



www.riskfootprint.com

844-SEA-RISE (732-7473)

November 2022



PROPERTY RESILIENCE ASSESSMENT **SCOPE OF WORK**

Introduction:

RiskFootprint™ has developed a process to provide actionable data and intelligence for current and future decisions regarding real assets owned/operated by its clients. Floods, natural hazards, and extreme weather, including those caused by or made more severe by climate change, are having significant impacts on commercial real estate, multi-family, hotels/resorts, and industrial/warehouse properties. Without more in-depth assessments and evaluations, senior managers have been hindered from making the best possible decisions for their companies. These decisions typically fall into certain defined categories, such as:

- **Should we sell or keep the asset?**
- **Should we add more insurance coverage and of what type(s)?**
- **Should we budget capex to protect the property and make it safer and more resilient - at what cost, and when?**
- **How should we report to various agencies our progress in dealing with how physical climate risks are impacting or will in the future impact our properties?**

The process described in this Scope of Work is generally called a **Property Resilience Assessment** (PRA). The PRA is a new genre of due diligence that is fast becoming an integral part of commercial real estate decision-making, both as a result of the gaps in current, property transfer due diligence *and* the recent availability of online, hazard assessment technology, such as RiskFootprint™, www.riskfootprint.com. Adding to PRA adoption momentum is the proposed US SEC physical climate risk disclosure standard. (<https://www.sec.gov/news/statement/gensler-climate-disclosure-20220321>) and the ASTM International Property Resilience Assessment Standard (<https://www.astm.org/workitem-wk62996>).



Property Resilience Assessment Process



Step One: For companies with multiple real assets, the first step in this process is the risk scoring of the Client’s entire portfolio of properties using the RiskFootprint™ hazard assessment technology.

RiskFootprint™ Dashboard Subscriptions

1. 35 Hazards Assessed
2. Single address or Excel spreadsheet
3. Property and community level hazards
4. Hand-drawing tool
5. Fast, accurate, affordable
6. B-Resilient™ Solutions



Once the portfolio is scored, which typically takes one day, the Client is provided with an Excel spreadsheet of their properties and qualitative, risk scores for 15 hazards and an Aggregate Risk Score, like the one shown below. Also, the Client is provided with bar charts (also shown below) that express the percentage of properties scoring high for one specific hazard or another.

In the process described herein, the Client is also set up with the private and secure RiskFootprint™ online Dashboard, which contains the scored, portfolio spreadsheet and *quantitative* RiskFootprint™ Reports for each property, including over 30 current risks and 4 future climate change risks (See Exhibit 1 for sample report).

The RiskFootprint™ Dashboard is then available to the client 24/7/365 for new acquisition due diligence and for physical climate risk reporting throughout the year. Once the Client has the RiskFootprint™ assessment of its portfolio properties, discussions are held to consider which properties are at the highest risk and should be on a “short list” for potential sale, insurance adjustments, or added resilience measures, etc. The decision as to which properties are short-listed may include review of the criticality of the property to the company (operational/financial), the sensitivity of the asset (e.g., a nursing home vs. a warehouse), and the compounding and cascading effects of floods, natural hazards, extreme weather, and climate events. *The “short list” is an important first product of this portfolio risk management process.*

The RiskFootprint™ scored portfolio and the RiskFootprint™ reports are hazard assessments, and, as such, do not express the actual, real-world vulnerability of the asset or the materiality of a hazard’s impact on the property and/or the company. Further assessments and consultation are typically required to determine each property’s vulnerability to the hazards and the materiality of the current and future risks.

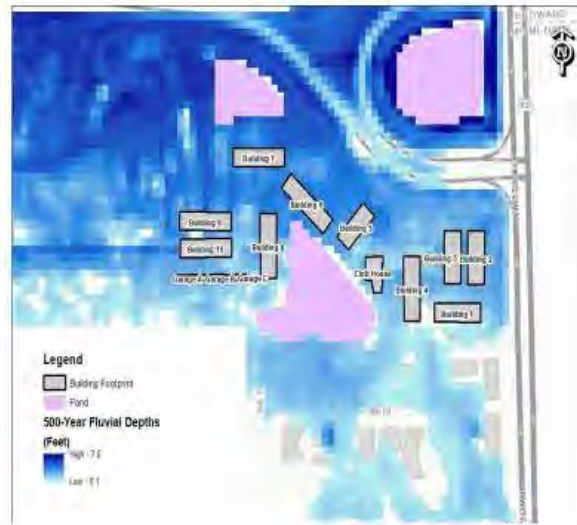
Step Two: Vulnerability/Materiality Assessment

To begin the Vulnerability and Materiality Assessment of specific properties, RiskFootprint™ provides a written questionnaire and document request regarding the client-selected, higher-risk properties identified in Step 1 (see Exhibit 2 attached). The information requested will be used to assist in identifying each property’s vulnerability to the identified hazards. Documents and information include, but are not limited to: (1) the building(s) elevation certificate(s) and/or surveys; (2) “COPE” data; (3) building diagrams; (4) information on existing site protections, etc.; and (5) any oral or written history of flooding or wind damages, etc. This Step may also include telephonic interviews with knowledgeable property management, if available. RiskFootprint™ will prepare new, more granular flood maps of each site based on the best LiDAR ground elevation data available to us and, using elevation certificates, prepare depth-in-structure tables like the example below. This may include depth-in-structure for: (1) the FEMA 100-year BFE; (2) pluvial and fluvial flood risks; and (3) Categories 1, 3, and 5 hurricane storm surges, etc.

Vulnerability Assessment – Equity Owner Depth in Structure – Apartment Complex – South Florida

Table 1: Fluvial Flood Elevations

Name	Top of Bottom Floor	Lowest Adjacent Grade	Highest Adjacent Grade	Fluvial 100-year		Fluvial 500-year		Fluvial 1000-year	
				Elevation	Height Above First Floor	Elevation	Height Above First Floor	Elevation	Height Above First Floor
Building 1	6.95'	6.37'	6.48'	6.5'	0'	7.0'	0.1'	7.9'	1.0'
Building 2	7.00'	6.22'	7.13'	7.8'	0.8'	8.8'	1.8'	9.3'	2.3'
Building 3	6.91'	6.49'	6.63'	7.7'	0.8'	8.1'	1.2'	8.6'	1.7'
Building 4	6.88'	6.18'	6.73'	8.2'	1.3'	8.5'	1.6'	9.0'	2.1'
Building 5	6.89'	6.33'	6.65'	8.5'	1.6'	8.8'	1.9'	9.3'	2.4'
Building 6	6.83'	6.01'	6.43'	8.5'	1.7'	9.5'	2.7'	9.9'	3.1'
Building 7	6.98'	6.39'	6.81'	8.9'	1.9'	9.5'	2.5'	9.8'	2.8'
Building 8	6.93'	6.43'	6.58'	8.5'	1.6'	9.0'	2.1'	9.4'	2.5'
Building 9	6.83'	6.13'	6.73'	8.3'	1.5'	8.8'	2.0'	9.5'	2.7'
Building 10	6.94'	6.56'	6.63'	8.4'	1.5'	8.8'	2.1'	9.5'	2.8'
Clubhouse	7.19'	6.73'	6.91'	8.3'	1.1'	8.7'	1.5'	9.2'	2.0'
Garage A	6.12'	5.82'	6.02'	6.6'	0.5'	7.3'	1.2'	7.9'	1.8'
Garage B	6.12'	5.82'	6.02'	6.7'	0.6'	7.6'	1.5'	8.1'	2.0'



Once vulnerability data is obtained, such as depth-in-structures from certain defined flood events, then, RiskFootprint™ can perform a damage/loss assessment, also referred to as a Value-at-Risk or Materiality Assessment. This assessment can be seen as the “avoidable loss” or the “benefit” side of a benefit- cost ratio. In a Value-at-Risk study, RiskFootprint™ employs the FEMA HAZUS model, a nationally standardized risk modeling methodology and depth-damage curves from FEMA, the US Army Corps of Engineers, and other sources. RiskFootprint™ uses proprietary methods to downscale HAZUS from the community to the asset-level.

Materiality Assessment – Value-at-Risk (VAR) - Equity \$440M Movie Studio Project, Queens, NY (with “COPE” data)

		NOAA Hurricane Storm Surge Model (SLOSH)																	
		FEMA 100-year Flood			NOAA Storm Surge Category 1			NOAA Storm Surge Category 2			NOAA Storm Surge Category 3			NOAA Storm Surge Category 4					
		Flood Elevation Levels 14.0 feet			Flood Elevation Levels 18.0 feet			Flood Elevation Levels 16.0 feet			Flood Elevation Levels 22.0 feet			Flood Elevation Levels 28.0 feet					
Building Component(s)	Flood Defense	Room Elevation(s) (feet)	Square Footage (Total)	Construction Cost Estimate (\$ Thousand)	Repair Cost Estimate (\$ Thousand)	Repair Cost Estimate as Percent	Repair Time (Range in days)	Repair Cost Estimate (\$ Thousand)	Repair Cost Estimate as Percent	Repair Time (Range in days)	Repair Cost Estimate (\$ Thousand)	Repair Cost Estimate as Percent	Repair Time (Range in days)	Repair Cost Estimate (\$ Thousand)	Repair Cost Estimate as Percent	Repair Time (Range in days)	Repair Cost Estimate (\$ Thousand)	Repair Cost Estimate as Percent	Repair Time (Range in days)
Community Hall	Dry floodproofing	9.0	3,070	\$720	\$0	0%	0	\$0	0%	0	\$295	41%	450-630	\$415	58%	720-900	\$533	74%	720-900
Entrance, Cabs, Misc Offices	Dry floodproofing	9.0, 15.0	5,076	\$1,286	\$0	0%	0	\$0	0%	0	\$368	29%	450-630	\$640	50%	720-900	\$869	68%	720-900
Other Offices, Rooms	Wet floodproofing	9.0, 13.0, 15.0	10,251	\$1,417	\$564	23%	450-630	\$140	9%	300-480	\$764	31%	450-630	\$1,288	53%	720-900	\$1,693	70%	720-900
Parking Garage, Loading Docks	Wet floodproofing	9.0, 13.0	130,486	\$13,986	\$888	7%	0-30	\$341	2%	0-30	\$1,634	12%	0-30	\$5,259	37%	0-30	\$8,955	71%	0-30

All elevations in NAVD 88

Step 3: Feasibility Study and Cost Estimates

In order to determine the cost side of a benefit-cost analysis for senior management decision-making, RiskFootprint™ undertakes a feasibility evaluation and rough cost estimates of available resilience measures. First, the Team will develop, at a conceptual level, risk mitigation feasibility and adaptation recommendations for properties to protect against identified flood and other hazards. These strategies will consist of those options available to reduce damage and loss together with rough estimates of costs, based on readily available data sources.

If requested by client, RiskFootprint™ will then conduct a benefit-to-cost (BC) analysis of flood, wind, hurricane and/or seismic protection measures according to standard methodologies employed by the US Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA).

In the area of flood protection, B/C analysis involves the determination of benefits as damages avoided over the life of the project and comparing them with the construction, operation, and maintenance (O&M) costs associated with the project. Therefore, the benefits of a project are equal to the damages without the project minus the damages with the project. If the project is technically sound, the damages with the project should be less than the damages without it and the net benefits will be positive. Most flood damage is physical and includes structural damage to buildings, loss of contents in those buildings, damage to infrastructure, and damage to special or unique facilities. Nonphysical damage includes business interruption losses, lost profits, emergency response costs, temporary relocation, post-flood cleanup and reputational injury. Some of these losses may be covered by insurance and some are not. Flood protection projects can be one or a combination of flood barriers, dry and wet floodproofing, building elevation, or in extreme cases, building relocation. The costs of the project are mainly the capital cost of construction and O&M costs (including training), periodic inspection, preventive maintenance, and repairs throughout the useful life of the project.

Step 3B – Review Community Risk and Resilience Plans (City and County level):

In many cases, evaluating existing and future Community risk and resilience is an important factor in determining a larger perspective of risks and how senior management should view site-specific investment and other important decisions. If requested, RiskFootprint™ will perform a Community Resilience Study of the relevant City and/or County. This study will examine the City and County's level of preparedness for the current and future impacts of floods, natural hazards, extreme weather, climate change and sea level rise and their adaptation and resilience strategies, progress, and funding. This is a review and analysis of existing studies and reports and typically does not entail new data collection efforts. This information will help guide decisions on the types of resilience measures needed at the property-level. Review of Community Resilience will also further the owner/operator's understanding of the risks to the larger community in which the asset resides and is an integral part. This may include the potential for disruption to the transportation system, roadways, water/sewer, electric grid, and telecommunications/internet. Risks from terrorism, cyber, and other human activities are not included in the study.

Step 4 – Implement Resilience Measures

In this Phase, specific and detailed recommendations are provided for those buildings identified in Step 3. More specific cost estimates are provided that can be used in Requests for Proposals (RFPs) and bidding purposes. RiskFootprint™ will assist the Client's Architects and Engineers of Record to incorporate appropriate resilience recommendations into actual designs, thereby making existing and new structures safer, more sustainable, and resilient. Recommendations will include both structural and operational matters and will account for emergency response and business continuity plans. Workshops (either in-person or virtual) will be held with the Client's site-specific project team to envision the various risk-mitigation options presented, navigate alternatives, and ultimately select viable recommendations for the Property.

For further information or sales, please contact: Albert Slap, President, RiskFootprint™, albertslap@riskfootprint.com, 844-732-7473.

RISK FOOTPRINT™ REPORT

Accelerate Your Resilience

PROPERTY DETAILS:
240 East Shore Road
 Great Neck, New York 11023
 lat: 40.79679 long: -73.71187

REPORT DATE & DETAILS:
 Date: October 19, 2022
 Status: Complete



[weather.gov](https://www.weather.gov)



[noaa.gov](https://www.noaa.gov)

240 East Shore Road, Great Neck, New York 11023



	Current Risks											Future Risks				
	Aggregate	FEMA NRI Risk	Pluvial	Fluvial	Tidal Flooding	Storm Surge	FEMA Flood	Tsunami	Wind Zone	Tornado	Wildfire	Earthquake	2050 SLR	2050 Heat	2050 Rainfall	2050 Drought
Property:	5	Low	Medium	Low	High	High	High	Low	Medium	Medium	Low	Low	High	High	Medium	Low
Neighborhood:	6	Low	High	Low	High	High	High	Low	Medium	Medium	Low	Low	High	High	Medium	Low

TABLE OF CONTENTS

- Pluvial Flood & Poor Drainage Hotspots.....3
- Fluvial Flood & FEMA Flood Zones4
- Tidal Flooding & Future Sea Level Rise.....5
- Hurricane Storm Surge.....6
- FEMA National Risk Index7
- Natural Hazards & Community Resilience8
- Climate Change.....9
- Glossary & References.....10

QUESTIONS?

WE'RE HERE TO HELP

CALL:

1-844-732-7473

RISK FOOTPRINT™



NATIONAL OCEANIC & ATMOSPHERIC
 ADMINISTRATION'S (NOAA) PARTNER



THIS REPORT IS PROVIDED SUBJECT TO THE COASTAL RISK CONSULTING, LLC. TERMS AND CONDITIONS OF USE, WHICH ARE AVAILABLE AT WWW.RISKFOOTPRINT.COM. THIS ANALYSIS IS FURNISHED "AS IS" FOR THE PERSONAL USE OF THE CUSTOMER AS OF THE DATE PROVIDED, IS APPLICABLE ONLY FOR THE ADDRESS OR ADDRESSES PROVIDED BY THE CUSTOMER AND IS NOT TRANSFERABLE OR ASSIGNABLE TO ANY OTHER ENTITY.



www.coastalriskconsulting.com
844-SEA-RISE (732-7473)



10/19/2022

Dear Client,

Thank you for purchasing the new RiskFootprint™ Report, the state-of-the-art assessment for floods, natural hazards, extreme weather, and climate change impacts. You have taken an important first step to better understand the risks facing your residential, commercial, industrial, or governmental property. The information found in this Report will empower you to make your property safer, more sustainable, and resilient – and to protect its market value in a changing environment.

The RiskFootprint™ Report is generated from our automated, proprietary model that screens properties for a variety of potential hazards and provides actionable intelligence for portfolio risk management, property transfer due diligence, loan and insurance underwriting and decisions relating to investments in risk/claims reducing, resilience measures.

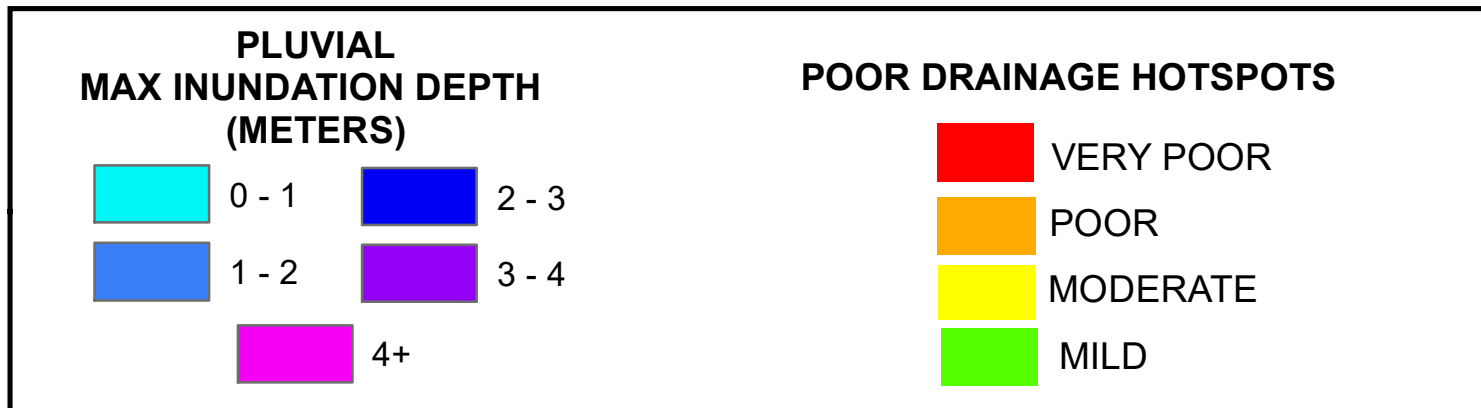
If your RiskFootprint™ Report indicates that your property faces risks, our Advisory Services team of professionals can assist you with our six-step, B-Resilient™ Solutions process to help you take appropriate cost-effective risk mitigation and adaptation actions.

If you would like to find out more about our innovative products and services, contact customerservice@riskfootprint.com.

Sincerely,

Albert J. Slap, President
844-SEA-RISE (732-7473)
albertslap@riskfootprint.com
www.riskfootprint.com

HEAVY RAINFALL (PLUVIAL) FLOOD RISK and POOR DRAINAGE AREAS

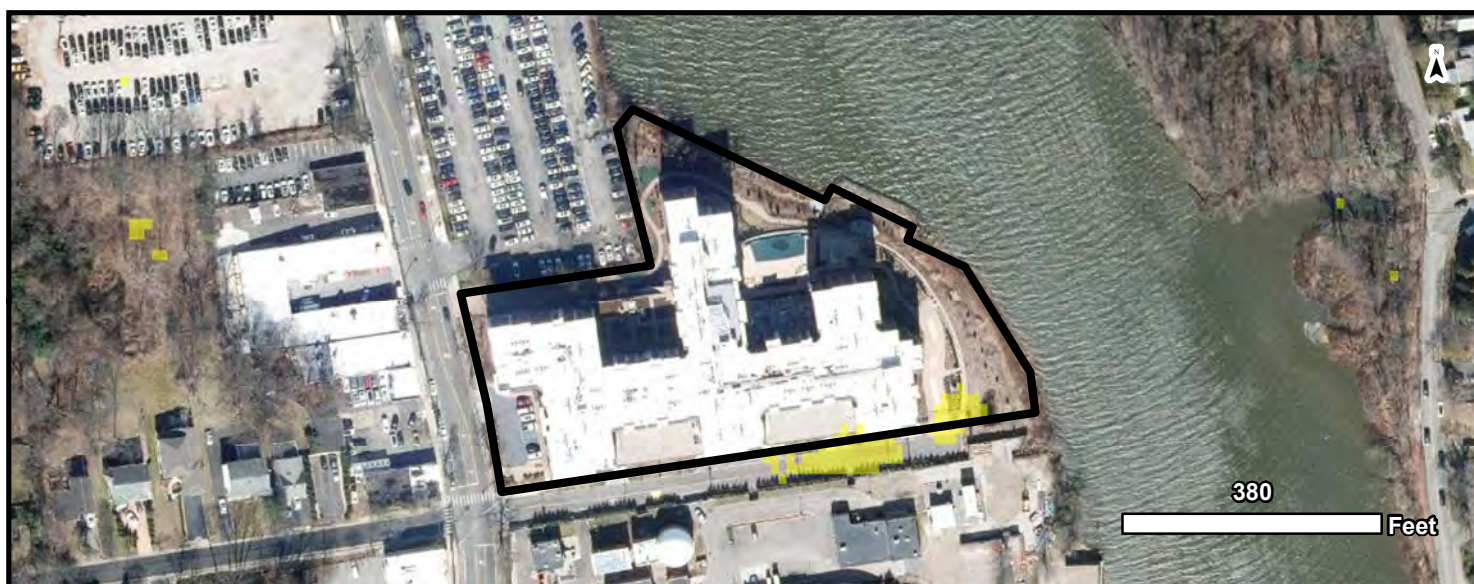


1000-Year Interval Pluvial Flood Risk*

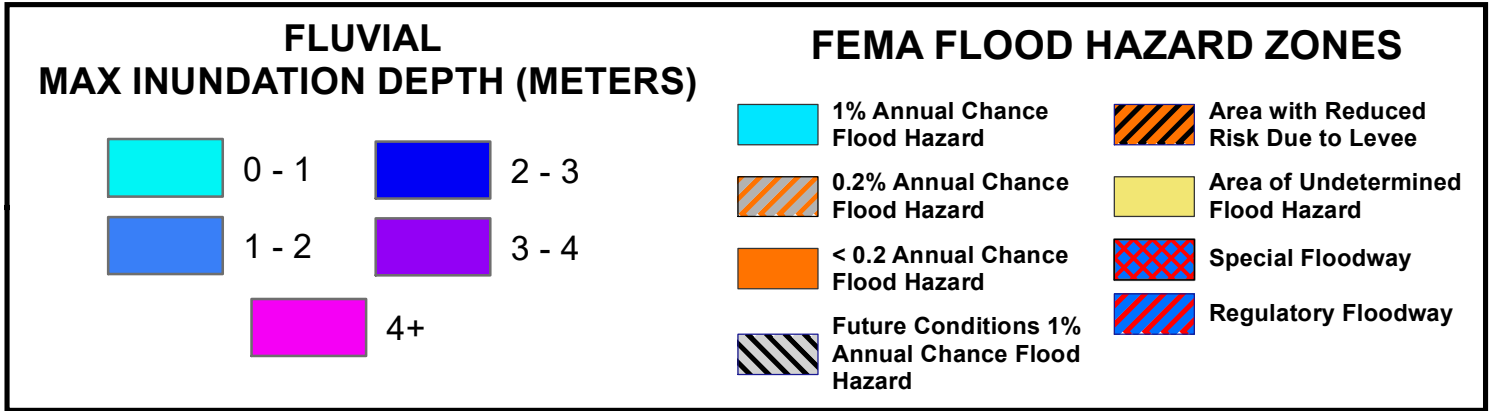
See note re: Fathom Maps on page 10



Poor Drainage Hotspots



RIVERINE (FLUVIAL) FLOOD RISK and FEMA FLOOD HAZARD ZONES



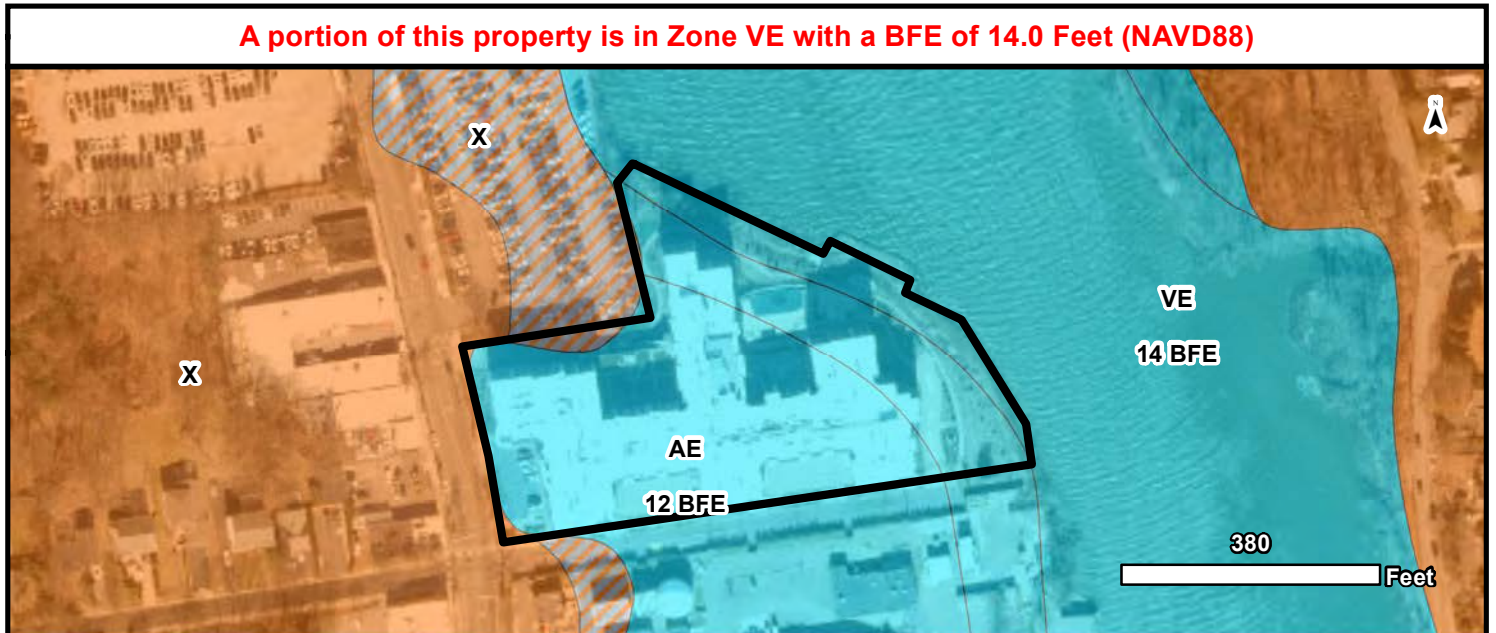
1000-Year Interval Fluvial Flood Risk*

See note re: Fathom Maps on page 10



FEMA Flood Hazard Zones

A portion of this property is in Zone VE with a BFE of 14.0 Feet (NAVD88)



Tidally-Influenced Flooding Potential*

*Illustrations of flooding below include the effect of levees and other flood control measures to the extent they are displayed in the NOAA SLR Viewer (see page 10 for Glossary & References)

Current Year High Tide Flooding

NOAA flooding threshold for this location is 60 cm (24 in) above Mean Higher High Water (MHHW). High Tide flooding occurs when high tides exceed the flooding threshold.

MHHW at Kings Point, NY is 3.6 ft above NAVD88 (North American Vertical Datum of 1988)

High Tide Flooding
(MHHW + Flooding Threshold)



Future Projected Flooding Due to Sea Level Rise (SLR)

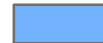
Areas representing inundation as a result of projected SLR in 2040 & 2060.

Flood Days = Number of days tidal flooding is expected with SLR.

Projected SLR = Estimated NOAA SLR projection for the nearest tide gauge.

SLR Flooding Potential = Relative to NAVD88

SLR Flooding Potential
(MHHW + Flooding Threshold + SLR)



Storm Surge

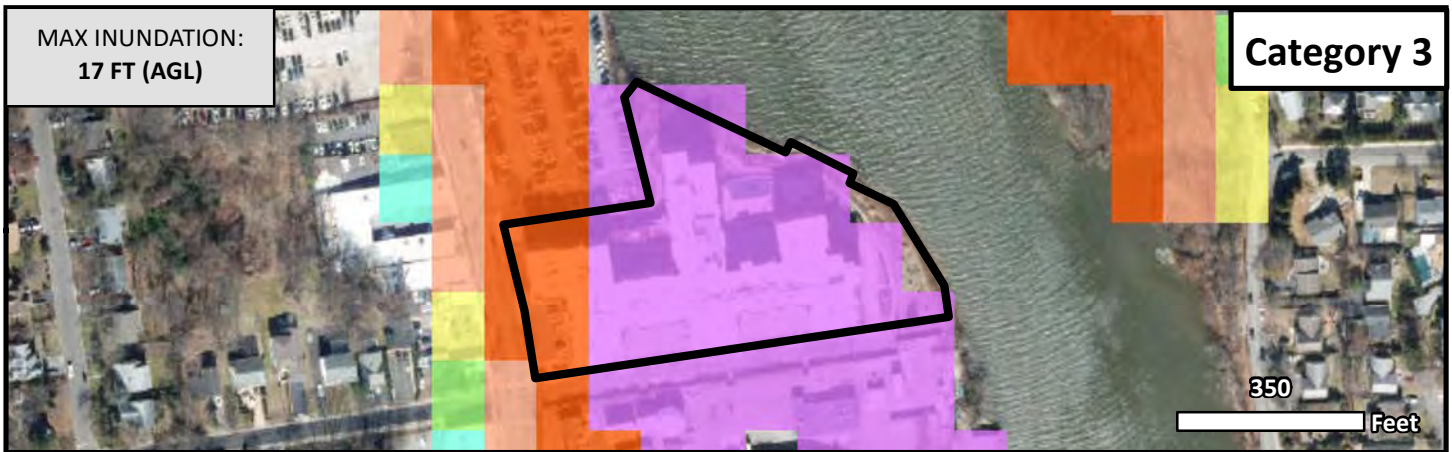
Maximum Possible Hurricane Storm Surge (2022)

Per data from the US National Hurricane Center:
 Annual probability of Category 1 winds and higher: **5.0%**
 Annual probability of Category 3 winds and higher: **4.0%**

INUNDATION (AGL)



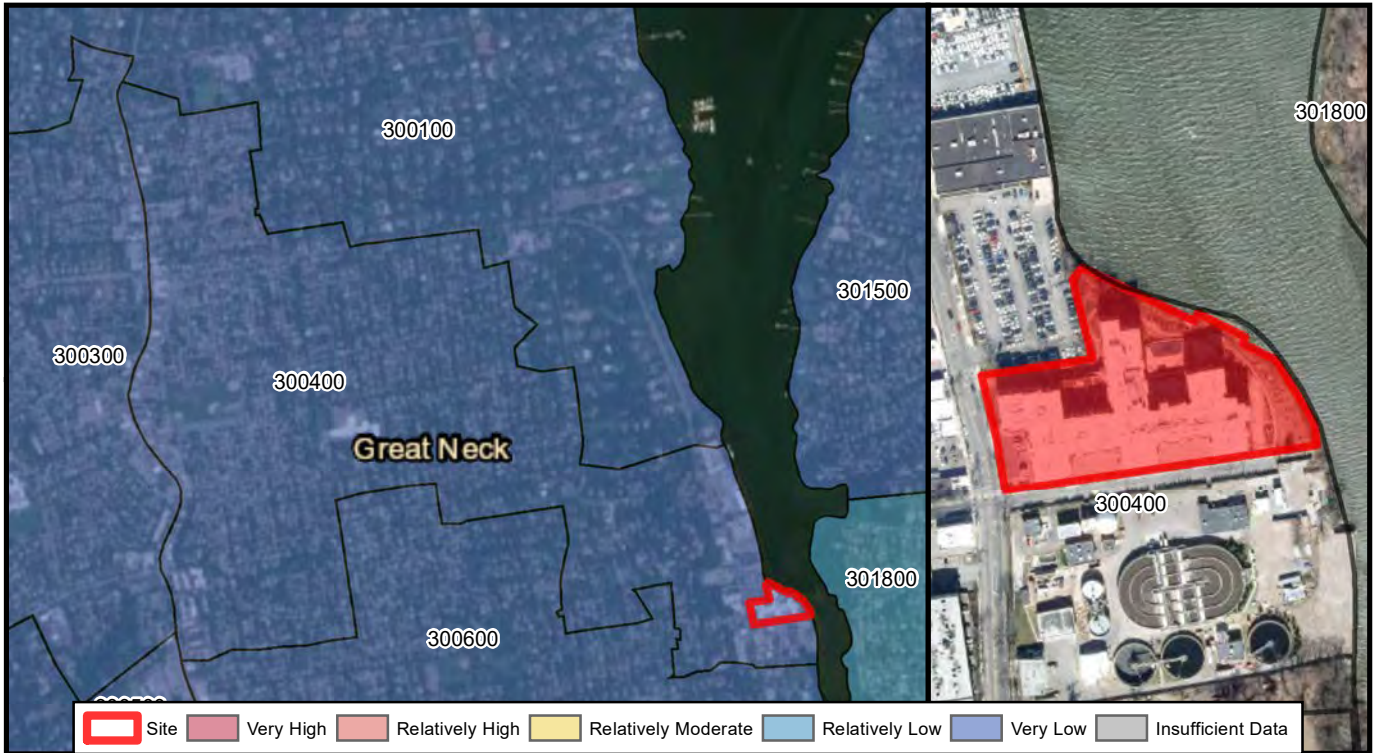
NAVD88 - North American Vertical Datum of 1988 AGL - Above Ground Level



FEMA National Risk Index (NRI)

Census Tract View

240 East Shore Road is in Census Tract 300400



Risk Index is Very Low

NRI Hazard Ratings

Avalanche:
Not Applicable

Heat Wave:
Relatively Low

Strong Wind:
Relatively Low

Coastal Flooding:
Very Low

Hurricane:
Very Low

Tornado:
Very Low

Cold Wave:
No Rating

Ice Storm:
Relatively Moderate

Tsunami:
Insufficient Data

Drought:
No Rating

Landslide:
Relatively Low

Volcanic Activity:
Not Applicable

Earthquake:
Relatively Low

Lightning:
Relatively Low

Wildfire:
No Rating

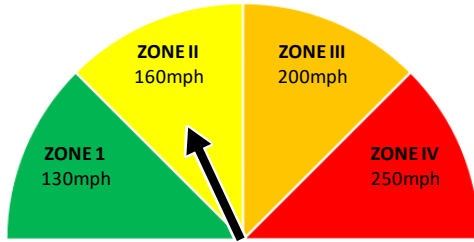
Hail:
Very Low

Riverine Flooding:
Relatively Low

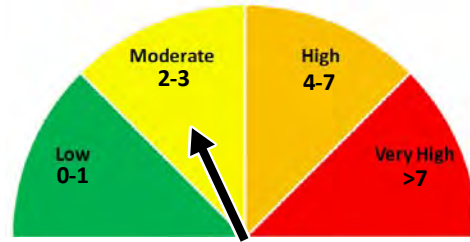
Winter Weather:
Relatively Moderate

Natural Hazards and Community Resilience

FEMA Wind Zone: II

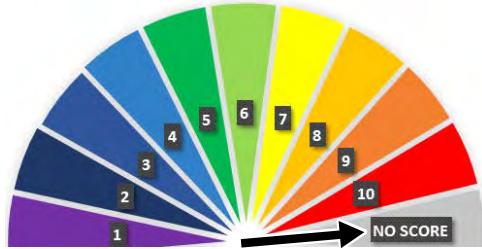


Tornado Risk: 2 occurrence(s)



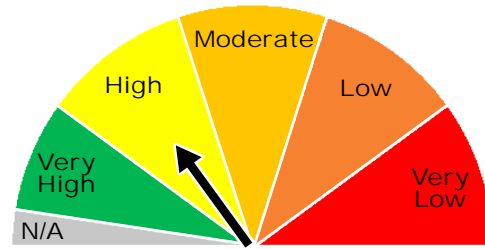
The 1,000-square-mile area surrounding the property has recorded 2 EF2 or higher tornadoes in the past 30 years

Community Rating Score: 0



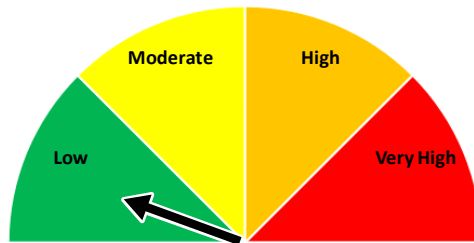
This property is not eligible for a reduction in flood insurance

NRI Community Resilience



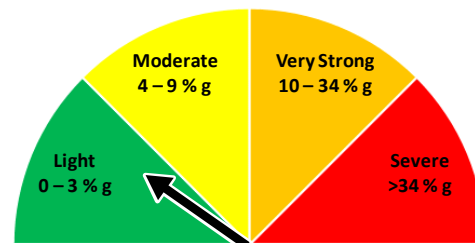
Nassau County Community Resilience is Relatively High

Wildfire Potential: Low



Wildfire Potential is a measure of wildfire likelihood and intensity

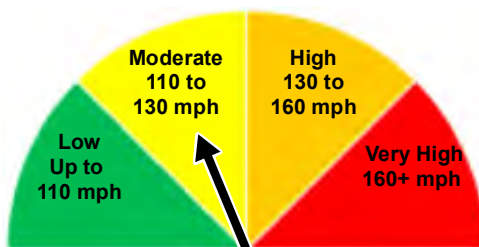
Earthquake Intensity: 3% g



This area is likely to experience Light ground shaking in the next 50 years

ASCE Design Wind Speed: 118 mph

(3-second ultimate design wind speed for Risk Category II buildings)



Wind speed corresponds to 7% probability of occurrence in 50 years. (ASCE 7-16)

Note:

This site is NOT in a special wind region.

This site is in a hurricane-prone region.

(See page 10 for Glossary & References)

Property Elevation: See page 12 for Glossary & References

Land elevation within the property boundary ranges from 4.4 ft to 13.8 ft. The average elevation of this property is 7.7 ft. Elevations use North American Vertical Datum of 1988 (NAVD 88). The first floor height (FFH) of this property is 0.55 ft above ground level.

Future Climate Change Impacts

Projections By Emission Scenarios (RCPs)*



Extreme Heat	2030	2040	2050
RCP 4.5	Moderate	High	High
RCP 8.5	Low	High	High



Extreme Rainfall	2030	2040	2050
RCP 4.5	Moderate	Low	Moderate
RCP 8.5	Low	Low	Moderate



Drought	2030	2040	2050
RCP 4.5	Moderate	Low	Low
RCP 8.5	Moderate	Moderate	Moderate

Metric Ranking Guidelines

* See Page 10 for Glossary & References

Extreme Heat	Less than 25%	25% - 50%	Greater than 50%
% of Global Climate Models predicting 20% or greater increase in days of maximum air temperature above 85° F (compared with 2021)	Low	Moderate	High
Extreme Rainfall	Less than 25%	25% - 50%	Greater than 50%
% of Global Climate Models predicting 20% or greater increase in days of annual maximum daily rainfall (compared with 2021)	Low	Moderate	High
Drought	0.0 or Greater	Between 0.0 and -0.2	-0.2 or Less
Mean annual 12-month Standard Precipitation Index (SPI) compared with 2021	Low	Moderate	High

RiskFootprint™ Glossary and References

Cover Page – AGGREGATE RISK SCORE – The Aggregate Risk Score is presented separately for both the property and the neighborhood (within a ½ mile radius of the property boundary). It is a summation of the Risk Zones scored for the 15 hazards in the table as follows:

0 "Red" Zones	Low Aggregate Risk
1 to 3 "Red" Zones	Moderate Aggregate Risk
4 or more "Red" Zones	High Aggregate Risk

Note that even if the Aggregate Risk Score is “yellow”, with only 1 red zone risk, e.g., for storm surge risk, this could be significant to the property owner. Also, sometimes the property in question is at low Aggregate Risk, but the neighborhood is at high risk, possibly causing ingress/egress or supply chain problems.

Page 3 – PLUVIAL (HEAVY RAINFALL) FLOOD RISK – Potential for heavy rainfall flooding above ground level (AGL) of the property with 0.1% probability. The term “1,000-year flood” means that, statistically speaking, a flood of that magnitude (or greater) has a 1 in 1,000 chance of occurring in any given year. In terms of probability, the 1,000-year flood has a 0.1% chance of happening in any given year. These statistical values are based on observed data. https://www.usgs.gov/faqs/what-a-1000-year-flood?qt-news_science_products=0#qt-news_science_products.

Page 3 - POOR DRAINAGE HOTSPOTS – “Poor Drainage Hotspots” identifies hyper-local areas of a property where water from heavy rainfall will tend to pond and fail to drain properly, sometime resulting in standing water for days. The RiskFootprint™ report uses a high-resolution elevation model along with soil and groundwater data from the Natural Resources Conservation Service to assign risk within our proprietary, flood hotspot methodology ([NRCS drainage classes](#)).

FATHOM PLUVIAL (HEAVY RAINFALL) & FLUVIAL (RIVERINE) FLOOD PROBABILITY (<https://www.fathom.global>). Fathom has pioneered methods using leading research and the latest datasets to model flood risks for both fluvial and pluvial perils. The dataset we use from Fathom-US incorporates the latest available inputs and the methodology has been validated via the peer-review process and published in world-leading journals. Fathom-US was validated against the entire FEMA flood hazard catalogue, identifying that current FEMA data misses around two thirds of total flood exposure nationwide. Fathom’s pluvial models also represent flash-flooding nationwide.

Page 4 – FLUVIAL (RIVERINE) FLOOD RISK – Potential for river flooding above ground level (AGL) of the property with 0.1% probability as a result of an overflowing river.

Page 4 - FEMA FLOOD HAZARD BOUNDARIES – ([overview](#)) ([definitions](#)) These zones are derived from the National Flood Hazard Layer (NFHL) depicted on a community's Flood Insurance Rate Map (FIRM), or, where available, derived from the FEMA Preliminary Flood Hazard Data. Each zone reflects the severity or type of flooding in the area. This updated version of FEMA maps includes areas that FEMA has determined are protected by levees or other flood defenses.

***Note:** Flood defenses in the FEMA maps may indicate a lower risk of flooding at a particular location. Flood defenses, however, may or may not be operational or competent at any given time and, flood waters may overtop defenses, thereby flooding areas with lower modeled risks.*

***Note:** The RiskFootprint™ Report helps you dimension risk of loss from flood hazards and better understand insurance needs. It is not appropriate, however, for insurance placement using the National Flood Insurance Program (NFIP), which exclusively utilizes effective FEMA flood maps for underwriting. Most commercial and industrial buildings do not rely on NFIP insurance. FEMA flood maps, therefore, are only one view of flood risks among others presented herein.*

Page 5 – CURRENT AND FUTURE TIDALLY-INFLUENCED FLOODING POTENTIAL – Modeled potential for current year “High Tide Flooding” and tidal flooding due to future Sea Level Rise (SLR) in 2040 and 2060. The methods, models and mapping are derived from the latest data and tools provided by NOAA and NASA (2022) and the *NOAA Sea Level Rise Viewer* <https://bit.ly/3N2jD5U>

NOAA and NASA data sources used for calculation of Flooding Potential are:
Height of Mean Higher High Water relative to NAVD88 at the nearest tide gauge -
<https://tidesandcurrents.noaa.gov/datums.html?>

NOAA Flooding Threshold - <https://sealevel.nasa.gov/flooding-days-projection/>

NOAA Sea Level Rise (SLR) Projections -
https://api.tidesandcurrents.noaa.gov/dpapi/prod/webapi/product/slr_projections.json?units=english&report_year=2022&scenario=intermediate-high

Flood Days = Number of days tidal flooding with SLR is expected at the nearest tide gauge –
<https://sealevel.nasa.gov/flooding-days-projection/>

Notes:

1. Projections of flooding potential in the RiskFootprint™ report are based on the NOAA “minor flooding” threshold. Flooding thresholds are national flood thresholds derived from [NOAA Technical Report NOS CO-OPS 086: Patterns and Projections of High Tide Flooding Along the U.S. Coastline Using a Common Impact Threshold](#). (February 2018).
2. Illustrations of flooding in areas with levees should be reviewed together with NOAA’s [“Leveed Areas Disclaimer”](#).
3. Inland locations for which the NOAA SLR Viewer shows no flooding potential within one mile of the property boundary will return N/A (not applicable) for data on this page.

Page 6 - HURRICANE STORM SURGE – Potential for current flooding on the property in the current year because of the wind field that drives hurricane storm surge ([overview](#)). The RiskFootprint™ Report utilizes NOAA National Storm Surge Maps (Ver. 2) to identify maximum inundation levels for each property above the ground level. The data is derived from The Sea, Lake and Overland Surges from Hurricanes (SLOSH) model that estimates storm surge heights resulting from hurricanes by considering the atmospheric pressure, size, forward speed, and track data. <https://www.nhc.noaa.gov/nationalsurge/>. Hurricane categories are based on the Saffir-Simpson Wind Scale, a 1 to 5 rating based only on a hurricane’s maximum sustained wind speed. <https://www.nhc.noaa.gov/aboutsshws.php>

HISTORIC HURRICANE STRIKE PROBABILITY – The Risk Footprint™ Hurricane Strike statistics are derived from 110 years of climatological data from the National Hurricane Center. <https://www.nhc.noaa.gov/aboutnhcprobs5.shtml>.

Page 7 – FEMA NATIONAL RISK INDEX - The National Risk Index is a dataset and online tool designed and built by FEMA to help illustrate the U.S. communities most at risk for 18 natural hazards. The Risk Index leverages available source data for natural hazard and community risk factors to develop a baseline relative risk measurement for each U.S. County and Census tract, to help users better understand the natural hazard risk of their communities. <https://hazards.fema.gov/nri/>

Calculation of FEMA NRI Risk Index:

$$\text{Risk} = \text{Expected Annual Loss} \times \text{Social Vulnerability} \times \frac{1}{\text{Community Resilience}}$$

Source: [FEMA National Risk Index Technical Document Nov 2021](#)

Page 8 – NATURAL HAZARD RISK METERS

FEMA WIND ZONES – ([website](#)) The United States is divided into four Wind Zones created by FEMA for construction purposes throughout the country. Buildings in their respective wind zones must be able to withstand the maximum wind speed as indicated by FEMA. Note that older buildings may not have been designed to these standards.

COMMUNITY RATING SYSTEM –([website](#)) The Community Rating System (CRS) awards points for steps taken by municipalities to manage the flood plain to reduce the community's risk. Flood insurance rates are discounted for participating municipalities that have accumulated points, thereby saving homeowners on NFIP flood insurance premiums. You should make sure your insurance agent is providing you with the appropriate discount.

NRI COMMUNITY RESILIENCE – ([website](#)) is a relative measure of the community that is associated with the parcel compared to all other communities at the nationwide level for its resilience to natural hazards. It is used in FEMA's National Risk Index ([website](#)), which identifies communities most at risk to natural hazards. Commonly, the community is a county, but depending on the location, may be a parish, borough, or an independent city. Community Resilience is defined by FEMA as the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. The score is based on 6 factors: 1. Human Well-Being/Cultural/Social; 2. Economic/Financial; 3. Infrastructure/Built Environment/Housing; 4. Institutional/Governance; 5. Community Capacity; and 6. Environmental/Natural.

WILDFIRE POTENTIAL – ([website](#)) Based on the US Forest Service's 2020 Wildfire Risk to Communities Product, Risk to Potential Structures dataset

TORNADO FREQUENCY – ([website](#)) Tornado historical data is based on the NOAA National Weather Service (NWS) Storm Prediction Center's (SPC) severe report database, which compiles tornado occurrences.

EARTHQUAKE INTENSITY – ([website](#)) Based on the USGS Earthquake Hazard Program - National Seismic Hazard Mapping Project (NSHMP) and depicts areas using peak ground acceleration (PGA) as its parameter and standard gravity (g) as its measure.

ASCE DESIGN WIND SPEED – ([website](#)) The American Society of Civil Engineers (ASCE) creates building codes for residential and commercial structures in the United States. The ASCE Wind Meter is based on [ASCE/SEI 7-16](#), and is the 3-second gust wind speed at 33 ft above ground for [Exposure C](#), Risk Category II buildings. Wind speed corresponds to approximately a 7% probability of exceedance in 50 years.

Special Wind Region

There are special regions in which wind-speed anomalies are known to exist. When selecting basic wind speeds in these special regions, use of regional climatic data and consultation with a wind engineer or meteorologist is advised. (ASCE 7-16).

Hurricane-prone region

Defined in the 2015 and later International Building Code ([IBC](#)) as:

- The U.S. Atlantic Ocean and Gulf of Mexico coasts where the ultimate design wind speed, Vult, for Risk Category II buildings is greater than 115 mph (51.4m/s); and;
- Hawaii, Puerto Rico, Guam, Virgin Islands, and American Samoa.

<https://www.fema.gov/glossary/hurricane-prone-region>

Property Elevation

First Floor Height (FFH) is an estimate of the height of the first floor above ground level based on data derived from [True Flood Risk](#), Inc.'s Artificial Intelligence (AI) technology. Large buildings may have multiple FFHs because of various access points. For a more detailed study of vulnerabilities, potential in-structure flooding depth and value-at-risk, please contact customerservice@riskfootprint.com

Page 9 – FUTURE CLIMATE CHANGE IMPACTS IN 2030, 2040 & 2050 – Projections for Future Extreme Heat, Extreme Rainfall & Drought impacts were derived from data downscaled from 32 General Circulation Models (GCMs) using LOCA (Localized Constructed Analogs), a statistical downscaling technique that improves the detail of data from GCMs. LOCA was developed and implemented by a team including representatives from NASA, US Army Corps of Engineers, University of Colorado and Scripps Institution of Oceanography. Using LOCA, the 32 GCMs were downscaled from the CMIP5 archive at a 1/16th degree spatial resolution. <http://loca.ucsd.edu/>.

a. Extreme Heat

Extreme heat risks related to the projected increase in maximum daily air temperature. Datasets from Representative Concentration Pathways 4.5 and 8.5* are used to determine the percentage change in number of days per year for annual maximum daily air temperature greater than 85°F (~29.44° Celsius) averaged over 2026-2030, 2036-2040 and 2046-2050 compared with no. of days per year averaged over 2021-2025.

b. Extreme Rainfall

Extreme rainfall risks related to the projected increase in maximum daily rainfall (precipitation). Datasets from Representative Concentration Pathway 4.5 and 8.5* are used to determine the percentage change in annual maximum daily precipitation averaged

over 2026-2030, 2036-2040 and 2046-2050 compared with the annual maximum daily precipitation averaged over 2021-2025.

c. Drought

Drought risk as measured by the 12-month Standard Precipitation Index (SPI), to characterize meteorological drought on a range of timescales. The SPI calculation for any location is based on the long-term precipitation record for the specific period. A 12-month SPI is a comparison of the precipitation for 12 consecutive months with the same 12 consecutive months during all the previous years of available data. <https://www.in.gov/dnr/water/water-availability-use-rights/water-resource-updates/monthly-water-resource-summary/explanation-of-standard-precipitation-index-spi/>

***Representative Concentration Pathways (RCPs)**

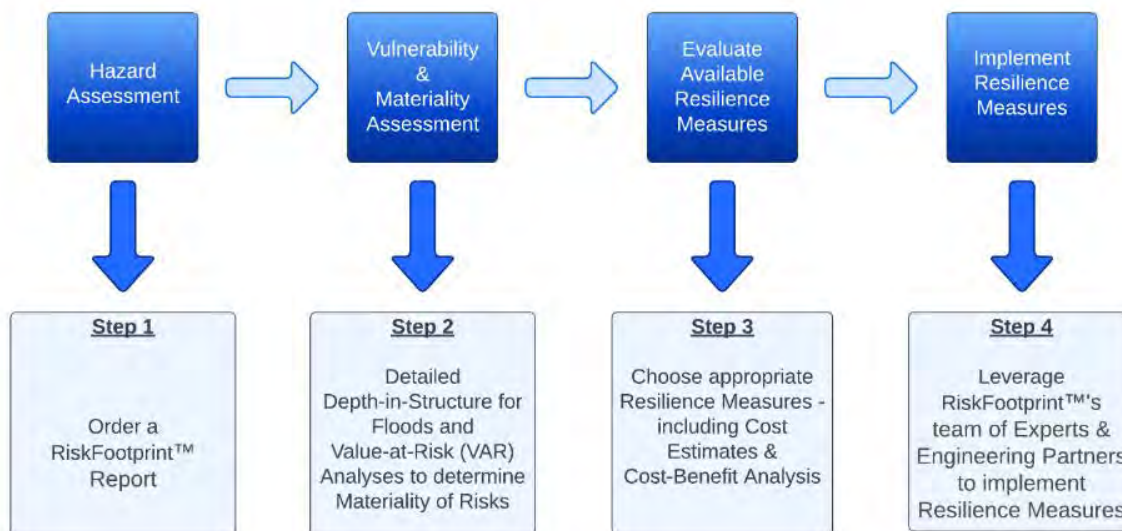
Values of Representative Concentration Pathway (RCP) represent the range of greenhouse gas emissions. RCP 4.5 refers to an intermediate emission scenario while RCP 8.5 refers to a high emission scenario. In this report, we do not include RCP 2.6 because it's a stringent emission scenario which is very unlikely based on current trends.

Note: Possible non-linear trend in severity of climate impacts for certain locations: The Ranking Guidelines for Low, Medium, and High are based on the % of models that show results within a certain range. Also, although projections of future temperature trends are generally linear, increasing heat creates changes in atmospheric conditions that may impact projected trends of extreme rainfall and drought over certain time periods. As a result of a combination of these factors, projections of extreme rainfall and drought may not always show a linear trend in severity for the next few decades.

Note: Apparent contradictions in different datasets: The RiskFootprint™ Report is comprised of both proprietary and open-source datasets. The various hazard scores and risk assessments included in the Report may be shown at different levels of granularity or specificity and measured over varying time frames. The different bases and methodologies used may lead to apparent contradictions. For example, a FEMA 100-year flood Base Flood Elevation (BFE) may not be the same as a NOAA storm surge height for the same return period. The National Risk Index (NRI) Strong Wind rating at the Census Tract level may not be the same as the ASCE Design Wind Speed at a specific building address. Accordingly, RiskFootprint™ Users are advised to consider the hazard assessments and risk scores in the Report only as starting points in the Property Resilience Assessment (PRA) Process.



Property Resilience Assessment Process



For further information on Property Resilience Assessments, RiskFootprint™ Scoring Methods or annual Dashboard subscriptions, please contact Customer Service at 844-732-7473 or email at customerservice@riskfootprint.com.



November 2022 Draft

RESILIENCE QUESTIONNAIRE FOR MAJOR CRE BUILDINGS

1. WHAT IS THE TYPE OF BUILDING , TYPE OF CONSTRUCTION, TOTAL SQUARE FOOTAGE, AND YEAR OF CONSTRUCTION?
2. WHAT IS THE TYPE(S) OF OCCUPANCY? E.g., COMMERCIAL, RETAIL, INDUSTRIAL, MULTI-FAMILY, ETC.
3. WHAT IS THE REPLACEMENT VALUE OF THE BUILDING, ITS CONTENTS AND THE ANNUAL BUSINESS INTERRUPTION LOSS ESTIMATE IN DOLLARS?
 - a. STRUCTURE
 - b. CONTENTS
 - c. BUSINESS INTERRUPTION
4. WHAT IS THE ELEVATION OF THE FIRST FLOOR/LOBBY IN NAVD88 VERTICAL DATUM? PLEASE PROVIDE THE BUILDING'S ELEVATION CERTIFICATE, IF AVAILABLE.
5. WHAT IS THE ELEVATION OF MAJOR "MEP" EQUIPMENT IN NAVD88 VERTICAL DATUM?
6. DO YOU HAVE A BACKUP GENERATOR AND, IF SO, WHAT IS ITS ELEVATION IN NAVD88 VERTICAL DATUM?
7. DOES YOUR BUILDING HAVE AN UNDERGROUND PARKING GARAGE? IF SO, ARE THE OPENINGS TO THE UNDERGROUND GARAGE PROTECTED WITH FLOOD BARRIERS?
8. DOES THE BUILDING, PROPERTY OR GARAGE/SUB-GRADE HAVE GROUNDWATER OR TIDAL FLOOD WATER INTRUSION? IF SO, PLEASE DESCRIBE AND STATE THE FREQUENCY.
9. ARE THERE ANY SUMP PUMPS IN THE SUB-GRADE OF THE BUILDING? IF SO, HOW FREQUENTLY ARE THEY OPERATING?

10. DOES YOUR BUILDING HAVE ANY REMOVABLE OR SELF-CLOSING FLOOD BARRIERS FOR THE LOBBY OR ANY OTHER OPENINGS? IF SO, DESCRIBE AND SPECIFY LOCATION(S).
11. HAS YOUR BUILDING EXPERIENCED FLOODING AND/OR FLOOD DAMAGES IN THE PAST 20-YEARS? IF SO, IDENTIFY THE DATE(S) AND THE NAME OF THE STORM OR HURRICANE OF FLOOD, IF APPLICABLE.
12. IN EACH OF THE PAST 5-YEARS, STATE THE DAMAGE/LOSS TO STRUCTURE, CONTENTS, AND/OR BUSINESS INTERRUPTIONS FROM ANY FLOOD EVENT AND THE DATE?
 - a. WAS THE BUILDING CLOSED IN ANY OF THESE EVENTS AND FOR HOW LONG?
13. IN EACH OF THE PAST 5 YEARS STATE THE DAMAGE/LOSS TO STRUCTURE, CONTENTS, AND/OR BUSINESS INTERRUPTIONS FROM ANY WIND EVENT AND THE DATE?
 - a. WAS THE BUILDING CLOSED IN ANY OF THESE EVENTS AND FOR HOW LONG?
14. IN EACH OF THE PAST 5 YEARS STATE THE DAMAGE/LOSS TO STRUCTURE, CONTENTS, AND/OR BUSINESS INTERRUPTIONS FROM ANY SEISMIC EVENT AND THE DATE?
 - a. WAS THE BUILDING CLOSED IN ANY OF THESE EVENTS AND FOR HOW LONG?
 - b. DURING THESE EVENTS, WAS ACCESS TO THE BUILDING LIMITED OR RESTRICTED BY AUTHORITIES OR OTHER FACTORS? PLEASE DESCRIBE.
15. HAS YOUR BUILDING HAD A PROPERTY CONDITION ASSESSMENT AND/OR AN ENVIRONMENTAL SITE ASSESSMENT PHASE 1 PERFORMED ON IT? IF SO, PROVIDE A COPY AND THE DATES OF ASSESSMENTS.
16. HAS YOUR BUILDING HAD A HAZARD ASSESSMENT PERFORMED ON IT? IF SO, PROVIDE A COPY AND THE DATE OF THE ASSESSMENT.
17. HAS YOUR BUILDING HAD A VULNERABILITY ASSESSMENT PERFORMED ON IT? IF SO, PROVIDE A COPY AND THE DATE OF THE ASSESSMENT.
18. HAS YOUR BUILDING HAD A DAMAGE/LOSS OR VALUE-AT-RISK ASSESSMENT PERFORMED ON IT? IF SO, PROVIDE A COPY AND THE DATE OF THE ASSESSMENT.
19. HAS YOUR BUILDING DEVELOPED A CAPITAL PLAN FOR THE BUILDING TO REDUCE IMPACTS OF FLOODS, NATURAL HAZARDS, EXTREME WEATHER AND/OR

CLIMATE CHANGE AND IMPROVE RESILIENCE? IF SO, PLEASE PROVIDE A COPY AND THE DATE OF THE PLAN.

20. DOES THE BUILDING HAVE AN EMERGENCY RESPONSE AND/OR EMERGENCY MANAGEMENT PLAN OR CONTINUITY OF OPERATIONS PLAN? IF SO, PROVIDE A COPY OF AND THE DATE OF THE MOST RECENT PLAN, INCLUDING EMERGENCY EVACUATION PLANS OR SHELTER-IN-PLACE PLANS (LIFE SAFETY) FOR HURRICANES, STORM SURGE, TSUNAMI, TORNADO, SEISMIC, ETC.

21. IN THE PAST 5-YEARS, HAVE INSURANCE PREMIUMS APPLICABLE TO THE BUILDING CHANGED (UP OR DOWN)? IF UP, WERE THESE CHANGES SIGNIFICANT TO MANAGEMENT IN TERMS OF THE TOTAL OPERATIONAL EXPENSES OF THE BUILDING?

22. IF INSURANCE PREMIUMS HAVE INCREASED, HAVE YOU ASKED YOUR INSURANCE CARRIER IF IT WOULD LOWER PREMIUMS, IF YOU MADE THE BUILDING MORE RESILIENCE TO CERTAIN NATURAL HAZARDS? IF SO, WHAT WAS THE INSURANCE CARRIER'S RESPONSE?

23. HAVE PUBLIC SEWER SYSTEM BACKUPS BEEN OBSERVED ON PROPERTY OR IN THE NEIGHBORHOOD? HAS THIS CAUSED ANY NUISANCE CONDITIONS ON THE PROPERTY?

24. IN THE PAST 5-YEARS, HAS THE BUILDING EXPERIENCED A LOSS IN POWER FROM THE ELECTRIC GRID FOR MORE THAN 1-HOUR? IF SO, PLEASE IDENTIFY THE DATE, THE CAUSE, IF KNOWN, AND THE AMOUNT OF TIME THAT THE BUILDING WAS WITHOUT POWER FOR EACH EVENT OR IF THE BUILDING HAS EMERGENCY GENERATOR CAPACITY THAT WAS EFFECTIVELY USED.

25. DOES YOUR BUILDING USE OR PLAN TO USE USGS "SHAKEALERT" TECHNOLOGY TO TURN OFF EARTHQUAKE-SENSITIVE SYSTEMS, SUCH AS ELEVATORS AND HEAVY MACHINERY?