1 of 1

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-4
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



SAMPLE TYPE	SAMPLE NO.	SPT (N)	SOIL DESCRIPTION	USC	SOIL SYMBOL	ADDITIONAL TESTING	Elevation (m)
			TOPSOIL: Peaty, black to 200mm depth.	OR			
	1		CLAY TILL: SIlty, sandy, stiff, medium to high plastic, moist, greyish brown, trace gravel, oxide.				
	2						
	3	15	-sandy to and sand, low to medium plastic, damp to moist from 750mm depth.				
	4		-silty, sandy, medium plastic, moist, trace gravel, oxide, coal, grey streaks.				
	5						
	6	12	-some sand layers.				
	7		-very stiff.	TILL			
	8						
	9	14					
	10						
	11						
	12	24	-trace to some sand lenses.				
			DEPTH OF TEST HOLE 5.8 METRES DRY UPON COMPLETION NO SLOUGH UPON COMPLETION STANDPIPE INSTALLED			Test hole dry after 11 days	

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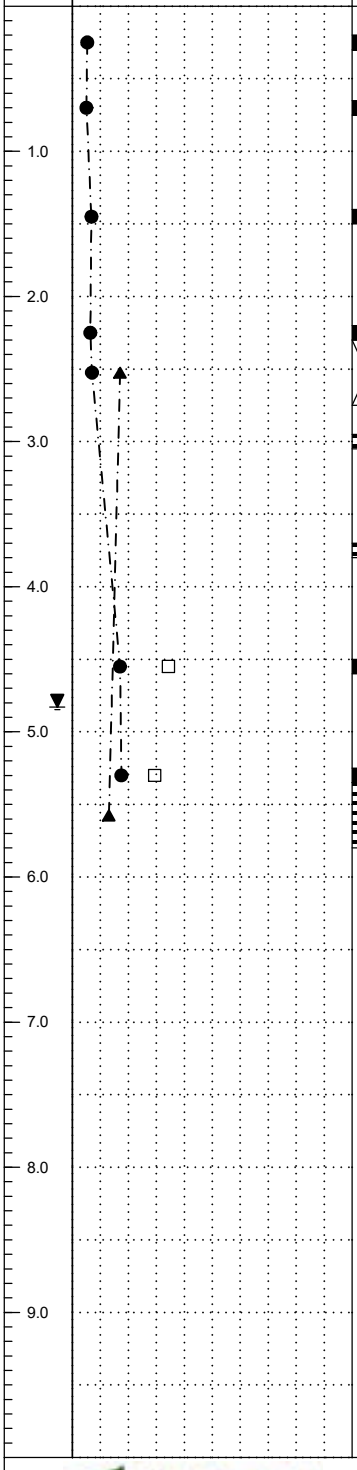
REVIEWED BY: SD	COMPLETION DATE: 5/17/19
FIGURE NO.: 4	Page 1 of 1

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-5
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



Depth (m)	SAMPLE TYPE	SAMPLE NO.	SPT (N)	SOIL DESCRIPTION	USC	SOIL SYMBOL	ADDITIONAL TESTING	Elevation (m)
		1		FILL: Topsoil, black to 75mm depth. -Sand, gravelly, loose to compact, fine grained, moist, brown trace cobbles to 2.3m depth.	FILL			
		2						
		3		-wet from 1.4m depth.				
		4						
		5	17	CLAY TILL: Silty, sandy, stiff, medium plastic, moist, brown, trace gravel, oxide, coal.	TILL		SPT affected by rock	
		6						
		7						
		8					Water @ 4.83m after 11 days	
		9						
		10	13	DEPTH OF TEST HOLE 5.8 METRES WATER @ 2.1m UPON COMPLETION SQUEEZED @ 3.0m UPON COMPLETION STANDPIPE INSTALLED				

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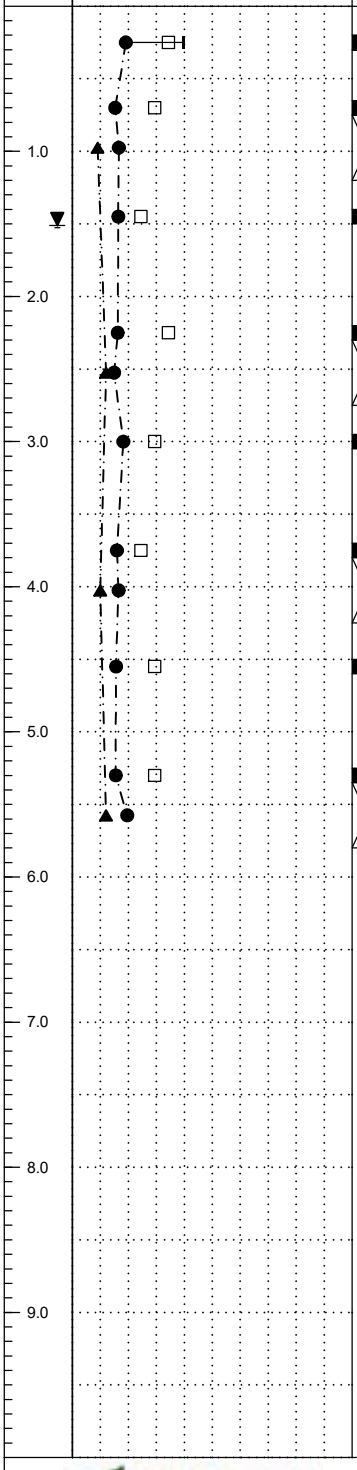
REVIEWED BY: SD	COMPLETION DATE: 5/17/19
FIGURE NO.: 5	Page 1 of 1

SUMMER VILLAGE OF SUNSET POINT- RV RESORT	V3 COMPANIES OF CANADA	TEST HOLE NO.: TH-6
4424 SUNSET DRIVE, GUNN, AB	START DATE: 5/17/19	PROJECT NO.: 1-21550
PROJECT ENGINEER: HKC	SOLID STEM AUGERS AND SPTS	ELEVATION.:

SAMPLE TYPE: GRAB | SHELBY TUBE | SPT | NO RECOVERY | HOLLOW STEM | CORE

BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND



Depth (m)	SAMPLE TYPE	SAMPLE NO.	SPT (N)	SOIL DESCRIPTION	USC	SOIL SYMBOL	ADDITIONAL TESTING	Elevation (m)
0.0		1		TOPSOIL: Silty, some gravel to 100mm depth.	OR			
				CLAY TILL: Silty, sandy, stiff, medium plastic, moist, brown, trace gravel, oxide, coal.			SO4=0%	
1.0		2						
		3	9					
		4					Water level @ 1.51m after 11 days	
2.0		5						
		6	12					
3.0		7			TILL			
		8						
4.0		9	10	-grey, trace gravel, coal. -free water on spt.				
		10						
5.0		11						
		12	12					
6.0				DEPTH OF TEST HOLE 5.8 METRES WATER @ 4.0m UPON COMPLETION NO SLOUGH UPON COMPLETION STANDPIPE INSTALLED				
7.0								
8.0								
9.0								

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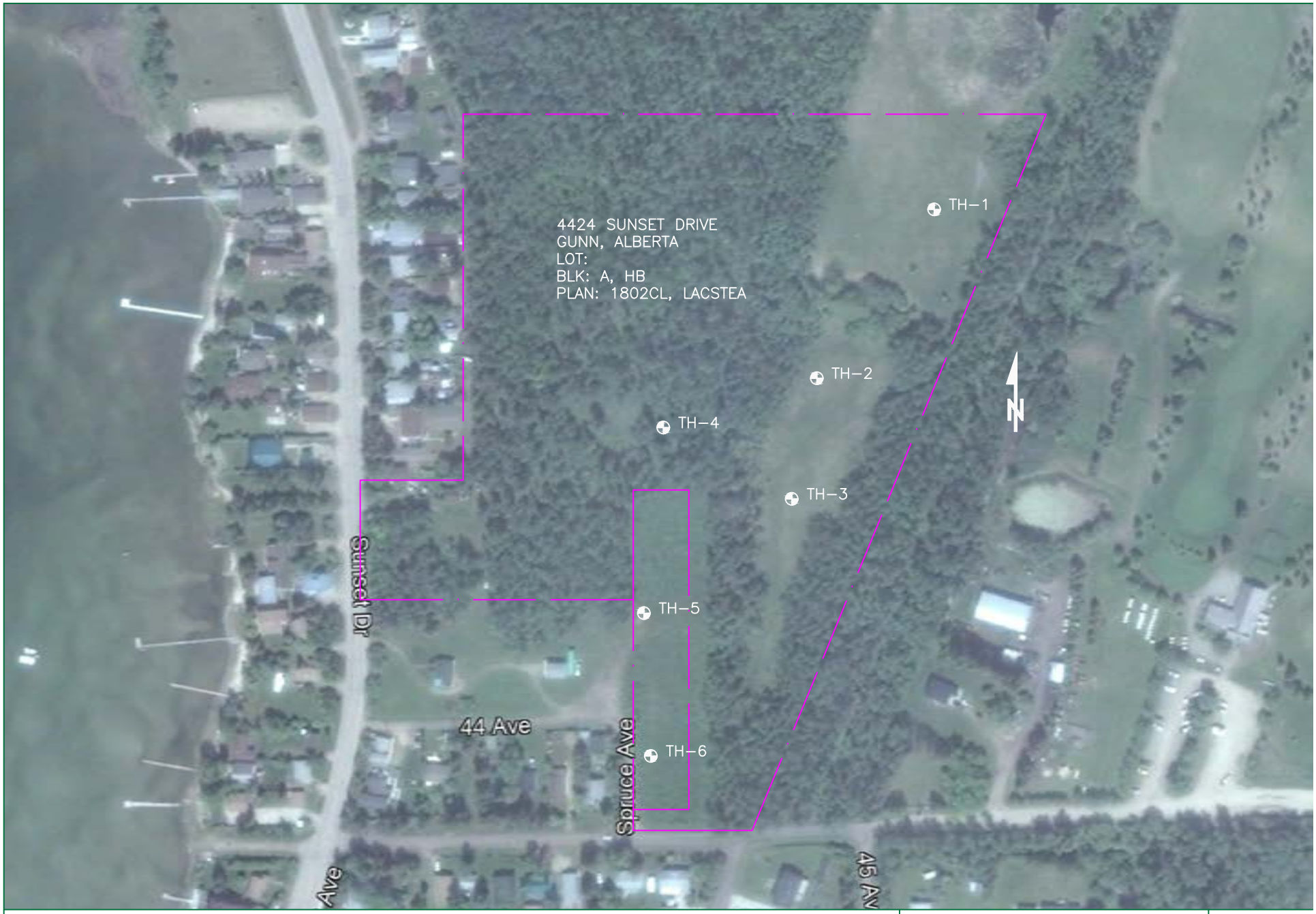
FIGURE NO.: 6	Page 1 of 1



ALL TESTHOLE LOCATIONS OBTAINED USING HANDHELD GPS UNIT
NOT INTENDED FOR SURVEYING PURPOSES

0m 28m

SCALE: 1:715

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JOB NO: 1-215
DATE: JUNE 20
DWN BY: TD
FIG NO: 7

SOIL CLASSIFCATION SYSTEM (MODIFIED U.S.C.)

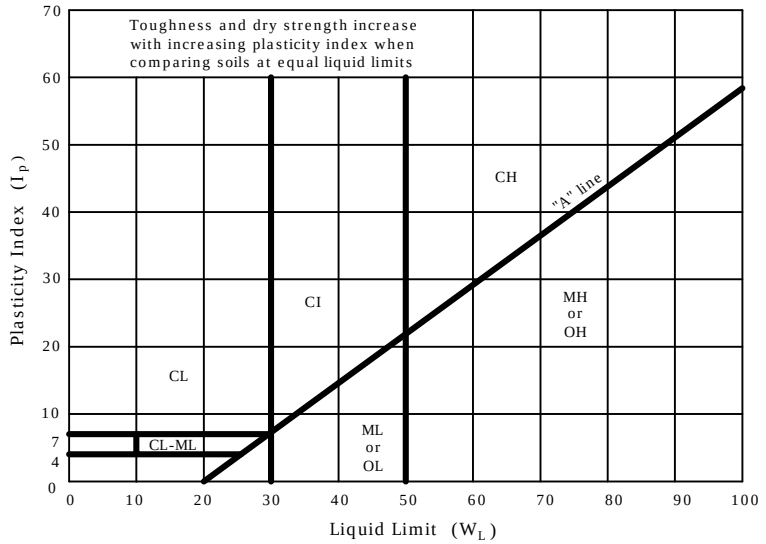
MAJOR DIVISION			GROUP SYMBOL	GRAPHIC SYMBOL	GROUP NAME	LABORATORY CLASSIFICATION CRITERIA
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE
COARSE-GRAINED SOILS — MORE THAN 50% RETAINED ON NO.200 SIEVE	GRAVELS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO.4 SIEVE	CLEAN GRAVELS — LESS THAN 5% FINES	GW		WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, < 5% FINES	$Cu = \frac{D_{60}}{D_{10}} > 4$ $\quad 1 \leq Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}} \leq 3$
			GP		POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, < 5% FINES	NOT MEETING ALL ABOVE REQUIREMENTS
		DIRTY GRAVELS — MORE THAN 12% FINES	GM		SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, > 12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR $I_P < 4$
			GC		CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, > 12% FINES	ATTERBERG LIMITS ABOVE "A" LINE OR $I_P > 7$
	SANDS — MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SANDS — LESS THAN 5% FINES	SW		WELL-GRADED SANDS, GRAVELLY SANDS, < 5% FINES	$Cu > 6$ and $1 \leq Cc \leq 3$
			SP		POORLY-GRADED SANDS, OR GRAVELLY SANDS, < 5% FINES	NOT MEETING ALL ABOVE REQUIREMENTS
		DIRTY SANDS — MORE THAN 12% FINES	SM		SILTY SANDS, SAND-SILT MIXTURES, > 12% FINES	ATTERBERG LIMITS BELOW "A" LINE OR $I_P < 4$
			SC		CLAYEY SANDS, SAND-CLAY MIXTURES, > 12% FINES	ATTERBERG LIMITS ABOVE "A" LINE OR $I_P > 7$
FINE-GRAINED SOILS — MORE THAN 50% PASSES NO. 200 SIEVE	SILTS — BELOW "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	$W_L < 50$
			MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	$W_L > 50$
	CLAYS — ABOVE "A" LINE ON PLASTICITY CHART; NEGLIGIBLE ORGANIC CONTENT		CL		INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	$W_L < 30$
			CI		INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	$30 < W_L < 50$
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	$W_L > 50$
	ORGANIC SILTS AND ORGANIC CLAYS — BELOW "A" LINE ON PLASTICITY CHART		OL		ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	$W_L < 50$
			OH		ORGANIC CLAYS OF HIGH PLASTICITY	$W_L > 50$

SEE PLASTICITY CHART BELOW

1. All sieve sizes mentioned on this chart are U.S. Standard, ASTM E11
2. Boundary classifications possessing characteristics of two groups are given combined group symbols. eg. GW-GC is a well-graded gravel-sand mixture with clay binder of between 5% and 12%.
3. Soil fractions and limiting textural boundaries are in accordance with the Unified Soil Classification System (ASTM D2487), except that an inorganic clay of medium plasticity (CI) is recognized.
4. The following adjectives may be employed to define percentage ranges by weight of minor components (per Canadian Foundation Engineering Manual, 1992):

And	- 35% to 50%
(y/ey)	- 20% to 35%
Some	- 10% to 20%
Trace	- 1% to 10%

PLASTICITY CHART



SHELBY ENGINEERING

SOIL CLASSIFICATION CHART

Appendix D

Servicing Report

SERVICING REPORT

SUMMER VILLAGE OF SUNSET POINT,
LAC STE. ANNE COUNTY, ALBERTA

Lakota Holdings Inc.

OCTOBER 2020

V3 Companies of Canada Ltd.
Suite 130 - 2899 Broadmoor Blvd.
Sherwood Park, Alberta
780-482-3700 phone
780-424-3837 fax
www.v3co.ca

Visio, Vertere, Virtute...
"The Vision to Transform with Excellence"

DRAWING NAME: C19-022 REPORT COVER.dwg

DATE PLOTTED: Nov 02, 2020 – 10:23 am

DISCLAIMER

This report has been prepared by V3 Companies of Canada Ltd. for the benefit of our client Lakota Holdings Inc. The information contained herein including any analyses, conclusions and recommendations represent our professional judgment in light of the information available at the time of the report's preparation. This report is therefore confidential and may be used only by the Client, Lac Ste. Anne County, Alberta Environment, their employees and assigns without written permission.

Issued for review October 22, 2020.

Prepared by:
V3 Companies of Canada
Suite 130, 2899 Broadmoor Blvd.
Sherwood Park, Alberta, Canada T8H 1B5
Tel: (780) 482-3700

Project Number: C19-022

Introduction

Our Client, Lakota Holdings Inc., has submitted an Area Structure Plan to develop a 6.22 ha (15.37 Ac) residential subdivision within Lac Ste. Anne County. The development is located in the Summer Village of Sunset Point. It is bordered by undeveloped land to the north, residential housing along Sunset Drive to the west and the railway embankment and Alberta Beach Golf Resort to the east.

This development will consist of the following improvements:

- 77 Residential Trailer Lots and 12 Cabin Lots
- Construction of drainage channels within the development for the conveyance of storm water
- Construction of a private road network to provide access to the various residential lots

Stormwater Management

The purpose of this section is to identify how the stormwater will be managed on and off of the site, in order to fulfill the county's requirements for stormwater management. Both the Lac Ste. Anne County General Municipal Servicing Standards (GMSS) and the stormwater management plan - June 2020 by SE Design and Consulting Inc. hereinafter referred to as the SE Report were used as reference for design. This stormwater plan will evaluate the quantity and quality of runoff resulting from the development of the subject site, and provide measures to attenuate the potential downstream impact of the increased runoff from the development.

Existing Conditions

Currently, the property flows along minor flow paths to the north west where an existing 600mm culvert flows north under Sunset Drive towards Lac Ste. Anne.

The surrounding lands to the north, south, and west appear to drain away from the proposed development. The runoff from the golf course to the east (approx. 29ha of contributing area) crosses the railway embankment through a culvert located approximately 180m south of the 48A Avenue centre line and drains to an existing dugout adjacent to the proposed development in the undeveloped land to the north. The dugout fills up and floods a significant area before reaching an overflow elevation and draining to the west along the existing power line right of way.

Peak Flow

The Rational Method was used to calculate the expected peak flow values for both the pre-development and the post-development scenarios. The first step was to determine the time of concentration, rainfall intensity and runoff coefficient for each case.

For the pre-development site, the time of concentration was calculated to be 52 minutes, using the FAA equation (U.S. Federal Aviation Administration). The time of concentration for the post-development site was assumed to be 10 minutes. The appropriate rainfall intensity was then selected from the City of Edmonton IDF curve to coincide with the calculated time of concentration.

The existing site consists primarily of flat woodlands with an assumed runoff coefficient of 0.15. For the post-development scenario, the runoff coefficient for country residential (0.2) from the GMSS was selected.

Based on this information, it was calculated that the maximum instantaneous discharge from a 1 in 100 year storm for the pre-development and post-development scenario is 0.15 m^3/s and 0.54 m^3/s respectively.

Storage Requirements

The proposed stormwater management plan in the SE Report is to construct a sediment bay in the northwest corner of the undeveloped parcel to the north. Water quality and quantity is to be managed in the proposed sediment bay prior to release to Lac Ste. Anne. This sediment bay will capture and detain all runoff from the proposed development. A drainage ditch is to be constructed along the west extent of the subject parcel in order to convey all stormwater runoff to the sediment bay. The drainage ditch will be constructed within a 6.0m right of way. To fit within the right of way the ditch should have a bottom width of 0.5m, a depth of 0.75m and 3 to 1 side slopes. Per the GMSS, ditch grades shall have a minimum grade of 0.5%. Using Manning's equation for open channel flow, the proposed drainage ditch has a calculated capacity of 2.61 m^3/s. This is far greater than the post-development peak flow.

When setting a post-development release rate, the SE Report points to the Big Lake Basin Study. The recommended release rate in this study is 2.5L/s/ha. This release rate acts as a compromise to balance the downstream impacts of development with the long-term development costs. The SE Report suggests that the lower of the pre-development discharge rate and the recommended release rate in the Big Lake Area Master Drainage Plan shall be adopted. Using the City of Edmonton rainfall data, the storage requirements for the development are determined by analyzing the site for a variety of 1 in 100 year rainfall durations. The critical storm duration was determined to be 0.3 hours with a maximum storage requirement of 250 cubic meters.

Water Quality

Based on literature found in "Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems", by Alberta Environment in January 2006, and the "National Pollutant Removal Performance Database", 2nd and 3rd Edition, formed by the U.S. EPA office, the extended-detention sediment bay proposed is estimated to remove 80% of all Total Suspended Solids (TSS). Additional TSS removal will also be found within the drainage ditches developed on site. The same literature mentioned above also finds grass ditches to provide 31-81% TSS removal. With the use of a sediment bay and onsite drainage ditches, the estimated TSS removal will be above the 85% TSS requirement, per Alberta Environment.

Water and Sanitary Servicing

This section has been prepared to outline the water and sanitary servicing requirements for the development of new lands. The design factors outlined in the Lac Ste. Anne County General Municipal Servicing Standards (GMSS) have been used for both the sanitary and water demand calculations for the proposed development.

Sanitary Demands

The guidelines for calculating the sanitary flow generation are outlined in Section E – Sanitary Sewer System of the *GMSS*. The GMSS sanitary flow generation factors used in this report are:

- Population Density (residential) 3.5 persons/residence
- Average Sewage Flow (residential) 350 L/day/person
- Peaking Factor (residential) $1+14/(4+P^{1/2})$
- Peak Sewage Flow Average Flow * PF
- Infiltration (residential) 0.28 L/s/ha

In order to determine the residential sanitary contribution for the development, the residential population needed to be determined. Per the *GMSS* a value of 3.5 persons/residence was used. With a total of 89 residential lots this amounted to a population of 312 people.

Next, the average flow and the peaking factors from the development were calculated to determine the Peak Dry Weather Flow (PDWF). The total average residential flow and peaking factor for the proposed development are 1.26 L/s and 4.07, respectively. This results in a total peak dry weather flow of 5.14 L/s.

Lastly, the infiltration flow is based on the entire area of the proposed development (6.22 ha) and totals 1.74 L/s. The total sanitary demand from the proposed development is 6.88 L/s which is found by combining the total peak dry weather flow and the total inflow and infiltration flow. Table 1 is a summary of the expected sanitary flow generation.

Table 1: Sanitary Flow Generation of the Village

	Residential						Total Flow	Design Flow*
	Area	Residential		Peaking	PDWF	I/I	PWWF	PWWF
	(ha)	Units	People	Factor	(L/s)	(L/s)	(L/s)	(L/s)
Summer Point	6.22	89	311.5	4.07	5.14	1.74	**6.88**	**8.00**

* Design Flow equals the Total Flow divided by a 0.86 factor

In accordance with the GMSS, sanitary sewers are to be designed for a flow rate of approximately 86% of the sewers' full flow capacity. This leads to a design flow of 8.00 L/s. This is under the capacity of the minimum pipe size which is a 200mm diameter. Therefore, the proposed sanitary servicing for the development would be provided by

200mm sewer pipes. The servicing would be connected to the existing sanitary system within sunset drive at the south west corner of the development.

Water Demands

The guidelines for calculating the water demand are outlined in Section D – Water Distribution System of the *GMSS.* The GMSS water flow requirement factors used in this report are:

- Population Density (residential) 3.5 persons/residence
- Average Daily Demand (ADD) 350 L/day/person
- Maximum Daily Demand (MDD) 2*ADD
- Peak Hourly Demand (PHD) 4*ADD

In order to determine the residential water demand for the development, the residential population needed to be determined. Per the *GMSS* a value of 3.5 persons/residence was used. With a total of 89 residential lots this amounted to a population of 312 people. Conforming to the GMSS, water demands for the development were determined by carrying out calculations for the Average Daily Demand (ADD) as well as using multipliers for the Maximum Daily Demand (MDD) and Peak Hourly Demand. The ADD, MDD, and PHD calculated for the development are 1.26 L/s, 2.52 L/s, and 5.05 L/s, respectively. Table 2 is a summary of the water demand calculated for the proposed development.

Table 2: Water Demands of the Village's Various Zones

	Residential					
	Area	Residential		ADD	MDD	PHD
	(ha)	Units	People	(L/s)	(L/s)	(L/s)
Summer Point	6.22	89	311.5	1.26	2.52	5.05

Currently, there is an existing water main that runs along the railway easement to the east of the proposed development. The proposed development is planning on using a cistern and pump system to connect to this existing water main.

Closure

We trust that the information contained herein meets your present requirements. Please contact our office if you have any questions or require additional information.

Sincerely,
V3 Companies of Canada Ltd.

Report prepared by:

Braeden Veeneman, P.Eng.
Project Engineer

Report reviewed by:

Deborah Kaleikini-Johnson, PEng. ,PE
Project Manager

Appendix E

ASP Maps

KEY PLAN:

Sunset Point - RV Park
Site Area 6.23 ha (15.4 acers)

LEGEND:

- SITE BOUNDARY
- CAMPGROUND AREA
- CABIN LOTS
- AMENITY AREA
- PRIVATE ROAD NETWORK
- PUBLIC UTILITY LOT
- POTENTIAL ENVIRONMENTAL RESERVE
- CAMPGROUND ENTRACE AND EXIT

NOTES:

Total Campground Area = 11.02Ac

Total Cabin Lots Area = 1.33Ac

Total Amenity Area = 0.19Ac

DRAFT

DATA SOURCES:
Altalis Ltd.
ArcGIS Online
Natural Resources Canada - Open Data
City of Edmonton

CLIENT:
LAKOTA HOLDINGS

TITLE:
SUNSET POINT - LAND USE MAP

PROJECT: C19-022 DATE: 19/05/2021

DESIGNED: Aman Jhawer

CHECKED: Nick Pryce

SCALE: 1:1,500

0 25 75m

V3 Companies of Canada Ltd.
2899 Broadmoor Blvd Suite 130,
Sherwood Park, AB T8H 1B5
Main Line: 780.482.3700

CISTERN AND
PUMPING SYSTEM

CONNECT TO EX. WATERMAIN

EX ___ mm WM

35mm WATER (TYP)
100mm SANITARY (TYP)

35mm WATER (TYP)
100mm SANITARY (TYP)

CONNECT TO EX. SANITARY
SEWER

EX ___ mm SAN

35mm WATER (TYP)
100mm SANITARY (TYP)

4341 KS

4340 KS

5675 HW

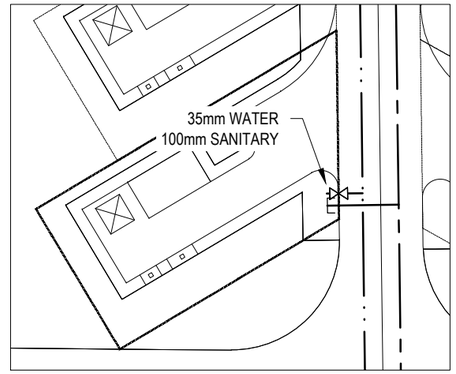
SPRUCE AVE

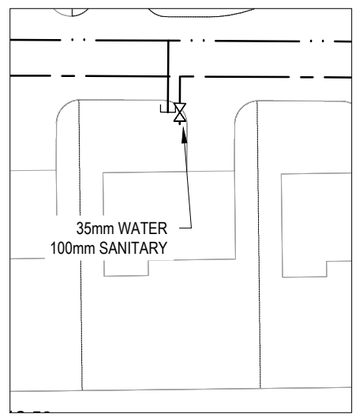
1802 CL

PCL A

42 ST

4569 HW





LEGEND

SUBJECT BOUNDARY

NOTES

1) DIMENSIONS ARE IN METER AND DECIMAL THEREOF
2) TYPICAL LOT SERVICES
   100mm SANITARY
   35mm WATER

PROJECT

SUNSET POINT -RV PARK

PROJECT NO.
C19.022

DATE: 06/17/2019

CLIENT

LAKOTA HOLDINGS

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#200 - 9945 50th STREET
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FILE: V:\JOB NUMBER\V3C CANADA PROJECTS\2019\C19-022 - LAKOTA HOLDINGS - SUMMER VILLAGE OF SUNSET POINT\01- ENGINEERING\C19-022 SVC CONCEPT V1.DWG Sheet: OPTION 10

KEY PLAN:

Sunset Point - RV Park
Site Area 6.23 ha (15.4 acers)

LEGEND:

- SITE BOUNDARY
- LOT LINE
- EXISTING TREED AREA
- SHRUBBY SWAMP BOUNDARY
- STORM WATER FLOW
- PROPOSED DRAINAGE SWALE

NOTES:

TOTAL PROPOSED CABIN LOTS = 12

TOTAL PROPOSED RV LOTS = 77

PROPOSED VISITOR PARKING STALLS = 26

TOTAL GREEN AREA (INCLUDES SHRUBBY SWAMP AREA) = 8.5 AC (55.2%)

TOTAL PROPOSED GRAVEL AREA (ROADS, RV PADS AND PARKING) = 5.3 AC (34.4%)

DRAFT

DATA SOURCES:
Altalis Ltd.
ArcGIS Online
Natural Resources Canada - Open Data
City of Edmonton

CLIENT:
LAKOTA HOLDINGS

TITLE:
NATURALIZED STORMWATER MANAGEMENT PLAN

PROJECT: C19-022 DATE: 02/11/2020

DESIGNED: Aman Jhawer

CHECKED: Deborah Kaleikini-Johnson

SCALE: 1:1,500

0 25 75m

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2899 Broadmoor Blvd Suite 130,
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