2022 CAPITAL REPORT

Prepared by: Credit Valley Conservation

September 30, 2021

Credit Valley Conservation
inspired by nature

Project Name:	Cause & Effect Program	**CVC Account:**	301-362
Location:	Watershed Wide	**Peel Ref #:**	22-1625
Project Manager:	Aviva Patel	**Project Duration:**	Ongoing
Rationale:	Growth, General Environment	**Date Revised:**	June 2021

Description of Project:

This program covers the analysis of cause and effect relationships relating to the Integrated Watershed Monitoring Program (IWMP) and other issues of concern or emerging issues identified through internal and/or external consultation. Where the IWMP goal is to identify the status and long-term changes (trends) of key watershed attributes and indicators, the Cause and Effect Program (CEP) was initiated in 2019 as a complementary program to:

1. Develop Ecosystem Assessment Points (e.g. thresholds or targets in monitored parameters) that will guide detailed CEP investigations and prioritize issues of concern;
2. Undertake Cause and Effect Investigations (e.g. investigate issues of concern) to determine likely causes of detected changes and/or impairment; and
3. Effectively communicate results to internal and external stakeholders, to guide informed decision making and conservation actions.

Ultimately this program is the integrative piece between the detection of impairment or change, and the provisioning of information upon which sound management and strategic decisions can be made. It aims to complete the cycle in adaptive ecosystem management and monitoring by leveraging the IWMP data to facilitate the production of conservation tools so that we can '*plan for an environmentally sustainable future*' and develop, maintain, and share '*leading edge knowledge to advance science-based decision making*' in the Credit River watershed (Strategic Goals 1 and 4) in partnership with municipalities and other stakeholders. This program also supports planning and plan review divisions at CVC through the provision of technical reviews and monitoring oversight for large scale developments occurring in northwest Brampton and throughout the Region of Peel. The data and knowledge gained from these initiatives directly relates to the interpretation of watershed-wide cause and effect relationships and can be effectively communicated to inform future development planning and conservation actions.

Project Justification:

With ongoing development in the watershed, there is a need for tools and products to assist municipalities and developers with the preparation of robust development monitoring plans and cause and effect analyses to support said plans. This program also supports the review of developer led monitoring plans and reports for knowledge sharing with Peel and its member municipalities.

This program is intended to bridge the gap between monitoring and management decisions, by leveraging IWMP data. As changes in status and trends, or emerging threats are identified under the IWMP, the complementary cause and effect program focuses on understanding the causes behind the observed changes and recommends potential management actions when possible. Tools will be created that allow for the assessment of conditions, benchmarks against which conservation activities can be compared, management

triggers, and development of monitoring guidelines for external partners. The products delivered under this program are based on consultation with internal clients to ensure monitoring data can inform sound conservation actions on our lands and throughout the watershed. This program will also continue to use the specific knowledge gained from the original effectiveness monitoring program to inform future land use planning initiatives within the rest of the Credit River watershed where applicable.

Project Deliverables:

1. Continued technical support to guide protection, management, and monitoring of natural heritage features within the Region of Peel through:
    a. Technical input to developer led monitoring plans and monitoring reports (e.g. Block 51-2, Mayfield West, and Heritage Heights).
    b. Develop a 5-year monitoring plan (2023-2027) for Block 51-2 in Northwest Brampton to examine pond anoxia (loss of oxygen) and impacts to receiving watercourses. This builds upon the comprehensive monitoring initiated by the landowners' group (2018-2022) and is partially funded through the provision of a one-time capital contribution.
    c. Support CVCs Planning and Development Services Department through tool development/refinement and data management of ecological data obtained through the Environmental Impact Study (EIS) process.
2. In support of the management of CVC and municipal lands, ecosystem assessment points (ecological thresholds) will be finalized that identify resource management targets, assessment triggers, and management triggers for urgent conservation action. This will be documented in a technical addendum to the Cause and Effect Framework Document. This project was delayed to 2022 due to COVID-19 pressures and staff reassignment in support of CVC's Watershed Plan.
3. To support the management of CVC and municipal lands, three cause and effect investigations will continue in 2022:
    a. One investigation (impacts of sugar maple dominance in forests and management recommendations) will be completed and results communicated in 2022.
    b. The second investigation (impacts of urban SWM ponds on downstream water temperature and flow) will continue through 2022 with project completion anticipated in 2023. Project fieldwork was delayed due to COVID-19, but during 2021 CVC established a partnership with TRCA and the University of Toronto to expand the scope of this investigation. This expanded collaboration is contingent upon funding through NSERC.
    c. The third investigation (impacts of rural online ponds on water temperature in sensitive cold-water streams) was initiated in 2021 and will be completed in 2022.
4. Continue the development, measurement and tracking of key performance indicators in partnership with TRCA and the Region of Peel for the measurement and reporting on Peel climate change special levy programs.

Impact if Project is Delayed:

Provision of technical monitoring support to municipalities and other stakeholders is an important part of CVC's role as technical expert and advisor to its partners. Analysis and reporting of key issues arising from monitoring data is an essential component of adaptive monitoring and adaptive environmental management and supports CVC's land management and plan input roles. Delays in this program will affect the ability of CVC, its municipal

partners, and CVC's partner agencies to implement adaptive environmental management and recommend best management practices.

Reductions in program scope and/or delayed implementation will:

- Restrict CVC's ability to acquire relevant data and provide scientifically based management recommendations and conservation tools that can inform municipal and agency management decisions and watershed planning.
- Prevent CVC from meeting its commitments to the City of Brampton through technical guidance and reviews related to development monitoring in Northwest Brampton.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$188,217	$177,893	$183,586	$189,574	$195,797

Signed off by:

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Aviva Patel
Senior Manager, Ecology and Monitoring/

Gayle Soo Chan
Director, Watershed Knowledge

Project Name:	Natural Heritage Inventory and Mapping	**CVC Account:**	301-356
Location:	Watershed Wide	**Peel Ref #:**	22-1631
Project Manager:	Aviva Patel	**Project Duration:**	Ongoing
Rationale:	General Environment, Growth, Regulatory	**Date Revised:**	June 2021

Description of Project:

This program conducts field inventories and mapping of the biological features of natural areas throughout the Credit River Watershed. The areas inventoried include the natural heritage systems of the Region of Peel and its municipalities, conservation authority (CA) lands and CA regulated wetlands. These inventories are detailed, using accepted protocols such as the Ecological Land Classification System (ELC) for Southern Ontario and an adaptation of the Ontario breeding Bird Atlas protocol. The result is a body of current, accurate information on the natural heritage assets of the watershed that forms the basis of many projects CVC and the Region of Peel partner on to maintain a sustainable and healthy environment for their residents.

The inventory work is carried out on private and public properties. All landowners that are visited receive the results of the inventories of their natural areas. Relationships are built with landowners, helping them to better understand the watershed lands they care for. These relationships frequently provide a starting point for continued engagement with CA, regional and municipal environmental stewardship programs.

The program also has data management and knowledge transfer components to ensure the natural heritage mapping and associated data are searchable, reliable, and secure. This program is responsible for generating, managing and annually updating CVC's baseline natural heritage and land use mapping that is fundamental to most projects and modelling undertaken by CVC as well as by its partners and collaborators. The community and species level data along with analysis and reporting products are critical in assisting CVC and its partner agencies and municipalities to undertake appropriate land and water management activities.

This program is carried out in partnership with all watershed municipalities, neighbouring conservation authorities, community groups and landowners. From time to time, specific municipalities (e.g. Brampton) provide additional one-time funding to leverage staff expertise in inventory and to advance the program schedule for specific municipally owned or managed lands.

Project Justification:

The Natural Heritage Inventory and Mapping program provides high quality ground-verified data and mapping that is fundamental to science-based environmental decision making and management. This information enables municipalities to identify and protect significant natural features and areas in accordance with municipal and provincial policy (e.g. Provincial Policy Statement, Official Plans) and assess the value of their natural assets. CVC planners also directly rely on Natural Heritage evaluations to determine the sensitivity of features, to ecological functions such as hydrological systems as related to CA regulations. Municipal planners use the information to help guide protection and management of municipally owned natural areas. An understanding of these features informs recommendations for mitigation or compensation of potential land use impacts and guides CVC restoration, stewardship and education programs. Comprehensive inventory data are needed as a base for environmental policies and programs and for managing CA lands. Accurate mapping

is critical for development of natural heritage systems within CVC and by municipalities, and for updating official plans. This program's data also serves to ground-truth ecological or hydrological modeling projects that CVC does in partnership with the Region and its municipalities. This work builds strong, positive relationships with landowners across the Credit River watershed.

Project Deliverables:

- Field inventory data collection from May through September covering over 500 hectares including Ecological Land Classification and vegetation mapping; botanical, breeding bird and bat inventories; and incidental records of other fauna or features including invasive species and Species of Conservation Concern. Field data supports updates to natural heritage systems for Peel and its member municipalities, and supports CVC's land management and plan input activities
- Wetland characterization and mapping supporting mapping updates and wetland and natural hazards management
- Updated mapping of CVC's land cover and land use information and data management of the Natural Heritage Database Management System to ensure efficient and effective data sharing with regional, municipal, planning, or land management staff or consultants.
- Natural Areas Inventory report: Site summaries of natural areas for which recent inventories have been completed, including Centres for Biodiversity and other parts of the regional and municipal natural heritage systems, CVC lands, municipal natural assets and natural areas containing CVC monitoring stations. This will supplement Volumes 1 through 9 (hosted on the Peel Data Centre website) and Volume 10 which is currently in preparation.
- Development and sharing of Natural Heritage data interpretation tools to facilitate internal and external knowledge transfer (e.g. up-to-date plant and animal species lists for the watershed, identification of stewardship opportunities for natural areas, invasive species location tool)
- Support to other CVC projects, programs (e.g. watershed management, Watershed Plan, subwatershed studies, Conservation Area Management plans, Landscape Analysis of Wetland Biological Integrity project, plant vulnerability ranking (Species of Conservation Concern) project, Agricultural Site Assessment Program, Landowner Action Fund ecological support and restoration projects)

Impact if Project is Delayed:

Delay of program activities impacts both the Region and watershed municipalities' ability to identify and protect significant natural heritage features in accordance with the Provincial Policy Statement and municipal Official Plans will be significantly impacted. This work provides essential information for many ongoing CVC programs including the Land Securement Program, Land Management Plans, Plan Input and Review, Natural Heritage System Strategy, Sustainable Forest Management Plan, Invasive Species Strategy, Biodiversity Conservation and Management Program, Landowner Action Fund project assessment, natural assets valuation projects and more. Failure to undertake this inventory work impacts the ability of CVC to implement many of its current programs that are currently conducted in partnership with municipalities. It impacts CVC's ability to manage its lands, and to respond to specific data requests within and outside CVC. Delays or failures in undertaking the work may add time to the land use planning process thereby increasing costs and reducing efficiencies for watershed stakeholders.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$433,619	$436,075	$450,030	$464,709	$479,964

Signed off by:

Aviva Patel
Senior Manager, Ecology and Monitoring

Gayle Soo Chan
Director, Watershed Knowledge

Project Name:	Leaders for Clean Waters- Headwaters	**CVC Account:**	101-199
Location:	Watershed (Partial)	**Peel Ref #:**	22-1639
Project Manager:	Jennifer Dougherty	**Project Duration:**	Ongoing
Rationale:	Climate Change/Asset Management	**Date Revised:**	June 2021

Description of Project:

Local climate change trends challenge us to consider existing risks and responsibilities with a new lens, one where the environmental conditions of the past do not dictate what we may experience now and into the future. Short duration high intensity storm events that have occurred across the CVC watershed over the last 10 years have highlighted our vulnerability to flooding and the cascading impacts to our environment and communities. CVC's Leaders for Clean Waters- Headwaters Program focuses on understanding local climate risks while also providing support for implementation of mitigation and adaption actions in local communities and on CVC properties (watershed wide) to meet corporate carbon reduction targets. This Program delivers technical climate risk assessments, research, tools, training and stormwater performance monitoring to assist partners in understanding local conditions and evaluate solutions to make evidence-based and cost-effective decisions to reduce climate change risks.

The Leaders for Clean Waters – Headwaters (LCWH) program aims to:

- Support the implementation of the CVC Climate Action Plan including corporate mitigation and adaption components.
- Support watershed and asset management planning through the application of climate research and tools such as the Risk and Return on Investment Tool (RROIT) which evaluates the cost benefit of implementing natural assets, grey and/or green infrastructure solutions.
- Address implementation barriers identified by stakeholders and provide rigorous assessments on stormwater performance and maintenance of green infrastructure to support wide scale adoption and support asset management planning.

This program both complements and serves 101-021 (Integrated Watershed Management Knowledge Transfer), 101-048 (Infrastructure Performance and Risk Assessment) and 101-008 (Water and Climate Change Risk Assessments Program) through the provision of LID performance data watershed wide and climate risk assessments.

Project Justification:

By working collaboratively, this program ensures opportunities for information sharing and building knowledge capacity to mitigate our corporate carbon footprint to achieve long term mitigation targets and reduce downstream risks to Peel Region. The Leaders for Clean Waters – Headwater Program supports the Region of Peel's Climate Change Master Plan (2019) Outcomes 3 and 4.

Project Deliverables:

- Comprehensive stormwater performance monitoring and reporting at 4 stations located outside the Region of Peel to assess long-term performance and maintenance considerations of a

residential subdivision treatment train with a stormwater management pond with up-gradient LIDs.

- Conduct stormwater monitoring on special projects on a fee for service supplementary basis to assist municipalities such as Halton Region and the Town of Halton Hills (Acton total phosphorus project) with LID implementation, maintenance and inform wastewater compliance approvals.
- Delivery of a webinar through Sustainable Technologies Evaluation Program to demonstrate performance of residential application of LIDs.
- Support the implementation of corporate climate change mitigation and adaption actions on CVC conservation areas by providing technical advice on PARCs master plans, input into energy transition scenarios, and pursue funding opportunities to fund action implementation.
- Support implementation of the Hungry Hollow Sustainable Neighbourhood Action Plan (SNAP) by providing technical design review for the Town of Halton Hills on LID retrofit of Sargant Road.
- Run the RROIT for the Credit River Watershed Plan to assess potential damages and identify socially vulnerable communities due to riverine flooding and erosion and evaluate the cost benefits of management options to inform CVC's Watershed Plan.
- Provide technical services to CVC's Watershed Plan by providing watershed levels of service targets, direction on climate risk assessment scenarios and stormwater management recommendations in conformance with Provincial Policy Statement and Reg 588/17 to support municipal planning.

Impact if Project is Delayed: Reductions in program scope and/or delayed implementation will:

- Delays would jeopardize CVC's ability to support Peel and member municipalities implement low impact development including ongoing performance, operation/maintenance considerations, training, and other knowledge transfer tools.
- Jeopardize commitments made in the service contract with Halton Region and the Town of Halton Hills (including Acton total phosphorus project) required for municipal WWTP ECA compliance conditions.
- Delays in running the RROIT would jeopardize CVC's ability to identify priority flood and erosion risks areas to support CVC's watershed plan recommendations and external grant funding requirements.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$145,145	$147,586	$152,309	$157,277	$162,440

Signed off by:

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Jennifer Dougherty
Senior Manager, Water and Climate Change Science

Gayle Soo Chan
Director of Watershed Knowledge

Project Name:	Ecological Goods & Services	**CVC Account:**	301-323
Location:	Watershed Wide	**Peel Ref #:**	22-1670
Project Manager:	Tatiana Koveshnikova	**Project Duration:**	Ongoing
Rationale:	Human Well- Being, Climate Change	**Date Revised:**	June 2021

Description of Project:

This Ecological Goods & Services (EGS) program serves as the socio-economic component of watershed research and monitoring, establishing and communicating links between watershed management, the ecological health of the watershed, and health and well-being of local communities. Models and tools developed under this program provide input into the CVC Watershed Plan and provide guidance for restoration actions on CVC lands and across municipalities. This program provides data on the monetary values of watershed ecosystem services and is developing metrics and tools to measure and report on changes in the health and wellbeing of watershed residents as they relate to changes in environmental conditions, including climate change, and management/restoration actions. In particular, the program develops and tests a guidance framework for the use of appropriate carbon storage and estimation tools depending on the nature-based solutions, spatial scale, and management goals across the watershed and the Greater Toronto Area[1].

This program both complements and serves the Peel Natural Assets Projects (301-319). For instance, the program leads the development of tools for municipal natural asset management in the watershed's municipalities outside the Region of Peel (e.g., Town of Halton Hills) to meet the requirements of Ontario Regulation 588/17.

Project Justification:

The health of watershed residents is inextricably linked to the health of the Credit watershed's ecosystems. Watershed residents both affect and are affected by watershed ecosystems and the services they provide.

Since 1999, CVC has been implementing an Integrated Watershed Monitoring Program that incorporates information on the watershed's health, including hydrology, water quality and terrestrial indicators. Currently monitoring is only conducted for biophysical measures of environmental health, although it has been recognized that a comprehensive watershed monitoring and assessment system should also include aspects of related social and economic well-being.

This program is aimed at developing a comprehensive framework and set of indicators to assess, monitor and communicate environmental connections to the well-being of watershed residents. This program has the following objectives:

- To better understand the importance of various environmental attributes and ecosystem services and their contribution to the well-being of watershed residents;

[1] In collaboration with TRCA, LSRCA and municipal partners

- To determine impacts that changes in the level/quality of key environmental attributes in the watershed have on the well-being of its residents;
- To relate these estimates to the watershed planning and current and future watershed conservation, restoration and management strategies to assess how well watershed residents and visitors are being served and what additional actions CVC and its partners can take to improve their well-being.

Project Deliverables:

In 2022, the Program will:

- Provide support to CVC's Watershed Planning process through the application of EGS methods, approaches and tools to assess the value of services resulting from current and future watershed planning scenarios
- Continue improving and applying the Health and Well-being valuation tool to assist CVC restoration staff and partners with the assessment of co-benefits and prioritisation of restoration actions
- Continue collecting new data for adapting, refining and applying valuation approaches and methodologies to assess and communicate benefits provided by the watershed's natural assets
- Continue developing and testing the guidance framework for the use of appropriate carbon storage and estimation tools
- Continue developing and updating key components and tools for municipal natural asset management in the watershed's municipalities outside the Region of Peel (e.g., Town of Halton Hills) to meet the requirements of Ontario Regulation 588/17. It is anticipated that the TOHH Phase 2 study will be completed by early 2022. Additional expansion work is likely.

Impact if Project is Delayed:

Failure to deliver the program will result in the inability to provide critical socio-economic input into the CVC watershed planning to ensure it addresses community health and well-being components. Timely delivery of the program will help to ensure that CVC's restoration and management projects benefit residents and visitors while increasing provision of environmental benefits.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$82,240	$82,471	$85,110	$87,886	$90,771

Signed off by:

Tatiana Koveshnikova
Program Manager, EGS

Gayle Soo Chan
Director of Watershed Knowledge

Project Name:	Headwaters Outreach	**CVC Account:**	301-335
Location:	Watershed (Partial)	**Peel Ref #:**	22-1670
Project Manager:	Andrew Kett	**Project Duration:**	Ongoing
Rationale:	General Environment	**Date Revised:**	June 2021

Description of Project:

This program enhances outreach programming in the headwater communities of Halton, Erin, Dufferin and Caledon through establishment of partnerships with community groups, municipalities and landowners, including Sustainable Neighbourhood Action Plans. The program engages partners in stewardship actions using outreach, education and behaviour change strategies. Target audiences learn about local land and water management issues and are supported with technical advice, restoration services and/or incentives to facilitate environmental stewardship activities that improve water quality or quantity, build ecosystem resilience to climate change and enhance wildlife habitat and biodiversity. The program builds local awareness of climate change and other priority watershed issues and the role of landowner and community stewardship in protecting and restoring watershed health.

Emphasis is placed on moving from awareness to action. Recommendations from scientific studies, reports and strategies are used to target outreach to priority areas and actions. Projects such as wetland restoration, tree planting, vegetated buffers, ground water protection, water quality/quantity enhancement and protection, invasive species management and, in settlement areas, lot level rainwater management (LID) are supported.

Project Justification:

Protecting headwater features and systems is critical to maintaining overall health of the watershed, especially given heavy urbanization in the lower watershed and dependence on healthy headwater systems for groundwater infiltration and recharge, flood control, fish spawning and nursery sites, and biodiversity. With over ninety per cent of the rural landscape under private ownership, strong stewardship programming is needed to facilitate landowner and community participation. Outreach to our headwater communities is critical to implementing strategic priorities and facilitating adoption of stewardship actions that build resilience to climate change and help protect and restore watershed health.

Project Deliverables:

- Support the delivery of Wellington and Dufferin Rural Water Quality programs.
- Deliver Countryside Stewardship landowner workshops.
- Conduct 30 landowner site consultations to facilitate implementation of environmental improvement projects.
- Administer $18,750 in grants through the Landowner Action Fund to support implementation of private land stewardship projects in the headwater's region (with a primary focus outside of Peel).
- Install 12 Caring for the Credit signs at entrances to rural properties to recognize landowners and build social norms.
- Coordinate inter-agency implementation of priority actions in Hungry Hollow Sustainable Neighborhood Action Plan (SNAP)
- Coordinate 3 Implementation Committee meetings for Hungry Hollow SNAP

- Coordinate and deliver multiple SNAP neighborhood engagement events and assist in coordinating engagement on SNAP capital projects such as Sargent Rd. retrofits in partnership with the Town of Halton Hills

Impact if Project is Delayed:

Failure to maintain a stewardship program in the headwater communities could lead to a slow deterioration in the health of the rural watershed through a lack of education, appreciation and action by rural landowners and communities. Sustained investment in landowner relations and education is essential to driving stewardship. Motivating behaviour and attitude change require dedication and continuity without which past investment, goodwill, and trust as well as future opportunity are at risk.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$120,669	$132,839	$137,090	$141,562	$146,209

Signed off by:

Andrew Kett
Senior Manager, Education and Outreach

Jeff Payne
Deputy CAO & Director, Corporate Services

Project Name:	Landscape Science	**CVC Account:**	301-353
Location:	Watershed Wide	**Peel Ref #:**	22-1670
Project Manager:	Aviva Patel	**Project Duration:**	Ongoing
Rationale:	Growth, General Environmental	**Date Revised:**	June 2021

Description of Project:

This program has two major areas of focus: 1) Natural Heritage System Support incorporating a watershed approach; and 2) reporting on status and trends in watershed health and analysis of long-term monitoring program data to identify emerging threats and provide management recommendations.

Natural Heritage System (NHS) Support: This program has developed a Natural Heritage System (NHS) Strategy to ensure continued watershed health and human benefits given current and future stressors. The program has since evolved to provide support for natural heritage system implementation at regional and municipal scales to protect and enhance water quality and quantity, and to improve the health of the natural system across the Credit River watershed. The NHS Strategy is being implemented externally by municipalities and with support from CVC through stewardship strategies and landowner programs to ensure effective and efficient use of taxpayer dollars. Through this program, CVC partners with municipalities to tailor its NHS for their use, or to review mapping for municipal natural heritage systems at the time of Official Plan updates. Landscape Science also includes research and tools to manage the natural heritage system, including road and valley crossings research for fish and wildlife connectivity, and Centre for Biodiversity plans. The Urban Natural Heritage Program (301-355) supplements the work of Landscape Science by partnering with urban municipalities (Mississauga, Brampton) on urban forest and urban natural heritage system projects and strategies.

Watershed Health Reporting: A second major focus of this program includes watershed health reporting in support of the NHS Strategy. Data from the Integrated Watershed Monitoring Program (IWMP) are analyzed with regular reporting on the condition of groundwater and climate, and the health of streams, forests and wetlands. The program includes integrative analyses of abiotic (e.g. water quality, land use and land cover) and biotic (e.g. fish) variables to characterize ecosystem health (i.e. status), highlight any changes in status and identify emerging issues. If an issue has been identified, and the underlying cause(s) and recommended management actions are not known, then this could potentially trigger further investigation by CVC's Cause & Effect Program (301-362) with the goal of supporting management recommendations in all CVC departments and with stakeholder activities.

Project Justification:

Landscape Science projects provide important information for the Region of Peel's Climate Change Strategy and future updates of the Region's Official Plan. The NHS provides a common watershed context for CVC to provide sound, science-based natural resource management information to municipalities and key stakeholders including CVC's land managers, provides efficiencies for plan input and plan review at provincial, regional or municipal scales, and lessens uncertainty to watershed stakeholders. Development, implementation and monitoring of the NHS supports Peel Term of Council's priorities relating to environmental resilience and preparedness for climate change.

Analysis and reporting on long term watershed monitoring data is critical to managing the multiple stressors that continue to affect watershed health. Data from IWMP are used to inform municipal, agency, academic or non-governmental organizations' analyses, strategies, and actions relating to environmental health, to ensure continued provision of ecological benefits to society. Monitoring can help provide recommendations for effective management of CVC and municipal lands.

Project Deliverables:

1. Natural Heritage System Support: Municipalities recognize the need for a healthy NHS for health and prosperity in the watershed. The scientific support provided is critical to this goal.
    - Continued technical support to the Region of Peel throughout its consultation and potential implementation of a Caledon and Peel Region NHS, subject to municipal timelines. This involves incorporation of the results of the CVC-led Regional NHS Integration Project, which mapped a Caledon CA NHS (Phase 1, 2018) and a Region of Peel CA NHS (Phase 2, 2019). Municipal timeline TBD.
    - Provide technical review and support for the Town of Caledon's Official Plan review and update, subject to municipal timelines. Municipal timeline TBD.
    - Lead Drivers and Stressors components of the Watershed Plan; Lead mapping of future natural heritage system scenarios.
    - Finalize Phase 2 of the Road and Valley Crossing Project including final report, shapefiles and user guide, documenting the analysis that was completed in 2021. Initiate Phase 3 (Implementation), including developing tailored products for municipal partners to incorporate into transportation planning and operations.
    - Analysis and writing support for products that guide management of the Natural Heritage System (e.g. finalize the Landscape Analysis of Wetland Biological Integrity (with 301-357); finalize content for the Ecological Restoration Strategy and Guidelines)
    - Input to strategies, plans and guidance documents relating to natural heritage systems and landscape ecology; e.g. watershed plan, subwatershed studies, Centers for Biodiversity programs, Sustainable Neighbourhood Action Plans (SNAPs), Greenlands securement strategy.

2. Watershed health reporting: Analyses of long-term monitoring data
    - Continued reporting on key results from forest, wetland, stream, groundwater, climate and landscape monitoring indicators through blogs and social media. This will include promotion of the six IWMP StoryMaps and the 16 Status and Trend Technical Reports that are tailored to inspire action by all implementors to protect and improve watershed health.
    - Strategize and conceptualize the next iteration of a StoryMap for CVC. This project may be broadened from an IWMP StoryMap collection to serve a role in CVC's Open Data Strategy, and/or include a potential collaboration with CVC's Watershed Plan.
    - Produce and distribute 2021 information packages to monitoring site landowners. These packages improve stakeholder understanding of watershed health and the importance of Regional natural heritage systems.
    - Produce a biennial report summarizing monitoring results and program highlights for 2020 and 2021. This report will demonstrate accountability by showcasing how we continuously work to improve our long-term monitoring program and support science-based decision making.

Impact if Project is Delayed:

Municipalities are required to identify natural heritage systems by the Province through the Provincial Policy Statement. A natural heritage system for the Region of Peel and other CVC member municipalities, developed using watershed and systems approaches and extensive CVC data, is essential to ensure continued protection and enhancement of the region's natural areas and the ecosystem benefits they provide.

Timely analysis and reporting of monitoring data is an essential component of adaptive monitoring and adaptive environmental management. Delays in this program will affect the ability of CVC, its municipal partners, and CVC's partner agencies to implement adaptive environmental management and recommend better management practices.

Reductions in program scope and/or delayed implementation will:

- Threaten the ability of natural systems to adapt to climate change and to be resilient to the impacts of human activities
- Limit the ability of municipalities to implement effective land use planning and manage their natural resources based on the collection of sound data and best available, defensible science
- Decreased/inadequate knowledge base to support conservation authority and municipal partner legislative responsibilities both direct and indirect (Planning Act, Growth Plan, Provincial Policy Statement, Niagara Escarpment Planning and Development Act, Greenbelt Plan, Oak Ridges Moraine Conservation Plan, etc.).

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$541,833	$567,970	$586,145	$605,265	$625,133

Signed off by:

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Aviva Patel
Senior Manager, Ecology and Monitoring

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Gayle Soo Chan
Director of Watershed Knowledge

Project Name:	Infrastructure/Major Maintenance - CA's	**CVC Account:**	401-455
Location:	Watershed Wide	**Peel Ref #:**	22-3103
Project Manager:	Terri LeRoux	**Project Duration:**	Ongoing
Rationale:	Health & Safety, Asset Management, Growth	**Date Revised:**	June 2021

Description of Project:
CVC currently owns approximately 2,800 hectares (7,100 acres) of land. The total land holdings are comprised of 62 distinct properties located throughout the watershed. Eleven (11) of these properties are 'active' Conservation Areas where there are well developed facilities, programs and services for visitors as well as developed trail systems and related infrastructure. These properties are referred to collectively as our Core Conservation Areas. Many of the remaining properties are largely maintained in a naturalized state with limited public access, while other properties are under long term leases with municipal partners and other public agencies.

This program supports ongoing asset management related to maintenance, repair, and additions to conservation area infrastructure including, but not limited to, land improvements (roads, trails, parking lots and signage), structures (buildings, trailers, pavilions, etc.), infrastructure (culverts, septic fields, utility lines) and property management (leases, agreements, documentation, technology, etc.). This program also provides funding for long-range strategic planning and targeted, new, capital construction projects that address the growing public demand for facilities and outdoor recreation infrastructure throughout the watershed.

Project Justification:
Asset management is necessary for the following reasons:

1. Reduction of risk and liability;
2. Ensure a state of good repair;
3. Meet population growth and increasing demand for recreation opportunities;
4. Achieve accessibility standards required under legislation; and
5. Provide full lifecycle asset management planning.

Project Deliverables:
Capital Asset Repair/Maintenance and Improvements

- Proactive minor to moderate repair and maintenance of existing capital assets (land improvements, structures, and infrastructure) to address all health and safety concerns (e.g. ongoing boardwalk and trail repairs, upgrades and replacements, over 80 km of trails)
- Addressing hazard tree management on an ongoing basis (including EAB and boundary trees)
- Proactive minor to moderate repair and maintenance of existing capital assets (land improvements, structures, infrastructure) to address deterioration of assets (state of good repair)
- Replacement of minor assets (e.g. signage, benches)
- Studies/drawings/professional services for activities such as site visits to inventory and assess bridges and board walks at various conservation areas to include in our asset management system, development of an asset management system, detailed technical plans from professional engineers and architects all leading to major repairs/maintenance/upgrading existing assets including surfacing/expansion of existing parking lots to improve drainage and increase capacity, bring selected walking/hiking trails to AODA standards and repairs and maintenance to existing picnic pavilions
- Install replacement and enhanced way finding signage and educational/interpretive signage

Strategic Planning

- Implementation of priority initiatives resulting from the Visitor Experience, Land Acquisition, and Indigenous Engagement Plans produced as part of the Conservation Areas Master Strategy (CAMS).
- Completion of Island Lake Conservation Area Management Plan; scoping management plan processes for priority properties throughout the watershed, pending results of CAMS work and acquisitions.
- Support the implementation of the Credit Valley Trail Strategy with watershed partners and stakeholders including implementation of the heritage destination plan, indigenous experience plan, and other strategic directions from the CVT Strategy.
- Monitor CVC lands (asset inventories, trail assessments for accessibility) and Visitor Monitoring (visitor surveys; trail counter data management and analysis, postal code analysis) data is collected at selected properties to support planning, operations and property management.
- Implementation of reservation and access systems for visitor management

Capital Projects

- Design, permitting, and implementation of approved capital projects on active properties throughout the watershed. Projects can be maintenance, repair, or new construction. Projects include construction projects for new trail infrastructure, park servicing, park access and other visitor amenities; construction or installation of new park servicing, trails, parking areas, pavilions, signage, and park program related infrastructure.
- Major 2022 initiatives include design and servicing for a new accessible washroom facility at Ken Whillans Conservation Area, and renewal of the Gorge Loop Trail boardwalk system at Belfountain Conservation Area, and installation of a new pedestrian bridge at Upper Credit Conservation Area.

Impact if Project is Delayed:

Delays in this project could result in increased health and safety risks/liabilities for the public and staff. Capital costs could increase without regular maintenance (facilities, infrastructure and dams). Timely investments avoid negative impacts to conservation area natural assets (e.g. unsanctioned trails/use or harm to the environment) and address legislative requirements related to accessibility. Conservation Area programs offset land management costs, so ensuring a positive visitor experience which is critical to achieving revenue targets (both recreational and educational) and desired level of service. Strategic investments will support revenue growth and increased market share.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$604,795	$675,201	$696,807	$719,536	$743,156

Signed off by:

Terri LeRoux
Sr. Manager, PARCS

Jeff Payne
Deputy CAO & Director, Corporate Services

Project Name:	Infrastructure Major Maintenance-Dams	**CVC Account:**	401-456
Location:	Watershed Wide	**Peel Ref #:**	22-3103
Project Manager:	Jeff Wong	**Project Duration:**	Ongoing
Rationale:	Public Safety, Regulatory	**Date Revised:**	Jun 2021

Description of Project:

This project plans for and undertakes major maintenance and upkeep of CVC owned and operated water control structures and completion of associated due diligence studies and reports intended for the ongoing protection of public safety. CVC owns and/or operates several control structures located on the main Credit and its tributaries including Island Lake North and South Dams, Belfountain Dam, Monora Dam, Erindale Ice Control Structure, and the Willoughby (Stonecutter's) Dam and weir (per management agreement with Ontario Heritage Trust). Minor maintenance activities such as routine vegetation management and debris removal at Erindale are covered under a separate General Levy budget code (401-453). Staff salaries for dam maintenance are drawn from 101-058.

Project funding supports:

- Studies and reports required under the Lakes and Rivers Improvement Act (LRIA) including Dam Safety Reviews, Emergency Preparedness Plans and Operation, Maintenance and Surveillance Manuals;
- Ongoing monitoring and surveillance of dam infrastructure;
- Contracted design and implementation of major works; and
- Application to Ministry of Natural Resources and Forestry for grant funding assistance under the province's Water and Erosion Control Infrastructure (WECI) Program.

Project Justification:

The Ministry of Natural Resources and Forestry (MNRF) approves and regulates the design, construction, operation, maintenance and safety of water control structures (dams) in Ontario under provisions of the *Lake and Rivers Improvement Act* (LRIA or the Act). The Act assigns duties and responsibilities to dam owners and operators. As operator and owner of water control structures, CVC is required and committed to ensure our structures are operated and maintained in compliance with the Act.

The costs of maintaining CVC's dam infrastructure are substantial and can vary over time. Aging infrastructure, changes in legislative requirements, and other factors influence the scope and timing of the capital investments in major maintenance, repairs and replacement needed to ensure compliance with LRIA requirements.

Project Deliverables:

<u>On-going Monitoring:</u> The following on-going monitoring projects will continue in 2022.

- Island Lake South Dam – monitoring of the post-tension anchors, stability of the east and west embankment retaining walls
- Island Lake South Dam Discharge Pipe – dive inspection and flow meter replacement

<u>Island Lake Dam Repairs</u> - The 2016 Island Lake Conservation Area Dam Safety Review Update (DSR Update) recommended over $1 Million of studies and repairs. CVC has developed a schedule for implementing the essential recommendations on a priority basis:

- The highest priority works recommended in the 2016 ILCA DSR Update are generally complete.
- A dam inspection by a qualified engineer is required 5 years after the completion of the DSR. This is currently under way and expected to be complete? Inform future works? .
- . Maintenance of the pressure relief wells may occur in late 2021 or in 2022 with the installation of monitoring sensors to follow.
- Working through other high priority items in 2021/22, projects for the South Dam will include ILCA Geotechnical Investigation, Seismic Criteria and Probable Maximum Flow update.
- Future ILCA South Dam works will include handrail repairs and riprap placement in stilling basin. The East Embankment will require study on Pore Pressure Review and Drainage System / Interceptor Trench Design along with groundwater level monitoring.
- The ILCA DSR Update also recommended instrument and monitoring for the North Dam.

Other Projects:

- Erindale Ice Control Structure - Shoreline Repairs are necessary to ensure the efficiency of the Structure. It is anticipated that the City of Mississauga will complete these works in 2023.
- Monora Dam – CVC staff are currently undertaking a Feasibility Study to determine the long-term plan for the Monora Dam. Options include repairing, lowering or removing the dam.
- TCCA Structures – A Scoped Dam Safety Review is planned for Wolf Lake at Terra Cotta Conservation Area for 2021/22.
- Belfountain Dam – Safety Review for new structure.

Impact if Project is Delayed:

Completion of these studies and works are legislated and/or due diligence requirements. Delays can place the public at greater risk and expose CVC to liability under the Lakes and Rivers Improvement Act or other statutes. WECI funding from the Province will provide 50% cost of eligible projects. Matching funds are required, and works are done during the Provincial fiscal year (from Apr 1 to March 31 of the following year). Failure to meet the Mar 31st deadline can impact WECI funding.

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$221,923	$221,858	$228,957	$236,426	$244,187

Signed off by:

Jeff Wong
Senior Water Operations Engineer

John Sinnige
Director, Watershed Management

Project Name:	Warwick Office and Nursery Infrastructure	**CVC Account:**	301-327
Location:	Watershed Wide	**Peel Ref #:**	22-3104
Project Manager:	Moheb Ekladios	**Project Duration:**	2021-2022
Rationale:	Asset Management,	**Date Revised:**	June 2021

Description of Project:

Warwick Conservation Area includes both office space and the nursery operations centre. The facility provides office space for the staff undertaking the programs and services based out of Warwick. The nursery operations include the facilities necessary for the production of native tree, shrub, plant and seed stock. Capital asset management needs of this facility are captured in this account.

Project Justification:

This project focuses on supporting effective asset management and maintaining the current state of good repair. Funding will enable infrastructure changes that will support efficient operations, maintain a safe work environment and to ensure efficient delivery of programs and services. The nursery products (trees, shrubs, plants and seeds) support carbon sequestration, water retention, improved water quality, sustain native plant stock and promote biodiversity. This facility is critical for CVC and its partners to accelerate climate change adaptation and mitigation strategies.

Project Deliverables:

- Improve the site security fencing
- Construction of a secure material storage facilities
- Enhance site storm water management and drainage
- Complete site landscaping

Impact if Project is Delayed:

If funding to support asset management of the Warwick facility is not in place it will lead to inefficiencies within the maintenance and operations which translate to higher operating costs. **Request & Long-term Project Forecast:**

Approved 2021	2022	2023	2024	2025
$112,568	$112,561	$116,163	$119,952	$123,890

Signed off by:

Moheb Eladios
Senior Manager, IT, IM and Infrastructure

Jeff Payne
Deputy CAO & Director of Corporate Services

Project Name:	Enforcement Program- Peel	**CVC Account:**	401-462
Location:	Watershed Wide	**Peel Ref #:**	22-3104
Project Manager:	Terri LeRoux	**Project Duration:**	Ongoing
Rationale:	Health and Safety	**Date Revised:**	June 2021

Description of Project:
The purpose of the Enforcement Program is to regulate activities on lands owned by CVC, to ensure visitor safety and to protect public assets. With the support of the Peel Region Greenland Program CVC has been able to secure key land holdings to protect the natural environment (wetlands; forests; meadows), address flooding (hazard lands) and to connect existing land holdings. With the addition of new lands comes an expanded responsibility for CVC to protect assets and address infractions through education and enforcement.

CVC currently owns approximately 2,800 hectares (7,100 acres) of land. The total land holdings are comprised of 62 distinct properties located throughout the watershed. Five (5) of these properties are 'active' Conservation Areas where there are well developed facilities, programs and services for visitors. Another six (6) properties have developed trail systems and related infrastructure. These eleven (11) properties are referred to collectively as Credit Valley Parks and Conservation Lands. The remaining properties are largely maintained in a naturalized state with limited public access. There are a number of land management issues that require constant and consistent attention for these lands. One conservation officer is specifically employed (Senior Specialist, Enforcement, Conservation Parks) to coordinate enforcement activities on all properties.

The CVC Enforcement Program uses a model of 'escalating level of response'. In practical terms this means the starting point for all infractions is to educate conservation area visitors of the rules and ask them to adhere. Subsequent or continued infractions may ultimately lead to charges being laid as required.

Project Justification:
Acquisitions of lands include the cost associated with responsible land stewardship and these differ from the normal enforcement responsibilities of providing recreational day use activities. These issues include a range of activities that are prohibited through Regulation 102 (R.R.O. 1990, REGULATION 102**)** under Section 29 of the Conservation Authorities Act *(Conservation Authorities Act, R.S.O. 1990, c. C.27)* and involve compliance and/or enforcement duties. They can include:

- Unsanctioned activities (unauthorized motorized vehicles, dogs off leash)
- Illegal uses (hunting, camping)
- Illegal dumping of materials (garbage, contaminates, fill)
- Creation of unsanctioned access points and unsanctioned trails
- Encroachments on CVCA lands (grass cutting, structures, buildings, gardens)

Project Deliverables:
Enforcement Program deliverables include:

- Support Provincial Offences Officer (POO) (re)training needs and seek training opportunities with other CA's
- Establish guidelines for enhanced POO training
- Develop / refine an integrated work schedule for regular, scheduled patrols at all of our parks and conservation areas
- Continue implementation of a plan to review, acquire, install and manage video surveillance technology at our active conservation areas

- Support the hiring of CVC Security Officers to augment regular weekday / weekend daytime patrols by CVC staff

Impact if Project is Delayed:
CVC has invested a considerable amount of time, effort and resources to acquire key lands throughout the watershed. Failure to support the Enforcement program can result in:

- Environmental degradation due to illegal use (fire hazards; contamination; illegal dumping)
- Reduced visitor experiences (excessive noise; conflict of use; damage to property)
- Increased risk for personal injury
- Title integrity issues if known encroachments are left unaddressed
- Negative reputational impacts

Request & Long-term Project Forecast:

Approved 2021	2022	2023	2024	2025
$133,883	$150,527	$155,344	$160,411	$165,677

Signed off by:

Terri LeRoux
Sr. Manager, PARCS

Jeff Payne
Deputy CAO & Director, Corporate Services