Mississippi Valley Conservation Authority

Asset Management Plan

October 2024

Table of Contents

Appendices

1 Mississippi Valley Conservation Authority (MVCA)

The MVCA is a provincial agency established in 1968 to further the conservation, restoration, development and management of natural resources in the Mississippi and Carp watersheds, and portions of the Ottawa River watershed. Our jurisdiction is composed of a network of rivers, streams, rapids and lakes, and a variety of landscapes from dense forests on the Canadian Shield to densely populated urban areas within the City of Ottawa.

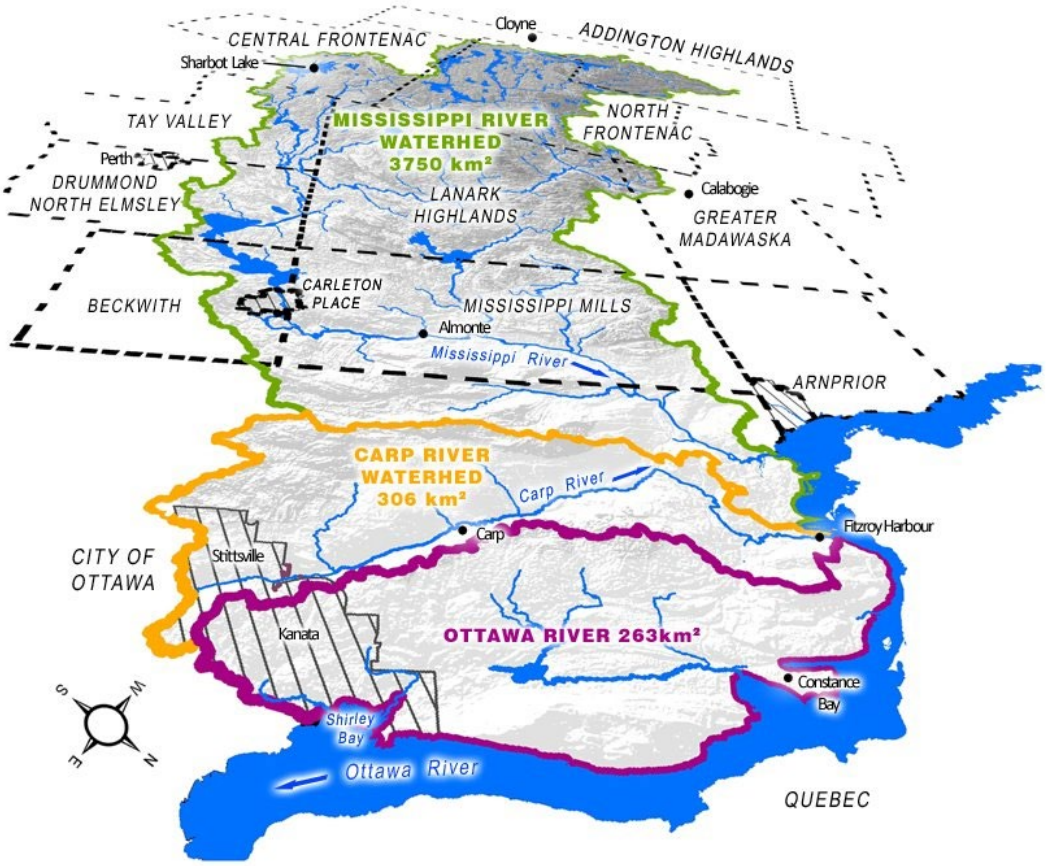

Figure 1. MVCA's Jurisdiction

MVCA is governed by a Board of Directors consisting of representatives from the eleven municipalities we serve, and a provincially appointed Agricultural Representative. Municipalities fund MVCA based upon the assessed property value within the watershed, with the City of Ottawa the largest contributor. MVCA charges fees for facility rentals, permits, and other services; and applies for grants from upper tier governments and charitable organizations to support program delivery.[1]

[1] Visit www.mvc.on.ca for more information on Mississippi Valley Conservation Authority.

2 Asset Management Planning (AMP)

MVCA began to prepare asset management policies and supporting documents in 2008 in anticipation of PSAB 3150 taking effect in 2009, which changed the financial accounting method for Tangible Capital Assets (TCAs) by government entities including conservation authorities.[2] Since then, MVCA has taken several steps to improve management of its assets including:

- Drafting an asset management policy and asset management strategy;
- Implementing a corporate Needs Assessment registry that is updated annually and addresses both operational and capital deficiencies and opportunities for improvement;
- Using the registry to identify priorities, inform annual work plans and budgets and to update of the *10-year Capital Plan*.
- Using a 10-year Schedule of Municipal Capital Levy Increases to implement the Capital Plan.

While MVCA has many tools typical of an Asset Management Plan, to date the Authority has not had a Board-approved document with that title. This document represents Version 1 of MVCA's Asset Management Plan. It contains high level goals, objectives and policies that will apply to all MVCA TCAs, but focuses on Water Control assets in fulfilment of Section 5.(2)2. of O. Reg. 686/21 under the *Conservation Authorities Act,* RSO 1990. Additional chapters will be added as resources allow.

2.1 Asset Management Goals & Objectives

The **Goals** of the Asset Management Plan are to:

1. Ensure business continuity and public safety.
2. Establish service levels and performance expectations.
3. Optimize investments in assets for the short and long-term.
4. Provide transparency in asset management.

The **Objectives** of the Asset Management Plan are the following:

1. Assets are inventoried, monitored, and actively managed throughout their lifecycle.
2. Assets are operated and maintained in accordance with agreed upon service levels.
3. Tracking and analysis of asset history are leveraged for continuous improvement.
4. Asset additions, betterments, and disposals are transparent and affordable.[3]
5. Funding is available when needed to maintain business continuity and public safety.
6. Long-term asset investments take into consideration evolving conditions (e.g. regulatory, climatic, technological) and the long-term consequences of decisions being taken.

[2] https://www.frascanada.ca/en/public-sector/projects/gnfp-capital-assets/in-brief-psab-ed-tangible-capital-assets
[3] "Additions" is to buy or build a new asset. "Betterment" is to enhance the functionality or extend the life of an existing asset. "Disposal" is to sell, decommission, or demolish an asset.

The following tools will continue to be used at the corporate level to manage assets under this plan:

- **Asset Registries** that list assets, acquisition details, and tracks investments and depreciation.
- Agreed upon **Service Levels** or **Performance Standards** needed to meet program requirements.
- **Operations and Maintenance Plans** that meet regulatory and industry standards.
- A corporate **Needs Assessment** registry that list deficiencies and opportunities for improvement, and prioritizes them using risk based-analysis.
- **Corporate Strategic Plan (CSP)** that sets 5-year goals and objectives.
- **CSP Implementation Plan** that identifies project and program priorities for the 5-year period.
- **Annual Work Plans** that identify priorities for the current fiscal year.
- The **10-year Capital Plan** that identifies priorities for the current and future years.
- The **Schedule of Capital Levy Increases** to sets the percent increase required to deliver the Capital Plan.

Individual program areas will develop asset-specific tools to support implementation of this plan.

2.2 Tangible Capital Assets & Asset Classes

MVCA owns/leases the following major Tangible Capital Assets[4] (TSA) with a combined replacement value in the order of $75-100 million:[5]

- six conservation areas
- twelve water control structures
- a variety of properties that were acquired to mitigate flood and erosion losses
- an extensive monitoring network to collect and transmit weather, soil, and riverine and lake conditions, and
- its headquarters on Hwy. #7 that houses offices, a garage, laboratories, and a work yard.

MVCA assets are divided into the following asset classes for accounting and asset management purposes:

- Land
- Land Improvements
- Water Control Structures
- Vehicles
- Machinery & Equipment
- Hardware/Software
- Buildings
- Leasehold Improvements
- Furniture & Fixtures

[4] Tangible assets are physical assets that can be seen, touched and felt. By comparison, an intangible asset is a non-monetary asset that cannot be seen or touched. Source: https://www.bdc.ca/. PSAB 3150 requires MVCA is required to track and depreciate assets with a value >$10k.

[5] This high-level estimate excludes property value. Heritage structures are irreplaceable; therefore, this estimate assumes like for like floor space built to current standards.

2.3 Asset Registers

A review of MVCA's asset management practices was carried out in 2017, which has been updated for this Plan.[6] MVCA maintains several asset registers which are at various stages of development and usefulness. Two registries are managed at the corporate level:

1. Tangible Capital Assets register used to implement accounting directive PSAB 3150.
2. Land Inventory prepared in accordance with O. Reg. 686/21.

The following registries are used by program areas to track assets and support decision-making:

- Water Control Structures – The Operations, Maintenance & Surveillance (OMS) Manual for each dam details its components parts and the history of the asset amongst other matters.
- Buildings - List of major structures but no tracking by subclass (e.g. cladding, roof, glazing, power lines, HVAC, private services.)
- Vehicles/Fleet – Lists items, manufactured year, make/model, key attributes, and mileage (if applicable).
- Hardware & Software – Lists all items, acquisition date, key attributes, warranties, and software on device; software is tracked by whether it is owned or SaaS, and whether it is supported; comprehensive network diagram.
- Furniture – Inventoried for insurance purposes.

The approach to tracking and managing machinery and equipment varies across the organization. For example, tools and machinery used for system operations and conservation area maintenance are inventoried with date of purchase and key details. Leased equipment (e.g. photocopier) is managed on a contract basis, but not as part of an inventory. Field monitoring equipment is tracked differently depending upon the type.

No asset registries exist for the following:

- Conservation Area Trails/Bridges/Culverts
- Conservation Area Other (e.g. privies, picnic tables, play structure)
- Off-site Road-side Signage

1. Registries will be developed and maintained for asset classes and subclasses, that documents the time and expense invested in those assets over their lifecycle, and their depreciating value.

[6] Bolivar Philips and BluMetric Environmental Inc. *Asset Management Preliminary Study*. January 2017.

2.4 Inspection and Condition of Infrastructure

Annual or more frequent inspections and condition assessments are a regular practice at MVCA. Depending upon the scope and value of an asset, the decision to repair or replace an item may require study by external specialists. The following is a summary of key inspection and condition monitoring practices:

- Water Control Structures:
    - Visually during every log operation
    - Every spring for public and operator's and safety during annual preventative maintenance
    - Visually at least once annually by the Engineering Department
    - Dam Safety Review – carried out in order of priority
    - Condition Assessment Report – carried out in order of priority
    - In response to calls from public
- Trail/bridges/culverts:
    - Trails-every spring and fall to remove hazardous trees/limbs and to clear debris from the paths
    - Trail-following major weather events to remove hazard trees/limbs and debris and during the season as time permits
    - Culverts-in response to calls from public
    - Study of bridge over the Clyde River carried out in 2020
- Vehicles
    - Employee walk-arounds before each trip
    - Monthly inspections of vehicles, fluid levels, tires etc.
    - Maintenance is as scheduled in accordance with warranties and as required
    - Yearly undercoating of vehicles, and washing after heavy use
- Computer Hardware
    - Ongoing scanning for viruses
    - Penetration-test (internal and external) conducted in 2023
    - Annual scheduled maintenance of all desktops and laptops
    - Helpdesk support and some tracking of chronic issues
    - Study carried out in 2023 regarding server replacement options
- Major Equipment
    - Preventative maintenance (PM) agreements are in place for the HVAC and generator at HQ

With few exceptions, there are limited performance standards in place for MVCA's assets and the programs they support. This can lead to uncertainty regarding what is "acceptable" in terms of asset condition, performance, and follow-up action, as well as failures in public confidence.

2. Service standards will be set for key asset classes and subclasses.
3. Inspection and maintenance schedules will be developed and implemented for asset classes and subclasses to optimize their function and identify needs and trends in a timely and cost-effective manner.

2.5 Asset Planning & Renewal

Most MVCA assets are at least 10 years old, several are over 100 years old (dams, and heritage buildings at the Mill of Kintail.) Assets less than 10-years old are typically vehicles and equipment (e.g. gauges, drone, computer hardware.) Prior to making a significant investment in either acquiring a new asset or enhancing an existing asset, MVCA goes through several steps best described as "Adaptive Management". This is a decision-making process that involves testing, monitoring, and evaluating, and incorporating new knowledge into asset management approaches. The continuous improvement cycle can be summarized as Plan-Do-Check-Adjust, as described below.

- **Plan**: Identify an opportunity for improvement and plan for change. Complete the necessary studies, processes, and permits before undertaking the project.
- **Do**: Implement the change at the desired scale.
- **Check**: Use data to analyze the results of the change and assess planned and unplanned inputs (cost, time etc.) and outcomes (effectiveness, acceptance, unintended consequences.)
- **Adjust**: Adjust the approach if needed, implement on a broader scale if appropriate, and begin the cycle again.

For example, MVCA tracks vehicle maintenance and repair costs and fleet usage before deciding whether to invest in a major repair on a vehicle, or to repurpose a vehicle, or to use residual value to offset the acquisition of a new vehicle, or to simply dispose of it. This is an ongoing process and allows MVCA to optimize use of and investment in its fleet.

MVCA implements this approach in several areas of its business, and is gradually implementing across the organization. The key first step is the documentation of a plan for each asset with defined service levels. This Asset Management Plan will support MVCA in the documentation of service expectations, and defining

Based upon the current condition and maintenance history of an asset, it will be added either to a current year work plan or to MVCA's Needs Assessment Registry. Thereafter, staff follow corporate procurement policies and provincial regulations such as environmental assessment processes to buy/replace or to plan, design, and build an asset. MVCA's asset renewal and replacement process for water control structures is shown in Figure 2. A comparable approach is used for most other assets.

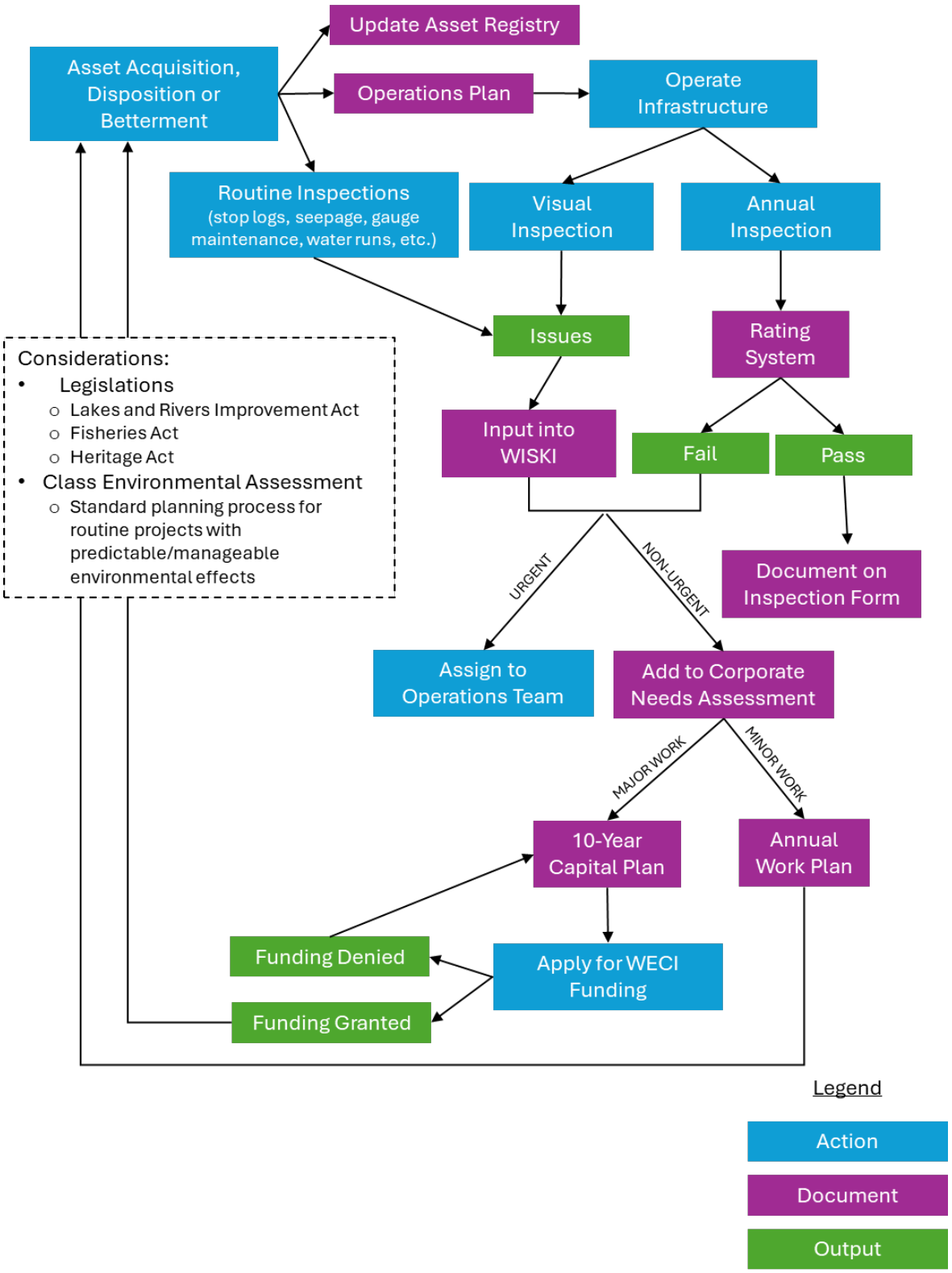

Figure 2. MVCA Asset Renewal & Replacement Process (Water Control Structures)

4. Trend analyses and predictive modeling will be used to develop and assess alternative approaches to operating and maintaining assets and for infrastructure design and purchases.
5. Where appropriate, options will be tested and assessed and applied more broadly.
6. Findings will be used to prioritize asset studies, renewal, and replacement projects in the annual Needs Assessment registry and 10-year Capital Plan.

2.6 Funding

As of 2023, MVCA received approximately 65% of its operating revenues and 75% of its capital revenues via the annual Municipal Levy which it receives from the eleven municipalities served. The balance is obtained primarily though user fees and upper-tier government grants, with some additional funds received through donations and interest earned. There are implicit limits to these funding sources, and programs must be delivered in a cost-effective manner. This Asset Management Plan will support the wise investment of resources into MVCA's assets.

2.6.1 Municipal Levies

Conservation authority programs and services are grouped into three categories that influence how activities and assets are funded by municipalities[7]:

> **Category 1:** Mandatory programs and services, e.g. dam operations, hazard mapping and regulatory services, provincial water quality monitoring, education and outreach related to these matters, and commenting on planning applications on behalf of the province.
>
> **Category 2:** Municipal programs and services, e.g. septic approvals/inspections, natural systems monitoring and planning.
>
> **Category 3:** Programs and services that further the purposes of the Act, e.g. lake and property stewardship programs, citizen science and some education programs.

Annual levies are charged to municipalities according to the scope of Category 1, 2, and 3 programs delivered in their jurisdiction. Revenues for the three categories are tracked separately, and money collected for Category 1 programs cannot be reallocated to Category 2 or 3 programs. Similarly, separate capital reserves have been established to support Category 1 and Category 3 program assets.

2.6.2 Water & Erosion Control Infrastructure Program

The study and renewal of MVCA's dam infrastructure relies upon funding under the provincial Water and Erosion Control Infrastructure (WECI) Capital Investment Program for Conservation Authorities. WECI is a Ministry of Natural Resources (MNR) capital cost share program with municipalities to provide

[7] Refer to O.Reg. 402/22

matched funding to conservation authorities for major maintenance or related studies of water or erosion control structures that are either owned or maintained by conservation authorities.

Conservation authorities are invited to submit applications for eligible projects for funding, including dams, dykes, shoreline erosion protection, and flood control channels. The program is a 50/50 cost share with the local municipality or contributors and must be completed within the fiscal year in which they are approved and funded. Applications are reviewed by a committee that determines the priorities within the following funding categories:

1. Safety Projects – repairs or studies of smaller value that are prioritized for funding. All safety projects are automatically funded.
2. Repair Projects – approximately 80% of funding is allocated annually to repairs.
3. Study Projects – approximately 20% of funding is allocated annually to studies.

Most repair and study projects at MVCA cannot proceed unless they receive funds under the WECI program as evidenced in 2024 when matching dollars were not granted for a Dam Safety Review.

2.6.3 Other Grant Programs

Many governmental and non-governmental grant programs require dollar-matching from the recipient organization so that, generally, MVCA must secure at least 50% of the funds through its own sources before it can proceed with a project. Typically, those monies would come from either the current operating revenues, or the drawing down of a capital or operating reserve. Over the period 2018-2022, MVCA made an average annual net contribution to capital reserves of ~$168,500/year and ~$166,400/year to the operating reserve.

2.6.4 Loans

MVCA is prohibited by legislation from securing a direct loan from a bank or other organization without the sponsorship of one of its member municipalities. Currently, MVCA has loans with the Town of Carleton Place and the City of Ottawa for the construction of the HQ and Shabomeka Dam, respectively.

2.6.5 User Fees

User fees are typically used to support operating costs and do not contribute significantly to capital reserves for capital renewal.

2.6.6 Capital Reserves

In order to meet asset renewal and replacement requirements set out in the *10-year Capital Plan*, MVCA's Board has approved a 10-year schedule of annual increases to the capital portion of the Municipal Levy. As well, in 2023 it approved targets for each of the restricted reserves:

a) "Water and erosion control asset reserve funds should have a balance equal to or greater than 50% of the approved 8-year capital program, up to a maximum of $500,000 per project. For

projects greater than $500,000, add the annual cost to carry 50% of the project cost at 5% interest paid monthly, amortized over 20 years.

b) All other reserve funds established for TCAs should have a balance equal to or greater than the approved 5-year capital program for those assets, or as specified" in Appendix A.

MVCA is not currently putting aside funds for longer term asset renewal and replacement; and the depreciation values captured in annual Financial Statements understate the liability of long-term asset replacement.

7. The 10-year Schedule of Municipal Capital Levy increases should be updated every 4-years.
8. The actual replacement value of all asset classes and subclasses should be valued where they have an estimated value >$50,000.
9. Projected asset renewal and replacement cost requirements for the next 25 years should be calculated and an affordability assessment completed.

2.7 Plan Implementation, Review & Update

This Asset Management Plan identifies several deficiencies and requirements, and will take several years to fully implement. Priority items will be added to the next iteration of the corporate Needs Assessment and undertaken as resources allow.

Over time, some conditions will change, such as:

- Changes to MVCA's mandate,
- Changes to MVCA's funding mechanisms and budgets,
- Changes to governing regulations and policies,
- Population and land use changes across the watershed, and
- Evolving climatic conditions.

For this reason, periodic review and update of the Plan are required.

10. The *Asset Management Plan* will be updated at least once every 5 years.

3 Water Control Structures

Water control structures are used to manage water levels and flows in the Mississippi River system. Most dams were originally built to maintain sufficient water levels to allow timbers to be floated downstream, but now serve various purposes including flood protection, low flow augmentation, ice management, recreational access, erosion control, and maintaining flow and level requirements for fish and wildlife habitat.

There are 24 water control structures within the MVCA's jurisdiction. Twelve of the water control structures in the Mississippi River system have a significant impact on water levels and flows, six of which are owned by MVCA:

- Shabomeka Lake Dam
- Mazinaw Lake Dam
- Kashwakamak Lake Dam
- Big Gull Lake Dam
- Mississagagon Lake Dam
- Carleton Place Dam.

Ontario Power Generation (OPG) owns the Crotch Lake Dam, and the other five operate as hydro-electric energy generating systems (High Falls, Appleton, Enerdu, Brian J. Gallagher and Galetta).

Of the remaining 12 water control structures in MVCA's jurisdiction, six are owned by MVCA (Farm Lake, Pine Lake, Bennett Lake, Widow Lake, and Lanark Dams, and the Glen Cairn flood control facility), and six are owned by the Ministry of Natural Resources (MNR) (Malcolm, Mosque, Summit, Palmerston, Canonto, and Clayton Lake Dams).

All water control structures are shown in Figure 3. The most significant reservoir on the Mississippi River system with regards to flood mitigation and low flow augmentation is Crotch Lake, located in the western sub-watershed (MVCA et al, 2020). The importance of Crotch Lake is further discussed in Section 3.4.2.

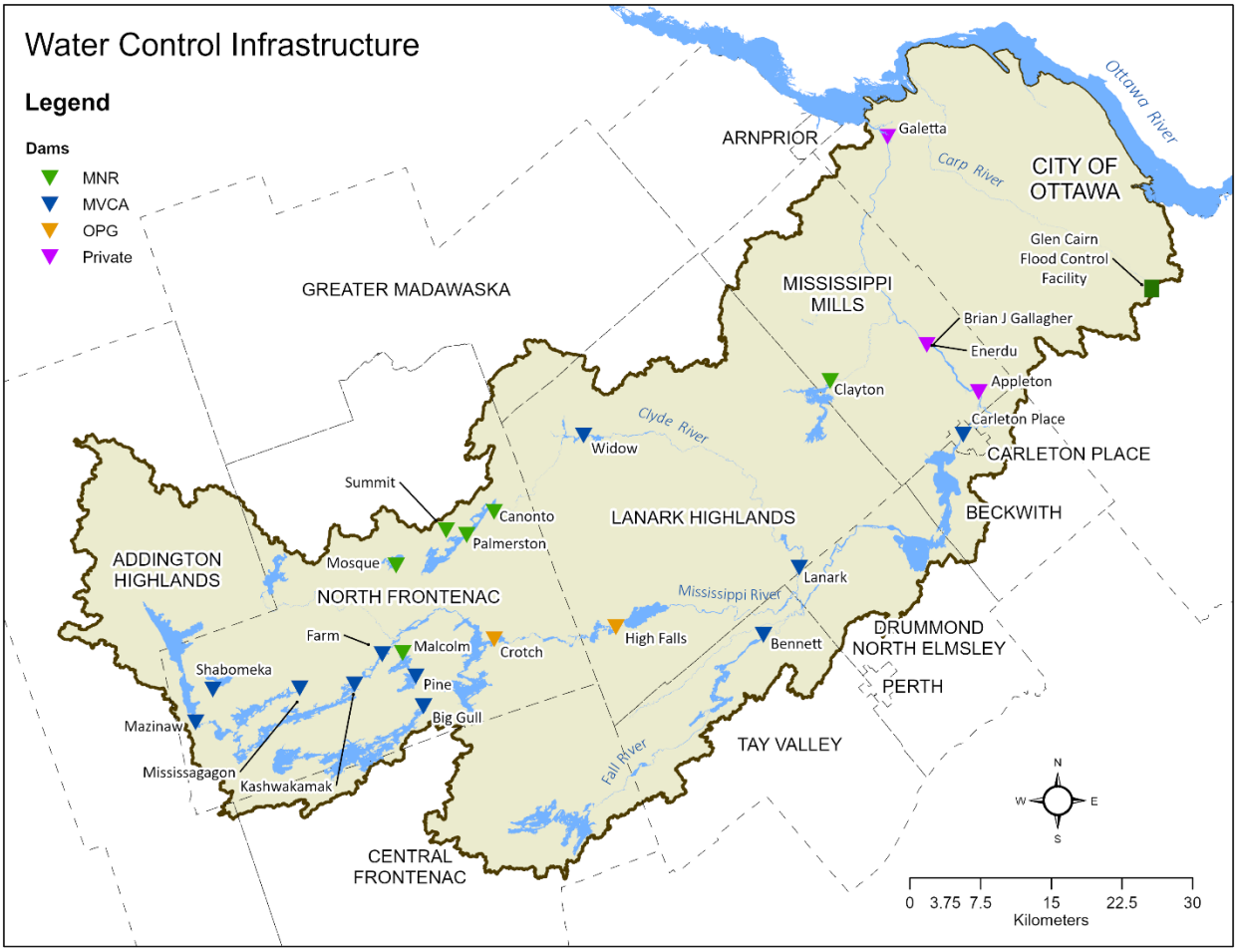

Figure 3. Water Control Structure Infrastructure in MVCA's jurisdiction

3.1 Water Control System Definitions

Abutments – the valley side or concrete wall against which a dam is constructed. The left and right abutments are defined with the observer viewing the dam looking in the downstream direction.

Dam Safety Review (DSR) – a systematic review and evaluation of all aspects of design, construction, maintenance, operation, and surveillance, and other factors, processes and systems affecting a dam's safety (Ontario MNR, 2011d).

Emergency Preparedness & Response Plan (EPRP) – describes the actions to be taken by the dam owner and operator in an emergency and assign responsibility for each action to be taken by an individual and/or a backup.

Gantry – a fixed or travelling bent-supported crane for handling heavy equipment.

Hazard Potential Classification (HPC) – determined through an assessment of the greatest incremental losses that could result from an uncontrolled release of the reservoir due to the failure of a dam or its appurtenances. Dams can be classified with an HPC of low, moderate, high, or very high.

Inflow Design Flood (IDF) – the most severe inflow flood (peak, volume, shape, duration, timing) for which a dam and its associated facilities are designed.

Mississippi River Water Management Plan (MRWMP) – documentation required by the Ministry of Natural Resources (MNR) that documents operating ranges and monitoring strategies for water control infrastructure in the Mississippi River watershed.

Mississippi River Improvement Company (MRIC) – formed in 1909 to hold title and operate dams at Crotch, Big Gull, and Kashwakamak Lakes, and later assuming maintenance and operation of Mazinaw, Shabomeka, and Mississagagon Dams. MRIC was formally dissolved in 1991 after shifting responsibilities to Ontario Hydro (Crotch Lake Dam) and MVCA (all other MRIC dams).

Public Safety Plan (PSP) – documents the existing site conditions and operational practices, as well as the identified public safety hazards, risk assessment results, recommended measures to either eliminate or mitigate the risks, and suggested practices for raising public awareness of the hazards related to the dam and its operation.

Sill – level up to which a dam can be emptied by flow through gravity.

Wing Walls – located adjacent to the abutments and act as retaining walls.

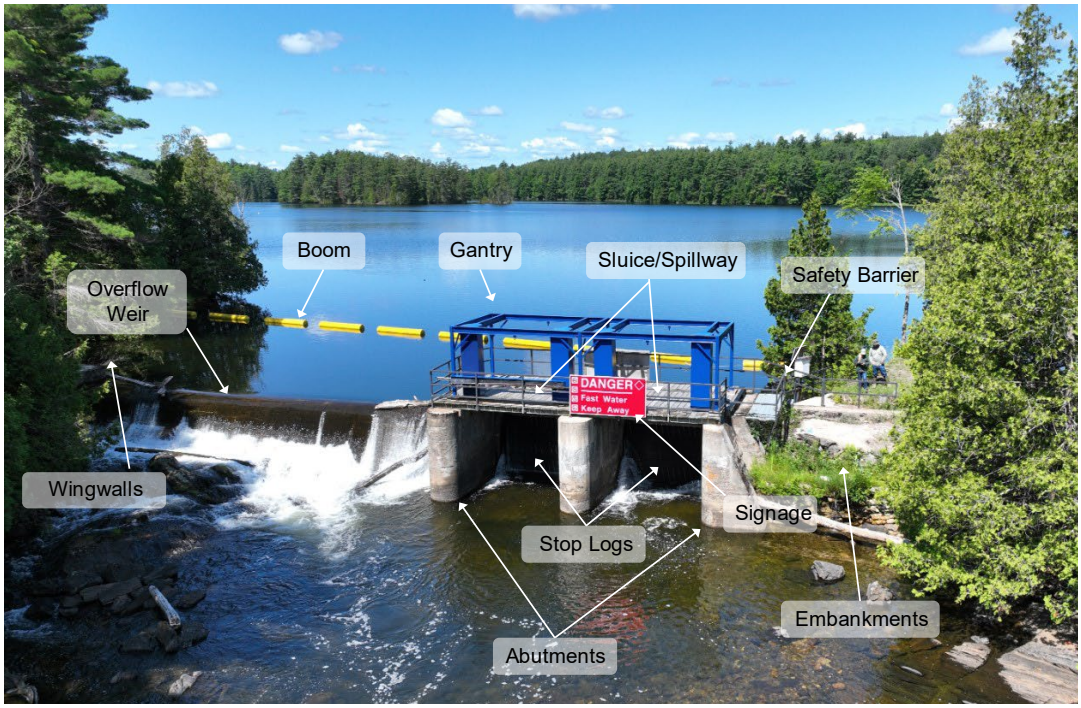

Figure 4. Dam Illustration with Key Components Labelled

3.2 Water Control Structure Asset Inventory

MVCA owns twelve water control facilities, and has contracts to operate facilities for OPG and MNR. This section only discusses the facilities owned by MVCA.

3.2.1 Shabomeka Lake Dam

Figure 5. Shabomeka Lake Dam

The Shabomeka Lake (also known as Buck Lake) Dam, formerly an abandoned lumbering dam, was rehabilitated by Ontario Hydro Eastern Region in 1959 on behalf of the Mississippi River Improvement Company (MRIC). The dam is located in the Township of North Frontenac, on Semicircle Lake, which then flows into Mazinaw Lake, and is considered a headwater lake on the Mississippi River.

Shabomeka Lake Dam is the first major water control structure in the headwaters of the Mississippi River watershed. MVCA assumed ownership and operation of the dam from MRIC in January 1991. The dam is a single bay concrete stop log structure with an earthen overflow embankment on either side of the control section. There is a total of 8 (eight) stop logs in the dam. The winch equipment consists of a 1-ton chain fall assembly on an overhead gantry system. The gantry system was engineered to also act as an overhead for fall arrest for the operators.

In 1998, extensive repairs were undertaken to the concrete surfaces of the dam, the piers were cleaned of deleterious concrete, and rebar was added, formed and re-poured. During 2021-22, MVCA carried out major reconstruction of the earthen abutments, replacement of metal works, and installation of various safety measures.

The earth embankments rehabilitation included a new cement-bentonite cut-off wall. A new emergency spillway was also constructed consisting of coarse rip-rap material within the north end of the dam.

Seepage has been and continues to be observed at the downstream end of the new emergency spillway. A non-destructive geophysical survey program was developed to delineate potential pathways of water seepage within the earth dam.

3.2.2 Mazinaw Lake Dam

The Mazinaw Lake Dam is located on Lot 31, Concession X, in the former Township of Barrie, North Frontenac. Constructed in the 1860s, its primary purpose was to maintain sufficient levels in the lake for logging. During the major floods of 1922, the dam was washed out and reconstructed the following year by the MRIC.

MVCA took over ownership and operation of the dam from MRIC in 1991 and rebuilt it in 1992. Several improvements have been made to the structure including installation of several safety measures such as an overhead gantry, gates, fencing, and new booms.

Figure 6. Mazinaw Lake Dam

The by-pass was washed out in the both the 2002 and 2019 floods; both times the fill was replaced later in the year. In general, the earth and concrete structures meet all stability criteria under normal and extreme conditions. Under the Inflow Design Flood (IDF), the earth spillway will be overtopped by about 0.2 m, but the dam structure is expected remain stable assuming all logs are pulled out of the two concrete spillways. Under this relatively minor overtopping of the earth spillway, scour of the sandy matrix between boulders could occur, which will necessitate repairs following the flood event to maintain the integrity of the structure. During overtopping, access to the dam control structure from the access road over the emergency spillway at the left abutment may not be possible. Access from the right abutment is feasible, but it is a walking-only access.

3.2.3 Kashwakamak Lake Dam

The Kashwakamak Lake Dam is in the Township of North Frontenac on the main channel of the Mississippi River and discharges to Farm Lake. The Kashwakamak Lake Dam was built in 1910 by the MRIC. In 1991, ownership and operation were transferred to the MVCA. The structure includes a small concrete saddle dam, an overflow weir spillway, and a sluiceway containing two stop log bays. The stop logs are placed and removed using manually operated chain falls as part of an overhead gantry system. There are steel handrails around the control structure and a floating safety boom upstream of the dam.

Figure 7. Kashwakamak Lake Dam

The Kashwakamak Lake Dam is one of six major dams managed to alleviate flooding and drought along the Mississippi River, protecting people, property, infrastructure, and natural ecosystems both upstream and downstream of the dam. Recreational development along the shoreline of Kashwakamak Lake includes over 500 residences/cottages and at least five marinas/resorts. There are also several wetlands around the perimeter of the lake and manòmin (wild rice) crops downstream of the dam.

The dam had undergone relatively minor repairs to the concrete surfaces until 1988, when extensive work was completed to the concrete surfaces of the weir. In 1995, MVCA undertook a repair program to reduce or eliminate the seepage around the earth embankment at the entrance to the dam. In 2000, MVCA undertook a grouting program and repairs to cracked and spalled concrete on the weir and the abutments. In 2002, the deck of the dam was replaced. In 2020, a proposed repair option was prepared by Cleland Jardine Engineering Ltd, which was not implemented. A Class Environmental Assessment was initiated in 2023 in preparation for potential reconstruction of the dam.

The proposed reconstruction project is to replace the Kashwakamak Lake Dam to mitigate the risk of dam overtopping and failure, which has been exacerbated by more frequent and severe extreme weather events. A 2022 Dam Safety Review Report completed by Hatch Ltd. states that the dam concrete structures are deteriorating and require substantial rehabilitation or replacement within the next five years. Major concrete repairs are required at the overflow structure, which has extensive spalled concrete surfaces at the upstream face and a severely deteriorated horizontal joint at the toe.

The new dam will be designed for an updated IDF and HPC to effectively address the increasing risk of failure of the existing structure. The project will incorporate future climate change considerations into the new dam design to ensure the new structure provides much needed flood protection and mitigation to the local communities, residents, businesses, and environment over the course of its service life.

3.2.4 Mississagagon Lake Dam

Mississagagon Lake Dam is located at the east end of Mississagagon Lake on Swamp Creek. It is situated approximately 15 km east of Cloyne on Lot 2, Concession IX in the Township of North Frontenac. The dam was originally built to support lumber operations in the 1860s. In 1923, it was reconstructed by the MRIC as a rock filled timber crib dam with wood sheeting on the upstream face. The sluiceway was rebuilt in 1960, and a concrete membrane was installed on the upstream face in 1973. Ownership was transferred from MRIC to MVCA in January 1991. Until 1997, dam operations were carried out by locals on a contract basis. Access to the structure is via a 0.5 km (privately owned) dirt road.

Figure 8. Mississagagon Lake Dam

Mississagagon Lake Dam is one of six key flood control structures in the Mississippi River watershed that act as storage reservoirs in the spring to alleviate flooding.

The dam is located just west of the hamlet of Fernleigh at the outlet of Mississagagon Lake. The dam has a single stop log bay containing six stop logs. The stop logs are bolted together in groups of four and two, effectively make them two stop logs.

The downstream channel is extremely shallow and vegetated most of the year. There is visible seepage along the north channel immediately below the dam.

An annual dam inspection of the Mississagagon Lake Dam identified high risk operational and public safety issues. These issues were addressed in 2023 by installing important safety measures including embankment steps and deck upgrades.

3.2.5 Farm Lake Dam

The Farm Lake Dam is located in the Township of North Frontenac. The dam was originally built in 1926 by one of the lumbering companies of that time and was rebuilt by the MVCA in 1976. The access road is privately owned and MVCA has an easement across the road. The dam is an overflow weir and therefore has no operating plan. The dam is used to sustain recreational water levels on the upstream Farm Lake. It has a drainage area of 427.9 sq km and a lake surface area of 120 ha.

Figure 9. Farm Lake Dam

The existing structure is a rock filled timber crib. The upstream face of the dam is sheathed in plywood at a 2:1 slope and has a level top 0.60 m wide. A 0.20 m flashboard was installed across the top of the crib in 1984 by MVCA. The dam varies in height and is 30.08 m long. The weir elevation is estimated to be around 248.01 m.

The wooden flashboards and plywood are repaired and replaced annually on an as needed basis. Leakage issues throughout the summer months have become a common occurrence due to the age and type of weir. Tarps are placed on the upstream plywood to better seal the structure and slow down the seepage. Continuous monitoring and repair of the leakage is needed until the structure can be replaced.

Public safety is also an issue due to easy access to the structure from a neighboring campground that uses the upstream shoreline for swimming and boating. A year-round safety boom has been in place since 1996.

3.2.6 Big Gull Lake Dam

Figure 10. Big Gull Lake Dam

Big Gull Lake Dam is located in the Village of Coxvale (Lot 9 Con IV Clarendon Ward, North Frontenac Township). The original lumberman dam is believed to have been constructed in the mid-1860s.

In January 1991, ownership was transferred from MRIC to MVCA. MVCA has an easement on the municipal right-of-way to access the dam per an agreement between the Townships of Clarendon and Miller, OPG and MRIC that transferred with the dam. The dam is a concrete structure consisting of two bulkhead walls, two sluiceways and a weir. The north bulkhead wall extends from the road embankment to the north pier of the control section, a length of 26.98 m. The wall is divided into two sections. Three concrete piers form the two sluices. The piers support a wooden deck, a steel pipe railing around the deck, and the stop log gantry assembly.

MVCA undertook extensive repairs to the structure in 1995, and a dam safety review was completed in 2006. A visual condition assessment of the dam was carried out in 2016 that concluded the dam was safe to operate for at least another 5 years.

3.2.7 Pine Lake Dam

The Pine Lake Dam is located at the outlet of Pine Lake, just south of the hamlet of Ardoch on Lot 16, Concession 4, Clarendon Ward in the Township of North Frontenac. Around 1970 the Townships of Clarendon and Miller rebuilt the Ardoch Highway and enlarged the culvert at the outlet of Pine Lake. According to residents on the lake, this had an adverse effect on the water levels on the lake. At that time, the cottagers requested that MVCA build a dam at the outlet of the lake. MVCA built a sand bag structure, which deteriorated over time and was not replaced.

Figure 11. Pine Lake Dam

In the late 1980's the residents again requested that MVCA build a more permanent structure. At that time a survey was undertaken to ensure that the majority of the residents around the lake were in favour of this proposal. The majority were in favour and in 1990 MVCA designed and built the present structure. The original operating guidelines called for the stop logs to be removed from the dam in mid-August to ensure the lake dropped enough to allow adequate cleansing of the walleye spawning beds. This was met with opposition and in 1993, following another survey of the residents, the operating guideline was changed to the present one.

Considerable problems with vandals manipulating the stop logs in 2007 resulted in larger fluctuations in water levels than are normally associated with this structure and necessitated MVC putting additional locks on the structure to prevent future problems.

When logs are out of the structure they are kept suspended in the gain by chains and locks. It should be noted that under high flows, the dam should be checked often, as levels in the channel could get high enough to be blocked by the suspended logs in the gain and cause interference with the structure's effectiveness. If this happens logs should be lifted or removed from the gains.

Over the years, seepage has continued to be an issue at this structure especially around the north embankment. There have been multiple attempts to repair the seepage around the upstream north embankment (with rock and or sandbags) and a few of these attempts have been vandalized. This seepage impacts the effectiveness of this structure to maintain stable water levels for the lake above.

In October 2016 a walkway was built between the north and south crib giving operators safer access to the far side of the dam. In summer of 2023 the crib decking was replaced as well as the winch posts. New railings were installed around the crib decking and the seepage around the north embankment was repaired.

3.2.8 Bennett Lake Dam

The Bennett Lake Dam is located at the outlet of Bennett Lake on the Fall River, on Lot 18, Concession X, in the Township of Bathurst, Lanark County. It is accessed via a 100 m private access road.

The dam was built at the request of cottage associations members from Bennett Lake and Fagan Lake in 1964 and again in 1970. In 1970, MVCA received Queens Council approval to undertake a Preliminary Engineering study to access the feasibility of constructing a dam at the outlet of the Bennett Lake. A Water Survey of Canada (WSC) gauge was installed downstream of the dam in 1970 to support analysis.

Figure 12. Bennett Lake Dam

Following the study and consultation with the cottagers, approval was given to construct the dam. MNR staff constructed the dam with MVCA staff on hand to supervise between November 1974 and April 1975 at a cost of ~$70,000.

A condition assessment of the concrete structure was completed in 2016 that found that concrete deterioration of the center pier had progressed to the point where rehabilitation was warranted within a 5-year period.

3.2.9 Widow Lake Dam

The Widow Lake Dam is located on the Clyde River at the outlet of Widow Lake, adjacent to the French Line and east of the hamlet of Clyde Forks on Lot 16, Con 4, Lavant Ward in the Township of Lanark Highlands. Widow Lake is the last major storage basin on the Clyde River to alleviate spring flooding at Cedardale and Lanark Village.

Figure 13. Widow Lake Dam

The dam was originally built in the 1800s to support the timber trade. MVCA purchased the land from John and Grace Grew in 1974 and reconstructed the timber cribbing dam.

Engineered drawings and specifications were commissioned for replacement of the concrete decking in 2019 but upgrades were not carried out due to expiration of the funding. Work was subsequently deferred due to COVID-19 and other capital priorities.

A landowner on the west side of the dam uses the dam to access their property, which has exacerbated safety concerns at the site. Currently, the dam is blocked for use by vehicular traffic, and railings have been reinforced with safety fencing to prevent accidental falls from the dam. A dam safety review (DSR) is planned for the coming years pending receipt of WECI funding from the province.

Widow Lake Dam is a rock filled gabion basket stop log structure, which has been capped with reinforced concrete. The dam was also built to act as a bridge to allow access to the cottage on the south side of the channel. It has four sluiceways, two on the north and two on the south side of the dam. An earth island separates the control sections. There are a total of 16 logs in the structure, 4 stop logs in each of the four bays. The stop logs are removed and replaced by a portable winch system and winch pods since the dam also acts as a bridge.

Cattails are a major problem at this structure. Removal of cattail mats is difficult because there is not normally sufficient flow to pass the mass through the dam except during spring runoff. Public safety and site security are also major issues at this structure.

In 2017 a Pre-Engineering Study was conducted by Cleland Jardine Engineering Ltd and a preliminary concept for replacing deteriorated components of the dam was developed. The proposed work involved replacement of cracked concrete slabs, wood-framed laydown platforms, wood gain covers and existing handrails. In 2019, Cleland Jardine Engineering Ltd was assigned the dam rehabilitation project including design drawings, tender package and construction review. The design work and tender package was completed but the project was put on hold.

3.2.10 Lanark Dam

The Lanark Dam is located in the lower Clyde River watershed in the Village of Lanark. The dam was originally built as a grist/saw mill in the 1800's. It was rebuilt by the MVCA in 1977.

Figure 14. Lanark Dam

The dam has a drainage area of approximately 650 km^2. MVCA operates the dam to mitigate flooding upstream of the George Street bridge in the village of Lanark. The dam is also used to maintain stable water levels for recreation on the river and Kerr Lake and for fire suppression.

In 1998, the Clyde River experienced a severe flood. Flows exceeded the 100-year return period and peaked on April 5, 1998 at 158 m^3/s. As a result of this flood, substantial damage occurred to the Lanark Dam as the water levels receded. Levels above and below the dam were almost equal, resulting in a considerable portion of the downstream banks being under water and water over the downstream wing walls. As the levels dropped, the earth behind the gabion baskets lining the bank eroded. The banks and a major scour hole at the end of the downstream apron were repaired in the summer of 1999.

Public safety and site security at this site are an ongoing issue. Located close to the village of Lanark, the dam is used as a roadway for the neighboring truss company and is located next to a public golf course. The public can access the dam, in or on the water, both upstream and downstream of the dam. Vandalism has previously occurred. The current safety boom is a seasonal boom which has been in place pre-1990's. It is removed in the fall and replaced in the spring after high flows decrease because the anchors are not designed to withstand spring flow conditions or ice movement. MVCA intends to replace the seasonal boom with a permanent (year-round) boom and fence off the dam structure to limit public access.

3.2.11 Carleton Place Dam

The Carleton Place Dam is located in the lower Mississippi River watershed in the Town of Carleton Place. The dam was originally built in the 1820's. It was rebuilt in 1973 by the MRIC and MVCA took ownership of the dam in 1975.

Figure 15. Carleton Place Dam

The Carleton Place Dam maintains water levels for the Mississippi River in the town and has some impact on water levels on Mississippi Lake located approximately 2 km upstream of the dam. Mississippi Lake is the last major storage basin on the Mississippi River to alleviate spring flooding. There are approximately 1700 residential structures along the shores of the lake, and there is a water intake pipe located between the lake and the dam.

The dam is a concrete structure consisting of two major sections: a control section and an ogee shaped (round crested) weir. The control section consists of five sluiceways which contain a total of 48 stop logs. There are 10 stop logs in each of the first three bays and 9 in the last two bays. The stop logs are removed and replaced by a gantry system with 2-ton chain hoists that is use under normal conditions as well as a two-rail mounted crab winch system for operating under high flows. The ogee crested concrete weir spans the rest of the river for a distance of 75.15 m. A safety boom extends across the river upstream of the dam to warn boaters and swimmers of the danger.

Public safety and site security are major issues at this structure. Located in the middle of downtown Carleton Place and beside a community park, public can frequent around the dam, in or on the water, both upstream and downstream of the dam. Previous vandalism, tampering of the dam and swimming in front of the structure are an ongoing cause for concern.

A DSR was carried out in 2022, and several safety enhancements were implemented including replacement of the boom system and enhanced gates and signage.

3.2.12 Glen Cairn Flood Control Facility

The Glen Cairn Flood Control Facility is located within the Carp River watershed and owned by MVCA. It was constructed in 1979 at the request of the province and the former City of Kanata to address flooding of Glen Cairn subdivision. This detention basin is not actively operated by MVCA. There is a maintenance agreement in place with the City of Ottawa and MVCA to distinguish responsibility of cost and maintenance of this structure.

Figure 16. Glen Cairn Flood Control Facility

The detention pond area has a concrete inlet along Castlefrank Road and extends to a small concrete weir at the outlet. The pond is surrounded by a well grassed sloped embankment covered with small non-symmetrically placed rip rap along the edge of the pond.

A second inlet channel coming out of the subdivision on the east side of Terry Fox Drive is a relatively straight channel. Three large (estimated 8 foot) culverts and a 4-foot drop box culvert with bars across upstream and downstream openings carry flows from the subdivision under Terry Fox Drive.

3.3 System Management

MVCA operates water control infrastructure according to the management plan shown in Figure 17. Only about half of MVCA's structures are guided by procedures set out in the MRWMP. MVCA uses the MRWMP as well as other federal and provincial guidelines to ensure all applicable standards are met and that MVCA's management practices are updated accordingly. The federal and provincial guidelines are described in Section 3.3.1, followed by a brief description of the various documents MVCA references in operating water control structures.

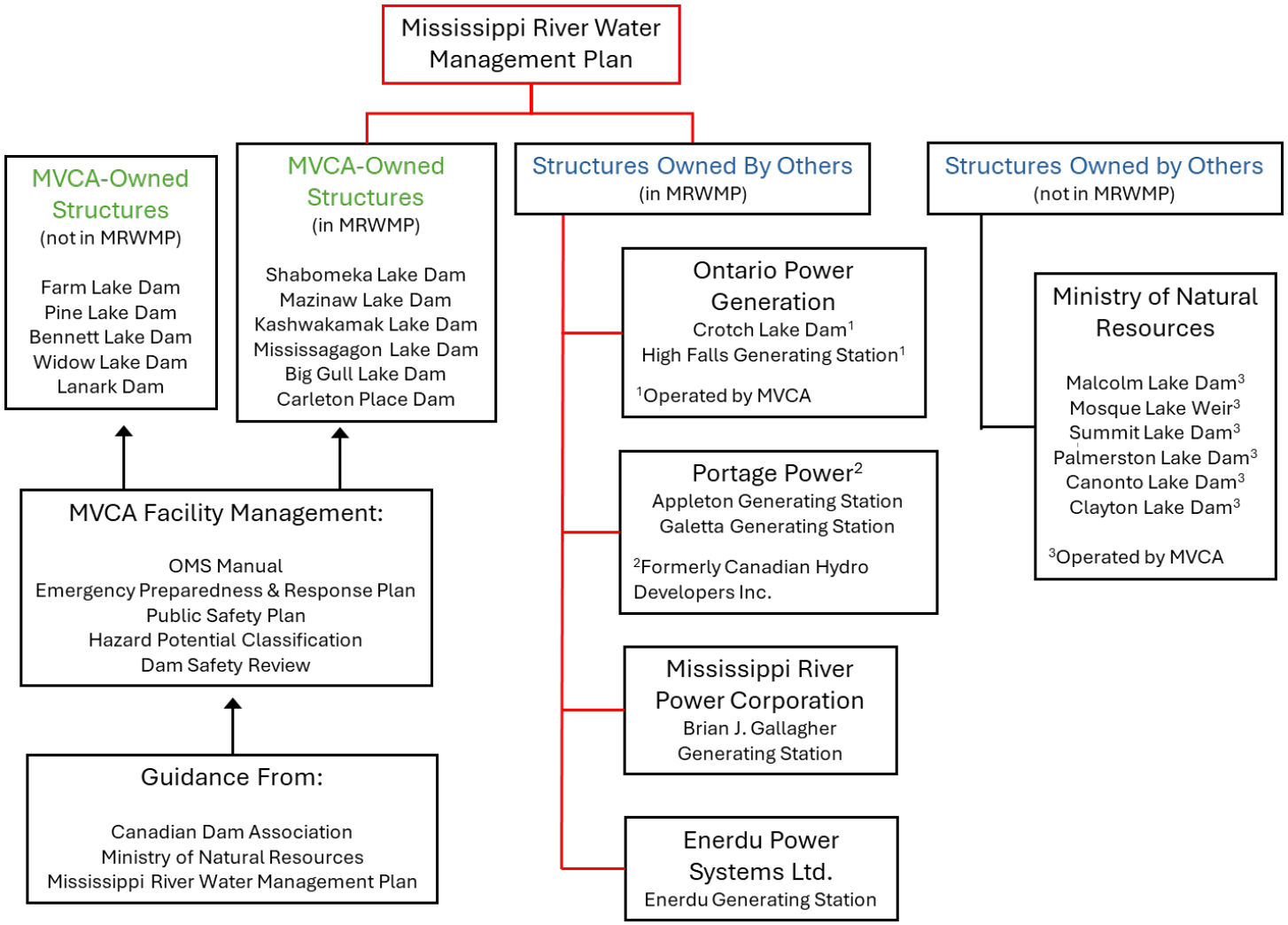

Figure 17. Guidance Documents for MVCA's Water Control Infrastructure

3.3.1 Federal and Provincial Guidelines

3.3.1.1 Canadian Dam Association Guidelines

The Canadian Dam Association (CDA) guidance documents were first published in 1995 and consist of set principles for all dams.

1. Dam Safety Management
    - The public and the environment shall be protected from the effects of dam failure, as well as release of any or all of the retained fluids behind a dam, such that the risks are kept as low as reasonably practicable.
    - The standard of care to be exercised in the management of dam safety shall be commensurate with the consequences of dam failure.
    - Due diligence shall be exercised at all stages of a dam's life cycle.
    - A dam safety management system, incorporating policies, responsibilities, plans and procedures, documentation, training, and review and correction of deficiencies and nonconformances, shall be in place.
2. Operation, Maintenance, and Surveillance (OMS) Manual
    - Requirements for the safe operation, maintenance, and surveillance of the dam shall be developed and documented with sufficient information in accordance with the impacts of operation and the consequences of dam failure.
    - Documented operating procedures for the dam and flow control equipment under normal, unusual, and emergency conditions shall be followed.
    - Documented maintenance procedures shall be followed to ensure that the dam remains in a safe and operational condition.
    - Documented surveillance procedures shall be followed to provide early identification and to allow for timely mitigation of conditions that might affect dam safety.
    - Flow control equipment shall be tested and be capable of operating as required.
3. Emergency Preparedness & Response Plan (EPRP)
    - An effective emergency management process shall be in place for the dam.
    - The emergency management process shall include emergency response procedures to guide the dam operator and site staff through the process of responding to an emergency at a dam.
    - The emergency management process shall ensure that effective emergency preparedness & response procedures are in place for use by external response agencies with responsibilities for public safety within the floodplain.
    - The emergency management process shall ensure the adequate staff training, plan testing and plan updating are carried out.
4. Dam Safety Review (DSR)
    - A safety review of the dam ("Dam Safety Review") shall be carried out periodically.
    - A qualified registered professional engineer shall be responsible for the technical content, findings, and recommendations of the DSR and report.

5. Analysis and Assessment
    - The dam system and components under analysis shall be defined.
    - Hazards external and internal to the dam shall be defined.
    - Failure modes, sequences, and combinations shall be identified for the dam.
    - The dam shall safely retain the reservoir and any stored solids, and it shall pass flows as required for all applicable loading conditions.

8. Planning, design, construction, operation, maintenance and renewal of MVCA water control structures shall reflect the principles established by the Canadian Dam Association.

3.3.1.2 Ministry of Natural Resources Guidelines

The *Lakes and Rivers Improvement Act* (LRIA) provides the MNR with the legislative authority to govern the design, construction, operation, maintenance, and safety of dams in Ontario. The MNR has provided best management practices to Ontario dam owners with guidance on the safe management of dams.

In the MNR Best Management Practices titled *Safety Reviews for Dam Owners* (Ontario MNR, 2011d), DSRs are recommended for High or Very High HPC dams. While a DSR may not be required for Low and Moderate HPC dams, a periodic review of the HPC should be completed every ten years to determine whether a change in the classification of the dam is warranted due to upstream or downstream changes in the watershed. These best management practices should be read in conjunction with the MNR's *Classification and Inflow Design Flood Criteria Technical Bulletin* (Ontario MNR, 2011a).

The MNR Best Management Practices titled *Public Safety for Dam Owners* (Ontario MNR, 2011c) states that dam owners and operators should be aware of both known and potentially significant public safety hazards associated with their structures, their operation and how it impacts the surrounding area. Once these hazards have been identified, public safety measures, commensurate with the potential hazard, should be taken to either eliminate or mitigate the hazard.

9. Dam Safety Reviews should be carried out at all water MVCA water control structures a minimum of every ten years.
10. Unless a public safety hazard can be addressed within the current fiscal year, required works shall be added to the corporate Needs Assessment registry and prioritized.
11. Public safety hazards will be eliminated or mitigated in accordance with their priority as resources allow.

3.3.1.3 Technical Bulletins

The LRIA technical bulletins detail MNR requirements for the location, design, construction, operation, decommissioning, removal, maintenance and safety of dams in Ontario. Links to the following bulletins can be readily found on the MNR's Dam Management website (Ontario MNR, 2011b).

- Alterations, improvements and repairs to existing dams
- Classification and inflow design flood criteria
- Dam decommissioning and removal
- Geotechnical design and factors of safety
- Location approval for dams
- Maintaining water management plans
- Seismic hazard criteria, assessment and considerations
- Spillways and flood control structures
- Structural design and factors of safety

3.3.2 Operation, Maintenance, and Surveillance Manual

Each MVCA dam has an Operation, Maintenance, and Surveillance (OMS) Manual. The OMS Manual includes guidance for operating, maintaining and inspecting (surveillance of) the dam in the spring, summer, fall, and winter. It also includes safety information to be considered during operations including specific hazards for each site (Ontario MNR, 2011d).

12. Every MVCA water control structure shall have an OMS Manual.

3.3.3 Emergency Preparedness & Response Plan

The Ontario MNR provides best management practices (BMPs) to provide Ontario dam owners with guidance on the safe management of dams. One of these BMPs is to prepare and/or review Emergency Preparedness & Response Plans (EPRPs) and response procedures. The requirements from the Ontario Dam Safety Guidelines specify that the EPRP shall describe the actions to be taken by the dam owner and operator in an emergency and assign responsibility for each action to be taken by an individual and/or a backup. The EPRP should include the operator's responsibilities for notification in the event of an emergency (including people in the immediate vicinity of the dam), the locations of equipment suppliers and materials available to the operator to assist in mitigating the effects of an emergency, details for access to the site and impacts of a potential dam failure (Ontario MNR, 2011d).

13. Every MVCA water control structure shall have an EPRP.

3.3.4 Public Safety Plan

A Public Safety Plan (PSP) documents the existing site conditions and operational practices, as well as the identified public safety hazards, risk assessment results, recommended measures to either eliminate or mitigate the risks, and suggested practices for raising public awareness of the hazards related to the dam and its operation. It does not address any other potential hazards at or around the site, whether naturally occurring or man-made which are not directly related to the dam structure or its operation. The PSP uses information obtained through staff records of public activity data collected by operators at the dam site and past incidents/inspection observations (Ontario MNR, 2011c).

14. Every MVCA water control structure shall have a PSP.

3.3.5 Hazard Potential Classification

In Ontario, dams are classified using the Hazard Potential Classification (HPC) system. The HPC is determined through an assessment of the greatest incremental losses that could result from an uncontrolled release of the reservoir due to the failure of a dam or its appurtenances. Potential losses are assessed with respect to life, property, the environment and cultural-built heritage sites at the dam site, upstream, downstream, or at other areas influenced by the dam (Ontario MNR, 2011a). Dams can be classified with an HPC of low, moderate, high, or very high. A review of the HPC should be completed every 10 years to determine whether a change in the classification of the dam is warranted due to upstream or downstream changes in the watershed (Ontario MNR, 2011d).

15. The HPC of MVCA water control structure should be reviewed at least once every 10 years.

3.3.6 Dam Safety Review

A DSR is a systematic review and evaluation of all aspects of design, construction, maintenance, operation, and surveillance, and other factors, processes and systems affecting a dam's safety. A DSR defines and encompasses all components of the "dam system" under evaluation, including the dam, spillway, foundation, abutments, reservoir, tailraces, etc. DSRs are required to demonstrate that the dam is safe, operated safely and maintained in a safe condition, and that surveillance is adequate to detect any developing safety problem. A DSR generally includes site inspection, review of all relevant documentation, and interviews with operating and maintenance staff. If safety cannot be demonstrated, the deficiency should be identified (Ontario MNR, 2011d).

3.4 System Operation

This section contains excerpts from the Mississippi River Water Management Plan (MRWMP), produced by MVCA, OPG, Portage Power[8], Enerdu Power Systems Ltd., Mississippi River Power Corporation, and the Ontario MNR, as amended October 2020. The MRWMP includes MNR-approved operating parameters, as demonstrated in Figure 18 below. The black lines represent the maximum and minimum water levels, red lines are the target levels, and the blue line is the actual historic mean water level. No targets are specified during the springtime due to high variability of flows/levels and the different timing of freshet each year.

3.4.1 General Operating Principles

Many dams in the Mississippi River watershed were originally built to maintain enough water in the system to allow timbers to be floated downstream. With the changing conditions in the watershed, these structures are now used for flood protection, low flow augmentation, ice management, erosion control and recreation. They are also operated to maintain specific flow and level requirements for lake trout, walleye, bass, pike and other fish species. Stable levels are also required for wildlife such as loons, frogs, muskrat and beaver. Sufficient flow should also be maintained to allow hydro producers to continue operating their plants and turn a profit.

Six major lakes act as storage reservoirs in the spring to alleviate downstream flooding: Shabomeka, Mazinaw, Kashwakamak, Big Gull, Crotch and Mississagagon. Every fall, the dams are operated to drawdown the lakes to provide storage for the spring runoff. As snowmelt and spring rains occur, the lakes are gradually filled to reduce flooding downstream and reach the summer target levels for recreation and tourism. Once the runoff is over, all the dams, except for the Crotch Lake Dam, are operated and sealed (if necessary) to maintain relatively stable water levels on the lakes for recreation throughout the summer months. Throughout the summer, dams are operated if needed in advance of and after major storm events.

16. MVCA water control structures subject to the *Mississippi River Water Management Plan* will be operated in accordance with the Plan unless system conditions prevent this or if directed otherwise by the province.

[8] Formerly known as TransAlta Renewables and Canadian Hydro Developers Inc.

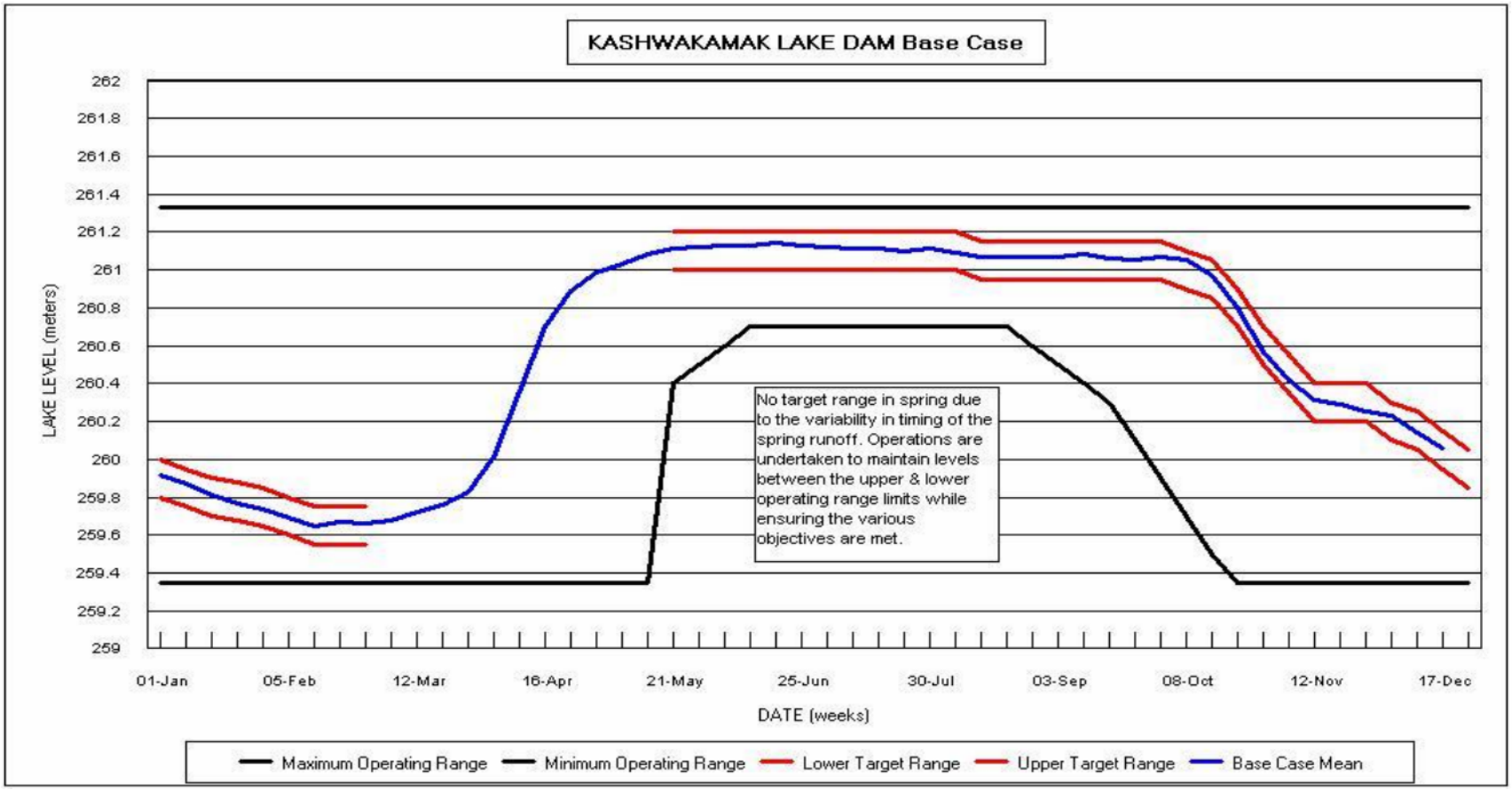

Figure 18. Kashwakamak Lake Dam Operating Guidelines

3.4.2 Crotch Lake

Crotch Lake Dam is unique as it is the only true reservoir lake on the system. From late June through early October, Crotch Lake is drawn down to ensure flows in the lower portion of the Mississippi River. Under normal conditions, approximately 60% of the flow in the river comes from Crotch Lake. Crotch Lake normally fluctuates from 2.5 to 3.5 m (depending on the amount of precipitation) over the course of the summer. Throughout the fall, as the other lakes are being drawn down, Crotch Lake is filled again while still maintaining at least a minimum average flow of 5 cms downstream of the dam. From January through March, the lake is again drawn down to perform the same low flow augmentation function over the remainder of the winter months and to maximize storage in the lake for spring.

3.4.3 Objectives

Five planning objectives were identified for the MRWMP. These objectives help define the level of service expected for each water control structure.

1. Maintain or Improve Aquatic Ecosystem Health throughout the System
    - Improve lake trout spawning success on Shabomeka and Mazinaw Lakes.
    - Maintain spring spawning opportunities for pike, walleye and bass by having steady flows or rising levels.
    - Minimize water level fluctuations as they affect aquatic and riparian wildlife.
    - Where possible, emulate the natural flow regime.
    - Improve aquatic ecosystem health by maintaining flow through the system.
    - Ensure abundance of wild rice is not reduced due to fluctuating water levels.
2. Address Public Safety and Minimize Property Damage
    - Minimize flooding throughout the system.
    - Minimize ice damage throughout the system.
3. Maintain Water Levels throughout the System for Navigation, Recreation, Cultural and Social Opportunities
    - Maintain stable water levels for navigation, including boat access only properties, throughout the recreational season and the entire system.
    - Maintain water levels suitable for access to Twin Islands and Fawn Lakes.
    - Maintain and improve recreation, and access to Wild Rice beds and Pictographs.
4. Recognize Power Generation Values from the System
    - Maintain or enhance power generation on a seasonal and daily basis.
5. Develop Public Awareness on Current Conditions
    - Explain constraints, objectives and natural processes that are considered in the operation of the Mississippi River system.
    - Foster an understanding of how the system operates.

In addition to these objectives identified in the MRWMP, MVCA operates water control infrastructure according to O. Reg. 686/21 in the Conservation Authorities Act to protect against natural hazards. This

includes operations to protect against or mitigate risks associated with erosion hazards, ice management, and low water or drought condition response.

3.4.4 Guiding Principles

The principles guiding the preparation of the MRWMP are:

1. Maximum net benefit to society – maximize net environmental, social and economic benefits derived from operation of water power facilities and associated water level control structures in terms of water flows and levels;
2. Riverine ecosystem sustainability;
3. Planning based on best available information and establishment of baseline conditions;
4. Evaluation of the need for changes to the existing water management operations for water level and flow management to address objectives and issues;
5. Planning will be without prejudice to the rights of Aboriginal people and treaty rights;
6. Public and stakeholder participation – communications and integration are paramount to this panning exercise;
7. Adaptive management – effectiveness monitoring to assist future planning. Operations may vary based on annual variations and extreme weather events. For example:
    - A cold snap in early April can dramatically change situations as runoff flows slow down and spawning may be delayed.
    - Winds and temperatures just above freezing can cause snowpack to sublimate rather than melt which reduces the water available to fill the system.
    - An early freshet leaves the system at risk from heavy rainfall events.

3.5 Levels of Service

It is necessary to categorize MVCA-operated dams based on their functionality and required level of service. For water control infrastructure, level of service includes dam operations, maintenance, surveillance (inspections), documentation, and studies. MVCA has limited resources for the operation, maintenance, study and renewal of water control infrastructure, so it is helpful to have pre-defined categories to prioritize activities and guide service levels. Structures are sorted into three levels of service (A, B, and C) based on the following characteristics: presence of a reservoir, whether the dam is operable, HPC, and nearby flood prone areas. The follow sections detail how these categories are defined, the level of service provided for each category, and a list of MVCA-owned dams and their categories. It is important that MVCA's dams are also operated according to federal and provincial guidelines, which are described in Section 3.3.1.

3.5.1 Category Definition

Dams are sorted into categories based on the following factors:

- Is there a reservoir?
    - Dams with reservoirs are drawn down in the winter to help mitigate flooding during the freshet. Reservoir dams are labelled as “important” or “support” for flood control from an operational perspective.
    - Dams without reservoirs may still be important because their operation has an immediate impact on a flood prone area.
- Is the dam operable?
    - Some dams are operable (i.e. logs can be added or removed), while others are not (i.e. weirs). Operable structures are a higher priority.
- Hazard Potential Classification
    - Dams with a higher HPC are higher priority. HPC is based on a variety of factors including losses of life, property, the environment, and cultural-built heritage sites. HPC classification can be low, moderate, high, or very high. Not all MVCA-owned dams have an HPC, in which case other factors will be relied upon for categorization.
- Flood prone areas
    - Dams near flood-prone areas are higher impact, and priority for operations, during flood events. While flooding can occur anywhere, the most susceptible areas which flood on a frequent basis are:
        - Lanark Village;
        - Cedardale and Clyde River downstream to Lanark;
        - Snow Road / Dalhousie Lake;
        - Innisville and Mississippi Lake;
        - Town of Carleton Place, Glen Isle and Appleton;
        - Town of Mississippi Mills (formerly Almonte, Pakenham);
        - Carp River – mainly villages of Carp and Kinburn; and
        - Ottawa River shoreline – mainly Constance Bay.

Table 1 provides descriptions of the criteria for each category.

Table 1. WCS Service Level Descriptions

Level of Service	Criteria Description
A	• All operable dams with a reservoir directly upstream that are considered "important" for flood control. • If defined, dams with an HPC of Very High or High. • All dams near a flood-prone area.
B	• All operable dams with a reservoir directly upstream that are considered "support" for flood control. • If defined, dams with an HPC of Moderate.
C	• Inoperable structures (i.e. weirs), operable structures that do not have a reservoir directly upstream, or small operable structures. • If defined, dams with an HPC of Low.

17. MVCA water control structures will be assessed and assigned a service level in accordance with the Asset Management Plan.

3.5.2 MVCA Dam Categorization & Service Levels

Table 2 shows the categorization of MVCA-owned dams based on the criteria described in Section 3.5.1.

Table 3 shows how the expected level of service differs for dams in each category for a number of different aspects of documentation and operation.

18. MVCA water control structures should be operated, maintained, assessed and documented in accordance with the service levels set out in the Asset Management Plan.

Table 2. MVCA Dam Categorization

Water Control Structure	Is there a reservoir?	Is the structure operable?	Near flood-prone area?	HPC	Category
Bennett Lake Dam	Yes - Support	Yes	No	None	B
Big Gull Lake Dam	Yes – Important	Yes	No	Low	B
Carleton Place Dam	Yes – Important	Yes	Yes – Innisville, Mississippi Lake, Town of Carleton Place	Low	A
Farm Lake Dam	No	No	No	None	C
Kashwakamak Lake Dam	Yes – Important	Yes	No	High	A
Lanark Dam	No	Yes	Yes – Lanark Village, Cedardale	None	A
Mazinaw Lake Dam	Yes – Important	Yes	Yes – Little Marble/Marble Lake	Low	A
Mississagagon Lake Dam	Yes – Important	Yes	No	None	B
Pine Lake Dam	Yes – Support	Yes	No	None	C
Shabomeka Lake Dam	Yes – Support	Yes	No	Low	B
Widow Lake Dam	Yes – Support	Yes	Yes – Lanark Village, Cedardale	None	B

Table 3. Levels of Service

Service Level	Category A	Category B	Category C	How is this tracked?
Emergency Preparedness & Response Plan	Update annually or as deemed practical.			Date of most recent revision tracked in EPRP.
Public Safety Plan	Update periodically or following any major changes occurring at the site that are likely to affect public safety.			Date of most recent revision tracked in PSP.
Inspections	Visual inspections are completed when operating a dam. Engineering inspections are completed annually.			Inspection form completed at each inspection and filed.
Operations	Operated on an as-needed basis.		Not operational, or on an as-needed basis.	Operations and visual inspection form is completed and saved to WISKI.
Leakage	Tarps may be installed in certain circumstances (i.e. low water or drought conditions).	Tarps may be installed in certain circumstances (i.e. low water or drought conditions).	Unless severe, sluiceway leakage is not a concern.	Inspection form completed at each inspection and filed.
Complaints	Complaints will be investigated at the next scheduled inspection.			Tracked in spreadsheet form and filed.
Minor/Routine Maintenance	Painting, grass mowing, lubrication and similar completed on an annual basis.			Operations Department Work Plan and Schedule
Dam Safety Reviews	Recommended every 10 years	HPC should be reviewed every 10 years to determine whether a change in HPC is warranted. If the HPC rating increases, a DSR will be required at that time.	HPC should be reviewed every 10 years to determine whether a change in HPC is warranted. If the HPC rating increases, a DSR will be required at that time.	Capital Planning
OMS Manuals	Update on an as-needed basis or if a DSR deems it necessary.			Filed

4 Future Considerations

The following recent and ongoing projects will aide in adapting to future changes and challenges in the watershed that may impact MVCA's water control infrastructure assets. This list is taken from MVCA's *Corporate Needs Assessment Update*, found in Appendix B. Additional progress and projects will be completed as funding allows.

- Carp Watershed Model Development (completed)
- Mississippi Watershed Model Development (completed)
- Carp Watershed Model Calibration (completed)
- Mississippi Watershed Model Calibration (completed)
- Prepare Natural Hazard Infrastructure Asset Management Plan (ongoing)
- Update Natural Hazard Infrastructure Operational Management Plans (ongoing)
- Update OMS Manuals (ongoing)
- Update Public Safety Plans (ongoing)
- Ice Monitoring Program/Ice Management Plan (completed)
- Develop digital forms for data collection and dam operation, inspection and maintenance (completed with ongoing improvements)
- Develop automated data QA/QC procedure (ongoing)
- Floodplain Mapping Strategy (ongoing)

Additional actions to help future-proof MVCA's water control infrastructure include:

- Including climate change modelling in dam improvement projects;
- Maintaining a robust and effective gauge network; and
- Conducting a gap analysis and addressing deficiencies (such as missing HPCs and DSRs).

Actions recommended in the *Mississippi River Watershed Plan* include:

- Engage and establish new relationships with indigenous partners through implementation of an Indigenous Engagement Plan and through ongoing engagement in watershed initiatives.
- Update the *Mississippi River Water Budget* to better evaluate water needs and use by completing the recommendations of the Mississippi-Rideau Source Protection Plan Tier 1 water budget assessment and incorporating climate change considerations.
- Update the *MRWMP* to address updated modelling and water budget work and assist in rebalancing the competing interests for the watershed's water resources where needed.
- Undertake a Water Storage Capacity and Management Study of both man-made (dams and reservoirs) and natural storage (wetlands) options and capacity.
- Enhance response planning and readiness through the Low Water Response Team to address low water response and to ensure it includes representation from all key water use sectors.
- Work with municipalities, landowners and other partners to enhance on-site retention and infiltration of water.

5 References

Bolivar Philips and BluMetric. (2017). *Asset Management Preliminary Study prepared for Mississippi Valley Conservation Authority.*

Mississippi Valley Conservation Authority (MVCA), Ontario Power Generation (OPG), Canadian Hydro, Enerdu Power Systems Ltd., Mississippi River Power Corporation, Ontario Ministry of Natural Resources. (2020). *Mississippi River Water Management Plan.*

Ontario MNR. (2011a). *Classification and inflow design flood criteria*. Retrieved from https://www.ontario.ca/page/classification-and-inflow-design-flood-criteria

Ontario MNR. (2011b). *Dam management*. Retrieved from https://www.ontario.ca/page/dam-management

Ontario MNR. (2011c). *Public safety for dam owners*. Retrieved from https://www.ontario.ca/page/public-safety-dam-owners

Ontario MNR. (2011d). *Safety reviews for dam owners*. Retrieved from https://www.ontario.ca/page/safety-reviews-dam-owners

Appendix A: Board-approved Restricted Reserve Funds (2023)

	Fund Name	Purpose	Funding Source(s)	Target Balance[9]	End Date
	Category 1				
1)	Building	Rehabilitation and enhancement of the HQ building and works yard.	Annual and special levy; and op surplus		n/a
2)	Conservation Areas	Implementation of CA Master Plans and the rehabilitation, replacement, and enhancement of assets at CAs.[10]	Annual and special levy; and op surplus		n/a
3)	Information and Communications Technology	Acquisition, enhancement, rehabilitation and replacement of hardware, software and peripherals.	Annual and special levy; and op surplus		n/a
4)	Priority Projects	Board-approved projects eligible for provincial grants under Section 39 of the Act.[11]	Above, and land dispositions	2x annual average payroll/ employee[12]	tbd
5)	Sick Pay	To backfill a person on extended leave but not on long-term disability.	Operating surplus and annual levy	Annual average payroll/employee	n/a
6)	Vehicles	Acquisition, rehabilitation and replacement of vehicles and related equipment (incl. boats and trailers.)	Annual and special levy; and op surplus		n/a
7)	Water Control System	Acquisition, enhancement, rehabilitation and replacement of erosion and water control structures and monitoring and measurement equipment	Annual and special levy; and operating surplus		n/a
	Category 2 & 3				
8)	Non-passive CA Projects13	Implementation of the MOK Museum Strategic Plan, and other approved Category 3 plans.	Operating surplus, grants, donations.		tbd

[9] To be completed upon update of the 10-year Capital Plan in fall 2022.
[10] With the exception of the MOK Museum building. The purpose of this fund will require update in advance of January 1, 2024.
[11] As of July 2022, funds in this account were obtained solely through the sale of Authority land that had been acquired using provincial funds (i.e. Glen Cairn property.) As such, use of funds in this account must be approved by the province in accordance with provincial polies.
[12] This would allow for dollar matching of grants, hiring consultants, and/or the temporary hiring of staff to complete priority projects of the organization.
[13] Previously known as the "Museum Building & Art" reserve.

Appendix B – Corporate Needs Assessment (2023)

Table 1: Program & Services Needs / Work Plan 2021-2025

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Governance and Administration					
Update Corporate Strategic Plan	Board of Directors / BMP		2021	Completed	Next update sched. for 2024
Prepare CSP Implementation Plan	Board of Directors / BMP		2021	Completed	Status report submitted in Feb. '23
Update Corporate Strategic Plan	Board of Directors / BMP		2024		
Prepare CSP Implementation Plan	Board of Directors / BMP		2025		
Prepare and submit Transition Plan	CA Reg 686/21		2021	Completed	
List & Cost Ex. & Fut. Programs & Services	CA Reg 686/21		2022	Completed	
Negotiate Cost Apportionment Agreements	CA Reg 686/21		2022	Completed	
Interim Reporting to the Province	CA Reg 686/21		2022	Completed	
Resolve Land Ownership Conflicts/Uncert.	CA Reg 686/21 and BMP		2021	WIP	Returning to court per Board direction
Prepare Conservation Area Strategy	CA Reg 686/21		2023	WIP	Due YE 2024
Prepare Watershed-based Resource Management Strategy	CA Reg 686/21		2023		Deferred to 2024. Due YE 2024.
Address Mental health / stress in workplace	Workplace health/resiliency; Strat. Plan Goal 3		2021	WIP	Ongoing implementation and monitoring
Carryout Strategic Land Disposals	Financial/Board Dir.		2021	WIP	K&P ongoing
Job Evaluation and Market Assessments	Employee attraction and retention; Strategic Plan Goal 3		2021	Completed	
Salary Scale/band review	Pay equity within organization		2023	Completed	Board approved in October
Business Automation - timesheets	CA Reg 686/21 & Corp. Rptg.		2021	Completed	

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Integrate payroll and timesheet systems	Admin. BMP		2021	Completed	Tweaking of new system ongoing
Business process mapping	Admin. BMP		2021	WIP	Ongoing
Water Control Structures (WCS) and Flood Forecasting and Warning (FFW)					
Carp Watershed Model Development	Strat. Plan Goal 1 – climate ch.		2021	Completed	
Mississippi Watershed Model Development	Strat. Plan Goal 1 – climate ch.		2021	Completed	
Carp Watershed Model Calibration	Strat. Plan Goal 1 – climate ch.		2022	Completed	
Mississippi Watershed Model Calibration	Strat. Plan Goal 1 – climate ch.		2022	Completed	
Prepare Natural Hazard Infrastructure Asset Management Plan	CA Reg 686/21 and BMP		2023		Deferred to 2024. Due YE 2024.
Update Natural Hazard Infrastructure Operational Management Plans (OMS Manuals)	CA Reg 686/21 and BMP; MNRF/CDA		2022	Completed	
Update Public Safety Plans	MNRF/CDA		2021		Completion anticipated in Q1 2023
Ice Monitoring Program (Ice Management Plan)	Strat. Plan Goal 1 – climate ch.; CA Reg. 686/21		2023	WIP	Drafted and piloted in 2023. To be finalized in 2024.
Develop digital forms for data collection and dam operation, inspection and maintenance	Operational efficiency and data accessibility		2022	Completed	Ongoing work to expand into new areas and enhance/refine existing.
Develop automated data QA/QC procedure	Climate Change Adaptation		2024		
Conservation Areas / HQ Facility					
Transition Museum to new Fin. Model	Bill 108/229; CA reg 687/21		2019	Completed	Ongoing effort to enhance fundraising and make Cat. 3 P&S self sufficient

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Prepare Conservation Land Inventory	CA Reg 686/21		2022	WIP	Nearing completion
Asset Management Plan – Phase 2	Strat. Plan Goal 1 – Asset Mgt.		2020	WIP	Annual program completed; need to doc. Prev. Maint. and level of service standards
Prepare CRCA Master Plan	New asset needs a Plan		2021	ON HOLD	City to lead; insufficient resources at this time.
Update MOK Master Plan	O.Reg. 687/21 (Cat. 3 elements)		2024		Needs to reflect new funding model
Undertake accessibility study of sites	Compliance monitoring/update		2024		Initial focus on MOK per Mstr Plan Update
Update MICA Master Plan	Prepared in 1987		2026		
Update Palmerston-Canonto M. Plan	Last updated 2006		2028		
Update Purdon Master Plan	Last updated 2013		2030		
Planning Review and Regulations					
Review guidelines and submission checklists for planning/permit applications	Regulation changes		2021	Completed	
Update regulation policies and procedures	Regulation changes		2021	Ph.1 Comp.	Awaiting Sec. 28 Reg. update from Prov.
Update planning policies	Regulation changes		2021	WIP	Completed wetland policy update
Update permitting documents	Regulation changes		2021	WIP	Further changes req. per Bill 23
Prepare Compliance Strategy	Regulation changes		2021	Completed	
Prepare Enforcement Strategy	Financial management		2024		
Review hazard mapping criteria	Regulation changes		2022	WIP	Drafted.
Unstable Soils Study	Regulatory changes / City of Ott		2024		
Prepare Unstable Soils Policies	Regulatory changes / City of Ott		2026		

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Track and report CO service standards	Strat. Plan – Goal 2 Public Cred.		2021	Completed	Ongoing / maintenance
Implement CO service standards	Strat. Plan – Goal 2 Public Cred.		2021	Completed	Ongoing / maintenance
Cost of Service Study (P&R)	Regulatory changes		2023	WIP	Need to benchmark and adjust timesheet system to improve/refine analysis
Fee Study	Regulatory changes		2024		
Technical Studies and Watershed Planning					
WECI applications and management	Interim Financial Plan		n/a	Ongoing	
Carp Creek Erosion Control project	City of Ottawa - MOU		2020	Completed	Post-construction monitoring
Carp Flood Plain Mapping (FPM)	Strat. Plan Goal 1 – climate ch.		2020	WIP	Completion anticipated in Q1 2024
Casey Creek Flood Plain Mapping	Strat. Plan Goal 1 – climate ch.		2020	Completed	
NDMP Flood Risk Assessment	Strat. Plan Goal 1 – climate ch.		2021	Completed	
Lower Mississippi FPM Update	Strat. Plan Goal 1 – climate ch.		2021	Completed	
Watts Creek/Kizell Drain FPM	Strat. Plan Goal 1 – climate ch.		2024-25		
Upper Shirley's Brook FPM	Strat. Plan Goal 1 – climate ch.		2024-25		
Clyde River FPM	Strat. Plan Goal 1 – climate ch.		2023	WIP	Field work and model completed; mapping in progress
Upper Feedmill Creek FPM	Strat. Plan Goal 1 – climate ch.		2024		
Implement Watershed Plans	Strat. Plan Goal 1 - MRWP		2021		
Land Conservation & Acquisition Strategy	Strat. Plan Goal 1 - MRWP		2021	Initiated	
Carp River Wetland Restoration Project	Carp River Action Plan		2021	Initiated	

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Implement ALUS project	Strat. Plan Goal 2 – Stakeh. Rel.		2021	WIP	designed in 2021; promoted in 2022; potential projects identified for 2023
Community/First Nations liaison	Strat. Plan – Goal 2 Rel. Bldg.		2020	WIP	Many outreach attempts made over three years without significant feedback due to capacity limits
Research / knowledge development re: watershed dynamics/climate change	Strat. Plan Goal 1 – climate ch.		2020	WIP	Mississippi Lake water quality study completion anticipated in Q2 2023
Review of wetlands in growth areas	Regulatory / Foundation		2020	WIP	
Review and update of field monitoring program	Strat. Plan – Goal 1 core mandate and Goal 2 Public Eng.		2021	WIP	
Enhance watershed reporting	Strat. Plan – Goal 2 Public Cred.		2022	WIP	
Review groundwater monitoring program	Existing sites have limited value				
Information and Communications Technology					
SOP - Computer/Internet Use	Strat. Plan – Goal 1 Asset Mgt.		2020	Completed	
Document Naming and Filing Standards	Strat. Plan – Goal 1 Asset Mgt.		2020	Completed	
File and Process - DRAPE 2019 data	Growth		2021	Completed	
ICT Plan and policies	Strat. Plan – Goal 1 Asset Mgt.		2021	WIP	
Cyber Security Review/SaaS investment	Strat. Plan – Goal 1 Asset Mgt.		2021	WIP	
Open data strategy	Strat. Plan – Goal 2 Public Eng't		2022		
Develop Network Plan	Strat. Plan – Goal 1 Asset Mgt.		2022	WIP	
MS Office 365 (cloud computing)	Staff collaboration / enhanced email security		2022	WIP	

Programs and Services	Driver	Risk	Scheduled Start Date	Status	Comments
Data Storage Strategy	Strat. Plan – Goal 1 Asset Mgt.		2022	WIP	
Phone service strategy/VOIP	Admin. BMP				
Education and Stewardship					
Develop and implement pilot stewardship program	Strategic Plan – Goal 2; MRWP		2021	Plan completed	Implementation occurring as funding allows
Conduct alternative service delivery review for education program	Bill 108/229; CA reg 687/21		2022		Requires contracted support
Pilot use of Eco Trekr	Strat. Plan – Goal 2 Public Eng't		2021	WIP	
Expand use of Eco Trekr to other sites	Strat. Plan – Goal 2 Public Eng't		2023		
Communications					
Complete update of corporate website	Strat. Plan – Goal 2 Public Eng't		2020	Completed	Updated monthly.
Prepare and implement Corporate Communications Plan – focused on relationship building and awareness of regulatory changes etc.	Strat. Plan – Goal 2 Public Eng't		2021	WIP	Public engagement requirements identified for 2023 key projects.
Prepare and implement social media plan	Strat. Plan – Goal 2 Public Eng't		2022	WIP	Completed for 2023. Updated as needed.

Table 2: Capital Work Plan 2021-2025

Capital Projects	Driver	Risk	Scheduled Start Date	Status	Comments
Water Control Structures (WCS)					
Shabomeka Dam replacement	MNRF, CDA		2021	Completed	Embankments installed January 2022, and deck and railings in November 2022.
Kashwakamak Dam Safety Review (DSR)	MNRF, CDA		2021	Completed	
Shabomeka Public Safety Measures	MNRF, CDA		2021	Completed	
Carleton Place DSR	MNRF, CDA		2022-23	WIP	Draft study completed
Carleton Place Public Safety Measures	MNRF, CDA		2023-24	WIP	Design in progress
Kashwakamak Dam Class EA	MNRF, CDA		2023-24	WIP	Project award in March 2023
Widow Dam DSR	MNRF, CDA		2024		
Widow Dam Repair Design	MNRF, CDA		2025		
Lanark DSR	MNRF, CDA		2024		
Lanark Dam Repair Design	MNRF, CDA		2025		
Farm Dam Risk Assessment Study	MNRF, CDA		2025		
Pine Dam Minor Repair	MNRF, CDA		2024		
Mississagagon Dam Minor Repair	MNRF, CDA		2024		
Flood Forecasting and Warning (FFW)					
Watershed LiDAR acquisition	Climate change adapt.		2021	WIP	flown 2021-22; data processing to be completed by May 2023
Topo-bathymetric data collection	Climate change adapt.		2021	WIP	
Expansion of monitoring network	Climate change adapt.		2021	WIP	
Depth & Flow meter acquisition (ADCP)	Climate change adapt.		2022	WIP	Equipment selection in progress
Conservation Areas / HQ Facility					

Capital Projects	Driver	Risk	Scheduled Start Date	Status	Comments
Purdon - Replace sections on Boardwalk	Safety - Lifecycle replacement		2021	WIP	Expected to be completed in 2023
HQ Sewer and water connection	Agreement with C.P.		2021	WIP	Water main being commissioned end of Nov. Anticipated connection by Summer 2023
Gate house - accessibility doors and ramps	AODA compliance		2022	WIP	Gatehouse door on back order
Replace riverside look-out	Building Code Structural concerns		2022	WIP	expected to be completed in May 2023 after ground thaw; 90% complete, waiting on railing fabrication/outcome of Mill roof
MICA Trail Bridge repairs	Safety - structural		2022	WIP	One of nine complete (largest bridge); expected to be completed July 2023
CA entrance signage- review and update for regulatory consistency	Recommendation from 3rd party risk assessment		2022-2023	WIP	MOK complete, MICA/Purdon to begin this fall
Review CA Trails for AODA compliance and sign appropriately	Recommendation from 3rd party risk assessment		2024		
Gatehouse – Paint ext. window/door trim			2021	Completed	
Gatehouse - Replace veranda joists and flooring	Heritage Act. Prev. Maint.		2021	Completed	
Purdon - Replace site signage	Lifecycle replacement		2022	WIP	Expected to be completed in May 2023 along with MoK renovations
MOK – Replace site signage	Lifecycle replacement		2024		
HQ - Condition Assessment	Asset management BMP		2025		
MOK Building Condition Assessment	Asset management BMP		2025		

Capital Projects	Driver	Risk	Scheduled Start Date	Status	Comments
Ed. Centre - security and access. upgrades	AODA compliance				
MOK Top up play structure wood chips	CSA Compliance		2022	Completed	
MOK Resurface roadway and parking lot	Preventative Maint. BMP		2023		
Develop MOK site Workshop	Secure Storage of Equip't		2022-2023		
Museum - Repaint windows & trim	Heritage Act		2024		
Purdon - Replace main look-out	Lifecycle replacement		2025		
MICA Signage renewal	Lifecycle replacement		2025		
Roy Brown Park - construct lookout	Park Plan / Agrt w C.P.		2025		
Education Centre - Replace siding	Prev. Maint.				
Gatehouse - Repoint stone work	Heritage Act, prev. maint.		2023		
Museum - Balcony repairs	Heritage Act				
MOK Construct flush washrooms	MOK Master Plan		2023		
K&P Trail Condition Assessment	Asset Mgt BMP				
Updates to Generator at HQ	CSA-282-15/ CSA B139-19		2023		
Vehicles & Equipment					
Vehicle purchase (Pick-up)	Lifecycle replacement		2022		Purchased Feb. 2023
Riding Lawn mower	Site maintenance		2023		
Tracks for ATV	Dam Ops		2024		
Tandem utility trailer	Dam Ops		2025	WIP	Sourcing upgraded trailer
ATV	Dam Ops				
Information and Communications Technology					
Buy/replace Computers	Growth and Lifecycle replacement			Ongoing	
Increase Storage	Growth		2021	Completed	
Integrate GIS & F.Plain reports/mapping	Transparency		2021	WIP	
Audio Visual Improvements	Remote & hybrid meetings		2021	Completed	Interim solution; does not allow for Chair to reside outside the Boardroom.
Replace Servers	Lifecycle replacement		2023/25		

Capital Projects	Driver	Risk	Scheduled Start Date	Status	Comments
Replace Plotter	Lifecycle replacement		2024	DEFERRED	May eliminate paper maps
Replace Monitors	Lifecycle replacement			Ongoing	
Data acquisition	Technical study needs			As req'd	LiDAR and DRAPE (every 5 years)
Purchase SAAS MS Exchange 365 back-up	Data management			DEFERRED	Pending outcome of Network Study