



Getting Ready To Finance

Project Preparation Template Instructions

Contents

About This Resource	1
Basic Project Information	2
1. Project name	2
2. Project summary	2
3. Project description	2
4. Project objectives/aim	2
5. Beneficiaries	2
6. Indirect beneficiaries	3
7. Location	3
8. Project duration	3
Detailed Project Information	3
9. Project team members	3
10. Mandate	3
11. Governance	4
12. Partner organizations	4
13. Partnerships – Operations and maintenance	4
Risk Assessment	4
14. Natural hazards and extreme weather events	5
15. Essential services impacted by natural hazard	5
16. Problem statement	5
17. Total population at risk	8
18. Supporting data sources for risk prior to project	8
19. Project implementation risk	13
20. Natural hazard risk transfer	14

Licenses, Permits, Land Acquisition, and Environmental Assessment	15
21. Land ownership	15
22. Land acquisition	15
23. Licenses and permits	15
Asset Details	16
24. Asset name	16
25. Is the asset considered critical infrastructure?	16
26. Asset/asset system type	16
Social, Economic, and Environmental Benefits	17
27. Community resilience – Expected outcomes	17
28. Expected return on investment (ROI)	18
29. Economic benefits	23
30. Social benefits	25
31. Environmental benefits	27
Budget and Work Plan	29
32. Estimated total project costs	29
33. Anticipated sources of funding	29
34. Operations and maintenance costs	29
35. Possible sources of cash flow	29

About This Resource

Getting Ready to Finance: Project Preparation Template Instructions is one of several resources included in the Getting Ready to Finance Toolkit — a toolkit designed to help Canadian municipalities work with private investors and traditional public funders to realize resilient infrastructure projects in their communities. As the name suggests, this resource provides detailed instructions on how to use the Project Preparation Template which is also found in the Toolkit.

The goal of the Template Instructions is to ensure that municipalities have all the information they need to fill out Getting Ready to Finance: Project Preparation Template. The two resources are designed to complement one another and are structured identically (i.e., divided into seven sections, each of which includes several information fields with a total of 35 information fields). We recommend referring to the Template Instructions while filling out the Project Preparation Template.

The Project Preparation Template and other complementary resources can be found on the Getting Ready to Finance Toolkit webpage. Visit icleicanada.org/project/getting-ready-to-finance/ to access the Toolkit and download all the resources you will need to identify bankable resilient infrastructure projects in your community.

[Access the Getting Ready to Finance Toolkit](https://icleicanada.org/project/getting-ready-to-finance/)

Basic Project Information

1. Project name

Indicate the official or tentative name of the project.

2. Project summary

The project summary should include key aspects of the project and any other information about the project's intended outcomes. Why is this project important for the community? What problem(s) will it solve? What are the key benefits of the project?

3. Project description

Describe the project in one to two paragraphs. Include who will do what, where, when, how, for how much, and why a particular approach was chosen.

4. Project objectives/aim

Describe the objectives and or aims of the project. Describe the changes in infrastructure as well as environmental, social, and economical changes that are expected to occur by the end of the project.

5. Beneficiaries

Indicate the start and end date of the project. These can be exact dates, tentative dates, or a broader time scale (e.g., 2024-2026).

- Municipality
- Local and regional government
- Indigenous recipients*
- Public sector body
- Non-for-profit organization and charity
- Private for/non-profit organization

*Indigenous recipients include:

- Indigenous governing bodies including but not limited to:
 - A band council within the meaning of Section 2 of the Indian Act;
 - A First Nation, Inuit or Métis government or authority established pursuant to a Self Government Agreement or a Comprehensive Land Claim Agreement between Her Majesty the Queen in right of Canada and an Indigenous People of Canada, that has been approved, given effect and declared valid by federal legislation; and

- A First Nation, Inuit, or Métis government established by or under legislation, whether federal, provincial or territorial, that incorporates a governance structure.
- Not-for-profit organizations whose central mandate is to improve Indigenous outcomes; and
- c) Indigenous development corporations. Under the NIF, ineligible recipients include (list is not exhaustive):
 - Individuals and private citizens;
 - For-profit organizations not working in collaboration with another eligible public recipient; and
 - Federal entities, including Crown corporations.

6. Indirect beneficiaries

Describe who will be impacted by the project. Who will benefit from the infrastructure project when implemented? Do the impacted beneficiaries represent a “vulnerable group” in your community? How will they benefit from the project? Are there any indirect benefits arising from the project?

7. Location

Describe where the project will be located. This could include an address, a general area, a neighbourhood, or multiple locations. If the final location is not yet determined, please indicate any potential locations if available.

8. Project duration

Indicate the start and end date of the project. These can be exact dates, tentative dates, or a broader time scale (e.g., 2024-2026).

Detailed Project Information

9. Project team members

Provide the full name and title of up to five individuals who will be part of your project team. If your project is endorsed or supported by a municipal elected official, please include their information as well.

10. Mandate

Indicate if you have the mandate/role to lead the project? If yes, do you also have approval from your Council?

11. Governance

Describe your municipality's governance structure and how your municipality is best placed to effectively deliver the proposed project.

12. Partner organizations

Provide information on the legal name, address, contact information, and organization type of the partner organization(s).

13. Partnerships – Operations and maintenance

Expand on the nature of your relationship with the external partner(s). Is there already a relationship in place? Given your partnership, how do you envision the continued operations and maintenance of the project after it is built?

Risk Assessment

The Natural Hazard Risk Assessment portion of the Project Preparation Template is designed to help understand the impacts of natural hazard(s) on the community. This can be done so by measuring:

- The likelihood of the natural hazard risk (magnitude and frequency), and
- The socio-economic impacts on the community.

Socio-economic impacts are measured using four key indicators:

- loss of lives/missing people,
- % people directly affected,
- % local economic loss, and
- % population without essential services.

Data provided in must be supported with reliable quantitative and/or qualitative sources such as reports, studies, and/or Indigenous Traditional Knowledge.

14. Natural hazards and extreme weather events

Select which of the following natural hazard(s) and extreme weather event(s) will be addressed by the project. Focus on both current and potential future impacts of climate change in your community and infrastructure at high risk.

- Avalanche
- Landslides
- Drought
- Permafrost thaw
- Earthquake
- Sea Level Rise
- Coastal erosion
- Storm surges
- Extreme Temperature
- Tsunami
- Riverine/ fluvial flooding
- Urban/ pluvial flooding
- Coastal flooding
- Wildland Fire
- Hurricane
- Other (If other, please specify)

15. Essential services impacted by natural hazard

Select one or more of the following essential services that are impacted by the natural hazard(s):

- Transportation
- Power
- Waste Supply
- Wastewater
- Stormwater
- Public Safety
- Other (if other, please specify)

16. Problem statement

Describe the main natural hazard that will be addressed by the project, and how the natural hazard has or will impact the community. To do this, you may choose to describe the context, type of hazard including magnitude and intensity, the speed of onset as well as duration of the hazard, and/or how imminently a future event causing significant damages can be expected.

Context

Define the threat(s) of concern and their effects on the community. Start by describing the threat(s) at the root of the problem statement. This typically includes the natural hazards and extreme weather events identified in information field 14. As you discuss which of the hazards are related to the project, touch on how these affect/have affected your community and outline the resulting negative effects. Negative impacts could include:

- Extensive property damage
- Prolonged power outages
- Health impacts
- Injuries and deaths
- Financial costs
- Population displacement
- Greenhouse gas emissions
- Local air quality
- Demand for health services, emergency response, hospitalization, and negative health outcomes
- Increased demand for water, wastewater services, and electricity
- Delays to outdoor city operations and outdoor events/community spaces
- Stress on built infrastructure
- Water contamination and flooding
- Hazardous travel conditions
- Supply chain issues
- Travel and transit interruptions
- Employee absence resulting in extra costs
- Service delays
- Etc.

Also discuss who is most vulnerable to these aforementioned impacts. This could include:

- Unhoused populations
- Medically dependent individuals
- Elderly
- Children and youth
- Outdoor workers
- Indigenous people
- Low-income individuals
- Etc.

If applicable, it can be worth briefly mentioning that certain hazards can lead to or exacerbate other hazards. For example, extreme heat could in turn lead to increased frequency and severity of wildfires which have indirect negative impacts such as causing further displacement, infrastructure damage, health and safety risks, biodiversity loss, etc.

Type

Define the nature of threat and whether this type of event is:

- Climatological (e.g., extreme temperatures, droughts, and wildfires)
- Geophysical (e.g., earthquakes, landslides, tsunamis)
- Hydrological (e.g., avalanches and floods)
- Meteorological (e.g., hurricanes and storms/wave surges)

Speed of onset

Describe how fast the event may occur. This could be:

- Minutes

- Hours
- Days
- Years

For example, the onset of

- Extreme heat can occur within hours...
- Flooding and extreme rain events could occur rapidly within hours...
- Extreme weather events such as wind and ice storms can occur in hours...
- Wildfires can occur within hours to days...
- Average annual temperature increases can occur over many years, unnoticed to many...

Duration

In addition to describing the speed of onset, describe how long the event or its consequences can last. For example:

- Extreme heat can occur within hours... and its consequences can last from days to months.
- Flooding and extreme rain events could occur rapidly within hours... and the consequences could take weeks to months to fully recover from.
- Extreme weather events such as wind and ice storms can occur in hours... with their consequences lasting anywhere from days to months, depending on their severity.
- Wildfires can occur within hours to days... and last anywhere from days to months, impacting and displacing thousands.
- Average annual temperature increases... can occur over many years, unnoticed to many... and can last anywhere from decades to centuries.

Problem statement example

Flooding and extreme rain events can cause delays and service disruption that will affect the city's outdoor operations and outdoor events/community spaces, increase demand on emergency services, increase stress and demand on aging infrastructure, and in turn lead to water contamination and flooding resulting in additional costs and displacement. As temperatures warm, rain may also increase in frequency in place of snow, causing increased power failures, damages to buildings, and increased stress and resources on municipal operations and services affecting water, wastewater, buildings, and human resources. There will also likely be an increase in drinking water advisories, the need for resources to reduce sodium in drinking water systems, and hazardous travel conditions leading to supply chain issues, travel interruptions, and employee absence that will result in additional costs and/or service delays. Many within the community will be affected including but not limited to: Low-income residents, persons with a disability, medically dependent persons, children and youth, Indigenous

populations, transient populations, new immigrants, and unhoused populations. This type of event could happen quickly, within hours, and the consequences could take weeks to months to fully recover from.

17. Total population at risk

Specify the population at risk in the area exposed to the main natural hazard. What part of the demographic is at risk? This can be the population of the entire city/town, a neighbourhood, a certain demographic of people within the city (e.g., households near a floodplain), etc. Once the type of population affected is identified, statistical information (e.g., population size) can typically be found on municipal, provincial or federal databases such as [Statistics Canada](#), or through a quick online search.

18. Supporting data sources for risk prior to project

Provide supporting data sources to indicate risk prior to the implementation of the project. Include up to two data sources to support the values entered. In addition, justify why the chosen data source(s) are relevant for each indicator. Reliable sources to support the data are essential and all data sources should be available through hyperlinks or as attachments including any internal, unpublished sources.

It is preferred for data to originate from internal, verified sources such as financial reports, cost analyses, or impact statements and reports. If data is not available internally, data may be obtained from a wide variety of sources including:

- Internal documents and reports
- Database
- Report
- Online Article/News Article
- Research Article
- Indigenous Knowledge
- Other

The following information must be provided for each data source:

- The value type. This could include:
 - Historic
 - Projected
 - Or both
- The sample size represented by the data source. This could include:
 - Provincial/Territorial
 - Regional
 - Municipal
 - Indigenous Community

- The type of data source in which the value was extracted. This could include:
 - Database
 - Report
 - Online Article
 - Research Article
 - Indigenous Knowledge
 - Other (if other, specify and describe the data source)
- The publication date of the data source.
- The relevant page number(s) within the data source that describes the value of the indicator.
- If applicable, provide the website address of the data source.
- Whether the data source is publicly available. If not, describe the data source and explain the data that supports the assumption made for the indicator. For example:
 - Traditional Indigenous Knowledge including Traditional Ecological Knowledge
 - Unpublished assessments/reports internal to the organization

Examples for four socio-economic indicators

Loss of lives/missing people

If the associated climate event (e.g., flooding, wildfires, etc.) has happened in the past and was severe enough to cause fatalities, injuries or missing people, please indicate this as it will help stress the importance of mitigation and adaptation strategies. If there is no internal data available, municipal impact statements, news articles, or government databases may provide such information through a quick online search. Be sure to indicate where you retrieved this information, especially if it is not from internal sources.

% people directly affected

The percentage of people directly affected can include:

- Number of people displaced by an event (e.g. flood, wildfire evacuation, etc)
- Number of people without essential services (e.g. water, power, heating and cooling, shelter, etc)
- Number of people whose property was damaged
- Number of people who use the public service (e.g. recreation center, disaster hub, cooling center, park etc)
- Number of people whose health was affected (e.g. wildfire smoke causing respiratory issues in individuals)

You may also include who was most affected such as vulnerable populations, individuals with medical concerns, etc.

This type of data may be found within internal reporting documents. If internal data is not available, public impact statements from your municipality, local news articles, or regional and federal government databases (such as the Canadian Disaster Database) may provide this information through a quick online search. Be sure to indicate where you retrieved this information, especially if it is not from internal sources.

To calculate an approximate percentage, you can sum the number of people you indicated above who have been affected by the event and divide it by the total population of your city to produce an estimate.

% local economic loss

The percentage of local economic loss can include:

- Health care system costs
- Infrastructure damages
- Insurance costs
- Costs due to disrupted essential services (e.g., power outages, lack of public transportation, etc)
- Remediation and restoration costs (e.g. contaminated water remediation)
- Damage to natural assets and ecosystems (e.g. damage to tree canopy after a windstorm resulting in loss of ecosystem services)
- Lost work hours
- Lowered work productivity
- Rising insurance premiums from flooded buildings
- Delays in operation
- Increased operation and maintenance costs
- Emergency services costs and increased demand
- Decreased agricultural production
- Loss of revenue in businesses who work with directly impacted businesses

ICLEI Canada's [Cost of Doing Nothing Toolbox](#) can be used as a resource to estimate the costs of climate impacts and events. Rough estimates are provided in Table 1 while Table 2 provides various sources for national and subnational climate change impacts and costs, both taken from the [Cost of Doing Nothing Toolbox](#). Other resources are also available in the [Cost of Doing Nothing Toolbox](#) such as case studies and data sources that provide more in depth references that may be used to extrapolate data for your city and project.

Table 1: The costliest weather events in Canada between 2016 and 2021 as summarized in ICLEI Canada's [Cost of Doing Nothing Primer](#).

Date	Location	Cost estimate	Weather event description
2021	South coast, BC	\$450 million	Multiple atmospheric rivers converged producing record precipitation that led to severe flooding across the region. Early estimates of insured losses are \$450 million (IBC, 2021); however, broader estimates suggest billions in damages.v
2020	Calgary, AB	\$1.2 billion	Severe hailstorm causing nearly \$1.2 billion in damages (IBC, 2020).
2020	Fort MacMurray, AB	\$500 million	Extreme precipitation resulting in \$500 million in flood damages.
2018	Eastern ON and Southern QC	\$300 million	Severe thunderstorm which spawned multiple tornados that caused \$300 million in damages.
2018	Southern ON and QC	\$1 billion	Severe thunderstorms produced hurricane-force gusts that caused over \$1 billion in damages (ECCC, 2019).
2017	Southern BC	\$650 million	Widespread and long-lasting wildfires caused an estimated \$650 million in damages.
2016	Fort MacMurray, AB	\$11 billion	Wildfires caused over \$4 billion in insured losses and had a broader economic cost of nearly \$11 billion (Alam & Islam, 2017).

Table 2: Sample of sources of national and subnational climate change impacts and costs from the [Cost of Doing Nothing Primer](#). Appendix A. The entire table to retrieve online: <https://icleicanada.org/project/CODN/>.

Produced By	Resource/Tool	Topic	Description
Asset Management B.C.	Integrating Natural Assets into Asset Management	Natural asset management	Integrating Natural Assets into Asset Management is one of a series of primers developed to expand upon concepts in Asset Management for Sustainable Service Delivery: A BC Framework.
Canadian Centre for Climate Services (CCCS)	Canadian Centre for Climate Services Climate Hub	Climate change resources	This resource contains a host of tools and information on climate change, climate data and projections, guidance documents, and a climate services support desk.
Canadian Climate Institute (formerly Canadian Institute for Climate Choices)	Due North: Facing the Costs of Climate Change for Northern Infrastructure	Climate change impacts and costing in Canada's North	This resource identifies the impacts of climate change and the associated infrastructure costs in Canada's North.
Canadian Climate Institute (formerly Canadian Institute for Climate Choices)	The Health Costs of Climate Change: How Canada can Adapt, Prepare, and Save Lives	Health related climate change risks and costs	This resource identifies the major climate change impacts that will impact Canadians, how existing inequity will be magnified, and the cost on Canada's healthcare system.
Canadian Climate Institute (formerly Canadian Institute for Climate Choices)	Tip of the Iceberg: Navigating the Known and Unknown Costs of Climate Change for Canada	Climate change costing and adaptation solutions	This resource addresses the major impacts of climate change and extreme weather events in Canada and the associated costs of those impacts.
Canadian Climate Institute (formerly Canadian Institute for Climate Choices)	Underwater: The Costs of Climate Change for Canada's Infrastructure	Climate change costing	This resource focuses on three types of climate change impacts on Canada's infrastructure: flooding of homes and buildings, damage to roads and rails, and impacts on Canada's electricity grids.
Canadian Climate Institute (formerly Canadian Institute for Climate Choices)	Damage Control: Reducing the costs of climate impacts in Canada	Climate change costing and proactive adaptation	This final report brings together research from the Costs of Climate Change series to provide a comprehensive assessment of how climate change is impacting Canada's economy and livelihood of Canadians. The report also builds the business case for proactive adaptation and recommendations for government action.

% population without essential services

Essential services that can be used can include:

- Power/electricity
- Transportation services
- Water
- Food
- Waste services
- Heating
- Cooling
- Shelter
- Disaster resources
- Access to resources
- Health care
- Medicine and prescriptions

To calculate an approximate percentage, you can sum the number of people without essential services due to the event and divide it by the total population of your city to produce an estimate.

19. Project implementation risk

Use this section to provide a deeper understanding of the major risks and difficulties that will be or could be encountered when carrying out this project, as well as your strategies for handling and reducing their impact. The following examples outlines common risks and challenges associated with project implementation. Please include any that are relevant to your specific project, and feel free to attach supporting documents related to the anticipated risks and challenges. Financial risks and risks to cash flow should particularly be discussed from a private investor's point of view.

Examples of implementation risks

Environmental risk

- Risk: Construction activities might temporarily disrupt local flora and fauna.
 - Strategy: Implement environmental management plans and work closely with environmental consultants to minimize the impact.

Social risk

- Risk: Residents might experience inconvenience due to construction noise, dust, and temporary traffic rerouting.
 - Strategy: Engage with the community early and maintain open lines of communication. Provide clear signage and information about construction schedules and alternative routes.

Financial risk

- Risk: Unforeseen challenges during construction may lead to costs exceeding the budget.
 - Strategy: Have a well-defined budget with contingencies. Monitor and control expenses diligently, and secure additional funding sources as backups.

- Risk: Risks related to timing, project prosecution, ROI, and procurement.
 - Strategy: Transfer some risk to a private party who can bear it through bundling projects together to bring costs down.
 - Strategy: Increase the scale of the project to make it more appealing. Explore leasing or buying in bulk potentially with other municipalities to pool resources together, create a bundled contract and increase collective purchasing power. Add in extra value, engage them over the long term.

Regulatory risk

- Risk: Delays in receiving necessary permits and approvals can hinder the project timeline.
 - Strategy: Engage with regulatory bodies early in the planning process, ensure compliance with all requirements, and maintain transparent communication.

Timing risk

- Risk: Adverse weather conditions could slow down or halt construction activities, extending the project timeline.
 - Strategy: Develop a flexible project schedule that accounts for potential weather-related delays with provisions for accelerating activities during favorable conditions.

Other risk

- Stakeholder Engagement Risk: Lack of community buy-in and support may affect the project's smooth implementation.
 - Strategy: Conduct community engagement sessions, address concerns proactively, and highlight the long-term benefits of the project for residents and the broader community.

20. Natural hazard risk transfer

Describe the measure(s) (i.e., strategies and/or procedures) to be taken during the implementation phase of the project to avoid transferring the risk associated with the natural hazard to a nearby area and/or to another community. A strong project proposal considers infrastructure solutions that comprehensively and effectively address the upstream and downstream impacts of the natural hazard risk.

Licenses, Permits, Land Acquisition, and Environmental Assessment

21. Land ownership

Indicate land ownership related to the project from the list below:

- Federal
- Provincial/Territorial
- Municipal
- Private
- Other (if other, provide the legal name of the land owner)

If the project is located on Federal Lands, specify the land administrator. Choose the federal owner/administrator from the follow options:

- Indian Reserve Lands – CIRNAC
- Indian Reserve Lands – First Nation
- National Park or Protected Area – Parks Canada
- Federal Agricultural lands – Prairie Farm Rehabilitation Administration
- Federal Airport lands – Airport Authority
- Federal Port lands – Port Authority
- Other (if other, specify the name of the organization such as the National Capital Commission or the Department of National Defence)

22. Land acquisition

Is land acquisition required for this project? If YES, please specify a date for when the land is expected to be secured. If YES, also consider and answer the following:

- Is land acquisition the sole component of the project?
- Is private land acquisition required?
- What is the amount related to the land acquisition that could be secured through funding?

23. Licenses and permits

Identify and obtain the necessary licenses or permits and ensure that the project complies with relevant municipal, provincial, and federal regulations. The process of obtaining all required licenses may take some time, so it's recommended to identify these needs and begin the process of obtaining them as early as possible. For example, a Watercourse and Wetland Alteration Permit must be applied for at least two months prior to the anticipated start date to ensure sufficient review time.

Asset Details

24. Asset name

Specify the asset(s) and/or asset system(s) for your project. An asset system example could be a wastewater system that could include a treatment plant as well as the required pipes. Please note that natural infrastructure assets must be identified separately.

25. Is the asset considered critical infrastructure?

Critical infrastructure refers to processes, systems, facilities, technologies, networks, assets, and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of government.

26. Asset/asset system type

Choose an asset type from the following list:

- Structural
- Natural
- Both

Examples of projects for different types of assets

Structural

- The enhancement of a bridge to increase its structural capacity to withstand earthquakes
- A sea wall to protect against coastal erosion
- A retention basin to prevent flooding

Natural

- A natural wildfire barrier
- Setback levees

Both

- The enhancement of built and natural stormwater infrastructure systems

Social, Economic, and Environmental Benefits

27. Community resilience – Expected outcomes

Strong project proposals demonstrate an important improvement to the infrastructure asset's resilience and decrease in socio-economic impacts on the population(s) exposed to a natural hazard risk. To describe the expected community resilience outcomes of the project, it can be helpful to refer to the objectives (information field 4) and problem statement (information field 16). What will the project accomplish by meeting its objective(s)? What impact will this have on the community? Will the issues outlined in the problem statement be solved, either fully or partially?

Examples of outcomes

This project would...

- ...reduce critical infrastructure impacts such as essential services interruptions or building damages.
- ...reduce the amount of critical infrastructure at risk.
- ...reduce impacts on health and safety of Canadians.
- ...reduce significant economic activity disruptions.
- ...reduce the cost of recovery/replacement.
- ...reduce the impact on Canada's vulnerable regions.
- ...result in less service interruptions due to power outages during extreme weather.
- ...decrease greenhouse gas (GHG) emissions from energy production.
- ...increase energy efficiency.
- ...increase reliability of power production and distribution even as impacts of climate change worsen over time.
- ...decrease health and safety impacts from power outages.
- ...decrease costs associated with power outages, power system failure, and infrastructure damage.
- ...prevent extreme weather event-related costs and damage.
- ...mitigate flooding and erosion risks.
- ...promote the protection and enhancement of local biodiversity.
- ...improve the physical, mental, and social health of the public.
- ...provide green space for outdoor recreation throughout the year.
- ...ensure community access to critical resources during times of crisis.
- ...mitigate adverse safety and health effects caused by increasing hot days, heat waves, extreme cold, and other extreme weather events.
- ...provide dynamic green and blue spaces in the community.

- ...increase community engagement and interest in resilience.
- ...prevent infrastructure damage and repair costs.
- ...provide sufficient heating and cooling for public and income-qualified homes.
- ...increase the efficiency of heating and cooling systems to save energy and electricity.
- ...reduce operating costs of heating and cooling systems.
- ...reduce GHG emissions from heating and cooling services while also increasing production to meet rising demand.

28. Expected return on investment (ROI)

ROI is a value that provides economic justification for investments. It is a measurement of the benefits that can be expected from a project relative to the costs of its implementation. To calculate the ROI of the project, use the calculation below. These calculation instructions are based on the [Disaster Mitigation and Adaptation Fund \(DMAF\) Applicant Guide](#). Please make sure to consult the funding application you are interested in to ensure this step is necessary and/or meets the funder’s requirements.

ROI Formula

$$ROI = \frac{\textit{Cost of damages during the asset life cycle}}{\textit{Total Eligible Project Cost}}$$

The ROI is a ratio that measures the estimated disaster losses avoided within the asset life cycle. For example, an ROI of 2:1 means that for every dollar spent under DMAF, at least two dollars are anticipated to be saved in future natural disaster losses.

How to calculate ROI

To calculate ROI, you will need certain values. The table below summarizes the inputs needed for the ROI calculation. An example is provided further below to demonstrate how the ROI is calculated for projects under the DMAF.

Table 3: Summary of values needed to calculate ROI.

Input	Formula	Data Source
Total estimated cost of damages	The sum total of the Canadian dollar (CAD) value of social, economic, environmental, and heritage and cultural damages	Calculation required. See Methodology and Table 4 for details.
Likelihood of the main natural hazard	Quantified value in years	Based on the likelihood of the main natural hazard identified.
Remaining life span of the funded asset(s)	Quantified value in years	<p>Calculation required.</p> <p>Provide the number of years of the remaining lifespan of the infrastructure asset, which includes any life extension projected from your project.</p> <p>For example, if the current lifespan of the asset is 30 years, and your project is expected to increase its lifespan for an additional 20 years, the “remaining lifespan of the funded asset” is 50 years.</p> <p>If your project involves multiple assets, calculate the average lifespan of all project assets. Use the average as the input value.</p> <p>For example, if the project involves assets A, B, and C. If:</p> <ul style="list-style-type: none"> • Lifespan of Asset A= 25 years • Lifespan of Asset B= 100 years • Lifespan of Asset C= 25 years <p>The average lifespan of the assets: = (Sum of Lifespan of Asset A, B, C) ÷ 3 = (25+100+25) ÷ 3 = 50 Years</p>
Total Eligible Project Cost	Quantified value in CAD dollars (\$)	Based on the amount indicated in the project financials section of the funding application.

Methodology

How is the “Cost of damages during the asset life cycle” calculated?

Cost of damages during the asset life cycle =

Estimated damages on a yearly basis x Remaining life span of the funded asset(s)



Estimated damages on a yearly basis =
$$\frac{\textit{Total estimated cost of damages}}{\textit{Likelihood of the main natural hazard}}$$

How is the “Total estimated cost of damages” calculated?

You will need to consider the estimated social, economic, environmental, and heritage/culture damages or losses that the project could prevent and the kinds and extent of damages that apply to your project in dollars, as of the year of the funding application. See Table 4 for examples. Damages and losses caused by natural disasters can include direct, indirect, tangible, and intangible costs. For each category, please describe how your estimates were determined.

Once you have determined the social, economic, environmental, and heritage and cultural damages, this is the “Total estimated cost of damages”. This value is used in the ROI formula.

Reliable sources to support the data included in this calculation are essential. Data sources and a strong explanation must be provided to support the value. All data sources should be hyperlinked or included as attachments including any internal, unpublished sources.

You can use quantitative data from similar geographic areas/communities to demonstrate the impact of the hazard as long as you justify how that would translate to your community.

Table 4: Examples of Economic, Social, Environmental, Heritage/Cultural damages by natural hazard(s).

<p>Economic</p>	<ul style="list-style-type: none"> • Public infrastructure and utilities damages <ul style="list-style-type: none"> • Bridges • Roads • Highways • Ports, airports, water and • Wastewater systems • Essential service interruption <ul style="list-style-type: none"> • Power • Transportation • Water Supply • Communications • Commercial and institutional building and structure damages • Housing damages • Business losses • Local GDP losses • Agriculture damages and losses <ul style="list-style-type: none"> • Livestock • Crops • Pastures/land • Emergency response cost
<p>Social</p>	<ul style="list-style-type: none"> • Deaths and injury cost • Displacement cost • Employment, retention, and hiring losses • Health cost <ul style="list-style-type: none"> • Chronic diseases • Mental health • Drugs and alcohol • Community well-being losses • Productive capacity losses • Homelessness cost • Violence and crime cost • Water, soil, and air pollution cost
<p>Environmental Note: Natural disasters could produce mixed outcomes for the environment: benefits to some parts of the natural system and losses to others; both should be considered in estimating the net impact.</p>	<ul style="list-style-type: none"> • Bio-diversity losses • Natural ecosystems and related impact to wildlife <ul style="list-style-type: none"> • Damages to plants, forests, wetlands, ground water, soils
<p>Heritage and Cultural Note: These can be difficult to calculate. Applicants may wish to consult national, provincial and/or municipal inventories to obtain estimates of the dollar value assigned to these types of assets.</p>	<ul style="list-style-type: none"> • Archeological and historical site losses • Cultural and historical asset losses

Example calculation of ROI

The natural hazard is expected once in every 10 years with a total estimated cost of damages of \$100 million. The asset has a remaining asset lifespan (which includes the potential extension of the lifespan due to the DMAF investment) of 40 years. The total eligible project cost is \$50 million. Information provided by the prompt:

- Likelihood of the main natural hazard: 1 in 10 Years
- Total Estimated Cost of Damages: \$100 million
- Total Eligible Cost: \$50 million
- Remaining lifespan of funded assets: 40 years

1. Calculate the “Estimated damages on a yearly basis”

$$\begin{aligned} \text{Estimated damages on a yearly basis} &= \frac{\text{Total estimated cost of damages}}{\text{Likelihood of the main natural hazard}} \\ &= \frac{\$100,000,000}{10 \text{ years}} \\ &= \$10,000,000 \text{ per year} \end{aligned}$$

2. Calculate the “Cost of damages during the asset lifecycle”

$$\begin{aligned} \text{Cost of damages during the asset life cycle} &= \\ &\text{Estimated damages on a yearly basis} \times \text{Remaining life span of the funded asset(s)} \\ &= \$10,000,000 \text{ per year} \times 40 \text{ years} \\ &= \$400,000,000 \end{aligned}$$

3. Calculate the ROI

$$\begin{aligned} ROI &= \frac{\text{Cost of damages during the asset life cycle}}{\text{Total Eligible Project Cost}} \\ &= \frac{\$400,000,000}{\$50,000,000} \\ &= 8 \end{aligned}$$

4. Answer

$$ROI = 8$$

For every one dollar invested, there is an expected savings of eight dollars in damages and long term replacement costs.

29. Economic benefits

Describe what economic benefits your project would have and provide the following information:

- How any economic benefits might be generated (e.g., capital and operating cost reductions, extension of asset life, lower total cost of ownership, revenue generation)
- Which economic indicators you would measure (e.g., financial savings, percentage cost savings, payback, internal rates of return, revenue)
- How the solutions in this project would generate value and would be financially efficient and effective
- An estimated number of direct jobs created by the project
- If the project would generate employment for underrepresented groups

Example of economic co-benefits by project type

All projects

- Planning, design, construction, and maintenance would require skilled and unskilled labor, leading to job opportunities.

Energy system resilience projects

- Construction of microgrid projects would offer opportunities for skill development and training in the renewable energy sector. Overtime, projects like this would equip the municipality's workforce with skills relevant to the global shift towards sustainable energy.
- District energy systems can use local fuel sources (e.g., waste heat, geothermal), which would keep energy dollars within the municipality and strengthen the community's resilience.
- Energy centres have access to economies of scale for natural gas and electricity purchasing, as well as cost avoidance measures such as peak shaving for Ontario's Class A rate structure. These energy cost savings would be transferred to the connected customers.

Flood resilience projects

- Mitigating flooding damage through rainwater retention could mitigate excess water flow into residents' basements, overflowing stormwater systems, and other public infrastructure that would then require significant repairs. It is estimated that the cost of repairing a flooded basement is **~\$40,000**.
- By preventing flooding conditions, services such as public transit and energy production would not be disrupted. Disruption to these services during a weather event typically costs the municipality a great deal of revenue loss. In large municipalities, disrupted transit alone could result in over **\$1 million** whereas power outages can cost **billions** of dollars.
- With less severe flooding events and water runoff, the need to repair and maintain stormwater systems would decrease, reducing operating and restoration costs.
- Flood mitigation measures would be expected to reduce costs of flood damage to property owners and could result in reduced insurance premiums.
- Flood mitigation measures would be expected to reduce the number of temporary business closures and disruption after rain events.

Resilient building retrofit projects

- Metal roofing would prevent the destruction of housing and mitigate the spreading of wildfires. This would lead to fewer repair expenses and insurance claims in the long-term compared to typical roofing structures.
- Homes that are retrofitted and built back with metal roofing would increase the value of the homes and the safety of the surrounding neighbourhood, raising selling prices of the homes as they are sold in the future and potentially increasing municipal income from property taxes.

Resilient development projects

- Not only would the development of a disaster hub support the municipality's activity and business, it would also support surrounding local businesses and community members in the surrounding neighbourhoods.
- Developing a disaster hub could lead to more public services available and more rental capacity for ice rinks and facilities.
- Development using the latest technology and energy efficient systems would reduce energy fees in the long-term, saving a significant amount of operating expenses.

30. Social benefits

In this section, describe benefits that go beyond current standards for similar infrastructure projects, such as improving the community's ability to adapt to climate change, increasing public safety, or creating job opportunities.

Example of social co-benefits by project type

Energy system resilience projects

- A microgrid would ensure consistent energy supply, particularly to essential services like emergency centers. This would in turn enhance the municipality's resilience and ensure the safety and well-being of its residents during emergencies.
- The incorporation of a hydro turbine would signal a commitment to green and sustainable energy solutions, setting a precedent for future infrastructure projects.
- The incorporation of a hydro turbine would provide an opportunity for schools and institutions to educate students about renewable energy, environmental stewardship, and the importance of infrastructure in society.

Extreme event resilience projects

- By directly addressing and mitigating extreme weather, heat, and wildfire risks, this project would safeguard the surrounding residential areas and public. By ensuring that the community has access to critical resources during times of crisis, the project would minimize potential public health crises linked to extreme heat, wildfires, and extreme weather.
- Facing and preparing for a common threat often brings communities together. These efforts could foster stronger bonds among residents.

Flood resilience projects

- Flood events from major rainfall, which often occur suddenly, are a significant hazard to public safety. By improving stormwater management, this project would increase the ability of the stormwater system to handle large rain amounts and decrease the risks of flash floods. Beyond the immediate threat of flooding, stagnant water can become breeding grounds for disease vectors and flood damaged properties can be impacted by black mold. By efficiently managing stormwater, this project would also reduce the risk of waterborne diseases and unsafe housing. In addition, the added vegetation would improve air quality and offer a reprieve from pollutants and allergens.
- Regular flooding events can lead to stress and anxiety among the affected residents, especially if they result in loss or damage of property. By addressing the root cause and offering a lasting solution, this project would contribute significantly to the mental well-being of the residents, ensuring peace of mind during heavy rainfall events.
- This project would increase resident's flood risk awareness, particularly about their residence's

vulnerabilities, as well as what they can do to increase their resilience to flood events.

- This project would increase resident's knowledge of financial programs available at various government levels for climate change adaptation, notably regarding flood risk management.
- Increased preparedness to flood risk would mitigate flood risks at the household level and increase the community's ability to recover from flooding events.
- Increased flood risk resilience at the residential building level would reduce impacts on household and community healthcare due to lesser stress, potable water contamination, overtime work, etc.
- Directly addressing and mitigating flood risks, the project would safeguard not just the marina but also potentially the surrounding residential areas and public spaces. By reducing erosion and overflows of water during flooding, the project would minimize potential public health crises linked to waterborne diseases, contaminants, and infrastructure deterioration.

Green infrastructure projects

- Naturalized areas, filled with native vegetation, not only serve functional purposes but also enhance the beauty and recreational value of neighborhoods. The green spaces created through this could become hubs for community activities, promote mental well-being, and increase property values.

Large infrastructure projects

- Infrastructure projects of this magnitude create employment opportunities. From engineers to construction workers and environmental consultants, the project would provide a significant boost to the local job market, benefiting the economy of the municipality and surrounding areas.
- The project's construction and maintenance phases would create numerous job opportunities for residents, from technical roles in engineering and environmental science to manual labor and project management.

Resilient development projects

- Redevelopment of the marina and surrounding green spaces would provide park space and enhanced public access along waterfront where none currently exists, enhancing resident's experience and natural assets in the neighbourhood.
- As a demonstration of sustainable urban planning, the project can serve as an educational tool for schools and institutions.

Water and wastewater system resilience projects

-
- A strengthened dam would ensure that towns downstream, including their residents and properties, are shielded from potential catastrophic dam failures. Considering the intensifying impacts of climate change, such as more frequent and severe storm events, fortifying the dam would not just be an upgrade but a necessary adaptation for safeguarding lives and assets.

- While not immediately apparent as a 'social' benefit, ensuring that essential services like water access are uninterrupted has long-term socio-economic advantages. Stable infrastructure encourages businesses to operate in the region, supports property values, and reinforces the City's reputation as a resilient, forward-thinking community

Wildfire resilience projects

- Beyond the immediate benefit of reducing fire hazards, this project would foster a sense of security among residents. Knowing that their homes, key municipal buildings, and community resource centers are fortified against wildfires, residents could live with a decreased sense of anxiety regarding potential fire outbreaks.
- By introducing community incentives for FireSmart on private property, the project would provide financial aid and indirectly educate the community about fire safety.
- By introducing the community to Fire Smart Canada and its resources, the project would provide resilient retrofits to residences and educate the community about climate change, wildfires, and extreme weather events.

31. Environmental benefits

Indicate if your project offers environmental co-benefits.

Example of environmental co-benefits by project type

Education and awareness projects

- Climate change education and resources could lead to greater local awareness of global warming, its effects, and its causes. This could lead to greater local climate action which could have significant benefits on the surrounding environment.

Energy system resilience projects

- The integration of energy storage solutions in the microgrid would provide the capability to store excess energy during low-demand periods and release it during peak demands or emergencies. This would serve as a buffer against potential brownouts or blackouts.

Flood resilience projects

- Beyond the immediate threat of flooding, the project would address riverbank erosion. Stabilizing the riverbank would protect infrastructure and also preserve the natural habitats of several species, maintaining the ecological balance of the area.
- An operational wastewater treatment plant plays a pivotal role in ensuring that effluents released into the environment are treated and harmless. By safeguarding the plant from floods, the project would ensure that untreated wastewater does not overflow and contaminate the surrounding environment, preserving the river's ecosystem and the quality of water sources downstream.

- In addition to decreasing flood risks, proper stormwater management also helps reduce the runoff of pollutants into local water bodies. By filtering and controlling stormwater, the project would help maintain the quality of local water bodies.
- Flooding can disrupt local ecosystems, especially aquatic habitats. By regulating water flow, the project would ensure the stability and health of local aquatic environments, preserving biodiversity.
- Improving the storm sewer system to reduce flooding also offers an opportunity to make street upgrades to support urban living and improve the public realm. These would include upgrading sidewalks, adding bike lanes where possible, improving lighting, and planting street trees. These public realm upgrades would make neighbourhoods safer, more accessible, and promote active transportation which in turn would reduce GHG emissions.

Green infrastructure projects

- Enhancing the green spaces as part of this project could involve planting native trees and shrubs. These act as natural barriers and play a role in carbon sequestration, contributing to GHG reduction.
- Incorporating urban greening as part of this project would absorb CO₂, provide shade, and enhance the urban ecosystem.
- By filtering stormwater through bioswales and other green infrastructure, pollutants and contaminants would be removed before they infiltrate groundwater or enter waterways. This could reduce risks related to waterborne diseases and contamination events.
- Green infrastructure, especially tree canopy coverage, can reduce urban heat islands. Trees provide shade and release water vapor, cooling the surroundings and providing relief during extreme heat events.
- Green infrastructure provides habitats for various fauna and flora, promoting biodiversity by supporting birds, pollinators, and other urban wildlife.
- By using green infrastructure to promote natural infiltration and groundwater recharge, this project would ensure sustained water supply for both natural ecosystems and human use.
- Trees and vegetation act as carbon sinks, capturing and storing carbon dioxide from the atmosphere. This could contribute to the municipality's efforts in reducing its overall GHG emissions.
- More green infrastructure could decrease the need for air conditioning during hot periods, leading to reduced energy consumption and associated GHG emissions.
- Tree planting along streets would increase shade, carbon storage and sequestration, and water filtration.

Resilient community planning project

- Elevating the access roads would ensure unobstructed access during floods and also mitigates the risk of landslide or subsidence, particularly in periods of heavy rain or rapid snowmelt.
- By design, emergency exit routes would double as active transportation pathways, encouraging residents to opt for walking, cycling, or other non-motorized modes of transport. This would reduce the community's reliance on vehicles, leading to a decrease in related GHG emissions.

Budget and Work Plan

32. Estimated total project costs

Create a rough project budget to estimate the total project costs.

33. Anticipated sources of funding

Has this project been submitted to another federal funding program? If so, indicate which sources of funding are anticipated.

34. Operations and maintenance costs

Include details on the operation and maintenance the project will require and ongoing/or year-to-year operations and maintenance funding. How will the completed project be maintained? How will the maintenance be funded?

35. Possible sources of cash flow

Possible sources of cash flows for the resilient infrastructure can be direct, indirect, or independent.

Directly from resiliency infrastructure

These cash flows may flow either directly to investors (e.g., earmarked user fees, generation of carbon credits), or flow through beneficiaries (e.g., tax increases, insurance premium reductions).

Indirectly from the infrastructure but dependent on it

The existence of the infrastructure may enable a municipality to enact a mechanism that gives rise to cash flows (e.g., tax increment financing, local improvement charges, development cost charges).

Independent of the infrastructure

A municipality may repay investors through sources of cash flow that are completely independent of the resiliency infrastructure (e.g., taxation, general operating revenues). Doing so likely requires an enabling political environment (e.g., high climate risk awareness and sense of urgency to act among citizenry).