



# Functional Study Amendment

**Future Circle K Convenience Store,  
13007 - 100 St., Grand Prairie, Alberta**

Mac's Convenience Stores

December 21, 2022

→ **The Power of Commitment**



<b>Project name</b>		Future Circle K Convenience Store, 13007 - 100 St., Grand Prairie, Alberta					
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# 1. Introduction

In 2012, the City of Grand Prairie (the City) completed the 132 Avenue Functional Planning Study (2012 FPS Study) which identified improvements for the 132 Avenue corridor between 84 Avenue and 116 Street. In 2020, the City completed an additional study, 100 Street and 132 Avenue Operational Analysis, Optimization, and Preliminary Design (2020 Intersection Study), which provided traffic analysis planning and preliminary design for intersection improvements in the short-term and long-term. The recommended long-term road configuration will significantly change access to the surrounding land uses.

Mac's Convenience Stores Inc. (Mac's), operating as Circle K Convenience Stores (Circle K) has proposed a development at the south-east corner of 132 Avenue and 100 Street Service Road which includes a convenience store, gas station, and truck stop. There is currently a Ford dealership at this location. The current road configurations allow easy access to the site and are not a concern for Circle K, but in the future long-term road configuration, access to the Circle K site is limited. To improve future long-term access to the site, Circle K is proposing an amendment to the future long-term intersection and road configuration.

## 1.1 Purpose of this report

The purpose of this memorandum is to explain the amendment to the future long-term road configuration, assess the operational and safety implications of these changes, and to provide recommendations.

## 1.2 Supplementary Report Approach

The intent of this memorandum is to act as a supplementary report to the 2012 FPS Study and the 2020 Intersection Study. It is not a replacement of either document. This report will not re-visit other background information contained in the original reports, such as detailed traffic analysis, geotechnical, environmental, drainage, and utilities.

# 2. Site Access Modifications

## 2.1 Proposed Development

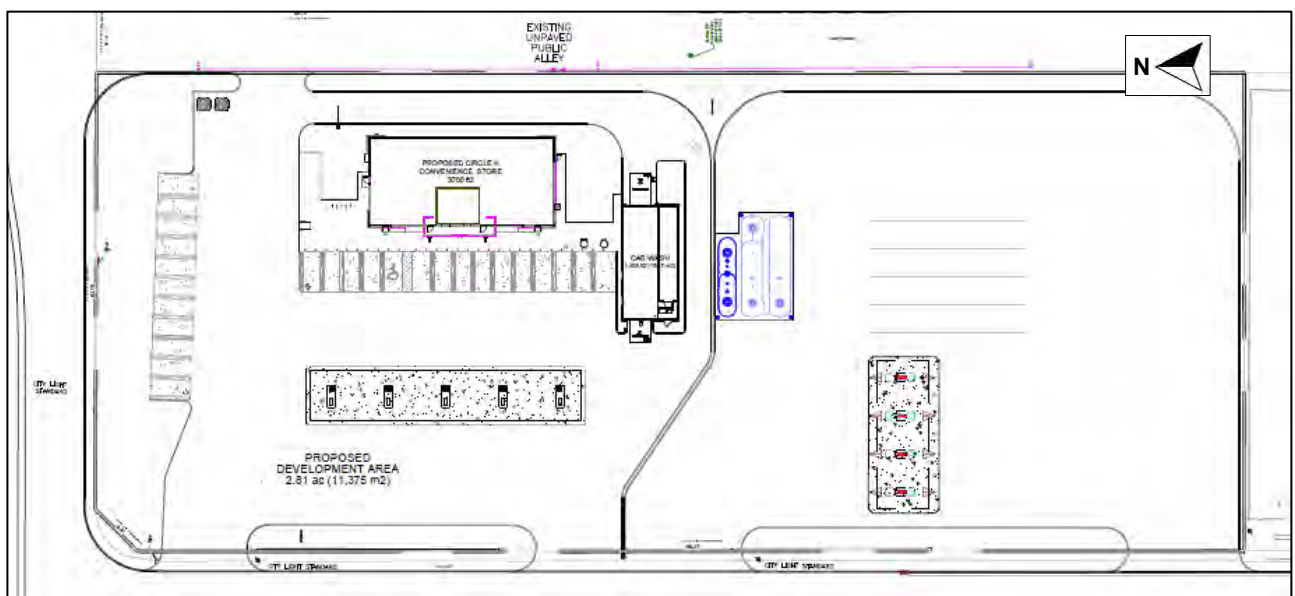


Figure 1 Proposed Circle K Site Plan



The proposed site plan is shown in **Figure 1**. The site is located on the southeast corner of 132 Avenue and 100 Street Service Road, which in the long-term plan will be the corner of 132 Avenue and 100 Street. The site includes a Circle K convenience store, a gas station with ten vehicle fuelling positions, and a truck stop with three fuelling positions. Trucks will access the site only from 100 Street Service Road. There are over 22 parking spots available on site.

## 2.2 Site Access Issue & Proposed Modifications

Mac's is concerned that the limited access options will cause a decrease in traffic to the site. To mitigate this issue, Circle K is proposing the following additional access movements (see **Figure 2**):

- 100 Street mid-block (south of 132 Avenue) right-out access
- 132 Avenue mid-block (west of 99 Street) right-in access

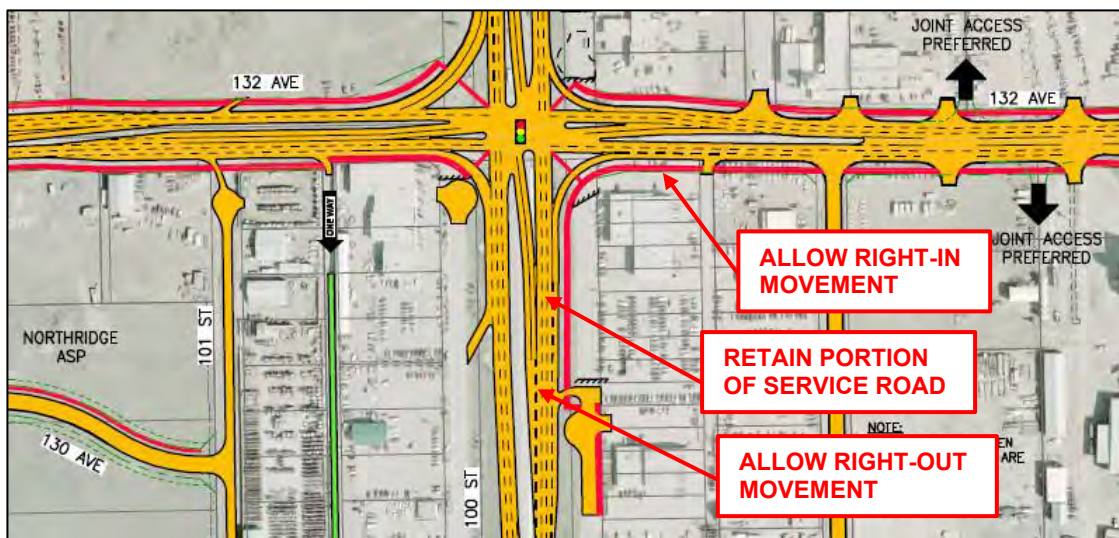


Figure 2 Long-Term Planned Road Configuration (from 2020 Intersection Study)

## 3. Analysis

### 3.1 Available Data

This additional study will utilize data from the 2012 FPS Study, the 2020 Intersection Study. As well, the Synchro Model from the 2020 Intersection Study has been provided by the City.

### 3.2 Traffic Considerations

A full Traffic Impact Assessment is not required for this development, since the impacts of elevated traffic volumes, and the mitigation measures for these impacts, has already been confirmed through the past studies. For the two new proposed access movements, a high-level queuing analysis will be used to assess impact on the City's long term planned road configuration. New Synchro modelling will not be used for this analysis since the queues on 100 Street have already been modelled in the 2020 Intersection Study, and the 132 Avenue right-in is a free movement which will not generate queues. The analysis resulted in the following findings:

- 100 Street mid-block (south of 132 Avenue) right-out access:
  - Right-out access is approximately 150 metres south of the northbound stop bar at the 132 Avenue and 100 Street intersection and leads onto a right turn storage lane for the 132 Avenue at 100 Street intersection

- According to the Synchro model from the 2020 Intersection Study:
  - The right turn storage lane has a 95<sup>th</sup> percentile queue of 0.0 metres for both the 90,000 and 120,000 population horizons
  - The adjacent through lanes on 100 Street have a 95<sup>th</sup> percentile queue of 140 metres for the 90,000 population horizon and 200 metres for the 120,000 population horizon
- The sidewalk will not cross the right-in/out access. Even if this is changed in future design revisions, pedestrian levels in the area are very low, and not expected to cause any significant queueing
- Queueing at this right-out access is therefore not expected, as there will be minimal vehicles in the right turn storage lane and no pedestrian crossings
- Vehicles using the right-out access who are destined northbound may experience a delay until the northbound through lane queue dissipates
- 132 Avenue mid-block (west of 99 Street) right-in access:
  - Free movement (no Synchro analysis required)
  - Pedestrian volumes in area are low, minimal crossings expected
  - Carwash drive-thru on site queues into the site, and not onto the laneway, and therefore will not cause any queues that could back up to 132 Avenue.
  - Queueing at this right-in access is therefore not expected, as it is a free movement and there are minimal pedestrian crossings

## 3.3 Safety Considerations

### 3.3.1 Sight Distance

Sight Distances have been assessed using the methodology outlined in TAC Chapter 9. A design speed of 70 km/hr (posted speed of 60 km/hr) was used for 100 Street and 60 km/hr (posted speed of 50km/hr) was used for 132 Avenue. A WB-21 design vehicle was used for the 100 Street midblock access and an MSU truck for the 132 Avenue lane access. The analysis resulted in the following findings:

- Stopping sight distance
  - Northbound 100 Street, approaching the mid-block access: 105 metres
  - Eastbound 132 Avenue, approaching the lane (east of site): 85 metres
- Intersection sight distances
  - Westbound-right movement from midblock access onto 100 Street: 235 metres
  - Northbound-right movement from lane onto 132 Avenue: 160 metres

### 3.3.2 Lane Weaving/Jumping

The 2012 FPS Study had noted lane weaving and lane jumping is a significant issue within this area. The addition of the right out movement at the 100 Street mid-block (south of 132 Avenue) access may encourage this behaviour as drivers could attempt to jump lanes to make a northbound left turn movement. To mitigate this issue, the northbound left turn median can be extended past the mid-block access point. At the 132 Avenue access lane weaving is less of a concern, as there is ample space for lane changes before the next left turn opportunity.

### 3.3.3 Corner Clearances

To check how close accesses can be to the intersection, corner clearances were checked using the relevant TAC guidelines (TAC Chapter 8 Figure 8.8.2 and Figure 8.9.2) as follows:

- 100 Street and 132 Avenue major intersection:
  - The recommended distance from a major intersection to an access on a divided northbound approach is:
    - Minimum: left turn storage length
    - Desirable: left turn storage length plus bay taper.
  - In the current long term planned design, the access is past the left turn storage length, but not past the bay taper
- 100 Street Service Road and mid-block access (south of 132 Avenue) minor intersection:
  - No driveways are present on the west side of the service road in this area
  - The driveways on the opposite side of the road should not impact traffic operations and are not a necessary design consideration for low volume local and collector roads (as per TAC 8.9.9)
- 132 Avenue and Lane (east of site) minor intersection:-
  - The recommended distance of the tangent section between a minor intersection curb radius and the driveway curb radius is a minimum of 5.0 metres
  - The current site plan design has a tangent section of 12 metres in the existing condition and 9 metres in the long-term configuration.

## 3.4 Other Considerations

Other considerations for this amendment include:

- Circle K is not intending to move forward with a land swap. 100 Street Service Road will remain a public road owned by the City. As advised by the City, the proposed bulb-out at the end of the 100 Street Service Road (approaching 132 Avenue) will be shifted north, to align with the middle driveway access to site. The service road will continue past the bulb-out and connect to the northmost driveway access to site. This configuration is similar to the configuration proposed in the 2012 FPS Study. The sidewalk along this portion can also be shifted to the east side of 100 Street Service Road to allow pedestrian access past the west side of the site.
- For the proposed 100 Street mid-block (south of 132 Avenue) right-out access movement, an RA-1 Stop Sign will be required.
- To ensure heavy vehicles do not enter the site from the northeast driveway entrance, an RB-62 Trucks Prohibited Sign is required at the right-in entrance

## 3.5 Site Circulation

To ensure queues are not forming within the site and spilling back onto public roads, a site circulation assessment was completed. Traffic entering and exiting site was estimated based on peak hour traffic volumes from the ITE Trip Generation Manual.

For the truck stop, queueing onto 100 Street Service Road, or onto 100 Street from the mid-block right-in access, was checked. It is estimated that during the busiest peak hour 24 trucks will be coming into the truck stop and 22 trucks will be leaving. This is approximately one truck every 2.5 minutes. Average fuelling times for these vehicles is five minutes. With one truck coming into site every 2.5 minutes, and a 5-minute fuelling time, on average only two vehicles will be on site at a time. With three diesel fuelling positions and additional space on site for truck parking/queueing, no queuing is expected.

For the gas station and convenience store, queueing onto 100 Street Service Road, or onto 132 Avenue from the lane east of site, was checked. It is estimated that during the busiest peak hour 105 vehicle trips in and 105 vehicle trips out will occur, with negligible truck trips. This equates to one vehicle coming into site every 35 seconds. This is a conservative estimate as Circle K has advised that their stores typically see 35 to 50 customers per hour maximum. Circle K has also advised that customers only stay for 3 to 5 minutes on average. With one vehicle entering site every 35 seconds and a 5-minute average stopped time, we can expect approximately 3 vehicles on site at a time during the peak hour. With over 22 available parking stalls, no queuing is expected.

## 3.6 Vehicle Accommodation

Vehicle clearances were checked using AutoTURN for the new right-in and right-out movement at each access. A WB-21 design vehicle was used for the 100 Street midblock right-out access and an MSU truck for the 132 Avenue lane right-in access. No issues were identified by the AutoTURN analysis. The results are shown in Appendix A.

## 3.7 Recommendations

Based on the analysis provided above, the proposed amendment to the future long-term road configuration (as shown in Figure 3) includes the following five recommendations:

- Amend the 2012 FPS to include and permit the following movements:
  - 100 Street mid-block (south of 132 Avenue) right-out (with stop sign control for right-out)
  - 132 Avenue mid-block (east of 100 Street) right-in.
- Provide adequate intersection sight distance for the 100 Street mid-block (south of 132 Avenue) right-out movement by ensuring vegetation or other visual blockades are not erected within the sight triangle.
- Extend the 100 Street northbound left turn median past the mid-block access point to prevent lane weaving from the 100 Street mid-block (south of 132 Avenue) right-out movement thereby restricting vehicles leaving Circle K to complete a northbound left-turn from 100 Street.
- Move bulb-out north and connect to the northernmost site driveway (similar to the configuration in the 2012 FPS). Shift the sidewalk along this portion to the east side of the service road.
- At 132 Avenue right-in, provide at least five metres of tangent section between the end of the curb radius and the northeast driveway access to site.
- Provide a WB-62 Trucks Prohibited Sign at the 132 Avenue mid-block right-in access and a RA-1 Stop Sign at the 100 Street mid-block right-out access.



**LEGEND**

- PROPOSED SIDEWALK
- LANING CONFIGURATION
- EXISTING LEGAL
- PROPOSED LEGAL
- SIGNALIZED INTERSECTION

1/4 Sec.2  
72 Rge. 6  
W.6 M.

ARBOUR  
HILLS  
ASP

NORTHGATE  
ASP

NORTHRIDGE  
ASP

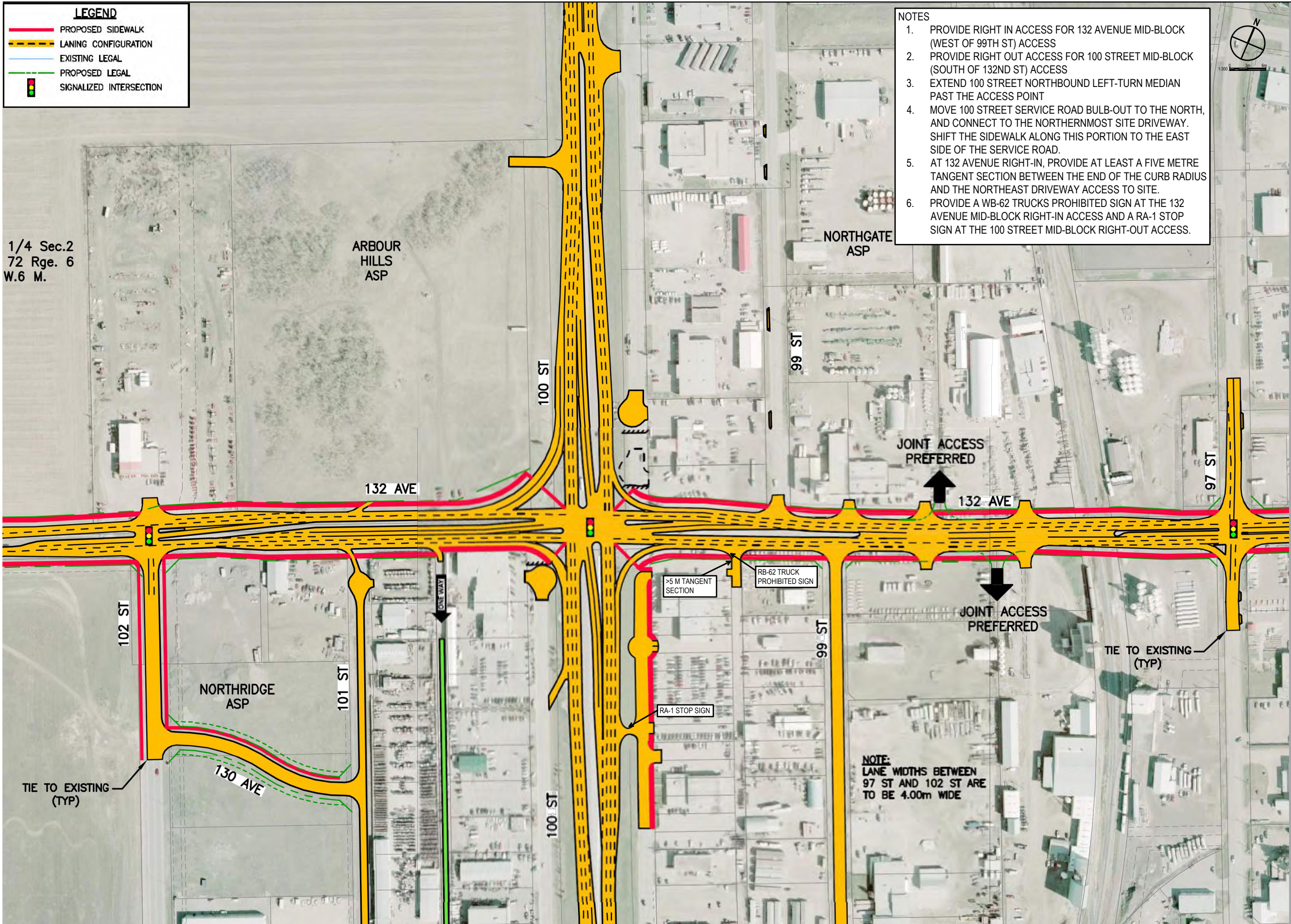
- NOTES**
1. PROVIDE RIGHT IN ACCESS FOR 132 AVENUE MID-BLOCK (WEST OF 99TH ST) ACCESS
  2. PROVIDE RIGHT OUT ACCESS FOR 100 STREET MID-BLOCK (SOUTH OF 132ND ST) ACCESS
  3. EXTEND 100 STREET NORTHBOUND LEFT-TURN MEDIAN PAST THE ACCESS POINT
  4. MOVE 100 STREET SERVICE ROAD BULB-OUT TO THE NORTH, AND CONNECT TO THE NORTHERNMOST SITE DRIVEWAY. SHIFT THE SIDEWALK ALONG THIS PORTION TO THE EAST SIDE OF THE SERVICE ROAD.
  5. AT 132 AVENUE RIGHT-IN, PROVIDE AT LEAST A FIVE METRE TANGENT SECTION BETWEEN THE END OF THE CURB RADIUS AND THE NORTHEAST DRIVEWAY ACCESS TO SITE.
  6. PROVIDE A WB-62 TRUCKS PROHIBITED SIGN AT THE 132 AVENUE MID-BLOCK RIGHT-IN ACCESS AND A RA-1 STOP SIGN AT THE 100 STREET MID-BLOCK RIGHT-OUT ACCESS.



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Bar is 25mm on original size sheet  
0 25mm



>5 M TANGENT SECTION

RB-62 TRUCK PROHIBITED SIGN

RA-1 STOP SIGN

JOINT ACCESS PREFERRED

JOINT ACCESS PREFERRED

TIE TO EXISTING (TYP)

TIE TO EXISTING (TYP)

**NOTE:**  
LANE WIDTHS BETWEEN 97 ST AND 102 ST ARE TO BE 4.00m WIDE

1	TECHNICAL MEMO	SB	SB	12/21/2022
No. Issue	Checked	Approved	Date	
Author	A.LETENDRE	Designer	A.LETENDRE	
Drafting Check	S.BALL	Design Check	S.BALL	
Project Manager	S.BALL	Project Director	N/A	

Client  
**CIRCLE K CONVENIENCE STORE**

Project  
**CIRCLE K, 100ST GRAND PRAIRIE**

Date  
12/21/2022

Scale  
N.T.S.

Project No.  
11229969

Title  
**FIGURE 3 LONG-TERM REVISED ROAD CONFIGURATION**

**CONCEPT ONLY**



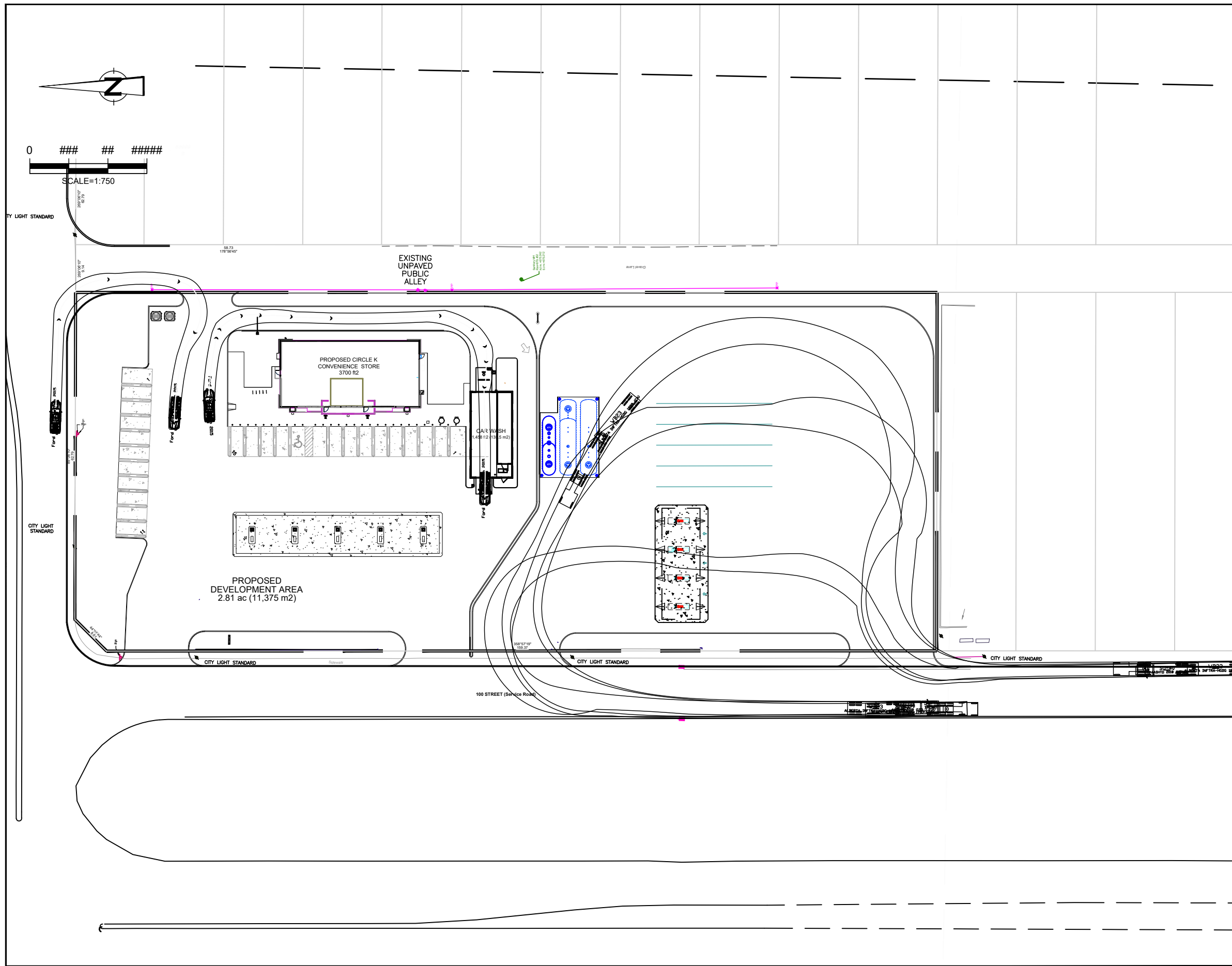
# **Appendix A**

## **Site Plan & Vehicle Tracking Drawings**



Mac's Convenience Store's Inc.  
 Suite 400, 229 - 33 Street NE  
 Calgary, Alberta T2A 4Y6  
 TEL: (403) 974-5400

NO	Revision	Date	Initial



SCALE VERIFICATION  
 THIS BAR MEASURES 25mm ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

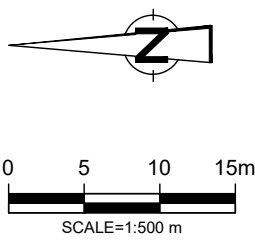
Circle K Convenience Store  
 13007 100 Street  
 Grande Prairie, Alberta  
 Mac's Convenience Stores Inc.

SITE LAYOUT & TRUCK PATH



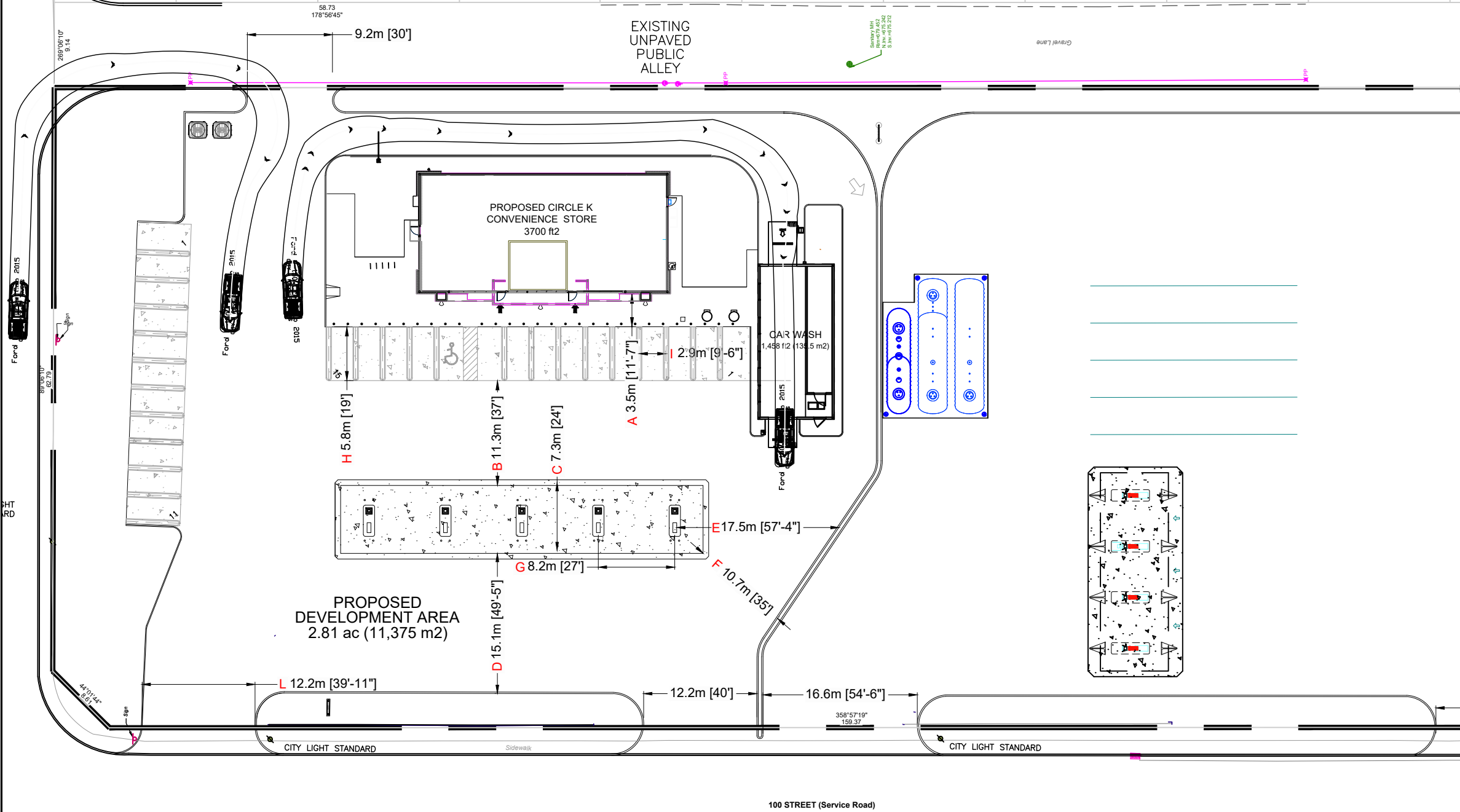
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SDB	SB	DEC 2022	
Scale:	Project NR:	Report NR:	Drawing NR:
1:750	11229969	PROP001	figure 1B



Mac's Convenience Store's Inc.  
Suite 400, 229 - 33 Street NE  
Calgary, Alberta T2A 4Y6  
TEL: (403) 974-5400

No	Revision	Date	Initial



SCALE VERIFICATION  
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DRAWING STATUS

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Status	Date	Initial

Circle K Convenience Store  
13007 100 Street  
Grande Prairie, Alberta  
Mac's Convenience Stores Inc.

SITE LAYOUT & TRUCK PATH



Source Reference:

Project Manager:	Reviewed By:	Date:
SDB	SB	DEC 2022

Scale:	Project NR:	Report NR:	Drawing NR:
1:500	11229969	PROP001	figure 2A





Mac's Convenience Store's Inc.  
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 Calgary, Alberta T2A 4Y6  
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Approved

DRAWING STATUS

Status	Date	Initial

Circle K Convenience Store  
 13007 100 Street  
 Grande Prairie, Alberta  
 Mac's Convenience Stores Inc.

SITE LOCATION



Source Reference:

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1:750	11229969	PROP001	figure 1B



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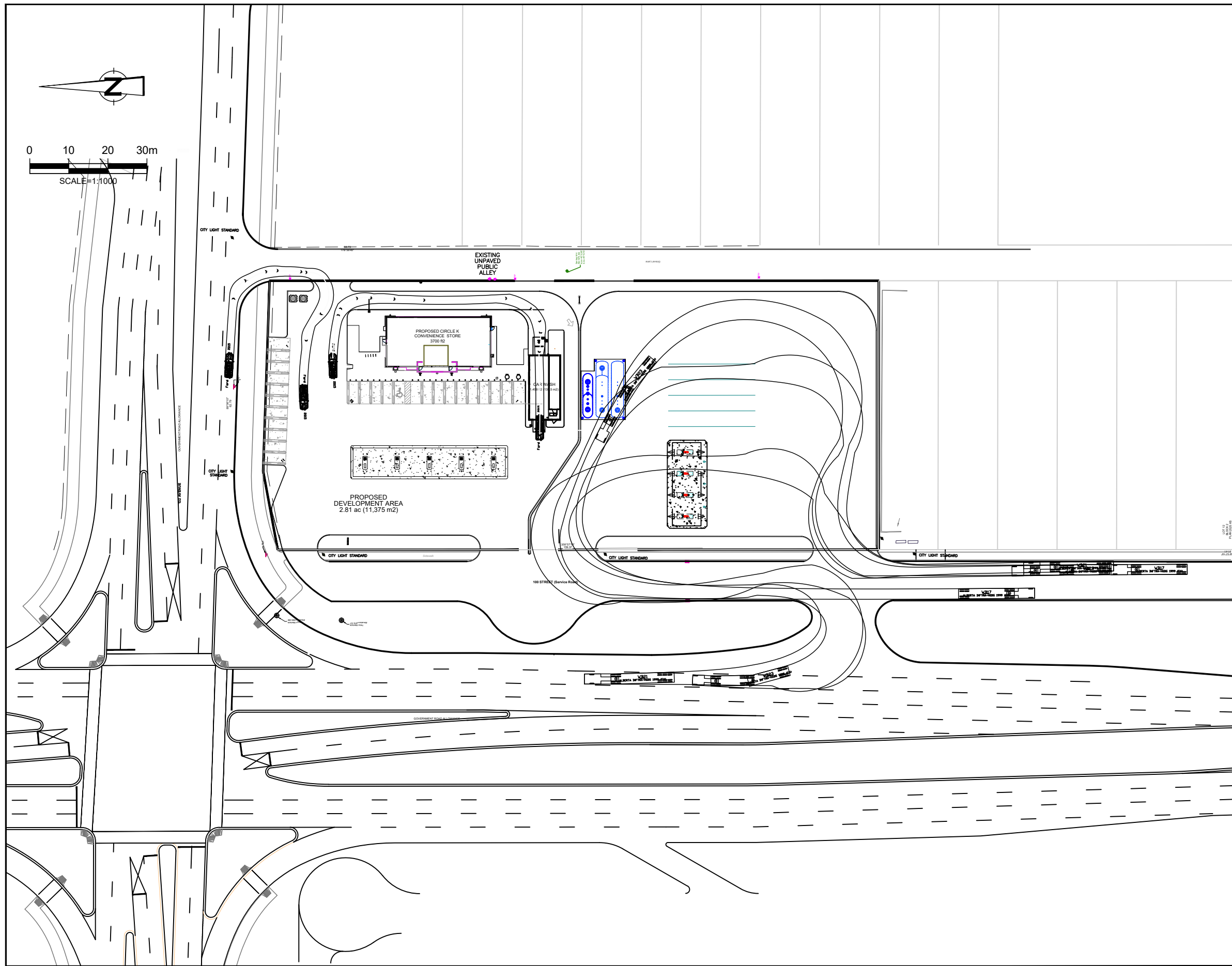
Status	Date	Initial

Circle K Convenience Store  
 13007 100 Street  
 Grande Prairie, Alberta  
 Mac's Convenience Stores Inc.  
 SITE LAYOUT & TRUCK PATH  
 FUTURE LIMITED SERVICE ROAD



Source Reference:

Project Manager:	Reviewed By:	Date:	
SDB	SB	DEC 2022	
Scale:	Project NR:	Report NR:	Drawing NR:
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SCALE VERIFICATION  
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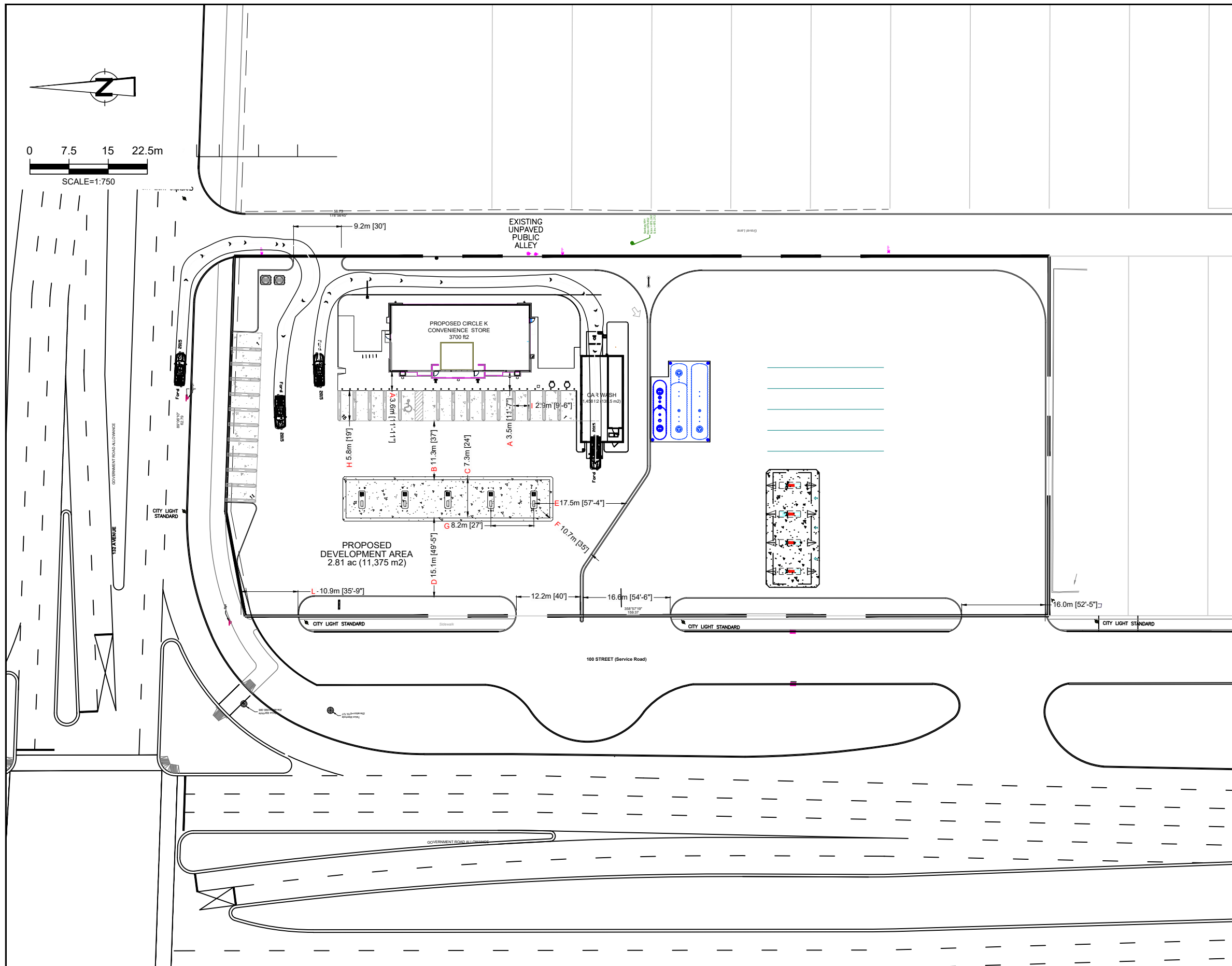
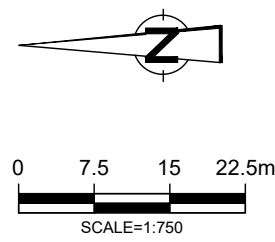
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Circle K Convenience Store  
 13007 100 Street  
 Grande Prairie, Alberta  
 Mac's Convenience Stores Inc.  
 SITE LAYOUT & NTI DIMENSIONS  
 FUTURE LIMITED SERVICE ROAD



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1:750	11229969	PROP001	figure 2A







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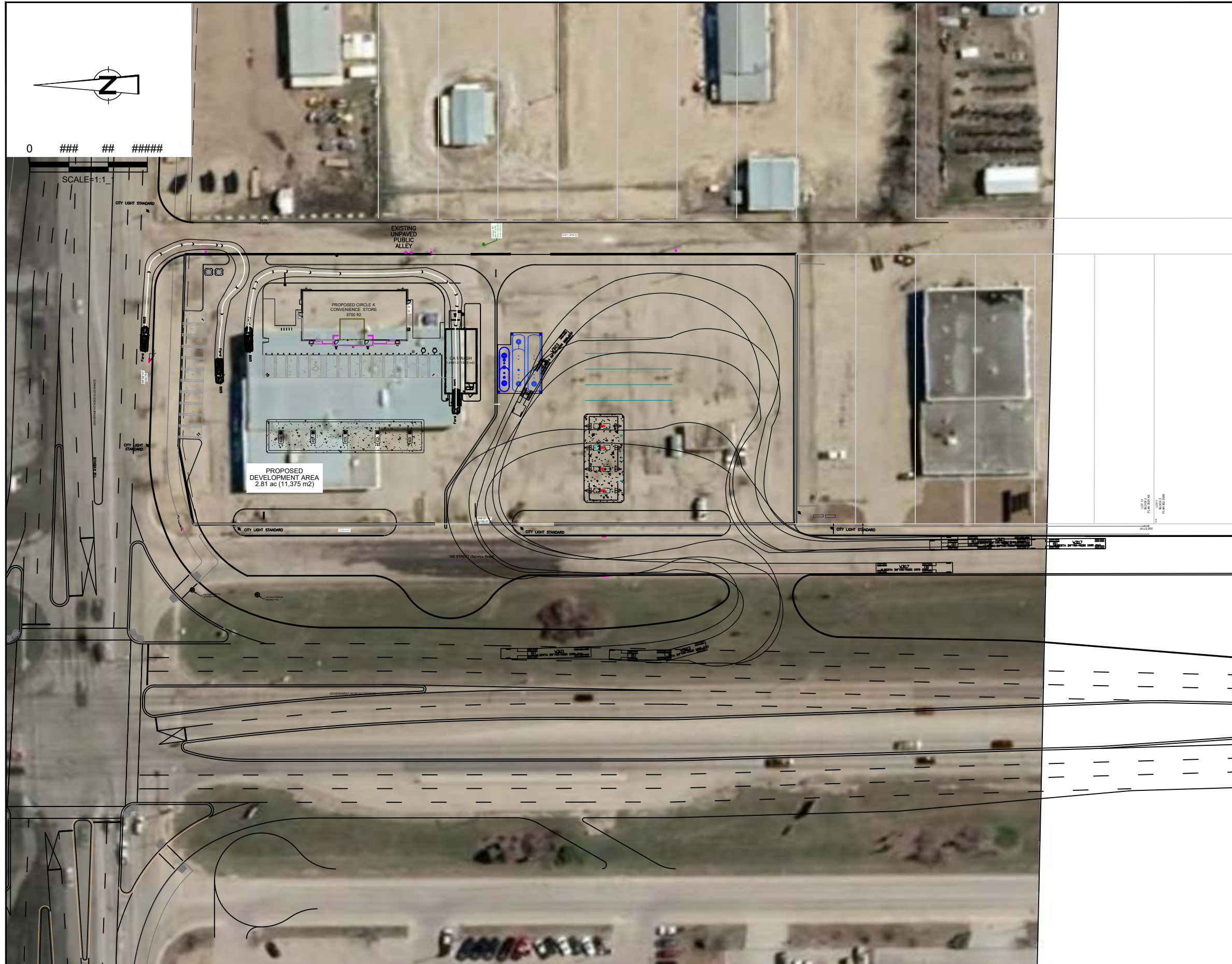
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Circle K Convenience Store  
 13007 100 Street  
 Grande Prairie, Alberta  
 Mac's Convenience Stores Inc.  
**SITE LAYOUT WITH AIR PHOTO  
 FUTURE LIMITED SERVICE ROAD**



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