

DATE: March 21, 2023
TO: RM of Dufferin and Resort Village of North Grove
CC: Bryan Gray
FROM: Saeed Bashi, P. Eng.
FILE: 5132.0004.01
SUBJECT: Emergency Preparedness Plan – RM of Dufferin and Resort Village of North Grove

1.0 INTRODUCTION

This transportation evaluation memorandum (memo) is completed as part of the joint emergency preparedness for the RM of Dufferin No. 190 (The RM) and the Resort Village of North Grove (the Village or North Grove). The transportation component is completed to evaluate two main items

- Review and incorporate information from completed studies on existing roadway network conditions
- Provide high level emergency access concepts to improve connectivity into and out of the village area in the case of emergency as well serve the proposed developments south of the village.

The memo does not complete new analyses, but rather utilize the information provided in completed studies to identify potential connection options for consideration. The developed connection options are derived from a completed site visit, high-level evaluation of the topography of area and current conditions of the road network surrounding the site. Further assessments, such as preliminary and detailed engineering, will be required to determine the feasibility of the selected option.

2.0 EXISTING AND PROPOSED DEVELOPMENTS

2.1 RESORT VILLAGE OF NORTH GROVE

The Resort Village of North Grove is located approximately 40 km north of Moose Jaw along the shores of Buffalo Pound Lake. The village is a popular place for recreational living either on a seasonal or year-round basis. The population of the Village is around 200 residences which sees some seasonal variation during the summer months as the area is a popular destination. Multiple amenities exist within the village, including playgrounds, sport courts, beach area and a boat launch.

Civic services such as road maintenance and garbage disposal are provided by the Village Administration, while potable and sewer water disposal are the responsibility of the owners. No hospitals or clinics exist within the Village and emergency services, such as RCMP and Fire Services, are provided through agreements with nearby municipalities.

The village sit along the east shores of the Buffalo Pound Lake and is served by Daniel Drive which connects to Highway 2 and is the only road through the village for traffic entering and existing it. The Village Administration maintains the road in all seasons to service permanent and seasonal residents.

Alternative accesses into the village are limited by the topography of the land surrounding it. As mentioned, the village is bounded by the by Buffalo Pound Lake to the west and slopes and ridges along the east. At the top of the ridges, the area consists of farming fields with gravel grid roads. None of the grid roads tie directly to the top of the ridges or the village as they are separated by pastureland to the north.

2.2 BUFFALO VISTA

Buffalo Vista is a proposed residential development south of North Grove with 12 lots planned during the first phase, with potential to expand to 30 lots at full build-out. Current information on the development website indicate that 9 lots have been sold to date and some of the sold lots have already been developed with traffic using Daniel Road to access the development.

The development is similar in nature to North Grove where residents can live in the property year-round and must enter into an agreement specifying the responsibilities of owners such as obtaining utilities, civic and maintenance services. It also specifies that structure size limits are required, and constructed homes cannot exceed set dimensions.

The initial Buffalo Vista phase was approved by the RM of Dufferin and would connect to the external road network through Daniel Drive. During a completed site visit by Urban Systems (USL) team in August 2022, the Village administration indicated that over 80% of residents in the village are frustrated with the approval of Buffalo Vista development, specifically that the development would be accessed via Daniel Drive. It is understood that this opposition has been communicated by the village's residents to the RM of Dufferin.

2.3 NORTHSHORE RESORT (GLAMPING RESORT)

Northshore Resort is a resort facility operated by Glamping Resorts Limited. There are currently 8 glamping units on the site with plans to expand to 24 units. The timeline for expansion is not indicated and likely reliant on appropriate market conditions. These accommodations can be described as short-term resort residences with amenities between that of a campsite and a resort cabin. The long-term plans are to increase the capacity of the site to include 200 seasonal campsites as well as 64 residential dwelling units for people staying overnight. A variety of supporting recreational and commercial facilities are also planned for the resort, including marinas, biking and hiking trails among others. The supporting facilities may be open to the general public, who would be visiting as part of day-trips and not necessarily staying overnight at the resort.

Similar to Buffalo Vista, Northshore Resort development anticipates utilizing Daniel Drive for its future traffic. The development was approved by the RM of Dufferin and has faced strong opposition from residents of North Grove. The concerns are primarily related to safety and maintenance demands due to increased traffic volume along Daniel Drive as well as the highly touristic nature of the future phases of Northshore resort which would be tailored to daily visitors and short-term renters that impact the rural nature and the attractiveness of North Grove.

3.0 EXISTING ROAD NETWORK

3.1 DANIEL DRIVE

Daniel Drive provides the primary and only road connection for the Village. The road is approximately 6 – 7 km long running through the village where it eventually terminates to the at an end of road within Buffalo Vista development. The posted speed limit is 60 km/hr near the entrance of the road which later changes to 40 km/hr approximately 1.5 km within the site. The road has 8-tonne weight limit; however the Village administration is having challenges with enforcing the weight limit and has witnessed trucks utilizing the road without obtaining necessary permits

The cross-section of Daniel Drive is not to a current day standard and maintains its original structure from early development of the village. It has overland and ditch drainage with a varying pavement width of approximately

9 meters directly south of Highway 2 for approximately 2 km before changing to a range between 4 – 6 meters through the remainder of the road.

Sight distances along the road are significantly limited at various locations due to horizontal or vertical curves in the road. Existing structure and buildings also limit sightlines due to the lack of setback from the edge of the road. Further, the vertical curves impact vehicle headlights illumination coverage significantly by limiting the necessary illumination for vehicles traveling along the road at night.

The road has gravel surface structure that is built along the historic trail that existed when the village was first established. Since then, minimal upgrades have been completed that includes grading, gravel and chip seal. As a result, the road has limited load bearing capabilities and shows various signs of wear and tear including rutting and cracking. The Village administration has jurisdiction over the road and maintain its structure to continue serving the village residents with more than 70% of its budget going to road maintenance.

Signage along the road does not appear to meet requirements in terms of type of signs and location of signs. During the August 2022 site visit, signs were observed along the wrong side of the road while other signs do not appear to be used correctly.

Pedestrians and other alternative modes commuters use the road as no dedicated facilities exist throughout the village.

Overall, the road is sub-standard compared to present day best practices and guidelines. Improvements to the road will require significant capital and land investment as identified in the previously completed Transportation Impact Assessment (CIMA+, 2021)

3.2 GRID NETWORK

The road network within the RM of Dufferin is a grid road network that connects the farming land throughout the region. The two main roads near the study area are Township Road 204 (Grid 739) running east-west and Range Road 262 running north-south. The roads have rural cross section with overland and ditch drainage. The road has a gravel surface and 80 km/hr posted speed limit. There is no direct access from North Grove to the roads as it is restricted by the terrain along its east side.

The grid network is currently the only access to the Northshore Resort. It is understood that due to Google Maps routing error, drivers are directed to take Daniel Drive through North Grove which does not have a connection to Northshore Resort. This creates additional pressure on Daniel Drive and the Village residents' safety as vehicles enter the village, only to circle out at the end.

While Northshore resort is planned to use Daniel Drive as the primary road connection through extending it, the grid network would provide a shorter travel time than Daniel Drive for vehicles reaching Northshore resort as shown in the previously completed TIA (CIMA+, 2021). It is understood that the RM of Dufferin has concerns regarding the potential increase in traffic volume along the grid network without additional improvements to the roads structure as the traffic would increase maintenance requirements along the roads.

During the August 2022 site visit it was observed that the two grid roads mentioned appeared well maintained and the road surface had minimal presence of rutting. Drainage along the road is also well established with surface water draining to ditches along the road. The RM of Dufferin may therefore consider directing Northshore traffic to the grid network over Daniel Drive.

3.3 HIGHWAY 2

The highway runs along the northwest edge of North Grove and is classified as Rural Road Classification 1 according to the Saskatchewan Rural Road Classification of Provincial Highways (2022). Near the study area, the highway is two lane, undivided with pavement width of approximately 9 meters and posted speed of 100 km/hr.

According to the Saskatchewan Ministry of Highways (MHI) 2021 traffic volume map, the highway has 1580 – 1850 vehicles per day (vpd) near the Village. The highway provides the primary connection to the village from the highway network to the north and south, it also connects to the surrounding grid network which serves the Northshore Resort.

3.4 INTERSECTION OF HIGHWAY 2 AND DANIEL DRIVE

A review of the said intersection identified that it generally has a simple configuration with one dedicated northbound right turn lane provided. It is understood that no additional evaluation or assessments were completed on the intersection as part of the approval additional developments along Daniel Drive. The addition of future traffic volume may place the intersection beyond its design capacity and create unsafe operational conditions.

4.0 TRAFFIC VOLUMES ESTIMATES

Previously completed studies estimated the daily traffic volume along Daniel Drive using a traffic count completed by RM of Dufferin in July 2021 combined with traffic volume calculations using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. The following table summarizes the daily volumes obtained as described.

Table 4-1: Forecasted Daily Traffic Volume

Development	Daily Traffic Volume (vpd)
Resort Village of North Grove	865
Buffalo Vista	130
Northshore Resort (Glamping Resort)	1,446
Total	2,441

As the above table shows, the growth in traffic volume along Daniel Drive will be driven by Northshore Resort and Buffalo Vista developments. This increase will place the road beyond its environmental capacity of 1,000 vpd and its existing structure.

5.0 IMPACTS ON DANIEL DRIVE

5.1 ROAD CLASSIFICATION AND FUNCTION

The current cross-section of Daniel Drive is similar to a Rural Local which can support a volume of up to 1,000 vpd. If future developments discussed in Section 2.0 are allowed to use the road as the primary connection, the traffic volume is anticipated to grow to more than 2,400 vpd. This increase would place Daniel Drive in Rural Collector classification that would support up to 5,00 vpd.

To have the road cross-section be properly positioned to handle such increase, the road would require significant capital investment and upgrades that would have substantial impact on the properties within the Village, especially properties located directly adjacent to the road as they do not have appropriate setback from the edge of the road.

Accesses along Daniel Drive would also need to be significantly modified and potentially consolidated as many are not in line with current day best practices and guidelines. Pedestrian crossing locations, speed limits and traffic signage would have to be revised and designed to properly match present day guidelines.

The road would also be expected to large size vehicles which would require substantial upgrades to its existing structures to bring the vertical and horizontal alignments within acceptable limits.

5.2 PAVEMENT STRUCTURE

The Village indicated that almost 80% of all its budget is direct towards maintaining the surface of Daniel Drive. The Village does not have the financial means to complete any necessary upgrades. The general public residing in the Village is about 90% opposed to spending tax dollars to upgrade the road and serve additional traffic from the two developments to the south.

At the same time, the increase in traffic generated by future developments along Daniel Drive will significantly drive the cost and requirements of road maintenance which the Village Administration consider a financially unsustainable task.

It is expected that larger traffic volume will cause an increase in pavement deterioration, including cracking, rutting and potholes. This would be in addition to areas where deteriorated road conditions are currently present. Placing weight limitation on road users may not be effective either, the village administration indicated that many non-compliant vehicles are still using the road with little ability of the village to enforce the weight limitations and permits as they do not operate enforcement officers. A deterioration of pavement conditions would likely increase the risk of collisions between vehicles and vulnerable road users such as children, cyclists and people with limited mobility .

5.3 INCIDENT RESPONSE AND EMERGENCY VEHICLE ACCESS

The current structure of the road and its width create a challenging environment in the case of traffic incident or the need for emergency vehicle to access any of the developments along Daniel Drive. While the DM of Dufferin is seeking to mitigate this issue by identifying a potential location of an access, maintaining Daniel Drive at the current width and structure would still carry increased risk. The risk originates from restrictive road width where a traffic incident has the potential to completely block the flow of traffic and impede emergency vehicle. In Addition, rother residents would also become impeded causing an elevated risk of attempting unsafe movements along Daniel Drive.

5.4 INTERSECTION OF HIGHWAY 2 AND DANIEL DRIVE

The current intersection of Highway 2 and Daniel Drive has a relatively simple geometry with no dedicated turn lanes except for a dedicated northbound right turn lane. This treatment will need to be examined and further assessed to ensure it meets the required provincial requirements for the anticipated future traffic volume. Increased pedestrian and other vulnerable users near the intersection is expected and may require the addition of clearly labelled crossing facilities and signage. It is understood that the approved Buffalo Visa and Northshore resorts did not evaluate the potential impact of the added traffic on the subject intersection.

5.5 SUMMARY AND MITIGATIONS

Based on the reviewed and observed information, the existing cross-section, pavement and alignment of Daniel Drive will not allow it to reliably and safely handle an increase in traffic volume resulting from the proposed developments. The traffic forecast shows that most of the traffic would come from Buffalo Vista and Northshore Resort as traffic from North Grove is anticipated to remain at steady levels. As Daniel Drive does not meet present day best practices or guidelines, limiting its use to North Grove Village residents and directing future North Resort traffic to the grid network maybe a more feasible option. This is because North Grove residents are generally familiar with roadway conditions compared to daily users and tourists that would be frequenting Northshore Resort.

If Daniel Drive is to become the main connection to Northshore Resort, it will require significant upgrades to mitigate operational and safety risks associated with increased traffic from the proposed developments. These upgrades include complete redesign and construction of road surface coupled with surface widening, access management and vertical and horizontal alignment corrections. Due to the limited Right-of-way (ROW) available, it will require significant land acquisition and design effort among other items.

6.0 CONNECTION AND EMERGENCY ACCESS OPTIONS

In addition to the impact of allowing future developments to use Daniel Drive as the primary connection, the RM of Dufferin is seeking to understand the opportunities to establish an emergency access road that would allow emergency vehicles to access the site as well as permitting residents to exit the area.

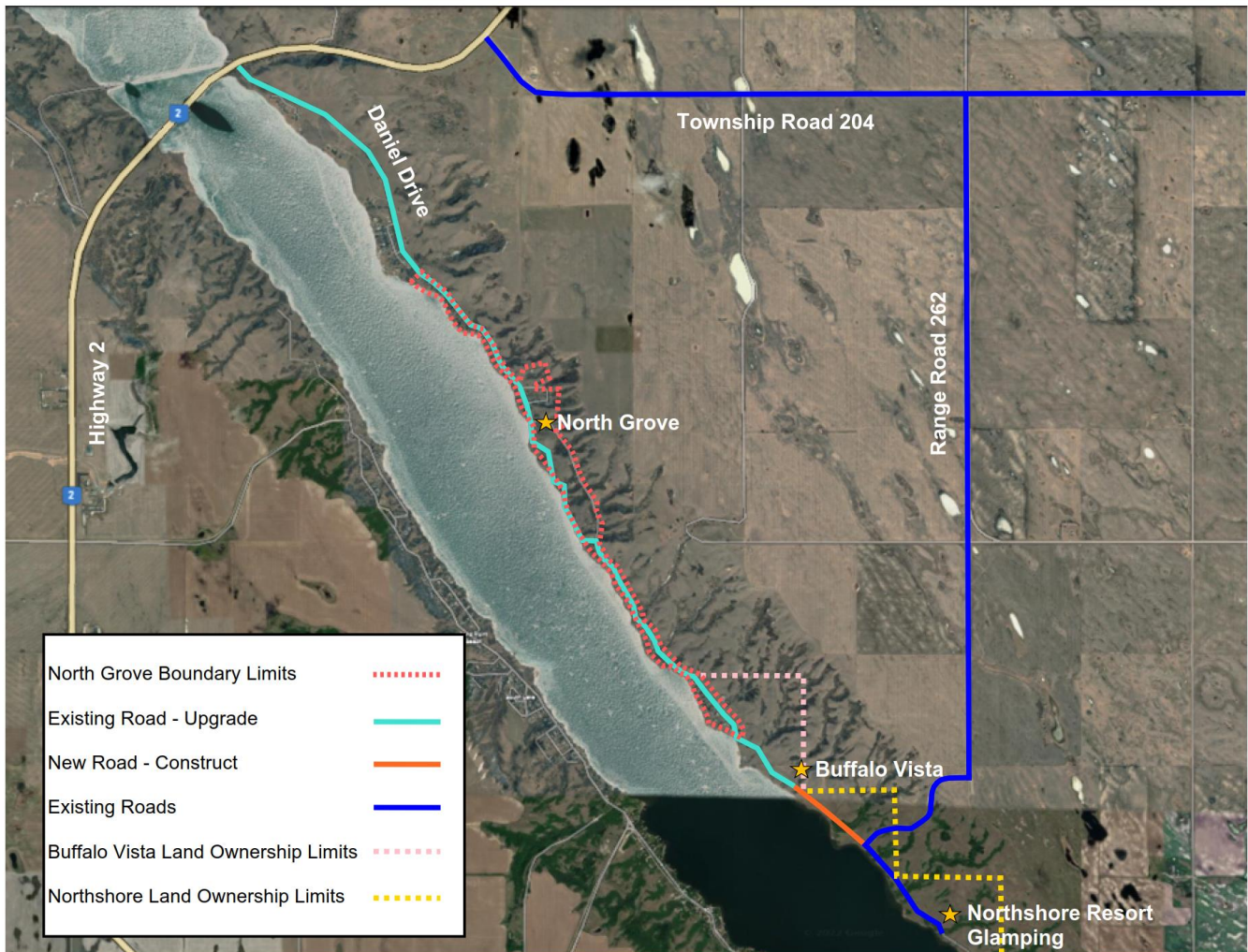
Multiple options were developed to provide the alternative connection for the Village. Considerations included the capital requirements, right of way limitations and effectiveness of the connection as described in the following sections

6.1 OPTION 1 – UPGRADE DANIEL DRIVE AND EXTEND TO NORTHSHORE RESORT

This option builds on previous evaluation of Daniel Drive where it is upgraded to Rural Collector cross section in accordance with modern day guidelines and best practices. If this is completed, the upgrades should be extended into Northshore Resort and connect to the grid network to the north. This would create a complete loop that provides residents and daily users an alternative route to exit the site in the case of an emergency.

This concept however is impeded by ROW limitations from existing properties along Daniel Drive within North Grove. The cost of upgrading the road is also prohibitive for the Village and significant funding would be needed. The Village administration also mentioned that the conversations with the RCMP indicated that the risk of crime could increase with the establishment of the loop as a way out of the community rather than the single in and out point. Finally, the Village Administration indicated that this option is extremely unpopular among residents as shown in their survey (more than 80% opposed) due to negative impact it has on changing the rural nature of the area.

Figure 6-1: Upgrading Daniel Drive Into Northshore Resort - Option 1



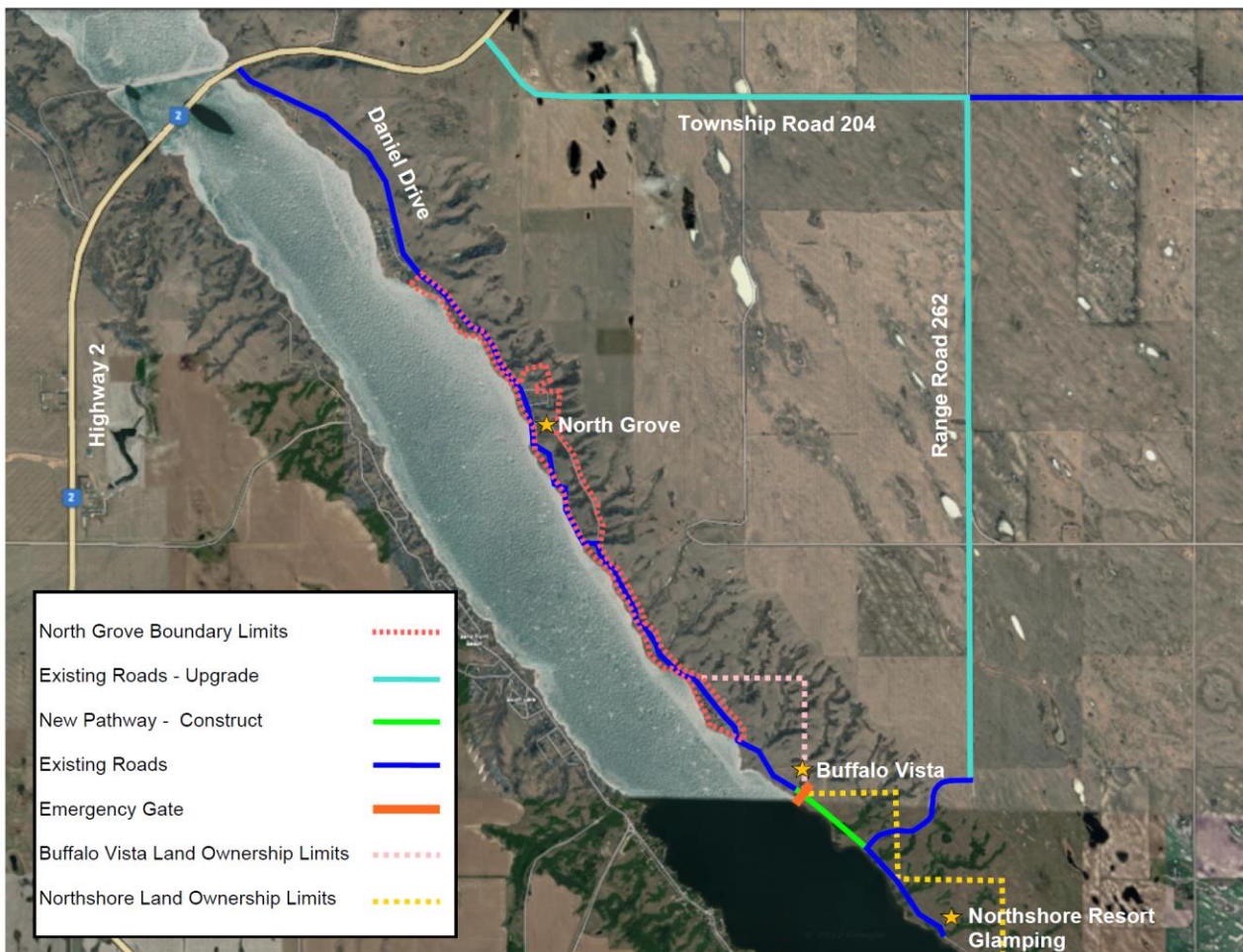
6.2 OPTION 2 – BUILD MULTI-USE CONNECTION TO NORTSHORE RESORT WITH BREAKAWAY POSTS

This option considers the construction of multi-use pathway to connect the Village to Northshore Resort and eventually the grid network. The pathway would be gated under normal circumstances with no daily vehicles utilizing it, however, it would be constructed as to accommodate emergency vehicles or residents attempting to evacuate the Village.

The grid network near the area, Township Road 204 and Range Road 262, would also be upgraded under this option as it will become the primary connection to the Northshore Resort. This builds on previous studies which showed that the existing grid network structure and cross section would be more feasible for upgrading than Daniel Drive given the available ROW and existing cross-section. As well, it showed that the travel time for users accessing Northshore resort is shorter through the grid network compared to Daniel drive.

The Village Administration also indicated that vehicles presently enter North Grove village before realizing that no connection exist to Northshore Resort. Signage at the entrance of the Village indicating no through access and conversation with Google Maps to adjust the routing algorithm would be needed to ensure vehicles are routed through the grid network.

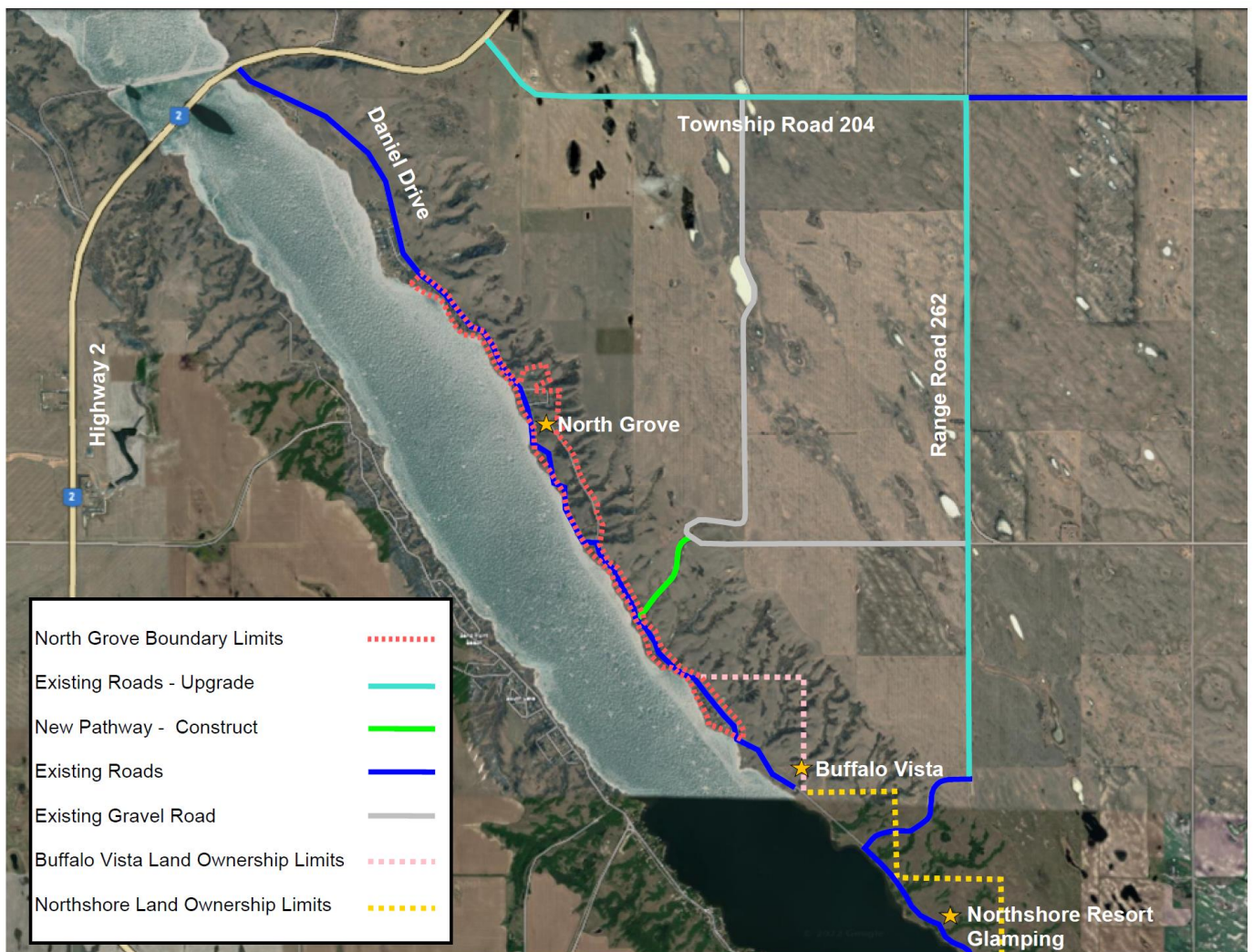
Figure 6-2: Breakaway Multi-use Connection and Upgrade the Grid Network - Option 2



6.3 OPTION 3 – ESTABLISH NEW MULTI-USE PATHWAY THROUGH THE RAVINE

This alternative would be to upgrade the grid network and construct a multi-use, emergency only route through the ravine to the north to connect to the grid network. The ravine is approximately 5 km inside the Village. This option however will require evaluation of the slopes and grades within the ravine to ensure a feasible access, that is able to accommodate emergency vehicles, can be constructed. An easement or right of way allowance would be needed as the land between the grid load and the Village is privately owned. The access can be for alternative modes however has sufficient structure to support emergency vehicles.

Figure 6-3: Multi-use Pathway Through the Ravine - Option 3



6.4 Findings of Options Evaluation

In evaluating the three options and determining the next steps, the balance between preserving the local nature of the existing developments and allowing growth within the area hinges on establishing proper transportation connections. Factors such as capital intensity and public approvals should continue to be at the centre of decision making regarding the preferred option. Other factors to consider are that high risk season is likely during the summer when most residents have boats and able to leave the area using their boats in emergency. Additionally, from future phases of the development to using Northshore resort while requiring future phases

Study and evaluate highway 2 and Daniel Drive Intersection

The following table summarizes the advantages and disadvantages as currently identified. It is noted that further assessments would be needed prior to the implementation of the selected option.

Option	Advantages	Disadvantages
Option 1	Daniel Drive is upgraded to Rural Collector cross section Full loop in and out of the developments in the study area	Significant capital investment from municipalities is required, large land acquisition to obtain the necessary ROW Highly unpopular among current residents of North Grove Will significantly damage the rural nature and countryside appeal of the area
Option 2	Faster access into Northshore (as per Google Maps) Avoids exposing North Grove residents to daily pass by vehicles destined to Northshore Avoids impact on existing ROW or nature of North Grove Potential for shared cost structure of upgrading parts of the grid network. Manageable capital investment needed to construct multi-use connection with emergency vehicle capabilities	Capital investments into evaluating, designing and implementing upgrades to the grid roads Cost sharing may require the RM to establish levies and fees system to raise the capital needed for upgrades Will require negotiations with the approved Northshore Development
Option 3	Provides a multi-use emergency access	Challenging topography might limit the feasibility or increase the cost of its implementation significantly. Additional studies needed to ensure feasibility of the concept

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7.0 CLOSING

The recommendations provided in this memo are meant as a starting point to ground decision-making on road dedication needs, as well as to be used as a foundation for further, more detailed study. Additional refinement and detailed analysis based on more refined land use and regional transportation network information, as it becomes available, should be completed in the future to ensure implemented improvements and measure address the network demands.

Mitigations to vehicle movement challenges at the intersection with Highway 11 near the study area should consider the ultimate development of the rural growth node both in the medium-term and the long-term. Beyond this constraint, the recommended network is expected to accommodate new vehicle trips generated by the proposed mix of land-uses, as outlined in this memo.

Sincerely,

URBAN SYSTEMS LTD.



Saeed Bashi, P.Eng.
Transportation Engineer

cc: Bryan Gray

/SB
Enclosure