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REPORT TO MAGIC LAKE ESTATES WATER AND SEWER COMMITTEE
MEETING OF THURSDAY, JUNE 11, 2026

SUBJECT **Captains Tank Conceptual Design**

ISSUE SUMMARY

To present options for the replacement of the existing storage tank, Captains Tank, within the Magic Lake Estates Water System, located on North Pender Island.

BACKGROUND

The Magic Lake Estates Water System (MLEWS) on North Pender Island is operated by the Capital Regional District (CRD) and provides domestic and fire protection water service to the Magic Lake Estates community. The system relies on two primary storage tanks: the Frigate Tank and the Captains Tank. The Frigate Tank, which was replaced in 2012, is in good condition and supplies approximately 75% of system demand. The Captains Tank, constructed in approximately 1970, is over 50 years old and is in poor condition, with visible deterioration, leakage, and safety concerns.

The existing Captains Tank has a storage capacity of approximately 340 m^3 and currently serves a single pressure zone within the system. The MLEWS is divided into four pressure zones, with the remaining three zones primarily supplied by the Frigate Tank. During peak summer demand periods, CRD Operations have identified challenges maintaining water levels in the Frigate Tank, indicating limitations in system redundancy and operational flexibility.

Operational experience has identified several deficiencies associated with the Captains Tank and its supporting infrastructure. The existing 150 mm PVC supply/distribution watermain connection is located on a steep slope and is partially exposed due to erosion, making it vulnerable to mechanical damage, soil movement, and potential failure. Access to the tank is constrained by a steep and narrow road, limiting safe access for routine maintenance and complicating future construction activities.

Water quality considerations have also been identified within the system, including periodic challenges maintaining adequate chlorine residuals. Hydraulic residence time within the Captains Tank is understood to contribute to water age and associated water quality concerns. In addition, the existing tank configuration, which utilizes a combined inlet and outlet, can limit effective mixing and contribute to localized stagnation. The current drainage system is also suboptimal, discharging without dechlorination and in a location that has the potential to impact adjacent properties, resulting in both operational constraints and regulatory challenges.

In response to these issues, the CRD initiated a conceptual design study to evaluate replacement of the Captains Tank and associated infrastructure improvements. Under Standing Offer Agreement, WSP was retained in 2025 to complete a conceptual design and prepare a Class D cost estimate. The work included review of background information, coordination with CRD staff, and development of design options and recommendations.

The conceptual design, completed in February 2026, recommends replacement of the existing tank with a new Glass-Fused bolted steel tank with a storage capacity of approximately 530 m³. This sizing is based on current provincial design guidelines and incorporates requirements for balancing storage, fire protection, and equalization volumes. The proposed capacity represents a significant increase over the existing storage and is intended to improve fire flow capability and overall system resilience.

The conceptual design also identifies opportunities to improve system operations, including potential reconfiguration to allow the Captains Tank to supply additional pressure zones via the Bosun Booster Station. This change would help balance system storage, improve redundancy, and reduce hydraulic residence time, thereby supporting improved water quality. These operational changes require further review and confirmation during detailed design.

In addition to tank replacement, the conceptual design includes upgrades to associated infrastructure, such as a new watermain connection, improved drainage with dechlorination, and enhanced access, safety features, and instrumentation. Options for replacement of the existing watermain have been identified and will require further evaluation during the next phase of design.

The Class D cost estimate for the overall project is approximately $2.14 million (excluding GST), including contingency and engineering costs. The estimate reflects the complexity of the site, including steep terrain, access limitations, and anticipated geotechnical requirements.

ALTERNATIVES

Alternative 1
That staff be directed to:

1. Prepare a budget estimate for detailed design and refined cost estimate of storage tank replacement for consideration in the 2027 budget; and
2. Develop a proposed scope and community engagement process for a voter assent process in 2027-2028 for loan authorization.

Alternative 2
That staff be directed to:

1. Defer advancement of project in 2027; and
2. Keep the tank replacement project within the 5-year capital plan.

Alternative 3
That this report be referred back to staff for additional information.

IMPLICATIONS

Financial Implications

The conceptual design identifies a total Class D project cost of approximately $2.14 million (excluding GST), inclusive of construction, engineering, and a 40% contingency, reflecting the early stage of design and site complexities such as steep terrain, constrained access, and anticipated geotechnical requirements. This estimate represents a significant capital investment for the Magic Lake Estates Water System and will require confirmation of funding sources, which

may include a combination of reserves, debt financing, grants, and/or service area taxation.

Advancing the project to detailed design will refine cost estimates and reduce uncertainty, particularly with respect to geotechnical conditions, watermain replacement strategy, and construction methodology. While the conceptual estimate includes appropriate contingencies, costs may vary as project scope is confirmed and market conditions evolve. Deferring the project may result in increased future costs due to continued asset deterioration, escalating construction pricing, and the potential for unplanned emergency repairs.

Service Delivery Implications

Replacement of the Captains Tank is expected to significantly improve the reliability and resilience of water service within the Magic Lake Estates Water System. The proposed increase in storage capacity, combined with potential system reconfiguration to allow the tank to serve additional pressure zones, will enhance operational flexibility and reduce the risk of low storage levels during peak demand periods. The project will also address the existing infrastructure deficiencies identified at Captains Tank, including aging assets, vulnerable watermain connections, and substandard drainage and mixing conditions within the existing tank.

CONCLUSION

The Captains Tank is a critical component of the Magic Lake Estates Water System that is nearing the end of its service life and presents increasing risks to system reliability, water quality, and operational safety. The conceptual design completed by WSP confirms the need for replacement and provides a feasible path forward to address existing deficiencies while improving overall system performance. The proposed upgrades, including increased storage capacity, improved infrastructure configuration, and potential operational enhancements, are expected to strengthen system resilience and better support current and future service demands.

Advancing the project to detailed design will allow refinement of key elements including cost, constructability, and system integration, and will support informed decision-making regarding funding and implementation. While the project represents a significant capital investment, it also addresses ongoing risks associated with asset failure and service disruption. Proceeding with the next phase of work will position the Committee to proactively manage infrastructure renewal and maintain reliable water service for the Magic Lake Estates community.

RECOMMENDATION

That staff be directed to:

1. Prepare a budget estimate for detailed design and refined cost estimate of storage tank replacement for consideration in the 2027 budget; and
2. Develop a proposed scope and community engagement process for a voter assent process in 2027-2028 for loan authorization.

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ATTACHMENT(S)

Appendix A: WSP Technical Memorandum