

RESILIENT LINKAGES / Design Narrative

How does one balance the immediate need for development with the understanding that, in the long-term, The 100 Acre District will be subject to regular flooding or inundated altogether? And what will district life be like when the proverbial sun is out? A framework for flexibility, diversity and innovation is presently more achievable than planning for any specific metrics or standards of performance in the face of the unknown. By focusing on resiliency strategies that are multifaceted – that both delight and perform – we can ensure that stakeholders have an unmatched urban experience, even as they face the challenges of climate change. Global gateway cities will require resilient districts to remain competitive on the world stage and offer the lifestyle urban dwellers seek.

RESILIENT LINKAGES proposes a strategy that embraces the fluctuations of the tide and mounting sea level by building a higher level “ground plane” through both public and private investment in a responsive infrastructure and creating an aqueous Central Park that doubles as a water management system. Planning policies that raise the resiliency requirements and incentivize responsible building and contributions to the public realm ensure successful development of a desirable and resilient urban district. The 100 Acre District must perform and captivate.

THREE OVERARCHING THEMES

1 Living with Water

The 100 Acres – already some of the lowest ground in Boston – will feature an integrated water park system that accepts sea level rise, wicked high tides and storm surges. Inland of A Street, there will be rainwater storage, from roofs and streets, and cisterns to store potable water as well as phytoremediated holding ponds.

From green to blue...

Progressing eastward from the Fort Point Channel, excavated inlets, will be carved out perpendicular to the channel and create shallow stepped coves. These terraced landscapes harken in character to the rocky tidal pool landscapes of the northeast, in places planted with salt tolerant grasses and in others containing shallow pools that alternatively collect water and drain. At low tide, the cove basins become places to enjoy and to explore the tidal pool life they support, while higher benches will be free of salt water except during the most extreme storm surges. The excavated soils from the coves will be used to construct low berms to protect the historic district from wicked high tides—at least for the next 35 years.

At the head of the central cove an operable and programmable floodgate will lead to an overflow area that is designed to either capture wicked high tide overflow or store rainwater flows from the land side for storage during high tides. This floodgate, programmed to anticipate storm events, will manage the water quality of the brackish zone where a variety of plants and animals will thrive in the unique conditions found there.

Closer to the BCEC, furthest from the incursion of the sea, rainfall collected from roads and roofs will be treated and stored. Surface ponds will be found within open space amenities for the district and feed phytoremediated water into a subterranean cistern for reuse. The parkland will cross over the rail line, linking the 100 Acre District to the BCEC and providing a means for directing water from its roof to fill the ponds and cisterns. This bridge to higher ground is a means for retreat to the BCEC where emergency response can be organized during extreme weather events.

Aqueous Central Park

Running in parallel to the performative landscape is an aqueous landscape of social space and recreation. Within the park, water is celebrated and enjoyed through water play areas, swimming pools, irrigated beds for urban agriculture, lush green open spaces, a beach, boardwalks, fishing docks and the stepped tidal play zone.

At the base of the central inlet are two swimming pools floating in Fort Point Channel. Lights within these pools act as indicators of water cleanliness - red means danger and blue/ green means clear to swim.

2 Building Resilient Infrastructure Over Time

A Harborwalk Model

Inspiration for the implementation of the elevated future roadway came from the policy framework employed by the City of Boston to create public amenities along the waterfront that have become the **Harborwalk**. New buildings would be incentivized to feature a plaza level at the Summer Street/BCEC elevation that would be transformed into the future open space and transportation network. These buildings would anticipate a long term future where South Boston's major roadways and utilities in the District are elevated to meet Summer Street. Building utility would be integrated into the raised infrastructure. In our plan, the supporting infrastructure for a new street grid is established today – anticipating need – requiring developers to integrate extra support columns and pedestrian terraces into their development, similar to the segment-by-segment construction of a contiguous Harborwalk. In time, as sea level rise (SLR) becomes undeniable and investments in resiliency gain public support, the City will provide the final road panels that link together the developers' existing structural supports to create a fully-functional, elevated street grid.

As sea levels rise, ground level uses and street levels will be raised slightly to avoid wicked high tides until they are fully abandoned (2050-2100) and the plaza level (+32') becomes the new street level. Building code will require all new development to be constructed to survive inundation of these first two levels.

District Resiliency

Existing buildings with large footprints (BCEC and Gillette) will be renovated as resilient, self-sufficient places of refuge in extreme storm events and are the basis from which the district's grid emerges. These buildings also act as sites for public open space, energy production and water collection in the

interim. These “Arks” will be a district resource, receiving public investment and serving as an amenity and safety net for district stakeholders.

The warm water discharged from Gillette will supplement energy generation for the district by jumpstarting a steam plant. The elevated roadways will double as thermal sinks, which will pipe hot fresh water, heated by embedded solar panels and run by thermal pumps, to area buildings. They will additionally filter storm water runoff and pipe sea-cooled water in a closed loop for parcel specific air conditioning needs. By this time, solar road technology may be advanced enough to also contribute significantly to the energy supply for the district. The roof of the convention center, outfitted with solar panels to supplement the energy production strategies of individual parcels, has the capacity to produce 7.8 million kWh/year from the onset. Wind turbines along the Ark rooflines complete the renewable energy strategy.

Such a District will offer all that its residents need to thrive (jobs, food, amenities) – and everything they need to survive should a catastrophic event isolate the District. These features will all be accessible within a self-sufficient, walkable neighborhood.

The science and technology pertaining to sustainable design solutions is evolving so rapidly that we can barely begin to imagine the possibilities available to make the District more efficient and resilient as the phases of the plan transpire.

Connect the BCEC with South Station

Plan for an elevated connection across the Fort Point Channel from the BCEC to South Station to join Summer Street as a critical connection to Downtown’s higher ground.

3 Harnessing the Private Sector for Implementation

We use the planning policy of codifying **LINKAGES** between development rights and public improvements, creating incentives to build responsibly. The first linkages, already mentioned, include developer funded structural improvements to support future elevated roadways. The second is to ensure that Chapter 91 requirements for publicly accessible spaces be elevated to the future public level. Additional linkages are necessary to create public open space and other social and environmental benefits.

The aim is to promote development that improves the performance of the buildings, provides public amenities and open space and contributes to social equity. Each parcel will have a specific role to play and may be incentivized in different ways to achieve a common vision of resiliency. Because the district will ask more of its private partners, our plan at full build-out will be denser than the vision set forth in the 2006 100 Acre Plan. With a site area of roughly 61 acres the vision includes 6.8 million sf of new development to augment 2.3 million sf of existing development. Over an underutilized land area of 1.5 million sf we are proposing a density of 4.5 FAR for new construction, well above the 3.87 for the 100 Acre Plan. The tradeoff is about twice the amount of open space. Almost 23 acres will be developed into plazas, sidewalks, parks, aquatic zones and areas of future inundation due to SLR. The only true

dimensional constraint is the 270' height limit overlay from the FAA. With more development and more open space, the public and private sectors both benefit.

The primary Linkages proposed for the project will:

- Contribute to the District's future infrastructure: the street-facing sides of a building must incorporate a specific structural canopy system, which in the future will be linked by the City to adjacent buildings via an elevated roadway and utility network.
- Allow for ground-level inundation: the floodable lower floor heights are returned to developers in the form of an additional height allowance above the 2006 Master Plan limit (180').
- New construction must be at least LEED Gold or seek Living Building certification. Substantial renovation projects will trigger a LEED retrofit process.
- Participation in a district BID responsible for helping maintain flood infrastructure and open space.
- Fortify existing buildings (particularly those along Melcher and A street) to withstand potential saltwater inundation of their lower levels.

Further incentivized improvements include:

- Net-zero energy use (or positive energy production)
- Inclusion of public open space in linkage infrastructure (plazas at the new street grid level)
- On-site affordable housing above current mandated city levels
- Public amenities at the ground plane
- Green roof and/or water purification systems that treat stormwater on-site before entry into flood spillway infrastructure
- Location of permanent jobs within the district

Those incentives need not solely provide developers dimensional relief. Other bonuses could include rapid permitting, tax abatement/relief, parking relief or flood insurance relief.

Future Portrait of the 100 Acres:

The following are features that will differentiate the district from an urban design perspective, helping ensure its viability

2025

In just ten years the 100 Acres will begin to see new market-driven development in housing, office and laboratories expansion of the Innovation District into the 100 Acres.

- New development will utilize the existing street network but enjoy a new district park on the Fort Point Channel that is designed to receive storm surges and wicked high tides in a new park featuring tide pools and boating.

- New buildings will have three floors of lobby space that allow for vertical retreat over time with the uppermost level at the same height as the Convention Center concourse.
- The City will use fill from park excavation to create a modest levee to protect existing historic structures from wicked high tides.
- Existing historic buildings undergoing renovations will be retrofitted to adjust to eventual sea level rise by fortifying ground level structural supports.
- New buildings will have ample rain storage capability to store and treat stormwater for reuse or release into the Fort Point Channel.
- The Convention Center will expand and retrofit its roof to provide renewable energy to the District.
- A district energy system will borrow power and water sources from Gillette and distributed power systems (PVC) in the district to share resources for everyday and emergency resiliency.
- Phase 1 of the new aqueous central park will be created.

2050

By 2050, the impact of global climate change—and sea level rise—will be better understood, and, while the district will be better prepared for continuing sea level rise and other extreme weather events, it will also be capable of sustaining its current status if conditions appear to have reversed and the risks diminish. In 2050:

- Construct new and retrofit existing historic buildings to be vertical retreat-ready, meaning they function at either the existing street level or at the new datum (+32).
- The City will be ready with bond financing to construct an elevated roadway system using supports from adjacent property owners.
- The City will either choose to protect the existing grade structures of South Boston with a levee system or abandon them for higher levels.
- The 100 Acres will have a well balanced mix of uses, including offices, laboratories, restaurants and retail, mixed-income housing and elevated plazas that begin to link together with pedestrian walkways connecting to the Convention Center and Summer Street.
- Phase 2 of the park is built, including the fresh water cistern and water regulation tanks.

2100

After 2050, the district will continue to grow either with the same infrastructure as in its 2050 iteration, or further transform to account for continuing climate change and sea level rise. Should sea levels continue to rise as per the most dire projections, the district—and much of Boston—will be radically transformed to adjust to this change.

- The 100 Acres—and much of Boston—will seek higher ground by retreating vertically to a new datum equivalent to the concourse level of the BCEC.
- New roadways and utilities will be constructed to connect to higher ground while levees or sea walls may be built to protect unmovable infrastructure (such as railways).
- New connections to downtown Boston will be built over the Channel to ensure escape routes.

- Parking structures will be abandoned at the lower levels. Future residents will increasingly use water transit or shared driverless vehicles.
- Residents will choose to walk and cycle to their destinations, increasing their fitness and lifespans with active commuting and open spaces for recreation.
- The aqueous central park is complete, creating water play areas, seamless horizontal pedestrian connections, robust urban agriculture and a future-proof fresh water supply.

IMPLEMENTATION CHALLENGES

A clear District planning vision must first be articulated to inspire select developers who are up for the unique challenges building resiliently entails. A robust vision and a strong stakeholder group will give the investment community confidence that the district can thrive. Implementation will require the constant collaboration of public and private sectors as well as assistance from the scientific community on timing for phased improvements. To ensure this collaboration happens, state and local officials should commission a task force composed of public, private and institutional stakeholders to evaluate district progress at regular intervals.

Lenders must respond by developing financing mechanisms that bank on appropriate future property value increases. Underwriting guidelines must adapt as a district with resiliency measures this sophisticated has not been undertaken in the U.S. Public subsidy must be strategic and impactful. It must balance district scale improvements with building scale incentives. Programs like I-Cubed offer examples of public investment that resonate at a district scale.

The success of the district assumes that coastal urban property values will continue to climb. Combined with a larger trend of in-migration to urban environments, locations such as Fort Point offer transit-friendly locations for future density. Executed correctly, a well-designed resilient district could offer a significant marketing and lifestyle advantage over vulnerable waterfront districts or inland neighborhoods. Assuming the resiliency measures outlined here are implemented fully, the risks to district residents and investors will not be in question and stakeholders can focus on the qualities of place that provide desired urban living.

Resilient Linkages imagines a viable future within an uncertain world. By linking the public and private sectors in a special district and choreographing innovative strategic interventions we believe the future of the 100 Acre district is bright. The outcome of today's careful planning can be an exemplary model of responsive waterfront development for our children and grandchildren to enjoy.