Municipality of Crowsnest Pass

CHINOOK INTERMUNICIPAL
SUBDIVISION & DEVELOPMENT APPEAL BOARD

June 9, 2025

10:00 a.m.

Hearing No. DP2025-015

Appellant: Patrol Base Inc. c/o Richard Harrison, Wilson Laycraft

Applicant: Tanrock Homes Ltd.

LIST OF ADDITIONAL EXHIBITS

O. Request for Postponement – Richard Harrison, Wilson Laycraft (Appellant)

P. Response to Appeal of Development Permit DP2025-015 – Tanrock Homes Ltd. (Applicant)

Q. Development Authority's Position Statement June 4, 2025, with Attachments

R. Letter from J. & R. James

S. LRPT Position on Adjournment Requests submitted on behalf of Municipality of Crowsnest Pass

T. Geotechnical Evaluation Slope Stability Assessment The Village @ Southmore – June 5, 2025

WILSON LAYCRAFT

Barristers & Solicitors

Richard E. Harrison*
Direct Line: 403 441-2257
Email: rharrison@wilcraft.com

Paralegal: **Amy Mitchell**
Direct Line: 403 476-0150
Email: amitchell@wilcraft.com

May 28, 2025

Our File Number:

Subdivision and Development Appeal Board
Municipality of Crowsnest Pass
Box 600
Crowsnest Pass, AB T0K 0E0

Via Email

Dear Sir or Madam:

Re: The Village @ Southmore – Comprehensive Site Development
Lot 51, Block 1, Plan 0812254
DP2025 – 015

I act for Patrol Base Inc., Chris Kopp and Allyson Cruickshank. My clients filed an appeal of the above captioned development permit on May 14, 2025.

This letter is a request for a postponement and to schedule the merit appeal. My clients request a two day appeal hearing, scheduled for the following dates: July 17 – 18, 2025; July 23 – 24, 2025; August 26 – 27, 2025.

The reason for the postponement request is twofold in nature.

First, I am unavailable until the dates referenced above. The date currently proposed by the board is June 9, 2025. I am unavailable on that day as I will be out of the country.

Second, this appeal contemplates a complex legal argument. My clients currently have two judicial reviews proceeding against the proponent. The first judicial review relates to the municipality's decision to convey the property to the proponent. My clients registered a certificate of *lis pendens* on title to the property because if they are successful, the property will be transferred back to the municipality.

My clients intend to assert that the certificate of *lis pendens* serves as notice of an interest claimed in the property, the result of which is that the development authority cannot issue a permit without the consent of the party who is claiming the interest.

My preference would be to have staggered submissions to provide the Board with written argument prior to the hearing. My preference for staggered submissions contemplates submissions from my office first, followed by proponent submissions with an opportunity for reply by my office.

Given the foregoing, my clients submit that an adjournment is merited in the circumstances. Thank you for your consideration of the foregoing.

Sincerely,

WILSON LAYCRAFT

per:
Richard E. Harrison
Barrister & Solicitor

June 5, 2025

Subdivision and Development Appeal Board
Municipality of Crowsnest Pass
Box 600
Crowsnest Pass, Alberta T0K 0E0

RE: Response by the Applicant to Appeal of Development Permit DP2025-015 T
The Village @ Southmore
Lands: Lot 51, Block 1, Plan 0812254
Hearing Date: June 9, 2025 @ 10:00am

To Whom It May Concern,

We respectfully submit this response to the appeal of Development Permit DP2025-015 regarding The Village @ Southmore. As a local builder with deep roots in the Crowsnest Pass, we are approaching this process with humility and openness. We recognize that new development can raise questions, and we appreciate the opportunity to provide clarity on our intent and our commitment to doing things the right way.

1. Appellant's Request to Postpone Appeal Hearing

The Applicant is opposed to the Appellant's request to postpone the Appeal Hearing currently scheduled for June 9, 2025 at 10:00am (the "Hearing") and wishes to proceed with the Hearing as currently scheduled. Section 686(2) of the *Municipal Government Act*, RSA 2000, c M-26, an excerpt of which is attached as Exhibit "A" states:

"The board hearing an appeal referred to in subsection (1) must hold an appeal hearing within 30 days after receipt of a notice of appeal."

The Appellant knew, or ought to have known, of the timeline for conducting the appeal when they submitted their appeal and their counsel's limited availability should not dictate when the appeal takes place.

Granting the postponement to the Hearing will unduly prejudice the Applicant as the construction season in Crowsnest Pass is short delaying the Hearing to one of the dates proposed by the Appellant will mean the Applicant, even if successful on Appeal, will have missed the window to complete the necessary work in order to meet the Time Specific

Conditions set out in the Notice of Decision issued by the Municipal Planning Commission as referenced on page D-2 of the Appellant's submissions.

For these reasons the Applicant wishes to proceed with the Hearing as scheduled.

2. Development Character and Zoning

The Village @ Southmore is a community-forward lodging project designed with intention, care, and alignment to the spirit of the area. The homes reflect a modern, mountain-inspired aesthetic and are positioned to preserve privacy, minimize visual disruption, and blend into the natural setting. The development sits within Southmore—the only area in the Crowsnest Pass zoned as CSV (Comprehensive Ski Village), a zoning designation created to allow for tourism-oriented uses such as Airbnbs, mountain homes, and short-term accommodation.

In recognition of this alignment, the Municipality rezoned the property to Urban Tourism Accommodation and Recreation (UTAR), and subsequently approved our Development Permit following a thorough review. Every element of our plan, including privacy, slope stability, fire safety, and site layout, has been created to meet or exceed the development standards outlined in the Land Use Bylaw and within the approved Comprehensive Site Development Plan.

3. Parking Considerations

The Appellant has raised parking considerations as grounds to appeal the Notice of Decision (the "Decision") issued by the Municipal Planning Commission (the "Commission"). It is the Applicant's position that the Commission has already considered and addressed parking for the proposed development in its Decision. Under clause 13 of the Decision located on page D3 of the Appellant's submissions, it states under Parking Requirements that the Applicant is required to have 12 on-site parking stalls to provide enough parking for all guests and that the guests will not be permitted to park on the roadways surrounding the site. The Applicant is confident that the proposed development contains more than enough parking spots its guests.

The Applicant is also concerned about vehicles parking on the surround streets restricting access to the area and the Applicant would support any action taken by the Municipality to restrict and/or ban street parking in the area. Attached as Exhibit "B" is a photograph from this previous winter of the streets adjacent to the Appellant and Applicant's properties of vehicles clogging the streets and restricting access to the area.

4. Lis Pendens

The Applicant is aware of the Certificate of Lis Pendens registered against the title to the Lands and the Applicant is confident that the Municipality followed all of the appropriate legislative requirements in selling the Lands to the Applicant and approving the rezoning of the Lands and the Municipality will be successful in the upcoming Judicial Review of these decisions.

The Applicant is not aware of any legislation, regulation or rule that prevents a Municipality from issuing a Development Permit on Lands that are subject to a Certificate of Lis Pendens so the Commission did not err in issuing the Notice with respect to the Lands.

5. Community Perspective

We recognize that any new development can raise concerns, and we genuinely respect that. At the same time, we've been encouraged by several residents who have shared their support and excitement for a project that reflects well-considered design and brings tourism activity to the ski hill area in a respectful way. These conversations have reinforced our belief that The Village @ Southmore can be a positive and natural extension of what Southmore was always intended to become.

6. Appellant's Status

On page C3 of the Appellant's submissions it states that one of the reasons for the appeal is "My clients' residence is adjacent to the site of the proposed development. They are an interested party." One could interpret this statement to mean that the Appellants reside adjacent to the site and are concerned on the effect that the proposed development will have on their neighbourhood however, unlike the Applicants, the Appellants primary residence is not within the Municipality and the Appellant's property adjacent to the proposed development site is being used as a short-term rental property. A copy of the AirBnB listing for the Appellant's property is affixed as Exhibit "C".

It is the Applicant's submission that the Appellant's appeal of the proposed development, along with the judicial review of the Municipality's sale and rezoning of the land, should not be viewed as a resident concerned about the development's impact on the neighbourhood, but rather that of a business operator looking to prevent competition from opening in the area.

In closing, we are not approaching this process with pride or defensiveness. We are simply two people who live and work in the Crowsnest Pass, building a company rooted in respect, care, and thoughtful collaboration. We believe this project fits both the character and zoning intent of the Southmore community and that the steps taken to date have honored the required processes and expectations of the Municipality.

We respectfully ask that the appeal be denied and that Development Permit DP2025-015 be upheld.

Sincerely,

Tanrock Homes Ltd.

Brock Fulkerth

Tanner Murphy

MEMORANDUM

To: Subdivision and Development Appeal Board (SDAB)

From: Katherine Mertz, Development Officer and
Johan van der Bank, Manager of Development & Trades
Municipality of Crowsnest Pass (MCNP)

Date: June 04, 2025

Re: SDAB File: DP2025-015 – hearing scheduled for June 9, 2025
Municipal File: DP2025-015
Roll File: 2210004

1.0 Location (see Map and photos attached):

1.1 The subject property, described as Lot 51, Block 1 Plan 0812254, is located in Blairmore on the edge of the Southmore subdivision. North of the property, the TC Energy High-Pressure pipleline divides the proposed development from an established residential neighbourhood. West of the property is currently forested mountainside consisting of Mountain Bike trails, for which an Area Structure Plan (ASP) is being proposed for residential type development in this area under Bylaw 1127, 2025. The ASP bylaw has received first reading with a Public Hearing scheduled for June 24, 2025. The Pass Powderkeg Ski Hill is situated east of the subject property and the Southmore subdivision.

1.2 The subject parcel is narrow, ranging in width from 10m – 20m with a significant slope. The property is accessed from Southmore Drive, a two-way road with a developed sidewalk. This road is identified in the draft Southmore Phase 2 Area Structure Plan as a minor collector road.

2.0 Land Sale:

2.1 The subject property was owned by the Municipality as a Municipal Reserve parcel, known as Lot 51MR, Block 1 Plan 0812254. On October 17, 2023, council approved the conditional sale of the parcel.

3.0 Redesignation of the Land Use District:

3.1 Bylaw 1168, 2023 was adopted on December 12, 2023 to close and remove the Municipal Reserve designation from the subject parcel, and the land was disposed of and is now owned by the applicant.

3.2 Bylaw 1197, 2024 was adopted on August 27, 2024 to redesignate the subject property from "Recreation & Open Space" to "Urban Tourism Accommodation and Recreation".

3.3 The Municipal Council adopted both of the above bylaws, and the Registrar of Land Titles removed the MR designation. These bylaws are presently the subject of a judicial review.

4.0 Proposed Development:

4.1 The development permit application dated February 6, 2025 was initially deemed incomplete on February 25, 2025. Upon submission of the outstanding materials the application was then deemed complete on March 14, 2025. An extension was granted by the applicant to April 30, 2024. The notice of decision was issued on April 24, 2025, with a 21-day appeal period.

4.2 The Notice of Decision approved the following:

- For the Comprehensive Site Development Plan (CSDP dated April 15, 2025) and;
- For "Tourism Accommodation, Small" (discretionary use) for the development if resort accommodation in Phase 1 of the CSDP consisting of:
  - Two single detached dwellings (units 8 & 9), and
  - One cabin in conjunction with an administrative office and laundry facility (unit 4).

5.0 Background:

5.1 An Historic Resources Permitting and Clearance (OPaC) is the responsibility of the applicant.

5.2 The Southmore Area Structure Plan (ASP), Bylaw 660, 2005 was adopted on December 6, 2005. The ASP proposed the Comprehensive Ski Village CSV land use district for the development as an amending Bylaw 659, 2005 to the Land Use Bylaw 632, 2004.

5.3 The Southmore subdivision was registered April 28, 2008 with the subject property designated as a Municipal Reserve parcel.

5.4 The development permit application was referred to **TC Energy pipeline**, due to the high-pressure line that runs north of the subject lands. The response from TC Energy was as follows:

- All new crossings or ground disturbances within 30m on either side of the pipeline requires written consent from TC Energy.
- Majority of the proposed development is within the 30m prescribed area. Written consent is required for any ground disturbances (excavation or digging) including landscaping.

5.5 As part of the approved Comprehensive Site Development Plan, the developer has finalized the servicing plan for municipal water and wastewater services in consultation with the municipality.

6.0 Response to Reasons for Appeal:

6.1 The reasons for appeal are summarized below, followed by the Development Authority's response to each reason for appeal:

(a) **Reason: The proposed development is out of character with the surrounding community.**

Development Authority's Response: The Development Authority's position is that the proposed development of "Tourism Accommodation, Small" in the Urban Tourism Accommodation and Recreation (UTAR) District is not out of character with the immediate neighbourhood or the surrounding community. While the neighbourhood to the north of the subject property is in the Residential R-1 district, it is separated from the subject property by a 40m wide buffer that consists of a Municipally owned parcel and the TC Energy pipeline ROW. The neighbourhood in which the subject property is located, the Southmore Subdivision, is in the Comprehensive Ski-Village CSV District. The CSV district is a unique land use district oriented towards the adjacent ski hill and other recreational opportunities in the area. The CSV district purpose statement is "To provide for the development of residential, recreational, and tourist-oriented land uses in a ski village". For this reason, the CSV district includes "Multi-unit Residential Building" as a permitted use (e.g. fourplexes, sixplexes, townhouses, and row houses). Another unique aspect of the CSV district is that it is a "Tourist Home district". A "Tourist Home" is an Airbnb or VBRO type use. In the typical Residential Districts, there is a 200m separation distance between "Tourist Homes" however, in the CSV land use district, there is no separation distance between Tourist Homes – for the reason that the CSV district is a "Tourist Home district". All properties within the Southmore Subdivision could be designated as a "Tourist Home." Presently within the 48 lots subdivision, 3 development permits have been issued for "Tourist Home", and 2 development permits were issued for "Short Term Rental / Bed & Breakfast". The Southmore neighbourhood is 70%built out - of the 48 lots in the subdivision, there are 20 vacant lots.

(b) **Reason: The proposed development will increase parking pressures for the surrounding community that were not appropriately mitigated.**

Development Authority's Response: The Development Authority's position is that:

- it established a reasonable parking standard for the proposed development to accommodate guests and visitors to the resort,
- standards are in place in the land use bylaw and the Notice of Decision (the development permit conditions) to ensure that parking for the proposed development does not increase on-street parking pressures for the surrounding community, and
- therefore, it was not necessary to "appropriately mitigate" the parking situation.

Pursuant to the UTAR land use district and Schedule 6, Off-street Parking and Loading Standards, Table 1 of the Land Use Bylaw, the parking standard for "Tourism Accommodation, Small" is established by the Development Authority on a case-by-case basis, depending on the type of resort accommodation that is proposed. As shown in the approved Comprehensive Site Development Plan, the proposed development accommodates 12 on-site parking stalls for the proposed 9 units, at a ratio of 1.33 parking stalls per unit to accommodate both the guests and visitors. Conditions 13 and 16 in the Notice of Decision, Section 8 in the UTAR district, and Table 1 in Schedule 6 prohibit any portion of the parking requirement for a Tourism Accommodation, Small" to spill over onto public streets. The Notice of Decision issued April 24, 2025, in condition #16, requires that all parking be accommodated on-site in accordance with the Overall Parking Plan in the approved Comprehensive Site Development Plan dated April 15, 2025. If parking for the "Tourism Accommodation, Small" occurs on-street, it will be subject to bylaw enforcement through a stop order and penalties and fines as per the Land Use Bylaw Administration Section 27. The Traffic Bylaw prohibits on-street parking for a period that exceeds 72 hours.

(c) **Reason: The Appellants maintain a certificate of lis pendens, the resolution of which is required before the Respondent may proceed with a development permit.**

Development Authority's Response: This statement by the appellant relates to one or both of two judicial reviews regarding Bylaw 1168, 2023 (closure of the MR parcel) and Bylaw 1197, 2024 (redesignation of the subject parcel). The statement by the appellant is unclear, because the Development Authority's position is that the development permit stands independent of the judicial reviews. The Development Authority is awaiting a legal opinion on this matter from its legal counsel, which will be presented at the appeal hearing.

7.0 Conclusion:

7.1 The Government of Alberta supports tourism growth opportunities such as the proposed development through the **South Saskatchewan Regional Plan**:

p. 19 - The Castle Region as an area of economic importance for tourism. The Castle area has been identified as an area with significant and attractive natural features that could provide unique and authentic tourism experiences. Development of commercial tourism and recreation around these tourism experiences can enhance visitation and drive visitor economy. The growth of tourism in the region can support economic diversification by making local economies less reliant on traditional resource-based industries and supporting growth in other sectors such as transportation, retailing, construction and agriculture. Tourism can also generate demand for more businesses to provide goods and

services, creating employment, attracting investment and contributing to government revenues.

p. 40 – **OUTCOME**: **The quality of life of residents is enhanced through increased opportunities for outdoor recreation and the preservation and promotion of the region's unique cultural and natural heritage** – Increasing outdoor recreational opportunities throughout the region by enhancing outdoor recreational and outdoor spaces will enhance quality of life and promote active, healthy living.
Strategic Direction - Providing recreation and nature-based tourism opportunities and preserving and promoting the region's unique cultural and natural heritage.

p. 50 – Tourism - **Objective**: the region is positioned as a world-class, year-round, tourism destination. **Strategies**: 1.19. Enhance Tourism Destination Areas within the South Saskatchewan Region (Kananaskis, Canadian Badlands and Southwest Alberta) by engaging with aboriginal communities, municipalities, industry and local stakeholders.

7.2 The Council of the Municipality of Crowsnest Pass supports tourism development through its 2021 **Municipal Development Plan** Bylaw No. 1059, 2020:

p. 30 – Council took a pro-active, strong policy position to support tourism as a future growth sector for the Crowsnest Pass by stating in the Growth Strategy on p. 30 of the MDP as follows: "Become a top tourism destination in the province and capitalize on the economic spin-offs from tourism driven development".

p. 70 – Policy 3.1.7 "Opportunity exists for new support industries to build a more robust economic ecosystem around campers. Future proposals for campgrounds and other private recreation facilities (ie. parks with rental cabins, golf course, ranches) may be supported provided that:

1. These uses are not located in urban growth nodes.
2. The intensity and scale of the development is appropriate for the site.
3. Uses are sensitive to the natural landscape on and adjacent to the site.
4. Potential impacts to the environmental and adjacent land uses can be mitigated appropriately, including the functionality of wildlife linkages, the protection of watercourses.
5. Uses are supported with appropriate servicing, access and (where applicable) non-motorized linkages to urban centres."

7.3 **Land Use Bylaw 1165, 2023** - Council's vision in the Municipal Development Plan for the Crowsnest Pass to become one of the top tourist destinations in the province, supported by the expectation of tourism growth, required that the MDP policy was implemented by an appropriate land use bylaw amendment that provides practical direction for development decision-making. On 28 May 2024 Council adopted a comprehensive land

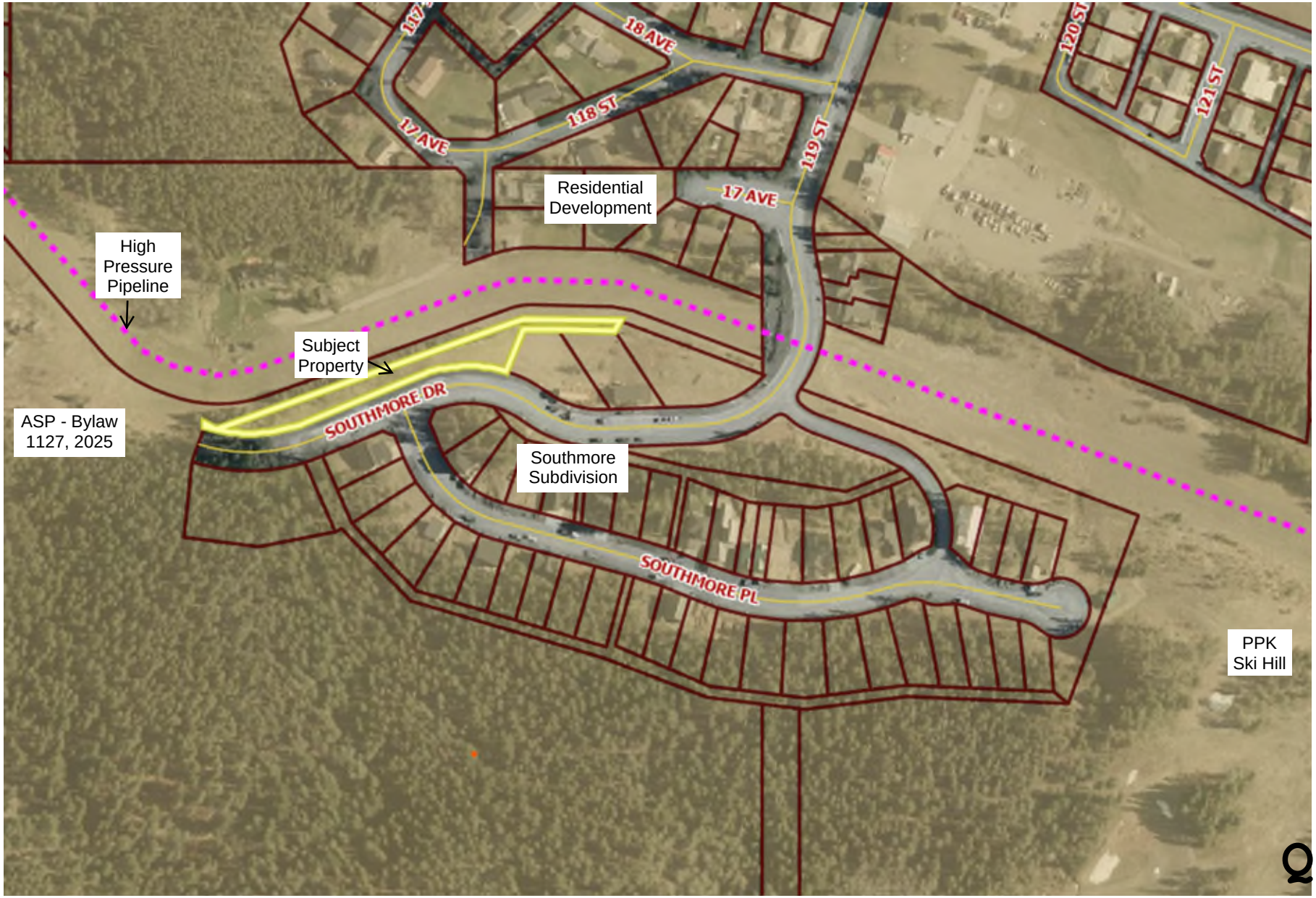
use bylaw amendment (Bylaw 1182, 2024) that introduced the Urban Tourism Accommodation and Recreation District and the Non-Urban Tourism Accommodation District, with associated standards for “Tourism Accommodation”, and revamping of all associated land use definitions, and the establishment of development standards.

7.4 Based on the arguments set forth above, the DA respectfully request that the SDAB dismiss this appeal and uphold the decision by the Development Authority.

Katherine Mertz B.SC
Development Officer

Johan van der Bank M.TRP, RPP
Manager Development & Trades

MAP 1 - DP2025-015

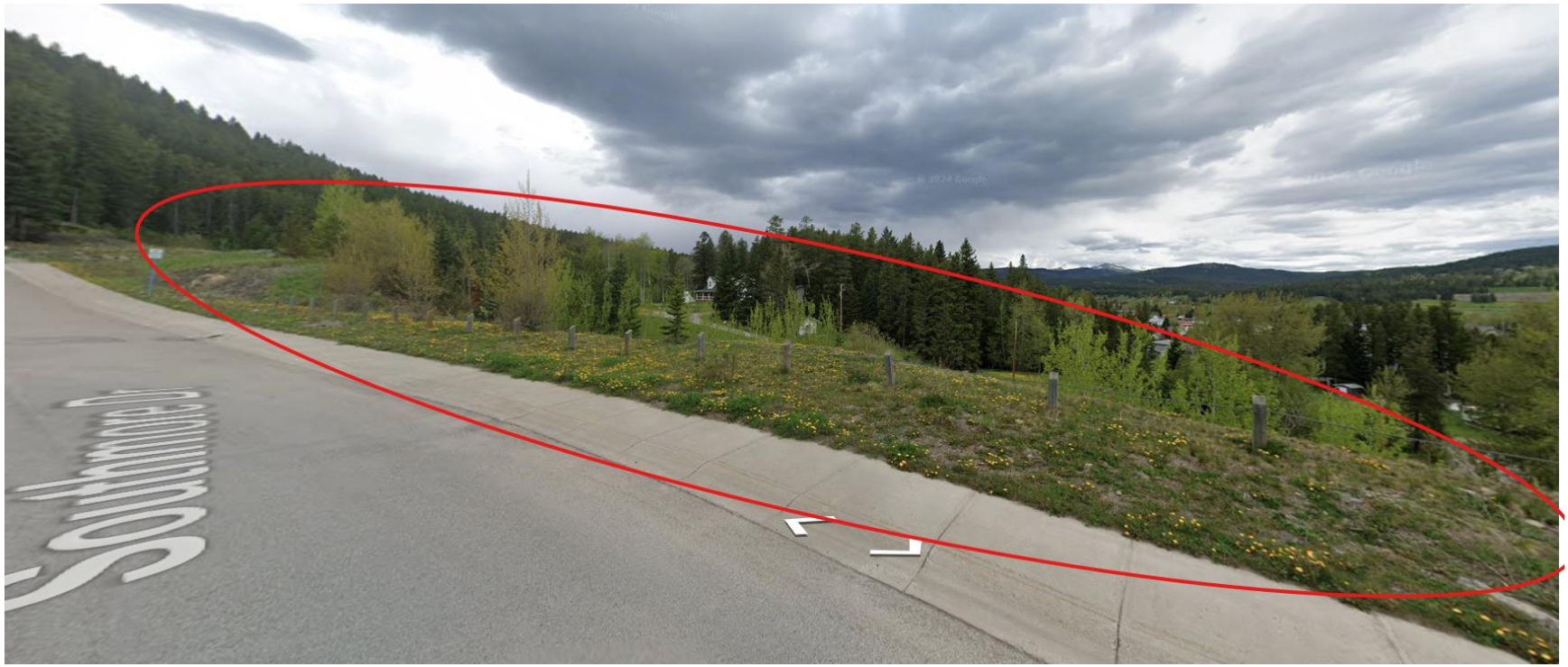


Q7

View of subject property from the East

Subject Property : Views from the Southeast

Subject Property: View from the South



Q10

Subject Property: View from the West

Q11

John and Robin James
205 Southmore Place
Crowsnest Pass, AB T0K 0E0
robinjames@shaw.ca
403-360-6685
June 5, 2025

Bonnie Brunner, Board Clerk
Oldman River Regional Services Commission
3105- 16 Avenue N, Lethbridge, AB T1H 5E8

Subject: **DP2025-015**

Dear Ms. Brunner,

I am writing to formally express our opposition to the proposed development application submitted by **Tanrock Homes Ltd.**, seeking to construct tourist accommodations in the form of tiny homes within our residential subdivision.

As a property owner in this community, we have significant concerns about the impact such a development would have on the character, safety, and livability of our neighbourhood.

Firstly, the proposed development does not account for the nature of tourism in our area. Visitors are often drawn here for outdoor recreation—particularly riding quads in the warmer months and snowmobiling in winter. These activities typically involve large vehicles towing trailers. However, the current proposal lacks designated space to accommodate such vehicles. This absence of infrastructure will inevitably result in overflow parking on residential streets, creating congestion, safety hazards, and visual disruption in a community not designed for this kind of commercial traffic.

Secondly, and most importantly, the parcel of land in question was **originally designated as a nature reserve**. Many of us purchased property in this subdivision based on the understanding that this designation would be preserved, maintaining a natural buffer and contributing to the environmental integrity and serenity of the area. A shift to tourist accommodations not only breaks that original expectation—it contradicts the spirit of responsible, community-focused planning.

The introduction of short-term rentals and transient visitors in a residential setting threatens to undermine the peaceful, cohesive atmosphere that defines our neighbourhood. Increased noise, traffic, and the temporary nature of occupancy are inconsistent with the long-term residential vision that guided the original subdivision plan.

For these reasons, I respectfully urge the Oldman River Regional Services Commission **to reverse the current approval with conditions made by the MD of Crowsnest Pass and reject the application by Tanrock Homes Ltd.** and if possible, preserve the original intent of this land as a nature reserve within a residential zone.

R1

Thank you for considering this appeal. I trust the Board will prioritize the long-term wellbeing of the community and environment in its decision.

Sincerely,

John & Robin James

R2

Bonnie Brunner

To: Johan Van Der Bank
Subject: RE: LPRT position on adjournment requests

From: Johan Van Der Bank <johan.vanderbank@crowsnestpass.com>
Sent: Thursday, June 5, 2025 8:00 AM
To: Bonnie Brunner <bonniebrunner@orrsc.com>
Subject: LPRT position on adjournment requests

Hello Bonnie
This email message is on behalf of the Municipality, not the Development Authority.
Patrick wanted me to let you know that the LPRT puts the following paragraph in their Notices of Hearing, as a standard practice:

Postponements

Postponements may have serious repercussions for other participants and are not granted automatically. If you need a postponement, email your request to the Case Manager with supporting reasons. All parties should be prepared to proceed on the date scheduled unless otherwise directed by the Case Manager or LPRT panel.

.../2

CROWSNEST PASS

Johan van der Bank M.TRP, RPP
MANAGER OF DEVELOPMENT AND TRADES

Municipality of Crowsnest Pass
P.O. Box 600 | Crowsnest Pass, Alberta | T0K 0E0
C (403) 563-6715 P (403) 562-8833 F (403) 563-5581
E johan.vanderbank@crowsnestpass.com

S1

ROSEKE ENGINEERING

GEOTECHNICAL EVALUATION

Slope Stability Assessment
The Village @ Southmore
Lot 51 Block 1 Plan 0812254
Blairmore, AB

Prepared For:
Tanrock Homes
P.O. Box 656
101 Southmore Drive
Blairmore, AB T0K 0E0

Prepared By:
Roseke Engineering Ltd.
3614 – 18 Avenue North
Lethbridge, AB T1H 5S7

T1

Table of Contents

Appendix E – LABORATORY TEST RESULTS

Appendix F – GENERAL CONSTRUCTION GUIDELINES

1 Introduction

This project consists of the slope stability assessment of the proposed future residential developments at Lot 51 Block 1 Plan 0812254 in Blairmore, AB. The lot consists of approximately 130 m of vacant land along the north of Southmore Drive.

This geotechnical investigation was undertaken to confirm the subsurface conditions at the site in order to assess the stability of the slope along the north / northeast of the lots and to provide geotechnical design parameters for the design and construction of the proposed residential developments. A site plan, including test pit locations, is included as Appendix B of this report.

2 Scope of Work

The scope of work for this geotechnical evaluation consisted of the excavating of five (5) test pits, a laboratory testing program to assist in soil classification and determination of engineering properties, a topographical site survey, software slope stability analysis, and this report which summarizes the recommendations for the proposed development.

3 Geotechnical Work

The fieldwork for the geotechnical investigation was performed on May 23rd, 2025, to assess subsurface conditions at the site. A total of five (5) test pits were advanced along the site to depths ranging from 1.8 m to 4.0 m. A rubber tracked excavator, contracted from Mohawk Excavating of Coleman, AB, was used for test pit operations. Roseke (REL)'s field representative was Mr. Christopher Allard, C.E.T.

Excavating and sampling were completed under the supervision of REL's field representative. Soil samples were collected at regular intervals. The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, laboratory testing, and future reference. Open test pits were checked for groundwater and general stability prior to backfilling.

A 25 mm diameter polyvinyl chloride (PVC) standpipe was installed in each test pit in order to determine the static groundwater elevation at the site.

Test pit logs summarizing soil and groundwater stratigraphy, conditions, and test results are located in Appendix A.

Physical laboratory testing, including moisture content and sieve analysis, was performed on the collected soil samples to confirm textural classification and to assess geotechnical parameters. Moisture content testing was completed on all retrieved soil samples. Results are presented on the test pit logs in Appendix A.

4 Site Conditions

At the time of the preparation of this report, the site was vacant with grasses and other vegetation. The majority of the proposed residence area appeared to be undisturbed greenspace; however, historic fill material was observed stockpiled on the west end of the site, north of the sidewalk. The proposed site is generally graded north sharply northward towards the valley below. A retaining wall was present along the north boundary for about half of the east slope until approximately 50 m west of the east lot boundary, where a ridge of bedrock was observed continuing

approximately 80 m until the west-most lot boundary. For the purposes of this geotechnical evaluation, these two distinct sections, the West Section and the East Section, will be considered separately due to differences in the observed soil composition and overall geometry of the slopes.

A topographical survey of the slope indicated overall slopes ranging from 24.6° to 38.3°, or approximately 2.2H:1V to 1.3H:1V. At the time of test pitting no tension cracks or other early indicators of ongoing slope failures were observed along the slope alignment. Additionally, no evidence of active or historic erosion was noted on the slope at the time of the preparation of this report.

5 Soil Stratigraphy

It should be noted that subsurface geological conditions are innately variable. At the time of preparation of this report, information on subsurface stratigraphy was available only at the discrete test pit locations. In order to develop recommendations from this information, it is necessary to make some assumptions concerning conditions other than at the test pit location. Adequate field reviews should be provided during construction to check that these assumptions are reasonable.

For the West Section, the general subsurface conditions consisted predominantly of a surficial layer of topsoil underlain by gravel and bedrock, in descending order. The subsurface conditions for the East Section consisted of a surficial layer of topsoil underlain by clay and gravel fill, and clay, in descending order. The following sections provide a summary of the soils encountered in the test pit logs. The subsurface conditions encountered are summarized in the attached test pit logs in Appendix A.

5.1 Topsoil

A surficial layer of topsoil was encountered in TP001 to TP003, and TP005 and ranged in thickness from approximately 100 mm to 150 mm, averaging 113 mm. The topsoil was described as damp, brown, and containing organic material.

5.2 Gravel

Gravel was encountered beneath the topsoil or at the surface in TP002 to TP005. The gravel was described as sandy and was compact to dense, moist, brown, and contained numerous cobbles and boulders. The moisture content of the clay and gravel fill ranged from 4.7% to 10.3%.

5.3 Clay and Gravel Fill

Clay and gravel fill was encountered beneath the topsoil in TP001 and was present to a depth of approximately 1.8 m. The clay and gravel fill was sandy, and was stiff, moist to very moist, low to non-plastic, and brown. The clay and gravel fill also contained cobbles and boulders. The moisture content of the gravel was 9.7%.

5.4 Clay

A layer of clay was encountered below the clay and gravel fill in TP001 and was present to the maximum depth of the test pit. The clay was described as sandy and gravelly with some silt. The clay was stiff, very moist, low plastic, and brown. The moisture content of the clay ranged from 10.9% to 12.9%.

5.5 Bedrock

TP002 to TP005 were terminated in bedrock once excavating became very difficult. The bedrock encountered was somewhat fractured, and possibly a limestone or shale.

6 Groundwater Conditions

At the time of test pitting, no sloughing or seepage was encountered. The depth to groundwater was measured 6 days after test pitting on May 29th, 2025. The following table summarizes the groundwater monitoring data.

Test Pit ID	Depth of Standpipe Below Ground Surface (m)	Depth to Groundwater from Ground Surface (m)
TP001	3.96	Dry
TP002	3.66	Dry
TP003	2.59	Dry
TP004	1.98	Dry
TP005	1.83	Dry

For the purposes of the site development and construction of the proposed developments, it is not anticipated that groundwater should be an issue. Groundwater should be monitored prior to construction. It should be noted that groundwater depths may fluctuate in response to climatic events.

7 Recommendations

The following recommendations are based on test pit information and are intended to assist designers. The recommendations are provided on the understanding and condition that REL will be retained to review the relevant aspects of the final design and to conduct such field reviews as are necessary to ensure compliance with geotechnical aspects of the Canadian Foundation Engineering Manual (5th Edition 2023) (CFEM), this report, and the final plans and specifications. REL accepts no liability for any use of this report in the event REL is not retained to provide these reviews.

Recommendations should not be construed as providing instructions to contractors, who should form their own opinions about site conditions. It is possible that subsurface conditions beyond the test pit locations may vary from those observed. If significant variations are found before or during construction, REL should be contacted so that we can reassess our findings, if necessary.

A stockpile of historic fill material was observed at ground level along the top of the slope on the west end of the alignment in the area of TP004 and TP005. The historic fill was comprised of gravel and was described as containing coal, cobbles and boulders, organics, and various deleterious materials (i.e. plastic lids, chunks of wood, debris, garbage). The historic fill material is not considered suitable for use as a part of the proposed development and should be over-excavated and disposed of off-site prior to lot development.

Shallow foundations are generally considered a suitable foundation system for the proposed development. It is anticipated that the shallow foundation footings would bear on the native clay, gravel, or bedrock. The following subsections provide recommendations for the design and construction of footing foundation systems.

All foundation recommendations presented in this report are based on the assumption that an adequate level of monitoring will be provided during construction and that all construction will be carried out by suitably qualified contractors, experienced in foundation and earthworks construction. An adequate level of monitoring is considered to be:

- For shallow foundations, inspection of bearing surfaces prior to placement of concrete or mudslabs.

All such monitoring should be carried out by suitably qualified persons, independent of the contractor. One of the purposes of providing an adequate level of monitoring is to check those recommendations, based on information collected at discrete test pit locations, are applicable to other areas of the site.

7.1 Construction Excavations

Excavations should be carried out in accordance with the Alberta Occupational Health and Safety (OH&S) Regulations. For this project, the depth for the majority of the excavations is assumed to be less than 3.0 m below existing ground surface. Excavations to deeper depths may require special considerations. The following recommendations notwithstanding, the responsibility of trench and all excavation cutslopes resides with the Contractor and should take into consideration site-specific conditions concerning soil stratigraphy and groundwater. All excavations should be reviewed by a geotechnical engineer prior to personnel working within the base of the excavation.

Temporary excavations within the sandy soils which are to be deeper than 1.5 m should have the sides shored and braced or the slopes should be cut back from the bottom of the excavation at an angle of not less than 45 degrees measured from the vertical as per OH&S Part 32's cutback requirements for, "soft, sandy or loose soil."

Flatter sideslopes may be required in some areas if groundwater is encountered. In these instances, the excavation configuration design should be reviewed by experienced personnel, prior to allowing personnel to enter the base of the excavation.

Any encountered groundwater seepage should be directed towards sumps for removal. Conventional construction sump pumps should be capable of groundwater control.

Temporary surcharge loads, such as spill piles, should not be allowed within a distance equal to the depth of the excavation from an unsupported excavation face or 3.0 m, whichever is greater, while mobile equipment should be kept back at least 3.0 m. All excavation sideslopes should be checked regularly for signs of sloughing, especially after rainfall periods. Small earth falls from the sideslopes are a potential source of danger to workmen and must be guarded against.

General recommendations regarding construction excavations are included in Appendix F.

7.2 Cement Type

Based on REL's experience with local soils, the properties of concrete for foundations in contact with soil and/or groundwater shall meet the requirements of CSA A23.1-14 Class S-2 exposure and have a minimum specified 56-day compressive strength of 32 MPa.

7.3 Lot Grading, Backfill Materials, and Compaction

Design grades should direct any surface water away from the building foundations. It is recommended that design grades are a minimum of 5% for the first 1.5 m from the sides of the dwelling. Surface water should be directed towards stormwater infrastructure and away from the slope to reduce the likelihood of potential erosion of the slope face. Roof leaders and downspouts and sumps should direct storm water to the concrete curb to the south and onto the adjacent street, or extensions may be used to discharge the water over the existing retaining wall or at the toe of the slope.

The steepening of the north slopes is not recommended. Should deep fills be required, a review of adjacent slopes and/or retaining structures may be required.

The existing site soils comprising clay and clay till are considered acceptable for use as general engineered fill. Backfill material should consist of clean, uniform, low to medium plastic clay or gravel, not containing deleterious matter, and compacted to 98% Standard Proctor Maximum Dry Density (SPMDD) within ±2% of Optimum Moisture Content (OMC).

7.4 Shallow Foundations

Footings and raft foundations can be designed to an allowable bearing capacity of 75 kPa as per section 9 of the National Building Code Alberta Edition (NBC (AE)), 2023. Footings for heated structures should have a minimum ground cover of 1.4 m (frost protection requirements) or equivalent insulation. Footing dimensions should be in accordance with the minimum Building Code requirements.

To adequately account for frost action for all raft foundations, it is recommended that rigid insulation, 100 mm in thickness, be placed vertically along the edge of the raft foundation and extended at least 1.5 m horizontally beyond the edge of the foundation. A levelling course of well-graded crushed gravel, at least 150 mm in compacted thickness, is recommended directly beneath rigid insulation, unless a thicker course is required for structural purposes.

Bearing inspections by a geotechnical engineer is recommended to ensure that the shallow foundations are placed on competent supporting soils. If softer soils are encountered at footing level, recommendations may be provided to widen the footings within softer soil areas. This should be a field determination at the time of bearing observation.

A permanent weeping tile system is recommended around the outside perimeter of the dwellings at the foundation elevation to maintain a consistent moisture profile of the foundation soils. Settlement of footings designed and constructed in accordance with the above recommendations should be within the normally tolerated 25 mm total and 15 mm differential at factored loading.

Further recommendations regarding shallow foundations are presented in Appendix F.

7.5 Below-Grade Walls

Below grade walls may be designed in accordance with section 9 of NCB (AE), 2023.

7.6 Floor Slabs on Grade

Floor slabs on grade may be designed in accordance with section 9 of NCB (AE), 2023.

7.7 Slope Stability

The stability of the site's slopes, at the time of the preparation of this report, was established based on field reconnaissance (test pitting and surveying), a desktop review of historical aerial photographs, and by software analysis using Slope/W by GeoStudio (Limit Equilibrium Modelling).

It is understood that the proposed residences are expected to have the first-floor elevation at or near the existing ground surface, and that the residences will have 2.7 m (9') deep basements with walk-out decks. Therefore, two versions of each cross-section (existing and developed conditions) were modelled to determine the stability of the slopes in their pre-development and post-development states. The "developed condition" cross-sections had the ground surface lowered to 2.7 m below the anticipated first-floor elevation, except for cross-sections 1 and 2 whose anticipated foundation systems are understood to be raft foundations.

7.7.1 Field Reconnaissance

During field reconnaissance operations, no tension cracks or other early indicators of active or historic slope failures were observed. A review of historical aerial photos also appeared to indicate no historical slope failures at the site. Historic aerial and select site photographs are included in Appendix D.

7.7.2 Limit Equilibrium Modelling

Analyses of six (6) cross-sections of the slope (Cross-Sections 1 through 6) were conducted using the Limit Equilibrium modelling software Slope/W by GeoStudio and took into account surcharge loads imparted by the proposed future residential foundations at the anticipated future footing elevations in order to determine the Factor of Safety (FOS) at each cross-section along the slope. The FOS is the ratio of the forces acting to hold the slope up (internal strength of soil, bedrock, retaining walls) to the forces acting to bring the slope down (i.e. gravity). While a minimum required FOS is not specified by the Municipality of Crowsnest Pass (CNP), comparable bylaw development plans, such as the City of Lethbridge's City Bylaw 5277 "River Valley Area Redevelopment Plan" (RVARP) specify a minimum FOS of 1.5 for a lot to be considered developable, which is generally accepted as a reasonable minimum FOS by the Canadian geotechnical community. The results of these analyses indicated post-development FOS ranging from 1.530 to 4.141, therefore, the slope adjacent to the west of the proposed residence is considered stable and suitable for development. Software analysis results can be found in Appendix C. The following material parameters were used in the software slope stability analyses:

Material Type	Unit Weight (kN/m^3)	Effective Cohesion (kPa)	Effective Friction Angle (°)
Gravel	22	0	35
Clay and Gravel Fill	18	10	25
Gravelly Clay	19	10	25

7.8 Additional Slope Stability Considerations

For residences (Unit 8 & 9) constructed along the East Section of the alignment, although the FOS of the slope exceeds the generally accepted minimum of 1.5, the critical slip surface for cross-sections 5 & 6 (shown on results included in Appendix C) intersect the anticipated footprint of the proposed residences. As such, this section of the slope, in it's anticipated post-development configuration, is not considered suitable to support residential structures from a geotechnical perspective. Additional measures (i.e. engineered retaining walls, slope terracing, etc.) will be required below the proposed residences to ensure the stability of the slope supporting the proposed development.

Additionally, the below-grade walls for the residences facing up the slope towards the south / southwest will need to be engineered retaining walls. Drainage should be provided for these and all other retaining walls such that surface water and/or groundwater is not allowed to accumulate behind the retaining walls.

7.9 Landscaping

It is REL's recommendation that zero or low-irrigation landscaping, such as hardscaping or native vegetation, be selected for the proposed development. This is because typical landscaping irrigation (watering lawns, garden beds, leaking irrigation lines, etc…) are associated with a rise in groundwater levels and increased pore pressure in the supporting soils, and potential destabilization of the sites slopes.

7.10 Seismic Design

The site classification recommended for seismic site response is Classification D, as per section 4 of NCB (AE), 2023.

7.11 Recommended Development Guidelines

For the future development of the site, the following precautionary guidelines should be considered for the long-term stability of the slope:

- No fill or stockpiling is to take place on the crest of the slope without approval from a qualified geotechnical engineer.
- No water is to be discharged directly onto the slope face.
- Care should be taken to maintain the vegetation both above and on the slope to minimize disturbance, as the vegetation plays a crucial role in providing stability and reducing water runoff down the slope face.
- No building materials, soil, equipment, grass clippings or any other materials should be permitted on the slope.
- All utilities and plumbing installed below grade should be carefully installed and inspected to ensure they are in good working order and to prevent leaks into the subgrade.

8 Conclusion

Based on the field reconnaissance, topographical survey results, slope stability analysis, subsurface soil and groundwater conditions encountered, and review of historic aerial photographs, it is REL's opinion that the site in question is generally considered developable with the additional considerations required for the residential structures along the East Section.

Site plans should be reviewed once final grades are development for the driveways and residences. Any retaining structures developed on the site should be reviewed or designed by a professional engineer dependent on height. Minimal disturbance of the slope north/northeast of the proposed residences is recommended.

9 Design and Construction Guidelines

General design and construction guidelines are provided in Appendix F, under the following supplemental heading:

- Floor Slabs-on-Grade
- Backfill Materials and Compaction
- Construction Excavations

These guidelines are intended to present standards of good practice. Although supplemental to the main text of this report, they should be interpreted as part of the report. Design recommendations presented herein are based on the premise that these guidelines will be followed. The design and construction guidelines are not intended to represent detailed specifications for the work although they may prove useful in the preparation of such specifications. In the event of any discrepancy between the main text of this report and Appendix F, the main text should govern.

10 Closure

We trust that this report meets your current requirements, and we are pleased to provide assistance in the completion of this project. Please do not hesitate to contact me if you have any comments, questions, or concerns.

Respectfully submitted by:

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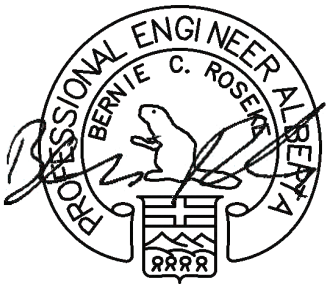

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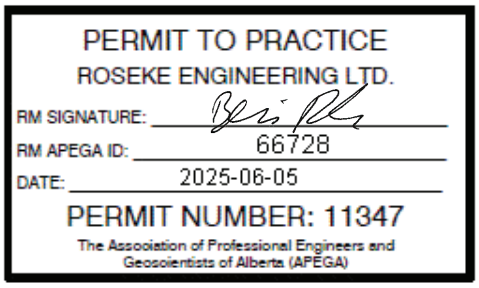


Appendix A – TEST PIT LOGS

TERMS USED ON BOREHOLE LOGS

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on 0.075mm sieve): Includes (1) clean gravels and sands, and (2) silty or clayey gravels and sands. Condition is rated according to relative density, as inferred from laboratory or in situ tests.

DESCRIPTIVE TERM	RELATIVE DENSITY	N (blows per 0.3m)
Very Loose	0 TO 20%	0 to 4
Loose	20 TO 40%	4 to 10
Compact	40 TO 75%	10 to 30
Dense	75 TO 90%	30 to 50
Very Dense	90 TO 100%	greater than 50

The number of blows, N, on a 51mm O.D. split spoon sampler of a 63.5kg weight falling 0.76m, required to drive the sampler a distance of 0.3m from 0.15m to 0.45m.

FINE GRAINED SOILS (major portion passing 0.075mm sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as estimated from laboratory or in situ tests.

DESCRIPTIVE TERM	UNCONFINED COMPRESSIVE STRENGTH (KPA)
Very Soft	Less than 25
Soft	25 to 50
Firm	50 to 100
Stiff	100 to 200
Very Stiff	200 to 400
Hard	Greater than 400

NOTE: Slickensided and fissured clays may have lower unconfined compressive strengths than shown above, because of planes of weakness or cracks in the soil.

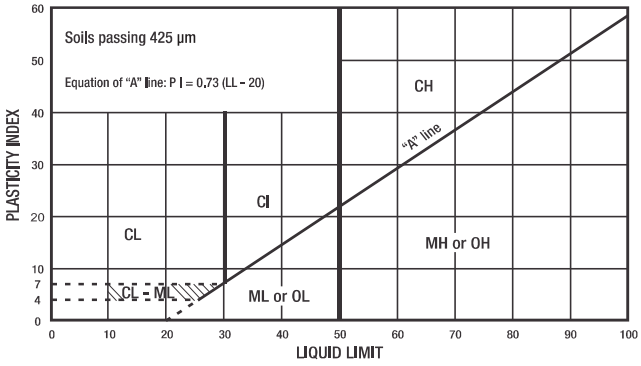
GENERAL DESCRIPTIVE TERMS

Slickensided - having inclined planes of weakness that are slick and glossy in appearance.
Fissured - containing shrinkage cracks, frequently filled with fine sand or silt; usually more or less vertical.
Laminated - composed of thin layers of varying colour and texture.
Interbedded - composed of alternate layers of different soil types.
Calcareous - containing appreciable quantities of calcium carbonate.;
Well graded - having wide range in grain sizes and substantial amounts of intermediate particle sizes.
Poorly graded - predominantly of one grain size, or having a range of sizes with some intermediate size missing.

MODIFIED UNIFIED SOIL CLASSIFICATION

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS More than 50% retained on 75 µm sieve*	GRAVELS 50% or more of coarse fraction retained on 4.75 mm sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines: Less than 5% Pass 75 µm sieve; More than 12% Pass 75 µm sieve; 5% to 12% Pass 75 µm sieve	GW, GP, SW, SP GM, GC, SM, SC Borderline Classification requiring use of dual symbols	$C_U = D_{60} / D_{10}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines			Not meeting both criteria for GW
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
	SANDS More than 50% of coarse fraction passes 4.75 mm sieve	CLEAN SANDS	SW	Well-graded sands and gravelly sands, little or no fines			$C_U = D_{60}/D_{10}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			SP	Poorly graded sands and gravelly sands, little or no fines			Not meeting both criteria for SW
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures		Atterberg limits plot below "A" line or plasticity index less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits plot above "A" line or plasticity index greater than 7	
FINE-GRAINED SOILS (by behavior) 50% or more passes 75 µm sieve*	SILTS Liquid limit <50		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands of slight plasticity	For classification of fine-grained soils and fine fraction of coarse-grained soils.		
	SILTS Liquid limit >50		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit <30		CL	Inorganic clays of low plasticity, gravelly clays, sandy clays, silty clays, lean clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit 30-50		CI	Inorganic clays of medium plasticity, silty clays			
	CLAYS Above "A" line on plasticity chart negligible organic content Liquid limit >50		CH	Inorganic clays of high plasticity, fat clays			
	ORGANIC SILTS AND CLAYS Liquid limit <50		OL	Organic silts and organic silty clays of low plasticity			
	ORGANIC SILTS AND CLAYS Liquid limit >50		OH	Organic clays of medium to high plasticity			
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils			

PLASTICITY CHART



*Based on the material passing the 75 mm sieve
Reference: ASTM Designation D2487, for identification procedure see D2488. USC as modified by PFRA

SOIL COMPONENTS

FRACTION	SIEVE SIZE PASSING	SIEVE SIZE RETAINED	DEFINING RANGES OF PERCENTAGE BY MASS OF MINOR COMPONENTS: PERCENTAGE	DESCRIPTOR
GRAVEL				
coarse	75 mm	19 mm	>35 %	"and"
fine	19 mm	4.75 mm	21 to 35 %	"y-adjective"
SAND				
coarse	4.75 mm	2.00 mm	10 to 20 %	"some"
medium	2.00 mm	425 µm		
fine	425 µm	75 µm	>0 to 10 %	"trace"
SILT (non plastic) or CLAY (plastic)	75 µm		as above but by behavior	

OVERSIZE MATERIAL

Rounded or subrounded	
COBBLES	75 mm to 300 mm
BOULDERS	> 300 mm
Not rounded	
ROCK FRAGMENTS	>75 mm
ROCKS	> 0.76 cubic metre in volume

T14

Project: The Village @ Southmore - Slope Stability		BOREHOLE NO: **TP001**
Client: Tanrock Homes		PROJECT NO: REL253029
	Mechanical Excavator	ELEVATION: 1320.24 m

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

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

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC M.C. LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (50 100 150 200) / ● POCKETPEN. (kPa) ● (100 200 300 400)	Volatile Organic Compounds (VOC)	SLOTTED PIEZOMETER	Elevation (m)
0		(100 mm) Topsoil								1320
		Gravel and Clay Fill - sandy, stiff, moist to very moist, brown, cobbles and boulders throughout								
1				B1						1319
		Clay - sandy gravelly, some silt, stiff, very moist, low to medium plastic, brown								
2				B2						1318
3										1317
				B3						
4		End of test pit at 3.96 m. Minor sloughing, no seepage. Standpipe installed to 3.96 m. Standpipe was found dry when monitored on May 29, 2025.								1316
5										1315
6										

LOGGED BY: CA	COMPLETION DEPTH: 3.96 m
REVIEWED BY: BR	COMPLETION DATE: 25-5-23

Project: The Village @ Southmore - Slope Stability		BOREHOLE NO: **TP002**
Client: Tanrock Homes		PROJECT NO: REL253029
	Mechanical Excavator	ELEVATION: 1322.75 m

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

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

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	Elevation (m)
0		(100 mm) Topsoil				
		Gravel - sandy, compact to dense, moist, brown, cobbles and boulders throughout				
1				B1		1322
2				B2		1321
3		- some clay to clayey		B3		1320
		Bedrock				1319
4		Practical refusal on bedrock at 3.66 m. No sloughing or seepage. Standpipe installed to 3.66 m. Standpipe was found dry when monitored on May 29, 2025.				1318
5						1317
6						

PLASTIC — M.C. — LIQUID (20 40 60 80)

▲ VANE SHEAR (kPa) ▲ (100 200 300 400)

■ N-VALUE ■ (20 40 60 80)

◆ UNCONF. SHEAR STR. (kPa) ◆ (50 100 150 200)

● POCKETPEN. (kPa) ● (100 200 300 400)

Volatile Organic Compounds (VOC)

SLOTTED PIEZOMETER

LOGGED BY: CA	COMPLETION DEPTH: 3.66 m
REVIEWED BY: BR	COMPLETION DATE: 25-5-23

AB TRANS BOREHOLE LOG SOUTHMORE SLOPE STABILITY.GPJ AB_TRANS.GDT 25-6-5

Project: The Village @ Southmore - Slope Stability		BOREHOLE NO: **TP003**
Client: Tanrock Homes		PROJECT NO: REL253029
	Mechanical Excavator	ELEVATION: 1323.04 m

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

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

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (50 100 150 200) / ● POCKETPEN. (kPa) ● (100 200 300 400)	Volatile Organic Compounds (VOC)	SLOTTED PIEZOMETER	Elevation (m)
0		(100 mm) Topsoil								1323
		Gravel - sandy, compact to dense, moist, brown, cobbles and boulders throughout								
1				B1						1322
		- clayey								
2										1321
				B2						
		Bedrock								
3		Practical refusal on bedrock at 2.59 m. No sloughing or seepage. Standpipe installed to 2.59 m. Standpipe was found dry when monitored on May 29, 2025.								1320
4										

LOGGED BY: CA	COMPLETION DEPTH: 2.59 m
REVIEWED BY: BR	COMPLETION DATE: 25-5-23

AB TRANS BOREHOLE LOG SOUTHMORE SLOPE STABILITY.GPJ AB_TRANS.GDT 25-6-5

Project: The Village @ Southmore - Slope Stability		BOREHOLE NO: **TP004**
Client: Tanrock Homes		PROJECT NO: REL253029
	Mechanical Excavator	ELEVATION: 1324.35 m

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

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

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400); ■ N-VALUE ■ (20 40 60 80); ◆ UNCONF. SHEAR STR. (kPa) ◆ (50 100 150 200); ● POCKETPEN. (kPa) ● (100 200 300 400)	Volatile Organic Compounds (VOC)	SLOTTED PIEZOMETER	Elevation (m)
0		Gravel - sandy, compact to dense, moist, brown, cobbles and boulders throughout								1324
1				B1						1323
				B2						
2		Bedrock Practical refusal on bedrock at 1.98 m. No sloughing or seepage. Standpipe installed to 1.98 m. Standpipe was found dry when monitored on May 29, 2025.								1322
3										1321
3.5										

LOGGED BY: CA	COMPLETION DEPTH: 1.98 m
REVIEWED BY: BR	COMPLETION DATE: 25-5-23

AB TRANS BOREHOLE LOG SOUTHMORE SLOPE STABILITY.GPJ AB_TRANS.GDT 25-6-5

Project: The Village @ Southmore - Slope Stability		BOREHOLE NO: **TP005**
Client: Tanrock Homes		PROJECT NO: REL253029
	Mechanical Excavator	ELEVATION: 1326.87 m

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

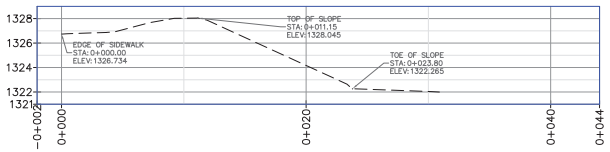
BACKFILL TYPE: BENTONITE | PEA GRAVEL | SLOUGH | GROUT | DRILL CUTTINGS | SAND

Depth (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	BLOWS /150 mm	PLASTIC — M.C. — LIQUID (20 40 60 80)	▲ VANE SHEAR (kPa) ▲ (100 200 300 400) / ■ N-VALUE ■ (20 40 60 80) / ◆ UNCONF. SHEAR STR. (kPa) ◆ (50 100 150 200) / ● POCKETPEN. (kPa) ● (100 200 300 400)	Volatile Organic Compounds (VOC)	SLOTTED PIEZOMETER	Elevation (m)
0		(150 mm) Topsoil								
		Gravel - sandy, compact to dense, moist, brown, cobbles and boulders throughout		B1		●				1326
1										
		Bedrock								1325
		Practical refusal on bedrock at 1.83 m. No sloughing or seepage. Standpipe installed to 1.83 m. Standpipe was found dry when monitored on May 29, 2025.								
2										
										1324
3										
3.5										

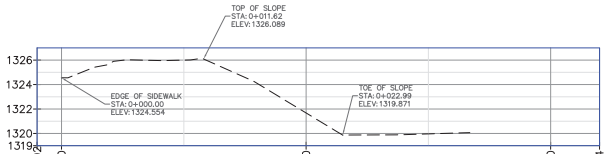
LOGGED BY: CA	COMPLETION DEPTH: 1.83 m
REVIEWED BY: BR	COMPLETION DATE: 25-5-23

AB TRANS BOREHOLE LOG SOUTHMORE SLOPE STABILITY.GPJ AB_TRANS.GDT 25-6-5

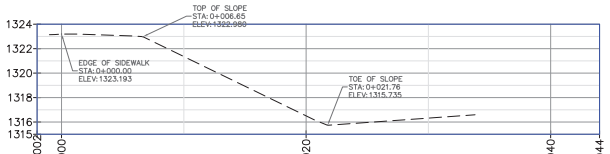
Appendix B – TEST PIT LOCATION PLAN / SITE LAYOUT



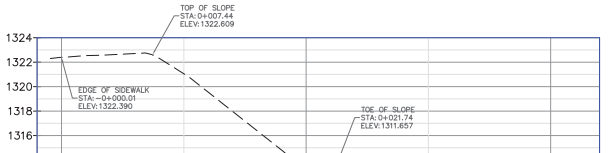
SLOPE SECTION #1



SLOPE SECTION #2



SLOPE SECTION #3



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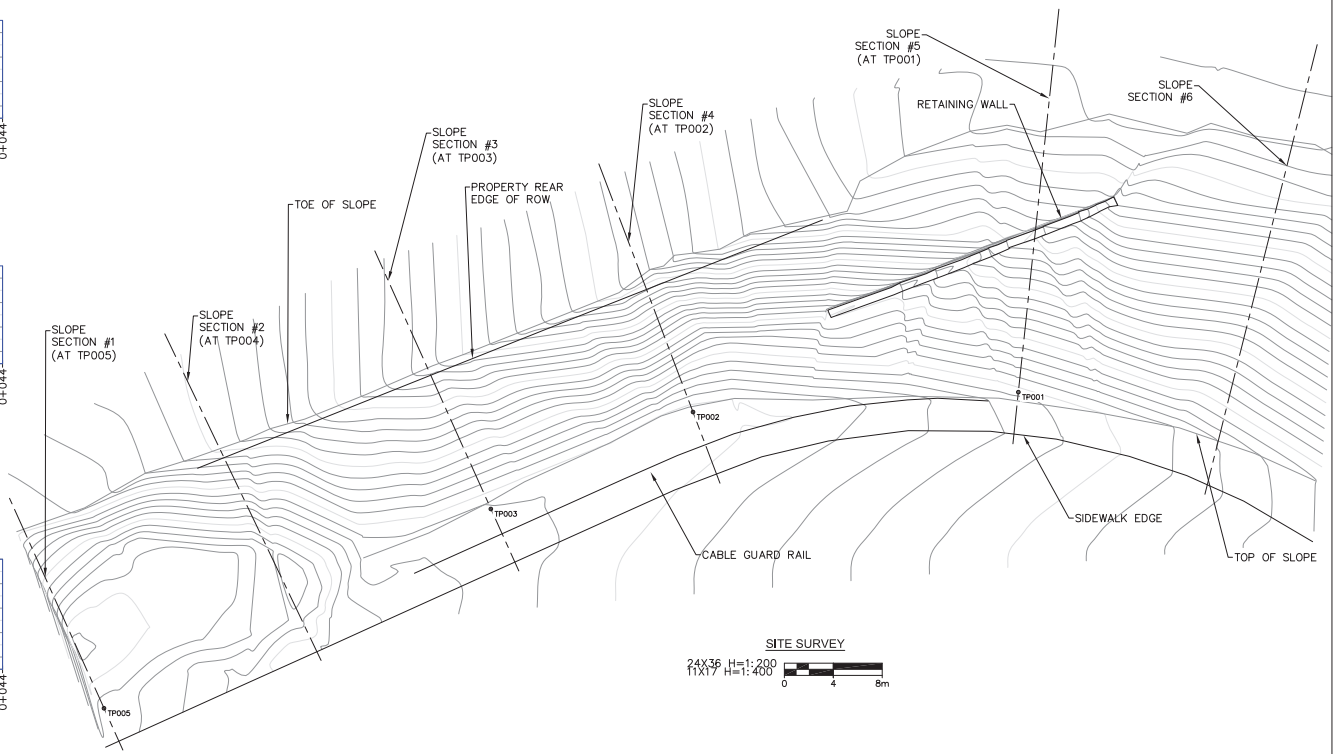
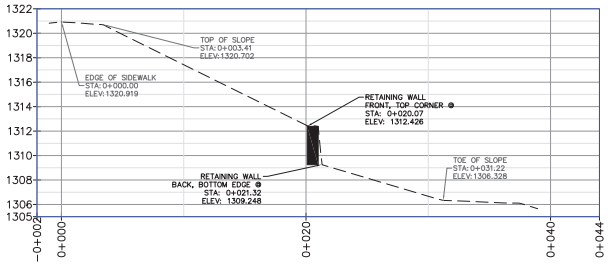


SITE SURVEY

24X36 H=1:200
11X17 H=1:400
0 4 8m



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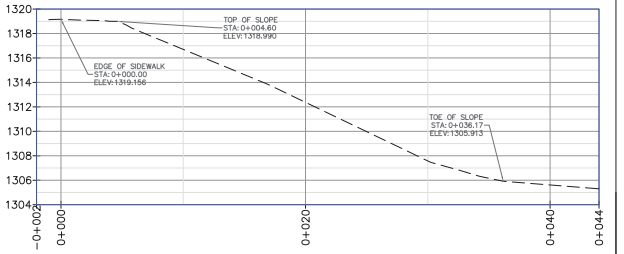


SLOPE SECTION #6

CONSULTANT		DESIGNER	CHECKER
JOB No.	REL253029		

REV	DATE	REVISION	BY
5	·	·	·
4	·	·	·
3	·	·	·
2	·	·	·
1	·	·	·

DATE	LOCATION	SITE
2025-06-02		·

TANROCK HOMES

THE VILLAGE AT SOUTHMORE
SLOPE STABILITY
SURVEY SHEET 1

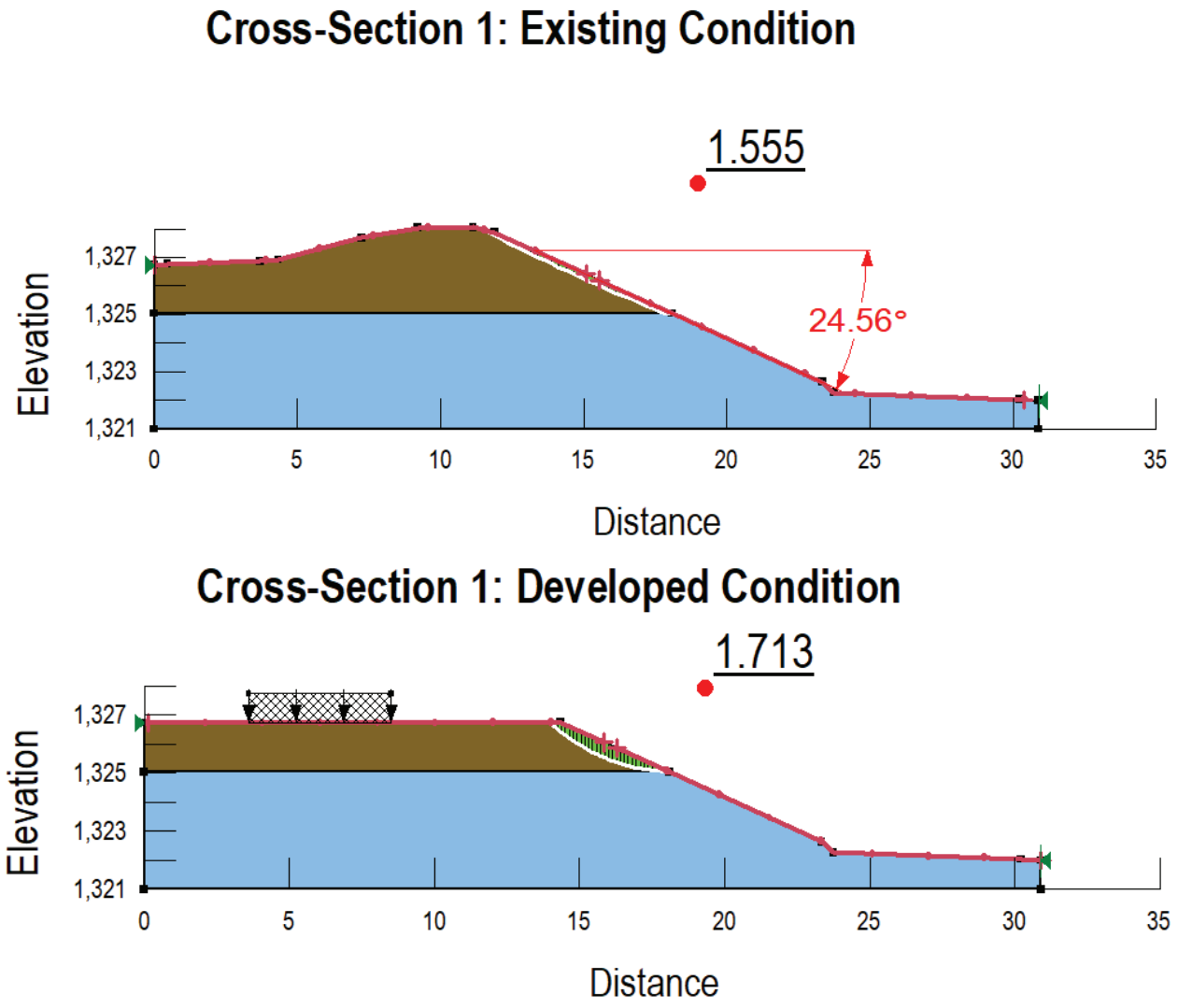
CONTRACT	HIGHWAY	SHEET NO.	DRAWING
	LOCAL	1	THE VILLAGE AT SOUTHMORE – SURVEY

DRAWING | HIGHWAY | CONTRACT | DESCRIPTION | PHOTO | DATE | BY | SURVEYED | DEPARTMENT BAR CODE

T21

Appendix C – SLOPE/W ANALYSES

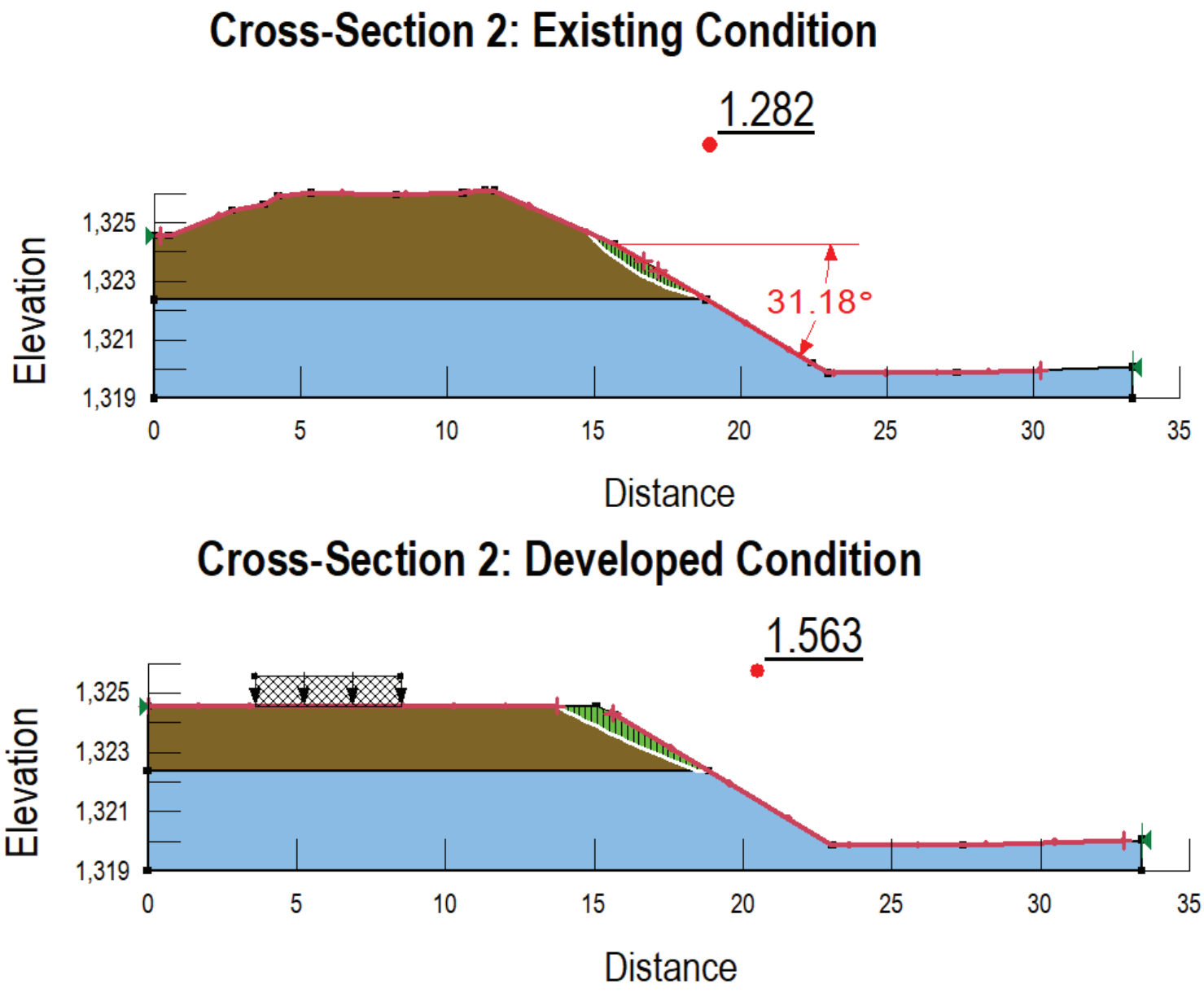
Figure 2 – SlopeW Results
Slope Stability Cross-Sections



F23

Drawings not to scale.

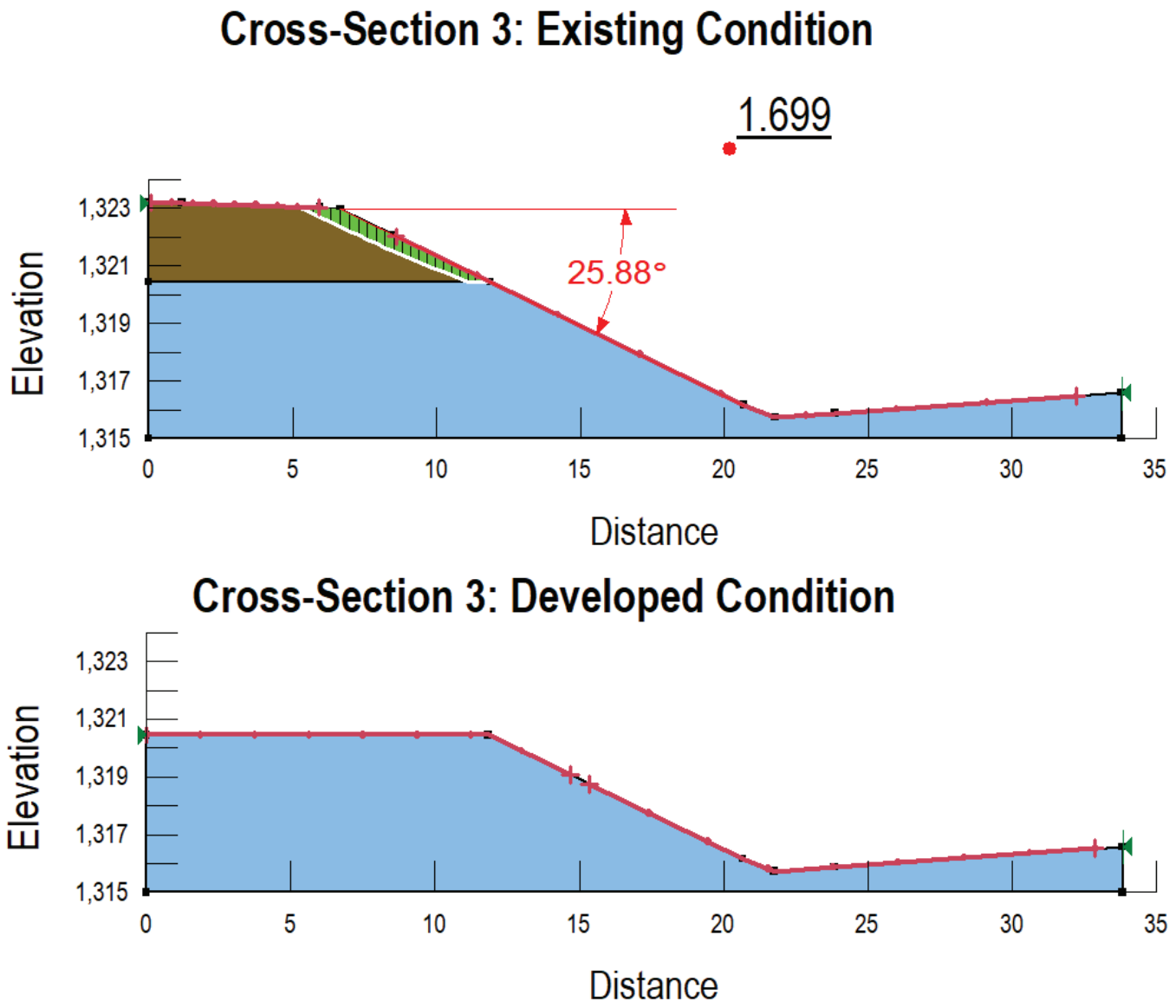
Figure 2 – SlopeW Results
Slope Stability Cross-Sections



T24

Drawings not to scale.

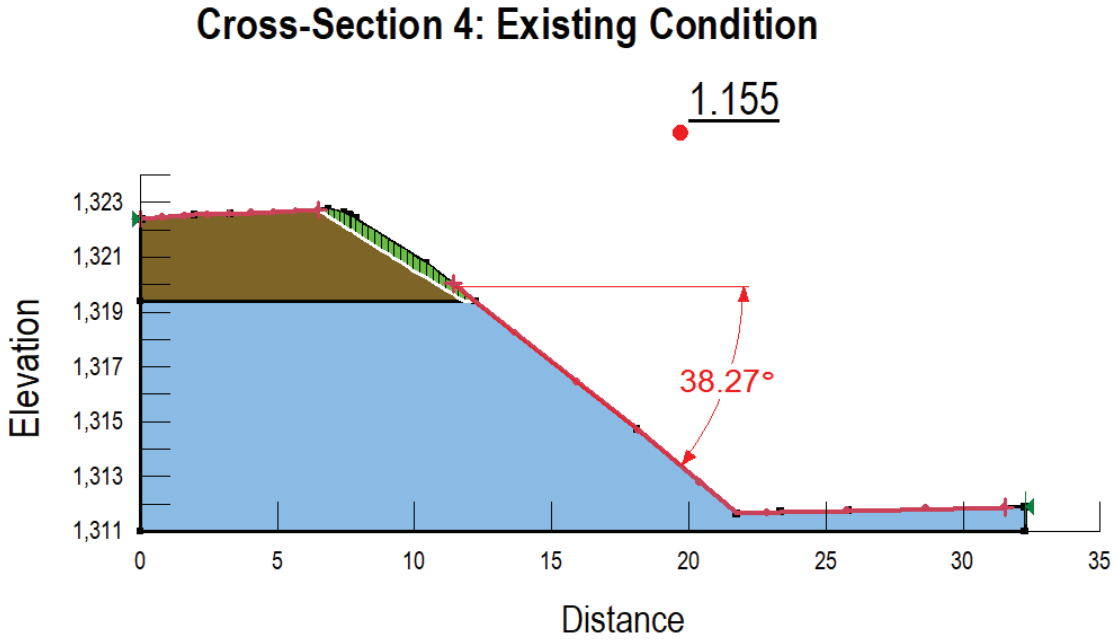
Figure 2 – SlopeW Results
Slope Stability Cross-Sections

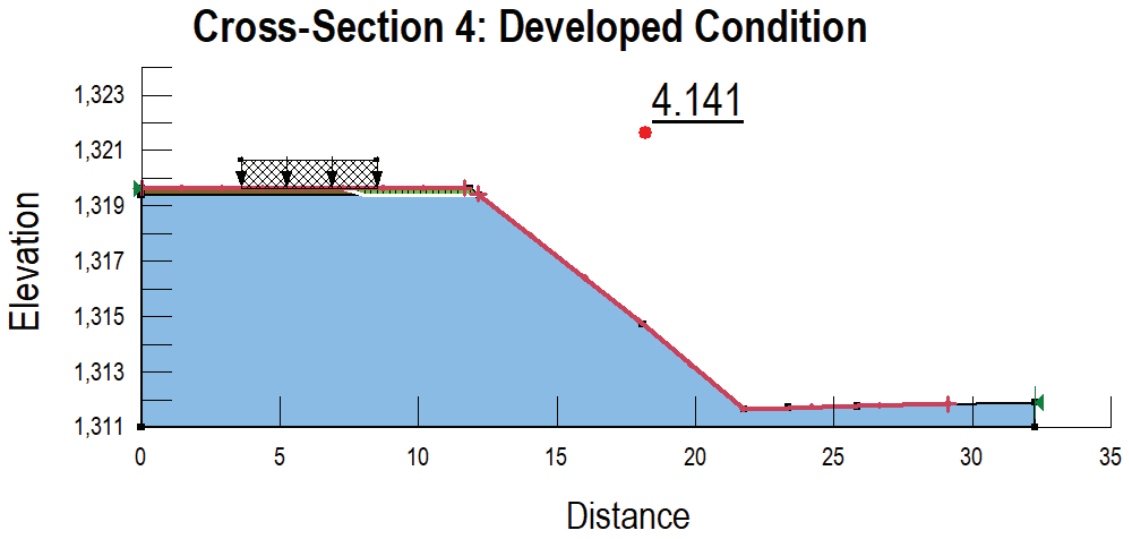


T25

Drawings not to scale.

Figure 2 – SlopeW Results
Slope Stability Cross-Sections

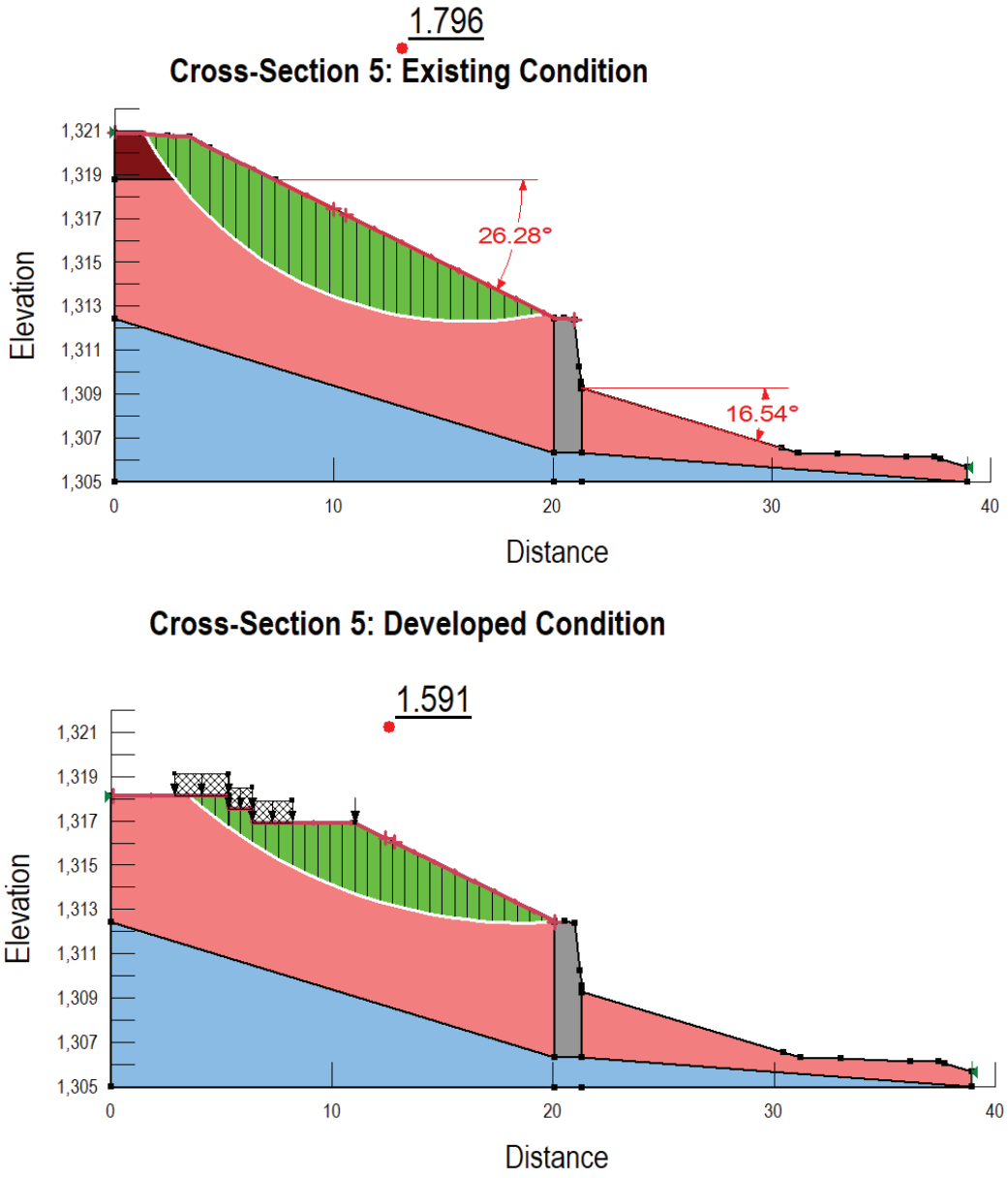




T26

Drawings not to scale.

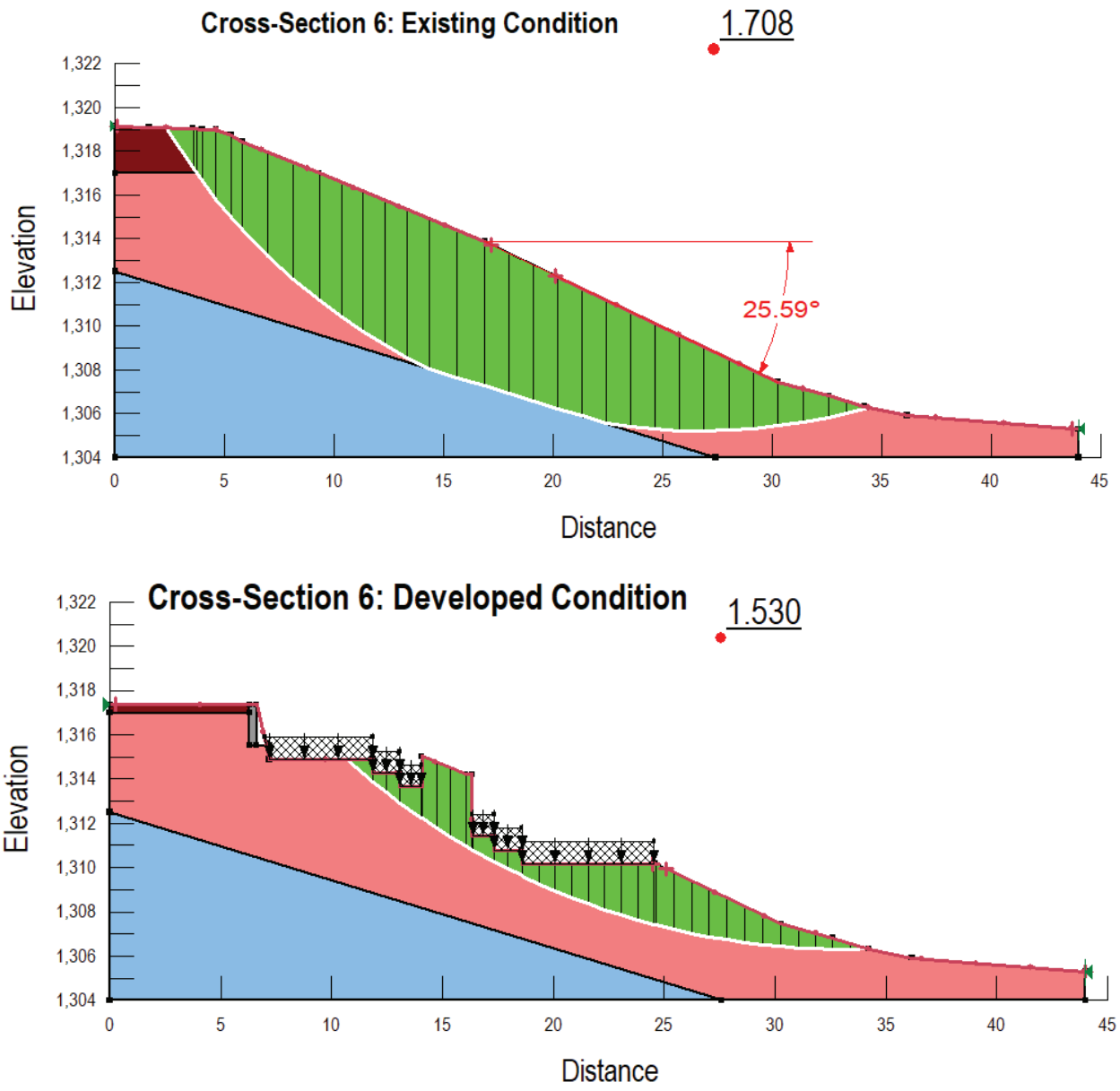
Figure 2 – SlopeW Results
Slope Stability Cross-Sections



T27

Drawings not to scale.

Figure 2 – SlopeW Results
Slope Stability Cross-Sections



T28

Drawings not to scale.

Appendix D – HISTORICAL AERIAL PHOTOS / SITE PHOTOS

Figure 3 – Historic Aerial and Select Site Photographs

2009 Aerial Site Photo

2012 Aerial Site Photo

Figure 3 – Historic Aerial and Select Site Photographs

2019 Aerial Site Photo

2020 Aerial Site Photo

Figure 3 – Historic Aerial and Select Site Photographs

2023 Aerial Site Photo

Looking East Over Crest of Slope – Near TP003

Figure 3 – Historic Aerial and Select Site Photographs

Looking Southeast at the East Section of Slope

Looking Southwest Along Toe of West Section of Slope

Appendix E – LABORATORY TEST RESULTS

MOISTURE CONTENT

JOB #	JOB DESCRIPTION	PROJECT
REL253029	The Village @ Southmore	Evaluation

Test Pit ID	Sample ID	Depth (m)	Wet + Tare (g)	Dry + Tare (g)	Moisture %
TP001	1TP1	0.9	397.7	363.2	9.7
	1TP2	1.8	302.2	268.6	12.9
	1TP3	3.7	349.0	316.2	10.6
TP002	2TP1	0.9	296.4	272.2	9.2
	2TP2	1.8	436.5	413.0	5.8
	2TP3	3.0	290.8	264.5	10.3
TP003	3TP1	0.9	311.3	289.7	7.7
	3TP2	2.4	314.1	297.6	5.7
TP004	4TP1	0.9	385.1	355.4	8.6
	4TP2	1.8	402.4	369.4	9.1
TP005	5TP1	0.9	323.7	309.6	4.7

Appendix F – GENERAL CONSTRUCTION GUIDELINES

Floor Slabs-on-Grade

All soft, loose or organic material should be removed from beneath slab areas. If any local 'hard spots' such as old basement walls are revealed beneath the slab area, these should be over-excavated and removed to not less than 0.9 m below underside of slab level. The exposed soil should be proof-rolled and the final grade restored by general engineered fill placement. If proof-rolling reveals any soft or loose spots, these should be excavated and the desired grade restored by general engineered fill placement. Proof-rolling should be carried out in accordance with the recommendations given elsewhere in this Appendix. The subgrade should be compacted to a depth of not less than 0.3m to a density of not less than 98 percent Standard Proctor Maximum Dry Density (ASTM Test Method D698).

A levelling course of 20mm crushed gravel at least 150 mm in compacted thickness, is recommended directly beneath all slabs-on-grade. Alternatively, a minimum thickness of 150mm of pit-run gravel overlain by a minimum thickness of 50 mm of 20mm crushed gravel may be used. Very coarse material (larger than 25 mm diameter) should be avoided directly beneath the slab-on-grade to limit potential stress concentrations within the slab. All levelling courses directly under floor slabs should be compacted to 100 percent of Standard Proctor maximum dry density.

General engineered fill, pit-run gravel and crushed gravel are defined under the heading 'Backfill Materials and Compaction' elsewhere in this Appendix.

The slab should be structurally independent from walls and columns supported on foundations. This is to reduce any structural distress that may occur as a result of differential soil movements. If it is intended to place any internal non-load bearing partition walls directly on a slab-on-grade, such walls should also be structurally independent from other elements of the building founded on a conventional foundation system so that some relative vertical movement of the walls can occur freely.

The excavated subgrade beneath slabs-on-grade should be protected at all times from rain, snow, freezing temperatures, excessive drying and the ingress of free water. This applies during and after the construction period.

A minimum slab concrete thickness of 100mm is recommended. Control joints should be provided in all slabs. Typically for a 125mm slab thickness; control joints should be placed on a 3 m square grid, should be sawn to a depth of one-quarter the slab thickness and have a width of approximately 3 mm.

Wire mesh reinforcement, 150 mm square grid, should be provided to reduce the possibility of uncontrolled slab cracking. The mesh should be adequately supported and should be located at mid-height of the slab with adequate cover.

Backfill Materials and Compaction

1.0 Definitions

“Landscape fill” is typically used in areas such as berms and grassed areas where settlement of the fill and noticeable surface subsidence can be tolerated. “Landscape fill” may comprise soils without regard to engineering quality.

“General engineered fill” is typically used in areas where a moderate potential for subgrade movement is tolerable, such as asphalt (i.e., flexible) pavement areas. “General engineered fill” should comprise clean, granular or clay soils.

"Select engineered fill" is typically used below slabs-on-grade or where high volumetric stability is desired, such as within the footprint of a building. "Select engineered fill" should comprise clean, well-graded granular soils or inorganic low to medium plastic clay soils.

"Structural engineered fill" is used for supporting structural loads in conjunction with shallow foundations. "Structural engineered fill" should comprise clean, well-graded granular soils.

"Lean-mix concrete" is typically used to protect a subgrade from weather effects including excessive drying or wetting. "Lean-mix concrete" can also be used to provide a stable working platform over weak subgrades. "Lean-mix concrete" should be low strength concrete having a minimum 28-day compressive strength of 3.5 MPa. Standard Proctor Density (SPD) as used herein means Standard Proctor Maximum Dry Density (ASTM Test Method D698). Optimum moisture content is defined in ASTM Test Method D698.

2.0 General Backfill and Compaction Recommendations

Exterior backfill adjacent to abutment walls, basement walls, grade beams, pile caps and above footings, and below highway, street, or parking lot pavement sections should comprise "general engineered fill" materials as defined above. Exterior backfill adjacent to footings, foundation walls, grade beams and pile caps and within 600 mm of final grade should comprise inorganic, cohesive "general engineered fill". Such backfill should provide a relatively impervious surficial zone to reduce seepage into the subsoil against the structure.

Backfill should not be placed against a foundation structure until the structure has sufficient strength to withstand the earth pressures resulting from placement and compaction. During compaction, careful observation of the foundation wall for deflection should be carried out continuously. Where deflections are apparent, the compactive effort should be reduced accordingly.

In order to reduce potential compaction induced stresses, only hand-held compaction equipment should be used in the compaction of fill within 1 m of retaining walls or basement walls. If compacted fill is to be placed on both sides of the wall, they should be filled together so that the level on either side is within 0.5 m of each other.

All lumps of materials should be broken down during placement. Backfill materials should not be placed in a frozen state, or placed on a frozen subgrade.

Where the maximum-sized particles in any backfill, material exceed 50 percent of the minimum dimension of the cross-section to be backfilled (e.g., lift thickness), such particles should be removed and placed at other more suitable locations on site or screened off prior to delivery to site.

Bonding should be provided between backfill lifts. For fine-grained materials, the previous lift should be scarified to the base of the desiccated layer, moisture-conditioned, and recompacted and bonded thoroughly to the succeeding lift. For granular materials, the surface of the previous lift should be scarified to about a 75 mm depth followed by proper moisture-conditioning and re-compaction.

3.0 COMPACTION AND MOISTURE CONDITIONING

"Landscape fill" material should be placed in compacted lifts not exceeding 300 mm and compacted to a density of not less than 90 percent of SPD unless a higher percentage is specified by the jurisdiction.

"General engineered fill" and "select engineered fill" materials should be placed in layers of 150 mm compacted thickness and should be compacted to not less than 98 percent of SPD. Note that the contract may specify higher compaction levels within 300 mm of the design elevation. Cohesive materials placed as "general engineered fill" or "select engineered fill" should be compacted at 0 to 2 percent above the optimum moisture content. Note that there are some silty soils which can become quite unstable when compacted above optimum moisture content.

Granular materials placed as "general engineered fill" or "select engineered fill" should be compacted at slightly below (0 to 2%) the optimum moisture content. "Structural engineered fill" material should be placed in compacted lifts not exceeding 150 mm in thickness and compacted to not less than 100 percent of SPD at slightly below (0 to 2%) the optimum moisture content.

4.0 "GENERAL ENGINEERED FILL"

Low to medium plastic clay is considered acceptable for use as "general engineered fill," assuming this material is inorganic and free of deleterious materials. Materials meeting the specifications for "select engineered fill" or "structural engineered fill" as described below would also be acceptable for use as "general engineered fill."

5.0 "SELECT ENGINEERED FILL"

Low to medium plastic clay with the following range of plasticity properties is generally considered suitable for use as "select engineered fill":

Liquid Limit	=	20 to 40%
Plastic Limit	=	10 to 20%
Plasticity Index	=	10 to 30%

Test results should be considered on a case-by-case basis.

"Pit-run gravel" and "fill sand" are generally considered acceptable for use as "select engineered fill." See exact project or jurisdiction for specifications. The "pit-run gravel" should be free of any form of coating and any gravel or sand containing clay, loam or other deleterious materials should be rejected. No material oversize of the specified maximum sieve size should be tolerated. This material would typically haves a fines content of less than 10%. The materials above are also suitable for use as "general engineered fill."

Construction Excavations

Construction should be in accordance with good practice and comply with the requirements of the responsible regulatory agencies.

All excavations greater than 1.5m deep should be sloped or shored for worker protection.

Shallow excavations up to about 3m depth may use temporary sideslopes of 1H:1V. A flatter slope of 2H:1V should be used if groundwater is encountered. Localized sloughing can be expected from these slopes.

Deep excavations or trenches may require temporary support if space limitations or economic considerations preclude the use of sloped excavations.

For excavations greater than 3m depth, temporary support should be designed by a qualified geotechnical engineer. The design and proposed installation and construction procedures should be submitted to Roseke for review.

The construction of a temporary support system should be monitored. Detailed records should be taken of installation methods, materials, in situ conditions and the movement of the system. If anchors are used, they should be load tested. Roseke can provide further information on monitoring and testing procedures if required.

Attention should be paid to structures or buried service lines close to the excavation. For structures, a general guideline is that if a line projected down, at 45 degrees from the horizontal from the base of foundations of adjacent structures intersects the extent of the proposed excavation, these structures may require underpinning or special shoring techniques to avoid damaging earth movements. The need for any underpinning or special shoring techniques and the scope of monitoring required can be determined when details of the service ducts and vaults, foundation configuration of existing buildings and final design excavation levels are known.

No surface surcharges should be placed closer to the edge of the excavation than a distance equal to the depth of the excavation, unless the excavation support system has been designed to accommodate such surcharge.