Using FEMA's Benefit-Cost Analysis (BCA) Toolkit to Demonstrate Cost-Effectiveness of Hazard Mitigation Projects

Washington, DC | November 2019

Welcome & Speakers

- Session Objectives
  - Review CDBG-MIT requirements for demonstration of project benefits (including alternate demonstration of benefits)
  - How to download, launch, and input data into FEMA's BCA Toolkit to demonstrate cost-effectiveness of planned mitigation projects
  - How to navigate the BCA Toolkit and access its Help Content and other FEMA BCA resources
  - How to generate project reports and export project files for inclusion in grant applications

- Speakers
  - Rebecca Carroll, FEMA Benefit-Cost Analysis (BCA) Program Lead
  - Jen Carpenter, Assistant Director of Policy, HUD DRSI

CDBG-MIT Notice: BCA Requirements

When do CDBG-MIT grantees need a BCA?

- A Benefit Cost Analysis (BCAs) is required to illustrate that a Covered Project will demonstrably benefit the Most Impacted and Distressed (MID) area

What is a Covered Project?

Covered Projects Definition

- An infrastructure project that is an activity or group of related activities that develop the physical assets that are designed to provide or support services to the general public in the following sectors: surface transportation, including roadways, bridges, railroads, and transit; aviation; ports, including navigational channels; water resources projects; energy production and generation, including from fossil, renewable, nuclear, and hydro sources; electricity transmission; broadband; pipelines; stormwater and sewer infrastructure; drinking water infrastructure.

What is a Covered Project? cont'd

- Covered Projects Definition
  - An infrastructure project having a total project cost of $100 million or more, with at least $50 million of CDBG (MIT, DR, NDR) funds.
  - Has to be submitted either via the initial action plan or in a substantial amendment to the action plan for HUD's review and approval.

What is a Covered Project? cont'd

- Covered Projects Definition for U.S. Virgin Islands (USVI) (defined in the Federal Register notice published September 10, 2019):
  - As the U.S. Virgin Islands has been determined by HUD to have unmitigated high risks with regard to its capacity, a Covered Project for the U.S. Virgin Islands will alternatively be defined as an infrastructure project having a total project cost of $50 million or more, with at least $25 million of CDBG (MIT or DR) funds.

National Objective

Covered Project criteria – in addition to meeting MIT criteria:

i. Demonstrate long-term efficacy and fiscal sustainability.

ii. Demonstrably benefit the MID area.

National Objective cont'd

i. Long-term efficacy and fiscal sustainability, grantees must:

- Document measurable outcomes or reduction in risk
- Document how the Covered Project will reflect changing environmental conditions (such as sea level rise or development patterns) with risk management tools and alter funding sources if necessary.

- The grantee also must establish a plan for the long-term operation and maintenance of the Covered Project and include a description in its action plan.

National Objective cont'd

ii. Demonstrably benefit the MID area.

- BCA is greater than 1.
- Grantees may use the FEMA BCA Toolkit.
  - Any BCA must account for economic development, community development and other social/community benefits or costs.
  - Must indicate whether another Federal agency has rejected a BCA for the Covered Project (including any BCA for an earlier version of the current proposed Covered Project).

Alternative methods can be used

- A non-FEMA BCA methodology may be used when:
  - (1) A BCA has already been completed or is in progress pursuant to BCA guidelines issued by other Federal agencies such as the Army Corps or the Department of Transportation;

Alternative methods can be used cont'd

- In order for HUD to accept any BCA completed or in progress pursuant to another Federal agency's requirements, that BCA must:
  - Account for economic development, community development and other social/community benefits or costs, and
  - The CDBG–MIT project must be substantially the same as the project analyzed in the other agency's BCA.

Alternative methods can be used cont'd

- A non-FEMA BCA methodology may be used when (continued):
  - (2) it addresses a non-correctable flaw in the FEMA-approved BCA methodology; or
  - (3) it proposes a new approach that is unavailable using the FEMA BCA Toolkit.

Alternate demonstration of benefits.

- When a Covered Project serves low- and moderate-income (LMI) persons or other persons that are less able to mitigate risks or respond to and recover from disasters, CDBG-MIT grantees may demonstrate that benefits outweigh costs if the grantee completes a BCA (which may be less than one), IF they can also include a qualitative description of benefits.

Alternate demonstration of benefits cont'd

- While this qualitative description of benefits cannot be quantified it must sufficiently demonstrate unique and concrete benefits of the Covered Project for LMI persons or other persons that are less able to mitigate risks or respond to and recover from disasters.
- This qualitative description may include how the Covered Project will provide benefits such as:
  - enhancing a community's economic development potential
  - improving public health, or
  - expanding recreational opportunities.

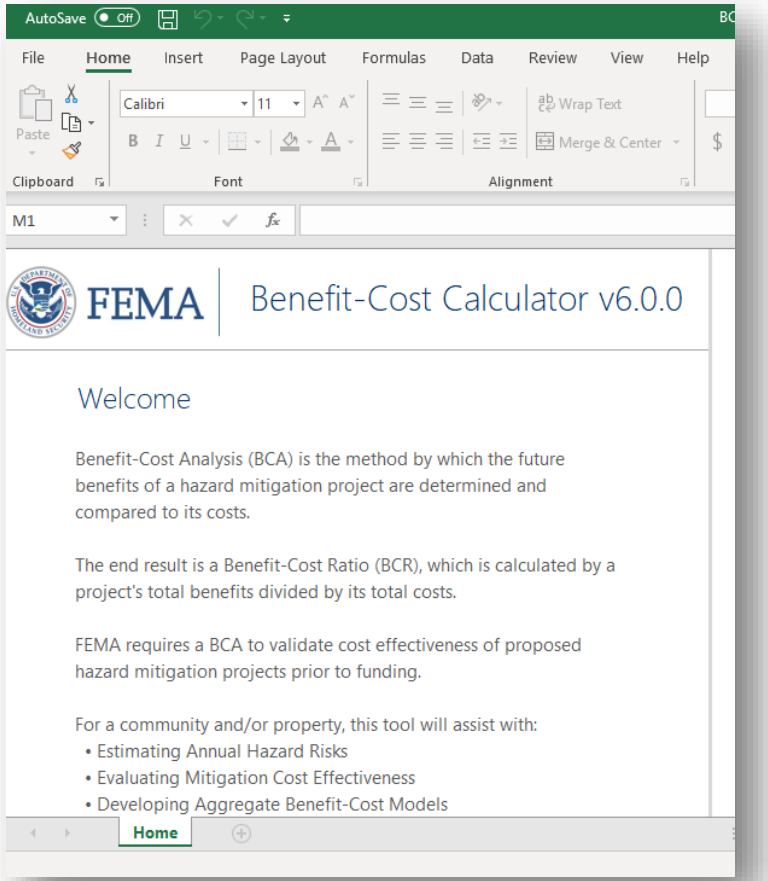
How do I submit it to HUD?

- CDBG-MIT grantees shall include the BCA for a Covered Project, together with any qualitative description as an appendix to the action plan or substantial amendment that proposes the project.

Don’t wait

- It is imperative to conduct a BCA early in the project development process to ensure the likelihood of meeting the cost-effectiveness eligibility requirement.

FEMA's BCA Toolkit



- To facilitate the process of preparing a BCA, FEMA has developed software, called the BCA Toolkit.
- The BCA Toolkit is an Excel-based tool that calculates a Benefit-Cost Ratio (BCR) for a hazard mitigation project.
- Primary users are grant applicants; however, it can be used to analyze any hazard mitigation project regardless of size or funding source.

FEMA's BCA Toolkit – History

- After a 1999 GAO report about FEMA's BCA process, FEMA developed the BCA Toolkit to standardize methodologies.
- In 2006 and 2007, FEMA re-engineered the BCA Toolkit, establishing the currently-used methodologies, equations, and standard values.
- BCAs performed in the BCA Toolkit comply with guidance in OMB Circular A-94.

FEMA's BCA Toolkit

- Newest version – Version 6.0 – is an Excel-based add-in.
- Download instructions at https://www.fema.gov/benefit-cost-analysis.
- The tool calculates a BCR for a project by estimating the damages before and after mitigation (i.e. the benefits of the project) and dividing by the costs.

$$\frac{\text{Benefits}}{\text{Costs}} = \text{BCR}$$

Benefits = Damages Before Mitigation – Damages After Mitigation

What Don’t Count as Benefits*

- Secondary effects of project – for example, increased employment or economic growth
- Anything not quantifiable – for example, increased “resilience” of community
- Energy cost savings
- Reduced pollution or greenhouse gas emissions

*In FEMA BCAs

Before You Begin Your BCA…

- The following questions will help you frame your BCA and gather data:
  - **What is the overall intent** of your project?
    - This is different than the physical work being performed.
  - **What structures or public services will be protected** by the project?
    - Homes, utilities, fire, police, gov't services, etc.
  - **What is the level of effectiveness** of your project?

What Count as Benefits?

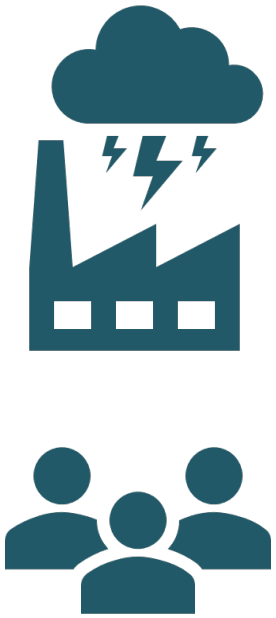
- Benefits in a FEMA BCA are any future costs or losses that are avoided as a result of the mitigation project, such as structural damage, loss of function, or deaths and injuries.
- Some projects also qualify for additional benefits if they improve the natural environment or prevent people from being displaced from their residences.
- Further guidance can be found in the BCA Toolkit Help Content and FEMA BCA training materials at https://www.fema.gov/benefit-cost-analysis.
  - **What damages occurred** (or are expected to occur) that can be directly tied to the hazard being mitigated?

What Data Do I Need?

Overall project data:

1. **Project location and hazard being mitigated**
   - Do not impact calculations, more for tracking purposes
2. **Project cost**
3. **Project useful life**
   - BCA Toolkit Help Content provides standard values for many project types

What Data Do I Need?*



For each facility being protected:

1. **Year built**
2. **Number of residents, customers,** or **annual budget** (depends on facility type)
3. **Past or estimated damages** – in dollars and/or number of days service impacted, preferably associated with Recurrence Intervals (RIs)
4. **Level of project effectiveness**

* Depends on project type and methodology

Past or Expected Damages

- To calculate the benefits of the project, the software bases it on past or expected damage amounts entered by the user.
  - Must be damages that would be mitigated by the project.

- Ideally, the damage amounts are associated with a Recurrence Interval (RI) – i.e. $60,000 of damage in the 1% annual chance storm.
  - RI = The likelihood of a hazard event **of specific severity, at that location**.

- If you do not know the RI for any of your damage events, you need at least 3 past events, and the software will calculate the RIs for you.

Project Effectiveness

Benefits = Damages Before Mitigation – Damages After Mitigation

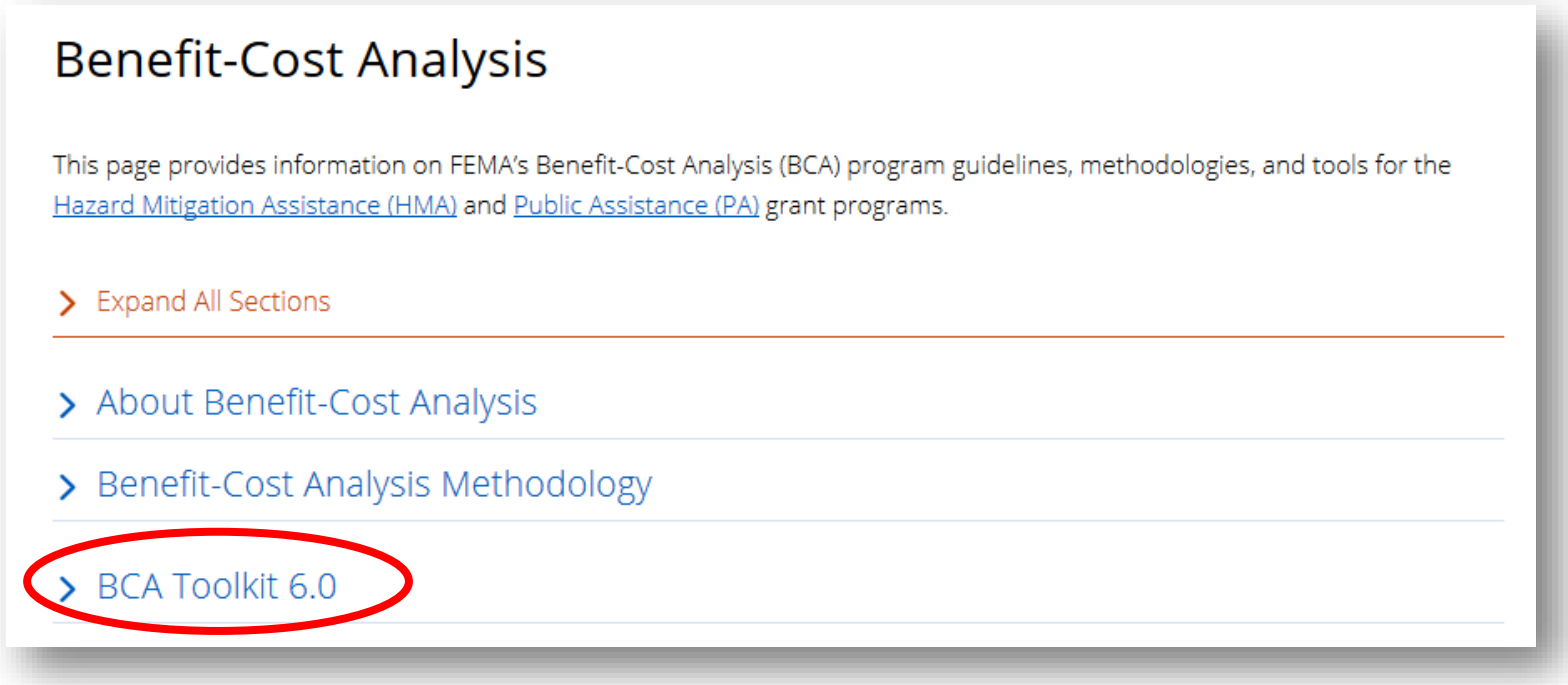
- To properly estimate the damages after mitigation, the software needs to know what the level of project effectiveness is.
  - Recurrence interval + damage amount (in dollars or number of days service would be impacted)
  - For example: In the **500-year event**, we expect **one day of lost service** even after the mitigation project is complete. This is also called “residual damages.”
- In most cases, this needs to be determined by the project engineer.

BCA Toolkit Overview

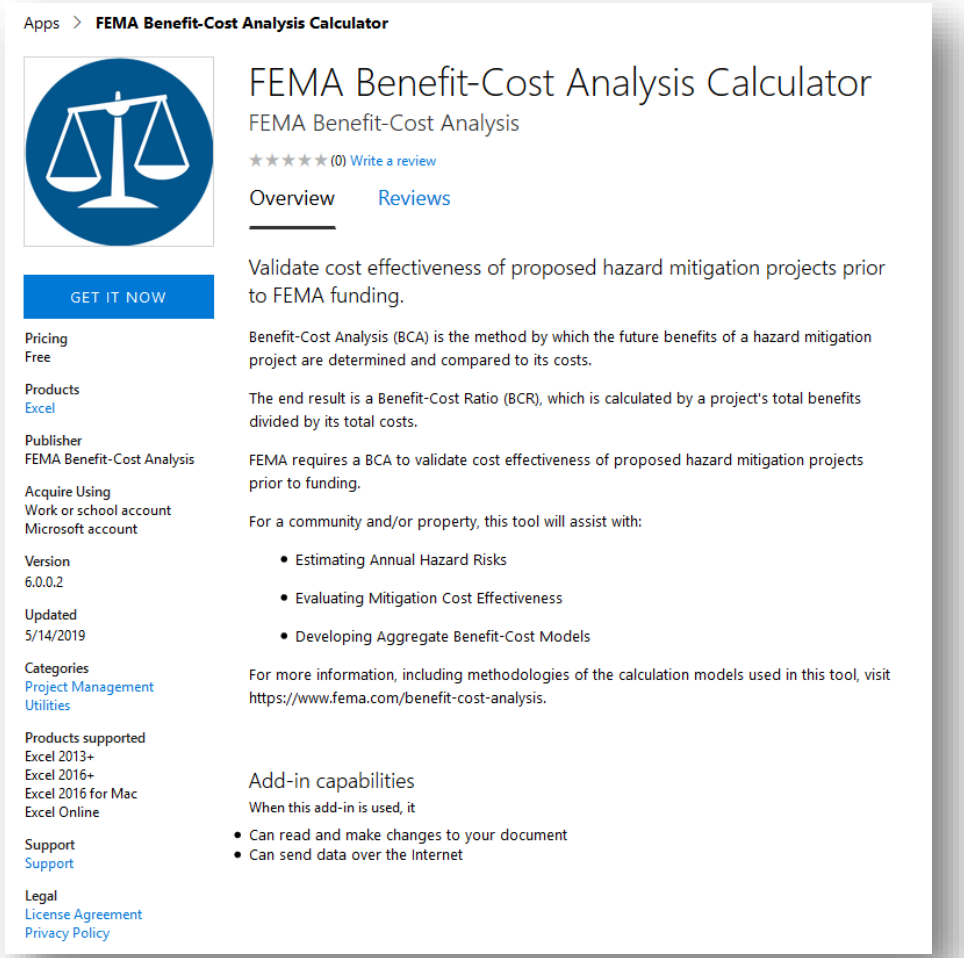
- We will cover:
  - Download, installation, and launching
  - Basic navigation
  - Starting a new project
  - Adding a structure
  - Saving
  - Generating the report and printing
  - Exporting and importing BCA files

Download & Installation

- Download instructions at https://www.fema.gov/benefit-cost-analysis.
- Requires Excel template file at https://www.fema.gov/media-library/assets/documents/179903.



Download & Installation



- Can be used in desktop Excel (Excel 2013 or later) or Excel Online.
- If the Store option or add-ins are disabled on your machine, we recommend using Excel Online.

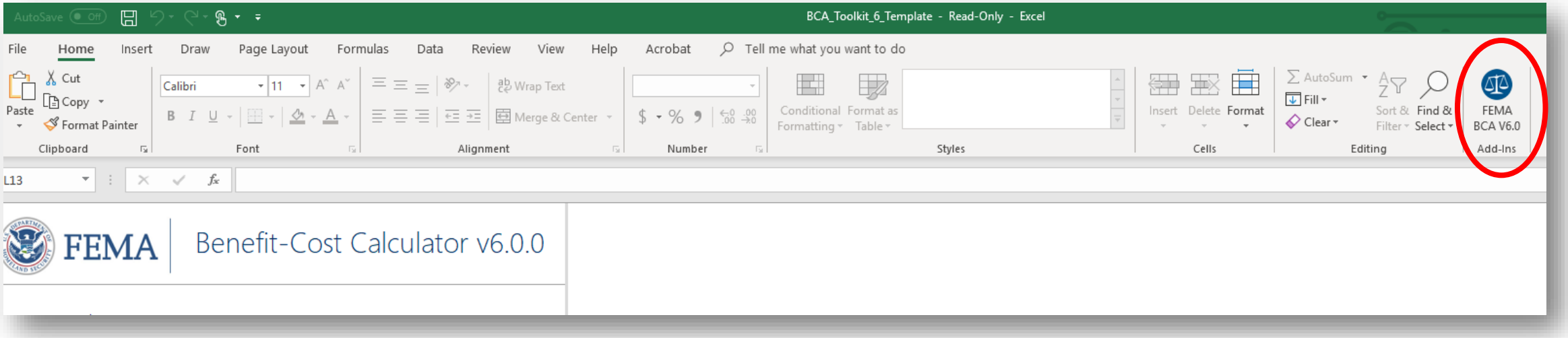
Link to Microsoft Store download: https://appsource.microsoft.com/en-us/product/office/WA200000176?tab=Overview

Live Demo

- The webinar will include a live demo of the BCA Toolkit.
- The following slides are provided as a visual reference for later viewing.

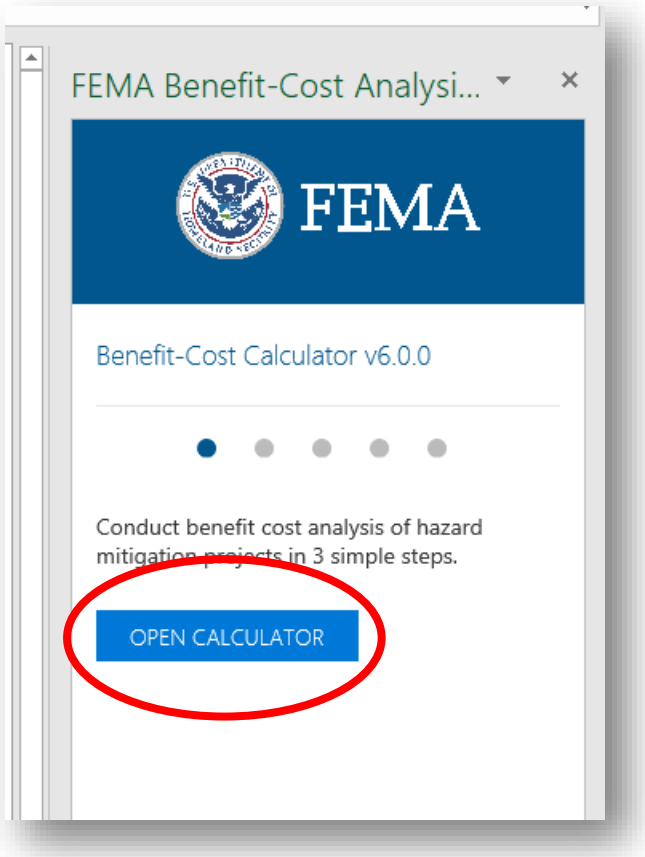
Launching

- Once you have inserted the add-in, click the FEMA BCA V6.0 icon in the upper righthand corner on the Home tab.



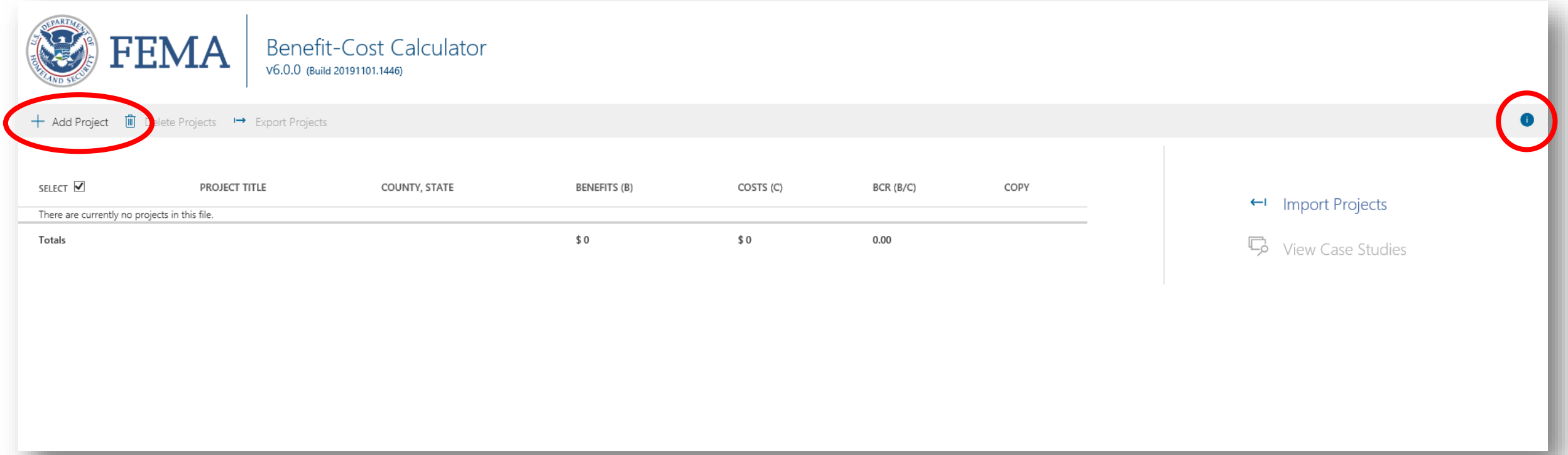
Launching

- In the sidebar window, click Open Calculator.



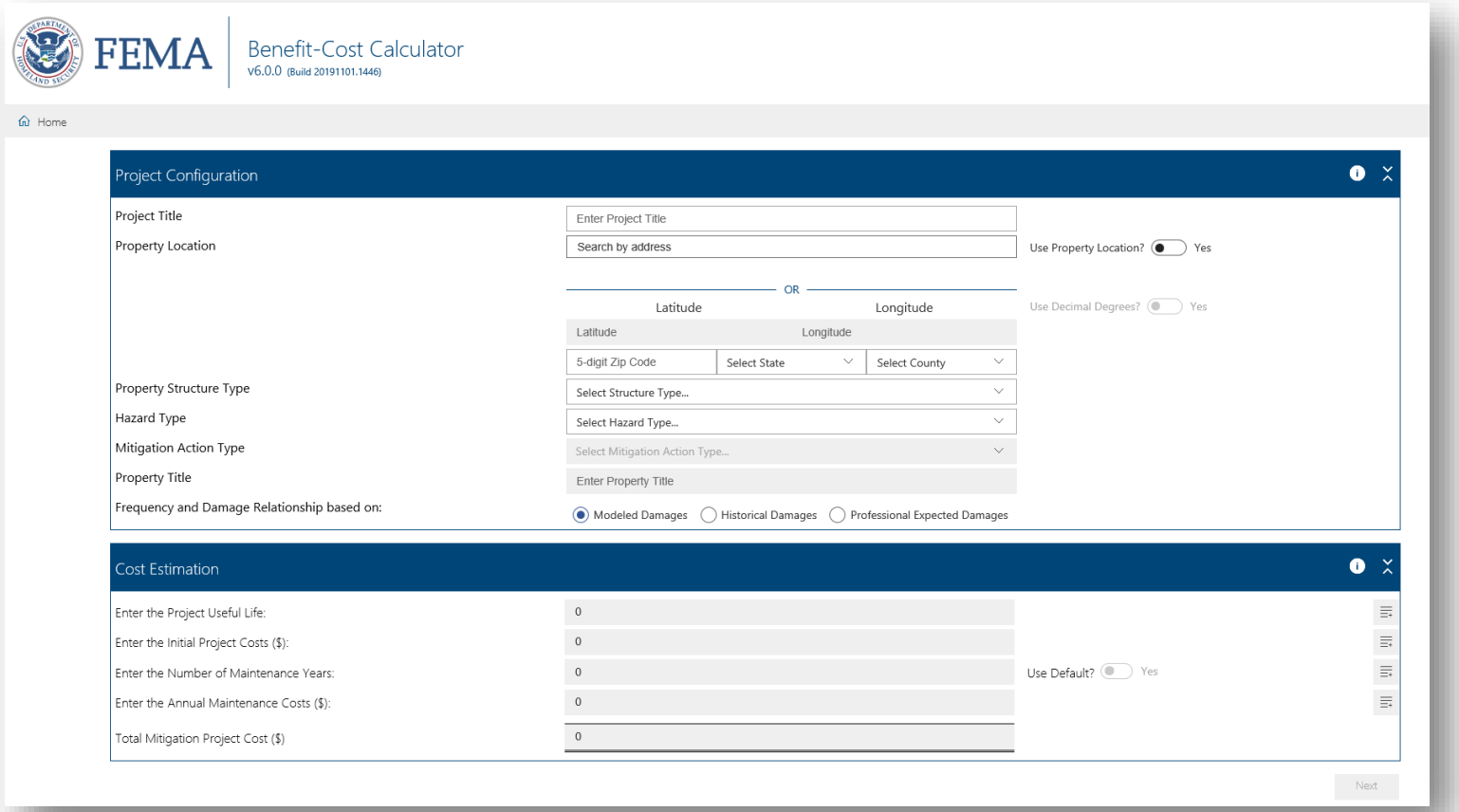
BCA Toolkit Overview

Home Screen


FEMA
Benefit-Cost Calculator
v6.0.0 (Build 20191101.1446)
Add Project
Delete Projects
Export Projects
SELECT
PROJECT TITLE
COUNTY, STATE
BENEFITS (B)
COSTS (C)
BCR (B/C)
COPY
There are currently no projects in this file.
Totals
$ 0
$ 0
0.00
Import Projects
View Case Studies

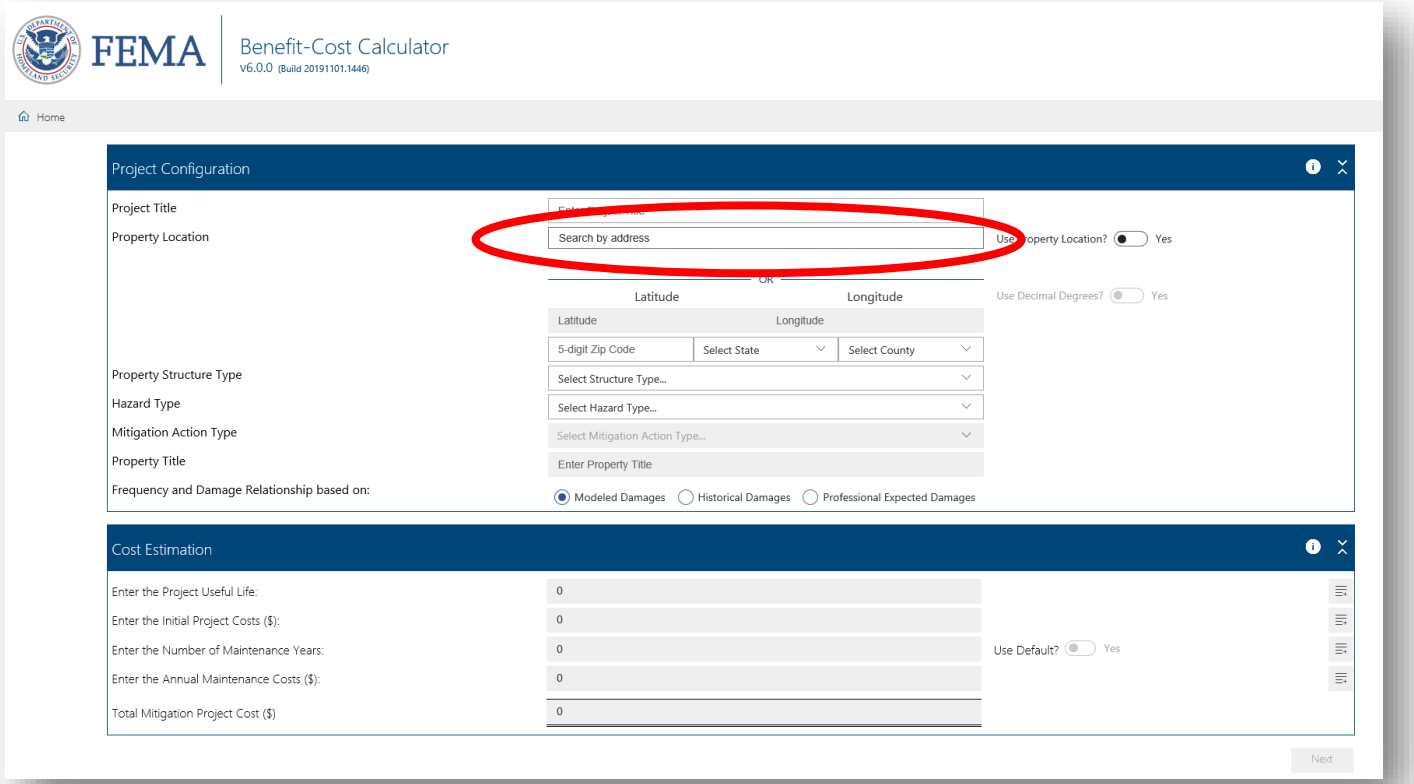
Starting a New Project (Project Configuration Screen)

User must enter data in all fields to move to next screen.



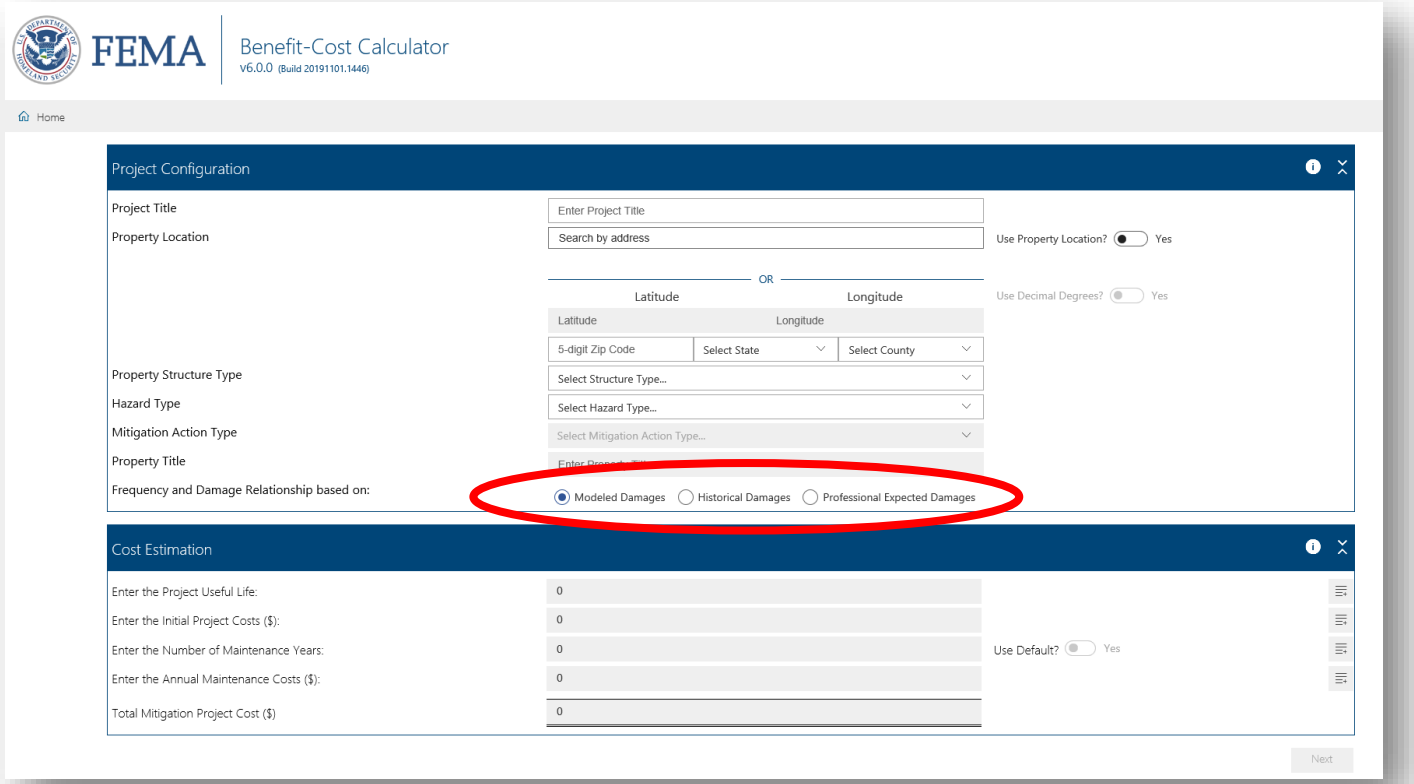
Property Location

Only important for wildfire, seismic, tornado, and wind retrofit projects, as these pull in the location-specific hazard data.

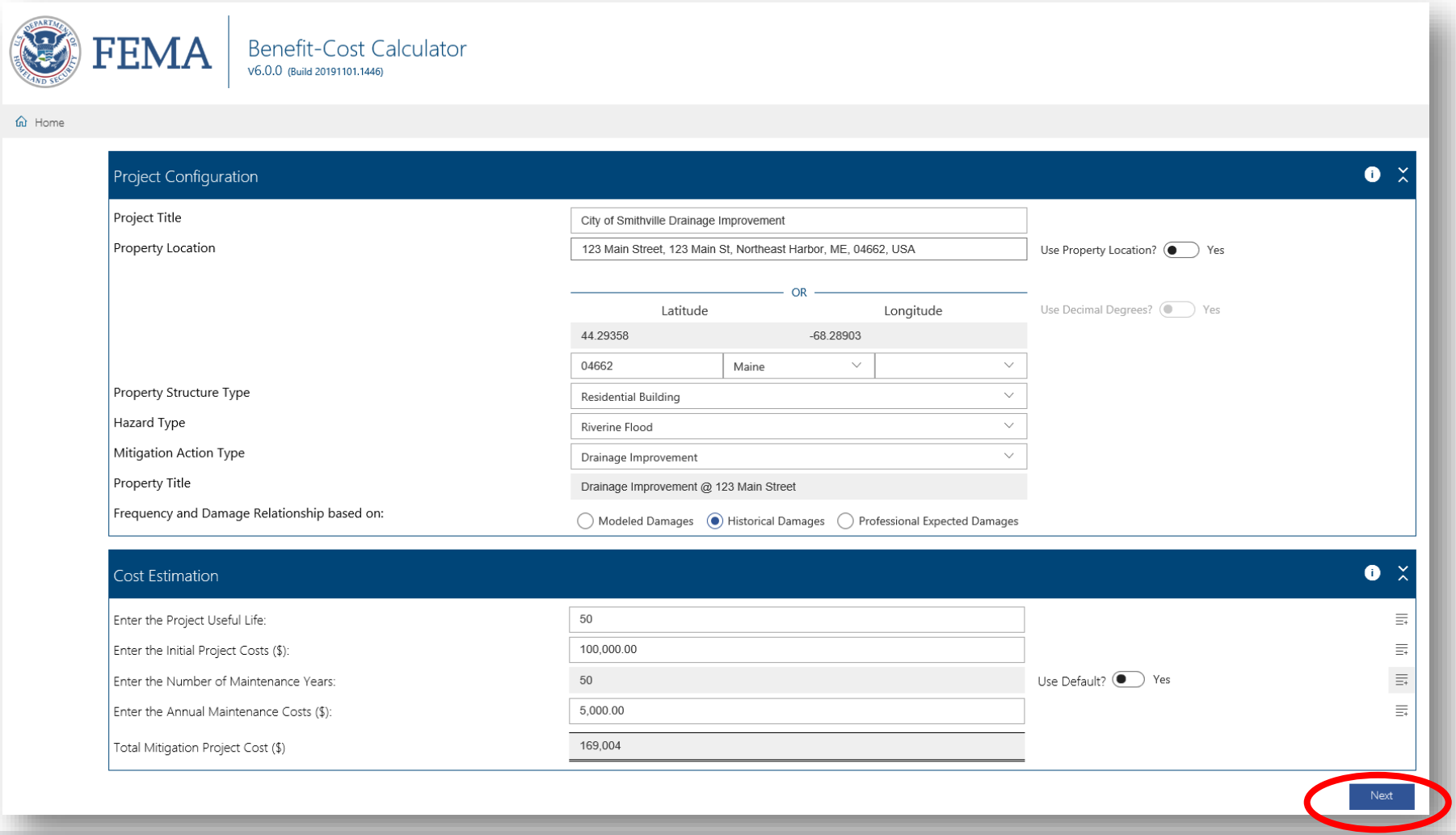


Frequency and Damage Relationship

Most applicants will probably use the “Historical Damages” or “Professional Expected Damages” option.

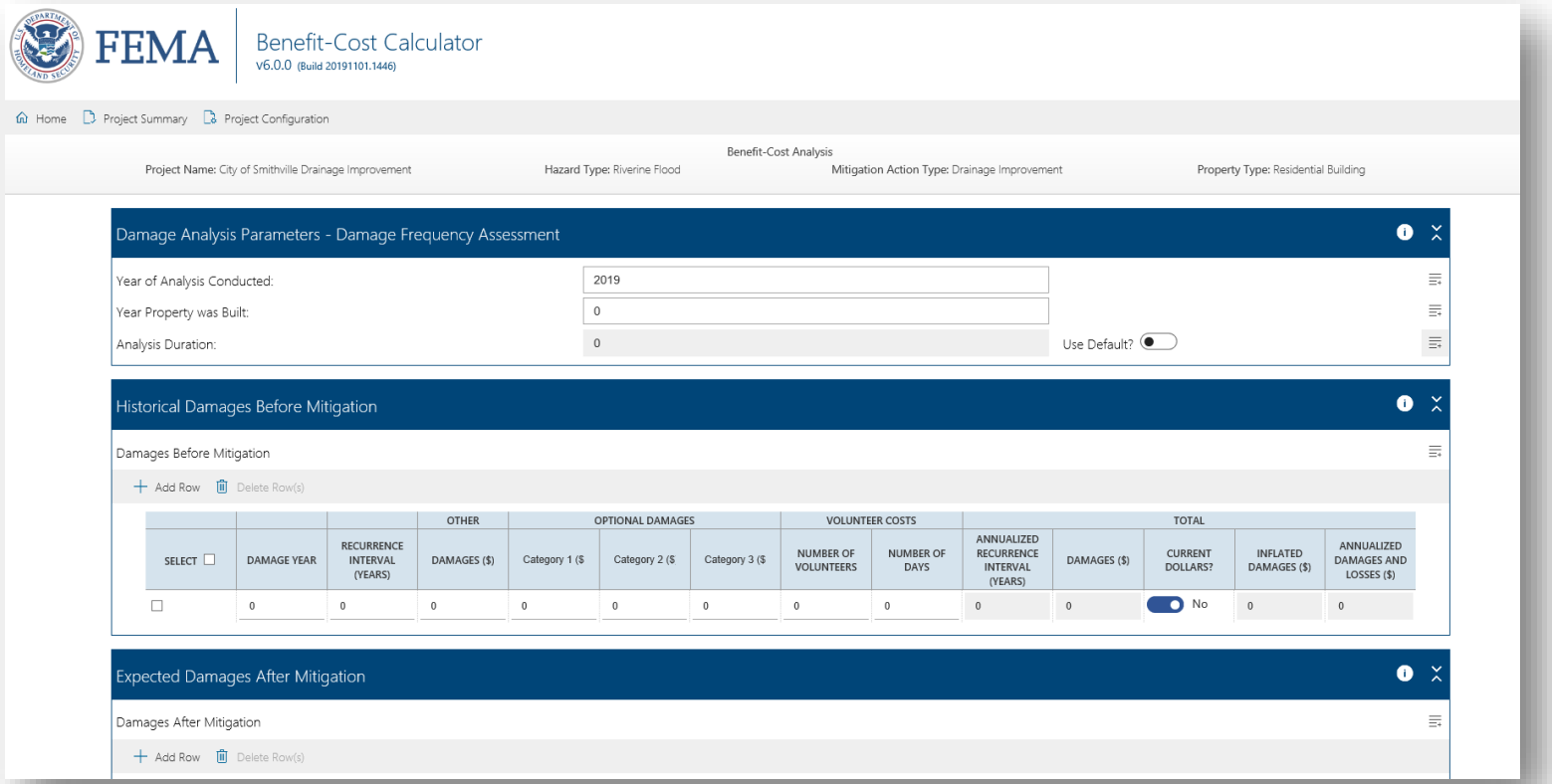


Starting a New Project (Project Configuration Screen)



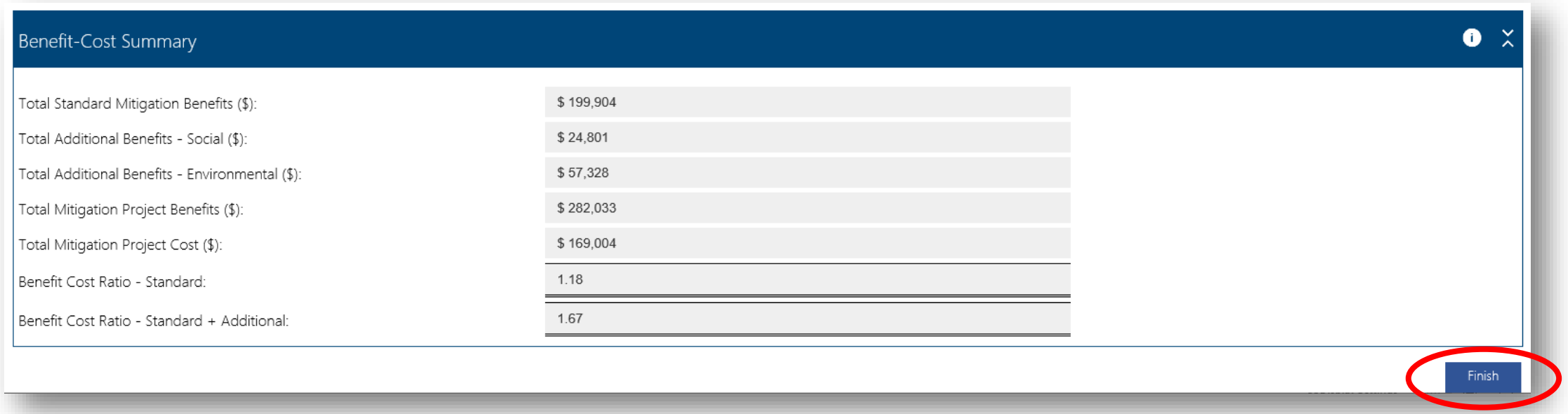
Hazard Analysis Screen

"Cards" appearing here are dependent on options chosen on Project Configuration screen.



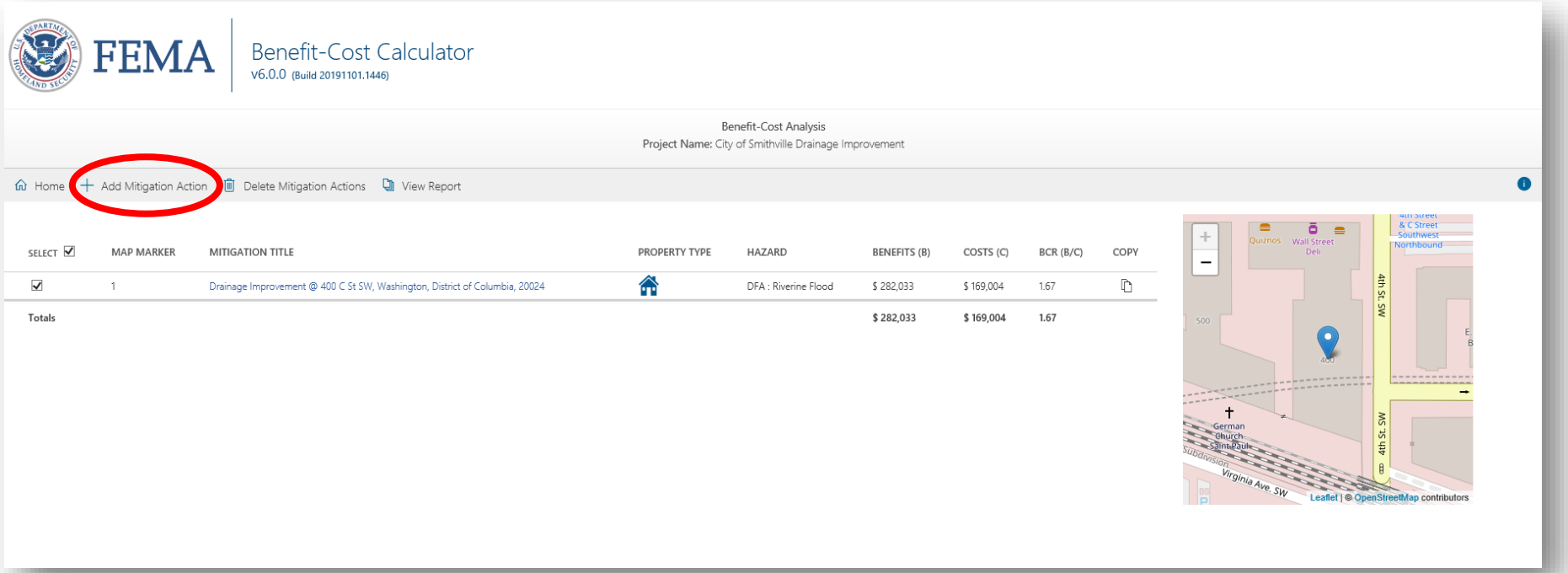
Hazard Analysis Screen

Once you have entered all data for your project, scroll down and click “Finish” at the bottom.



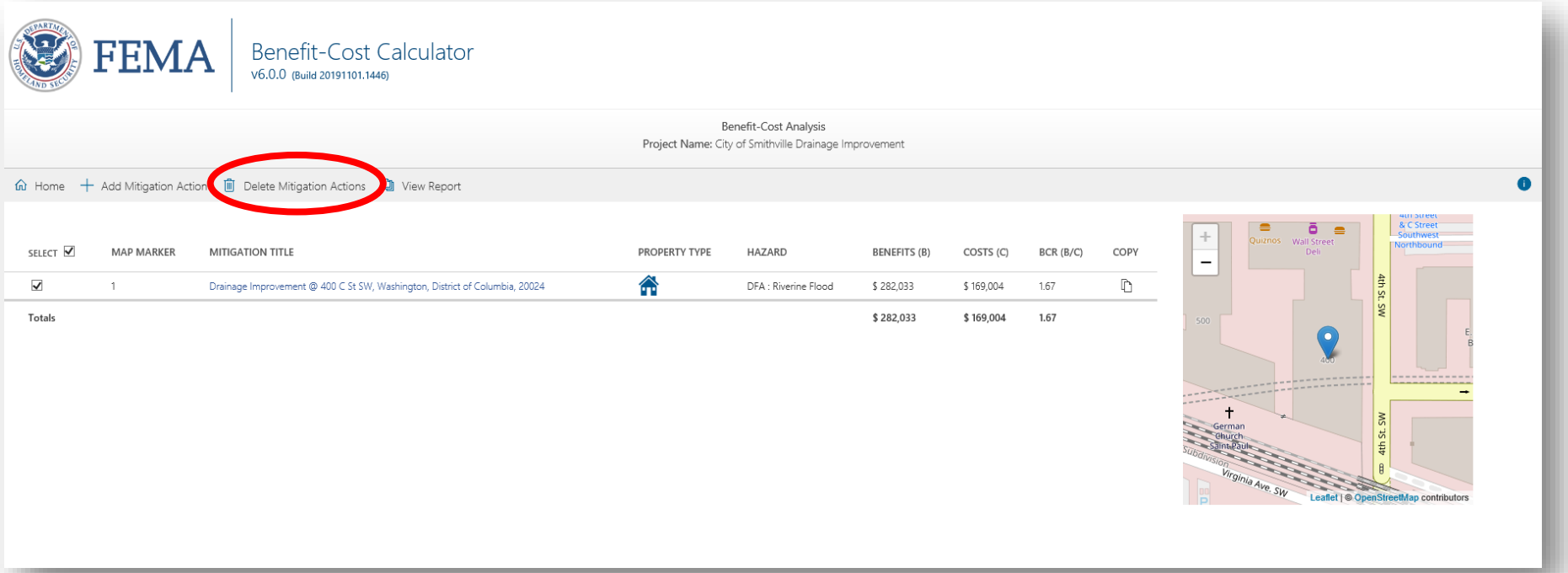
Project Summary Screen

To add another structure to your project, click “Add Mitigation Action.”



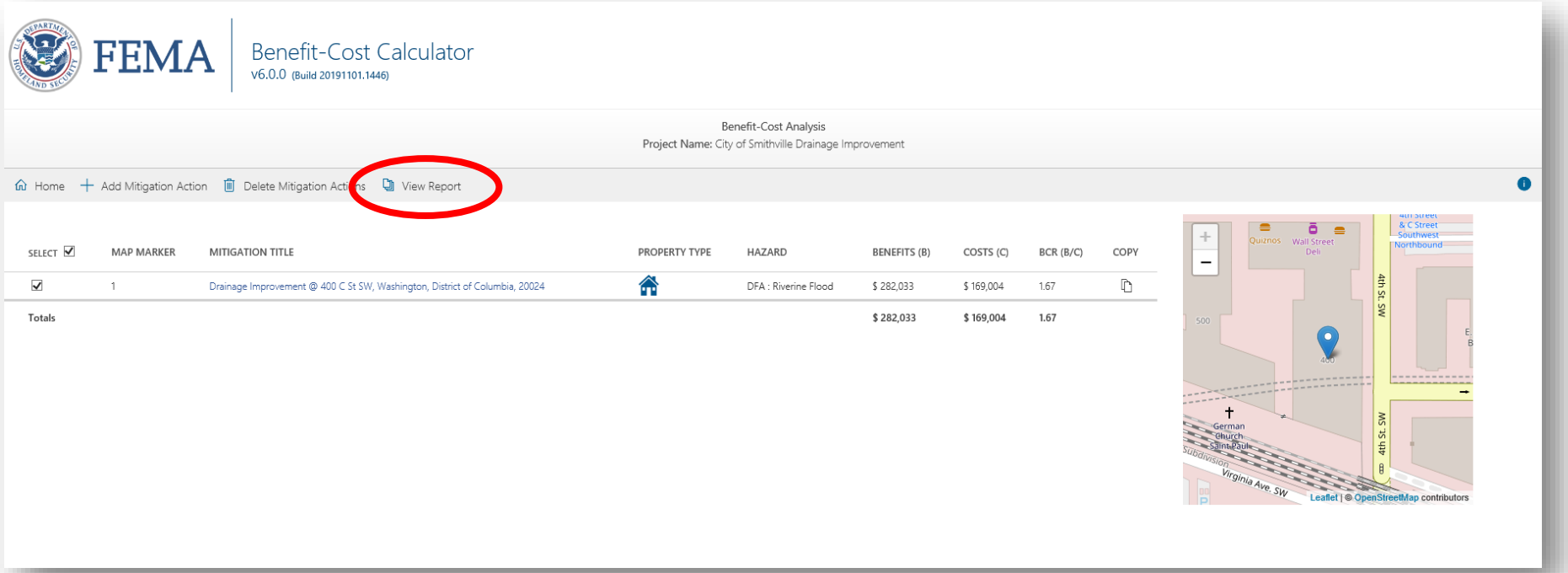
Project Summary Screen

To delete a structure from your project, select the structure(s) you want to delete and click “Delete Mitigation Actions.”



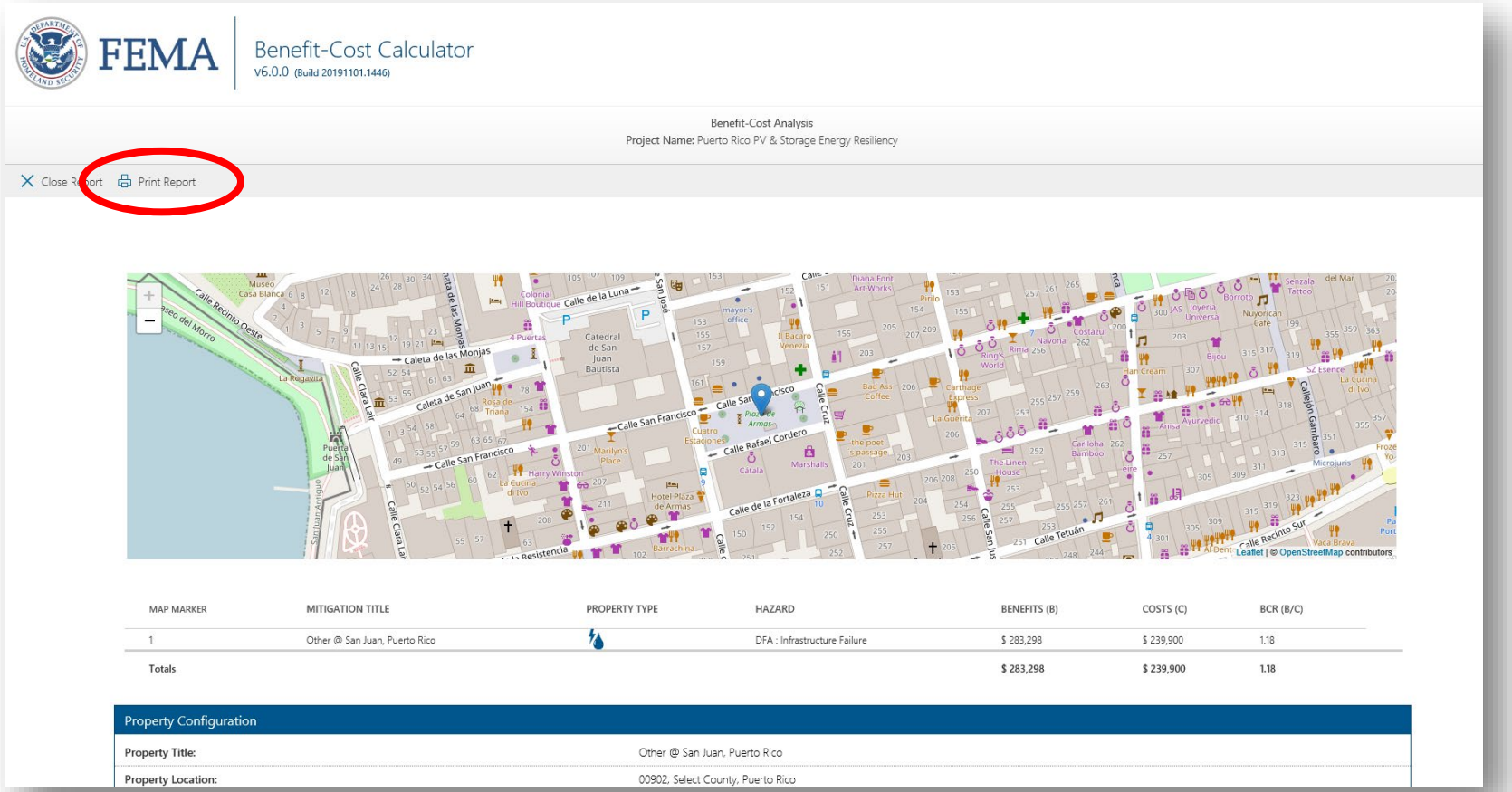
Project Summary Screen

To view the report for your project, click “View Report.” The report will include all selected structures.



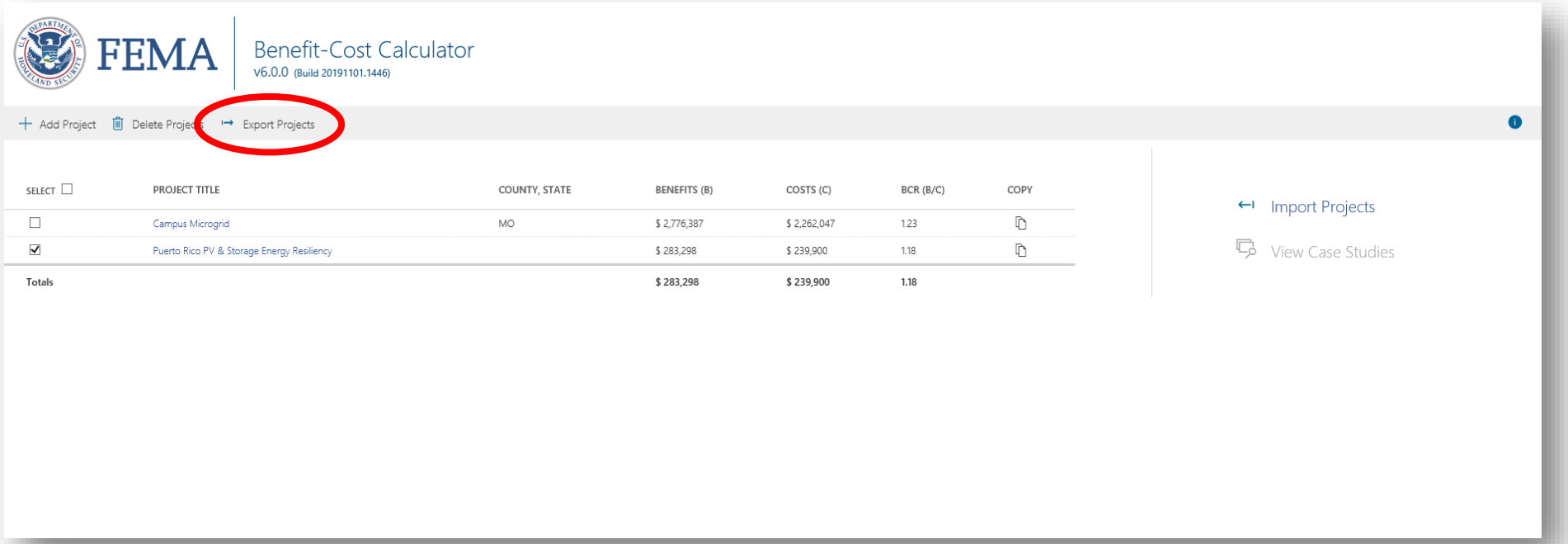
Project Report

This is the project report. You can print it by clicking Print Report.



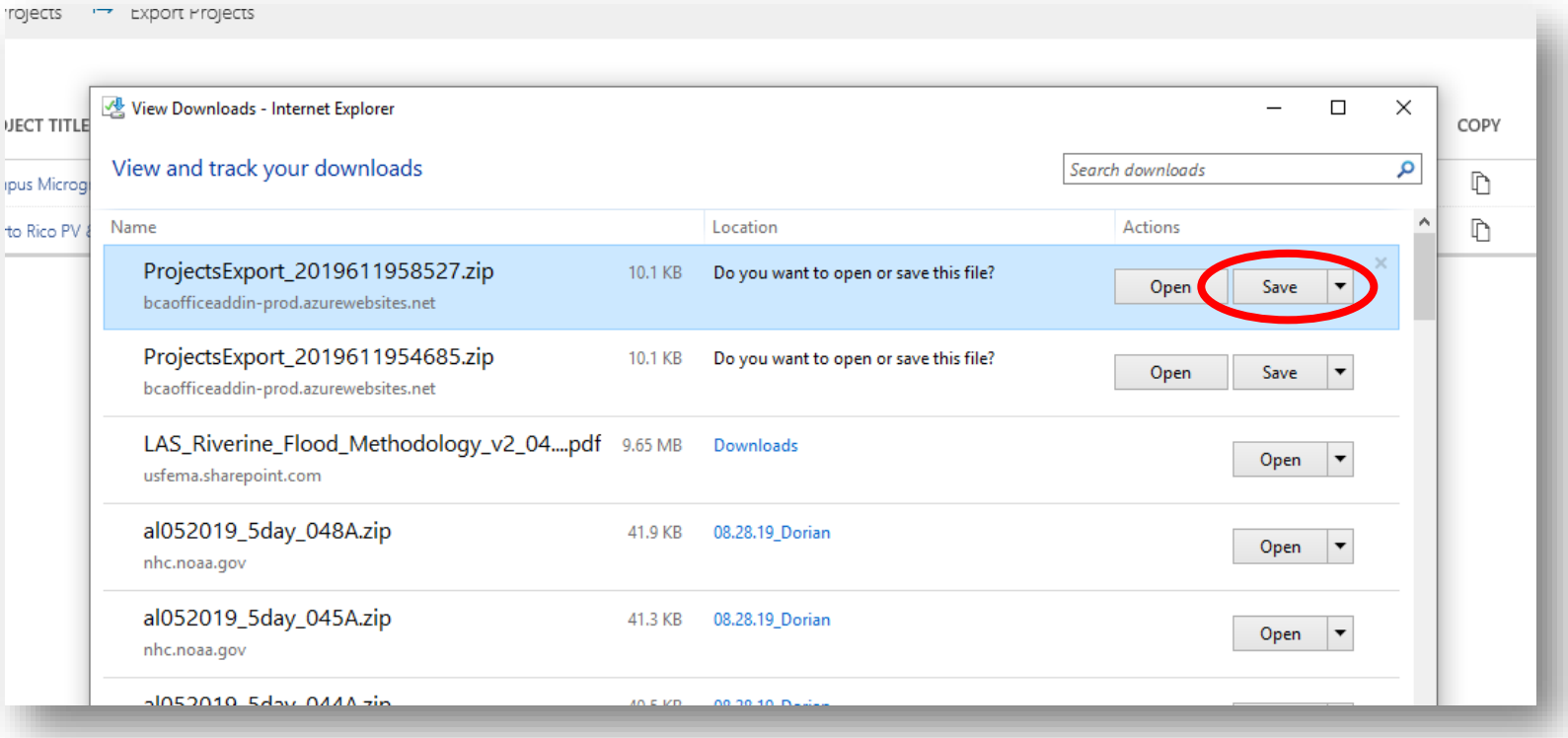
Exporting

To export your projects, click Export Projects.



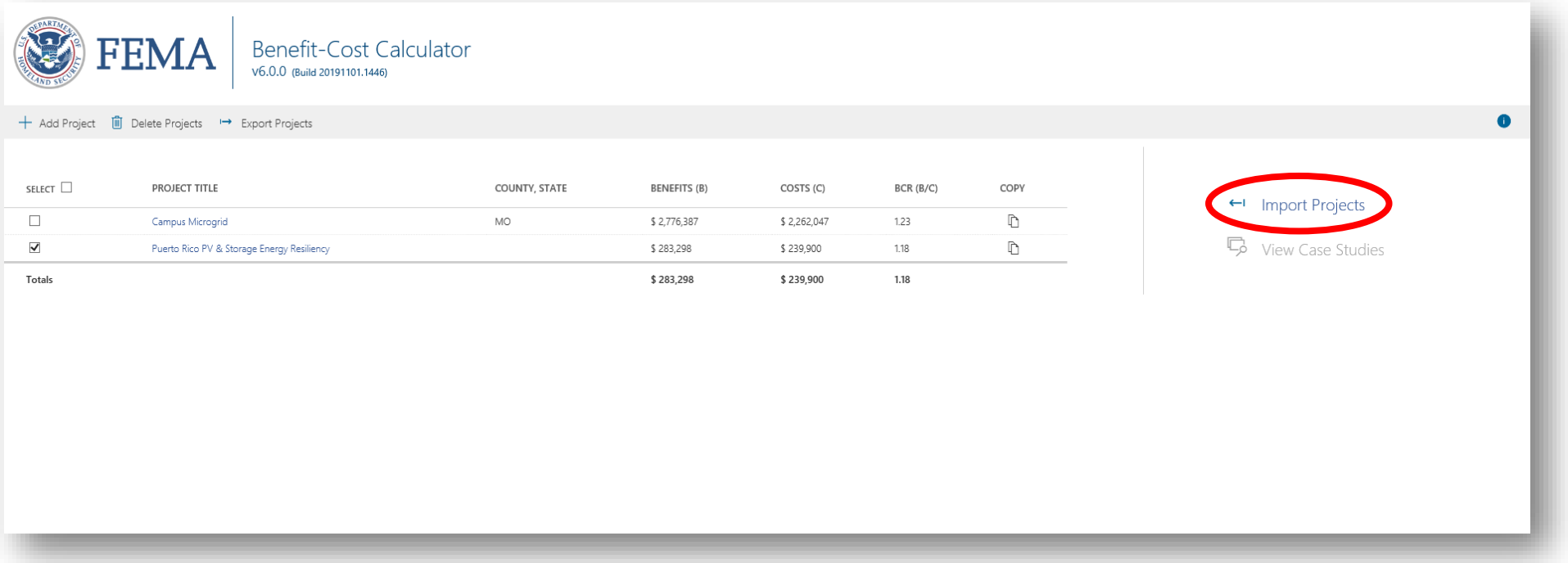
Exporting

An Explorer window will appear. Click “Save” to save the file to your machine. You can then attach the file to an email or upload in a project application. There is no need to unzip the file.



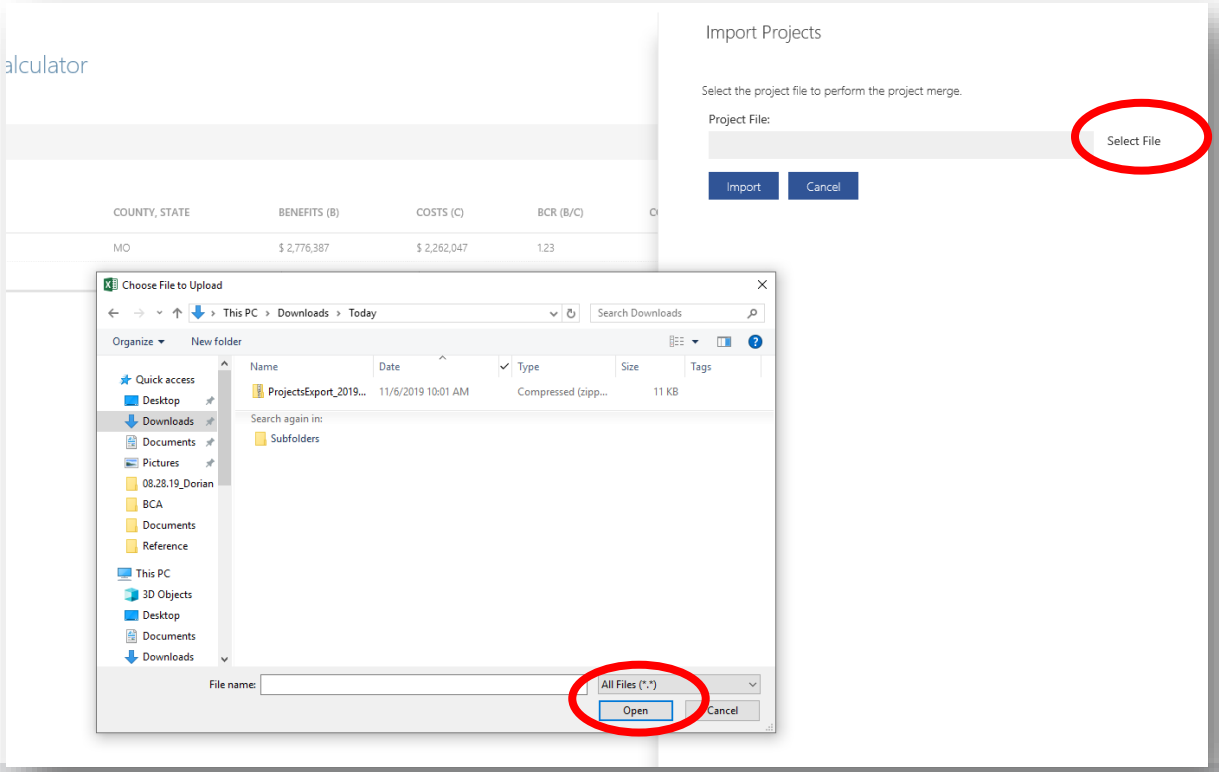
Importing

To import a BCA file, click Import Projects on the Home screen and navigate to where the exported .zip file was saved.



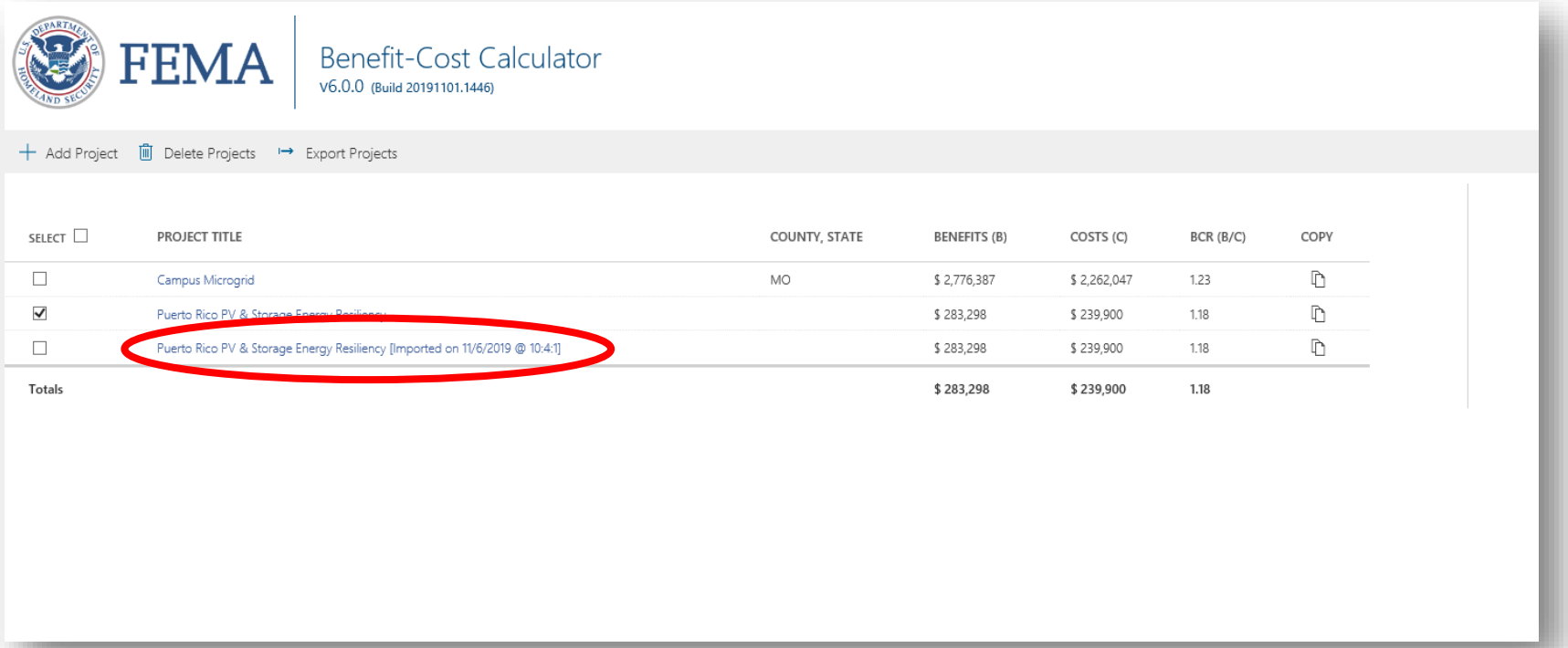
Importing

To import a BCA file, click Import Projects on the Home screen, click Select File, and navigate to where the exported .zip file was saved (most likely in the Downloads folder). Click Open, Import.



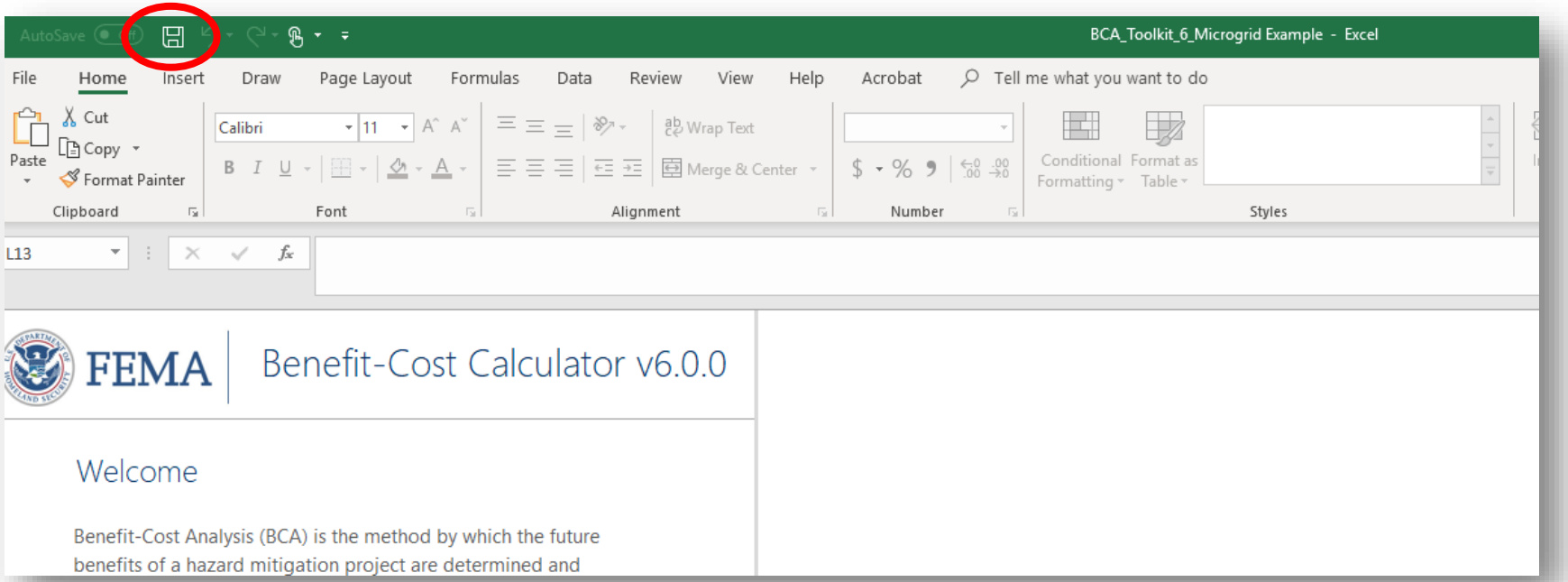
Importing

The imported project will now appear on the Home screen.



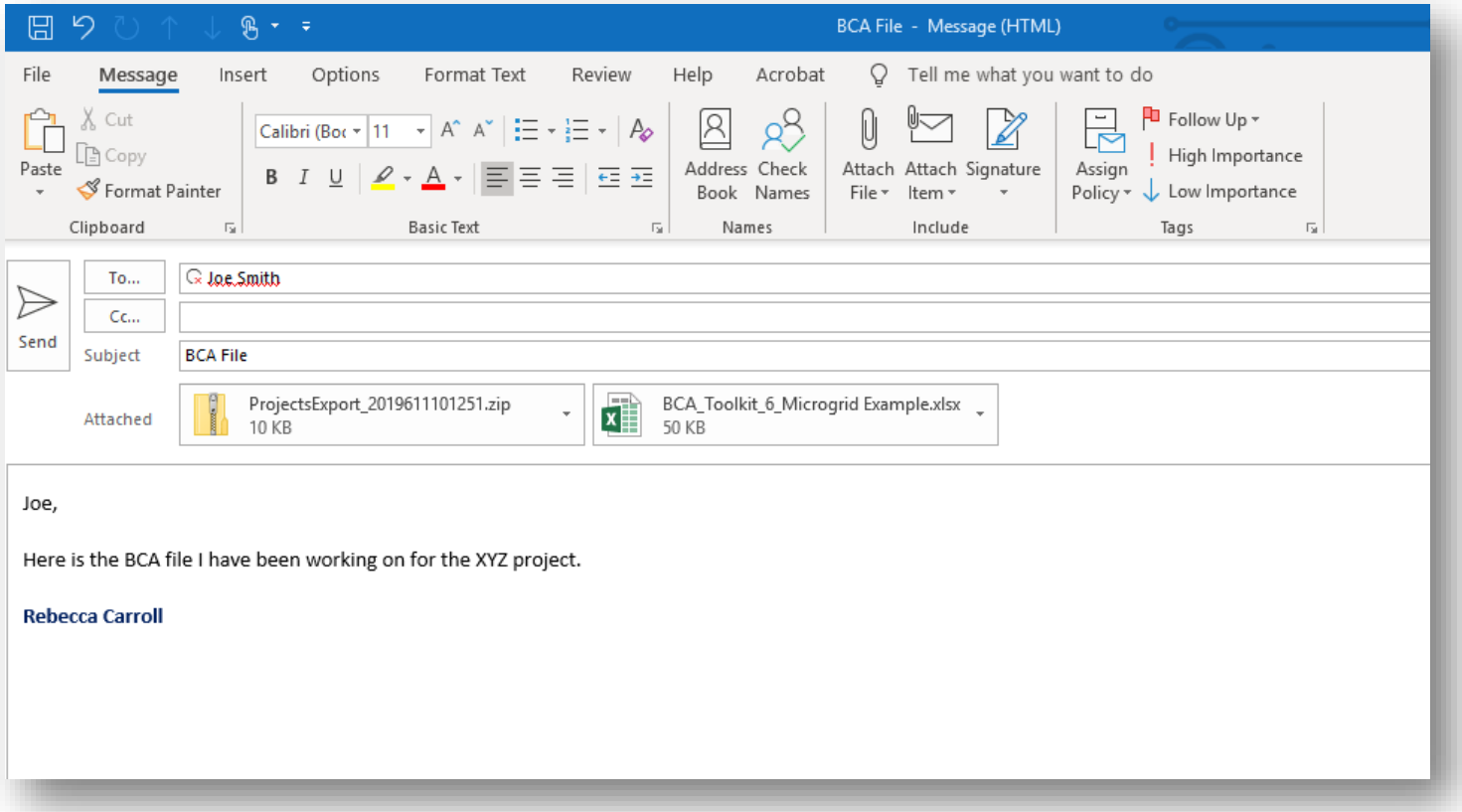
Saving Your Work

To save your work, save the Excel file to your machine. You may rename it if desired.



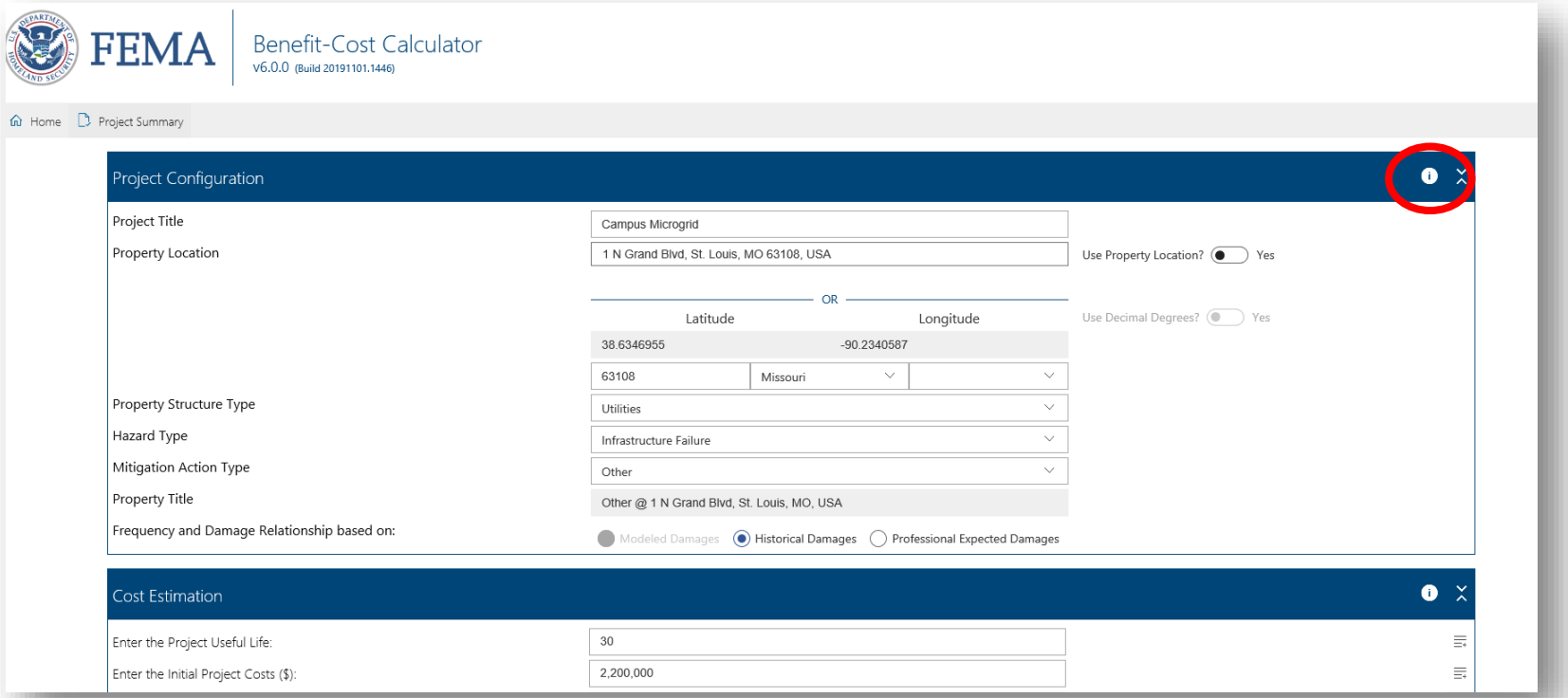
Sharing Your BCA

To share your BCA with others, you can either share the Excel file, or export the project and/or share the .zip file.



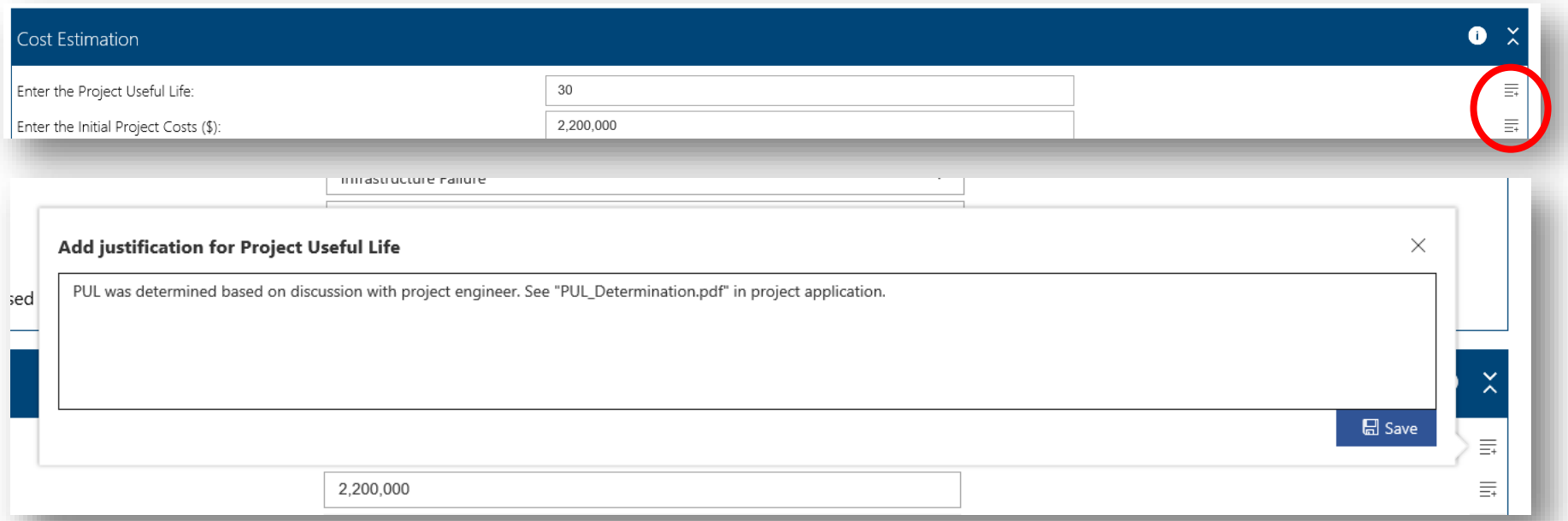
Help Content

The Help Content provides a wealth of information and resources. It is dynamic and may be accessed by clicking on the “i” at the top of each card.



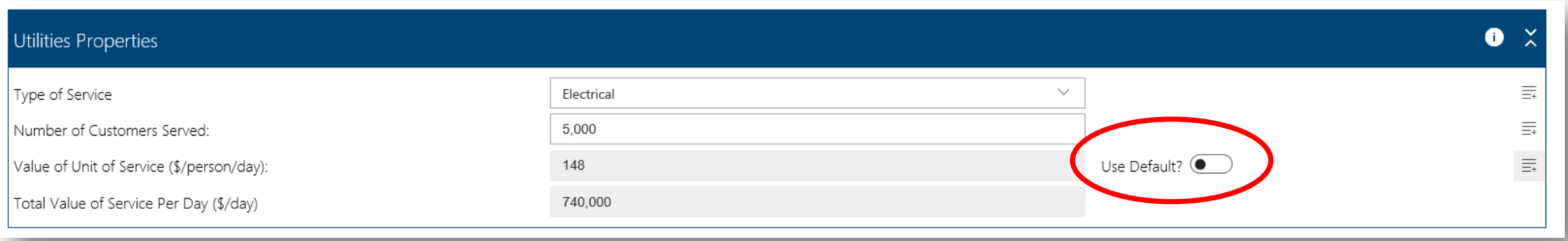
Comment Boxes

The comment boxes are a way for the user to tell the BCA reviewer(s) why they entered certain values and where documentation for those values may be found in the project application. The comments appear in the Project Report.



Default Values

Many fields have a default value or option. The user may override the value if they have better data by switching the Use Default? toggle to No.



Common BCA Challenges & Issues

- Lack of documentation for data entered
- Insufficient data or documentation on level of project effectiveness
- Lack of damage history
- Including damages that would not be mitigated by project
- Lack of recurrence interval (RI) data or incorrect interpretation of RI
- Not including all protected structures

BCA Resources

- BCA Toolkit Help Content
- FEMA BCA webpage: https://www.fema.gov/benefit-cost-analysis
- FEMA BCA training materials available at https://www.fema.gov/media-library/assets/documents/182462

Questions?

CDBG-MIT Webinar Series

Past Webinars:

- CDBG-MIT Federal Register Notice (September 3, 2019)
  https://www.hudexchange.info/trainings/courses/cdbg-mit-federal-register-notice-webinar/

- Conducting a Mitigation Needs Assessment for CDBG-MIT (October 10, 2019)
  https://www.hudexchange.info/trainings/courses/conducting-a-mitigation-needs-assessment-for-cdbg-mit-webinar/

- Public Participation & Citizen Action Group - Requirements & Best Practices (October 30, 2019)
  https://www.hudexchange.info/trainings/courses/cdbg-mit-webinar-public-participation-citizen-action-group-requirements-best-practices/

- Buyout Program Guidance and Best Practices (November 7, 2019)
  Materials being posted shortly

CDBG-MIT Webinar Series

Upcoming Webinar:

- Wednesday, November 20 at 3:00 PM EST: Best Practices for Transformative Mitigation Projects