

**TOWN OF GIBBONS  
AGENDA  
SUBDIVISION AUTHORITY  
AUGUST 24, 2022  
TO BE HELD AT THE MUNICIPAL OFFICE AT 10:00 AM**

- 1.0 ROLL CALL
- 2.0 CALL TO ORDER
- 3.0 ADOPTION OF THE AGENDA
- 4.0 ADOPTION OF THE MINUTES
  - 4.1 Subdivision Authority Hearing – May 22, 2019 File 19-R-011
- 5.0 SUBDIVISION APPLICATION
  - 5.1 MPS File 22-R-546 Town of Gibbons
- 6.0 ADJOURNMENT

**MINUTES OF THE SUBDIVISION AUTHORITY BOARD MEETING HELD ON WEDNESDAY, MAY 22, 2019 AT 6:30 PM**

Council Present: Mayor Deck,  
Councillor Woodger  
Councillor Sandahl

Staff Present: Farrell O'Malley - CAO,  
Louise Bauder – Planning and Development  
Terra Pattison - Recording Secretary.

As there was a quorum present, Mayor Deck called the meeting to order at 6:30 pm.

**PRESENTATION**

Mrs. Bauder presented information to the Subdivision Authority Board in considering the approval of the subdivision of P39 located in Pt. Lot 187, Block 18, Plan 022-3247, File # MPS 19-R-011.

**RECOMMENDATION**

1. That the registered owner and/or developer enter into and comply with a development agreement with the Town of Gibbons pursuant to Section 650 of the Municipal Government Act, as amended which shall be registered by way of caveat against the title of Lots 1 – 15, Lots 17 – 37 and Lots 39 – 41. This development agreement shall, amongst other matters address, to the satisfaction of the Town of Gibbons, the matter of construction of all municipal services (roads (new and upgraded) required to give access to the development, sidewalks, public utilities, off-street parking and loading/unloading facilities) relating to the site to appropriate standards. This development agreement will include lot grading plans and requirements to provide detailed engineering requirements and security based on appropriate cost estimates for the completion of deficiencies, all to the satisfaction of the Town. Additionally, the development agreement will also contain the provisions that no occupancy of any building on the subject site shall occur until the matters described with the development agreement have been constructed to the satisfaction of the Town of Gibbons or appropriate guarantees for the completion of deficiencies have been received by the Town.
2. That concurrent with the registration of an instrument affecting this plan, utility right of way easements be registered against the affected lots. Copies of the signed agreements will be forwarded by the developer to the Town and the Subdivision Authority Officer for review and approval prior to endorsement of the instrument.
3. That taxes are fully paid when final approval (endorsement) of the instrument effecting the subdivision is requested.

**NOTES FOR INFORMATION PURPOSES ONLY: (These are not conditions of approval)**

1. The subdivision is being approved because the land that is proposed to be subdivided is, in the opinion of the Subdivision Authority, suitable for the purpose for which the subdivision is intended, and the proposal is considered by the Subdivision Authority to conform to the provisions of the municipality's Municipal Development Plan and, with the exception of site depth, the Town's Land Use Bylaw. The matters listed in Section 7 of the Subdivision and Development Regulation and any submission made by adjacent property owners were considered with care.

4.1

2. In order to expedite consideration of the final approval and endorsement of this proposal, a letter from the Town of Gibbons indicating that Conditions #1, #2, and #3 above, have been satisfied, should accompany any request for final approval or endorsement
3. The discharge shall to be registered concurrently with the instrument for endorsement noted that, the Subdivision Authority Officer will prepare a discharge affecting the deferred reserve caveat (Doc. # 072402841) for the full amount of the deferred reserve.
4. To avoid unnecessary complication, you are advised that no site work to affect your proposal should be commenced prior to endorsement of a registrable instrument by this office and/or without prior consultation with the Town of Gibbons as to its requirements regarding such development.
5. The following information is provided as required by Section 656(2)(a) of the Municipal Government Act. Any appeal of this decision lies to the Municipal Government Board, whose address is: 1229 - 91 Street SW, Edmonton, Alberta, T6X 1E9 (phone 780-427-4864).

Councillor Woodger moved to approve the subdivision of P39 located in Pt. Lot 187, Block 18, Plan 022-3247, File # MPS 19-R-011 with the recommendations provided by Municipal Planning Services.

<b>19.01</b>	<b>MOTION CARRIED</b>
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There being no further business, Mayor Deck adjourned the meeting at 6:42 pm.

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Mayor, Dan Deck

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CAO, Farrell O'Malley

# Subdivision Report



## FILE INFORMATION

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**File Number:** 22-R-546  
**Municipality:** Town of Gibbons  
**Applicant:** Farrell O'Malley  
**Owner:** Town of Gibbons  
**Legal:** Lot 5, Block 1, Plan 032-2750

**Date Acknowledged:** June 23, 2022  
**Decision Due Date:** August 22, 2022  
**Revised Decision Date:** September 21, 2022  
**Notification Date:** June 23, 2022  
**Date of Report:** August 18, 2022

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**Existing Use:** Vacant Residential  
**Proposed Use:** Residential  
**District:** DC-COT Direct Control Cottage

**Gross Area of Parcel:** 3.46 ha (8.55 ac.)  
**Net Area of New Lot(s):** 3.46 ha (8.55 ac.)  
**Reserve Status:** Required  
(provided as land dedication)

### 1. SITE DESCRIPTION AND ANALYSIS

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This application would create separate titles for 36 residential lots, 2 PUL lots, 1 ER lot and 2 MR lots. The application will also result in the registration of roadway to provide access to the lots. The site is located in the northern portion of the Town of Gibbons. A large ER parcel which includes the Sturgeon River Valley is located to the west of the site and a CN rail line and the residential neighborhood of Williams Park are located to the east of the site.

Access to the proposed lots will be via a proposed new internal road, which will be an extension of 52 Street. Construction of the new road shall be to the Town design standards. No direct access onto the highway has been proposed. It appears that with the registration and construction of the new road, access requirements can be met.

The subject site is generally cleared and flat. The site is adjacent (western boundary) to a large Environmental Reserve Parcel which is currently a portion of the riverbank.

To determine the site layout and the suitability of the site for the proposed development, the Town undertook a Phase 1 Environmental Site Assessment (May 2021) and a Geotechnical Investigation and Slope Stability Report (June 2021).

*Phase 1 Environmental Assessment* concluded that:

- After consideration of the available information and site observations all [potential] environmental concerns were rated to have a low risk of environmental impact to the subject site.
- No further environmental investigation or remedial action was recommended at the time of preparation of the report.

The findings of the *Geotechnical Investigation and Slope Stability Report* are summarized below:

- No signs of slope failures, slumps or erosion were observed anywhere on site at the time of the slope walk with the exception of a small erosion hole caused by ground water



seepage near the middle of the slope below test hole 2021-01 and an old slump at the top of the slope near Test hole 201-03.

- The area behind the critical slip surface with a minimum FOS of 1.5 would be considered geotechnical[ly] satisfactory for building development.
- Based on the slope analysis, it was determined that all 4 slope profiles have a FOS of greater than 1.5 at the Top of Bank (TOB). No building setbacks are required beyond the TOB, based on the FOS, for any parts of the slope. However, Hoggan recommends that a minimum 10m property setback, from the TOB Line be used for all slopes on the site as identified on the plan. These setbacks are recommended for safety purposed and human effects.

The Tentative Plan is consistent with the recommendation in the *Geotechnical Investigation and Slope Stability Report*. Additionally, the tentative plan includes 2 MR lots which will provide additional green space within the development area, provide access to the ER lot and will maintain access and connectivity to views of the river valley.

A Preliminary Stormwater Management Plan was also prepared by the Town’s Engineering consultant to address surface and stormwater management within the subject site to ensure that post construction lot grading and drainage would be directed away from the bank of the river to minimize impacts on the slope and the riparian area of the river resulting from the proposed subdivision. The Town’s engineer indicated that the lots will be graded to drain to the road and that the surface water will be collected and conveyed from the site within the Town’s SWMS. **A post construction lot grading and drainage plan for the proposed lots should be required as a condition of subdivision approval to enable the Development Authority to determine, at time of development, if the development proposed on each lot will conform to the overall SWMP requirements.**

The site has been identified by the province as having HRA Values of 4a, 5a and p. An application was made through AB Culture for *Historical Resources Act* Approval. *Historical Resource Act* Approval was granted by AB Culture on June 28, 2022.

From the information provided, the subject site does not appear to include:

- flood hazard lands,
- wetlands, or
- abandoned wells or pipelines

The proposed use of the lots is consistent and compatible with surrounding land uses. All of the proposed residential lots will be backing onto green space (either ER or MR) which should increase the attractiveness of the development and provide a buffer between this development and the top of the bank of the river.

The subject site shall be serviced by Town services.

The proposed lots appear to be suitable for the proposed use (residential).

In the opinion of the planner, the proposed subdivision appears reasonable. There appears to be reasonable building sites on the proposed lots and access requirements can be met.

## 2. AGENCY & ADJACENT LANDOWNER COMMENTS

Agency	Comments
To. of Gibbons staff	<ul style="list-style-type: none"> <li>• Development Agreement is not required</li> <li>• Accesses and approaches are required</li> <li>• MR to be provided as land dedication</li> </ul>

	<ul style="list-style-type: none"> <li>• Property taxes are not outstanding</li> <li>• The proposal conforms to the Town's LUB and MDP</li> <li>• Site is not within 2 miles of a CFO</li> </ul>
AEP	<ul style="list-style-type: none"> <li>• No response</li> </ul>
AEP- Water Act	<ul style="list-style-type: none"> <li>• No response</li> </ul>
AER	<p>No response received</p> <p>Abandoned Wells</p> <ul style="list-style-type: none"> <li>• The applicant has signed a statement indicating that there are no abandoned wells on the subject site.</li> <li>• Additionally, the applicant has indicated that the site is not within 1.5 km of a sour gas facility.</li> </ul>
AB Transportation	<p>AB Transportation acknowledges receipt of the referral circulation and offers the following comments:</p> <ul style="list-style-type: none"> <li>• The requirements of Section 18 of the <i>Matters Related to Subdivision and Development Regulation</i> (the <i>Regulation</i>) are not met, considering the nature of the proposal, subject to Section 20...Alberta Transportation is willing to approve the variance by the Subdivision Authority of the requirements of Section 18.</li> <li>• The requirements of Section 19 of the <i>Regulation</i> are not met. Given the nature of this proposal, to meet the requirements of Section 19(2) of the <i>Regulation</i> Alberta Transportation would be satisfied if the subdivision authority required no service road to be dedicated.</li> <li>• Pursuant to Section 20 of the <i>Regulation</i>, Alberta Transportation authorizes the Subdivision Authority to vary the requirements of Section 14 and `5 of the <i>Regulation</i> to accommodate the proposed subdivision.</li> <li>• Pursuant to 678 of the MGA, Alberta Transportation is varying the distance for appears for this subdivision application. Therefore, from the department's perspective, any appeals can be heard by the local Subdivision and Development Appeal Board.</li> </ul>
CN	<ul style="list-style-type: none"> <li>• <b>Safety setback of habitable buildings from the railway rights-of-way to be a minimum of 30 metres in conjunction with a safety berm. The safety berm shall be adjoining and parallel to the railway rights-of-way with returns at the ends, 2.5 metres above grade at the property line, with side slopes not steeper than 2.5 to 1.</b></li> <li>• <b>The Owner shall engage a consultant to undertake an analysis of noise. At a minimum, a noise attenuation barrier shall be adjoining and parallel to the railway rights-of-way, having returns at the ends, and a minimum total height of 5.5 metres above top-of-rail. Acoustic fence to be constructed without openings and of a durable material weighing not less than 20 kg. per square metre of surface area. Subject to the review of the noise report, the Railway may consider other measures recommended by an approved Noise Consultant.</b></li> <li>• <b>Ground-borne vibration transmission to be evaluated in a report through site testing to determine if dwellings within 75 metres of the railway rights-of-way will be impacted by vibration conditions in excess of 0.14 mm/sec RMS between 4 Hz and 200 Hz. The monitoring system should be capable of measuring frequencies between 4 Hz and 200 Hz, ±3 dB with an RMS averaging time constant of 1 second. If in excess, isolation measures will be required to ensure living areas do not exceed 0.14 mm/sec RMS on and above the first floor of the dwelling.</b></li> <li>• <b>The Owner shall install and maintain a chain link fence of minimum 1.83 metre height along the mutual property line.</b></li> </ul>

	<ul style="list-style-type: none"> <li>• The following clause should be inserted in all development agreements, offers to purchase, and agreements of Purchase and Sale or Lease of each dwelling unit within 300m of the railway right-of-way: "Warning: Canadian National Railway Company or its assigns or successors in interest has or have a rights-of-way within 300 metres from the land the subject hereof. There may be alterations to or expansions of the railway facilities on such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, notwithstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwelling(s). CNR will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."</li> <li>• Any proposed alterations to the existing drainage pattern affecting railway property must receive prior concurrence from the Railway and be substantiated by a drainage report to the satisfaction of the Railway.</li> <li>• The Owner shall through restrictive covenants to be registered on title and all agreements of purchase and sale or lease provide notice to the public that the safety berm, fencing and vibration isolation measures implemented are not to be tampered with or altered and further that the Owner shall have sole responsibility for and shall maintain these measures to the satisfaction of CN.</li> <li>• <b>The Owner shall enter into an Agreement with CN stipulating how CN's concerns will be resolved and will pay CN's reasonable costs in preparing and negotiating the agreement.</b></li> <li>• The Owner shall be required to grant CN an environmental easement for operational noise and vibration emissions, registered against the subject property in favour of CN.</li> </ul>
AB Culture	The site has been identified by the province as having HRA Values of 4a, 5a and p. An application was made through Alberta Culture for <i>Historical Resources Act</i> Approval. Historical Resource Act Approval was granted by Alberta Culture on June 28, 2022.
Sturgeon County	No response
Canada Post	No response
North Parkland REA	No objections or conflicts identified
Select Engineering	No response
FortisAlberta	No objections
Telus Communications	No objections
AtcoGas	No response
Atco Pipelines	No objections
Sturgeon School Division	There is no agreement with the municipality in regard to the allocation of reserves. The School Division does not wish to be provided with Reserves as a result of this decision.
Alberta Health Services (Edmonton Zone)	No objections or concerns

The application was circulated to adjacent landowners on the following dates:

- Sturgeon County – July 6, 2022
- Town of Gibbons – July 25, 2022

Five written comments and one phone call from an adjacent landowner were received by our office. All of the written comments received indicated expressed opposition to the proposed subdivision. The comments and concerns identified through the adjacent landowner notification were considered with care. They are area summarized and, where appropriate, a response or recommendation has been provided for the Subdivision Authority's consideration. Comments have been grouped by topic and edited for clarity.

Comments	Response
<p><b>River Valley Views</b></p> <ul style="list-style-type: none"> <li>Concerned about how the proposed development will impact views of the river valley</li> </ul>	<ul style="list-style-type: none"> <li>The proposed development will change the view from William's Park looking west to the river valley. The site design does provide visual access to the river valley in 2 locations where MR lots have been proposed.</li> <li>The site is privately owned land and has been identified in the Town's LUB and MDP for future residential development since 2006.</li> <li>Viewscapes are not currently identified or protected within the Town of Gibbons' MDP or LUB.</li> </ul>
<p><b>Slope Stability</b></p> <ul style="list-style-type: none"> <li>Concerned that the ground is unstable and that the foundations of the homes will crack over time.</li> <li>Concerned about how the development will impact bank stability and that the development may cause further slumping or erosion.</li> </ul>	<p>In order to identify and address any potential geotechnical development considerations or concerns affecting the subject site the Town engaged an engineer to prepare a <i>Geotechnical Investigation and Slope Stability Report</i>. The findings of the <i>Geotechnical Investigation and Slope Stability Report</i> are summarized below:</p> <ul style="list-style-type: none"> <li>No signs of slope failures, slumps or erosion were observed anywhere on site at the time of the slope walk with the exception of a small erosion hole caused by ground water seepage near the middle of the slope below test hole 2021-01 and an old slump at the top of the slope near Test hole 201-03.</li> <li>The area behind the critical slip surface with a minimum FOS of 1.5 would be considered geotechnical[ly] satisfactory for building development.</li> <li>Based on the slope analysis, it was determined that all 4 slope profiles have a FOS of greater than 1.5 at the Top of Bank (TOB). No building setbacks are required beyond the TOB, based on the FOS, for any parts of the slope. However, Hoggan recommends that a minimum 10m property setback, from the TOB Line be used for all slopes on the site as identified on the plan. These setbacks are recommended for safety purposes and human effects.</li> </ul> <p>The tentative plan is consistent with the recommendation in the <i>Geotechnical Investigation and Slope Stability Report</i>. Additionally, the tentative plan includes 2 MR lots which will provide additional green space within the development</p>

<p><b>Erosion Control</b></p> <ul style="list-style-type: none"> <li>• Concerned about erosion and instability of the riverbank (example given is the Town's trail)</li> <li>• There is a natural spring that runs in the area which causes erosion.</li> </ul>	<p>area, provide access to the ER lot and will maintain access and connectivity to views of the river valley.</p> <ul style="list-style-type: none"> <li>• See comments above.</li> <li>• Additionally riprap will be added to several identified areas to prevent the possibility of future soil erosion.</li> <li>• Additionally, an Environmental Reserve (ER) parcel will be registered to protect environmentally sensitive lands within 10 m of the at the top of the bank of the river.</li> <li>• The adjacent river valley lands area already registered as an environmental reserve lot to protect the river and riparian areas around the river valley. As the proposed the subdivision will increase the amount of land in this location dedicated as ER.</li> <li>• The Town's engineer has indicated that storm water shall be managed on the site by directing runoff towards the road and into the Town's offsite storm water management facilities. Lot grading and drainage plans will be prepared for the lots to direct stormwater to the road when the lots are regraded and developed. This drainage pattern will minimize run off from the development area directly impacting the slope or the Sturgeon River and River Valley.</li> </ul>
<p><b>Proximity to the Rail line</b></p> <ul style="list-style-type: none"> <li>• Trains on the CN line adjacent to the site currently cause significant vibrations and shake houses in Williams Park which are also effected by noise of the trains operating.</li> <li>• Trains disrupt the foundation of homes in Williams Park and causing shifting.</li> <li>• Concerned that this will be a problem for new houses in close proximity to the rail line.</li> <li>• Concerned about how the proposed sound barrier wall by the railway tracks may effect or increase noise in the Williams Park Neighbourhood.</li> </ul>	<ul style="list-style-type: none"> <li>• The proximity of the rail line is a concern.</li> <li>• CN has recommended the installation of a berm and fencing adjacent to the eastern boundary of the subject site to minimize impacts from the rail line on the proposed development.</li> <li>• The Town may wish to explore further noise studies to determine the most efficient way to manage noise and vibrations on lands adjacent to both sides of the rail line (proposed subdivision area and William's Park).</li> <li>• <b>Prior to the development of any sound attenuation infrastructure the Town should undertake a noise study to ensure that there will be no negative impacts on the existing neighbourhood.</b></li> </ul>
<p>Concerns about how the development will impact the Sturgeon River Watershed, specifically:</p> <ul style="list-style-type: none"> <li>• Disruptions to biodiversity and wildlife.</li> <li>• Increase in infiltration of pollutants leaching into the soil in the drainage basis</li> <li>• Concerned about impacts on the Gibbons Badlands and Cactus Prairie that are located near the development area.</li> </ul>	<ul style="list-style-type: none"> <li>• See note above re: erosion control and stormwater management within the development area.</li> <li>• Administration has also indicated that: "The Gibbons Cactus Prairie is a desert-like area located along the dry south facing slopes on the opposite side of the Sturgeon River Valley on town parkland; this is the only known place on public land where cacti grow wild in the Metropolitan Edmonton Area."</li> <li>• There is no anticipated impact on the Gibbons</li> </ul>

	<p>Cactus Prairie as a result of the proposed subdivision.</p>
<ul style="list-style-type: none"> <li>Concerned about increased traffic in Williams Park neighbourhood from families who must drive to get to the park.</li> </ul>	<ul style="list-style-type: none"> <li>There are 2 MR lots identified on the proposed subdivision plan. If demand for park space justifies the development of new park infrastructure, there are 2 locations where it could be provided within the proposed subdivision.</li> </ul>
<p>Concerns about traffic safety in the proposed subdivision area:</p> <ul style="list-style-type: none"> <li>The road leading into the subject site is not built to a high enough standard for the additional traffic</li> <li>There is only one way in and out of the proposed development site.</li> </ul>	<ul style="list-style-type: none"> <li>Off-site improvement to existing infrastructure, including water/sewer and roads to meet current Municipal Standards will be required to support this development. The Town has indicated that these improvements will be undertaken.</li> <li><b>The planner recommends that an emergency access/egress be identified and secured prior to endorsement of a plan to register this subdivision.</b></li> </ul>
<p>Concerns about the lack of conservation of green spaces in Town.</p> <ul style="list-style-type: none"> <li>Recommends that the site should be preserved as a green space for the benefit of the larger community.</li> </ul>	<ul style="list-style-type: none"> <li>The Town's current and proposed green space (community) areas are identified in the Town's MDP on Map 1 – Future Land Use and Information Map 6. A large portion of the River Valley has been identified as future community area. This site was not identified as a future community area when the MDP was revised in 2018.</li> <li>The Site has been identified for residential development for a minimum of 16 years. In the 2006 Town of Gibbons MDP (and LUB) the site was designated for high density residential development (apartments).</li> </ul>
<p>Concerned that the proposed development will negatively impact their property value</p>	<ul style="list-style-type: none"> <li>Insufficient data provided to assess impacts of a proposed residential development on an adjacent residential development.</li> </ul>
<p>Development is located in close proximity to an old landfill.</p>	<ul style="list-style-type: none"> <li>The location of the landfill was not provided and the Town has no historic information which would indicate the presence of an old landfill in close proximity to this site. The Town is aware of a historic landfill in an adjacent parcel (N½ of 14-56-23-W4) and the proposed residential lots appear to be located outside of required setbacks from non-operating landfills (300 m).</li> <li>A landfill was not identified in the Phase 1 Environmental Site Assessment prepared in by Hoggan Engineering &amp; Testing</li> <li>Further, MPS reviewed the 1985 <i>Associated Engineering Field investigation of Waste Disposal Sites</i>, which is an inventory of known historic landfill locations throughout Alberta. The report indicates that there was an approximately 5.0 ac. landfill located within NW and NE 14-56-23-W4. From our review of the available information, this location is well removed from the subdivision area and will</li> </ul>



	not result in the creation of residential lots within the required 300m setback area of a reclaimed landfill.
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**3. STATUTORY ANALYSIS**

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**MDP AND LUB REQUIREMENTS**

The subject site is designated Residential Area in the Town of Gibbons Municipal Development Plan. The proposed use conforms to provisions for this land use areas. **Map 3 – Transportation** does not identify a future collector or arterial road running throughout the site. The site will be serviced by a local, internal road. At present, the subdivision is consistent with **Map 3 – Transportation** in the MDP.

Policy 7.2.3 states that the Town encourages the maximum residential density for single detached dwellings and semi-detached dwellings on lots less than 15m in width to be 27 units per hectare. The proposed subdivision has a density of 26 units per hectare and therefore the proposed subdivision is consistent with the encouraged maximum density identified in the MDP.

The proposed subdivision is considered to be infill development within a existing neighborhood rather than a subdivision which would create a new neighborhood. The site is a logical extension of an existing developed area and would not constitute “leap frog development.” The total extent of the development area is 3.46 ha, of which only 1.36 ha of land will be utilized for residential purposes. The remaining area will be dedicated as: PUL, road, MR and ER lots.

At full build out, the maximum density of the subject site will be 36 residential units. Further, the subdivision has been proposed in a single stage.

The proposed subdivision, is also consistent with Policy 7.1.3 which states: the Town will encourage the intensification and infill of existing neighbourhoods to provide a wide variety of housing options.

The proposed subdivision is not consistent with Policy 7.1.4(e) which states:

“e. the placement of overall low residential densities in areas close to the Sturgeon River Valley (lots no less than 15 m wide), with some high density (multi-dwelling unit) housing forms in particular locations where access and views are most amenable;”

This policy may not apply to the proposed subdivision because, it is not within an approved ASP and it is not part of a new residential neighbourhood.

The site is adjacent to the CN rail line. The following policies apply:

**11. Circulation**

[2.]2. The Town shall require that sufficient right-of-way and noise attenuation measures are provided along the CNR, Provincial Highways, and arterial roadways, for noise attenuation purposes and landscaping. During preparation of Area Structure developers and subdivision plans, private shall consult with Alberta Transportation, Canadian National Railways, and the Town as appropriate, regarding required development setbacks and buffers and design requirements for noise attenuation devices.

[2.]3. Roadway and public access across the Canadian National Railway line shall be limited to designated crossings, determined by the Town in consultation with the railway company.

The subdivision should incorporate, where reasonable to do so, the recommendations from CN provided in CNs referral comments.

The proposed is also consistent with Goal 8.1 in the MDP which states that:

“Natural environmental features shall be conserved and responsibly managed by the Town to support local and regional ecosystems and increase recreational opportunities for Gibbons residents and visitors. “

All lands within the bank of the river and extending 10m from the bank of river valley into the site have been identified as ER. This dedication will minimize impacts on sensitive environmental features by ensure that these features have been avoided and established a formal 10 m buffer to ensure that the subdivision will have minimal impact on local and regional ecosystems.

The subdivision is also consistent with Policy 8.1.3 in the MDP which requires the provision of reserves. In addition to the Environmental Reserve lot, 2 MR parcels are being dedicated with this subdivision. The subdivision is also consistent with Policy 8.2.2 which requires new park space to be designed to provide linkages to other areas. The Proposed MR parcel will provide access to the ER and the river valley through the MR and , previously dedicated ER in the River Valley.

Therefore, in the opinion of the Town’s planner, **the proposed subdivision generally conforms to the Town’s MDP.**

The subject site is within the “Direct Control Cottage District (DC-COTT)” District in the Land Use Bylaw. Single family cottages are a permitted use within this district.

The lots range is area between 333.7 m<sup>2</sup> and 491.6m<sup>2</sup>. All of the proposed lots meet the required minimum lot area of 278.7 m<sup>2</sup> (3000 ft<sup>2</sup>) requirement in the district.

Therefore, in the opinion of the Town’s planner, **the proposed subdivision may conform to the Town’s LUB.**

There is no Area Structure Plan for this area.

#### **MGA AND MRS DR REQUIREMENTS**

Section 10 of the *Matters Related to Subdivision and Development Regulation* requires that the written decision of a Subdivision Authority include reasons for the decision, including an indication of how the Subdivision Authority has considered any submissions made to it by the adjacent landowners and the matters listed in Section 9 of the *Regulation*. Section 9 indicates that, in making a decision, a Subdivision Authority must consider its topography; its soil characteristics; storm water collection and disposal; any potential for flooding, subsidence or erosion; accessibility to a road; the availability and adequacy of water supply, sewage disposal system, and solid waste disposal; whether the proposal complies with the requirements of the *Private Sewage Disposal Systems Regulation*; the use of land in the vicinity; and any other matters that it considers necessary to determine whether the land is suitable for the purposes for which the subdivision is intended.

In the opinion of the planner, with respect to these matters:

- a) topography
- b) soil characteristics
- c) storm water
- d) flooding
- e) subsidence/erosion
- f) accessibility

- g) water supply
- h) sewage disposal
- i) solid waste
- j) Private Sewage Disposal Systems Regulation, and
- l) other matters

the proposed subdivision appears satisfactory.

A note following the decision can indicate the Subdivision Authority's consideration of these matters and satisfy the *Regulation* in this regard.

Sections 11 through 20 of the *Matters Related to Subdivision and Development Regulation* are satisfied.

Since Section 663 of the *Municipal Government Act* applies, Reserves are due and have been provided as land dedication.

#### **APPEAL BOARD**

The subject site is not in the Green Area, does not contain an approved confined feeding operation, and is not within the setback distance to a landfill or wastewater treatment facility.

**The subject site is adjacent or within the prescribed distance of a historical site and a highway. Alberta Transportation has agreed to vary the distance under the Regulation however Alberta Culture has not provided a variance.**

MPS notes that the Energy Resources Conservation Board (ERCB) and the Alberta Energy and Utilities Board (AEUB) are now the Alberta Energy Regulator (AER). The site does not contain facilities with AER licenses, and is not affected by s. 678(2)(a)(i)(C) of the Act. MPS notes we are unable to determine if the subject site is affected by s. 678(2)(a)(i)(C) of the Act with respect to AUC approvals.

MPS reviewed the Alberta Environment & Parks Authorization (AEP) Viewer, which did not identify any Registrations for Traditional Agriculture Users issued under the *Water Act* or approvals pursuant to the *Environmental Protection and Enhancement Act*. The subject site does not appear to be affected by s. 678(2)(a)(i)(D) of the Act.

The subject site is within the referral distance to Highway 777 (though AT has waived their right to have the appeal heard by the LPRT). The site may contain wetlands identified during the ortho photo analysis and the site is affected by a historical site. Therefore, in the opinion of the planner, appeal lies to the Land and Property Rights Tribunal.

#### Reserves

The ability to take Reserves is noted above. 2 MR parcels are proposed on the tentative plan that have a combined total area of 1738.65m<sup>2</sup>.

10% of the total parcel area (less the ER dedication is 2630 m<sup>2</sup>. Therefore, the MR lots provided are less than the normal required 10% MR dedication by 891.35 m<sup>2</sup>. To achieve this amount of MR dedication, the subdivision area would have to be revised to remove approximately 2 of the proposed residential lots.

To ensure setbacks are maintained from the top of the bank, the proposed subdivision also include 8348.3 m<sup>2</sup> of dedicated ER lands. Taking into consideration the additional green space that will be provided as ER, the Subdivision Authority may wish to consider relaxing the required MR amount.

#### 4. SUMMARY

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The proposed subdivision is for residential use, and may conform to provisions in the Town's Land Use Bylaw and Municipal Development Plan as well as the requirements set forth in the MGA and applicable Regulations therefore the subdivision can be approved subject to the following conditions:

1. Development Agreement
2. Registration of Utility Right of Way Easements
3. Restrictive Covenant (Re: geotechnical report & lot grading and drainage plans)
4. Provision of Lot Grading and Drainage Plans
5. Taxes up to date

#### 5. RECOMMENDATION

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That the subdivision application be approved at this time, subject to the following conditions:

1. That the registered owner and/or developer enter into and comply with a development agreement with the Town of Gibbons pursuant to Section 650 of the *Municipal Government Act*, R.S.A. 2000, c. M-26, as amended which shall be registered by way of caveat against the title of Lots 1-15, Lots 17-37 and Lots 39-41. This development agreement shall, amongst other matters address, to the satisfaction of the Town of Gibbons, the matter of construction of all municipal services (roads (new and upgraded) required to give access to the development, sidewalks, public utilities, off-street parking and loading/unloading facilities) relating to the site to appropriate standards. This development agreement will include lot grading plans and requirements to provide detailed engineering requirements and security based on appropriate cost estimates for the completion of deficiencies, all to the satisfaction of the Town. Additionally, the development agreement will also contain the provision that no occupancy of any building on the subject site shall occur until the matters described within the development agreement have been constructed to the satisfaction of the Town of Gibbons or appropriate guarantees for the completion of deficiencies have been received by the Town of Gibbons.
2. That concurrent with the registration of an instrument affecting this plan, utility right of way easements be registered against the affected lots. Copies of the signed agreements will be forwarded by the developer to the Town of Gibbons and the Subdivision Authority Officer for review and approval prior or endorsement of the instrument.
3. That prior to endorsement of an instrument affecting this plan, the Subdivision Authority Officer and the Town of Gibbons receive a Restrictive Covenant that shall be registered concurrently with the instrument for endorsement on Lots 1-7 as shown on the attached conditionally approved plan. The restrictive covenant shall register the geotechnical Investigation and slope stability Report on all of the proposed residential lots shown on the conditionally approved tentative plan.
4. That prior to endorsement of an instrument affecting this plan, the Subdivision Authority Officer and the Town receive lot a lot grade and drainage plan for all of the proposed residential lot that provides the required lot grading and drainage elevations for each of the proposed lots to ensure that stormwater run off will be directed away from the top of the river valley and directed towards the Town's storm water management facilities.
5. That taxes are fully paid when final approval (endorsement) of the instrument effecting the subdivision is requested.

NOTES FOR INFORMATION PURPOSES ONLY: (These are not conditions of approval)

1. The subdivision is being approved because the land that is proposed to be subdivided is, in the opinion of the Subdivision Authority, suitable for the purpose for which the subdivision is intended, and the proposal is considered by the Subdivision Authority to conform to the provisions of the municipality's Municipal Development Plan and the Town's Land Use Bylaw. The matters listed in Section 9 of the *Matters Related to Subdivision and Development Regulation* and any submission made by adjacent property owners were considered with care.
2. In order to expedite consideration of the final approval and endorsement of this proposal, a letter from the Town of Gibbons indicating that Conditions #1, #2, #3, #4 and #5, above, have been satisfied, should accompany any request for final approval or endorsement.
3. To avoid unnecessary complication, you are advised that no site work to affect your proposal should be commenced prior to endorsement of a registrable instrument by this office and/or without prior consultation with the Town of Gibbons as to its requirements regarding such development.
4. The following information is provided as required by Section 656(2)(a) of the Municipal Government Act. Any appeal of this decision lies to the Land and Property Rights Tribunal, whose address is 2nd Floor, Summerside Business Centre, 1229 - 91 Street SW, Edmonton, Alberta, T6X 1E9 (phone 780-427-2444).
5. The Subdivision Authority for the Town of Gibbons is a "Committee of Council."

Attachments:

1. Application
2. Location map
3. Site plan
4. Proposed Tentative Plan of Subdivision
5. June 2021 Geotechnical Report (Hoggan Engineering and Testing)

**REPORT NO: 6449-99**

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**GEOTECHNICAL INVESTIGATION & SLOPE STABILITY  
PROPOSED SUBDIVISION – THE COTTAGES  
LOT 5, BLOCK 1, PLAN 0322750  
52 STREET & 53 AVENUE  
GIBBONS, ALBERTA**

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**June 2021**

**Hoggan Engineering & Testing (1980) Ltd.  
17505 – 106 Avenue  
Edmonton, Alberta  
T5S 1E7**

**Phone: 780-489-0990  
Fax: 780-489-0800**

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**REPORT NO: 6449-99**

**GEOTECHNICAL INVESTIGATION & SLOPE STABILITY  
 PROPOSED SUBDIVISION – THE COTTAGES  
 LOT 5, BLOCK 1, PLAN 0322750  
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## **GEOTECHNICAL INVESTIGATION**

**PROJECT:** Proposed Subdivision – The Cottages

**LOCATION:** 52 Street & 53 Avnue  
Lot 5, Block 1, Plan 032 2750  
Gibbons, Alberta

**CLIENT:** Town of Gibbons  
c/o Select Engineering Consultants Ltd.  
Suite 100, 17413 – 107 Avenue NW  
Edmonton, Alberta  
T5S 1E5

**ATTENTION:** Steve Brittain, C.E.T.

### **1.0 INTRODUCTION**

This report presents the results of the subsurface investigation made on the site of the proposed subdivision in Gibbons, Alberta. The objective of the investigation was to determine the subsoil data for use in the geotechnical planning and design aspects of the residential development project including slope stability and building setbacks. Environmental issues are beyond the scope of this report. Authorization to proceed was received from Steve Brittain of Select Engineering Consultants Ltd. (Select) in March 2021. Field work for the project was completed on March 18 & 22, 2021.

### **2.0 PROJECT & SITE DESCRIPTION**

The site of the proposed subdivision development is located north of the intersection of 52 Street and 53 Avenue in Gibbons, Alberta. The area is approximately 9 acres in size and approximately 500 metres long and 150 metres wide. The Sturgeon River bank is noted on the west side of the site. The project is to consist of a rural subdivision of approximately 35 lots backing onto the Sturgeon River bank with a roadway along the east side of the site. The roads are proposed with be curb and gutter. Surface drainage is proposed to be directed to a ditch along the

east side of the site and drained to the north. A preliminary plan of the subdivision was sent to our firm at the time of the RFP by Steve Brittain of Select.

At the time of drilling, the site was partially snow covered with grass and weeds below. It appeared the land was used for agricultural purposes. The site sloped slightly to the west toward the Sturgeon River bank. Trees bordered the site to the west and a railway right-of-way bordered the site to the east. A line of trees was also noted along the east border of the site. To the north was undeveloped land and to the south were residential properties.

The trees on the Sturgeon River slope consisted mostly of poplar on the north end of the site and a mixture of poplar and spruce on the south end. The size of trees varied from 100 millimetres to 300 millimetres. Significant deadfall was noted over most of the slope.

Access to the site was obtained from the residential road to the south, through one of the residential yards. Travel about the site was possible for normal wheeled vehicles.

#### **Air Photo Review**

- The 1950 air photo shows the site and local area are undeveloped farmland, part of a larger area of cultivated land extending for most of the quarter section. There is a railway line bordering the east side of the site, and range road (the former Range Road 232 and present Highway 28A) nearby to the east and Township Road 643 (present 53 Avenue) nearby to the south. There is a treed slope bordering the west and northwest sides of the site. The Sturgeon River is noted beyond the slope to the west. There appears to be a farm or acreage bordering the southwest corner of the site, with one structure partially within the subject site. The general area is agricultural development, with wooded areas bordering the river and some small woodlots. The Town of Gibbons is visible nearby to the southwest. There are farms/acreages nearby to the east and north.
- The 1962 air photo is essentially the same as the previous air photo. The site is farmland, with a small farm or acreage bordering the southwest corner of the site, with buildings near the site, and one small building within the site. There is a dugout nearby to the southwest. The nearby roadway to the east appears to have been upgraded. A slump area on the north end of the site at the top of the slope is evident, which was not evident in the 1950 photo possibly due to low quality. The slump area is part of the farming land and no noticeable affects are seen on the slope or below the slope.

- The 1974 air photo shows a path created along the slope. Flooding of the Sturgeon River is evident. The farm/acreage to the southwest is much smaller. There is construction activity along the nearby roadway to the east, it appears to be in the process of being realigned and upgraded. There has been development within the Town of Gibbons, with additional buildings visible. The mid slope walking path has been cut out of the slope. The previous slump area is evident at the top of slope.
- The 1979 air photo is essentially the same as the previous air photo. Development within the Town of Gibbons has progressed, with a residential subdivision immediately adjacent to the rail line to the east of the subject site.
- The 2001 air photo is essentially the same as the previous air photo. Some vegetation growth is noted in the slump area on the top of slope
- The 2012 air photo is essentially the same as the previous air photo. Larger trees are noted in the slump area
- The 2020 air photo is essentially unchanged from the previous air photo, and is representative of the current site conditions. The subject site consists of a long, narrow, approximately rectangular lot, running between a railway line and the Sturgeon River. The site is undeveloped and grassed, with an area of trees and forest along the northwest and northeast sides bordering the river. There are residences bordering the southwest corner of the site to the south, with several buildings near the property line. The nearby land to the east is a residential development, with many single family residences present. A two lane highway is nearby to the east, and a gravelled roadway is present nearby to the south.

#### **Coal Mine Atlas Review**

- No coal mining information within the subject site was found in the Alberta Coal Mine Atlas published by the Alberta Energy Regulator. Coal mining related issues should not be a concern for this site and were not investigated further.

### **Slope Inspection**

A slope walk was completed on May 14, 2021 along the west side of the site to the Sturgeon River. At the time of inspection many of the trees and low bushes were beginning to grow foliage. No snow was on the ground. Observations were made with respect to the site topography and slope stability issues.

Generally trees covered the slope with some low bushes and some deadfall. The grade of the slope varied considerably from as steep as approximately 2H:1V in isolated areas up to approximately 10H:1V. The overall grade of the slope was generally more consistent, averaging between 2.5H:1V and 3H:1V. A walking path was noted near the middle of the slope, running south to north. The walking path appeared to be cut out of the slope many years ago, creating a flat plateau approximately 6 to 8 metres wide and a steeper slope above the path which was up to an estimated 1.5H:1V. The slope generally continued to the Sturgeon River edge on the south and middle area of the site. On the north end, a plateau approximately 40 metres wide, was noted near the Sturgeon River approximately 3 metres above the existing river level.

The vegetation on the slopes generally varied from Poplar and Spruce trees with some low bushes. Poplar trees generally lined the top of the slope and varied from 50 – 200 millimetres in diameter. The middle to south end of the site had mainly Spruce trees which were up to 300 millimetres in diameter above the path and up to 450 millimetres below the path. The odd young poplar tree was noted on the south end on the site. On the north end of the site the trees consisted mostly of poplar up to 150 millimetres in size with the odd larger Spruce tree. Some deadfall was noted in some areas. In some areas the trees were sparse with many medium to high bushes but in other areas the vegetation was often thick and difficult to navigate through.

A slump area was observed near the north end of the site at the top of slope near Testhole 2021-03, as noted in the air photos. The slump area is approximately 100 metres long parallel to the slope and up to 20 metres wide. It is a flat area approximately 2.0 metres lower than the area to the east. Some small trees and bushes with some grass is growing within the slump area. Below the slump the vegetation is similar to the surrounding slope.

Water was noted seeping from the slope bank above the walking path near slope profile 3 or below Testhole 2021-01. The water was noted pooling in an eroded pocket of the slope approximately 2 metres wide, and trickled across the walking path to the lower slope. No erosion was noted on the path or below the path related to the water seepage. Some channels along the

slope were noted in various areas which appeared to be drainage paths over the slope but did not show significant erosion at the time of investigation. No signs of slope failures, slumping, or erosion were noted along the slope. It was understood from the previous owner, that the slope area near Testhole 2021-01 was often saturated and water seepage was often noted on areas of the slope below Testhole 2021-01

### **3.0 FIELD INVESTIGATION**

The soils investigation for this project was undertaken on March 18 and 22, 2021 utilizing a truck mounted drill rig owned and operated by SPT Drilling Ltd. The site was accessible with normal wheeled vehicles. A total of three testholes were drilled at locations shown on the attached site plan to depths between 13.4 metres and 16.5 metres. The testholes were planned to be drilled to a depth of up to 30 metres but were terminated in the Bedrock soils once drilling became difficult. The testhole layout was selected by Hoggan Engineering & Testing(1980) Ltd. (Hoggan) prior to drilling, based on the subdivision plan provided to Hoggan. The deep testholes were placed near the Sturgeon River slope to determine the soil profile for a slope stability analysis. The testholes were surveyed for elevation and location by Hoggan following drilling using a mobile Trimble GPS unit.

The testholes were advanced with 150 millimeter diameter solid stem augers in 1.5 meter increments. A continuous visual description, which included the soil types, depths, moisture, transitions, and other pertinent observations, was recorded on site. Disturbed samples were removed from the auger cuttings at 750 millimeter intervals for laboratory testing. Standard Penetration Tests c/w split spoon sampling was also taken at regular 1.5 meter intervals.

Following the drilling operation, slotted piezometric standpipes were inserted into all deep testholes for water table level determination. The lower 5 metres of the testhole was backfilled with sand and a 2 metre bentonite layer was placed over top. The remainder of the testhole was backfilled with drill cuttings and a bentonite cap at the surface. An additional standpipe was inserted at all 3 testhole locations in a separate testhole, to a depth of 3.8 metres BGS. The additional standpipe was backfilled with drill cuttings and a bentonite cap at the surface. Watertable readings were obtained 8 and 52 days after drilling.



#### **4.0 LABORATORY TESTING**

All disturbed bag samples returned to the laboratory were tested for moisture content. In addition, the plastic and liquid Atterberg Limits and soluble soil sulphate concentrations were determined on selected samples. Lab results are included on the attached testhole logs located in the Appendix.

#### **5.0 GEOLOGY & SOIL CONDITIONS**

According to GIS maps made available by Alberta Geological Survey, the local surficial geology of the area is classified as stream and slopewash eroded deposits of Pleistocene and Holocene age. Such deposits were described in the legend as exposed till and bedrock, local slump materials, and slopes of river and meltwater channels. The general bedrock geology in the region was identified as the Belly River Group of upper Cretaceous age. The Belly River Group was described in the legend as to comprise of greenish grey feldspathic sandstone, grey siltstone, green mudstone, and ironstone beds.

A detailed description of the soils encountered is found on the attached testhole logs in the Appendix. In general, the soil conditions at this site consisted of surficial topsoil followed by a silty clay with some sand layers, all underlain by a bedrock soil.

Topsoil was encountered at the ground surface in all 3 testholes to depths ranging from 150 and 450 millimetres below ground surface(BGS). Topsoil and peat depths are visual estimates and are known only at the testhole locations, and may vary between testholes.

A silty clay material was encountered in all the testholes below the topsoil. The clay soil was typically moist with a medium plasticity and stiff consistency. Some very moist, sandy layers were noted within the clay in some testholes. This clay soil was encountered to depths of 2.4 to 3.8 metres BGS.

A sand layer was observed in Testhole 2021-01 and 2021-03 below the clay soil at depths of 3.8 metres BGS. The sand was typically fine grained and compact and was 0.5 to 0.9 metres thick in the two testholes. Water seepage was noted in the sand layer in testhole 2021-01.

The final soil encountered in all 3 of the testholes consisted of a clay shale or sandstone bedrock. In Testhole 2021-02 and 2021-03 a weathered layer of bedrock was initially encountered. The weathered bedrock was typically high plastic with a very stiff to hard

consistency, and featured traces of oxides. The weathered bedrock was noted to depths of 5.0 to 5.3 metres BGS.

Below the clay in Testhole 2021-01 and below the weathered bedrock in the remaining two testholes, a clay shale bedrock was encountered. The clay shale was generally moist, grey in color with a high plasticity and a hard consistency. Sandstone layers were encountered in the bedrock in all 3 testholes at various depths. In addition, some bentonitic bedrock was noted at various depths. The bedrock was noted to termination depths of 13.4 to 16.5 metres BGS in all 3 testholes.

During drilling, free water was noted in Testhole 2021-01. Approximately 9.1 metres of water was noted at the completion of drilling in Testhole 2021-01.

## 6.0 GROUNDWATER CONDITIONS

### Groundwater Table Readings Proposed Subdivision - The Cottages (Metres Below Ground Surface)

Testhole	Ground Elevation	Conditions At Testhole Completion	8 Day 30-Mar-21	52 Day 14-May-21	Watertable Elevation
2021-01A	651.47	10.0 m of water, 4.6 m of slough	14.14	12.20	639.27
2021-01B	651.47	0.3 m of water, No slough	1.50	1.49	649.98
2021-02A	651.95	No water and slough	7.35	6.84	645.11
2021-02B	651.95	No water and slough	Dry to 3.8	Dry to 3.8	< 648.15
2021-03A	651.70	No water and slough	Dry to 13.2	Dry to 13.2	< 638.50
2021-03B	651.70	No water and slough	Dry to 3.8	Dry to 3.8	< 647.90

Two sets of standpipes were installed at each testhole location to determine the near surface watertable and lower bedrock watertable. The watertable was typically higher on the south end of the site and lower to the north.

It should be noted that water table levels may fluctuate on a seasonal or yearly basis with the highest readings obtained in the spring or after periods of heavy rainfall. The above winter/spring readings would be below seasonal average levels.

## **7.0 RECOMMENDATIONS**

### **7.1 Slope Analysis**

Based on a supplied LIDAR contour map supplied by Select Engineering, it was determined that the Sturgeon River bank slopes to the west of the site were approximately 25 to 30 metres in height and at a grade of between 3H:1V and 4H:1V overall.

No signs of slope failures, slumps or erosion were observed anywhere onsite at the time of our slope walk, with the exception of a small erosion hole cause by groundwater seepage near the middle of the slope below Testhole 2021-01. And an old slump at the top of the slope near Testhole 2021-03.

Our SLOPE/W software generates an Interactive Limit Equilibrium Slope Stability Analysis. The method used for this analysis was the Morgenstern-Price method. With this modelling, a factor of safety (FOS) against failure is given for a specific slip surface. Circular and translational slip surfaces were analyzed. Only the slip surface with the lowest FOS, known as the critical slip surface, would be utilized in the geotechnical evaluation of each profile. The area behind the critical slip surface with a minimum FOS of 1.5 would be considered geotechnical satisfactory for building development, while a minimum FOS of 1.3 is generally accepted for the property lines, road right-of-way, and underground utilities.

Four cross sectional profiles were chosen to be analyzed by Hoggan for the site slopes. Profiles 1 to 3 were chosen by Select Engineering near the proposed testhole locations and were approved by Hoggan. A forth profile was analyzed through the noted slump area. The profiles were modeled and analyzed using GeoStudio's SLOPE/W software. The soil conditions in the testholes were used to model the soil conditions for the slope profiles.

A bedrock layer was noted in all 3 testholes below approximately 2.4 to 4.7 metres BGS. Although no bentonite seams were noted in the testholes, some slightly bentonitic layers were noted within in the bedrock soils. The shear strength parameters of the bedrock soils are important factors in the analysis of the stability of the slope. The strength of highly bentonitic shales or bentonite layers varies with the amount of strain that has occurred in the soil. These soils tend to be strain weakening and are given assigned peak and residual strength values. The analysis utilized a 15 degree bentonite/weak layer residual friction angle, as a conservative worst case scenario for profiles 1 to 3. The lower watertable was also raised 4 metres from the measured or dry levels in the 3 testholes. In addition an 8 degree bentonite/weak layer residual

friction angle was used for Profile 4 and a raised watertable of 4 metres from the measured level in Testhole 2021-03, since a previous slump was noted in that area.

The Sturgeon River, near the south end of the site runs east toward the analyzed slope and then turns north and runs relatively straight, parallel to the slope. Due to the outside bend adjacent to the slope, the analysis of Profile 3 included a potential 10 metre toe erosion of the river bank.

Based on the slope analysis, it was determined that all 4 slope profiles have a FOS of greater than 1.5 at the Top of Bank(TOB). No building setbacks are required beyond the TOB, based on the FOS, for any parts of the slope. However, Hoggan recommends that a minimum 10 metre property setback, from the TOB Line, be used for all slopes of the site as identified on the plan. These setbacks are recommended for safety purposes and human effects.

The TOB Line used for the analysis was determined by Pals Geomatic Corp., and supplied to our firm by Select Engineering. The recommended property setback lines referenced from the TOB line and shown on the site plan located in the Appendix. JRP did not observe the TOB line location in the field.

## **7.2 Slope Recommendations & Discussion**

Based on the methodology, assumptions, and limitations described above, the following recommendations and discussion are provided with respect to the stability of the subject slopes within the project site under the present conditions. The following design and construction recommendations are very important to help maintain the stability of the slope and limit the human impacts upon the slope.

1. For all lots backing onto the west slopes, no excessive fill or other loads should be placed within the property setback zone, or on the slope without further engineering analysis. Lot grades adjacent to the proposed setback should be maintained at or below existing levels. Proposed lot grading with fill depths over 1.0 metre within 20 metres of the TOB should not be allowed without a detailed review by a qualified geotechnical engineer.
2. Unoccupied structures such as decks and gazebos are considered acceptable between the TOB and the setback line, with care taken not to rigidly attach these structures to any buildings. These structure types must be designed as sacrificial, pulling away from building foundations without causing any damage or movement to the building.

3. It is critical that the design, construction and ongoing maintenance of the development do not adversely affect ground conditions. Vegetation cover over the slope and within set back zones should not be disturbed. No dumping of any material beyond the development setback or on the slope is recommended.
4. Since existing grades are sloped toward the Top of Bank no additional surface flow over the bank is anticipated. Sheet flow would be acceptable for the back of lots, however it would be beneficial if lot grades directed water away from the slopes where possible. Roof leaders should be directed to the front of lot if possible and no water should be allowed to collect or concentrate, and then drain over the top-of-bank. A small amount of diffuse surface lot drainage is acceptable. Any surface erosion should be immediately corrected and vegetation started to prevent further erosion. No water should be allowed to collect or concentrate, and drain over the escarpment as the soils are susceptible to erosion. Any surface erosion should be immediately controlled. Vegetation should be strategically planted to prevent further erosion.
5. Infiltrating surface water will make slopes less stable. It is important that the design, construction, usage, and ongoing maintenance of the property will not saturate the existing soil condition. Sources of water should be eliminated or minimized. Lawns should not be over watered. No underground automatic watering, swimming pools, ornamental ponds, or other water storage items should be permitted for all lots backing on the slope for a distance of 30 metres from the TOB. Hot tubs would be acceptable within the previously mentioned 30 metre setback with an approved leak detection and abatement system.
6. If stormwater management facilities (SWMFs) are planned for this site they should be designed a minimum 30 meters from the top-of-bank line. This setback can be modified if a more rigorous investigation and analysis is performed for a specific SWMF design and location.

### **7.3 Site Preparation and Grading**

1. This site consists agricultural land which is generally flat but slopes gently to the west. Conventional clearing and stripping should be possible for most of the site. The trees along the west border of the site, on the Sturgeon River slope, should be left untouched.

The topsoil layer around the site was mostly 150 to 450 millimetres thick. The topsoil depth is known only at the testhole locations, and may vary between testholes.

2. The near surface watertable levels in the testholes were low to high and noted between 1.2 and below 3.8 metres BGS. Testhole 2021-01, on the south end of the site, had a watertable level at 1.2 metres depth, whereas the remaining 2 testholes were dry to 3.8 metres BGS. Cuts in high water table areas will increase road, sewer and other construction costs and are therefore not recommended. Therefore, cuts should be carefully considered at this site and Hoggan should review the grading plan prior to finalizing. Areas where the watertable is less than 3.0 metres depth would benefit from an increase in the grade, notably on the south portions of the site.
3. Engineered fill may be considered in areas where low elevations necessitate deep fill zones. This option should be reviewed prior to implementation by a geotechnical consultant to evaluate site conditions, slope issues and borrow material sources. Basically, engineered fill is fill which is placed in a controlled manner under the full-time inspection of a qualified soils technician. The fill is placed and compacted to a minimum 98 percent of its Standard Proctor Density near its optimum moisture content, in maximum 150 millimetre lifts. All topsoil and non-engineered fill must first be stripped from the engineered fill area. Engineered fill construction requires full-time monitoring and extensive testing by the geotechnical consultant during construction. However, proper placement of engineered fill will negate the need for pile foundations in deep lot fill areas, and possibly reduce the foundation costs to the builders and developer.

It should be noted that engineered fill construction is not possible in all situations. One of these situations occurs when soft, very moist, underlying soils are exposed once stripping has been completed. Compacting the first lift of fill material over these soft underlying soils to the engineered fill standard may be impossible. Where a minimum fill depth condition is met, construction of a clay pad approximately of 300 to 500 millimetres in thickness will be required to obtain an adequate working platform to start from. This pad should be compacted to a minimum of 95 percent of Standard Proctor Density where possible. The normal engineered fill lift thickness and compaction criteria mentioned above should be applied to successive lifts. To employ this method, a minimum of 1.0 metre of engineered fill must be placed on top of the clay pad. If this



condition is not met, the fill would not be considered to have met engineered fill standards.

In addition, engineered fill requires fill depth differentials across the building footprint of less than 1.5 metre. This may be a limiting factor in this area, due to the rolling nature of the existing ground. In some cases, removal of native material may allow for the minimum fill depth or the maximum fill differential conditions to be met. However, this may not always be the most economical solution.

#### **7.4 Residential Housing Units**

1. The subsurface soil conditions encountered throughout this site are considered fair for supporting single family dwellings utilizing standard concrete footing foundations. The upper silty clay materials encountered in the testholes were predominately moist with a stiff consistency, therefore the bearing capacity of these materials should be a minimum 75 kilopascals required for applying the Alberta Building Code Section 9. Topsoil and other deleterious material is not considered suitable for footing or slab-on-grade support.

Consideration should be given to the moderate to high watertable on the south end of the site and any areas where cuts may occur. Difficulties may be encountered during excavation of house foundations, including a soft excavation base, temporary dewatering and upgraded drainage measures. In addition, a high watertable can cause frost heave concern for driveways, sidewalks and other landscaping features.

2. Some very high plastic bedrock soils were encountered in the testholes with Atterberg Liquid Limits greater than 90 percent noted in Testhole 2021-03. Our firm has encountered bentonite soils in other areas near Gibbons and in Northeast Edmonton. From past history of these areas, the following discussion is provided in dealing with the very high plastic bedrock and bentonite soils should they be encountered during construction.

Based on the bedrock depths in the testholes which were initially encountered below depths of 2.4 to 4.7 metres BGS, a typical basement footing at 2.0 metre depth could be affected. The concern for houses founded on or near these very high plastic clays is the high swelling and shrinkage potential. Swelling/shrinkage of the clays can cause significant movements in the house foundation, basement slab-on-grade, and other

structures associated with residential lot development. The following recommendations should be considered to minimize the bedrock swelling concerns.

- a. A 1.0 metre separation between the house footing and the bentonite/highly bentonitic bedrock soils should be maintained. The 1.0 metre buffer is chosen based on our knowledge and research in similar soil conditions in North Edmonton. The value is not conservative and is not meant to be an exact limit to prevent swelling. The design lot grading should be raised if possible in high bedrock areas to help maintain the 1.0 metre buffer from the bedrock. If bentonitic soils are found at the foundation level during basement excavation, the bentonite should be excavated to 1.0 metre below footing grade and replaced with engineered fill consisting of low to medium plastic clay.
  - b. In order for swelling or shrinkage to occur, the moisture content must change. If water transfer does not occur, swelling or shrinkage of the clay would not occur. Therefore, the control of free water and excessive drying are important factors for minimizing the risk of swelling/shrinkage. Upgraded foundation drainage may help regulate surface water infiltration into the bedrock.
  - c. As with many geotechnical considerations, the swelling and shrinkage risk cannot be completely eliminated, only minimized. All parties should be made aware of and must accept the risk of foundation and slab movement in order to utilize footing foundation or slab on grade. Otherwise, pile foundation and structure slab with void forms would be required.
3. Proper lot grading away from the houses must be provided to minimize the ingress of surface water into the subsoil. All houses will require at least 1.5 meters of earthen cover to prevent potential frost heave problems, and to minimize movements associated with seasonal variations in moisture content. The amount of cover should be increased to 2.5 meters for exterior isolated footings or for footings of non-continuously heated structures.
  4. Grading requirements of the site are unknown at this time but if general lot grading will produce areas of fill extending to depths below that of footing elevations, it is strongly recommended that house excavations be inspected by qualified geotechnical personnel prior to foundation construction. Generally, it is not recommended that footings be constructed on non engineered fill. In such cases, the following alternatives are

commonly recommended:

- i) Removal of the fill down to native soil and replacement with a compacted coarse clean granular material, or concrete. A normal footing foundation may then be utilized.

or

- ii) Utilize a pile foundation.

5. Other foundation types besides footings should be evaluated for the specific site conditions on which they are to be used.

In the case of pile foundations, some installation problems may be encountered. Some accumulations of free water and/or slough were present at the completion of drilling in Testhole 2021-01. Casing of the piles may be required and should be readily available on site during construction. Also, at the very least, pile concrete should be on-site during the pile drilling to allow for quick concrete placement.

Screw piles could be considered where a pile foundation is required. The design and installation of screw piles is commonly undertaken on a design build basis. However, the hard bedrock soils may make installation of the screw piles difficult.

6. Engineered fill may be considered in areas where low elevations necessitate deep fill zones. Fill placement should be in accordance with Item 7.3.4.
7. No loose, disturbed, remoulded or slough material should be allowed to remain in the open footing excavations. Hand cleaning is advised if an acceptable surface cannot be prepared by mechanical equipment. In order to reduce the disturbance to the bearing surface, all basement excavations should be advanced by a backhoe operating remote from the bearing surface.
8. Footing excavations should be protected from drying, rain, snow, freezing and the ingress of surface or groundwater. Care should be taken to ensure that all exposed soils are protected from excessive drying or wetting. The soils encountered immediately below the topsoil in some of the testholes were medium plastic, and have a moderate swelling potential.
9. A 150 millimeter layer of free draining sand or sand-gravel mixture, with less than 10 percent fines, should be placed immediately below all floor slabs. This material should be uniformly compacted to 98 percent of the corresponding Standard Proctor Density at

- optimum moisture content.
10. A non-deteriorating vapour barrier should be placed immediately below the floor slab to prevent desiccation of the subgrade material.
  11. The site is located within an area that has been identified by the national research council to have high levels of relative Radon hazard. Radon is a tasteless, odorless, colorless gas potentially emitted by the site subsoil and is a health concern. As per Section 6.2.1.1 of the Alberta Building Code 2014 Volume 2, Radon prevention system may need to be addressed for all new building construction. The Building Code calls for a maximum allowable Radon level in an occupied space. Currently, Hoggan is not aware of any scientific method for predicting Radon gas levels in a specific building at a specific site.

Although the radon mitigation system should be designed by others, one method of addressing the Radon prevention system may include a minimum 100-millimeter-thick crushed Radon rock layer below the slab for Radon ventilation purposes. This crushed Radon rock layer may be increased to 150-millimeters-thick to substitute the granular base recommended in Item 8. The crushed Radon rocks may need to meet the following ASTM C33/C33M-16 #5 aggregate specifications.

<b>Radon Rock Gradation</b>		
<b>Sieve Size (mm)</b>	<b>Minimum Passing</b>	<b>Maximum Passing</b>
37.5	100	100
25.0	90	100
19.0	20	55
12.5	0	10
9.5	0	5

A non-woven geotextile separator (Nilex 4551 or similar) should be considered between the soil subgrade and the Radon rock layer to prevent infiltration of fines into the Radon rocks. Radon gas extraction issues from the Radon rock layer are beyond the scope of this report.

In addition, this Radon prevention system may include an air tight vapor seal between the Radon rock and bottom of slab. For Radon mitigation purposes, the vapor barrier may need to be a minimum 10 mil in thickness, and bonded together with air tight seal. This air tight vapor barrier can be used as the vapor retarder recommended above in Item 9.

12. Other radon mitigation methods may include manufactured products, such as Radon Guard and increased ventilations. These products may meet the criteria for air flow in order to mitigate the radon gas below the slab. Use of such radon mitigation products may have adverse effects on the slab-on-grade in certain applications. It is recommended that that radon mitigation system be reviewed by a qualified geotechnical engineer.
13. The watertable at this site was low to high, measured at between approximately 1.2 to greater than 3.8 meters below the existing ground surface. Temporary dewatering may be required for basement excavations advanced below the watertable. In addition, some other measures are recommended, as outlined in the following items. Winter excavation in high watertable areas may become challenging and should be avoided if at all possible.
14. At a minimum, peripheral weeping tile lines will be required for all houses. All lines should be placed at or slightly below footing elevation and connected to ensure positive drainage to an approved system. The weeping tile lines will require a suitable clean tile rock drainage filter, with a minimum of 150 millimetres of rock wrapped in filter cloth around the line. Basements located near the water table may require interior drains and clean tile rock beneath the floor in addition to perimeter drains. The recommended configuration for houses with footing elevations located below or near the watertable is illustrated in the Appendix.
15. The time span between the start of excavation to installation of basement footings, walls, peripheral weeping tile and backfilling operations should be minimized in order to prevent any problems developing within the excavation due to ingressing of ground or surface waters or desiccation of the subsoil.
16. It is recommended that floor joists be placed prior to backfilling the excavation in order to minimize any detrimental effects on the foundation walls caused by backfilling operations.
17. During cold weather construction, it is essential that all interior fill and load bearing materials remain frost free. Recommended cold weather construction practices, with respect to hoarding and heating of the forms and the fresh concrete, should be followed. In order to minimize the potential frost heave problems, the interior of the building must be heated as soon as the walls have been poured. The period in which the excavation is left open due to freezing conditions should be as short as possible. If doubts remain as to the suitability of the foundation during construction, the builder should consult a

qualified geotechnical engineer.

## 7.5 Underground Utilities

1. The subsurface soil conditions encountered in the testholes are considered generally satisfactory for the installation of underground utilities incorporating the Town of Gibbons backfilling and compaction requirements. The upper moist, clay and lower bedrock soils encountered in the testholes would be considered satisfactory while the very moist to wet, sand layers noted in Testhole 2021-01 would be considered poor. The upper clays were below to near optimum moisture content, while the lower bedrock materials were near optimum moisture content. Deeper trenches near Testhole 2021-01, will be troublesome due to water seepage and sloughing sand. Topsoil and other organic materials are not considered suitable for backfill material.
2. The watertable was typically low to high between 1.2 and greater than 3.8 metres depth BGS in the testholes. Therefore, saturated soil conditions, sloughing and ingressing groundwater may be encountered in the trenches at this site, depending on the design elevations and location within the site. Sand soils encountered in Testhole 2021-01 were typically wet with significant water seepage. Ingressing water should be expected in the trenches where wet sand seams are encountered, and specialized dewatering should not be ruled out for these areas. Overall the amount of groundwater infiltration is expected to be low at this site. Typical temporary dewatering measures should be sufficient for most areas of the site and will likely be required during utility installation. Opening relatively long portions of utility trench is not recommended for this site.
3. Standard trenching cutback angles of approximately 45 degrees from the vertical are anticipated for most areas of the site. Sand layers may cause significant water seepage and sloughing and may require increased cut back angles of 60 degrees, and/or benching. Actual cutback angles should be determined in the field during construction. Exact stable slope values cannot be pinpointed without detailed and extensive analysis. For this reason, this information should be used as a guideline only and that the optimum cutback angles for utility trenches be determined in the field during construction. The Occupational Health and Safety Code, Part 32 Excavating and Tunnelling should be strictly followed, except were superseded by this report.

Bentonitic bedrock soils were present in the testholes and are present in the Gibbons area. Therefore bentonite could be encountered in isolated areas of the site during construction. Bentonite can be relatively weak material and slope movements can occur when it is present in a trench. Therefore the presence of bentonite should be carefully monitored during construction. Bentonite is typically associated with bedrock soils and can be recognized by its peculiar color with typical colors being yellow, green or brown, although it can be grey and match the bedrock. Bentonite can also be identified by its soapy texture.

If bentonite is suspected present during underground construction, our firm should be contacted immediately to evaluate the situation and determine the need for any of the stated extra slope measures. Separation and removal of the bentonite is recommended when encountered in the trenches. Over excavation of the bentonite soils may be required where bentonite soils are noted near the pipe zone.

4. Trench widths should be compatible with safe construction operations. The trench width must be wide enough to accommodate pipe bedding and compaction equipment.
5. Temporary surcharge loads, such as spill piles, should not be allowed to within 3.0 meters of an unsupported excavation face, while mobile vehicles should be kept back at least 2.0 meter. All excavations should be checked regularly for signs of sloughing or failures, especially after rainfall periods.
6. The backfill material beneath and above the pipe should be an approved bedding sand material where conditions allow. This material should be hand placed and hand tamped, with care taken to fill the underside of the pipe. Bedding sand should be compacted to a minimum of 95 percent of Standard Proctor Density in maximum 150 millimetre thick lifts. Ingressing groundwater and soft soil conditions may be encountered in deep trenches at this site, especially in areas below the watertable. To overcome the installation difficulties which may be encountered where ingressing groundwater and/or poor bearing conditions may be a problem, it is recommended that a washed rock and geotextile separator be utilized for pipe bedding in these areas. The washed rock and geotextile configuration should be determined in the field during construction. The need for this configuration is expected to be low to moderate at this site depending on the depth of pipe.

7. The moisture content of the silty clay in the testholes was variable, but was generally very moist to wet. The variable condition of the soils will cause a corresponding variability in the utility trench pipe bedding and backfill conditions. A substantial amount of drying and/or mixing will likely be required at this site to meet the moisture content criteria and adequately construct a platform for surface utility construction. Trenching operations may be slowed down due to the required moisture conditioning. Failure to adequately moisture condition the trench backfill may result in subgrade softening of the trench backfill.
8. All trench backfill should be composed of suitable soil free of organic content. Backfill should be placed in maximum lift thickness of 300 millimetres and compacted to a minimum 95 percent of the corresponding SPD below 1.5 metres of the bottom of subgrade, and a minimum compaction of 98 percent of SPD in maximum 150 millimetre lifts within the upper 1.5 metres. The moisture contents of the near surface native clay were generally near to slightly above optimum moisture content. Therefore, some minor drying and/or mixing may be required to achieve adequate compaction.
9. The existing native clay and bedrock soils on this site are considered suitable backfill material for utility trenches. The bedrock soils should be separated during trenching and placed at the bottom of the trench and not in the top 1.5 metres below subgrade. The high plastic clays or bedrock materials as encountered during trenching, should be placed a minimum 1-3 percent over optimum moisture content to reduce the risk of swelling. In addition, the bedrock soils should be adequately pulverized prior to compaction.

If significant sand seams are encountered during trenching the sand should also be separated from the clay soils and not mixed in during backfill. The sands should be placed in the trenches below 1.5 metres depth to reduce the frost heave potential.
10. It should be noted that the ultimate performance of the trench backfill is directly related to the consistency and uniformity of the backfill compaction, as well as the underground contractors construction procedures. In order to achieve this uniformity, the lift thickness and compaction criteria should be strictly enforced.



## 7.6 Surface Utilities

1. The subsurface soil conditions encountered throughout this site are considered generally fair for the construction of roads, curbs, and sidewalks in undisturbed areas. Difficulty will likely be encountered in utility areas due to mixing of materials during trench backfilling. Topsoil and other deleterious materials should be removed prior to construction of roads, sidewalks and other surface utilities.
2. The main concern for surface utility construction at this site is the elevated moisture content of the sand materials in Testhole 2021-01 and the high watertable encountered near Testhole 2021-01. It is noted that the degree of trench backfill drying during underground utility installation affects the soil conditions for road and sidewalk construction, with increased drying improving the soil conditions.
3. Where fill is to be placed, the fill material below the upper 150 millimeters should be compacted to a minimum 98 percent of Standard Proctor Density. All fill should be placed in maximum thickness lifts of 150 millimeters.
4. Cement stabilization is the recommended minimum subgrade treatment for this site. For stiff clay subgrade, minimum 10 kilograms of cement per square meter of subgrade should be mixed to a depth of 150 millimetres, and re-compacted to 100 percent of Standard Proctor Density (SPD) near optimum moisture content. For soft to firm clay subgrade, 20 to 30 kilograms of cement per square metre of subgrade mixed to a depth of 300 millimetres would be required. In addition, if sorting of the bedrock soils is not possible then the addition of 25 kilograms of cement per square metre of subgrade mixed to a depth of 300 millimetres is recommended. Actual cement content should be determined in the field by our firm. Weather and time of year will also be factors.

The subgrade should be inspected and proof rolled after final compaction and any areas showing visible deflections should be repaired prior to paving.

5. The observed watertable depths were low to high between 1.2 and greater than 3.8 metres depth BGS in the testholes. The near surface site clays are of low to moderate frost susceptibility. A high watertable within approximately 3.0 meters of the road surface is required for significant frost heaving to occur. The closer the watertable is to the surface, the higher is the frost heave potential. The standpipe in Testhole 2021-01, on the south end of the site, stabilized above this level, and therefore the potential for frost heave will

be high in this areas. The design grades should be set high as possible in high water table areas. Other frost heave reduction measures may be required and our firm should be review design grades to determine where these measures may be required.

5. All road subgrade should be crowned at a minimum 2 percent slope to the ditches.
6. The following 2 year staged pavement design may be applied to the proposed residential roadways. An estimated Subgrade Resilient Modulus ( $M_r$ ) of 30 MPa is used in the design, as well as a design life of 20 years. The previous items have discussed the possible difficulty and recommended options for attaining this estimated  $M_r$  at this site, and need to be referenced. The stated Equivalent Single Axel Load (ESAL) values and pavement designs for different roadway designations were obtained from City of Edmonton guidelines.

<b>Recommended Staged Pavement Structures</b>		
Design Traffic Loading	Local Residential ( $3.6 \times 10^4$ ESALs)	Minor Collector ( $1.5 \times 10^5$ ESALs)
<b>STAGE 1</b>		
Asphaltic Concrete	65 mm ACR or 10mm-LT	75 mm ACO or 10mm-HT
Crushed Gravel (3-20)	200 mm	250 mm
<b>STAGE 2</b>		
Asphaltic Concrete	35 mm ACR or 10mm-LT	35 mm ACO or 10mm-HT
ACR(12.5 mm) = Asphaltic Concrete Residential ACO(12.5 mm) = Asphaltic Concrete Overlay 10mm-LT = City of Edmonton Asphaltic Concrete Mix Type 10 mm - Low Traffic 10mm-HT = City of Edmonton Asphaltic Concrete Mix Type 10 mm - High Traffic 3-20 = City of Edmonton Class 3 Designation 20 aggregate or equivalent All granular base material should be compacted to 100 percent of the Standard Proctor Density in maximum 200 mm lifts.		

No traffic loading data was provided to our firm at this time. Our firm should be advised if updated traffic loading information becomes available and the pavement design should be modified accordingly.

## 7.7 **Cement**

Tests on selected soil samples indicated negligible concentrations of water soluble soil sulphates in the near surface clay deposits. The following alternatives are advised:

1. **Underground Concrete Pipe**

Concrete used for all underground pipes must be constructed of C.S.A. Type HS (high sulphate resistant hydraulic cement).

2. Curbs and Sidewalks

All concrete for surface improvements such as sidewalks and curbs may be constructed using C.S.A. Type GU (general use hydraulic cement).

3. Foundation Construction

Based on C.S.A. Standards A23.1-14, Type GU (General use hydraulic cement) can be used for all concrete coming in contact with the soil. Individual locations may show higher concentrations of soluble soil sulphates, and thus additional soil testing on particular sites may prove valuable.

All concrete subject to freeze thaw must be air entrained with 5 to 7 percent air. Other exposure conditions and structural requirements should be considered when choosing a minimum strength for the concrete. Concrete should conform to CSA Standards A23.1-14 and A23.2-14.

## **7.8 Groundwater and Drainage Issues**

1. The groundwater readings in the proposed subdivision were generally high on the south side of the site and low on the north side. The watertable levels on the south side are of higher concern in design and construction of underground utilities and house construction.
2. The groundwater seepage rates into utility trenches from the native silty clay materials should be low to moderate. The sand layer encountered in Testhole 2021-01 was wet with significant water seepage. Significant groundwater seepage should be expected in the trenches where wet sand layers are encountered, and specialized dewatering should not be ruled out for these areas. It is expected that some trench dewatering will be required for some areas of the site, and construction delays can be expected.
3. At a minimum, peripheral weeping tile lines will be required for all houses. All lines should be placed at or slightly below footing elevation and connected to ensure positive drainage to an approved system. The weeping tile lines will require a suitable clean tile rock drainage filter, with a minimum of 150 millimeters of filter around the line. Basements located near the water table may require interior drains and clean tile rock beneath the floor in addition to perimeter drains. The recommended configuration for houses with footing elevations

located near the watertable is illustrated in the Appendix.

In high water table areas sump pump flows may be higher than normal, running several times a day throughout the entire year. During cold weather, ice may build up at the outlets, therefore proper grading of the outlet and of the surrounding landscaping must be maintained to ensure sump water drains away from the house. It may be prudent to address the potential icing issues during foundation design.

4. House basement excavations situated below the groundwater table may experience water ingress. If this is the case, our firm should be contacted to provide recommendations for handling the groundwater. A temporary dewatering system may be required until the permanent weeping tile system is operational.
5. Water dispersed on the property from the roof leaders must not be allowed to accumulate against the foundation walls. To ensure positive drainage, the soil surface of all lots should be made sloping away from all buildings. This will require a positive lot grading of at least five percent away from the foundation walls toward the sidewalk for a minimum of 1.5 meters. In cases where the lot drainage runs from the back of the lot to the front, runoff should be kept 1.2 meters away from the house.
6. At least the top 1.0 meter of backfill around the basement walls must be a suitable impermeable clay material. The near surface clay materials found at this site will be suitable for this purpose. This serves to reduce water penetration into the backfill, and subsequently into the weeping tile system.
7. In order to ensure no flow paths for water from the roof leaders occur adjacent to the foundation walls, the following two alternatives are proposed:
  - i) A concrete splash pad, placed beneath the downspouts, a minimum of 1.2 meters long and firmly anchored to the house foundation can be used.
  - or
  - ii) A permanent downspout extension could be used to carry water away from the foundation wall.

Downspouts should be directed toward the front of lot where possible. Any surface water directed toward the slope should not concentrate over the slope as noted in Item 7.2.4.

## 8.0 CLOSURE

This report has been prepared for the exclusive and confidential use of Town of Gibbons, Select Engineering Consultants Ltd. and their authorized agents. Use of this report is limited to the subject proposed residential subdivision only. The recommendations given are based on the subsurface soil conditions encountered during test boring, current construction techniques and generally accepted engineering practices. No other warranty, expressed or implied, is made. Due to geological randomness of many soils formations, no interpolation of soil conditions between or away from the testholes has been made or implied. Soil conditions are known only at the test boring location. Should other soils be encountered during construction or other information pertinent become available, the undersigned should be contacted as the recommendations may be altered or modified.

With regards to the slope stability assessment conducted for the subject property, the Owner(s) and all future lot Owners should be aware that our analysis has endeavoured to describe the risk of developing at this site and limit the risk with engineering analysis. The risk can only be limited and not eliminated, therefore slope movement risk must be accepted by all current and future landowners.

We trust this information is satisfactory. If you should have any questions, please contact our office.

Respectfully Submitted:

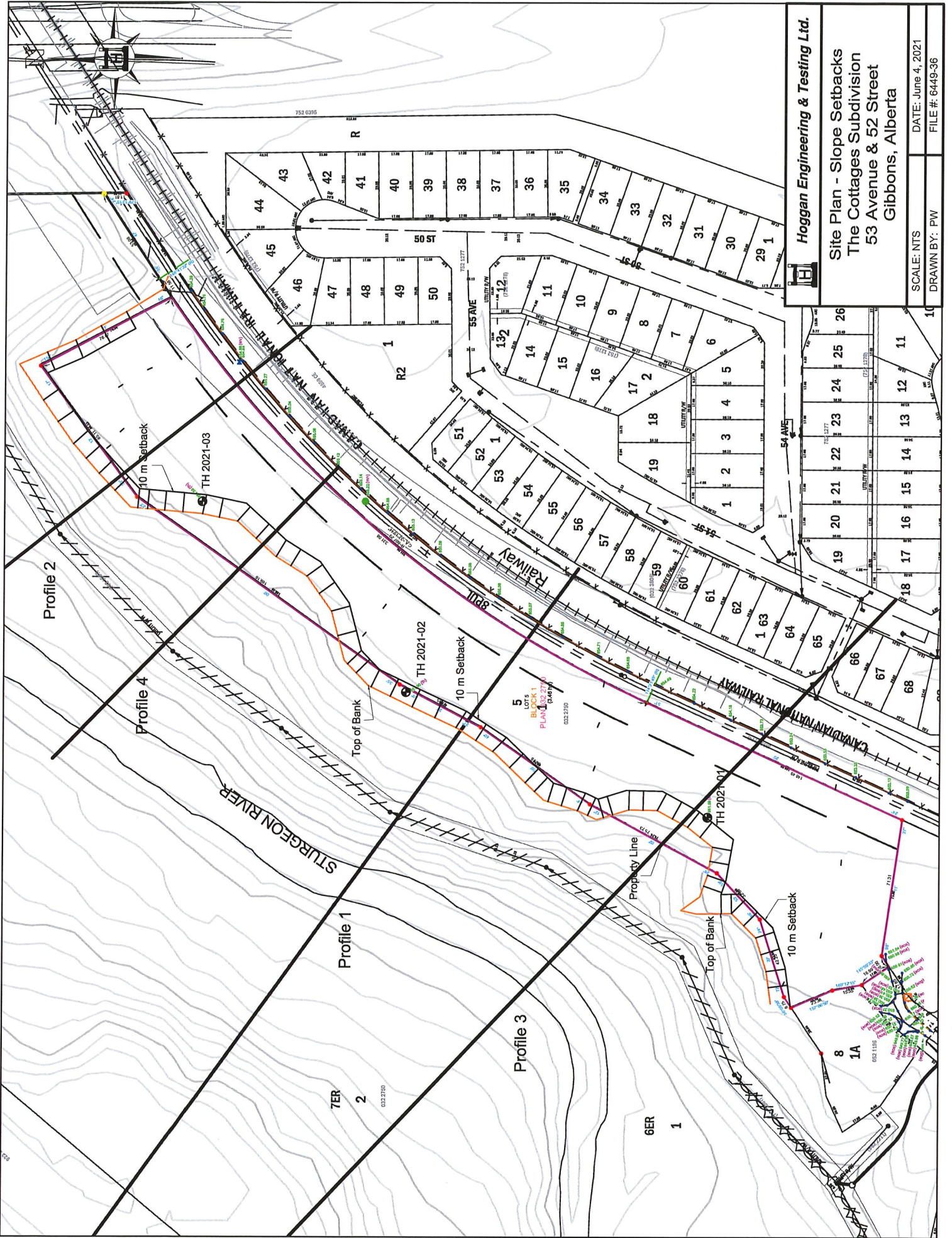
Hoggan Engineering & Testing(1980) Ltd.

Patrick Winski, P. Eng.  
Reviewed By: Rick Evans, P. Eng.

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**APPENDIX**



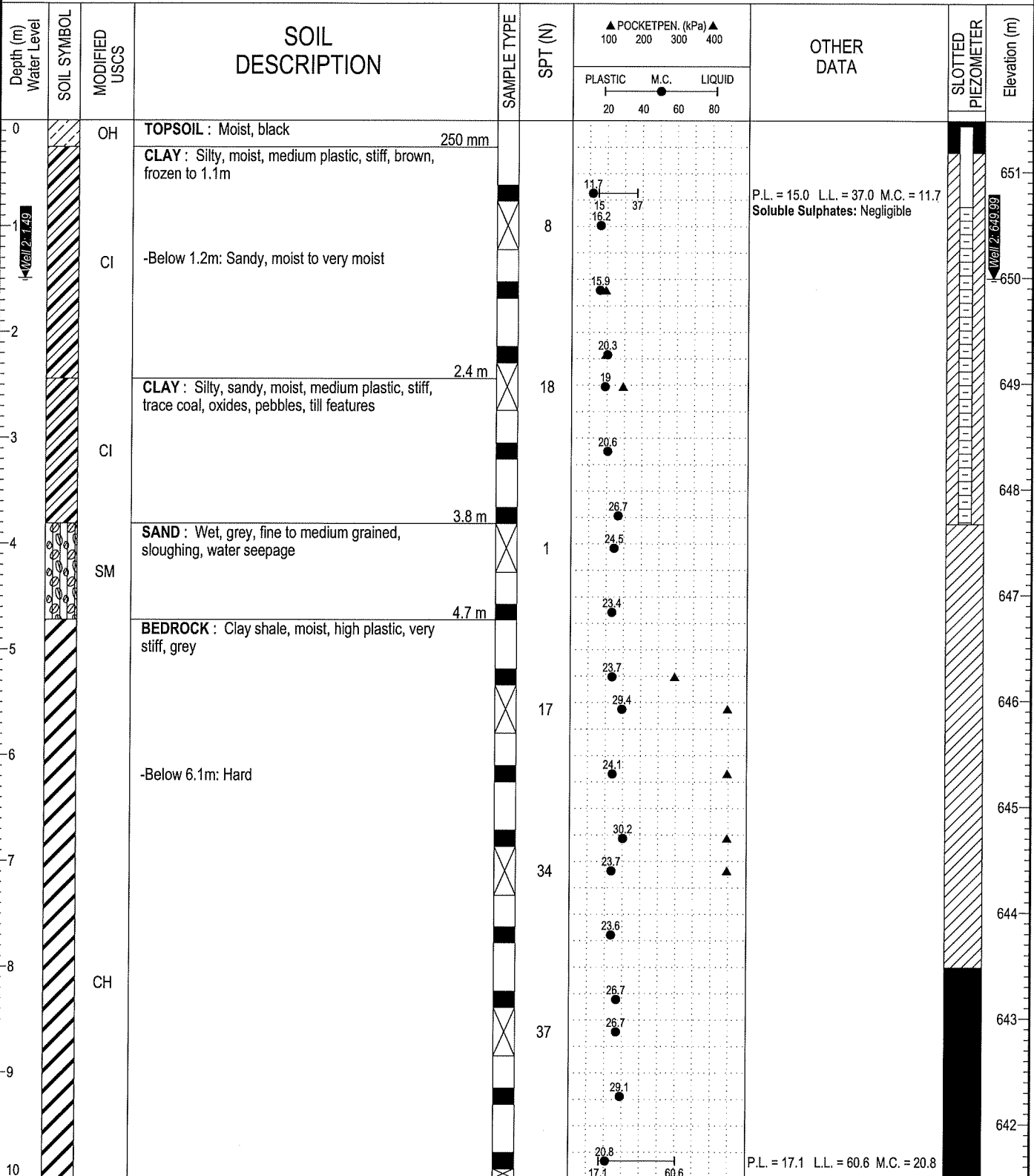


Hoggan Engineering & Testing Ltd.

Site Plan - Slope Setbacks  
 The Cottages Subdivision  
 53 Avenue & 52 Street  
 Gibbons, Alberta

SCALE: NTS  
 DRAWN BY: PW  
 DATE: June 4, 2021  
 FILE #: 6449-36

PROJECT: The Cottages - Gibbons		PROJECT NO:	BOREHOLE NO: 2021-01
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			<input checked="" type="checkbox"/> SAND



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HOGGAN ENGINEERING & TESTING (1980) LTD.

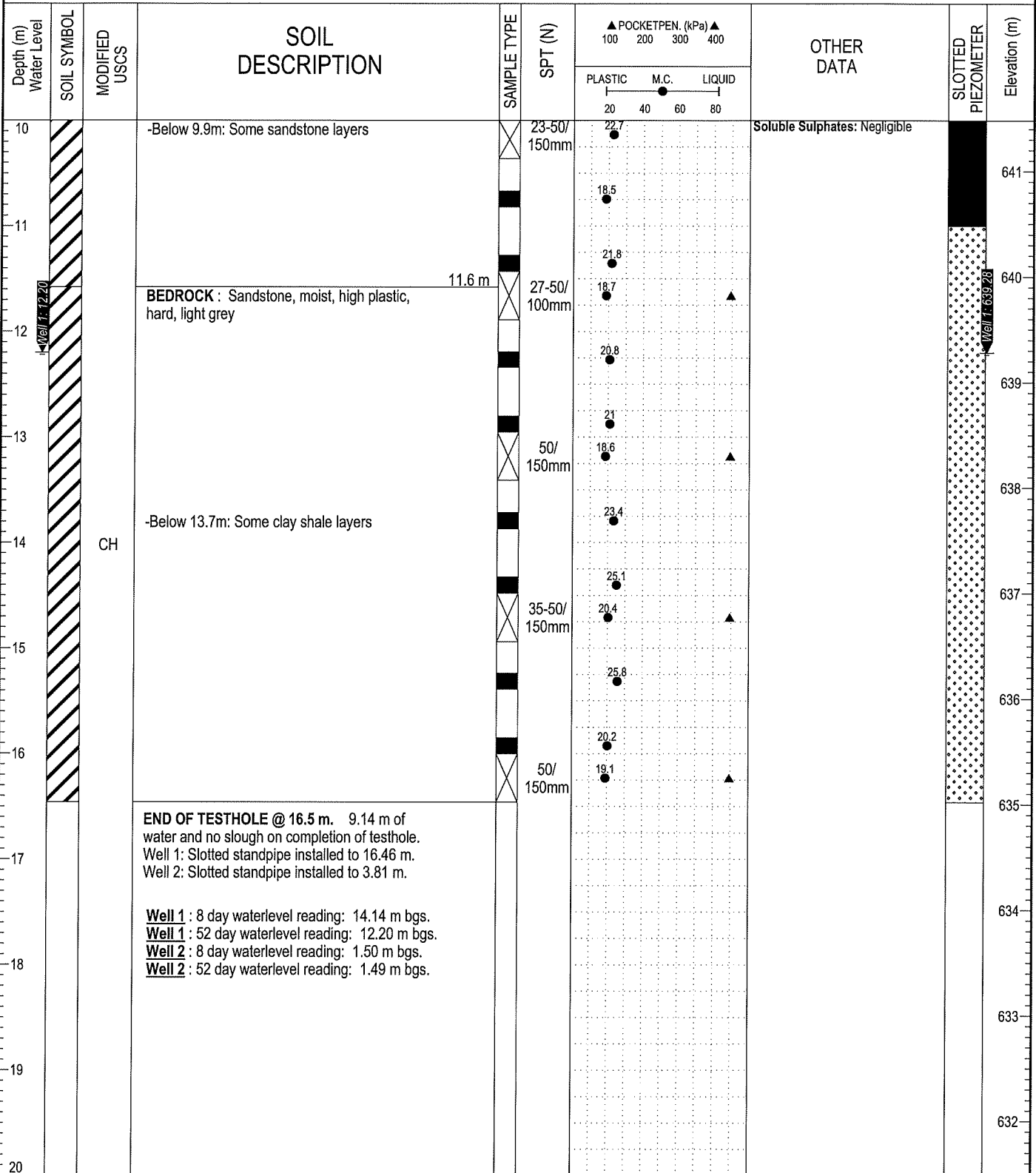
17505 - 106 Avenue  
Edmonton, AB T5S 1E7  
Phone: (780) 489-0700  
Fax: (780) 489-0800

LOGGED BY: P Winski  
REVIEWED BY: R Evans

COMPLETION DEPTH: 16.46 m  
COMPLETION DATE: 03/18/21



PROJECT: The Cottages - Gibbons		PROJECT NO:	BOREHOLE NO: 2021-01
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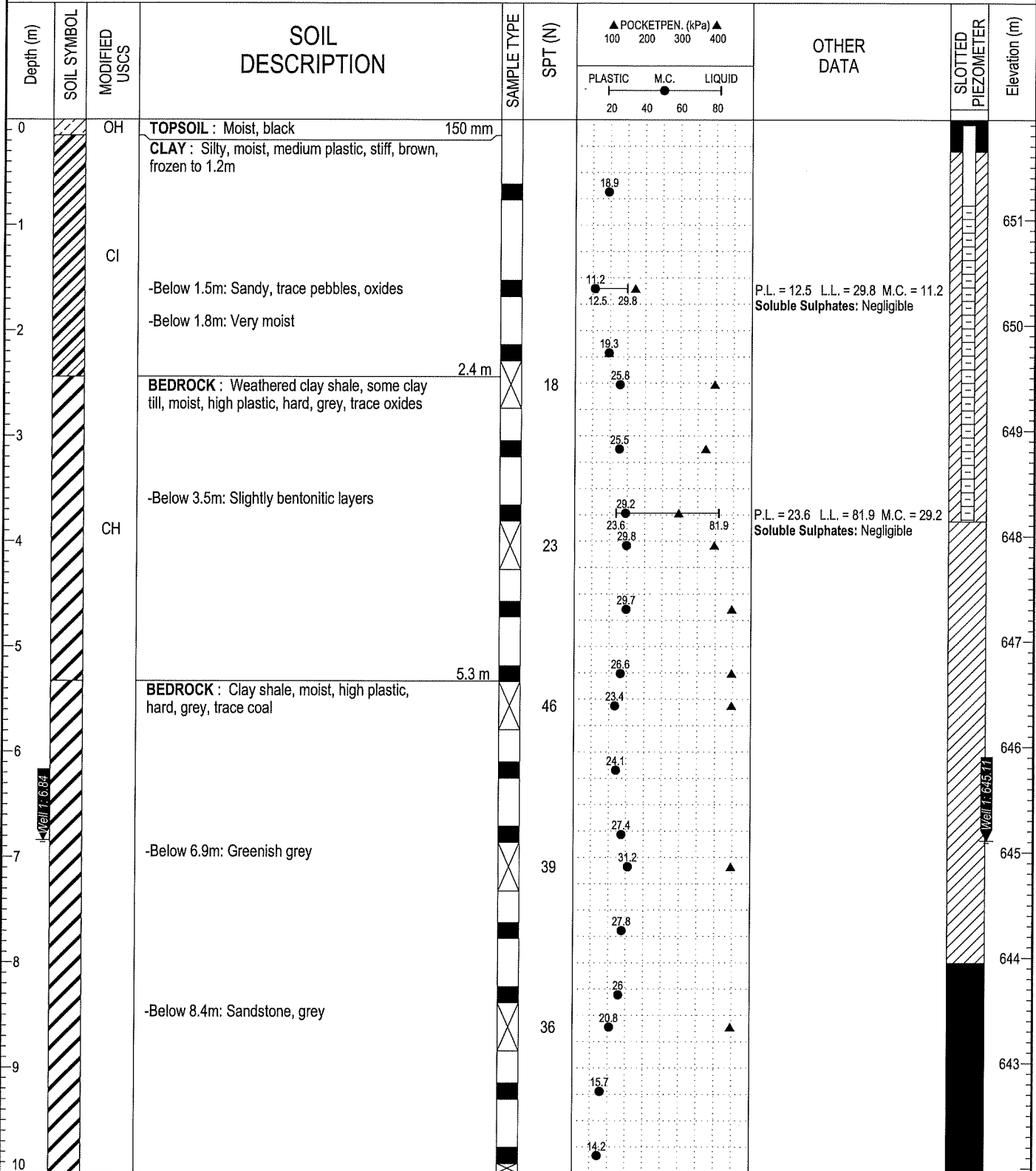
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REVIEWED BY: R Evans

COMPLETION DEPTH: 16.46 m  
COMPLETION DATE: 03/18/21

PROJECT: The Cottages - Gibbons		PROJECT NO:	BOREHOLE NO: 2021-02
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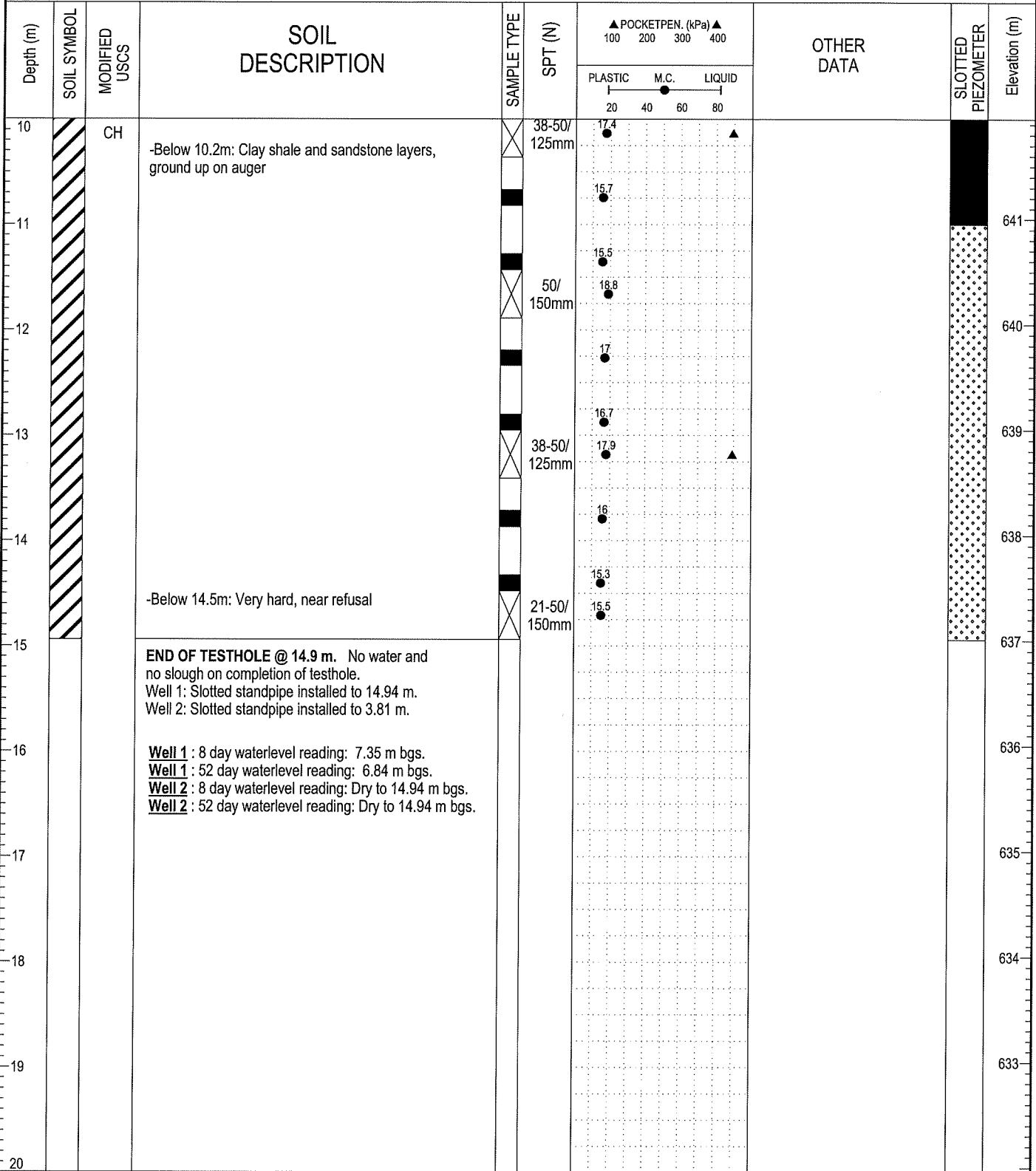
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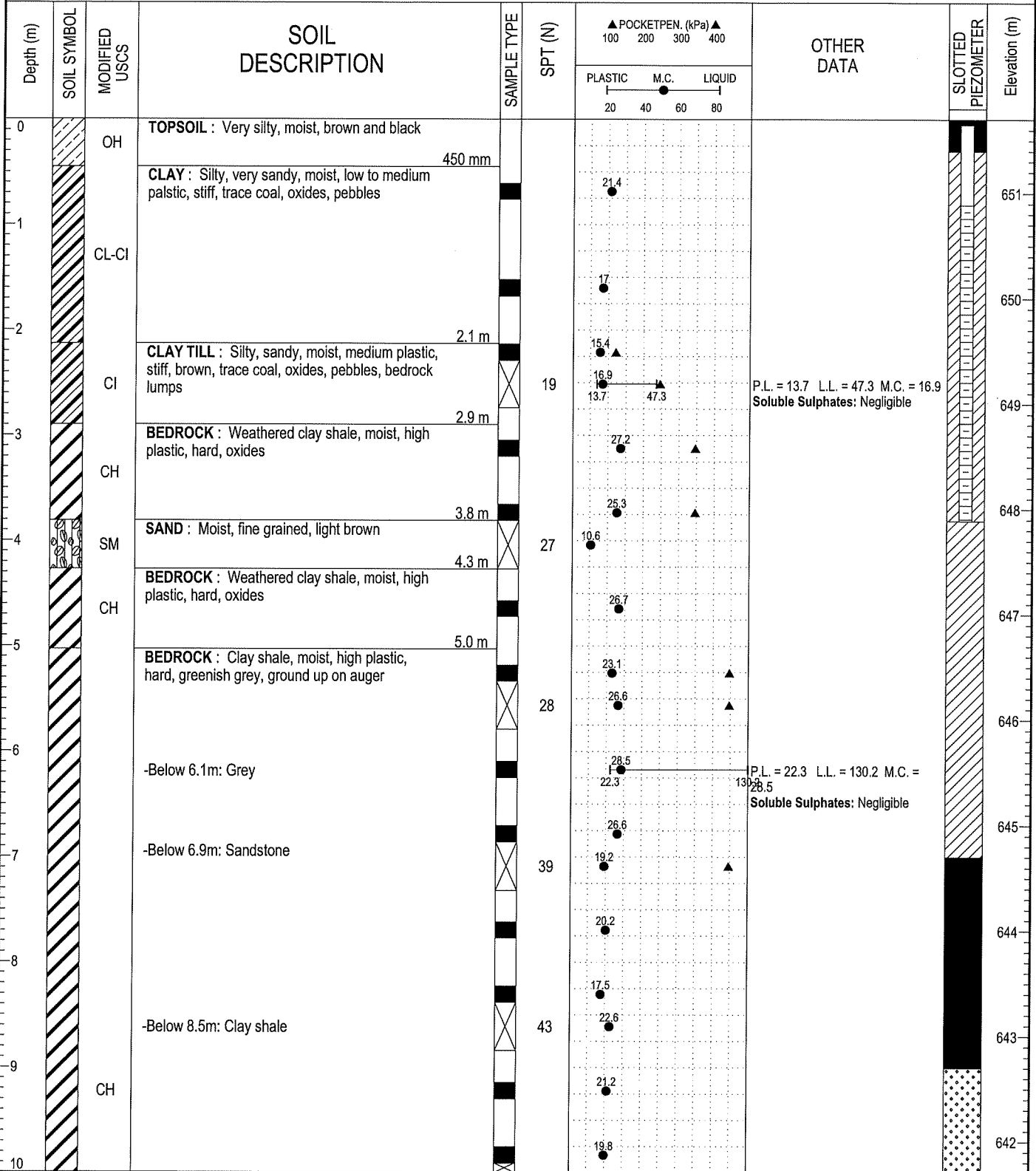
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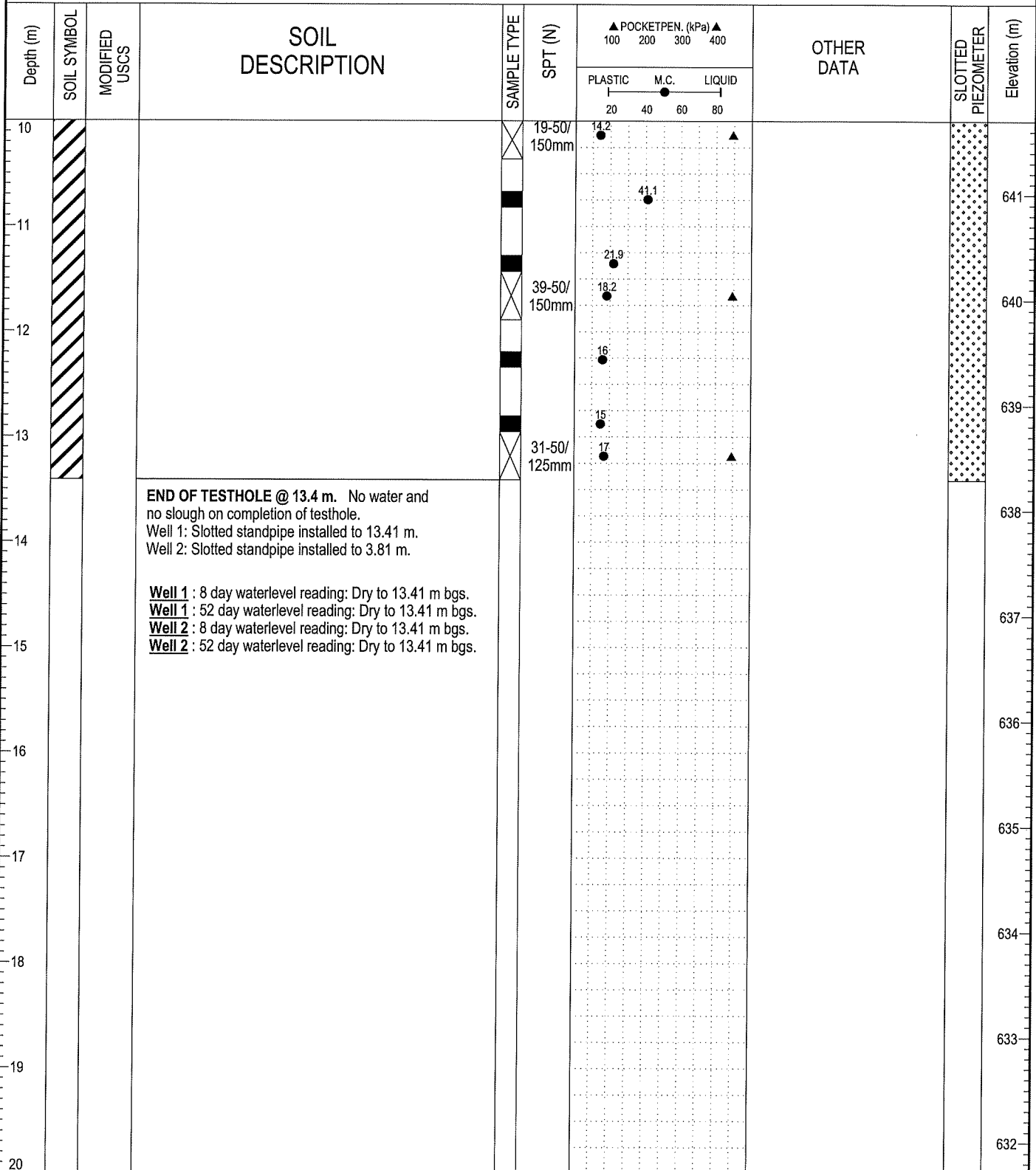
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	<input checked="" type="checkbox"/> GRAB SAMPLE	<input type="checkbox"/> NO RECOVERY	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH
	<input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



JRP\_GIBBONS\_SLOPE.GPJ\_JRPV3\_0.GDT 06/04/21

PROJECT: The Cottages - Gibbons PROJECT NO: BOREHOLE NO: 2021-03  
 CLIENT: Select Engineering DRILL METHOD: Solid Stem Auger ELEVATION: 651.7 m  
 OWNER: LOCATION: As per site plan

SAMPLE TYPE  SHELBY TUBE  CORE SAMPLE  SPT SAMPLE  GRAB SAMPLE  NO RECOVERY  
 BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND



JRP\_GIBBONS\_SLOPE.GPJ\_IRPV3\_0.GDT\_06/04/21



HOGGAN ENGINEERING & TESTING (1980) LTD.

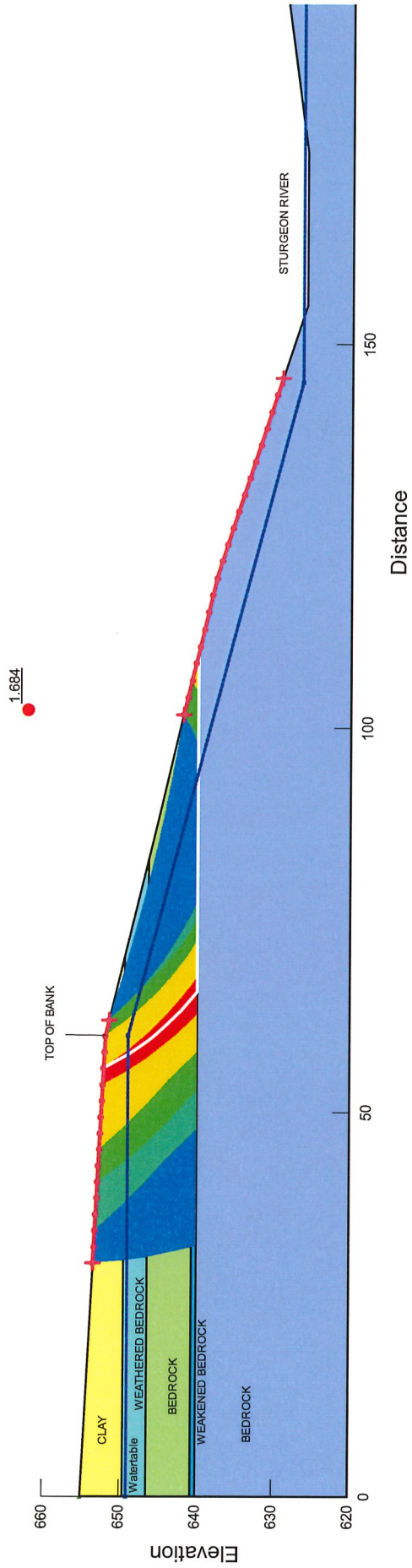
17505 - 106 Avenue  
 Edmonton, AB T5S 1E7  
 Phone: (780) 489-0700  
 Fax: (780) 489-0800

LOGGED BY: P Winski COMPLETION DEPTH: 13.41 m  
 REVIEWED BY: R Evans COMPLETION DATE: 03/22/21  
 Page 2 of 2

THE COTTAGES SUBDIVISION  
SLOPE SECTION 1  
HIGH WEAKENED BEDROCK  
RAISED WATERTABLE

Color	Name	Model	Unit Weight (kN/m <sup>3</sup> )	Effective Cohesion (kPa)	Effective Friction Angle (°)	Phi-B	Piezometric Line
Light Green	Bedrock	Mohr-Coulomb	20	50	25	0	1
Yellow	CLAY	Mohr-Coulomb	19	0	25	0	1
Light Blue	Hard Bedrock	Bedrock (Impenetrable)					1
Dark Blue	Weakened Bedrock	Mohr-Coulomb	20	0	15	0	1
Light Blue	Weathered Bedrock	Mohr-Coulomb	20	5	28	0	1

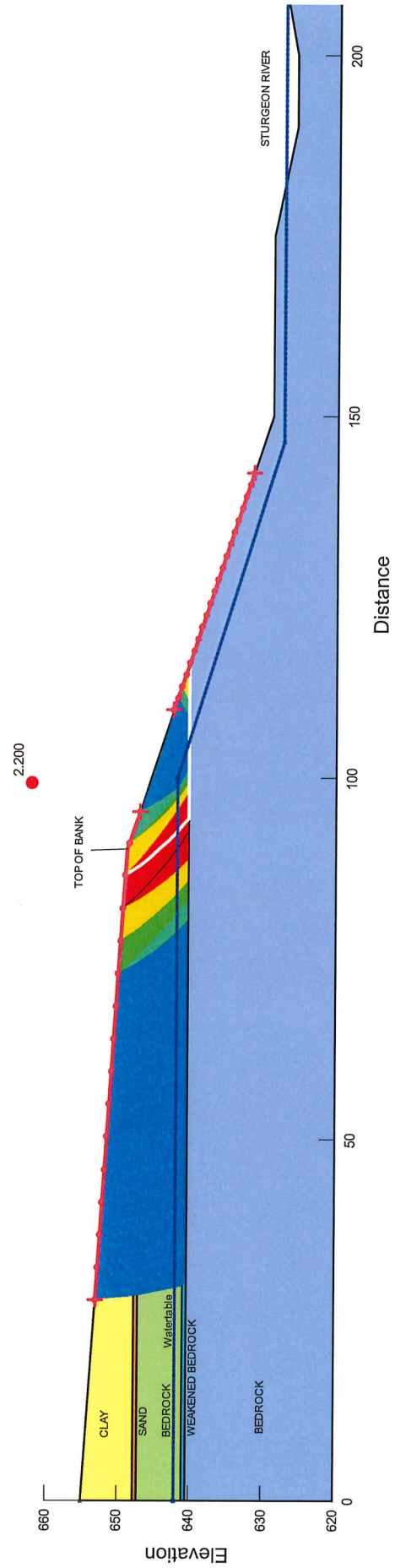
Factor of Safety
≤ 1.600 - 1.700
1.700 - 1.800
1.800 - 1.900
1.900 - 2.000
≥ 2.000



THE COTTAGES SUBDIVISION  
 SLOPE SECTION 2  
 HIGHWEAKENED BEDROCK  
 RAISED WATERTABLE

Color	Name	Model	Unit Weight (kN/m <sup>3</sup> )	Effective Cohesion (kPa)	Effective Friction Angle (°)	Phi-B Friction (°)	Piezometric Line
Light Green	Bedrock	Mohr-Coulomb	20	50	25	0	1
Yellow	CLAY	Mohr-Coulomb	19	0	25	0	1
Blue	Hard Bedrock (Impenetrable)	Bedrock					1
Orange	SAND	Mohr-Coulomb	20	0	30	0	1
Light Blue	Weakened Bedrock	Mohr-Coulomb	20	0	15	0	1

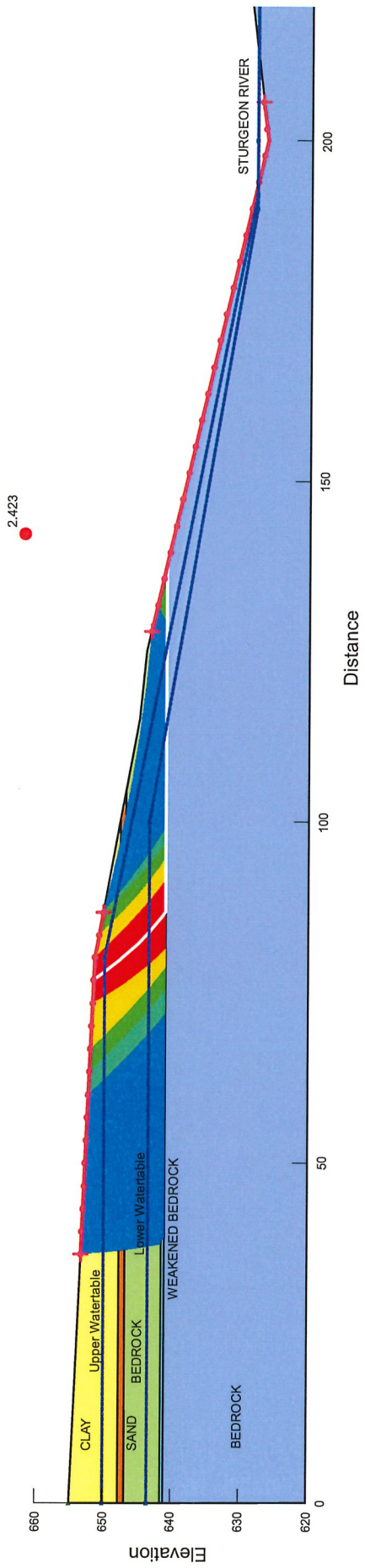
Factor of Safety
≤ 2.200
2.300 - 2.400
2.400 - 2.500
2.500 - 2.600
≥ 2.600



THE COTTAGES SUBDIVISION  
SLOPE SECTION 3  
HIGH WEAKENED BEDROCK

Color	Name	Model	Unit Weight (kN/m <sup>3</sup> )	Effective Cohesion (kPa)	Effective Friction Angle (°)	Phi-B Friction (°)	Piezometric Line
Green	Bedrock	Mohr-Coulomb	20	50	25	0	2
Yellow	CLAY	Mohr-Coulomb	19	0	25	0	1
Blue	Hard Bedrock (Impenetrable)						2
Orange	Sand	Mohr-Coulomb	20	0	30	0	1
Light Blue	Weakened Bedrock	Mohr-Coulomb	20	0	15	0	2

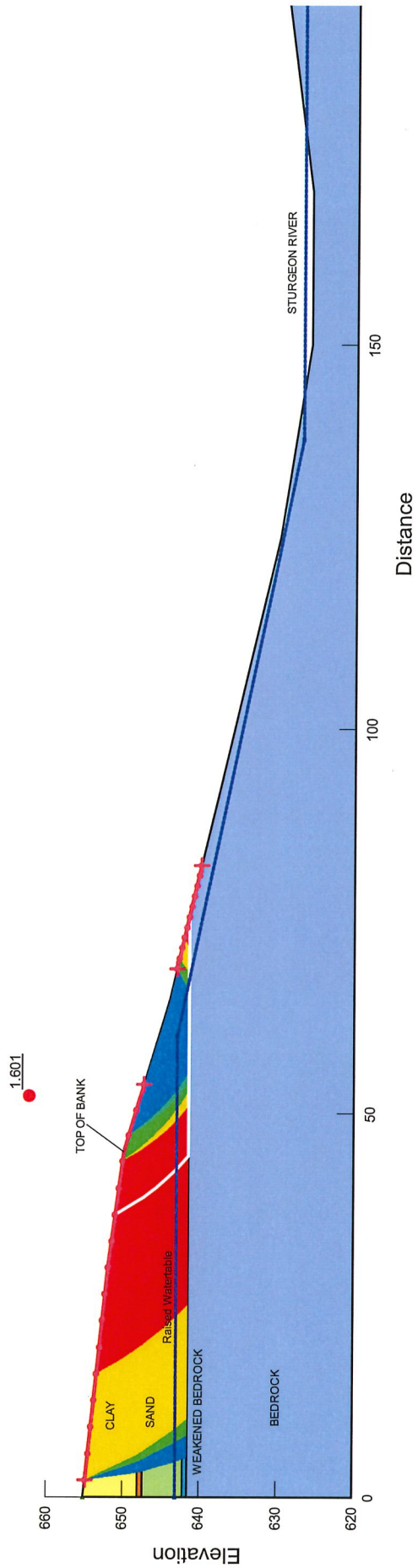
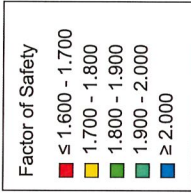
Factor of Safety
≤ 2.400 - 2.500
2.500 - 2.600
2.600 - 2.700
2.700 - 2.800
≥ 2.800

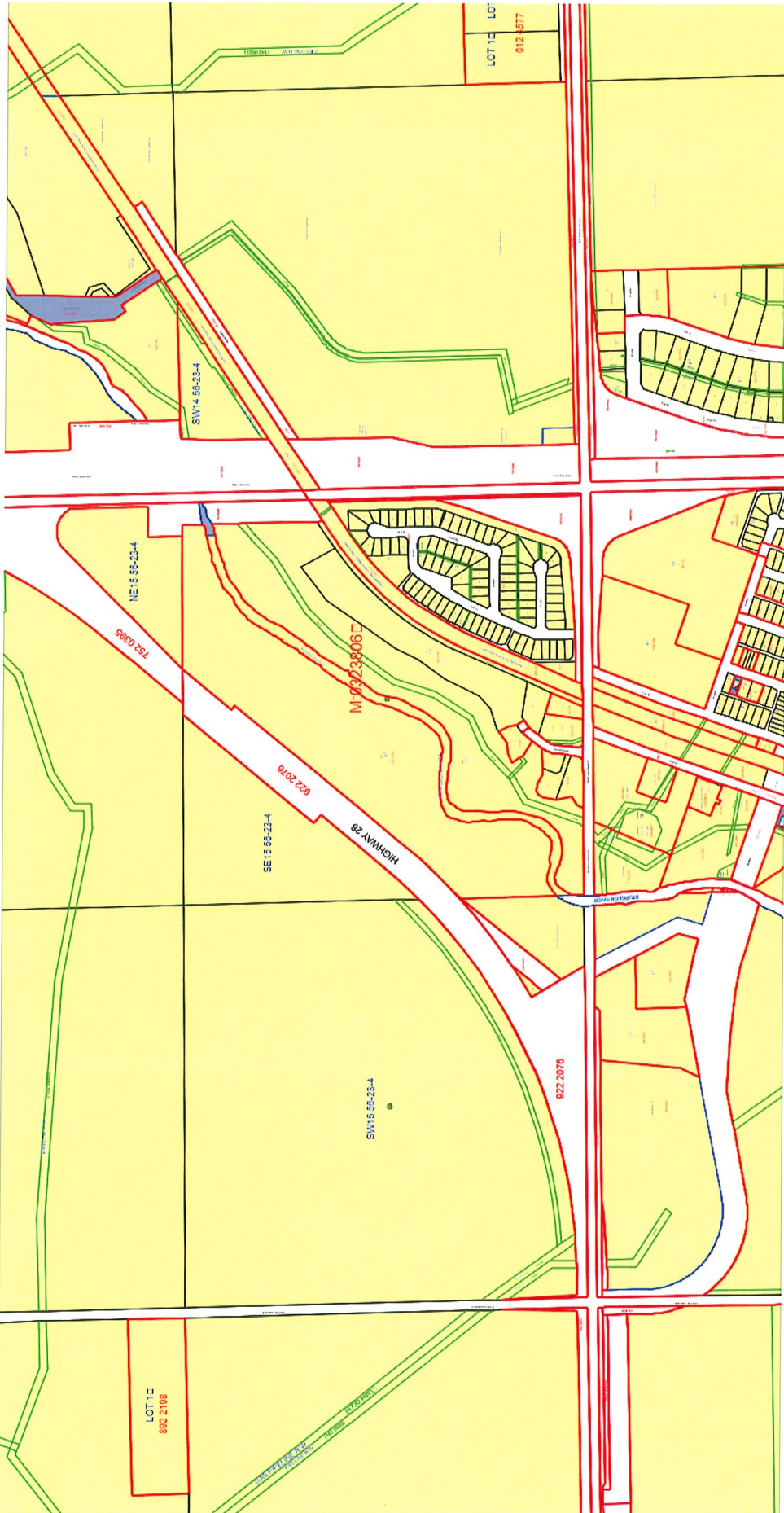




THE COTTAGES SUBDIVISION  
SLOPE 4 SECTION  
HIGH WEAKENED BEDROCK

Color	Name	Model	Unit Weight (kN/m <sup>3</sup> )	Effective Cohesion (kPa)	Effective Friction Angle (°)	Phi-B Friction Angle (°)	Piezometric Line
Green	Bedrock	Mohr-Coulomb	20	50	25	0	1
Yellow	CLAY	Mohr-Coulomb	19	0	25	0	1
Blue	Hard Bedrock	Bedrock (Impenetrable)					1
Orange	SAND	Mohr-Coulomb	20	0	30	0	1
Light Blue	Weakened Bedrock	Mohr-Coulomb	20	0	8	0	1





LOT Number	AREA (sq.m)
1	497.6
2	380.0
3	385.1
4	370.9
5	392.2
6	419.7
7	434.7
8	380.9
9	333.7
10	336.9
11	335.5
12	346.6
13	353.6
14	351.4
15	351.4
16	350.1
17	351.4
18	351.4
19	350.1
20	351.4
21	351.4
22	350.1
23	351.4
24	350.1
25	336.1
26	392.6
27	423.7
28	387.0
29	424.9
30	435.4
31	491.6
32	462.2
33	470.0
34	470.4
35	437.7
36	362.4
37PUL	176.6
38PUL	1265.8
39ER	8348.3
40VIR	894.1
41MR	844.5



LOT 7ER  
BLOCK 1  
PLAN 032 2750

S.E. 1/4 SEC. 15-59-23-4

Top of Bank Surveyed by  
Ben De Jong, A.L.S., on  
April 20 and 21, 2021.

10.0m offset to Top of  
Bank

LOT 6ER  
BLOCK 1  
PLAN 032 2750

LOT 8PUL  
BLOCK 1  
PLAN 032 2750

BLOCK 1  
PLAN 752 1277

55 AVENUE

CANADIAN NATIONAL RAILWAY  
PLAN 4515 AQ

BLOCK 1  
PLAN 752 1277

BLOCK 2  
PLAN 752 1277

LOT 8  
BLOCK 1A  
PLAN 052 1196

38PUL  
BLOCK 1  
0.127 ha

LOT 4  
PLAN 032 2750

BLOCK 1  
PLAN 182 2165

LOT 3  
PLAN 032 2750

LOT 3A  
PLAN 082 2319

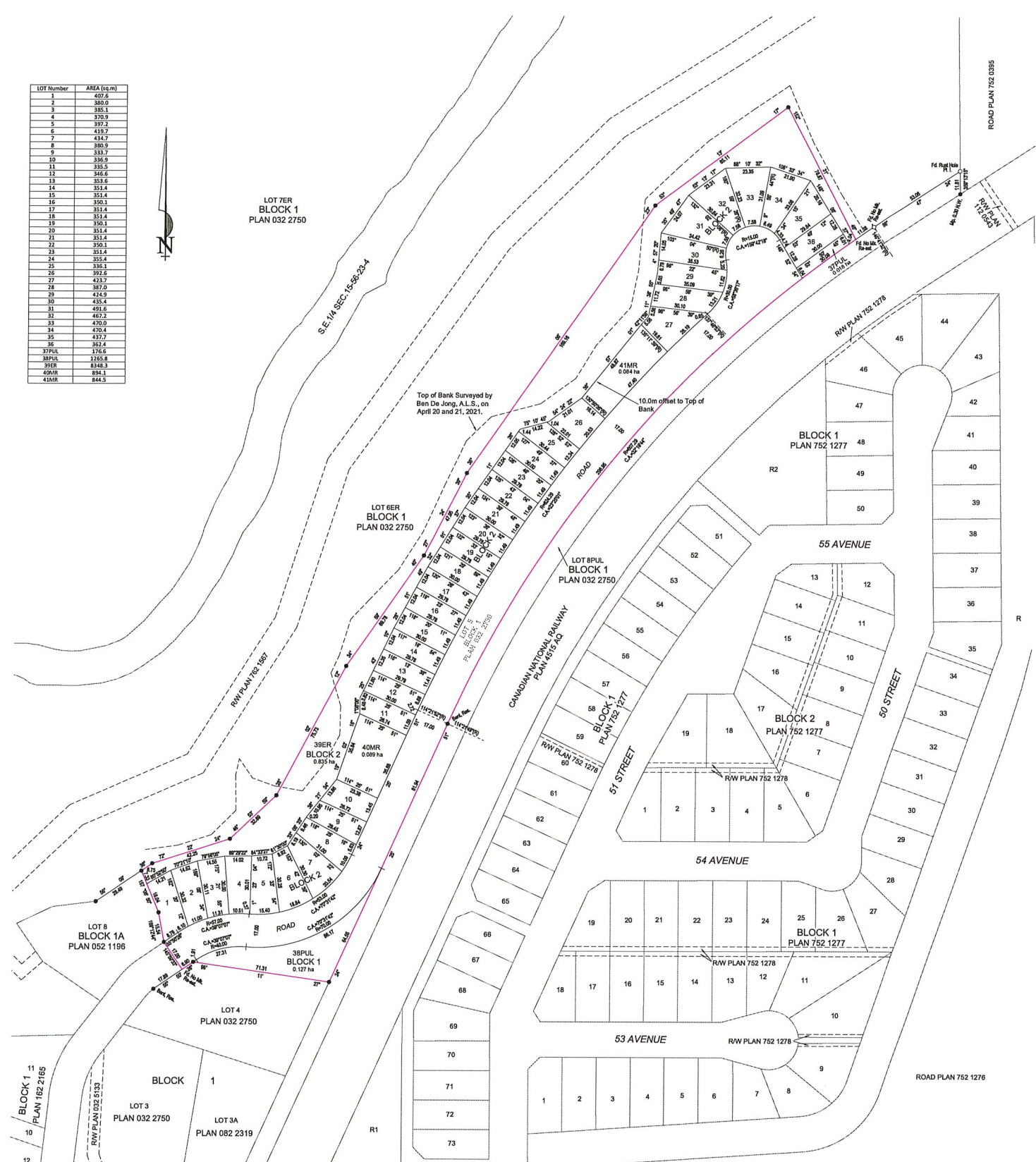
54 AVENUE

BLOCK 1  
PLAN 752 1277

53 AVENUE

ROAD PLAN 752 1276

ROAD PLAN 752 0395





FORM 1 | APPLICATION FOR SUBDIVISION

MPS FILE NO. 22-R-546

DATE RECEIVED: JUN 09 2022

DEEMED COMPLETE: JUNE 23, 2022

This form is to be completed in full wherever applicable by the registered owner of the land that is the subject of the application, or by a person authorized to act on the registered owner's behalf.

1. Name of registered owner of land to be subdivided  
Town of Gibbons Address, Phone Number, and Fax Number  
Box 68, 4807 - 50 Street Gibbons, AB T0A 1N0  
Phone - 780-923-3331/Fax 780-923-3691

2. Name of person authorized to act on behalf of owner (if any)  
Farrell O'Malley Address, Phone Number, and Fax Number  
same as above

3. LEGAL DESCRIPTION AND AREA OF LAND TO BE SUBDIVIDED  
ALL  PART  of the      1/4 SEC.      TWP.      RANGE      WEST OF      MERIDIAN.  
Being ALL  PART  of LOT 5 BLOCK 1 REG. PLAN NO. 0322750 C.O.T. NO. 212 257 237  
Area of the above parcel of land to be subdivided 3.46 hectares (8.55 acres)  
Municipal address (if applicable) N/A

4. LOCATION OF LAND TO BE SUBDIVIDED  
a. The land is situated in the municipality of: Town of Gibbons  
b. Is the land situated immediately adjacent to the municipal boundary? YES  NO   
If 'YES', the adjoining municipality is       
b. Is the land situated within 1.6 KM of a right-of-way of a highway? YES  NO   
If 'YES', the Highway # is: 28 & 28A  
d. Is a river, stream, lake, other water body, drainage ditch, or canal within (or adjacent to) the proposed parcel? YES  NO   
If 'YES', the name of the water body/course is: Sturgeon River  
e. Is the proposed parcel within 1.5 KM of a sour gas facility? YES  NO

5. EXISTING AND PROPOSED USE OF LAND TO BE SUBDIVIDED (Please describe)

Existing Use of the Land	Proposed Use of the Land	Land Use District Designation (as identified in the Land Use Bylaw)
<u>Vacant</u>	<u>Residential</u>	<u>currently large lot residential being rezoned to direct control residential</u>

6. PHYSICAL CHARACTERISTICS OF LAND TO BE SUBDIVIDED (Please describe, where appropriate)

Nature of the Topography (e.g. flat, rolling, steep, mixed)	Nature of the Vegetation and Water (e.g. brush, shrubs, treed, woodlots)	Soil Conditions (e.g. sandy, loam, clay)
<u>flat farmland setback from the top of bank of the Sturgeon River Valley</u>	<u>cleared farmland</u>	<u>sandy loam</u>

7. STRUCTURES AND SERVICING  
Describe any buildings/structures on the land and whether they are to be demolished or moved. vacant  
Describe the manner of providing water and sewage disposal. municipal servicing will be installed

8. REGISTERED OWNER OR PERSON ACTING ON THE REGISTERED OWNER'S BEHALF  
Farrell O'Malley  
I  hereby certify that  I am the registered owner OR  I am the agent authorized to act on behalf of the registered owner and that the information given on this form is full and complete and is (to the best of my knowledge) a true statement of the facts relating to this application for subdivision.  
Farrell O'Malley Signature Date May 24, 2022

ADDITIONAL APPLICATION REQUIREMENTS (CHECKLIST)

The following is a list of application requirements needed to provide a completed subdivision application:

- Application Fee (Please refer to applicable MPS fee schedule)
- FORM 1 | Application for Subdivision (must be completed in full and signed)
- FORM 2A or 2B | Alberta Energy Regulator (AER) Abandoned Wells Statement (whichever is applicable)
- FORM 3A | Authorization for Electronic Communication
- FORM 4 | Landowner Letter of Authorization  
\*\*Must accompany all applications where the applicant is not the landowner OR where there is more than one registered landowner. Please note that signatures are required for ALL registered landowners\*\*
- Certificate of Title (obtained within 3 months of the submission of the application)  
\*\*Please note that if one is not provided, we may acquire one on your behalf for a fee\*\*
- Tentative Plan of Subdivision (with area and dimensions of the proposed lot(s) and remainder parcel)
- An orthophoto of the subject site (including proposed and remainder parcels)
- Any other items or information identified during pre-submission consultation. Please list below.

Please note that applications may not be deemed complete until all application requirements have been submitted and reviewed for completeness.

FORM 3a | AUTHORIZATION FOR ELECTRONIC COMMUNICATION

**Municipal Planning Services (2009) Ltd.**  
#206, 17511 – 107 Ave. Edmonton

Phone: 780.486.1991  
Fax: 780.483.7326

Business Hours  
M-F: 8:30am to 4:00pm

Email:  
admin@munplan.ab.ca

**Owner(s) consent to receive electronic communication by an authorized person of Municipal Planning Services for the purpose of conveying information relative to a subdivision application.**

Section 608 (1) of the Municipal Government Act, R.S.A. 2000, c. M-26, as amended states:

**608 (1)** *Where this Act or a regulation or bylaw made under this Section requires a document to be sent to a person, the document may be sent by electronic means if*

(a) *the recipient has consented to receive documents from the sender by those electronic means and has provided an e-mail address, website or other electronic address to the sender for that purpose.*

In accordance with the above Section and the municipality's Land Use Bylaw requirements, it is necessary that this form be completed and returned with your application submission in order that an authorized person from Municipal Planning Services may be able to communicate information to you electronically regarding your file.

**I/We grant consent for an authorized person of Municipal Planning Services to communicate information electronically regarding my/our file.**

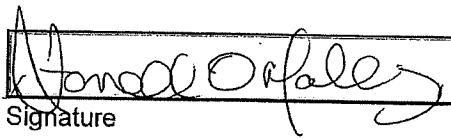
YES     NO

Legal Land Description      Lot 5, Block 1, Plan 032 2750

Applicant or Registered  
Owners Name as Per  
Certificate of Title      Town of Gibbons

Name of Signing Authority  
(If owner is a numbered  
company)      Farrell O'Malley

E-mail Address, Website  
or other Electronic Address      planning@gibbons.ca

 Signature      Farrell O'Malley      May 24, 2022      Date  
Print

*This information is being collected under the authority of section 33(c) the Freedom of Information and Protection of Privacy (FOIP) Act. It will be used to administer a subdivision application and decision. The personal information provided will be protected in accordance with Part 2 of the Act.*