Avoiding Application Pitfalls

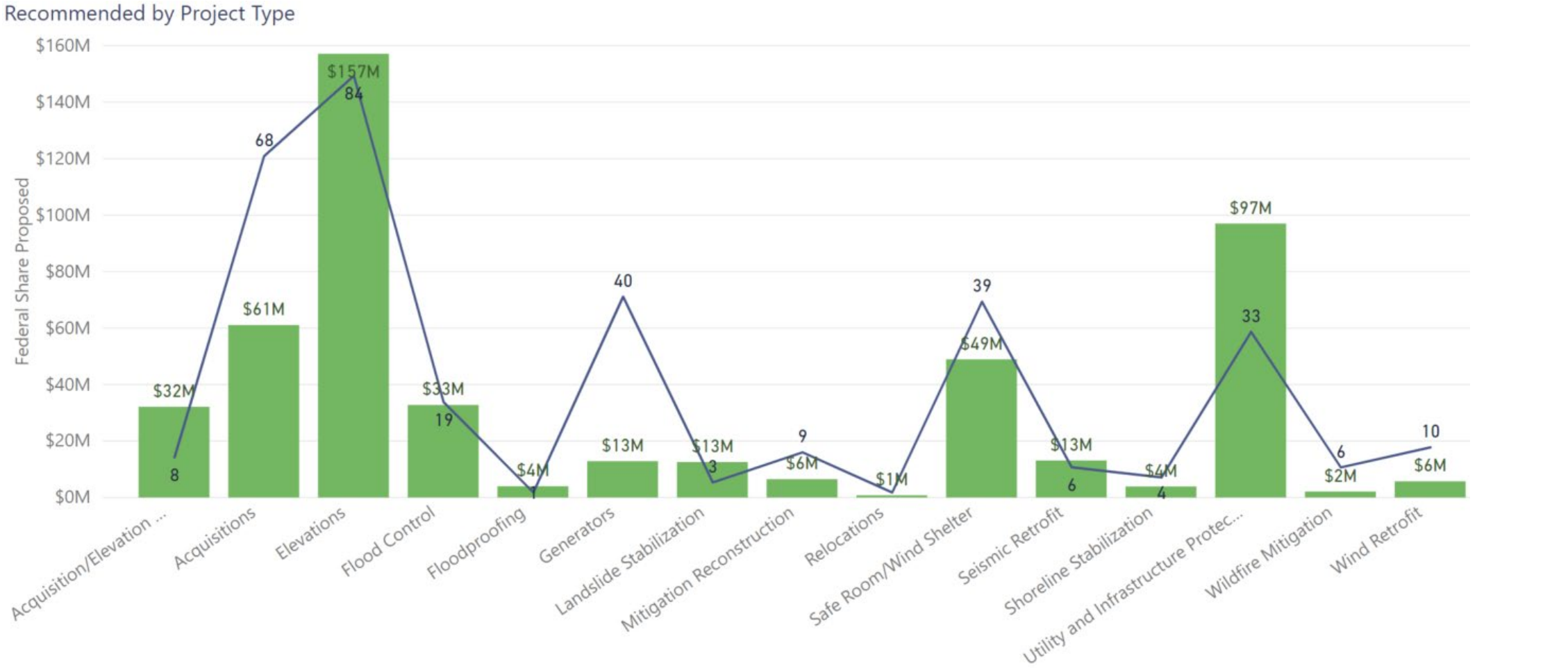
Lessons Learned from the Fiscal Year 2019 National Technical Review | September 1 & 2, 2020

FEMA

Agenda

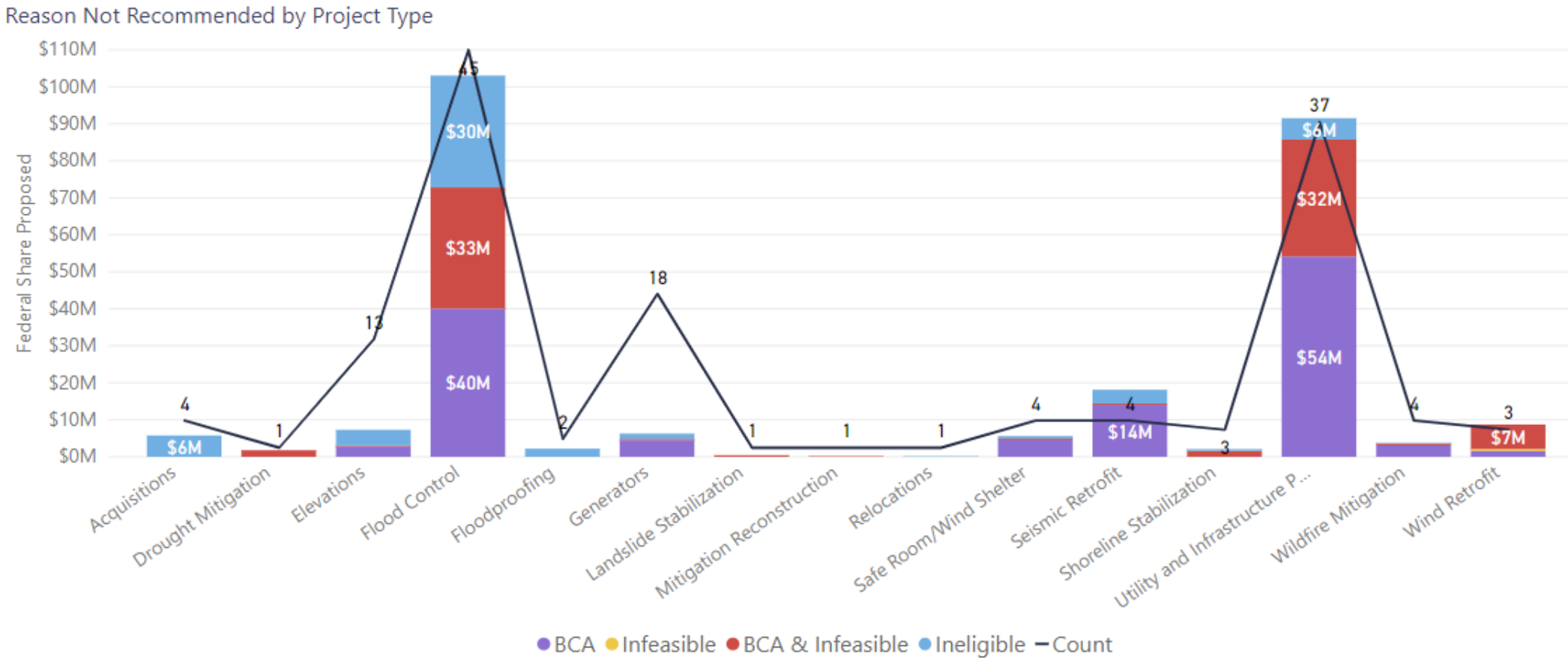
- Fiscal Year 2019 Summary
- Overall Observations (Pitfalls and Best Practices)
- Project Type Specific Observations
- Recommendations
- Questions and Answers

Areas to Maintain Success



FEMA

Areas for Focused Improvement



General Observations

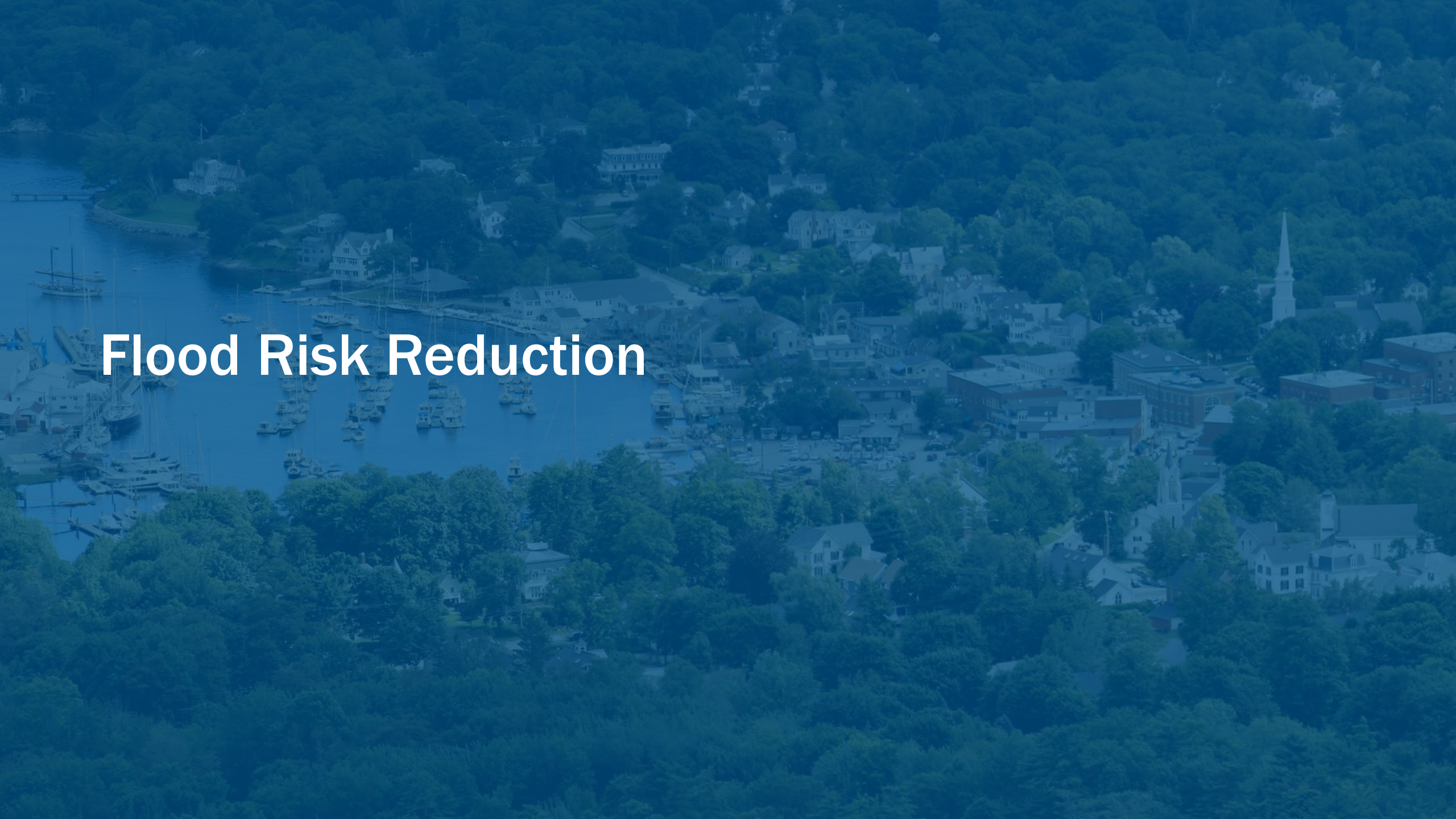
Application – Common Pitfalls

- Scope Conflicts with Industry Standards
- Before/After-Mitigation Damages Conflict
- Insufficient Documentation
  - Supporting Assumptions
  - Lack of a Vulnerability Assessment
- Inconsistencies Across Application – Especially Related to Level of Protection

BCA – Common Pitfalls

- Basis for Estimating Damages
  - Focus on Benefitting Area
  - Document Building / Infrastructure Features
    - Building Type, Number of Stories, First/Lowest Floor Elevation
    - Infrastructure Capacity, Population Served
  - Damages Align with Event Severity
- Recurrence Intervals (RI)
  - RI Increase with Event Severity
  - Period Between Events
  - User-Entered Analysis Durations
- Unsupported Benefit Cost Analysis (BCA) Inputs

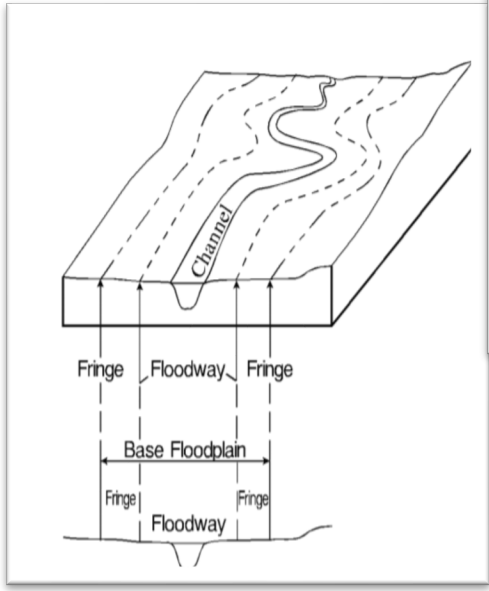
FEMA

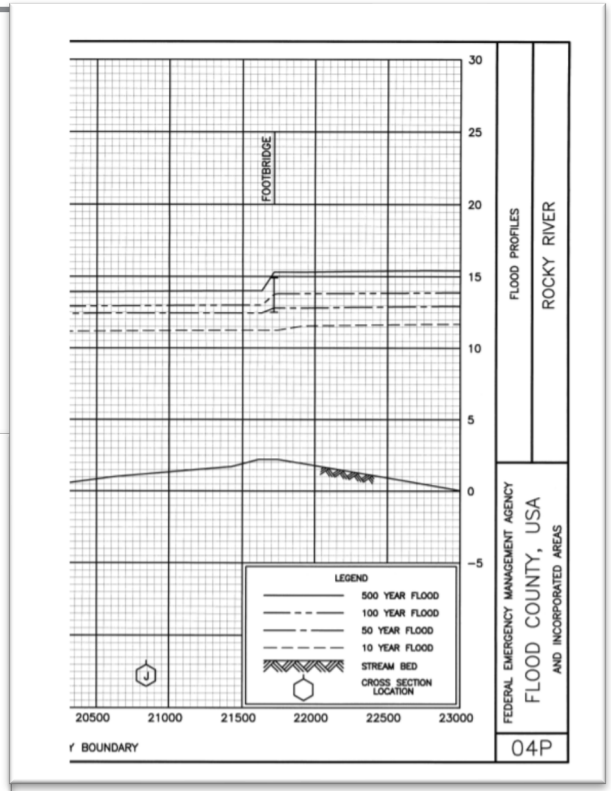


Flood Risk Reduction

Best Practices

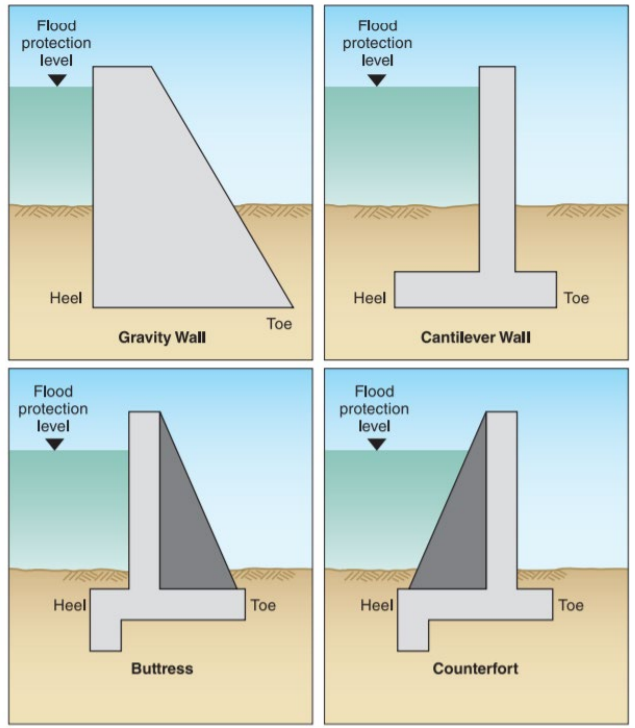
- Include pre- and post-project hydrologic and hydraulic (H&H) data with water surface elevations for multiple recurrence intervals and documented lowest floor elevations for structures (or elevation of vulnerable infrastructure – roads)
- Include at least 30% design and detailed cost estimate, clearly defined level of service
- Include a BCA narrative with detailed description of methodology, assumptions, and organized documentation of past damages and/or loss of function





Common Pitfalls

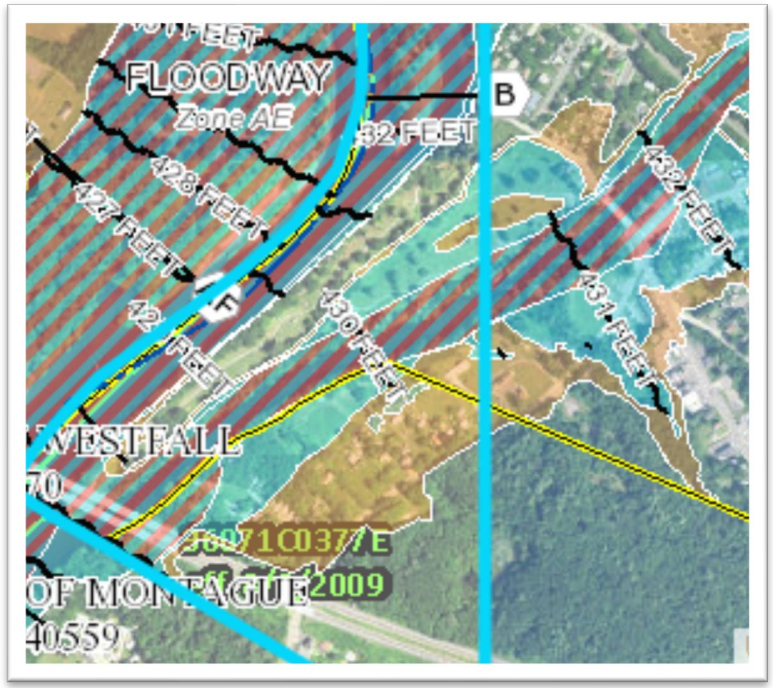
- Historical Damages: No supporting documentation of damages, downtime, and/or recurrence intervals
- Assumptions are unjustified and/or undocumented
- Lack of post-project damages, or after-mitigation damage inconsistent with level of protection in scope of work
- Not clearly defined/documented as a stand-alone solution
- Lack of documentation of upstream/downstream impacts

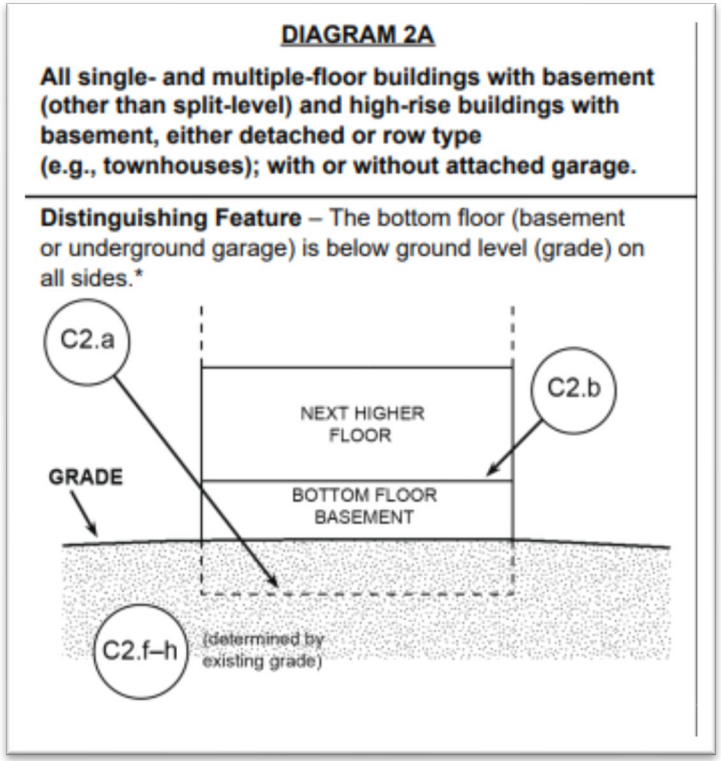


Acquisition and Elevation

Best Practices and Common Pitfalls

- Identify Flood Risk
- Properly Apply Efficiencies
- Select Correct Lowest Floor Elevation

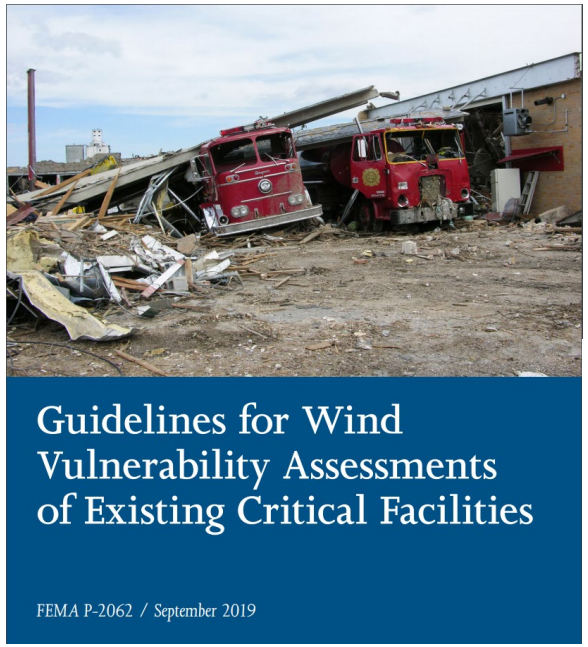


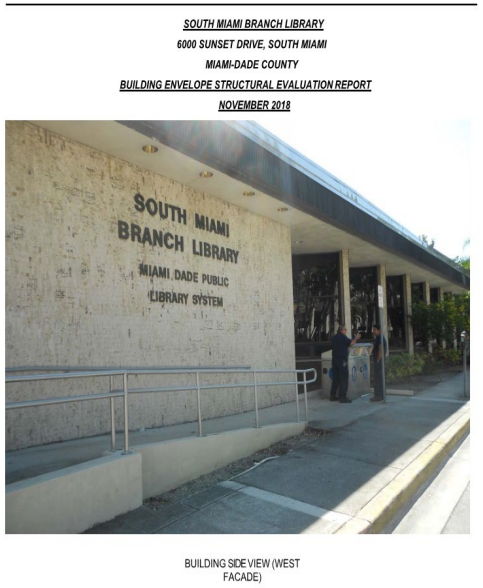


Wind Retrofit

Best Practices

- Confirm that the building envelope and structural system can resist current code level wind speeds
- Provide a wind vulnerability assessment report indicating components in need of a wind retrofit
- Verify that impact protective systems are rated to wind speeds and missile impacts for building location
- Process for inspecting and certifying retrofit





Common Pitfalls

- Using impact protective systems with known vulnerabilities, such as screens and films
- Not performing a wind vulnerability assessment
  - Addressing only the windows and doors, but not other building components
- Insufficient documentation for Annual Operating Budget, Building Replacement Value (BRV), and Loss of Function (LOF)

Wildfire Mitigation

Best Practices and Common Pitfalls

- Treatment area and proximity to other structure
  - Maps with clear project site boundaries
  - Identification of benefiting structures
  - Project clearly meets FEMA eligibility requirements and aligns with recommended best practices

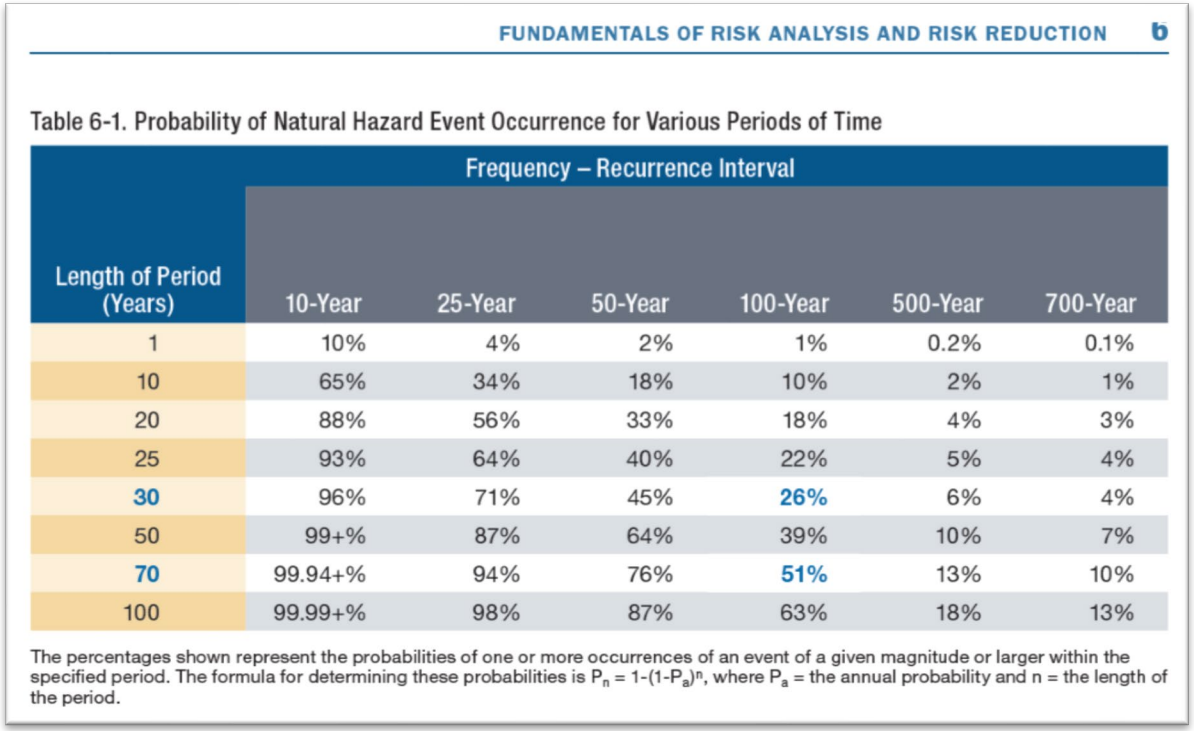
Energy Resiliency

Best Practices

- Identify emergency power needs in critical facilities
- Complete (transfer switch, fuel, etc.) multi-hazard (flood, wind, etc.) solution
- Establish clear basis for risk
  - Probability (recurrence interval)
  - Exposure (loss of function impact)

Common Pitfalls

- Lack of documentation/explanation to support
  - Probability/recurrence interval
  - Loss of function impact
  - Criticality
  - Basis for required emergency power generation capacity
  - Components required to implement (e.g., fuel storage capacity, transfer switch)
  - Existing conditions
- No residual risk



FUNDAMENTALS OF RISK ANALYSIS AND RISK REDUCTION 6

Table 6-1. Probability of Natural Hazard Event Occurrence for Various Periods of Time

Length of Period (Years)	Frequency – Recurrence Interval					
	10-Year	25-Year	50-Year	100-Year	500-Year	700-Year
1	10%	4%	2%	1%	0.2%	0.1%
10	65%	34%	18%	10%	2%	1%
20	88%	56%	33%	18%	4%	3%
25	93%	64%	40%	22%	5%	4%
30	96%	71%	45%	26%	6%	4%
50	99+%	87%	64%	39%	10%	7%
70	99.94+%	94%	76%	51%	13%	10%
100	99.99+%	98%	87%	63%	18%	13%

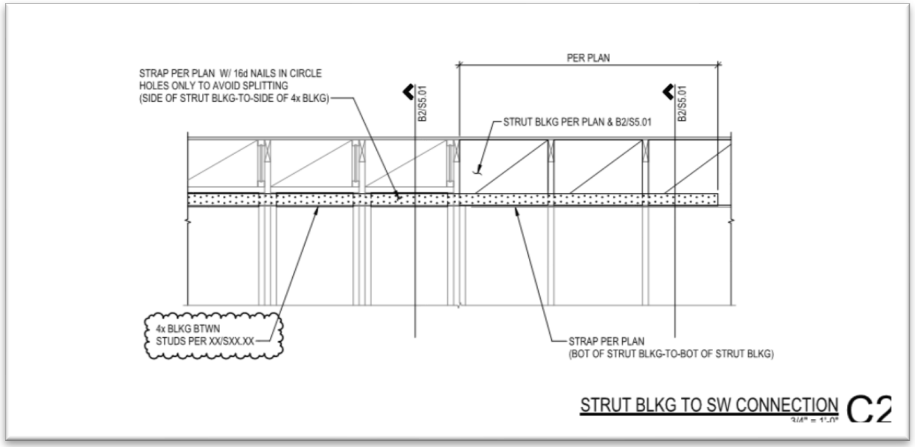
The percentages shown represent the probabilities of one or more occurrences of an event of a given magnitude or larger within the specified period. The formula for determining these probabilities is $P_n = 1-(1-P_a)^n$, where P_a = the annual probability and n = the length of the period.

FEMA P-55, Coastal Construction Manual, Volume 1, August 2011

Seismic Retrofit

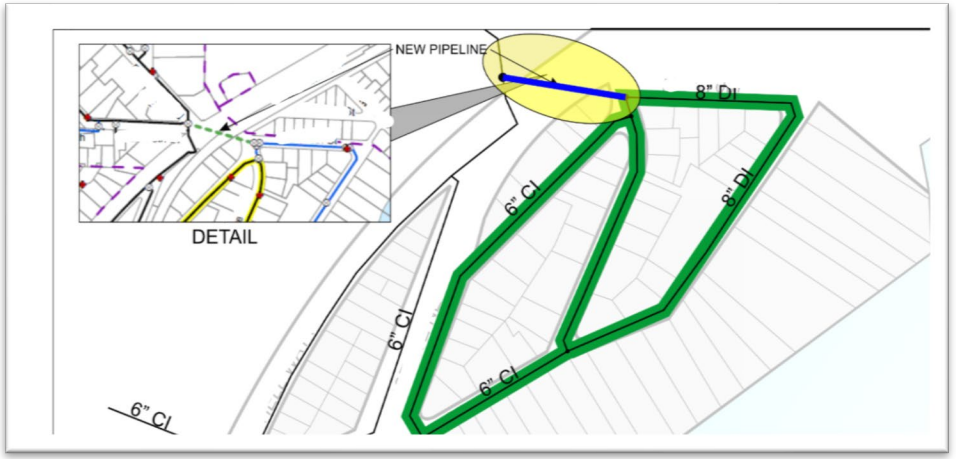
Best Practices

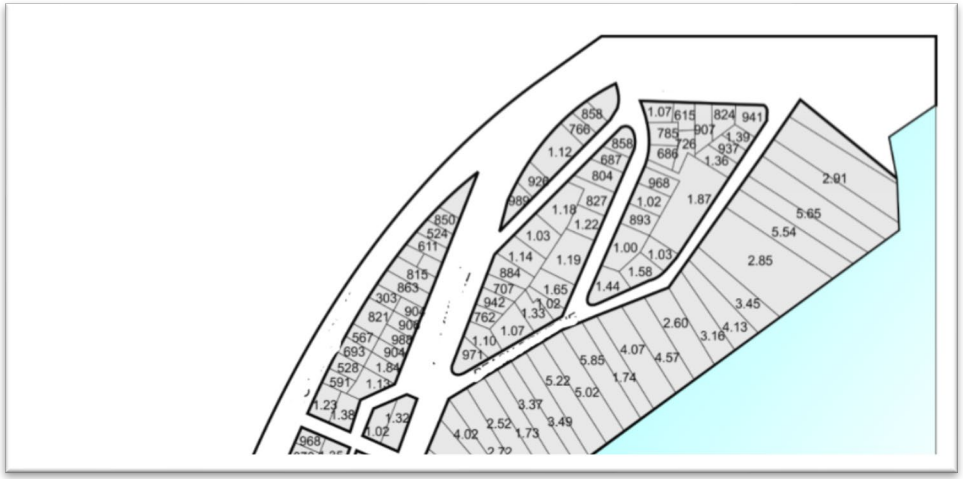
- Include Seismic Evaluation Report complied by an engineer and performed in accordance with American Society of Civil Engineers (ASCE)/Structural Engineering Institute (SEI) 41
- Provide drawings with details of retrofit approach
- BCA: Document loss of service validation (number of customers, coverage area).
  - For hospitals, and police and fire stations, clearly indicate the nearest available location (or the station next in line if the nearest is known to be unavailable or vulnerable)
- BCA: For historical damage seismic (e.g., utility) projects: Provide recurrence interval based on thorough analysis



Common Pitfalls

- Historical Damages: Determining seismic recurrence interval based on time between seismic events
  - Each event has its own recurrence interval
- Including land value in BRV
- Assuming 100% probability of dual probability events occurring, such as uncontrolled fire and loss of potable water utility

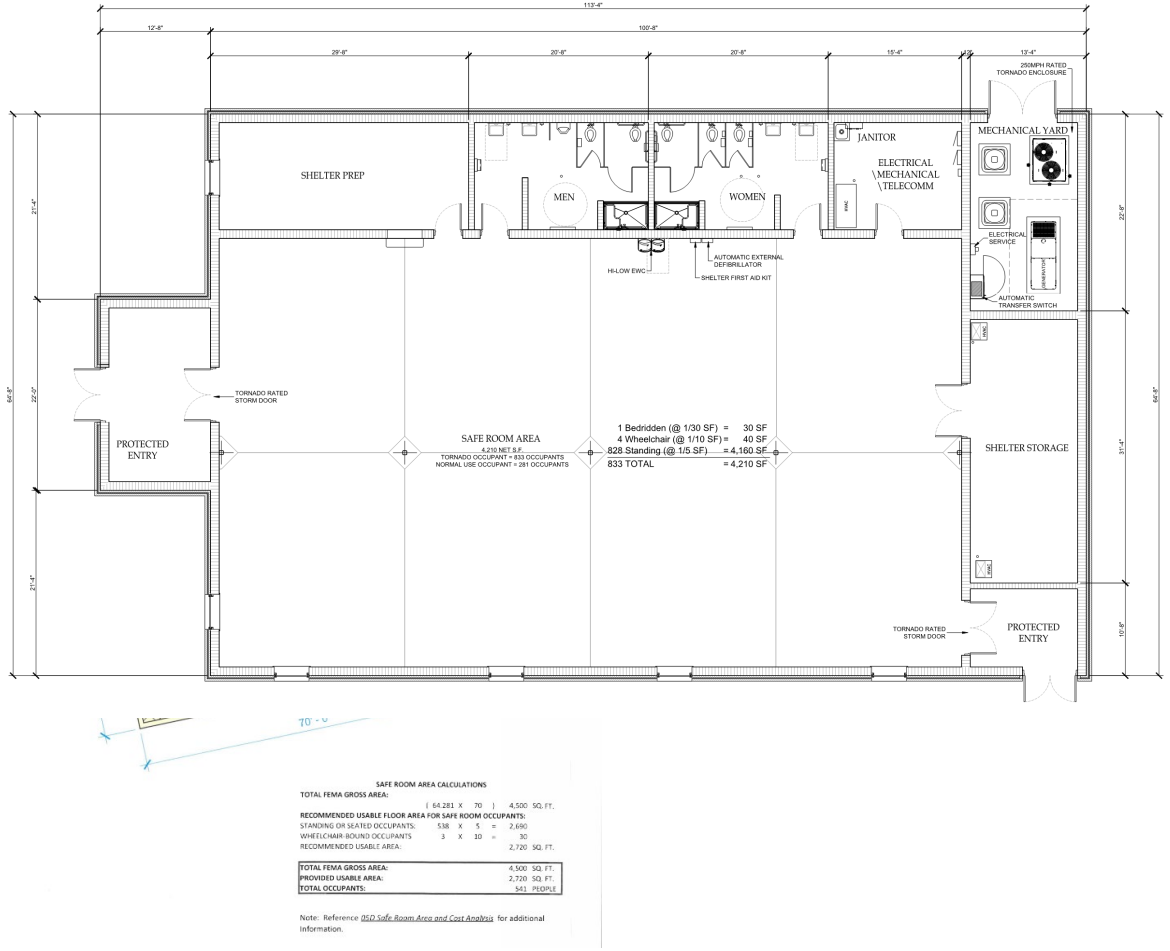




Safe Rooms

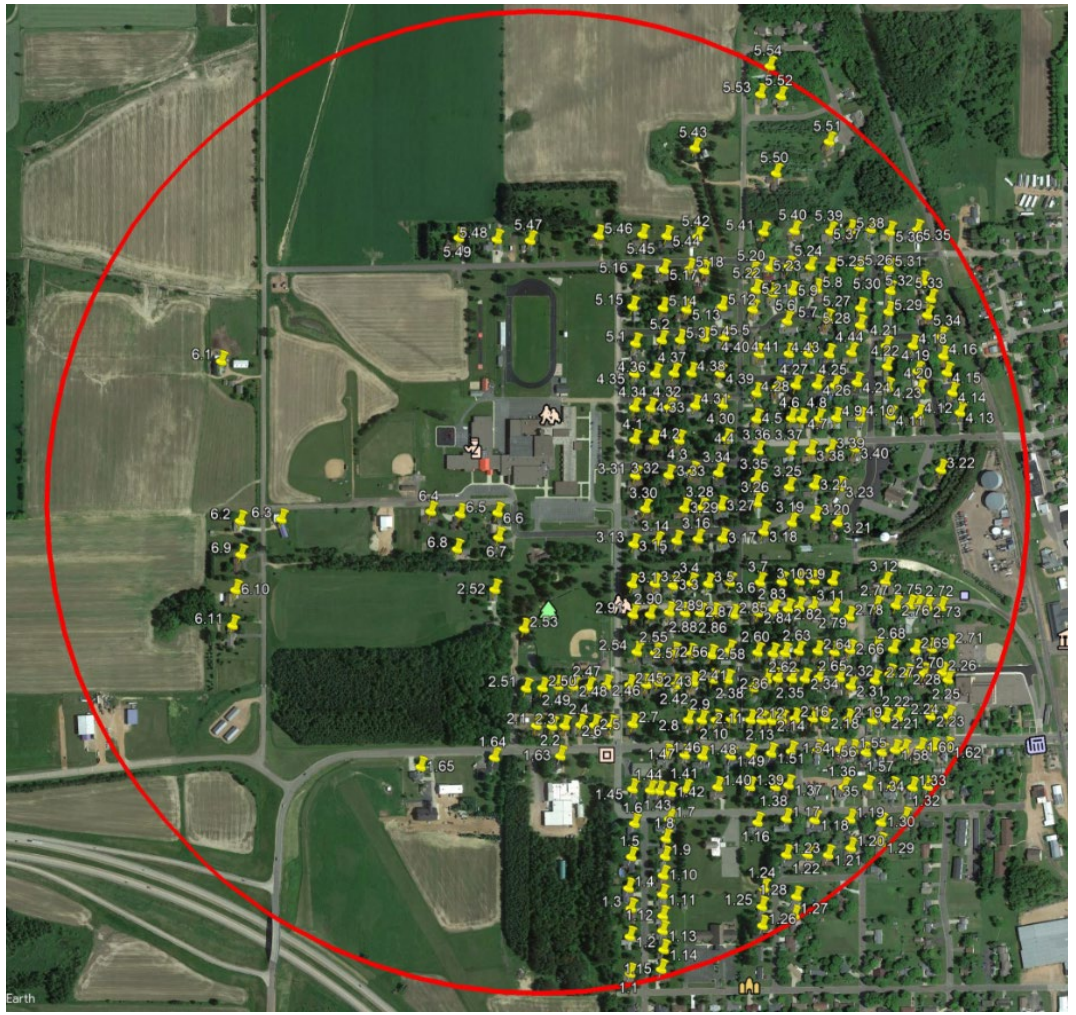
Best Practices

- Statement that the safe room will be designed and constructed in accordance with the current edition of FEMA P-361
- Statement that doors and any opening will meet the wind pressure and wind-borne debris missile impact requirements of FEMA P-361
- Provide conceptual floor plan that identifies usable and unusable areas, restrooms with fixtures, MEP rooms, emergency power systems
- Use an internal pressure coefficient of ±0.55



Common Pitfalls

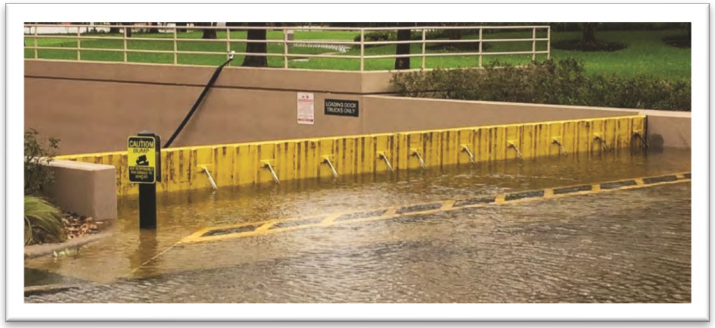
- Use of Historical Damages module for Safe Room BCA
- Identifying potential protected occupants from a 0.5-mile radius instead of the 0.5-mile travel distance.
- Not providing sufficient planning factors or logistics (e.g., parking spaces, usable area) for large occupancy safe rooms
  - Not providing an analysis or statement indicating that an existing residential area road network is able to handle a sudden influx of traffic

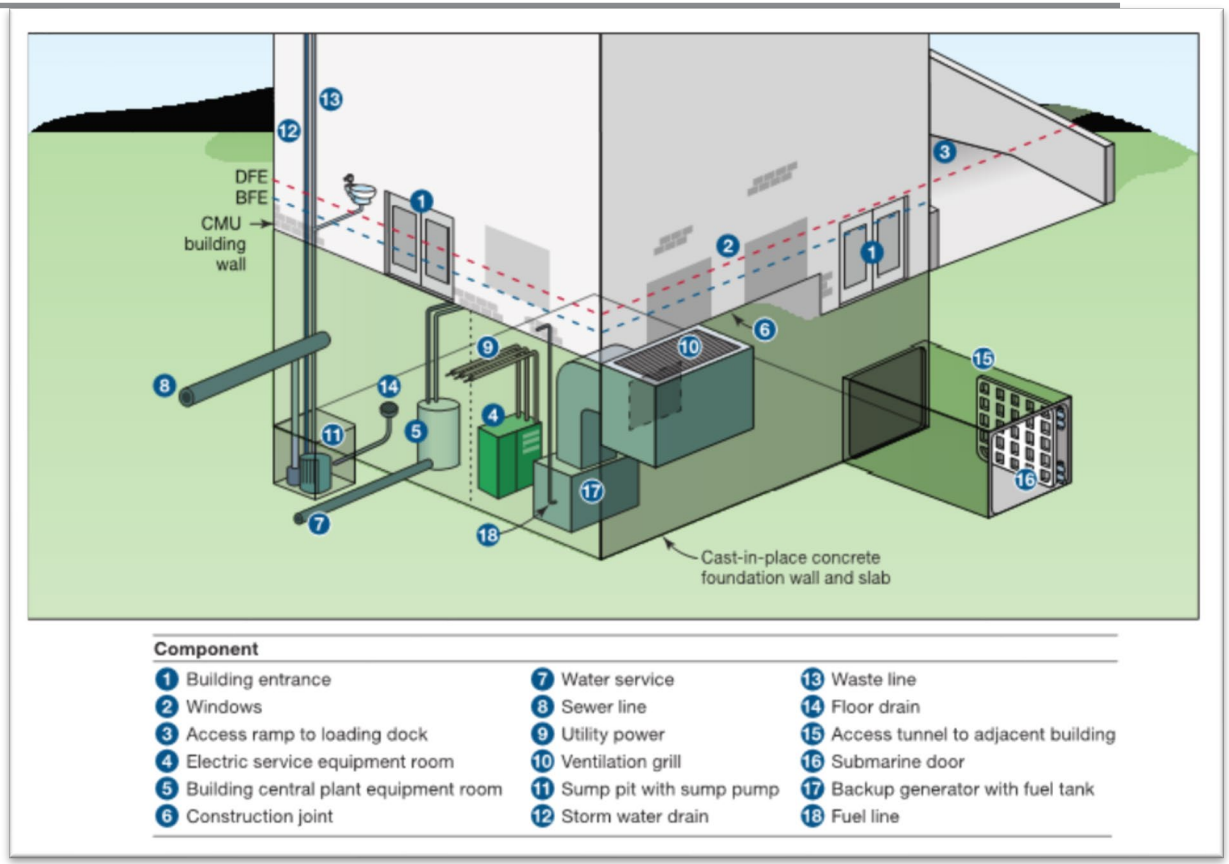


Dry Floodproofing

Best Practices

- Provide the flood vulnerability assessment report, prepared by a design professional, that states components in need of mitigation
- Provide documentation indicating flood risk and design flood elevation
- Utilize closure systems that are ANSI/FM 2510 certified





Component		
1 Building entrance	7 Water service	13 Waste line
2 Windows	8 Sewer line	14 Floor drain
3 Access ramp to loading dock	9 Utility power	15 Access tunnel to adjacent building
4 Electric service equipment room	10 Ventilation grill	16 Submarine door
5 Building central plant equipment room	11 Sump pit with sump pump	17 Backup generator with fuel tank
6 Construction joint	12 Storm water drain	18 Fuel line

Common Pitfalls

- Noncompliance with ASCE 24
  - Placing dry floodproofing in V flood zones or areas where water velocity exceeds 5 ft/sec
  - No sump pumps
  - No emergency power systems
- Only addressing protection to doors and not mitigation of other vulnerabilities, such as seepage though the building envelope and utility penetrations

FEMA

Recommendations

- BCA Narrative
- Project Scoping
- Efficiency Mechanisms
- Review Memo Feedback

Contact Information

Thank you.

BCA Questions
bchelpline@fema.dhs.gov
855-540-6744

Program Questions
866-222-3580

FEMA