From:	[redacted]
To:	Minister of Environment and Climate Change; mike.moyes@yourmanitoba.ca; +WPG569 - Environmental Approvals Branch Director; +WPG569 - Public Registry
Subject:	File # 6257.00 Sio Silica Simba sand
Date:	November 30, 2025 6:41:53 PM
Attachments:	EAP 6275 OLS.pdf

Re: Sio Silica, Simba Sand Extraction Project File #6257

Thank you for this opportunity to comment on the project.

We understand that Manitoba's assessment and licensing process allows for public comments. These are responded to by the developer however, we feel this is insufficient to fulfill meaningful public engagement in environmental decision making.

Thus, we request that all comments from the public and organizations received by the Public Registry are reviewed by the Technical Advisory Committee to inform their evaluation of the project.

We also direct our written submission to The Honourable Mike Moyes, as our concerns are pertinent to *The Environment Act* and the required meaningful reform to ensure the environment and thus public health is protected.

We trust that clear, reliable answers will be provided.

Sincerely,

[redacted]
Our Line in the Sand MB

Our Line in the Sand
Box 203
Oakbank, MB R0E1J0

Honourable Mike Moyes
Minister Environment and Climate Change

Agnes Wittman
Director Environmental Approvals
Environment and Climate Change

Public Registry

Re: Sio Silica, Simba Sand Extraction Project - File # 6275

Our Line in the Sand Manitoba(OLS) is a group of concerned citizens advocating Watershed protection in eastern Manitoba. OLS officially formed when a silica mining operation targeted a freshwater aquifer system that supplies drinking Water for Manitobans. Engaged in this and other licensing applications, we recognize the need to reform Manitoba's assessment and licensing process to enable evidence based decision making for real and enforceable protections.

OLS continues to call for long overdue reform of Manitoba's environment and mineral legislation, complete framework for robust groundwater management plans for the southeast, more opportunities for meaningful public engagement and funding for technical assistance for citizens seeking to protect their homes and livelihoods from proposed development.

OLS questions and concerns are to the Honourable Mike Moyes, the regulator, the developer and to inform the Technical Advisory Committee.

OLS trusts that clear, reliable answers will be provided.

Public Engagement

This 2nd application, that was accepted by the Department of Environment and Climate Change(ECC), again prevents meaningful public participation. The majority of the proposal contains omissions and material deficiencies that will only be provided if licensed. Our comments will indubitably be dismissed with 'you will get scientific and technical engineering data and management plans if we get a license and experiment for 5 years'. In our view, this is a form of extortion and does not provide for "an effective method of public involvement in environmental decision making"[1].

[1] *Manitoba Environment Act* s. 2(2)(d)

Furthermore, the continuation of information gaps do not provide for "an effective review"of project impacts "to ensure that the environment is protected and maintained".[2] This does not meet best practice standards for Impact Assessment.

*We request that this project be deemed a Class 3 project, that the arms-length provincial government agency, the Manitoba Clean Environment Commission(CEC), undertake a fulsome public hearing on the entire proposed project - BRU, DEN, ALY, RWM mineral claims and all supportive infrastructure; that the Participant Assistance Program be established for the hearing to fulfill effective public engagement; that extensive data collection and analysis from a pilot project limited to a single cluster of sand extraction wells - "seven extraction wells operating simultaneously for 5 to 7 days each…spread across two adjacent well clusters (e.g. four operating wells in one cluster and three in an adjacent well cluster)" be included; that prior to a cluster test, the wastewater treatment method[3] undergo "rigorous validation testing" and must include extensive measurements before/after of treated water i.e. but not limited to suspended and dissolved concentrations, heavy metals, organics, fines, chitosan monomer, dissolved oxygen, entrained air, microbes,…; the water return process must be extensively monitored and measured in tandem with a full scale well cluster test; and all data be made publicly available; that request for material omissions and deficiencies identified in motions[4] filed to the 2023 CEC hearing be provided; that short-term monitoring and long-term monitoring, extensive data collection, management plans be completed and documented and available for assessment.
*Before a licensing decision can be made, a thorough, independent public inquiry under *The Evidence Act* into the entire Sio Silica project must be called to ensure that our democratic institutions and assessment and licensing process under *The Environment Act* and *The Mines and Minerals Act* are sound.
*As proposed, it would be unreasonable and imprudent to license this current project.

Misinterpretation of CEC Recommendations

We feel Sio Silica's, Simba Sand Extraction Project(Sio) 2nd application is a deliberate misinterpretation of the CEC Report[5] and its recommendations that Sio is manipulating to push through licensing.

Recommendation 2) iii) "The proponent must carry out full scale well-cluster extraction tests in order to provide information on the potential effects of extracting the planned 21,000 tonnes of sand from a single cluster. This should be completed from several clusters in different parts of the project area."

As reviewed by the CEC, the full scale well cluster extraction: "Maximum of up to seven extraction wells operating simultaneously for 5 to 7 days each… this maximum number of wells operating simultaneously maybe[sic] spread across two adjacent well clusters (e.g. four operating wells in one cluster and three in an adjacent well cluster)."

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[2] *Environment Act* 1(1); 1(1)(c)
[3] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/siosicilia_supplimental_information4_process_wastewater_treatment_options.pdf
4 https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/wtfmb_dln_ motion_brief.pdf
https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/mbwn_ols_motion_brief.pdf
https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/mssac_brief.pdf
[5] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/cec_vivian_sands_extraction_project_report.pdf

Sio description: “Maximum of up to seven extraction wells operating simultaneously at the Project site for five to seven days each.” (EAP 1, p.3)

Year 0 is detailed as “the first few wells utilized to confirm extraction conditions in a scaled scenario:”

“Up to seven wells may be operating at any given time at full capacity in Phase 3 from year 2 onwards.(EAP 1, p.4).

Clearly the first two years (Year 0 and Year 1) are to collect base-line data. **It is unreasonable to use an Environment Act License to obtain baseline data and to attempt to figure out a mining project - it is in conflict with best practice standards for Impact Assessment.**

Sio “**phased approach”** ***does not carry out a full scale well cluster extraction test*** **until the 3rd year.**

The CEC *did not* prescribe for the proposed scale of producing wells over a 5 year time frame as described in the “phased approach”, nor that Sio be handed a license to do so, nor that the processing facility be constructed for the “full scale well cluster test…from several clusters in different parts of the project area.”

* the proposed phased approach takes too many liberties with the CEC Report and recommendation 2)iii to carry out full scale well-cluster extraction tests and is similar to actions documented in Manitoba’s Ethics Commissioner Report.[6]
* the proposed phased approach violates Stantec recommendation to “Complete a full-scale extraction test to confirm expected conditions”(app c)
* CEC consultants and Participants challenged why a pilot project limited to a single cluster of sand extraction wells was not carried out earlier to attain baseline data and before approving the processing facility.
* The proposed reduced sand extraction tonnage is a maneuver to garner public acceptance and downplay irremediable project effects.
* So too the proposed further reduction of temporal and spatial scope. Fewer wells and less sand extraction does not mean less risk or a smaller impact.
* The phased approach is a data gathering exercise that should have been undertaken prior to beginning the licensing process. The proposal must be rejected.
* The phased approach is a deliberate attempt to construct the processing facility and rail yard[7] through manipulation of CEC recommendations. The project must be rejected.
* This manipulation to construct the facility is complete betrayal and confirms recent findings in Empowering Impact Assessment[8] that Manitobans have “lost trust in Manitoba’s process and did not feel decision-makers were keeping the public’s best interests in mind.”
* This is an experimental project that has not provided data to prove feasibility and must be denied licensing.
* The Sio project is a clear example of the need to strengthen the dangerously flawed assessment and licensing process under the outdated *Environment Act (1988)*.

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[6] https://ethicsmbblob.blob.core.windows.net/investigation-report-en/Report - Heather Stefanson, Cliff Cullen, Jeff Wharton and Derek Johnson - May 2025.pdf
[7] https://www.gov.mb.ca/sd/eal/registries/6275/eap_part_2.pdf
[8] https://mbeconetwork.org/wp-content/uploads/2025/10/2025-IA-Reform-Report-FINAL-single-pages.pdf p.29

* A pilot project limited to a single cluster of sand extraction wells can be granted under an advanced exploration license per *The Mines and Minerals Act.* *Why was this not carried out?*

An October 23, 2023, Economic Development Advisory Note on Sio Silica confirms "the **CEC report** was completed and **recommend more research be undertaken to confirm the risks are adequately understood and manageable *before Manitoba issues an environmental license***".[emphasis added].

* Before a licensing decision can be made, a thorough, independent public inquiry under *The Evidence Act* into the entire Sio Silica project must be called to ensure that our democratic institutions and assessment and licensing process under *The Environment Act* and *The Mines and Minerals Act* are sound.

"*That this is an experimental project is underlined by the fact that significant changes have been made to the plans since the EAP was submitted in July 2021.*"(CEC 2023).

That this experiment continues with further changes to spatial and temporal scope, material omissions and deficiencies that prevent a comprehensive assessment of project risks, and is again being considered by the Department for licensing, is **untenable**. This emphasizes the immaturity of the project and from our viewpoint sends a message that our regulatory body is complicit.
*It is unacceptable and goes against best practice standards for Impact Assessment to license an experimental project.
* It is distressing that this project is even considered again, given the need to protect vital local and regional groundwater sources.
*Manitoba's environment and mineral legislation is dangerously flawed and requires meaningful reform.
*As proposed this project must be denied a license.
* A thorough, independent public inquiry under *The Evidence Act* into the entire Sio Silica project must be called now before proceeding any further with a license decision to ensure that our democratic institutions and assessment and licensing process under *The Environment Act* and *The Mines and Minerals Act* are sound.

The EAP describes two different phased approach scenarios: year 0 has 23 vs 25 wells and 5 year totals: 373 wells vs 267 wells.(EAP 1, pp. v, 23) A difference of 108 wells between the two scenarios.
* Explain which is correct and why conflicting information is still an issue in this application?

"The stated goals of the Water Management Strategy[9] suggest that all developments **that pose risks or claim to have beneficial impacts on water resources deserve a high standard of judicious review."**(CEC 2023 p.45)

In review of the 2007 Pembina Valley Water Cooperative Supplemental Groundwater Supply System, the CEC concluded "*The Project cannot be appropriately assessed in the absence of an integrated watershed plan for the Manitoba portion of the Red River basin including associated aquifer plan(s) for the Sandilands*

[9] https://www.manitoba.ca/sd/pubs/water/water_mgmt_strategy2022.pdf

aquifers." It recommended against granting an Environment Act license for the Project and advised the government to establish robust groundwater management plans for the southeast.
*Has the province fulfilled recommendation 3 "take the lead and make development of an integrated watershed plan for the Manitoba portion of the Red River basin and the associated aquifers a priority."?
*Has the province fulfilled recommendation 6 "developed a fully integrated watershed management plan for the Red River Basin"?
*Has the province fulfilled recommendation 8 "Issue Guidelines…more prescriptive as to what constitutes an acceptable environmental assessment; and establish protocols for best professional practice."?
***How does this assessment meet "high standard of judicious review"?**
* You cannot make a decision about Sio's project unless you look at the health and sustainability of the aquifers as recommended.

CEC 2023 **Recommendation "8)** A cumulative effects assessment for the full 24-year life of the project be carried out and its impact be considered in light of other existing and foreseeable projects in the area."

Sio dismissed the recommendation as it is not required under Guidelines. The CEC responded "correct…but not including such an analysis leaves an information gap for the assessment of the long-term environmental effects and necessary mitigative actions for this project."(p. 30).

* In order for environmental assessments "to be done well, they must include an assessment of cumulative effects." (CEC 2014, 2018)

"Taking a longer view than that in the proponent's EAP, which focused only on the first four years of the project, would reflect the reality that capital-intensive mining projects are planned with a long term in mind." (CEC p. 32)
*the further limited scope – both spatial and temporal – in this EAP underlines **the need for cumulative effects assessment to be a required component and for greater government involvement in groundwater management.**

According to material filed to United States Security Exchange Commission, the Oct 8, 2023, Technical Report Summary for the adjacent DEN property, states "Sio Silica intends to proceed with the project development in 2026".[10] It is plausible that both properties could be operating simultaneously. This may also occur with Sio's other mineral claims - ALY and RWM - and include supporting infrastructure i.e. sand processing facilities.
*The refusal to produce a cumulative effects assessment is telling. The extent of irreversible damage and potential contamination to this precious Water system would be clear to even the most unhinged and morally questionable.

"In Matrix's opinion, the potential cumulative effects caused by potential indirect effects such as point or distributed sources of contamination, given the potential for the sand extraction process to create permanent zones of enhanced vertical permeability through a portion of the Red River Carbonate Aquifer and the

[10] https://www.sec.gov/Archives/edgar/data/1848756/000121390023085565/ea186711ex96-2_pyrophyte.htm at 1-20; 19-2

Winnipeg Shale Aquitard, is impetus for requiring a cumulative assessment of potential effects under a risk assessment framework."(p.16)

* Until a cumulative effects assessment is completed, an informed license decision cannot be made for their project. **The project must be denied.**

Sio interpretation of CEC recommendation 1) "The Manitoba Water Rights Act prohibits connecting two aquifers within a single well completion to minimize hydraulic communication between saline and freshwater portions of drinking water aquifers. There is no known saline water present within the Project Area."(App b, part 1, p.18)

*Provide the section(s) of *The Water Rights Act* made reference to?

CEC Recommendation 1) states "The government seek a legal opinion with respect to sections 2(e) and 3(1) of the Well Standards Regulation under *The Groundwater and Water Well Act* and section 6(1) of the Drilling Regulation under *The Mines and Minerals Act*, regarding the interconnection between the Winnipeg Formation and any overlying aquifer, including aquifers within the Stonewall, Stony Mountain or Red River Formations."

*Explain how recommendation 1) is deemed "N/A" to the project.

A Freedom of Information(FOI) request to the Department of Environment and Climate Change(ECC) for the legal opinion was refused per "solicitor-client privilege". The CEC did not direct the Department to prevent access to this important information. The CEC stated the legal opinion "is a matter on which members of the public and the commission need to see clarity."[11] The legal opinion was never intended to be confidential. **It is an interpretation of legislation required on this project to provide the intended clarity for assessment as directed by the Commission.**

*We request the Department waive their solicitor-client privilege and provide the legal opinion for this assessment; and that the Department extend the public comment period to allow for review.

Manitoba legislation:

Well Standards Regulation under *The Groundwater and Water Well Act:*

2(e) prevents the interconnection or mixing of groundwater having distinctively different characteristics within the same aquifer or different aquifers.

MbEN/OLS expert witness, Matrix Solutions Inc. filed material to the CEC confirming the Carbonate and Sandstone Aquifers are "**Two distinct water types"** based on Isotopic Characterization. [12]

"The Winnipeg Shale Aquitard hydraulically isolates the Winnipeg Sandstone Aquifer from overlying geologic formations and acts to limit groundwater flow between these different units. This is further evidenced by the difference in stable isotopic composition of the groundwater from these two aquifers (AECOM 2021; Appendix A; Figure 4-5; Section 4.2.2.4)."[13](Matrix solutions, p.7)

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[11] http://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/cec_vivian_sands_extraction_project_report.pdf (p.xiii)

[12]2008 Phipps, Geochemical and Isotopic Characterization of a Regional Bedrock / Surficial Aquifer System, Southeastern Manitoba
https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/H-038 OLSMBEN Updated Presentation (updates H-024).pdf

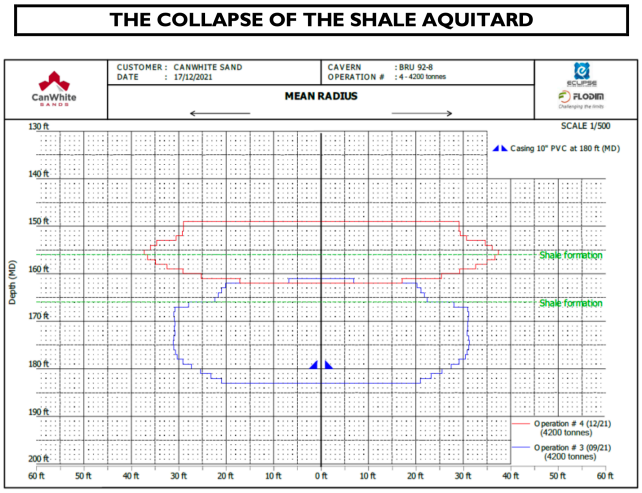
[13] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/23 02 13 MBEN OLS Document submission.pdf

Well Standards Regulation under *The Groundwater and Water Well Act: Interconnection of geologic formations 3(1) Without limiting the generality of clause 2(e), a person* ***must not construct or seal a well or test hole in a manner that allows the interconnection or mixing of groundwater between the Winnipeg Formation and any overlying aquifer*****.**[14]

Drilling Regulation under *The Mines and Minerals Act:*
Movement of fluids between aquifers,
6(1) A licensee shall drill and abandon a borehole in such a manner as to *prevent the vertical movement of fluids between permeable water bearing zones penetrated by the borehole.*[15]
6(2) For the purposes of this section, a *"permeable water bearing zone"* means a section of rock that produces water, or a zone in which drilling fluid is lost. [emphasis added]

"Once the production piping is removed from **the extraction well, the well will be sealed as per *The Groundwater and Water Well Act* requirements to prevent movement of water vertically between the aquifers."**(EAP p.21).

Sonar scans filed to the CEC[16] document collapse of the protective shale aquitard *and* fractured limestone in the overlying Carbonate Aquifer on a radius of 25 to 40 ft. Sonar scan reproduced[17].



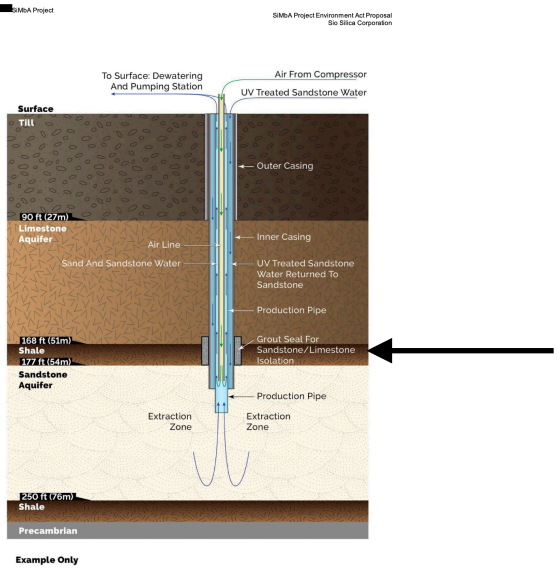


Figure 2-2: Sand Well Extraction Method

* Explain how the "Grout Seal For Sandstone/Limestone Isolation" on the outside of the casing shown in Figure 2-2 to "*prevent movement of water vertically between the aquifers*" is accomplished when a large expanse of geological material - Winnipeg Shale Aquitard and Limestone - is no longer present?

[14] https://web2.gov.mb.ca/laws/regs/current/_pdf-regs.php?reg=215/2015
[15] https://web2.gov.mb.ca/laws/regs/current/063-92.php?lang=en
[16] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/appendix_a-b-c-cec-ir_14.pdf
[17] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/23 03 15 MBEN OLS Closing Slides_to file.pdf at slide 34

* How does this comply with Well Standards Regulation that prohibit interconnection/intermixing *"between the Winnipeg Formation and any overlying aquifer"*?
* How does this comply with 6(1) of Drilling Regulation - "*drill and **abandon** a borehole in such a manner as **to prevent the vertical movement of fluids between permeable water bearing zones penetrated by the borehole."***
* Since standard well abandonment procedures, under the Act, used to prevent the spread of contamination cannot be applied when expansive loss of geological material occurs, what mitigation(s) are identified to prevent the spread of contamination?

"Each well raises potential for multiple preferential pathways. Abandoned wells need to be perpetual(>>100 years)"[18]
* What is the life expectancy of Sio Silica well seals? Explain what monitoring will take place to insure well seals maintain integrity?
* Has financial security been allocated for potential contamination via borehole seal failure/drilling/ interconnection?[19] How much? Inflation adjusted? What then is the true price of Water?
* Provide data for drilling fluid and loss of circulation material, properties utilized, quantities and loss, depth(s) loss occurred, length of drill, fluid pressure(s), identify boreholes/wells and the cause for each fluid loss and action taken.

<u>Changed climate</u>

"It is noteworthy that the deep Winnipeg Sandstone aquifer will remain protected by thick and low permeability glacial sediments and separated from ground surface by the Red River Carbonate aquifer and **residual intact portions of the Winnipeg Shale** (Appendix B)."(p. 76)
*The first two years of proposed mining takes place in gravel pits where much of the overburden has been stripped away, there is no protection in these areas.

"Advancement / logging of inclined boreholes and acoustic televiewer and optical televiewer (ATV/OTV) surveys prior to extraction activity in a new area to characterize sub-vertical discontinuities."
*How many inclined boreholes will be drilled for the project? Over lifetime? Define "new area"? Will incline drilling occur for old area? For previously extracted boreholes to assess stability and ensure safety of community and wildlife?

"There is a shale layer that separates the two main aquifers and helps to preserve water quality and separate hydraulic pressures and chemistry. The proponent notes that degradation of this shale layer may occur because of project operations which would result in more direct communication between the two main aquifers: Winnipeg Sandstone and the Red River Carbonate. **This is a crucial risk to the operation.**"[20]
*What specific amount of collapsed shale was assessed to be acceptable? Provide data.

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[18] Matrix Solutions presentation March 8, 2023(Exhibit H-038) slide 11 Marc
[19] "commission suggests that consideration be given to requiring a substantial security or possibly two securities – one for the known risks associated with decommissioning and a second substantial security to address potential significant failures in the future."p.80
[20] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/Hydrogeology_Technical_Review.pdf (p.4)

* Do “residual” portions of Winnipeg Shale Aquitard continue to provide the same baseline condition currently present in the aquifer system?
* Will the Winnipeg Shale Aquitard integrity be monitored?
* If integrity is lost, what mitigation(s) are identified to restore integrity to ensure “water quality and separate hydraulic pressures and chemistry”?

Deep, isolated, freshwater aquifers, such as the Sandstone, are **crucial** in meeting demands of a changing climate. They are not as susceptible to extreme weather that create drought conditions or flooding that results in groundwater contamination.

“It must be pointed out that the best water quality (i.e. lower dissolved parameter values) is found in the eastern portion of the RM (FD, 2019; Pip, unpublished data), which is also unfortunately the target area for the proposed project. Indeed, some waters in that region compare favorably with commercial bottled waters (Pip, 2000), and should be protected as a valuable future resource.”[21](CEC 2023 WS - 21)[emphasis added]

Currently, the Winnipeg Shale Aquitard effectively isolates the Sandstone Aquifer: “The results from the stable isotope composition analysis support distinct recharge between the two aquifers, which support the efficacity of the Winnipeg Shale in isolating the exchange of fluid between the two aquifers under baseline conditions.”(Matrix Solutions, p.11)

Matrix Solutions identified two critical irreversible impacts from the project: “Degradation of the Winnipeg Shale Aquitard and the increase in fracture density in the Red River Carbonate Aquifer are *irreversible effects that could lead to potential preferential pathways for vertical migration of groundwater and contaminates.”* [emphasis added](p. 14)

“If mining of the Winnipeg Sandstone Aquifer is approved, it will be diminishing the volume of sand within the aquifer and will be creating preferential pathways for groundwater to flow at greater velocity where voids and fractures were induced by the extraction activities.”(Matrix Solutions, p,14)

The **Winnipeg Shale Aquitard is a valued environmental component**. It is crucial that it remains intact to continue its role in the protection of the Sandstone from migration of contaminates and intermixing of aquifers and for the continued healthy functioning of the hydrogeological system for the environment and thus human health and safety, today and for future generations. Project impacts cause extensive, permanent collapse of the Aquitard. In our view this is ***environmental violence*** that clearly stems from greed and entitlement.(See Ethics Commission Report referred to earlier)
*What remedial measures are proposed to repair the collapsed Aquitard?
*Detail how a potential spread of contamination from the project or other activities(agriculture, manufacturing, infrastructure) can be mitigated.
* Detail the economic consequences of compromised water sources in southern Manitoba?
* Have economic consequences been assessed? Covered in the financial security? What amount of money can truly cover the loss of Water? Public health?

[21] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/WS - 21 Dr. Eva Pip Updated.pdf

Sio's mining operations increase the vulnerability of the entire hydrogeological system and raise ethical issues that deny our right to a healthy environment. The Winnipeg Shale Aquitard and the Sandstone Aquifer require protection not exploitation.
*We request the province establish protections available under *The Water Protection Act*[22] by enacting s. 5(1) (a) to designate the Sandstone Aquifer and Winnipeg Shale Aquitard as a Water quality management zone for the purpose of protecting the Water; and (b) prohibit the destruction or degradation of the shale aquitard.

The sand is the Aquifer. Water is Life.

Compromised "the license had been signed"[23]

During numerous mining conventions, often attended by elected officials and Approvals Branch staff, Sio distributed promotional materials that state "2025 Issuance of Sio Environment Act License; 2026 Construction of Sio Facility & Initiation of Extraction; Generational Impact: A 500-year deposit; A Sio and RCT partnered Approach".

Sio's promo material gives the impression that a license decision has been made for this application. How is this plausible?

"A draft license was circulated to Sio in September of 2023 from the Approvals Branch with a phased approach requiring Sio to conduct initial multi-well testing, rigorous data collection and a final report on findings as well as a Cumulative Effects Assessment all before proceeding with commercial-scale extraction. All recommendations from the CEC were included in the draft licence and Sio accepted these recommendations from the findings of the CEC and conveyed that acceptance to the Provincial Government. This draft licence was known to the current NDP government. This staged approach would have required Sio to address any remaining environmental and technical concerns the Government may have had with the commercial extraction process, **before** any commercial extraction actually occurred."[24]

Following defeat of the former government Oct 2023, a "get it done" culture to license the project was documented in the Ethics Commissioner Report. The report shows an unhealthy relationship between elected officials and the public service who "explored options over several weeks during and after the election that were dubious, unworkable and illegitimate, until the incoming NDP government shut it all down, communicating its disapproval for any licensing action."[25]

Included in these actions to accommodate company interest and concerns was sharing the licence with Sio "to ensure its regulatory requirements were acceptable."[26]

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[22] https://web2.gov.mb.ca/laws/statutes/ccsm/w065.php
[23] Ethics Report at note 136 to 170
[24] http://pdf.secdatabase.com/684/0001213900-24-015068.pdf
[25] Bureaucrats must also be accountable, WFP 07/06/2025
[26] Unresolved issues from the ethics commissioner's report WFP 31/05/2025

Dec 2023, "Premier Wab Kinew told the Free Press Sio Silica's mine was likely to be developed". Then minister of environment and climate change, the Honourable Tracy Schmidt, stated the CEC recommendations "would be baked into the environmental license."[27]

February 2024, the minister utilized section 11.1 of the Act to remove the Director's role from the licensing decision. This "procedure had never been used."[28] We feel this was done because the department, advising the minister, was found to be compromised; we still do.

Manitoba's assessment and licensing process contains a "pre-proposal stage". During this time, representatives from the development, and staff from Environment and Climate Change and Environmental Approvals Branch discuss the proposal. Staff can request further information and facilitate the process. This 'revised' proposal was filed to and accepted by the Approvals Branch, August 18, 2025, and released to the public October 28, 2025.

In light of what has occurred since the project was first denied, it is extremely concerning that the Branch accepted this half-baked proposal which writes off CEC recommendations #1 and #8 and unacceptably manipulates recommendations #2 through #7 to obtain baseline data on an Environment Act License. Even more absurd the proposal also facilitates construction of the previously licensed processing facility. A Licence that was obtained through a section of the Act that splits a project for assessment and is highly criticized for evading a comprehensive review.

*The public has no confidence in Manitoba's assessment and licensing process under The Environment Act.
*The handling of this project, since it came into the province continues to be suspect.
*The lack of meaningful reform to environment and mineral legislation to ensure for evidence based decision making and real and enforceable protections, adds to the mistrust.

* Until a full, independent pubic inquiry under The Evidence Act into the Sio Silica file occurs, Manitobans will have no trust in our publicly funded processes.
* Before a licensing decision can be made, a thorough independent public inquiry under *The Evidence Act* into the entire Sio Silica project must be called and completed to ensure that our democratic institutions and assessment and licensing process under *The Environment Act* and *The Mines and Minerals Act* are sound.[emphasis added]
* Upon completion of the public inquiry the director and minister must designate this project as a Class 3 development, convene the Manitoba Clean Environment Commission to undertake a public hearing to review the entire Sio Silica Project with participant funding to ensure that a thorough and effective independent review takes place.

Disinfection treatment of mined slurry water

Information on the treatment process is limited in the proposal. The CEC website contains the AECOM Process Wastewater Treatment Options Technical Memorandum. [29] The memo recommends:

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[27] Shifting sands mounting concerns WFP 6/2/2024
[28] Ethics report at 8
[29] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/siosicilia_supplimental_information4_process_wastewater_treatment_options.pdf

“rigorous validation testing…Due to uncertainty in the settling ability of the solids and unique characteristic of the wastewater it is recommended to pilot some of the recommended treatment options in order to assess the efficiency of the equipment treating the process water before proceeding with final equipment selection. It is especially recommended to pilot trial test the hydrocyclones and mobile/lamella clarifiers. It is also recommended to conduct a particle size analysis of the particle fraction below 36 μm to have a better understanding of a distribution of the smallest particle fraction.”
*Although testing is emphasized, it has not been addressed in the proposal. This is a major component required for public health. The continued unjustified delay in testing this component speaks volumes that this license application must be rejected.

Table 1-1 of ‘revised’ proposal states “Key changes: original vs. new project” shows the only addition to UV treatment is “plus filtering…testing of groundwater treatment process to confirm compliance with provisions in an Environment Act License.” We also read under “operational stage: return of this groundwater to the well(also known as ‘reinjection’) following a filtration and UV light treatment, or other approved treatment method”.

- What is the filtering process? What is the “other” method? Why is this not known by now?
- Is the use of sewage treatment plant criteria rather than Drinking Water criteria still proposed for the return slurry water?
- How does the UV treatment work with 7 wells working simultaneously “(e.g. four operating wells in one cluster and three in an adjacent well cluster).”? What volume does it handle? Calculations? Schematics? How many are required? Provide details of monitoring water quality, analysis. What happens when the TBD treatment equipment breaks down?
- It is unacceptable to license a proposed project that has so many unknown, unproven components.

Modelling shows slurry water, returned to the aquifer system is oxygenated and will result in oxidizing conditions in the cavity.
*How will the slurry water UV filter system TBD remove the oxygen in the slurry water to prevent it from contaminating the aquifer system?

The model only considers the oxygen dissolved in the water at a range of 4 to 12 mg/L but entrained or gaseous air occurring from air lift mining where air and water mix in the production tube can result in many times the amount of oxygen entering the aquifer system than by dissolved air. Additional oxygen leakage from the airlift mining method and extending the air tube into the aquifer to move sand toward the casing was ignored. Without this data, the model grossly underestimates potential contamination.
*A thorough assessment of all potential oxygen sources entering the aquifer through mining operations must be modelled to obtain a sufficient understanding of contamination of the aquifer system.

During the provincial review and the CEC hearing, Sio and consultants dismissed concerns of oxygen entering the aquifer. However, only dissolved oxygen was assessed.
*Mining operations have occurred since 2017. Provide oxygen measurements since operations commenced.

The model only assessed oxygen in the cavity. Figure 4-10, plots arsenic, uranium and selenium contained in the material that collapses into the cavity from mining. Selenium remains above drinking water guidelines in

the cavity for 7 years until it slowly disperses. The model duration was set to 10 years and does not allow for further dissolution. Although selenium is said to disperse, the dispersement of oxygen is not considered. As it moves downstream it could potentially oxidize material such as interbedded shale in the sandstone. This shale was not sampled and poses an uncertainty.
*Provide a full assessment of oxygen movement throughout the aquifer system and further dissolution. Sample and test interbedded shale in the sandstone.
*Model contaminate transport
*Model time frames beyond 10 years, lifetime, "multigenerational project" timeline.
*Abandoned wells are perpetual sources for contamination from surface sources. Identify and model potential contaminate sources i.e. industrial, manufacturing, petroleum, agriculture, chemical…
*What mitigations are provided for well users while selenium levels are above drinking water guidelines? What monitoring will take place?
*Southeastern Manitoba is known for elevated radon levels. The degradation of uranium can potentially elevate radon levels. Provide an assessment, mitigations, management and monitoring for homeowners.

The model is 1 dimensional and does not consider how the contaminate plume interacts with other mined cavities or how increase in gradients and flow from continuous mining impacts movement.
*Mining causes complete collapse of the protective Shale Aquitard. With increase in gradient and flow from operations, assess movement of the plume into the overlying Carbonate Aquifer.
*Model in relation to the proposed full scale well cluster extraction method i.e. the proposed operation, to provide an assessment relevant to the proposed project.

Table 4-3 provides borehole 121-1 sample for selenium in the shale at 13.1ppm and 0.533ppm in the carbonate. Therefore the total mass of selenium in the cavity is 198 kg. However, only 0.25 kg out of the 198 kg of selenium was allowed to dissolve in their model. Thus the model only considered 0.126% of the available selenium was assumed to have dissolved in the cavity. The model did not analyze if the 99.87% of selenium would continue to dissolve.

Shake Flask Evidence(SFE) for selenium showed that 42.6 % of available selenium dissolved in 24hrs with a concentration of 1.64 mg/L. This exceeds the 0.01 mg/L allowable limits by a factor of more than a hundred. This is extremely concerning since *dissolution of 42.6% of all available selenium dissolved in the shake flask, whereas in the model, only 0.126% was allowed to dissolve.* With the percentage of dissolution that occurred in the shake flask test, model guidelines would be greatly exceeded by a factor of approximately 333.0.
*The ***model grossly underestimates contamination*** and does not consider cumulative effects across the entire project area.
* A finite, healthy, functioning aquifer system is at risk from this mining. There are lives at stake.

The induced oxidizing condition in the aquifer from operations can explain the "brown water" residents experienced during operations. Under these conditions, iron and manganese form insoluble precipitates, which can discolour water. Sio concludes this oxidation to be a "positive" effect. A formal complaint of discoloured water, new or rising levels of iron, including sulphur smell and swampy taste, and of the numerous open extraction and monitoring wells, were filed to the Water Branch, Feb 25, 2020. The Branch

deemed the complaint as "correspondence", rising levels of iron as historically naturally occurring, and did not do an investigation independent of Sio. Residents have complained of noise, lighting, unsecured mine sites, dust/fines from uncovered stockpiles. It took a street protest and media to have sand stockpiles covered. The other concerns remain unaddressed…trust and confidence is lost in our government and regulatory bodies who are mandated to protect the environment and thus public health.

"Inadequate"

"The sampling campaign related to acid mine drainage was of limited extent. A very small number (nine) of soil samples were collected and analyzed. Not a single duplicate was taken and tested so that no uncertainty ranges for each solute or mineral concentration can be presented. All samples were taken from the same borehole so that no information can be presented on regional changes. There was also no detailed description of how the samples were retrieved and handled after the removal from the borehole. Some of the samples (Winnipeg Sandstone) were even grab samples from a stockpile (p. 34). **Such sampling is inadequate to be used for the geochemical analysis described later on.** The period between sampling and analysis of some samples was relatively long."[30](p.42)

*Without proper sampling, chain of custody, and storage, CEC consultant, PorousTec, essentially deemed *"the geochemical analysis" "inadequate"*. No new samples were provided for this "revised" proposal. Why?

"Winnipeg Sandstone will not be a waste stream."(app b, part1, p.23). However, the proposal documents "overs such as concretions…small rocks" will be screened at the well sites. The Sandstone is documented to contain interbedded shale layers, oolite, concretions, and marcasite coated sand grains.[31] These are brought to surface. The collapsed shale layer is "potentially acid generating(PAG) and can be extracted along with the sand.
*It is critical that the Sandstone be treated as a waste stream, assessed, and managed. The scant Waste Characterization and Management Plan is unacceptable. This critical, information is required from Sio Silica Simba BEFORE a licensing decision. We need to properly understand the full scope of impacts before irreversible harm occurs to the environment and thus public health.

Sio indicates that these 'overs' are stored in a "covered containment bin prior to disposal at a licensed facility or for use in annual progressive closure and decommissioning of extraction wells." (EAP 1, p.24)
*Use of this material for sealing wells does not meet s. 7(1) Manitoba Well Standard Regulation "suitable for potable water" and "clean and free of contamination".
*Sio dismissal of the obvious "waste stream" in the Sandstone is another failure to fully assess project impacts.

The X1T model set a 50 m radius cavity resulting in 9,816 cubic meters of collapsed material - Winnipeg Shale Aquitard and fractured limestone from the Carbonate Aquifer - into the mined sandstone cavity due to

[30] https://www.cecmanitoba.ca/hearings/silica-sand-extraction-project/doc/Hydrogeology_Technical_Review.pdf
[31] "Pyrite and Marcasite Coated Grains in the Ordovician Winnipeg Formation"L. Riciputi, J.Schreiber (2004, 2005) and Watson(1985)

mining operations. Total mass of this collapsed material is 24.5 thousand tonnes. Sampled materials show naturally occurring selenium, uranium, arsenic, boron, fluoride. The return of mined, oxygenated slurry water, to the aquifer results in oxidizing conditions mobilizing heavy metals in the material.
*To access the ore body, the shale and limestone have become dislodged as a result of operations. According to the X1t modelling, this material is contained in the cavity. This collapsed material has no economic value and is not further processed. Material that is extracted with the sand is screened and stored for disposal. Oxygenated slurry water that is returned to the cavity will mobilize selenium, arsenic and uranium in the material. Selenium exceeds drinking water guidelines for 7 years. The model input was 10 years. Further dissolution was not modelled, nor dispersement outside of cavity/containment. The shale has also been found to be potentially acid generating.
* Sio must account for this waste stream, storage in the cavity/tailing pond, and prevent the resulting contamination and environmental impacts.
* "Water is central to the well-being of our natural environment, our families and our communities."[32].
It is distressing that the sampling program was thoughtlessly undertaken and waste streams dismissed and the mined cavity/tailings pond not accounted for.
*With the large number of exploratory drilling and mass of material mined out since 2017, it is concerning that "not a single duplicate was taken and tested" to rule out "uncertainty" and an obvious "waste stream" in the sandstone ignored.
*We would like to think more of Sio and its specialists since their project proposes to mine directly in Manitobans drinking Water for "generations". This project must be rejected.

<u>"Follow-up Plans and Overall Assessment"</u>

Sio states that Plans will be "developed and submitted" after project approval and "based on requirements" in the license "which is common practice". **This is unacceptable.** These plans are required now to review and verify if the Plans do indeed successfully identify, prevent, and mitigate potential adverse effects. That would require a comprehensive assessment. Sio has again failed to provide.
*The assessment and licensing process under the Act is in dire need of meaningful reform.

"It is recommended that mitigation measures, follow-up plans, and monitoring programs described in this report be implemented to avoid or minimize potential environmental effects and/or identify any unanticipated adverse effects early so that appropriate adaptive management action can be undertaken."(eap 1, p. xiv).
*Where are they? Why are they kept from public review? We are told they will be based on license conditions but if there has been no assessment i.e. noise, lighting,…exactly how appropriate will these conditions be? Evidence-based or boilerplate? Identified later via TBD complaint handling plan?
*Provide these mitigations, plans and programs for public review <u>*before*</u> licensing.

A Noise Mitigation Plan is handled the same way - no assessment, be based on license conditions. Vibrations are dismissed as they were for the processing facility/rail yard. Sio operations are scheduled year round, 24/7, up to 100 m of homes. And what of barns, housed animals? Animals have greater hearing sensitivity

[32] "Manitoba's Water Management Strategy" p.2: <u>https://www.gov.mb.ca/sd/pubs/water/water_mgmt_strategy2022.pdf</u>

and will be adversely impacted. Are they written off like "wildlife species…anticipated to be accustomed(habituated) to some level of noise due to the presence of existing developments (e.g.agricultural activities, residential areas, roads and aggregate quarries)."[33] Nocturnal species? Nesting parameters? **We anticipate Sio operations will in no way be comparable to what is occurring now.**
*Where are the noise, light measurements? Provide these measurements for public review?
*Undertake a Noise Assessment and an Artificial Light Assessment and provide for public review *before* a licensing decision.

"Sio is committed to protecting the community and the environment in the event that environmental emergency situations arise from the Project. The purpose of the Environmental Emergency Response Contingency Plan (EERCP) is to identify and respond to potential environmental accidents and emergency situations, and to identify preventative and mitigative measures for any associated potential impacts… This plan will be prepared based on conditions and requirements within an Environment Act Licence for the Project."(EAP 2, p.112) The previous proposal was more clear: "developed after issuance of a license for the project."
*Again, the assessment and licensing process under The Act is in dire need of meaningful reform, it does not provide for "an effective review"of project impacts "to ensure that the environment is protected and maintained"[34]. Such provisions must be provided before licensing.
***There are lives at stake,** not having a clear understanding of the project from a comprehensive assessment is scientific malfeasance in our opinion. This project must NOT proceed without these detailed plans and reviewed *before* a licensing decision in order to protect the environment and thus public health.

The conditions and requirements within a license are based on Sio and their specialists' assessment. The current setup of the assessment and licensing process under the Act assures that a best-case scenario is presented to ensure licensing. We need to know the truth about impacts from development to avoid mistakes that will be costly to the next generations. Particularly when it comes to Water, there is no room for error.
*How are conditions and requirements identified for the License when data and analysis will only be available after the first two years of operation and through to the fifth year?
* "A robust plan that anticipates worst-case scenarios is needed at the onset for such a project."(CEC 2023 p67)
* This application must be rejected.

Monitoring

"Confirmation and monitoring of void space using sonar after extraction including long-term monitoring (after 1 year)." Sonar scans taken in 2021, were filed with the CEC for the 2023 public hearing. The CEC and Participants identified the lack of "long-term monitoring data."
*There are two boreholes, previously scanned that have not been used to provide information for this assessment. There are numerous, unsealed extraction boreholes that are available for obtaining data and monitoring long-term stability. Why are the existing boreholes not being utilized to provide information.

[33] EAP 1, p.xi
[34] *Manitoba Environment Act* s. 1(1); 1(1)(c)

Scans show different cavity shapes indicating materials are heterogeneous or that the air lift apparatus was extended outside the casing per Patent description.
*Detail the use of the air lift apparatus for the two boreholes that were scanned? Depths of apparatus use in casing, use outside of casing, pressure(s) used, etc.
*Describe how the model can predict a cavity space in heterogenous material?

"Should monitoring results yield requirements for Project operation parameter changes, Sio will advise the EAB of Project operation changes in accordance with provisions in an Environment Act Licence for the Project."(EAP1, p.13)
*The company proposes to monitor itself? From past experience, we have no confidence in the company to self regulate, self report, or for a contracted party to do so.
*In no way should the company and paid consultants monitor operations.
*Can the regulator guarantee that monitoring of operations by the regulator will occur 24/7/365 and be highly controlled and supervised?
*Can Sio Silica/Simba and consultants guarantee there will be no negative effects to Water quality? Quantity?
*Does the province have staffing levels and experience capable of strong monitoring and enforcement for the proposed 5 year experiment? Please detail? For life of the project? The Conflict of Interest Act excludes public servants. In light of this project and the Ethics Commissioner Report, it would be prudent to reexamine that exclusion.
*Based on our experience we do not have reason to be confident in the assessment and licensing process.

<u>Conclusion</u>

OLS has numerous, continuing concerns regarding the proposal and the assessment and licensing process for the Sio Silica, Simba Sand Extraction Project - File # 6275

The proposal is once again a best case scenario that is unrealistic for a project that causes serious and irreversible damage to the aquifer system, and inflicts environmental and ecological damage. It brings about ongoing distress, negatively impacts our livelihoods and communities and creates future liabilities.

Material in the proposal is presented in a way to dismiss impacts and/or bury information detrimental to licensing.

What is missing in the proposal is the required integrity, respect and knowledge essential to protect the environment and thus public health.

The experimental approach filed and accepted by ECC for licensing is fundamentally troubling.
This project illustrates how Manitoba's antiquated environment and mineral legislation fails to protect the Land, Air, and Water for today and future generations. The public's role is a mere formality to attribute credibility to what, in our view, is an unacceptable and corrupted process.

The assessment and licensing process under The Environment Act does not meet best practice standards for Impact Assessment "to ensure that the environment is protected and maintained"[35].
The Manitoba government has a responsibility to protect the public. We need this government to establish an evidence-based process to provide for real and enforceable protections. Until this occurs, there must be a suspension to all projects that pose such significant and irreversible harm; "Protect the people, protect the environment and then do economic development.[36]"

Before a licensing decision can be made, a thorough, independent public inquiry under *The Evidence Act* into the entire Sio Silica project must be called to ensure that our democratic institutions and assessment and licensing process under *The Environment Act* and *The Mines and Minerals Act* are sound.

FreshWater is finite. Our planet has about 3%. Of that, surface water accounts for 1% of which groundwater is 0.31%. Much of that groundwater is not usable because it has been ruined by ineffective enforcement i.e. fracking, mining or irremediable spills.

Water is too precious and the risk too great, this project must NOT receive an Environment Act License and must be prohibited.

Tangi Bell
Our Line in the Sand MB

[35] *Environment Act* 1(1); 1(1)(c)
[36] "P. Fitzpatrick, Oct 30, 2025, CJOB radio. "Putting People and the Planet first: What Manitobans Expect from Impact Assessment" https://mbeconetwork.org/wp-content/uploads/2025/10/2025-IA-Reform-Report-FINAL-single-pages.pdf

[redacted]

November 27, 2025

Agnes Wittmann, Director
Environmental Approvals Branch
Manitoba Environment and Climate Change
Box 35, 14 Fultz Boulevard
Winnipeg, MB R3Y 0L6
publicregistry@gov.mb.ca

Re: Request for Independent Review — SIO SILICA SAND / SIMBA EXTRACTION PROJECT
Sio Silica Corporation — File #6275 (and related Files #6057, #6119; Licence No. 3367)

Dear Director Wittmann,

I write to you as an affected resident of the Rural Municipality of Springfield and as an individual who has carefully reviewed the environmental licensing processes related to the Sio Silica proposals over several years. My concerns relate to the cumulative environmental risks, procedural inconsistencies, missing regulatory safeguards, and potential **political interference** that may have influenced key decisions. Given the significance of this project, the scale of its proposed footprint, the experimental nature of its extraction method, and the potential to adversely affect a vital and irreplaceable drinking water resource, I am requesting that these files be referred for independent review.

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1. Reason for Requesting an Independent Review

The licensing history of Sio Silica and its predecessor (CanWhite Sands) raises numerous red flags. These include:

A. Splitting the Project Into Multiple Files

Instead of evaluating the extraction and processing components as one integrated project, the EAP allowed the proponent to divide them into separate environmental approvals (Files #6119, #6057, #6275). This approach:

- reduces transparency,

- prevents the public from understanding the full environmental impact, and
- lowers the regulatory threshold by avoiding a Class 3 designation.

In reality, the extraction and processing facilities cannot operate independently. Considering them separately undermines the principles of cumulative effects assessment under Manitoba's environmental legislation.

B. Down-classification to Class 2

A project with a land disturbance area of **166,890 acres (67,537 ha)** — the largest mineral claim footprint ever granted to a single company in Manitoba — plainly warrants Class 3 consideration. Class 2 classification weakened the oversight process and curtailed **public hearing requirements**.

C. Licence 3367 Issued Despite Serious Unresolved Issues

Licence 3367 (File #6057) was issued even though:

- public submissions identified non-compliance with the Well Standards Regulation and the Groundwater and Water Well Act;
- the drilling method risked connecting aquifers that must, by law, remain isolated;
- the proponent had not demonstrated that its extraction or reinjection processes could be operated safely; and
- the CEC had not yet conducted its review of the broader extraction project (File #6119).

The licence was issued with acknowledgement that the extraction project was still pending, yet it allowed construction of a processing plant that would be useless unless the extraction method — the portion most likely to harm the aquifers — was later approved. This sequencing appears to pressure regulators to approve the extraction component simply because the facility already exists.

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2. Aquifer Risks and Environmental Concerns

The risks associated with Sio's proposed extraction method are exceptionally serious.

A. Aquifer Interconnection

The proposal requires drilling thousands of wells through multiple geologic layers:

- Red River Carbonate Aquifer (upper aquifer used by residents)
- Shale aquitard (protective barrier that **must not** be breached)
- Winnipeg Sandstone Aquifer (deep aquifer proposed for extraction)

This drilling increases the risk of **interconnecting the aquifers**, introducing the possibility (Papadopulos Review, 2023; CEC Technical Report, 2023) of:

- contamination pathways,
- changes in water chemistry,
- irreversible mixing of aquifers with distinct hydrogeologic characteristics,
- reduction in water quality for private and municipal wells.

B. Structural Instability and Subsidence

Multiple hydrogeology experts have stated that:

- the extraction method would create “rooms and pillars” underground,
- the sandstone loses integrity when converted into slurry and removed,
- insufficient testing has been done to determine whether these voids will remain stable,
- collapse may propagate upward through the shale and carbonate layers.

Subsidence and sinkholes could (Golder Geotechnical Assessment, 2021; CEC Report, 2023):

- threaten homes, roads, infrastructure,
- alter groundwater flow paths,
- cause wells to go dry by redirecting natural flow.

C. Unproven Mining Method

This method has not been used anywhere in the world at the scale proposed (CEC Report, 2023; Independent Hydrogeology Review, 2022). Pilot tests were limited and did not evaluate long-term geotechnical effects.

The CEC and Papadopulos reviews both concluded that significant knowledge gaps remain and **those knowledge gaps have not been addressed within Sio Silica Corporation 2nd application— File #6275!**

In Manitoba’s proposed Environmental Rights Act it is explained as: If an activity raises threat of serious harm to the environment precautionary measures should be taken even if it has not been fully established scientifically that the activity is harmful to the environment.
In this content, the proponent of the activity rather than the public should bear the burden of proof.

The proof must not be gathered by obtaining a licence from the EAP, that licence in effect would be for experimental data gathering.

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3. Concerns Regarding Procedural Integrity and Governance

I am deeply troubled by indications of potential **political interference** during decisions on earlier phases and iterations of this project Sio/CanWhite File #6119. Evidence referenced in media, public submissions, and FIPPA disclosures suggests:

- decisions were expedited or influenced outside the normal regulatory structure,
- officials used language framing applicants as "clients," raising concerns about regulatory capture,
- questionable decisions were made contemporaneously with broader issues involving the former government.

Given these concerns, only an external, independent review by the Auditor General can restore public trust and confidence.

Additional potential political interference and past governance concerns: Given prior reports and concerns about corruption and political interference, an independent review maybe warranted on the following files include:

- Berger – File #6055
- Parrish & Heimbecker - File #6028

Other files in progress include:

- RM of Springfield Water Treatment Plant File #6219, No licence yet issued, contains data that has been misrepresented to the ratepayers of the RM of Springfield which could be deemed fraudulent
- RM of Springfield Wastewater Treatment Lagoon File # 4929.30, No licence yet issued, also contains skewed data

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4. Specific Requests for Action

I respectfully request the following:

A. Referral to the Auditor General

That Director Wittmann formally notify Minister Moyes, and request that the Auditor General conduct a full review of Files **#6275, #6057, #6119**, and the issuance of **Licence No. 3367**, including:

- potential political interference,
- adequacy of regulatory process,
- compliance with the Well Standards Regulation,
- whether the project was improperly down-classified to avoid scrutiny.

B. Suspension/Revocation of Licence No. 3367

Until the Auditor General completes the review, **Licence 3367 should be suspended or revoked**. It is unacceptable to allow a facility to be built and operate when **its feedstock (extracted sand) may rely on an illegal or unsafe extraction process.**

C. Reclassification to Class 3 & Referral to CEC

Based on the project's scale, risk, and experimental nature, the extraction + processing components must be considered together as a Class 3 development have a **public hearing** and reviewed again by the Clean Environment Commission with full public participation and participant funding.

D. Implementation of All CEC and Peer Review Recommendations

Before any further approvals, the proponent must complete:

- Waste Characterization & Management Plan
- Water Management Plan
- Groundwater Monitoring & Impact Mitigation Plan
- Progressive Well Abandonment Plan
- Cumulative Effects Assessment
- Cluster well extraction tests
- Legal opinions on compliance with well and drilling regulations
- Monitoring programs for collapse and subsidence risk
- Early warning and response systems

These requirements are not optional. They are essential safeguards.

6. Mandatory Liability Insurance and Surety Bond to extend 20 years beyond Project's Projected life

A requirement and condition of licencing through the EAP must be a mandatory Liability Insurance Policy and a Surety Bond.

- An audit by an independent insurance broker must preform a risk assessment of this project to determine what appropriate monetary value of liability insurance and surety bond must be carried

- Insurance broker to be chosen by the Auditor General
- The independent insurance broker audit must be paid by Sio the applicant
- A liability insurance policy for the value determine by the independent insurance to cover all Manitoba residents who's water and or property may and will be damaged
- Managed intrust by the EAP a surety bond of the value determined by the independent insurance broker audit
- Managed by the EAP both the Insurance Policy and the Surety Bond for a minimum period of 20 years extending past the projected projects life
- Managed by the EAP both the Insurance Policy and the Surety Bond will ensure that no, cancellation unknowingly occurs by the owners
- With any CHANGES in title and or ownership, any and all new change in ownerships, the EAP must be notified so that both the Insurance Policy and the Surety Bond is transferred in kind to all new owners and land titles and remains in effect for 20 years past the life of the project
- Guidelines established in advance on burden of proof regarding dry wells, polluted water, property damage (sink holes) and personal liability to mitigate the legal burden the can and will occur for affected persons

Requesting these conditions regarding the Insurance Policy and the Surety Bond comes from the evident lack of fiduciary considerations for the ratepayers of Springfield was revealed when the RM of Springfield Council, CAO, and the Development Officers negotiated a previous Development Agreement with Sio.
It was revealed that Sio was only required to have a 10-million-dollar Insurance policy with an ability to give a six-week cancellation notice of the insurance.
Thankfully, due to massive protesting by residents and Premier Wab Kinew stopping the project the Development Agreement has gone by the wayside for now.

Perhaps again this was due to potential political interference?

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5. Conclusion

A licence must not be granted — and any existing licence must not remain in effect — for a project that is experimental, inadequately tested, potentially unlawful, and capable of permanently damaging Manitoba's drinking water resources (Groundwater and Water Well Act, MR 215/2015; CEC Findings, 2023).

I therefore formally request that the Sio Silica SIMBA extraction project (File #6275) be denied. The future of our aquifers and the safety of thousands of residents depend upon transparent, independent, and science-based decision-making.

Please confirm receipt of this submission and advise, in writing, what steps the Environmental Approvals Branch will take to forward these requests to the Minister and the Auditor General. I request confirmation that Licence No. 3367 will be reviewed and that my full submission and attachments will remain on the public registry without redaction.

Attachments to include (in order 1 to 4):

1. CEC Report
2. Expert Report on the Sio Silica Proposed Vivian Silica Sand Project Prepared for:
   The Rural Municipality of Springfield, Manitoba Prepared by: Christopher J. Neville, M.Sc., P.Eng.
   S.S. PAPADOPULOS & ASSOCIATES, INC, 90 Frobisher Drive, Unit 2B, Waterloo, Ontario N2V 2A1 • (519) 579-2100
3. University of Winnipeg / EcoManitoba / Public Interest Law Centre summary - concerns with EAP
4. Braid Report - inappropriate or biasness within the Manitoba Municipal Board, (as Sio went before the Board) https://www.gov.mb.ca/mr/mfas/pubs/mmo/bulletins_2025/what_we_heard-review_provincial_planning_legislation.pdf

Please do not redact my name or contact information from this submission.

Thank you for your attention to this matter.

Respectfully,

[redacted]
[redacted]
[redacted]
Email: [redacted]

JUNE 22, 2023

CLEAN ENVIRONMENT COMMISSION REPORT

ON THE VIVIAN SAND EXTRACTION PROJECT

Manitoba CLEAN·ENVIRONMENT™ COMMISSION

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June 22, 2023

Honourable Kevin Klein
Minister of Environment and Climate
Room 344, Legislative Building
450 Broadway
Winnipeg, Manitoba R3C 0V8

Re: Sio Silica Project

Dear Minister Klein,

The panel is pleased to submit the Clean Environment Commission's report on the technical review and public hearing with respect to the Sio Silica Project.

Sincerely,

[redacted]

[redacted], Chairperson

[redacted]

[redacted]

[redacted]

[redacted]

Laurie Streich

[redacted]

Manitoba

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Foreword: Considering a Project Without Precedent

In November 2021 the Minister of Environment and Climate asked the Clean Environment Commission to review the Environment Act Proposal for the Vivian Sand Extraction Project. Specifically, the terms of reference directed the commission "to review The Environment Act proposal and the hydrology and geochemistry assessment report and provide advice and recommendations to the minister regarding potential environmental and health effects of the proposed sequential installation, operation and decommissioning of silica sand wells for the silica sand extraction project."

At the same time, the commission was asked to provide members of the public with an opportunity to voice their thoughts regarding Sio Silica Corporation's project. Roughly a year and a half later, the commission has heard from many Manitobans on this project, including those who wrote the 290 written submissions the commission has received, the 50 individuals who spoke at sessions of hearings designed for public presentations, and those who represented the groups that took part in the commission's hearings as official participants.

Members of the review panel listened to and read extensive amounts of material generated by the proponent, by participant groups and by the general public. Panel members were assisted in their understanding of the highly technical material by independent experts retained by the commission for the purpose of helping in this process.

After this lengthy review, members of the panel are unable to state with confidence that all potential environmental effects of this project have been fully considered and that adequate detailed plans have been prepared for preventing or mitigating these effects. This is not to disregard the work of the professional engineers and scientists who carried out assessment activities on behalf of the proponent. Rather, the uncertainty that remains about this project is largely a result of the unique nature of the Vivian Sand Extraction Project.

Silica sand is a strategically important resource, which is in high demand as the world transitions away from fossil fuels to renewable energy systems. Currently, around the world, silica sands are mined in open-pit operations. In contrast, Sio Silica proposes to mine silica sand using a novel approach known as airlift, in which air pumped down wells into a layer

of loosely consolidated sand will draw up a mixture of sand and water. This airlift method is an established method of extracting water from wells, but to the commission's knowledge has never been used to mine silica sand. Compared to conventional open-pit mining, the approach has potential environmental and economic advantages which make it worth judicious review.

The proponent proposes to extract large amounts of silica sand, as much as 1.36 million tonnes per year for four years, from as many as 1,200 extraction wells in a production zone near Vivian, in southeastern Manitoba. As no evidence has been found that very large amounts of sand have been mined from deep underground (60 to 70 metres) before, there are no parallels that can be looked at in considering the Environment Act Proposal (EAP) prepared by Sio Silica. The proponent has carried out test drilling and test extraction and has created models of the geology and hydrology of the area. Sio Silica retained one team of professional technical consultants to prepare their EAP, and then retained a second team to review the work of the first consultants. There is no question that considerable effort and expense has gone into assessing the potential impacts of this proposed project. But the validity of predictions about the risks of this project cannot be tested by looking at the actual impacts of similar projects elsewhere, because there are no similar projects elsewhere.

The uncertainty resulting from a project that is essentially experimental in nature is a greater concern when we consider that the proponent intends to carry out these activities, over the long term, within aquifers that are a source of drinking water for towns and residences and water for agriculture and industry in a region that is home to some of the most rapidly growing communities in Canada.

Questions about the effect of the project on groundwater quantity and quality were central to this hearing process. Of the two categories, quantity concerns are somewhat less pressing, given the proponent's plan to reinject most of the water following treatment (minus an estimated 15 per cent that is expected to remain with the sand when it is sent for processing, which will then be lost to evaporation). Even in this case, though, the prospect of climate change bringing more variability in precipitation does raise the issue of what might happen in future drought years. Added to this is the growing population of southeastern Manitoba, where new homes and businesses are continually and rapidly being added. The regulatory regime in Manitoba places priority on domestic water use as opposed to industrial.

Water-quality issues drove most of the public concern and most of the scrutiny from participant groups and the general public. Again, because this type of project has never been done before on such a scale, we are left with uncertainties, some of these concerning its long-term effects. Introduction of dissolved oxygen into the groundwater, through the injection of air into the sandstone aquifer, could cause some change in the chemical composition of the water. The proponent believes these will not be significant. The collapse of the layer of shale immediately above the sand into water-filled voids created by the project brings further potential for changes in the chemical composition. Again, the proponent believes these will not be significant. The project would create some 1,200 new wells, all of which would need to be decommissioned and permanently sealed to prevent future contamination. These would be permanent potential pathways for groundwater intrusion into two aquifers used for drinking water, should these future seals degrade.

One fundamental question raised by this proposal is that the project would connect two

aquifers: the Red River Carbonate (limestone) aquifer and the Winnipeg Sandstone aquifer, in which the sand-mining is planned to occur. Creating hundreds of large voids in the sandstone formation by removing sand is expected to cause the layer of largely impermeable shale above the sand to collapse. This shale currently acts as an aquitard, separating the sandstone aquifer below from the carbonate aquifer above. The collapse of this shale would therefore connect the two aquifers. The proponent has stated that the aquifers are already connected via hundreds of wells throughout the region, but each one of the newly created voids would have an area far larger than all the existing wells combined. The proponent furthermore claimed that since the water quality and hydrostatic heads (a term referring to the pressure of the groundwater) in both aquifers in this region are similar, there would be minimal mixing and water quality would not be impaired. Participants and presenters in the hearings raised the question that this may run counter to Manitoba's Well Standards Regulation: ". . . a person must not construct or seal a well or test hole in a manner that allows the interconnection or mixing of groundwater between the Winnipeg Formation and any overlying aquifer." Assessment of the applicability of this regulation to the construction and sealing of wells for this project was not within the Clean Environment Commission's Terms of Reference for these hearings, but it is central to the project moving forward and is a matter on which many members of the public and the commission need to see clarity.

Another area of uncertainty surrounds the long-term geotechnical effects of creating hundreds of these large voids. The proponent has shown that in a test extraction, removing the sand has resulted in the collapse of portions of the limestone layer immediately above the shale layer. The proponent has stated that what is known as "competent" limestone – found immediately above the weaker, lower layer of fractured limestone – has the ability to span these voids without collapsing up to the Quaternary till overburden. But again, with hundreds of voids being created, what are the risks that some of them will be created in areas where the limestone is not as strong or is weakened by vertical fractures or other anomalies that can weaken the rock mass? If extraction occurs in such weakened areas, what probability can be assigned to the risks of subsidence or collapse of the surface and creation of new pathways for contamination of the aquifer?

To raise questions about uncertainties is not to say that the risks identified by participant groups or members of the public are likely to occur. The proponent's conclusion that the project will have no significant negative effects on the environment, however, is based on a relatively small number of tests carried out in a relatively small portion of the project area. It is also based on the assumption that plans for water treatment, water return and well-sealing will function reliably in real-world conditions during operations. The commission is of the opinion that, given the stakes involved and the magnitude of the project, greater certainty is required before proceeding to full-fledged development of this project.

The proponent indicated during the hearing that it is willing to conduct inclined drilling to reveal whether or not vertical fractures or cracks exist in the limestone layer. This is the kind of additional information that would raise confidence levels. There was also discussion during the hearings of the possibility of the proponent conducting additional sonar examinations of the cavities both during extraction and continuing after extraction to verify predictions about the long-term stability of the cavities and the limestone. Additional sonar examinations of the voids already created by test extraction would help to verify predictions of long-term stability

of the limestone. Additional pump tests to verify the groundwater model on which the proponent's effects predictions were based would also provide more confidence, as would additional testing of the effects on water quality.

Beyond this, recognition that this is essentially an experimental project would be a way of underlining the need to reduce uncertainty. Approaching this project with careful preliminary steps – which we are describing as a "step-wise approach" – would provide for an opportunity to better understand the potential effects. Data from a smaller number of extraction wells than the 1,200 referenced in the EAP would provide an opportunity to more fully consider and assess risks such as subsidence, shale collapse and the potential effects on water quantity and quality.

That this is an experimental project is underlined by the fact that significant changes have been made to the plans since the EAP was submitted in July 2021. At that time, the proponent expected to drill up to seven wells per cluster. Subsequently, after discovering that the amount of sand that can be extracted per well is greater than was originally expected, the extraction plan was changed to allow for up to five wells per cluster. As well, as a result of further studies of the thickness of the limestone caprock layer above the sand, the proponent changed the boundaries of the project site, shifting much of it to the west, where the limestone caprock is thicker. A conservative approach would enable the proponent to more fully understand the application of its technology to this resource in this environment.

The effects assessment in the proponent's Environment Act Proposal was accompanied by brief descriptions of a large number of monitoring and mitigation plans, although drafts of some of these plans were submitted only a few weeks before the hearings began. Proceeding on a step-wise basis would allow these plans to be fully fleshed out, so that specific matters to be studied and specific triggers for specific mitigation actions could be identified. While finalizing these plans, the proponent could build relationships with the community in which this project is intended to operate. With input from Manitoba Environment and Climate, including the branches responsible for groundwater management, environmental licensing and enforcement, from the branch of Manitoba Economic Development, Investment and Trade responsible for mines management and from local municipalities, mechanisms for community input into monitoring and reporting could also be developed before an application for a longer-term project is considered.

Ultimately, the Vivian Sand Extraction Project is envisioned to last for 24 years or more, generating nearly 10,000 extraction wells. In view of the potential effects on a water resource that serves tens of thousands of Manitoba homes, farms and businesses, getting it right at the beginning is essential before anything of this magnitude should proceed at full scale.

Chapter One
Introduction

1.1 The Manitoba Clean Environment Commission

The Manitoba Clean Environment Commission is an arms-length, provincial agency established under the authority of The Environment Act (1988), wherein the commission is mandated to provide advice and recommendations to the Minister of Environment and Climate*, and to develop and maintain public participation in environmental matters. In the context of a review such as that undertaken for Vivian Sands Extraction Project, this includes holding open hearings to allow members of the public to provide input on the Environment Act Proposal (EAP) prepared by the project's proponent (Sio Silica Corporation) and to state their opinions to the hearing panel.

*For the sake of clarity, this report refers to the provincial department by its current name, Manitoba Environment and Climate, except where directly quoting documents that use an earlier name.

1.2 The Project

The Vivian Sand Extraction Project is proposed to extract silica sand using wells drilled through various layers of sediments and rock to reach a formation, known as the Winnipeg Sandstone, or Winnipeg Formation, lying approximately 60 metres below the surface. Using a process known as airlift or air-injection, the proponent intends to draw sand and water from this formation to the surface. The proponent intends to drill approximately 1,200 such wells, in clusters of up to five, on private land south and west of the village of Vivian, on plots of land to the west and east of Provincial Road 302. The project site comprises 633 hectares (1,564 acres), within the Rural Municipality of Springfield. Drilling and extracting sand from these wells is planned to occur from spring to fall for four years, during an estimated 250 days per year, depending on weather.

Once the sand and water are brought to the surface, the proponent plans to separate sand from the water and transport it via a slurry pipeline containing a sand/water mixture to a nearby processing facility, where it will be further cleaned, dried and loaded for train shipment to customers. This facility has been licensed separately following a review by Manitoba Environment and Climate. After suspended sediments are removed, the water brought to the surface with the sand is to be disinfected through a process of exposure to ultraviolet (UV) light and then fed by gravity into the cavities created through extraction.

While this hearing process focused on the four-year Vivian Sand Extraction Project, the

proponent intends to continue mining sand from the Winnipeg Sandstone formation for an additional 20 years. Sio Silica has stated that if it receives a licence for the initial project, it will later apply for a series of approvals to cover the intended 24-year production period.

Silica sand from the Winnipeg Formation has a high degree of purity. The proponent has stated that this sand is valuable for use in many industries, including manufacturing electronic products, solar panels, computer chips, batteries, fibre optics, medical products and aerospace products. Sand is also used for fracking in the oil and gas industry.

1.3 The Proponent

Sio Silica Corporation is a Canadian company, headquartered in Calgary. The company was incorporated in 2016 under the name CanWhite Sands. In 2016 it began exploration in Manitoba and in 2017-18 it acquired mineral claims through its subsidiary, HD Minerals. In 2022, the company changed its name to Sio Silica and amalgamated with its HD Minerals subsidiary.

1.4 Terms of Reference

On Nov. 15, 2021, the Minister of Environment and Climate wrote to the Clean Environment Commission (CEC) to request that the commission hold public hearings on Sio Silica's application for an Environment Act licence for the Vivian Sand Extraction Project. The letter noted that, during the public review of Sio Silica's application, requests had been made for a CEC hearing on the project. The minister directed the commission to carry out a hearing in accordance with section 6(5) (a) and (b) of The Environment Act and in accordance with the commission's Process Guidelines Respecting Public Hearings. The letter instructed the commission to provide advice and recommendations to the minister and provided the commission with terms of reference for the hearings as follows:

Terms of Reference:

"1. The CEC will conduct a technical review of the Environment Act proposal and the hydrogeology and geochemistry assessment report and provide advice and recommendations to the Minister regarding potential environmental and health effects of the proposed sequential installation, operation and decommissioning of silica sand extraction wells for the silica sand extraction project.

2. In providing advice and recommendations, the CEC will provide members of the public the opportunity for input regarding the CanWhite Sands silica sand extraction project proposal at a public hearing in a location consistent with the affected community.

The CEC review should begin as soon as possible and be completed by March 15, 2022."

A subsequent letter extended the time frame for the CEC's hearing, noting that the Environment and Climate departmental review of the project was still on-going. This letter directed the CEC to proceed in a timely manner, once the department's environmental review process was complete.

1.5 The Hearings

Public hearings were held over 12 days, from Feb. 27 to March 15, 2023, in Steinbach, Anola and Beausejour. Weekday hearings

were held in Steinbach and Beausejour, during which the proponent and participant groups presented information and were questioned. Two evening sessions, in Steinbach and Beausejour, and a Saturday session, in Anola, were scheduled to provide members of the public with the opportunity to make presentations. Written submissions were welcomed and the hearing record closed on March 24. Hearing transcripts were placed on the public record on the commission's website.

During the hearings, 21 individuals gave testimony, including 13 representing Sio Silica and the consultants it hired to prepare and review its Environment Act Proposal. Five participant groups took part in the hearings and five individuals gave testimony on their behalf. During the weekend and evening sessions, 50 presentations were given by members of the public. The commission also received 290 written submissions from members of the public. As a result of these hearings, the commission has gained greater understanding of the project's potential environmental and health effects.

1.6 Section 35 of Canada's Constitution

Section 35 of the Constitution Act (1982) stipulates that "[t] he existing Aboriginal and treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed." While Section 35 is not an environmental statute, it does require consultation with Aboriginal peoples whose rights may be impacted in some fashion by a project. The obligation to initiate and carry out consultations with respect to Section 35 belongs to the province and/or Canada, depending on the nature of the project under consideration. The Government of Manitoba, through the Department of Indigenous Reconciliation and Northern Relations, not the Clean Environment Commission, conducts such consultations. The commission hearings played no role in formal Section 35 consultations regarding the Vivian Sand Extraction Project, although the commission's process can play a role in gathering input relevant to the consultation process.

1.7 The Report

This report is divided into 12 chapters describing the process, the proposed project, the areas of potential effect on the biophysical and socio-economic environment, plans for monitoring and follow-up, the commission's notes on other issues raised in this process and the commission's conclusions and recommendations. Within these sections are summaries of the matters discussed by the proponent in the Environment Act Proposal and in the hearings, summaries of concerns raised (under the heading "What We Heard") and statements of the panel's thoughts on these matters (under the heading "Commission Comment.") Recommendations to the minister follow in Chapter Twelve: Conclusions and Recommendations.

Chapter Two:
The Licensing Process

2.1 Needed Licences and Approvals

The Environment Act sets out the environmental review and licensing process for developments in Manitoba. Developments are designated as one of three classes in The Classes of Development Regulation (Manitoba Regulation 164/88), with Class 1 developments generally smaller and less complex and Class 3 generally the largest and most complex. The Vivian Sand Extraction Project was designated a Class 2 project. The regulation specifically classifies "mines, other than pits and quarries" as Class 2 developments. To obtain the licence, the project must be assessed in accordance with the process outlined in The Environment Act.

Sand extraction is proposed to occur within mining claims issued to Sio Silica under provisions of The Mines and Minerals Act and under borehole licences issued under Part 3 of the Drilling Regulation. A closure plan will be developed and submitted to the Manitoba Mines Branch in accordance with the Manitoba Mine Closure Regulation 67/99 General Closure Plan Guidelines (Section 8.9.)

The project also requires water rights licences for extraction of groundwater under The Water Rights Act and injection permits, under The Groundwater and Water Well Act, for return of water to the sandstone aquifer.

2.2 Manitoba's Review Process for an Environment Act Licence

Sio Silica (then known as CanWhite Sands) submitted its Environment Act Proposal (EAP) to the Environmental Approvals Branch of Manitoba Environment and Climate on July 23, 2021. The proposal contained information required in the Environment Act Proposal Report Guidelines, which lay out the kinds of information required in an EAP. According to these guidelines, environmental assessments typically contain the following:

- Executive summary
- Introduction and background
- Description of proposed development, including construction, operation, maintenance, and decommissioning, if applicable
- Description of existing environment in the project area
- Description of environmental effects of the proposed development
- Description of the human health effects of the proposed development
- Mitigation measures to protect the environment and human health, and residual environmental effects

- Follow-up plans, including monitoring and reporting
- Conclusions

Following receipt of the proponent's EAP, a Technical Advisory Committee (TAC), with representatives from the departments and branches of government responsible for environment, natural resources, health, land-use planning, agriculture, infrastructure, municipal affairs and mining, was given the opportunity to provide comments on areas of potential concern. The comments were placed on the public registry. The EAP was made available online and advertising was placed to invite the public to comment on it.

2.3 Role of the Clean Environment Commission

The commission's role in this process is to make recommendations and provide advice on possible environmental and health effects of the proposed sequential installation, operation and decommissioning of silica sand extraction wells for this project. In making its determinations as to the effects of the project and its recommendations, the commission relied on information and viewpoints received from many sources:

- the Environment Act Proposal
- the review by the Technical Advisory Committee
- public comments submitted during the department's EAP review
- responses to two rounds of information requests (IRs) prior to the hearings
- revised project plans submitted by Sio Silica as part of this process
- technical experts retained by the commission
- submissions and presentations provided during the hearing by the proponent, participants and the public
- testimony by expert witnesses and questioning of expert witnesses
- written presentations submitted by members of the public before and during the hearings and received up to March 24

The commission was required, under the terms of The Environment Act, to submit its report to the minister within 90 days of the closing of the record for the hearings. In the case of a Class 2 development, such as the Vivian Sand Extraction Project, under The Environment Act, the director of the Environmental Approvals Branch is the usual decision maker, although the minister may make the licensing decision, after providing written notice.

After considering this large amount of information, the commission concludes that the majority of the potential environment impacts have been identified. Due to the novel nature of the Vivian Sand Extraction Project, and limitations in the data and models presented, the commission concludes that areas of uncertainty remain. Specifically, while the nature of the risks related to this project has been identified, our understanding of risk probabilities is insufficient for a project that involves extensive drilling and extraction in aquifers critically important to a large number of people in southeastern Manitoba. Accordingly, the commission's recommendations to the minister include calls for additional studies, monitoring and mitigation planning. These recommendations are listed in Chapter Twelve: Conclusions and Recommendations.

Chapter Three:
The Public Hearing Process

3.1 Clean Environment Commission

The panel assigned to conduct the public hearings on the Vivian Sand Extraction Project consisted of John (Jay) Doering (chair), Ian Gillies, Terry Johnson and Laurie Streich.

3.2 Public Participation

This report uses two terms to describe members of the public who took part in the process: participants and presenters.

Participants are groups or individuals who were substantially involved in the process. Participants took part in the pre-hearing process, during which they reviewed the proponent's EAP, and sought further information through two rounds of information requests (IRs). Participants were present throughout. Many participants were represented by legal counsel. Participants were able to ask questions of the proponent and in turn, when they presented evidence they may have been questioned by the proponent. Some of the participants hired their own experts to review the proponent's EAP. Participants were:

- Dennis LeNevue
- Manitoba Eco Network (MBEN)
- Municipal Silica Sand Advisory Committee (MSSAC)
- Our Line in the Sand (OLS)
- Rural Municipality of Springfield

What the Frack Manitoba was also granted participant status, but withdrew on the first day of hearings.

3.3 The Pre-Hearing

Following the filing of the EAP on July 23, 2021, the Manitoba government placed the proposal on the public registry and placed advertisements in The Winnipeg Free Press (Aug. 7) and The Lac du Bonnet Clipper (Aug. 12) inviting public comments. Public responses were open until Oct. 7. Within government, a Technical Advisory Committee (TAC) reviewed the EAP and comments were placed on the public registry by Oct. 22. The Clean Environment Commission was issued its terms of reference on Nov. 15, 2021, and directed to conduct hearings and report by March 15, 2022. Following a request by the commission that its process not begin until the TAC and public review were completed,

the Minister of Environment and Climate revised the timeline for the hearing and directed the commission to proceed in a timely matter once the departmental review was completed. On Feb. 2, 2022, following the proponent's response to the TAC and public comments, the commission was notified that the departmental review was complete.

To prepare for a hearing on the EAP, the commission engaged technical experts to review the proponent's assessments of geotechnical and hydrogeological aspects of the project as well as to provide an overview of the overall EAP. This review occurred over the spring and summer of 2022 and the experts' reviews were made available on the commission's website in September 2022.

Groups and individuals wishing to take part as participants in the hearing had until January 30, 2023, to apply to the commission for participant status. The commission held two pre-hearing meetings, on Oct. 14, 2022, and Jan. 19, 2023, with representatives of the proponent and the participants. The purpose of these meetings was to discuss procedures and timelines for the hearing. All motions were addressed in writing.

In advance of the hearings, a process of information requests (IRs) occurred, in which participants asked questions about specific matters in the proponent's EAP and the proponent provided answers. Two rounds of IRs took place, with questions submitted in October 2022 and January 2023. In all, 143 IRs were made in the two rounds, with many IRs containing a list of related questions. The proponent's responses to the questions, including the questions themselves, are posted on the commission's website.

During this pre-hearing period, the proponent released further information, including a revised plan for extraction of the sand. The revised plan used the same technology, but changed some of the drilling locations. A revised assessment considered the potential effects of the project in light of these boundary changes and found no changes to the assessment conclusions. The proponent accompanied this revised extraction plan with new data developed through underground sonar of the spaces created by test extraction of sand. Draft management plans related to progressive well abandonment, waste characterization and management and groundwater and impact mitigation were also provided.

3.4 The Hearings

Hearings began on Feb. 27, 2023, in Steinbach and continued from Monday to Thursday in that city until March 9. A one-day hearing of public concerns was held in Anola on Saturday, March 11, followed by three days of hearings, March 13-15, in Beausejour. One evening session was held in each of Steinbach and Beausejour to provide opportunities for public presentations.

Hearings followed a formal process. All speakers swore or affirmed that they would tell the truth. The hearings began with formal opening statements by representatives of the proponent and the participants. Next came panels of representatives of the proponent and its technical specialists, who gave presentations on the company, project overview, permitting process, environmental and health matters and geotechnical, hydrogeological and geochemical issues. Each presentation by the proponent or its experts was followed by a period of questioning by the representatives of the participants and members of the panel. Next, the commission's technical experts gave presentations on their technical reviews and answered questions from the proponent and participants. After that came presentations by the participants, who were also questioned.

After all the participants spoke, the proponent presented a rebuttal. During the final two days of the hearings, closing addresses were delivered by the participants and the proponent.

In addition to hearing 50 oral presentations from the public, the commission received 290 written submissions.

After the close of the hearings on March 15, the record remained open until March 24, in order for the proponent and participants to provide the written version of their closing remarks.

3.5 Access to Information

All information presented to the commission during the hearings is available on the commission's website (www.cecmanitoba.ca). This includes background documents, presentations, verbatim transcripts and written submissions.

Chapter Four:
The Vivian Sand Extraction Project

4.1 Overview

The Vivian Sand Extraction Project is intended to extract sand with a high level of purity from below ground. The sand is found in a formation known as the Winnipeg Sandstone. High-purity silica sand can be used in manufacturing a variety of products, including solar panels, lithium-ion batteries, fibre-optic cables, smart glass, tires, medical and dental supplies, electronic devices, computer chips, aerospace and automobile components, ceramics and low-iron glass used in building envelopes. Sand is also used in hydraulic fracturing, or fracking, to release oil and gas from rock formations. The proponent states that the sand to be mined is among the best available sources of high-purity sand in the world, with 99.85 per cent purity in its raw form and processed purity greater than 99.9 per cent. The proponent intends to produce up to approximately 1.36 million tonnes of silica sand per year for four years.

Because this sand is found at depths of approximately 51 to 76 metres, it is not feasible to extract it using an open-pit method, which is the technique commonly used in the industry. Instead, the proponent intends to drill holes into the Winnipeg Sandstone and use a technique known as airlift to raise the sand to the surface. The Winnipeg Sandstone formation is an aquifer covering a large area of southeastern Manitoba. Pumping compressed air down through a production tube within the well will cause water and sand to be drawn back up the well as the air rises to the surface. The sand is loosely cemented in the formation and in test wells has been brought to the surface using this technique.

The proponent intends to separate most of the water from the sand and direct the sand into a system of pipelines, containing a slurry of sand and water, which will take the sand to a nearby processing facility. At the processing facility, which has already received an Environment Act licence and was not a subject of investigation in these hearings, the sand will be further purified, dried and prepared for loading onto rail cars. Water in the slurry pipeline will remain in the pipeline throughout the extraction season. Approximately 85 per cent of the water brought to the surface is to be directed separately to treatment. After suspended solids are settled out, the proponent plans to use ultraviolet (UV) light treatment of the kind used in water treatment plants and return the water to the extraction wells.

Reaching the Winnipeg Sandstone formation will require drilling through three layers of sediments and rock. Closest to the surface is the Quaternary Sediments layer, consisting of glacial till and clay. Next is the Red River Carbonate formation, consisting of limestone. Between the Red River Carbonate and the Winnipeg Sandstone is a thinner

formation known as the Winnipeg Shale. The Red River Carbonate is, like the Winnipeg Sandstone, an aquifer. Both of the aquifers are used for domestic, agricultural and commercial purposes in the region. Most wells in the area are in the Red River Carbonate. The Winnipeg Shale is known as an aquitard, meaning that is a relatively impermeable layer that separates two aquifers. A small amount of water is located within the shale.

The proponent's extraction plan calls for approximately 1,200 such wells to be drilled over four years in clusters spread out over a project site of 633 hectares (1,564 acres). The project site is south of the village of Vivian, with extraction areas located on both sides of Provincial Road 302, though the majority of the area is to the west of the road. The proponent has extensive mineral claims, amounting to 85,000 hectares (210,000 acres), mostly in an area running south from Provincial Trunk Highway 15, east of Provincial Trunk Highway 12 and south to Provincial Road 302. The proponent's plan is to continue extracting sand for 24 years, though the Environment Act licence currently being sought is just for the first four years. The proponent has stated that it intends to apply for an alteration of its Environment Act licence for the remainder of the project's lifespan.

Figure 1: Conceptual illustration of geological layers. (Courtesy of Sio Silica.)

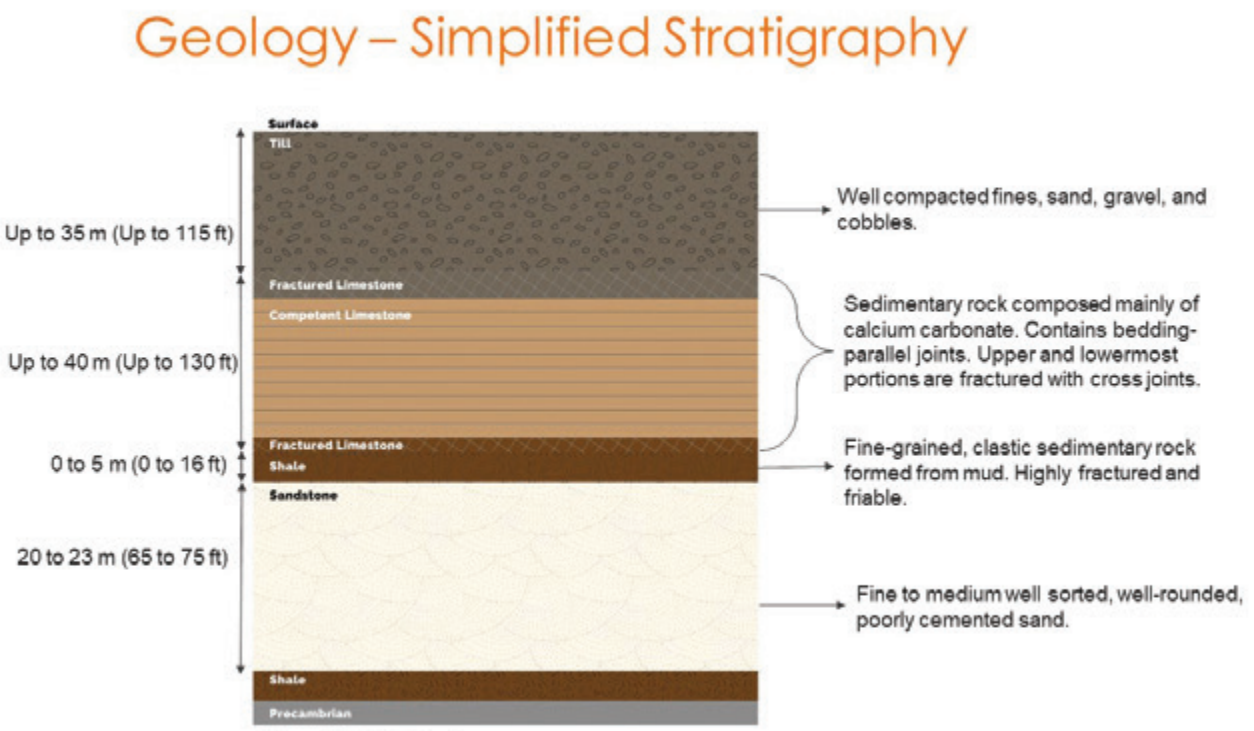
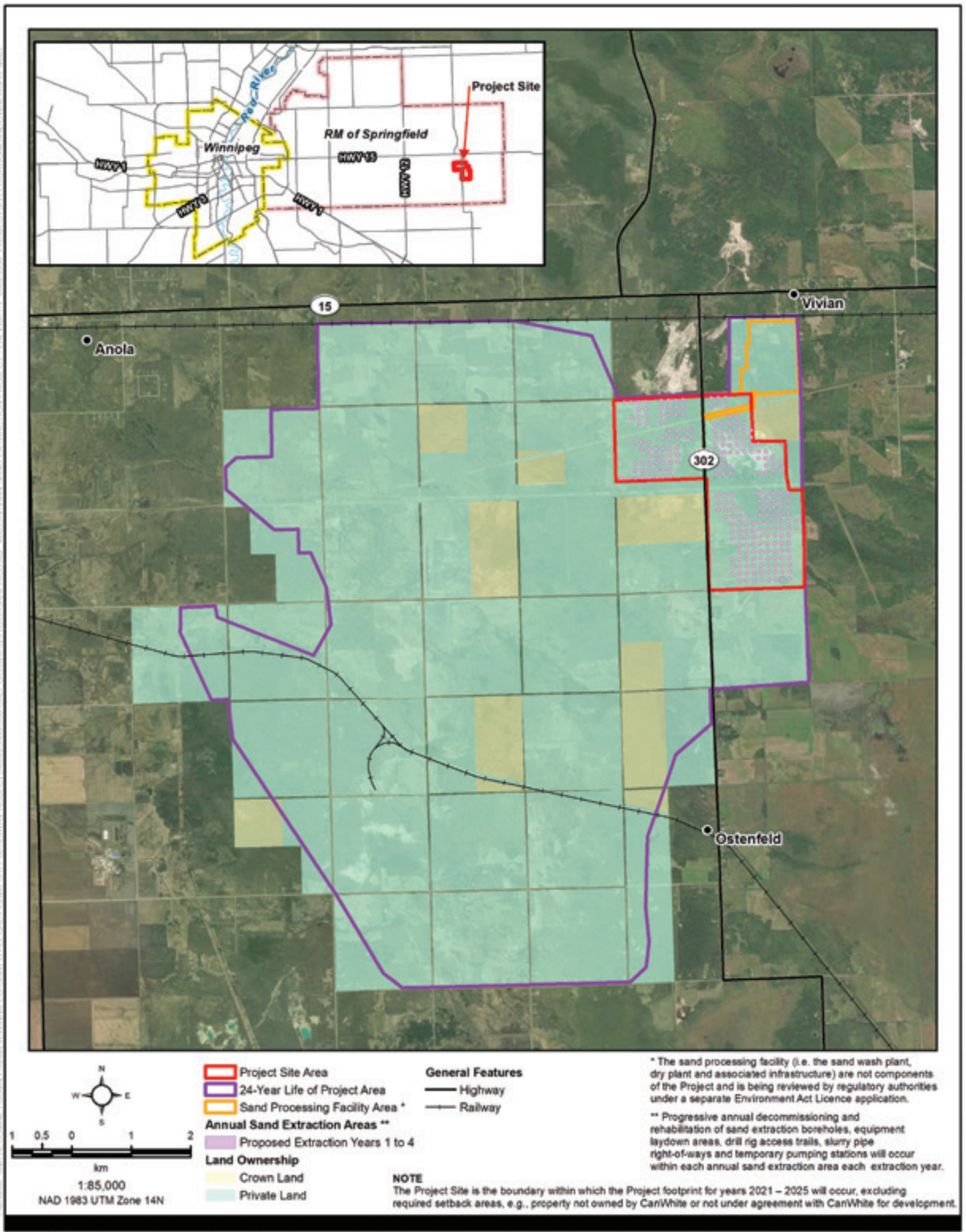


Figure 3: *Site Stratigraphy*

Figure 2: Original project site outlined in red and shown in relation to Winnipeg and RM of Springfield. Full 24-year project site outlined in purple. Modified project site is discussed in Chapter Six. (Courtesy of Sio Silica.)



Vivian Sand Extraction Project
Project Site Location and Land Ownership
Sio Silica Corporation

AECOM

4.2 Overview of Major Issues

The EAP for the project considered potential biophysical and socio-economic effects of the project. In the hearings for the project, and during the pre-hearing period of information requests, the majority of the attention focused on the potential for effects on the quality and quantity of groundwater available to users in the area. In examining this matter, participants, presenters and those who sent in written statements discussed a number of geotechnical, hydrogeological and geochemical issues.

Geotechnical matters are those concerned with the behaviour of earth materials, such as rock and soil. Geotechnical questions for this project focused on the potential for these materials to move, crack or slump in response to the drilling and extraction of sand.

Hydrogeology is the study of groundwater and includes examinations of how water flows through aquifers. Hydrogeological issues related to the project included effects on the amount of water available to users in nearby wells and the effect of removing the shale layer that separates the Red River Carbonate and Winnipeg Sandstone aquifers. Hydrogeological discussions also focused on the modelling used to understand the nature of groundwater flow, water pressure, recharge rates and change in water levels within the aquifers.

Geochemistry is the study of the chemical composition and reactions of earth materials such as rocks and soils. Geochemical issues raised by participants and presenters included the potential for oxygen introduced through the airlift process to change the chemical composition of the groundwater and the potential for changes to the groundwater chemistry as a result of the collapse of the Winnipeg Shale into the sandstone aquifer.

These issues will be discussed at greater length in the chapters to follow, as will matters such as air quality, noise, light and quality-of-life concerns.

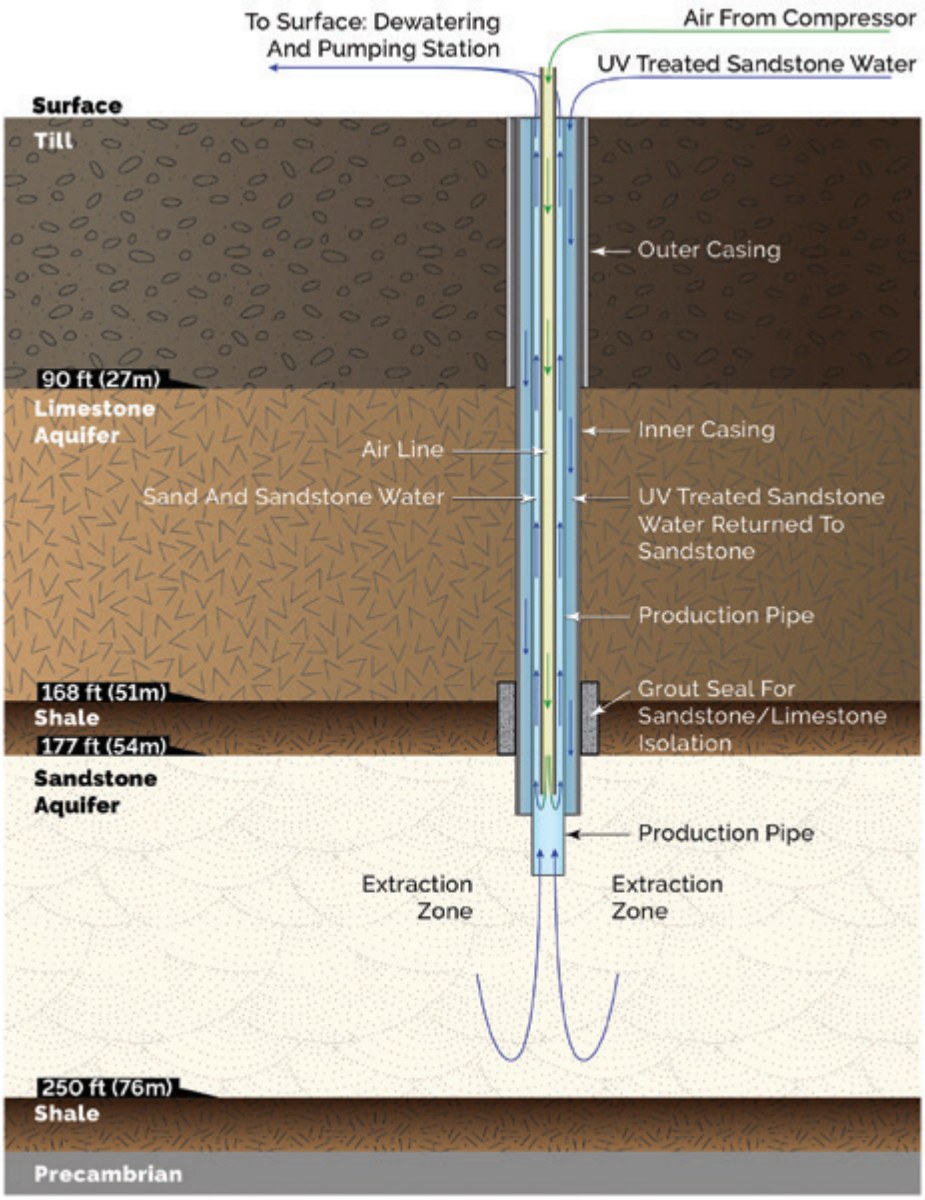
4.3 Sand Extraction Method

Sio Silica intends to extract sand from the Winnipeg Sandstone formation through approximately 1,200 wells drilled in clusters of one to five wells. The proponent intends to extract sand from each well for approximately five days, after which the wells will be capped and sealed. In the first year of operation, the company intends to extract more than 1.1 million tonnes of sand, increasing to a goal of 1.36 million tonnes per year in the following years.

The company intends to drill wells between eight and 16 inches in diameter* (20.3 to 40.6 cm) and install a well casing to seal off the surrounding rock. A production tube will run down the centre of the well. Between the production tube and the well casing will be a donut-shaped ring of space known as an annulus. In the airlift method of sand extraction, which the company plans to use, compressed air will be blown down a line in the production tube. The air will then rise back to the surface through the production tube, bringing both water and sand with it. Airlift is a common technique in water wells, but it has not been used before as a method of mining sand. The proponent plans to extract sand from each well for approximately five days, with several wells operating at one time. Water that is reinjected into the well after treatment will go down through the annulus to be returned to the sandstone aquifer.

*While Manitoba government style uses the metric system, measurements of well diameter and water pumping were typically reported in Imperial units. In these cases, this report employs Imperial first and the metric conversion after.

Figure 3: Illustration depicts compressed air sent down a line in the middle of the production pipe. Air will return to surface, bringing sand and water with it via the production pipe. In the space outside the production pipe, the treated water will be returned to the aquifer. Note the geological layers and depths. (Courtesy of Sio Silica.)



According to the proponent's plans, extracting sand will create voids in the Winnipeg Sandstone, produced either by a lone extraction well or multiple wells extracting from what will become a common void. Extraction of sand is planned to reach a depth of up to 25 metres below the top of the sandstone. The maximum diameter of these voids will depend on the thickness of the Red River Carbonate layer above, with thicker layers of "competent" limestone allowing for larger diameters. In this context, "competent" refers to limestone that is not substantially weakened by cracks and joints. In places where the competent limestone is 25 metres thick or more, the maximum allowable extraction zone, according to the proponent's research, will have a diameter of 40 metres at the top

and 21 at the bottom. In places where the competent limestone is 15 to 20 metres thick, maximum allowable extraction areas will have a diameter 22 to 25 metres at the top and three to six metres at the bottom. (The calculation of maximum allowable void is also influenced by the thickness of the layer of glacial till and clay near the surface, known as Quaternary Sediments). The proponent said it will not extract sand in places with less than 15 metres of competent limestone. Spacing of well clusters will be determined by the need for a minimum distance of 60 metres from the outer edge of one void to the outer edge of another void. Each well cluster is expected to produce, on average, 21,000 tonnes of sand.

Sio plans to extract sand from April to October, depending on weather. Extraction is planned to occur on a 24/7 basis during this period. Well cuttings (clay and rock brought up in drilling the wells) and overs (larger objects, such as calcified sand) are to be stored on site adjacent to the wells until disposed of in accordance with applicable regulations. After each well is finished extracting sand, the production pipe will be removed and the well will be capped. The proponent has prepared a plan for well abandonment, discussed later in Chapter Ten: Management and Mitigation Plans.

4.4 Sand Transport

According to the proponent's plans, when the sand and water mixture is brought to the surface, it will pass through screens to capture larger objects, such as pieces of calcified sand, known as "overs." From there, the sand and water will be pumped to a dewatering station where the sand and water will be separated, although this initial separation will not completely dry the sand. The separated water will then be pumped to a treatment station (described in Section 4.5 Water Treatment). The sand will be directed to a slurry pipeline, where it will mix with additional water for transport to the processing facility. At the beginning of each season, the company plans to extract an amount of water necessary to operate the slurry loop and continue using this same water throughout the season. At the processing facility, remaining impurities will be removed from the sand. The sand will be dried before being loaded for transportation. Because the sand still contains water when it arrives in the processing facility and this water will evaporate, not all water extracted from the aquifer will be returned to the extraction wells.

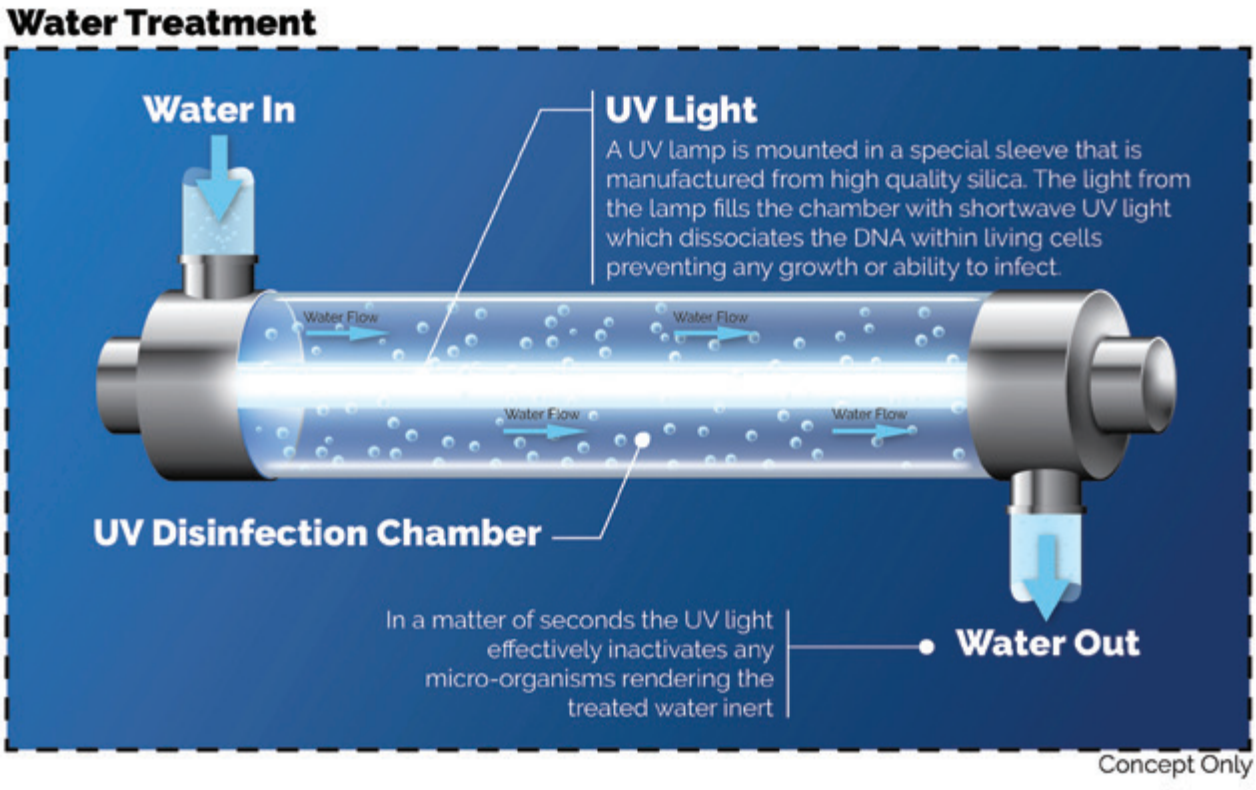
The slurry pipelines will be moveable as extraction locations are changed over time. Each cluster is planned to have two slurry lines (a line leading to the processing facility and a return line). These lines will be 500 metres to 3.5 km long, depending on the location of the extraction cluster. Pumping stations will be needed every 500 metres along the slurry pipeline to maintain the flow of slurry. Lines are to be above ground, and where necessary to cross roads, such as PR 302, they will cross under the road using culverts. The slurry line will also need to cross Manitoba Hydro transmission rights-of-way. When extraction is completed in one area, the proponent plans to dismantle the slurry line and move it to the location of the next year's extraction.

4.5 Water Treatment

In order to kill any organisms that may have been introduced to the water, the proponent plans to treat the water that has been separated from the sand before it is reinjected in the wells. The water will be treated with ultraviolent (UV) light, which will require that suspended solids are removed from the water. To accomplish this, water will go from a collection tank to a clarifier and pass

through multiple layers of sand filtration. To remove smaller solids, the proponent plans to add a substance known as chitosan – a natural polymer derived from crab and shrimp shells – to the water. These particles will bond with the chitosan, allowing them to be further filtered out, along with the chitosan. Chitosan is used for clarifying water in potable water treatment plants, swimming pools, sewage treatment plants, industrial waste treatment facilities and storm water treatment facilities. Once the suspended solids have been removed using chitosan and a cloth filter, the water will be treated with ultraviolet light. The UV-treated water will be returned to the aquifer through the annulus of the wells. The sludge resulting from removal of suspended solids will be stored and sent to a waste facility.

Figure 4: Conceptual illustration of UV treatment. (Courtesy of Sio Silica.)



Chapter Five: Community and Indigenous Engagement

5.1 Community Open Houses/Meetings

The proponent held in-person and virtual events in communities in the region beginning in May 2017 with a meeting in Anola. Community meetings were held in La Broquerie, Anola and Richer on April 9, 10 and 11, 2019. During the period of pandemic restrictions, virtual public meetings were held on May 26 and Dec. 15, 2020, and Aug. 24, 2021. Advertising was placed in local and Winnipeg newspapers and some 5,800 flyers were sent out in the local area to publicize meetings and open houses. An additional in-person meeting was held at the Anola Community Centre on Nov. 29, 2021. The proponent's technical experts in fields such as hydrogeology were available at this meeting.

5.2 Local Government Meetings

The proponent held 22 meetings with the Rural Municipalities of Springfield, Brokenhead, Reynolds, La Broquerie, Hanover, Taché, and East St. Paul and Towns of Beausejour and Ste Anne between Dec. 17, 2019, and Nov. 30, 2022. In discussions with the RM of Springfield, where the project is located, topics included movement of the slurry pipelines and the impact of abandoned wells.

5.3 Indigenous Engagement

The proponent held discussions with Brokenhead Ojibway Nation (June 14, 2021, and July 14, 2022) and Peguis First Nation (July 13, 2022), the Manitoba Metis Federation (Dec. 7, 2021), the Southern Chiefs Organization (June 1, 2022) and Treaty One Development Corporation (March 2021).

What We Heard: Community and Indigenous Engagement

Several participants and presenters stated that the level of engagement was not sufficient for a project of this magnitude. The fact that community engagement began before the EAP was filed was also a concern to some presenters, who felt the public did not have an adequate opportunity to understand the project at that time. Some community residents who attended open

houses said these events lacked detail on the project. One presenter, who lives adjacent to the site, said the proponent only contacted her after she spoke out at an open house. A number of presenters viewed the proponent's communications and engagement efforts as purely promotional, rather than an effort to understand community views. Several presenters discussed the proponent's focus on jobs that could be created by manufacturing industries attracted by the presence of the resource. It was felt that this diverted attention away from open discussion of the community's concerns regarding the project's potential impact. The panel heard some presentations from community members who supported the project because of its economic benefits or the potential for creating products for low-carbon energy generation. Some spoke of it as a way of helping Canada make the transition to a lower carbon economy. Others spoke of the potential for future employment in the region for their children.

During the hearings, the commission heard that the proponent had been in discussion with Peguis First Nation regarding contracting to provide monitoring services for the project. The representative of Peguis who made this announcement said the first nation was supporting the project and added that this was the first Clean Environment Commission hearing in which Indigenous communities had not applied to take part as participants.

Commission Comment: Community and Indigenous Engagement

While it appears that the proponent did hold a number of meetings in the communities near the project site and with Indigenous communities and organizations in southern Manitoba, this engagement effort appears to have been hampered by a lack of up-to-date information. The proponent was still working out details of its proposed extraction activities when it began engagement. Some important information, such as the revised extraction plan and the drafts of some of the monitoring and management plans, was only available shortly before the hearings began. Engagement is hampered when such important information is not available to the community.

As to the content of the open houses and meetings with local governments and Indigenous communities, it is not clear what issues were raised and what were the outcomes of these meetings. The proponent presented no detailed summary of the issues that were raised and information that was provided. Documenting engagement activities in such a way would allow a better understanding of the proponent's commitment to engaging the community. While it is understandable that pandemic restrictions may have hampered some engagement efforts, it became clear from some of the written and in-person presentations that the proponent's communication with the community was poorly received by many people. In the presentations and comments received by the commission it became evident that some of the information circulating in the community consisted of misinterpretations and misunderstandings of the actual components of the proposal and associated activities.

The proponent needs more effective two-way communication to develop a more effective engagement process tailored to the audience. Communication efforts are most effective when they provide technical information in a manner that can be understood and be relatable to the on-the ground situations.

Further information on the company's commitment to engagement is required, as well as an explanation on how the agreement with Peguis First Nation fits into its monitoring and communication planning.

The commission encourages the government to include a requirement for a local advisory committee in any authorization or licence granted for the project. Such a committee should include either a subcommittee or a separate committee for municipal concerns. The interactions of this committee should be available to the public, through posting on a website of minutes of meetings and other information. The proponent and community spokespeople should jointly lead this committee, with government representatives as ex-officio members to provide guidance on regulatory and technical issues. Any significant changes to the project should be introduced to this committee for review.

Chapter Six:
Project Area and Assessment Boundaries

6.1 Assessment Boundaries and Site Description

The proponent assessed effects based on three spatial boundaries: the project site, the local project area and the regional project area. The project site occupies 633 hectares, and is where the proponent plans to carry out project activities, such as drilling wells, extracting sand, building access trails and transporting sand through the slurry line. The boundaries of the project site were changed following the development of a new extraction plan, which was released in January 2023. The original site occupied land on the east and west of Provincial Road 302, south of Vivian, with the portion to the east extending approximately 1.6 km further south than the portion on the west side. The modified project site still contains land on both sides of PR 302, but the portion to the west of that road is located farther south and parts of the east-side portion have been eliminated from the site.

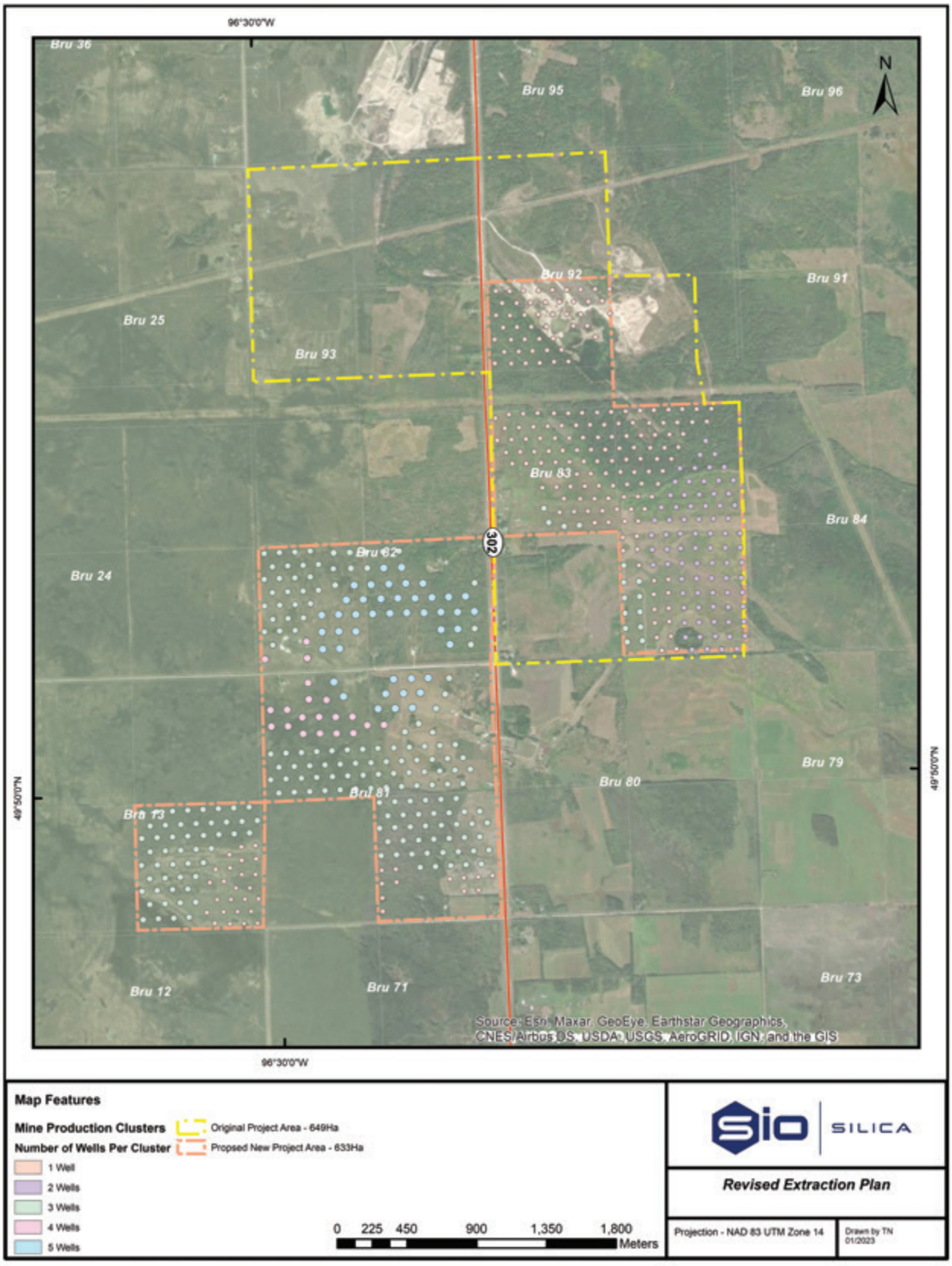
The local project area is the area within two kilometres of the project site, and takes in areas that would be directly exposed to project impacts, such as noise and habitat loss. The village of Vivian falls within the local project area. The regional project area is the area within 10 kilometres of the project site. The Town of Anola and the villages of Ostenfeld and Ross fall within the regional project area.

While the proponent also intends to build a processing facility adjacent to the nearby CN Rail line, along with a rail loop for loading train cars, those developments were not part of this EAP. The location of the planned processing facility is within the local study area, but not part of the site for the extraction project. The processing facility has already been licensed through a separate process, not involving the Clean Environment Commission.

In assessing potential effects on groundwater, the proponent studied a larger area. The proponent developed conceptual and numerical models for regional groundwater flows in an area of approximately 3,200 square kilometres. This area is bounded on the east by the Sandilands, on the southwest by the Seine River, on the northwest by the Red River Floodway and the Red River and on the northeast by Hazel Creek.

The project area lies within the Steinbach ecodistrict of the Interlake Plain ecoregion, which is located within the Boreal Plain ecozone. The ecodistrict receives an average of 510 mm of precipitation per year, mostly

Figure 5: Yellow border indicates area of originally planned project site. Light red border is area of modified project site, as of January 2023. Dots are sites of well clusters. (Courtesy of Sio Silica.)

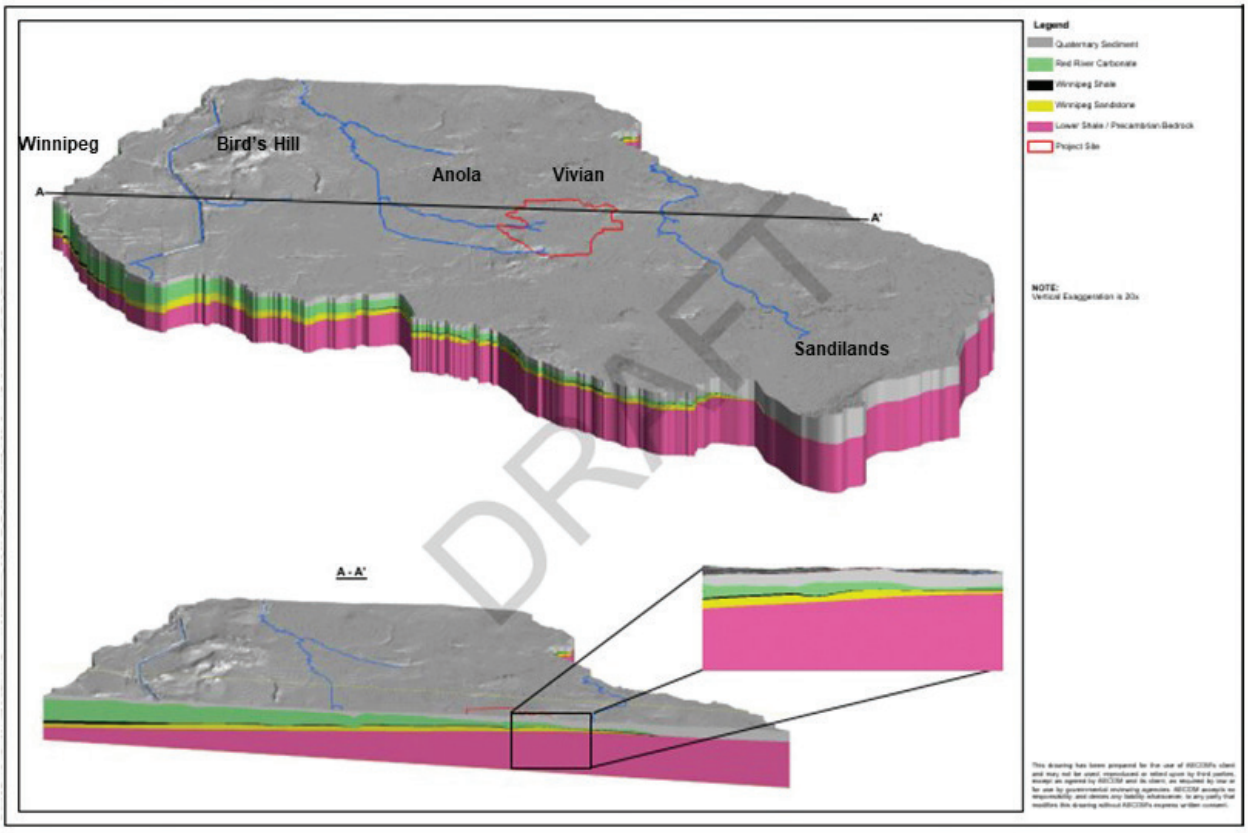


as snow, and has vegetation dominated by trembling aspen with some balsam poplar, with an understory of species such as willow and red-osier dogwood. Much of the Steinbach ecodistrict is agricultural land. Within the 633 hectares of the project site, 43 per cent of the land is previously disturbed, either agricultural land or previously developed, while 51 per cent is forested.

The ecodistrict is mostly flat, with gentle slopes in places that are characteristic of ancient glacial lake bottoms and lake shores and some gentle undulations of glacial till (rock debris from ice age glaciers). The land slopes gradually toward the Red River at a rate of about one metre per kilometre. Sandy and ridged terraces occur in parts of the ecodistrict, typically at sites of ancient glacial lakeshores.

Below ground the geological layers consist of Quaternary Sediments (gravel, clay and glacial till), Red River Carbonate (limestone), Winnipeg Shale and the unconsolidated sand and sandstone of the Winnipeg Sandstone. Below that is the ancient granite bedrock. These layers can be visualized as tilted gradually downwards to the west. To the east, in the Sandilands area, there is only the Quaternary Sediments layer above the granite bedrock. Moving gradually westward from there, the limestone, shale and sandstone layers first appear relatively close to the surface.

Figure 6: Overhead view and cross-section of region used to model groundwater. Grey is Quaternary Sediments, green is Red River Carbonate, yellow is Winnipeg Sandstone. Thin, black layer is the Winnipeg Shale. (Courtesy of Sio Silica.)



6.2 Temporal Boundaries

While the proponent plans to seek approval to continue the project for 24 years, this Environment Act licence application was only for the first four years of extraction. The proponent, if successful, intends to apply for a licence alteration to expand the project onto other land in the following years. Sio Silica has extensive mineral claims, amounting to approximately 85,000 hectares, most of it running in an uneven band from Highway 15 to the point where Highway 12 bends and becomes Provincial Road 203. Accordingly, the EAP only looked at potential environmental effects of the first four years of this project.

What We Heard: Project Area and Assessment Boundaries

The panel heard many concerns about spatial and temporal boundaries in the EAP. Regarding spatial boundaries, a witness for Manitoba Eco Network and Our Line in the Sand (MBEN/OLS) discussed the boundaries of various regional hydrogeological studies carried out in the past. Two studies (Wang, 2008, Kennedy and Woodbury, 2002) had boundaries running south to the U.S. border, east to the Canadian Shield and north to Lake Winnipeg. In support of the argument for a larger study area, the expert noted that several significant environmental effects of past developments affected groundwater in or near the domain of the proponent's groundwater model. Near Winnipeg, groundwater levels decreased by seven metres as a result of the construction of the Red River Floodway in 1964. In that same area, the front between saltwater and freshwater moved eastward following the disruptions caused by building of the Floodway. More recently, an area near Steinbach experienced a drawdown of two metres in the level of groundwater as a result of urban development.

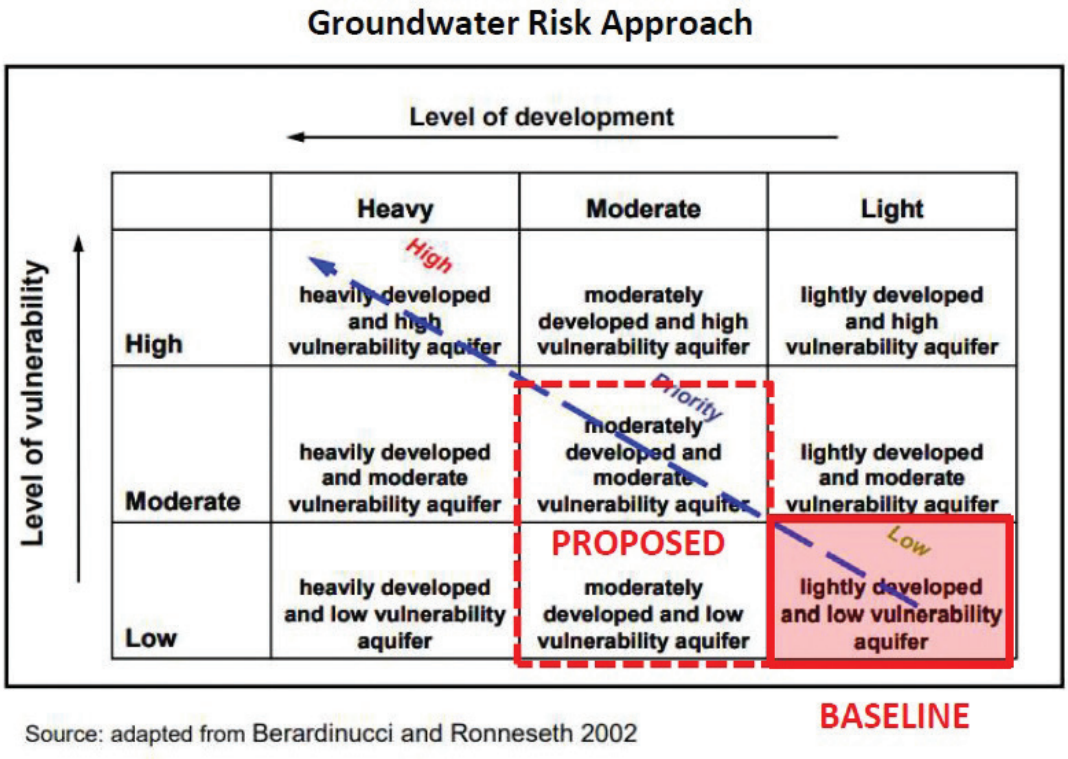
Concerns about overdevelopment and salt intrusion led to development of aquifer management plans in other locations in Manitoba in the 1990s and early 2000s, including Winkler, Oak Lake (near Virden in western Manitoba) and the Assiniboine Delta aquifer (covering approximately 3,900 square kilometres around Carberry). The Southeast Regional Groundwater Management Plan was completed in 2010 by local stakeholders with coordination and support provided by what was then called Manitoba Water Stewardship, drawing on a three-dimensional digital model for groundwater flow completed in 2008. Models such as these can be used as tools to evaluate recharge areas and recharge volumes, local and regional water tables, potential water levels and the impacts of proposed developments on groundwater. Such groundwater management plans are intended to foster collaboration between water users and allow for planning of future growth so that it will not threaten the sustainability of the groundwater system. Within the proponent's study area, the Rural Municipality of Springfield, currently home to approximately 16,000 people, completed a study in 2019 for a new municipal groundwater supply capable of supplying up to 40 litres per second (approximately 630 U.S. gallons per minute). At the time of the study, the population of the rural municipality had grown by 1.8 per cent per year for five years. Given this growth in demand and the evidence of past groundwater effects over large areas of southeastern the MBEN/OLS advocated for a larger study area for water effects and for assessing effects over the project's full lifespan. In its rebuttal, the proponent argued that planning for sustainable yield of an aquifer is a responsibility of the Groundwater Management Section of Manitoba Environment and Climate.

The four-year time frame of the EAP was discussed by many participants and presenters, who argued that the entire 24-year life of the project should have been the subject of the

review. Many of these speakers also argued that the proponent should have been required to have a section of the EAP dedicated to cumulative effects. The proponent noted that a cumulative effects assessment was not a requirement of the process for a Class 2 development under The Environment Act. The MBEN/OLS argued that the Clean Environment Commission itself has called for greater emphasis on cumulative effects in past reports, including the 2007 report on the Pembina Valley Water Cooperative Supplemental Groundwater Supply System. In that report (focusing on a plan to draw groundwater from a region in the Sandilands and transport it by pipeline to the Pembina Valley), the commission stated that cumulative effects should be considered in future assessments of other developments, as "ecosystems in the area are currently affected by other developments and activities in the region and consideration of the additive effect of another impact needs to be addressed." In 2013, the commission's report on the Bipole III Transmission Project noted that "cumulative effects analysis should be the most important section of an environmental assessment report. It is where the residual or lasting effects of the project are described."

The MBEN/OLS presented an illustration that incorporated effects of the project with potential future development in the area. At present, they argued, the project area is lightly developed and has a low-vulnerability aquifer, placing it in a "low-priority" category for the level of risk to groundwater. With additional development in the area and the effects the project will have on the Winnipeg Shale aquitard (discussed in 7.1 Geology and Topography and 7.3.3 Water Quality) the area moves to a higher priority for groundwater risk.

Table 1: Conceptual table showing current low aquifer vulnerability and low development of region, with arrow illustrating increased risk as development increases and potential threats to aquifer are created. (Courtesy of Our Line in the Sand/Manitoba Eco Network.)



Source: adapted from Berardinucci and Ronneseth 2002

Many public presenters and writers of submissions expressed concern about the exclusion of the subsequent 20 years of extraction and the sand-processing facility from the EAP. Many of them referred to this as "project splitting," and referred to the use of this term by the commission's independent reviewer. The term "project splitting" refers to viewing components of large developments separately, so that the entirety of their impacts is not viewed.

Commission Comment: Project Area and Assessment Boundaries

Concerns about the limited scope – both spatial and temporal – of this EAP underline the need for cumulative effects assessments to be a required component of such proposals and for greater government involvement in groundwater planning.

Academics and environmental assessment practitioners all agree that cumulative effects are best dealt with at the regional level through planning that addresses ecological thresholds and development limits and includes on-going monitoring. The proponent raised this point as well, regarding discussion of planning for aquifer sustainability. However, often when a project is proposed, no regional plan exists and in such cases project-level cumulative effects assessments are used as the next best tool to assess long-term environmental effects.

The proponent also noted that the EAP guidelines did not include a requirement for a cumulative effects assessment. They are correct that it is not a requirement of the guidelines, but not including such an analysis leaves an information gap for the assessment of the long-term environmental effects and necessary mitigative actions for this project. The Canadian Environmental Assessment Agency defines cumulative effects as referring to "the combined effects from past, present, and reasonably foreseeable future activities and natural processes. Specific definitions vary among different parties and under different legislation and policies, but the term generally refers to effects that may be individually minor, but collectively significant." (https://www.canada.ca/en/environment-climate-change/services/cumulative-effects.html) Without such an assessment, the full effects of a project cannot be determined with confidence.

Cumulative effects assessment is not dependent on the size or permanence of a project. All effects add to those that already are experienced or can be predicted. Project-level assessments identify effects from the entire project within its operating area over the life of the project and take into consideration the influence of other activities in the area that have happened, are on-going or have been proposed.

A cumulative effects assessment assesses effects on valued ecosystem components (VECs). Aspects of the biophysical or socio-economic environment are designated as VECs because they are a specific element of concern (such as the shale aquitard) or because they encompass characteristics of a particular ecological community (such as a bird species that represents a forest type). The cumulative effects assessment includes the local effects (those caused by the project) on the VECs, as well as effects caused by other actions outside the project. Best practice is to have local community input into the assessment process, especially the selection of VECs. Doing so helps to identify the components that are of the most concern to the community.

The proponent intends to have two other development components in the immediate area: a sand-processing facility and a 3.5-km rail loop for loading the sand onto rail cars. The effects of these in addition to those of the extraction project should be taken

into account, along with other impacts of developments in the area. This would provide a longer-term and more complete assessment of the environmental and health effects. A cumulative effects assessment covering the entire 24 years of the project is required to understand the short and long-term environmental effects. Such a document can be compiled while additional technical studies are being conducted.

A wider scope of study would address other concerns regarding the scope of the EAP, as demonstrated by discussions of project splitting, water consumption and long-term geological effects.

The term "project splitting" can be interpreted in two ways. The first is that a single project, such as the extraction project, is split into smaller projects or intervals and licensed progressively and separately without assessment of the project as a whole. This would apply to the current approach, where it is proposed that the project be licensed for four years with future amendments. A cumulative effects assessment for the whole project would address the issue of the overall effects of the project not being considered in the EAP.

The second interpretation of project splitting refers to the separation of interrelated components. During the hearing, the proponent characterized the processing and extraction projects as separate, independent projects, thus justifying their being licensed separately. It seems obvious, though, that they are very closely interconnected. It is hard to imagine that the processing facility would be viable without sand being produced in the immediate area and it seems equally obvious that processing the sand and loading it onto the adjacent CN rail line is what makes the investment in extracting sand in this area viable. The commission provides no comment on the legislation allowing licensing of separate projects. However, a cumulative effects assessment would take into consideration the additive effects of all three components on the environment and human health.

Discussions of water consumption by the project also pointed to the need for greater planning of groundwater use, in order to better assess potential impacts of projects such as this. In its 2007 report on the Pembina Valley Water Cooperative Supplemental Groundwater Supply, the Clean Environment Commission recommended that no further development take place until a watershed plan was developed. Following that, under the direction of a local steering committee, the Southeast Regional Groundwater Plan was developed, though it is not known if that plan was incorporated by the government into its planning. In addition, the Rural Municipality of Springfield conducted a groundwater study in 2019 for its development of supplemental water supply.

Though much research on groundwater resources in the area has been carried out over recent decades, a lack of coordination in groundwater planning has made it hard to consider the full effect of projects. In these hearings, the panel has learned of disparate estimates of recharge rates for the aquifers and a variety of boundaries that have been used to study the aquifers. It is imperative that the government standardize the benchmark for comparison for the boundary conditions and the recharge rate or range for the aquifers so that the effects of this and future projects can be measured consistently. Modelling should include the assessment of the higher and lower ranges for recharge, not just the average. Without consistent criteria, it is extremely difficult to assess the effect of any project on the sustainability of the aquifer. In addition, the commission encourages the government to provide an up-to-date status of the aquifer that takes into account experienced and

predicted climate effects and experienced and projected development.

Several participants discussed the long-term change this project will cause to subsurface geology, especially considering the scale of the full 24-year project. Their arguments will be discussed in a later chapter. Taking a longer view than that in the proponent's EAP, which focused only on the first four years of the project, would reflect the reality that capital-intensive mining projects are planned with a long term in mind. In hard-rock mining, it is common for major developments to last for multiple generations, as seen in several of Manitoba's northern mining communities. Conducting a cumulative effects assessment over the 24-year period would address these long-term effects.

Chapter Seven
Effects Assessment (Biophysical)

7.1 Geology/Topography

Creating large voids in the Winnipeg Sandstone by extracting sand has the potential to cause impacts on geology and topography. The voids are expected to cause the collapse of the Winnipeg Shale layer, which would be a permanent geological change. Without the sand for support, at least some of the overlying "incompetent" limestone is also expected to collapse into the voids. If the voids created by sand extraction exceed the carrying capacity of the remaining competent limestone layer it will also collapse into the cavity. Such a failure of the limestone could result in change to the surface topography as layers of rock subside into the spaces below. Geotechnical assessments were carried out to determine the potential for such a failure to occur.

The proponent carried out a program of drilling 46 vertical boreholes to identify the geological layers and build a geological model of the area. Eight geotechnical boreholes were drilled to allow the proponent to characterize the ability of the layers below to support the load resulting from removal of the sand. The proponent tested samples of the rock cores from these boreholes to determine their rock-mass rating and geological-strength index, measures of the strength and solidity of rock. The proponent conducted an acoustic and visual scan of one borehole to identify structures and did four sonar scans of two extraction cavities in order to identify the shape of the cavities after extraction of sand. The proponent also gathered information from a large number of other boreholes in the area in order to characterize the geology of the area, including mapping the thickness of the carbonate (limestone) layer. Generally, this layer is thicker to the west and thinner to the east. In much of the project site, the layer of "competent" carbonate (non-fractured rock) is 15 to 20 metres thick.

The geology of the area consists of the following strata, in order from the surface to the deepest below ground:

- a layer of compacted till, sands, gravel and cobbles that is up to 35 metres thick (Quaternary Sediments)
- a layer of limestone that is fractured at the top and bottom and competent in the middle and is up to 40 metres thick (Red River Carbonate)
- a layer of shale that is up to five metres thick and is highly fractured and friable (Winnipeg Shale)
- a layer of loosely cemented sand that is 20 to 23 metres thick (Winnipeg Sandstone)
- a layer of shale
- the Precambrian bedrock

Figure 8: Geological formations and their interactions with the Vivian Sand Extraction Project. (Courtesy of Sio Silica.)

Eon	Era	Period	Geologic Unit	Member	Lithology	Role/Impact on Stability
Phanerozoic	Cenozoic	Quaternary			Diamicton (Till)	Overburdern Load
	Paleozoic	Orodvician	Red River Formation	Selkirk, Cat Head, Dog Head Members	Carbonate (Limestone)	Supporting Caprock
					Shale	Not Supporting
			Winnipeg Formation	Carman Sand Member	Sand	Target Extraction Zone
				Equiv. Ice Box Member	Shale	Not Drilled
				Black Island Member	Sand	Not Drilled
Archean					Granitoid	Not Drilled

Laboratory tests were carried out to determine the unconfined compressive strength (UCS) rating of the limestone. In 12 such laboratory tests, the average score of the competent limestone was 68, on a scale in which a score of 50 to 100 is considered strong. The proponent also carried out a larger number of field tests to estimate UCS. Samples from five different boreholes were estimated to have UCS scores of 68 to 98.

The proponent analyzed the potential for two kinds of potential failure of the limestone layer: shear failure and bending failure. In shear failure, the load on a block of competent limestone directly above the cavity overcomes the resistance of the limestone and the entire block drops down. In bending failure, the assumption is that each layer of limestone may act separately in bearing the load and the lowest layer – the roof of the cavity – will begin to bend as a result of the weight of the layers above. In this case, the lower layer will break and portions will fall into the cavity, leaving unbroken rock closer to the edge of the cavity. Shear failure would lead to a large block of the cavity roof caving in, while bending failure would lead to collapse in the centre of the roof, with intact beams of competent limestone remaining in place along the edges. Bending failure was determined to be the failure mode that would control project planning, in that bending failure would occur before shear failure would. Using a kind of geotechnical modelling software known as FLAC (Fast Lagrangian Analysis of Continua) the proponent estimated the maximum roof spans, given varied thicknesses of competent limestone and of the Quaternary Sediments above. That produced a table showing maximum thicknesses for extraction cavities in locations with competent limestone

thicknesses of 10, 15, 20 and 25 metres and Quaternary Sediments thicknesses of 25 and 35 metres. In addition to not extracting sand in places where the competent limestone is less than 15 metres thick, the proponent stated an intention not to extract in areas of karst limestone – limestone that has been eroded by dissolution, leaving features such as fissures and sinkholes.

Table 2 : Maximum cavity spans, based on thickness of competent limestone and Quaternary Sediments layer. (Courtesy of Sio Silica.)

Competent Limestone Thickness (m)	Overburden Thickness (m)	Long-term Allowable Limestone Unsupported Span (Diameter) (m) (Notes 1 and 2)	Extraction Disturbance Zone Dimensions (notes 3 and 4)	
			Top Diameter (m)	Bottom Diameter (m)
10	25	26	16	0 (Note 5)
	35	24	14	0 (Note 5)
15	25	35	25	6
	35	32	22	3
20	25	43	33	14
	35	40	30	11
25	25	50	40	21
	35	47	37	18

Notes:

1) Bending (Tensile) is the controlling failure mechanism to determine the long-term allowable span.

2) Single beam maximum long-term allowable span is 7 m. Average competent limestone bedding thickness is 0.7 m.

3) Extraction zone side wall slope of 65°.

4) Extraction depth is 20 m.

5) The long-term diameter of the extraction cavity is expected to be 10 m larger than the short-term diameter.

6) Due to possible long-term cavity expansion, limit the extraction zone to the long-term allowable unsupported span.

7) Extraction in areas with only 10 m of competent limestone is discouraged due to competency uncertainties.

Depending on how much the sand sloughs off over time, the size of the cavity is expected to increase after extraction is finished. When initial work began on the project in 2018, the proponent's experts assumed that the side walls of the sand cavities would shift until they ended up at a natural angle of repose of 31 degrees. This assumption was based on the hypothesis that the sand was not cemented together. Later testing led to the conclusion that the sand is weakly cemented and would form side walls of approximately 65 degrees. Side-scan sonar taken inside two extraction cavities showed that immediately after extraction, the walls of the cavities were vertical or overhanging. Over time the overhanging and vertical sand is expected to slough off to the bottom of the cavity. In order to estimate the long-term shape of the cavity, the proponent determined a numerical value of the strength of the cohesion that holds the sand together. This was determined using FLAC computer modelling and physical tests, known as penetration tests, of the strength of the sand layer. In penetration testing, a rod is advanced through a layer using measured hammer blows. The number of blows required to advance the rod a short distance indicated that the sand layer was as hard to push the tool through as rock. Once a numerical value for cohesion was established, the proponent estimated that the sand should achieve approximately a 65-degree angle.

Modelling of the strength and cohesion of the sand layer led to the conclusion that at least 60 metres of intact sand are needed between cavities in order to maintain stability (with a safety factor). In order to ensure that there is at least 60 metres of intact sand, the proponent plans to ensure that the initial extent of intact sand is at least 70 metres. That allows for widening of the cavities as the sand reaches its final angle. The proponent described this as similar to the "room-and-pillar" mining carried out in many hard-rock mines, in which an ore body is mined out in a way that leaves intact walls of rock to act as pillars supporting the roof over the vacated space. The intact sand between the extraction zones would act as pillars to hold up the limestone layer above.

Sonar scans showed that, four months after extraction of sand, the layer of shale above the sand had collapsed into the void, as had some of the bottom portion of the limestone. The proponent stated that layers of competent limestone above the fractured limestone are expected to remain secure. This conclusion was based on the various strength tests carried out on the limestone.

The potential for surface subsidence was examined through the use of five settlement gauges placed four to 20 metres away from three boreholes. The settlement gauges measured any change in the surface from April to December 2021, following test extraction of sand. The gauges, with an accuracy of plus or minus one millimetre, recorded zero to two millimetres of surface deformation. The proponent stated during the pre-hearing Information Request phase that it plans to conduct tests for surface subsidence before, during and after extraction activities.

The proponent intends to develop a plan known as the Trigger Action Response Plan (TARP) to guide responses to potential environmental effects on geology and topography. The plan, which the proponent intends to develop after receiving a licence for the project, would designate findings that trigger specific responses, such as stopping extraction and using video or sonar to determine if the limestone caprock is at risk of collapse.

What We Heard: Geology and Topography

The Clean Environment Commission contracted with consulting engineers to

examine the proponent's EAP and supporting documents. The commission's experts were concerned about a modelling assumption used by the proponent – that the geology of the project area was homogeneous. However, the commission's consultants agreed with those of the proponent that given the design parameters described above (regarding maximum spans, a minimum of 15 metres of competent limestone and an initial 70-metre distance between cavities) the project would not result in significant adverse impacts to the surface, such as sinkholes and subsidence if the assumption of homogeneity is true. This conclusion refers only to the impacts at the surface on topography, and does not refer to the potential impact on groundwater resulting from the collapse of the shale layer into the cavities. Those concerns will be discussed in Section 7.3.3 Groundwater Quality.

Participants focused many questions on the proponent's estimates regarding the stability of the sand pillars remaining after extraction. A member of the public questioned the use of the "room and pillar" description of the mining procedure, saying that this was not appropriate for mining in which the "pillars" would consist of sand, rather than hard rock. If the angle of repose of the sand ended up being much smaller than the expected 65 degrees, it was suggested that the length of the roof spans in the cavities would be greater. That, in turn, would put greater stress on the limestone and potentially lead to more failure of this layer. Participants asked whether the proponent could have extracted sand from the formation in order to conduct laboratory tests to determine the degree of cohesion. The proponent replied that such a test would not be feasible, as the sand's cohesion would be destroyed in extracting it.

A great deal of discussion was generated by an illustration depicting the size of one well cavity four months after extraction, as indicated by the proponent's side-scan sonar. This scan indicated that the shale layer above the sand had failed and fallen into the cavity, along with a portion of the lower part of the limestone layer.

The Municipal Silica Sand Advisory Committee (MSSAC), representing several nearby municipalities, engaged an engineering consulting firm to review the proponent's EAP. The MSSAC's professional geologist questioned the way the proponent characterized the limestone caprock of the Red River Carbonate. Whereas the proponent has characterized this layer as horizontally bedded without vertical jointing, the geologist stated that much carbonate caprock in Manitoba contains vertical and sub-vertical jointing. These vertical joints are a reflection of a geological history in which the rock was subjected to many geological processes that may have fractured or weakened it. These include:

- basin-wide uplift and tectonic processes
- exposure, erosion and karst processes (referring to landscapes where rock has been dissolved by water, creating fissures, sinkholes and other features)
- glaciation and isostatic rebound (in which landscapes that had been depressed by the weight of ice age glaciers slowly rebound)

These processes create vertical joints, as illustrated by photographs of vertical joints in limestone visible in locations such as Hecla/Grindstone Provincial Park. Such vertical fissures, if they are present in the limestone caprock at the project site, could reduce the capacity of the caprock to bridge the spans above the cavities where sand has been extracted. The geologist also raised questions about the cementing of the sand in the layer where extraction is planned. If the sand is less uniformly cemented in some locations, that could affect its ability to maintain the expected 65-degree angle in the cavities, leading to a

longer cavity span as the sand slumps further. The sonar the proponent used inside two boreholes to examine the shape of the cavities could not penetrate the sediment-filled water at the base of the cavities, so it was incapable of determining what angle the sand was at below that level.

An expert testifying for the MBEN/OLS also spoke about the potential for vertical fractures in the limestone layer. Noting that the 35-metre spans would be as long as three normal-sized city buses, the expert said the forces exerted on the unsupported limestone over these spans could either cause vertical fractures to form or could expand existing vertical fractures, which could then have the potential to become pathways for surface water to reach the aquifers.

Experts for participants questioned assumptions about the homogeneity of the geological structures. These assumptions, they said, could best be addressed by a more robust program of exploratory borehole drilling, including inclined drilling, to better characterize the condition of the limestone and the presence or absence of vertical fractures. The proponent committed, during the hearings, to carrying out inclined drilling.

The MBEN/OLS later argued that the proponent's assessment of the project should have considered the shale aquitard as a Valued Ecosystem Component (VEC) of the environment. In environmental assessment, the effects of a project are considered by assessing effects on specific VECs as elements of specific concern or as proxies representing a particular aspect of the environment. Because of the role of the shale aquitard in keeping the carbonate and sandstone aquifers separate, it helps to protect the two aquifers from contamination and allows for them to be managed separately.

Commission Comment: Geology and Topography

The panel notes that the stability of the carbonate (limestone) layer is essential to questions about surface impacts, such as subsidence, and to those regarding groundwater quality. The groundwater implications will be discussed later in 7.3.3 Groundwater Quality.

In its modelling and production planning, the proponent has assumed that a relatively homogenous limestone structure exists across the entire initial 633-hectare project area. The proponent has characterized the carbonate layer using results from 46 vertical boreholes. Core samples from this type of borehole are not considered to be a reliable gauge of the existence and frequency of vertical jointing. Technical experts for the proponent confirmed this in testimony, undertaking to drill additional inclined test boreholes once the required licences have been secured to begin production. In the absence of additional data to raise the level of confidence that the carbonate formation in the production zone has been properly characterized, the risk of mine failure is difficult to determine. The proponent's analysis indicated that ensuring a minimum over the long term of 60 metres of intact sand between extraction voids will provide enough support to prevent subsidence, but the panel notes that there was no long-term monitoring data to show that voids created in testing have not continued to expand. The panel notes that creating a large number of extraction wells across a relatively large surface area increases the possibility of mine failures should the carbonate layer be more heterogeneous than is currently portrayed.

The commission observed the absence of comments from the Mines Branch during the TAC process. This project will require approval under The Mines and Minerals Act

as well as The Environment Act. Although the extraction plan has been prepared by credible professionals and reviewed by commission experts and the hearing panel, as well as experts engaged by participants, none of these parties is the regulator. Without input from Mines Branch, it is unknown whether the proposed extraction plan will meet the requirements under the Mines and Minerals Act. Should the Mines Branch have concerns, it could require additional studies or alterations that may influence environmental and health effects. It is imperative that, before proceeding further, the Mines Branch be consulted to confirm whether it has provided an approval in principle.

In the absence of input into the review process from Mines Branch, the commission has carried out its review based on the knowledge gained through the hearing process. Should such input lead to adjustments to the extraction plan, conclusions in this report may need to be reassessed.

The panel is of the opinion that further exploration is needed to verify the proponent's prediction of a 65-degree angle for the sand slopes in the cavities. This may be a valid prediction in places where the sand is partially cemented, but as in the case of the carbonate layer, the possibility of heterogeneity in the sand layer needs further examination.

The proponent made a number of references to its Trigger Action Response Plan (TARP) plan as a key tool to ensure that the project does not cause limestone collapse. This plan should be spelled out in greater detail for the public to be confident. Assuming the plan provides the proponent with early warning information in order to stop extracting from a cavity, it may prevent limestone collapse. The plan must describe responses if extraction in a weak area results in a substantial collapse, as well as indicating what the response will be if a collapse occurs 25, 50 or more years in the future.

The panel agrees that the project needs to be considered using a long time frame. The changes it will create in the underlying geology are essentially permanent. Will the sand walls of the cavities slowly degrade? Will the caprock above progressively degrade if a void expands over time? Four months after extraction, when the follow-up side-scan sonar was taken, may not be a long enough time to have confidence that all of the gradual below-ground changes have finished. The proponent has argued that the sand will not be extracted nor water returned with sufficient force to disturb the remaining sand in the walls; therefore, it is likely to retain the cohesion and strength that will prevent it from declining past the expected 65-degree.

The panel and its consultants were concerned that the proponent did not provide more analysis on possible consequences of mine failure. As one consultant retained by the commission noted, even in the case of a project using a well-understood and frequently used technology, such as an earth-filled dam, a proponent will analyze the consequences of a failure, however unlikely it might be. It would be useful to know what the proponent's response would be if a failure were to occur as a result of human error or unforeseen circumstances, such as a cavern collapsing to the surface. The proponent referred to Trigger Action Response Plans (TARP) to be developed in the future, but these were not available at the time of the hearings.

In discussing what kinds of actions might be included in the TARP, an expert testifying for the proponent gave a number of examples of monitoring that might be carried out during extraction. Various instruments for detecting changes in pressure or cavity shape could be installed underground. Continuous monitoring at the surface could be used to detect any surface displacement. Sidescan sonar might be carried out when extraction has reached 50 per cent of its target for a given

well. These measures would be planned for each extraction area based on the specific subsurface conditions, such as the thickness of the competent limestone in that area. Should this project proceed, the panel encourages such measures to provide a greater level of confidence in predictions of project effects on geology and topography. The government, using its best judgement, should decide whether the area monitored in this manner is sufficient to provide an appropriate assessment of the effects on the carbonate aquifer or if an expanded monitoring regime is required.

These and other questions about long-term impacts need to be resolved with additional testing in order to provide greater confidence for Manitobans concerned about a project that will permanently alter the geology of two important aquifers. A recommended plan to address these and other concerns will be presented in Chapter 12: Conclusions and Recommendations.

7.2 Soils

The proponent plans to remove vegetation in places within the project site for well sites, pumping stations, dewatering and water treatment facilities and access trails. These trails are planned to be four metres wide in most places and eight metres wide in some places to allow for trucks to turn. Well-cluster sites are expected to be up to 0.28 hectares in area. A substantial number of pieces of equipment, including drilling rigs, pumps, light stations and dewatering stations, will be moved around the site. As such, there is the potential for disturbed soil to be subject to wind or water erosion. The proponent has committed to use access matting to help preserve the ground and plans to revegetate disturbed areas as quickly as possible after project work moves to a different part of the site. The proponent will develop an Erosion and Sediment Control Plan, which will describe how such measures will be carried out.

Commission Comment: Soils

Members of the public expressed concern about impacts of surface activities, such as clearing of vegetation and moving of heavy equipment. The panel noted that the first four years of the sand extraction project are planned to occur on private land and that some of this land has already been impacted by gravel extraction operations, with resulting impact on both surface soil and vegetation.

7.3 Groundwater Issues: Overview

Issues related to groundwater dominated the hearings on the project. Broadly speaking, these can be grouped into two categories: quantity issues and quality issues. Quantity issues were related to the amount of water to be extracted along with the sand and whether drawing a large amount of water from hundreds of wells per season would affect neighbouring wells drawing on the same aquifer. Water-quality concerns related to the potential effect of combining waters from the carbonate (limestone) aquifer and the sandstone aquifer, the potential changes to the water resulting from the presence of collapsed shale in the water-filled cavities, the potential effects of air being pumped down the wells changing the chemistry of the water in the aquifer, and the potential for contamination of the groundwater prior to its being returned to the aquifer.

Testing and Modelling of Groundwater

A key challenge in assessing potential impacts on groundwater is that, by definition, it is hidden away underground. While it's conceptually easier to visualize the potential impact of clearing a forest or damming a river, effects on groundwater are inherently more difficult to visualize. Groundwater flow and quality are understood through gathering data on existing and purpose-built test wells. Hydrogeologists, who specialize in the study of the flow of groundwater and the interactions between groundwater and the surrounding rock and soil, work to determine the direction of flow (up and down as well as horizontally), the speed of flow (known as conductivity), the ability of the rock or soil to hold water (known as storativity) and the rate at which an aquifer recharges through rain and snowmelt. They use a variety of different kinds of tests to estimate these measures. One kind of test is known as a "pump test." In a pump test, a well is pumped at a specific rate and the effect is measured in one or more surrounding wells in order to estimate the properties of the aquifer. A "step test" is one in which the rate of the pumping well is varied, typically by beginning at a low rate and increasing the rate by a set amount at a regular interval of 30 minutes to two hours. In a "slug test" a set amount of water is rapidly added to or taken from a well and observers measure how long it takes for water in the well to return its normal level.

To assess impacts of a project such as the Vivian Sand Extraction Project, it is necessary to develop a computer model of groundwater and validate that model by comparing it with actual well data. Then, once a model has been validated, it can be used to simulate what will happen if a certain amount of water is pumped from an aquifer. The validation process is critical to assuring model reliability.

7.3.1 Groundwater Modelling

In order to assess potential impacts of the project on groundwater, the proponent developed a model to understand how groundwater moves, the rate at which it is recharged, the pressure of the water within the aquifers and other parameters.

To develop this model, the proponent used regional geological maps, federal and provincial government databases of boreholes, measurements of groundwater elevation taken from local domestic wells and other data. Approximately 2,500 observation wells in the area provided information on groundwater elevations. The proponent developed a regional-scale model covering an area of approximately 3,200 square kilometres (roughly 80 km by 40 km). This model domain was bounded to the east by the Sandilands area, where the aquifers are recharged by precipitation, on the southwest by the Seine River, on the northwest by the Red River and

Red River Floodway and on the northeast by Hazel Creek. Within this area, groundwater flows to the northwest. The project site is at least 10 kilometres away from the nearest point on any of the boundaries. The boundaries of the groundwater model were selected to represent where water enters the system and where it is discharged into water bodies. To the west of the Red River, groundwater flows generally northeast. Groundwater west of the Red River is more saline than the groundwater in the project area. Within the area of the groundwater flow model there were, at the time of the EAP's filing, nearly 11,000 registered wells, approximately 1,600 within the regional project area and 400 within the local project area.

The proponent developed a numerical model of the groundwater system in order to make predictions about effects of pumping water out of the sandstone aquifer and connecting the sandstone and limestone aquifers with extraction cavities. The numerical model was created using software called FEFLOW, which is commonly used in the industry. The numerical model allowed for calculations of groundwater levels, draw down, groundwater flow paths and other parameters. The proponent tested the validity of the model by comparing results it predicted to actual historic data and to results generated by test wells.

The proponent created one well to conduct a series of step tests and a constant-rate pumping test. In the step test, the well was pumped at various rates (from 373 to 421 U.S. gallons per minute) for two to 2.5 hours. In the constant-rate test, the well was pumped continually at 372 gpm for 72 hours. (In the hearings and the documents under consideration, measurements for water were often in U.S. gallons, with one U.S. gallon the equivalent of 3.8 litres.) Effects of this pumping were monitored using four piezometers (instruments for measuring hydraulic pressure in groundwater) located in a well 89.3 metres from the pumping well, and making groundwater measurements in five monitoring wells located 338 and 1,211 metres from the pumping well and three domestic water supply wells located 491 to 960 metres from the pumping well. This network of monitoring wells allowed the proponent to estimate the zone of influence of the test well, and thereby that of the planned extraction wells. In response to concerns that only one pump test was carried out, the proponent noted that two EAPs for water projects in the area that will draw a larger amount of water than the Vivian Sand Extraction Project (one for the RM of Springfield and the other for the City of Steinbach) were also supported by a single pump test.

The proponent calibrated the numerical model to determine its likely accuracy. Calibration is a process of adjusting the parameters and boundaries used in the model so that the model matches historically observed groundwater conditions, such as the elevation of water in approximately 2,500 monitoring wells. Several statistical measures were used to assess the accuracy, including mean error, normalized root mean square error and correlation coefficient. Essentially, these are statistical measures to determine how close the model's simulated numbers for parameters such as groundwater elevation come to the actual observed numbers in the database. According to the proponent, the normalized root mean square error and correlation coefficient measures both showed that the model had a level of accuracy that was higher than industry standard. The mean error measure indicated a less accurate fit, but the experts testifying for the proponent attributed this to clusters of wells close to the Red River where effects of the construction of the Floodway affected groundwater elevations. In testing its model, the proponent also conducted a sensitivity

analysis. Such an analysis is intended to determine which parameters are the most important for the model to derive accurate predictions. By running simulations with slight changes in the values of various parameters, the sensitivity analysis indicates which parameters will affect the results the most. The sensitivity analysis showed that the two parameters that must be most accurately characterized are hydraulic conductivity and recharge.

Estimates in the EAP regarding the amount of drawdown that would be experienced by neighbouring well owners and the recovery time of these wells were based on simulations using this numerical model. The proponent has proposed conducting additional pump tests prior to development of the project and intends to establish a network of groundwater monitoring wells.

What We Heard: Groundwater Modelling

An expert retained by the commission to review the EAP expressed several concerns about the validity of the proponent's groundwater modelling. A central point was that the modelling was not based on enough data because the proponent conducted only one pump test and five slug tests and that these do not provide information that is representative of the wider area. The drawdown area from the pump test would amount to about three square kilometres, so to extrapolate from that test to the 3,200 square kilometre model area requires the assumption that conditions in the aquifer are the same over large areas. The expert questioned the use of one assumption used in building the model – that geological conditions are homogeneous throughout the area – noting that other studies of the area have found heterogeneous (varied) geology.

Concern was raised about the validity of the boundaries for the model and about the historic studies used. A map showing the proponent's comparison of simulated groundwater elevations versus observed groundwater elevations indicated a large cluster of wells near Winnipeg where the simulation was at least 10 metres lower than the observation and a cluster near Birds Hill where the simulation was at least 10 metres higher than the observation. Such pockets of concentrated inaccuracy suggest a poor fit near the boundaries. The use of data from many different sources over several decades was a concern. Data from the 1980s were combined with data the proponent gathered from its test wells in 2020/21. Doing so assumes that the older observation wells would still provide the same data 30 to 40 years later. Another suggested conceptual shortcoming of the model was that as a result of over-simplification there is the risk of a flaw known as equifinality, which is where more than one solution can arrive at the same answer. Additional data-gathering is required in such cases, in order to determine which set of parameters provides the correct fit. The commission's expert also said there was a systematic error in the way the proponent's model estimated groundwater head (a term referring to a measurement of water level in a well). The commission's expert found that in comparing simulations using the proponent's model to actual results, groundwater heads were systematically over-estimated below 275 metres above sea level.

The expert retained by the MBEN/OLS compared the proponent's groundwater model with the models developed for the RM of Springfield's additional groundwater supply (2019), for the Southeast Regional Groundwater Management Plan (SRGMP) (2010) and in the Kennedy and Woodbury study of 2005. The proponent's model estimated water use at 200 litres per person per day, where the Springfield study estimated

300 litres and the SRGMP estimated 500 litres. The expert witness also questioned the figure the proponent's model assigned to recharge, the key factor in evaluating a sustainable use of water. The proponent's model assigned a figure of 620,000 cubic metres per day to recharge, where the Springfield study applied less than 33,000 cubic metres and the Kennedy and Woodbury model applied 164,160 cubic metres. Using a much higher figure for recharge allows the daily use of water to be a smaller percentage of recharge. The proponent's model area excluded areas to the west where there are concerns about saltwater intrusion into the aquifer as well as areas of heavier development to the south.

Commission Comment: Groundwater Modelling

As indicated above, many questions were raised during the hearing process regarding the adequacy of the proponent's hydrogeological testing.

The panel concludes that additional testing and data collection are required to provide confidence in the modelling. Pump tests and slug tests should be carried out in extraction areas some distance from the previously tested site. This would help to confirm or disprove the expectation that effects of extraction will have the same effects throughout the project site.

A recommended plan to address these and other concerns will be presented in Chapter Twelve: Conclusions and Recommendations.

Given the growing population in southeastern Manitoba that is dependent on groundwater and the potential future effects of climate change, an up-to-date assessment by government of aquifer sustainability would be helpful for assessing effects of this and future projects. The variations in boundaries used by groundwater studies in this area and in the numbers assigned to aquifer recharge rates point to the need for the government to standardize these benchmarks for understanding aquifer sustainability.

During the hearings, the panel heard debate between the proponent and participant groups regarding the concepts of "industry standards" and "state of the art" or "academic research standards." Experts testifying for the proponent said the statistical tests used to calibrate the groundwater model showed that it was considered a very good fit by industry standards. But it was argued by other experts that a project that is essentially experimental must meet a higher standard.

The standards that this project is measured against should be determined by the government. An updated assessment of the state of the aquifer as well as standardization of the benchmarks could alleviate some concerns. This could be assisted by the execution of aquifer management planning as authorized by The Groundwater and Water Well Act. Given that Manitoba's recently completed Water Management Strategy has a mission to meet environmental, social and economic needs, today and in the future, setting a standard for groundwater testing and modelling is an appropriate job for the government.

Manitoba's Water Management Strategy

In November 2022 the Manitoba government released its new Water Management Strategy. The strategy was developed following the release in 2017 of the Manitoba Climate and Green Plan. That plan led to the creation of an Expert Advisory Council, which in 2020 was tasked with providing recommendations on a modernized, coordinated water management strategy. An engagement process of surveys and in-depth interviews with key stakeholders and water experts led to the creation of the strategy.

The strategy lists 11 focus areas in support of its vision of "healthy waters that support resilient, thriving ecosystems, communities and economies for generation of Manitobans" and its mission of "the stewardship and protection of Manitoba's waters to meet environmental, social and economic needs, today and tomorrow." Beneath the 11 focus areas are 47 strategic objectives and action plans that describe how Manitoba will achieve these objectives.

Among the focus areas are "meet the water supply needs of current and future generations sustainably," "protect the quality and quantity of groundwater" and "improve the coordination of water management and governance across watersheds, basins and aquifers." The stated goals of the Water Management Strategy suggest that all developments that pose risks or claim to have beneficial impacts on water resources deserve a high standard of judicious review.

The full text of the strategy is available online at https://manitoba.ca/sd/pubs/water/water_mgmt_strategy2022.pdf.

7.3.2 Groundwater Quantity

The proponent stated that risks to groundwater quantity will be minor, seasonal and reversible. The carbonate and sandstone aquifers in the area adjacent to extraction are expected to recover 80 per cent within two days of extraction activities. The remaining 20 per cent of recovery is expected within 20 to 80 days. The proponent's conclusion, based on hydrogeological and geotechnical assessment involving field investigation, data analysis, numerical groundwater modelling and geotechnical modelling, is that drawdown effects will be localized. Beyond 1,500 metres distance from the extraction wells, the proponent expects little or no effect once the groundwater has been reinjected. During a pumping test, existing domestic wells near the project site showed little to no decline (0.02 m to 0.77 m) in water levels in the sandstone or carbonate aquifer. Within a network of observation wells, water levels declined by up to 8.5 metres (in the Winnipeg Sandstone aquifer) and 1.5 m (in the Red River Carbonate aquifer) at a distance of 89.3 m from the pumping well. Drawdown effects were largely restricted to the project site boundary, but minor effects are anticipated to extend beyond it during and immediately following operation of extraction wells close to the boundary.

The slurry loop will require an estimated 1,325 cubic metres of water to operate. This water will be extracted at the beginning of each season and continuously reused. During sand extraction, the proponent intends to separate most of the water from the sand and direct this water to a treatment process prior to re-injection to the individual extraction well. Some water, amounting to approximately 54 cubic metres (14,265 U.S. gallons) per day, will remain with the sand as it is sent to the slurry loop. The proponent has stated that during extraction, up to 540 U.S. gallons per minute of sand and water mixture will be pumped from the aquifer (with individual wells producing 40 to 120 U.S. gpm each). At full production, the proponent states that water lost to evaporation would amount to 54 cubic metres per day (10 U.S. gallons per minute), based on 85 per cent of water being re-injected. The proponent characterized the annual amount of water use as less than that required by a typical golf course.

The proponent plans a buffer of 100 metres between extraction wells and any existing homes or water supply wells. With reinjection of water into the aquifer, the proponent states that wells greater than 1.5 km from the project site are unlikely to be affected. For wells that are affected, the majority are expected to experience a maximum drawdown of one to five metres, for a short period of time during and after extraction. Wells with the pumps located five metres or more below the piezometric surface (the level at which there is sufficient hydraulic head for the pump to function) are not expected to be affected. In the event the project affects water in neighbouring wells, measures will be developed to avoid and/or mitigate any well interference issues as required by The Water Rights Act. This could include providing water, typically as a temporary measure, lowering the pump of a well affected by drawdown or drilling a new well.

What We Heard: Groundwater Quantity

An expert retained by the MSSAC noted that there is seasonal variability in groundwater recharge, with a lag of as much as eight months for water levels in the aquifer to respond. As a result, depending on when water is taken from the aquifer, it may take longer for natural recharge to return conditions to normal.

An expert retained by the MBEN/OLS raised concerns about the numbers used for aquifer recharge in the proponent's groundwater model. The proponent's model used a much larger figure for aquifer recharge than did two other studies of groundwater in southeastern Manitoba. If the figure for recharge is too high, it is easier to see a project's use of groundwater as sustainable. However, the expert for the MBEN/OLS also agreed with the proponent's calculations regarding the capacity of the aquifer to meet the project's groundwater demands sustainably.

Public presenters concerned about potential impacts on quantity and quality of water spoke of the rapid growth in southeastern Manitoba. One presenter, noting growing demand for water and need to prepare for droughts, noted that the entire region's population is approaching 100,000. The presenter calculated the value of residential property in southeastern Manitoba at $17 billion and said the government must protect this investment by protecting the aquifer. It was noted by members of the public that Manitoba's Water Management Strategy gives domestic water use the priority over industrial use. Written submissions also discussed recent droughts in Manitoba, with one resident saying they had already reduced the size of their garden in order to cut water consumption and another saying that the most recent drought year (2020-21) had already caused a loss of well pressure.

Commission Comment: Groundwater Quantity

Based on current water usage in the area and modelling provided, it appears that the project is not likely to cause a significant impact on the quantity of water available to other users, assuming the proponent is able to return 85 per cent of the water it extracts, as planned. This does not mean there are no concerns at all regarding quantity. Variability in recharge rates from season to season and year to year should be considered. An amount of withdrawal that is insignificant most years might be significant in a serious and protracted drought. Placing the project's expected water usage in context with other withdrawals of water and with forecast growth would help Manitobans to better predict the longer-term effect of the project. Population growth in the region, combined with provincial water policy that gives the highest priority to domestic uses of water, suggests that projects such as this are best assessed using a framework of regional water plans. The government should set the benchmarks for recharge and water use to be used in modelling the impacts of developments on groundwater.

It is also worth noting that even if the project's water consumption is not significant on a regional and long-term basis, it does present the possibility of short-term disruptions in the immediate area. The proponent expects the majority of wells within 1.5 km of extraction activities to have a maximum drawdown effect of one to five metres and that within two days of the end of extraction, these wells will recover 80 per cent. That suggests some very close wells are likely to experience greater drawdown. It also suggests at least a temporary inconvenience for a number of nearby residents. These calculations of the effect on neighbouring wells are likely to depend on the ratio of water to sand extracted, which the proponent expects to be 1:1. If a higher proportion of water is extracted, these drawdown effects may be greater.

The proponent must have a comprehensive plan to address drawdown in wells close to the sites of extraction. The proponent should strive to inconvenience nearby residents to the least extent possible. The proponent has stated that it intends to monitor groundwater elevations continuously so that operations can be stopped if water levels reach pre-determined impact thresholds. In the event that availability of water is affected, the proponent has committed to providing potable water at its expense. The proponent also, during the pre-hearing Information Request phase of this review, committed to carrying out a multi-well test after issuance of a licence. The proponent plans to begin extraction with clusters of a single well or two wells and use information generated from these first extraction activities to test design assumptions and groundwater models. This indicates a realization on the part of the proponent that more information is required to build confidence, especially among members of communities dependent on the groundwater in this area.

On-going monitoring of the aquifer levels is required to confirm assumptions about effects on the aquifer and to identify problems should they occur. This is expected to be covered in detail in the proponent's Water Management Plan, discussed in Chapter Ten: Management and Mitigation Plans.

A recommended plan to address these and other concerns will be presented in Chapter Twelve: Conclusions and Recommendations.

7.3.3 Groundwater Quality

The proponent predicts the project to have a minor and temporary effect on groundwater quality. This prediction is based on the plan to carry out a number of steps to prevent contamination.

- Casing is to be applied in each well and grouted in place to keep the Red River Carbonate and Winnipeg Sandstone aquifers separate.
- Drilling and sealing (decommissioning) wells will be carried out in accordance with applicable guidance documents such as "Constructing and Sealing Wells in Manitoba" (Province of Manitoba, 2018) and Environment Act licence requirements. This is intended to prevent surface water contamination of the aquifer.
- Water separated from the sand is to be subjected to ultraviolet (UV) treatment before it is reinjected in the wells. The proponent states that this water will not come into contact with any contaminants, and UV treatment will be carried out as a conservative measure for any pathogens such as bacteria. Suspended solids that would otherwise make UV treatment ineffective will be removed through sand filters, followed by the addition of a substance derived from shrimp and crab shells, known as chitosan, which bonds with the smallest particles and allows them to be filtered.
- A Waste Characterization Plan will be implemented to identify any rock or soil materials that have the potential to generate acid or contribute to leaching of metals after exposure to oxygen in the air. This will include testing drill cuttings from the various layers (Quaternary Sediments, Red River Carbonate and Winnipeg Shale) and storing or neutralizing any of those that have a chemical composition that makes acid generation or metal leaching possible.

Metal Leaching and Acid Rock Drainage

Rocks containing sulphides, such as pyrite (an iron sulphide with the chemical formula FeS_2), can generate acid rock drainage when exposed to water and oxygen. The resulting chemical process of oxidation releases sulphuric acid and metal oxides. This acidic runoff can release metals from rock, including iron, selenium, arsenic, manganese and copper. If it reaches drinking water sources, such as aquifers or surface water used for drinking, it can affect health and safety of those who consume the water. If this water drains into creeks and rivers it can disrupt the growth and reproduction of aquatic plants and animals and affect any infrastructure, such as water pipes, in contact with the water.

Acid rock drainage is a common form of water pollution in areas where there are abandoned mines that have left large rock pits or slag piles behind. Mine reclamation projects often involve adding alkaline materials to neutralize the acidity and applying uncontaminated soil, planting vegetation and stabilizing slopes to reduce the infiltration of surface water to the potentially acid-generating material.

The proponent collected 20 water-quality samples and duplicates from several monitoring wells, including three private wells. Thirteen water samples were sent for isotopic analysis. Analysis found that the water currently has very little oxygen in it and is fresh, meaning it has very low dissolved solids – both in the sandstone and the carbonate aquifers. The proponent sought to determine what would happen to the water from the sandstone aquifer after it was brought to the surface through the extraction process, exposed to oxygen from the atmosphere and reinjected into the wells. Modelling indicated that the water, if left at the surface, would become oxidized, resulting in metals such as iron precipitating out in reaction to the oxygen. However, the proponent's experts said oxidizing reactions in the aquifer would not be possible, because such reactions would require both an unlimited supply of oxygen and abundant sulphide materials (pyrite). In a saturated below-ground environment, there would not be enough oxygen and the rocks have low levels of pyrite.

In order to assess the risk of acid rock drainage (ARD) and metal leaching (ML), the proponent conducted tests of the materials brought to the surface in test drilling. The focus of testing for acid rock drainage and metal leaching is to prevent run-off from waste rock at the surface becoming unsuitable for aquatic life if it reached surface water or harming drinking water if it were to re-enter the aquifer. The proponent's laboratory testing of rock materials indicated that the samples from the Red River Carbonate and Winnipeg Sandstone layers are not potentially acid-generating, because they have very low levels of sulphide materials. Some of the Winnipeg Shale samples were classified as "uncertain," meaning that it's not certain that the material could neutralize acidity and maintain a neutral pH. Waste material from the shale layer, therefore, will need to be managed in a way that protects groundwater quality. The proponent estimates that each of approximately 1,200 wells over the four years of the project will generate approximately 0.15 cubic metres of shale waste and 0.66 cubic metres of carbonate (limestone) waste. Nine samples (three each from the carbonate, shale and sandstone) were sent for laboratory testing. The samples were taken from four boreholes. Two of three shale samples sent for testing were found to have small concentrations (0.6 per cent and 1.3 per cent) of pyrite, which was not found in the carbonate or sandstone samples. The mining industry standard for sampling calls for three samples to be tested for a project generating up to 10,000 tonnes of waste rock. The proponent estimates that the project will generate a total of approximately 3,600 tonnes of shale and limestone waste rock combined, in contrast to traditional mine sites where there may be millions of tonnes of waste rock in tailings piles.

The shale layer was a particular focus of studies into the potential for ARD and ML. Black shale present at the former sand quarry site on Black Island, near Hecla Island, has high levels of pyrite and a high potential for metal leaching, with elevated levels of cobalt, lead, silver and arsenic. The Winnipeg Shale found within the project area was not found to contain elevated metal concentrations. In shake-flask tests, in which samples were shaken under oxidizing conditions for 24 hours, it was found that selenium could be released from the shale at levels exceeding drinking water guidelines. Based on these results, the proponent intends to carry out a Waste Characterization and Management Plan, in which rock waste will be tested and managed to avoid run-off.

In response to concerns about acid rock drainage, the proponent noted that the water had a neutral pH – that is, it is not acidic. The limestone that is likely to enter the cavities from above contains calcite ($CaCO_3$), which

reacts to acid by forming bicarbonate, which is alkaline. The limestone would thereby buffer any reaction and prevent an increase in the acidity of the water. In response to concerns about the effect of oxygen in the cavities leading to reactions that would leach metals from the rock, the proponent said such reactions would be unlikely given that the sandstone is fully saturated. Acid rock drainage and metal leaching requires unlimited amounts of oxygen and plentiful sulphides, the proponent said. Even with some increase in dissolved oxygen, there would be limited oxygen in the saturated cavities.

The proponent also examined the water-quality effects of mixing water from the two aquifers. Because the water in the sandstone aquifer has lower iron concentrations, if the mixing of waters causes the water from the sandstone to enter the carbonate aquifer, it could result in lower concentrations of iron in groundwater taken from the carbonate aquifer. If water from the carbonate aquifer enters the sandstone aquifer, a slight increase in iron in the sandstone aquifer could occur. Concentrations of other substances stipulated in drinking water guidelines, including chloride, calcium, magnesium, arsenic and uranium, would decrease with higher concentrations of water from the sandstone aquifer entering the carbonate aquifer. (Most drinking water wells in the area draw water from the carbonate aquifer.) Water in the sandstone aquifer has higher levels of manganese, so if concentrations of sandstone water exceed 70 per cent, the level of manganese may exceed drinking water guidelines for aesthetics.

Mixing of waters between the two aquifers would depend on changes in gradient between the two aquifers. At present, the proponent said, both aquifers have mostly horizontal gradients. The connection created by eliminating the shale aquitard at each cavity would cause some exchange of water, as a result of localized changes in pressure in the aquifers. The proponent's experts said a new equilibrium would be reached in a matter of days or weeks, which would return the gradients in both the carbonate and sandstone aquifers to a primarily horizontal direction. In other words, it was predicted that there would neither be a large-scale or long-lasting flow of carbonate water down into the sandstone nor a large-scale or long-lasting upwelling of sandstone water into the carbonate.

The proponent argued that because both aquifers are fresh, keeping them separate is not critical. Both aquifers are fed by the same recharge area in the Sandilands approximately 10 kilometres to the east and have similar properties in the project area. Past issues regarding saline water entering the carbonate aquifer from the sandstone have occurred farther west, near the Red River, where upward gradients have pushed the saline water up through boreholes that have connected the two aquifers. More than 1,000 wells near the project area connect the two aquifers, the proponent argued, and they have not resulted in water-quality impacts.

Wells will have a PVC casing to keep them separate from the surrounding rock and will have a grout seal to keep the carbonate and sandstone aquifers isolated. However, the collapse of the shale layer, as revealed through the proponent's sonar, will result in connections between the aquifers. Manitoba Well Standards Regulation 215/2015 prohibits constructing or sealing a well in a manner that allows interconnection or mixing of groundwater between the Winnipeg Formation (sandstone) and any overlying aquifer. While the project will result in new connections between the carbonate and sandstone aquifers, the proponent's assessment indicates that water in the two aquifers has very similar properties. The proponent notes that the aquifers are already connected by many existing wells, including 215 wells in the RM of Springfield.

What We Heard: Water Quality

The commission contracted with a hydrogeological consulting firm, to examine the proponent's assessment of groundwater issues. The groundwater engineering experts raised a number of issues regarding the EAP and the models used to predict the effects of the project. The experts raised a number of questions regarding the proponent's hydrogeological investigations. These included:

- Testing was inadequate given the size of the basin, approximately 3,200 square kilometres. One aquifer test was carried out, covering an area of about three square kilometres.

- The model for groundwater assumed homogeneity of the aquifers, whereas experience and literature reviews indicate that they are not homogeneous.

- The proponent's hydrogeological assessment assumed that the shale layer acts as effective barrier (aquitard) between the carbonate and sandstone aquifers. Pump-test data indicate that the shale is a leaky barrier, as drawing down water in the sandstone aquifer leads to drawdown of the carbonate aquifer.

- The proponent's assessment did not consider the hydraulic effects of removing the sand and creating large cavities that will fill up with water. How this will affect storativity (referring to the volume of water that can be released from an aquifer) and conductivity (referring to rate of flow in an aquifer) was not assessed.

- Questions remain regarding the calibration of the model. In places in the basin, the water level underground is several metres different from what is predicted by the model. The industry standard approach for creating a groundwater map is to create it for a specific short period, whereas the proponent's model was made using new data as well as historical data from decades ago.

- The EAP did not consider the possibility that poorer-quality water could be drawn into areas that currently have good-quality water. Brackish (saline) water exists in the Winnipeg Sandstone formation near the Red River.

- The groundwater model does not consider potential pathways opening up through the limestone aquifer as a result of the project.

- The groundwater model systematically overestimated groundwater heads (a term referring to underground water pressure) for elevations below 275 metres above sea level.

- Assumptions regarding the ability to keep the aquifers separate, through measures such as a grout seal to separate the limestone and shale layers, are called into question by the expectation that the shale layer will fail and fall into the extraction cavities. Because the hydraulic head is greater in the sandstone aquifer, in time there will be upward mixing as water is pushed up through the openings created by removal of the shale layer.

- In testing of rock samples for acid rock drainage potential, the proponent did not take duplicates of any of the samples in order to reduce uncertainty.

- The proponent's assumption that the project will generate only 3,600 cubic metres of waste rock per year may turn out to be low, in which case more samples may be needed.

- The EAP did not adequately consider the dissolved oxygen that will be introduced

into the water as it is brought to the surface using the airlift method. Though not all this dissolved oxygen will remain in the Winnipeg Formation sandstone, it has the potential to change the redox state in the aquifer. (Redox refers to chemical processes – such as rust – that cause the transfer of electrons from one substance to another.)

An expert witness presented by the MBEN/OLS found the proponent's assessment of short-term water quality effects to be appropriate. The addition of oxygen through the airlift method would have a minor effect locally (with some precipitation of iron and manganese) near the extraction wells. The expert added that his review of the potential direct effects on water quality did not include an examination of the potential results of the Winnipeg Shale entering the water-filled voids.

The MBEN/OLS expert spoke at greater length about the potential for long-term indirect effects of the project, given that it would drill and cap approximately 1,200 wells in four years, and up to 10,000 should it continue for the 24-year lifespan. The expert predicted that the proponent's plans are unlikely to contaminate the aquifers if all mitigation measures are implemented, but the risk increases with the number of wells. Every well drilled through an aquifer creates potential pathways for contamination, which could result from damage to the well plug, well casing, cement fill between the casing and the rock formation and weakness between the rock formation and the cement fill. As the expert put it, it is unlikely that the drilling and abandonment of thousands of wells will be 100 per cent compliant with the proposed well design and abandonment plan, due to unforeseen technical issues (such as unexpected quality issues for the cement or casing). The expert also noted that the project area is up-gradient (upstream) from most of the well users in the region. The groundwater in the project area is currently at low risk of being contaminated, being located in a lightly developed area with aquifers at low vulnerability. Creating many new potential pathways raises the groundwater risk. Given that nearly half of the project site is currently used for agriculture, there is the risk that, at some point in the future, manure will be spread on parts of the site, creating a possibility of contamination if well seals degrade over time.

The expert also discussed the nature of uncertainty in assessing future environmental effects. Practices considered appropriate at one time may turn out to create new problems. As an example, the expert cited Ontario's problem of "legacy wells" – old, shallow wells left over from oil-well drilling in the 19th century. When these wells were abandoned, the iron used as casing was valuable and so the companies removed the iron and filled the holes with rocks. Decades later, it was discovered that the rocks were not a good seal and so, starting in the 1950s, cement was poured down the holes. But it turned out that the cement degraded over time and the seals are again a problem.

The MBEN/OLS expert also discussed the increased connection between the carbonate and sandstone aquifers that would be created by the project. While it is true that there are hundreds of existing wells that connect the two aquifers, each of those, assuming a standard diameter of six inches (15.24 cm), connects the aquifers over an area of roughly 0.02 square metres. The collapse of the shale layer as indicated by the proponent's sonar of one test cavity created a connection between the aquifers of some 491 square metres (based on a 25-metre diameter). Creating hundreds of such interconnections essentially removes the ability to manage the carbonate and sandstone aquifers separately downstream of the region of interconnection. The MBEN/OLS also noted that Manitoba law enshrines the importance of keeping aquifers separate. The

organization's representative cited Manitoba Well Standards Regulation 215/2015: "…a person must not construct or seal a well or test hole in a manner that allows the interconnection or mixing of groundwater between the Winnipeg Formation and any overlying aquifer." The representative also cited Manitoba Drilling Regulation 63/92 under The Mines and Minerals Act: "A licensee shall drill and abandon a borehole in such a manner as to prevent the vertical movement of fluids between permeable water-bearing zones penetrated by the borehole."

The MBEN/OLS expert spoke on the loss of portions of the shale aquitard. Reducing the ability of the shale aquitard to keep the carbonate and sandstone aquifers isolated calls into question the effect of regulations intended to preserve the ability of government to manage the two aquifers separately. Currently, the proponent's studies show isotopic differences between the water in the two aquifers, resulting from differences in the way the aquifers are recharged. With the shale aquitard punctured at the many extraction sites, the water will be mixed. Without the aquitard, both aquifers are more vulnerable to contamination, because contamination in one may lead to contamination in the other, depending on the direction of groundwater flow. A representative of the group argued that there is no evidence to support that any specific amount of shale collapse is acceptable.

Hearing participant Dennis LeNevue raised questions about impacts on water quality resulting from the proposed airlift approach to mining the sand. He expressed concerns that the oxygen could be introduced into the water in the aquifer and that this could result in leaching of metals found in the rock, including selenium. He also asked about the potential for microbes in the air to be introduced into the aquifer. Noting the fossil-fuel powered drills and air compressors used in the process, he raised the question of the effect of substances found in exhaust from fossil fuels being introduced into the aquifer. (In response, the proponent stated that airlift drilling is common in water well drilling and has not resulted in wells contaminated by substances in exhaust.) Mr. LeNevue, as well as the authors of several written submissions from the public, expressed concern about the potential for contamination resulting from a chemical that may be used in the Sio Silica processing plant. A polymer called polyacrylamide is expected to be used in the plant to clarify the water removed from the sand in during processing. Polyacrylamide decays to a substance called acrylamide, which is hazardous to health. If the polyacrylamide enters the slurry loop that will travel back and forth from the extraction site to the plant, leaks from the slurry loop could result in spills of water containing acrylamide. Mr. LeNevue also raised the concern that introducing oxygen into the aquifer could support the growth of iron bacteria. These bacteria, found in the soil, live off the energy produced in the oxidation of iron and can plug up wells and plumbing and make water unsuitable for drinking. One written submission recommended that to reduce the risk of iron bacteria all drilling equipment must be kept from contact with the ground when not in use.

Public presenters during sessions in Steinbach, Anola and Beausejour spoke on the importance of clean water for human health and the irreversible nature of the interconnection that would be created between the two aquifers. The rapid growth of southeastern Manitoba was underlined by several presenters, who spoke of the growing population of domestic, commercial, industrial and agricultural groundwater users in the region. Several public submissions referred to a 1981 report that described the Vivian area as containing areas of high groundwater vulnerability, based on permeable surface deposits and uncertainty around conductivity between these deposits near the surface and the carbonate aquifer.

The Manitoba Government's 2022 Water Management Strategy was referenced by several members of the public both in written and in-person submissions. They noted that the strategy's vision is to support "healthy waters that support resilient, thriving ecosystems, communities and economies for generations of Manitobans." One of the major focus areas of the strategy is "Protect the quality and quantity of groundwater."

A number of public presenters and writers of written submissions expressed concerns about leaching of metals, whether as a result of oxidation of waste rock at the surface or the addition of oxygen to the aquifer in the extraction process. Several submissions expressed a general concern with the environmental record of the mining industry and opposed the idea of mining a product within an aquifer used for domestic water.

Several presenters cited examples of water contamination from other jurisdictions, including the Walkerton, Ontario, water crisis of 2000. In that incident, E. coli from manure contaminated a municipal water-supply well, leading to seven deaths and many cases of illness. The operators of the water treatment and supply system in that case were ultimately charged with criminal offences in relation to their operation of the system and pleaded guilty to the charge of "common nuisance."

Concerns about possible effects on surface water, resulting from spills from the slurry loop or equipment, were expressed in several submissions.

Commission Comment: Water Quality

The apparent conflict between this proposed project and Manitoba's well standards regulations, raised by participants, must be resolved by government before this project can go forward. The proponent has argued that the rule against allowing water from the sandstone and carbonate aquifers to mix does not apply in this case, because in this area both aquifers contain fresh water, of similar quality. If that is the case, a ruling by the government is required to make that clear, especially as it relates to the regulation regarding interconnection or mixing of groundwater specifically from the Winnipeg Formation.

Water quality was the most passionately discussed topic during the hearings and understandably so, as these aquifers are the only source of drinking water for many of the presenters. The panel heard many presentations that included phrases like "water is life." Indeed, given the way Canadians proudly identify their country as the most freshwater-rich in the world, it is not surprising that there would be concern about a project that proposes to drill approximately 1,200 wells and extract millions of tonnes of material from within an aquifer.

While some of the risks identified by presenters and participants at the hearing may have low probability of occurrence, there are uncertainties regarding the project's effect on water quality. The source of much of the uncertainty arises from the experimental nature of the project. No evidence has been found that airlift well technology has been used on such a scale to mine material from underground. We cannot point to the prior results of similar sand-mining projects elsewhere, either to allay fears or to learn from mistakes. Key questions that were raised in the hearings were:

- Will creating hundreds of cavities in the sandstone aquifer, which propagate upwards into the shale and fractured limestone until competent limestone is reached, change the properties of the aquifer?

- In the event the region experiences a serious, prolonged drought during this project, will the predictions of quick recovery of neighbouring wells still hold true?

- What will be the effects of shale collapsing into potentially hundreds of extraction cavities?

- What will be the effects of dissolved oxygen reinjected into the aquifer?

- Given that the project involves approximately 1,200 wells, how confident can we be that that no harmful micro-organisms will be injected into the aquifer along with the air?

- Will the filters being used to remove suspended solids from the water (a step necessary for UV treatment) become clogged or degrade in performance and affect the ability to treat water?

- Will the UV treatment be successful?

- In the long term, how confident can we be that sealed wells will not fail and open pathways for contamination?

- In the event that the limestone layer above one or more cavities fails, will this enhance pathways for contamination of the aquifer as a result of ponding due to surface subsidence?

The expert who brought up Ontario's "legacy wells" problem raises a central question about evaluating environmental effects. When we consider questions like this, we can identify "known unknowns" – that is, questions we can pose, questions we know we want answered. With known unknowns, we can identify facts that we need to gather and topics in need of field or laboratory testing. A more vexing issue is raised by "unknown unknowns." These are things we don't know, and we don't know even that we lack this knowledge. The people who tried to solve Ontario's legacy wells in the 1950s knew they had a problem of leaking wells. What they didn't know was how the concrete they poured in those wells would react over time. Their unknown unknown became a problem for people in southwestern Ontario today.

The other Ontario well issue that came up during the hearings points to another issue of managing risks and unknowns. Many aspects of the Walkerton water disaster are different from the matter we are examining. In Walkerton, a municipal water well was very shallow (less than seven metres below grade) and less than 100 metres from a cattle operation. And in Walkerton, serious human error was involved in failing to test the contaminated aquifer. But with 1,200 wells creating potential future pathways for contamination, the unknowns include what future uses this land will be put to and who will be responsible in the future to inspect these well sites and test well water. We don't know if decades later this land will be farmed more intensively, creating sources for contamination. We know that human error and uncertainty are encountered in all areas of endeavour. The challenge for this panel has been assessing the probability of errors and the probability of errors with serious consequences. While the Walkerton water disaster resulted from a very different scenario than this project, one of the conclusions of the Honourable Justice O'Connor in the Report of the Walkerton Inquiry is relevant here. Commissioner O'Connor concluded that a cornerstone of an effective system of

protection for drinking water was to ensure a multi-barrier approach. Protection of drinking water sources was suggested to best be done on a watershed basis as a component of a comprehensive approach to all water sources. (The Honourable Dennis R. O'Connor, Report of the Walkerton Inquiry: The Events of May 2000 and Related Issues. http://www.archives.gov.on.ca/en/e_records/walkerton/index.html)

The proponent should be required to undertake a risk assessment to identify the level of risk and how it will be addressed in the long term. Such an assessment should consider the probability of significant negative outcomes, including worst-case scenarios. As an example, an expert retained by the commission noted that a proponent planning to build an earth-filled dam – a well-established technology – will assess the probability of and response to a dam failure, even though this may be extremely unlikely.

If the Government of Manitoba is to fulfill its obligations under the Manitoba's Water Management Strategy, we must ensure that future generations are not affected by decisions made today. For this project to proceed without burdening future generations with a potential threat to their water, we must ensure that sufficient testing appropriate to the potential consequences of engineering failures has been carried out. We need to know that systems for injecting air and treating and reinjecting water can operate reliably on a large scale without harmful effects on water chemistry or introducing contaminants. We need to know that shale collapse will not have a harmful effect or significantly change the water chemistry. We need a greater level of confidence about the geotechnical stability of the caprock. If this project is to proceed safely and with confidence that there will be no significant adverse effect, it must be treated as a prototype, operating in a limited capacity as something less than a fully licensed development and something more than a program of test wells.

The proponent's plan for mining silica sand has some attractive features. If the sand extraction can be done safely according to engineering plans and where the geological and hydrological consequences do not introduce unacceptable long term risks, the project would appear to be less damaging than open-pit alternatives. It is difficult to find the right balance between economic growth, environmental care and social well-being, and this is made more difficult by the challenges of outcomes far in the future. More knowledge is essential to inform government in finding that balance.

Accordingly, the commission recommends that additional sampling and study is required to provide further confidence regarding the effects of the shale collapse on water quality, provide a more robust assessment of pathways for contamination, provide further confidence regarding the effects of oxygen infusion, and assess whether adjustments to modelling will be required. Before it begins operation, the proponent must develop a groundwater monitoring plan that describes the number and placement of monitoring wells, which parameters of the water will be tested, and how these tests will be conducted, and what actions will be taken should problems be detected. The plan for well abandonment should address procedures for sealing wells to prevent contamination of the aquifers by surface water and should indicate what actions will be taken if contamination does occur.

A recommended plan to address these and other concerns will be presented in Chapter Twelve: Conclusions and Recommendations.

7.4 Air Quality

Potential sources of impact on air quality are dust and emissions from drilling rigs and mobile equipment. The proponent plans to

use an excavator, two drilling rigs, two water trucks and two grouting systems during construction and site set-up. More equipment is planned for the operational stage, including 10 diesel extraction rigs, 16 slurry pumps, 20 water pumps, eight light plants, two diesel generators, eight cyclones, two excavators and various trucks. All will generate nitrogen dioxide, carbon monoxide and sulfur dioxide as a result of emissions. They would not all be operating simultaneously.

In addition to fuel emissions, dust has the potential to impact air quality. Dust could be generated by the movement of the vehicles on the site. Dry silica sand could impact air quality if left exposed, but the proponent states that dry silica sand will not be left exposed at the project site. Sand will be wet and within the slurry pipe en route to the processing facility. Large pieces removed from the sand, known as overs, are planned to be stored in containment before being used later in well sealing or being removed from the site. As this hearing focused only on the proponent's application for an Environment Act licence for the extraction project, storage of sand at the processing facility, which has already received an Environment Act licence, was not discussed.

Steps to be taken to reduce impacts on air quality include minimizing the idling of vehicles, applying water to gravel roads as necessary to control dust, and ensuring proper maintenance of equipment. Based on these measures, the proponent assesses the impact on air quality as minor to negligible.

What We Heard: Air Quality

Several public presenters and writers of written submissions expressed concern about the presence of silica sand at the site. Silica sand is known to be a cause of silicosis, a type of lung disease caused by breathing in tiny pieces of silica. Workers in construction, countertop fabrication, foundries, ceramics manufacturing and mining and fracking can be at higher risk of silicosis. Several presenters reported that during the proponent's preparations for the project, walkers and children on bicycles accessed the property and came upon piles of unattended sand that had been extracted during the proponent's testing. The proponent, in its rebuttal, stated that access gates to the site had been vandalized and showed a photograph of a sand pile that had been covered with tarps. Regarding both air quality and the greenhouse gas impact of the project, some presenters asked if the proponent could use electrical power for more of its operations, such as the air compressors and water pumps.

Commission Comment: Air Quality

The commission notes that gravel pits are already active throughout eastern Manitoba. Dust-suppression practices exist to reduce the impact from these activities and from vehicle traffic on gravel roads. Given that silica sand will be stored at the processing facility, concerns about the effects of this material are not expected to arise on the extraction project site.

7.5 Greenhouse Gases and Climate

The proponent estimates that the project would generate approximately 6.8 million kilograms of CO_2 equivalent per year through the various kinds of equipment used. Extraction rigs would be the largest contributor to the greenhouse gas total, adding more than 2.4 million kg. Two different kinds of drilling rigs would contribute just under 1 million kg in total.

At 6.8 million kg per year, the project's greenhouse gas emissions would amount to just under 0.03 per cent of Manitoba's greenhouse gas emissions for 2019. Based on that, the project is deemed by the proponent to have a negligible impact on greenhouse gases and climate.

What We Heard: Greenhouse Gases and Climate

The commission heard from some public presenters who noted that one of the potential uses for the silica sand is the manufacture of solar panels, which are necessary to reduce the fossil fuel consumption of the power generation industry (in jurisdictions where electricity is generated primarily by fuel burning). These individuals were among the small number of presenters who spoke in favour of the project. The proponent has listed solar panels as one of the uses for high-purity silica sand. Prior to the hearings, Sio Silica announced discussions with a German firm that could lead to a solar panel manufacturing plant in Manitoba.

Several other public presenters characterized the proponent's advertising of its intentions to sell the sand for such technology as "greenwashing." Some of these presenters also raised the question of the sand being sold for use in fracking. It was suggested by at least one presenter that if the project were approved, the proponent should not be allowed to sell the sand for fracking. The proponent noted that manufacturers of solar panels, communication technology, and other such products pay a higher price for high-purity sand than fossil fuel companies pay for fracking sand. The proponent would therefore have an incentive to sell the products to customers other than the fossil fuel industry.

Commission Comment: Greenhouse Gases and Climate

The panel sees the opportunity to reduce greenhouse gas emissions through greater use of solar power as important. The panel accepts the proponent's undertaking at the hearings to make best efforts to reduce GHG emissions and would support efforts to electrify more of the project's operations. However, the panel does not have the authority to make such recommendations on a case-by-case basis. The panel does not have the authority to make any recommendation about the sale and use of silica sand.

7.6 Noise

Noise from the project has the potential to impact nearby residents and wildlife. If the project is approved, drilling, pumping and extraction will be carried out continuously, on a 24/7 basis, during the extraction season. The nearest residence to a planned well cluster area is 133 metres away.

To reduce the impact of noise, vegetation clearing will be minimized as much as possible, a 100-metre setback from residences will be maintained and idling of vehicles will be kept to a minimum. The proponent also plans to use noise-mitigation measures, such as portable noise barriers, as required.

Impacts of noise on wildlife are expected to be moderate in the vicinity of project areas, where disturbance of vegetation and human presence would also have a localized effect on wildlife. Overall, noise impacts are assessed by the proponent as minor to moderate.

What We Heard: Noise

Many presenters, including several members of a family living immediately across the road from the project site, expressed concern about the impact of project noise. The commission heard from many area residents who said that the relatively undisturbed quiet of the area is one of the things they value greatly about their homes. Presenters were especially concerned that project activities would occur on a 24/7 basis throughout the extraction season. The continuous operation of drilling and extraction rigs and the various pumps and compressors was noted by many presenters.

7.7 Surface Water

The proponent states that, because there are no permanent water bodies on the project site, if approved, the project will have a negligible impact on surface water. No surface water will be used and no water will be discharged on the surface. Potential effects on surface water are related to clearing vegetation, leveling and compacting soil and disturbing the ground at well cluster sites, pumping stations and access trails. Removing vegetation can potentially affect surface water if it leads to more sediment reaching water bodies, but given the absence of permanent water bodies or wetlands on the site, this is not expected to be the case.

To avoid effects on surface water quality, the proponent plans to construct drainage ditches along access trails and disturbed areas to maintain natural drainage patterns. Portable toilets will be installed to prevent potential contamination. An erosion and sediment control plan will be implemented for the project.

The proponent's Waste Characterization and Management Plan, which is being developed to prevent acid rock drainage and metal leaching, is intended to prevent leaching of metals from waste rock produced by the project, and thereby prevent run-off of such metal from reaching any waterbodies. The proponent intends to test these rock wastes and will store the shale rock waste – the material with the greatest potential for metal leaching – in ways that will keep it from being exposed to moisture.

What We Heard: Surface Water

Participant Dennis LeNevue and several members of the public who made written submissions expressed concern about the potential for leaks from the slurry pipeline. As the project expands over time, the length of the slurry pipeline is expected to increase. It will contain a large amount of water that will be continually circulated to the processing facility and back to the extraction sites. Concern was expressed about the use of the polymer polyacrylamide in the processing facility, which is hazardous to health when it breaks down into acrylamide. One recommendation was for the water in the slurry pipeline to be tested regularly. The proponent's management plans call for daily inspection of the pipeline.

Commission Comment: Surface Water

The greatest potential for an impact that could reach surface water sources is likely the slurry pipeline, which the proponent has stated will be up to 3.5 km in length as extraction areas stretch a greater distance from the processing facility. The commission notes that the proponent has stated it plans to inspect the slurry pipeline daily.

7.8 Fish and Fish Habitat

Since there are no permanent water bodies on the project site and assuming application of the erosion and sediment control plan, no impact on fish and fish habitat is expected.

7.9 Vegetation

If the project is approved, clearing access trails and spaces for project components such as well clusters will involve removal of vegetation. Based on the revised extraction plan submitted in January 2023, 51 per cent of the 633-hectare project site consists of natural vegetation. Each well cluster will have a footprint of 0.2 to 0.28 hectares. Over the four-year lifespan of the project, the proponent plans at least 200 well clusters, so that may be approximately 20 to 30 hectares. Other cleared areas will include the slurry line, which will have a two-metre width, and the access trails, which will be four metres wide in most places, with eight-metre widths in some locations to allow large vehicles to turn. Some areas will need to be cleared for pumping stations along the slurry line, but these are relatively small (63 square metres).

To reduce the impact on vegetation, the proponent says it will minimize clearing to the extent feasible. The proponent committed to use access matting to help prevent disturbance. Disturbed areas will be allowed to revegetate naturally, augmented by a native seed mixture and native plantings where needed. A revegetation monitoring plan will be implemented to determine the success of revegetation and determine if follow-up seeding or planting is required. Dust-control measures implemented to address air quality will also help reduce the impact on vegetation. Because of the relatively small area to be cleared, the impact on vegetation is assessed by the proponent as minor within the project site and negligible within the local project area.

Commission Comment: Vegetation

Any project involving substantial amounts of vegetation clearing and moving heavy equipment has the potential to spread invasive species. It's important to make sure that equipment moved to the site does not bring with it seeds from invasive species. Equipment should be cleaned before being brought to the site to prevent spread of invasive species. Replanting and reseeding need to be carried out successfully to keep invasive species from spreading on the site.

7.10 Wildlife

Vegetation clearing, noise and light are the potential pathways for impact on wildlife. The proponent assessed the impact of the project on wildlife in the context of the larger regional project area, on the grounds that wildlife populations (such as deer) are not measurably affected if only a small number of individuals within a small area are affected. Nearby alternative habitat exists for wildlife displaced by clearing or noise within the project site. As well, the proponent states that the project site currently is sub-optimal wildlife habitat as a result of existing disturbances and fragmentation (such as agricultural fields, roads and quarries). Noise generated by the project has the potential to influence wildlife behaviour by making some species avoid the project site, but the proponent states that it is unlikely to have an effect in the larger regional project area because noise will not be substantial beyond the project site and the adjacent local project area. Light pollution from the well clusters and work areas is expected to influence wildlife behaviour by making some species avoid the project site. An increase in traffic resulting from the expected 35-45 employees, plus delivery and service vehicles, also has the potential for a minor increase in wildlife collisions.

To reduce impacts on wildlife, vegetation clearing will take place outside of the spring and summer months, to the extent possible, in order to avoid disturbing breeding birds. Fully shielded directional lighting fixtures are planned in order to focus light specifically on work areas and minimize light pollution. Measures discussed earlier regarding minimizing the impacts on vegetation are also expected to reduce impacts on wildlife.

7.10.1 Species of Conservation Concern

The project site has some areas of habitat that could support species of conservation concern. The proponent's assessment stated that there was a moderate to high probability of barn swallows (rated as threatened) residing in the project site, as the originally planned project site contained buildings, which are the preferred nest location for barn swallows. It is uncertain if the modified project site as designated in the January 2023 revised extraction plan contains buildings. Little brown bats (rated as endangered) were considered to have a moderate to high probability of occurring at the site, either for maternity roosting in tree cavities or foraging, though there are no caves at the site that could serve as hibernacula.

Eastern whip-poor-will, golden-winged warbler and red-headed woodpecker (all rated as threatened) were considered to have a low to moderate probability of occurring in the project site, as they have some suitable habitat within the site. The eastern whip-poor-will is a ground-nesting species that prefers semi-open forests or patchy forests that are regenerating from disturbance, while the golden-winged warbler prefers mature forest where canopy gaps create a patchy shrub layer. The red-headed woodpecker is associated with a variety of habitats, including forest edges, treed agricultural areas and pastures and in Canada its range is mostly in southern Manitoba and southern Ontario. The project site is located within an area that has been federally designated as critical habitat for the golden-winged warbler and red-headed woodpecker.

Some species of conservation concern that have little suitable nesting habitat at the site, such as the common nighthawk, short-eared owl and Canada warbler, were considered to have 10 to 20 per cent probability of being observed at the site.

Effects on species of conservation concern could be caused by vegetation clearing at the site, which is currently 51 per cent forested, predominantly trembling aspen, and by noise and light disturbance causing them to avoid the area.

Commission Comment: Species of Conservation Concern

Information used to determine the surface and wildlife impacts was based solely on desktop studies. No on-the-ground surveys were conducted to verify the published information. The proponent should conduct pre-disturbance surveys to determine the presence and distribution of flora and fauna in the area and identify critical habitats. In recognizing these habitats, every effort should be made to avoid their disturbance and connections to neighbouring habitats.

Chapter Eight:
Effects Assessment (Socio-economic)

8.1 Labour Force and Employment

The proponent estimates that 35 to 45 people will be employed in project activities such as site-clearing, well-drilling, extraction and assembly and relocation of project components such as the slurry line and water-treatment facilities. An additional estimate of 100 to 120 indirect jobs could be created to support the project's activities.

8.2 Infrastructure and Services

The proponent's EAP notes the potential for a minor increase in pressure on local emergency services (police, fire and ambulance) as a result of the potential for accidents on the site or as a result of travel to or from the site. Solid waste generated at the site will be transported by a licensed local contractor to a licensed local landfill. If there is more waste than a local landfill can handle, it will be transported to the Brady Road landfill in Winnipeg.

What We Heard: Infrastructure and Services

Some written and in-person presentations expressed concern that as the extraction area expands over time it will encroach upon the City of Winnipeg's aqueduct and Manitoba Hydro's Manitoba-Minnesota Transmission Line. A letter from the City of Winnipeg indicated that as of now the city has no concerns about the project, but would like to be consulted should the slurry line cross the aqueduct. Other presenters expressed the concern that if the project causes subsidence it could damage roads in the area. A representative of the Municipal Silica Sand Advisory Committee (MSSAC) expressed the concern that area roads could also be damaged by transportation of heavy equipment, including drilling rigs. The MSSAC representative also spoke of the potential for increasing pressure on emergency services in the community.

8.3 Land and Resource Use

Portions of the site being used by the project in any given year will not be available for other uses, though after work has moved on to another portion of the site, those areas may be available. Land within the project site is all privately owned and the proponent will negotiate access agreements with landowners.

What We Heard: Land and Resource Use

Several people who made written or in-person submissions expressed concern about the effects of the project on property values. Damage to wells, or fear of damage to wells, could lower property values near the site, as could the aesthetic impact of light, noise and vegetation clearing. Concerns were expressed about the impact of the project on insurance rates for landowners whose property is used by the project.

Several presenters stated that parts of the project site had been used recreationally for walking or cycling. Construction and operation of the project will eliminate this recreational use of the land.

8.4 Human Health

The proponent assessed human health effects resulting from increased traffic, dust and noise as negligible.

What We Heard: Human Health

During the public presentations at Anola and Beausejour, the panel heard several area residents express concern about the physical and mental health effects of dust, noise and traffic. Residents were concerned that the 24/7 nature of operations would destroy their sense of peace and quiet. Written presentations noted that the assessment of health effects did not consider the mental health effect of a major development generating noise, light and traffic. Residents also spoke of the noise and visual impact of the processing facility, which has already received an Environment Act licence and was not part of this review. Several presenters expressed concern about the presence of silica sand, noting that breathing tiny particles of silica can cause silicosis. While the proponent has said there will be no dry silica sand on site and has stated that sand extracted will be go directly into the slurry pipeline to be taken to the processing facility, presenters spoke of the fact that silica sand had been left on the site following test extractions.

Commission Comment: Human Health

If indeed all sand extracted is sent directly into the slurry pipeline, the risk posed by silica sand at the extraction site is expected to be minimal. However, as with many aspects of the project, that depends on everything going according to plan. If the project proceeds, extraction is likely to begin before the plant is operational. As a result, an interim plan is required to address the handling, storage and transportation of extracted materials in the short-term. Proper control of the site is required for environmental protection and health and safety of workers and residents.

It may be reasonable to expect that there may be some malfunctions or accidents that will result in sand being spilled or piled in the open. We heard little about planning for such malfunctions. Further details are required to ensure that mitigation measures are satisfactory to protect the environment and human health. Furthermore, the assurance that sand on the project site will be wet and contained does not refer to the processing facility, where the sand will be dried prior to being loaded in railcars. Since this related project was not discussed in the EAP or in the hearing process, there was no opportunity in this hearing to pursue questions about potential health impacts of the processing facility.

8.5 Indigenous and Treaty Rights

The proponent notes that the project site is entirely located on privately owned land, where access for uses such as hunting or foraging is only allowed with permission. A relatively small amount of wildlife habitat will be affected on the 633 hectares of the project site, which is currently 51 per cent forest land and 43 per cent agricultural land. As well, there are no permanent water bodies, so the project does not affect fish or fish habitat. Based on these points, the proponent says that the project has no effect on Indigenous and treaty rights.

8.6 Heritage Resources

The proponent committed to submit the modified project site boundaries to the Heritage Resources Branch for review. If areas of concern are identified, a qualified archaeologist will conduct a Heritage Resources Impact Assessment (HRIA). Given that nearly half of the project site is agricultural or developed land and that there are no permanent water bodies on the site, the site is not considered to have a high potential to contain heritage resources. Within the originally proposed project site, five areas of concern were identified by LiDAR, a kind of remote-sensing technology that employs lasers. These areas of concern were well-defined ridges, higher points or topographic anomalies. Such elevated features are considered to be potential travel pathways or resource extraction areas. An HRIA was carried out in these areas, consisting of an on-site visual inspection and shovel testing (excavating a pit 45 cm by 45 cm down to the subsoil at approximately 40 cm depth), and no archaeological artifacts were discovered. Twenty shovel tests were carried out.

8.7 Traffic

With 35 to 45 employees during construction and operation, the project is expected to cause a minor increase in traffic. In addition to regular commuting by employees, equipment deliveries and waste removal will cause periodic truck traffic. Workers accessing different well cluster locations will travel within the project site along PR 302 or along municipal road 42E. Depending on where employees live, commuting routes to the site will likely be on PTH 15, PTH 12 or PR 302. The proponent expects approximately 25 per cent of workers at the site will commute from each of Winnipeg and Steinbach. Others will come from smaller nearby communities such as Anola, Vivian, Beausejour, Ste Anne and Richer. Traffic is increasing in the area as the population of the Rural Municipality of Springfield and other RMs grows.

8.8 Aesthetics

The project is expected to have a minor adverse effect on aesthetics as a result of light, traffic and vegetation clearing. The proponent states that aesthetic impacts will be limited by minimizing clearing of vegetation to the extent possible and maintaining minimum setback distances around homes and communities. Unless otherwise indicated in a landowner agreement, statutory requirement or licence requirement, project components will have the following setbacks:

- 100 metres from a dwelling and the dwelling's drinking water well
- 100 metres from a hamlet
- 50 metres from a private property line
- 100 metres from any Manitoba Hydro utilities

The aesthetic impact of the processing facility was not discussed in the EAP, as it has been separately licensed.

What We Heard: Aesthetics

As with noise impacts, the aesthetic impact of the project was discussed by several presenters during the portions of the hearings set aside for public presentations in Steinbach, Anola and Beausejour. The possibility of light impacts, as a result of the 24/7 operation of the project, was raised by presenters. Removal of trees has the potential to increase aesthetic impacts by making project activities and equipment visible off site. The panel also heard references to aesthetic impacts of the sand-processing facility, including large storage buildings and sand stockpiles. The cumulative effect of growing development was brought up by many presenters and writers of submissions, who noted grain-handling and rail-siding developments, new housing developments and increased traffic as factors that were already having an aesthetic impact in the area.

8.9 Accidents and Malfunctions

A variety of materials expected to be at the project site have the potential for adverse environmental effects in the event of spills or malfunctions, including diesel fuel, lubricants, oils and hydraulic fluids. Such spills, depending on the type and quantity of substances, could affect air, surface water, groundwater and soils, resulting in effects on vegetation, aquatic resources and human health and safety. An accidental release of slurry or return water could occur as a result of a break or crack in the slurry or water return line.

Steps listed in the EAP to reduce the risk of spills and discharges include:

- using self-contained, above-ground storage tanks for diesel fuel
- using groundsheets and drip trays to catch all fluid during draining or pumping of oil or fuel and ensuring absorbent material is available, if needed
- safe handling and storage of waste oils, fuels and other hazardous materials in accordance with regulations
- notifying Manitoba Environment and Climate immediately if a reportable spill occurs
- inspecting storage sites regularly
- training of personnel on fuel- and chemical-handling and spills and stationing of spill kits for easy access by employees
- servicing and repair of equipment at the processing facility, where possible
- pre-shift inspections of vehicles and equipment and daily inspections of the slurry and water-return lines

The presence of fuel and other flammable material at the site creates the potential for fires and explosions, which could cause the release of environmentally harmful substances as well as causing harm to people and property. A number of fire-prevention steps are outlined in the EAP, including providing appropriate fire-prevention training and equipment; storing, transporting and disposing of flammable materials safely, in accordance with regulations; ensuring emergency communication equipment is available; and restricting smoking to designated areas.

Transportation accidents have the potential for environmental effects (in addition to effects on human health) if they result in spills of fuel, waste or other materials. The proponent notes that the use of a slurry pipeline to transport sand to the processing facility (where it will be loaded onto train cars) eliminates the need for truck transport of sand, reducing the risk of road accidents.

What We Heard: Accidents and Malfunctions

An expert witness for the Manitoba Eco Network and Our Line in the Sand (MBEN/OLS) spoke of the need to consider the probability of accidents and malfunctions on a large, multi-year project. Each of approximately 1,200 wells proposed in the four-year life of the project (as well as the thousands of additional wells planned for the full 24-year-life of the project) would create a potential pathway for contamination, in the event that hazardous materials are released onto the ground. A robust plan that anticipates worst-case scenarios is needed at the onset for such a project.

Commission Comment: Accidents and Malfunctions

The commission agrees that worst-case scenarios must be assessed to provide the greatest level of protection possible for the environment and human health. A risk assessment that considers probabilities and worst-case scenarios should be required. A larger view of the subject of "Accidents and Malfunctions" should address the possibility of and response to pipeline spills, failure of the water-treatment system, failure of well seals and other subjects. Further comments will be provided in the chapter related to the proponent's management and mitigation plans, along with recommendations for an overall plan provided in Chapter Twelve: Conclusions and Recommendations.

Chapter Nine:
Closure and Decommissioning

The proponent stated in the EAP that it would develop a series of plans after receiving an Environment Act licence. Matters to be incorporated into the Closure Plan would include:

- sealing and decommissioning of extraction wells and well-cluster sites
- removal and disposal of infrastructure (such as slurry and water-return lines, pumping stations and generators);
- removal of sand overs/fines (some to be used in well decommissioning)
- removal of surface and well-drilling equipment
- removal of propane, fuel and oil tanks
- testing and, where necessary, remediation of contaminated soils
- re-grading and contouring of previously disturbed areas
- revegetation of disturbed areas to restore the landscape to native conditions to the extent feasible

Grasses and forbs (flowering plants other than grasses and sedges) would be expected to grow on the site within the first few years of closure. Trees and shrubs would be expected to be evident within five to 10 years.

Chapter Ten:
Management and Mitigation Plans

10.1 Overview

Several plans affecting management of matters that could result in environmental impacts were discussed in the EAP and during the hearings. The EAP stated that the proponent planned to develop these plans during the construction, operation and decommissioning phases of the project. Key points that the plans would include were listed in the EAP, but the plans themselves were not present for detailed review. Drafts of three of these management plans – the Progressive Well Abandonment Plan, the Waste Characterization and Management Plan and the Groundwater Monitoring and Impact Mitigation Plan – were submitted in February 2023.

10.2 Waste Characterization and Management Plan

The focus of this plan will be the storage and disposal of waste from the mining process in a way that prevents environmental harm, such as metal leaching (ML) and acid rock drainage (ARD). The plan refers to waste from the mining process, such as drill cuttings and large objects (such as calcified sand concretions) extracted along with the sand. The plan will be developed under guidance from a geochemist and include rules for testing of waste for geochemical properties that could lead to metal leaching and acid rock drainage if exposed to air and water. Matters that the proponent expects to describe in detail in the plan include:

- a summary of the characteristics of each type of waste material to be extracted
- protocols for identifying, sampling, characterizing and managing waste
- definitions of appropriate end uses for each type of waste, in categories such as Potentially Acid Generating (PAG), Uncertain, Non-PAG, Metal Leaching (ML)
- descriptions of measures for mitigating ML/ARD and impacts on the environment
- descriptions of protocols for monitoring quality of surface water and groundwater to assess performance against the plan's objectives
- procedures for documenting and reporting information on matters such as soil quality, surface and groundwater quality, geochemical testing, volume of waste generated
- procedures for review and modification of the plan

A draft of this plan was submitted in February 2023. The draft describes the collection of samples of different kinds of waste rock, with greater amounts of sampling before extraction and in the early stages of operations. Before operations and in early stages, one sample will be taken for each 2,000 tonnes of Quaternary Sediments, one for each 700 tonnes of Red River Carbonate and one per 200 tonnes of Winnipeg Shale. During operations, planned sampling frequency is one per 5,000 tonnes for Quaternary Sediments, one per 2,000 tonnes of Red River Carbonate and one per 500 tonnes of Winnipeg Shale. Samples will be collected from well cuttings and from extraction-well clusters and bagged in amounts of two to three kilograms. Characterizing the samples according to potential for acid rock drainage and metal leaching is to be carried out under the supervision of a qualified professional. Any materials designated to have potential for acid generation or metal leaching, or designated as uncertain, are to be stored in a way that limits contact with water. If there is contact with water, the water is to be treated. Red River Carbonate and Winnipeg Shale are to be stored in covered bins or mobile tanks for hauling to a licensed landfill or waste disposal facility.

10.3 Water Management Plan

The proponent intends to develop a Water Management Plan that will describe use, monitoring and protection of water. The plan will provide a more detailed water balance, comparing how much water is extracted to the amount that is reinjected after treatment. Factors that influence how much water the project uses will be examined to establish the plan, including the ratio of solid to liquid in the slurry pipeline and the amount of water the pipelines require to operate. The plan will specify elements that require on-going monitoring, including pumping rates, groundwater use and reinjection rates. While this plan is primarily focused on monitoring of water quantity, the Groundwater Monitoring and Impact Mitigation Plan (discussed later in this chapter) includes measures for monitoring water quality.

Components of water monitoring under this plan will include:

- a groundwater and surface-water monitoring network of flow meters and water-level monitoring devices
- monitoring of water levels, pressures, stored quantity and flows during and after extraction operations
- assessment of the efficiency of groundwater return, based on volume of sand extracted
- inspections of water-management infrastructure, including that used in extraction, transport and storage
- monitoring of water to confirm the effective pumping rate from each extraction well and the resulting zone of influence on groundwater quantity around project operations
- mitigation measures to avoid or minimize impacts
- a framework for reporting

10.4 Progressive Well Abandonment Plan

The proponent intends to develop a plan for the abandonment of wells following extraction. Because the proponent plans to extract sand from each well for approximately five days, wells will be abandoned in stages while drilling and extraction is going on

elsewhere. The Progressive Well Abandonment Plan will describe how wells are closed to ensure protection of groundwater, with closure of wells consistent with industry standards and the requirements of The Groundwater and Water Well Act and its regulations and with the borehole abandonment requirements of The Mines and Minerals Act. Procedures to be used in abandoning wells will include:

- placement of a mechanical plug within the well casing, between the sandstone and limestone aquifers, to isolate movement of water
- placement of a bentonite (a kind of clay) plug above the mechanical plug
- placement of several feet of cement plug above the bentonite plug
- placement of layers of bentonite and pea gravel or a bentonite grout to 1.5 metres (described as five feet) below the surface
- a 1.5-metre cement cap at the top, with topsoil/organics placed above to allow for vegetation to grow
- detailed logs of each abandoned well, with GPS coordinates and the depth of each layer recorded

A draft of this plan was submitted by the proponent in February 2023. It lays out in more detail the steps to be taken to seal abandoned wells, including test wells, monitoring wells and extraction wells, and the time frame for sealing wells. Extraction wells and boreholes are to be sealed within one year of installation after they are no longer required for operations. Operational monitoring wells, which are intended to be used to monitor performance of operations, are to be sealed within one year of the end of sand extraction from nearby well clusters or following completion of post-extraction monitoring. Long-term monitoring wells are to be sealed following completion of post-extraction groundwater monitoring, which the proponent estimates will be five years or more after the end of extraction.

10.5 Groundwater Monitoring and Impact Mitigation Plan

This plan will include a framework for surveying existing domestic water wells and monitoring quantity and quality of groundwater during and after operations, as well as responding to complaints from well owners. It will establish parameters to be monitored, locations to be monitored and frequency of reporting. It will also develop mitigation measures, which may include setback distances, modification of extraction operations, lowering of pumps in affected wells or providing alternate water supply.

Monitoring components of the plan will include:

- establishing regional and local groundwater-monitoring well networks to monitor wells completed in the Quaternary Sediments, Red River Carbonate and Winnipeg Sandstone layers
- evaluating proposed project activities in advance to determine potential effects on water wells
- a survey of water wells within the zone of influence, including location, construction, condition, performance and water quality
- monitoring of the zone of influence of extraction wells and any impacts on quantity or quality of water
- mitigation measures to avoid or reduce any impacts

- provisions for developing monitoring reports
- a procedure for addressing concerns and complaints of well owners

A draft of this plan was submitted in February 2023. The proponent intends to invite well owners within the zone of influence (1,500 metres for wells in the sandstone aquifer, 800 metres for those in the carbonate aquifer) of project operations to take part in a water-well survey prior to operations. Monitoring wells are to be established in the Quaternary Sediments, Red River Carbonate and Winnipeg Sandstone aquifers in each section where extraction is to occur. At least one monitoring well is to be installed between extraction wells and any private water-supply wells. The draft lays out the frequency of monitoring in the various wells and the data to be collected in the monitoring wells. The draft plan also lays out a summary of groundwater sampling to be carried out before, during and after operations. Samples are to be analysed daily by an accredited laboratory for the following parameters: pH, specific conductivity, alkalinity, hardness, acidity, total suspended solids, nutrients, dissolved organic carbon, major anions, dissolved metals and total metals. The document lays out thresholds for mitigation action regarding quantity and quality of water.

10.6 Erosion and Sediment Control Plan

The purpose of this plan is to prevent or control erosion and control water on the project site so that sediment is not introduced into streams, ditches and low-lying areas. The proponent intends to apply measures to all aspects of the project, including clearing and construction, development and operation of wells and placement of the slurry pipeline. Management practices in this plan will include:

- modifying work when weather increases the risk of erosion and sedimentation and phasing the work to limit the exposure of soil to erosion
- maintaining existing vegetation as much as possible
- installing, inspecting and maintaining silt fences and other erosion-control devices
- replacing topsoil and restoring it to the original condition and stabilizing soil as soon as possible after construction
- maintaining natural drainage patterns as much as possible
- placing excess material from excavation in a location where it won't be a source of siltation to any wetland areas
- suppressing dust

10.7 Environmental Emergency Response Plan

The proponent intends to develop a plan for identifying and responding to environmental accidents and emergencies arising from equipment failure, human error or natural causes. This plan will also identify preventative measures and mitigation measures in the event of such accidents. Roles and responsibilities of employees, training requirements, communications and investigations of emergencies will be described in the plan, which will address emergencies including spills, fires, extreme weather, erosion emergencies and wildlife emergencies.

10.8 Revegetation Monitoring Plan

This plan will be developed to determine the success of revegetation and whether reseeding or replanting is required. If reseeding is required, it will be with a native seed mixture. The proponent plans to discuss with Manitoba Environment and Climate strategies for ensuring that revegetated areas can benefit species such as the golden-winged warbler.

10.9 Heritage Resources Protection Plan

As mentioned in 8.6 (Heritage Resources), the proponent will develop a plan to guide actions to be taken if heritage resources are found on the site. This will include stopping work, contacting the Historic Resources Branch and having an archaeologist record the discovery.

10.10 Closure Plan

This plan will outline rehabilitation, mitigation and monitoring activities during the closure phase of the project. Closure cost estimates and financial assurances are required in a closure plan.

What We Heard: Management and Mitigation Plans

Concerns were expressed that the management and mitigation plans lack sufficient detail to confirm that the proponent's practices will be capable of identifying and mitigating potential environmental impacts. Specifically, the plans do not indicate how the proponent would mitigate large-scale hydraulic connections between the carbonate and sandstone aquifers should those connections have a negative impact on groundwater. While the proponent indicated it intends to develop more detailed plans following project approval, the independent expert retained by the commission considered that an approach more suited to a project for which interactions with the environment are already well understood, such as a conventional mine. Regarding the plans for well closure, the expert noted that the proponent intends to apply techniques that are used to close conventional groundwater wells. However, such techniques will not avoid or repair the large breaches in the shale aquitard that are expected. Given that preventing aquifer mixing is the goal of some of Manitoba's well regulations, a preliminary opinion on the adequacy of the proponent's closure plans may be a necessary step before any authorization to proceed.

Representatives of the MSSAC raised the question of on-going community involvement in the project if it is licensed to proceed. Speaking as a representative of the MSSAC (a participant group representing several municipalities in the region), the mayor of the RM of Taché recommended that any approval of the Vivian Sand Extraction Project be conditional. He compared it to the way the RM's council approves requests from residents to keep chickens. After being approved to keep chickens, residents are required to return to council later, at which point council ensures that they haven't caused problems for neighbours. Noting that he has heard from residents who are against and in favour of the project, he recommended creation of a long-term monitoring committee, with representatives from neighbouring municipalities. Such a committee would help to protect residents' interests.

Many presenters raised concerns about the capacity of the proponent to respond to a worst-case scenario, in which aquifers are contaminated and nearby communities lose access to safe water. In both in-person and written submissions, members of the public expressed doubt that, in such a situation, the proponent would be able to provide a large number of people with clean water for as long as the aquifer remained contaminated. Several submissions referred to problems in other jurisdictions (including Alberta's "orphan well" problem) in which governments were left to clean up after a mining or oil company had left an area contaminated and then gone out of business.

Commission Comment: Management and Mitigation Plans

Although outlines of the various management plans were provided in the EAP, few details regarding concrete actions were available until late in the hearing process. The proponent argued that these plans are generally not compiled until a licence issued. In most cases, that is the process. Because of the unique nature of this project, though, it was difficult to determine if the identified effects would be appropriately mitigated without the ability to review more complete plans. The draft plans that were issued provided greater clarity regarding the mitigation measures the proponent intends to take, but without more details on each plan, many information gaps still remain.

The panel considers that reviewing drafts of each of these plans is an important part of assessing the environmental and health effects of the project, especially long-term effects. These plans should also be readily available to the public.

The commission recommends that drafts of each of the management plans be provided to the regulator and the public prior to the project proceeding. On-going monitoring and management of this project will require community involvement. A mechanism for such involvement is described in Chapter Twelve: Conclusions and Recommendations, which will also address needs for additional studies.

A closure plan is not required under The Environment Act for an environmental licence, but is required under The Mines and Minerals Act. Access to a draft closure plan (not including financial figures) would help in understanding potential long-term effects, but such a plan was not available for the panel to review.

Chapter Eleven:
Other Observations and Comments

Coming to an understanding of the proponent's proposals and the potential effects of the project on the environment was made more challenging for all parties as a result of certain process and other concerns.

11.1 Participant Assistance Program

One of the challenges was the lack of a Participant Assistance Program for these hearings. The Participant Assistance Regulation under The Environment Act allows for qualifying public organizations to access funds to help them make meaningful contributions in hearings of this nature. Typically, participants use these funds to engage legal counsel and experts with experience in the subject matter. There was no Participant Assistance Program funding made available for these hearings.

The commission retained experts to review the hydrogeological and geotechnical aspects of the EAP and to consider the EAP as a whole. The reports of the commission's experts were made available to the public in September 2022. However, hearing-process protocols limited the review to the evidence put before the commission, such as the work done by the proponent's consulting engineers and scientists. Participant groups, on the other hand, are able to bring other experts, studies and findings that may provide the hearings with different perspectives. Participant groups indicated that without participant assistance funding they were not able to canvass all the relevant issues and were restricted in the scope of their studies. Additional information of this sort might have been helpful to the commission panel.

11.2 Environmental Assessment Guidelines

For many years, through most of its reports, the commission has been encouraging the department to improve and clarify its environmental assessment guidance to proponents. Although a short guide is available for the preparation of an EAP, it is limited in topics and level of details and does not reflect current environmental assessment best practices. While all project proposals should be reviewed carefully, projects with a higher potential for negative impacts and significant consequences require more specific attention and rigorous review. The current project under review would have benefitted from greater involvement of the regulator early on. A review in tandem with Mines Branch could have addressed some of the geotechnical issues much earlier in the process. Guidance tailored to the project that indicated the

required types and depth of information needed to make an informed assessment of the environmental and health effects would have filled many of the information gaps that were found. This could have allowed for a more complete and efficient process, with the possibility of speeding up the review process.

Consideration should be given to upgrading the guidance document and including cumulative effects as one of the topics that needs to be covered in an EAP. Prospective applicants should also be advised that the guidelines provided are a starting point and that additional information may be required during the review process.

Applicants also bear some responsibility in providing the appropriate information so that the regulator can make an informed assessment. The guidelines are just that – guidelines – and represent the minimum that is required. Going beyond the minimum will provide the regulator with greater confidence in the mitigation of project effects on the environment and human health.

11.3 Financial Security

Another issue raised in the hearings was the question of a financial security, like that required for traditional mining projects. This is something outside of the commission's terms of reference for this hearing, but it is a question that was raised by many people in the community, who wanted assurance that the proponent, if issued a licence for this project, would provide a security to ensure it would be able to restore and secure the site after closure.

In the commission's recent review of environmental liabilities related to mining operations, it was clear that future unanticipated events have not been appropriately addressed in the past. The commission suggests that consideration be given to requiring a substantial security or possibly two securities – one for the known risks associated with decommissioning and a second substantial security to address potential significant failures in the future. These securities could be captured either in the scope of approvals under The Mines and Minerals Act or under The Environment Act.

11.4 Defining Aquifer Parameters

During this review, the panel was made aware of a number of studies of groundwater in southeastern Manitoba, conducted at different times for different purposes. Variations in boundaries and in numbers assigned to aquifer recharge in these studies made it difficult to assess the proponent's conclusions about the project's potential impact on the sustainability of the aquifer. Given the growing population in southeastern Manitoba that is dependent on groundwater and the potential future effects of climate change, an up-to-date assessment by government of aquifer sustainability would be helpful for assessing effects of this and future projects. The government should set the benchmarks for recharge and water use to be used in modelling the impacts of developments on groundwater.

Chapter Twelve:
Conclusions and Recommendations

The commission advises that significant conditions be required for the project to proceed. Our reasoning is that, despite the geotechnical, hydrogeological and environmental studies the proponent has carried out in preparing its Environment Act Proposal, the commission does not have sufficient confidence that the level of risk posed to an essential source of drinking water for the region has been adequately defined. This conclusion is based on the novel characteristics of this project, which uses a technology that has never been used for such a purpose; on limitations in the proponent's testing and modelling; and on the critical importance of maintaining the quality and security of aquifers that provide drinking water to thousands of residents in growing communities in southeastern Manitoba. If the project proceeds, moving in careful steps may provide important knowledge to prevent negative effects to the aquifers and other components of the environment. To some extent, the proponent is already planning for a stepped process, with a commitment to begin extraction using single-well or two-well clusters. The commission also advises that legal questions raised during the hearing must also be resolved before the project can proceed.

The commission considers that the mining approach proposed by Sio Silica does have merit if the risks posed to the quality of water in the affected aquifers can be better defined and the management of those risks can be adequately addressed.

The commission therefore recommends that:

1) The government seek a legal opinion with respect to sections 2(e) and 3(1) of the Well Standards Regulation under The Groundwater and Water Well Act and section 6(1) of the Drilling Regulation under The Mines and Minerals Act, regarding the interconnection between the Winnipeg Formation and any overlying aquifer, including aquifers within the Stonewall, Stony Mountain or Red River Formations.

2) If work on this project continues, it should be done on a step-wise basis to improve the level of confidence that no significant adverse effects will occur to impair the quality and quantity of water available from the affected aquifers. While the commission defers to the expertise of qualified professionals to design a detailed step-wise program, the following considerations should be taken into account:

i.) As a general principle, full-scale production should only proceed if and when the body of scientific and engineering evidence confirms that the

risks are adequately understood and manageable.

ii.) The proponent must add to the body of evidence relating to the possible heterogeneity of the geological structures in the production area so that the risks of subsidence and propagation and impact of extraction voids over time are defined to a higher level of confidence. This must include inclined drilling in order to determine if vertical fractures exist in the limestone that could affect the stability of the layer.

iii.) The proponent must carry out full-scale well-cluster extraction tests in order to provide information on the potential effects of extracting the planned 21,000 tonnes of sand from a single cluster. This should be completed from several clusters in different parts of the project area.

iv.) During extraction tests, cavities must be monitored to determine their likely long-term shape and size and establish whether they are likely to continue to grow over time. A representative number of cavities reflecting the potential variability of geological conditions should be monitored to indicate that the cavities have remained stable over time.

3) The minister appoint a project monitoring committee with membership from municipal and provincial government departments to receive and assess relevant information as the proponent undertakes step-wise development. This should include member(s) of the affected municipal government(s), senior leadership from Environment and Climate, and technical experts from the government related to mining, groundwater and environmental licensing and enforcement. The committee should be provided with additional resources and technical expertise as required. The guiding principles for the monitoring process should include:

i) sharing of scientific and engineering findings between the proponent and the monitoring committee;

ii) regular, defined reporting requirements by the proponent to the monitoring committee, and;

iii) regular, defined reporting jointly by the monitoring committee and the proponent to the public.

4) The proponent be required to complete the following detailed plans and distribute them for comment. In so doing, it is recognized that these plans may continually evolve on the basis of additional information, as it is available.

i) Waste Characterization and Management Plan

ii) Water Management Plan

iii) Progressive Well Abandonment Plan

iv) Groundwater Monitoring and Impact Mitigation Plan

v) Erosion and Sediment Control Plan

vi) Environmental Emergency Response Plan

vii) Revegetation Monitoring Plan

viii) Heritage Resource Protection Plan

ix) Trigger Action Response Plan(s)

x) Closure Plan

5) The proponent demonstrate the full-scale performance of water-treatment processes for the re-injection of the water that has been separated from the extracted sand.

6) Extraction be planned and operated in a manner that is compliant with the engineering limits suggested by the proponent's experts, required by the Manitoba government and/or as amended based on more data-gathering.

7) The proponent be required to carry out a risk assessment that considers the probability of worst-case scenarios (collapse of the limestone layer leading to sinkholes, failure of well-sealing) and the consequences of these scenarios and what the response would be to remediate such damage.

8) A cumulative effects assessment for the full 24-year life of the project be carried out and its impact be considered in light of other existing and foreseeable projects in the area.

Appendix A:
Terms of Reference
Clean Environment Commission
Hearings on Vivian Sand Extraction Project

MINISTER OF
CONSERVATION AND CLIMATE

Legislative Building
Winnipeg, Manitoba, CANADA
R3C 0V8

NOV 1 5 2021

Serge Scrafield
Chair
Clean Environment Commission
305-155 Carlton Street
Winnipeg MB R3C 3H8
Serge.Scrafield@gov.mb.ca

Dear Serge Scrafield:

In accordance with section 6(5) of The Environment Act, I hereby request the Clean Environment Commission (CEC) to conduct a public hearing regarding the proposed CanWhite Sands Corp. silica sand extraction project.

I am requesting that the CEC review process begin as soon as possible, and I have provided a review mandate and Terms of Reference to guide your exercise as enclosed. Additionally, I am requesting a final report with recommendations, including on licensing conditions, in accordance with section 7(3) of The Environment Act. The CEC may ask for clarification on this request at any time.

Please contact Laura Pyles, Acting Director, Environmental Approvals Branch, regarding information obtained through the environmental assessment process should you wish to discuss this request further.

Warm regards,

[redacted]

Sarah Guillemard
Minister

Enclosure

c. Laura Pyles

Terms of Reference

Clean Environment Commission Review of

CanWhite Sands Corp. Silica Sand Extraction Project Environment Act Proposal

Background

On July 23, 2021, CanWhite Sands Corp. submitted an Environment Act Proposal for the sequential installation, operation and decommissioning of silica sand extraction wells to remove water and silica sand from groundwater at various locations on private land within the R.M. of Springfield.

The water from the silica sand slurry brought to the surface from the wells would be separated from the sand on site, undergo UV treatment and returned down the wells. The separated silica sand would be transported to a previously proposed sand processing facility using a slurry transport line operating in a loop system. The proposal includes a comprehensive hydrogeology and geochemistry assessment report and independent third-party review.

During the public comment period, requests for a Clean Environment Commission hearing were made by members of the public. The Rural Municipality of Springfield formally requested a Clean Environment Commission Hearing and provided a certified Resolution of Council in that regard.

Mandate of the Review

In accordance with section 6(5) (a) and (b) of The Environment Act, the CEC, at the request of the Minister of Conservation and Climate, shall conduct a technical review and a public hearing to consider the potential environmental effects of the proposed CanWhite Sands silica sand extraction project.

The CEC shall conduct the hearing in general accordance with its *Process Guidelines Respecting Public Hearings*.

The CEC will provide advice and recommendations to the Minister in the form of a report pursuant to section 7(3) of The Environment Act and in accordance with the following terms of reference.

Terms of Reference

1. The CEC will conduct a technical review of the Environment Act proposal and the hydrogeology and geochemistry assessment report and provide advice and recommendations to the Minister regarding potential environmental and health effects of the proposed sequential installation, operation and decommissioning of silica sand extraction wells for the silica sand extraction project.

2. In providing advice and recommendations, the CEC will provide members of the public the opportunity for input regarding the CanWhite Sands silica sand extraction project proposal at a public hearing in a location consistent with the affected community.

The CEC review process should begin as soon as possible and be completed by March 15, 2022

Appendix B: Presenters

Arklie, C. Hugh	Private
Barkh, Mohsen	Recens Mine Water Consulting Services for Sio Silica Corp.
Bell, Tangi	Private
Belluk, Brent	Private
Benjamin, Marcel	Private
Boitson, Lorraine	Private
Boutin, Louis-Charles	Matrix Solutions Inc. for OLS/MBEN
Bullen, Brent	Sio Silica Corp.
Bundrock, Steve	Stantec for Sio Silica Corp.
Burland Ross, Siobhan	Manitoba Environment and Climate
Burnett, Madeline	Private
Clubb, Lindy	Private
Cole, Ted	Private
Deduke, Peter	Private
Dyck, Gary	Private
Eaglewoman, Medicine	The Bear Clan
Elemine, Cheibany Ould	AECOM for Sio Silica Corp.
Eshraghian, Arash	Stantec for Sio Silica Corp.
Fars, Emily	Private
Fuhl, Glen	Private

Galvin, Taylor	Private
Gawluk, Rusty	Private
Gerrard, Honourable Dr. Jon	Private
Gibson, Janine	Private
Gifford, Marlene	AECOM for Sio Silica Corp.
Hamill, Jocelyn	Private
Hollander, Hartmut	PorousTec for CEC
Harvey, Miln	AECOM for Sio Siica Corp.
Hughes, Nichola	Private
Klein-Sesser, Pauly	Private
Klos, Lily	Private
Langstaff, Pamela	Private
Leneveu, Dennis	Environmental Consultant
Mackling, Al	Private
Maize, Anessa	Private
Maluzynsky, Julian	Private
Mann, Jason	KGS for MSSAC
McLauchlin, Douglas	AECOM for Sio Silica Corp.
Mendela, Irene	Private
Meuzelaar, Tom	Life Cycle Geo, LLC for Sio Silica Corp.
Mills, Ryan	AECOM for Sio Silica Corp.
Mustard, Georgina	Private
Mustard, Kiara	Private
Mustard, Ryder	Private
Mustard, Wesley	Private

Mustard-Leonard, Rochelle	Private
Neufeld, Erin	Private
Novak, Maximillian	Private
Nylen , Janet	Private
Panchoo, Katelyn	Private
Poirier, Armand	Mayor, Regional Municipality of Tache for MSSAC
Ralke, Valerie	Private
Redekop, Doug	Private
Romaniuk, Gloria	Private
Samoiloff, Clifton	AECOM for Sio Silica Corp.
Schreyer, Honourable Ed	Private
Skillen, John	Private
Smith, J. Bert	KGS for MSSAC
Somji, Feisal	Sio Silica Corp.
Speer, Darryl	Private
Sutherland, Mike	Peguis First Nation
Symbol, Richard	Private
Therrien, Patrick	Private
Tymko, Cathy	Private
Walls, Shandy	Private
Whyte, Carolyn	Private
Weeden, Laura	Sio Silica Corp.
Wiatzkia, Gerd	ARCADIS for CEC
Wiens, Matthew	Private
Ziemski, Sue	Private

Appendix C:
Written Submissions Received

Adam, Jackie	Public
Albo, Kevin	Public
Allan, Garth	Public
Anania, Nicolas	Public
Anderson, Nan	Public
Ana, Darlene	Public
Appleby, Jim	Public
Araujo, Vanessa	Public
Arklie, C. Hugh	Public
Attas, Robin	Public
Bais, John	Public
Bauer, Leiah	Public
Bell, Acksanna	Public
Bell, Tangi	Our Line in the Sand
Bell, Tim	Public
Bennett, Brenda	Public
Berard, Kristin	Public
Billekop, Jody	Public

Blahitka, Travis	Public
Bohn, Lori	Public
Boonstra, Sandi	Public
Buelow, Wendy	Public
Brian, David	Public
Boiteau, Jared	Public
Borchasdtwa, Harold Rev.	Public
Broeska, Jonathan	Public
Broesky, Trevor	Public
Brolly, Janice	Public
Burbank, Pat	Public
Burau, Tatjana	Public
Burland, Elaine	Public
Byers, Craig and Jolene	Public
Cail, Virginia	Public
Campbell, Judith	Public
Carriere, Jerry	Public
Chan, Walter	Public
Cherry, Mark	Public
Cibula, Ralph	Public
Cook, Sandra	Public
Copp Catherine	Public
Copp, Joyce	Public
Cross, Abigail	Public
Culleton, James	Public

Darragh, Alden and Sally	Public
Decebal-Cruz, Alexander	Public
Degagne, Jeanette	Public
Deley, Chris	Public
Derksen, Risa	Public
Derraugh, Gillian	Public
Derraugh, Jayse	Public
Derraugh, Verne	Public
Dienstbier, Suzanne	Public
Dopheide, Kymberley	Public
Douglas, Lukas	Public
Doupe, Taomi	Public
Druzyk, Mavis	Public
Dube, Gerard	Public
Dudych, Darlene	Public
Dudych, Darlene and Julian	Public
Dugas, Jeanette	Public
Duma, Diane and Allen	Public
Duplak, Gail	Public
Eggett, Michael	Public
Erickson, Heather	Public
Eirikson, Alana-Dawn	Public
Eschenwecker, Ralph	Public
Evans, Nicole	Public
Everett, Grant	Public

Everett, Keena	Public
Fast, Tatianna	Public
Fefchak, John	Public
Fell, Lloyd	Public
Freynet, Carol	Public
Freynet, Chloe	Public
Freynet-Gagne, Kateri	Public
Friesen, Kaitlynn	Public
Fortin, Roland	Public
Funk, Steve	Public
Garrod, Helen	Public
Gavel, Aline	Public
Gavran, Claudia	Public
Gawrluk, Linda	Public
Gehrs, Paul	Public
Gerrard, Jon	Public
Gibson, Janine	Public
Giesbrecht, Edwin	Public
Ginter, Joel	Public
Graham, David	Public
Gretziner, Tannis	Public
Gruber, Brittany	Public
Guttormson, Garth	Public
Hajzler, Josef	Public
Hajzler, Mila	Public

Hajzler, Sita	Public
Hajzler, Teresa	Public
Hajzler, Tony	Public
Hanson, Marlene	Public
Hartle, Meagan	Public
Hartle, R	Public
Hartje, Ernst and Gail	Public
Harvey, Shirley	Public
Hayes, John	Public
Henderson, Derek	Public
Hiscott, Alex	Public
Hunter, Anna	Public
Ingram. Laine	Public
Innes, Janice	Public
Jackson, Linda	Public
Jaques, Susan	Public
Johnson, Brenda	Public
Johnson, Emily	Public
Jovel, Carlos A.	Public
Jovel, Dinorah	Public
Karman, L	Public
Kehler, Laura	Public
Kellett, Brent	Public
Ketola, Karra	Public
Kettner, Shawn	Public

Kister, Joe	Public
Klassen, Valerie	Public
Kociuk, Larry	Public
Kok, Bram	Public
Korortkov, Alex	Public
Kozakowaki, Shana	Public
Krasulja, Taylor	Public
Kroeker, Tim	Public
Krause, Doug	Public
Kulczycki, Brian	Public
Kulczyski, Carol	Public
Lalonde, Karen	Public
Langendo, Gail and Werner	Public
Langstaff, L	Public
Langstaff, Pamela	Public
Langstaff, Shawn	Public
Lapointe, Monique	Public
Laroque, Paul	Public
Latocki, Barbara	Public
Latocki, Nancy	Public
Lazarenko, Leah	Public
Lemoine, Eric	Public
Lenton, Sheila	Public
Lessard, Gilles	Public
Letain, Audry	Public

Lyons, Maureen	Public
MacDonald, Marilyn and Alan	Public
Maddaford, Colleen	Public
Maddaford, Thane	Public
Marchildon, Thierry	Public
Marcolete, Florence	Public
Marcoleta, Lianed	Public
Marcoleta, Lucien	Public
Marion-Akins, Margaret	Public
Mast, Meghan	Public
May, Sonya	Public
McClelland, Chelsea	Public
McCulloch, Tracey	Public
McGowan, Ian	Public
McGowan, Peter	Public
Mendelsohn, Phil	Public
Miller, Deanne	Public
Miller, Mark	Public
Miller, Susan	Public
Mueller, Sarah	Public
Mulock, Barbara	Public
Murray, Myrna	Public
Mustard. Hunter	Public
Mustard, Joshua	Public
Mustard, Lanigan	Public

Naayen, Druanne	Public
Nathaniel, Ernie	Public
Nathaniel, Kiara	Public
Nathaniel, Lynette	Public
Nelson, Jeff	Public
Newman, Cheryl	Public
Nylen, Janet	Public
Okoro, Samantha	Public
Orebanjo, May	Public
Papillon, Pierrette	Public
Payment, Jane	Public
Pinnell, Nancy	Public
Dr. Pip, Eva	Public
Plikett, Pierce	Public
Plischke, Jonathan	Public
Popoff, Amanda	Public
Pratt, Lois	Public
Pritchard, Angeline	Public
Ptak, Monica	Public
Putro, Donny	Public
Pytel, Monica	Public
Rempel, Eric	Public
Reyes, Jannica	Public
Richter, Andrea	Public
Roberts, Greg	Public

Rodrigues, Gabriele	Public
Romaniuk, Gloria	Public
Rosentreter, Hillary	Public
Roshka, Tamara	Public
Rosmus, Patricia	Public
S. Spen	Public
Salchert, Katharina	Public
Salinas, Evelio	Public
Scammell, Sean	Public
Schmidt, Jennifer	Public
Scott, Madi	Public
Sellen, Larry	Public
Sherlock, Carolyn	Public
Sherwood, Diane	Public
Shymko, Kelly and Deb	Public
Simmons, Barbara	Public
Simmons, Brad	Public
Singh, Koha	Public
Smith, Bert	Public
Smith, Jody	Public
Sontag, Ellen	Public
Sontag, Jerry	Public
Speer, Darryl	Public
Speers, Elizabeth	Public
Stanwick, Greg	Public

Stanwick, Roslyn	Public
Steinhilber, Christina and Herbert	Public
Sturbym Shaun	Public
Taras, Wayne	Public
Thornsteinson, Gerri	Public
Tibbetts, Jane	Public
Tinkler, Kara	Public
Tomiak, Sarah	Public
Wachniak, Doraine	Public
Walker, Ian	Public
Walls, Tom	Public
Wastle, Rick	Public
Wasylik, Judith	Public
Wasylishen, Penny	Public
Weiss, Alison	City of Winnipeg
Whyte, Carloyn	Public
Whyte, Derek	Public
Whyte, Kelly	Public
Wiebe, Jaclyn	Public
Wiens, Matthew	Public
Worden, Elizabeth	Public
Wood, Charles	Public
Young, Eric	Public
Zaharia, Jim	Public

Zalusky, Kim and Vince	Public
Ziemski, Sue	Public
Zurawasky, Andy	Public
Zurawasky, Tricia	Public

Manitoba Clean Environment Commission

Expert Report on the Sio Silica Proposed Vivian Silica Sand Project

Prepared for:

The Rural Municipality of Springfield, Manitoba

Prepared by:

_____

Christopher J. Neville, M.Sc., P.Eng.

S.S. PAPADOPULOS & ASSOCIATES, INC.
Waterloo, Ontario

January 12, 2023

Executive Summary

The Rural Municipality of Springfield (RM of Springfield) has retained Christopher J. Neville, M.Sc., P.Eng., to advise the municipality on the proposed groundwater aspects of the Vivian Silica Sand Project to be developed by Sio Silica (previously CanWhite Sands Corp.). Mr. Neville has reviewed the technical submissions presented in the report *Vivian Sand Extraction Project – Environmental Act Proposal* (AECOM, 2021a) and Appendix A of that report, *Hydrogeology and Geochemistry Assessment Report* (AECOM, 2021b). This expert report has been prepared to identify issues of potential concern for the groundwater resources of the RM of Springfield. These issues may be conveyed to the Manitoba Clean Environment Commission (CEC), which will advise the Province of Manitoba. The ultimate decision to approve the proposal, and the conditions that may be attached to that approval, rest with the Province.

There is much uncertainty regarding this proposal. Some of this uncertainty is related to the testing that has been conducted during the site investigations, some is related to the interpretations made of the data, and some is related to the approach that has been adopted to assess the potential impacts of mining. The material presented in the *Vivian Sand Extraction Project – Environmental Act Proposal* and the *Hydrogeology and Geochemistry Assessment Report* raises concerns that the site investigations have not adequately characterized the essential elements of the site and the potential impacts to groundwater resources in the RM of Springfield.

Creating a slurry of the Winnipeg Sandstone and extracting silica sand is expected to result in the development of horizontal arrays of “rooms and pillars” in the Winnipeg Sandstone. The proponent has referred to the loss of strength of the sandstone and has also referred to pilot testing that has been conducted. However, there is no indication of whether the loss of strength was assessed during the pilot testing. The proponent has indicated that “Some collapse of the overlying strata may occur but collapse is expected to be limited and not to spread to the surface.” It is not clear from the project documentation whether this is an assumption, or data have been collected and analyzed to support this expectation. In the absence of data, it may be safer to assume that the operations will result in a mass of loose sand with the potential for progressive, large-scale collapse of the overlying strata.

By any standard, the proposal project will require a large number of wells to be subsequently abandoned. The wells will extend across and may connect the otherwise isolated Red River Carbonate and Winnipeg Sandstone. Improperly abandoned wells may act as preferential pathways for the migration of surface contamination into deeper aquifers. The practices adopted for well abandonment will be of particular concern for this project. It is suggested on Page iv of the Executive Summary of the *Vivian Sand Extraction Project – Environmental Act Proposal* that well drill cuttings may be included in the materials used to seal wells. It is also suggested on Page vii that calcified sand (“overs”) may be used in well sealing activities. I caution against using drill cuttings and “overs” for this purpose. Wells should be sealed with bentonite and/or grout to surface to ensure that over the long term they can never act to connect the two aquifers. Furthermore, wells that are no longer in operation should be sealed in a continuous abandonment program rather than being left as open holes until groups of wells are abandoned.

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Section 1
Introduction

I am a professional engineer registered in the Province of Manitoba, #48048. I am the Chief Hydrogeologist of S.S. Papadopulos & Associates, Inc. (SSP&A), environmental and water-resource consultants. SSP&A operates under Engineers Geoscientists Manitoba Certificate of Authorization No. 7922. I was educated as a civil engineer and I have advanced training in the discipline of hydrogeology. I have over 30 years of professional experience. I am recognized internationally as an expert in the quantitative analysis of groundwater flow and solute transport. In my role of Chief Hydrogeologist and director of SSP&A's Canadian operations I synthesize hydrogeologic data, evaluate groundwater resources, and develop regional and site-scale analyses of groundwater flow and solute transport. My resumé is included as appendix to this report.

The Rural Municipality of Springfield (RM of Springfield) has retained me to advise the municipality on the proposed groundwater aspects of the Vivian Sand Project to be developed by Sio Silica (previously CanWhite Sands Corp.). My role consists of reviewing the technical submissions presented in the report *Vivian Sand Extraction Project – Environmental Act Proposal* (AECOM, 2021a) and Appendix A of that report, *Hydrogeology and Geochemistry Assessment Report* (AECOM, 2021b). My role as a hydrogeology peer reviewer involves identifying issues of potential concern for the RM of Springfield. These issues may be conveyed to the Manitoba Clean Environment Commission (CEC), which will advise the Province of Manitoba. The ultimate decision to approve the proposal, and the conditions that may be attached to that approval, rest with the Province.

My role as hydrogeology peer reviewer for the RM of Springfield has involved the following activities.

1. Supporting the RM of Springfield in its application for Participant Standing for the Clean Environment Commission Panel. The RM of Springfield was granted standing on October 12, 2022.

2. With the assistance of Mr. Mark Prydon, conversion of the requests for clarifications in my May 13, 2022 letter into Information Requests (IRs) in the format required by the Clean Environment Commission. A total of 18 IRs were submitted on November 16, 2022.

3. Preparation of a note summarizing my major concerns regarding the development on December 14, 2022. On December 21, 2022 I attended a virtual meeting with Council to discuss these concerns and respond to questions.

4. Preparation of this expert report.

Section 2
Overview of the major concerns related to the hydrogeologic aspects of the proposed Vivian Sand Extraction Project

The following elements are essential to the assessment of the potential impacts of any major proposal:

- Identification of the natural resources that are potentially affected;
- Prediction of the potential impacts to those resources;
- Evaluation of potential mitigation measures; and
- Evaluation of contingency measures in case the potential mitigation measures are either not feasible or not effective.

The proposed Vivian Sand Extraction Project is a major undertaking involving the fluidization and removal of a portion of the Winnipeg Sandstone aquifer with potential impacts to the overlying Red River Carbonate aquifer. It is indicated in the *Environmental Act Proposal* report that in the area of the Project Site, groundwater in the Red River Carbonate and Winnipeg Sandstone aquifers is used extensively to meet demands for a variety of water uses.[1] It is critical to ensure the groundwater supply is not negatively affected by project operations, and that the Red River Carbonate and Winnipeg Sandstone continue to meet the needs of the community.

It is clear from the reporting that a substantial effort has been involved in conducting the field investigations and developing and documenting the analyses of potential impacts. In my opinion the work has been conducted to a high technical standard. However, at the end of my review I was left two major concerns:

- That the impact assessment may not adequately address the impacts to the Winnipeg Sandstone and the Red River Carbonate aquifers; and
- The drilling and relatively rapid abandonment of a large number of wells may compromise the integrity of the Winnipeg Sandstone and Red River Carbonate aquifers and introduce preferential pathways for the vertical migration of contaminants into the aquifers

By design, the mining will locally alter the properties of the Winnipeg Sandstone. In particular, the Winnipeg Sandstone will made into a slurry that will be extracted. It is indicated that "the removal of sand will permanently increase the effective porosity and storativity of the Winnipeg Sandstone aquifer within the Project Site through the extraction of material and resulting creation of void space."[2] I anticipate that the hydraulic conductivity of the Winnipeg Sandstone will also change substantially, both due to an increase in its porosity and to the collapse of its structure. The analyses conducted for the assessment do not consider the potential effects of the changes in the properties of the Winnipeg Sandstone, either during mining or following the progression of mining around the site.

[1] AECOM, 2021a: *Environmental Act Proposal*, p. 36
[2] AECOM, 2021b: *Hydrogeology and Geochemistry Assessment Report*, Page 81

It is indicated on Page 75 of the *Hydrogeology and Geochemistry Assessment Report* that for the predictive scenarios one production well is specified at any one time, since production is occurring at one well cluster. However, by the time the wells in cluster 213 have been activated, the Winnipeg Sandstone will have been extensively disturbed by the fluidization and extraction of sand at the other clusters that have been operated in 2025. In my opinion, the assessment of potential impacts of the proposal does not address the cumulative impact of the removal of the sandstone.

It is not clear whether there are data that can support an assessment of the effects of changes in the sandstone properties. I am left with the concern that changes in the properties of the sandstone may invalidate the predictions of local and temporary changes in water levels. It is assumed that the drawdown effects associated with sand extraction are expected to be localized [3]. In my opinion, it is important to recognize that this assumes that the fluidized sandstone will eventually returns to its pre-mining condition and that mining does not lead to progressive, widespread collapse of the formation.

The Winnipeg Sandstone regional aquifer is protected by the overlying Winnipeg Shale. It is acknowledged in the assessment that mining may result in degradation of the shale and enhanced hydraulic connection between the Red River Carbonate and the Winnipeg Sandstone within the Project Area. It is indicated that degradation of the shale may occur due to fractures and borehole annuli extending across the Winnipeg Shale aquitard. After completing my review, I was left questioning whether any geotechnical analyses have been undertaken to rule out the possibility of widespread collapse of the shale due to its being undermined.

It is indicated that if the impacts of mining exceed expectations, pumps installed near the current elevation of the piezometric surface can be lowered, or alternative water supplies could be provided. There is no analysis to suggest that these mitigation measures might be feasible and whether the provision of alternative water supplies is an acceptable mitigation measure.

I have never encountered a project with as many production wells proposed to be drilled, operated and abandoned. I estimate from the information on the preliminary design that has been provided that almost 400 wells are planned to be abandoned during each year of operation:

$$56\ \frac{clusters}{year} \times 7\ \frac{wells}{cluster} = \ 392\ \frac{wells}{year}$$

By any standard this is a large number of wells that will have to be abandoned. The wells will extend across and may connect the otherwise isolated Red River Carbonate and Winnipeg Sandstone. Improperly abandoned wells may act as preferential pathways for the migration of surface contamination into deeper aquifers. The practices adopted for well abandonment will be of particular concern for this project. Furthermore, the proponent must commit to initiate abandonment procedures immediately following the end of operations at each well, rather than waiting until operations have ceased at a large number of wells.

[3] AECOM, 2021b: *Hydrogeology and Geochemistry Assessment Report*, p. 67

Section 3
Major comments regarding the hydrogeologic aspects of the proposed Vivian Sand Extraction Project

1. It is indicated at the beginning of Section 4.1.4 of the *Environmental Act Proposal* report that groundwater in the vicinity of the Project is obtained from Red River Carbonate Formation and the Winnipeg Sandstone Formation. Referring to Page 16 Figure 1-3 of the *Hydrogeology and Geochemistry Assessment Report*, there are relatively large numbers of existing groundwater users in the Quaternary Sediments, the Red River Carbonate and the Winnipeg Sandstone in the Regional Project Area:

   - Number of registered wells within the limits of the groundwater flow model: 10,879;
   - Number of registered wells within the Regional Project Area: 1,612; and
   - Number of registered wells within the Local Project Area: 406.

   In response to RM of Springfield Information Request RMSF-IR-001(a), the proponent has indicated that within the Project Site Area there are an estimated 19 wells completed in the Winnipeg Sandstone aquifer, 62 wells completed in the Red River Carbonate aquifer and 5 wells completed in the overburden aquifer.

   Referring to Figure 1-3 of the of the *Hydrogeology and Geochemistry Assessment Report*, there also appear to be 17 existing users in the Winnipeg Shale within the Regional Project Area. In response to RM of Springfield Information Request RMSF-IR-001(b), the proponent confirmed that it is unlikely that groundwater users rely on the Winnipeg Shale for supply. The proponent's reply highlighted the uncertainties associated with the well database.

   > *Screen intervals were not available for all wells. Further, well databases are known to contain information that may not be accurate or is out of date. It is possible that some wells were incorrectly assigned to the Winnipeg Shale, but that cannot be verified without detailed information on screen intervals, well yield and geology in some cases. This is a known uncertainty associated with work completed to date and is best addressed by completing site-specific well surveys in advance of any groundwater or sand extraction activities.*

   At a minimum, the proponent will need to conduct a detailed survey of neighboring wells to confirm the locations and details of the open intervals and the non-pumping levels in the wells within the Project Site Area.

2. It is indicated on Page 7 of the of the *Hydrogeology and Geochemistry Assessment Report* that the waste materials (calcified sand, bedrock cuttings and shale) "have been deposited on ground surface during the advancement of nearly every water supply well drilled in southern Manitoba for over a century without any reported water quality issues linked to ML/ARD [metal leaching/acid rock drainage]". While this may be true, it is important to note that the number of wells that are proposed to be drilled over a relatively small area is unprecedented.

3. It is indicated on Page 22 of the of the *Hydrogeology and Geochemistry Assessment Report* that water extracted from the slurry will be passed through an ultraviolet treatment system prior to being re-injected into the Winnipeg Sandstone. In my experience, ultraviolet treatment is effective only if the water is filtered prior to passing through the UV lamps. In response to RM of Springfield Information Request RMSF-IR-002(a), the proponent has confirmed that filtration will be included in the treatment system. In response to RM of Springfield Information Request RMSF-IR-002(b), the proponent has committed to appropriate handling of the materials collected from the filtration system.

4. It is indicated on Page 67 of the *Environmental Act Proposal* report that the effects of mining are reversible (i.e., the aquifer will recharge over time). In my opinion, the indication that the that the effects of mining will be reversible is only an *assumption*. There are no data to assess whether the assumption of reversibility depends on the properties of the Winnipeg Sandstone and the overlying shale. The changes to these wells will <u>not</u> be reversible. In response to RM of Springfield Information Request RMSF-IR-003(a), the proponent has indicated that:

   The sensitivity of modelling results and recovery to the properties of the fine-grained materials that overlie the Red River Carbonate was not directly evaluated.

   In response to RM of Springfield Information Request RMSF-IR-003(a), the proponents indicate, "The influence of variable hydraulic conductivity of the shale on recovery rates could be further evaluated as part of future modelling updates." It is important to note that the assessment of the properties of the shale must go well beyond the sensitivity of modelling results. The proponent would have to commit to detailed monitoring of each hydrostratigraphic unit and evaluation of the data during operations.

   The proponent indicates that groundwater flow conditions in the Red River Carbonate aquifer and the Winnipeg Formation are likely to recover relatively quickly following mining: *Both aquifers are relatively permeable and connected to a known significant source of recharge below the Sandilands Glaciofluvial Complex* (response to RM of Springfield Information Request RMSF-IR-003(b)). However, the proponent has noted that, "*The sensitivity of the predicted recoveries in the Red River Carbonate Formation and the Winnipeg Formation to recharge in areas where the aquifers are in direct contact with coarse-grained sediments at surface was not directly evaluated.*" In my opinion, the recovery of the aquifer system to mining is an important uncertainty of the proposal.

5. It is indicated on Page 24 of the *Hydrogeology and Geochemistry Assessment Report* that the field investigation was focused on characterizing the hydrogeology of the Local Project Area. Referring to Figure 1-4 and Figure 3-1 of the report, it is important to note that the characterization is actually limited to a small portion of the Local Project Area. Only two wells, Bru 121 and Bru-146 were installed beyond the limits of the yellow rectangle shown in Figure 3-1.

6. It is difficult to draw any general conclusions regarding the potential long-term effects of mining from the available data. The site characterization included a constant-rate test with pumping from a single well at a rate of 372 USgpm for 3 days. In contrast, referring to Figures 6-7 and 6-8 of the *Hydrogeology and Geochemistry Assessment Report*, during each year of operation there will be continuous pumping from an array of 7 wells at a combined rate of 550 USgpm for about 210 days (the arrays will move around during this time). Applying the results of the pumping test to the overall impact assessment therefore necessarily involves a large degree of extrapolation. Referring to the pumping test analysis files included in Appendix E.2 of the *Hydrogeology and Geochemistry Assessment Report*, while water levels in the test pumping well (Bru 95-7) appeared to stabilize, water levels in the observation wells in the Winnipeg Sandstone were continuing to decline at the end of the pumping test. From the available data it is not possible to infer the likely magnitudes of the long-term changes in groundwater levels that would be observed during operations.

Section 4
Detailed comments regarding the assessment of potential groundwater impacts of the proposed Vivian Sand Extraction Project

4.1 References for the *Hydrogeology and Geochemistry Assessment Report*

1. The references in the *Hydrogeology and Geochemistry Assessment Report* are incomplete. Some, but not all, of the missing references are included in Section 10 of the *Environmental Act Proposal* (AECOM, 2021a). No references are provided for the following documents cited in the *Hydrogeology and Geochemistry Assessment Report* (AECOM, 2021b).

   - Matile and Keller (2004)
   - Teller and Fenton (1980)
   - Peltier (1994)
   - Betcher (1986)
   - Ferguson (2004)
   - Matile and Keller (2011)
   - Simpson et al. (1987)
   - Cherry (2000)
   - Friesen (2015)
   - Johnston (1934)
   - Charron (1965)

4.2 Details on proposed project operations

2. A mining plan for the first five years of operations is presented in Figure 6-5 of the *Hydrogeology and Geochemistry Assessment Report*. Referring to the excerpt from this figure shown here in Figure 1, each blue dot represents a cluster of 7 wells that will be drilled, operated and abandoned during 2025. The corresponding schedule of pumping is shown in Figure 6-7 of the report. During each year, pumping will shift from one cluster to the next (for example, from Cluster 213 to Cluster 214).

   In response to RMSF-IR-004, the proponent clarified the pumping rates assumed in the impact assessment. Each well in the cluster is planned to be operated for approximately 4 days at a variable rate ranging from 262 m^3/day to 654 m^3/day (48 to 120 USgpm). If all 7 wells in a cluster were operating continuously this would correspond to 1,834 m^3/day to 4,578 m^3/day (336 to 840 USgpm). It is indicated in the response that the overall average combined production rate is expected to be 2,943 m^3/day. For the predictive simulations, during each year's simulated operating period the cumulative pumping is assumed to be 2,998 m^3/day (540 USgpm), slightly higher than the expected average. The cumulative pumping of 2,998 m^3/day corresponds to 550 USgpm, which is the rate assumed in the impact assessment, as indicated in Figure 6-7 of the *Hydrogeology and Geochemistry Assessment Report*.

3. The responses to RMSF-IR-005 clarify that there may be extraction pumping at the same time as treated pumped water is re-injected at wells in the same cluster. The *net* groundwater withdrawals may therefore vary from 100% to some smaller fraction of the 550 USgpm, depending on the rate at which water is re-injected.

4. It is indicated on Page 22 of the *Hydrogeology and Geochemistry Assessment Report* that extraction wells within each cluster will be located "approximately 22 m apart". This is not consistent with the conceptual layout shown in Figure 2-B (see Figure 1 below), which suggests that the wells will be spaced 18 m apart. In response to RMSF-IR-006, the proponent has indicated that the text in Section 2.3 and Figure 2-B of the *Hydrogeology and Geochemistry Assessment Report* should have reflected a well spacing of 18 m.

   The proponent has also indicated in the response to RMSF-IR-006 that "new efficiencies have been realized" that may allow for an increase in the distance between wells to produce the same amount of sand. It is my understanding that these efficiencies are inferred from updated geotechnical analyses, but they may also have been inferred from pilot testing referred to the response to RMSF-IR-005. The critical factor controlling the spacing between wells will be the stability of the rock that overlies the Winnipeg Sandstone. This implies that the geotechnical investigations and analyses will have a critical bearing on the final design of the project.

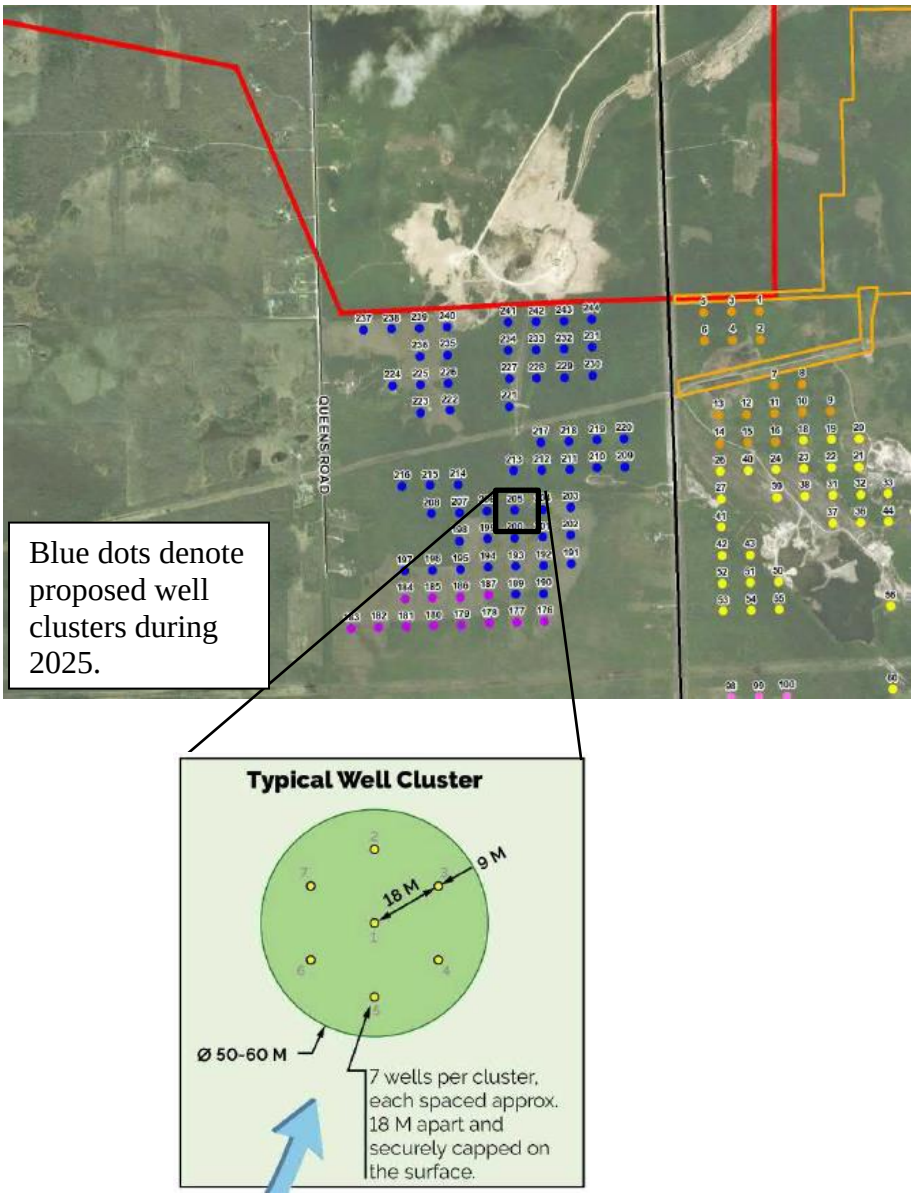

Figure 1. Concept for the proposed well layout during operations

5. It is indicated on Page 19 of the *Hydrogeology and Geochemistry Assessment Report* that the proponent proposes to extract Winnipeg Sandstone from an approximate depth of 51 m to 76 m. However, the conceptual illustration in Figure A-2 suggests that the Winnipeg Shale lies at a depth of 51 m to 54 m. In RMSF-IR-007 it was asked whether the extraction depth of the sandstone should be at least 54 m. The proponent has provided a detailed response to RMSF-IR-007, explaining that the elevations shown in Figure 2-A referred to only one well at a specific location and were included only for illustration purposes.

   The sedimentary rocks dip to the west. Based on the available logs for water wells, the interpreted elevations of the top of the Winnipeg Sandstone range from 240 masl to 180 masl across the Project Site Area and the elevations of the base of the Winnipeg Sandstone range from 200 masl to 160 masl. The response to RMSF-IR-007 (b) refers to the estimated depth to the top of the Winnipeg Sandstone indicated in the response to RMSF-IR-007 (a). However, only the elevations of the top and bottom of the Winnipeg Sandstone are indicated in the response, not the depth to the top of the unit. Estimating a ground surface elevation of about 290 masl from Figure 5-1, the estimated depths to the top of the Winnipeg Sandstone range from 50 m to 110 m.

6. It is indicated on Page vi of the *Environmental Act Proposal* that through 2025, "approximately" 0.18% of the silica sand resource will removed and that over the full 24-year lifespan of the project "approximately" 1.06% of the silica sand will be removed. In the response to RMSF IR-008, the proponent has provided the basis for the values. Since these calculations are not developed elsewhere in the documentation, the values are checked here.

   - Sio Silica has been granted mineral claims over an area that was estimated in 2019 to contain 3,202 Mt of sand-in-place. The proponent has proposed extracting 5,628,000 tonnes of sand over the initial 4 years of operation.

$$\frac{5{,}628{,}000 \text{ tonnes}}{3{,}202 \text{ Mt}\left|\frac{1{,}000{,}000 \text{ tonnes}}{\text{Mt}}\right|} \times 100 = 0.18\% \surd$$

   - Sio Silica has proposed extracting 1,360,000 tonnes of sand per year for 24 years. This corresponds to a total extraction of 32,640,000 tonnes.

$$\frac{32{,}640{,}000 \text{ tonnes}}{3{,}202 \text{ Mt}\left|\frac{1{,}000{,}000 \text{ tonnes}}{\text{Mt}}\right|} \times 100 = 1.02\% \surd$$

4.3 Site characterization

7. As part of the site investigation, a constant-rate pumping test was conducted at well Bru 95-7, which is open across the Winnipeg Sandstone. As shown in Figure 1-4 and Figure 3-1 of the *Hydrogeology and Geochemistry Assessment Report* and here in Figure 2, a relatively large number of domestic wells in the vicinity of Bru 95-7 were identified from the Manitoba provincial database. In the response to RMSF-IR-011 it is confirmed that only three of these wells were monitored during the pumping test, Obs 23901, Obs 66124 and Obs S1. Obs 23901 and Obs 66124 are open across the Red River Carbonate Formation and are located 660 m and 491 m from the pumping well, respectively.

   Only Obs S1 is open across the same formation as the pumping well and it is located 960 m from the pumping well. It is indicated in the response to RMSF-IR-011 that well Obs S1 is a geoexchange well. The yellow dots in Figure 2 denote the locations of wells indicated the water well database as being open across the Winnipeg Sandstone. It is not indicated in the report whether Obs S1 was the nearest accessible domestic well in the Winnipeg Sandstone.

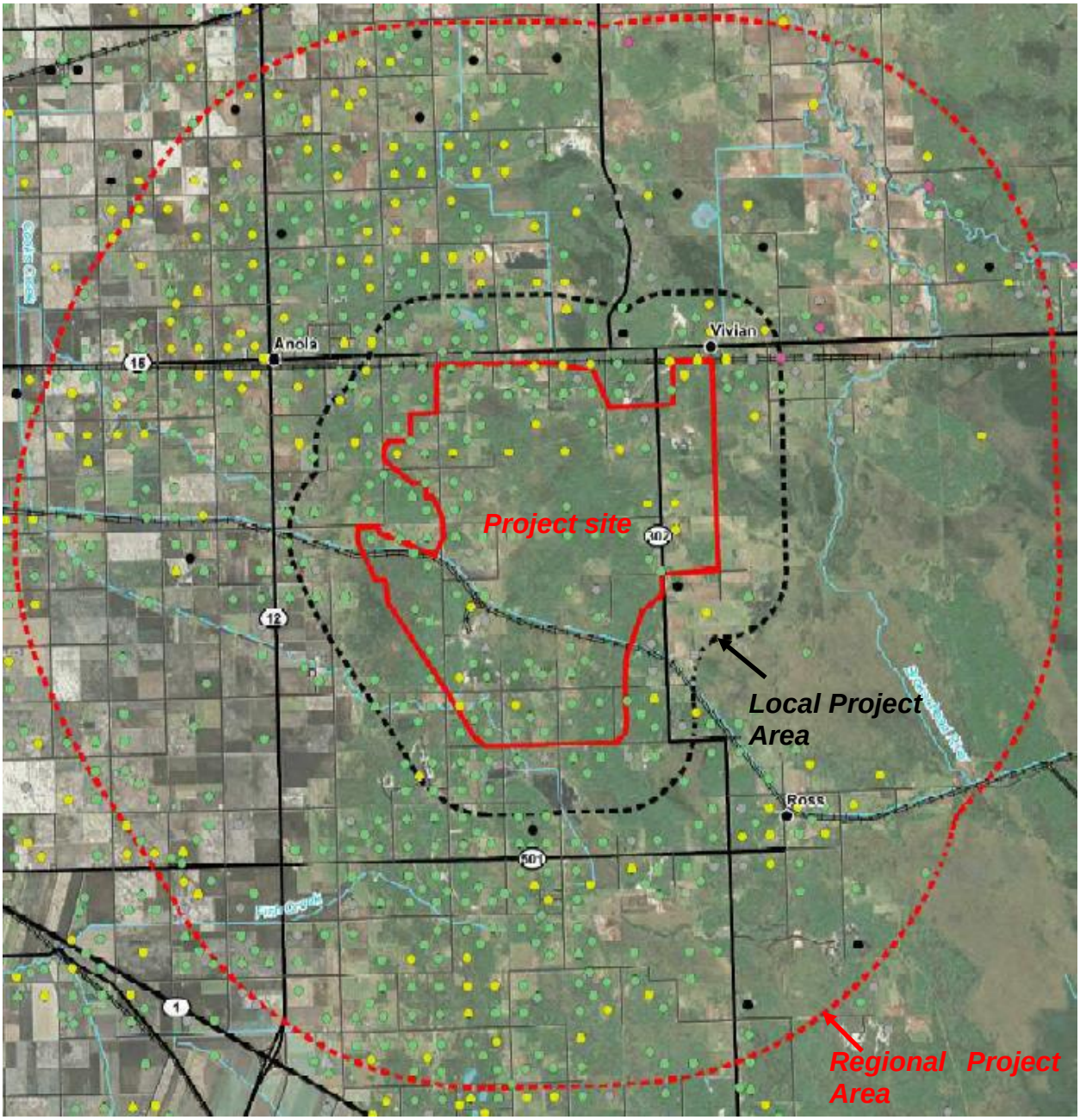

Figure 2. Map of existing groundwater users, colour-coded by aquifer
(Excerpt from AECOM, 2021b, Figure 1-3)

8. Although it is indicated on Page 29 of the *Hydrogeology and Geochemistry Assessment Report* that a step test was conducted at the pumping well Bru 95-7 prior to the constant-rate pumping test, no data or analyses are reported. It is indicated that "Evaluating the hydraulic efficiency of the pumping well was not part of the scope of work." It is unfortunate that the data from the step test were not analyzed. In my experience, distance-drawdown analyses provide the most reliable estimates of the bulk-average transmissivity. As shown in the distance-drawdown plot reproduced from Appendix E shown here in Figure 3, the data from only three observation wells were considered in the proponent's estimation of the representative bulk-average transmissivity of the Winnipeg Sandstone. This is important here because the transmissivity of the Winnipeg Sandstone is the key parameter for the prediction of the propagation of the effects of pumping.

9. The data from step drawdown tests can frequently be used to identify additional well losses so that the drawdowns from the pumping well can be treated as if the well was another observation well. The data from the step test may have provided valuable insights explaining the relatively low efficiency of the pumping well (the observed drawdown at the end of pumping of about 32.5 m is about double that inferred from the distance-drawdown analysis).

   It is suggested on Page 31 of the *Hydrogeology and Geochemistry Assessment Report* that the "excess drawdown" in the pumping well was due primarily to residual drilling mud in the sand pack and surrounding formation. This does not appear to be consistent with the text on Page 26 of the report, which indicates that an extensive development effort was undertaken prior to conducting the constant-rate pumping test.

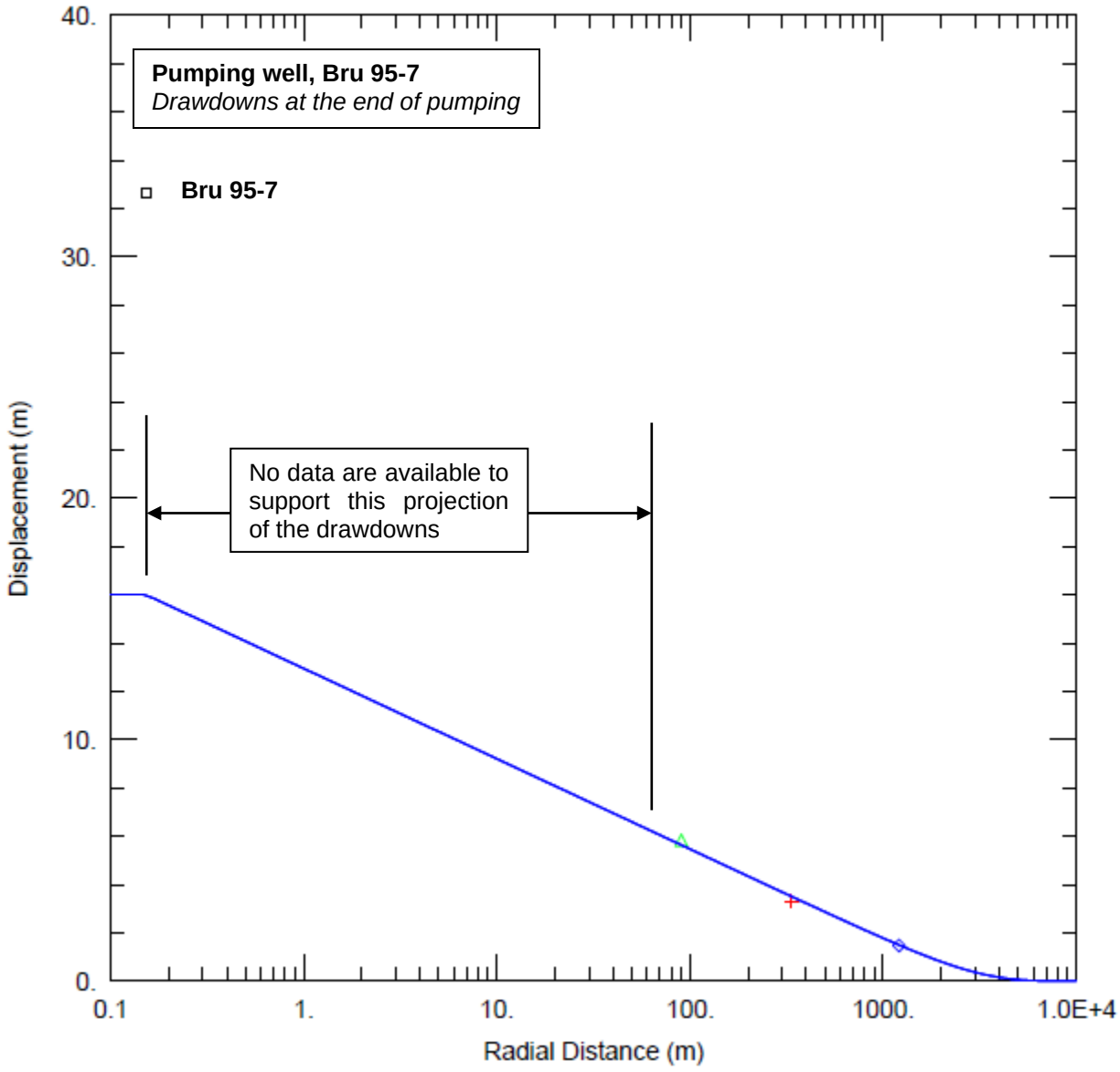

Figure 3. Distance-drawdown analysis for Bru 95-7 pumping test
Adapted from AECOM (2021; Appendix E.2)

10. The analytical models used to match the observations from the Bru 95-7 pumping test are the based on the Theis (1935) model of an ideal confined aquifer. Among the most important assumptions of the Theis solution is that the aquifer is homogeneous. Some of the results of the analyses listed on Table 3-C of the *Hydrogeology and Geochemistry Assessment Report* are consistent with this assumption, while others are not. The transmissivities estimated from matching the observation well drawdowns with the Theis solution and the Cooper and Jacob (1946) straight-line analysis are consistent, as they should be when applied in a consistent manner. In contrast, the matching of the pumping well drawdowns with the Theis solution yields a transmissivity that is about half of the value estimated for the observation wells. The transmissivity estimated by matching the observed pumping well drawdowns with the Theis (1935) solution is not reliable here, as the analysis is affected by additional well losses. As shown in Figure 4 here, the Cooper-Jacob analysis effectively filters the additional well losses and the transmissivity estimated for the pumping well is consistent with the observation wells.

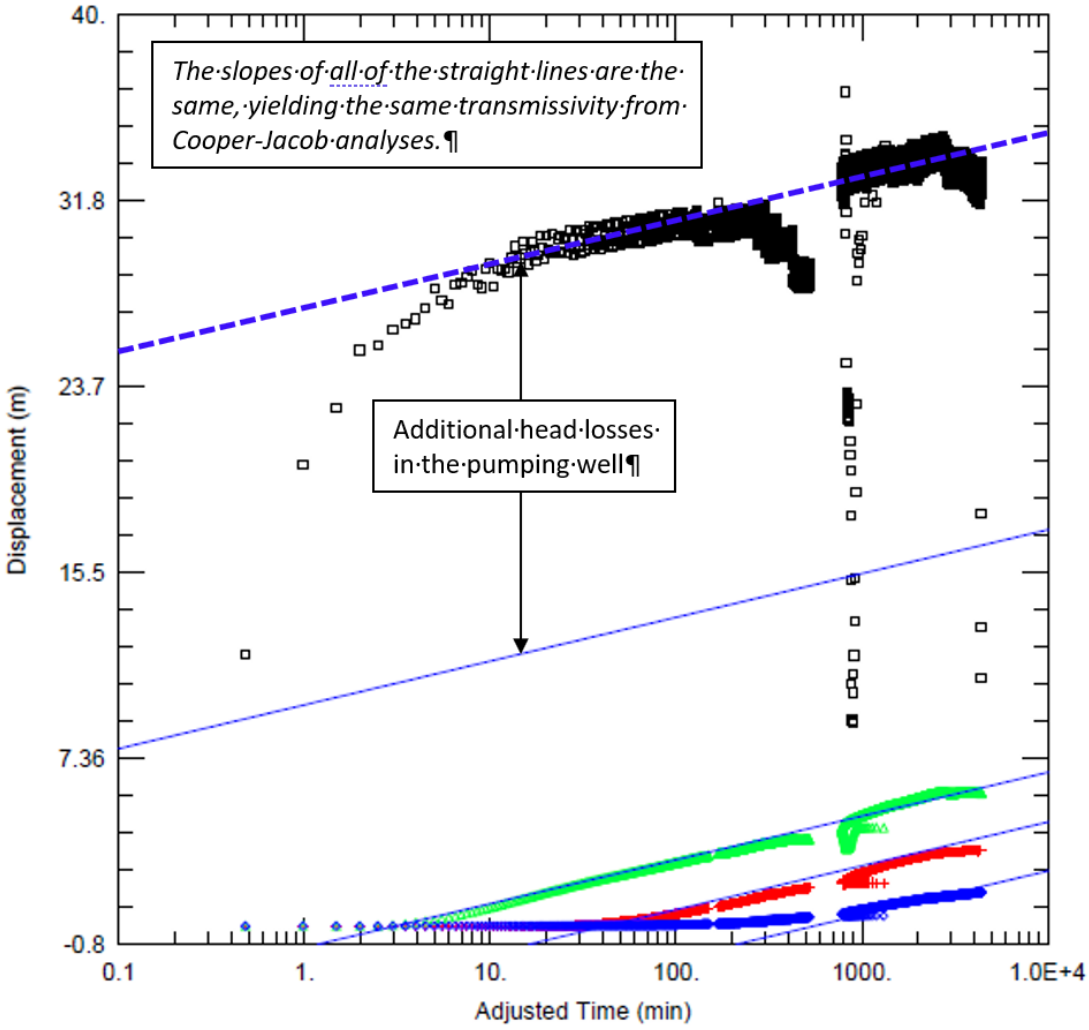

Figure 4 Inference of additional well losses in Bru 95-7
Adapted from AECOM (2021; Appendix E.2)

11. The responses observed following the end of pumping are complex. In an ideal confined aquifer, the recovery data for the pumping well and observation wells should eventually approximate a single straight line that approaches the asymptotic value of zero residual drawdown as *t/t'* approaches a value of 1.0 (indicated by the red circle in Figure 5). The data satisfy neither of these conditions. The fact that the recovery records approach values of zero drawdown for values of *t/t'* of about 9, 20 and 25 rather than 1.0 suggests that the drawdown cone at the end of pumping is replenished by a source of water in addition to confined storage.

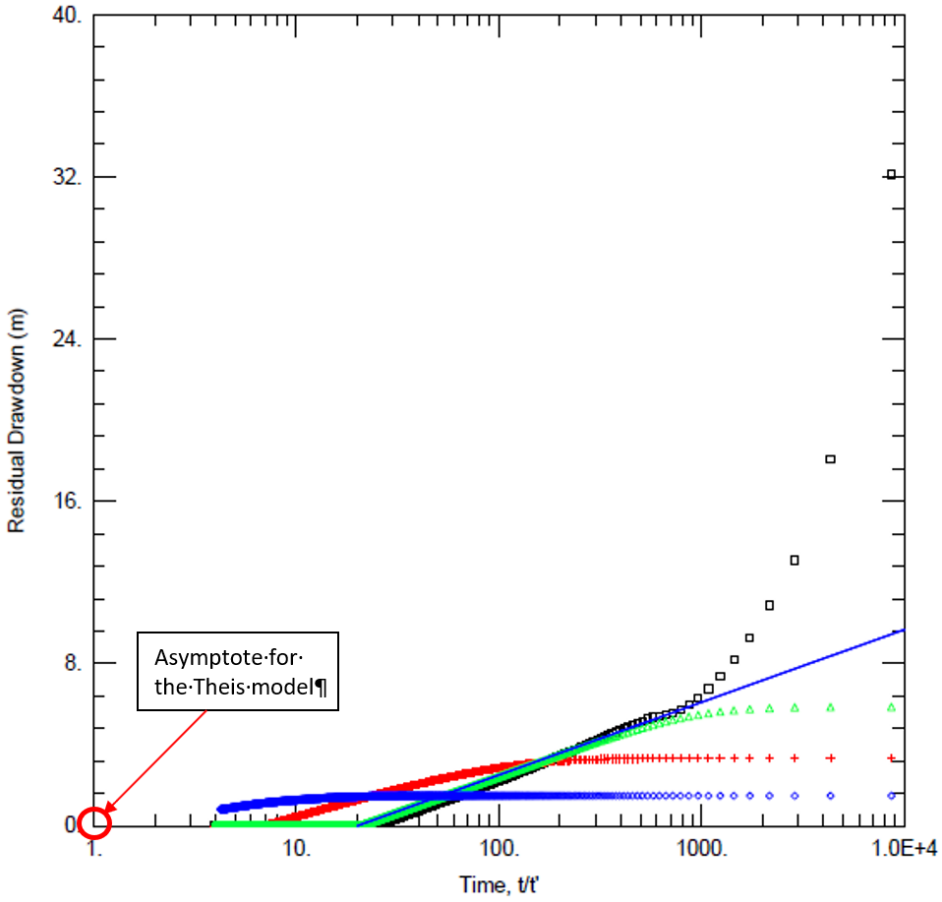

Figure 5. Recovery analysis for the Bru 95-7 pumping test
Adapted from AECOM (2021; Appendix E.2)

12. The additional source of water that is inferred from the recovery portion of the pumping test may be leakage across the Winnipeg Shale. A drawdown of 2.8 m was observed at the vibrating wire piezometer in the shale (Bru 95-8 VW3). Drawdowns in the Red River Carbonate Formation were observed during the pumping test. Variable, but detectible, drawdowns (s) at the end of the pumping test are estimated from the hydrographs.

    - Bru 96-2: s = 0.18 m
    - Bru 95-5: s = 0.4 m
    - Bru 95-8 (VW2): s = 1.2 m
    - Bru 95-8 (VW1): s = 0.3 m

    The properties of the Winnipeg Shale are important with respect to the assessment, as this unit controls the hydraulic connection between the Winnipeg Sandstone and the Red River Carbonate. The report provides conflicting assessments of the Winnipeg Shale. It is indicated on page 32 of the report that in the area of proposed operations the Winnipeg Shale is "an effective hydraulic barrier to interaction" between the Winnipeg Sandstone and the Red River Carbonate. However, it is indicated on Page 60 of the *Hydrogeology and Geochemistry Assessment Report* that the shale "is not well understood" and that its thickness is variable, ranging in thickness from 1 m to 24 m (citing Stantec, 2019). Only one slug test was conducted in the Winnipeg shale (Bru 95-9) and the vertical hydraulic gradients reported on Page 32 of the *Hydrogeology and Geochemistry Assessment Report* are based on only one monitoring located in the shale (Bru 95-8 VW3). In my opinion, there is limited evidence to support the conclusion that the shale is an effective hydraulic barrier between the sandstone and the shale.

13. The interpretations of the vertical hydraulic gradients and directions of vertical groundwater flow on Pages 64-65 of the *Hydrogeology and Geochemistry Assessment Report* are consistent with the values reported on Table 5-B. However, they are not consistent with the sign convention for the gradient adopted in Figures 5-12 to 5-14.

    <u>G05SA003 – G050SA013 [G05SA013] (Figure 5-12)</u>

    - G05SA003 is the upper well, open in the Red River Carbonate.
    - G050SA013 is the lower well, open in the Winnipeg Sandstone.
    - The water levels in G05SA003 are almost always lower than in G050SA013. Therefore, the hydraulic gradient is *negative*, not positive as indicated in Figure 5-12. Vertical groundwater flow should almost always be upwards.

    <u>G05SA014 – G050SA015 [G05SA015] (Figure 5-13)</u>

    - G05SA014 is the upper well, open in the Red River Carbonate.
    - G05SA015 is the lower well, open in the Winnipeg Sandstone.
    - The water levels in G05SA014 are always higher than in G05SA015. Therefore, the hydraulic gradient is *positive*, not negative as indicated in Figure 5-13. Vertical groundwater flow should always be downwards.

G050J163 – G050J175 (Figure 5-14)

- G05OJ163 is the upper well, open in the Red River Carbonate.
- G05OJ175 is the lower well, open in the Winnipeg Sandstone.
- The water levels in G05OJ163 are always higher than in G05OJ175. Therefore, the hydraulic gradient is *positive*, not negative as indicated in Figure 5-14. Vertical groundwater flow should always be downwards.

G050J176 – G050J177

Hydrographs for the fourth pair of wells listed on Table 5-B, G050J176 and G050J177, were not included in the *Hydrogeology and Geochemistry Assessment Report*. The hydrographs have been included in the response to RMSF-OR-013. Contrary to what is suggested on Table 5-B, the vertical hydraulic gradient at this location is generally not neutral. The data shown in the hydrograph suggest that during the spring the water level in G050J177 was higher than in G050J176, while through the summer and fall of 2020 the water level in G050J176 was higher. These data suggest that the vertical hydraulic gradient changes direction during the year.

14. It is indicated on Page 66 of the *Hydrogeology and Geochemistry Assessment Report* that the difference between water levels in the Red River Carbonate Formation and the Winnipeg Sandstone Formation suggest that the two aquifers are "not highly interconnected in the immediate vicinity of the observation wells listed on Table 5-B". The data that are presented do not support this suggestion. Inspection of Figures 5-12 through 5-14 suggests there is a direct connection between the two aquifers. In the case of wells G05SA003 and G050SA013 (Figure 5-12), the water levels in the two wells are nearly identical. In the cases of wells G05SA014/G050SA015 and G050J175/G050J163 (Figure 5-13 and Figure 5-14), the trends in the water levels are similar and the daily fluctuations in the records in the two wells at each location track each other closely.

    The data suggest it is likely that the natural variability in the thickness/spatial extent and hydraulic properties of the Winnipeg Shale are the most important contributors to the exchange of water between the two aquifers.

4.4 Groundwater modelling

15. The groundwater model includes single layers representing the Red River Carbonate (model layer 4) and the Winnipeg Shale (model layer 5). In my experience, where carbonate rocks are the uppermost rocks, it is typical to encounter an interval of weathered rock that has properties quite distinct from the underlying rock. It is generally appropriate modelling practice to incorporate a separate layer representing the top-of-rock zone.

16. I concur that recharge is a key driver of the regional flow balance. Referring to Table 6-B of the *Hydrogeology and Geochemistry Assessment Report*, I note that recharge accounts for 98% of the simulated inflows to the groundwater model. Calibrated hydraulic conductivity values are reported on Table 6-C and calibrated recharge rates are reported on Table 6-D. The recharge rates and vertical hydraulic conductivities of the surficial sediments are directly correlated and cannot be estimated independently. The reporting does not include any indication of how the correlation between hydraulic conductivity and recharge has been addressed in the analyses.

17. In my opinion, it is possible that the recharge over the model area is overestimated. It is indicated on Page 73 of the *Hydrogeology and Geochemistry Assessment Report* that the recharge is related to the mean annual precipitation at the Ostenfeld climate station for 1981-2020, 639 mm. Depending on the source, it appears that the average annual precipitation near Winnipeg is substantially less, between about 450 mm and 520 mm (see for example, (https://weather-and-climate.com/average-monthly-precipitation-Rainfall-inches,winnipeg,Canada and https://www.weather-atlas.com/en/canada/winnipeg-climate#snowfall). Referring to the excerpt from the Atlas of Canada reproduced here in Figure 6, the average annual precipitation over the study area is about 21 inches (530 mm).

    A simplified analysis of the precipitation surplus (Precipitation – Evapotranspiration), which represents the maximum amount of water that is available to recharge the water table, has been developed with the Thornthwaite-Mather analysis. According to the results of my calculations shown in Figure 7, the average annual surplus is about 130 mm. The implied annual evapotranspiration from the Thornthwaite-Mather analysis is 400 mm, which is roughly consistent with the average annual value of 450 mm mapped in Morton (1975) [see Figure 8].

    The recharge rates applied for the Birds Hill and Sandilands areas of the groundwater model are substantially larger than 130 mm (250 mm/yr and 189 mm/yr, respectively). Specification of too high recharge rates will have the effect of attenuating the simulated effects of the proposed development. In my opinion, it is appropriate practice to obtain water budgets from the Engineering Climate Services of Environment Canada for several climate stations around the study area (ec.scg-ecs.ec@canada.ca).

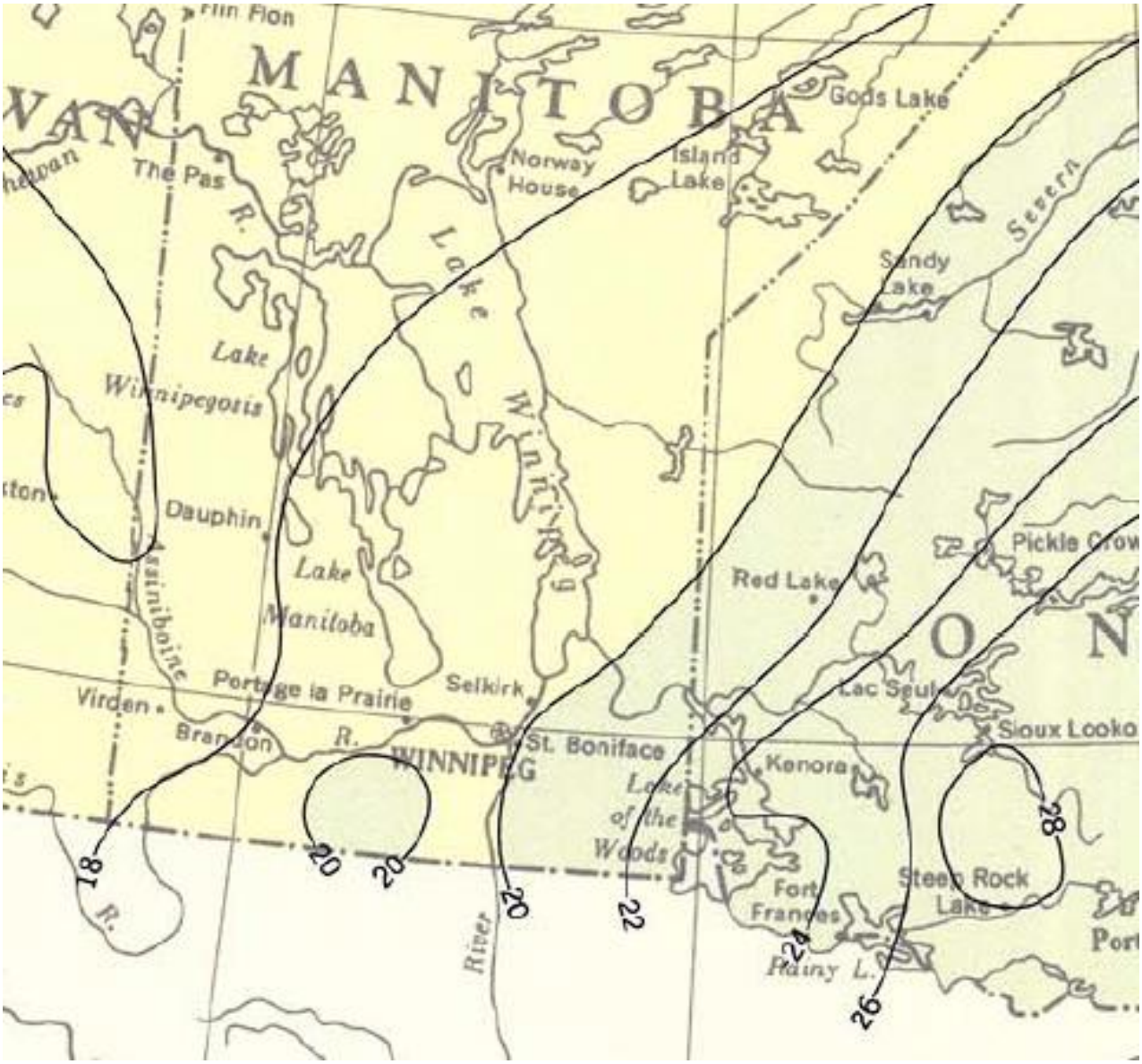

Figure 6. Average annual precipitation (inches)
Reproduced from Atlas of Canada (Meteorological Division, Department of Transport, 1957)

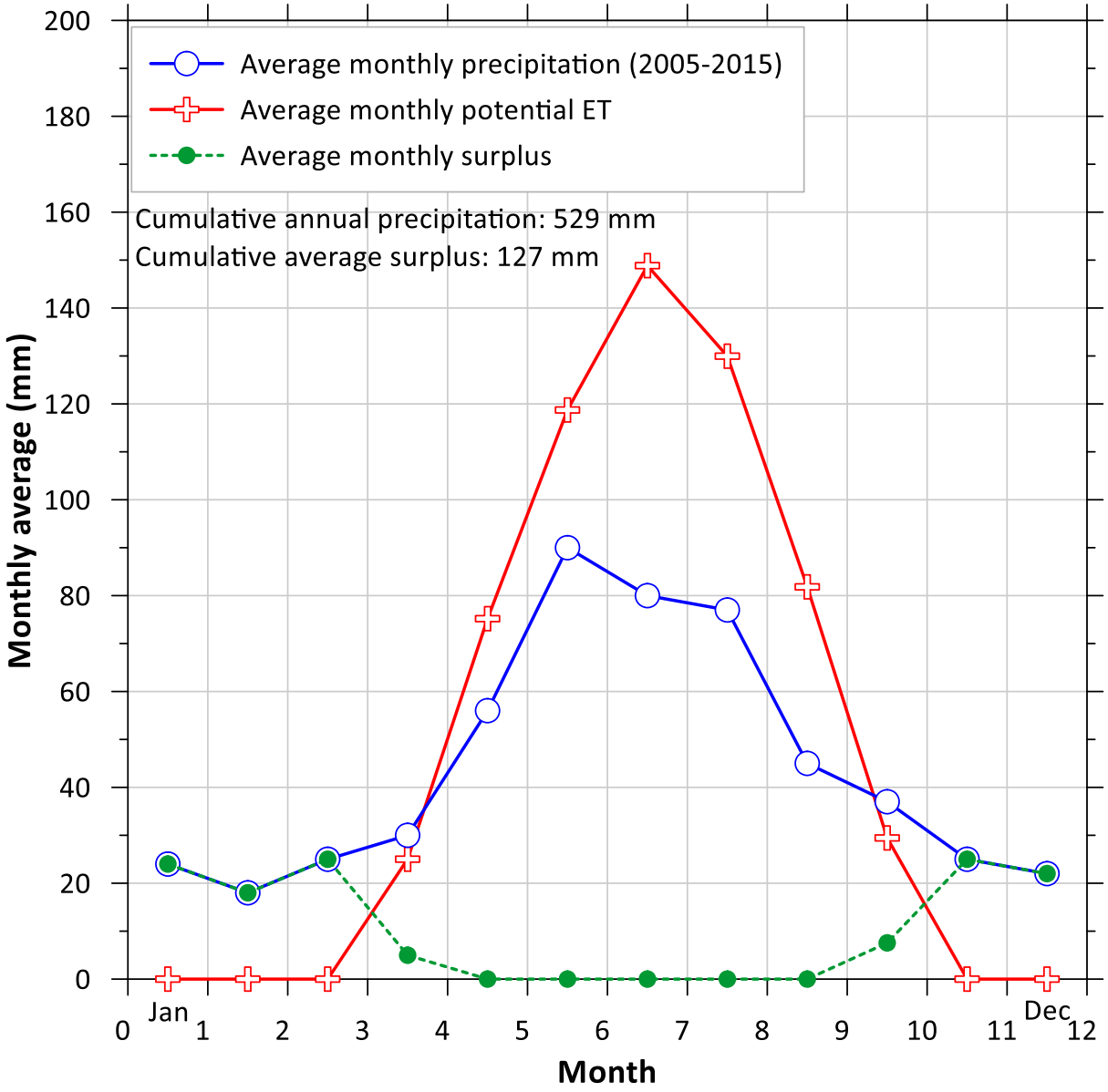

Figure 7. Simplified Thornthwaite-Mather analysis to estimate the average annual surplus

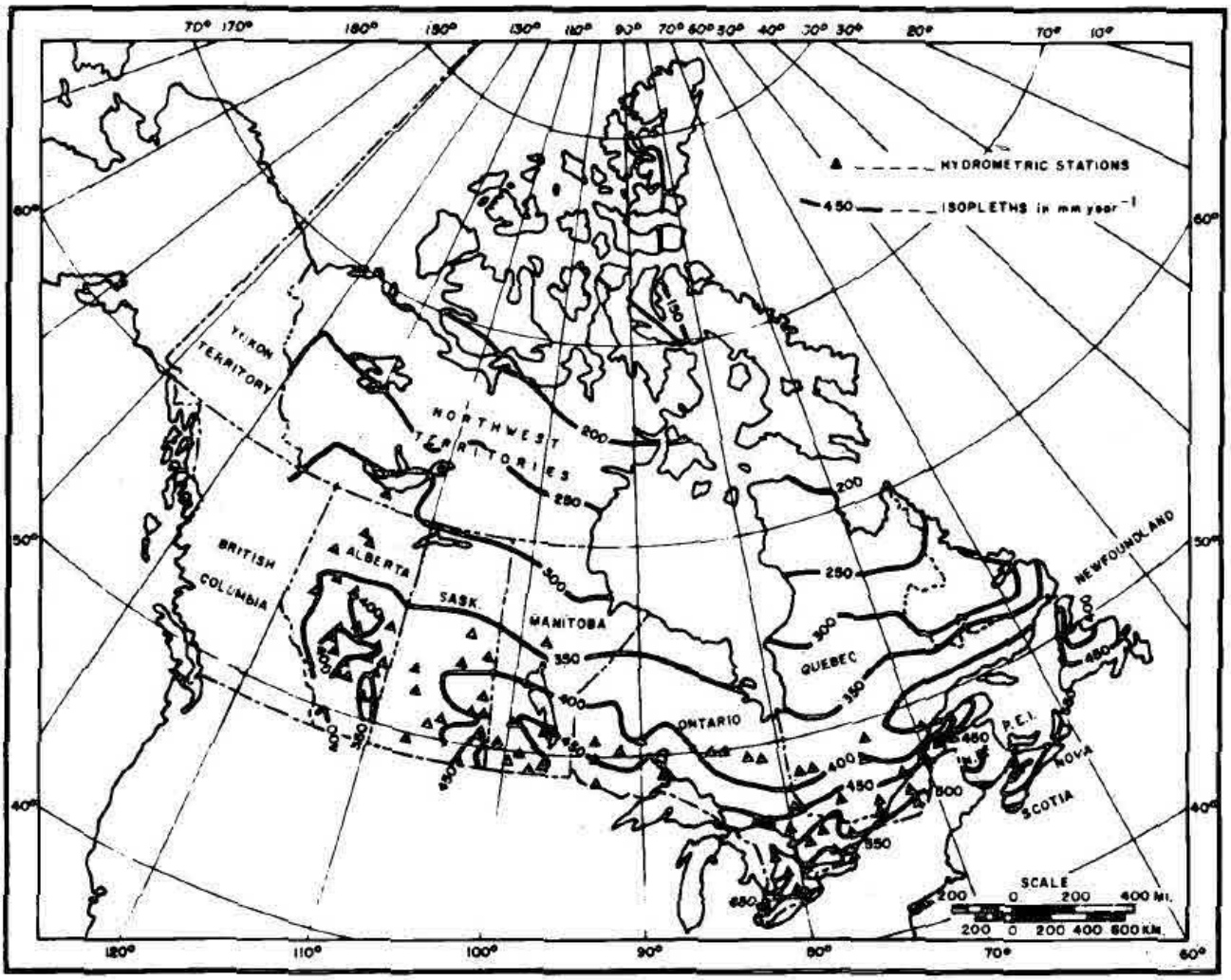

Figure 8. Average annual evapotranspiration (mm)
(Reproduced from Morton, 1975)

18. A scatterplot comparing the model results against the targets for the steady-state calibration is presented in Figure 6-2 of the *Hydrogeology and Geochemistry Assessment Report* and reproduced here in Figure 9. In my opinion, the scatterplot does not provide a convincing demonstration that the model has been adequately calibrated. I base my opinion on the following observations.

    - No distinction is made between the reliability of the water levels that are used as targets. Average water levels estimated for dedicated observation wells installed for the project and the wells from the Manitoba Provincial Monitoring Program should be assigned higher weights in the calibration. In terms of the graphical presentation, the symbols for these wells should be prominent.

    - As shown in Figure 9, the model exhibits a clear bias to overpredict water levels. The mean residual is 3.27 m.

    - As indicated by the red dashed lines added in Figure 9, at the location of any particular target it appears that the mismatch of the model is likely on the order of ±15 m. It may be debated that the Root Mean Square Error (RMSE) is a better measure of the local mismatch than the range of the errors estimated here by eye. Acknowledging this, it is still important to note that for this model the RMSE of 5.46 m is relatively large compared to the anticipated effects of the proposed operations.

    - Although the Normalized Root Mean Square Error (NRMSE) is frequently adopted as a measure of the model goodness-of-fit, it is important to note that it is open to mis-application. In particular, the value of the NRMSE depends on the interpreted range of the observed water level targets. The NRMSE is defined as:

      $$NRMSE\ (\%) = \frac{RMSE}{Range\ of\ Observations} \times 100$$

      Noting that the reported RMSE is 5.46 m and the reported NRMSE is 1.70%, the back-calculated Range of Observations is 321.2 m. As shown in Figure 9, the range of the observations is more likely 125 m. With this range the NRMSE is re-calculated as 4.3%.

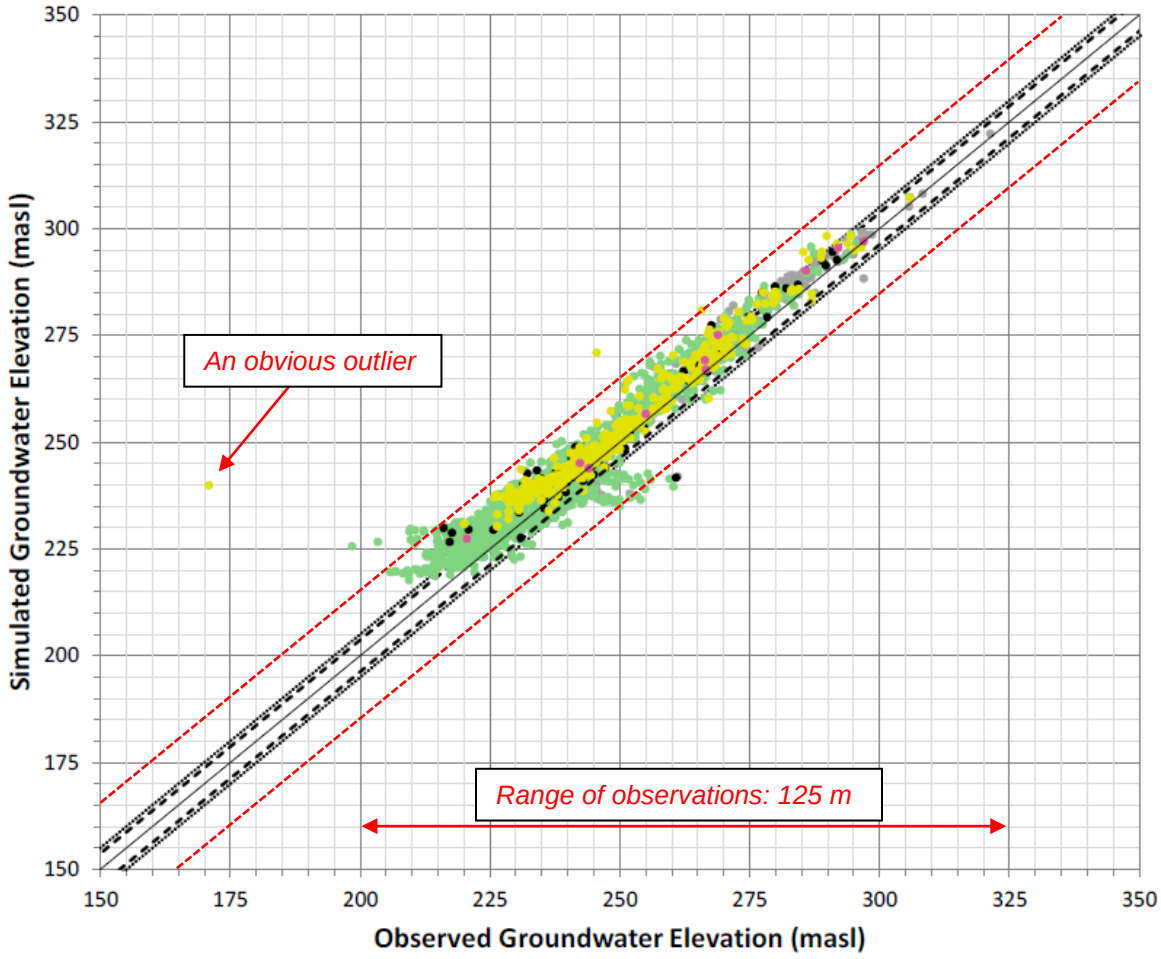

Figure 9. Scatterplot for the steady-state model calibration
Adapted from AECOM (2021b; Figure 6-2)

19. It is indicated on Page 72 the *Hydrogeology and Geochemistry Assessment Report* that at lower elevations, the calibrated steady-state groundwater model simulates groundwater levels that are higher than observed. The mismatch near Winnipeg is attributed to increased groundwater use in the area east of Winnipeg that is not accounted for in the modelling analysis. Based on my examination of Figure 6-3, the mismatch along the Red River is more suggestive of a problem with the model structure. As shown in the excerpt from Figure 6-3 shown here in Figure 10, there is an area close to Winnipeg where the simulated water levels are more than 10 m *lower* than observed (red circles; observed – simulated > 10 m). North of this area there is an area close to Red River Floodway where the simulated water levels are more than 10 m *higher* than observed (pink circles; observed – simulated < - 0 m). The large positive and negative residuals suggests that the boundary conditions may not be assigned appropriately.

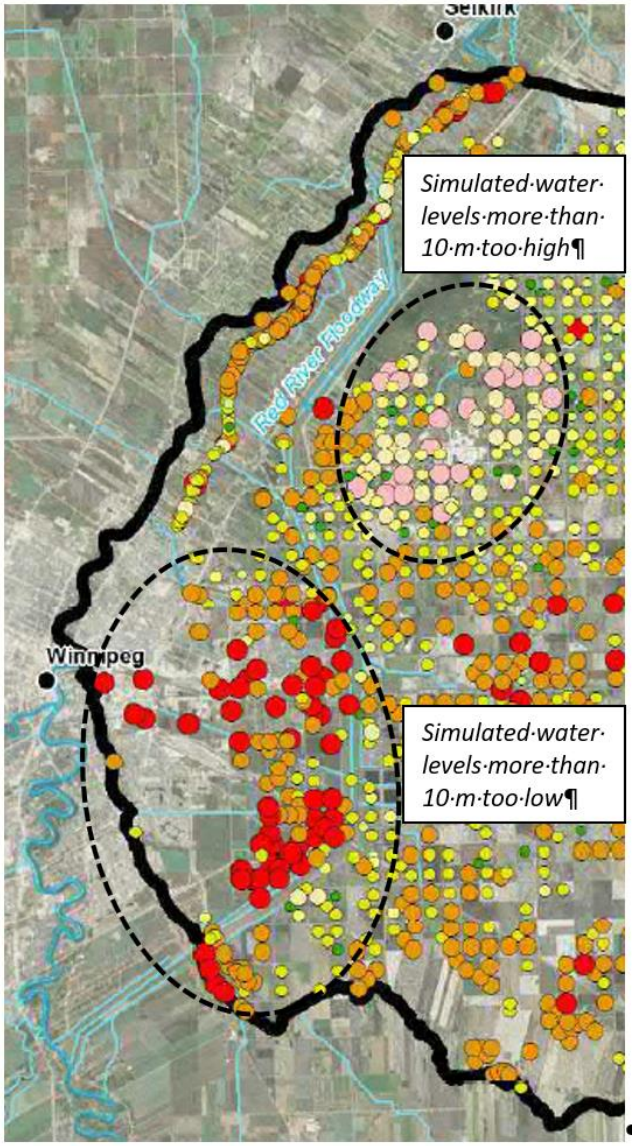

Figure 10. Detail of calibration residuals near Winnipeg
Excerpt from AECOM (2021b; Figure 6-3)

20. It is indicated on page 73 of the *Hydrogeology and Geochemistry Assessment Report* that at distances greater than 300 m the groundwater model simulates smaller drawdowns than were observed during the pumping test. This is highlighted in the comparison between observed and simulated drawdowns at the end of the pumping test. The drawdowns have been estimated from Figure 6-4. The results shown here in Figure 11 suggest that there is a systematic underestimation of the drawdowns at more distant locations in the Winnipeg Sandstone. This has important implications with respect to the impact assessment, as it is an indication that potential impacts on neighboring private wells may be underestimated.

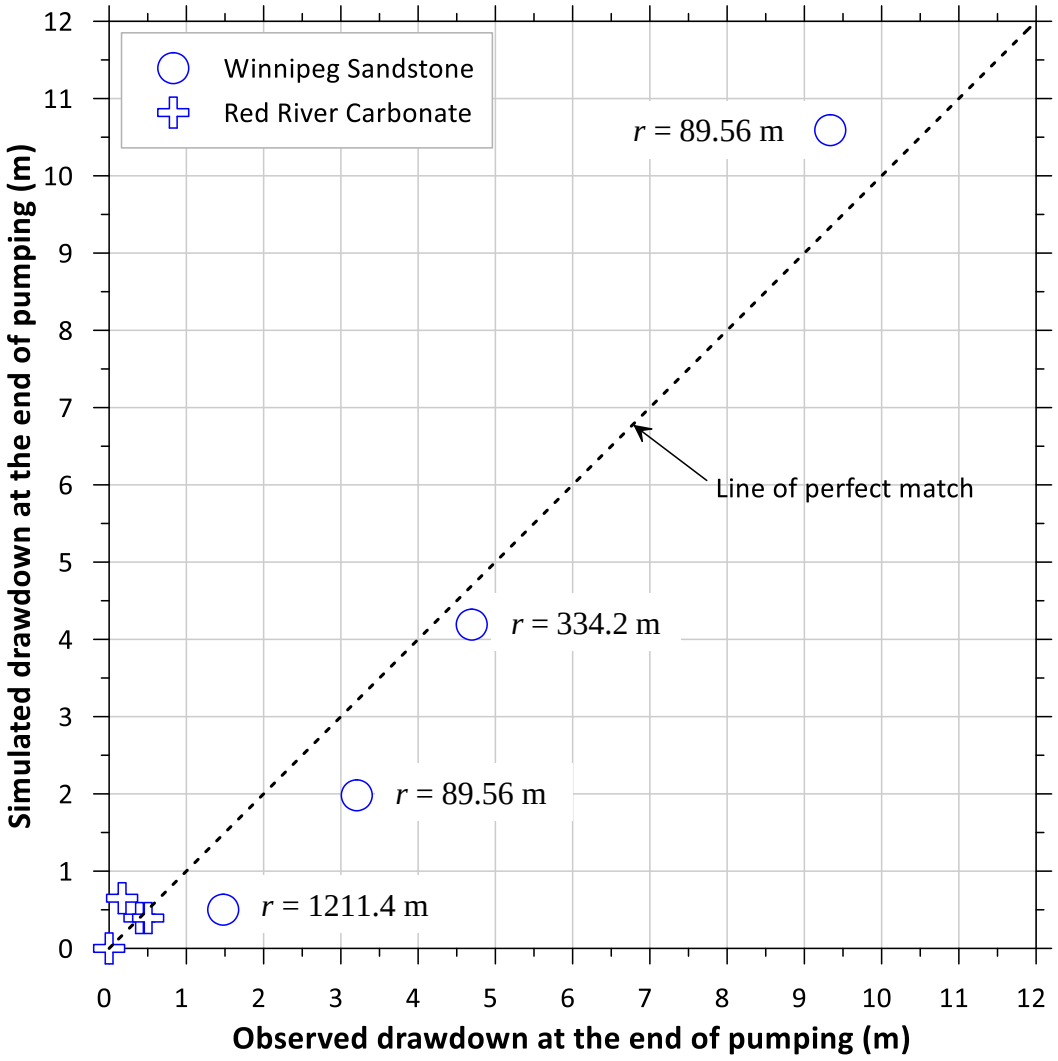

Figure 11. Comparison of observed and simulated drawdowns for the Bru 95-7 pumping test

21. Limited data are available to assess whether representative values of the hydraulic conductivities of the Winnipeg Sandstone and the Red River Carbonate have been inferred through model calibration. As shown here in Figure 12, although the value of the hydraulic conductivity of the Winnipeg Sandstone specified in the groundwater model is consistent with the estimates obtained from the two slug tests, it is substantially lower than the value inferred from the pumping test. The hydraulic conductivity of the Red River Carbonate specified in the groundwater model is within the range of the two estimates obtained from slug tests, but the most important conclusion that might be drawn from the comparison is that the two slug test estimates vary by a factor of about 25.

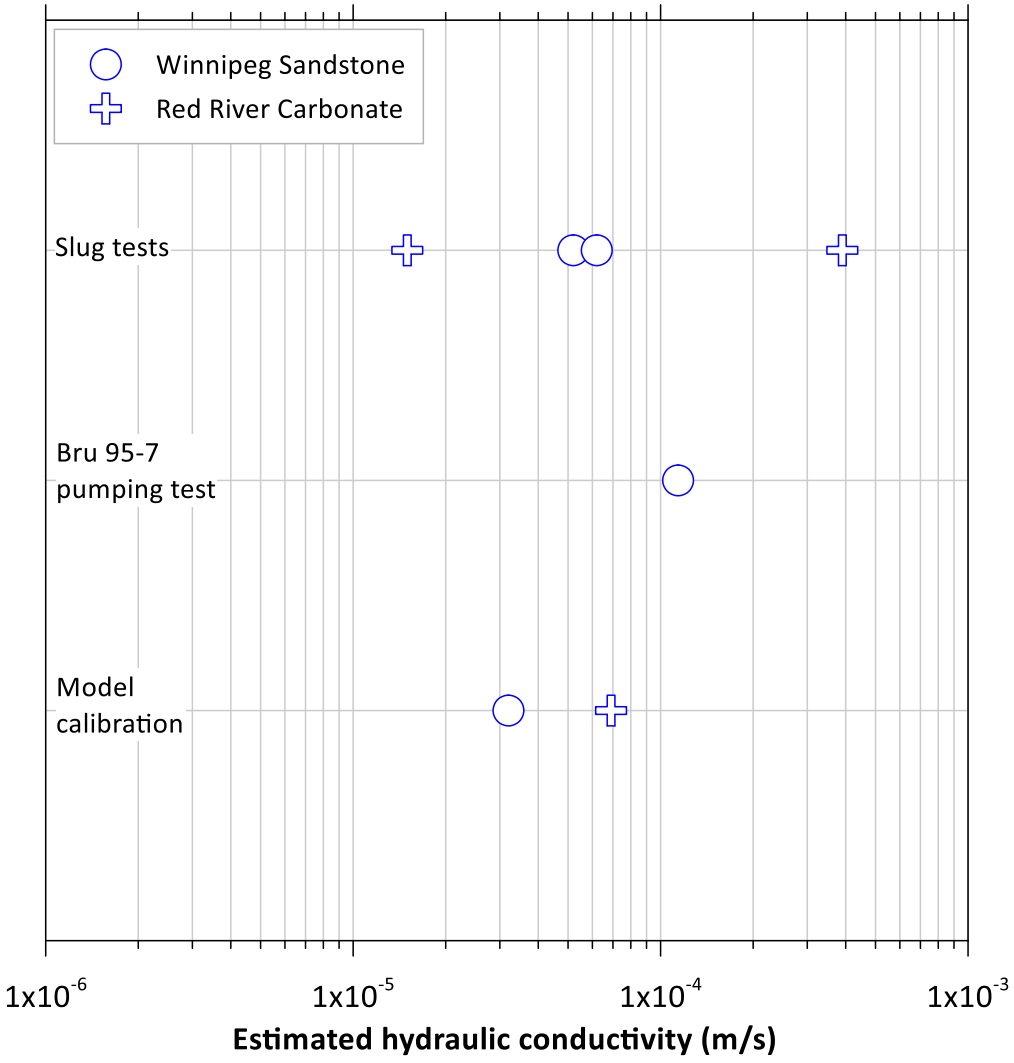

Figure 12. Summary of hydraulic conductivity estimates

22. Certain other aspects of the presentation of the calibrated aquifer properties in Section 6.9.3 are not clear in the documentation.

    - Referring to Figure 5-4 of the *Hydrogeology and Geochemistry Assessment Report*, the Lower Shale/Precambrian Bedrock is represented with a model layer that extends to an elevation of 0.0 m (i.e., mean sea level). The model layer is assigned a hydraulic conductivity that is 7 orders of magnitude less than the overlying Winnipeg Sandstone. It was not clear from documentation what data were available to constrain the assignment of the hydraulic conductivity of the Lower Shale/Precambrian bedrock. Details for supporting the specification of the of the hydraulic conductivity of the Lower Shale/Precambrian bedrock are provided in response to RMSF-IR-014.

      "*It is acknowledged that the hydraulic properties of these very deep units are poorly constrained, but they are not likely important to the conclusions and recommendations of the Hydrogeology and Geochemistry Assessment given their depth and likely low permeability in comparison to the overlying units*."

    - The basis for assigning the vertical hydraulic conductivities of the stratigraphic units was not indicated in the documentation. In the response to RMSF-IR-014 it is indicated that with the exception of the Red River Carbonate, a vertical anisotropy ratio of 1:10 was simply assumed. It is also indicated in the response that sensitivity analyses were not conducted to assess the significance of the vertical hydraulic conductivity with respect to the model calibration and predictions. It is not clear whether the vertical hydraulic conductivities specified in the groundwater model have an important influence on the prediction of potential impacts of the development. Of greater significance is the potential large-scale change in the properties of the Red River Carbonate and the Winnipeg Sandstone arising from collapse of the intervening shale.

    - In response to RMSF-IR-014 it is indicated that although a sensitivity analysis with respect to values of the specific storage was not conducted, the results "are relatively well constrained by literature values".

4.5 Impact assessment

23. For the case of 0% re-injection, the pumped water is simply removed from the model. From the perspective of the impact assessment, this simulation will yield worst-case results, that is, it will have the effect of exaggerating the potential impacts.

24. Referring to the response to RMSF-IR-015, it is my understanding that the re-injection of groundwater is not explicitly simulated. Instead, for the case of 50% re-injection an "effective" pumping rate equal to about half the extraction rate from the equivalent well at the center of a cluster is specified. The relatively small difference between 550 USgpm/2 and the rates of 265 USgpm and 275 USgpm cited in the response to RMSF-IR-015 reflects the residual moisture on the extracted sandstone.

25. Referring to Pages 5-6 and Figures 6-9 to 6-13 of the *Hydrogeology and Geochemistry Assessment Report*, the limits of groundwater impacts are defined as the 1.0 m drawdown contour. It is indicated that changes in groundwater levels of this magnitude are similar to those experienced due to natural seasonal variability. This interpretation should be confirmed with a review of the magnitudes of the natural fluctuations in the water levels in the wells in the Manitoba groundwater monitoring program within the model area (Figure 6-1).

26. The predictions shown in Figure 6-7 of the *Hydrogeology and Geochemistry Assessment Report* should correspond to Scenario 4 (p. 74) and the predictions shown in Figure 6-8 should correspond to Scenario 5. However, the same pumping histories are shown in Figures 6-7 and 6-8. The following correction is issued in the response to RMSF-IR-016.

    The pumping history shown on Figure 6-8 does not reflect the pumping history simulated by Scenario 5. This graph should reflect pumping rates that follow a similar temporal pattern to those shown, but vary in magnitude from approximately 280 US gpm to 0 US gpm seasonally as illustrated in Appendix H of the Hydrogeology and Geochemistry Assessment Report.

27. Mining is assumed to have no effect on the properties of the Winnipeg Sandstone, either during or after pumping. The basis for the assumption is presented in the response to RMSF-IR-017.

    The project proposes to remove a very small proportion of the overall volume of sand in the Winnipeg Sandstone aquifer and will leave residual water-filled voids where the sand has been extracted. It is understood that this will increase the overall storativity of the aquifer as the effective porosity of the water-filled void will be 100%. Between the voids, the sandstone aquifer will not be disturbed by mining and will remain intact. Local hydrogeological properties (e.g., hydraulic conductivity and storativity) will be quite variable depending on whether measurements are collected within a water-filled void or within the intact aquifer between the voids. However, the scale of the project is regional, and the response of the aquifer to sand removal will be governed by regional aquifer properties as measured at the scale of the Representative Elementary Volume (REV), as the source of recharge is from both surface and distal inputs near the Sandilands Complex east of the project.

Reasonable efforts were undertaken to simulate the effects of sand extraction and groundwater reinjection on the aquifer and adjacent well users. Similar to other conventional underground mining projects, it is not possible to directly measure the magnitude of any change in aquifer properties prior to completion of mining. The numerical groundwater model developed for this assessment implemented time-variant changes in hydraulic properties around the production wells, in an effort to simulate the response of the aquifer to sand extraction.

The assumption that between the voids created by mining the Winnipeg Sandstone aquifer will not be disturbed by mining and will remain intact is a very strong assumption. While there is no evidence that sand extraction will lead to widespread collapse of the Winnipeg Sandstone and the rock units that overlie it, there is no evidence that this possibility can be discounted outright. In the response to RMSF-IR-017 it is indicated that the scale of the project is regional. It is possible that the scale of the *impacts* of sandstone mining will also be regional in scale. In the response to RMSF-IR-005 reference is made to pilot testing. However, no descriptions of the pilot testing are presented and there are no indications as to whether displacements of rock unit were measured during the testing. Although it may not be possible to directly measure the magnitude of any change in aquifer properties prior to completion of mining, it is certainly possible to measure ground movements and changes in groundwater conditions around the site during operations.

In the response to RMSF-IR-018 it is indicated that the areas with the potential for degradation of the Winnipeg Shale are estimated to be 188 ha (Year 0) to 691 ha (Years 1 through 4), “based on the simplified assumptions taken during groundwater modelling”. These areas are sufficiently large to support detailed monitoring, which is the only real way to test the assumptions incorporated in the analyses. As the center of production shifts through time, the extent of zone of degraded shale is assumed to expand. Referring to the excerpt from Figure 6-5 of *Hydrogeology and Geochemistry Assessment Report*, shown here in Figure 13, the extent of the degraded shale is assumed to extend 200 m beyond the limits of the 2025 wells. It is indicated in the response to RMSF-IR-018 that the extent of the degraded zone will be “validated during operations”. This validation will be essential to demonstrate that the effects of mining are understood, controllable and limited to the Project Site Area.

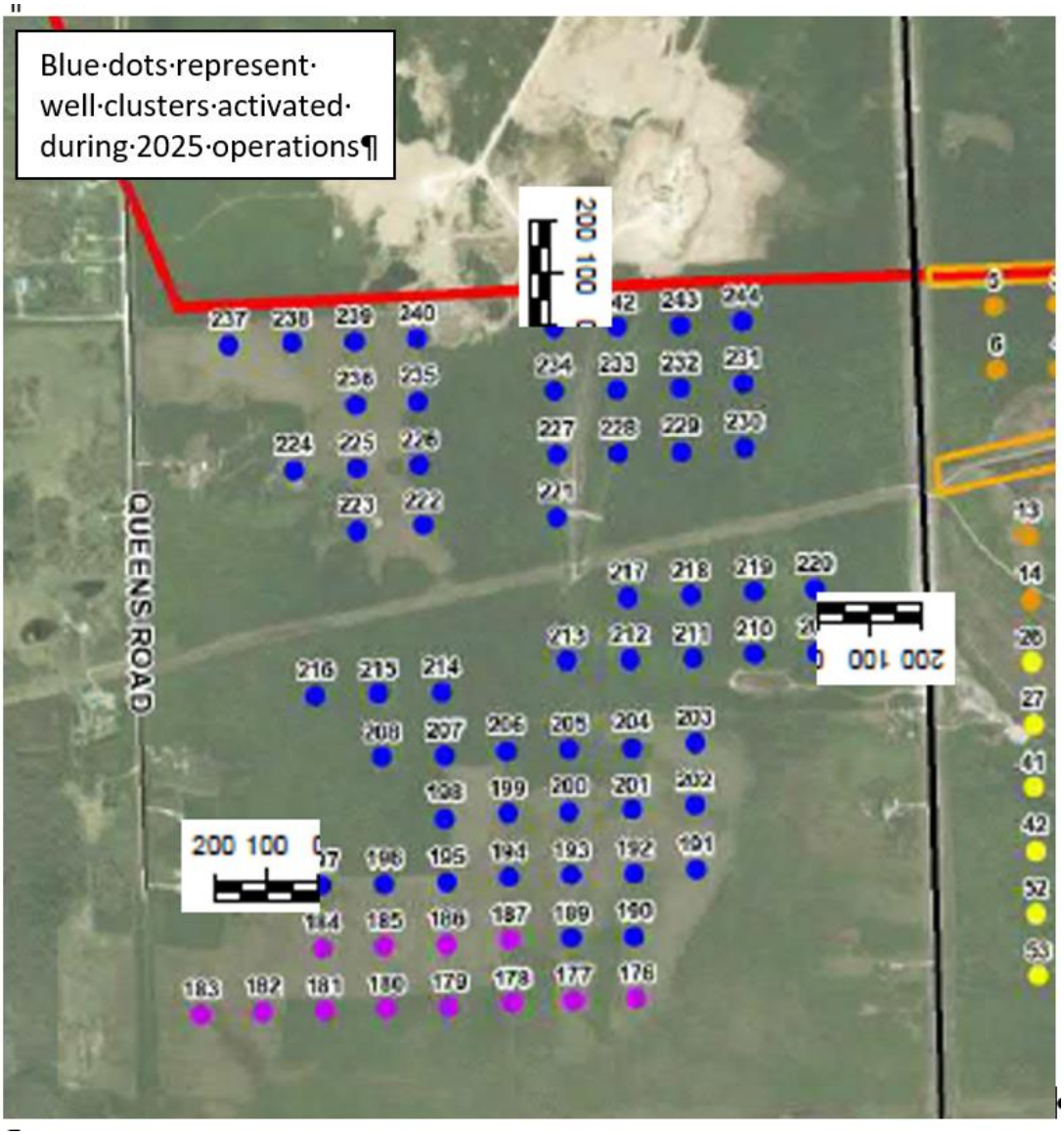

Figure 13. Well clusters activated during 2025
Adapted from AECOM (2021b; Figure 6-5)

28. In theory, it should be feasible to conduct a back-of-the-envelope check on the results for the steady-state analysis of Scenario 3 (0% re-injection, no degradation of Winnipeg Shale). Referring to Table 6-1, steady-state drawdowns of 0.9 m and 0.0 are reported for G05SA014 and G05OJ163, respectively. The Theis (1935) solution is applied here with the parameter values listed on Table 6-C, assuming an aquifer thickness of 21.1 m and specifying the approximate radial distances between 30-10-8E1 and G05SA014 and G05OJ163. It is not clear why the results of the groundwater model are so much smaller than those estimated with the Theis solution. My expectation is that the steady-state analysis would provide conservative upper-bound estimates on the drawdown.

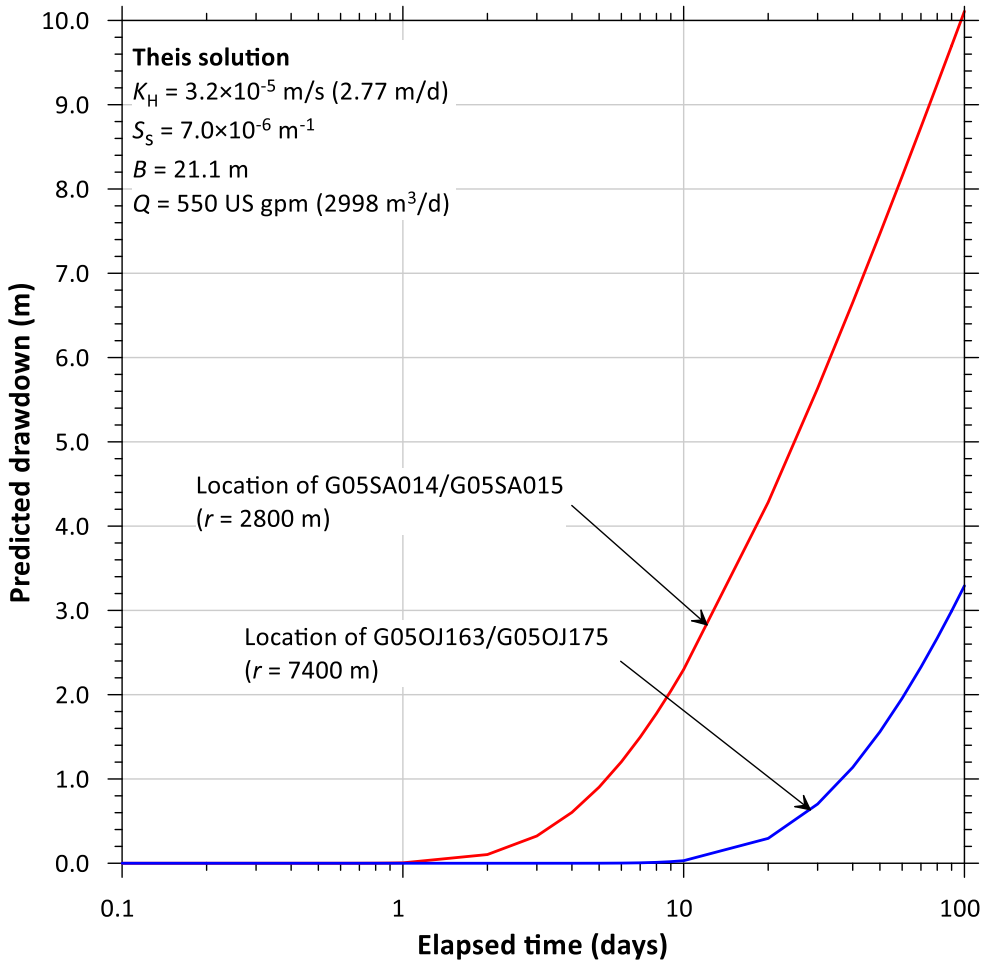

Figure 14. Results of simplified analysis of the transient response to pumping near well 30-10-8E1

29. It is not clear that the predictions of transient drawdowns are consistent with the results of the steady-state analyses presented in the *Hydrogeology and Geochemistry Assessment Report*. To compare the results between the scenarios, I have identified the time when pumping is closest to observation well 20-10-8E1 and extracted the results for well 20-10-8E1 from Table 6-1, Figure 6-7 and Figure 6-8. For the transient scenarios, the drawdowns listed below are estimated as the maximum drawdowns from the figures. Comparing the results of Scenarios 1 and 2, and Scenarios 4 and 5, it appears that the drawdowns scale with respect to the amount of re-injection. However, I cannot reconcile the differences in the magnitudes of the drawdowns for steady-state and transient conditions. It is physically realistic to expect the steady-state results to provide a conservative upper bound on the potential drawdowns; however, the reported steady-state drawdowns are small fractions of the transient results.

Scenario	Winnipeg Sandstone drawdown (m)	Red River Carbonate drawdown (m)
1 0% re-injection Shale degradation Steady-state	0.9	0.9
2 50% re-injection Shale degradation Steady-state	0.4	0.4
3 0% re-injection No shale degradation Steady-state	1.2	0.9
4 0% re-injection Shale degradation Transient	18.4	6.2
5 50% re-injection Shale degradation Transient	9.2	3.0

Section 5
Summary of peer review findings

The Rural Municipality of Springfield (RM of Springfield) has retained me to advise the municipality on the proposed groundwater aspects of the Vivian Sand Project to be developed by Sio Silica (previously CanWhite Sands Corp.). My role as hydrogeology peer reviewer for the RMSF involves identifying issues of potential concern for the RM of Springfield. These issues will be conveyed to the Manitoba Clean Environment Commission, which will in turn advise the Province of Manitoba. The ultimate decision to approve the proposal, and the conditions that may be attached to that approval, rest with the Province.

1. The material presented in *Hydrogeology and Geochemistry Assessment Report* does not alleviate my concerns that the site investigations have not adequately characterized the essential elements of the site and the potential impacts to groundwater resources in the RM of Springfield.

2. Creating a slurry of the Winnipeg Sandstone and extracting silica sand is expected to result in the development of horizontal arrays of "rooms and pillars" in the Winnipeg Sandstone. Referring to the response to RMSF-IR-010, the "rooms" refer to the combined voids created at each well cluster, and the "pillars" refer to zone of intact sandstone between the well clusters. Reference is made in the response to the loss of strength of the sandstone. Elsewhere in the responses, the proponent refers to pilot testing that has been conducted but there is no indication of whether the loss of strength was assessed during the pilot testing. It is indicated in the response to RMSF-IR-009 that "Some collapse of the overlying strata may occur but collapse is *expected* to be limited and not to spread to the surface." It is not clear from the project documentation whether this is an assumption, or data have been collected and analyzed to support this expectation. In the absence of data, it may be more appropriate to assume that the operations will result in a mass of loose sand with the potential for progressive, large-scale collapse of the overlying strata.

3. I support the indication that the following additional formal documents will be prepared:

    - Waste Characterization and Management Plan;
    - Groundwater Monitoring and Impact Mitigation Plan;
    - Water Management Plan; and
    - Progressive Well Abandonment Plan.

4. I support the indication that although the complete project has an anticipated lifespan of 24 years, the current proposal will extend only for 4.5 years (nominally half of 2021, and 2022 through 2025). This will provide an opportunity to assess the impacts of mining and the annual rehabilitation prior to the full scale-up of operations. I recommend that a formal report on the first year of performance during operations also be required.

5. If the proposal is approved, a detailed monitoring program will have to be implemented to ensure that widespread collapse of the units overlying the Winnipeg Sandstone is not occurring. The monitoring program will have to include an early-warning system that will halt operations if widespread collapse does occur and propagates to the ground surface.

   The monitoring program required to validate the assumptions of the analyses must include monitoring of groundwater levels in the Winnipeg Sandstone, the Carbonate Aquifer, and detailed geotechnical monitoring of ground movements.

6. The practices adopted for well abandonment will be of particular concern for this project, as the wells will extend across and may connect the otherwise isolated Red River Carbonate and Winnipeg Sandstone. In my experience, improperly abandoned wells have acted as preferential pathways for the migration of surface contamination into deeper aquifers. It is suggested on Page iv of the Executive Summary of the *Vivian Sand Extraction Project – Environmental Act Proposal* that well drill cuttings may be included in the materials used to seal wells. It is also suggested on Page vii that calcified sand ("overs") may be used in well sealing activities. I caution against using drill cuttings and "overs" for this purpose. Wells should be sealed with bentonite and/or grout to surface to ensure that over the long term they can never act to connect the two aquifers. Furthermore, wells that are no longer in operation should be sealed in a continuous abandonment program rather than being left as open holes until groups of wells are abandoned.

Section 6
Signature page

This report was prepared by Mr. Christopher J. Neville, M.Sc., P.Eng., Chief Hydrogeologist of S.S, Papadopulos & Associates, Inc.

[redacted]

January 12, 2023

Section 7
References

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APPENDIX

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

AREAS OF EXPERTISE

- Quantitative Interpretation of Hydrogeologic Data
- Groundwater Flow Modeling
- Solute Transport Modeling
- Peer review
- Litigation Support and Expert Testimony
- Professional Instruction

SUMMARY OF QUALIFICATIONS

Mr. Neville directs the Canadian operations of S.S. Papadopulos & Associates, Inc. from its Waterloo, Ontario office. His primary area of expertise is the quantitative analysis of groundwater flow and solute transport. He synthesizes hydrogeologic data, evaluates groundwater resources, develops regional and site-scale analyses of groundwater flow and solute transport, and evaluates remedial measures.

Mr. Neville has developed and documented large-scale three-dimensional numerical models for industrial, mining, and government clients, and has reviewed numerous site-specific hydrogeologic analyses and groundwater modeling codes. He has extensive experience in the development of work plans for groundwater projects and in directing groundwater modeling studies. He serves as a senior peer-reviewer and provides technical support for litigation. Mr. Neville is actively involved in the development of professional short courses in the interpretation of pumping tests and groundwater modeling, and he has assisted in teaching graduate courses at the University of Waterloo.

YEARS OF EXPERIENCE: 30+

EDUCATION

MSc, Earth Sciences (Hydrogeology), University of Waterloo, 1992
MEng, Course work for Geotechnical Engineering, University of Alberta, 1985–1987
BEng, Civil Engineering, McGill University, 1985

REGISTRATIONS

Professional Engineer
Ontario (PEO) #100013705
Manitoba (EGM) #48048

PROFESSIONAL HISTORY

S.S. Papadopulos & Associates, Inc., Senior-Staff Hydrogeologist to Chief Hydrogeologist, 1993 –1996, 1999 to present
Conestoga-Rovers & Associates, Inc. Senior Hydrogeologist, 1998
Klohn-Crippen Consultants Ltd. Senior Hydrogeologist, 1997
University of Waterloo Dept. of Earth Sciences, Research Assistant, Research Associate in Hydrogeology, 1987–1992

REPRESENTATIVE EXPERIENCE

INTERPRETATION OF HYDROGEOLOGIC AND GEOCHEMICAL DATA

- **Hanford Nuclear Reservation, Washington** — Provided senior technical review of the interpretation of slug tests in the 100 Area, the FR 3 area, and the BC 5 area. Provided technical review of the design and testing program for groundwater withdrawal wells in the 200 ZP 1 area. Reviewed the results of preliminary step drawdown tests of well EW 1. Directed and reviewed the interpretation of well development data and slug testing (100-Area). Interpreted step test and constant-rate pumping test data. Provided internal senior review of probabilistic analyses of horizontal and vertical groundwater velocity in the 100 Area. Directed, reviewed and documented the interpretation of RUM aquifer tests. Directed the interpretation of Cr (VI) column data and the development of nonequilibrium transport models to predict the progress of remediation.
- **Reid Gardner Generating Station, Moapa, Nevada –** Developed and documented the technical approach for estimating horizontal and vertical hydraulic gradients from monitoring data collected at the Reid Gardner Generating Station (RGS) site. Applied an extended version of Darcy's Law to accommodate variations in water density.
- **Onondaga,** New York — Developed a solute-transport analysis to estimate Darcy flux through lakebed sediments from concentration profiles.

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

- **Region of Waterloo,** Middleton Street Well Field — Interpreted hydraulic testing data for a municipal well field in fractured-karstic rock.
- **Schlage Lock Company,** Colorado Springs, Colorado — Modified and applied an axisymmetric finite-difference model for the interpretation of aquifer pumping tests.
- **Chem-Dyne Site,** Hamilton, Ohio — Developed and applied models for the interpretation of stepped-rate aquifer tests.
- **Texas-Eastern Gas Transmission Company,** Houston, Texas — Prepared a closure plan for a pump-and-treat remediation system of a BTEX plume in fractured porous-media.

SENIOR PEER REVIEW

- **Hanson Brick Co., Oakville,** Ontario, Canada — Provided senior peer review for the Region of Halton for the assessment of a proposed shale quarry.
- **Nelson Quarry, Burlington,** Ontario, Canada — Provided senior peer review for the Region of Halton for the assessment of a proposed expansion of a dolostone quarry.
- **Ontario Ministry of the Environment** — Served on the peer review panel for the development of guidance documents for Source Water Protection.
- **Credit Valley, Toronto and Region, and Central Lake Ontario Conservation Authority (CTC) Source Water Protection Region,** Canada — Served as senior peer review for the development of water budget studies and water quantity risk assessment.
- **Lake Erie Source Water Protection Region,** Canada — Served on a peer review panel for the development of water budget studies and water quantity risk assessment for the Long Point, Kettle Creek, and Catfish Creek Conservation Authorities.
- **York-Peel-Durham-Toronto (YPDT) Oak Ridge Moraine Groundwater Model,** Ontario, Canada — Provided senior peer review for the development and application of a large-scale regional groundwater flow model of the Oak Ridge Moraine area.
- **Waste Management Canada Richmond Landfill,** Ontario, Canada — Provided senior peer review for the analysis of the impacts of landfill expansion.
- **Arkell Spring Grounds, City of Guelph,** Ontario, Canada — Provided senior peer review in the analysis of impacts of increased water takings.
- **Vancouver Wharves Berth 1 Site,** Canada — Provided senior peer review for the modeling of measures to remediate groundwater contaminated with heavy metals.
- **CH2M HILL-Canada, Alder Creek Groundwater Study, Region of Waterloo** — Provided senior peer review in the development of the Alder Creek regional groundwater flow model.
- **Region of Waterloo** Ontario, Canada — Reviewed the delineation of capture zones for municipal supply wells in the Waterloo Moraine.
- **Smithville Phase IV,** Ontario, Canada — Reviewed groundwater-flow and solute-transport models for the evaluation of remedial alternatives for the Smithville PCB contamination site.

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

GROUNDWATER FLOW MODELING FOR WATER RESOURCES DEVELOPMENT AND PROTECTION

- **Region of Waterloo,** Ontario — Directed the groundwater modeling to support the updated characterization of the Middleton Street wellfield.
- **Region of Waterloo,** Ontario — Directed the groundwater modeling to support increased takings from the Blair Road wellfield.
- **Region of Waterloo,** Ontario — Directed the development of a groundwater model to support an application for additional water takings in the Cambridge East area.
- **Itapúa,** Paraguay — Directed the development of a regional groundwater flow model of the Guaraní transboundary aquifer for the region adjacent to the Paraná River in eastern Paraguay.
- **Prey Veng and Svay Rieng Provinces,** Cambodia — Directed the development of a regional groundwater flow model of southeastern Cambodia for the evaluation of the feasibility of the development of large-scale groundwater withdrawals for irrigation.
- **Town of Colgan,** Ontario — Developed a regional groundwater flow model to delineate a wellhead protection area for a proposed new municipal supply well.
- **Region of Waterloo,** Middleton Street Well Field — Directed the development of groundwater modeling analyses to support the delineation of capture zones and the estimation of the sustainable yield of the well field.
- **Region of Waterloo,** Greenbrook Well Field — Developed analyses to predict water-level recoveries following the shutdown of the well field.
- **Region of Waterloo,** Cedar Creek Groundwater Study — Directed the development of a groundwater model to evaluate groundwater resources and to anticipate the potential effects of large-scale gravel extraction.
- **Region of Waterloo,** Mannheim Well Field — Directed the delineation of capture zones for municipal supply wells.
- **Town of Marathon,** Ontario — Directed the development of a groundwater model to delineate wellhead protection areas for municipal wells.
- **Denver, Colorado – Directed groundwater modeling to estimate potential inter-aquifer flows during operation of a proposed geothermal system at the Colorado State Capitol.**
- **Itapúa,** Paraguay — Directed the development of a regional groundwater flow model of the Guaraní transboundary aquifer for the region adjacent to the Paraná River in eastern Paraguay.
- **Prey Veng and Svay Rieng Provinces,** Cambodia — Directed the development of a regional groundwater flow model of southeastern Cambodia for the evaluation of the feasibility of the development of large-scale groundwater withdrawals for irrigation.

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

GROUNDWATER FLOW AND SOLUTE TRANSPORT MODELING TO SUPPORT THE DESIGN AND EVALUATION OF REMEDIAL MEASURES AT CONTAMINATED SITES

- **SABIC (National Methanol Company) Ibn Sina,** Saudi Arabia — Developed the site conceptual model and directed the analysis of the migration and fate of MTBE.
- **Glenn Springs Holdings, Inc. (Occidental Chemical Corporation), Hyde Park Landfill,** Niagara Falls, New York — Directed the development of a large-scale groundwater model to evaluate capture of contaminated groundwater and to optimize remedial actions. Assignments included the development of work plans for data collection and interpretation, the supervision of hydraulic testing and analysis, and supervision of groundwater modeling.
- **Gurabo,** Puerto Rico — Directed numerical flow- and solute-transport modeling conducted to evaluate the performance of a pump-and-treat system.
- **Massachusetts Military Reservation,** Cape Cod — Developed an analysis to predict the extent of groundwater mounding due to the re-injection of treated groundwater.
- **Schlage Lock Company, Colorado Springs,** Colorado — Developed a groundwater model to assist in the evaluation of alternative pump-and-treat designs for remediation of a PCE plume.
- **Pacific Gas & Electric Company,** California — Developed and documented a groundwater flow and transport model for simulating the evolution of a plume of chromium-contaminated groundwater. Developed and documented analyses for the evaluation of remedial pumping alternatives.
- **Oregon Department of Environmental Quality,** Portland — Developed and applied a method of analysis for optimizing the placement of recovery wells for remediation of a large plume of TCE-contaminated groundwater and for protection of the City of Portland's emergency water supply.
- **Eastman Kodak Company,** Rochester, New York — Assisted in the development of a regional groundwater model that had automatic telescopic mesh refinement capabilities. Developed a user manual for the model, and provided a training course to enable Kodak staff to evaluate proposed remedial measures at the facility. Directed the updating of the model.
- **Pyrite Canyon Group,** California — Developed numerical air-flow and groundwater-flow models to assist in the evaluation of remedial measures at the Stringfellow Acid Pits. Conducted analyses for feasibility studies of remediation of shallow organic contamination, using dewatering and soil vapor extraction. Developed analyses for evaluating the performance data from a horizontal well constructed in fractured bedrock and for predicting the long-term efficacy of the well for plume remediation.

TECHNICAL SUPPORT FOR THE GROUNDWATER ASPECTS OF INFRASTRUCTURE DEVELOPMENT

- **Toronto Spadina Yonge Subway Extension —** Provided peer review of dewatering requirements and interpretation of hydrogeologic tests for the Steeles West and Finch West stations.
- **Eglinton Crosstown LRT, Toronto** – Conducted analyses to support the 30% design for the proposed Bathurst, Dufferin, Caledonia and Keele Stations. Analyses included the interpretation of hydraulic tests, estimation of groundwater pressures on Support of Excavation, estimation of groundwater inflows to station box excavations and analytical and numerical modeling to support the design of groundwater control measures. Assisted in the development of the work plan for supplemental investigations to guide the estimation of dewatering requirements.
- **San Manuel Band of Mission Indians, Highland, California** –Developed a groundwater model to assist in the evaluation of the potential effects of alternative methods of construction of the MWD Arrowhead East tunnel on the water resources of the San Manuel Tribe. Conducted an extensive follow-up studies to establish the model as a reliable tool for reconstructing past conditions and predicting future changes in groundwater conditions in the vicinity of the San Manuel Indian Reservation.

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

LITIGATION SUPPORT

- **Reko Diq Mine,** Pakistan — Served as water resources expert to the government of Pakistan and provided testimony at the International Centre for Settlement of Investment Disputes, London, UK (ICSID Case no. ARB/12/1). Provided expert opinion of the predictions of potential declines in groundwater levels the proposed Reko Diq project. Conducted independent analyses of the data from 21 days of pumping in the Fan Sediments northwest of the proposed mine.
- **Timbro Ranch,** Colorado (Colorado Water Court consolidated cases 2013CW3144 and 2014CW3134 — Developed on behalf of Denver Water independent interpretations of data collected during pumping tests to support a non-tributary water assessment.
- **Pinnacle Heights Golf Course,** Orangeville, Ontario — Provided expert opinion on the reliability of groundwater modeling conducted to evaluate the potential impacts of irrigation pumping for a proposed golf course.
- **Thomson Facility,** Marion, Indiana — Provided expert opinion on the groundwater velocity at the site. The analysis was developed within a stochastic framework.
- **Homestead Golf Course,** Michigan — Reviewed the environmental impact of a proposed golf course development adjacent to a sensitive river.
- **Cities of Vaughn and Pickering,** Ontario — Evaluated the design calculations for proposed municipal waste landfills having complex liners. Reviewed the methods for predicting leakage through composite geomembrane liners, and reviewed the methods to predict the development of groundwater mounds due to failure of leachate collection systems. Performed benchmarking of the solute transport code POLLUTE.
- **Duntroon Quarry Expansion, Singhampton,** Ontario — Served as expert witness for the Niagara Escarpment Commission for the assessment of hydrogeologic aspects of the proposed extension of the Duntroon Quarry. Prepared expert witness reports and provided testimony for the Joint Board under the *Consolidated Hearings Act*.
- **Nelson Quarry Expansion,** Burlington, Ontario — Served as expert witness for Halton Region for the assessment of hydrogeologic aspects of the proposed extension of the Nelson Quarry. Prepared expert witness reports and assisted counsel in preparation of cross-examination for the Joint Board under the *Consolidated Hearings Act*.
- **MAQ Highland Quarry,** Singhampton, Ontario — Directed the Experts Meeting and prepared the *Statement of Agreed Facts* for the proposed MAQ Highland Quarry.

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HYDROGEOLOGY TRAINING

- **Critical Thinking in Aquifer Test Interpretation** — Developer and instructor of a professional short course on hydrogeologic testing. The course has now been taught over 35 times in Canada, the United States, Brazil and China.
- **International Ground-Water Modeling Center, Colorado School of Mines,** Golden, Colorado — Provided professional short courses in MT3D solute transport modeling.
- **Environment Institute for Continuing Education** — Developed and presented Internet-based seminars.
- **Midwest Geosciences** — Presented short-course lectures. Developed and presented Internet-based seminars on the interpretation of aquifer tests.
- **Kingdom of Cambodia Ministry of Water Resources and Meteorology** — Provided training for groundwater modeling expertise in Cambodia.
- **Eastman Kodak Company,** Region of Waterloo — Developed and led training courses for site-specific models and technology transfer.

LANGUAGES

French, Portuguese, Spanish

AWARDS AND HONORS

Citation for Leadership Recognition, National Ground Water Association, 2018

Graduate Scholarship, University of Waterloo, 1990

Citation for Reviewing Excellence, Water Resources Research, 2005

PROFESSIONAL SOCIETIES

International Association of Hydrogeologists

National Ground Water Association

American Geophysical Union

Canadian Geotechnical Society

American Society of Civil Engineers

International Mine Water Association

APPOINTMENTS

2007 – present:	Co-Chair of the Kitchener-Waterloo Hydrogeology Seminar Series
2016 – 2017:	Chair of the National Ground Water Association Groundwater Advisory Panel Group #2 (Stepwise modeling)
2015:	Co-Technical Chair of the IAH-CNC Waterloo 2015 Hydrogeology Conference
2010 – 2013:	Canadian Geotechnical Society, Chair of the Hydrogeology Division
2006 – 2009:	University of Waterloo, Department of Earth Sciences, Adjunct Lecturer
1999 – 2009:	Canadian National Chapter of the International Association of Hydrogeologists, Vice President

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PUBLICATIONS AND PRESENTATIONS

BOOKS

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Priebe, E.H., C.J. Neville, D.L. Rudolph, 2017. Enhancing the spatial coverage of a regional high-quality hydraulic conductivity dataset with estimates made from domestic water-well specific-capacity tests, *Hydrogeology Journal*, https://doi.org/10.1007/s10040-017-1681-2, 14 p.

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Priebe, E., C. Neville, and F. Brunton, 2015. Evaluating the influence of regional stratigraphic architecture on hydraulic conductivity variability in Early Silurian carbonate rock aquifers, Guelph Region, southern Ontario (abstract). *Waterloo 2015*, International Association of Hydrogeologists – Canadian National Chapter, October 29, 2015, Waterloo, ON.

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Sorel, D., C. Neville, M. Rafferty, K. Chiang, and C. Andrews, 2002. Hydraulic Containment Using Phytoremediation and a Barrier Wall to Prevent Arsenic Migration. *Proceedings of the Third International Conference on Remediation of Chlorinated and Recalcitrant Compounds,* May 20-23, 2002, Monterey, CA, A. Gavaskar and A. Chen, eds, Battelle Press.

Neville, C., S. Sayko, M. Kuhl, R. Passmore, G. Luxbacher, M. Mateyk, J. Williams, and B. Trytten, 2002. Identification of Groundwater Flow Zones with Borehole Geophysics and Flowmeter Profiling, Hyde Park Landfill Site, Niagara Falls, New York. *Proceedings of the 2002 Fractured-Rock Aquifers Conference,* March 2002, National Ground Water Association, Denver, CO.

Andrews, C., and C. Neville, 2001. Groundwater Flow in a Desert Basin: Complexity and Controversy. in *Proceedings of MODFLOW 2001 and Other Modeling Odysseys*, September 11-14, 2001, International Groundwater Modeling Center, Colorado School of Mines, Golden, CO, pp. 770-775.

Neville, C., and M. Tonkin, 2001. Representation of Multiaquifer Wells in MODFLOW. *Proceedings of MODFLOW 2001 and Other Modeling Odysseys*, September 11-14, 2001, International Groundwater Modeling Center, Colorado School of Mines, Golden, CO, pp. 51-59.

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CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

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Guo, W., and C. Neville, 1998. Adaptation of MODFLOW for Transient Air Flow Simulation. *roceedings of the MODFLOW 98 Conference*, October 1998, International Ground Water Modeling Center, Colorado School of Mines, Golden, CO.

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Neville, C., S. Sayko, M. Kuhl, R. Passmore, G. Luxbacher, M. Mateyk, J. Williams, and B. Trytten, 2002. Identification of Groundwater Flow Zones with Borehole Geophysics and Flowmeter Profiling, Hyde Park Landfill Site, Niagara Falls, New York. *2002 Fractured-Rock Aquifers Conference,* National Ground Water Association, Denver, CO, March 2002.

Riley, M., and C. Neville, 2001. Natural Attenuation in Tidal Zones. *National Ground Water Association Northwest Focus Conference*, Portland, OR, February 2001.

Neville, C., M. Riley, and C. Zheng, 1998. Implicit Modeling of Low-Permeability Features: An Appraisal for Solute Transport. *MODFLOW '98 Conference*, International Ground Water Modeling Center, Colorado School of Mines, Golden, CO, October 1998.

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Neville, C.J., 1992. Contaminant Recovery Test Site: Summary of Geostatistical Analyses of Core Data. Technical Note, Waterloo Centre for Groundwater Research.

Neville, C.J., 1991. A Numerical Study of Hydraulic Communication Around Packers in Uncased Boreholes. Prepared for Solinst Canada Ltd. Waterloo Centre for Groundwater Research.

Kaiser, P., D. Chan, D. Tannant, F. Pelli, and C. Neville, 1987. Numerical Simulation of Room 209 Instrument Ring, Interim Technical Report. Prepared for Atomic Energy of Canada. Pinawa, Manitoba. Department of Civil Engineering, University of Alberta, Canada.

CHRISTOPHER J. NEVILLE, M.SC., P.ENG.

Chief Hydrogeologist

DOCUMENTATION OF GROUNDWATER MODELING SOFTWARE

Wang, X., and C.J. Neville, 2016. User's Guide for DECAY, Analytical Solution for One-Dimensional Solute Transport with Multispecies Subject to First-Order Decay Reactions. S.S. Papadopulos & Associates, Inc.

Neville, C.J., 2004. MPNE1D Analytical Solution: User's Guide. Version 4.1. S.S. Papadopulos & Associates, Inc.

Neville, C.J., 1998. ATRANS: Analytical Solutions for 3D Transport from a Patch Source. Version 2. S.S. Papadopulos & Associates, Inc.

Zhang, Y., C. Zheng, C. Neville, and C. Andrews, 1996. ModIME User's Guide: An Integrated Modeling Environment for MODFLOW, PATH3D, and MT3D. Version 1.1. S.S. Papadopulos & Associates, Inc.

Neville, C.J., 1992. Analytical Solutions for Transport with NAPL Sources. Technical Report (computer program and documentation), Waterloo Centre for Groundwater Research, Canada.

Neville, C.J., 1992. GA83: A Program for Computing the Effective Hydraulic Conductivity and Macrodispersivity Tensor for Three-Dimensionally Heterogeneous Aquifers Using the Stochastic Theory of Gelhar and Axness [1983]. Technical Report (computer program and documentation), Waterloo Centre for Groundwater Research, Canada.

Neville, C.J., 1992. Notes on the De Hoog Routine for the Numerical Inversion of Laplace Transforms: Analytical Solutions. Technical Report (computer program and documentation), Waterloo Centre for Groundwater Research, Canada.

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6) Public Trust in Manitoba Impact Assessment Process

Participants expressed significant concerns about the trustworthiness of IA in Manitoba and recommended that independent oversight and decision-making is required. Some participants indicated they had lost trust in Manitoba's process and did not feel decision-makers were keeping the public's best interests in mind. As explained by one survey participant:

> "Impact assessments are conducted by proponents with hired consultants that only present information favourable to the project otherwise they are dismissed. The TAC only reviews this biased impact assessment. The TAC never meets as a whole and considers only aspects under their narrow jurisdiction monitored by their politically appointed directors who often promote the project for ideological or personal interest reasons. It is a systemically corrupt process."

Across all engagement methods in this project, there were calls for more independent oversight of the provincial IA process. Participants focused on several aspects of the process, such as the steps taken to classify and assess the potential impacts of a project, the license decision, the identification and review of potential licensing conditions, and monitoring and follow-up activities.

> "[Monitoring] should be done in unbiased, independent, trustworthy, transparent collection and analysis" (Public Survey Respondent)

There was support for the creation of an "Environmental Commissioner" position, e.g., a provincial equivalent of the federal Commissioner of the Environment and Sustainable Development (CESD) out of the Auditor General's Office, that would play a similar oversight role to the provincial Ombudsperson but focused specifically on environmental matters. There was also support for expanded powers or more use of independent tribunals like the Clean Environment Commission and the Public Utilities Board.

Manitoba is required by law to undertake a comprehensive review of recent amendments to The Planning Act and The City of Winnipeg Charter (formerly Bill 37 and Bill 34). Manitoba retained Braid Solutions Inc. to conduct the independent review of the legislative amendments including a comprehensive stakeholder engagement process.

Conducted from March to October 2024, this review involved over 250 participants representing more than 95 municipalities, development stakeholders, and the public. This included extensive consultations with the City of Winnipeg, the Manitoba Municipal Board, Manitoba Municipal and Northern Relations (MNR), and other relevant government departments.

The review team utilized a structured methodology that included structured interviews, analysis of municipal regulatory performance data, review of Municipal Board appeal functions, public input through EngageMB, and formal submissions from stakeholder organizations.

This document constitutes the What We Heard Report. A Final Report that includes recommendations has been delivered to government. Manitoba is required to table the report in the Legislative Assembly by October 29, 2025.

The following appendices will be provided with the Final Report at that time:

A. Statutory Review of Planning Legislation Phase I Report
B. Statutory Review Methodology
C. Implementation Guides for Bill 19, Bill 34 and Bill 37
D. Structured interview guide
E. Regulatory performance data analysis
F. Summary of areas for clarification received from participants with Act, Section and Clause reference
G. Planning appeal structures and authorities in other jurisdictions
H. Formal submissions received by review team

Statutory Review of Provincial Planning Legislation

What We Heard

Prepared for:

Manitoba Municipal and Northern Relations

October 28, 2024

Executive Summary

In accordance with legislative requirements, an independent review of The Planning Amendment and City of Winnipeg Charter Amendment Act (Former Bill 37), The City of Winnipeg Charter Amendment and Planning Amendment Act (Former Bill 34), and related appeal provisions of The Planning Amendment Act (Improving Efficiency in Planning) (Formerly Bill 19) was conducted to assess their impact and effectiveness.

This review aimed to capture feedback from a broad range of stakeholders, analyze the legislation's performance, and provide recommendations for improvement.

Conducted from March to October 2024, this review involved over 250 participants representing more than 95 municipalities, development stakeholders, and the public. This included extensive consultations with the City of Winnipeg, the Manitoba Municipal Board, Manitoba Municipal and Northern Relations (MNR), and other relevant government departments. The review team utilized a structured methodology that included structured interviews, analysis of municipal regulatory performance data, review of Municipal Board appeal functions, public input through EngageMB, and formal submissions from stakeholder organizations.

What We Heard

The review revealed that while many of the legislation's objectives have merit, the implementation has fallen short of expectations. Stakeholders expressed concerns about the legislation's complexity, lack of adequate implementation support, and unintended consequences that have, in some cases, exacerbated problems that existed before the legislation was introduced.

Qualitative insights and perspective from review participants were contrasted with an analysis of the impacts of the legislation on development decision making processes wherever possible.

The consultation findings were aggregated into the following 9 key theme areas:

- Consistency, Clarity, and Certainty in the Legislation
- Implementation Resourcing and Supports
- Planning and Development Approval Processes
- Balance between Provincial Interest/Strategic Assets/Economic Development and Community Interest in Land Development and Planning Decision Making
- Regional Planning Board Formation and Governance
- Regional Plan Role, Emphasis and Adoption
- Role of the Municipal Board as Appeal Body for Planning and Development Decisions:
- Effectiveness of Municipal Board Processes for Planning and Development Decisions:
- Balance between Landowner Rights and Community Interest in Land Development and Planning Decision Making

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Appendices

1. Introduction

Manitoba is required by law to undertake a comprehensive legislative review of The Planning Amendment and City of Winnipeg Charter Amendment Act (Former Bill 37) and The City of Winnipeg Charter Amendment and Planning Amendment Act (Former Bill 34) within 3 years of this legislation coming into force (October 29, 2024). These pieces of legislation set out a requirement for public representations to be included in the statutory review process. Within one year after the review is undertaken, the minister must table a report on the review in the Legislative Assembly.

The purpose of this report is to set out the findings of the legislative review process conducted by Braid Solutions Inc. ("the review team").

Conducted from March to October 2024, the project incorporated participation from over 250 individuals representing some 95+ municipalities, development stakeholder organizations, and the public. It also included significant consultation with the City of Winnipeg, the Manitoba Municipal Board, Manitoba Municipal and Northern Relations Community Planning Branch, and other departments of the Manitoba government with a role in planning and development approval processes.

1.1. Objectives of this review

The formal objectives of this review were to:

- Capture feedback on the impact and performance of the legislation from a broad range of stakeholders and the public
- Independently assess this qualitative feedback using a range of quantitative analysis methods and processes
- Provide recommendations to inform future policy, operational, and legislative changes for consideration of the Minister of Manitoba Municipal and Northern Relations and the Manitoba government

Throughout the course of the review, the review team operated independently from Manitoba Municipal and Northern Relations (MNR) but was supported by a project lead and steering committee responsible to assist with coordination of all review activities.

Throughout the statutory review, the review team focused on the following questions:

- Did the changes to the legislation and supporting regulations achieve their intended outcome?
- What is working well and what is not?
- What has been the actual performance of planning and development processes since the legislation has been enacted?
- What improvements can be made to improve performance under the legislation or is a fundamental realignment required?
- Has the legislation struck the appropriate balance between the role of local governments to oversee planning and land development at the local level in contrast to the Manitoba government's role to establish policy and define performance or process expectations for municipalities?

The review scope did not include an assessment of the process to define and establish the legislation. Similarly, the review scope did not include the evaluation or assessment of decisions made by any stakeholder or organization as a result of the legislation being enacted. Rather, the review team adopted an approach to understand issues, concerns, and situations with a "going forward" perspective.

The review was completed in three phases:

- **Phase I** consisted of a structured process to engage with stakeholders to finalize the review consultation plan and to assess available data that could be used to support analysis of planning and development processes. At the completion of this phase, the review team published a report with recommendations to guide the formal review process. The full Phase I Report is included in **Appendix A.**
- **Phase II** involved execution of the review consultation and analysis process. Together with a comprehensive report of findings from the review ("What We Heard"), this document provides details on the overall review methodology including the approach for defining and executing a comprehensive consultation process with impacted stakeholders and the public. The complete statutory review methodology is included in **Appendix B**.

The specific legislation in scope of the review is described in the next section.

1.2. About the legislation in scope of the review

The key pieces of the legislation included in this statutory review are:

- The Planning Amendment and City of Winnipeg Charter Amendment Act (Former Bill 37) with most provisions coming into effect on October 29, 2021. A key provision related to major developments from this legislation remains un-proclaimed.
- The City of Winnipeg Charter Amendment and Planning Amendment Act (Former Bill 34) proclaimed on June 1, 2022, with planning amendments coming into force on September 1, 2023.
- The appeal provisions of The Planning Amendment Act (Improving Efficiency in Planning) (Formerly Bill 19) which received royal assent on June 4, 2018 with sections 18, 20, and 25 were proclaimed in later phases.

This legislation was developed in response to a June 2019 Treasury Board Secretariat Report, Planning, Zoning and Permitting in Manitoba. A copy of this report can be found here: www.gov.mb.ca/asset_library/en/proactive/planning_zoning_permitting_recommendations_2019.pdf.

The key goals for this legislation as described in a November 2, 2020 news release Manitoba to Improve Efficiency and Transparency of Land Use Planning were to:

- Streamline planning and approval processes to ensure timely and transparent decisions on private-sector capital investment opportunities
- Complement the existing authority of Manitoba municipalities to adopt, administer and enforce their development plans, zoning and all other bylaws respecting land use and development in their municipality
- Establish a regional planning authority in the Winnipeg Metropolitan Region
- Create new rights of appeals on a wide range of local planning decisions, including expanding public appeals to the Municipal Board for zoning applications in the city of Winnipeg
- Prescribe timelines for municipalities to process planning applications across the province

On the basis of stakeholder feedback, the same release noted that an earlier draft of the proposed legislation was updated to:

- Provide residents the right to appeal zoning bylaws in the City of Winnipeg, bringing consistency to the zoning appeals process across Manitoba
- Ensure decisions on planning applications cannot be delayed on the basis that the preparation or amendment to secondary plan is pending
- Ensure consultation with potential member municipalities before establishing any future planning regions

This announcement followed the work of a Minister's advisory group comprised of industry and municipal stakeholders with support by Manitoba Municipal and Northern Relations (MNR). Advisory group participants appreciated the requirement for a statutory review process to be included in the legislation so that a formal opportunity to review outcomes from many of the new provisions was established. They noted throughout the course of the review, that it was a key addition that improved stakeholder support for many of the changes introduced by these Bills.

In addition to working group sessions, Manitoba Municipal and Northern Relations conducted 76 consultation sessions with stakeholders from August 2019 to May 2022. Stakeholders that participated in these sessions included AMM, UDI, City of Winnipeg, many Manitoba municipalities, the Municipal Board, Manitoba Hydro, professional associations, and other stakeholders.

Together, these legislative changes are comprehensive in nature and resulted in updates to many areas of The Planning Act C.C.S.M. c. P80 and The City of Winnipeg Charter, SM 2002, c.39. Both Manitoba and the City of Winnipeg maintain websites with current information on these changes together with related procedural information as follows:

- City of Winnipeg: https://legacy.winnipeg.ca/ppd/Zoning/Bill37.stm
- Province of Manitoba: https://www.manitoba.ca/mr/land_use_dev/about_planning.html

A copy of the MNR implementation guides supporting this legislation is included in **Appendix C**. This material was utilized in all stakeholder consultation processes as a reference.

These materials, together with the relevant Acts, should be consulted for specific language or interpretation guidance.

These changes addressed eight general areas:

- New service standards for applications and appeals intended to add consistency, transparency, and clear timelines for common applications and appeal processes were introduced to:
    - Set timelines for key decision points for applications and appeals
    - Increase consistency for developers, planners, and government in sharing the same timelines for an application's processing or appeal's review
    - Align Manitoba to other Canadian provinces with planning and development service standards
- Changes were implemented to require a municipality to automatically refer a proposed zoning bylaw or zoning bylaw amendment to the Municipal Board when the municipality receives formal objections from 25 or more people who are eligible to vote in the municipality. These changes:
    - Ensure proposed zoning changes with significant public opposition receive a hearing overseen by an independent board
    - Create a consistent way for how a zoning bylaw referral may be trigged by public objection

- Changes were implemented for conditional uses affecting large livestock operations and aggregate operations to:
    - Provide applicants with the right to appeal a decision to reject, or a decision to impose conditions on large livestock operations
    - Provide applicants with the right to appeal a decision to reject, or a decision to impose conditions on an aggregate operation (e.g., quarry)
- Changes were introduced to require planning authorities to identify their reasons for rejection of some planning applications. These changes were made to improve transparency to applicants and the public.
- Changes were introduced to the Municipal Board's planning appeal and referral processes including time limits to hold hearings and make decisions that:
    - Require the Municipal Board to hold a hearing within defined timeframes set out in legislation after receiving a completed application
    - Require the Municipal Board to make a decision within defined timeframes set out in legislation after completing a hearing
    - Allow the Municipal Board to assign costs if it deems that unnecessary delays were caused by a municipality or planning district

  These legislative changes in turn rely on established processes that the Municipal Board has for scheduling a hearing or referral, conducting a hearing, providing notice to stakeholders, developing a decision, and issuing an order or referral report.
- Expanded appeal rights were introduced for specific planning applications in the City of Winnipeg and all other municipalities and planning districts. These changes were made to create new ways of appealing certain planning and development applications as well as adding consistency to the way appeals are processed. Notable changes include:
    - Increasing the number and types of development applications that may be appealed by applicants in municipalities outside of the City of Winnipeg, such as a development agreement decision, a development permit decision, a decision made by a council or planning commission regarding a development agreement, and more
    - Establishing new appeal rights for many types of development applications within the City of Winnipeg
    - Establishing maximum timelines for specific types of development applications to allow applicants the opportunity to appeal a lack of decision after a certain amount of time has passed
- Changes established the process to create planning regions across the province, including at the request of municipalities or the Minister. They also established the Capital Planning Region to create a consistent regional planning approach to land use in the province's capital region in alignment with other Canadian jurisdictions. These changes included:
    - Setting out mechanisms for formation of the Planning Region Board as a statutory corporation, the appointment of the Chair and Board Members, record keeping and recording requirements, decision-making and quorum considerations, and financial contribution by member municipalities
    - Requiring the 18 municipalities to be members of the Capital Planning Region
    - Allowing the Minister to change the boundaries by a planning region to add or remove municipalities by regulation

- Changes established a requirement that all planning regions, including the Capital Planning Region, must establish a regional plan, lead regional planning initiatives, and facilitate cost-effective regional infrastructure and services. The adoption process for regional plans must include at least two public hearings after which the planning region board must decide if it will give second reading to the plan or decide not to proceed any further with the by-law. The Minister can approve the plan, reject it or refer the plan or parts of it to the Municipal Board. Member municipalities must ensure their development plans are not inconsistent with the regional plan within three years after the regional plan is adopted.

The drafting approach for this legislation required it to work in concert with other statutes that set out the role and function of municipalities and the Manitoba Municipal Board. The review team's recommendation to include the following inter-related/consequential legislation in scope was accepted by MNR:

- The Planning Act, C.C.S.M. c. P80
- The City of Winnipeg Charter, SM 2002, c.39
- The Municipal Act, C.C.S.M. c. M225 Act
- The Municipal Board Act, C.C.S.M. c. M240 (with an emphasis on the Municipal Board's role and function in planning and development decision making processes)

This legislation is supported by several regulations that provide additional direction and implementation guidance. The regulations considered by the review team throughout the course of the review are:

- Capital Planning Region Regulation 161/2022 under The Planning Act C.C.S.M. c. P80
- Inland Port Special Planning Area Regulation 48/206 under The Planning Act C.C.S.M. c. P80
- Northern Manitoba Planning By-law Regulation 45/2002 under The Planning Act C.C.S.M. c. P80
- Planning Districts Regulation 25/2015 under The Planning Act C.C.S.M. c. P80
- Provincial Planning Regulation 81/2011 under The Planning Act C.C.S.M. c. P80
- Special Planning Areas Regulation 49/2016 under The Planning Act C.C.S.M. c. P80
- Subdivision Regulation 137/2006 under The Planning Act C.C.S.M. c. P80
- Technical Review Committee 119/2011 under The Planning Act C.C.S.M. c. P80
- Council Members' Codes of Conduct Regulation 98/2020 under The Municipal Act, C.C.S.M. M225
- Local Authority Designation Regulation 121/97 under The Municipal Act, C.C.S.M. M225
- Local Urban Districts Regulation 174/99 under The Municipal Act, C.C.S.M. M225
- Municipal Status and Boundaries Regulation 567/88R under The Municipal Act, C.C.S.M. M225
- Municipal Board Tariff of Fees Regulation under The Municipal Board Act C.C.S.M. c. M240
- Airport Vicinity Protection Area Regulation 66/2021 under The City of Winnipeg Charter, SM 2002, c.39
- City of Winnipeg Boundaries Regulation 102/92 under The City of Winnipeg Charter, SM 2002, c.39

- City of Winnipeg Wards and Communities regulation 154/92 under The City of Winnipeg Charter, SM 2002, c.39
- City of Winnipeg Zoning By-law Procedure Regulation 65/2003 under The City of Winnipeg Charter, SM 2002, c.39

1.3. Key planning concepts applicable to this review

The landscape for planning and development decision-making is complex and includes many related powers and functions supported by many different organizations.

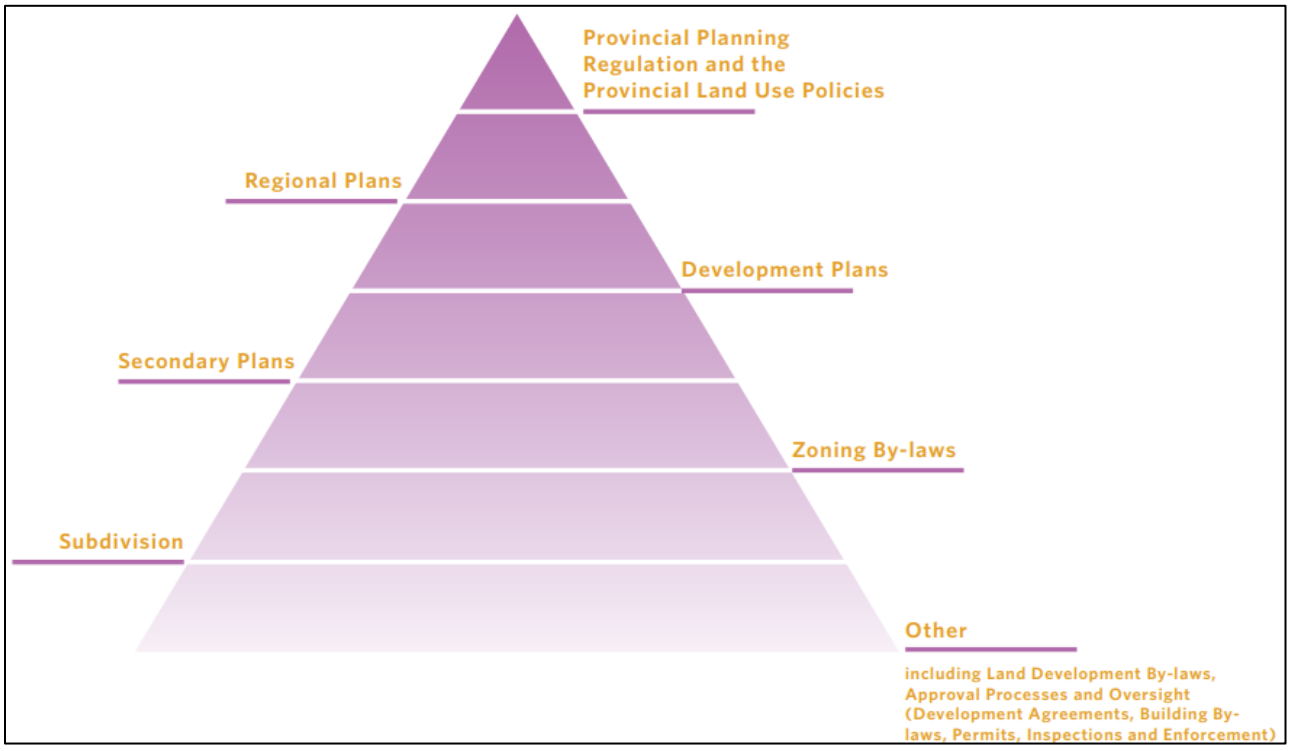
Readers of this statutory review that are not familiar with the underlying processes may benefit from reviewing the MNR's Planning Act Handbook at:
https://www.gov.mb.ca/mr/land_use_dev/pubs/the_planning_handbook.pdf

While there is variation in the processes followed by each municipality, this document provides a good general overview to all planning processes outside of the City of Winnipeg including those provisions introduced by the legislation subject to this review.

For the City of Winnipeg, the Planning, Property and Development Department maintains a good resource at: https://legacy.winnipeg.ca/ppd/Zoning/DevelopmentApplications.stm

Five basic concepts with greatest significance to this review are:

Figure 1: Hierarchy of Planning and Development Control



Source: The Planning Act Handbook, Province of Manitoba (2023): Page 37.

- **Land use decision making works within a hierarchy of policies and plans**
    - The Provincial Planning Regulation and Provincial Land Use Policies define the fundamental requirements established for land development in the province.

- All municipal development plans, including those for the City of Winnipeg must support and reinforce these requirements.
- Development plans, secondary plans, zoning by-laws, and subdivisions work within this framework at an increasing level of detail.
- Development plans are intended to guide development decision-making over a longer period (up to 20 or 25 years) while secondary plans and zoning by-laws provide more specific guidance to decision makers about a specific land use (e.g. housing, commercial development, quarry…) at the time of application.
- "Conditions" and/or "development requirements" are established by a planning authority to ensure that a development aligns with these policies.
- There are prescribed processes to ensure that the input of impacted land owners and the public are reflected in these policies and plans before they are finalized.
- The Minister has final approval authority over all development plans and their alignment with established Provincial Land-Use Policies.

- **There is a formal opportunity for input from impacted stakeholders, adjacent landowners, and the public in all stages of the process.**
  - The Province of Manitoba is required to undertake a consultation process in the establishment of the Provincial Land-Use Policies.
  - The Planning Act and City of Winnipeg Charter set out notice and hearing provisions that create an opportunity for stakeholders, adjacent landowners, and the public for all plan and policy approval.
  - The primary mechanism for this input is through a public hearing convened by the planning authority or municipal council.
- **Planning authorities are responsible to ensure that all development aligns with the approved development plan and zoning bylaws for each municipality**
  - The government establishes the role of planning authorities to oversee development through the Planning Act and City of Winnipeg Charter.
  - A municipal council is the default planning authority in Manitoba.
  - Municipalities can delegate all or part of its planning decision making authority to a planning district.
  - Municipalities also have the authority to establish a planning commission that can administer delegated approval functions outside of a council decision making structure.
  - Manitoba Municipal and Northern Relations Community Planning Branch supports all planning authorities with:
    - Administering the subdivision process (except for planning authorities specifically authorized to manage this activity)
    - Circulating all plans to relevant departments of the Manitoba government for comment (e.g. Canada Post, utilities, etc.)
    - Providing formal comments on all applications with respect to their alignment with provincial requirements and approved plans including a recommendation report to the planning authority and/or council
    - Delivering specialized panning support on a request basis
  - The City of Winnipeg is established as its own planning authority under the City of Winnipeg Charter.

    - Winnipeg's Planning, Property & Development Department supports all application and plan circulation processes on behalf of all City of Winnipeg Departments.
        - It is responsible for providing formal comments on planning applications and making a recommendation report.

- **An application initiates the formal approval process. A development permit and/or a development agreement establishes the commitments of a project proponent and municipality following approval.**
    - Planning authorities establish the requirements for each type of application within the requirements established by legislation and regulation.
    - Following submission of the application, the planning authority notifies adjacent landowners, stakeholders, and the public of the application.
    - The planning authority also undertakes a review of the application to ensure that it aligns with the appropriate municipal plans, by-laws, and development standards.
    - The planning authority also circulates the application internally to understand the requirements for a development to proceed.
    - This process includes circulation of the plan to internal stakeholders responsible for infrastructure, transportation networks, and the provision of other services.
    - These requirements and a recommendation from the Planning Authority are included in a report provided to a municipal council to support decision making together with other information provided at the public hearing.
    - The requirements defined in this process often form the substantial part of a development approval.
    - These requirements are incorporated into the final approval by the council or planning authority and, often established as conditions in a development permit and/or a development agreement.
    - These documents confirm the development plan included in the application and include the requirements or conditions of its approval as well as any other commitments from the applicant or municipality to proceed with the project.
- **Municipalities have the authority in legislation to delegate some of their powers to a "designated official" or "designated employee"**
    - This scope of the designated functions will depend on the requirements of each planning authority.
    - Generally, a designated official can make decisions on the completeness of an application, provide assistance with approval processes, and make delegated approval decisions authorized by council.

1.4. Environmental factors affecting this review

Throughout the course of the project, the review team identified a number of factors that had an impact on the conduct of the review and/or the perspectives of participants. Many of these factors were identified by participants as important during the review process and may assist the reader in understanding the full context of the review.

These factors are provided here in no particular order together with some feedback on their relevance to the review:

- **Provincial by-election**
  Manitoba conducted a byelection for Tuxedo for a 30-day period ending June 18, 2024. Neither the Department nor the review team was able to communicate with review participants or the public leading up to, and during this period, due to campaign communication restrictions defined in The Election Financing Act (C.C.S.M c. E27).

- **New direct funding initiatives for municipalities**
  After the legislation was implemented, the federal government introduced a number of programs providing direct financial support to municipalities. The most significant of these is the Housing Accelerator Fund (HAF). All municipal participants noted that this new program has increased the urgency for municipalities to find ways to streamline housing development in order to access funding supports. This has directly increased the willingness/interest of most municipalities to consider accelerated approval process change as well as to investigate significant realignment of community development plans and zoning by-laws to meet program funding criteria. This level of engagement did not exist at the time the legislative change was implemented in Manitoba. Municipal stakeholders believe that funding programs that have direct municipal performance criteria will expand over time and move into future programs like infrastructure investment. The review team was aware that MNR and stakeholders were engaged in discussions about changes to the objector referral provisions to improve their ability to deliver on housing commitments. Manitoba announced Bill 40 with this objective on October 16, 2024.

- **Increased interest in planning and populist sentiment**
  All municipal governments in Canada, and in many other countries, are experiencing an increased activity and interest in community planning and development processes. This includes participation by individuals and groups that have developed positions based on misinformation and broad populist theories being advanced through social media. In many cases, these stakeholders have taken extreme positions on issues ranging from land use to density to transportation planning. During the course of the review, there was strong opposition expressed to the approval of Winnipeg Metropolitan Region Plan20-50 as part of its formal public hearing process and through formal delegations registered at council meetings of several WMR municipalities. This activity was accompanied by verbal threats of violence against many elected representatives, administration officials and the public service. Participants in this review noted that this decision-making context was not contemplated when the legislation was implemented. They noted that this experience has shaped their perspective on the implications for overall municipal governance as well as the performance of key aspects of this legislation.

- **Government decision to introduce changes to legislation under review**
  During the course of the review, the Province of Manitoba announced its intention to change provisions of the regional planning board legislation to allow municipalities to opt out of the Winnipeg Metropolitan Region. This legislation is in scope of this review. It is the prerogative of the government to implement any legislative change at any time. Following the announcement, the review team noted a change in the tone and direction of the feedback from many municipal participants. Many participants made formal requests to be re-engaged and to provide additional perspective based on government's actions.

- **Operational review of the Municipal Board**
  A key component of the legislation under this review encompassed expanded appeal processes for planning and land development decision making at the Municipal Board. The review team noted that the Municipal Board initiated an internal operational review while the statutory review was underway. The scope and direction for the operational review is entirely separate from the legislative review process. While there was some

opportunity for the two review teams to share findings, there was no opportunity for the legislative review team to have input into operational review findings.

1.5. Organization of this document

This report is organized into the following sections:

Section Two presents review outcomes ("What We Heard") summarized into 9 key themes. For each theme area, stakeholder and public feedback are summarized together with independent analysis conducted by the review team. This section includes feedback on the review process and regulatory performance data analysis provided by participants during the review.

Appendices have been included to provide additional detailed information wherever applicable. A full description of the statutory review methodology together with any limitations of this approach is included in this section as **Appendix B**.

2. Themes: "What We Heard"

This sets out review outcomes summarized into 9 key themes. For each theme area, stakeholder and public feedback are summarized together with independent analysis conducted by the review team.

The 9 theme areas as follows:

- Consistency, clarity and certainty in the legislation
- Implementation resourcing and supports
- Planning and development approval processes
- Balance between provincial interest/strategic assets/economic development and community interest in land development and planning decision making
- Regional planning board formation and governance
- Regional plan role, emphasis and adoption
- Role of the Municipal Board as appeal body for planning and development decisions
- Effectiveness of Municipal Board processes for planning and development decisions
- Balance between landowner rights and community interest in land development and planning decision making

This section also includes feedback on the review process and regulatory performance data analysis provided by participants during the review.

Feedback has been summarized to reflect participant feedback. The approach to consolidate this information is set out in **Appendix B**.

Summary response definitions

The review team has grouped findings that can be attributed more directly to a segment of project participants where applicable.

In this context, the following segment definitions are applied consistently throughout this report:

- Participant(s) – an individual or group of participants in any phase of the statutory review project.
- "Specific group" participants – a segment of the participants with a common role or perspective as in "municipal participants" or "government participants".
- Stakeholders – all individuals or organizations with a direct interest in the legislation subject to this review.
- Public – refers in the appropriate context to all citizens of Manitoba or specific comments attributed to a citizen impacted by the legislation as distinct from other stakeholders with a more formal interest in the legislation subject to this review or responses from the public survey conducted on EngageMB.
- Department/The Department/MNR – findings or feedback or actions related to Manitoba Municipal and Northern Relations as the responsible department for the legislation subject to this review.
- Manitoba government/government – findings or feedback or actions specifically directed at the Manitoba government.

Quantifying the aggregate perspective of a specific stakeholder group is particularly challenging, especially when many sessions were conducted in a workshop setting with multiple participants.

To assist readers of this report understand how the review team summarized the feedback it has received, the following definitions have been adopted throughout the report:

- All participants – comments or feedback that would apply to essentially all participants without exception
- Majority – comments or feedback that would apply to a majority of participants, with a strong majority being 75% or more of participants
- Minority – comments or feedback that would apply to a minority of participants, with a strong minority being 30% or more of participants

Where the review team has included its own observations or perspective, this commentary or feedback is specifically attributed to the review team throughout the report.

Where appropriate to add context to findings, quotes from review participants are identified as shared with the review team as follows:

> *"This is an example of the formatting for a representative quote where confidentiality has been maintained by the review team." – Source/participant role*

2.1. Consistency, clarity, and certainty in the legislation

Review participants were almost universal in the perspective that the planning legislation in scope of this review did not achieve the intended goal of creating consistency, clarity, and certainty. This perspective was shared by all key stakeholder and the public.

The majority of review participants share the perspective that the concepts informing key aspects of the legislation have merit, including a structured approach to regional planning, setting timelines and service standards, requiring reasons for decisions by councils and establishing an independent appeal function.

The key themes expressed by participants focused on the overall implementation approach to the legislation including the process to establish the specific language and supporting regulations it contains. They included:

- Complexity of the legislative changes and their integration within The Planning Act and City of Winnipeg Charter making interpretation difficult
- Lack of clarity on the interpretation and application of certain provisions in the legislation resulting in further divergence in processes between municipalities
- Drafting inconsistencies between the Planning Act and City of Winnipeg Charter as well as concerns about "errors" that were not addressed during implementation
- Concerns that feedback from stakeholders involved in the consultation process was not incorporated into the legislation and regulations

The drafting approach is seen by a majority of participants as overly "heavy-handed, top-down and regulatory". They noted that the legislation has been established with an emphasis on compliance, instead of being formalized as enabling legislation that would facilitate expedited decision making across all entities involved in planning and development decision making.

Municipal stakeholders were near unanimous that the legislation has diminished the role that municipalities have in planning and development decision making by setting out a regulatory framework that emphasizes compliance instead of collaboration. They noted that it would have been more effective to develop strong enabling legislation that reframed challenges as a common problem that spans across all organizations involved in planning decision making. This could have been supported by setting out more broadly defined policy outcome expectations that would align all organizations involved in planning decision making processes.

All municipal stakeholders acknowledged the government has a constitutional role to establish performance standards and define the expectations for municipal government. They raised concerns, however, that the balance between local autonomy and the provincial oversight role has been negatively impacted by this legislation.

Many rural municipal stakeholders stated their belief that the legislation was developed to address the performance of a small number of municipalities including the City of Winnipeg. They shared the perspective that a "broad brush" approach was not necessary, and the emphasis should have been placed on managing outcomes in municipalities where there were performance issues. One participant made a representative statement that noted:

> *"Department officials always retained powers to address non-performance through identifying performance concerns on an individual municipality basis and through engagement at that level. There was not a requirement to address this in such a broad-brush way through legislation." – Consultation participant*

All municipal stakeholders shared the perspective that there were alternative approaches to the legislation that could have been employed to improve "buy in" and alignment from the outset including:

- Incorporating clear policy principles or parameters that are applicable to all municipalities, planning authorities and government departments and agencies
- Clearly articulating the reasons for changes, expected outcomes, and how performance will be measured under the legislation to reduce uncertainty and resistance
- Engaging municipalities early and often in the process of developing new objectives or standards that would be incorporated into the legislation
- Implementing changes on a pilot basis in select municipalities before rolling them out province-wide, allowing for refinement of the approach
- Establishing a phased rollout of changes so that municipalities, developers, and the public had time to adapt and adjust to new processes
- Allowing for some degree of local adaptation to account for unique municipal circumstances, while maintaining core provincial objectives
- Ensuring that the process for evaluating municipal performance was transparent and fair, with clear criteria and opportunities for municipalities to address concerns
- Incorporating a mechanism for ongoing review and adjustment of the objectives and processes, incorporating feedback from municipalities and stakeholders

Representative statements from stakeholders reflecting this perspective include:

> *"The core motivation of improving coordination and efficiency in planning decisions is a good one. However, the existing legislation is too heavy-handed and takes away too much power from local governments and municipalities." – Consultation participant*

> *"Subsidiarity is the principle that all decision-making should happen at the lowest competent level and Bills 34 and 37 seem to be based on the assumption that there is no competent decision-making at the local level. That's generally not true. People care deeply about their communities and while occasionally mistakes are made, decisions are predominantly competent at the local level. If these Bills were edited to acknowledge subsidiarity, to acknowledge that there is competent decision-making at the local level, it would be easier to get to the important goals of delivering affordable housing and addressing homelessness" – Consultation participant*

> *"…[W]e strongly believe that the role and autonomy of local governments should be maintained. We also fully support the notion that municipal Councils are in the best position to make decisions based on their knowledge and understanding of their communities. It is their mandate as elected*

representatives to make decisions based on local priorities and context." – AMM formal submission

Development and industry stakeholders shared the perspective that there continue to be challenges impacting the effectiveness of planning decision-making processes in many municipalities, and that the overall effect of the legislation has not improved the situation. They noted that in response to the legislation many municipalities implemented new and varied processes for application processing and review. They also noted that the legislation has impacted the willingness of many municipalities to engage in shared planning processes especially at the concept stage because of concerns about missed timeframes. They also noted that it has significantly impacted the decision-making processes for many councils who are worried that decisions made locally will be overturned on appeal. Together, these indirect impacts have resulted in increased uncertainty and the establishment additional decision-making steps that have increased timeframes.

Some representative statements from developer and industry participants about the legislation overall included:

> *"There are significant inconsistencies in the use of terms and categories in different areas of the legislation within the City of Winnipeg and between municipalities, despite promises of standardization when the legislation was introduced." – Consultation participant*
>
> *"There have been way too many cooks in the kitchen developing this legislation, and if simply put, there has been a flawed outcome." – Consultation participant*
>
> *"Even experienced developers face challenges working under the new legislation and we are concerned about the impact it has had on the average citizen building a deck or on new entrants into our market." – Consultation participant*
>
> "*Have the changes resulted in consistency, clarity and certainty? No, in fact, the opposite has been true for the development industry. The changes to Manitoba's planning legislation have created additional processes and roadblocks rather than streamlining processes and improving approval timelines." – UDI formal submission*

Legal profession participants shared the perspective of other stakeholders that the legislation has been successful in establishing some minimum expectations. Specifically, they noted that the establishment of timeframes and the introduction of an appeal mechanism have been generally well received by those seeking accountability in the planning process. These participants were concerned, however, that the legislation has too much room for interpretation in many areas and does not provide enough guidance about expectations, especially about the role of the Municipal Board as an appeal body. Legal profession participants noted that these types of gaps in legislative guidance have resulted in very inconsistent decision making at all levels from application to appeal. This perspective can be represented in the following representative quotes:

> *"I have no idea what the intended outcomes ever were of the legislative changes, whatever the intent was that was, what the problem was? What was the issue? Because the changes were pretty broad." – Consultation participant*
>
> *"I know they tried to achieve some sort of consistency, but I think there is a challenge in trying to do that, and because everything doesn't fit within that little round hole and as a result it's a crapshoot as to what [councils decide] and how they're going to interpret the legislation." – Consultation participant*
>
> *"I think if you look at other legislation, particularly in Ontario and other provinces, they have built into the legislation [process and guidance] about how*

to operate within the established constructs. We have none of that in Manitoba." – Consultation participant

All participants expressed concerns about limitations in MNR's ability to provide meaningful support for the interpretation and application of the legislation as a key challenge. They noted that a lack of adequate guidance eroded support for the legislation and contributed to frustration on the part of all stakeholders and the public on many aspects of the legislation. Key concepts identified consistently by participants throughout the review requiring more clarification included:

- The role and scope of the Municipal Board's authority
- Procedural and coordination challenges resulting from new timeframe expectations
- Many aspects of the process to establish the capital planning region
- The process to develop the initial capital region plan

The review team summarized specific sections of the legislation where a requirement for interpretation or refinement was identified by participants. The review scope did not include detailed analysis of the identified clauses for accuracy or legislative intent. These are included in **Appendix F**.

Participants were universal in the perspective that the legislation requires clearer definitions, parameters and guidance to achieve the original objectives.

A strong majority of participants share the perspective that comprehensive improvements to the legislation are required.

Formal submissions received from AMM and UDI advocated for a process to redefine and clarify the legislative intent to establish a new framework that builds from the strengths and weaknesses identified in this review.

A significant minority of stakeholders believe that either the entire set of legislative changes or key sections of the legislation should be repealed or reframed entirely. This perspective is also shared by a minority of stakeholders represented in the public survey.

2.2. Implementation resourcing and supports

Background on the process to establish the legislation and inform stakeholders on its impact

The review scope does not include a full analysis of the process to establish the legislation, however, the review team believes that some context is relevant to readers of this review.

Following direction from government to initiate a process to develop this legislation, MNR undertook a significant consultation and communication program with stakeholders beginning in 2019. This engagement extended to the summer of 2022 and incorporated updates associated with milestones where various parts of the legislation were proclaimed.

In addition to working with an advisory group comprised of various professionals, industry and municipal stakeholders, MNR completed over 80 consultation and communication sessions focused on service and appeal timeframes under the legislation and an additional 15 sessions, focused on regional planning board implementation in the capital region.

The review team notes that the timing of the roll out occurred during various phases of the COVID-19 pandemic, and as a result, most consultation sessions were conducted using virtual meeting technology. MNR representatives and all review participants acknowledged the challenges the pandemic introduced during this process.

The Department has created comprehensive implementation guides supporting the changes for all three bills and published an updated Planning Act Handbook in January 2023.

Feedback on the legislation in scope of this review

All review participants share the perspective that the roll out process following proclamation of the legislation did not adequately anticipate the scope and scale of the change impacts for all stakeholders. They noted that the roll out plan did not provide for the appropriate resourcing and change supports to ensure it could be successfully implemented.

All review participants shared the perspective that, as an integrated set of changes, the legislation represents a major realignment of the process expectations across all planning authorities and government.

In that context, participants noted that the establishment of a formal regulatory structure with defined decision-making timeframes and appeal rights created a "perfect storm" without additional investment at all levels. They noted that these impacts were particularly significant as the impact of the legislation was being experienced just as development industry activity resumed to pre-covid levels.

Key areas identified by municipal and industry stakeholders that may have benefitted from incremental resource investments included:

- Training of industry participants as well as municipal staff and councils on decision making expectations under the legislation and the application of new requirements like formally documenting council's reasons to not approve an application
- Investment in new or upgraded technology to support planning application processing especially in municipalities with high levels of development activity
- Resources to support processing, tracking and reporting on approval processes set out in the new legislation including provincial review departments with a role in planning and development application processing
- Resources to support appeal and referral process requirements including preparation and attendance at appeal and referral hearings under the legislation

All review participants acknowledged efforts on behalf of the department to provide information and support. They noted, however, that the MNR team's ability to support the roll out was not supported with necessary investment in change management and communication supports.

Many review participants noted that feedback provided during the consultation process anticipated many of the impacts now being experienced on the ground and that a more effective implementation plan may have reduced the impacts in most areas.

Most public participants shared the perspective that there is not enough information available on the legislation that is targeted at individual members of the public. They noted that the resources developed to support the roll out are highly technical and primarily focused on the needs of the development community and municipal decision makers. They identified weaknesses in the communication associated with the implementation of the legislation, and in particular, the communication about capital region formation and Plan20-50. Details on these topics can be found in **Section 2.5** and **Section 2.6** of this report. Two representative quotes from public survey participants expressing this perspective are as follows:

> *"[There is] a lack of understanding by the public in the process, role and scope of Manitoba and its [planning] processes." – Public survey participant*

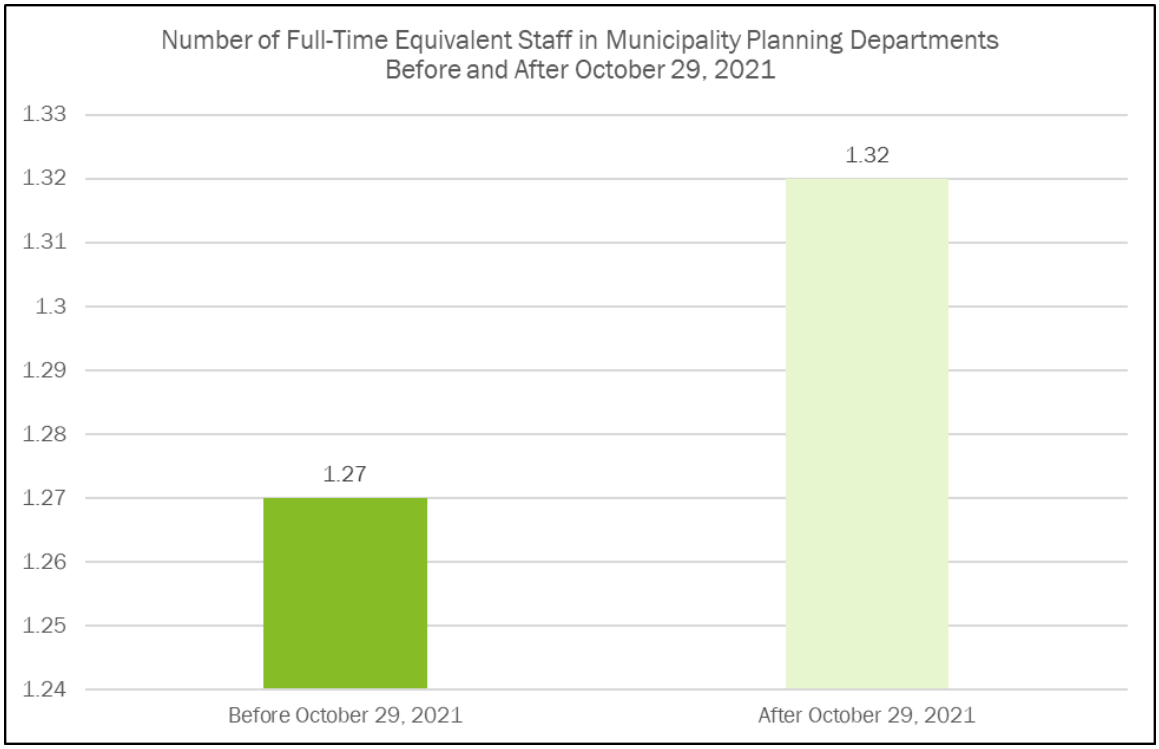
> *"The terminology and concepts in this legislation have not been made accessible to the average person so that they can understand how it benefits them in any way." – Public survey participant*

To understand some of the resource impacts experienced by municipalities under the new legislation, the review team incorporated questions in a survey to all municipalities about this topic. The complete analysis can be found in **Appendix E**.

In response to this survey, 65% of municipalities indicated that there had been little to no impact on their operation as a result of the legislation.

They identified the main area of impact to be an increased requirement for staff support to manage and track applications as a result of timelines established by legislation. For these municipalities, the increased staff requirement before and after October 29, 2021 is shown as follows:

Figure 2: Number of Full-Time Equivalent Staff in Municipality Planning Departments Before and After October 29, 2021



Source: Municipality Survey.

For larger municipalities including the City of Winnipeg, review participants confirmed that these resource impacts could be absorbed into existing teams but that this resulted in a corresponding impact on overall processing timelines.

Some representative quotes from participants in the municipal data survey on this topic are:

> *"No change in our operation, but increased time and effort in documentation." – Municipal survey respondent*
>
> *"Development permit system was implemented in 2021 and city allocated more staff time to meet the obligations." – Municipal survey respondent*
>
> *"Timelines have shortened so it seems everyone is stressed and harder to reach. We have to prioritize some applications. We also have incurred a development plan review cost of approximately $70,000 for a plan we really don't want to update." – Municipal survey respondent*
>
> *"There really are no significant changes or impact, the only thing being is our municipality is extremely bus, and at times, it is difficult to stay on track with deadlines." – Municipal survey respondent*

"No significant changes experienced since 2021. [Some of the pressure] could be partially due to a slow down in development in 2020, 2021 and 2022. A return to normal has only recently occurred." – Municipal survey respondent

All municipal, development, and industry stakeholders noted that there has been a significant increase in resource time and investment associated with the appeal and referral process. The detailed feedback on this process established under the legislation is provided in **Section 2.8**. For those participants that have been exposed to an appeal, they have identified significant increased costs for:

- Staff and leadership participation preparing and attending appeal hearings
- Investment requirements for legal services, planning and other professional services firms to support the application or to defend an appeal or referral filing

MNR participants expressed similar concerns associated with their support and participation of appeal and referral hearings through the Community Planning Branch.

The perspective of other review participants on this theme captured as representative quotes is as follows:

"In regard to costs being incurred by our members due to an increase in appeals, the examples provided by some municipalities to our office show that each appeal can cost $60,000-$100,000+ per appeal due to legal fees, personnel costs, disbursements, printing, and postage." AMM formal submission

"Municipal government must have a large budget set aside to cover the legal costs that result when companies with very deep pockets challenge a council decision." – Consultation participant

"… the threat of appeals represents significant financial risk which cannot be budgeted for in advance. Examples we have heard of are over $100,000 and this represents more than [our community] spends on planning resources in a calendar year.' – Consultation participant

Departments and agencies involved in the review of applications under the legislation expressed many concerns with its rollout including:

- A general lack of awareness of the legislation despite the fact that it had been in force for three years (The review team noted that only 3 out of 18 participants indicated that they had knowledge about the legislation before the review consultation session)
- Concerns about the lack of communication regarding the new legislation for municipal governments and the expectation it placed on other departments that were working with other legislated mandates that do not align with the changes to the Planning Act
- Concerns about the ability to meet the new timelines at current staffing levels with little engagement from MNR to prepare for the new requirements in an environment with limited ability to access new funding

Some representative quotes from departmental review participants about the legislation implementation and resource supports are as follows:

"It seems like this legislation was like building a NASCAR team, highlighting the lack of resources and the need for millions of dollars before the team can start racing." – Consultation participant

"[The review team's] package was very informative, and you know, all the timelines were there, and it's like, how did we not learn about this before?" – Consultation participant

"At this juncture, it's just not really realistic for us to be meeting [those legislated expectations] due to a variety of issues" – Consultation participant

Development and industry stakeholders shared these concerns expressed by review departments for all type of applications. They noted that specialist department resources were already under resourced to provide necessary planning studies and information that is fundamental to successfully undertake a development project. These participants shared their perspective that the new legislation further complicated the ability of these departments to fulfill their overall mandate while meeting the new requirements for planning and development decision making processes.

2.3. Planning and development approval processes

The legislative changes to establish a common planning and development approval process introduced several new concepts including:

- Service standards for processing and council decision making for applications resulting in zoning bylaw changes, subdivisions, conditional use application for quarry and aggregate and livestock operations, and development agreements
- Service standards for determining the completeness of various planning applications by a designated official or planning authority
- Establishing a requirement for councils to provide reasons for decisions not to approve planning and development applications
- Service standards for the completion of development agreements following a council decision.

These changes include un-proclaimed parts of the legislation related to major developments.

The implemented legislation relies on procedural requirements for decision making that are established in the Municipal Act, Planning Act and City of Winnipeg Charter. Decision making processes are enabled by the legislation, procedure by-laws, and administrative policies and procedures that are the responsibility of individual municipalities and planning authorities under these pieces of legislation.

Feedback on the legislation in scope of this review

While most review participants supported the concepts informing the legislation that work to establish a common service standard and approval process across the province, they shared the perspective that the implementation of this aspect of the legislation has been difficult, resulting in many unintended consequences.

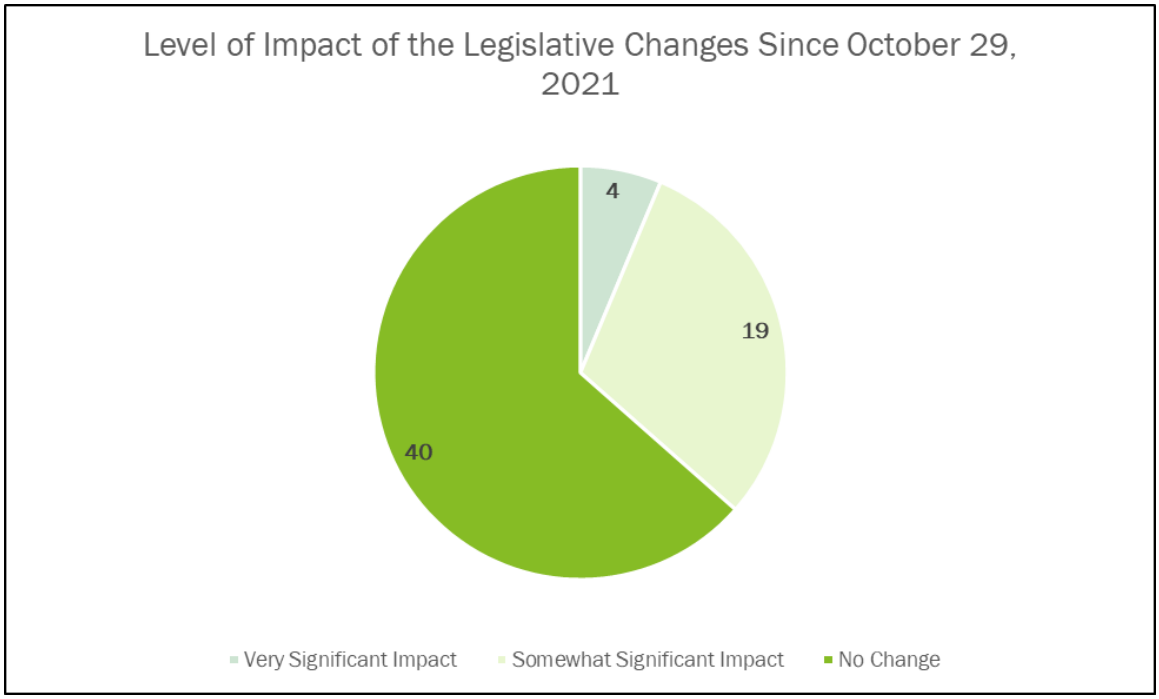
Review participants noted that the impacts of this aspect of the legislation have been variable across the province as shown by the response to the municipal survey conducted by the review team in Figure 3 below. Details on this survey can be found in **Appendix E.**

Many municipal and planning district participants outside of the capital region reported that these changes have had no impact on their operation or effectiveness. These participants noted that they had existing processes in place to facilitate development and planning applications that brought internal departments together to quickly identify municipal requirements and support project proponents with application and approval processes. Participants in this group were situated in areas of the province experiencing both higher and lower levels of planning and development activity.

In contrast, 37% of survey respondents reported that they experienced a somewhat significant or very significant impact from the legislation. The main areas of impact identified by these survey participants included challenges with processing times, introduction of processes for tracking and managing applications, and resource challenges associated with new decision-making implemented in response to the legislation.

These survey results align with feedback from consultation participants that the impact of these changes was experienced inconsistently by some municipalities, and in particular, within the City of Winnipeg.

Figure 3: Level of Impact of the Legislative Changes Since October 29, 2021



Source: Municipality Survey.

Municipal and planning district participants operating under the Planning Act consistently identified the challenges to meet the new timelines and process requirements due to lack of staff, funding, and technological resources resulting in delays and difficulties in processing applications efficiently. Some of these participants shared that the legislation has "almost created a sense of paranoia" about timelines on the part of some municipalities, resulting in a more bureaucratic process that makes it harder for municipal governments and planning districts to be customer-friendly.

Many municipal participants report that they have changed how they make decisions, particularly in providing reasons for rejections. They share that in many cases their Council has have added additional steps or extended decision-making timelines. These participants shared that they often find the new timelines difficult to meet, especially for complex applications or when dealing with provincial departments that are slow to respond with comments or requirements within established timeframes.

A majority of these stakeholders noted that they would benefit from a range of supports including standardized templates and direction on required decision-making processes in order to help further streamline approval processes across the province.

Many City of Winnipeg participants noted that the implementation of the legislated requirements was particularly challenging, particularly as it coincided with increased activity near the end of the COVID 19 pandemic. They noted several initiatives were implemented to action the legislation including service level agreements with review departments, establishing release & indemnity agreements to facilitate construction while a development agreement is being finalized and realignment of development approval functions. These participants noted that some actions did not have positive impacts. In its formal submission, the City of Winnipeg noted that some of the service standard provisions do not allow for consideration of existing Council decision making processes including hearing adjournments. The City's formal submission included a list of

specific provisions requiring clarification or revision. These have been incorporated into **Appendix F**.

Development and industry participants identified challenges attributed to this aspect of the legislation including:

- Less transparency by some municipalities, particularly at early stages of a project, because of concerns about missed timeframes especially about the completeness of applications
- Establishment of new procedures by some municipalities outside of established processes in the legislation with an emphasis on pre-application activities
- Variation and inconsistency of decision-making processes between municipalities across the province
- Lack of accountability for timely, consistent, and complete feedback by MNR and other government review departments involved in planning and development approval processes within timeframes set out by legislation
- Lack of accountability for timely, consistent, and complete feedback by departments at the City of Winnipeg involved in planning and development approval processes within timeframes set out by legislation

Many municipal, development and industry participants noted that this legislation could be strengthened by reinforcing a stronger collective emphasis on facilitating development instead of seeing planning decision making as a control function. These stakeholders noted that:

- Several Manitoba municipalities (including frequently identified examples Neepawa, Dauphin, and South Interlake Planning District) have an excellent approach to facilitating planning and development processes
- Participants noted that the experience of cities like Kelowna, Calgary and Edmonton should be considered for further evaluation
- They noted the key differences associated with processes in these jurisdictions compared to most Manitoba jurisdictions as follows:
    - They have total alignment and commitment to facilitate economic development and land development as a priority for all departments
    - They maintain structured application processes with transparent requirements for submission requirements at each phase in the process
    - These jurisdictions have clear processes to complete the initial application review that identify all requirements and conditions for project approval up front
    - These organizations utilize development agreements with standard schedules and terms to accelerate timeframes

The balance of this section provides more detailed feedback on specific aspects of the legislative changes intended to establish a common service standard and process across the province. It incorporates the feedback of all review participants and the public in addition to providing an analysis of timeline impacts completed by the review team.

2.3.1. Timelines

All review participants agreed that the concept of timelines for planning and development applications has merit.

The standardized timelines have provided some consistency and clarity for developers and municipalities about service standard expectations. This has generally been appreciated by stakeholders in the development industry and the public.

The key limitations of the legislated timelines identified by the majority of review participants are:

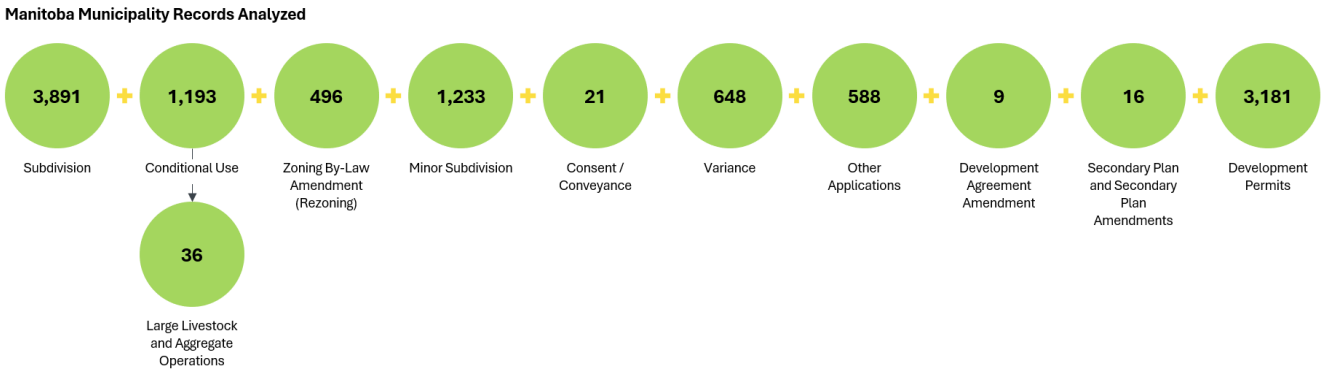
- The timelines don't account for the varying complexity of different applications. More complex projects often require additional time for proper review and consultation. This can lead to incomplete reviews or administrative recommendations to council, potentially compromising the quality of decision making and effectiveness of public hearings.
- The specified timelines do not provide adequate response timeframes especially when multiple departments or external agencies need to be consulted. This is particularly evident in cases involving provincial departments, where delays in responses can impact the overall timeline.
- Many municipal and planning district participants noted it was difficult to balance the need for thorough public consultation with the prescribed timelines, especially for contentious or complex applications.
- While the legislation allows for timeline extensions, some stakeholders feel that more flexibility is needed to accommodate unique circumstances or unforeseen challenges.
- The variation in timelines established between the City of Winnipeg Charter and Planning Act have created inconsistent expectations that make it difficult for project proponents working in many areas of the province.
- The stated timelines do not provide for municipalities to accommodate procedural delays, Council breaks/prorogue periods, or provide guidance about the applicability of periods when council decision making would be suspended (e.g. during an election).
- The timelines do not adequately account for the impact of appeal and referral processes on overall decision-making process, especially given delays experienced when an application is referred or appealed to the Municipal Board.

The review team conducted an analysis of timeframes specified under the legislation. The full analysis can be found in **Appendix E**.

Timeline impacts under the Planning Act

A total of 8,106 planning and development records were provided by municipalities. An additional 5,124 records were provided by MNR containing detailed timelines and critical dates for standard subdivisions and minor subdivisions. All analysis focused on the period after October 29, 2021 when these provisions came into force.

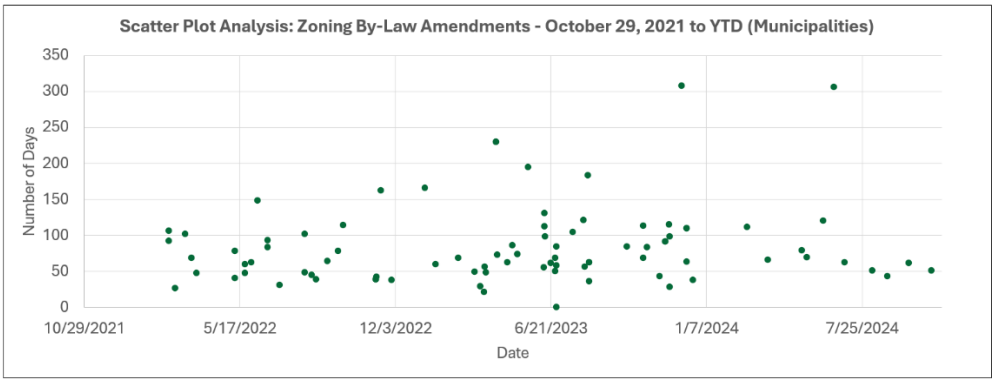
Figure 4: Manitoban Municipality Records Analyzed



Source: Municipality Data Request.

Graphs showing the performance of municipalities against the established timelines follow below:

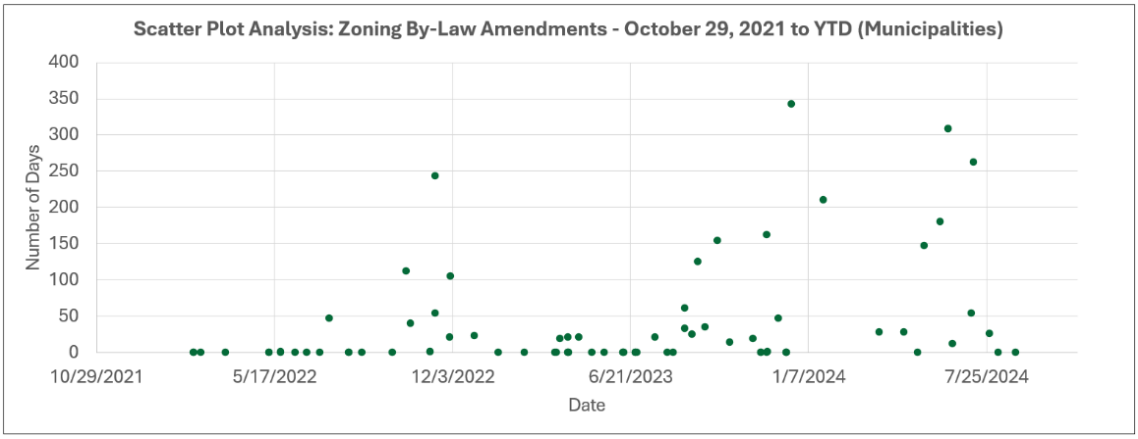
Figure 5: Municipalities Zoning By-Law Amendments – 90 Days from Date Application is Made to Hearing



- ✓ Records Analyzed: 85
- ✓ Mean Days Observed: 84
- ✓ Median Days: 68
- ✓ Minimum Days: 1
- ✓ Maximum Days: 308

Source: Municipality Data Request.

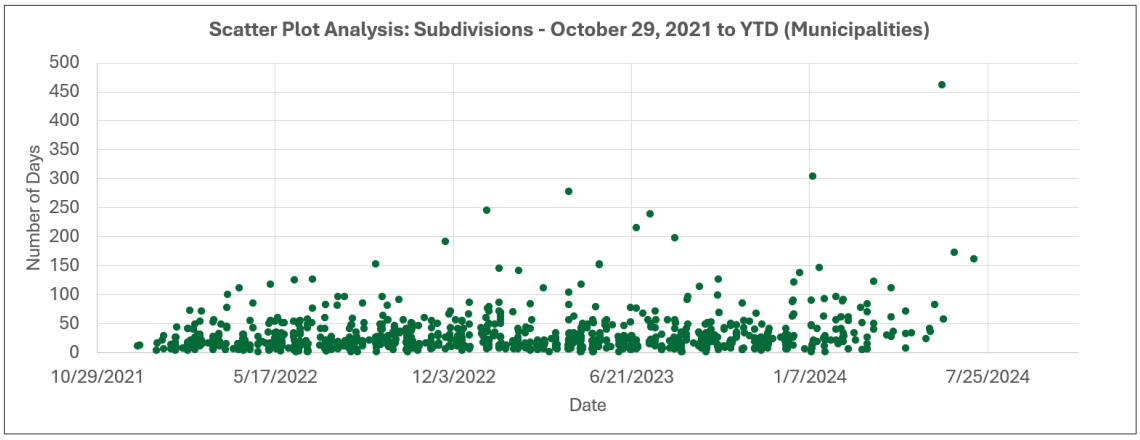
Figure 6: Municipalities Zoning By-Law Amendments – 60 Days from Hearing to Council Decision or Referral to The Manitoba Municipal Board



- ✓ Records Analyzed: 89
- ✓ Mean Days Observed: 37
- ✓ Median Days: 37
- ✓ Minimum Days: 1
- ✓ Maximum Days: 143

Source: Municipality Data Request.

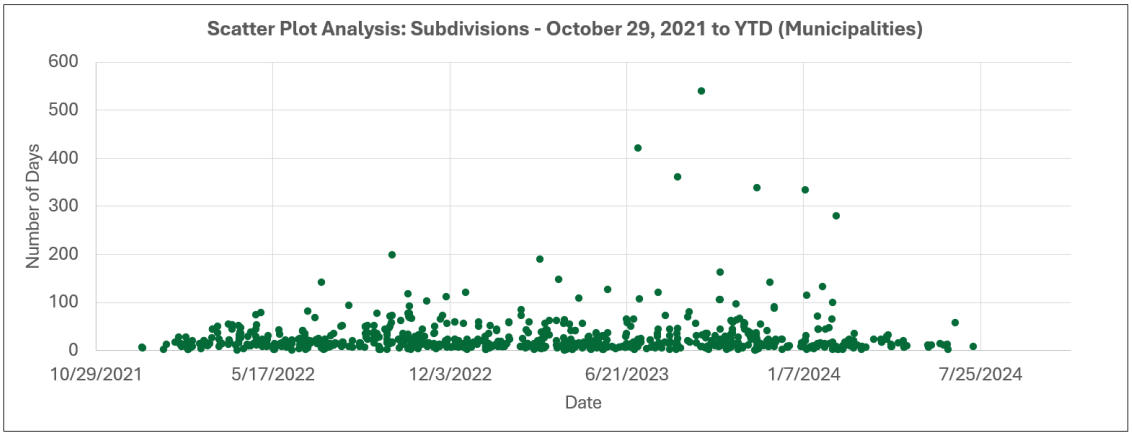
Figure 7: Municipalities Subdivisions – 90 Days from Date Application is Received by Council to Resolution



- ✓ Records Analyzed: 885
- ✓ Mean Days Observed: 31
- ✓ Median Days: 21
- ✓ Minimum Days: 1
- ✓ Maximum Days: 462

Source: Municipality Data Request; Manitoba MNR.

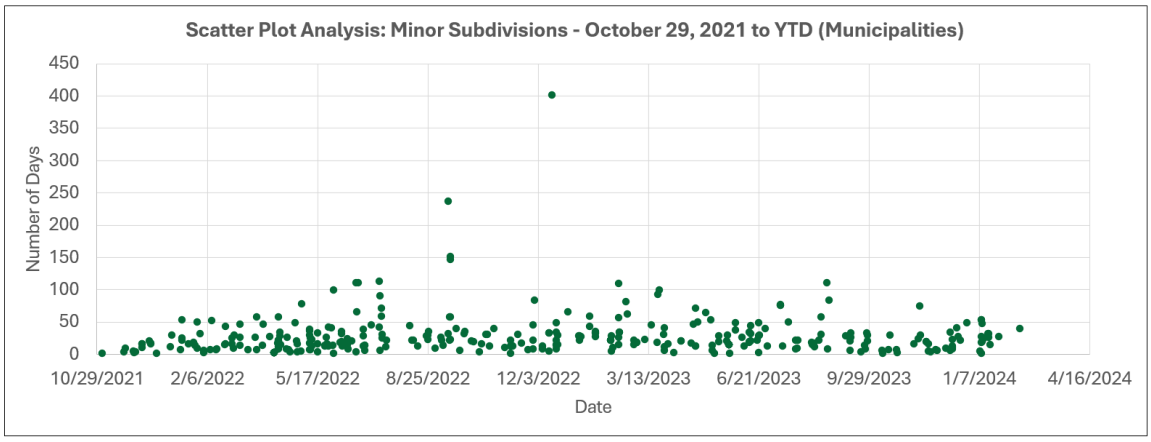
Figure 8: Municipalities Subdivisions – 60 Days from Date of Council Resolution to Approving Authority Decision



- ✓ Records Analyzed: 897
- ✓ Mean Days Observed: 24
- ✓ Median Days: 14
- ✓ Minimum Days: 24
- ✓ Maximum Days: 549

Source: Municipality Data Request; Manitoba MNR.

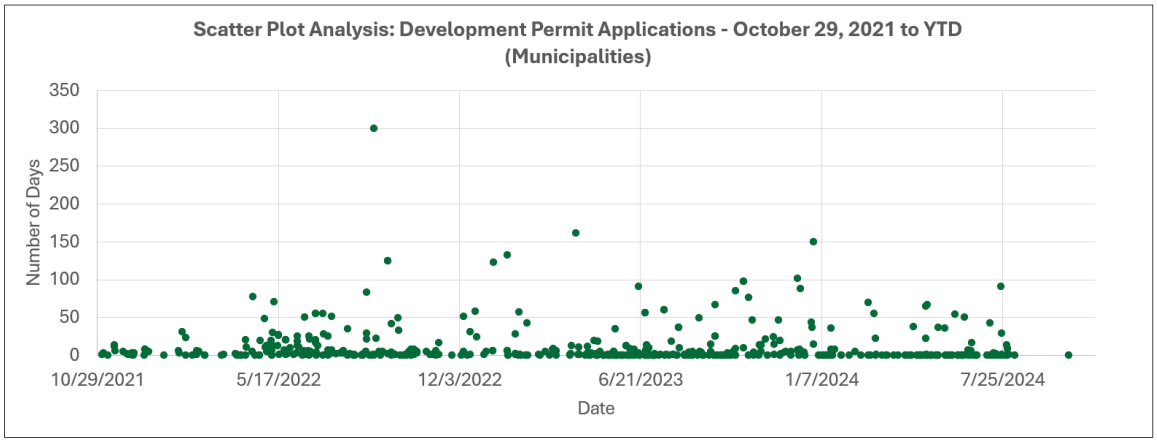
Figure 9: Municipalities Minor Subdivisions – 60 Days from Date Application is Received by Council to Decision



- ✓ Records Analyzed: 356
- ✓ Mean Days Observed: 27
- ✓ Median Days: 20
- ✓ Minimum Days: 1
- ✓ Maximum Days: 401

Source: Municipality Data Request; Manitoba MNR.

Figure 10: Municipalities Development Permits – 20 Days to Determine Whether Application is Complete from Date Application Submitted



- ✓ Records Analyzed: 546
- ✓ Mean Days Observed: 10
- ✓ Median Days: 1
- ✓ Minimum Days: 1
- ✓ Maximum Days: 300

Source: Municipality Data Request; Manitoba MNR.

The review team's conclusions from this analysis are:

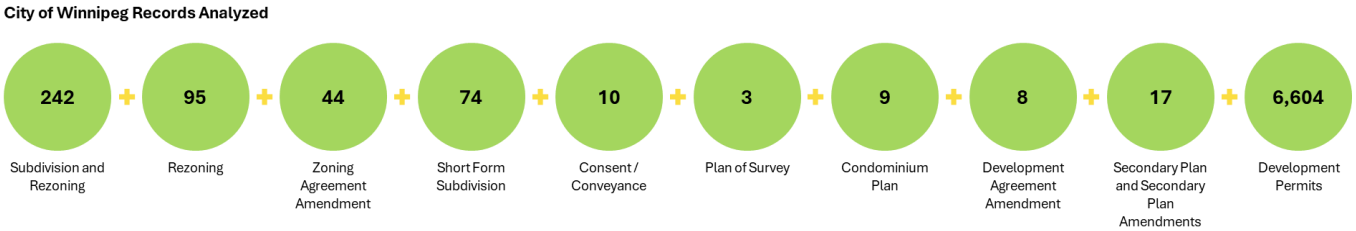
- Municipalities operating under the Planning Act are making significant progress towards the stated timeframes.
- For all application types, the mean and median performance is well within the established timeframes set out in legislation for all application types.

- Municipalities are generally consistent in meeting all appropriate service standards for standard subdivision and minor subdivision applications. (MNR administers the subdivision process except for Planning Districts with the formally established authority to perform this function.):
    - Almost all applicants are serviced within the appropriate service standard targets for standard subdivisions (92% - 95%) and minor subdivisions (92%)
- Municipality performance is variable for secondary plan amendments but there was not enough date available to make a complete assessment of performance for this type of application.
- Municipal performance in meeting the appropriate service standards for development permit applications is improving.
- There is an increasingly large number of instances where development permits are deemed complete in as little as one business day versus previous years.
- The major areas with a variance from established timeframes are as follows:
    - 35% of zoning by-law amendments are not meeting the appropriate service standard for the maximum number of days between when the application is made to the hearing date.
    - 16% zoning by-law amendments are not meeting the appropriate service standard for the maximum number of days between the hearing date to council decision.
    - 14% of development permit applications are not meeting the appropriate service standard target for the maximum number of days provided for a municipality to deem whether a development permit application is complete.
- There appear to be significant delays associated with the stated timeframes of 60 days from public hearing to council decision or referral to the Municipal Board
    - This includes significant deviations often as much as 4 to 5 times the established timeframes.
    - This finding underscores the time impact associated with referrals or appeals at the Municipal Board on the overall approval process.

Timeline impacts under the City of Winnipeg Charter

A total of 7,106 planning and development records were provided by Winnipeg to perform this analysis. All analysis focused on the period after October 29, 2021 when these provisions came into force.

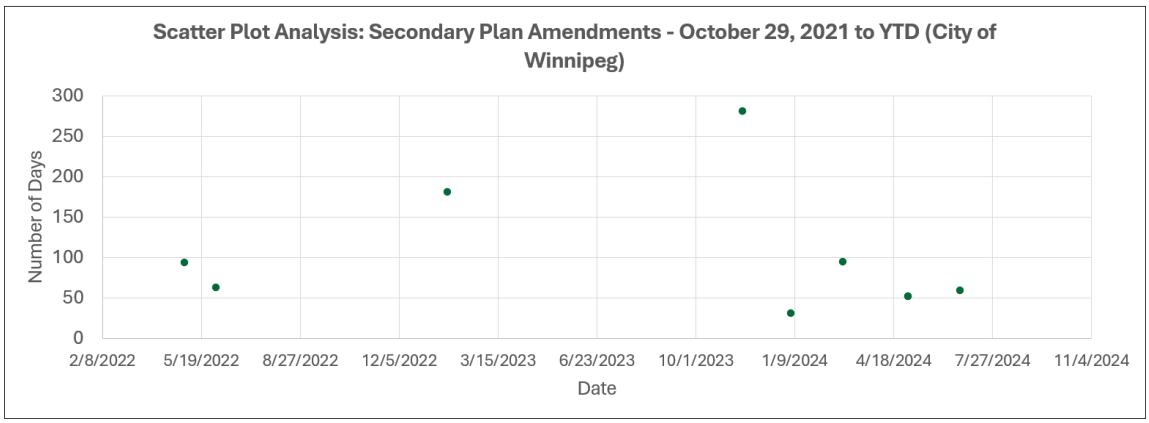
Figure 11: City of Winnipeg Records Analyzed



Source: City of Winnipeg Data Request.

Graphs showing the performance of the City of Winnipeg against the established timelines follow:

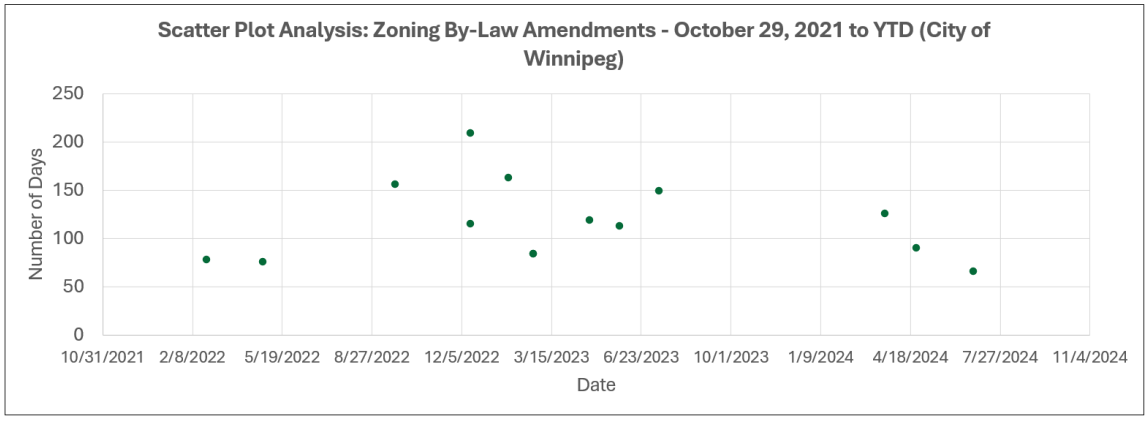
Figure 12: City of Winnipeg Secondary Plan Amendments – 150 Days from Date Completed Application is Received by City to Decision



- ✓ Records Analyzed: 9
- ✓ Mean Days Observed: 100
- ✓ Median Days: 63
- ✓ Minimum Days: 31
- ✓ Maximum Days: 281

Source: City of Winnipeg Data Request.

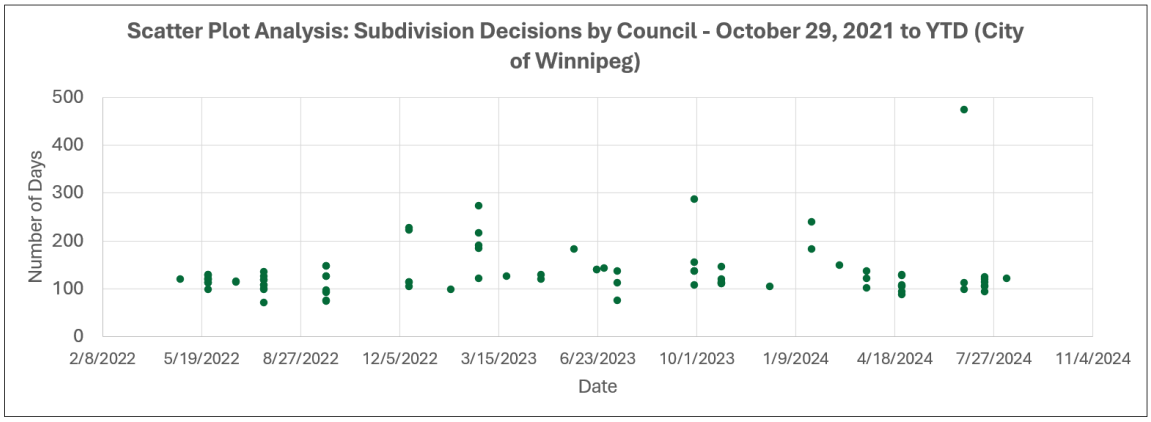
Figure 13: City of Winnipeg Zoning By-Law Amendments – 150 Days from Date Completed Application is Received by City to Decision



- ✓ Records Analyzed: 14
- ✓ Mean Days Observed: 116
- ✓ Median Days: 114
- ✓ Minimum Days: 66
- ✓ Maximum Days: 209

Source: City of Winnipeg Data Request.

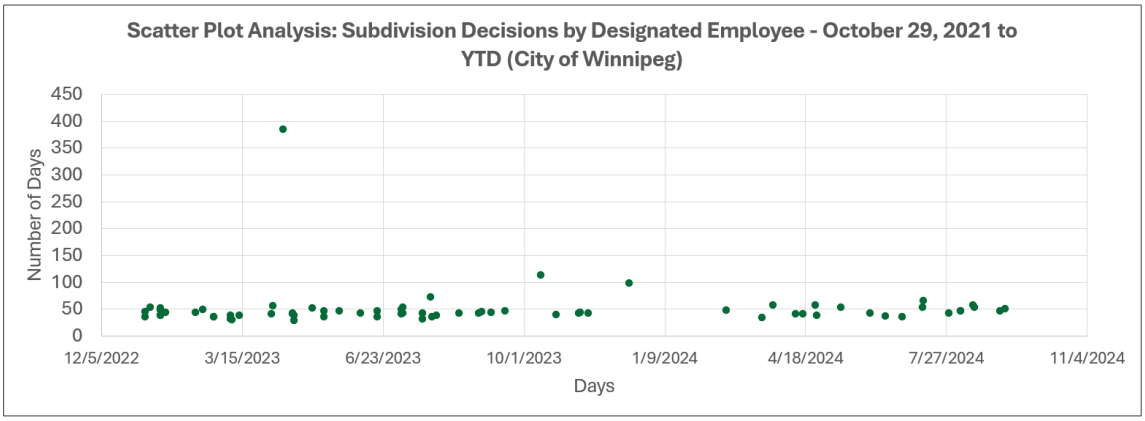
Figure 14: City of Winnipeg Subdivision Decisions by Council – 150 Days from Date Completed Application is Received by City to Decision



- ✓ Records Analyzed: 88
- ✓ Mean Days Observed: 131
- ✓ Median Days: 119
- ✓ Minimum Days: 71
- ✓ Maximum Days: 474

Source: City of Winnipeg Data Request.

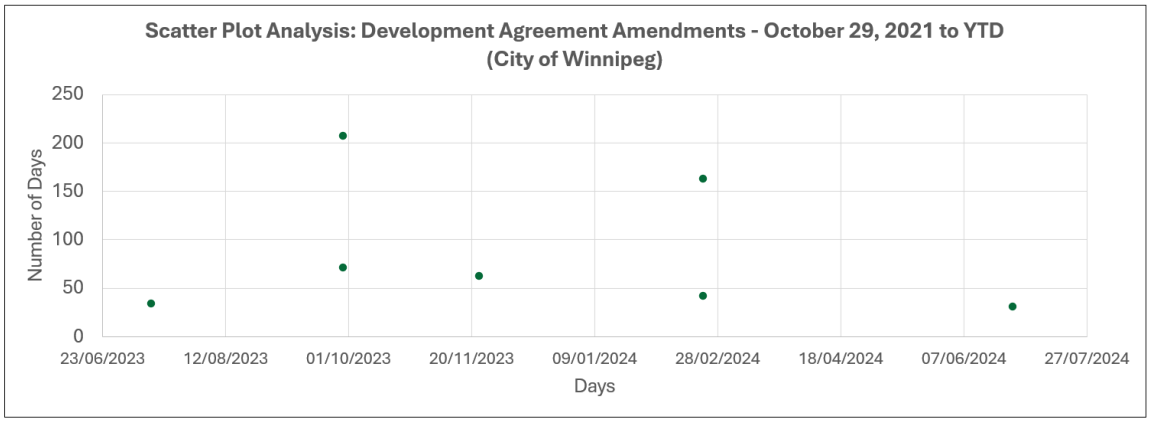
Figure 15: City of Winnipeg Subdivision Decisions by Designated Employee – 60 Days from Date Completed Application is Received by City to Decision



- ✓ Records Analyzed: 70
- ✓ Mean Days Observed: 50
- ✓ Median Days: 43
- ✓ Minimum Days: 29
- ✓ Maximum Days: 384

Source: City of Winnipeg Data Request.

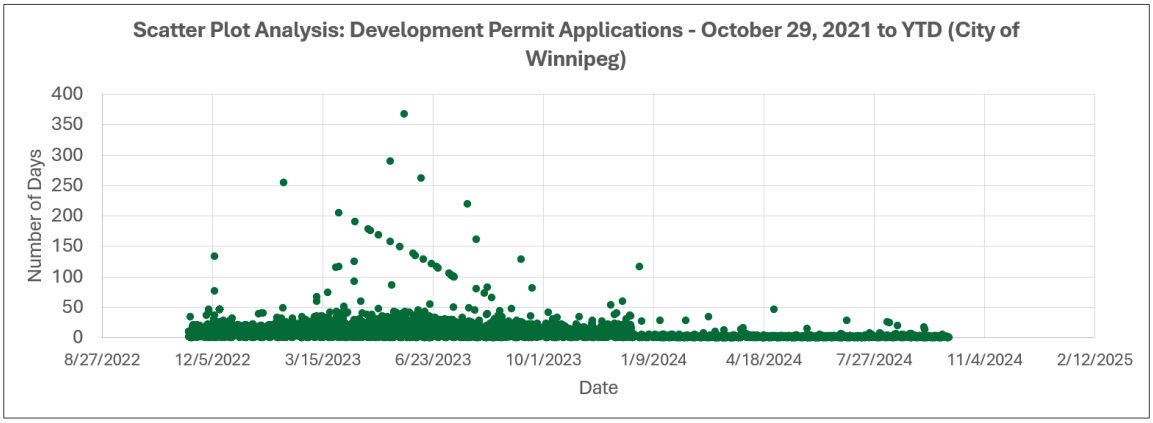
Figure 16: City of Winnipeg Development Agreement Amendments – 90 Days from Date Completed Application is Received by City



- ✓ Records Analyzed: 7
- ✓ Mean Days Observed: 87
- ✓ Median Days: 62
- ✓ Minimum Days: 31
- ✓ Maximum Days: 207

Source: City of Winnipeg Data Request.

Figure 17: City of Winnipeg Development Permit Applications – 20 Days to Determine Whether Application is Complete from Date Application Submitted



- ✓ Records Analyzed: 6,604
- ✓ Mean Days Observed: 8
- ✓ Median Days: 4
- ✓ Minimum Days: 1 (e.g., Same Day)
- ✓ Maximum Days: 367

Source: City of Winnipeg Data Request.

The review team's conclusions from this analysis are:

- The City of Winnipeg is making significant progress towards the stated timeframes.
- The City of Winnipeg is meeting some service standards more consistently than others especially in meeting the appropriate service standards for development permits (90%) and subdivision decisions by designated employee (92%).
- The City of Winnipeg has improved significantly in meeting the appropriate service standards for development permits post-legislation.

- The major areas with a variance from established timeframes are as follows:
    - 29% of development agreement records are not meeting the appropriate service standard.
    - 22% of secondary plan amendment decisions are not meeting the appropriate service standard.
    - 22% of zoning by-law amendment decisions are not meeting the appropriate service standard.
    - 14% of subdivision decisions by council are not meeting the appropriate service standard.
- There are targeted opportunities for improvement to increase the City of Winnipeg's consistency in meeting the appropriate service standard targets for development agreements, secondary plan amendment decisions, and zoning by-law amendment decisions.

The review team reviewed 5 complex applications identified by UDI against the approved timelines assessed above for the City of Winnipeg. The purpose of this analysis was to understand the impact of pre-application activities as well as the time requirements for completing development agreements following council approval. The number of records does not support the development of formal conclusions and is more representative in nature. This analysis was shared with representatives of the City of Winnipeg and UDI for input. It highlights that:

- Legislated timelines do not address the extended period associated with preapplication communication between developers and the City.
- The records highlight the impact of procedural processes in decision making associated with all development applications including appearance at various community committees.
- The records highlight the extended time requirement associated with the development and finalization of a development agreement in contrast to the established 90-day standard.
- The records provided show that the end-to-end process from first contact with the City of Winnipeg, to application, to Council approval and completion of the development agreement can be hundreds of days or even years in duration.
- The City of Winnipeg noted that some delays are initiated at the request of the developer based on changing market conditions, revised development plans, etc.
- The City does not "suspend" applications when this occurs so the data analysis reflects the impact of City processes as well as delays requested by the applicant.
- Both development industry participants and the City of Winnipeg noted that these processes incorporate shared activities and that there are opportunities for improvement on both sides.

Feedback from participants on timelines

The following representative quotes reflect the feedback on timelines of municipalities, development, industry stakeholders, and the public on timelines:

> *"The changes to Manitoba's planning legislation have created additional processes and roadblocks rather than streamlining processes and improving approval timelines." – UDI formal submission*
>
> *"First Reading is typically one month after Council has approved the report. This is the actual timeline that the Province put into the legislation and what the City*

works toward as a target. However, the process is nowhere near finished." – Consultation participant

"If the goal is to eliminate delays in the approval process, timelines should be consistent with all parties involved to ensure that a bottleneck is not created elsewhere in the system." – Consultation participant

2.3.2. Completeness of applications

Views on the requirements established for municipalities to manage complete applications within 20 days are mixed.

The majority of municipal, development, and industry stakeholders shared the perspective that:

- There's a lack of clear, consistent guidelines on what constitutes a complete application in the legislation.
- This ambiguity leads to disagreements between applicants and municipalities.
- The role of the designated employee in determining application completeness is crucial, but there's often a lack of clarity about who should hold this position and if there should be a more consistent standard for determining completeness applied by individuals in this position.
- The requirement has made it more difficult to have information conversations at the start of a development because the legislation focuses municipalities on managing complete applications instead of working through a problem in stages.
- There's a growing recognition that digital platforms and standardized forms could help improve application completeness and streamline the submission process.
- In cases where provincial department input is required, delays in receiving this information can impact the completeness of applications, creating frustration for both applicants and municipalities.

Development and industry stakeholders identified that some municipalities implemented formal pre-application review processes as a direct result of the legislation. From their perspective, this moved review work outside of established timeframes so that it "wasn't measured". Many of these participants shared experience that municipalities provided communication about deficiencies in an application near the end of the established timeframe with the intention of taking the application outside of the legislated timeframes.

The review team confirmed with many planning authorities that this strategy has been employed as a way to manage more complex files where there was incomplete information or more time was needed to complete a full review.

Many municipal and planning district participants shared that some developers have used this provision in the legislation to intimidate or threaten designated officials with personal lawsuits. They noted that these same developers often threaten to use Municipal Board appeal processes as a way to intimidate officials involved in decision making processes. They said this behaviour has further reinforced an emphasis on procedural and administrative protocol instead of finding ways to accelerate development in a collaborative way.

These same participants noted that the legislation creates the expectation that issues with a planning or development application are all a matter of completeness. They say this has watered down their ability to refuse applications even though legislated "cooling off" requirements provide for a designated official or planning authority to refuse an application that has been rejected.

Feedback from participants on completeness

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on completeness:

“Incomplete applications – City will now take several months before they look at an application and declare it 'incomplete'. Once they declare it 'incomplete', the clock starts ticking on the appeal to the MMB regarding the reasons for 'incomplete'. But to get to this start date it may be several months of the City not willing to look at the materials.” – Consultation participant

"Departments have too much discretion in defining what makes an application complete” – Public survey participant

“When you look generally through the act, every section, division, whatever the language is, it says all the provisions indicate the completeness of things and application and appeal. It's in the opinion of the approving authority. Is there anywhere where we have a common understanding, even amongst planners, what complete means? Is there a definition? Do you all appreciate what the definition of completeness is between all the various planning authorities and separate and apart from that, like when things come to you, do you have a definition of what you would consider complete if they sent it to you for review?" – Consultation participant

2.3.3. Review of applications

While not directly defined in legislation, the review and circulation of applications is a critical function that has a direct impact on planning decision making.

All development and industry stakeholder feedback identified the following themes:

- There's a lack of standardization across municipalities in how development applications are reviewed and circulated.
- There are challenges in coordinating between different departments involved in the review process within the City of Winnipeg and between government departments which often leads to delays and inefficiencies.
- There are no implications for missed timeframes on the part of review departments set out in the legislation.
- Established mechanisms within the City and Province to assess applications and determine more global requirements for an application are not well understood by applicants and seem to provide incomplete or contradictory requirements.
- Some municipalities chose to implement formal pre-application review processes outside of the legislative timeframes.
    - The review team confirmed that 14% of municipalities have implemented some form of formal pre-project review and that many of these processes were established prior to the implementation of this legislation.
- Participants noted that decisions by the City of Winnipeg to implement formal pre-application reviews had a significant impact on timeframes.

The review team notes that Winnipeg City Council eliminated the requirement for a formal pre-application review introduced as a response to the legislation on July 18, 2024. As part of this decision, Council directed the Public Service to ensure that all informal inquiries regarding development application details be addressed in a constructive and timely manner.

MNR and provincial review departments acknowledged that there are set timelines for circulation and commenting but meeting these consistently can be challenging. Municipal stakeholders all shared significant concerns about the timeliness of these reviews noting that the results often are received the day before a public hearing. This impacts the administration of the planning authority or council to incorporate that information effectively into the administrative report and recommendations. Some participants noted this process was the function of the former Interdepartmental Planning Board that was discontinued as part of these legislative changes.

All development stakeholders noted that the City of Winnipeg's review processes are particularly cumbersome. They pointed to requirements for preparation and attendance at multiple committees involved in planning decisions as well as requirements for applicants to provide the same information multiple times as key concerns.

Planning professionals, development and industry review participants identified concerns that review agencies do not provide complete, actionable requirements or conditions for most applications during initial review. This prevents the identification of clear requirements to support council and project proponent decision making. These participants provided examples of formal comments provided by provincial review departments and City of Winnipeg departments following application review. Some of these representative review comments included:

- "Due to circumstances beyond our control, we are not able to provide comments on this application. If you have not received comments from our section, please accept this e-mail as a request for an extension and we will try and get to the application as soon as we can."
- "We believe the requirements identified by the planning district are appropriate but we reserve the right to incorporate additional requirements at a future date."
- "We do not have background information to make a determination in this area. The proposed development requires the following studies to be completed: LIST after which we will determine requirements that will be applied to the proposed project."
- "This project is in a [TYPE OF REGION] that requires completion of a [Study] or dedication of lands or fees in lieu of dedication. This is a new requirement defined under regulation X of the NAME ACT."

Development and industry participants noted that the inability of municipalities to clearly identify technical requirements and development conditions at the time of application contributes to an increased reliance on a standard condition to require a development agreement for many applications. This reduces the certainty for municipalities and project proponents. It also contributes to frustration on all sides as requirements are identified at later stages in a project when they should have been available prior to project approval.

Some participants noted that the entire approval process may be improved by municipalities taking steps to implement a planning commission function which is permitted under the Planning Act. Planning commissions function as an alternate decision-making body to elected councils. They are typically composed of appointed individuals, often with technical backgrounds, rather than supported by elected officials. It was noted by some participants that the City of Brandon has a well-functioning planning commission that handles smaller land use applications like variances and conditional uses. This approach frees up council resources and keeps more decision-making local. Many participants noted that in addition to improving application review processes planning commissions could potentially improve decision making by mitigating political influence in planning decisions.

Feedback from participants on review of applications by planning authorities and government

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on review of applications:

> *"We just get an email. It says, respond by this day, and that's what we do." – Consultation participant*
>
> *"Sometimes it's difficult for us to determine whether we want to comment based on the quality of what we see in front of us. – Consultation participant*

2.3.4. Reasons for decision

Background on the council reasons to reject an application.

A complete review of the legislative background for this provision is beyond the scope of this project, however, the review team believes some context will assist readers of this section.

In the context of planning and development processes, municipal councils and planning authorities function in the role of a quasi-judicial body. They are required to make decisions consistent with established by-laws, plans, policies and procedures.

Written reasons are now required where there is a decision to reject an application for a conditional use or subdivision, and where there is a decision to not adopt a development plan by-law, secondary plan by-law and zoning by-law (or any amendment to any of them).

Several Manitoba Ombudsman opinions set out the expectation that municipal councils provide written decisions that demonstrate thoughtful consideration to the issue brought before them. These decisions set out an expectation of procedural fairness and the expectation that the planning authority inform the applicant how their application was not consistent with the established by-laws, plans, policies, and procedures.

There is an expectation for municipal councils and planning authorities to provide consistent decisions pursuant to by-laws, plans, policies and procedures, on all planning applications. Written reasons provide the thought and deliberation contemplated by the decision-maker at the time of the decision.

MNR has provided guidance to municipalities on reasons for decision in The Planning Act Handbook.

Feedback from participants on review of applications

The perspective of review participants on the legislated requirement for councils to provide written reasons for decisions not to approve planning applications is mixed.

Legal profession participants noted that this requirement strengthens procedural fairness. They also noted that it also has the benefit of protecting decision-making bodies from legal challenges by forcing them to articulate clear planning-based rationale. They noted that it encourages councils to put more thought into their decisions and ensures they are rejecting applications for valid planning reasons rather than political or other non-planning considerations.

Development, industry stakeholders and public review participants expressed strong support for the requirement for written decisions. Many participants advocated for this requirement to be extended to approval decisions as well as reasons by council to not approve an application.

Most municipal political leader participants do not support this requirement. They shared that they should be able to make decisions based on local requirements and that their ultimate accountability is established through the electoral process.

Many municipal administration and planning district participants supported the introduction of this requirement. While it was challenging to implement, they noted that it was helpful to focus approval decision making on a clear rationale for the decisions made at the public hearing. This improved the quality of council decision making and provided a higher level of transparency to the applicant and public about the decision. It also required administration to be very clear in decisions by designated officials about the reasons an application was not being supported.

Despite these benefits, these participants noted several issues with the implementation of this requirement under the legislation as follows:

- Councils are not formed by political parties and often lack consensus making it difficult to articulate a final decision.

    - Participants underlined that each council member may have different reasons for their decision making it challenging to provide a unified explanation on behalf of the planning authority.
    - They noted that it is unclear how to manage situations when there are minority opinions or votes recorded in the approval hearing.
- Some municipalities have received strong legal advice about the risks associated with documenting reasons for decisions because it would create an avenue for challenges.
- There is a lack of clear guidelines about what constitutes a decision and what the implication of this requirement has for future appeals.
    - The review team has verified a wide range of approaches to meeting this requirement between municipalities ranging from:
        - Providing council with standardized resolutions as part of the recommendation that set out minimal detail beyond non-conformance with existing plans and by-laws; to,
        - Recording the complete discussion by council and appending it to the approval motion.
- Some councils have adopted a process to document reasons outside of the public hearing and to approve them in the next meeting of the planning authority.
- Many participants noted that this contributes to a lack of transparency and for refining the decision based on information outside of the public hearing process.

Many review participants including those in the legal profession noted that the focus on decisions "not to approve" creates an "in-built asymmetry" that is not appropriate. They noted that changes to require reasons for all decisions would improve consistency and procedural fairness in the process.

Participants were almost universal in the perspective that better training and education is required for council members, development and industry participants and the public on the requirement and application of reasons for decision in planning and development decision making.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders, and the public on reasons for decision:

> *"The requirement to provide reasons to reject development applications is a sound practice, since it forces Council [and Designated Officers] to consider applicable municipal policy when making its decisions. [Council] should also be required to provide reasons to approve applications." – Municipal survey participant*

> *"The requirement to state reasons for rejection of application from a positive perspective is well received. It inoculates our decision-making bodies, whether it's the planning commission or city council, from legal challenges. We have to put some actual thought into why we're saying no to a decision." – Consultation participant*

2.3.5. Development agreements

The perspective of review participants on legislated timelines for the completion of development agreements is mixed.

All stakeholders shared the perspective that the provisions in the legislation to establish timeframes for development agreements have not resulted in a meaningful impact on outcomes.

Many municipalities and planning districts report feeling increased pressure to complete development agreements within the prescribed timelines. They note that the 90-day timeframe is

seen as challenging, especially when dealing with complex projects or when development requirements require significant supporting materials (e.g. easement agreements, survey plans, etc.) that are the responsibility of the applicant. Significant concerns were expressed from most municipal stakeholders that these timeframes will lead to more appeals to the Municipal Board when agreements are not reached within the prescribed period.

Some municipalities and planning districts indicated they are moving towards standardized templates for development agreements to streamline the process and meet the new timelines. They also indicated that they have taken steps to revise their internal processes to accommodate the new timelines, including earlier engagement with developers on development requirements and conditions included in a development agreement.

Development and industry stakeholders shared the following perspective about development agreements timeline requirements:

- While there are challenges for both municipalities and developers in meeting the timelines, the requirement provides a strong motivation for parties to resolve issues and work towards resolution.
- The ability to secure extensions by mutual agreement in writing, provides some flexibility but also adds another layer of process.
- The time taken to finalize development agreements varies greatly between municipalities.

Many developer and industry participants reported experiencing significant delays in obtaining development agreements, with some mentioning it taking up to a year after council approval or longer. They noted these delays are particularly significant for development agreements within the City of Winnipeg.

The absence of standardized templates for development agreements was often cited as a major cause of delays. Developers suggested that a high percentage of agreement (90%+) conditions could be populated by entry level staff using templates that could significantly speed up the process.

Many developers pointed to delays caused by municipal legal departments as a significant issue in the development agreement process. They noted that there is a reluctance to adopt standardized agreements and to rely on processes to establish unique agreements for all development projects.

Some developers feel that the emphasis on front-end application and approval timelines doesn't address the real issue of delays associated with the time it takes to finalize development agreements after a council decision is made.

Feedback from participants on timeline requirements for development agreements

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders, and the public on timeline requirements for development agreements:

> *"I agree with [name removed] regarding the timeline. It's very difficult to get a development agreement done within the 90-day period, if we're waiting on drainage plans, easements, supplementary documents related to that development agreement." – Consultation participant*

> *"Having a timeline to say this is how long it could take, and this is the shortest amount of time it could take if all went well is positive. I guess the same would apply for quarry or livestock operations, kind of the worst-case scenario, length timeline to the best case." – Consultation participant*

2.3.6. Un-proclaimed legislation: Major developments

The legislation contemplates the implementation of provisions to accelerate the approval of major developments. These projects would not require approval for each subsequent phase of a

development but would allow a municipality to establish requirements by attaching a development agreement to a development permit.

In its un-proclaimed form, a development agreement may be imposed where the development is prescribed as a “major development” or when expansion of a public service is required. The details surrounding development agreements being permissible with the application of a development permit as well as the defined term of “major development” were to be included in a further provided regulation.

Feedback from participants on un-proclaimed major development provisions

Municipal and development stakeholders are interested in this concept for different reasons that are not aligned.

They shared the perspective that there is considerable confusion about what constitutes a "major development." The lack of a clear definition has left many stakeholders unsure about how this provision would be applied.

Some development participants see the potential for this provision to streamline the approval process for larger, more complex projects. It could provide a mechanism to expedite significant developments that align with municipal or regional priorities.

Participants noted that what constitutes a major development may vary significantly between urban and rural areas or between large and small municipalities. This makes it challenging to create a “one-size-fits-all” definition that would be consistently applied across the province.

Some municipal stakeholders including the City of Winnipeg expressed a strong desire for these provisions to be implemented to accelerate infill and densification initiatives being contemplated to address housing demands and fulfill requirements of the federal government’s Housing Accelerator Fund. They noted that this is a fundamental requirement to enable City initiatives including major zoning by-law updates to allow for “by-right” development on major corridors and in targeted development zones.

The ability to attach development agreements to development permits for major developments is seen as potentially beneficial, but many development stakeholders expressed concerns that implementing this clause as a blanket power would give municipalities too much authority to apply the concept to small infill projects and to change requirements for future phases of approved developments if, in the opinion of the municipality, servicing requirements have changed. They also noted that some municipalities have raised the possibility of extending this authority beyond development permits to include development agreements for building permits where there is a requirement for municipal investment in infrastructure, etc.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on timeline requirements for un-proclaimed major development provisions:

- *“It would be beneficial if the wording and related regulation were to be circulated to municipalities for review and comment prior to adoption. Municipalities should welcome the option of requiring a development agreement as condition of a major development's development permit approval.” – Municipal survey participant*
- *“What constitutes a major development? How is that built into the legislation, and given the fact that it is an un-proclaimed part of the legislation, is that clarity? What do we mean by major developments, anything that comes across your desks, or have we actually given thought to what that might be?” – Consultation participant*

2.4. Balance between Provincial interest/strategic assets/economic development and community interest in land development and planning decision making

There are mixed perspectives on how the legislation has impacted the balance between a community's role in development and planning decision making and broader interests to support regional planning, economic development or certain forms of development.

Development and industry stakeholders were clear that the legislation's emphasis on decision making relying on approved development plans, zoning bylaws and policies is beneficial. They shared experience that many municipal development processes prevent critical projects from proceeding in a predictable manner. The primary factors contributing to this situation identified by these participants included:

- Concerns about political pressure and the risk for councilors to make unpopular decisions due to fear of political repercussions, even if those decisions are in the best interest of the community
- Lack of expertise by municipal leaders and administration who lack the necessary knowledge or training to make informed decisions on complex planning and development issues
- Inconsistent application of existing development plans, by-laws, and policies especially as they apply to projects with a significant provincial or regional interest

They noted that special consideration needs to be preserved in the legislation for projects with an overall benefit to the entire province, significant economic development initiatives with regional impact, and for projects that have a unique constraint due to geography like quarry and aggregate operations or major transportation infrastructure like railways.

These participants advocated for increased strengthening of requirements for municipalities to follow evidence-based decision making based on approved municipal plans, bylaws and policies. They also emphasized the benefit of increased reliance on technical submissions to guide approval decisions. They noted that this type of decision making should be carried forward as the standard for independent appeals at the Municipal Board.

Some review participants advocated for increasing legislative requirements for decision making on a wider range of applications and for the implementation of strengthened appeal provisions. These participants noted that there is a need for stronger provincial oversight in some areas to ensure that strategic economic interests are not unduly obstructed by local concerns.

While it has some limitations, The Technical Review Committee (TRC) process established for livestock operations was highlighted by many stakeholders as an example of an effective process for development application review and decision making. It provides a structured approach for evaluating development proposals and facilitating collaboration between different departments, stakeholders and the public.

Key benefits of the TRC review process identified by participants included:

- Improved coordination by bringing together representatives from various departments to review proposals collectively, ensuring all relevant perspectives are considered
- Efficiency created by having all parties review proposals simultaneously to streamline the process and reduce delays caused by sequential reviews
- Consistency by following consistent standards and interpretations across different projects and departments
- Early identification of issues saving time and resources for both developers and municipalities

- Better communication by providing a forum for direct communication between developers, municipal staff, and other stakeholders, and the public fostering clearer understanding of requirements and expectations

Municipal participants shared the perspective that the best forum for making decisions about all development is at the local level. They noted that locally elected councils are in the best position to balance community needs and development requirements, even those with broad economic or development benefits. They noted that local communities should retain the right to determine the types of development they wish to pursue as well as to establish conditions for those developments when infrastructure investment or impact mitigation is required.

These participants expressed the opinion that the legislative changes have shifted too far toward provincial control and priority setting at the expense of local autonomy. They noted that many communities and their residents have real interests in the impact of all forms of development. They advocated for a strengthened voice in all decision making including more restricted appeal powers for decisions on these developments at the Municipal Board.

Many industry and municipal stakeholders shared that the government had existing tools to establish clear priorities through the Planning Act prior to the introduction of the legislative changes.

These stakeholders agreed that government could utilize to establish clear policy and priority for all types of development is the Provincial Land Use Policies (PLUPs).

The benefits of focusing effort on establishing priorities in the PLUPs identified by participants included:

- Clarifying provincial priorities for the nature and form of development that the government wants municipalities to factor into their planning process and decision making
- Identifying and protecting strategic resources crucial to economic development as well as establishing expectations about how these resources should be managed in all planning and development processes
- Establishing the expectation that evidence-based decision making should form the basis of all planning processes
- Clarifying the expectations for the consistency of planning process, terminology and decision making to better balance global economic development interests with local governance accountabilities
- Creating clear criteria for determining appeal rights when there is a conflict between local community interest and an overall provincial priority

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on timeline requirements on the balance between local decision making and development with strategic benefit:

- *“We also fully support the notion that municipal Councils are in the best position to make decisions based on their knowledge and understanding of their communities. It is their mandate as elected representatives to make decisions based on local priorities and context.” – AMM formal submission*
- *“Since this is about quarry and livestock, this legislation did affect Council's position on how they proceeded, or how they made their final decision, because it comes to the point, do we put less conditions in and hope that they don't appeal to the Municipal Board. [If that happens] then it's totally taken out of our hands, and we have no control over an intensive livestock that's going to be in our municipality." – Consultation participant*
- *“Upon a comprehensive examination of The Planning Act, the Provincial Planning Regulation, and the PLUPs, we have determined that The Planning*

Act, the foundational framework for land use planning in Manitoba, and its recent amendments, lack explicit directives for municipalities to adopt policies pertaining to developments in proximity to railway operations and infrastructures. Similarly, the Provincial Planning Regulation, which provides additional details and guidance on specific aspects of land use planning and encompasses the PLUPs as well as policies guiding the requirements for drafting Development Plans and provisions for livestock operations, also lacks these explicit directives." – Consultation participant

2.5. Regional planning board formation and governance

During the course of the review, the Capital Planning Region undertook public hearings on Plan20-50. There was significant public interest in these hearings including strong representation from individuals and groups who voiced strong opposition to the Capital Planning Region and the draft plan. Several member municipalities voiced concerns about the draft plan and their membership in the region during this process. In part as a response to this feedback, the Manitoba government announced changes to the legislation that requires municipalities to participate in the Winnipeg Metropolitan Region and Plan20-50. While the content of Plan20-50 and the decision making of the Winnipeg Metropolitan Region is outside of the scope of this review, these circumstances have had an impact on the review process and feedback received from stakeholders.

Legislation in scope of this review established the process to create planning regions across the province, including at the request of municipalities or the Minister. It sets out the role and function of a planning region, its mandate and powers. The key role of a planning region is to prepare and adopt a regional plan. It establishes requirements for the formal structure of a planning region and requirements for administrative functions and record keeping. The legislation incorporates regulatory power for the Minister to set out accountability, voting provisions, planning region bylaw requirements and other governance matters by regulation. It also defines the requirements for a regional plan and allows for the provision of more detailed direction to be provided by regulation.

The legislative changes established the Capital Planning Region and specified its membership. The membership of Capital Planning Region can be varied by the Minister through regulation.

Detailed requirements for the regional plan are set out in the Capital Planning Region Regulation.

Background on regional planning in the capital region and its relationship to the legislation under this review

The review scope does not include a full analysis of regional planning in the capital region, however, the review team believes that some context is relevant to readers of the review.

There is over 30 years of regional planning experience/history/activity in Winnipeg's capital region. The first capital region strategy was published in March of 1996. This initial plan incorporated participation of 16 municipalities and focused efforts on 5 policy areas: sustainable land use, servicing, transportation, and economic development.

Since that initial plan, there have been many reviews, reports, and initiatives advanced. A number of these reports are identified in **Appendix B Section 1.6**.

In 2006, the Capital Region Partnership Act was passed with the purpose of establishing the capital region. It identified 16 municipalities that were part of the Capital Region and provided for those organizations to cooperate on adopting a regional strategy. In 2013, the member municipalities operating under this act changed their name to the Partnership of the Manitoba Capital Region (PMCR) and again in 2018 to the Winnipeg Metropolitan Region (WMR).

The legislation subject to this review dissolved the Capital Region Partnership Act and established the Capital Planning Region Board with the jurisdiction and functional responsibility

described above. This change saw the formal membership of the Capital Region expanded to 18 municipalities with the addition of the Town of Niverville and the Village of Dunnottar.

The Capital Planning Region Board was established as a new statutory corporation with strengthened legislative mandate and powers. While it has adopted the operational name of the Winnipeg Metropolitan Region, the organization was not established as a continuation of predecessor organizations.

This approach was intended as the next evolution of regional planning framework and was advanced with the support and recommendation of municipal stakeholders in the capital region.

The legislative changes in scope of this review incorporated or adapted the key elements of the governance framework under the previous act including provisions endorsed by member municipalities endorsed through council resolution for voting and decision-making processes.

Many municipal stakeholders confirmed through the course of the review that there was a need to move planning in the capital region to the next level of maturity and to establish the capacity to adopt and implement plans with real effect. This idea supports the rationale and approach to the legislation implemented to establish the Capital Planning Region Board.

The Manitoba government has provided significant funding to the Capital Planning Region Board and its predecessor organizations to support activities associated with its operation and planning activities.

Feedback on the legislation in scope of this review

From the outset of the review, the perspective of participants on these legislative changes was mixed.

The majority of all participants across the province shared the perspective that it is too early to tell if this part of the legislation is effective or not. Municipalities outside of the capital region and review participants without direct involvement with the capital region planning process were clear that they did not have enough direct experience to comment in a meaningful way.

Within the Winnipeg Metropolitan Region, the majority of municipal participants expressed support for the concept of a regional planning organization. They noted that regional planning had resulted in coordination between municipalities on common issues and helped to establish clear priorities. They noted that a regional planning board model is a better alternate than other approaches to regional integration including annexation.

Several capital region municipalities expressed concerns that the implementation concept in the legislation moved too far. These participants shared the concern that it introduced another layer of decision making that infringed on the role of member municipalities to oversee development at the community level. A strong minority of municipal participants expressed strong opposition to their inclusion within the capital planning region. They advocated for a formal process of exemption to be set out in the legislation and shared frustration that requests to various Ministers for a variance under the existing regulatory powers were not supported.

Many participants felt that the implementation concept set out in legislation was not consistent with the spirit of collaboration and intention necessary to make meaningful strides within the capital region. The key concern areas identified included:

- Appointment of non-elected members to the capital planning region board and to key executive positions
- The decision-making structure that gives the City of Winnipeg a “super majority” voting right based on population
- Loss of autonomy for local decision making as a result of powers established for the planning region including the ability of a regional planning board to force member municipalities to stop actions that do not align with an approved regional plan through formal request or injunction if required

- Established powers to levy additional fees associated with operational costs and capital planning region board activities
- Uncertainty about the precedence of the capital region's governance framework and by-laws in contrast to the governance framework and by-laws of member municipalities
- Lack of clarity about how a regional plan would impact member municipalities and create additional complexities to appeals before the Municipal Board (e.g. WMR or Municipality defending regional plan, inconsistencies arise between regional plan and local by-laws, etc.)

These participants noted that while both a "carrot and a stick" is required to balance regional and local interests within the capital region, that the expanded powers upset the spirit of collaboration that predated the legislation's implementation.

Representatives from planning districts expressed several concerns about potential conflicts between planning districts and regional planning boards including:

- Planning districts lack proper representation on regional planning boards, beyond elected officials resulting in a gap in the planning district's ability to provide input on regional matters.
- There is uncertainty about the appropriate scope for regional planning boards and how this might overlap or conflict with a planning district's jurisdiction.
- The legislation is seen as vague in defining where the roles and responsibilities shift from regional to planning district level which could lead to overlap and potential conflicts in decision-making.

Some participants fear that regional planning boards may give too much power to larger member municipalities (like the City of Winnipeg), potentially leaving smaller municipalities and planning districts vulnerable. They noted apprehension that regionalization might result in planning districts and rural municipalities losing their voice and autonomy in decision-making processes.

Feedback from participants in the public survey were extremely varied with respect to the legislative framework establishing a regional planning board. The majority of responses shared the perspective that local municipal governments are in the best position to make decisions about planning and development on behalf of residents. These participants did not support a regional board structure because it removed the autonomy of a community and introduced an unnecessary level of decision making. A minority of public participants expressed support for the regional plan and advocated for government to reinforce clear priorities and expectations for the capital region.

Capital planning region board representatives underlined that the approach set out in the legislation was fundamental to ensure that the region could action its mandate. They noted that most jurisdictions in Canada provide for regional planning bodies in provincial legislation. While varied, they noted that the concepts to define membership, establish authorities and jurisdiction for regional planning and the alignment of municipal decision making are not unique to Manitoba. These participants explained that in practice the board operates on a principle of building consensus, however, they noted that a regional planning board needs to have the capability to make decisions and advance proposals when complete consensus is not possible. A representative quote expressing this point is:

> *"Although critique of the governance structure and procedures are worthwhile to explore, the certainty of membership and decision-making framework provided by amendments to The Planning Act and establishment of the Capital Planning Region Regulation are important to maintaining regional decision-making and collaborative working relationships. Without a framework for governance procedures like voting requirements, decisions cannot be made, and little effective action can take place." – Consultation participant*

Some WMR board representatives observed that the changing the legislation to allow regions to opt out completely or in part would undermine the role that a planning board could deliver regardless of its mandate.

Many review participants shared the perspective that many of the functions defined for regional planning boards could have been enacted by the government using its established authority in legislation. They noted that the government could have established requirements for all municipalities in the capital region through the Provincial Land Use Policies (PLUPs). They noted that the process to revise the PLUPs with new objectives incorporates a formal requirement for public consultation and is a more appropriate way for the government to establish its priorities and expectations for regional planning in all areas of the province including the capital region.

All review participants shared the perspective that the participation of Indigenous communities in the governance and decision making of regional planning boards is fundamental. They noted that the appointment of representatives from Manitoba Métis Federation and Treaty One Development Corporation were a step in the right direction.

Most review participants underscored the requirement that regional planning boards need to be established around a clear concept of shared benefit. They cited the recent experience of the Winnipeg Metropolitan Region to support this perspective. These participants noted that all stakeholders and the majority of citizens recognize that infrastructure projects, economic development, and service delivery can be more efficient and cost-effective when approached regionally. They shared that regional planning benefits extend beyond municipalities to support the requirements of industry and to all citizens of the province. These participants expressed that the concept of shared benefit isn't always clear or well-defined in the role or function of regional planning boards and that the government has an important function to establish their importance.

Many review participants observed that the implementation process would have benefitted by the government providing more guidance and support to all municipalities in the capital region on the following topics:

- Strengthening guidance about governance concerns during the implementation period specified in legislation after the adoption of the regional plan
- Confirming the certainty of securing predictable funding source that would not be dependent on fees from member municipalities
- Providing clarity on the expectation for the capital planning region board's role to ensure that member municipalities comply with the approved plan
- Clarifying the expectation of the WMR to function as a commenting agency or review agency as well as the expectation of the WMR in relation to appeals at the Municipal Board

Following the government's announcement to provide changes to the legislation requiring municipalities to be part of the Capital Planning Region Board several municipal, development, and industry participants reached out to the review team to provide supplementary feedback. Their perspective can be summarized as follows:

- There is an important role for regional planning organizations and regional planning in Manitoba, especially for a jurisdiction of this size.
- While there have been bumps in the process to move ahead with Plan20-50 and with the establishment of the capital region, there are many strong reasons for these actions to continue.
- Participants expressed concerns that the circumstances leading up to the government's action have eroded trust between participating municipalities.
- It is now more important than ever for the government to clarify its priority and expectations for continued regional planning work in the capital region and other areas of the province.

- There was hope that following this review the government would work identify a champion at the political level to re-establish a framework that is aligned with the government's objectives.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders, and the public on timeline requirements on the formation of regional planning boards:

- *"There should be clear provisions outlining a transparent mechanism in legislation granting flexibility to municipalities to opt-in or opt-out of not only the Capital Planning Region board but any regional planning board that may be devised in the future." – AMM formal submission*
- *"Our members identified several shortcomings with the provincial government's approach to implementing regional planning for the Winnipeg Metropolitan Region (WMR) during this review. When the Province established the WMR as a regional planning authority, it appears to have failed to give the WMR sufficient direction in what was to be achieved by its regional plan" – UDI formal submission*
- *"Many of the functions of a regional planning board are already addressed by municipalities through existing legislation. What is the reasoning for uploading these responsibilities to a new layer of authority?" – Public survey participant*
- *"The idea was a good one – how can you get all the municipalities around a city to talk to each other – you need an organization or association where they can sit around the same table and you need a plan to follow and a way to make decisions." – Public survey participant*
- *"It was a mistake to cave in to the complainers (15-min city people, Selkirk, Headingley, etc.). This bill will result in a break-down of coordinated planning." – Public survey participant*
- *"Allowing municipalities to opt out of the Capital Planning Region would defeat the entire purpose of a regional planning framework." – Public survey participant*

2.6. Regional plan role, adoption and emphasis

During the course of the review, the Capital Planning Region undertook public hearings on Plan20-50. There was significant public interest in these hearings including strong representation from individuals and groups who voiced strong opposition to the Capital Planning Region and the draft plan. Several member municipalities voiced concerns about the draft plan and their membership in the region during this process. In part as a response to this feedback, the Manitoba government announced changes to the legislation that requires municipalities to participate in the Winnipeg Metropolitan Region and Plan20-50. While the content of Plan20-50 and the decision making of the Winnipeg Metropolitan Region is outside of the scope of this review, these circumstances have had an impact on the review process and feedback received from stakeholders.

Legislation in scope of this review established a requirement that all planning regions, including the Capital Planning Region, must establish a regional plan, lead regional planning initiatives, and facilitate cost-effective regional infrastructure and services. The legislation established a formal adoption process requiring a public hearing and the process for adopting a plan that include its recommendation to the Minister. The Minister can approve the plan, reject it or refer the plan or part of the plan to the Municipal Board. The Capital Planning Region Regulation sets out expectations for the scope and content of the regional plan.

The introduced changes establish the approved regional plan as the highest-level planning document and requires municipalities and planning districts to bring their development plans and by-laws into alignment with the regional plan within 3 years of its adoption.

Background on the process to develop Plan20-50 and its relevance to the legislation under this review

The review scope does not include a full analysis of the capital region plan or the steps associated with its development, however, the review team believes that some context is relevant to readers of the review.

The Winnipeg Metropolitan Region planning team initiated the formal planning process for developing the capital region plan in December 2019.

The capital planning region board received direction from the Minister of Municipal Relations in November 2020 to finalize Manitoba's first regional growth plan for the Capital Region. This confirmed direction to finalize its work on the plan in the context of Bill 37. It established direction on the contents of the plan and established contacts for support within the department.

The Capital Planning Region Regulation was registered as of December 14, 2022 and came into effect on January 1, 2023. This regulation provided further direction to the capital planning region board on the plan and its content.

The WMR has conducted 131 facilitated sessions and meetings on the plan and its development from 2020 to 2023. These sessions included a wide range of stakeholders including municipalities, planning districts, Indigenous communities, industry associations, regulatory authorities, and other stakeholders to develop the plan.

The plan adoption process was initiated by the Capital Region Planning Board in September 2023 and a series of changes and updates to the plan. The board gave the plan first reading on June 13, 2024. Between September 2023 and June 13, 2024, the plan was presented in many public open houses and information sessions. These sessions were advertised to the public and through direct invitation. Formal public hearings were scheduled in Winnipeg on July 25, 2024 and in Niverville on August 8, 2024. These public hearings were advertised to the public in several newspapers and through direct communication to interested parties identified by previous consultation activities.

Many regional jurisdictions in Canada have a legislated regional plan that incorporates requirements for a range of planning policies to be developed including, but not limited to, economic development, land use, regional infrastructure and services, public services, transit, environment, drainage and the protection of natural spaces or agricultural lands.

Feedback on the legislation in scope of this review

Review participants had disparate views on the requirements set out in legislation for the initial regional plan for the Capital Region from the outset of the review.

The majority of all review participants shared the perspective that it is too early to tell if this part of the legislation is effective or not.

Municipalities outside of the capital region were clear that they did not have enough direct experience to comment in a meaningful way.

Most participants from capital region municipalities and those who have participated in the direct regional planning process, shared concerns about the legislated approval process. They noted that other approaches could have been taken to finalize and deliver a plan for approval by government. The key themes identified by these participants included:

- The speed at which the plan was being developed and implemented, without allowing sufficient time for understanding and adaptation for communities, stakeholders and the public
- Governance issues including a lack of clarity about the role that municipal councils play in relation to the Capital Planning Region Board in approving the plan
- Concerns about the representation for certain groups in the planning process including Indigenous communities, smaller municipalities and some industry sectors

These stakeholders expressed concern that the government had not provided sufficient guidance on key planning issues or on questions about the adoption of the plan.

Feedback from participants in the public survey were extremely varied with respect to the legislative framework establishing a regional plan. The majority of responses shared concerns about the balance of authority between a regional planning board and the function of a municipal council to guide development decisions. These participants noted strongly that municipalities should be able to determine the nature of development in their community without a requirement to align with a regional plan except by a decision of the local council. A minority of public participants expressed support for the regional plan and advocated for government to move forward with the approval of Plan20-50.

A number of capital region municipalities have identified concerns with specific recommendations within the plan including the application of its policies at the community level. The most commonly referenced issue was the requirement for density provisions to be incorporated in the plan and the degree to which member municipalities needed to align with this requirement.

During the course of the review, a significant minority of capital region participants notified the review team of their intention to request a formal exemption from the planning process prior to the initiation of the public hearing sunder the regulatory provisions established in legislation. As many as 9 municipalities subsequently passed council resolutions requesting exemption from the plan or identifying concerns with key provisions in the plan. (The review team notes this was a contributing factor to the government's decision to introduce Bill 42 that will establishes a formal process for municipalities to withdraw from membership in the capital region.) .

Development and industry participants shared concerns that the regional planning process was initially targeted at municipal stakeholders. They noted that engagement with strategic industries was not formally part of the planning process. These participants appreciated that the WMR team had adjusted to concerns identified by industry and changed the process to improve over time. They shared that this was a new process and that everyone would gain knowledge and incite to make the process better over time.

Most review participants shared the perspective that the initial emphasis on "shared benefit" and mutual cooperation had shifted to a more comprehensive planning framework reflecting broad requirements including land use and density. While they recognized that there is long-term benefit in those areas, stakeholders emphasized possible areas for improvement including:

- Removing provisions for density in favour of a more focused approach on regional infrastructure and transportation
- Restoring emphasis on joint pursuit of capital funding for infrastructure with strategic regional emphasis like wastewater treatment facilities and water distribution networks
- Aligning provincial funding decisions with defined regional projects that will have priority impact

Some WMR board representatives noted that the requirements for the content of the regional plan and its adoption were set by government. They noted that these requirements are based on sound planning practices implemented in most metropolitan communities in Canada as well as those in other countries. From a legislative perspective, they shared that the Planning Act does not provide clear direction on what scope is clearly regional as compared to local in terms of decision-making authority. They expressed that direction in The Capital Planning Regulation and the Provincial Land Use Policies is not granular enough to give clarity to the regional planning board or member municipalities about expectations. Based on experience to date, they noted that it may not be appropriate to establish global requirements because the requirements may vary for each region. They advocated for strengthening of the direction provided to a regional planning board through its specific planning board regulation.

Most stakeholders shared the perspective that more clarity is required for the transition period once the regional plan is adopted. Specifically, they highlighted the provision the regional plan

comes into full effect upon adoption is problematic. Concerns persist within many municipalities about the precedence of the regional plan during the 3-year implementation period after its adoption despite the fact that this concept has been defined in the legislation as enacted.

As part of the survey to municipalities, the review team asked capital region municipalities to provide an update on their readiness to align with the regional plan in the event it is adopted. Out of the 14 capital region municipalities that responded including the City of Winnipeg, 9 or 64% indicated they were in a good position to align their development plans and by-laws with the regional plan.

This supports the feedback from review participants that many capital region member municipalities have taken steps to refresh their development plans and to update their zoning bylaws. They noted that many provisions in Bill 37 created an increased urgency on this activity including the regional planning process.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders, and the public on timeline requirements for preparation of regional plans:

- *"Previously, municipalities and planning districts obtained input from government agencies, local boards, stakeholder groups, and the public, then developed community plans that reflected local character while accommodating Provincial government interests. Now, local Development Plans will have to comply with Plan2050." – Public survey participant*
- *"However, when it comes to contentious issues such as this, the expectation for the regional plan must be guided by the province and the provincial interest, and clarity as to what is a regional expectation versus municipal one. The WMR received direction from the province, by letter from the Minister, to include density provisions in the plan and as such they were included. However, such topics as density may require more formal guidance in legislation, as even with a letter from the Minister directing the inclusion of density in the regional plan the WMR received push back on its inclusion." – Consultation participant*

2.7. Role of the Municipal Board as appeal body for planning and development decisions

The legislative changes strengthened the role of the Municipal Board as the appeal body for many planning and development appeals across the province. It expanded the Municipal Board's existing role to consider a limited number of appeals under the Planning Act as well as extending the appeal provisions to the City of Winnipeg. The Municipal Board's appeal function was extended aspects of quarry and aggregate operations and livestock operations as part of these changes.

In exercising its authority as an appeal body, the legislative changes empowered the Municipal Board to make "any decision on a matter that a council would have otherwise made".

The legislative provisions associated with the Municipal Board appeals rely on the Municipal Board's overall authority under The Municipal Board Act. In its capacity as a quasi-judicial tribunal under the Act, the Municipal Board has broad powers including the ability to conduct hearings, establish and publish its rules of practice, define procedural matters at a hearing and to dismiss appeal actions.

The Municipal Board Act has also been afforded wide powers as a court of record. The Act also sets out requirements for the Municipal Board to publish its rules of practice regulating its procedure and time of sitting, and sets out the judicial notice of every order, rule, regulation or decision by the Courts, once published on their website.

The review of these legislative powers is not included in the scope of this project but board practices and procedures have a material impact on the legislation and its operation.

Feedback on the legislation in scope of this review

Views are mixed on the Municipal Board's role under the new legislation.

All stakeholders shared the perspective that there is value in an independent appeal process for planning and development decision making. The main difference in participant perspective is whether this appeal function should be established at the municipal or provincial level.

Development and industry participants as well as those in the legal profession share the perspective that there is a fundamental requirement for an independent appeal body outside of the jurisdiction of planning authorities and municipalities. They believe the Municipal Board or another provincial level body are the best forum for an appeal that is separate from local political influence.

Municipal stakeholders are nearly universal in the perspective that the scope of the Municipal Board's authority under the legislation is not appropriate. Their position is that municipal councils are in the best position to make decisions based on their knowledge and understanding of the local community. It is their mandate as elected representatives to make decisions based on local priorities and context. They advocated for an independent appeal function to be established at the municipality or planning district level.

The City of Winnipeg's formal submission was provided as an administrative report adopted by Council on September 26, 2024. This submission included the recommendation that there should be no applicant appeal to the Municipal Board.

All review participants shared the perspective that the appeal provisions in the legislation are too broad in terms of the Municipal Board's appeal decision making powers, the range of decisions that are appealable, and decisions about the scope of parties that have standing to appear in an appeal or referral process.

In that context, the provision identified by most review participants is the Municipal Board's authority to make "any decisions that a council would otherwise make" when combined with the Board's established practice to conduct a "de novo" hearing. They suggested that at minimum the Municipal Board's decision making authority should have a refined focus on the final council decision including its reasons for decision.

A strong majority of planning authority participants believe that the established process effectively means that the Municipal Board is not an appeal body but essentially functions as the "planning authority or hearing body". They noted that this has shifted accountability away from municipalities and enabled project proponents to use the threat of the appeal process as a mechanism for increased leverage during the approval process interactions.

All stakeholders also identified concerns with the impact of provisions requiring an automatic referral to the Municipal Board when sufficient objection is registered by at least 25 objectors. They noted that this provision has increased the number and frequency of board hearings resulting in delay and increased costs to all parties. This will be dealt with in more detail in **Section 2.9**.

All stakeholders expressed that, in response to the legislation, the Municipal Board has become a more litigious and costly forum instead of functioning as an independent tribunal intended to resolve disputes between parties in an expeditious manner.

The review team engaged with the Municipal Board members and administrative representatives during the course of the review.

The Municipal Board participants expressed a strong understanding of the concerns of all stakeholders about its role and function under the legislation. They noted that all the Municipal Board functions have been guided by principles of natural justice that work to ensure a transparent and fair resolution of matters with opportunities for input from all stakeholders. They noted that the main function of the Municipal Board provides:

- Independence from local decision making ensuring consistent application of local development plans, by-laws and policies within a provincial context
- A crucial safety valve for errors in decision-making at the municipal level
- Accountability for municipalities to keep their planning documents and policies current with current priorities
- A forum for members of the public to be heard on all appeal and referral matters to ensure that decision making processes are inclusive

The review team conducted research into the planning appeal structures of Alberta, Saskatchewan, and Ontario as part of this review. The emphasis of this research was to understand the structure of planning appeal mechanisms, the structure and function of appeal bodies and the role that these bodies have in relation to the role of municipal decision-making functions. A summary of this information can be found in **Appendix G**.

The key findings from this research when compared to the Municipal Board's role as an appeal body are as follows:

- An automatic objector process is not common, with most jurisdictions instead focusing on standard appeal processes
- Most frameworks emphasize the appeal rights of applicants and impacted landowners as well as required participation of appellants in earlier stages of the approval process
- Appeals to quasi-judicial boards in most jurisdictions are limited to prescribed statutory limits of appeal
- Other jurisdictions establish prescribed statutory limits of appeal to guide De Novo hearing practices.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on the role of the Municipal Board as appeal body for planning and development decisions:

- *"Chief among the [City of Winnipeg] public service's suggested changes is that applicants/landowners should no longer have the right to appeal decisions to the Municipal Board. As we've previously discussed, I strongly disagree with this suggested amendment. While the appeal provisions could be improved upon or somewhat refined, taking them away entirely is in my opinion completely unwarranted. The Province of Ontario (through the Ontario Land Tribunal, formerly the Ont. Municipal Board) and several other jurisdictions across the country provide for appeal rights to an independently appointed tribunal to resolve legitimate land use disputes. That is for good reason. Politics and irrelevant considerations should be removed from the equation and developments should be considered on their merits. I fail to see why City Council members should in all cases be the ultimate arbitrator of these types of disputes. If appeal rights are removed, an aggrieved landowner would have no other choice but to seek judicial review and that is extremely challenging in the context of municipal decisions. This is to say nothing of the cost and inordinate delay that would result if the Court was the only avenue of redress." – Consultation participant*
- *"Municipalities still retain local decision-making authority, as long as they deal with applications in a timely manner. The requirements set out in The Planning Act limit when applicants can appeal to the Municipal Board–applicants cannot file appeals in all circumstances. We support the ability for producers to file an appeal to the Municipal Board if applications are not handled in a timely manner; additionally, we support having the Municipal Board make final decisions of appeals. While recognizing the challenges municipalities encounter with the*

recent amendments (e.g., meeting deadlines, understanding new policies), we recommend the provincial government provide municipalities with adequate support and resources to ensure municipalities can meet the requirements of The Planning Act. Lastly, given the Municipal Board's increased workload, we recommend the province hire additional Municipal Board staff to enable prompt decision-making." – Producer group formal joint submission

- *"The ability to appeal also highlights other issues in contention, being that a decision of a municipality, that may in the minds of local elected officials, be in the local public good, but with a wider lens looking at the issues at hand, that local decision may not be in the interests of the greater good." – Consultation participant*

2.8. Effectiveness of the Municipal Board processes for planning and development decisions

All review participants shared concern about the effectiveness of the Municipal Board processes for planning and development decision making.

The common themes identified by stakeholders in this area included:

- Labour intensive, manual and inflexible processes for making application and providing documentation to support the Municipal Board processes including reliance on printed applications and restricted use of correspondence by email or other electronic means
- Lack of transparency into the Municipal Board administrative procedures including but not limited to status of scheduling hearings and order release timeframes
- Limited direction from the Municipal Board relative to coordination issues with municipalities on scheduling conflicts and alignment of decision-making processes
- Limitations in processes to schedule a hearing and manage notification to participants including the identification of facilities to conduct hearings in local communities
- Absence of clear policies, guidelines and procedures for complex cases brought before the Municipal Board
- Inconsistent hearing processes often dependent on the background or experience of the individual board members and acting chair
- Limited ability to access the Municipal Board decisions electronically including historical decisions that could be used to provide insight
- Inability of the Municipal Board to establish required case management functions for planning and development appeals
- Failure of the Municipal Board to achieve legislated timeframes to conduct hearings and publish orders or referral reports combined with a lack of clear repercussions for missed timeframes on the part of the Municipal Board

While an analysis of the Municipal Board's operational capacity is out of the scope of this review, most review participants shared the perspective that the Municipal Board has not been supported with the appropriate level of investment to enable its new responsibility for planning and development appeals/referrals. Many participants noted that there has been a noticeable impact on the Municipal Board's ability to support the other functions it has under legislation and to support to the other tribunals it administers.

Municipal Board review participants shared these concerns. The key limitations impacting Board performance they identified were:

- Staff shortages including full-time staff to dedicated to managing the planning and development appeal work load

- Budgetary constraints preventing investment to fully implement new procedures or solutions to facilitate improved processes like case management processes supported in other areas of the Municipal Board's jurisdiction
- Inability to implement electronic application, correspondence and decision publishing capability due operational and privacy constraints
- Reduced Municipal Board member complement to support increased hearing workload
- Long training requirements for new board members restricting the size of the pool of experienced board members to draw on to chair hearings and develop decisions compared to historical levels
- Complexities associated with notice provisions under the legislation with an emphasis on coordinating with municipal officials to convene hearings in communities where appeals or referrals are initiated

The review team notes that un-proclaimed legislation to establish a Land Value Appraisal Commission outside the scope of this review is anticipated to reduce some of the workload of the administration team supporting the Municipal Board.

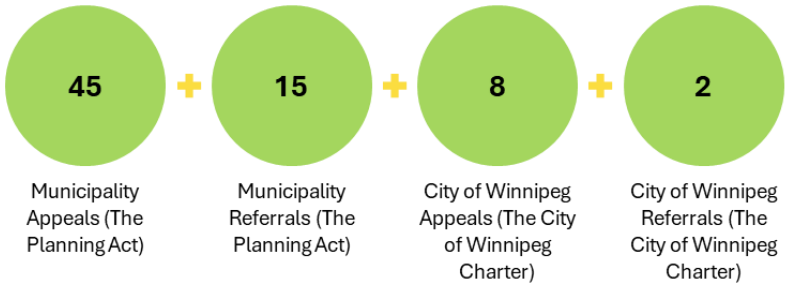
The Municipal Board participants confirmed that they were initially supported with a part-time term planning resource from the Community Planning Branch to support case inquiries and to provide technical support to the Municipal Board members and staff. This resource support has been discontinued.

Municipal Board representatives also noted challenges all parties to an appeal or referral are having to complete required applications and support documents to support the Municipal Board hearings. They noted that incomplete applications and filings have significantly impacted the Municipal Board's ability to meet legislated timeframes.

They noted that there has been a significant learning curve for these parties and the Municipal Board to adjust to the requirements for Municipal Board hearings under the new legislation

The review team conducted an analysis of the Municipal Board's performance against timeframes specified under the legislation. The full analysis can be found in **Appendix E**.

Figure 18: Manitoba Municipal Board Records Analyzed

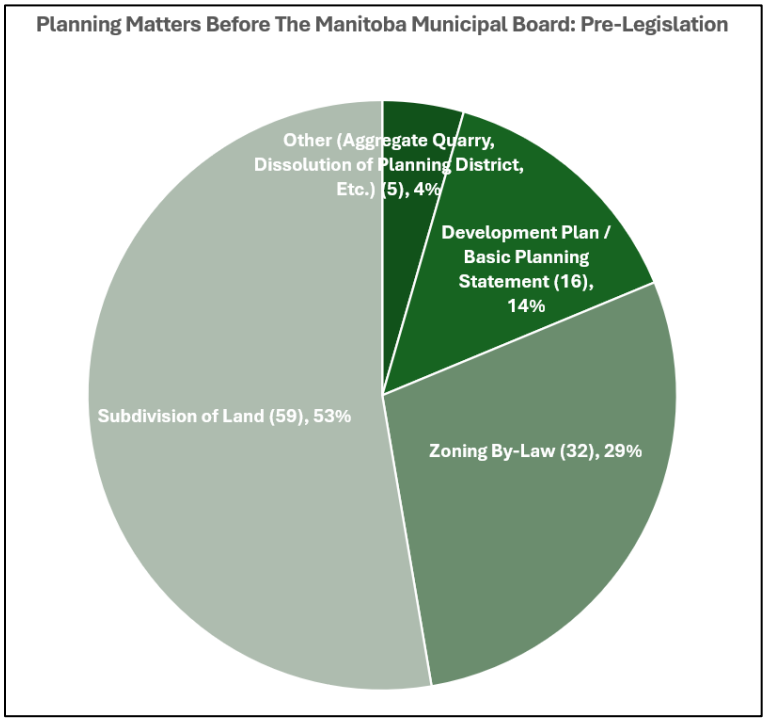


Source: The Manitoba Municipal Board Data Request.

A total of 70 appeal and referral records were provided by The Manitoba Municipal Board to complete this analysis. All analysis focused on the period after October 29, 2021 when these provisions came into force. The Manitoba Municipal Board was unable to provide their detailed internal referral and appeal application tracker. This resource would have enabled the review team to understand timeframes from receipt of an application or referral until the point at which the Board determined that these files were completed. The review team performed analysis of all scheduling metrics from the date the referral or appeal application was received by The Manitoba Municipal Board. This approach is consistent with the measures described the Province's Bill 37

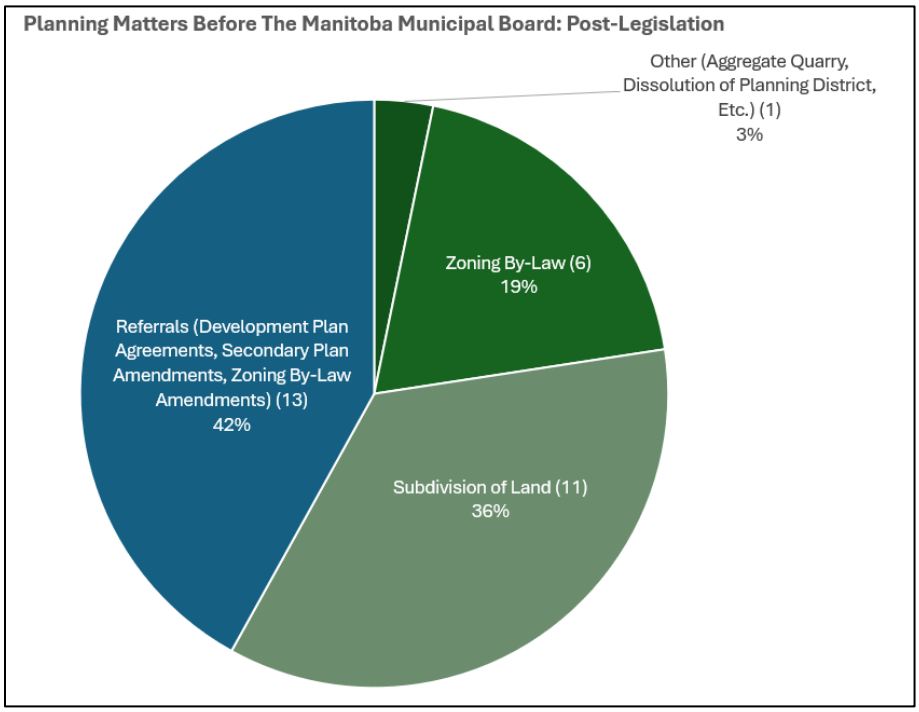
Implementation Guide and the review team considers it an acceptable proxy for the purposes of this review.

Figure 19: Planning Matters Before the Manitoba Municipal Board: Pre-Legislation



Source: The Manitoba Municipal Board Data Request.; Manitoba MNR

Figure 20: Planning Matters Before The Manitoba Municipal Board: Post-Legislation



Source: The Manitoba Municipal Board Data Request; Manitoba MNR

The key findings from this analysis are as follows:

- Overall, referrals have accounted for 35% of the Municipal Board's workload since the new legislation was introduced.
- The Municipal Board is not consistently meeting the legislated service standard targets assigned to common planning and development applications.
- There are two service standards for the Municipal Board:
    - The Municipal Board must conduct a hearing 120 days from receiving an appeal notice or notice of sufficient objections.
    - The Municipal Board must issue its order or referral report 30 or 60 days from the date of the Municipal Board hearing.
- The Municipal Board's performance under The Planning Act (Appeals and Referrals) provisions has been:
    - 62% of zoning by-law appeals are not meeting the 120-day service standard to conduct a hearing from receipt of application. The average time is 194 days \and the longest time has been 481 days. 57% of zoning by-law appeal decisions are not meeting the 60-day service standard to issue an order from the date the hearing is completed. The average time for this measure is 83 days and the longest time has been 481 days.
    - 50% of zoning by-law referrals are not meeting the 120-day service standard to conduct a hearing from receipt of application. The average time is 111 days and the longest time has been 178 days. 100% of zoning by-law referrals meet the service standard of 60 days to issue an order from the date the hearing is completed. The average time for this measure is 33 days and the longest timeframe is 44 days.
    - 40% of subdivision appeals do not meet the 30-day standard to issue an order from the date the hearing is completed. The average time is 39 days from when the hearing is concluded to the order and the longest time has been 93 days.
- The Municipal Board's performance under The City of Winnipeg Charter (Appeals and Referrals) has been:
    - 25% of subdivision appeals are not meeting the 120-day service standard to conduct a hearing from receipt of application. The average time is 137 days to hearing with the longest time being 215 days.
    - 100% of the orders for subdivision appeals or referrals have been issued in 59 days.
- Generally, applications for appeals and referrals related to the City of Winnipeg Charter are completed within the prescribed timeline more often than those related to the Planning Act.
- The results validate that the Municipal Board is prioritizing appeals where there are specified timelines. Standard subdivision appeals subject to The Planning Act do not have a specified timeframe. The average number of days for these hearings to be convened is 174 days with the longest taking 343 days.

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on the effectiveness of the Municipal Board processes for planning and development decisions:

- *"The Municipal Board should be an appeal body, not a hearing body. If the Municipal Board hearing is a de novo hearing, then Council's decision is irrelevant. This should not be the case. Municipal Council decisions should be identified and be important and should be the basis for all appeals." – UDI formal submission*
- *"As we recognize that an appeals process with clear parameters and guidelines may be warranted, municipal Councils should be provided an opportunity to re-visit and make new decisions on land use applications, based on the findings of a modernized Municipal Board or similar body following an appeal." – AMM formal submission*
- *"Case management and other mediation tools must be in place to resolve straightforward disputes before a Municipal Board hearing is scheduled." – Municipal survey participant*
- *"They should do case management like they do for assessment appeals – that way they can get the easy stuff out of the way and have more time for the complicated stuff – also people would not have to get lawyers when all they want is to explain why something does not make sense or why they don't agree with a decision." – Public survey participant*

2.9. Balance between land owner rights and community interest in land development and planning decision making

The legislated changes introduced provisions for applicants to appeal to the Municipal Board for missed timeframes and to appeal specified decisions by the planning authority or municipal council.

They also introduced an automatic referral of planning matters to the Municipal Board when sufficient objection of 25 residents was received for the adoption or amendment of a zoning by-law under the City of Winnipeg Charter or the Planning Act.

Under the Planning Act, sufficient objection provisions for zoning bylaws require the matter to be referred to the Municipal Board. The Municipal Board must then issue an order.

Under the Charter, sufficient objection provisions require the matter to be referred to the Municipal Board. The Municipal Board must then submit a report with recommendations to council.

These provisions were established to create a legislated protection for the public for development decisions that would have a significant impact in the community.

Feedback on the legislation in scope of this review

Stakeholders had mixed views about the balance of land owner rights and provisions in the legislation intended to protect community interest.

Municipal stakeholders noted that the legislation established the ability for project proponents to appeal planning authority decisions based on failure to meet established timeframes as well as decisions by council. They recognized that the objector provisions were intended to provide an offset to an applicant's legislated appeal rights.

Specific themes identified by Municipal stakeholders about appeal and objector provisions in the legislation included:

- The legislation creating an imbalance in favour of project proponents and essentially positioned municipalities as an obstacle to development despite their legislated role to oversee development in their community

- Increased financial risk for planning staff and councils being named to a legal challenge resulting from processes to turn down an application
- Legislated timeframes being established without consideration of existing processes for Council decision making or an understanding of the capacity of organizations to introduce changes
- Lack of clarity from government on the application of a planning authority's reasons for decision not to approve and the subsequent role that these decisions have in the required appeal process
- Concerns that referral processes to the Municipal Board can be initiated before a Council has even had an initial public hearing
- Concerns that there no longer appears to be a circumstance where a municipality can realistically reject an application without being subject to a risk of going through an appeal or referral process

The majority of municipal participants provided feedback that the emphasis on applicant appeals is inappropriate, especially combined with provisions in the legislation that emphasize the applicant's rights to seek costs from the Municipal Board. While they recognized that the legislation provides the Municipal Board with discretion on costs, they believed that the rights of municipalities to recover costs should be made equivalent.

Development, industry, and legal participants shared the perspective that at a basic level the legislation has been successful in establishing a basic framework for project proponents to move forward when there is a fundamental disagreement on a project or its approval with a planning authority. These proponents also shared experience that some municipalities continue to make decisions that are not consistent with Council approved plans and by-laws. In that context, they noted that the right to an appeal is fundamental.

These stakeholders noted that there are inconsistencies between the appeal rights of developers or land owners in the City of Winnipeg as compared to those operating in communities governed under the Planning Act.

All stakeholders shared the perspective that the provisions to establish an automatic referral to the Municipal Board when 25 or more objectors have been identified is not functioning appropriately. They noted that this process has resulted in:

- Delays in decision making for critical projects, including housing priority initiatives associated with the referral process
- Increases in the number of unnecessary referral hearings where there are no inconsistences in planning authority decision making
- Increased risk of abuse of the legislation by NIMBY interests and frivolous appeals by individuals who are not directly impacted by the development resulting from an application

The vast majority participants noted that while the 25-person limit represented an attempt to establish a consistent threshold, in practical terms, it is not working appropriately because the threshold number of objectors is still too low. They advocated for an immediate increase to these thresholds and for a re-evaluation of this concept based on experience to date under the legislation.

Public participants participating in the questionnaire expressed a lack of understanding of the appeal and referral provisions in the legislation. They noted that significantly more public education is required on these concepts by the department and municipal authorities.

All stakeholders felt that improvements to the legislation in these areas would be strengthened with:

- Ensuring the appeal rights of landowners are consistent between the Planning Act and City of Winnipeg Charter
- Increasing the threshold for automatic referral based on the scope of the original council decision and population of the jurisdiction responsible for the decision
- Clarifying which parties should have legal standing to appeal and making updates to the corresponding notice provisions
- Clarifying whether and how a petition would meet the requirements for the minimum referral standard for objections under the legislation
- Establishing standard application filing fees for all appeals including objector referrals
- Providing guidance to the Municipal Board on its ability to assign costs for frivolous or vexatious appeals under the legislation including the potential for Municipalities to recover costs

The following representative quotes reflect the feedback of municipalities, development and industry stakeholders and the public on the balance between land owner rights and community interest:

> *"In my view, there should also be a level of consistency regarding appeal rights under The Planning Act and the City Charter. Developers or landowners applying for subdivisions or zoning by-law amendments in a neighbouring RM should not have greater or lesser appeal rights than those within City limits." – Consultation participant*

2.10. Feedback on review process

This section incorporates feedback from participants about this statutory review process. It includes feedback on the consultation process and overall review methodology as well as specific feedback on the regulatory performance data analysis activities.

A detailed overview of the methodology for the review including the regulatory performance data analysis activities can be found in **Appendix B.**

2.10.1. Overall approach, methodology and process

Participant feedback on this statutory review process was consistent across all stakeholder groups and interests.

The main themes were as follows:

- Participants expressed appreciation for the review team's approach. They found the process to be thorough and were pleased with the opportunity for in-person consultation.
- The review team's efforts to engage with various stakeholders was viewed positively. Stakeholders appreciated the team's efforts to gather diverse perspectives and the structured nature of the consultation process.
- Participants noted that review team's efforts to ensure broad and representative stakeholder representation was worth the effort and had significantly increased confidence in the review findings. Specific feedback on stakeholder selection emphasized:
    - Participant size and capacity within a specific sector (e.g. large/medium/small developer or City of Winnipeg/urban/rural municipalities)

    - Participant perspective by focus area (land development, quarry and aggregate, livestock)
    - Participant perspective by experience with legislation especially for regional planning board and appeal provisions
    - Participant perspective by geography within the province
- Participants expressed satisfaction with the depth of the discussion and the team's willingness to explore complex issues. They felt the review process was thorough and allowed for a meaningful exchange on the relevant topics.
- Participants commented on the multi-disciplinary nature of the team. They noted that the ability to bring team members with planning, legal expertise and analysis capability together with an understanding of the development process and municipal government was fundamental to achieving a review with solid outcomes.
- Participants noted the review team's preparation and steps taken to be prepared for discussion about issues relevant to each group of stakeholders.

Some representative quotes from session participants included:

> *"This was as the best consultation on the legislation that we have participated in, and, while we understand that the government is responsible for the response, there is comfort that the review team was really listening and trying to address/understand/reflect on the legislation and its impact." – Consultation participant*

> *"The AMM wishes to once again thank Braid Solutions Inc. for their objectivity and professionalism throughout the conduct of this independent review. We also greatly appreciate the openness and willingness to collaborate with our association when facilitating targeted municipal focus group meetings and consultations with our members." – AMM formal response*

> *"The process used for this legislative review to obtain substantive feedback from stakeholders and industry experts was very well done and appreciated by our members. This is a model that should be looked at for future similar reviews." – UDI formal response*

The review team was provided with feedback about their efforts to ensure that stakeholder comments in the in-person sessions was aligned with the actual wording or in scope intention of the legislation as follows:

> *"I did not appreciate how our perspective was challenged in the meeting. We interpret the legislation in a specific way and we should not be corrected when sharing our interpretation." – Consultation participant*

Participants expressed frustration that the timing of the review and coincided with the summer busy period for planning and development activities.

Some participants questioned the timing of the review despite the fact that it was being conducted as a legislated process. Many stakeholders felt that the review was occurring too soon after the implementation of the legislation, before anyone could fully understand and experience its impacts.

Municipal participants felt that the timeframes associated with a formal legislative review would not meet the needs of municipalities looking to implement new or changed processes to access Housing Accelerator Fund support. They highlighted that a more responsive process was required to ensure that there would be no delay in the province making changes so that municipalities achieve program requirements.

The review team received feedback through the public survey that the EngageMB public survey was not appropriately advertised. This feedback highlighted media coverage about this topic.

Phase II review participants supported the idea of maintaining and repeating the review process in the future, though with some caveats and suggestions for improvement:

- Many participants saw value in ongoing reviews to ensure legislation remains effective and responsive to changing needs. They appreciated the opportunity to provide feedback and have their concerns heard.
- Some stakeholders suggested that future reviews should be more frequent or regular, rather than waiting for a full statutory review cycle. This would allow for more timely adjustments to the legislation.
- There was a desire for more transparency and follow-up on how stakeholder input is used in the review process. Participants wanted to see clear outcomes from their involvement. Some participants questioned the value of the review if they were not engaged on the resulting recommendations before they were made to government.
- Several stakeholders emphasized the importance of maintaining in-person consultations in future reviews, as they found these more effective than virtual or written submissions.
- A few stakeholders expressed concern about "consultation fatigue" and suggested that future reviews should be streamlined to avoid overburdening participants.

2.10.2. Regulatory performance data analysis and survey

Stakeholder feedback provided on the regulatory performance data analysis process was mixed.

Development and industry stakeholders noted that this is a critical part of the process and that transparency with respect to outcomes should be fundamental component of the review. Some development stakeholders highlighted concerns that the data provided by municipalities would not provide a consistent picture of challenges, especially for the City of Winnipeg.

While the majority of municipal stakeholders supported this activity being incorporated in the review, over half of Manitoba's municipalities (74) did not participate.

The main themes identified by municipal stakeholders about this part of the review were:

- Despite the expectation to provide data to support the review being communicated by MNR, a minority of municipalities challenged the requirement to participate in this part of the review because there was no formal requirement to provide data set out in the legislation.
- Some municipal stakeholders raised concerns about how the information would be used in the review. They expressed concern that it would not be transparently shared with stakeholders and that it would be used to reinforce policy decisions by government without further input.
- Many municipalities noted that the level of effort to meet the request was significant. This concern was particularly significant for municipalities who maintained paper-based systems to process their planning and development applications because it required them to manually retrieve all relevant records so they could be submitted. Larger municipalities (e.g., the City of Winnipeg) with more staff were better positioned to complete the request while smaller and more rural municipalities had to reallocate their resources and business priorities to meet the request's timelines.
- All municipalities noted that planning and development activity is high for most municipalities in Manitoba over the summer months compared to other times in the year. They noted that the timing of the request introduced challenges to support the request in contrast to other work activities.

- Some municipalities raised concerns about the quality of records and data that would be provided through the data request given the limitations identified above and the lack of a consistent tracking methodology across the province. Some stakeholders expressed concerns that firm conclusions about the state of municipal planning and development would have limited value without having full visibility of all transactions completed under the legislation.
- Some municipalities expressed concerns that the final data collection method incorporated fields that were either not tracked or managed differently. They noted that while the supporting materials were helpful, they could not provide the required information in the format that was requested in all situations.

In its formal response to the review team, AMM expressed the sentiment of a majority of municipalities this way:

> *"While [AMM] appreciated the flexibility that was ultimately granted to municipalities and an extension to the submission deadline, the initial scope of the request was excessive and cumbersome for many of our members. The tight response timeframe in the middle of summer quickly overwhelmed municipal offices given staff availability and resourcing constraints. For example, one of our members calculated it would take 800+ hours to fulfil the original data request. As the capacity and resources of municipalities varies greatly across Manitoba, we would encourage the Province to allow sufficient time and provide resourcing support to help municipalities fulfil similar, but more refined, requests in the future." – AMM formal submission*

An assessment of the regulatory data analysis and the review team's perspective on its applicability to the review is included in **Appendix B Section 1.2**.