

Riverbank Overlay District – Review of In-Ground Swimming Pools

ISSUE

City Council, at its Public Hearing, held on December 16, 2019, approved the creation of a Riverbank Slope Overlay Zoning District (Overlay District) containing development standards for development within the area while maintaining the integrity of the riverbank.

City Council requested Administration provide further options to consider adding regulations for the development of in-ground swimming pools in the Overlay District.

BACKGROUND

History

City Council, at its Public Hearing, held on December 16, 2019, approved amendments to Bylaw No. 9700, The Official Community Plan and Bylaw No. 8770, the Zoning Bylaw (Zoning Bylaw), to provide policy and regulations for development of specific sites adjacent to the South Saskatchewan River. The approved regulations provided for the creation of the Overlay District which contains development standards for development within the area while maintaining the integrity of the riverbank.

City Council requested additional information related to development of in-ground swimming pools and made the following resolution:

“that Administration report back not later than June 2020 with options to consider adding regulations for in-ground swimming pools in the slope overlay district.”

In June 2020 and December 2020, the Standing Policy Committee on Planning Development and Community Services received reports from Administration requesting additional time to complete the review of municipal development standards and to engage with industry professionals and other stakeholders. The challenges in completing this work was due to limited engagement opportunities due to COVID-19 restrictions.

Current Status

Building and Development Permits are approved in accordance with applicable civic bylaws and approved development standards identified within the Overlay District in the Zoning Bylaw. In accordance with the Overlay District, no applications received after December 16, 2019, for in-ground swimming pools have been considered since they are currently prohibited.

The Overlay District is comprised of 137 properties. There are eight properties with in-ground swimming pools constructed prior to December 2019.

Public Engagement

Administration consulted with local geotechnical and structural engineers, swimming pool contractors and homeowners who spoke at the December 2019 public hearing on further options to consider adding regulations for the development of in-ground swimming pools. Input received from these stakeholders has been used to inform the approach presented.

City of Saskatoon Current Approach

Development standards contained within the Overlay District are guided by the following slope management practices:

- 1) allow for developments that use engineered controls to meet a defined factor of safety without reliance on future monitoring or enforcement;
- 2) limit future impacts to groundwater levels;
- 3) continue City-led monitoring programs of riverbank areas; and
- 4) support property owners through slope stability education.

Development standards contained within the Overlay District support reasonable development with the area, while maintaining the integrity of the riverbank.

Development standards are also intended to manage public safety, financial and legal risks to both the City and private property owners.

Approaches in Other Jurisdictions

In preparation of this report, a specific review was completed of how other municipalities manage the interaction of swimming pools on private property and slope instability. In some cases, in-ground swimming pools are prohibited and in others, may be supported through site-specific engineering. Approaches by other municipalities include:

1. The City of Red Deer permits swimming pools, subject to a geotechnical report.
2. The City of Medicine Hat permits swimming pools located away from the top of the bank. The homeowner is responsible for maintenance of the pool and ensuring it remains free of leaks.
3. The City of Edmonton, in the development of new neighbourhoods, includes development restrictions to manage risks within slope stability areas which typically include the prohibition of swimming pools and other water retention structures. In cases of lower risk, for properties at much greater setback distance from top of bank or shallow ravine areas for example, lesser restrictions involving the requirement for an underdrain system and leakage detection may be adopted.
4. For older neighbourhoods which preceded such requirements, the City of Edmonton requires a supporting site-specific geotechnical slope stability assessment. The development of swimming pools is strongly discouraged for properties abutting the top of a bank. A defensible technical basis is required to support such development proposals for new pools, which are relatively rare.

5. The City of Calgary restricts new development in certain areas in order to meet established slope stability standards and conducts the appropriate level of technical review while seeking to mitigate slope stability concerns on private property. There is no specific restriction regarding swimming pools but documentation recognizes each situation is unique. The City may conduct the appropriate level of investigation or technical review and collaborate with private landowners in order to mitigate slope stability concerns on private land, on a case-by-case basis.

OPTIONS

Administration has identified three options for consideration with respect to the development of in-ground swimming pools in the Overlay District. The options incorporate different strategies to manage risks, present within the Overlay District, to both property owners and the City.

Before elaborating on the options, it is necessary to provide some context around the components which affect slope stability and the impact an in-ground swimming pool may have on groundwater levels.

Slope failure is a natural occurring geological activity. There are three main components which affect slope stability: geology, geometry and groundwater. The manner of slope failure can vary significantly depending on these three components. The following shows how each of these components affect slope stability:

- Geology - Soil is mainly comprised of sand, silt and clay. Sand particles are typically rounded and can lock together, whereas clay particles are much smaller, flatter and do not lock together as well. Therefore, a slope made from sand can usually exist at a steeper angle for a longer time than the same slope made from clay. Additional complexities, such as different layers of soil stacked on top of each other and tilted in certain directions can increase or decrease the stability of a slope.
- Geometry - Some slopes can be stable at very steep angles; others need to be almost flat to be stable. Through slope instability, nature self-corrects a slope to an angle which maintains equilibrium.
- Groundwater – The groundwater level is the elevation within the ground where water fills the space between the soil particles. The groundwater level will naturally fluctuate and will be present within a slope at some depth. Increases in the groundwater level result in an increase in the pressure of the water in the spaces between the soil particles. This increased pressure effectively pushes the soil particles apart and increases instability. Therefore, the higher the groundwater level in a slope, the greater the impact on the stability of the slope.

Of these three components which impact slope stability, a change in groundwater levels is the factor most likely to be the difference between a failure occurring along the riverbank or not. Changes in groundwater levels may result from both natural and human sources. Natural sources include infiltration from rain events, recharging

aquifers. This infiltration could occur significant distances from the riverbank, but in time, will impact groundwater levels. Fluctuations in groundwater from natural sources are difficult to predict and costly to control. In comparison, human activities which impact groundwater are typically more localized, such as landscape watering, water retention structures or swimming pools and can be managed to reduce the likelihood of a failure occurring.

In-ground swimming pools are designed to be leak free; however, even with ongoing pool maintenance, most swimming pools leak at least a small amount. It is difficult to build an entirely waterproof structure. Pools can leak through fittings, plumbing or through the pool basin or liner itself. They naturally lose water through evaporation and splash out, making small leaks difficult to detect if only water level is considered.

There are technologies available to continually monitor the water level within a swimming pool, as well as technologies able to detect a source of a leak. Swimming pools can also be designed with leak mitigation or containment systems designed to capture water from a leak and divert it to an alternative outlet.

While the area of an in-ground swimming pool is relatively small and the area of a leaking pool impacting on the groundwater may also be relatively small, the action of a leaking pool is constant for the entire time it is filled. During a period of lower groundwater levels, a leaking pool may not impact slope stability, but during periods of high groundwater levels, the addition of leaking pool water could add to the groundwater and lead to critical groundwater levels within the slope.

Groundwater exists across property boundaries. While a localized increase in water from a single swimming pool may not significantly impact ground water levels within the slope, the cumulative water from multiple sources could raise groundwater levels, negatively impacting adjacent areas including other private properties, City infrastructure and the riverbank.

The City can assess and mitigate risks associated with permitting the development of in-ground swimming pools and impacts to groundwater levels by consistently applying corporate risk management practices and established corporate risk tolerances to each option that follows.

Option 1 - Maintain the Status Quo – Prohibit In-Ground Swimming Pools

This option proposes the City continue with the status quo where the development of in-ground swimming pools continues to be prohibited within the Overlay District. Above ground swimming pools would continue to be permitted.

Implications

This option is the most effective strategy to minimize risks associated with this development type and impacts to groundwater levels. By not permitting the development, the likelihood of the risk is effectively eliminated. This strategy also avoids the financial and public safety impacts which could result in the event of a failure.

This option does not generate any additional financial, public safety or legal implications; however, this option does not address the desire expressed by property owners within the Overlay District to construct an in-ground swimming pool.

In summary, the advantages and disadvantages of this option are:

Advantages

- 1) Eliminates risks to groundwater levels associated with this development type and avoids financial and public safety exposure;
- 2) No further implementation requirements; and
- 3) No new financial costs.

Disadvantages

- 1) Prohibits this type of development which property owner's have expressed an interest in pursuing.

Option 2 - Permit In-Ground Swimming Pools with Site Specific Geotechnical Review and Engineered Design – No Monitoring

This option would permit construction of an in-ground swimming pool within the Overlay District, subject to a site-specific geotechnical review with seepage analysis and engineered design to an established factor of safety with demonstrated leak mitigation provisions. In this option the reliance on monitoring will not be permitted as the only measure for leak mitigation.

The review and approval processes to construct the in-ground swimming pool would be administered under Bylaw No. 7981, Swimming Pool Bylaw, 2000 (Swimming Pool Bylaw) and the Zoning Bylaw, through the Building and Development Permit Program.

Implications

Consideration of this option addresses desire expressed by property owners within the Overlay District for allowing construction of an in-ground swimming pool. This option would require geotechnical review and engineered design, by a professional engineer licensed to practice in the Province of Saskatchewan, to reduce the likelihood of the development type impacting groundwater levels.

Although this option increases the likelihood groundwater levels would be negatively affected by the development and increase the likelihood of failure, the requirement for geotechnical review and an engineered design is intended to offset some of the increased risk. These requirements would also result in some of the financial and legal impacts being transferred from the City to the property owner and the design professional who certified the integrity of the site and design.

If a leak is detected under this option, it will be up to the property owner to fix the leak. The City will not necessarily know about the leak. Thus, we will be relying on individual property owners to maintain their swimming pools. In some cases, this may be subsequent property owners who will be facing potentially expensive repairs.

It is estimated the costs to the property owner to meet the geotechnical review and engineered design requirements associated with this option could exceed \$20,000, which would be in addition to the costs to construct the swimming pool.

The implementation of this option would require amendments to the Overlay District regulations within the Zoning Bylaw to permit the development of in-ground swimming pools subject to the stated requirements. Further engagement with residents within the Overlay District would be required along with the necessary public notice and a Public Hearing at City Council.

Amendments to the Swimming Pool Bylaw would also be required to include regulations related to site specific requirements. In consideration of current work plans, some reprioritization of projects would be required and it is estimated it would be six to nine months time before Administration would be able to complete the work required to implement this option.

In summary, the advantages and disadvantages of this option are:

Advantages

- 1) Addresses the desire expressed by property owners within the Overlay District to construct an in-ground swimming pool; and
- 2) Transfers a portion of the financial impact of this type of development from the City to the property owner and design professional.

Disadvantages

- 1) On a net basis, increases risks to groundwater levels associated with this development and increases the City's financial and public safety risk exposure;
- 2) Additional administrative time to implement; and
- 3) Increased costs to property owners associated with the geotechnical review, engineered design and construction of the in-ground swimming pool.

Option 3 - Permit In-Ground Swimming Pools with Site-Specific Geotechnical Review, Engineered Design – with Monitoring and Enforcement Program

This option, similar to Option 2, would permit construction of an in-ground swimming pool within the Overlay District, subject to a site-specific geotechnical review and engineered design. The one difference between Option 2 and 3 is this option requires property owners to submit leak detection monitoring reports to the City as part of an established monitoring and enforcement program.

Implications

Consideration of this option addresses the desire expressed by property owners within the Overlay District to construct an in-ground swimming pool. This option would require a geotechnical review and engineered design, with reliance on monitoring programs administered by the City, to reduce the likelihood of the development type impacting groundwater levels.

As with Option 2, this option increases the likelihood groundwater levels would be negatively affected by the development and increases the likelihood of failure, the requirement for geotechnical review and an engineered design is intended to offset some of this increased risk. Although these requirements transfer some of the financial and legal impacts from the City to the property owners and design professionals, this transfer is offset by the impacts the City assumes by administering a monitoring and enforcement program. As a result, this option transfers more of the financial and public safety risks to the City than to the property owner and design professional.

It is estimated the cost to the property owner to meet the geotechnical review and engineer design requirements associated with this option could exceed \$20,000, would be in addition to the costs to construct the swimming pool. Annual pool monitoring costs are estimated to be \$200 to \$500.

Similar to Option 2, implementation of this option would require the applicable amendments to the Overlay District regulations within the Zoning Bylaw (including the necessary public engagement, public notice and a Public Hearing) and amendments to the Swimming Pool Bylaw. The development of a monitoring and enforcement program would require additional administrative resources and stakeholder engagement to define the program requirements and funding options.

In consideration of current work plans, some reprioritization of projects would be required and it is estimated it would be upwards of one year's time before Administration would be able to complete the work needed to build out a monitoring and enforcement program. This work would involve identifying monitoring and enforcement provisions and further review of financial impacts associated with administration of the program. It would also involve the necessary engagement and processes related to the applicable Bylaw Amendments.

In summary the advantages and disadvantages of this option are:

Advantages

- 1) Addresses the desire expressed by property owners within the Overlay District to construct an in-ground swimming pool; and
- 2) Transfers a portion of the financial impact of this type of development from the City to the property owner and design professional.

Disadvantages

- 1) On a net basis, increases risks to groundwater levels associated with this development and increases the City's financial, public safety and legal risk exposure;
- 2) Significant administrative time to implement with further operational costs being identified; and
- 3) Increased costs to property owners associated with the geotechnical review, engineered design, construction and to meet monitoring program requirements.

RECOMMENDATION

That the Standing Policy Committee on Planning Development and Community Services recommend to City Council that Option 1 – Maintain the Status Quo – Prohibit in-Ground Swimming Pools, be approved.

RATIONALE

Groundwater exists across property boundaries. Increases in groundwater levels negatively impact the riverbank and cannot be localized to an individual property. Prohibiting developments which could contribute to an increase in groundwater levels avoids the risk of a resulting failure and the associated impacts for the City and all property owners within the Overlay District.

Administration recommends Option 1 be approved. This option continues to provide many development opportunities for property owners within the Overlay District, while eliminating risks to groundwater levels associated with this type of development. This option is also in alignment with the City’s low tolerance for financial, public safety and legal risks as outlined in the [Corporate Risk Appetite](#).

FINANCIAL IMPLICATIONS

As this option is the current approach, there are no financial implications associated with the recommendation. The financial implications associated with Option 2 and Option 3 are identified within the report.

ADDITIONAL IMPLICATIONS/CONSIDERATIONS

There is no additional implications or considerations associated with the recommendation.

COMMUNICATION ACTIVITIES

Monitoring reports and information related to the Overlay District will continue to be made available on the City of Saskatoon website and to residents residing within the Overlay District.

APPENDICES

1. Confidential Solicitor/Client Privilege

REPORT APPROVAL

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