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## Climate Adaptation & Resilience for the Commercial Real Estate (CRE)

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# CRE Climate Adaptation & Resilience

## **1. BOMA Canada's efforts**

- **Resilience Brief**
- **Flood Adaptation**

## **2. BOMA Toronto's efforts**

- **Carrying Capacity Study**
- **Technical Guidance Notes**

# BOMA Canada's National Effort



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# BOMA Canada Resilience Brief



<http://bomacanada.ca/resources/resilience-brief/>

# BOMA Canada Resilience Brief

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# BOMA Canada – Ahead of the Storm



<https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2019/10/Ahead-of-the-Storm-1.pdf>

# Why focus on flood mitigation?

- ✓ Escalating cost of natural disasters in Canada
- ✓ Impacts on CRE tenants
- ✓ Impacts on CRE insurance and availability
- ✓ Legal liability
- ✓ Impacts on credit rating
- ✓ Investor's attention to climate risk adaptation & resilience
- ✓ Help meet Canada's commitment to respond to climate change and reduce flood risk



# BOMA Canada – Ahead of the Storm

**Table 1: Key Flood-Resilience Measures for Commercial Real Estate (Office Towers), Canada**

| Plans and Procedures   | Equipment & Supplies  | Major Retrofits*   |
|--|---|--|
| <b>PP1. Emergency plans:</b> emergency preparedness and response plans are in place and include flood event procedures.  | <b>ES1. Critical equipment and supplies:</b> critical equipment and supplies are available onsite to respond to flood emergencies, (e.g., sandbags, sump pumps, portable generators, fuel, portable lights, extension cords, dehumidifiers, protective clothing, etc.).<br><br><b>ES2. Portable flood barriers and sandbags:</b> for buildings with critical operations (e.g., buildings housing data centers), portable flood barriers and sandbags are available to protect the building from overland flooding.<br><br><b>ES3. Back-up generation:</b> onsite back-up generation equipment and fuel are available and have the capacity to provide electrical power to at least one elevator, all building sump pumps, heat pumps, boiler, smoke | <b>MR1. Elevating and flood-proofing critical equipment:</b> heating, cooling, ventilation, and air conditioning (HVAC) equipment; electrical transformers, switchgear and service panels, as well as communication systems are elevated above expected flood levels. If not feasible to elevate, these systems are flood-proofed (e.g., with equipment elevated off the ground and drains at the lowest points on the floor). |
| <b>PP2. Practice drills:</b> building operations staff are trained on flood event procedures. Annually, practice drills are performed with tenants and procedures are updated as required.   |   | <b>MR2. Protecting server rooms:</b> server rooms are located on higher floors, preferably on a raised platform, with a sump pump installed at the lowest point. Water sensors are installed for leak detection.   |
| <b>PP3. Emergency funds:</b> dedicated funds are available for emergency operations, including flood events. Designated staff have access to both credit cards and sufficient amounts of cash to be used for emergency operations. |   |  |
| <b>PP4. Tenant communication channels:</b> tenant and stakeholder communication channels have been established for emergency situations, including flood events.   |   | <b>MR3. Protecting high-voltage and telecommunication pull rooms:</b>  |



# Why focus on flood mitigation?

**Table 2:** *Scope of Flood-Resilience Approaches for Existing Commercial Real Estate Properties in Canada*

| In Scope   | Out of Scope   |
|--|--|
| <b>Property-Level Measures:</b> <ul style="list-style-type: none"><li>• Emergency response procedures</li><li>• Flood preparedness activities</li><li>• Physical building improvements</li></ul> | <ul style="list-style-type: none"><li>• Climate risk assessments</li><li>• Broader resilience plans</li></ul>  |
| <b>Geography:</b> <ul style="list-style-type: none"><li>• All of Canada</li></ul>  | <b>Geography:</b> <ul style="list-style-type: none"><li>• Permafrost communities</li></ul>   |
| <b>Flood Hazards:</b> <ul style="list-style-type: none"><li>• Riverine</li><li>• Overland</li><li>• Sanitary sewer back up</li><li>• Storm sewer back up</li></ul>                               | <b>Flood Hazards:</b> <ul style="list-style-type: none"><li>• Water damage due to burst pipes, sink overflows, fire system failures</li><li>• Storm surge and sea level rise</li><li>• Tidal flooding, dam failures and other unique flood hazards</li></ul> |
| <b>Property Types:</b> <ul style="list-style-type: none"><li>• Commercial (primary focus is on office towers)</li></ul>  | <b>Property Types:</b> <ul style="list-style-type: none"><li>• Industrial, institutional and multi-unit residential buildings (MURB)*</li></ul>  |

# BOMA Canada – Ahead of the Storm

## CHAPTER 2 - Floor Resilience Measures for Existing CRE Properties in Canada

### BEFORE THE FLOOD

- ✓ Plans & Procedures
- ✓ Equipment & Supplies
- ✓ Major Retrofits

### DURING THE FLOOD

- ✓ Procedures
- ✓ Communication
- ✓ Action items

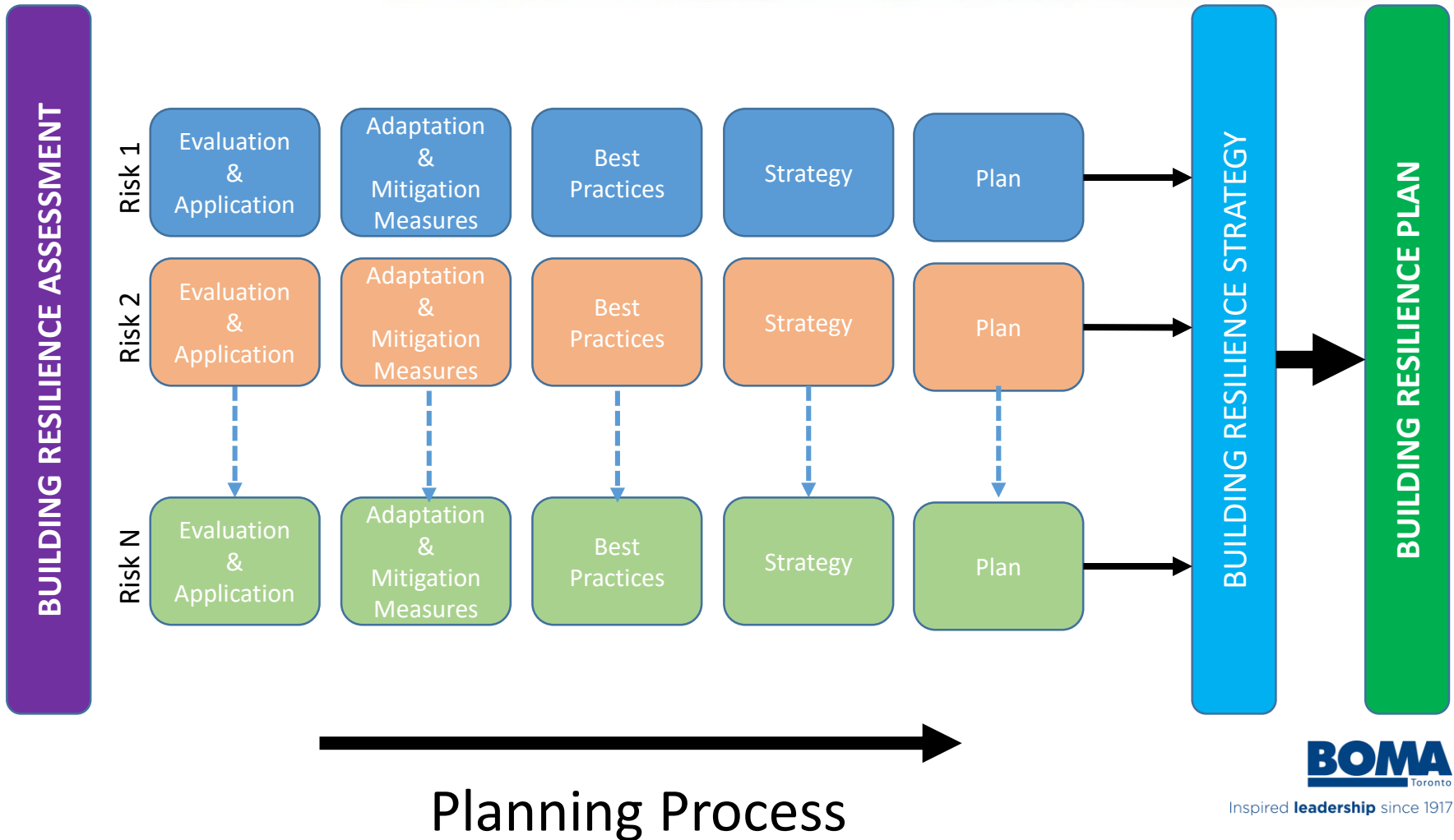
### AFTER THE FLOOD

- ✓ Procedures
- ✓ Action items

# BOMA Toronto's Approach to CRE Resilience

*Under Resilient TO*

# General Approach



# PHASE I

**Create a Business Case for CRE Resilience.** Develop a risk-based evaluation model that considers influence of critical infrastructure on the building's capacity to operate, and the building's capacity to recover should the utility from one or more of critical infrastructure in the building is interrupted. [A mathematical model with a quantifiable and verifiable input and output]

***Rationale:*** Building owners and managers need a methodology to calculate their risk exposure and determine their ability to recover from extreme events as part of their business impact assessment. The outcome would lead to a resilience strategy that aims to minimize risk exposure and maximize their ability to recover and achieve normal operational/performance level (or better) at the shortest possible time.

## PHASE II

**Develop a Building Infrastructure Resilience Planning Guide for Commercial Real Estate.** The planning guide will include a set of best practices and procedures that could directly impact the outcome of PHASE I.

***Rationale:*** Once the risk exposure and the capacity to recover are determined, building owners and managers may need directions on how to manage and change input variables so that they could aim for the desired output that meets their business requirement.

The extent to which the input variables are changed (or expected to change) will form the basis of their resilience strategy and planning.



# Progress Update – PHASE I

- In early 2016 BOMA Toronto (in collaboration with UofT - Centre for Resilience of Critical Infrastructure & FCR) commissioned a study to investigate Carrying Capacity of buildings and the infrastructure that supports operation of buildings.
- 12 buildings participated.
- **Part 1:** Focused on determining what are the variables and how it should be usefully measured + derived a methodology. Findings were presented internationally
- **Part 2:** Investigated how to apply the methodology to real-life scenario. Finding was published
- **Part 3:** Application & Validation – Applied to international sites & portfolios with desirable outcome

# Progress Update – PHASE I

- International application sites:
  - Gaza strip (Israel – Ministry of Infrastructure)
  - International Red Cross facilities
  - St. Lucia airport
  - Middle-East
- Contribution to a special report on "Smart City Connectivity to Support Municipal and Community Resilience." through the International Telecommunications Union (ITU). A report commissioned under "United for Smart Sustainable Cities" a UN initiative

# Resilience in the Commercial real Estate Industry

*Designing for a Graceful and Survivable Future*

## Technical Guidance Notes

[https://cdn.ymaws.com/www.bomatoronto.org/resource/resmgr/2019/Resilience Guide Book\\_Final.pdf](https://cdn.ymaws.com/www.bomatoronto.org/resource/resmgr/2019/Resilience_Guide_Book_Final.pdf)



A BOMA Toronto Technical Guidance Note

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## 5 Key Drivers

How to Use the Five Drivers of Resilient Development

Each of the drivers is structured in the following way, using only what is reasonably foreseeable:

1. An objective statement
2. An explanation of the driver's supporting principles and concepts
3. Guidance for executing it

# DRIVER 1:

## SITE SELECTION

### Objective

*Incorporate location-based hazards and reasonably foreseeable consequences into the site selection process and investment decision criteria.*



## DRIVER 2: PLANNING ENVELOPE

### Objective

*Understand the capabilities of the facility and its servicing infrastructure and compare it with the needs of tenant operations. This will assist in determining the most suitable use for each space, and in prioritizing any investments that may be required.*

## DRIVER 3: INCIDENT SEQUENCING

### Objective

*Understand what tenants need to achieve to stay in business, and work backwards to assess the level of facility performance required to enable it.*

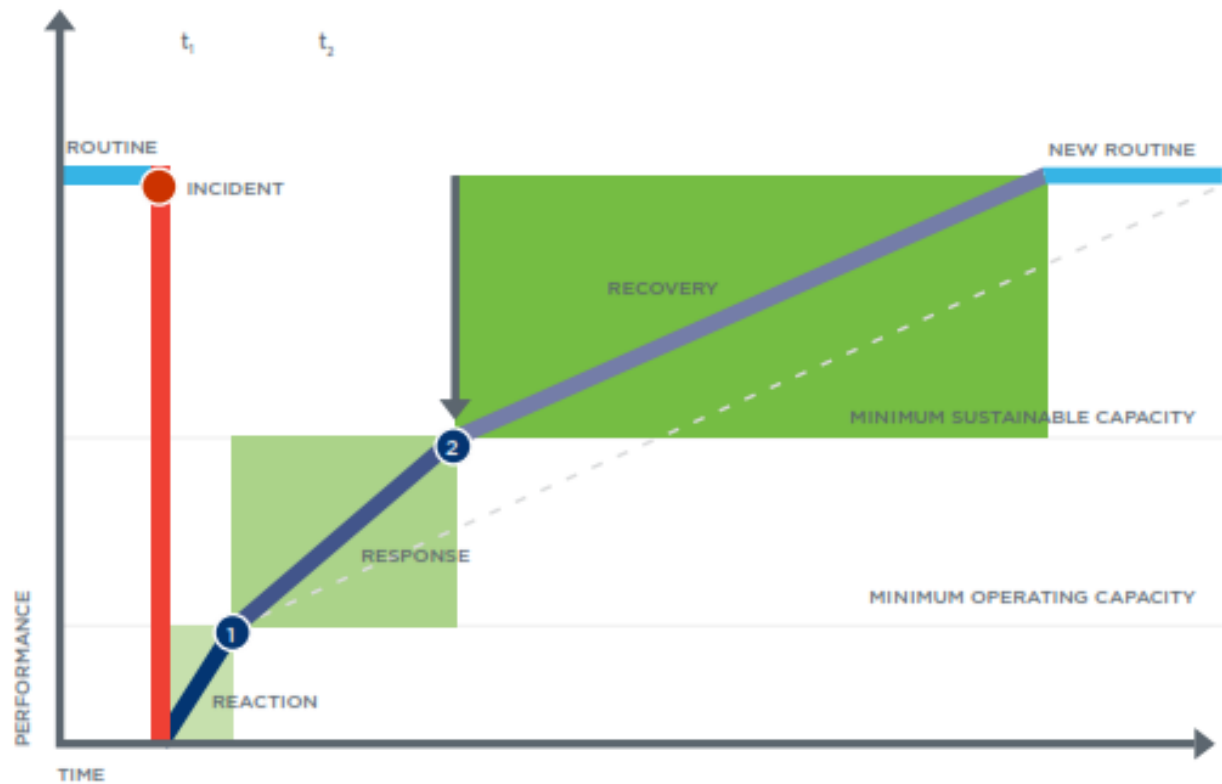


Figure 1: The Incident Sequence

The key here is to interrupt a cascading failure and buy the time required to implement active recovery measures.

## DRIVER 4: SECURITY REQUIREMENTS

### Objective

*Understand where residual risk remains and design your security requirements to fill these gaps. Security functions themselves also need to be protected. An all-hazards awareness must be maintained as these security functions are developed to ensure that measures to address one risk do not exacerbate the vulnerability to or impact from another.*

## **DRIVER 5:** INTEGRATED DESIGN

### **Objective**

*Understand the value in having all functional and operational interests represented early and throughout the facility lifecycle. Requirements and assumptions must be documented, and key performance requirements verified by testing critical processes and systems against the failure scenarios (defined by the incident sequences) to assure that each scenario unfolds as expected.*

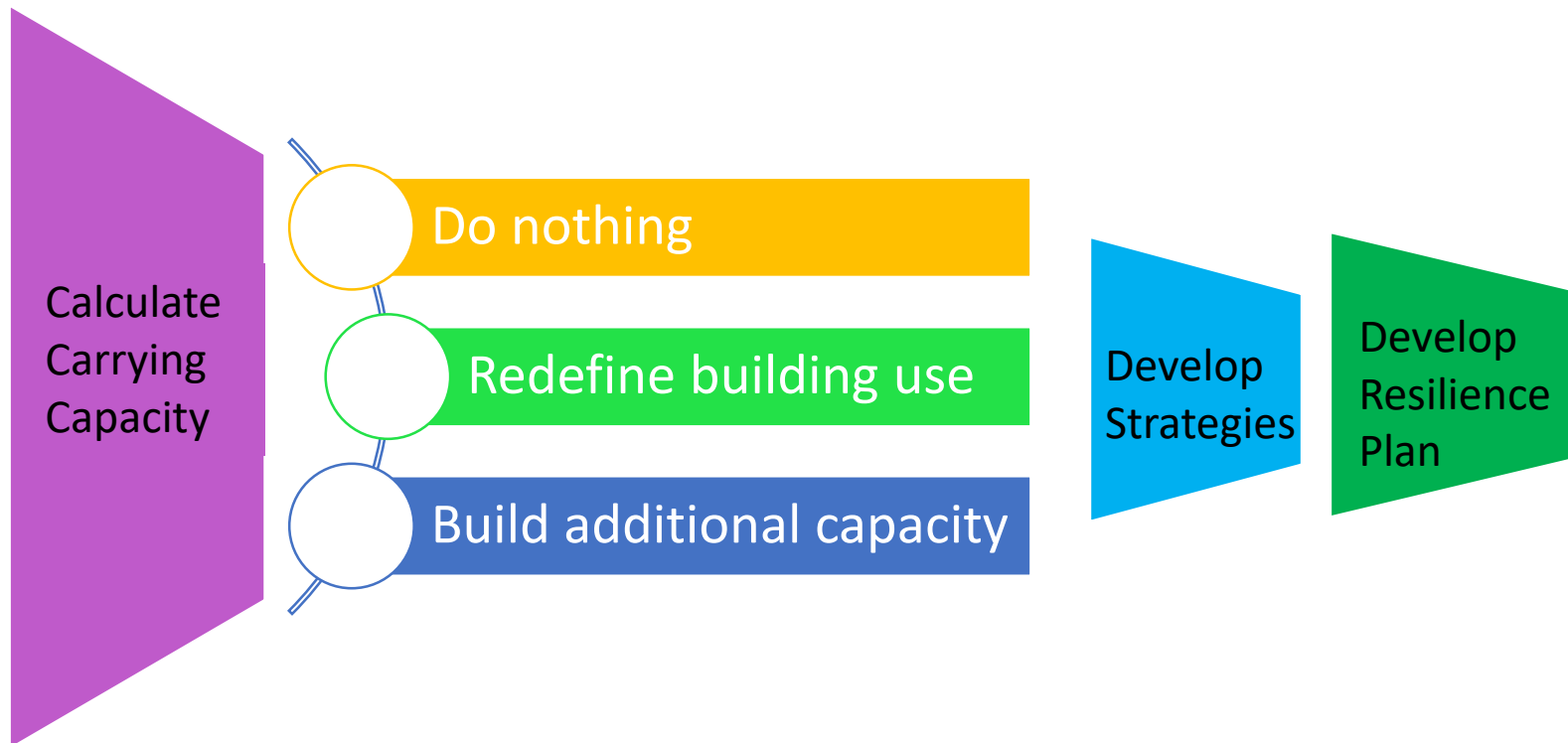
# In Practice....

**Assessment**

**Decisions / Options**

**Strategy**

**Plan**







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