



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.

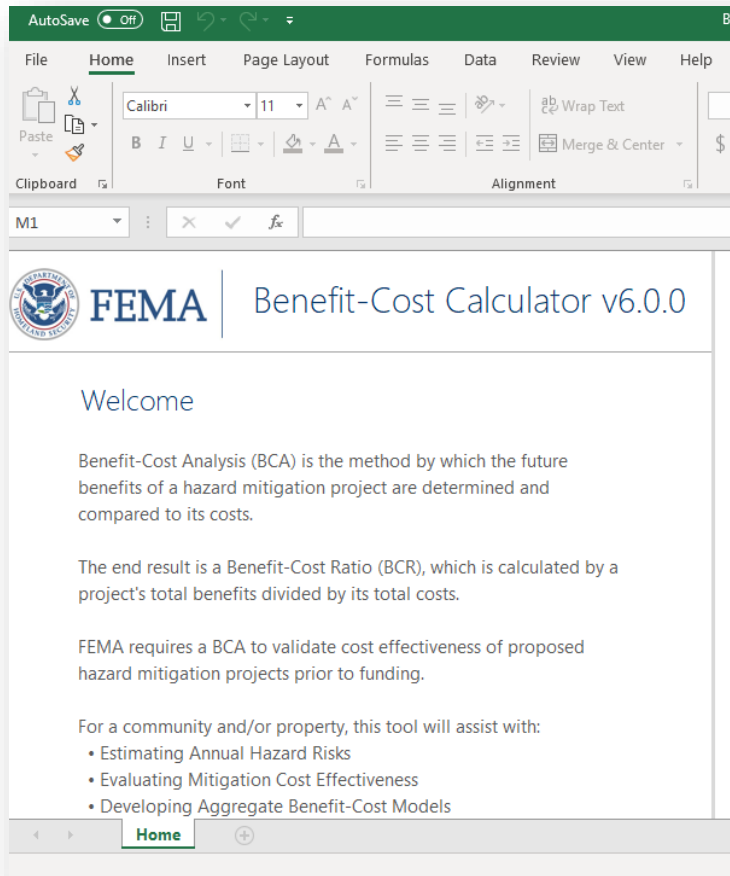


Don't wait

- 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.

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

$$\text{Benefits} = \text{Damages Before Mitigation} - \text{Damages After Mitigation}$$

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?

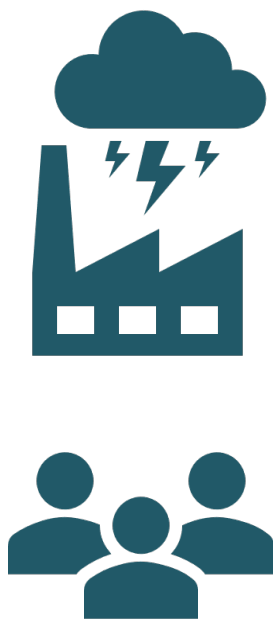
Overall project data:



- 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>.

Benefit-Cost Analysis

This page provides information on FEMA's Benefit-Cost Analysis (BCA) program guidelines, methodologies, and tools for the [Hazard Mitigation Assistance \(HMA\)](#) and [Public Assistance \(PA\)](#) grant programs.

> Expand All Sections

> About Benefit-Cost Analysis

> Benefit-Cost Analysis Methodology

> BCA Toolkit 6.0

Download & Installation

Apps > **FEMA Benefit-Cost Analysis Calculator**



FEMA Benefit-Cost Analysis Calculator

FEMA Benefit-Cost Analysis

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FEMA Benefit-Cost Analysis

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Work or school account
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Version
6.0.0.2

Updated
5/14/2019

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Validate cost effectiveness of proposed hazard mitigation projects prior to FEMA funding.

Benefit-Cost Analysis (BCA) is the method by which the future benefits of a hazard mitigation project are determined and compared to its costs.

The end result is a Benefit-Cost Ratio (BCR), which is calculated by a project's total benefits divided by its total costs.

FEMA requires a BCA to validate cost effectiveness of proposed hazard mitigation projects prior to funding.

For a community and/or property, this tool will assist with:

- Estimating Annual Hazard Risks
- Evaluating Mitigation Cost Effectiveness
- Developing Aggregate Benefit-Cost Models

For more information, including methodologies of the calculation models used in this tool, visit <https://www.fema.com/benefit-cost-analysis>.

Add-in capabilities
When this add-in is used, it

- Can read and make changes to your document
- Can send data over the Internet

- 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.

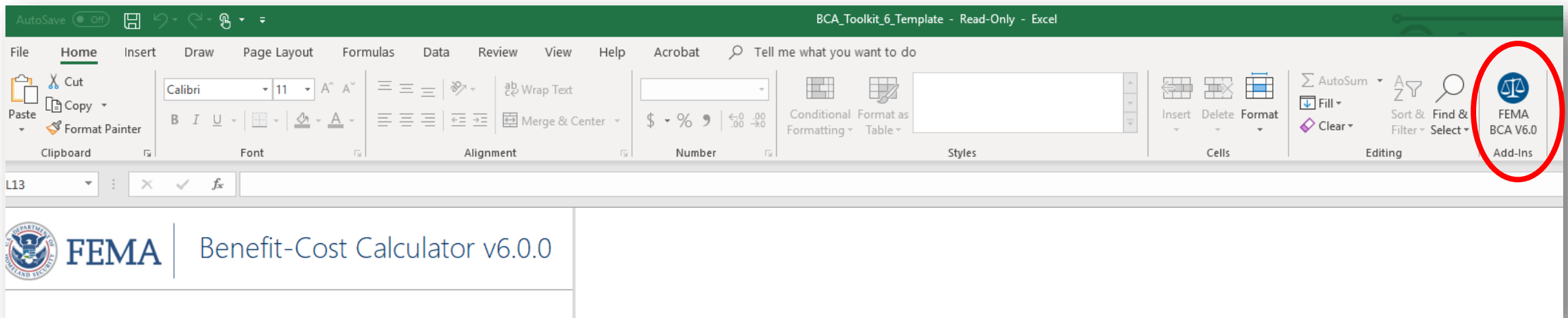
Link to Microsoft Store download:
<https://appsource.microsoft.com/en-us/product/office/WA200000176?tab=Overview>

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.

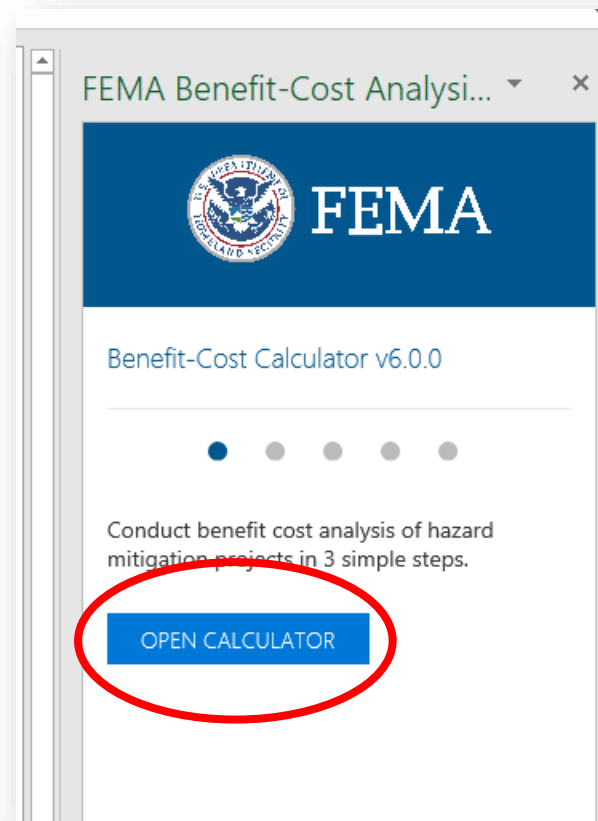
Launching

- 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.

The screenshot displays the FEMA Benefit-Cost Calculator interface, specifically the Project Configuration screen. The header includes the FEMA logo and the text "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)". A "Home" link is visible in the top left. The main form is divided into two sections: "Project Configuration" and "Cost Estimation".

Project Configuration Section:

- Project Title:** A text input field labeled "Enter Project Title".
- Property Location:** A text input field labeled "Search by address". To its right is a toggle switch for "Use Property Location?" with "Yes" selected.
- Latitude/Longitude:** A section with a toggle for "OR" between "Latitude" and "Longitude". Below this are input fields for "Latitude" and "Longitude", and a "5-digit Zip Code" field. To the right is a toggle switch for "Use Decimal Degrees?" with "Yes" selected.
- Property Structure Type:** A dropdown menu labeled "Select Structure Type...".
- Hazard Type:** A dropdown menu labeled "Select Hazard Type...".
- Mitigation Action Type:** A dropdown menu labeled "Select Mitigation Action Type...".
- Property Title:** A text input field labeled "Enter Property Title".
- Frequency and Damage Relationship based on:** Three radio buttons: "Modeled Damages" (selected), "Historical Damages", and "Professional Expected Damages".

Cost Estimation Section:

- Enter the Project Useful Life:** A text input field with the value "0".
- Enter the Initial Project Costs (\$):** A text input field with the value "0".
- Enter the Number of Maintenance Years:** A text input field with the value "0".
- Enter the Annual Maintenance Costs (\$):** A text input field with the value "0".
- Total Mitigation Project Cost (\$):** A text input field with the value "0".
- To the right of these fields is a toggle switch for "Use Default?" with "Yes" selected.

A "Next" button is located at the bottom right of the form.

Property Location

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

The screenshot displays the FEMA Benefit-Cost Calculator interface. The top header includes the FEMA logo and the text "Benefit-Cost Calculator V6.0.0 (Build 20191101.1446)". Below the header is a "Home" link. The main content area is divided into two sections: "Project Configuration" and "Cost Estimation".

In the "Project Configuration" section, the "Property Location" field is highlighted with a red circle. It contains a "Search by address" input field. To the right of this field is a toggle switch labeled "Use Property Location?" which is currently set to "Yes". Below the "Search by address" field, there are fields for "Latitude" and "Longitude", each with a "5-digit Zip Code" and "Select State" dropdown. There are also dropdowns for "Select Structure Type...", "Select Hazard Type...", and "Select Mitigation Action Type...". A "Enter Property Title" field is also present. At the bottom of this section, there are radio buttons for "Frequency and Damage Relationship based on:" with options "Modeled Damages" (selected), "Historical Damages", and "Professional Expected Damages".

The "Cost Estimation" section contains input fields for "Enter the Project Useful Life:", "Enter the Initial Project Costs (\$):", "Enter the Number of Maintenance Years:", "Enter the Annual Maintenance Costs (\$):", and "Total Mitigation Project Cost (\$)". Each of these fields has a value of "0" entered. To the right of these fields is a toggle switch labeled "Use Default?" which is currently set to "Yes".

A "Next" button is located at the bottom right of the "Cost Estimation" section.

Frequency and Damage Relationship

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

FEMA Benefit-Cost Calculator
V6.0.0 (Build 20191101.1446)

Home

Project Configuration

Project Title: Enter Project Title

Property Location: Search by address

Use Property Location? ☒ Yes

OR

Latitude: 5-digit Zip Code, Select State, Select County

Longitude: Use Decimal Degrees? ☐ Yes

Property Structure Type: Select Structure Type...

Hazard Type: Select Hazard Type...

Mitigation Action Type: Select Mitigation Action Type...

Property Title: Enter Project Title

Frequency and Damage Relationship based on:

☒ Modeled Damages ☐ Historical Damages ☐ Professional Expected Damages

Cost Estimation

Enter the Project Useful Life: 0

Enter the Initial Project Costs (\$): 0

Enter the Number of Maintenance Years: 0

Enter the Annual Maintenance Costs (\$): 0

Total Mitigation Project Cost (\$): 0

Use Default? ☐ Yes

Next

Starting a New Project (Project Configuration Screen)

**FEMA**

Benefit-Cost Calculator
V6.0.0 (Build 20191101.1446)

Home

Project Configuration

Project Title

City of Smithville Drainage Improvement

Property Location

123 Main Street, 123 Main St, Northeast Harbor, ME, 04662, USA

Use Property Location? ☒ Yes

OR

Latitude

44.29358

Longitude

-68.28903

Use Decimal Degrees? ☒ Yes

04662

Maine

Property Structure Type

Residential Building

Hazard Type

Riverine Flood

Mitigation Action Type

Drainage Improvement

Property Title

Drainage Improvement @ 123 Main Street

Frequency and Damage Relationship based on:

☐ Modeled Damages ☒ Historical Damages ☐ Professional Expected Damages

Cost Estimation

Enter the Project Useful Life:

50

Enter the Initial Project Costs (\$):

100,000.00

Enter the Number of Maintenance Years:

50

Use Default? ☐ Yes

Enter the Annual Maintenance Costs (\$):

5,000.00

Total Mitigation Project Cost (\$)

169,004

Next

Hazard Analysis Screen

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

The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the title "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)" are visible. Below the header, navigation links for Home, Project Summary, and Project Configuration are present. The main content area shows project details: Project Name (City of Smithville Drainage Improvement), Hazard Type (Riverine Flood), Mitigation Action Type (Drainage Improvement), and Property Type (Residential Building).

The "Damage Analysis Parameters - Damage Frequency Assessment" card contains input fields for "Year of Analysis Conducted" (2019), "Year Property was Built" (0), and "Analysis Duration" (0). A "Use Default?" toggle is also present.

The "Historical Damages Before Mitigation" card features a table for recording damages. The table has columns for SELECT, DAMAGE YEAR, RECURRENCE INTERVAL (YEARS), OTHER DAMAGES (\$), OPTIONAL DAMAGES (Category 1, 2, 3), VOLUNTEER COSTS (NUMBER OF VOLUNTEERS, NUMBER OF DAYS, ANNUALIZED RECURRENCE INTERVAL), and TOTAL DAMAGES (\$). The current row shows all values as 0.

The "Expected Damages After Mitigation" card is currently empty, showing only the "Add Row" and "Delete Row(s)" buttons.

Hazard Analysis Screen

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

Benefit-Cost Summary

Total Standard Mitigation Benefits (\$):

\$ 199,904

Total Additional Benefits - Social (\$):

\$ 24,801

Total Additional Benefits - Environmental (\$):

\$ 57,328

Total Mitigation Project Benefits (\$):

\$ 282,033

Total Mitigation Project Cost (\$):

\$ 169,004

Benefit Cost Ratio - Standard:

1.18

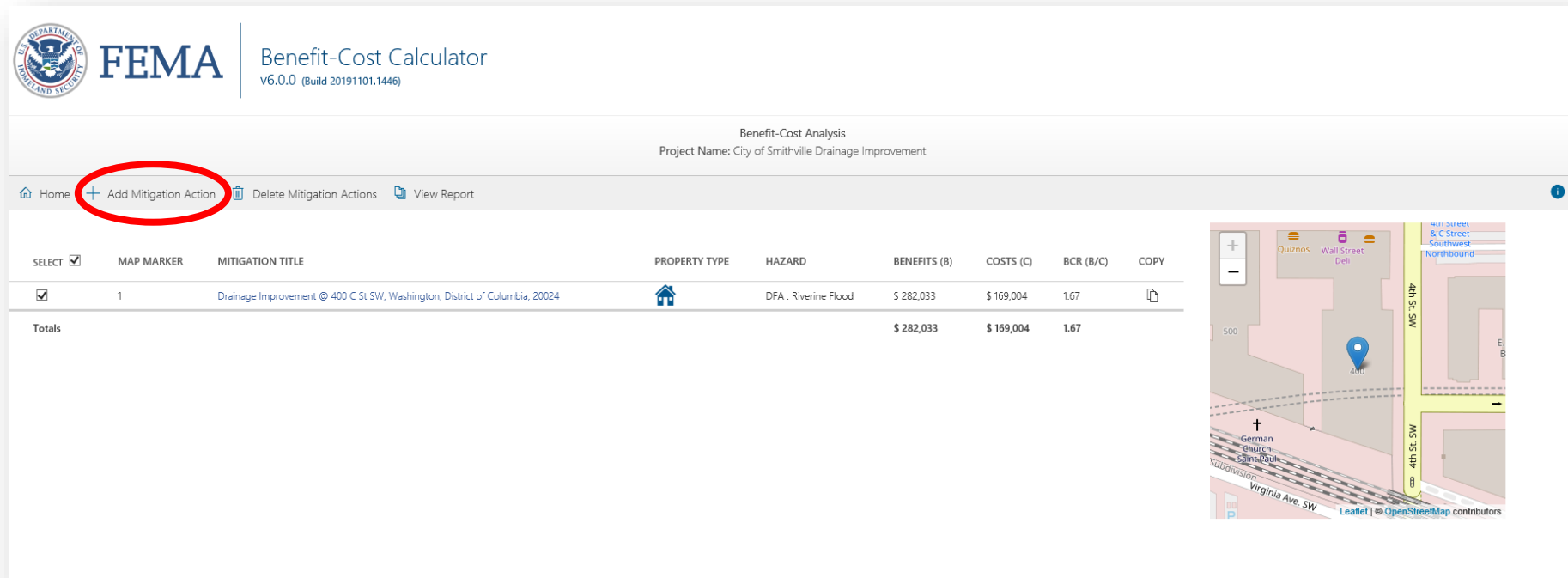
Benefit Cost Ratio - Standard + Additional:

1.67

Finish

Project Summary Screen

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



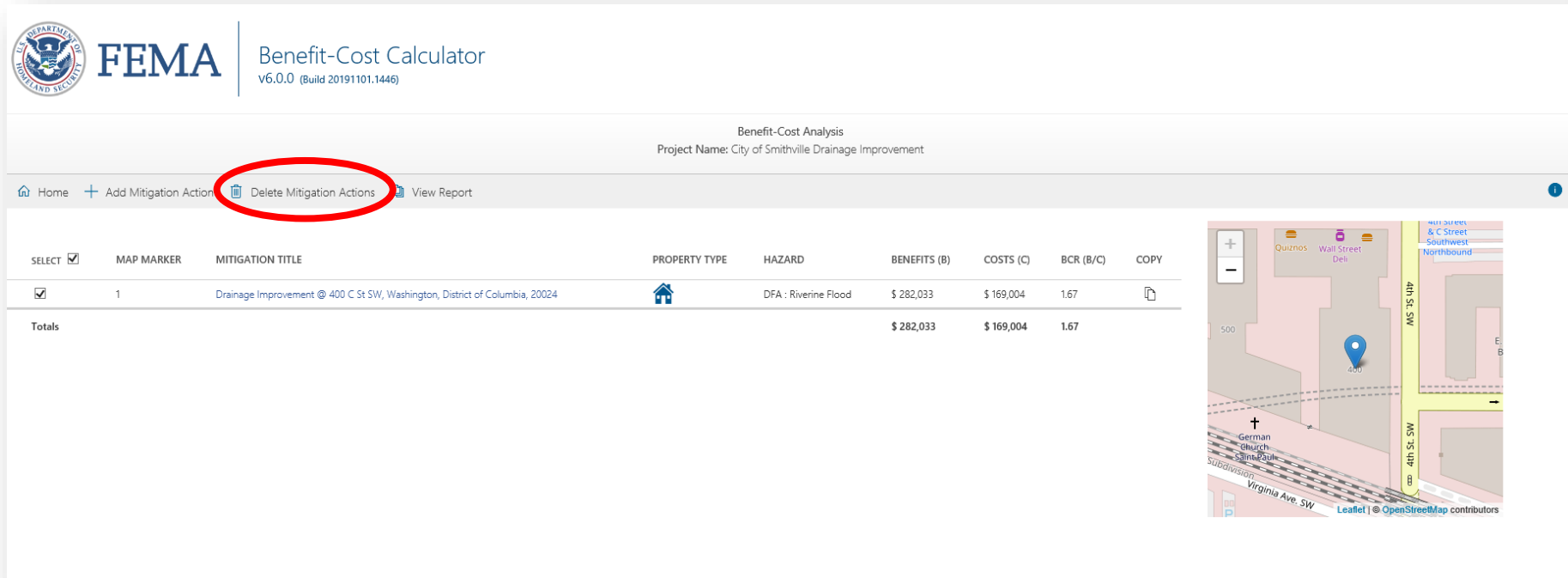
The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the text "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)" are visible. Below this, the project name "City of Smithville Drainage Improvement" is shown. A navigation bar includes links for Home, Add Mitigation Action (circled in red), Delete Mitigation Actions, and View Report. The main content area features a table with the following data:

SELECT	MAP MARKER	MITIGATION TITLE	PROPERTY TYPE	HAZARD	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☒	1	Drainage Improvement @ 400 C St SW, Washington, District of Columbia, 20024		DFA : Riverine Flood	\$ 282,033	\$ 169,004	1.67	
Totals					\$ 282,033	\$ 169,004	1.67	

To the right of the table is a map showing the project location at 400 C St SW, Washington, DC. The map includes labels for "German church Saint Paul", "Virginia Ave. SW", "4th St. SW", and "MS 15 4th". The map is credited to "Leaflet | © OpenStreetMap contributors".

Project Summary Screen

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



The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the text "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)" are visible. Below this, the project name "City of Smithville Drainage Improvement" is shown. A navigation bar contains links for "Home", "Add Mitigation Action", "Delete Mitigation Actions" (which is circled in red), and "View Report".

The main content area features a table with the following columns: SELECT, MAP MARKER, MITIGATION TITLE, PROPERTY TYPE, HAZARD, BENEFITS (B), COSTS (C), BCR (B/C), and COPY. The table contains one data row and a Totals row.

SELECT	MAP MARKER	MITIGATION TITLE	PROPERTY TYPE	HAZARD	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☒	1	Drainage Improvement @ 400 C St SW, Washington, District of Columbia, 20024		DFA : Riverine Flood	\$ 282,033	\$ 169,004	1.67	
Totals					\$ 282,033	\$ 169,004	1.67	

On the right side of the interface, there is a map showing the project location. The map includes labels for "4th St. SW", "MS 15 14th", "German Church", "Saint Paul", and "Virginia Ave. SW". A blue location pin is placed on the map. The map is credited to "Leaflet | © OpenStreetMap contributors".

Project Summary Screen

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

The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the text "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)" are visible. Below this, the project name "City of Smithville Drainage Improvement" is shown. A navigation bar includes links for Home, Add Mitigation Action, Delete Mitigation Actions, and View Report, with the latter highlighted by a red circle. The main content area features a table with columns for SELECT, MAP MARKER, MITIGATION TITLE, PROPERTY TYPE, HAZARD, BENEFITS (B), COSTS (C), BCR (B/C), and COPY. The table lists one mitigation action: "Drainage Improvement @ 400 C St SW, Washington, District of Columbia, 20024" with a value of 1 in the MAP MARKER column. A "Totals" row summarizes the data. To the right of the table is a map showing the project location in Washington, D.C., with a blue pin at 400 C St SW. The map includes labels for "German Church Saint Paul", "Virginia Ave. SW", "4th St. SW", and "MS 15 14th".

SELECT	MAP MARKER	MITIGATION TITLE	PROPERTY TYPE	HAZARD	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☒	1	Drainage Improvement @ 400 C St SW, Washington, District of Columbia, 20024		DFA : Riverine Flood	\$ 282,033	\$ 169,004	1.67	
Totals					\$ 282,033	\$ 169,004	1.67	

Project Report

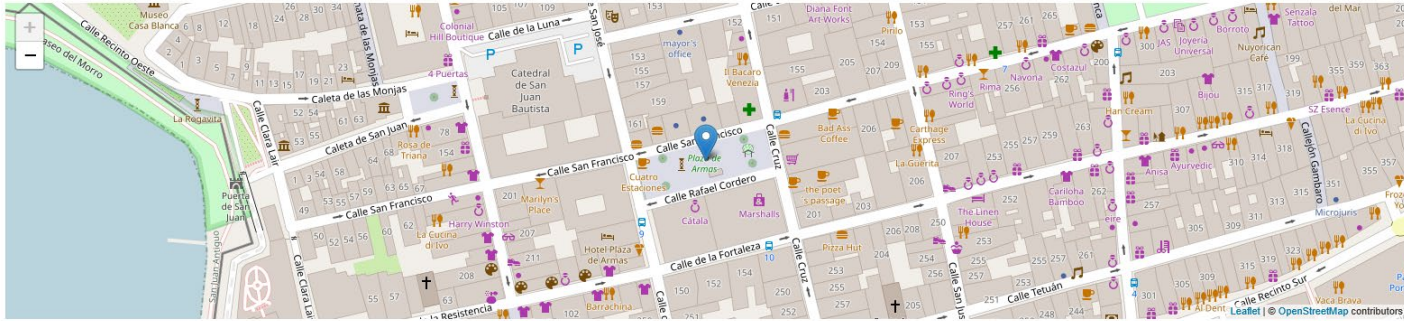
This is the project report. You can print it by clicking Print Report.

**FEMA**

Benefit-Cost Calculator
v6.0.0 (Build 20191101.1446)

Benefit-Cost Analysis
Project Name: Puerto Rico PV & Storage Energy Resiliency

[Close Report](#) [Print Report](#)

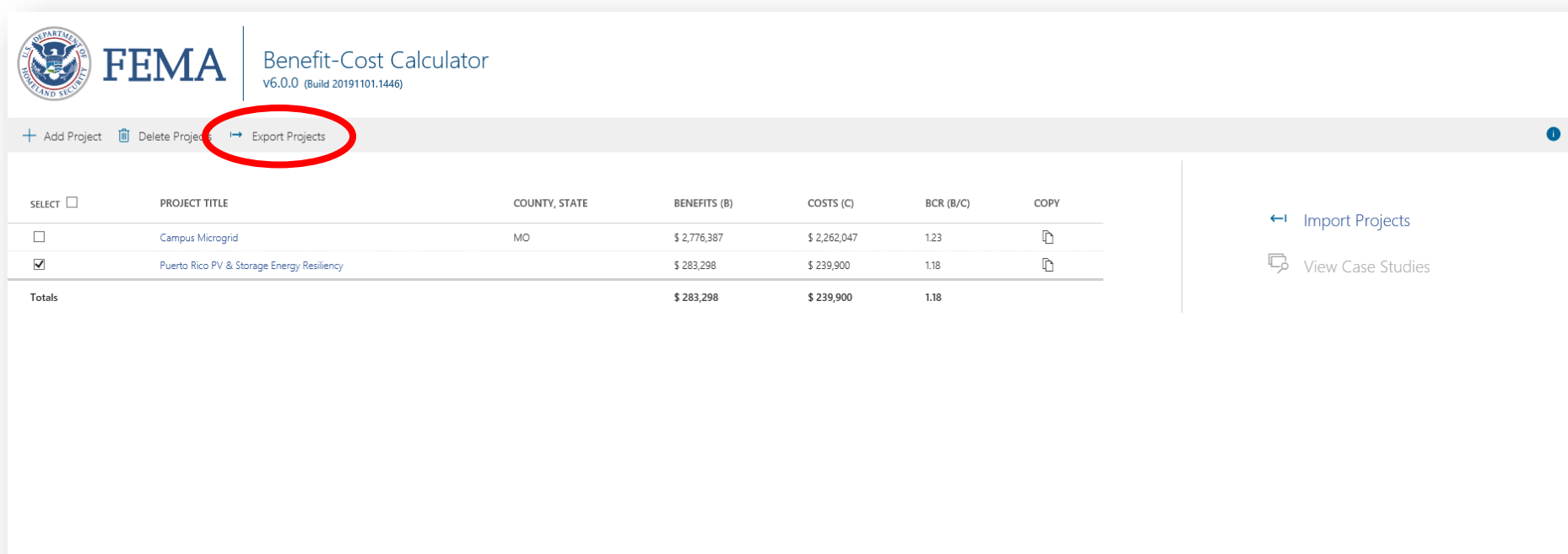


MAP MARKER	MITIGATION TITLE	PROPERTY TYPE	HAZARD	BENEFITS (B)	COSTS (C)	BCR (B/C)
1	Other @ San Juan, Puerto Rico		DFA : Infrastructure Failure	\$ 283,298	\$ 239,900	1.18
Totals				\$ 283,298	\$ 239,900	1.18

Property Configuration
Property Title: Other @ San Juan, Puerto Rico
Property Location: 00902, Select County, Puerto Rico

Exporting

To export your projects, click Export Projects.

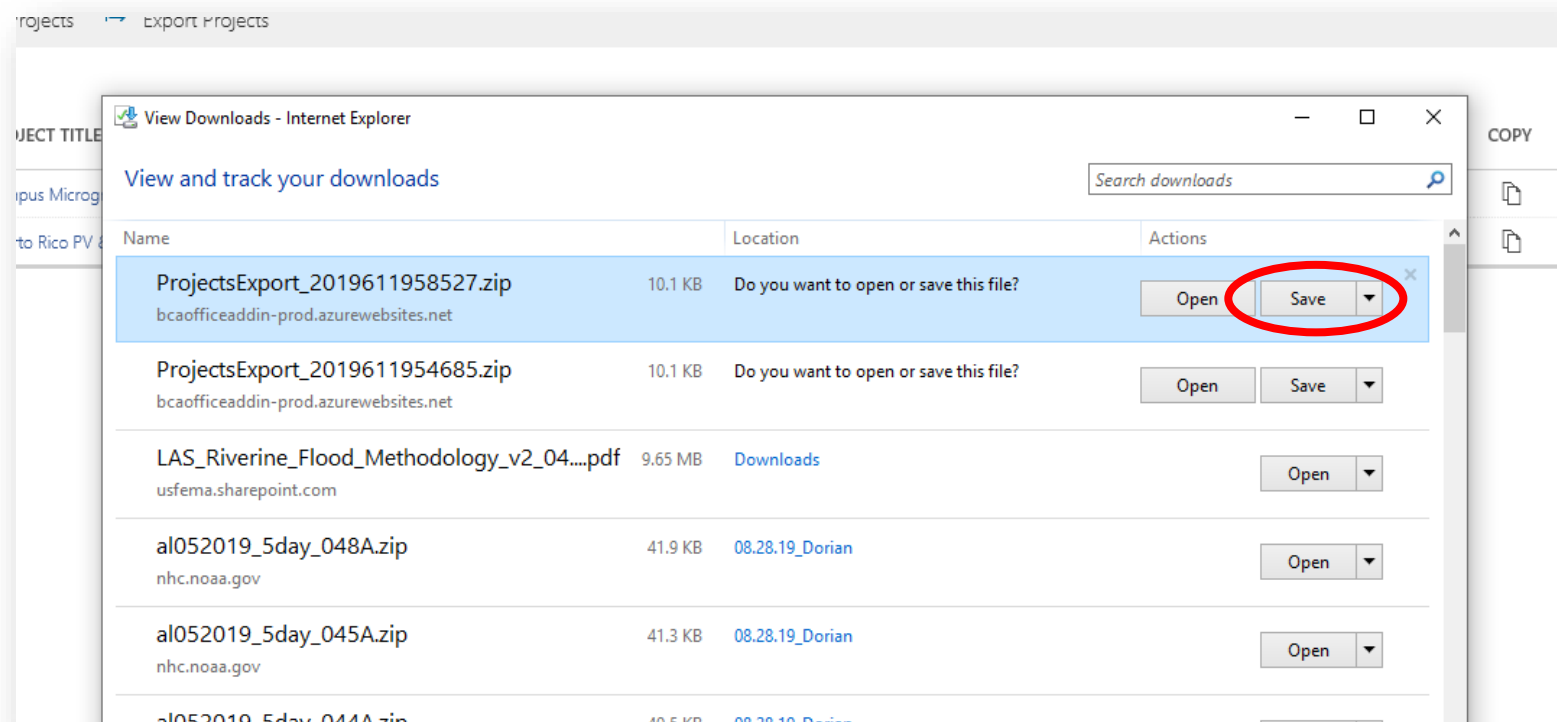


The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top left is the FEMA logo. The title 'Benefit-Cost Calculator' is followed by the version 'v6.0.0 (Build 20191101.1446)'. Below the header is a toolbar with three buttons: '+ Add Project', 'Delete Projects', and 'Export Projects'. The 'Export Projects' button is circled in red. To the right of the toolbar is a blue information icon. Below the toolbar is a table with the following columns: 'SELECT', 'PROJECT TITLE', 'COUNTY, STATE', 'BENEFITS (B)', 'COSTS (C)', 'BCR (B/C)', and 'COPY'. The table contains two data rows and a 'Totals' row. The first data row is 'Campus Microgrid' in 'MO' with benefits of \$2,776,387, costs of \$2,262,047, and a BCR of 1.23. The second data row is 'Puerto Rico PV & Storage Energy Resiliency' with benefits of \$283,298, costs of \$239,900, and a BCR of 1.18. The 'Totals' row shows a total benefit of \$283,298, total costs of \$239,900, and a BCR of 1.18. To the right of the table are two links: 'Import Projects' and 'View Case Studies'.

SELECT	PROJECT TITLE	COUNTY, STATE	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☐	Campus Microgrid	MO	\$ 2,776,387	\$ 2,262,047	1.23	
☒	Puerto Rico PV & Storage Energy Resiliency		\$ 283,298	\$ 239,900	1.18	
Totals			\$ 283,298	\$ 239,900	1.18	

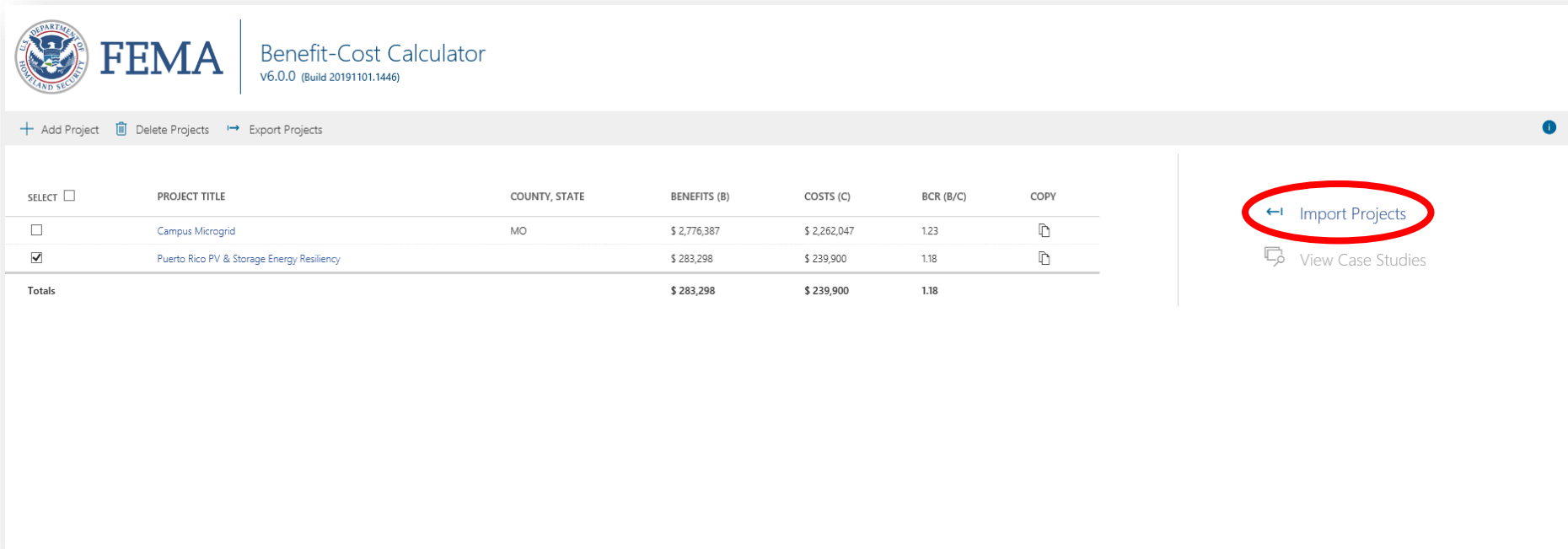
Exporting

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.

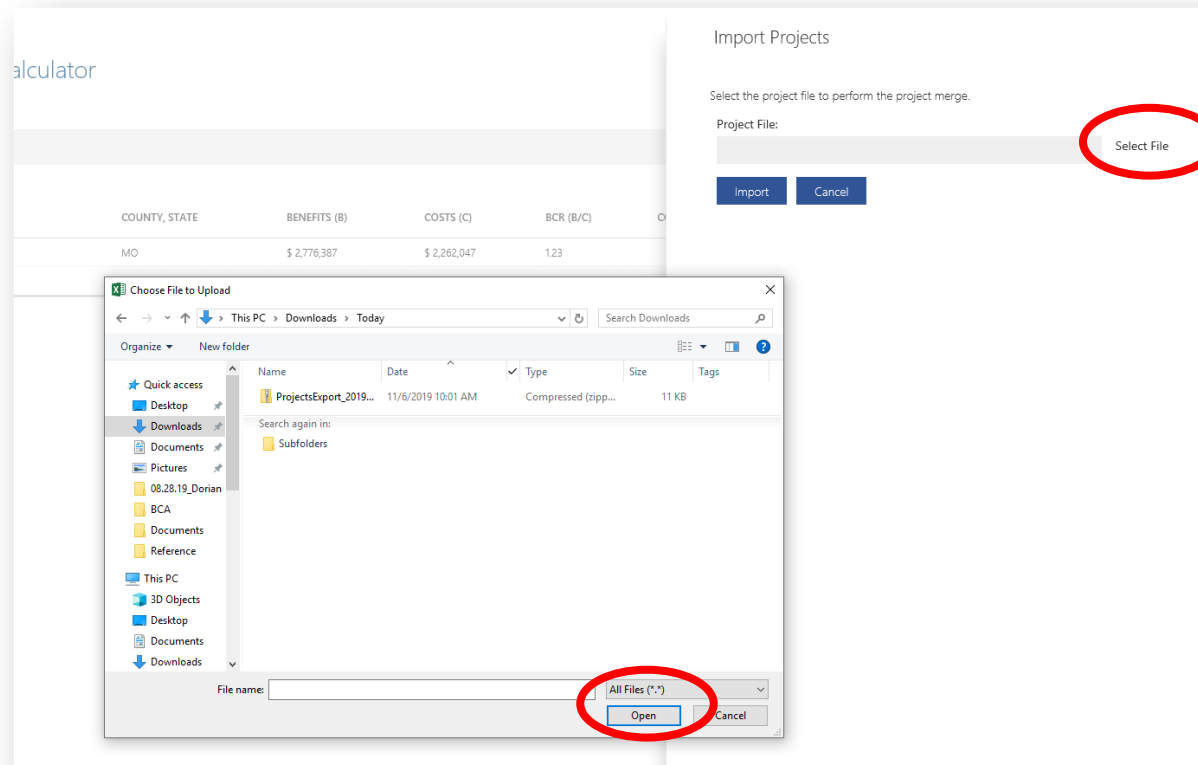


The screenshot shows the FEMA Benefit-Cost Calculator interface. The header includes the FEMA logo and the text "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)". Below the header, there are three buttons: "Add Project", "Delete Projects", and "Export Projects". The main content area features a table with the following columns: "SELECT", "PROJECT TITLE", "COUNTY, STATE", "BENEFITS (B)", "COSTS (C)", "BCR (B/C)", and "COPY". The table contains two rows of data and a "Totals" row. To the right of the table, there are two buttons: "Import Projects" (circled in red) and "View Case Studies".

SELECT	PROJECT TITLE	COUNTY, STATE	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☐	Campus Microgrid	MO	\$ 2,776,387	\$ 2,262,047	1.23	
☒	Puerto Rico PV & Storage Energy Resiliency		\$ 283,298	\$ 239,900	1.18	
Totals			\$ 283,298	\$ 239,900	1.18	

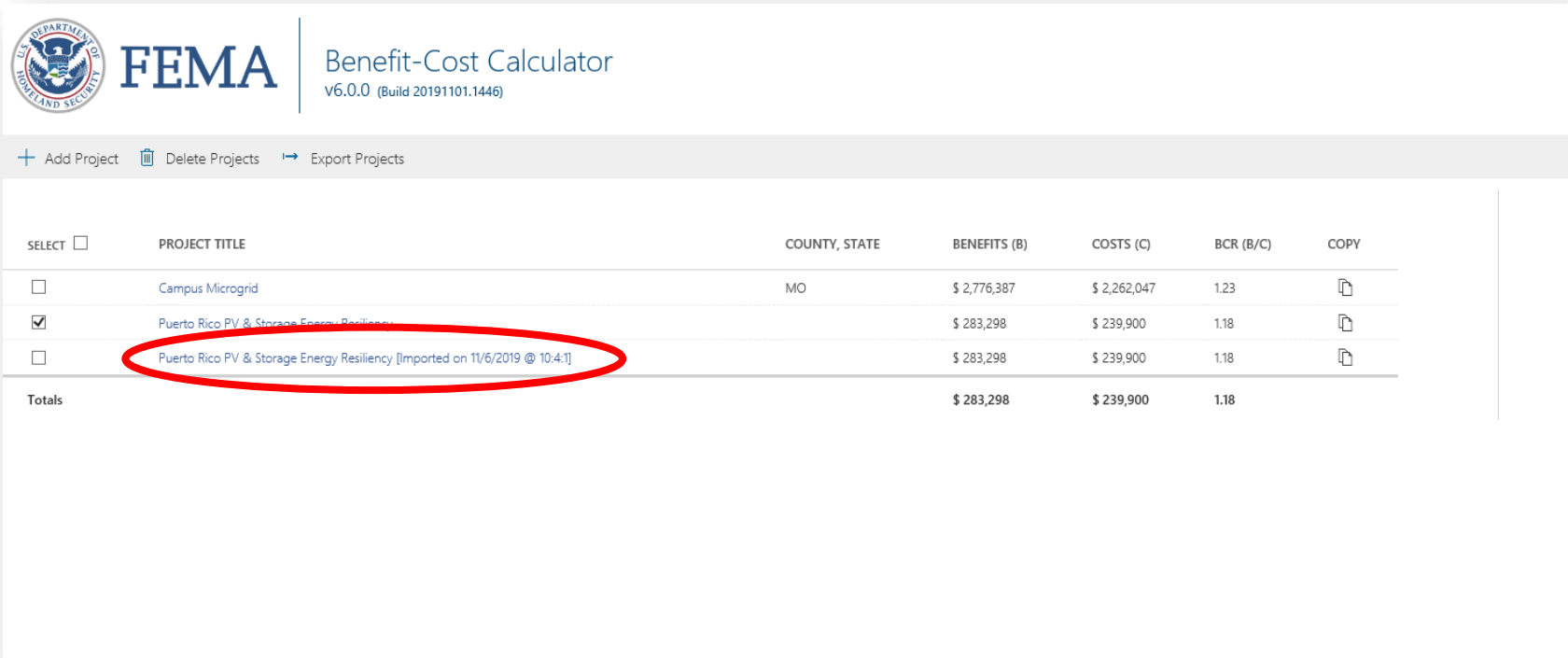
Importing

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.

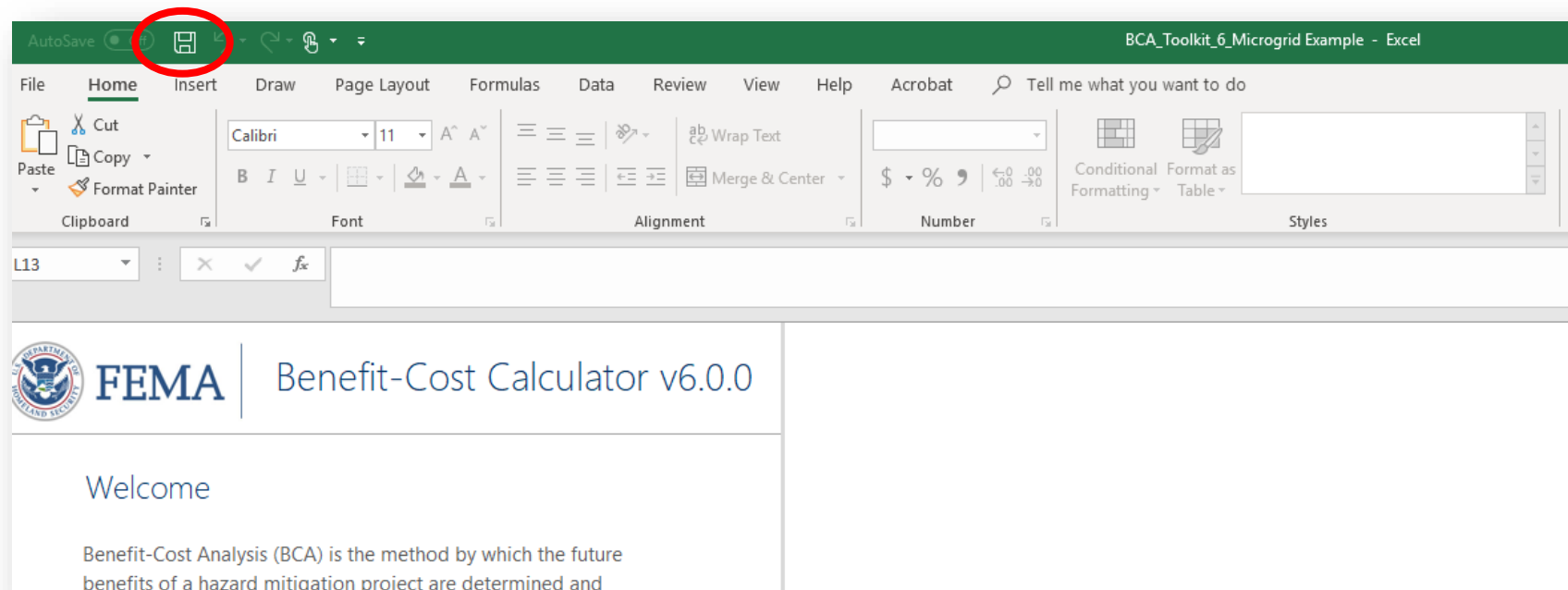


The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the text 'Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)' are visible. Below this, there are three buttons: '+ Add Project', 'Delete Projects', and 'Export Projects'. The main content is a table with the following columns: 'SELECT', 'PROJECT TITLE', 'COUNTY, STATE', 'BENEFITS (B)', 'COSTS (C)', 'BCR (B/C)', and 'COPY'. The table contains three rows of data. The first row is 'Campus Microgrid' with a value of \$2,776,387 in benefits and \$2,262,047 in costs, resulting in a BCR of 1.23. The second row is 'Puerto Rico PV & Storage Energy Resiliency' with a value of \$283,298 in both benefits and costs, resulting in a BCR of 1.18. The third row is 'Puerto Rico PV & Storage Energy Resiliency [Imported on 11/6/2019 @ 10:4:1]' with the same values as the second row. A red circle highlights the third row. At the bottom of the table, there is a 'Totals' row showing a total benefit of \$283,298, a total cost of \$239,900, and a total BCR of 1.18.

SELECT	PROJECT TITLE	COUNTY, STATE	BENEFITS (B)	COSTS (C)	BCR (B/C)	COPY
☐	Campus Microgrid	MO	\$ 2,776,387	\$ 2,262,047	1.23	
☒	Puerto Rico PV & Storage Energy Resiliency		\$ 283,298	\$ 239,900	1.18	
☐	Puerto Rico PV & Storage Energy Resiliency [Imported on 11/6/2019 @ 10:4:1]		\$ 283,298	\$ 239,900	1.18	
Totals			\$ 283,298	\$ 239,900	1.18	

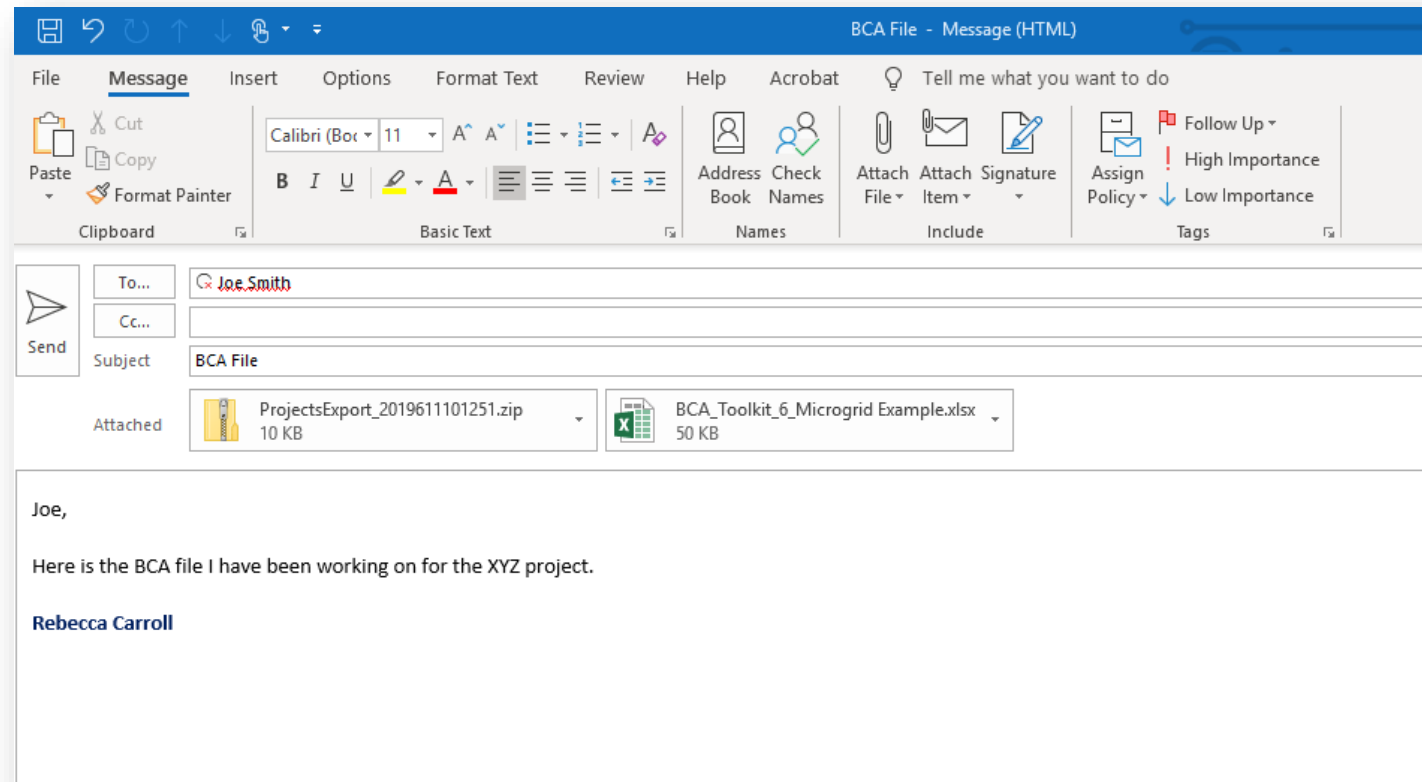
Saving Your Work

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.

The screenshot displays the FEMA Benefit-Cost Calculator interface. At the top, the FEMA logo and the title "Benefit-Cost Calculator v6.0.0 (Build 20191101.1446)" are visible. Below the header, there are navigation links for "Home" and "Project Summary". The main content area is divided into two sections: "Project Configuration" and "Cost Estimation".

The "Project Configuration" section includes the following fields and options:

- Project Title:** Campus Microgrid
- Property Location:** 1 N Grand Blvd, St. Louis, MO 63108, USA
- Use Property Location?** ☒ Yes
- Latitude/Longitude:** 38.6346955 / -90.2340587
- Use Decimal Degrees?** ☐ Yes
- Property Structure Type:** 63108
- Hazard Type:** Missouri
- Mitigation Action Type:** Utilities
- Property Title:** Infrastructure Failure
- Frequency and Damage Relationship based on:** Other
- Modeling Options:** ☐ Modeled Damages ☒ Historical Damages ☐ Professional Expected Damages

The "Cost Estimation" section includes the following fields:

- Enter the Project Useful Life:** 30
- Enter the Initial Project Costs (\$):** 2,200,000

A red circle highlights the information icon (i) in the top right corner of the Project Configuration section, indicating where users can access help content.

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.

The screenshot displays a software interface for 'Cost Estimation'. It features two input fields: 'Enter the Project Useful Life:' with the value '30' and 'Enter the Initial Project Costs (\$):' with the value '2,200,000'. To the right of these fields are comment boxes, indicated by a red circle around the icon in the top right corner. A modal window titled 'Add justification for Project Useful Life' is open, showing a text area with the justification: 'PUL was determined based on discussion with project engineer. See "PUL_Determination.pdf" in project application.' and a 'Save' button. The 'Initial Project Costs' field also has a comment box icon visible below it.

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.

Utilities Properties

Type of Service

Electrical

Number of Customers Served:

5,000

Value of Unit of Service (\$/person/day):

148

Total Value of Service Per Day (\$/day)

740,000

Use Default?

☒

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

