

Name of the Exhibit: **ExhibitESoundnessofApproach**

Applicant: **The State of Connecticut**

Name of the File: **ExhibitESoundnessofApproach**

Consultation process. The NDRC team undertook a robust process of outreach and engagement described in greater detail in Attachment D. This process built upon the lessons learned in Rebuild by Design and numerous other community resiliency processes in Connecticut. The process included over 50 consultations, 3 public hearings and open houses, a project website, site visits, and social media campaigns. This enriched the discovery process, informed the resiliency strategy, resulted in 28 partnerships (with more to come) and will continue to shape the Phase 2 application.

Stakeholder identification and engagement. State Agencies For Resilience (SAFR) forms the core team for NDRC working with Yale, CIRCA and partners. Members actively shaped the application through internal and external consultation on resiliency needs and strategies for the environment, water, health, transportation, housing, relief services and energy. This team reached out to the chief elected officials of all impacted communities and held interagency calls with most. Members exchanged knowledge about vulnerabilities revealed during Sandy, continuing recovery needs, and opportunities to leverage federal funds. Team members met with town engineers, planning staff, and other representatives such as the Bridgeport Neighborhood Trust and toured areas affected by Sandy. During these meetings local representatives reviewed infrastructure and housing assets damaged in past storms and detailed ongoing and planned projects to address these issues. A myriad of resources were mined for creative and cost-effective approaches to build and maintain communities that are physically, socially, environmentally and economically resilient.

Design and collaboration. Our process built upon a substantial number of previous Sandy-recovery and resiliency engagement initiatives, many of which involved deep participation by vulnerable populations. These include: 1) Rebuilding by Design (with bike tours, an All Scales Workshop and many stakeholder meetings), 2) State Sandy Recovery programs, CDBG-DR and Shore UP outreach, 3) The Nature Conservancy's (TNC) Coastal Resilience Planning (including the Tool Kit and technical assistance to planning agencies), 4) the Regional Plan Association's

SustainableNYCT Plan, 5) the Sea Grant Climate Adaptation Academy 6) community-based green infrastructure and living shorelines projects such as the Seaside Village community rain garden and 7) the Shoreline Preservation Task Force's year-long investigation based on public hearings and expert consultations on the impact of sea level rise and storms on the state. Also consulted were: 1) Local and State Conservation and Development and hazard mitigation plans, 2) plans for adjacent areas such as the Eastern CT Sustainability Plan and the Sustainable Knowledge Corridor Plan for the Capital Region and 3) other state and agency plans. A design charrette was held with regional planning organizations at the South Central Regional Council of Governments where an outline of the proposal was presented, critiqued and refined by representatives from CIRCA, CTDOT, DEEP, Yale UEDLAB, the Greater Bridgeport Regional Council, the Shoreline Task Force, TNC and the Western CT COG. These initiatives revealed the need for planning and infrastructure solutions to support resilient redevelopment connected by fortified infrastructure to serve impacted areas including public housing in the floodplain.

Vulnerable populations. Team members consulted with organizations representing and/or composed of members of vulnerable populations including the CT Publicly-Assisted Housing Resident Network, the Fairfield Co. Environmental Justice Network, CT Coalition for Environmental Justice the Partnership for Strong Communities and other advocacy groups. Input from housing authorities, lenders, insurers including the Housing Authority Insurance Group, neighboring tribal nations and states, individuals, and employers were also sought to help build solutions to identified problems and as well as to foster understanding of regional impacts.

Public outreach. Outreach to the public and residents of impacted areas included publication in the state's primary newspaper, the *Hartford Courant* and the Spanish language *La Voz*; flyers distributed to libraries, public housing, town halls, and houses of worship; Twitter and blogs; and use of multiple existing listservs from groups such as DOH, the CT Association of Conservation and

Inland Wetland Commissions, and TNC. We also created a dedicated webpage with information, resources, the proposal, and synopses of the public hearings and open houses, and a method for submitting comments on the proposal and process. This process of expanding stakeholder contacts and review of existing initiatives is ongoing and will inform Phase 2.

Three public hearings and open houses provided opportunities for comment on the draft proposal and brainstorming about Phase 2. Participants were engaged through interactive activities such as mapping and preference surveys. Posters supported exploration of broad concepts: unmet needs, vulnerabilities, coastal typologies, resilient landscapes, the approach (strategies for solutions to unmet needs), and a comment and idea station. These meetings were accessible by public transportation and held in the MID counties, Fairfield and New Haven, as well as the State Capitol. 71 individuals signed into the hearings and provided extensive comments, which are summarized and responded to in Attachment D. Materials were also available on the website thereby creating a virtual open house.

The cumulative impact of the risks and vulnerabilities identified include losses experienced by individuals, families, neighborhoods, municipalities and the state. Sandy resulted in lost homes, jobs, personal possessions and business stock. Lack of power, transportation, access to health care and services in turn caused lost days of school, work, commerce and progress. Flooding of exit routes and fear of looting trapped residents. Relocation for short and long periods of time led to loss of vital connections to family and commercial support. As witnessed in team community tours, destroyed neighborhoods require rebuilding and reknitting social fabrics as well as securing safe exit routes and plans for resilience. Municipalities experienced loss of business revenue and tax base. These cumulative losses will have deep long-lasting impacts on the State's economy and culture. However, they also generated a multitude of studies and initiatives designed to make Connecticut more resilient, some of which are already underway.

Unmet needs reported are extensive, including everything from the need for an emergency generator for an elderly housing facility to larger and longer-term social vulnerabilities such as unsafe, unhealthy neighborhoods to the need for fortification of railways and roads. Of particular importance is the need to develop resilient solutions for public housing. Residents and housing authorities report the need for rebuilding almost two thousand units located in the floodplain.

Indirect risks and vulnerabilities disproportionately impact low-income households, which have fewer resources to endure disruptions, thus potentially increasing inequality. The target area includes unfortified brownfields, wastewater treatment plants and other sources of contamination that constitute health hazards. Rents have increased due to the loss of housing stock, thereby increasing the number of families experiencing rent burdens. Uninsurable losses in property value and quality-of-life are widely experienced as is the stress and time expended coping with the storm and its aftermath.

Influence on the proposal. Stakeholders, partners, and citizens have shaped this proposal by identifying unmet needs; revealing scientific and planning research; proposing structures that network existing initiatives; cataloging capacity for implementation; advocating for addressing needs for resilient community development including examining health impacts; proposing financing and insurance mechanisms; and building replicable solutions for future funding especially in meeting the needs of public housing and its neighbors located in the floodplain.

Future plans. Plans for collaboration, outreach, and communication for Phase 2 include continuing to work with identified stakeholders and their representatives and extensive collaboration with proposed project communities. In Phase 2, direct engagement with residents, particularly from the most vulnerable communities, will be expanded. This participation will be held in conjunction with regular meetings of residents' and neighborhood associations and other identified constituent groups. Stakeholder involvement will continue to include framing issues, determining priorities and

communicating preferences. Shared learning will facilitate growth in the ability to fully engage stakeholders in discussions. Workshops and charrettes will allow deep engagement in design. Advocacy groups will continue to advise on engaging vulnerable populations and participate alongside individuals impacted by proposals. The Department of Public Health will explore the potential of integrating a rapid Health Impact Assessment (HIA) into the Phase 2 planning process.

Concept

Approach to addressing risk. Due to Connecticut's complex geology and topography (AttE, p. 181) the areas most vulnerable to flooding (shown in blue) occur in patches along the coast. This geography complicates the response to flooding and makes collective, engineered flood control measures (i.e. storm surge barriers, reinforced dunes) more technically challenging and costly. However, the state's topography also creates opportunities because ridgelines often extend down to the coastline. These elevated corridors can become a critical connection and safe way back to the inland areas (AttE, p.182). This unique physical environment also means that all of the communities impacted by Sandy have areas of high ground (often the historic center of the community), which can serve as resilience zones (AttE, p. 183). By identifying these resilience corridors and zones and strategically investing in their long-term functionality, the state can enhance the safety and livability of shorefront communities. By connecting these corridors to regional transportation networks, the state can strengthen economic resilience while adapting to future flooding (AttE, p. 184-5).

Resilience zones. These areas of high ground can over time be adapted to house the most critical facilities, resilient housing, and to provide key services and shelter during storms (AttE, p.186). Increasing investment in these resilience zones provides an opportunity to increase economic resilience by strongly tying back to the regional transportation network and regional economic opportunities (AttE, p. 187). Therefore, these investments represent a 'no regrets' approach to climate adaptation because in addition to providing long-term resilience, they provide a myriad of

co-benefits that strengthen communities and economic opportunities in the short term and between storms.

The Sandy-impacted communities are closely linked to the regional transportation network, which provides a unique opportunity to encourage more resilient redevelopment. Many of the most impacted communities are home to the most vulnerable populations, including areas of West Haven, Bridgeport, Norwalk, and Stamford (AttE, p.188). DOT previously identified many of these same locations as areas with both high rates of poverty and served by rail service. DOT's map highlights areas where more than 11.6% of the population is living below the poverty line (shown in green). These areas present opportunities to simultaneously support economic development while building more resilient communities.

Connecticut faces an acute shortage of affordable housing and many of the existing affordable units are vulnerable due to their location within the floodplain and this vulnerability is expected to increase as sea levels rise. As regulations regarding development in the floodplain and near sensitive ecosystems become more stringent, it may become more challenging and costly to modify these low-lying properties. We propose addressing these needs by creating new incentives that support the development of mixed-income, transit-oriented developments within these resilient zones (AttE, p. 189). Creating new affordable housing in mixed-income developments would create new opportunities to access desirable job markets and educational institutions in Fairfield and New Haven counties. Encouraging this development would contribute to creating more economically and socially diverse communities and create opportunities to leverage public-private partnerships that address the state's housing needs. Encouraging transit-oriented development also aligns closely with the Governor's new investments in transportation. Connecticut's economy is closely tied to the northeast regional corridor and demographic and market trends suggest that demand is rising among younger demographics for housing in more compact, walkable communities with access to multiple

modes of transportation. Retaining younger residents is an important contributor to the State's long-term economic health.

Creating more resilient centers and providing more housing options will also provide families with more housing choice within their own communities. In the most vulnerable neighborhoods there is the potential that following a disaster some families may not have the financial resources or may choose not to risk future loss or disruption by rebuilding in place. Providing alternative housing within the same community and school district will help maintain cohesion and ensure their continued diversity. Socially cohesive communities have also been shown to be more resilient in the face of disaster (Weil F., 2011).

Resilience corridors. The state's transportation network is vulnerable to flooding; at the local level many egresses become partially flooded or impassable at low-lying points. Such pinch points often occur in underpasses beneath the rail line and causeways over creeks, rivers, and wetlands. As these transportation networks lose functionality, they increase the risk to residents and increase demands on emergency workers during a storm. Following a storm (and moving forward as sea levels rise) these flooded egresses may impact home values as neighborhoods that become isolated isolated during storms may come to be seen as riskier and less desirable places to live.

As an extension of transit-oriented developments in the resilience zone the team proposes to support resilient transportation and economic development corridors that connect the resilience zones down to shorefront communities. The resilience corridors provide support and ensure the livability of more vulnerable shorefront communities and reduce perceived risk. The corridors will link critical facilities (hospitals, fire stations, power generation) and provide greater continuity of service to the lower-lying communities. Currently, shorefront communities are accessible by a network of roadways, many of which become impassable during bad weather; however, these vulnerable points have not been systematically mapped and prioritized at the state level. We

therefore propose prioritizing investment along strategic ridgelines to ensure that communities have at least one secure egress.

Components of these resilience corridors will gradually be raised above the floodplain to ensure emergency access and evacuation. Strategic land use and other infrastructural changes will support this strategy. For example, these corridors could provide additional services to intermittently flooded properties including community parking, debris removal staging sites, reinforced infrastructure (such as water mains) and water infiltration or storage. For highly urban areas these can become reinvestment corridors providing new commercial services and more resilient housing close to desirable waterfront areas but outside of the floodplain. These retrofits can be combined with other initiatives such as providing enhanced drainage and water storage using green infrastructure, increasing the resiliency of the electrical grid and establishing microgrids, and integrating other modes of transportation, such as expanding walking trails and bike paths (AttE, p. 190). Providing this lifeline will enhance the safety of residents and may help stabilize the long-term property values. More importantly, strategically mapping the vulnerabilities and prioritizing urgently needed investment along key roads will help infrastructure funds go farther. Investment along these corridors, which directly link with regional and local level transportation networks, will maximize the immediate co-benefits for residents. These corridors can also enhance connections within neighborhoods by making it easier to access public beaches and transit stations via improved bike paths and walkways. These corridors would also be designed to connect critical facilities, given that many (including regional power generation facilities) are located in the floodplain (AttE, p. 191). Ensuring access to critical facilities during times of flooding can limit the potential damage, shorten recovery time and reduce the costs of storms. The creation of distributed power and emergency centers will further expedite recovery. Infrastructure investment within this zone can be further refined to reflect physical conditions and the level of future risk.

Shorefront communities and the coastal zone. Additional investment is needed in the most vulnerable shorefront communities and along the coastal zone to protect and gradually reduce flood risks in existing neighborhoods (AttE, p. 192). More proactive management is also needed for buffering ecosystems and drainage networks to support the continued livability of shorefront communities. As described in Exhibit D, due to the variegated coastline and the close connection between risk and local physical features, each community will need to determine how they choose to respond to a changing environment. However, there are shared characteristics between vulnerable coastal typologies (Exhibit D, p. 22). The following proposed interventions have the potential to benefit many coastal areas and typologies.

- **Expand access to financing for mitigation measures to adapt the built environment.** The financing mechanisms described subsequently will support elevation, flood-proofing, and floodwater management to support longer-term transition to resiliency.
- **Prioritize safe access along a resiliency corridor.** This will ensure emergency access to and from the shoreline and reduce the potential for loss of life and property.
- **Create resilience nodes that can serve as a refuge during flood events.** Nodes within low-lying communities can provide safe places for emergency operations, parking and access to key goods and service within walking distance from flood-prone neighborhoods.
- **Enhance green infrastructure.** Green infrastructure networks can simultaneously improve stormwater management, create recreational and open space amenities, enhance ecological resilience, and link regional recreation trails. These enhancements can be leveraged in conjunction with roadway reconstruction and sewer separation investments.
- **Encourage mitigation through participation in the Community Rating System (CRS).** Only three communities in Fairfield and New Haven counties currently receive discounted insurance premiums through their participation in the CRS. Expanding participation has the potential to

save shorefront communities \$3.9 million dollars annually. Currently the administrative burden is too high for many municipalities; therefore the feasibility of providing assistance through the state or regional entities will be explored.

- **Enhancing or creating naturalized storm buffers.** Greater protection is needed along the coast to ensure that existing buffer areas such as dunes and wetlands continue to provide protection as environmental conditions change. There are many opportunities to construct, enhance, or restore protective areas both onshore and offshore while enhancing public access, biodiversity, and the aesthetic value of coastal recreational areas. Potential projects such as dune reinforcement, beach nourishment, or the creation of living breakwaters have been shown to reduce the risk of wave damage, erosion, and stabilize the shoreline.

Financing resilience. We intend to lower barriers to investment in resiliency projects through a public private partnership modeled on Connecticut's Green Bank. The CT Green Bank is the most successful example in the country of project underwriting and financing for investing in renewable energy and energy efficiency projects. The proposed resiliency program, which may build directly on existing Commercial Property Assessed Clean Energy (C-PACE) or Shore Up CT financing initiatives in the state, will be designed to provide a combination of private financing, government grants, insurance vouchers and low interest loan options for low and moderate-income homeowners and renters, neighborhood associations, taxing districts, municipalities and small businesses who invest in retrofitting structures including critical infrastructure to lower the risks of damages due to flooding and extreme storms. Using a mix of vouchers, grants and low interest loans assessed to a property instead of a property owner can help address gaps in existing mitigation grant programs. The program would be designed to incentivize low- and moderate-income residents who may not participate in other programs due to the financial hardship required to provide the up-front soft costs or who may be reticent to incur additional debt. The details of

how the financing mechanism would be designed will be outlined in Phase 2 and Connecticut is very well positioned to take on these challenges. Connecticut's innovative PAR financing model was presented at the national conference for the Association of State Floodplain Managers (ASFPM) in 2014 and will be presented in more detail at the ASFPM national conference in 2015. Connecticut is known across the country as a center for financial businesses and insurance, and draws on the experience of the Green Bank and the operation of three resilience financing programs: the nation's first microgrid program, Shore Up CT and the Clean Water Fund.

Coherence with existing policy goals. This proposal is closely aligned with the growth management principles outlined in the state's Conservation and Development Plan including their goals to 1) "Redevelop and revitalize regional centers...with existing or currently planned infrastructure" 2) "Expand housing opportunities...to accommodate a variety of household types and needs" and 3) "Concentrate development around transportation nodes and along major transportation corridors." The plan also outlines "priority funding areas" where development is actively encouraged. There is very clear coherence between the "priority funding areas" and the areas identified by this proposal as key resilience zones. Furthermore this proposal is closely aligned with the Department of Housing's 2010-15 Consolidated Plan for Housing and Community Development. This plan outlines a vision where "Housing developments will be clustered around pedestrian-friendly areas, in close proximity to employment and commercial centers, schools, public transportation, and around established infrastructure. Connecticut will revitalize its urban and regional centers with mixed-use, mixed-income housing and community development, providing a safe and clean environment to attract an economically and socially diverse workforce." This proposal would also be closely aligned with the work underway for the Transit Oriented Development working group. Additionally, the coastal components of this proposal are closely aligned with the Long Island Sound Study's Comprehensive Conservation and Management Plan.