

TOD RESILIENCE DESIGN GUIDELINES
PRESENTATION TO STATEWIDE TOD COUNCIL
12 NOVEMBER 2019



ARUP

PROJECT GOALS

1. Establish clear guidance for development in urbanized areas regarding strategies to adapt to climate change-related impacts without compromising the quality of the urban experience. Climate-related impacts include increase in heat, flooding from rainfall events, and surface and groundwater inundation due to sea level rise.
2. Develop adaptation recommendations based on best practices pertaining to site buildup, building designs, block frameworks, etc. in urban areas; and,
3. Create a user friendly and graphic-heavy guidance document that can be used as a reference by large and small developers as they prepare project proposals.

Action 14:
**Establish Future Conditions Climate
Resilience Design Guidelines**

Forward-looking Design Parameters for:

Heat

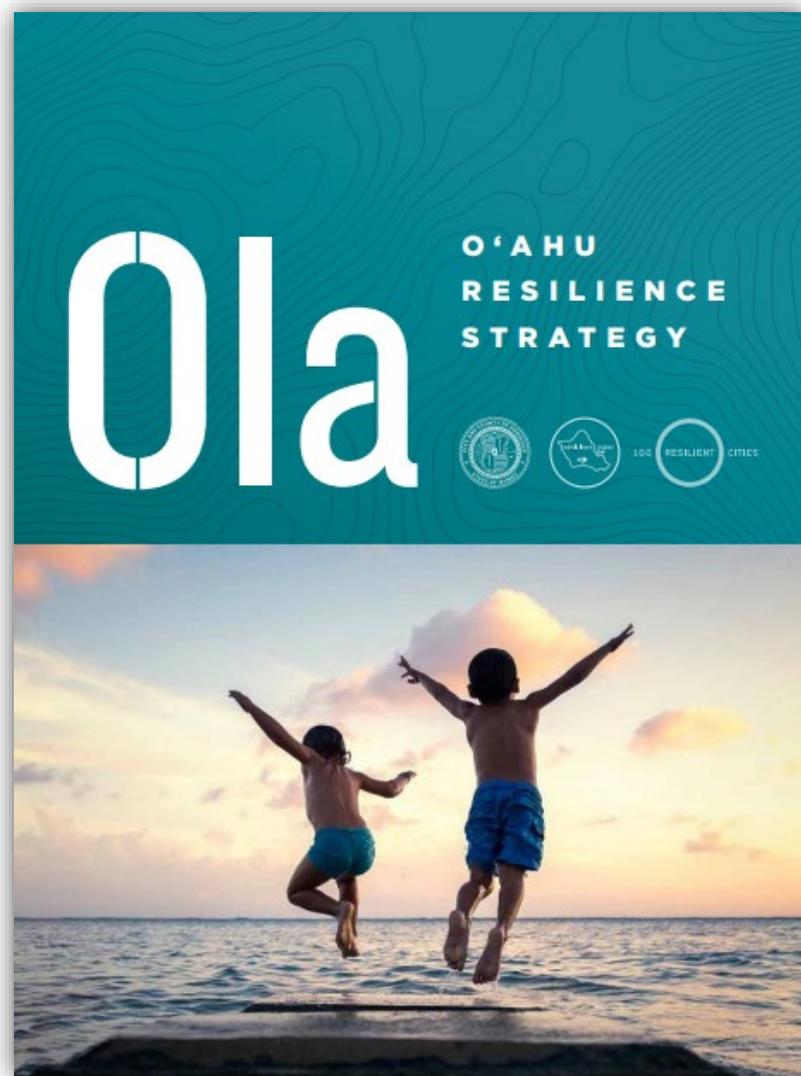
Wind

Flooding

Sea Level Rise

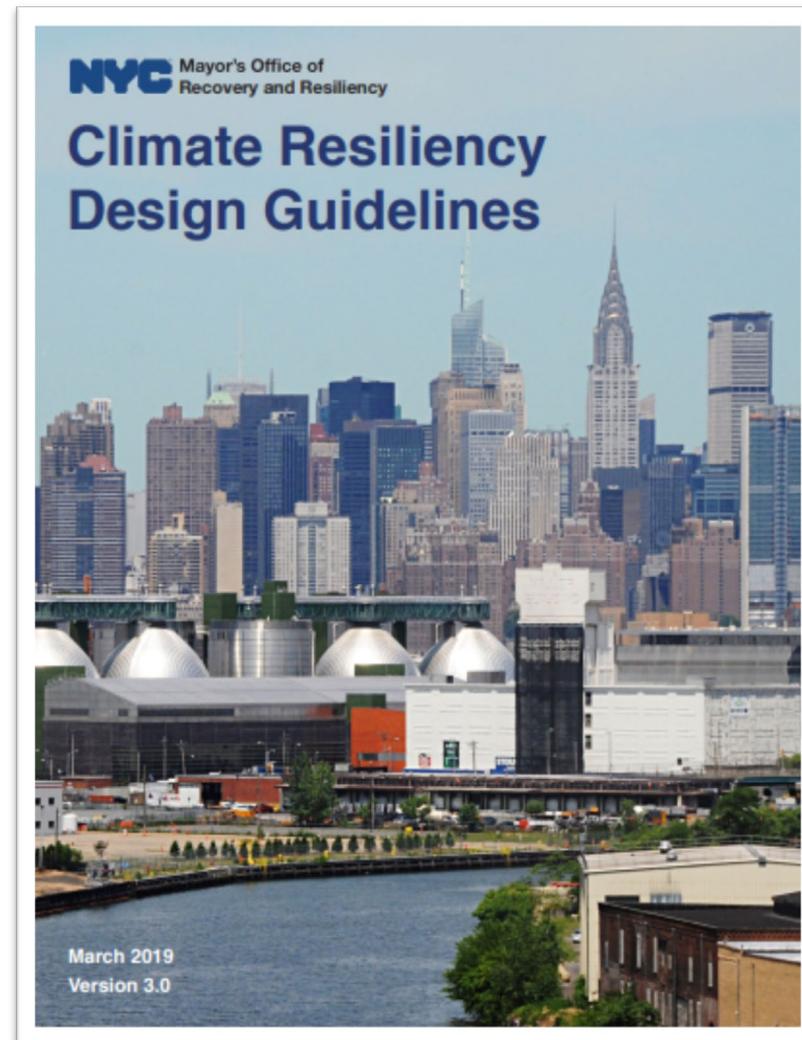
Materials and Reuse

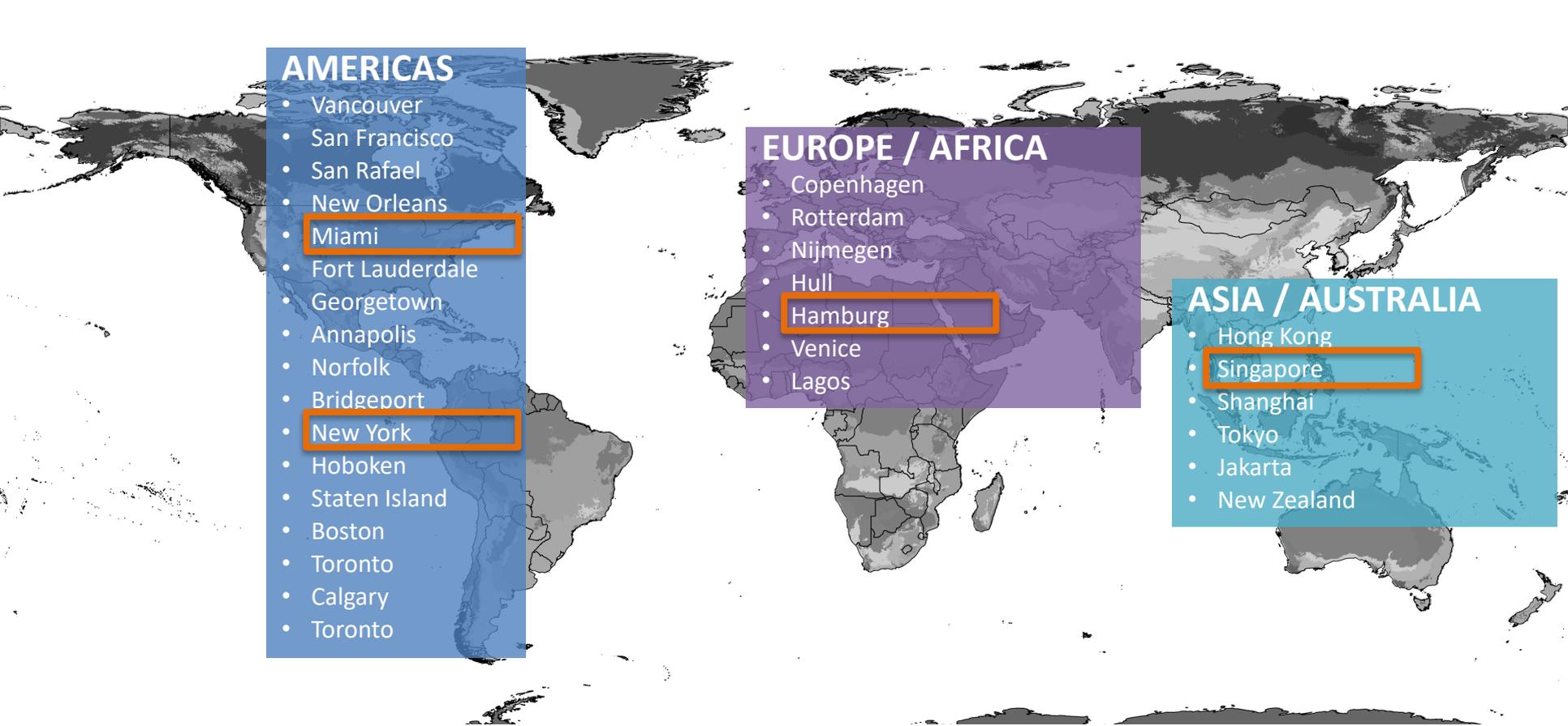
+ *Waikīkī Special District Design Guidelines,*
TOD Design Guidelines



LITERATURE REVIEW

1. Assemble local, national, and international examples pertinent to Honolulu.
2. Highlight relevant guidelines/recommendations that may be relevant to Honolulu.
3. Review recommended guidelines to see what is currently allowed here, and what policies need to be changed in order to foster implementation.





AMERICAS

- Vancouver
- San Francisco
- San Rafael
- New Orleans
- Miami
- Fort Lauderdale
- Georgetown
- Annapolis
- Norfolk
- Bridgeport
- New York
- Hoboken
- Staten Island
- Boston
- Toronto
- Calgary
- Toronto

EUROPE / AFRICA

- Copenhagen
- Rotterdam
- Nijmegen
- Hull
- Hamburg
- Venice
- Lagos

ASIA / AUSTRALIA

- Hong Kong
- Singapore
- Shanghai
- Tokyo
- Jakarta
- New Zealand

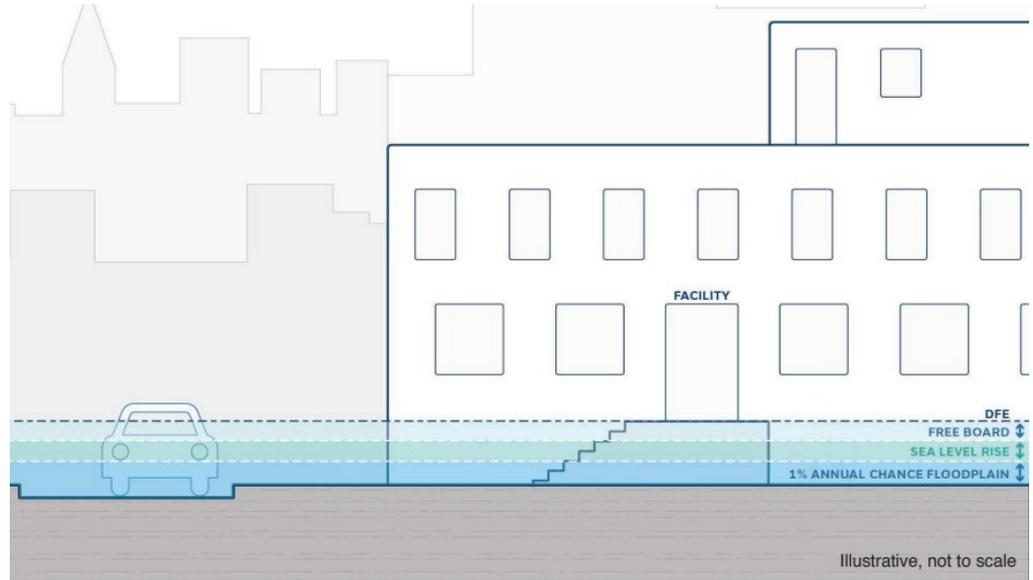
**INTERNATIONAL & NATIONAL PRECEDENTS:
SEA LEVEL RISE ADAPTATION AND STORM RESILIENCE**

NEW YORK RETROFITS & FREEBOARD

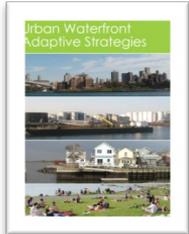
Multi-family and commercial buildings
require 100-year + 12”

Critical facilities require
100-year + 24” + (6” to 36”)
depends on lifecycle

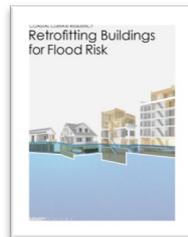
Non-critical facilities require
100-year + 12” + (6” to 36”)
depends on lifecycle



[Urban Waterfront Adaptive Strategies](#)



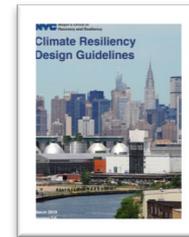
[Retrofitting Buildings for Flood Risk](#)



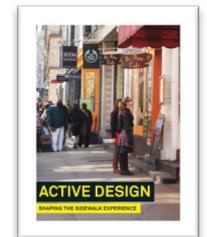
[Street Design Manual](#)



[Climate Resiliency Design Guidelines](#)



[Shaping the Sidewalk Experience](#)



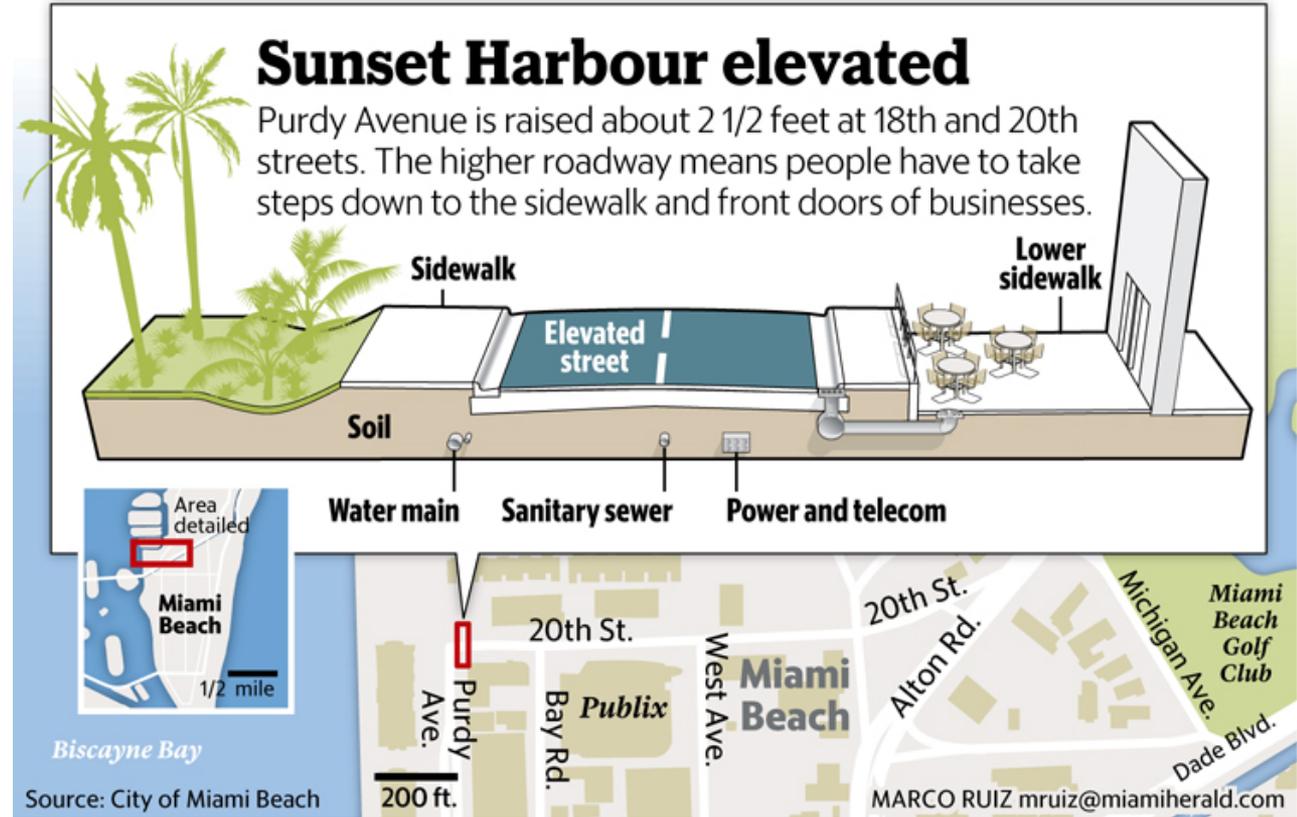
MIAMI BEACH STREET & BUILDING RAISING

The City of Miami Beach is currently exploring ways to make existing buildings and adjacent infrastructure more resilient

Many properties fall within an historic district

Working on resilient building design guidelines and updates to zoning code to allow for raising of buildings

Raising buildings provides challenges related to transitions from street to sidewalk to building



HAMBURG

ELEVATED PROMENADES

HafenCity is partially protected against storm surges and rising seas.

Old buildings have been raised; new buildings adhere to flood-resilient design standards.

The city built the roads and open public spaces on terraces more than 25 feet above normal high tide.

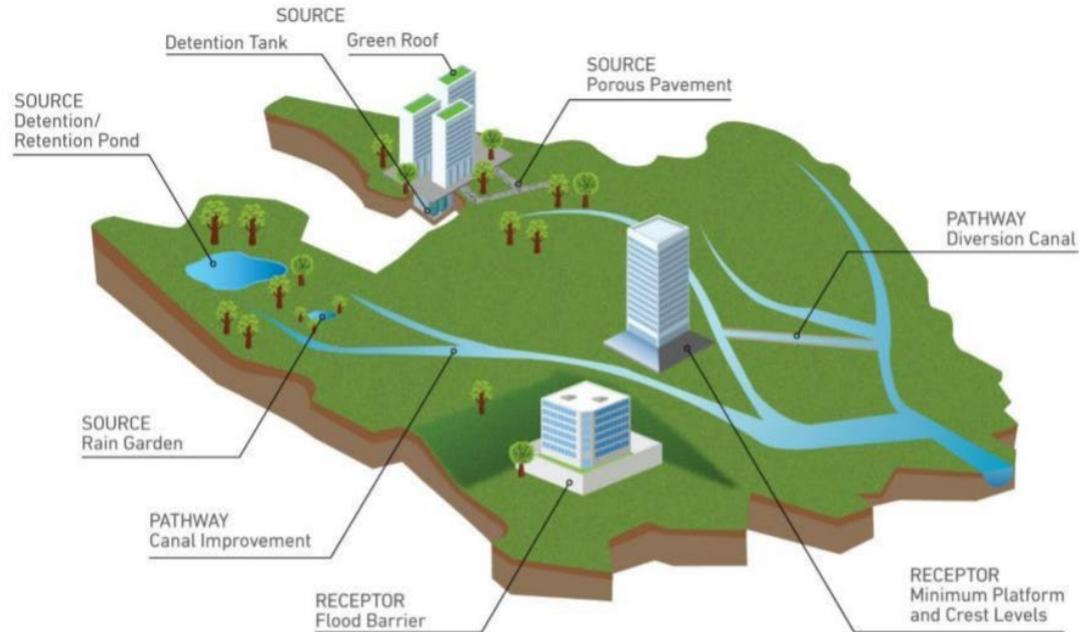
Developers were permitted to build at this level, but were required to waterproof the structures all the way up to, and have entrances at, the higher street level.



SINGAPORE

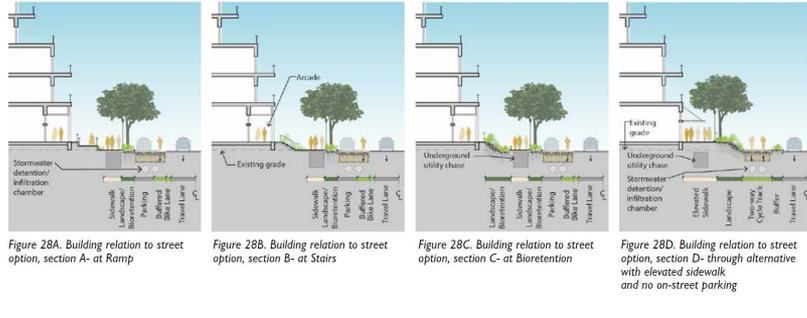
“SOURCE-PATHWAY-RECEPTOR”

Using a system-wide source-pathway-receptor approach, Singapore has managed to develop and implement new drainage standards to decrease flood risk.

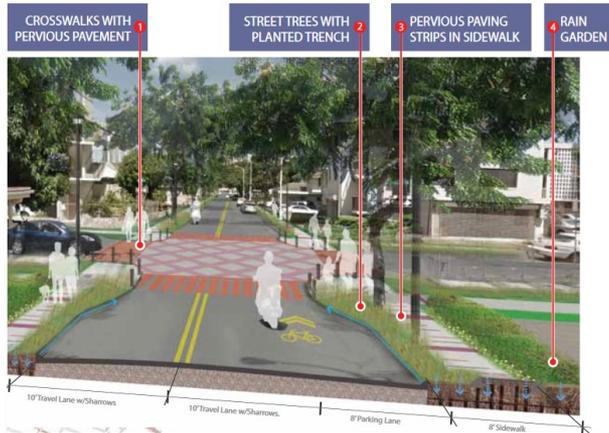


LOCAL POLICY & REGULATORY REFERENCES

GREENING IWILEI AND KAPALAMA



TOD NEIGHBORHOOD PLANS



- *Mayor's Directive on Climate Change (18-02)*
- *Hawai'i Sea Level Rise Vulnerability and Adaptation Report*
- *Department of Facilities Maintenance Storm Water Management Plan*
- *Department of Facilities Maintenance Green Infrastructure Design Guidelines*
- *Department of Transportation Services Complete Streets Design Manual*
- *Department of Planning and Permitting: Land Use Ordinance (Draft Update)*
- *Plan Review Use Permit Guidelines*
- *Planned Development Permit Guidelines*
- *Special District Design Guidelines*
- *SMA Use Permits (major/minor)*
- *Shoreline Setback Ordinance (Draft Update)*
- *Subdivision Permit Requirements/Workflow*
- *Site Development Division Submittal*
- *Requirements*
- *Building Permit Checklists (residential/commercial)*
- *Rules Relating to Water Quality*
- *Storm Water BMP Guide for New and Redevelopment*

INTER-DEPARTMENTAL COORDINATION

Purpose:

Compare National/International best practices with local plans/regulations, identify gaps/needs, opportunities for coordination.

Information Sharing:

- What existing regulations should be referenced in the guidelines?
- What initiatives are ongoing?
- What's on the horizon?

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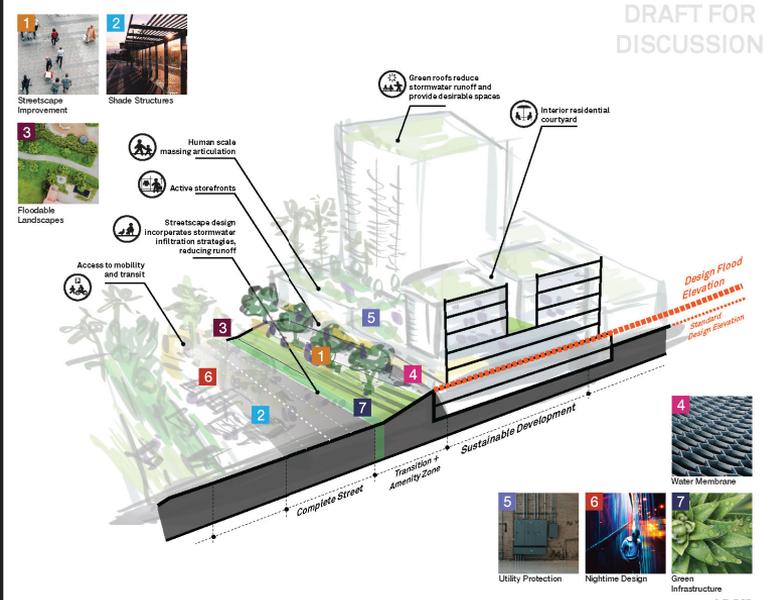
GUIDANCE DOCUMENT FOR DEVELOPERS

- Will communicate resilient design strategies for buildings and public realm transitions using simple, intuitive imagery
- Focus on urban development types representative of new development/redevelopment trends in TOD areas
- Will show scalable solutions for different building types
- Will reference existing regulations and guidance; highlight upcoming regulatory changes

1 Large Scale Mixed-Use

Mixed-Use High Density Tower on Podium

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DRAFT FOR DISCUSSION

BUILDING TYPOLOGIES:

POINT TOWER & PODIUM (EXAMPLES: THE COLLECTION, KEAUKOU LANE)



Typical development characteristics:

- 8 – 40+ story tower on mixed use, multilevel podium structure
- Tower and podium is residential, office, or resort-related uses
- Parking, lobby, and ground floor retail in podium
- Elevator building and emergency stairs
- Exposed portions of parking structure wrapped by low or mid-rise residential building
- Considerable landscaping and pedestrian amenities between building facades and back of sidewalk.
- Frontage on a complete street

BUILDING TYPOLOGIES:

MID-RISE APARTMENT BUILDING (EXAMPLE: 400 KEAWE)



Typical development characteristics:

- 4–7 stories
- L-shaped, U-shaped, or perimeter residential building with courtyard
- Retail and/or elevated residential uses on first floor
- Wrapped parking structure or rear-sited parking structure
- Elevator building with emergency stairs
- Landscaping and pedestrian amenities between building facades and back of sidewalk
- Frontage on a complete street

BUILDING TYPOLOGIES:

MODERN WALK-UP (EXAMPLES THROUGHOUT URBAN HONOLULU)



Typical development characteristics:

- 2 – 3 stories
- Single-family, multilevel attached dwelling units
- Individual attached garages, detached garages, or tuck-under parking
- Frontage on a complete street

BUILDING TYPOLOGIES:

MULTI-TENANT COMMERCIAL (EXAMPLE: INTERNATIONAL MARKETPLACE)



Typical development characteristics:

- 1 – 3 stories
- Integrated parking structure or standalone rear-sited structure
- Street facing retail and/or indoor shopping mall
- Considerable landscaping and pedestrian amenities between building facades and back of sidewalk
- Frontage on a complete street

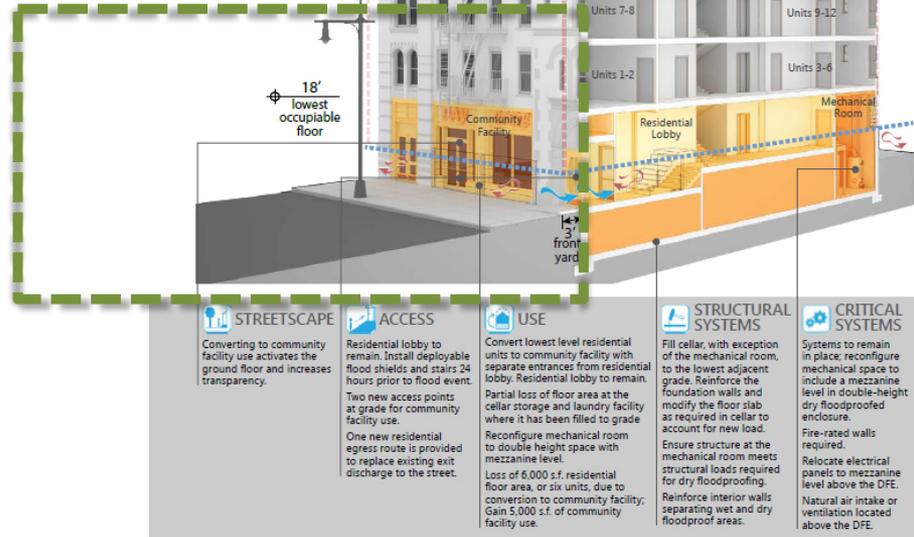
EXAMPLE GRAPHIC & RECOMMENDATIONS

- Design public realm transitions between building and street to provide welcoming pedestrian environment
- On-site detention/retention/infiltration for rainfall and flood events
- Floodable parking areas/courtyards
- Mitigate heat using green/blue/cool roofs, shade trees, awnings
- On-site water reuse and recycling
- Dry/wet floodproofing of uses on ground floors
- Elevate sensitive equipment/uses above first floor
- Floodproof uses below first floor

WET & DRY FLOODPROOF

Fill partial cellar to lowest adjacent grade.
 Convert lowest occupiable floor from residential to community facility use to enable dry floodproofing of the ground floor.
 Contain mechanical systems and utilities within dry floodproofed double-height enclosure within existing mechanical room footprint.
 Wet floodproof area below the DFE by installing flood vents located at all exterior and interior walls, and replacing all windows, doors and finishes with flood damage-resistant materials.

DEVELOP PUBLIC REALM TRANSITION GUIDELINES



LOCAL EXAMPLES

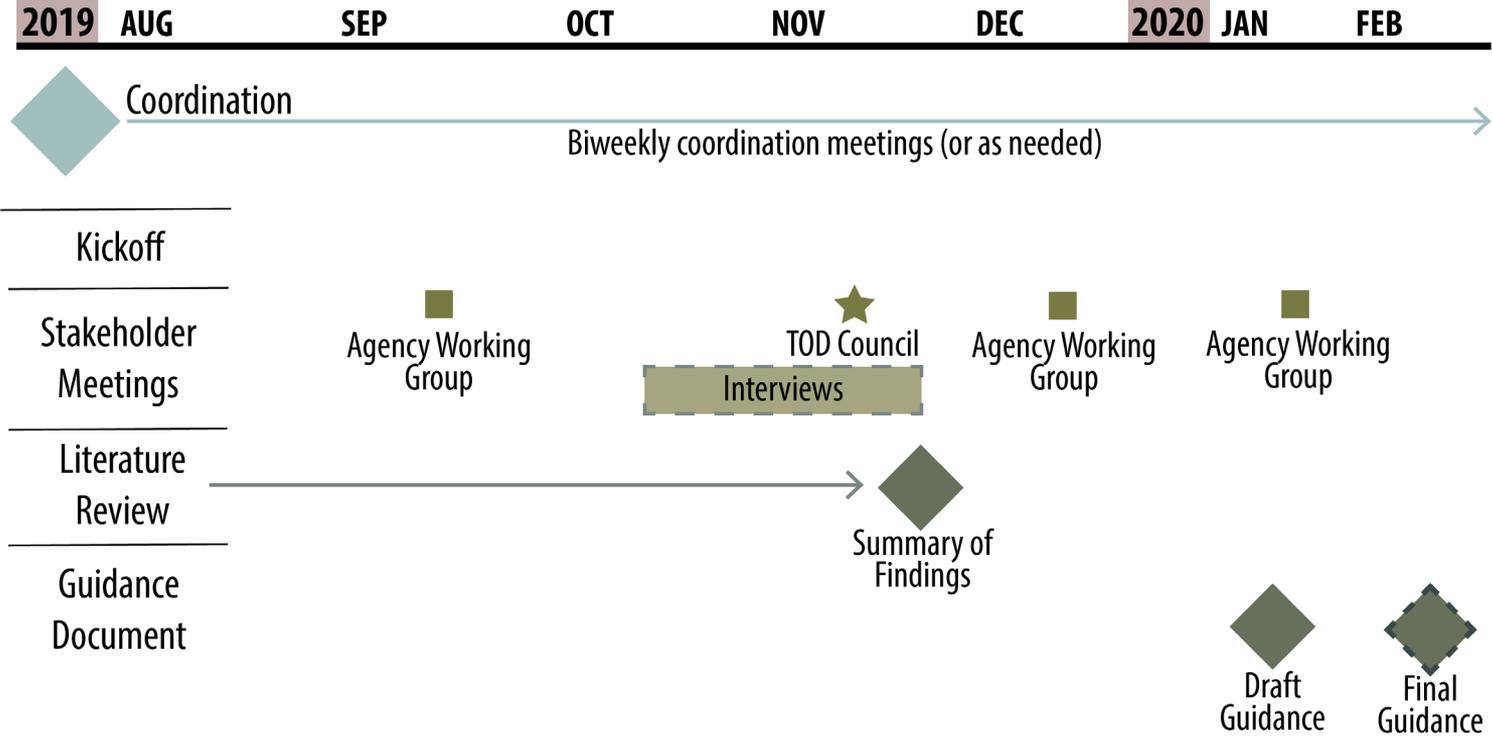


LOCAL EXAMPLES

KEAUHOU LANE, SOUTH SHORE MARKET



PROJECT SCHEDULE



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