5

Resiliency Approaches & Strategies

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“ …if ambition…pricked on to change, that change was of necessity wrought in the unmistakable fashion of the time;… but every change, whatever history it destroyed, left history in the gap, and was alive with the spirit of the deeds done midst its fashioning. The result of all this was often a building in which the many changes, though harsh and visible enough, were, by their very contrast, interesting and instructive and could by no possibility mislead.”

William M orris, founder of the British conservation movement. Quoted in The Construction of New Buildings Behind Historic Facades Copyright 1991 David Highfield

Collins Waterfront Study Area | Indian Creek Dr with 38th street looking South

5.1 // INTRODUCTION

In considering adaptation models and strategies for Miami Beach historic districts, it is important to affirm evident realities, as well as community values. In spite of its vulnerability to sea level rise, it is unlikely the City will ever be able to make use of flood barriers at an urban scale. The impossibility of retreat must also be considered; the city has no substantially higher ground. Further, Miami Beach is relevant, historic and economically viable because of its coastal situation. In the face of any rational cost vs. benefit analysis, the social and cultural values of the city argue to adapt in place. Indeed, the City has made the critical choice to preserve its community and focus on adaptation, as demonstrated through various initiatives and documented on the Rising Above website: www.mbrisingabove.com. The strategies that follow are built on this adaptive aim, and on the calculus that the City of Miami Beach will continue to maintain, through infrastructure improvements, its viability as a stable setting for private adaptive redevelopment.

The strategies developed here may be applied across a variety of scales, from modest improvements that can be accommodated today to more significant changes rooted in a place-based vision. They are based on consideration of building type, typical significant historic resources, typical structural systems, local development and building practices, context, and current zoning and building code requirements. In General Adaptation Strategies (Section 5.1), tactics are informed by best practices internationally, with special attention to the specific issues found on Miami Beach. In Mid- and long-term adaptation strategies (Section 5.2), the approaches demonstrate more profound scenarios that look forward 60 years. They anticipate that Miami Beach will, over time, reframe these study areas as essential laboratories of resilience, expanding the placemaking potential and environmental performance of buildings, landscapes and streetscapes while building the future identity of the city. Together, the strategies illustrated were conceived with the objective of keeping the city vibrant, not just above water.

The study areas chosen by the City for this report represent particularly low areas of Miami Beach, where issues of sea level rise, extreme rain events and King Tides are particularly present. The adaptive tools and medium- to long-term strategies developed here are based on water conditions identified in the Quantifying Water section of this document (Chapter 2). As suggested there, the adaptation strategies incorporate separate planning for cyclical events vs. storm surge.

Considering that most building adaptation will be financed by individual property owners, the City should consider leveraging increased density and intensity to incentivize adaptive rehabilitation. Patterns of development found in Miami Beach's history demonstrate how the city can transform rapidly, although current limitations on growth must also be considered. The section titled Cost | Incentivization (Section 5.4) demonstrates ideas about how the study areas may accommodate increased densities.

As William J. Murtagh notes in Keeping Time: The History and Theory of Preservation in America, "The preservation of a neighborhood should be seen as a heterogeneous product, the whole of which exceeds the value of the individual parts". Preserving how the buildings of the district relate to each other and to their context is important, but other elements including landscape, streetscape and infrastructure are vital. The sections titled Landscape Strategies (Section 5.5) and Streetscape Strategies (Section 5.6) demonstrate approaches to making more adaptive and ecologically balanced neighborhoods.

New Historic Preservation and Resiliency Framework (Section 5.7), suggests new contours for balancing historic preservation with resilient design. The final section comprises specific recommendations related to preservation and resiliency.

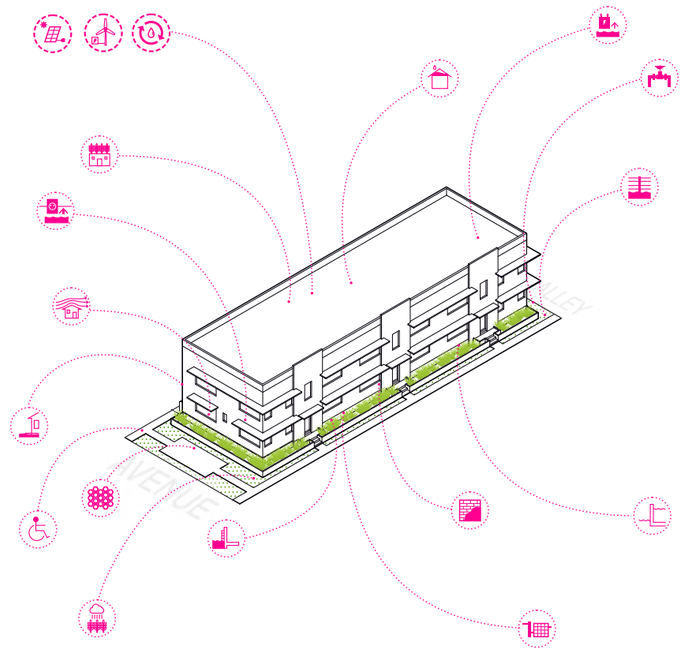
5.2 // GENERAL ADAPTATION STRATEGIES

General adaptation strategies are tools that can be applied at any scale of adaptive rehabilitation. These tools are grouped under four categories: Building and Systems Strategies, Green Infrastructure, Stormwater Management, and Futureproofing; although many strategies may be considered to overlap categories. These general adaptation strategies find guidance from FEMA and others, and are generally based on national best practices.

A reasoned application of these approaches according to building type and adaptation strategy can be found in the Guidelines section of this study (Chapter 6). Further description of the general adaptation strategies can be found at the Appendices (Chapter 8).

Adaptation work in Miami Beach historic districts must consider fixed factors including site elevation, property configuration and access, building configuration and access, building footprint and orientation, adjoining property, building type, building elevation, and building foundation and construction system. The complexity of integrating this work will depend on a number of factors; an architect should be consulted to determine the appropriateness and scope of work required.

Although not strictly building-resiliency related, futureproofing strategies, like the use of wind and solar power, and the re-use of water, are included here. Reducing the demand for energy and water resources not only builds sustainable practices that reduce environmental impact, it reduces loads on city infrastructures, lowering their costs and vulnerability.



A. BUILDING & SYSTEMS STRATEGIES | For more detail see Appendix IV

BACKFLOW PREVENTION
Elevated water levels can cause waste in sanitary sewer lines to back up through drainpipes and flow into homes through toilets and other drains. One solution is to install backflow prevention valves on sewer lines in existing structures. Backflow prevention valves allow flow in only one direction. Waste or stormwater can flow out through the sewer pipe but is also prevented from flowing back into the structure.

MECHANICAL SYSTEMS FLOOD PROTECTION
Mechanical equipment primarily includes heating, ventilation, and air conditioning (HVAC) systems. Small amounts of saltwater can quickly corrode mechanical systems, rendering them inoperable. the simplest and most effective ways to protect primary mechanical system components is to elevate them above design flood elevations. In Miami Beach, where buildings occupy most of their lot, mechanical units should be relocated to the roof of the building, where there is sufficient structural capacity.

UTILITY & LIFE-SAFETY FLOOD PROTECTION
Unless an electrical system - electric panels, meters, switches, outlets, light fixtures, and the wiring that connects them all together - is specifically designed to be submerged underwater, floodwater can severely damage its various components. Similarly, gas and water meters, unless rated for submersion, can be damaged by flooding. Use flood-rated equipment or relocate above Design Flood Elevation.

DRY FLOODPROOFING
Dry floodproofing involves taking measures to make a building watertight to prevent entry of water into interior spaces. Dry floodproofing measures must be paired to prevent failure. Reinforcing openings and walls to withstand floodwater pressures should be combined with reinforcing or anchoring the building slab to resist flotation from uplift pressures and other buoyancy forces.

WIND MITIGATION
Wind mitigation is the implementation of certain building techniques in order to limit damage caused by intense wind. These building features include opening protection of the doors and windows, appropriate roof deck and roof to wall attachment, use of appropriate roof coverings and implementation secondary water resistance systems.

SEEPAGE AND WATERPROOFING
While most building materials appear solid and impenetrable to the naked eye, when sustaining flood loads water may pass through these materials. Waterproofing techniques make a building envelope more impermeable and reduce the amount of water than can infiltrate. Waterproofing can be applied from either inside or outside a building wall, depending on the type of sealant used. Impermeable membranes can also be used to waterproof foundation walls belowgrade to resist groundwater seepage.

FLOOD RESISTANT BUILDING MATERIALS
Everyday building materials may be susceptible to rot and mold when exposed to flooding. Using flood-resistant materials can reduce the damage and make cleanup easier following a flooding event. Building materials are considered flood-resistant if they can withstand direct contact with flood waters for at least 72 hours without being significantly damaged (damage requiring more than cosmetic or low-cost repairs).

ADA ACCESSIBILITY FEATURES
The Americans with Disabilities Act (ADA) requires businesses that serve the public to remove barriers from older buildings and to design and build new facilities implementing features that provide access to customers with disabilities. These accessible features include parking, access to the building entrance, route into and through the establishment, access to the store's goods and services, restrooms, cashier stations, and egress from the building.

WET FLOODPROOFING
Wet floodproofing is a concept that accepts some level of flooding, rather than working to reinforce the structure against floodwater pressures. Strategically designed and placed openings allow floodwaters to automatically enter and exit the enclosed area.

B. GREEN INFRASTRUCTURE | For more detail see Appendix IV

RAIN GARDENS
Rain gardens are special planting areas designed to capture and store rainwater. Not only do rain gardens assist in reducing overall storm runoff quantity, but they can also aid in purifying water from pollutants and contaminants using natural filtration processes present in soil and plants. Plantings and microorganisms in the soil have the ability to break down biological toxins and also bioaccumulate toxins. Rain gardens are usually located within a small depression in a property to allow water to naturally flow to low points.

GREEN ROOFS
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SUNKEN PLAZAS AND PATIOS
Recessed parks, building courtyards, and plazas may contain impervious surfaces designed to temporarily store water during extreme events. These landscape features keep the water out of adjacent properties and also reduce inputs to storm drains not sized for current and future more extreme storm events. These landscapes can retain the water until a storm has passed at which time the collected rainfall can be drained to a storm sewer system or other storage area.

PERMEABLE PAVEMENT
Permeable pavements and surfaces allow direct infiltration of water into the ground. By allowing water to naturally infiltrate into the ground, stormwater can be stored underground before flowing into stormwater systems, recharging local freshwater aquifers, and feeding nearby plants. Permeable paving helps reduce the load on traditional storm sewers that were not sized for the severity of contemporary storm events.

CISTERNS
Cisterns below ground and rain barrels that hold water from roof drains are a simple and affordable way for property owners to capture water, reducing the amount of stormwater impacting their property and harvesting rainwater for other uses. Rain barrels capture water for later use in irrigation or even cleaning purposes. Likewise below ground cisterns can also be used for irrigation and flushing a landscape of salt after larger storm events. With proper treatment, cistern water can also be used for water features and car washing.

C. STORMWATER MANAGEMENT STRATEGIES | For more detail see Appendix IV

BLUE ROOFS
Blue roofs capture rainwater by functioning as a tank-like structure and often collect it for re-use within the building through non-potable (water not used for drinking or cooking) needs such as irrigation and flushing toilets. Typically, stored water is designed to be drained within 24 hours if not within an enclosed system to prevent insects and other issues that can come with standing bodies of water.

INJECTION WELLS
Miami Beach's unique geology and high groundwater table can often make storage of rainwater difficult. One alternative is to use injection wells to send water into an area of the earth where more space is available for water to infiltrate. Stormwater injection wells are used throughout Miami for larger, developed sites where there is minimal space available for natural infiltration or storage at or near the surface.

D. FUTURE PROOFING | For more detail see Appendix IV

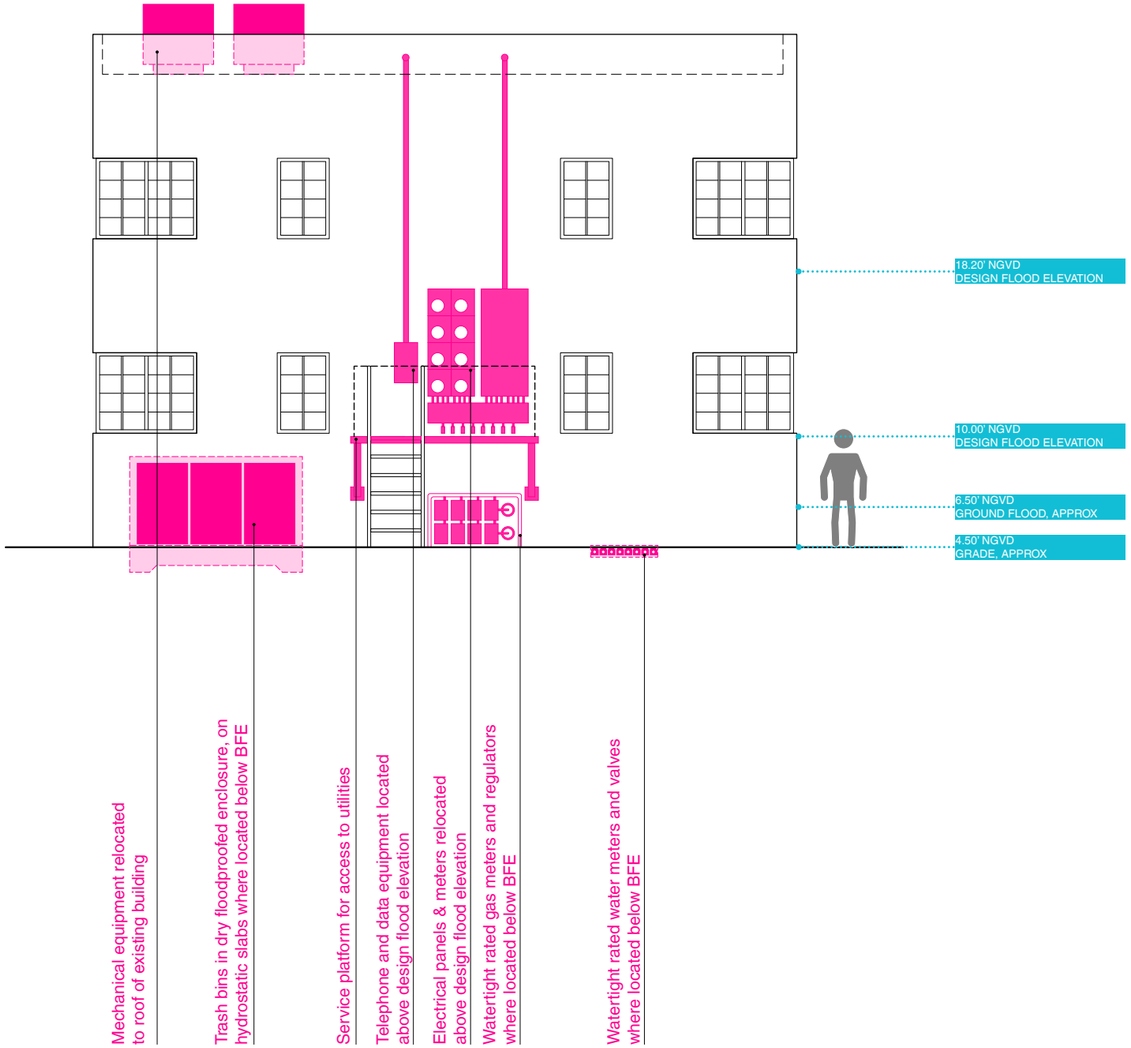
SOLAR PANELS
Solar panels are used to absorb the sun's rays and convert them into electricity or heat through photovoltaic effect. Use of solar panels helps decrease greenhouse gas emissions as well as reliance on fossil fuels and traditional power sources.

WIND TURBINES
Wind turbines are an alternate source of electricity. They operate via wind energy, which turns two or three propellers, or blades, around a rotor. The rotor is connected to the main shaft, which spins a generator to create electricity.

WATER RECYCLING SYSTEMS
The recycling of water involves treating wastewater and reusing it. Recycled water can be reused again to treat wastewater, or can be used for irrigation or other non-potable uses.

Utility Relocation Study

As recommended under General Adaptation Strategies, building utilities and services should be raised or protected up to the DFE (Design Flood Elevation.)



5.3 // MID- & LONG- TERM ADAPTATION STRATEGIES

The following mid- and long-term strategies explore how the adaptation of the Miami Beach historic districts might work as they face the threat of rising water. In general, the strategies follow two pathways: Adapt-in-Place (Strategy 1) and Raise (Strategy 2).

Adapt-in-Place and Raise explore divergent scenarios for adapting buildings in the Flamingo Park and Collins Waterfront study areas (which the team recommends designating as Experimental Action Areas) in response to issues of resiliency. Both are based on the belief that contributing buildings in these districts will need to be flexible enough to respond to varying conditions of water in two distinct ways; namely, that buildings should be resistant to projected tidal flooding and rain events while simultaneously being resilient (able to bounce back) to projected storm surges.

To preserve the historic resources and local building types under consideration -- mainly hundreds of modest residential apartment buildings, homes and commercial buildings -- their context, designation criteria and historical development were considered; Miami Beach building practices, current land use regulations and building code requirements were also taken into account. Particular emphasis was placed on the character and identity of historic neighborhoods – the intimate relationship between the buildings and the ground plane and the crucial role the streetscape and thresholds between public and private (characteristic stoops, built-in planters, side-yard gardens, and door yards) play in defining Miami Beach's historic districts. It is here that the two sets of strategies vary most; they test alternate thinking about Miami Beach historic districts: are the buildings primary or is the district as a whole primary? Here a question of preservation goals becomes crucial. There may not be a single answer to this question, and approaches may need to differ by district.

Certainly, Miami Beach was not conceived according to a unified plan, but evolved and accreted in layers over many generations. Notwithstanding the lack of conformance to any singular pattern, the variegated streetscapes of Miami Beach, in their particular ad-hoc arrangements, have become a relevant image. Adapt-in-Place works to preserve these streetscapes, the relationships between building and ground, and interstitial spaces that make up the rich experience of each historic neighborhood. It acknowledges that individual buildings need to evolve in order to survive, but that in this evolution the vibrancy of the districts can be preserved and enhanced. Raise prioritizes the preservation of individual buildings as they are, even as it requires that unless every building and its lot are raised equivalently, the look and feel of the district will be changed.

The Strategies suggested here vary considerably, but each, taken to its logical conclusion, will yield a vision of a future resilient historic district. In reality (no matter what Strategy is followed) Miami Beach is about to become a more complex, challenging and stimulating preservation environment. It is the opinion of our team that the City must continue to progress and develop its next resiliency layer in order to preserve the vibrancy of its historic districts.

Note: the team believes that Strategies can be mixed across the city, but not within subdistricts. Each district should take one approach (Adapt-in-Place or Raise).

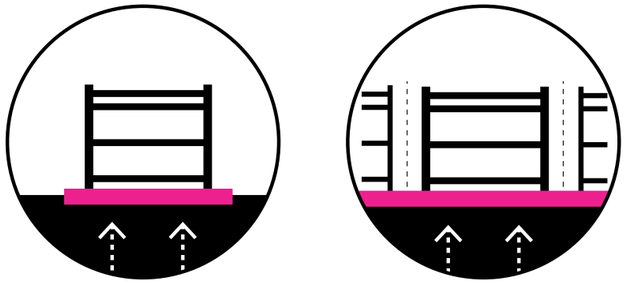
Adapt in Place
Strategy 1

1A
Internal Raise

1B
Adaptive Use Approach

1C
Building in a Building

Raise
Strategy 2



2A
Individual Approach

2B
Combined Approach

Adapt in Place | Strategy 1

Adapt in Place proposes incremental adaptation/expansion of buildings in their current position and within their current 'authentic' building facades. As current or anticipated water levels render the ground floor of current buildings obsolete and/or unsustainable, buildings can be adapted in place by change of use or raising interior floor levels. The tactics grouped in Strategy 1 argue the primacy of the tightly-knit fabric of existing structures in terms of their relationship to the ground and to other buildings and features. The three strategies demonstrated here allow more surgical approaches to retain the public facades, but also the fine-grained semi-public landscape of interstitial spaces, patios, stoops, planters, and exterior stairs. By raising or adapting floor areas while leaving existing facades and site features at their current elevation, Strategy 1 infers the development of neighborhood, site and landscape retrofits to support living with water during extreme flood or storm events.

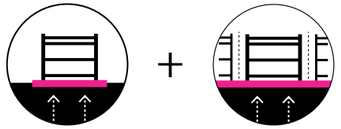
While proposing more continuity in the urban landscape, Strategy 1 emphasizes inventive, even radical, approaches to the architecture itself. It provides ample room for experimental preservation, as it imagines buildings adapting one-by-one, nudged by the need for adaptive procedures, but also by market forces and incentivized zoning regulations. Strategy 1 would have the effect of allowing preservation and adaptability to coexist in layered juxtaposition, highlighting typological consistency and architectural innovation as primary characteristics of the Experimental Action Areas within the Miami Beach historic districts .

The arguments for a more surgical approach are many: in the study areas investigated, most interiors are less significant as historic resources and have a longer history of change; most buildings are substantially deficient in code terms, so any substantial renovation would likely require bringing the building up to current Florida Building Code – requiring substantial structural improvements, new windows and roofing, fire and life-safety improvements, and the upgrading or replacement of many components. Further, in order to help offset the cost of adapting buildings, the City of Miami Beach may wish to consider compensatory floor areas to replace residential floor areas lost to resilience, or bonus floor area, as incentives.

Strategy 1 and its variations explore the logic that the building façade (the public face) and building interior (the private face) fulfill different functions and thus may be detached. Admittedly, this approach runs up against the National Park Service Secretary of Interior's Standards for Rehabilitation – in particular Standards 2, 5 & 6, which counsel against the removal of historic materials, advocate for the retention of existing finishes and construction techniques, and advocate repair rather than replacement of deteriorated historic features.

Adapt in Place has ample precedent in current preservation practice in Miami Beach. It is founded on preserving as much of the current contributing historic resources of a building (generally the facades and public interior spaces) as possible, while allowing internal adjustments, limited external expansion and adaptive use. To date, adaptive use has made sense in Miami Beach, allowing buildings to adjust to shifting economic conditions and evolving neighborhood context by adopting new programs. Ground floor apartment/hotel uses have been recast as retail spaces, entire residential buildings have been converted to commercial or office uses, and buildings have been rebuilt from the inside to respond to Building Code requirements. Beyond their origins in entrepreneurial practice, such changes of use may generally deploy a range of adaptation strategies, and often bring substantial urban amenity.

Raise | Strategy 2



Raise proposes lifting buildings in their current position on site, retaining as much of their current construction as possible. Raising buildings would adapt them to higher water levels, in principle necessitating fewer internal changes to the fabric and use of the buildings. Studies confirm that a majority of contributing buildings in both study areas can be raised (See Section 3.6). A description of techniques for raising buildings can be found in Appendix IV.

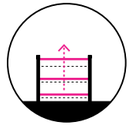
Raise takes a more purist approach to the structures themselves, allowing them to be variously raised as intact (albeit, as normally required by Building Code, FEMA requirements and ASCE 24, substantially improved) artifacts. It suggests less architectural innovation, while permitting a more permissive approach to the continuity of district streetscapes. Indeed, as buildings are variously raised or not, the strategy may result in local discontinuities. The National Park Service (NPS) has not endorsed raising buildings; indeed, by NPS standards, moving a building entirely may be preferable to raising it. The effect on neighbors is not well understood, with few if any local precedents.

Though raising buildings has little precedent in Miami Beach, it is shaping up nationally as an accepted approach toward adaptation of historic buildings – although admittedly more in the treatment of individual houses and single-family residential districts. For the purpose of this study, the team has considered two Raise scenarios: individual raise and combined raise. The latter would clearly be preferable, as historic relationships between adjacent buildings might be maintained. Two thresholds of Raise have been investigated: the first elevates the ground floor of historic buildings to 10' NGVD, the Design Flood Elevation (DFE) suggested earlier in this study; the second raises the ground floor of historic buildings to 14' NGVD, an elevation that roughly represents current permitted freeboard. Further, the team has investigated two ways of raising buildings. The first would raise only the structure and any necessary adjacent land necessary to maintain entry and egress from the current building doors and stoops (this largely means the side yards). The second raises the entire lot along with the buildings, establishing a speculative new ground plane and finding additional space for compensatory flood storage. These strategies were tested in order to explore the appropriateness of raising buildings, especially in the Flamingo Park study area. Whatever the merits, consistency of approach is critical in any raise.

While raising buildings reduces or eliminates the need for dry or wet floodproofing, the team recommends constructing a new first floor in concrete to provide further resilience against future tidal or rain events. Raising buildings allows the area beneath the raised building/lot to be used for water storage systems (cisterns, etc.). On the other hand, stringent measures must be taken to combat the 'bathtub effect' and retain as much water on the new, raised site as possible.

As raising buildings individually would be disruptive, one variant would be to conceive a system allowing multiple raises; leaving a grillage of steel in the building after one raise; this would mitigate much of the cost of the next raise.

Internal Raise | Strategy 1A



- **Retain and preserve all facades, stoops, stairs, built-in planters and yards at current positions.**

- **Construct new raised floors behind existing contributing facades.**

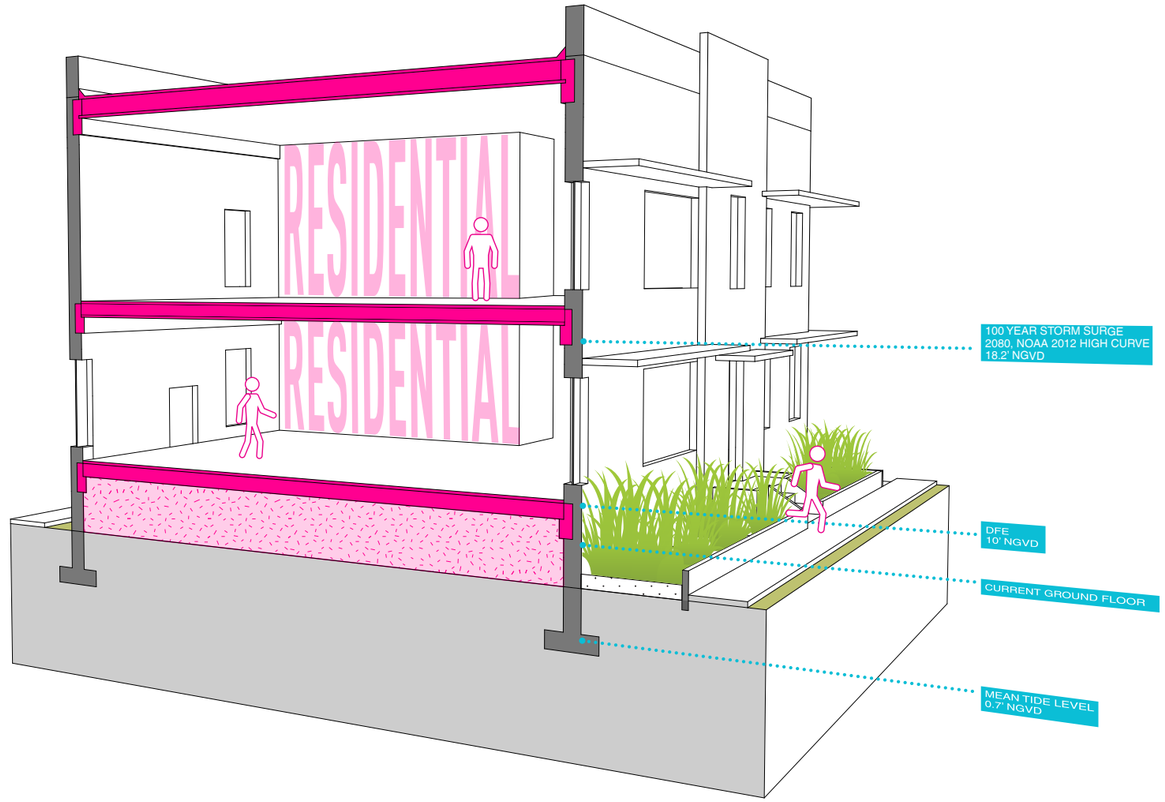
Strategy 1A proposes that buildings be adapted internally by constructing new raised floors behind the existing contributing facades, stoops, stairs and planters. First floors would be raised to the Design Flood Elevation (DFE), making them compliant with FEMA regulations. As current Finished Floor Elevations (FFE) vary across the beach according to both location and building type, the actual amount of raise would vary.

Internally raising floors in isolation from the building envelope is a strategy highlighted by FEMA in its Flood Plain Management Bulletin. For instance, the bulletin cites the successful integration of historic preservation and hazard mitigation in Darlington, Wisconsin, where floors were raised behind historic retail facades, earning a Preservation Achievement Award from the State Historical Society of Wisconsin”

Raising floors behind the existing façade would be particularly appropriate where this can be done within existing building walls, capitalizing on the existing attic space and/or generous parapet heights found in most flat-roofed buildings (corridor and walk-up type buildings are best for this option).

Strategy 1A retains all current exterior building features and relationships that establish the character of the district. On the other hand, interior arrangements would be entirely rebuilt, either following the original layout or by inventing new layouts.

This strategy imagines that in some cases, the combination of storeys into taller floors without penalty should be permitted. Limited rooftop additions would be allowed to compensate the removal of floor area.



Adaptive Use Approach | Strategy 1B

- **Retain and preserve all facades, stoops, stairs, built-in planters and yards at current positions.**

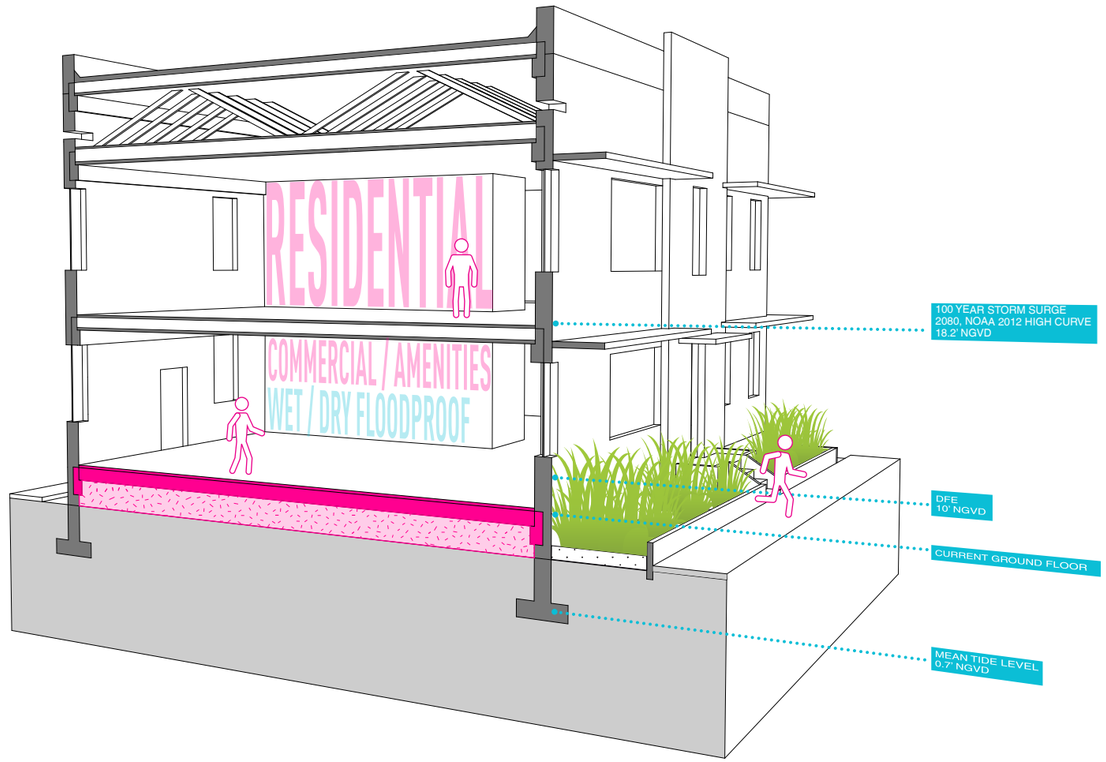
- **Upgrade ground floor at current level below Design Flood Elevation, improving its resilience by transforming ground floor uses and using wet or dry-floodproofing.**

Strategy 1B, the Adaptive Use approach, allows buildings to adapt by transforming their ground floor into flex amenity or limited commercial uses; this strategy preserves a maximum amount of existing building fabric in place by allowing adaptive use of the ground floor to programs that are more resilient than housing. The adaptive use of ground floor spaces would create a new horizontal 'innovation layer' along the ground plane of the district, in the most vulnerable area of the existing buildings.

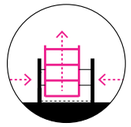
The potential uses in this area could yield an interesting new economic/social/cultural dynamic, allowing historic districts to become much more mixed-use in nature, and provide enhanced live-work opportunities. Limited commercial activities like professional offices, service establishments, small shops, pop-up retail (as is already the case, for instance, in the small homes located where the Flamingo Park district abuts Alton Road), could thrive here. However, another solution would be use of the ground floor space for building amenities, lobbies, storage and logistical/service areas, or perhaps as flex space (for instance as dedicated art space).

An advantage of this accretive approach is that all current floor levels may be maintained, although the team recommends that the ground floor be reconstructed in concrete and made accessible; the structure would also be brought up to code. Uses in the ground floor innovation layer, below current BFE+1, would be either wet floodproofed, a lower cost solution that would allow them to flood during high water, or dry floodproofed, including the impermeabilization of ground floor with flood barriers and a hydrostatic slab.

In some capacity, Strategy 1B could work for all building typologies, allowing most of the existing building to be retained. Overall, it would allow buildings and the district to grow in intensity, transforming and invigorating vulnerable areas. Even absent any other incentivization, this may have the effect of spurring redevelopment and adaptation. However, the team recommends pairing this strategy with incentives that allow the exploitation of unused development rights, and the replacement of residential floor areas distributed in the innovation layer.



Building in a Building (Matryoshka doll) Approach | Strategy 1C



- **Retain and preserve all facades, stoops, stairs, built-in planters and yards at current positions**

- **Develop new adaptive structures behind the existing contributing facades.**

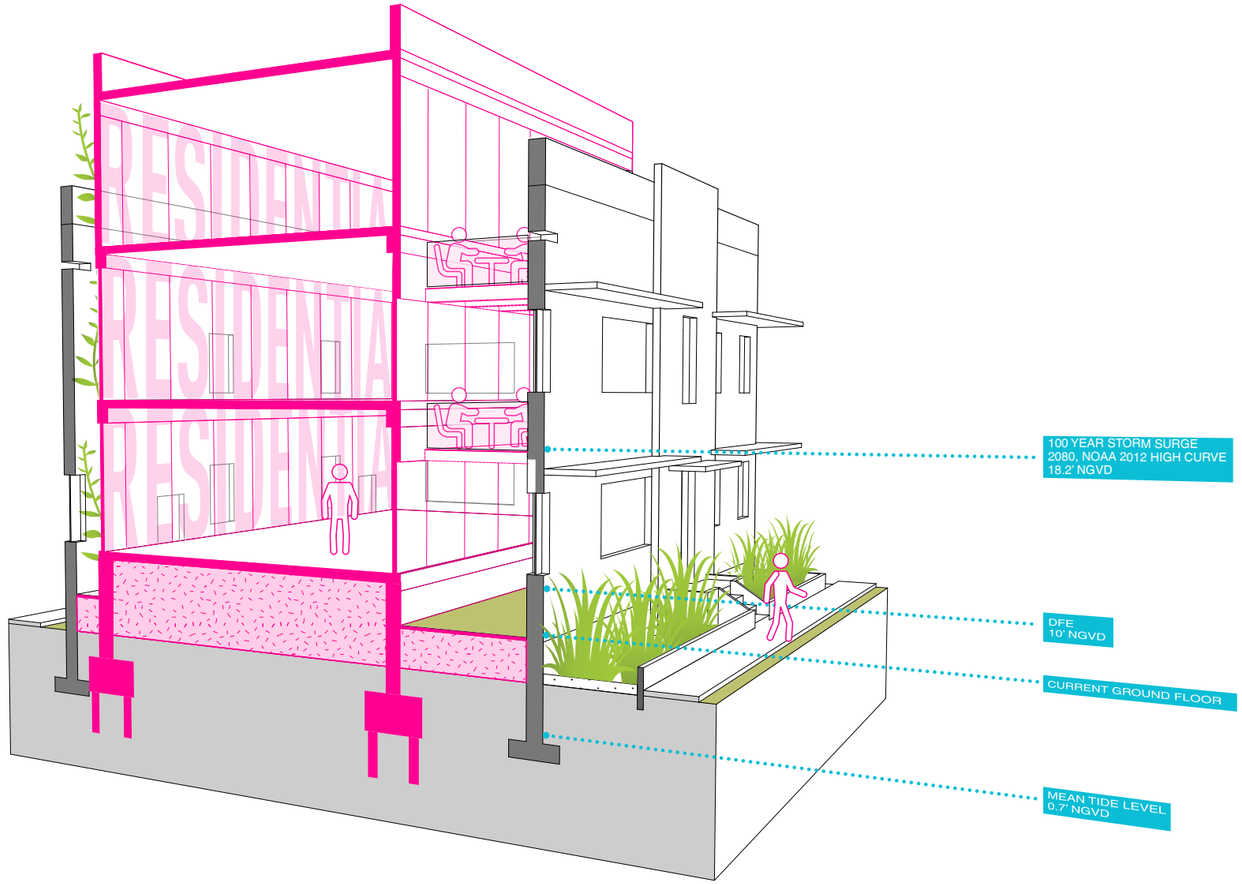
Strategy 1C, the Building in a Building approach, allows buildings to be raised internally by developing new adaptive structures behind the existing contributing facades, stoops, stairs and planters, to be maintained in their current position (aka façade retention). It allows a legible reading of the adaptation strategy, with contemporary new structures delineated behind historic 'artifactual' facades. Open spaces such as terraces, patios and gardens can help resolve the inevitable elevational offset between historic façade and new structure, located at the Design Flood Elevation.

The Building in a Building approach acknowledges the resonance of building façades culturally, as part of the larger intact whole of the district, and as an example of its architectural style or period. It offers an honest reading of the bifurcation between exterior and interior, and allows the material of the historic facade to read as an architectural layer. This strategy would yield poignant but perhaps awkward relationships. To address this issue, a preservative layer of construction on the front of the building, perhaps 20' deep along the Avenue-facing facade, might be retained at current floor elevations, in order to mitigate sight lines to the new construction.

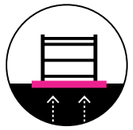
This strategy raises philosophical and ethical questions, and is controversial in the preservation community (especially in the US; the strategy is widely used abroad). Is the façade preserved for purely aesthetic or decorative purposes? Is the facade reduced to a farcical mask? Does the loss of the interior historic building fabric result in the loss of the building's architectural and historic integrity? The term "facadism" is often used to describe development practices where the preserved facade of a building is considered separately from, or not well integrated into, the rest of the building. Many preservationists believe that "what lies behind a building's facade should be related to it both architecturally and historically."[FN] Further, buildings entirely rebuilt behind facades are new, and the unit arrangement will likely respond to new development criteria. Does this contradict the purpose of the retention of the district, to retain its current housing stock?

Yet some loss of a building's integrity may be inevitable if a building is to be preserved in the face of rising waters. Of course, the practice of building new structures inside existing preserved facades is already common in Miami Beach, although the new building is generally reconstructed behind the existing façade in an invisible way. These instances require the structural stabilization of the building facades, as masonry and concrete loadbearing walls are temporarily braced, or adapted to support themselves.

Perhaps such practices can be understood as a compromise situation in a difficult context: the 'force majeur' aspect of sea-level rise. The contrast of old and new can be treated in an interesting and didactic way, and several remarkable contemporary projects illustrate how architecturally and culturally rich the contrast can be. Perhaps this strategy would not be appropriate for building types like hotels, banks or cinemas, comprising significant interior public rooms, but in modest residential and commercial buildings, the value of interior vs. exterior may justify it.



Individual Raise Approach | Strategy 2A



- **Individual property owners raise buildings/properties one by one**

Strategy 2B, the Individual Raise approach, anticipates buildings to be lifted individually, according to owner prerogative. It acknowledges the interest of some, but perhaps not all, property owners to invest in protecting their properties (building elevation would likely require a substantial investment, as it would create conditions requiring other improvements and upgrades).

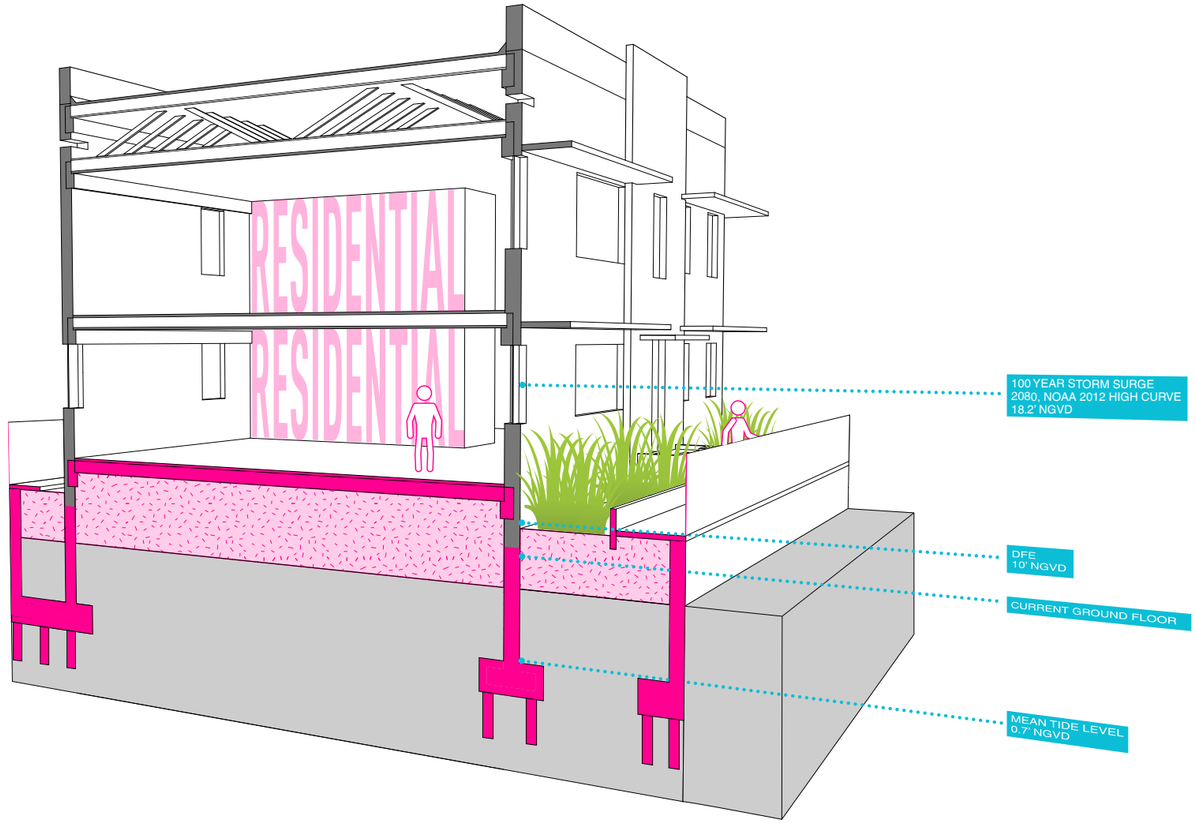
An advantage of individual raise is that property owners may consider the disposition of their buildings in their own way.. It follows some recent national practices, for instance in Charleston, SC, where new regulatory standards have been developed and historic buildings may now be raised.

The idea of raising buildings individually raises important preservation issues for the district. As a district of low-rise buildings in very close proximity, changes in height in some buildings can break the continuity that characterizes the neighborhood, and create awkward juxtapositions. Until every building is raised, raising buildings one by one will change the relationship of building to the ground and surrounding context. This strategy may challenge the idea of an historic district as a stable entity. Private initiative in raising buildings may result in a scattered approach to saving historic fabric; A mix of building lifecycle, building type and owner prerogative would govern the shape of historic district.

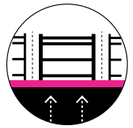
It is reasonable to assume that, without controls, the amount that buildings are raised may vary substantially. On the other hand, raising buildings from their varied existing heights to a uniform floor elevation would subtly change the relationships between them. Over time, standards will likely change during the evolution of any particular street or block, so the degree of raise may also change. Many owners and developers expending the effort of raising buildings may wish to raise them a maximum amount, taking advantage of freeboard, in order to prepare for future changes in Base Flood Elevation. Buildings that are not raised may confront even more water due to drainage from raised sites (the bathtub effect), or the hydraulic movement of water around raised sites. Any raised building will need to retain and dispose of its water without affecting its neighbors.

Raising one-by-one also creates issues for the building and its surrounding lot. Given the intimate relationship of buildings with their ground plane in Miami Beach (through stoops, exterior stairs, planters, and the provision of narrow side-yard walkways), raising buildings will need to be accompanied by the partial or total raising of the lot. While most residential buildings in Miami Beach historic district are not currently accessible, raising buildings will contribute to or even worsens their inaccessibility.

If buildings are raised individually, a uniform standard of Raise set by the City Planning Department and Historic Preservation Board would assure at least some continuity within the district. As only some buildings and infrastructure will be raised at any time, one may imagine a two-layer or multi-layer city evolving, where raised viaducts and properties are interspersed with structures and infrastructure at the city's original ground level (areas of historic Rome come to mind).



Combined Raise Approach | Strategy 2B



- **Property owners coordinate with the city and each other to raise buildings/ properties as a group.**

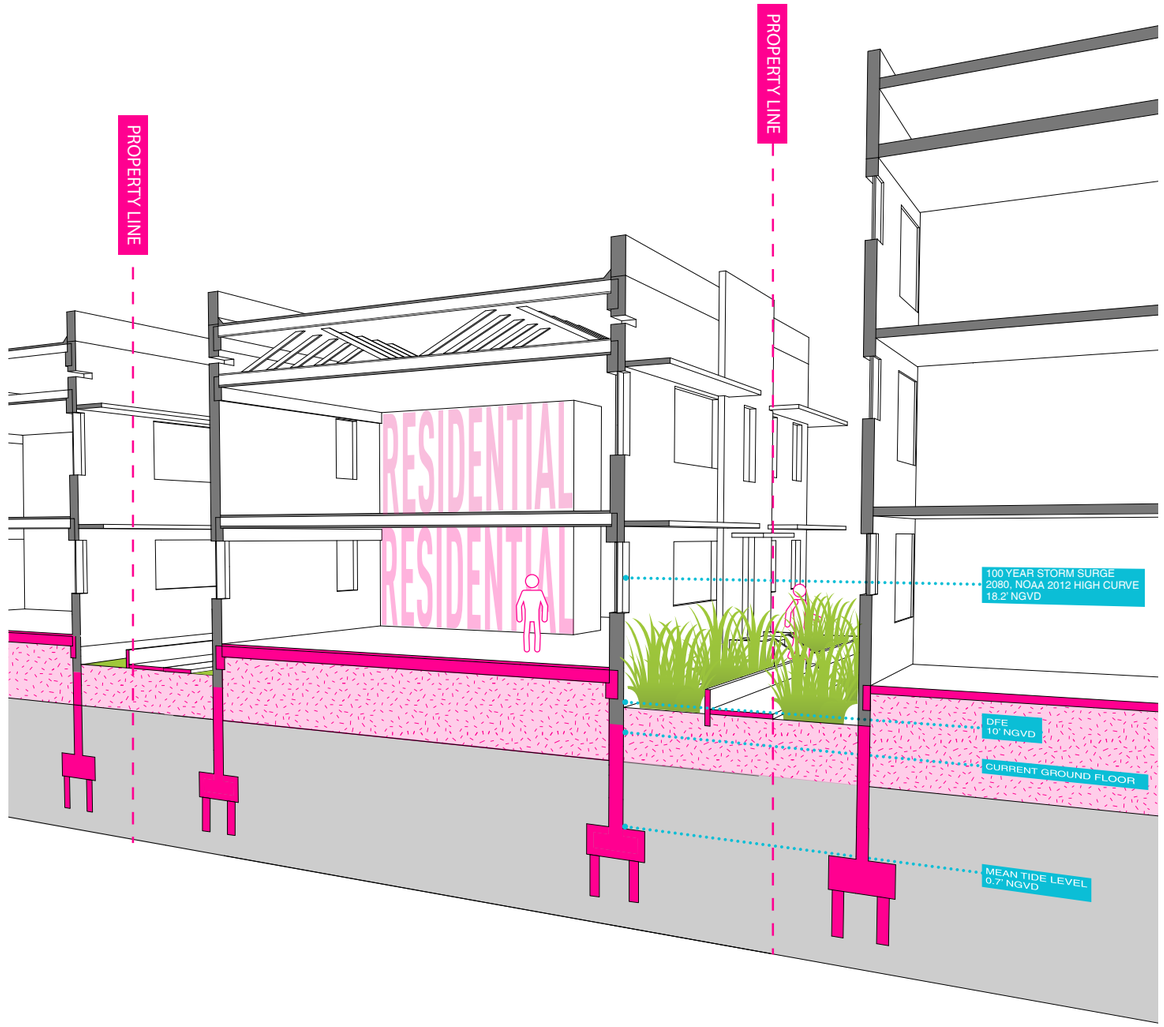
Strategy 2B, the combined approach to Raise, anticipates all buildings and landscape features could be elevated in a coordinated fashion. Such a combined approach would require a coordinating body, such as the City or other agency, to manage. In a coordinated raise, an area of the district (perhaps a block at a time) would be raised together, observing an equal amount of raise to maintain existing relationships. The raising of private property could perhaps also be coordinated with the raising of public infrastructure like avenues, streets and alleys, and with the concurrent development of water collection and storage systems, as well as water gardens and green infrastructure. By raising all elements of the built landscape in parallel, all components of the district would be reproduced according to their current relationships at a higher elevation.

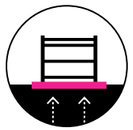
Coordinated Raise may seem merely an efficient or cost-effective improvement on raising buildings one by one. Indeed, there likely would be significant savings, not only because of the quantity of work, but also because individual site retaining walls, railing systems and individual access points to raised properties would not be necessary. However, by addressing the complex interaction of buildings with each other – for instance the disposition of interstitial spaces – the combined approach offers significant advantages in preserving the character of the district.

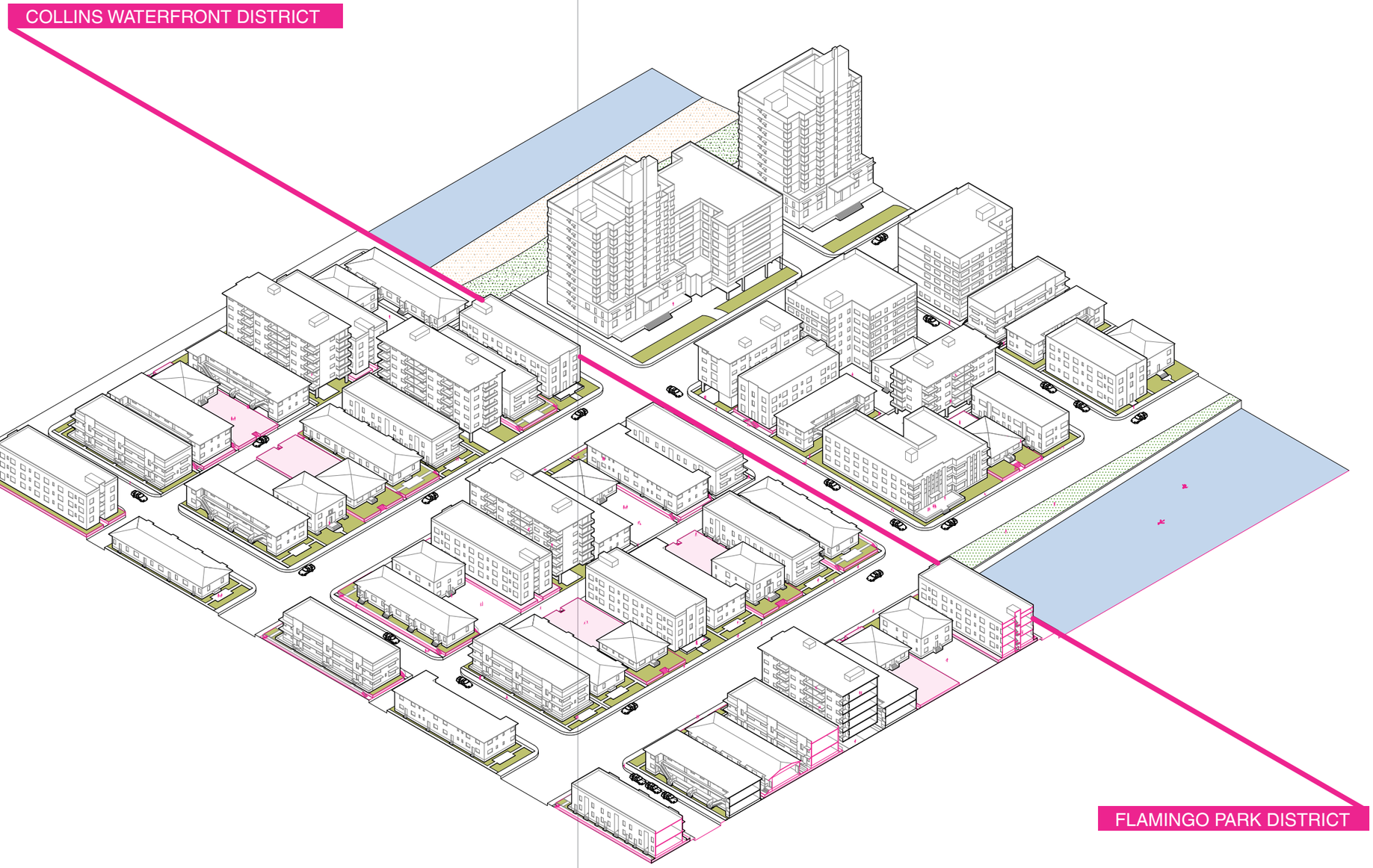
The combined raise approach, as it suggests the development of ‘superblocks’, might bring other advantages as well. For instance, a coordinated approach to parking, strategies to reduce pavement, and advantages in obtaining funding, for the application of municipal resources, and perhaps in applying for grants from funds like the FEMA Hazard Mitigation Grant Program.

Reformulation of a new ground level may seem radical, but much of Miami Beach was built using similar land-raising strategies. All of the Flamingo Park district was originally a tidal wetland and was developed as a result of dredge and fill operations conducted in the early 20th century. Other land-filling operations are currently underway. Further, this approach is already being used in road raising. And if historic districts around the nation are considering retreat and relocation, why cannot the city consider relocating its districts – vertically.

Further, the coordinated approach to raising buildings has some precedent in North American urban history. Galveston, Texas was famously raised after a devastating hurricane in 1900. Highlands, New Jersey, has also promoted raising the whole town after most of its buildings were destroyed following Hurricane Sandy. In general, the application of this approach has followed destructive events; the mechanisms to make this work (policy, finance, etc.) as a preventative measure are less well understood. This approach does not follow the typical property-by-property mechanisms of development in Miami Beach, but should nonetheless be considered.

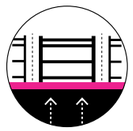


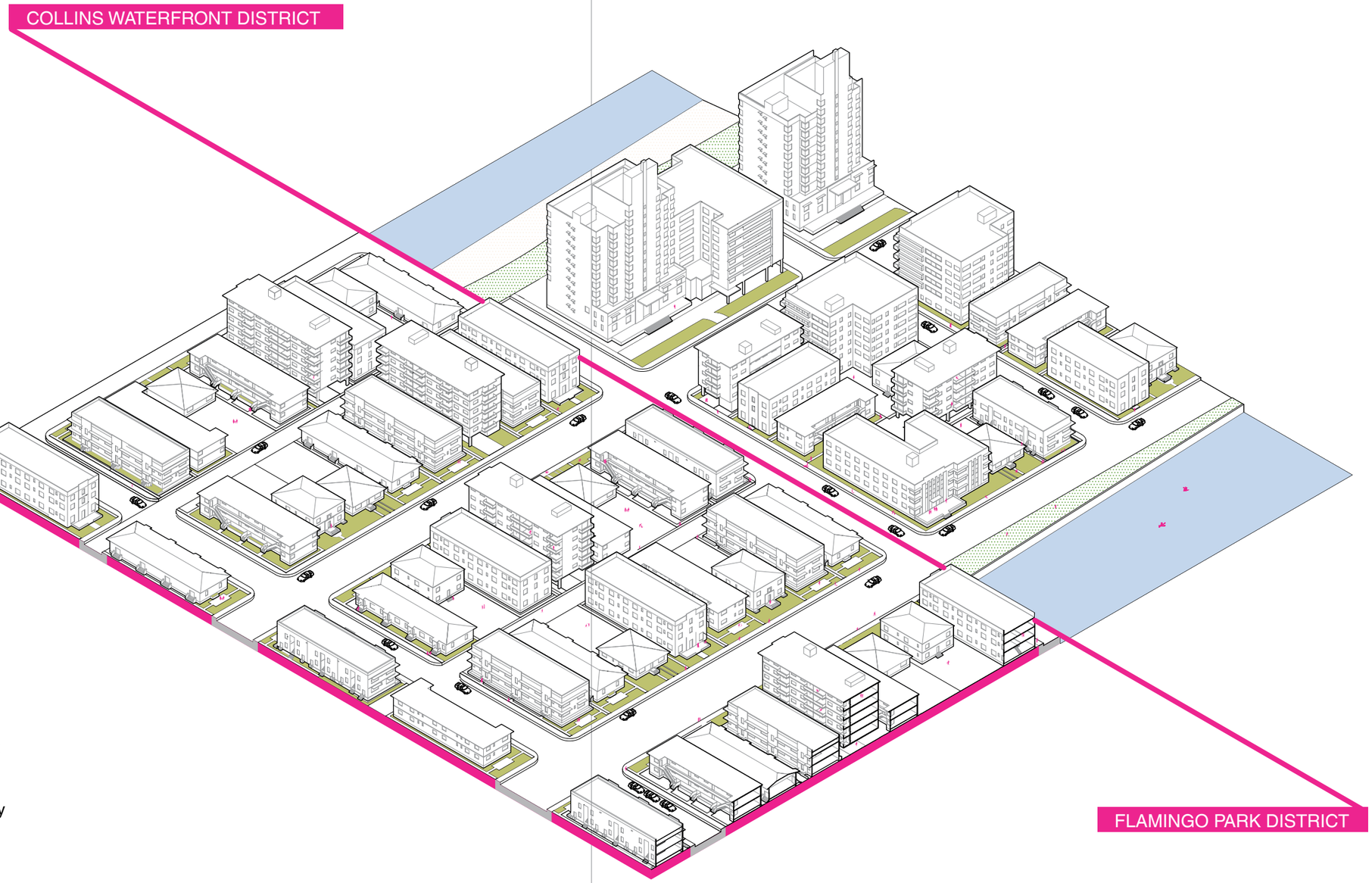




Area of intervention

Combined Approach | Strategy 2B

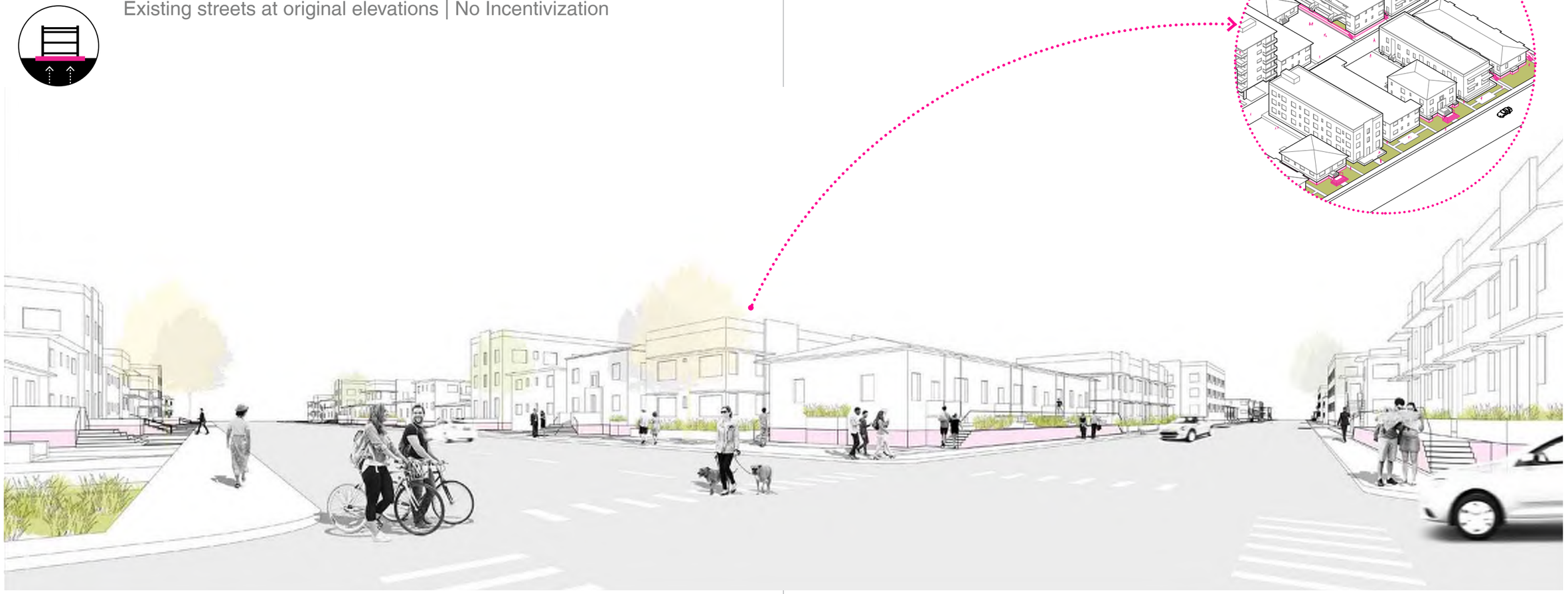


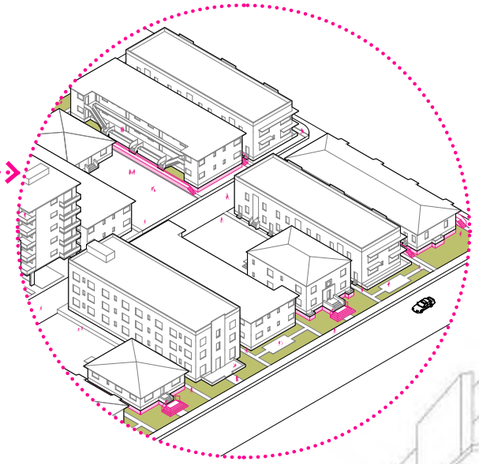


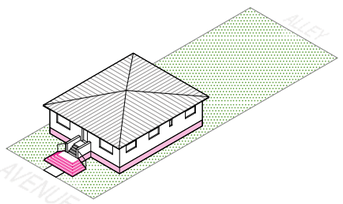
Raised Private lot | Block

Raised Public right of way

Strategy 2A | Individual approach | NGVD 10’ | Raise some buildings
Existing streets at original elevations | No Incentivization







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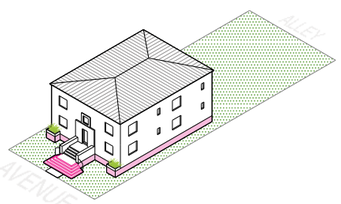
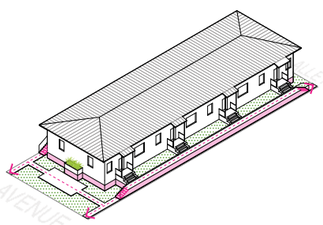


UV URBAN Villa



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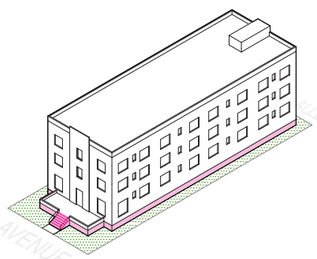

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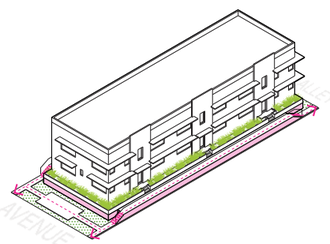

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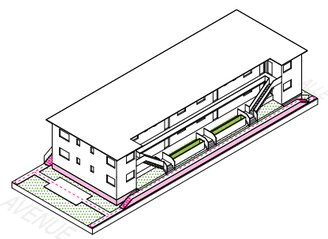
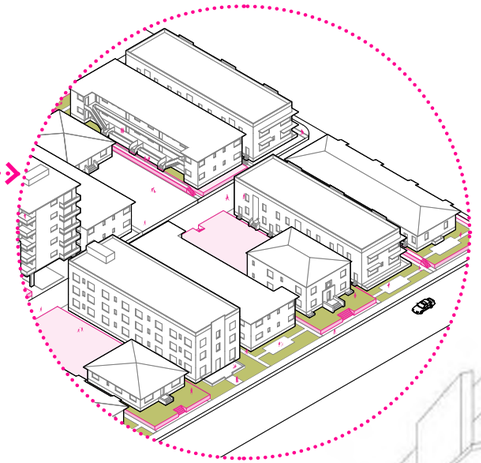
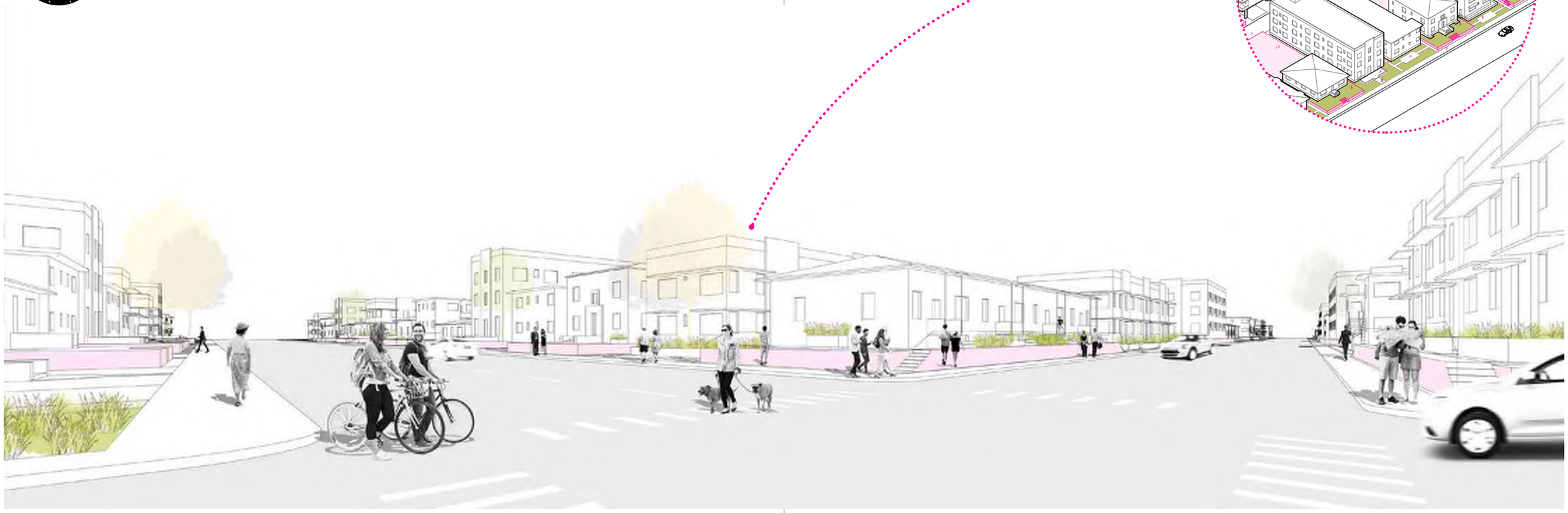
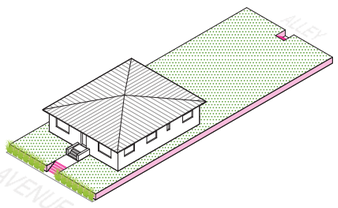


C CATWALK

Strategy 2A | Individual Raise | NGVD 10' | Raise some buildings & lots
Existing streets at original elevations | No Incentivization







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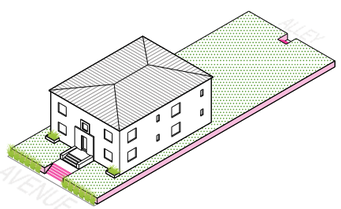

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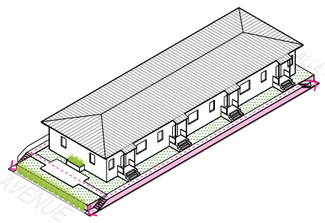

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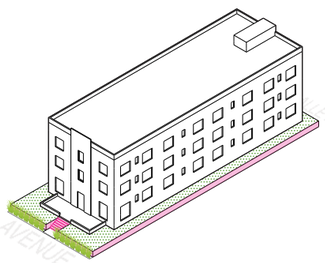

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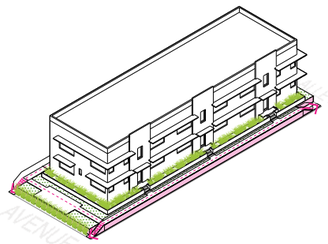

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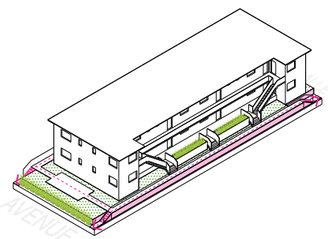
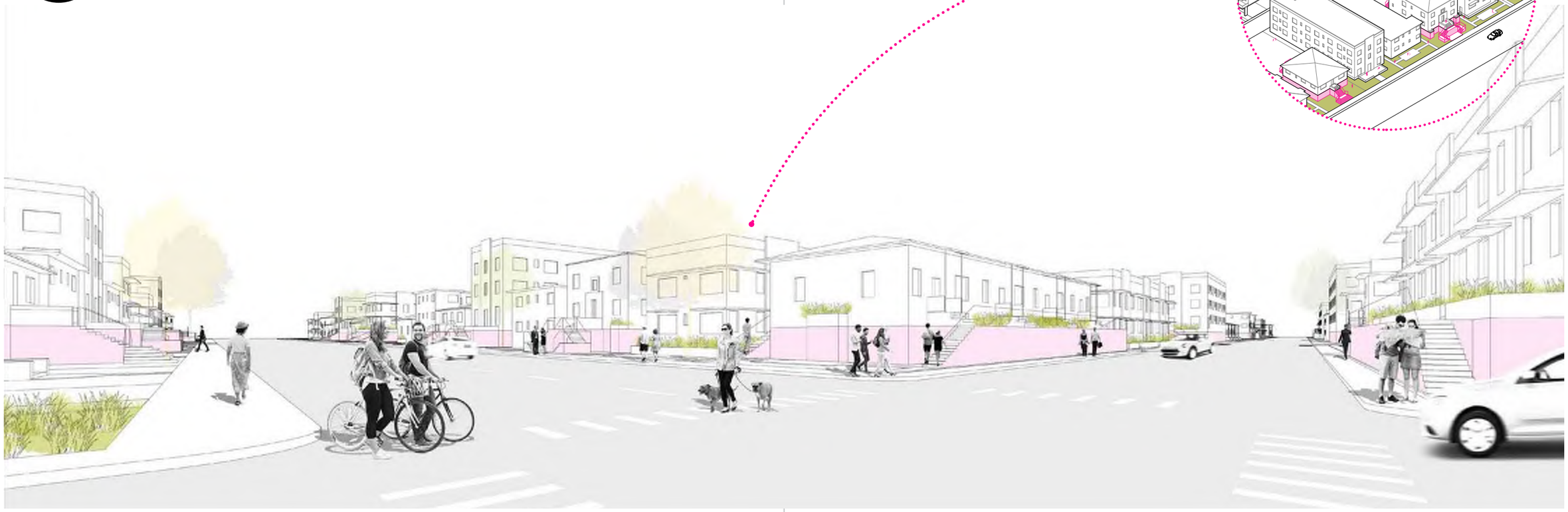
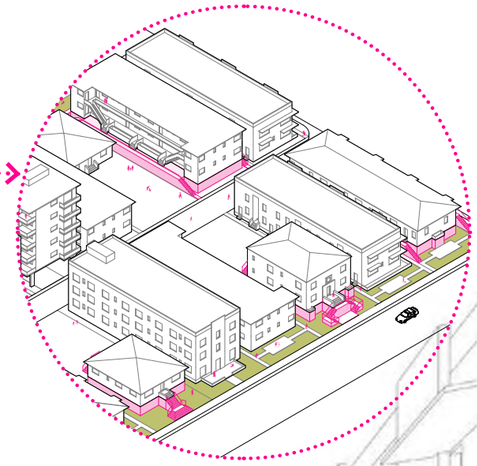
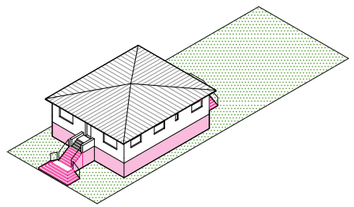


C CATWALK

Strategy 2A | Individual Raise | NGVD 14' | Raise some buildings
Existing streets at original elevations | No Incentivization







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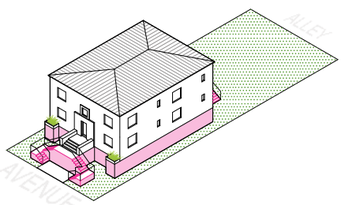

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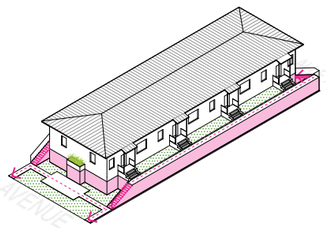

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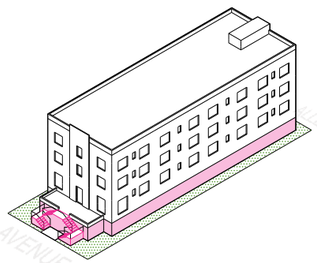

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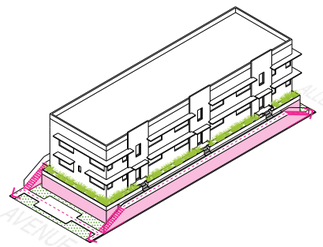

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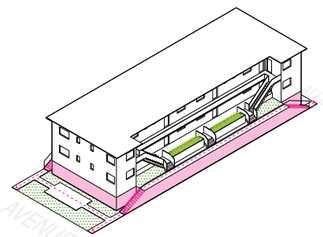
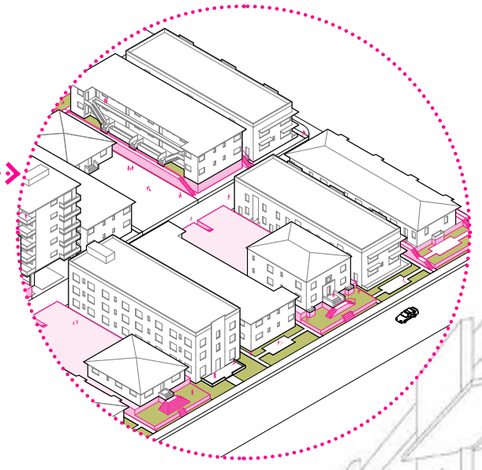
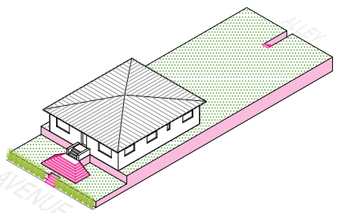


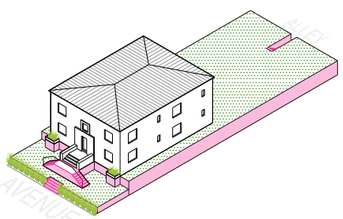
C CATWALK

Strategy 2A | Individual Raise | NGVD 14’ | Raise some buildings & lots
Existing streets at original elevations | No Incentivization

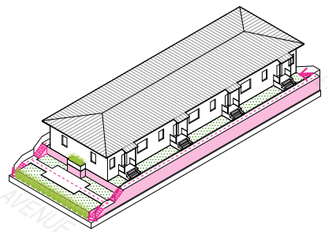




CH COTTAGE/HOUSE



UV URBAN Villa



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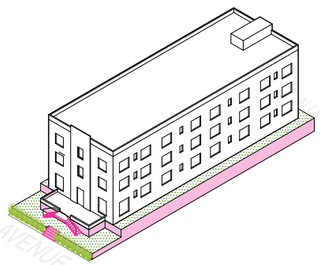

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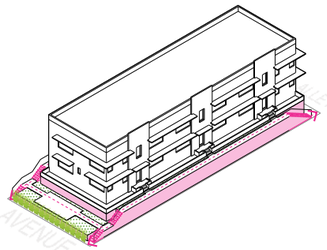
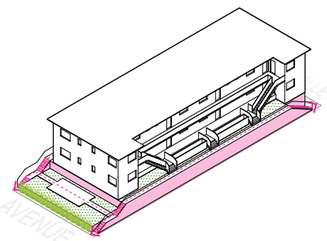
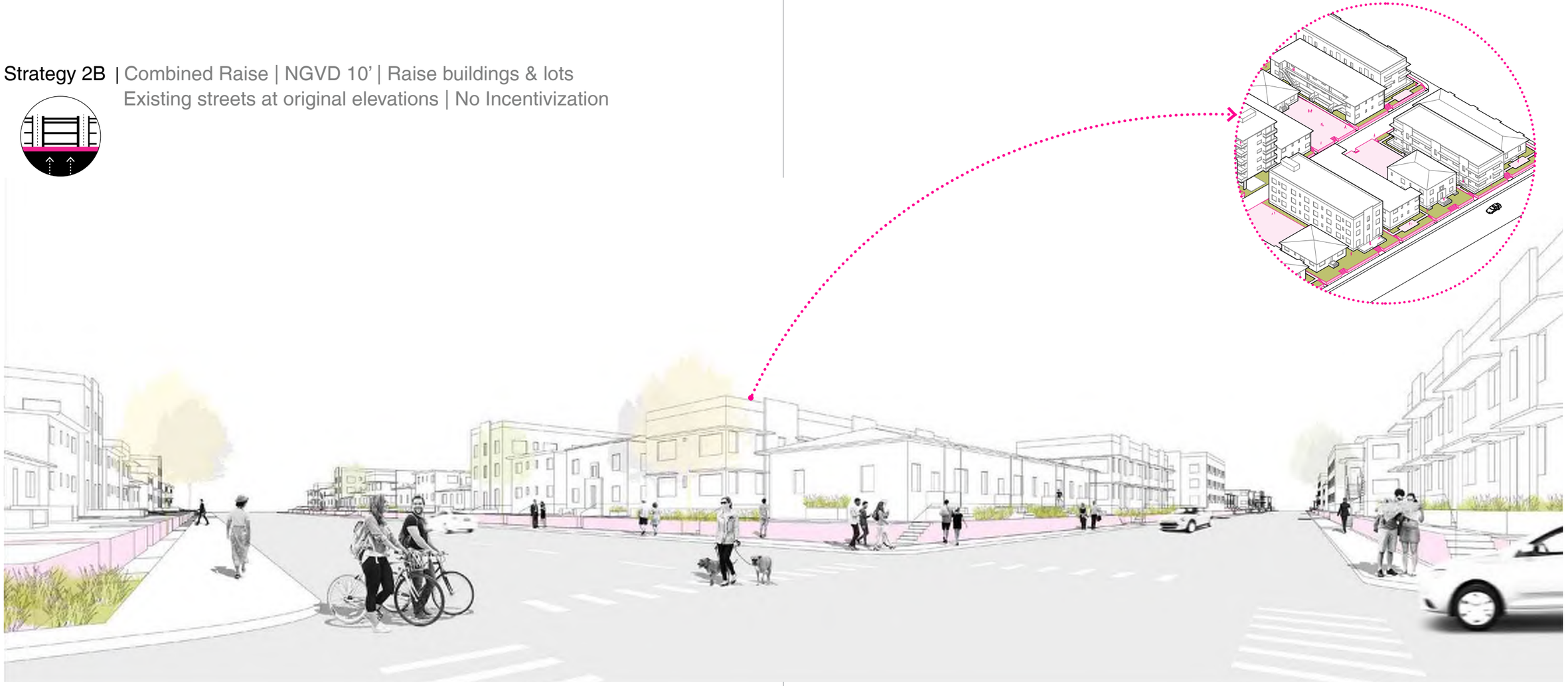


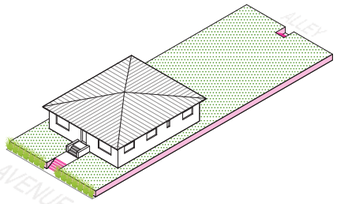
WU WALK-UP



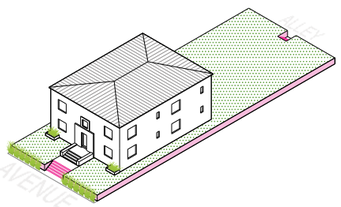
C CATWALK

Strategy 2B | Combined Raise | NGVD 10’ | Raise buildings & lots
Existing streets at original elevations | No Incentivization

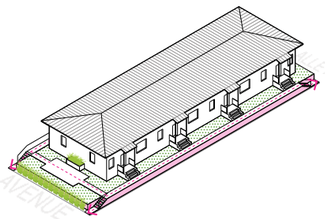




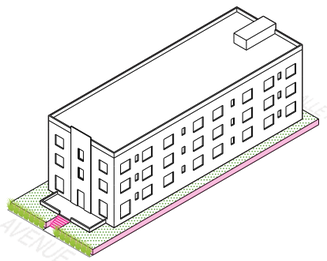
CH COTTAGE/HOUSE



UV URBAN Villa



R RAMBLER



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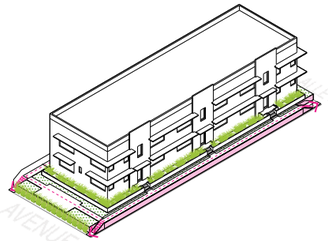
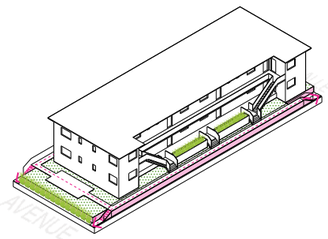
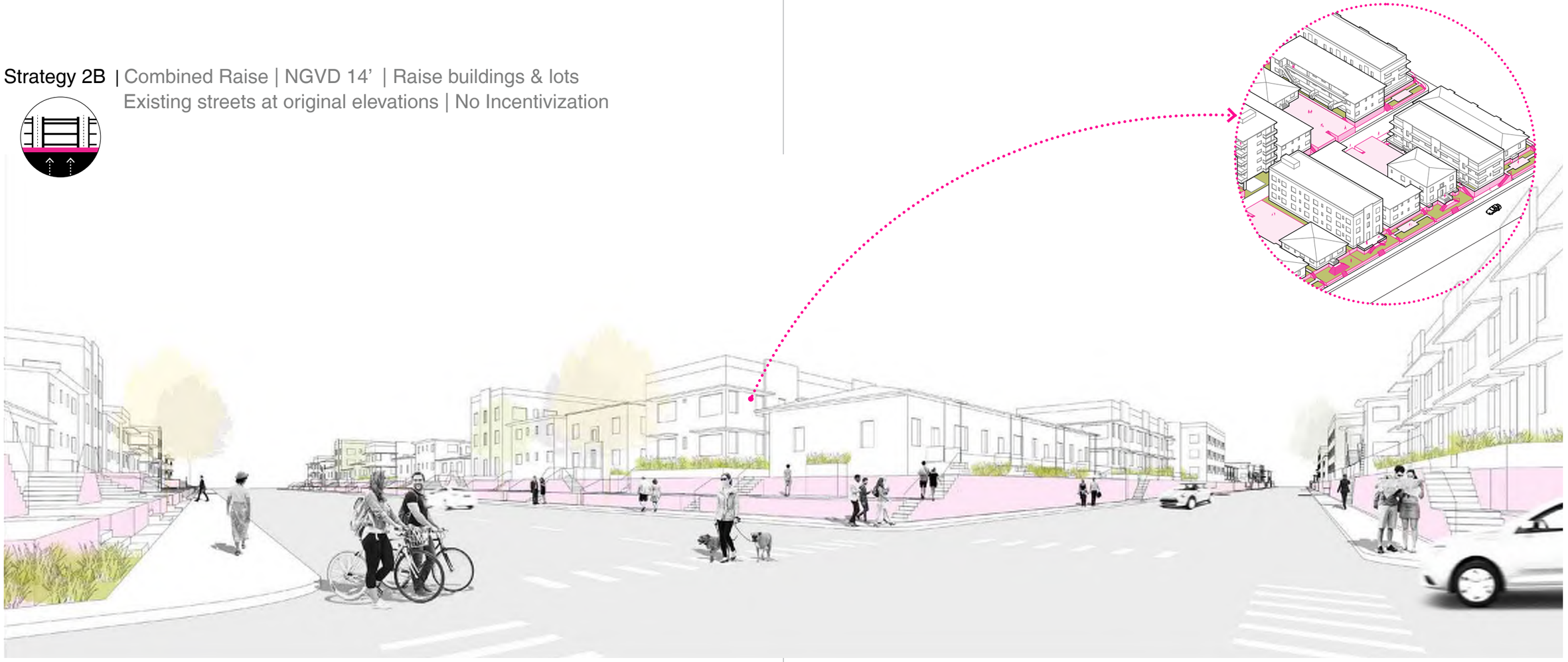


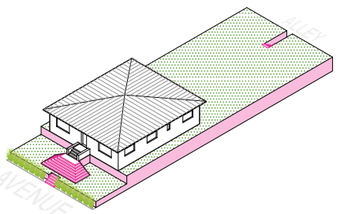
WU WALK-UP



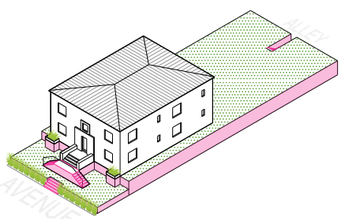
C CATWALK

Strategy 2B | Combined Raise | NGVD 14’ | Raise buildings & lots
Existing streets at original elevations | No Incentivization

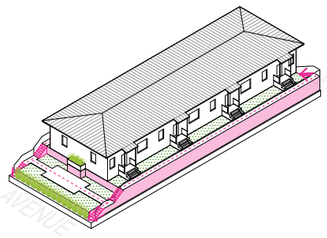




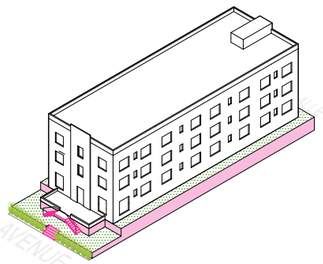
CH COTTAGE/HOUSE



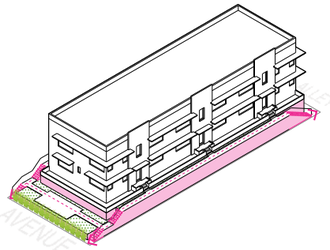
UV URBAN Villa



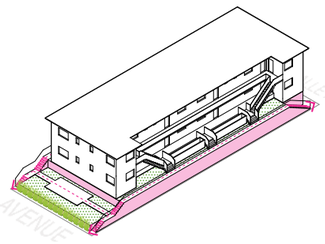
R RAMBLER



IC INTERIOR CORRIDOR



WU WALK-UP



C CATWALK

Strategy 2B | Rambler facing Walk-Up

Rambler facing raise Walk-Up

Strategy 2B | Walk-Up facing Interior Corridor

Wak-Up facing raise Interior Corridor

Strategy 2B | Walk-Up facing Interior Corridor

Walk-Up facing raise Interior Corridor

Strategy 2B | Catwalk facing Urban Vila

Catwalk facing raise Urban Vila

5.4 // COST | INCENTIVIZATION

Although specific types or patterns emerge, each building in Miami Beach is distinctive, and the cost to adapt the structure will depend on a number of issues. As individual building owners consider their situation, and the options available, they will need to take several factors into consideration. Among those factors:

- First floor elevation of the building
- Elevation of adjacent grade
- Building construction type
- Building condition/level of alteration or improvement since initial construction
- Building structural system/first floor construction
- Contributing or non-contributing status in its historic district
- Foundation type
- Strategy of adapt-in-place or raise
- Future use/income potential
- Further development potential (unused FAR, etc.)

The cost of adapting existing structures, especially contributing buildings, will likely be considerable. In addition to the cost of improvements that directly enhance resilience, most adaptive work will qualify the building for upgrade to current Building Code requirements. This is because of dual requirements: (1) the FEMA 50% rule under the National Flood Insurance Program, and (2) the Florida Building Code's Level 3 Alteration rule. In (1), building rehabilitation that exceeds 50% of the assessed market value of a building (not including land) must meet the requirements for new construction under the current code, including, the requirements of ASCE 24, and be brought up to current floodplain management standards. In (2), the Florida Building Code generally requires that Level 3 Alterations - rehabilitation work where the work area exceeds 50% of the aggregate area of the building (total floor area) - or where more than 30% of the total floor and roof areas of the building or structure have been or are proposed to be involved in structural alteration within a 5-year period, require bringing the structure to current code. While bringing a building up to code aligns with the adaptation goals posited in this study by enhancing its strength and resilience, it adds considerable cost.

It is likely that the cost burden of adaptive rehabilitation will be carried by individual property owners. Absent other options, including substantial funding sources for adaptation, there will be increased pressure to demolish existing contributing buildings.

The value of Miami Beach's cultural patrimony to the city, as a public good, would be difficult to calculate, but is certainly very significant. Therefore, rehabilitation work that combines preservation and adaptation would be a public benefit. In order to promote this combination, the City of Miami Beach should consider incentivizing adaptation of historic properties/districts, over new construction, as a tool of resiliency. The City should consider establishing a resiliency standard for adaptation in order to evaluate such incentive bonuses. It should consider granting incentives to adaptation projects that fully implement a resiliency strategy that meets the City's minimum standard and which are brought up to current Building Code. Bonuses should be implemented in a phased way that rewards greater efforts toward adaptation. Using incentives, the City may leverage the attraction, lifestyle benefits and economic vibrancy of Miami Beach to encourage developers to build/adapt new resilient layers of the city.

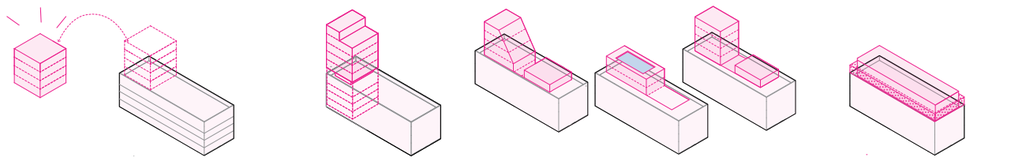
Such a strategy builds on the powerful existing modus of development potential in Miami Beach (buildable floor area) as a lever to spur adaptation. Building additions (either rooftop and ground-up) are quite common in the city, as building sites are optimized in terms of floor area and amenity. However, incentivization imagines new floor areas developed on the roof/rear of existing buildings as stylistically/materially distinct from historic building fabric, as a legible 21st century layer of urban development, and as a signal of 21st century adaptation. It would reveal, instead of concealing, the changes wrought by a proactive resilience to sea level rise.

In order to implement incentives, the City should consider changes in its standards and guidelines that would address issues arising from building additions. Additions, generally expanding the bulk and height, and perhaps changing aspects of a building's appearance, may go against the sense of Standard 9, which counsels that additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property, and that they should be compatible with the massing, size, scale, and architectural features. In practice in Miami Beach, such additions are encouraged to be outside public sightlines. See incentives in Recommendations (Section 5.7)

For the purposes of this study, the team suggests four alternative strategies for accommodating incentivized buildings of the historic district:

1. Transfer of Development Rights
2. Accretive Urbanization – Rear Development
3. Accretive Urbanization – Rooftop
4. Accretive Urbanization – Mixed

While the Transfer of Development Rights approach suggests no visible incentivized additions within historic districts, the accretive approaches would require both a conceptual and regulatory change in the way the City allows redevelopment of historic structures. In particular, it would be contingent on a consensus understanding that historic buildings are organic and may grow (ideally in a way that is predictable and clearly legible). It would require an understanding that incentives will expand intensity of uses in the district. The City would need to amend its Land Use Regulations to allow additions that exceed 1-story maximum over the existing roof (where controlled in location and footprint). It should also allow accretive additions without demolishing the historic building fabric, especially facades, underneath. The continuity of historic facades, even as new structures rise behind or above, should be maintained.



1 Transfer of Development Rights

2 Accretive Urbanization Rear

3 Accretive Urbanization Stepped

4 Accretive Urbanization Spread

Rooftop Additions

Rooftop additions to historic buildings are one of the most sensitive issues in historic preservation. Nationally, Standards 9 and 10 of the Secretary of the Interior Standards for Rehabilitation, which govern the administration of the Historic Preservation Tax Incentives program, suggest strong controls on the scope and impact of new additions. According to Standard 9, “New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment;” and Standard 10 states “New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.” Notwithstanding the above, rooftop additions are common in Miami Beach, although most follow City guidance that they are set beneath sight-lines from the fronting avenue or street. In character, most are designed to be discreet.

However, if added floor area was to be a necessary component in compensating floor area located below Base Flood Elevation, or incentivizing robust adaptation, and if rooftops are the only area where new floor area might be located, new paradigms of adding to historic buildings will probably be necessary. From iconic landmarks to industrial heritage to everyday historic buildings, architects around the world are exploring bold additions to historic structures, adding a new layer in a way the reinvigorates the existing structure. Perhaps the most famous of these is Herzog & de Meuron’s rehabilitation of Sir Giles Gilbert Scott’s Bankside Power Station in London. Its transformation into the Tate Modern featured strikingly contemporary rooftop additions that announce the new program of the structure. Herzog & de Meuron has practiced this approach in several other notable structures, including the CaixaForum in Madrid and Elbphilharmonie in Hamburg.

Such approaches have proliferated especially in Europe, where the challenge of accommodating growth or new programs in a tight urban context is particularly present. Eschewing a discreet approach (hiding or minimizing rooftop additions), these recent structures use rooftop additions to visibly adapt buildings, proclaim continuity and demonstrate contemporary approaches. One key to these additions is legibility – rooftop additions are clearly distinguishable as a product of their time and place. Often, emphasis is placed on poignant contrasts of form, orientation, materiality and color.

In Miami Beach, such an approach seems doable and practical, and as noted above is already present. Perhaps resiliency improvements in Miami Beach must fundamentally be understood as ‘adaptive use’, rather than as ‘renovation’. Such adaptive use, paired with strict preservation of historic facades, would put greater emphasis on innovation in development of new layers of architecture. In this team’s opinion, this approach seems particularly applicable to the Strategy 1, Adapt in Place models of adaptation, as these already provide for the careful maintenance-in-place of existing building envelopes. Of course, as is the case today, any changes to the characteristic look of historic buildings should be carefully reviewed by City Planning staff, and by the Historic Preservation Board.

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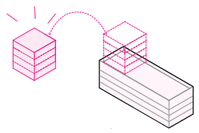
1 | Breiner 310, Portugal, Ezzo, 2015 2 | Louis Sullivan’s Pilgrim Baptist Church, Chicago, Dirk Lohan 3 | RaabestraBe, Berlin, Gussman Atelier, 2010 4 | Iberostar Grand Hotel Budapest, Budapest, Peter Reimholz and Peter Nagy, Tamas Nemeth, 2010 5 | Increase in MargaretenstraBe, Vienna, MG9, 2012. 6 | Corso I Karlin, Prague, RBTA, 2000.

Transfer of Development Rights | Incentivization 1

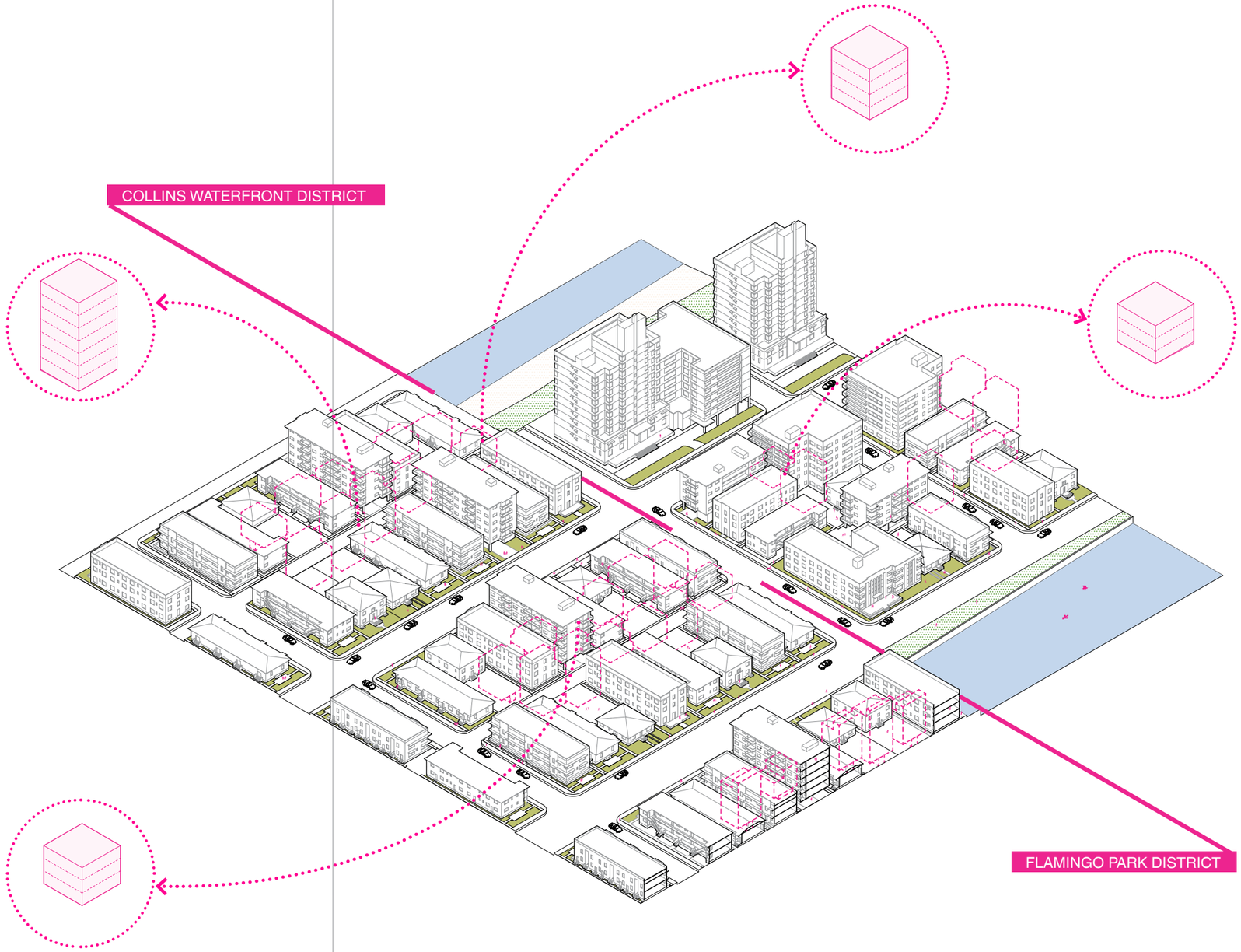


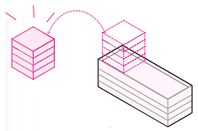
"Transfer of Development Rights is a zoning technique that "conserves land by redirecting development that would otherwise occur on the land (the sending area) to a receiving area suitable for denser development. The technique operates so that owners in the sending area can be compensated for their redirected development rights."[FN] Transfer of Development Rights would allow properties in historic districts to receive development incentives for qualified adaptation projects, while maintaining the current scale and look of the district.

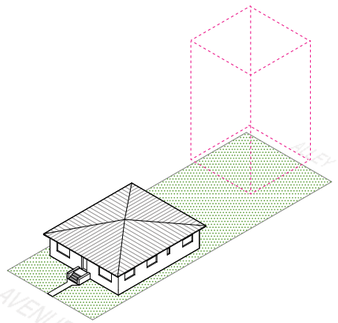
Unused development potential, such as Floor Area, may be transferred from sites within Miami Beach historic districts, to sites outside such districts.

Opportunities
- Maintain the look and feel of historic districts while also rewarding adaptation in a way that can be monetized
- Prioritize the adaptation of historic districts in the granting of further density outside historic districts.

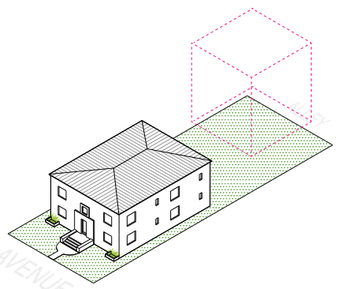
Challenges
- Pressure to keep areas outside historic districts at a compatible low scale
- Find appropriate locations for additional Floor Area
- The potentially huge amount of Floor Area that can be generated by incentives or unused development rights might overwhelm nearby receiving areas.
- Would require that the market for additional floor area in receiving areas is robust.



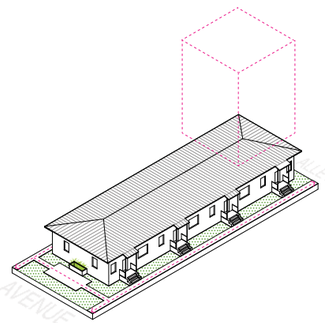




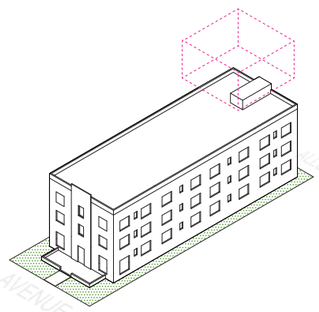
CH COTTAGE/HOUSE



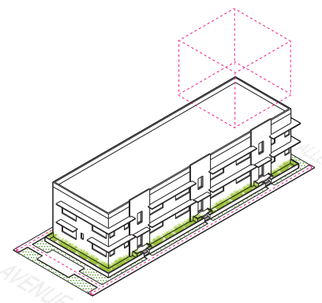
UV URBAN Villa



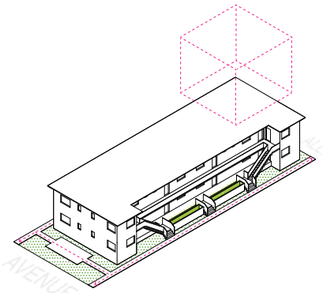
R RAMBLER



IC INTERIOR CORRIDOR

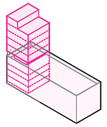


WU WALK-UP



C CATWALK

Accretive Urbanization | Rear Development | Incentivization 2



As an incentive to adaptive redevelopment, allow new ground-up additions to the rear 35' of a structure (on a typical 140' lot). The accretive Rear Development, or Alley (in Flamingo Park) approach, promotes compensatory housing development as a legible new adaptive layer set deeply behind the city's iconic avenue/street facades. The development of taller, limited-footprint additions along the alley of building lots would create a receiving area for new incentivized development within the historic district, even perhaps within each block.

Set back 105' from the street right-of-way line, and approximately 85' from the front façade of existing contributing buildings, this new housing would constitute an 'experimental zone' of new architectural approaches, massing strategies, contemporary façade articulation strategies and adaptive architectures. In the Flamingo Park district, a new vertical urbanism would emerge within the block as alleys are redeveloped in this way.

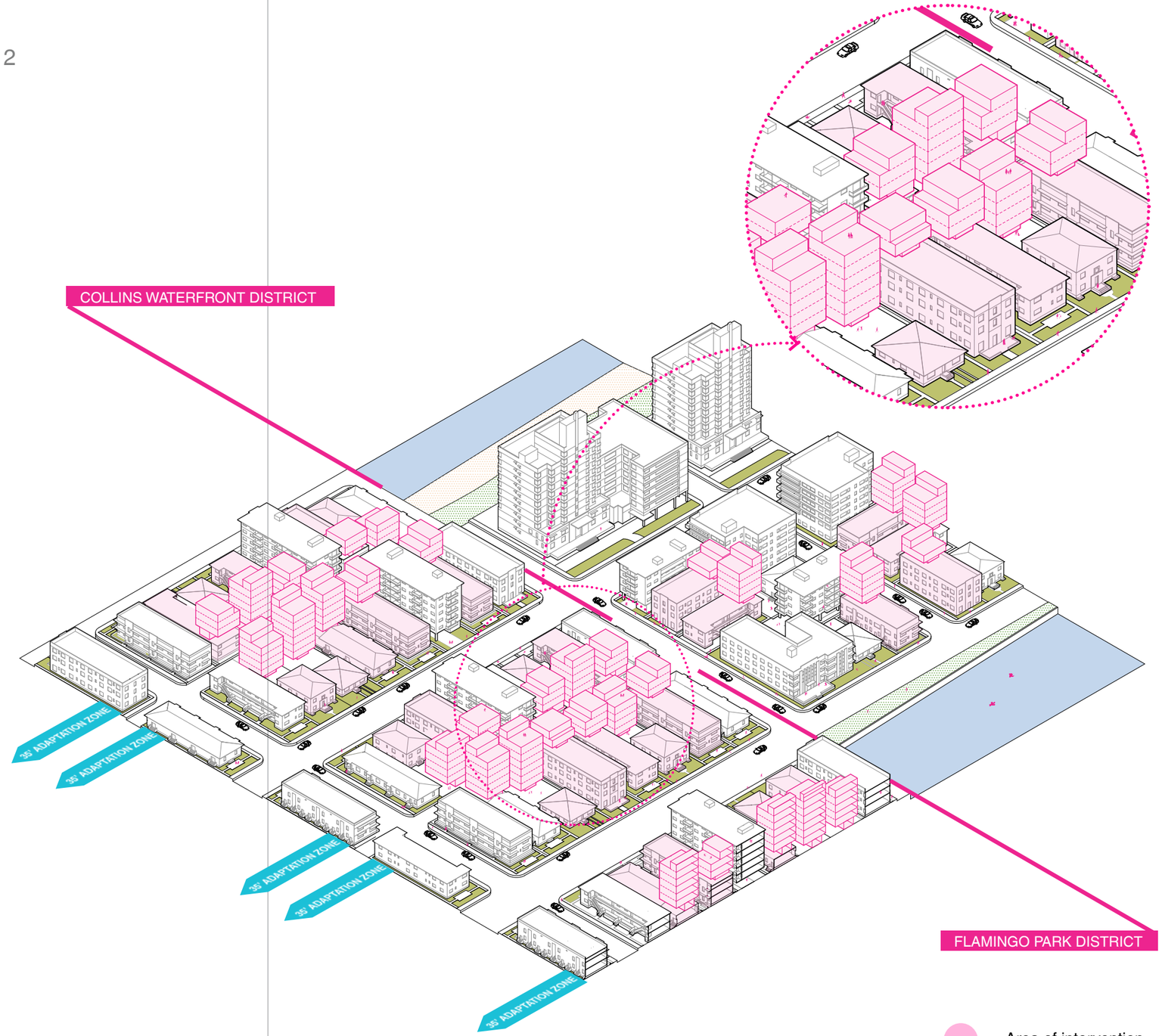
The accretive Alley approach works particularly well for cottages and urban villas, where new additions at the rear of the property would be ground-up, not requiring demolition or costly refiguring of existing structural elements. The accretive Rear Development approach also works best at mid-block buildings, where appropriate setbacks from nearby right-of-ways can be maintained. It would be problematic on end-blocks where buildings have secondary frontages on E-W streets. The team recommends that these properties incentivize through Transfer of Development Rights.

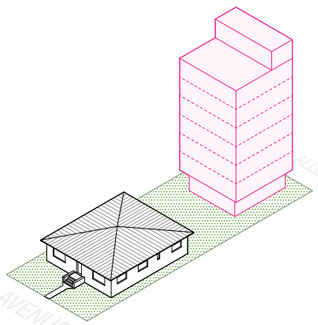
Opportunities

- Maintain the look and feel of historic districts as a primary layer while also rewarding adaptation in a way that can be monetized
- Prioritize the adaptation of historic buildings in-situ.
- Allow evolution of building types and development of new urbanisms within the context of existing historic architectural and urban fabric.
- Replace residential floor area of existing floor plates below DFE while maintaining the residential intensity of the district.
- Highlight creative approaches as a new attraction of Miami Beach

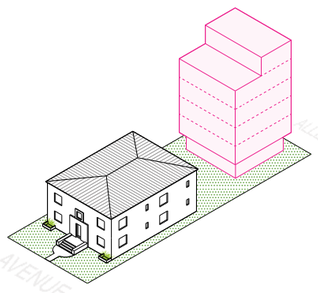
Challenges

- Compatibility/integration of taller new structures with existing low-scale building fabric
- Visibility of new layers, albeit as a secondary layer, from the public right of ways
- Would require robust market for additional floor area in the historic district

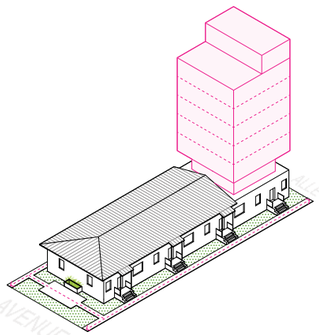




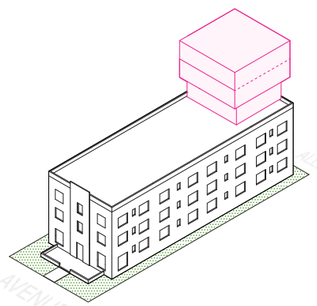
CH COTTAGE/HOUSE



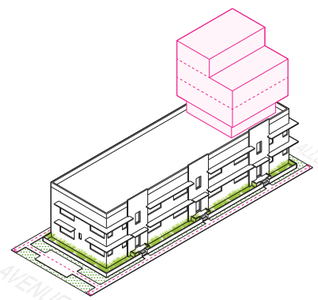
UV URBAN Villa



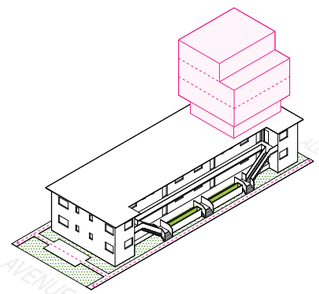
R RAMBLER



IC INTERIOR CORRIDOR

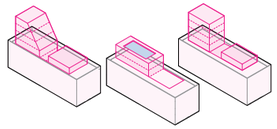


WU WALK-UP



C CATWALK

Accretive Urbanization | Rooftop Stepped | Incentivization 3



As an incentive to adaptive redevelopment, allow various rooftop additions that exceed the current standard of not being visible. The Accretive Mixed approach promotes compensatory housing development as a legible new adaptive layer spread over the top of existing buildings. The development of rooftop additions would create a receiving area for new incentivized development within the historic district.

Although visible rooftop additions are discouraged by the US Secretary of Interior Standards for Rehabilitation, the strategy is quite common in other countries, and has been deployed in remarkable architectural icons. New architectural approaches, massing strategies, contemporary façade articulation and adaptive architectures could be explored and developed on the rooftops, high above anticipated flooding. The Accretive Mixed approach would allow maximum flexibility for the redevelopment of contributing properties in historic districts, and stimulate variety in approach. Rooftop additions of varied character have already been approved and constructed in Miami Beach, although most follow a standard of being built behind sightlines from the right of way.

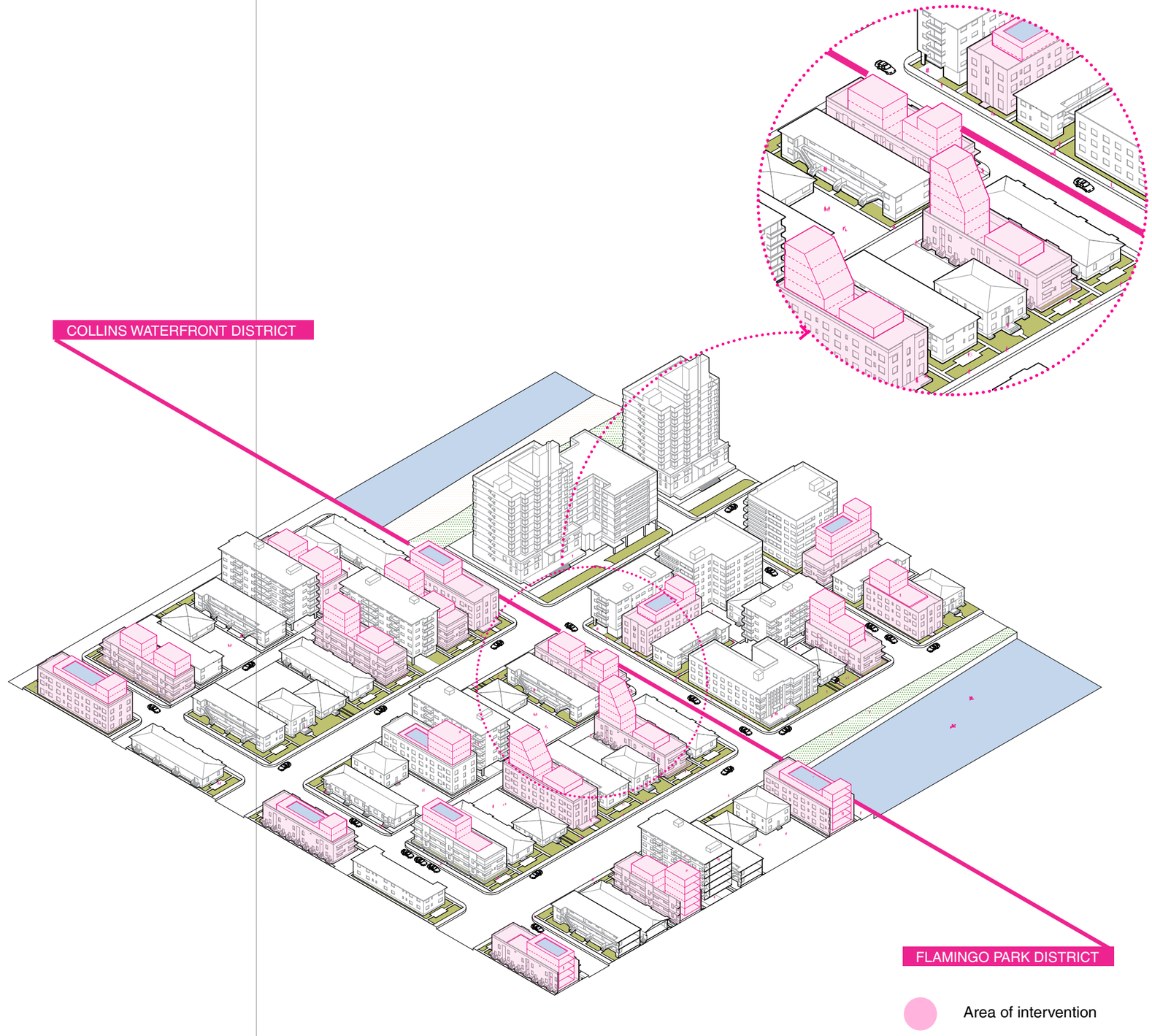
As a whole, the accretive approach would require both a conceptual and regulatory change in the way the City allows redevelopment of historic structures. In particular, it would depend on a consensus understanding that historic buildings are organic, and that they may grow in a way that is predictable and clearly legible. It would further require an understanding that intensity of uses in the district might expand if incentives are allowed. Code-wise, the city would need to allow additions that might exceed one story over the existing roof. Finally, the City would need to allow such accretive additions without demolishing the historic buildings underneath. The continuity of historic facades, even as new structures rise behind or above, should be maintained.

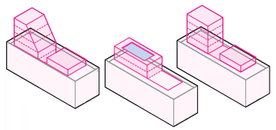
Opportunities

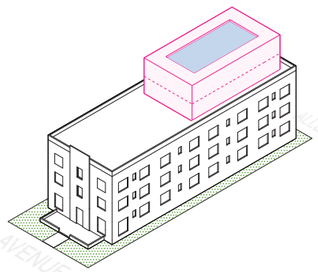
- Maintain the continuity and location of existing building fabric, while also rewarding adaptation in a way that can be monetized
- Prioritize the adaptation of historic buildings in-situ.
- Allow evolution of building types within the context of existing historic architectural and urban fabric by allowing new vertical layers.
- Replace residential floor area of existing floor plates below Design Flood Elevation. Maintain the residential intensity of the district.
- Highlight creative approaches as a new attraction of Miami Beach

Challenges

- Compatibility/integration of rooftop structures with existing low-scale building fabric below
- Visibility of new layers from the public right of ways
- Would require robust market for additional floor area in the historic district







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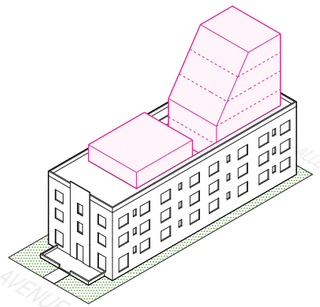

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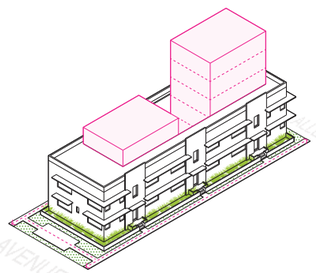
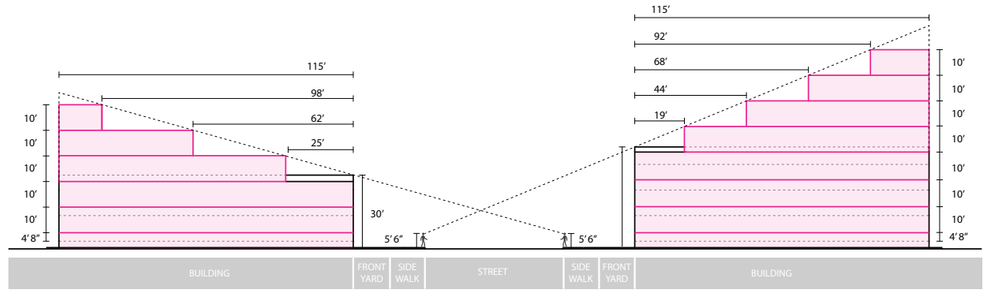
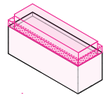


WU WALK-UP



Accretive Urbanization | Rooftop Spread | Incentivization 4



As an incentive to adaptive redevelopment, allow rooftop additions that exceed the current standard of not being visible. The Rooftop Spread approach promotes compensatory housing development as a legible new adaptive layer spread over the top of existing buildings. By spreading the additional floor area, it would be more visible, but not as tall. The development of spread rooftop additions would create a receiving area for new incentivized development within the historic district.

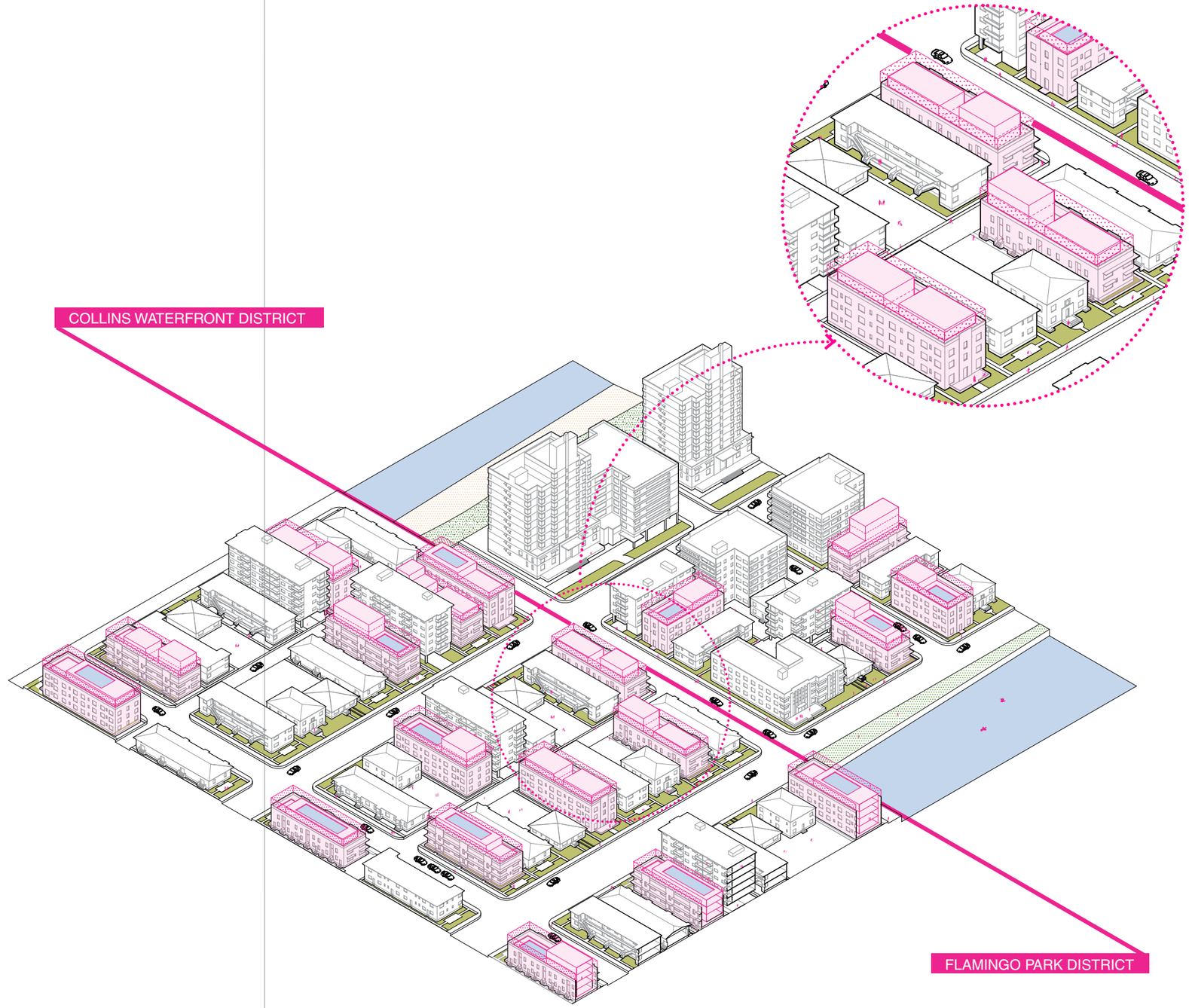
Although visible rooftop additions are discouraged by the US Secretary of Interior Standards for Rehabilitation, and have generally not been either proposed or approved in Miami Beach (where most additions must follow a standard of falling behind sightlines from the right of way), the strategy is quite common in other countries and has been deployed in remarkable architectural icons. New architectural approaches, massing strategies, contemporary façade articulation strategies and adaptive architectures could be explored and developed on the rooftops, high above anticipated flooding. The Rooftop Spread approach emphasizes visibility as a poignant new counterpoint to historic building fabric.

Opportunities

- Maintain the continuity and location of existing building fabric, while also rewarding adaptation in a way that can be monetized
- Prioritize the adaptation of historic buildings in-situ.
- Allow evolution of building types within the context of existing historic architectural and urban fabric by allowing new vertical layers.
- Replace residential floor area of existing floor plates below Design Flood Elevation while maintaining the residential intensity of the district.
- Highlight creative approaches as a new attraction of Miami Beach

Challenges

- Compatibility/integration of rooftop structures with existing low-scale building fabric below
- Visibility of new layers from the public right of ways
- Would require robust market for additional floor area in the historic district



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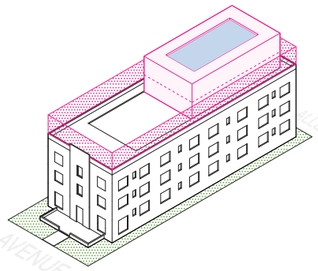

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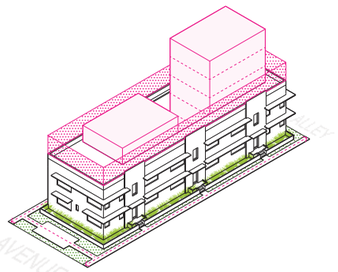
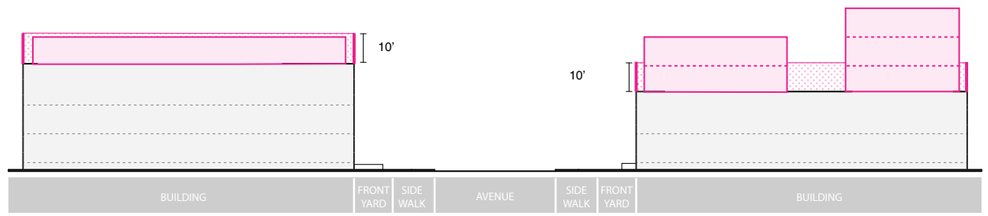


WU WALK-UP



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5.5 // LANDSCAPE STRATEGIES

Opportunities for Improved Ecology

Miami Beach is surrounded by the rich and diverse ecosystem of the Biscayne Bay and ocean reefs. These fragile ecologies are sensitive to stormwater runoff, which can modify the natural temperature, salinity, turbidity and chemical composition of these water bodies.

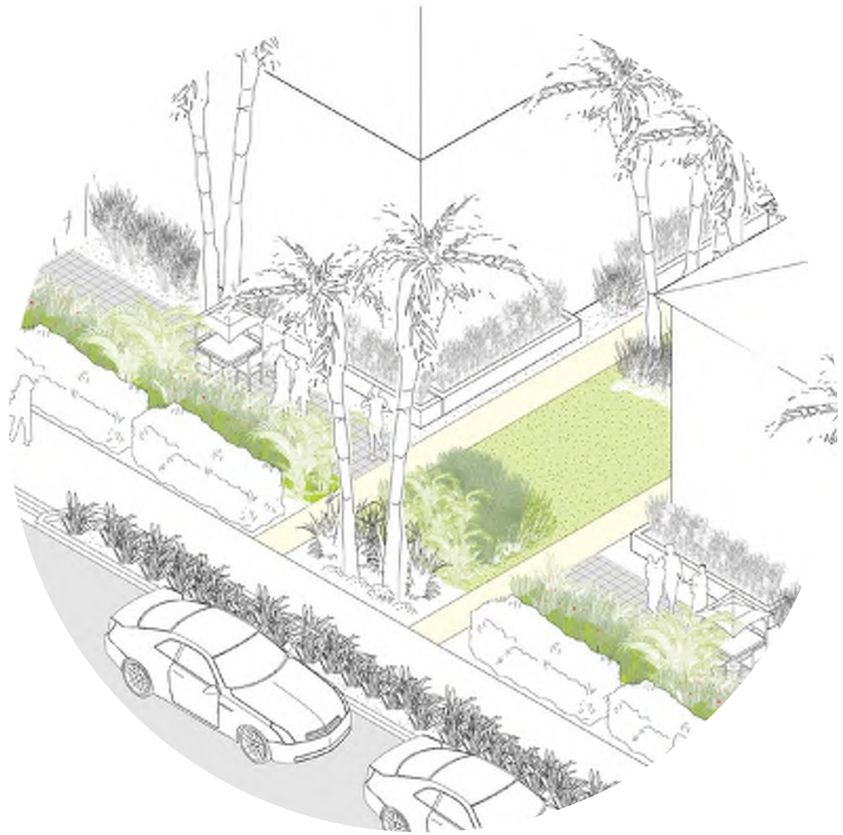
The City of Miami Beach has recently added pumping systems to trap and remove a large percentage of the debris, oil, and other pollutants that are added to stormwater runoff as it travels across the roads and yards of the city, which greatly improve the quality of runoff before it enters the Bay.

As both the City and private owners grapple with the implications of sea level rise, there is an opportunity to design in ecological measures to further treat stormwater runoff through an extensive use of green infrastructure within both private yards and along public streets.

Planting for the future

To account for future climate conditions, the plantings of Miami Beach should be chosen looking towards the future. Plantings in Miami Beach should be drought tolerant, salt tolerant, and tolerant of wind or hurricane conditions.

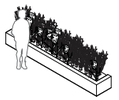
The choice of plantings should also facilitate local ecology. There is a benefit to native plantings in order to provide food and shelter for the pollinators and bird populations. Native plant communities including the beach dune, coastal strand and maritime hammock communities are naturally drought and salt tolerant, and are a natural fit for green infrastructure. Native and resilient plantings are the best and recommended choice for Miami Beach.



RECOMMENDED PLANTING MATRIX

This matrix lists high performance native plantings from coastal plant communities which are tolerant of salt, drought, and wind, as well as being appropriate for green infrastructure use. These plants can be used to replace any invasive or intolerant plantings for the existing prevalent Miami Beach vegetal typologies of hedges, shrubs, palm trees and canopy trees. This plant matrix presents a limited list of possibilities, with the sources listed for further recommendations.

CHARACTERISTICS

		NATIVE	SALT TOLERANT	DROUGHT TOLERANT	GREEN INFRASTRUCTURE	RECOMMENDATION SOURCE
HEDGE	COCOPLUM CHRYSOBALANUS ICACO	●	●	●	●	1, 5, 6
	SEAGRAPE COCCOLOBA UVIFERA	●	●	●	●	1, 2, 3, 4, 5
	BUTTON MANGROVE CONOCARPUS ERECTUS	●	●	●	●	1, 2, 3, 4, 5
SHRUBS 	SEA LAVENDER ARGUSIA GNAPHALODES	●	●	●	○	1, 6
	CHAMAESYCE PROSTRATA PROSTRATE SANDMAT	●	●	●	●	5
	WAXMYRTLE MORELLA CERIFERA	●	●	●	○	1
	GULLFEED SCAEVOLA PLUMERI	●	●	●	○	1, 3, 6
	SPANISH BAYONET YUCCA ALOIFOLIA	●	●	●	○	1, 3

Recommendation Source

1. NRCS; Native Plants For Coastal Dune Restoration
2. SFWMD.GOV; Storm Wise South Florida Landscapes
3. Univ Of Florida ; Salt Tolerant Plants For Florida
4. Miami Dade County; Guide To Tree Planting And Maintenance
5. Recommended Species For Rain Gardens, Bioswales, And Bioretention Cells In Puerto Rico And The Caribbean Islands
6. USFWS; Beach Dune, Coastal Strand And Maritime Hammock

CHARACTERISTICS

		NATIVE	SALT TOLERANT	DROUGHT TOLERANT	GREEN INFRASTRUCTURE	WIND TOLERANT	RECOMMENDATION SOURCE
	SPICEWOOD CALYPTRANTHES PALLENS	●	●	●	○		
	BUTTONSAGE LANTANA INVOLUCRATA	●	○	○	○		1
	SAW PALMETTO SERENOA REPENS	●	●	●	●		1, 3
PALM TREES	PAUROTIS PALM ACOELORRHAPHE WRIGHTII	●	●	●	○	●	2, 3
	ROYAL PALM ROYSTONEA SPP.	●	●	●	●	●	2, 3, 5
	FLORIDA THATCH PALM THRINAX RADIATA	●	●	●	○	●	2, 3
	CABBAGE PALM SABAL PALMETTO	●	●	●	●	●	1, 2, 3, 6

RECOMMENDED PLANTING MATRIX

Recommendation Source

1. NRCS; Native Plants For Coastal Dune Restoration
2. SFWMD.GOV; Storm Wise South Florida Landscapes
3. Univ Of Florida ; Salt Tolerant Plants For Florida
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5. Recommended Species For Rain Gardens, Bioswales, And Bioretention Cells In Puerto Rico And The Caribbean Islands
6. USFWS; Beach Dune, Coastal Strand And Maritime Hammock

		CHARACTERISTICS					
		NATIVE	SALT TOLERANT	DROUGHT TOLERANT	GREEN INFRASTRUCTURE	WIND TOLERANT	RECOMMENDATION SOURCE
CANOPY TREES	**DAHOON HOLLY** **ILEX CASSINE**	●	○	●	●	●	2
	GUMBO LIMBO **BURSERA SIMARUBA**	●	●	●	●	●	2, 3, 4, 6
	REDBAY **PERSEA BORBONIA**	●	○	●	●	●	2,4, 6
	STRANGLER FIG **FICUS AEREA**	●	●	●	○	●	2,4, 6
	MASTIC **SIDEROXYLON** **FOETIDISSIMUM**	●	●	●	○	●	2, 6
	LIVE OAK **QUERCUS VIRGINIANA**	●	●	●	○	●	2, 3, 4, 6

DO NOT PLANT LIST

The following list is trees that are not recommended for Miami Beach, due to wind intolerance, weak branches, or a tendency to uproot easily. These plants are included in a list of trees to consider removing due to performance in recent storms, and should not be planted.[1]

		CHARACTERISTICS	
		UPROOTS OR FALLS IN WIND	BRANCHES FALL OR BREAK IN WIND
TREES NOT TO PLANT	**EARLEAF ACACIA** **ACACIA AURICULIFORMIS**	○	●
	NORFOLK ISLAND PINE **ARAUCARIA HETEROPHYLLA**	○	●
	HONG KONG ORCHID **BAUHINIA VARIEGATE**	●	○
	JAVANESE BISHOPWOOD **BISCHOFIA JAVANICA**	●	●
	BLACK OLIVE **BUCIDA BUCERAS**	○	●
	AUSTRALIAN PINE **CASUARINA SPP.**	●	○
	CARROTWOOD **CUPANIOPSIS ANACARDIOIDES**	●	○
	ROYAL POINCIANA **DELONIX REGIA**	○	●
	EUCALYPTUS **EUCALYPTUS CAMALDULENSIS**	○	●
	WEEPING FIG **FICUS BENJAMINA**	●	○
	SILK OAK **GREVILLEA ROBUSTA**	○	●
	JACARANDA **JACARANDA MIMOSIFOLIA**	○	●
	JAVA PLUM **SYZYGIUM CUMINI**	●	○
	YELLOW TABEBUIA **TABEBUIA CARAIBA**	●	○
	QUEEN PALM **SYAGRUS ROMANOFFZIANUM**	●	○
	WASHINGTON FAN PALM **WASHINGTONIA ROBUSTA**	●	○

1 “Storm Wise South Florida Landscapes”, South Florida Water Management District, West Palm Beach FL, Accessed September 23, 2019, https://www.sfwmd.gov/sites/default/files/documents/bts_stormwise_landscapes.pdf.

LANDSCAPE STRATEGIES FOR PROPERTY OWNERS

High performance preservation

Although densely urbanized, Miami Beach properties retain meaningful and functional open spaces. In the Flamingo Park district, and to a lesser extent in the Collins Waterfront district, front yard spaces form continuous green buffers between the right-of-way and the buildings. The terraces and patios that often occupy these spaces are a Miami Beach tradition. Between the buildings, fine grained interstitial spaces are used as courts and buffers. It is possible to preserve the current uses of private sites while adding a high-performance upgrade to manage stormwater runoff. The building types described in this study describe common configurations with similar percentages of open space. The following diagrams are intended to provide guidance for property owners to manage stormwater in these spaces.

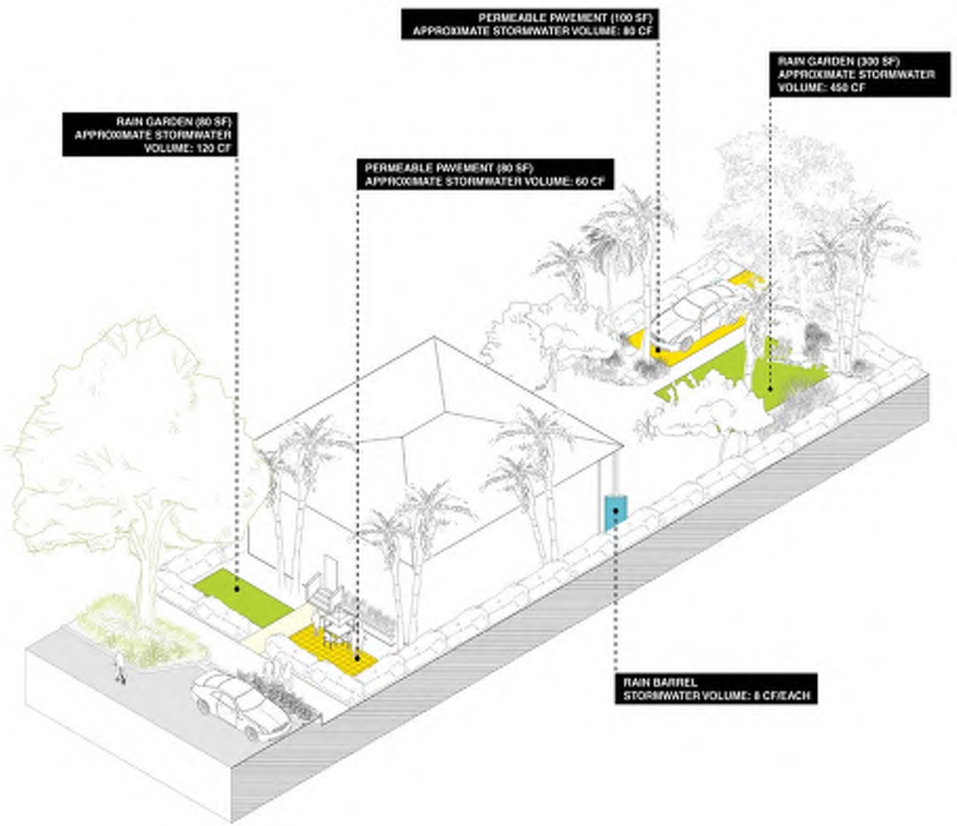
Green infrastructure opportunities for a small building footprint

Small buildings on larger sites provide greater opportunities for using the landscape to manage flood water. Many simple interventions in the landscape can help. These include hardscape strategies such as replacing impermeable terraces, drives, parking areas and walks with permeable pavers. Rain barrels can capture water from roofs. Construction of rain gardens with engineered soils and native salt tolerant plantings can help improve site drainage and evapotranspiration.

Applicable typologies

COTTAGE / HOUSE
70% OPEN SPACE

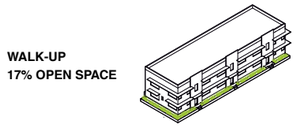
URBAN VILLA
67% OPEN SPACE

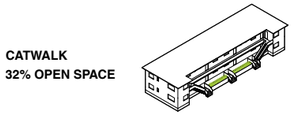


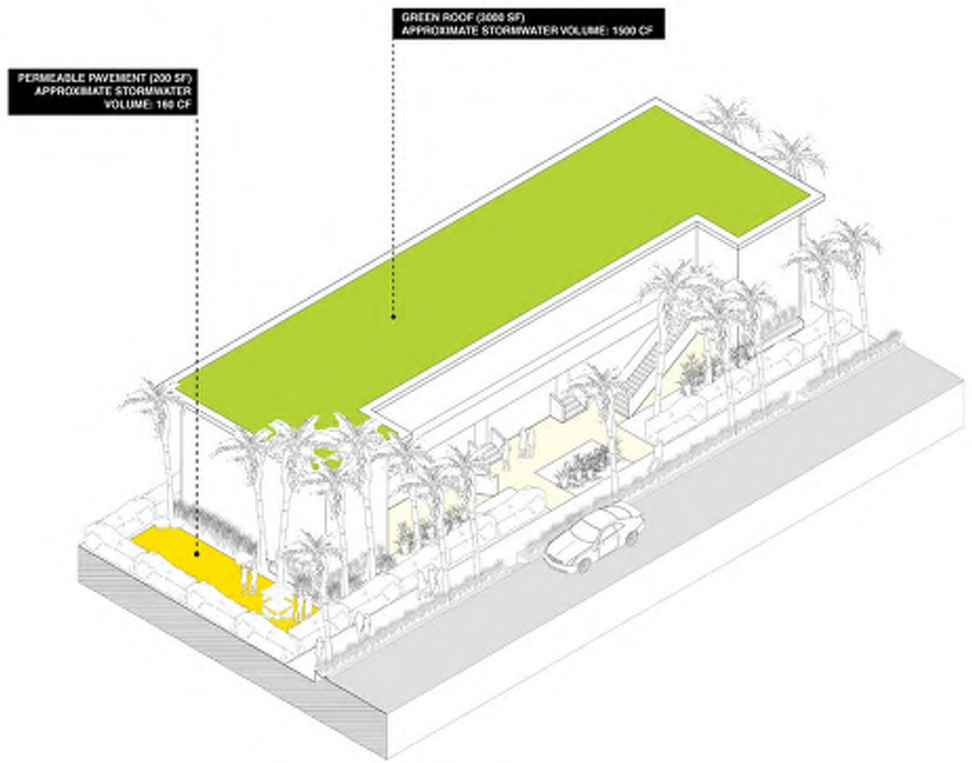
Green infrastructure opportunities for a larger building footprint

The building typologies with a lower percentage of open space have less of an opportunity to manage stormwater in the landscape. However, buildings with flat roofs present an opportunity to add intensive or extensive green roofs to absorb excess storm water. Depending on the roof structure, these roofs can manage different amounts of water with the deeper profile allowing for greater capacity. All green roofs add insulation value and help to reduce ambient temperature of the surrounding area to reduce heat island effects. Lower temperatures and increased insulation help reduce air conditioning costs and lower energy bills. Larger footprint sites can also include permeable paving to enhance overall site drainage.

Applicable typologies



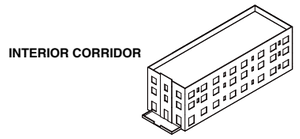


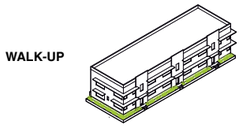


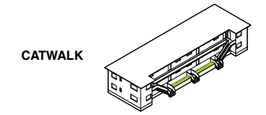
Green infrastructure opportunities for a courtyard building footprint

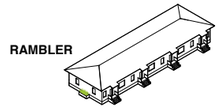
The courtyard building typologies present the opportunity to manage stormwater through simple interventions in the landscape. Sponge landscapes, sunken plazas and rain gardens can all be integrated in the overall design. This diagram shows the approximate amounts of managed stormwater, although the actual amount would be based on the specific site as the courtyard configurations vary significantly in size.

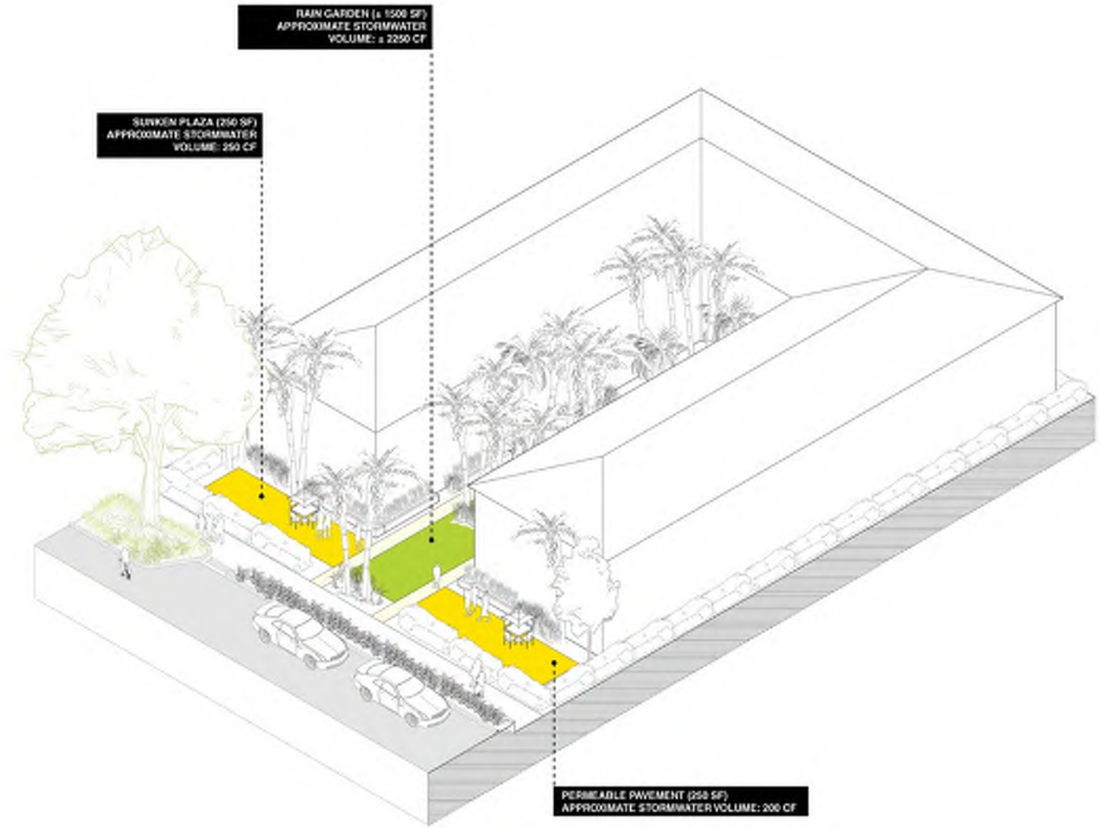
Applicable typologies









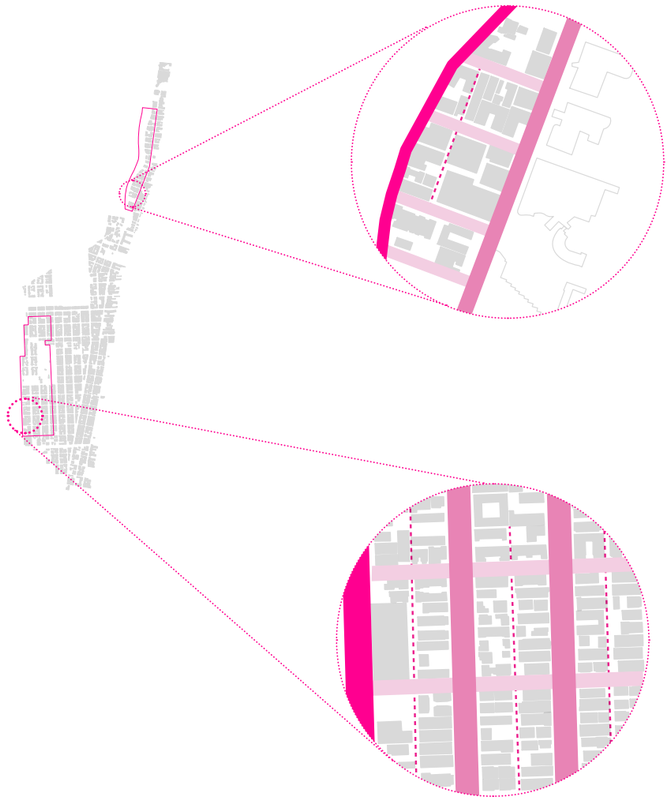


5.6 // STREETSCAPE STRATEGIES

Public Right of Ways

Miami Beach's wide avenues and streets offer excellent opportunities for increased tree canopy, green space, amenity and environmental/hydrological functions. Reducing excessive pavement in these rights of ways, the use of permeable pavements for car and bicycle parking areas, and the installation of continuous green infrastructure systems will increase water storage and recycling and reduce stormwater runoff. Reduced paved areas can still accommodate wide sidewalks, on street parking and designated bicycle lanes.

Looking to the future, provision needs to be made for accessibility between raised streets and adjacent properties. The raising of the roads and the adaptation or raising of buildings will not happen simultaneously. Indeed, there is no certainty that private properties will be raised at all. The team recommends adding a planting buffer within the public right-of-way that will allow the sidewalk and the roadway to be at different elevations. The planter buffer will provide continuous green infrastructure along the streetscape. Raised tree planters located in this planting buffer/parking zone will allow roadways or sidewalks to be repeatedly raised in the future without disturbing mature canopy trees along the avenues and streets.



Indian Creek Dr: > 70' ROW
Collins Avenue: 70' ROW
Street: 50' ROW
Alley: 20' ROW

Alton Road: > 70' ROW
Avenue: 70' ROW
Street: 50' ROW
Alley: 20' ROW

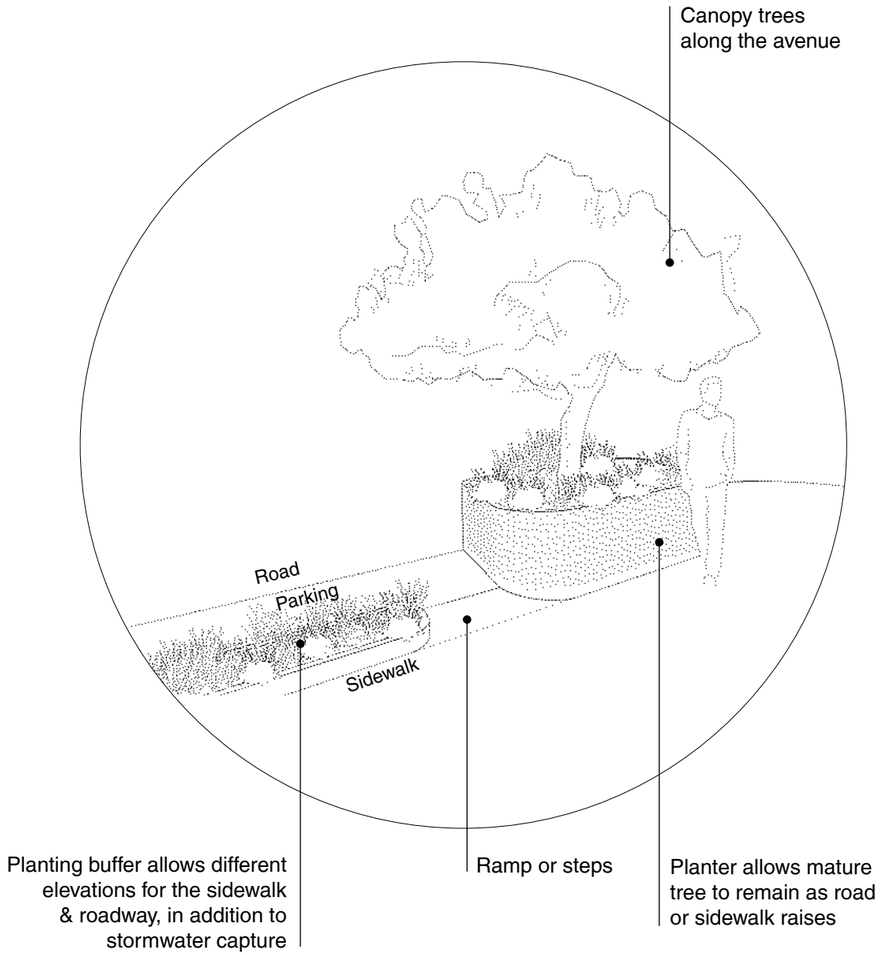
Road diet for E-W streets

Converting E-W streets into one-way streets would create space to fit both bike paths and green infrastructure along the street and mitigate raised roadway conditions. One-way street design precedents include streets in Brooklyn, where the streets include one way driving lanes, a bike lane and parking on both sides of the street.

Bergen Street, Brooklyn

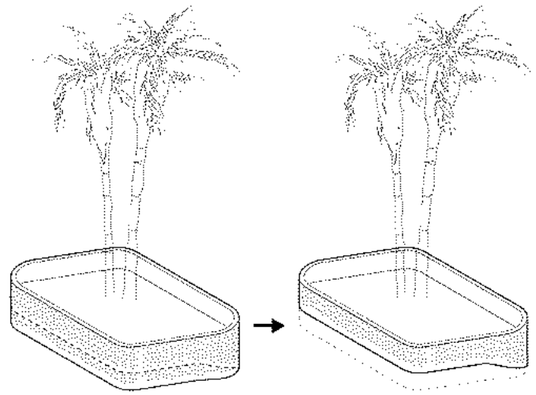
Moderating change

The planting buffer within the public right-of-way will allow the sidewalk and the roadway to be at different elevations to allow flexibility for the sidewalk elevation within the interior of the block. This planter buffer will also provide continuous green infrastructure along the streetscape, and will not disturb the mature street trees when roadways or sidewalks are repeatedly raised in the further future.

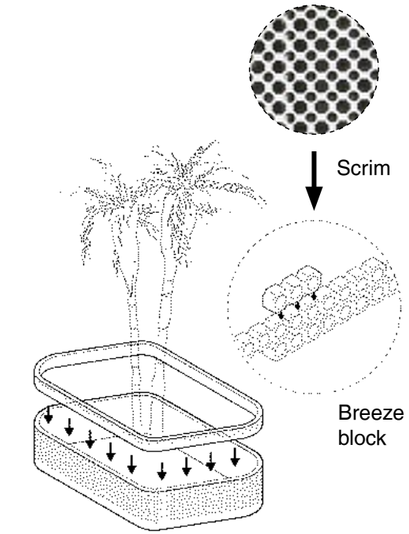


Modular planter

The planter design was inspired by masonry screens that characterize many garden enclosures throughout the district. The design is modular and expandable with edges that can be added to and components that can be buried over time. Formed from masonry units, the material is durable and units easily replaceable. The walls can be buried in soil and periodically submerged in water.



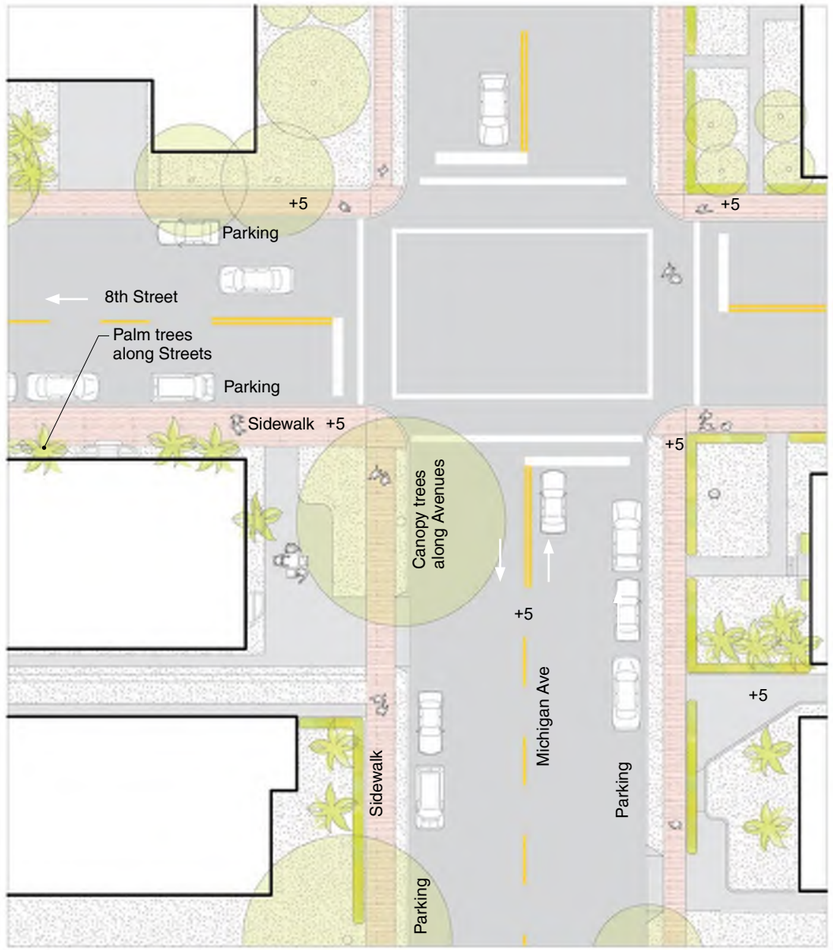
Road or sidewalk grade changes
+ mature tree remains



Modular additive planter

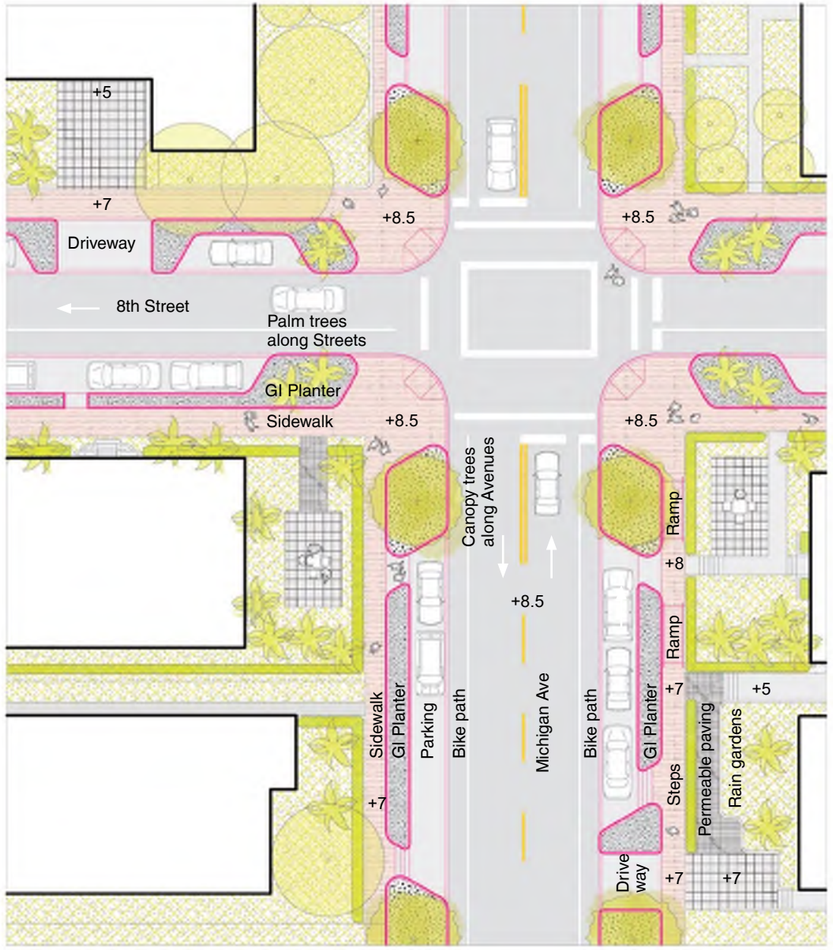
Plan for Avenue & Street | Existing Conditions

The existing conditions for the Flamingo Park neighborhood include avenues with a 70’ Public Right-of-Way lined with mature canopy trees. Front yard setbacks along the avenues range from 15’ - 25’ width, and usually include a perimeter hedge and small patio with seating. The streets have a 50’ Public Right-of-Way with minimal side yards typically 5’ wide, often with planted palm trees lining the streets.

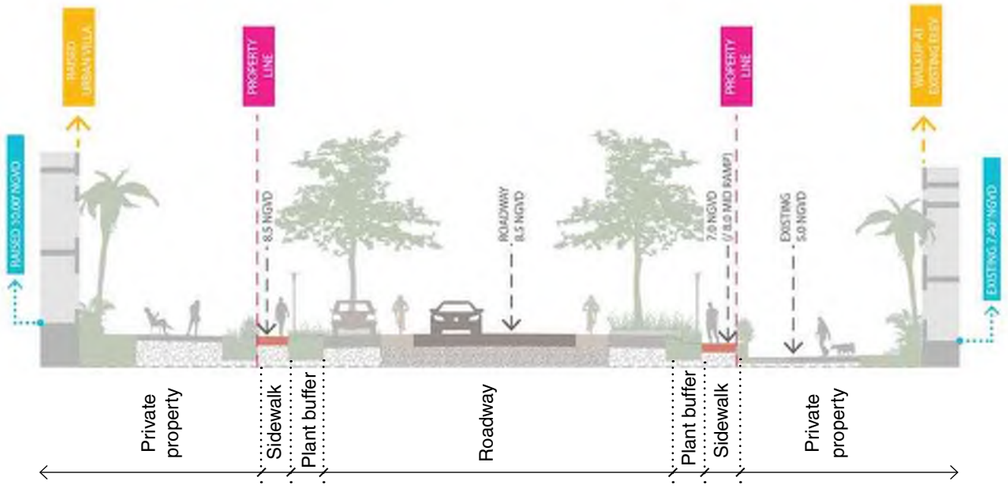


Plan for Avenue & Street | Raised Roadway at 8.5 NGVD

In the condition where the road has been elevated to 8.5 NGVD, the buffer planter will moderate between the different elevations of the sidewalk and the roadway while maintaining a mature tree canopy. In addition to the planter zone, the new streetscape will include bike paths, parking and planters that can absorb storm water. A best-case scenario would include permeable paving in the parking areas. Excess pavement in the public right-of-way should be eliminated.



Section for Avenue | Michigan Avenue



Flamingo Park Study Area | 14th street with Michigan Ct

Existing road

Raised road

Individual approach | NGVD 14' | Raise building & lots (some) | Strategy 2

Existing road

Raised road

Individual approach | NGVD 14’ | Raise building & lots (some) | Strategy 2A

Existing Street

Raised Street

Individual approach | NGVD 14' | Raise building & lots (some) | Strategy 2A

Existing Avenue

Raised Avenue

5.7 // NEW HISTORIC PRESERVATION & RESILIENCY FRAMEWORKS

Over the next 60 years, the study areas considered will need to be reconstructed/adapted in significant ways. As adaptive rehabilitation projects are conceived for vulnerable contributing properties, how should the City of Miami Beach and its Historic Preservation Board (HPB) consider proposals outside its current preservation frameworks? New frameworks will need to be developed to address both the specificity and generality of the issues. The team recommends a broad approach to developing these frameworks: first, establish new historic preservation standards and guidelines that align with future resiliency goals and strategies; as part of this effort, reconcile these historic preservation standards with resiliency mandates and initiatives citywide; in order to communicate the relevance of newly adaptive historic districts, reframe these important districts as cultural resources and leaders of resiliency; and finally, in order to maintain a diverse population in the adaptive districts, reconcile resiliency goals with affordability and social equity objectives.

Establish new Historic Preservation Standards/Guidelines
The established theory and practice of historic preservation, locally and nationally, will likely present obstacles to the adaptation of contributing buildings in Miami Beach. The Secretary of Interior Standards for Rehabilitation, as well as other guidance from the National Park Service, have over time become the default guidance for regulatory review of a wide range of projects involving historic buildings. While not required to do so, local preservation ordinances, including those in Miami Beach, have incorporated the Standards to guide their own reviews, making them the de facto preservation policy governing preservation nationwide. Nevertheless, as a Certified Local Government, Miami Beach is responsible for determining and enforcing its own regulations. While the Standards have been an excellent preservation tool to date, the city should initiate the next generation of its guidelines, and consider these as an opportunity to correlate local building types with issues of resiliency more directly.

As an example of the obstacles that will be confronted, the mid and long-term strategies proposed by this study – Adapt in Place and Raise – present numerous issues under current preservation standards. The challenges include modification to the use and appearance of individual buildings, removal of original building materials, change in the landscape and paving around buildings to accommodate green infrastructure, and changes that exceed what could be removed/recovered in the future. The lifting or moving of buildings changes how buildings interact with each other and their setting, and challenges preservation guidelines in a number of other ways. Zoning incentives, such as added floor area, height, relief from setbacks, and open space requirements will pose additional challenges as they come up against the Secretary of Interior Standards, and current guidance to the HPB. Yet, in adaptive rehabilitation projects, the removal of historic materials, the alteration of distinctive features, finishes and construction techniques, replacement of building structural systems, rooftop additions, and the alteration of interior spaces may be unavoidable.

The City will need to develop more flexible frameworks and procedures that tolerate and even support adaptive projects, and help guide HPB members in their decisions. Such a new paradigm of historic preservation may de-emphasize the importance of integrity and authenticity (visual and material), and instead place emphasis on the cultural and place-making value of historic resources. It might suggest a more organic approach to the evolution of historic districts, in which contributing buildings function as DNA, and as elements of a mosaic that forms the urban fabric. This paradigm may emphasize the need to alter or add to an historic property to meet adaptation goals while retaining the property's historic character. It should also emphasize environmental principles as necessary for long-term resilience. Specific recommendation for new historic preservation standards are included in Recommendations at the end of this chapter (Section 5.7).

As it revises its standards and guidelines, the City should avoid decisions that may lead to de-listing of historic districts, and work with partners to find agreement on strategies. The City should lobby Miami-Dade County, the State Historic Preservation Officer in Tallahassee, and the National Park Service to develop Programmatic Agreements that would qualify sponsored approaches to resiliency in historic districts for future tax credits, State Accessibility Waivers, and County ad-valorum tax credits.

Reconcile Resiliency and Historic Preservation Objectives
Up to this point, resiliency and preservation initiatives have generally proceeded outside a coordinated framework. However, in order to confront the issues facing Miami Beach, such a framework must be invented. This task is complicated because there is no accepted national standard defining how historic preservation and resiliency should work together (although a number of recent initiatives, described below, are exploring this topic).

Historic preservation has long played a critical role in Miami Beach. The city's Historic Districts and the National Register Architectural Districts have emerged over the past few decades as cultural resources that drivers of the local identity and economy. The urban character and historic architecture of these districts are so culturally impactful that they have redefined Miami Beach's original resort vocation. The foundations that support historic preservation are about to be challenged, because on the adaptive front, the need to act is compelling.

Historic preservation and resiliency are, perhaps naturally, opposing concepts. Historic preservation emphasizes the permanence of buildings and their ongoing role in the collective memory of cities. In preservation terms, the 'design lifetime' of buildings can be considered as suspended. In contrast, resiliency considers the continuous adaptability of structures and systems. It commonly acts against the idea of permanence. The Urban Land Institute (ULI) has observed that "future coastal communities may need to be treated as temporary cities." Resilience concerns may be used as a reason not to improve property, or to demolish it. Conversely, preservation considerations may be cited as a reason not to improve resiliency. In these oppositions, the city must navigate how historic buildings can contribute creatively to the discussion of resiliency. Miami Beach will define itself as a leader by inventively amalgamating preservation thinking and practice with issues of resilience and sustainability in policy and in practice.

At a minimum, the City of Miami Beach should undertake a process of reconciliation of historic preservation ordinances and practices with resiliency-oriented codes and objectives. It should channel the often-disparate discrete decision-making of various jurisdictional authorities (as well as property owners) into a coordinated vision. The City should incorporate adaptation as a requirement in all preservation planning, and historic preservation concerns should be carefully integrated into all adaptation planning and permitting. The City's Historic Preservation Board should be granted increased authority over resiliency-based decisions (in the same way it was granted increased authority over zoning variances in the 2010's.)

Further, the city should advocate for changes to the Florida Building Code, the National Electrical Code, FEMA's flood plain management guidelines and other national codes in order to emphasize the particular needs of Miami Beach (both in terms of preservation and resilient adaptation), and should authorize the City Building Official to interpret the application of these codes to historic properties in a manner that is consistent with the City's larger preservation and resiliency goals.

Reframe the Importance of Historic Districts as Leaders in Resiliency
Global climate change poses a threat to cultural heritage. In the preservation community, much work has been done in the last 10 years to gain a better understanding of climate change and sea level rise threats, including quantifying potential impacts on historic landmarks, historic districts, and historic buildings listed on the National Register of Historic Places. A number of preservation-related organizations have taken on the task of reframing the discourse of preservation and adaptation. For instance, the Climate Heritage Coalition, established in 2015 and grouping professionals from both the cultural heritage and climate science, has been helping push the preservation field from inaction to action, and to feel more equipped to handle making decisions about historic properties and places in the context of climate projections.

The National Trust for Historic Preservation is leading the charge to evolve our thinking about historic preservation. Borrowing from the context of the 1970s oil crisis and notion that historic preservation is the "ultimate recycling," the Trust has taken the position that the preservation field needs to face the challenge of climate change head on; to be persistent, creative, and innovative in demonstrating historic buildings' compatibility with adaptation. The Trust recognizes that addressing the impacts of climate change and sea level rise will require both policy makers and the preservation community to be flexible and willing to consider non-traditional solutions, such as moving buildings, raising them, or using newer, experimental approaches and building materials. The Trust's Research & Policy Lab - formerly the Preservation Green Lab - conducts research and explores conservation through policy-making; the NPS has focused on resilience to natural hazards, and is developing new adaptive treatments necessary to respond to challenges of resilience; FEMA, which focuses on pre-and post-disaster mitigation, has highlighted new approaches in its Floodplain Management Bulletin, and sponsors a Hazard Mitigation Grant Program.

It makes perfect sense that preservation, as a field and as a profession, belongs at the front lines of helping communities to make the necessary tough decisions and to design innovative approaches to the impacts of sea level rise. Preservationists are experts at saving places, preserving buildings, and have long documented the way in which — over time — various regions throughout the country have adjusted their building and construction techniques to adjust for changing weather, new technology, and advances in science. While the original impetus for preservation policy and law was to prevent demolition of historic buildings, it is now widely understood that the field has advanced to address other issues and interests too. In practice, preservation is evolving toward models that are flexible, adaptable, and creative. This perspective allows for a broader and more holistic interpretation of significance and the notion of continued value.

In Miami Beach, historic districts should take the lead in testing climate adaptation and neighborhood-wide flood mitigation retrofits. As the preservation community in Miami Beach is strong, and where historic districts are under threat of water, the city is well positioned to develop new frameworks. Historic Preservation infrastructure offers several tools, including Federal Tax Credits and assistance from the State Historic Preservation Officer (SHPO). The National Flood Insurance Program (NFIP) floodplain management regulations already offer relief to historic structures, which do not have to meet the floodplain management requirements of the program. Miami Beach typically grants relief through variance exemption (44 CFR 60.6(a)) or exclusion (44 CFR 59) of historic buildings from requirements. The organizational, legal and procedural frameworks of preservation in Miami Beach can be deployed to further resiliency.

Reconcile Resiliency and Affordability / Social Equity
"Culturally relevant and vibrant places" are maintained when the diversity and character of a city's population (not just its architecture) are preserved.

Although Miami Beach is a wealthy city by many measures, it is home to many vulnerable populations — defined by Boston's CRO Dr. Atyia Martin as "children, the elderly, the sick, the disabled, renters, low-income communities, minority residents, those with less than a high school education, and those with limited English proficiency" — According to 2016 U.S. Census Bureau figures, 16.7% of Miami Beach residents live below the poverty line. This is 4.4% higher than the national average, and does not take into account citizens above the poverty line who still have significant need, like the "50% of renters [who] are rent burdened and [the] 38 percent of home-owners [who] are house-burdened." When making decisions about resiliency, it is crucial that cities consider the specific challenges these vulnerable populations will face — challenges of finance, mobility, communication — to make living with water an equitable reality for all.

The Southeast Regional Climate Change Compact released an updated version of its Regional Climate Action Plan (RCAP) in December 2017. The RCAP 2.0 includes a new Social Equity section that makes recommendations for local governments about policy, community engagement and infrastructure adaptation. These recommendations suggest, at every level of government, making equity an integral part of project planning and policymaking. They suggest prioritizing investments in infrastructure that support issues of health and safety as well as economic mobility, and focusing on access to transit and green infrastructure; and they propose more effective engagement of community leaders and residents in discussions of infrastructure design and preparedness planning.

Further, the RCAP 2.0 outlines the following facts:

> *In 2017, Hurricane Irma caused an estimated $50 billion in damage and 97 deaths nationwide, with the worst effects occurring in Florida. Global and national trends show that extreme weather events are increasing in frequency and intensity. In 2017, the most destructive extreme weather events across the country — including hurricanes Irma and Maria—caused more than $300 billion in damage, setting a new annual record. While upper-income households often have the resources to rebuild relatively quickly in the wake of such disasters, it can take years for low- and moderate-income households to rebuild—if they are able to do so at all.*
>
> *Sea level around Southeast Florida is projected to rise from 6 to 10 inches above 1992 levels by 2030, increasing flood risks and the need for resilient infrastructure and housing. Nuisance floods—small, frequent floods that can block roads and create other hazardous conditions—have outsized impacts on working people when they are forced to spend limited funds or go into debt to meet flood recovery costs; when places of employment close; or when commutes become physically impossible.*

While investments in infrastructure and education are key to the development of inclusive cities, the implementation of broad policies alone will not suffice. Low-income and vulnerable communities often do not have the resources to rebuild after a disaster, nor are they able to adapt and "futureproof" in preparation for these events. According to the Urban Land Institute's (ULI) 2018 Stormwater Management and Climate Adaptation Review of Miami Beach, "the city needs to ensure that low-income populations are given priority for investments in stormwater management" and strive to create a more equitable, resilient community that offers "more housing options affordable for people at a range of

income levels." The ULI recommends "the establishment of a community adaptation fund [that] would provide low-interest loans to help residents and businesses finance the large upfront costs of retrofitting properties." While social equity goals, such as increasing transportation, establishing an adaptation fund and "enhancing affordable housing and income diversity [may] reach beyond the remit of a stormwater management program, they are critical goals to inform the city's broader resilience work."

At times, both preservation and resiliency have acquired reputations as harbingers of gentrification. Indeed, in Miami Beach vulnerable populations are located in the midst of a partly gentrified community, most often in unrenovated and un-adapted structures. Preservation and adaptation strategies for these buildings will no doubt be costly, increasing pressure on vulnerable populations to leave. Specific strategies should be developed in parallel with resiliency and preservation legislation, to retain vulnerable populations. Such strategies may include: incentivizing low-cost housing in adapted buildings; reducing the average unit size requirements for adapted housing; remove the parking requirement for low-cost housing; establishing a community adaptation fund that would provide low-cost loans to projects meeting both resiliency and social equity goals; adopting Miami-Dade County inclusionary zoning provision; creating block-wide pool/credit program to incentivize lower-cost, affordable and inclusionary housing; and promoting greater physical accessibility to rehabilitated/adapted properties.

Flamingo Park Study Area | 1035 9th Street, Miami Beach, FL

5.8 // Recommendations | Resiliency & Preservation Related

5.8.1 // REVIEW HISTORIC DESIGNATIONS

The City of Miami Beach should review local and national district designations to study how adaptation will affect those designations. The City should consider changes/ amendments to these designations that would prepare them for dealing with likely issues connected with adaptation. Where these designations are constructed on architectural criteria alone (i.e. the Miami Beach Architectural District), expand the criteria to include cultural and other criteria. Expand the platform of significance to support the relevance of the districts going forward.

5.8.2 // SELECT A RESILIENCY STRATEGY

The City of Miami Beach should establish Experimental Action Areas (EAA) in each study area, or a subdistrict of a study area, in order to test resiliency strategies and approaches. Within each EAA, it should adopt a coordinated, integrated and consistent resiliency strategy (for instance, select the Adapt-in-Place strategy, or the Raise strategy, but not both). Within each EAA, it should emphasize goals associated with the selected strategy. For instance, emphasize contextual appropriateness in Adapt-in-Place strategies, and the connection of building to ground –stoops, planters, entranceways --in Raise strategies. The City should allow a period of experimentation, and commission a review of the results. The team vision for implementation of each strategy is further explained in Chapter 6..

5.8.3 // DEVELOP A TIERED PRESENTATION MODEL

The City of Miami Beach may consider different levels of preservation for different types of structures.

Tiering is a system in use abroad, such as in the UK, where the Historic England Grading System has been in place since 1947. Under the English system, historic buildings fall into one of three grades, based on differing levels of significance: Grade II buildings are of special interest, warranting every effort to preserve them; Grade II* buildings are particularly important and of more than special interest; Grade I buildings—the highest grade—are of exceptional interest.

In Miami Beach, such a tiering system may be based on civic/artistic quality or current degree of authenticity. The system may emphasize more stringent preservation requirement to capital structures, while allowing more flexibility in the vastly larger number of modest hotels, residential and commercial buildings that make up the fabric of the city. **Note: such a system should not be construed as selecting what to preserve, since most buildings that make up Miami Beach historic district are modest structures, and the districts are significant for the way these structures work together to establish character and identity.** However, within this fabric, the varied resilience characteristics of contributing buildings, and the greater importance of the building façade in establishing significance, argue for more flexibility. The tiered preservation system could work as follows:

Tier 1: highest degree of civic/artistic quality and degree of authenticity
Example: the Miami Beach Post Office (Howard Lovewell Cheney, 1937)
Allow/require building elevation to minimize impacts to contributing structure. Require low-impact solutions with minimal effect on interior resources.

Tier 2: moderate degree of civic/artistic quality and degree of authenticity
Example: An oceanfront Art Deco hotel facing Lummus Park, such as The Breakwater (Anton Skislewicz, 1936)
Allow creative approaches to adaptation, including building elevation; allow some flexibility in pursuing adaptive use of ground floor, prioritize wet floodproofing as a low-impact solution to infrequent flooding.

Tier 3: lowest degree of civic/artistic quality
Example: modest residential building type
Focus on maintaining the facades and elements that contribute to the continuity of the surrounding district. Allow the most flexibility in the interior of the building, including reconstruction with adaptive materials. Allow elevation in Experimental Action Areas where Raise has been selected as the appropriate adaptation strategy. Follow resilience design guidelines, enforced by the HP Board, for most renovations.

Note: Under this system, the City of Miami Beach should tier all buildings (in the same way all buildings are currently classified as contributing or non-contributing). For the purposes of this study, the team would consider all buildings in the Flamingo Park study area and most buildings in the Collins Waterfront study area as Tier 3 structures. Hotels in the Collins Waterfront study area may be considered Tier 2.

5.8.4 // DEVELOP A TIERED APPROACH TO HISTORIC RESOURCES

The City of Miami Beach may consider tiering of historic resources within each structure/ site. Such a tiered system might give further guidance to the Historic Preservation Board in evaluating proposed rehabilitation projects in the context of implementing adaptive measures. The tiered resources model could work as follows:

Primary Resources
- Building skin facing streets and primary sideyards/courts, including all architectural features
- Projecting and decorative façade features, such as balconies, eyebrows, bas-relief
- Built-in exterior stairs, stoops, planters, railings
- Site features, such as terraces, patios, site walls
- Historic signage

Secondary Resources
- Building skin facing secondary (service or inaccessible) side yards, alleys
- Lobbies and other public spaces (except in hotels and civic buildings)
- Interior historic resources, like fireplaces, characteristic plaster moldings

Tertiary Resources
- Other unit interior areas

5.8.5 // DEVELOP A RESILIENCY DESIGN STANDARD

The City of Miami Beach should set resiliency objectives, but be open to different levels of adaptation. It should set adaptation standards for new rehabilitation projects, and incentivize greater resilience. For instance, it should require or incentivize that ground floor structures be reconstructed in concrete (wet or dry-floodproofed if commercial); use only flood-resistant building materials and finishes below projected storm surge levels; and install water storm storage systems in the space below raised buildings. However, it should allow a variety of levels of engagement, allowing property owners to take a phased approach in fortifying their structures against water (for instance by using Take Action Now strategies where possible; see Chapter 6). As a guide for adherence to requirements, and for incentivization, it should establish tiered adaptation levels.

5.8.6 // RECONCEIVE HISTORIC PRESERVATION STANDARDS

The City should develop revised and highly localized historic preservation standards and guidelines that complement or replace the Secretary of Interior Standards for Rehabilitation. These new guidelines should address issues posed by the two main strategies available for building adaptation: Adapt in Place and Raise.

Specific suggestions for a new historic preservation standard include:
- Prioritize contribution to the character of the historic district and urban consistency by emphasizing the typological characteristics of buildings, and the importance of facades, planters, stoops, and Miami Beach's characteristic yards and courtyards.
- Deemphasize in modest contributing residential and commercial buildings the importance of the interiors, and the integrity and authenticity of physical properties not associated with the public realm.
- Remove the existing requirement that historic structures below new multi-story additions, and facades in particular, be demolished
- Allow flood plain waivers, but favor strategies that increase the resilience of the ground floor.

5.8.7 // PROMOTE INCENTIVES FOR ADAPTIVE REHABILITATION

The City of Miami Beach should consider incentivizing adaptation of historic properties/districts, over new construction, as a tool of resiliency. It should consider establishing a resiliency standard for adaptation in order to evaluate such incentive bonuses. It should consider granting incentives to adaptation projects that fully implement a resiliency strategy that meets the City's minimum standard and which are brought up to current Building Code. Bonuses should be implemented in a phased way that rewards greater efforts toward adaptation. See Section 5.5 for a full discussion of incentives.

5.8.8 // DEVELOP A RESOURCE VULNERABILITY INDEX

The City of Miami Beach should integrate resource vulnerability and significance as a method of evaluating rehabilitation proposals. The City should remap its districts with new layers of information, including properties that are vulnerable due to issues related to elevation of lot or adjacent grade; elevation of basement/first floor; construction type/material content; wind resistance; and vulnerable population as owners or inhabitants.

5.8.9 // UNIFY RESILIENCY AND PRESERVATION REVIEW UNDER THE HISTORIC PRESERVATION BOARD

The City of Miami Beach should unify historic preservation and adaptation decision making under the Historic Preservation Board, which should be granted increased authority over resiliency-based decisions (in the same way it was granted increased authority over zoning variances, etc.). Require for any new rehabilitation project a Resiliency Resources Report (RRR) documenting existing conditions and proposed adaptation measures.

5.8.10 // DEVELOP THRESHOLD DOCUMENTATION

As the City confronts greater threats from flooding, and embarks on a new era of adaptive rehabilitation, it should employ state-of-the-art imaging technology to document the current state of its existing historic districts and resources. Such documentation would serve as a baseline for evaluating proposed changes, and could be an invaluable resource in

any post-storm event reconstruction effort. It would preserve an accurate record of historic properties that can be used in research and other preservation activities. It could also be configured to bolster the very incomplete HABS documentation on file at the National Park Service. The City should solicit documentation proposals from professionals and local academic institutions. At a minimum, this documentation should cover photography, photogrammetry, imaging from drones, 3D laser scanning, and enhanced GIS database development.

5.8.11 // NEGOTIATE PROGRAMMATIC AGREEMENTS

The City of Miami Beach should develop a Programmatic Agreement with State and Federal preservation offices that streamlines Federal action in applying alternative mitigation strategies appropriate to Miami Beach. Such an agreement should cover Federal action in National Register districts requiring an 'undertaking', as defined under Section 106 of the National Historic Preservation Act (NHPA), but also Historic Preservation Tax Credits and the status of districts listed on the National Register of Historic Places. Such a programmatic agreement may also be possible with Miami-Dade County, for the purposes of County ad-valorum tax credits. The programmatic agreement should encompass the issues that will be encountered under mid and long-term adaptation strategies, and with incentivization of resilience bonuses. Programmatic agreements should consider the large number of individual architectural and historic resources in Miami Beach districts, by developing systems that can be applied to multiple buildings and districts.

5.8.12 // DEVELOP COMMUNITY ADAPTATION FUND

Establish a community adaptation fund that would provide low-cost loans to projects meeting both resiliency and social equity goals. Such a program might be funded by application fees for development outside historic districts in Miami Beach.

5.8.13 // ESTABLISH CONSISTENT STANDARD FOR BUILDING RAISING

Where buildings are raised, the City should establish and enforce a consistent standard for such raising for each district. This standard might, at a minimum, include height of raise, the question of raising the building only, the building and its attendant circulation systems, or the building and lot together. An explanation of the differences in approach is demonstrated in Chapter 6.

5.8.14 // MITIGATE BUILDING CODE COMPLIANCE WITH STANDARDS FOR NEW CONSTRUCTION

As a way of reducing the cost of adaptive rehabilitation, empower the City of Miami Beach Building Official to carve exemptions in practice for resilience in historic districts.

Allow resiliency upgrades without triggering full code upgrade to existing structures, or compartmentalize code upgrade areas to allow experimental changes.

5.8.15 // IMPLEMENT LAND USE REGULATORY CHANGES

The City should introduce zoning modifications that encourage new behaviors in EAAs. Zoning amendments that combine preservation and adaptation objectives may replace Building Codes as the most powerful tool determining and propagating adaptation models. Such changes may include:

1. Allowing mixed-uses in RM-1 district; emphasize adaptive use of ground floor areas below Design Flood Elevation.
2. Counting ground floor areas below BFE +1 at 50% of calculated floor area (similar to how basements are currently treated).
3. Reconsidering the open nature of Freeboard in rehabilitation projects. Establish a single freeboard target in each district to maintain consistency of approach.
4. Incentivizing resiliency measures in a phased or stepped manner, awarding the highest incentives to projects that meet current Building Code requirements and meet the highest standard of resiliency.
5. Incentivizing 'future-proofing' tactics with additional Floor Area. Such tactics may include the use of alternative energy systems, like solar panels and windmills, as well as gray water systems.
6. Incentivizing Social Equity goals and targets, like low-cost housing in adapted buildings, with additional Floor Area through FAR or other bonuses
7. Reducing the average unit size requirements for adapted housing
8. Removing the parking requirement for adapted housing
9. Adopting Miami-Dade County inclusionary zoning provision
10. Creating block-wide pool/credit program to incentivize lower-cost, affordable and inclusionary housing
11. Promoting greater physical accessibility to rehabilitated/adapted properties, using the FHA and ADA guidelines where appropriate, even if exempted.

5.8.16 // RECYCLE BUILDINGS AND BUILDING MATERIAL

Emphasizing new regulations that promote the preservation of existing structures of development of new structures. Where buildings or building components must be demolished, require recycling as a preservation and resilience strategy.