Friesen DRILLERS

January 16, 2026

Mr. Jay Mak, M.Sc., P.Eng.
Senior Environmental Engineer
Land Use, Waste Management, and Energy Section
Environmental Approvals Branch
Department of Environment and Climate Change
Box 35, 14 Fultz Blvd, Winnipeg, MB R3Y 0L6

Dear Jay,

Subject **Response to Public Comments – Environmental Act Licensing - File 6013.10**
Rural Municipality of Springfield Well Field Expansion

Friesen Drillers is pleased to provide this letter in response to the public comments that are provided in the Environmental Act Licensing's public registry for the above noted project. In total there were 31 documented public comments provided.

A listing of articled comments is attached. Each comment is addressed individually as follows:

- Article #1 - Related to aspects of the project that are addressed by Associated Engineering
- Article #2 - Related to aspects of the project that are addressed by Associated Engineering
- Article #3 - Comments related to the saline boundary and sustainability
    - **RESPONSE**: It is notable that no calculations to reference the movement of the saline boundary are provided. Further, there is no data provided to support the claim.

      Hydrographs in this area do not show any signs of sustainability issues in the region. Outside of the immediate well field area, the projected drawdown for the proposed pumping is within the range of natural annual fluctuations. However, the authors would agree that it would be beneficial for the province to do more work on a regional scale.

      The 2007 application is not relevant to the current application.
- Article #4 - Repeat of Article #3
- Article #5
    - **RESPONSE**: To clarify, the province has not ordered the abandonment of the Heatherdale municipal wells. These wells are completed in an unconfined aquifer and, as such, are highly vulnerable to anthropogenic impacts, surface water interactions, and are subject to different and costly treatment standards.
- Article #6 - Repeat of Article #3
- Article #7 - Repeat of Article #3
- Article #8
    - **RESPONSE:** *Attachment 1:* The comments are not relevant to the current project. *Attachment 2*: The comments are not related to technical aspects of the project.
- Article #9 - Repeat of Article #3

- Article #10 - **RESPONSE:** The comments are more related to aspects of the treatment.
- Article #11 - Repeat of Article #3
- Article #12 - Repeat of Article #3
- Article #13 - **RESPONSE:** Comments related to treatment, addressed by Associated Engineering.
- Article #14
    - **RESPONSE:** Much of the requested information is already stated in the Hydrogeology Report. Statements provided in relation to groundwater, including the saline boundary, are not supported by available calculations or data.

      Aspects of the treatment are addressed by Associated Engineering.
- Article #15 - **RESPONSE:** The comments are political in nature and not related to technical aspects of the project.
- Article #16 - **RESPONSE:** Comments related to treatment, addressed by Associated Engineering.
- Article #17 - Repeat of Article #3.
- Article #18 and attachment
    - **RESPONSE:** We had prepared a report of the investigation. The offer to meet was in good faith to address any questions.

      Comment fails to understand that the Moosenose Ridge wells are unconfined.

      Comment includes political statements not related to technical aspects of the project.

      It is important to note that unconfined aquifers in the Birds Hill complex will remain unconfined regardless of the land use or surface activities that are present. This is the geological state of nature for the area.

      The RM of East St. Paul draws from the Carbonate Aquifer, and it is treated due to the unconfined conditions.

      Comment seems to be unaware of the agreement in place for Shoal Lake.

      Comment fails to understand Manitoba Regulations, engineering principals, etc.
- Article #19 - Repeat of Article #3.
- Article #20 - Repeat of Article #3.
- Article #21 and attachment
    - **RESPONSE:** The comment appears to be unaware of regulations. The Heatherdale wells are unconfined.
    - Related to many aspects of the project that are addressed by Associated Engineering.
- Article #22 - Related to aspects of the project that are addressed by Associated Engineering.
- Article #23 - Repeat of Article #3.
- Article #24 - Related to aspects of the project that are addressed by Associated Engineering.
- Article #25 - Repeat of Article #3.

- Article #26 - Related to aspects of the project that are addressed by Associated Engineering.
- Article #27 - Repeat of Article #3.
- Article #28
    - **RESPONSE:** The letter is untrue and lacking detail and facts. There is no issue with practitioners working in multiple municipalities.

We thank you for the opportunity to be of service on this project. Should you require anything further or have any questions, please call us at 204-326-2485.

Sincerely,

Friesen Drillers Limited

[redacted]

Jeff Bell, B.Sc. (G.E.), P.E
Hydrogeological Engineer

APEGM
Certificate of Authorization
Friesen Drillers Limited
[redacted] Date: [redacted]

Attachments Public comment - File 6013.10 - Rural Municipality of Springfield Well Field Expansion

Limitations

The scope of this report is limited to the matters expressly covered and is intended solely for the client to whom it is addressed. Friesen Drillers Limited makes no warranties, expressed or implied, including without limitation, as to the marketability of the site, or fitness to a particular use. The assessment was conducted using standard engineering and scientific judgment, principles, and practices, within a practical scope and budget. It is based partially on the observations of the assessor during the site visit in conjunction with archival information obtained from a number of sources, which is assumed to be correct. Except as provided, Friesen Drillers Limited has made no independent investigations to verify the accuracy or completeness of the information obtained from secondary sources or personal interviews. Generally, the findings, conclusions, and recommendations are based on a limited amount of data (e.g. number of boreholes drilled or water quality samples submitted for laboratory analysis) interpolated between sampling points and the actual conditions on the site may vary from that described above. Any findings regarding the site conditions different from those described above upon which this report was based will consequently change Friesen Drillers Limited's conclusions and recommendations.

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January 16, 2026

Mr. Jay Mak, M.Sc., P.Eng.
Senior Environmental Engineer
Land Use, Waste Management, and Energy Section
Environmental Approvals Branch
Department of Environment and Climate Change
Box 35, 14 Fultz Blvd, Winnipeg, MB R3Y 0L6

Dear Jay,

Subject **Response to TAC Comments – Environmental Act Licensing - File 6013.10**
Rural Municipality of Springfield Well Field Expansion

Friesen Drillers is pleased to provide this letter in response to the commentary that was provided by the Technical Advisory Committee for the Environmental Act License of the above noted project. In particular this letter is focused on the comments provided by the Groundwater Management section on September 26, 2025.

After careful review, we offer the following responses. The original TAC comments are provided in italicized font, with our responses following in plain text.

Comment #1.

[page 31 – 10.6.2] The expansion project may cause the freshwater/saline boundary to migrate closer to the project sites over time. It is recommended that monitoring of this boundary be included as part of the ongoing monitoring plan and considered in the scope of future work.

The statement presents no technical data or arguments to support this assertion. The work by Friesen Drillers relies on technical data that shows that this representation is not accurate.

The undersigned agrees with the need for ongoing groundwater monitoring around the expanded well field. This recommendation is included in the hydrogeology report on page 63.

This consideration is not new to the current well field expansion project. Groundwater monitoring, including analysis for impacts to the saline/freshwater boundary, has been ongoing since the initiation of municipal pumping at the original well field in 2021, which is actually closer to the mapped boundary by about one mile. Using Groundwater Management Section's own mapping, the nearest location of the saline boundary is over 5 miles away.

Monitoring to date has not shown any change in groundwater quality or impacts to the freshwater boundary. The analysis shows that there will be no detectable impact on the wells at distance in the Winnipeg Formation.

Comment #2.

[page 44 – 12.1] With continuous pumping over decades, the cone of depression will gradually expand, eventually impacting wells and creeks, much further from the well than short-term tests suggest. "For a given pumping rate, the drawdown cone in a low-transmissivity aquifer will be deeper and narrower than in a high-transmissivity aquifer", but, the area of influence will increase with time as water is removed from storage. Agreed:" It was further noted that the conditions of the drawdown cone will develop gradually within the aquifer as the total annual usage increases. As a result, well interference impacts should be reviewed regularly as part of the Groundwater Monitoring Plan.[page 3 – 5.]"

Previous testing on the site supports that the aquifer follows the Theis method. It should be considered that the Winnipeg Formation Sandstone Aquifer has no direct hydraulic connection with surface water within the immediate project area. It is also important to remember the additional recharge that occurs to the aquifer annually.

For a regional bedrock aquifer, it has been our experience that estimations of long-term (years) pumping drawdown derived from the extrapolation of relatively short-term pumping test results (hours to days) can often yield exaggerated impressions of the depth and extent of the drawdown cone. This has been shown on several projects, including the initial installation of the wells for this project. A simplified analysis is ideal for conducting sensitivity analyses to develop likely bounds on the results.

Changes in storage in the subsurface around a pumping well tend to dissipate relatively rapidly. In the intermediate to long term, the water pumped by a well is derived not from storage, but from the capture of groundwater that would otherwise discharge to surface water features or from induced infiltration or leakance between adjacent hydrostratigraphic layers.

Groundwater monitoring has been ongoing on this project since the first well field was installed several years ago. The data is reviewed annually. The Groundwater Management section appears to be in agreement with our recommendations.

It is also important to recognize that the data generated from private wells are fundamentally problematic, due mainly to the cyclical nature of residential pumping and the condition of the well and pump. Dedicated observation wells provide a much better source of monitoring data.

A well interference plan is ongoing and has been in place from 2020 to present.

Comment #3.
[page 48 – 12.2] For clarity and transparency, it may be helpful to provide additional detail on how the maximum simultaneous well pumping rate was determined in the proposal.

We would draw the readers attention to Page 9 and 10 of the Hydrogeology Report for an explanation of the pumping rate determinations.

Comment #4.
[page 48 – 12.2] Similarly, clarifying the rationale for the values and assumptions used in Table 10, Note 2—such as the basis for available drawdown and the assumed well interference—would strengthen the assessment of sustainable yields.

The determination of the available drawdown is detailed in the note. The assumptions used in this analysis are also detailed in the section.

Comment #5.
[page 54 – 13.1] The 72-hour pumping test is a standard industry practice, typically applied for aquifer characterization and capacity assessment, however, it may not adequately reveal longer-term or cumulative interference effects, especially for neighboring wells and other groundwater sourced users. Well interference and aquifer impacts may develop over multiple seasons for the given transmissivity in sandstone aquifer.

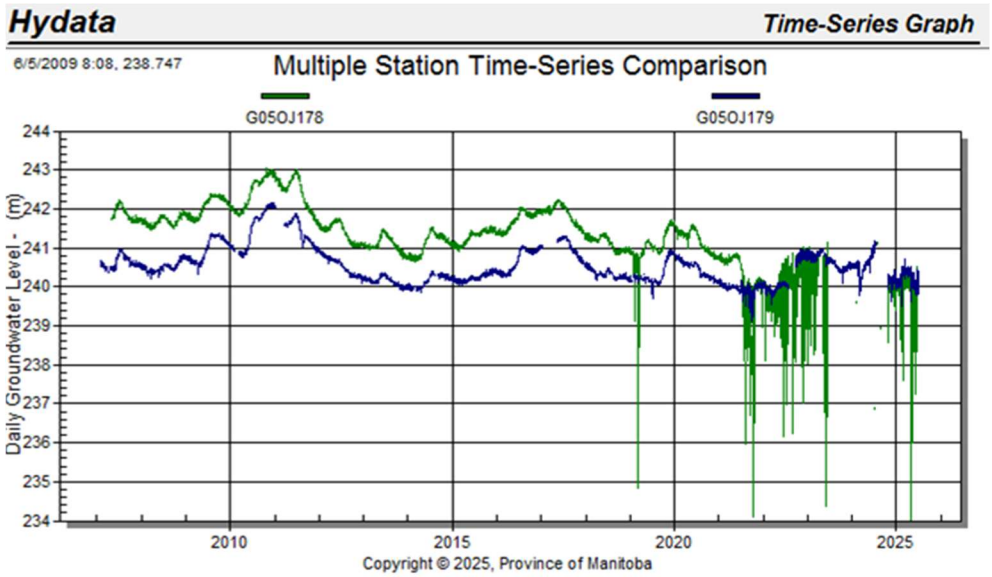
The pumping test duration of 72 hours exceeds the Guide to Groundwater Withdrawal Approvals that was published by Manitoba Conservation and Water Stewardship (2013). What alternatives are proposed by the Groundwater Management Section?

While the uncertainties inherent in an estimation of the long-term groundwater development capacity cannot be dismissed, it should also be recognized that the hydraulic conditions of the Sandstone Aquifer are not new to the current project. The Sandstone Aquifer has been developed, tested, and monitored in many places across southeast Manitoba for decades. The abundance of historical data lends credible support to the interpretations that have been made. This is also an important consideration that helps to achieve a balance between the increased costs of longer duration pumping tests, and the generation of sufficient data to confidently undertake the evaluation at hand.

The Hydrogeology Report recommended that a cautious approach be adopted in assessing the aquifer capacity and the future expansion of municipal pumping rates. In addition, it was recommended that continuous long-term monitoring of the pumping rate and water level in the pumping well be conducted, with regular review of data collected.

Comment #6.

[page 56 – 13.2] Hydrograph data from provincial wells completed in both the sandstone and carbonate aquifers (OJ178 and OJ179) show that the groundwater level response in the carbonate aquifer at OJ179 is significantly greater than 5% of the drawdown in the sandstone, especially during periods of municipal pumping. The attached hydrograph of both demonstrates that cumulative impacts in the carbonate aquifer may be much greater than concluded in the report, particularly in the context of future, long-term operations. In addition, the time-series comparison of groundwater levels at stations G05OJ178 and G05OJ179 clearly shows a persistent head difference (gap) between the two aquifers prior to 2021, reflecting the confining effect of the intervening shale layer. However, since mid-2021, this head gap has largely disappeared, with groundwater levels in both aquifers converging and fluctuating together. This loss of head separation strongly suggests that the confining effect has been compromised, most likely due to increased municipal pumping. As a result, the hydraulic connection between the sandstone and carbonate aquifers has been enhanced, allowing pumping impacts to rapidly transmit between both units



The carbonate aquifer and the underlying sandstone aquifer appear to be performing in a parallel manner, with a slight head difference. This is present in many areas of the southeast. As noted in page 26 of the report, there are many examples of interconnection in the two bedrock aquifers in Manitoba.

In the hydrographs for the two wells, we see that prior to 2021 the potentiometric level in the Sandstone Aquifer was about 1 m higher than the potentiometric level in the overlying Carbonate Aquifer. Pumping from the Sandstone Aquifer appears to have begun in 2021 and the non-pumping potentiometric level declined to the level in Carbonate Aquifer [the potentiometric level in the Carbonate Aquifer continued to fluctuate within its historical range]. In effect, the tendency for groundwater to flow upwards from the Sandstone to the Carbonate Aquifer was neutralized by the change in head difference. This should not be interpreted as an enhancement of the hydraulic connection between the two aquifers, which is a physical reality of the geology. Rather, the effect of pumping is to reduce the rate of upward leakance from the Sandstone into the Carbonate Aquifer. If the Carbonate Aquifer is pumped, a negative local vertical hydraulic gradient will likely be re-created.

It is important to note that a reversal of the hydraulic gradient between the two aquifers occurs naturally across the Springfield region, as is reflected in the provincial hydrographs for the area. The figure shown below (also presented on page 24 of the Hydrogeology Report) compares provincial hydrographs along the inferred groundwater flow path to illustrate the change from a relatively higher carbonate head (downward gradient) in eastern parts of the RM to relatively lower carbonate head (upward gradient) in western parts of the RM. A plot of provincial observation wells OJ176 and OJ177, also shown below, reveals frequent gradient reversals occurring naturally between the two bedrock aquifers.

It is also important to note that the confined nature of the Sandstone Aquifer, as it relates to source-water protection, does not rely solely on the shale aquitard. The Carbonate Aquifer formation and the overlying quaternary till and clay overburden are also significant factors. These considerations are discussed throughout the Hydrogeology Report.

Figure 16 – Multi-station Hydrograph Comparison - West RM

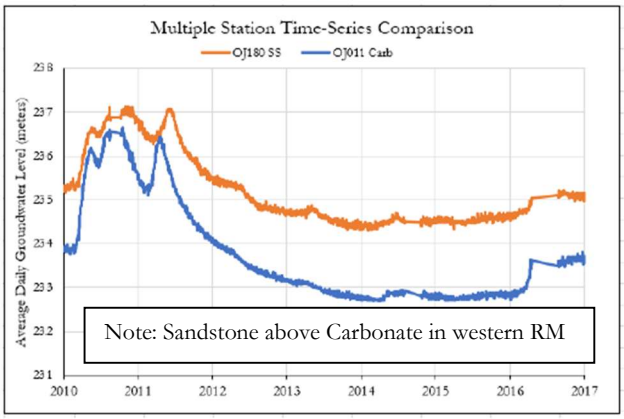
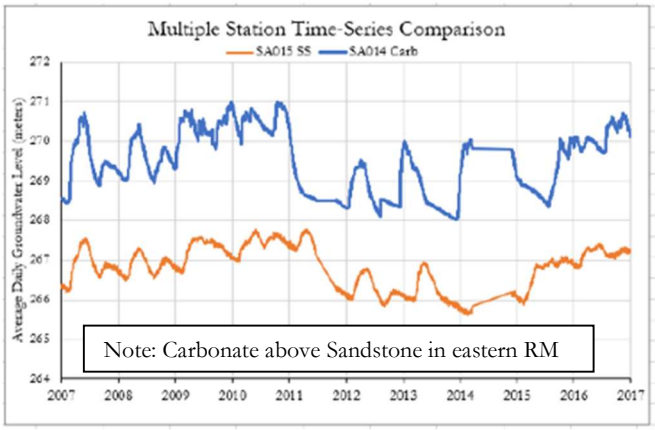
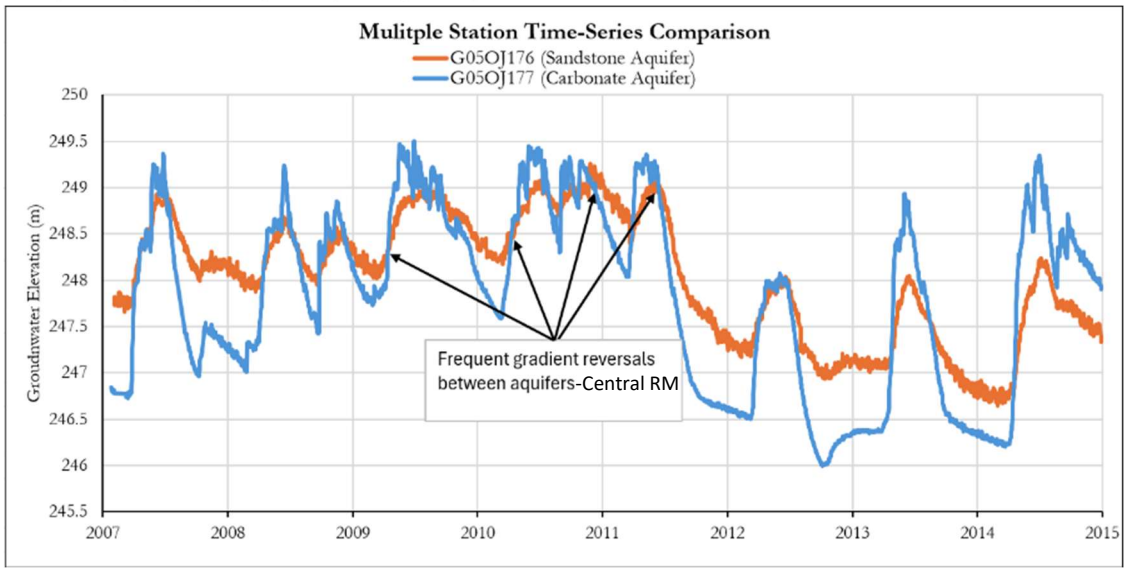


Figure 17 – Multi-station Hydrograph Comparison - East RM





Comment #7.

[page 57 – 13.3] While the Theis equation is widely used for initial assessments, it is generally not recommended for predicting offsite impacts in long-term pumping scenarios. Its assumptions—such as an infinite aquifer—rarely hold true over decades. Predictions become less accurate the longer the ideal assumptions are applied. More sophisticated, site-specific models that account for boundaries, heterogeneity, and variable recharge should be considered for long-term projections. Additionally, the report notes that drawdown calculations are "very conservative" (assuming no recharge, continuous pumping), yet the use of the Theis model inherently assumes infinite horizontal inflow (equivalent to infinite recharge), which is inconsistent with the no-recharge scenario. More sophisticated approach would enhance the accuracy of predicted offsite impacts and better align with observed site conditions.

The recommendations for a more sophisticated analytical approach are interesting. The development of a numerical groundwater model would undoubtedly be useful for aquifer management in the southeastern parts of the province. However, a regional modelling effort would certainly be beyond the scope of the current project and might be more in line with the stated regional objectives of the Groundwater Management Section.

The commentary indicates that the Theis (1935) method is not suitable, although no alternatives have been suggested. It is agreed that the assumptions underlying the Theis solution rarely hold true over decades. This is noted on Page 43 of the report. However, in our experience the assumptions tend to lead to conservative predictions. That is, the predictions tend to overestimate the likely drawdowns over time. The Theis solution assumes that the water pumped by a well is supplied exclusively by confined storage. Therefore, the drawdown cone is predicted to expand without limits. The Theis solution discounts the "true" long-term sources of supply to a well, leakage from over and underlying strata and from recharge. Unless the pumped aquifer is bound by completely impermeable units, the true sources of supply cause drawdowns to eventually stabilize.

Under certain circumstances it may be appropriate to consider more comprehensive analysis approaches. These circumstances should include:

- The proposed groundwater takings are relatively large.
- The proposed takings are anticipated to disrupt existing groundwater supplies.
- The proposed takings represent a substantial fraction of the baseflow of nearby surface water features.
- The proposed takings are from an aquifer with nearby boundaries.
- High-reliability monitoring data of suitably extensive duration and regional-scale coverage are available.

If the first four conditions are not met, developing anything other than a conservative estimate of the local-scale drawdowns around a pumping well and the extend of the drawdown cone would be an inefficient use of resources. In our opinion, a comprehensive analysis with a numerical model that is developed in the absence of high-reliability data is worse than a simplified analysis, as the results of the numerical model provide a false sense of precision. Regardless of the approach that is adopted to predict the potential yield and impacts of proposed groundwater takings, long-term monitoring is required to assess the actual long-term well performance and the effects of pumping, which is recommended in our report.

Comment #8.

[page 58 – 13.3.3] The projected long-term drawdown (up to 33 ft at ½ mile) could exceed historic seasonal or climatic lows, which may stress existing wells not designed for such conditions. Additionally, with long-term operation, empty storage in the sandstone aquifer may induce sustained downward flow from the overlying limestone (carbonate) aquifer. This could affect the integrity of the intervening shale layer, potentially increasing hydraulic connection between the two aquifers in the future, even though the current analysis assumes the shale aquitard is intact.

Long-term measurements of water levels in the Carbonate Aquifer and Sandstone Aquifer will be required to confirm the reliability of the predicted drawdowns.

The comment implies that with pumping, the structure of the shale aquitard will be compromised. We have found no examples in Manitoba, or in the literature in general that supports this supposition.

Referring to the hydrographs for wells G05OJ178 and G05OJ179, the average water level in the Carbonate Aquifer is historically about 1 m lower than in the underlying Sandstone Aquifer. We do not envision "emptying" the Sandstone Aquifer, and we cannot anticipate a condition in which enhanced upward leakage from the Sandstone Aquifer will give rise to a loss of integrity of the intervening shale unit. As noted in the provincial data, the head condition between the two aquifers is frequently reversed naturally. Several miles to the east, the carbonate aquifer has a higher head pressure than the underlying sandstone aquifer. As far as we are aware, the extensive takings from the Carbonate Aquifer that were documented in Render (1970; Figure 18) did not give rise to collapse of the shale unit. There appears to be no examples of this occurring in Manitoba that we would find in the literature.

Comment #9.

[page 58 – 13.3.3] The observed low drawdown in the Carbonate Aquifer is reassuring, but the analysis admits that hydraulic connection can vary greatly depending on the number and type of interconnecting wells and the thickness of the shale. In areas with more connections or compromised shale, drawdown effects could be much larger than currently observed. Although borehole leakance is mentioned, leakance coefficients are not quantified, nor is the potential for vertical flow through defective or abandoned wells. This could underestimate potential impacts on the Carbonate Aquifer and on domestic wells, and it also challenges the appropriateness of Theis-based predictions in these contexts.

We are struggling to understand how additional drawdown would occur that was not observed in the 34 observation wells employed during this testing. Our understanding is that in areas where wells are present to enhance the interconnection between the Carbonate and Sandstone Aquifers, and in areas where the intervening shale is thin or more permeable that occurs naturally, the drawdowns in the Carbonate Aquifer would be smaller, not larger. The increased leakage from the Sandstone Aquifer through defective or abandoned wells would represent an additional source of supply that is not considered in the simplified analyses. In other words, by neglecting enhanced leakage, the predictions of potential impacts in the Carbonate Aquifer and on domestic wells that are made with the Theis solution are more likely overestimates than underestimates. This conservative approach was explicitly noted in the analysis.

We thank you for the opportunity to be of service on this project. Should you require anything further or have any questions, please call us at 204-326-2485.

Sincerely,

Friesen Drillers Limited

[redacted]

Jeff Bell, B.Sc. (G.E.), P.Eng
Hydrogeological Engineer

[redacted]

APEGM
Certificate of Authorization
Friesen Drillers Limited
[redacted]

Attachments Technical Advisory Committee - File 6013.10 – Additional Comments

Limitations

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