

B-RESILIENT™

Building Resilience Assessment Tool

[Enhancing Resilience of LEED and RELi projects through Climate Risk Analysis](#)
Green Business Certification Inc. | DECEMBER 7, 2020

[An EU task force recommends ways companies can measure and respond to climate change risks](#)
The Invading Sea | JULY 28, 2020

[Accelerating climate resilience through asset-level risk assessment insights](#)
AWS Public Sector Blog | FEBRUARY 27, 2020

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A 6-Step Process to Accelerate Resilience



More frequent and costly floods, natural hazards and climate change impacts have brought with them negative impacts on physical building assets, business continuity and asset values. As a result, building owners and operators, investors, lenders and other stakeholders should utilize Coastal Risk's [RiskFootprint™](#) Dashboard technology for portfolio and asset-level risk assessments and our B-Resilient™ process to make your buildings safer, more sustainable and resilient.

Why Should You B-Resilient™?

Over the past 40-years, the number of natural disasters causing financial losses in excess of \$1 billion has risen steadily. Since 1980, the U.S. has sustained 258 weather and climate disasters exceeding \$1 billion. The cumulative cost for these events exceeds \$1.75 trillion.

<https://www.climate.gov/news-features/blogs/beyond-data/2010-2019-landmark-decade-us-billion-dollar-weather-and-climate>

During 2020, the U.S. was impacted by 22 separate billion-dollar plus disasters, including 7 major hurricanes and 13 severe storms. 2020 marked the seventh consecutive year (2014-20) in which 10 or more billion-dollar plus disaster events have impacted the U.S.

<https://www.scientificamerican.com/article/billion-dollar-disasters-shattered-u-s-record-in-2020/>

As a result of these trends, real estate investors, owners and operators, lenders and other stakeholders need to better understand individual building risks, including the risks in surrounding communities, and the cost and benefits of risk mitigation investments. Until recently, the availability of detailed, location-specific information has been limited. This situation has changed with new technologies such as the **RiskFootprint™** Dashboard and the B-Resilient™ Advisory Service from Coastal Risk.

New Technology is Here, Now

New technologies, such as **RiskFootprint™** and **B-Resilient™** improve both risk management and resilience of commercial real estate through better assessment of building-specific risks and mitigation options in order to protect assets and values and ensure business continuity by making new and existing buildings more resilient to floods, natural hazards, and climate impacts.

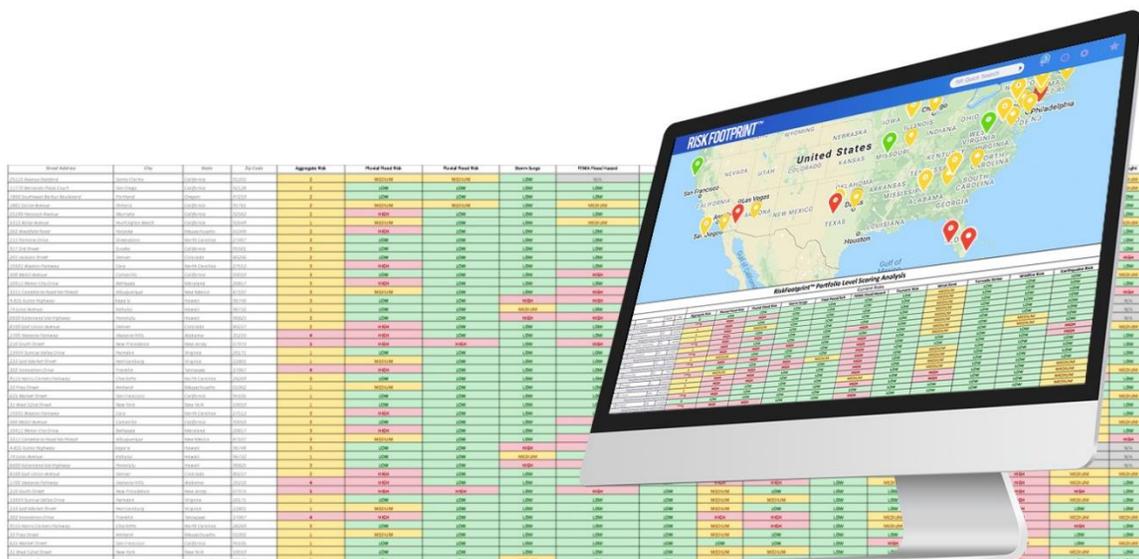
With new technologies entering the market, CRE investors, asset owners, lenders and building occupiers can introduce more systematic assessments of building exposures and vulnerabilities. A best practice assessment tool is Coastal Risk's RiskFootprint™ Dashboard, which covers flood, natural hazards, and climate impact risks, for every property in the US and many areas, globally. This holistic risk assessment program improves the client's understanding of hazards, reduces vulnerability, and helps structure plans for risk mitigation investments and business emergency procedures.

STEP 1 Portfolio Risk Screening

The first step in the **B-Resilient™ 6-Step process** involves using the **RiskFootprint™ Dashboard** to establish flood, natural hazard, and climate impact risk profiles for assets in company, government, or investment fund portfolios. This triage approach qualitatively scores assets as low, medium, and high risk for aggregate risks, nine current risks (pluvial, fluvial, FEMA, storm surge, tsunami, wind, tornado, earthquake, and wildfire), and, four future climate impact risks, including: sea level rise, extreme heat, extreme rainfall, and risk of drought.

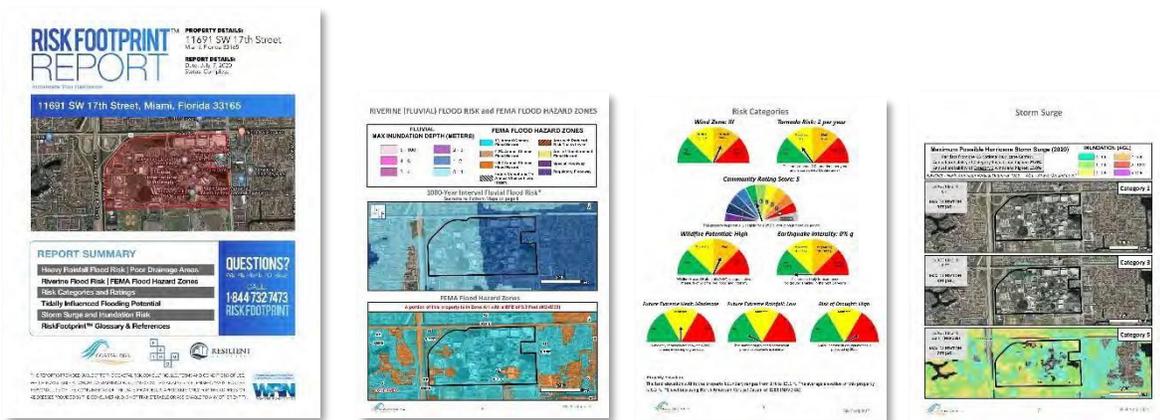
Once the portfolio scoring has been completed, then, the investor, owner or operator will know which assets are most at risk and can decide (based on budgetary and other considerations), which ones to focus on with more granularity.

Our risk management experts work with you and the portfolio-level report to better understand where risks may be concentrated. The risk-scored spreadsheet is statistically analyzed, and graphics created such as pie charts and bar graphs to answer such questions as: (1) what percentage of my portfolio has a “red zone” aggregate risk score? (2) what percentage of my California properties are located in wildfire or earthquake risk areas? (3) which assets are located in neighborhoods with high-risk scores for flooding? or, (4) which assets will have a significant increase in Cooling Degree Days and increased energy costs due to climate change impacts? The portfolio spreadsheet of risk scores can be used in PRI/TCFD and other physical climate risk disclosure programs. Additionally, the RiskFootprint™ scores and reports can be used in the US Green Building Council’s LEED, RELi, and Resilience Pilot Credit Programs, <https://www.usgbc.org/articles/introducing-riskfootprint-enhancing-resilience-through-climate-risk-analysis>



STEP 2 Property-Level Risk Assessment

The second step in this process is to order and review the in-depth, RiskFootprint™ Reports for buildings at highest risk (and neighborhood and supply route impacts). These site-specific reports include quantitative, threat probabilities, inundation depths and other important analytics (e.g., visualizing areas of the property/building most at risk). This analysis is performed at a high level of granularity (typically, 1-3-meter resolution, if available).

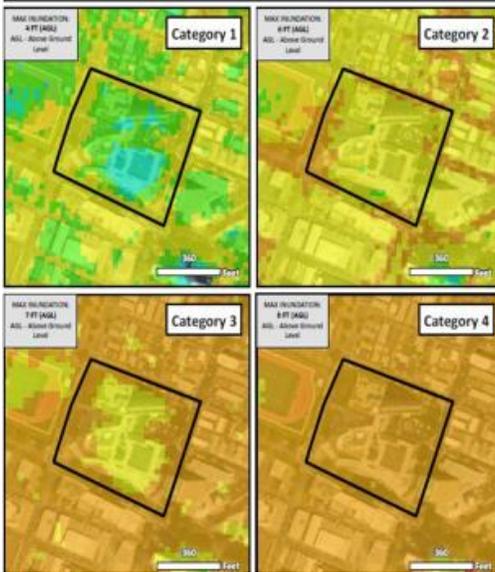


STEP 3 Damage/Loss Calculations

Estimating the cost of risk mitigation for any particular property is not difficult. Architects and engineering or other specialized vendors can provide this type of information. But, in order to properly utilize this cost information in the decision-making process, management must understand the cost-benefit of risk mitigation investments (ROI). To do cost-benefit calculations, the asset owner needs to understand the “benefit” of the investment. What is being gained from the risk mitigation investment and, is it worth the cost? Can the potential damage simply be covered by insurance? To accomplish this, we provide estimates of “avoidable” damage and loss from floods, natural hazards, and future climate change to help owners determine the ROI of asset-protective investments. An example of a damage/loss for hurricane storm surge damage/loss for a condo complex in Honolulu, HI, is shown below.

Cost/Benefits of Risk Mitigation Investments

Projected Inundation from Hurricane Storm Surge



Estimate economic “avoided losses” for all flood/hazard scenarios, including structure, contents, and business interruptions;
 Enable property owners, operators, investors, and insurers to make better decisions, faster.

Hurricane Category	Facility	First Floor Height	Flooding Depth (feet)	Flooding Depth in Structure (feet)	Building Loss Percent (First Floor)	Building Repair Cost	Content Loss Percent (First Floor)	Restoration Time (Days)
1	East Tower	0.75	2.0	1.25	18.3%	\$668,505	26.2%	270 - 450
	West Tower	0.75	2.0	1.25	18.3%	\$668,505	26.2%	270 - 450
2	East Tower	0.75	3.0	2.25	25.8%	\$943,234	33.5%	270 - 450
	West Tower	0.75	3.0	2.25	25.8%	\$943,234	33.5%	270 - 450
3	East Tower	0.75	4.0	3.25	28.3%	\$1,034,810	35.5%	270 - 450
	West Tower	0.75	4.0	3.25	28.3%	\$1,034,810	35.5%	270 - 450
4	East Tower	0.75	5.0	4.25	29.5%	\$1,080,598	38.0%	360 - 540
	West Tower	0.75	5.0	4.25	29.5%	\$1,080,598	38.0%	21 360 - 540

STEPS 4 & 5 Risk Mitigation Cost Estimation & Recommend Solutions

Step Four entails an evaluation, at the concept level, of cost-effective, risk mitigation (adaptation) options that may be available to reduce the risk and vulnerability to specific assets, also taking the asset’s sensitivity and criticality into account. Step 4 typically involves engaging specialized experts who can help the client match the risks identified in Steps 1-3 with remedies that are relevant and available.

Instead of just providing clients with the “bad news” and leaving them hanging when they ask, “what do we do next”, Coastal Risk deploys its Ecosystem of Experts™ to help the client accelerate its resilience. Step Four identifies specific investments that will mitigate some or all the risks. These may include such measures as: flood barriers; dry/wet floodproofing; improved storm sewers; improved roofing to prevent wind damage; enlarged roof drains to prevent water intrusion; hurricane windows and shutters; elevation of electrical and communications equipment; replacement and upgrade of AC chillers to reduce energy costs; improved emergency response plans, etc.

In Step 5, Coastal Risk matches the potential mitigation remedies with the risks to the building and makes specific recommendations of solutions and, more definite cost estimates are provided.

Discussion of Risk Mitigation/Resilience Building Options RISKFOOTPRINT™

We advise clients on practical, cost-effective strategies for Resilience.....*Examples:*



“Dry Floodproofing”



“Temporary Storm Barriers”

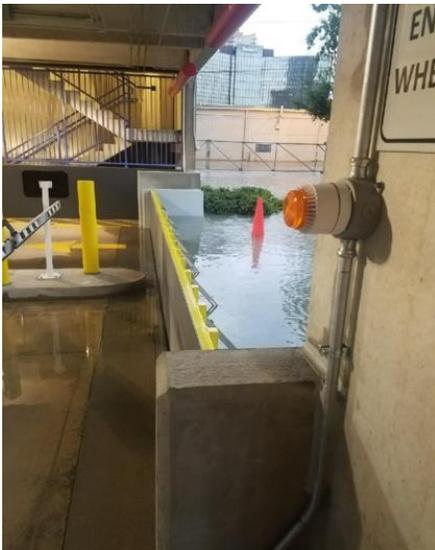
	Total Savings in Cooling Cost from High Efficiency Chiller Plant Replacement (2020 to 2049)		
System	Low Model	Median Model	High Model
Central Plant	\$ 3,942,000	\$ 4,268,000	\$ 4,708,000
Tower Plant	\$ 1,581,000	\$ 1,644,000	\$ 1,803,000
Pool Club Plant	\$2,124,000	- \$2,450,000-	\$2,785,000
Total	\$ 7,647,000	\$ 8,362,000	\$ 9,296,000

“Cooling options for projected increases in extreme heat events”

STEP 6 Implementation

We have found that while some real property owners/operators, investors, lenders, tenants, etc. may have obtained “high-level” climate change risk assessments, few have any specific plans of action to mitigate those risks. The last step of our B-Resilient™ process involves the Advisory Services division of Coastal Risk. We call this our [Ecosystem of Experts™](#).

We deploy on the client’s behalf a wide-array of national and internationally-recognized climate scientists, engineers, architects, storm water and flood mitigation, and regulatory permitting experts, etc., to actually implement the risk mitigation measures that are needed. This process helps companies determine if “at risk” properties should be targeted for mitigation investments or, in some cases, divestment. This will permit companies to maintain profitable assets, while making them more resilient.



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