

ExhibitDNeed

Applicant: The State of Connecticut

Filename: ExhibitDNeed

Hurricane Sandy clearly highlighted the increasing vulnerability of Connecticut's coastal communities to storms, extreme weather, and climate change.

#### **Exhibit D.a. Unmet Recovery Need & Target Geography**

Connecticut's unique topography defined by north-south ridgelines shaped the development of the east-west rail and road transportation corridors that traverse the state's coastal communities. These systems connect diverse communities, provide linkages to critical infrastructure services, and connect to key assets, forming a network across the state that serves as the backbone of the local, state, and northeast regional economy. Hurricane Sandy revealed the untenable risk to community, environment, and economic livelihood along the coastline of Connecticut when this network is interrupted.

The State proposes a long-term statewide vision to address recovery needs from Sandy (and other shocks and stresses) and create social, environmental and economic resilience in the face of future vulnerabilities. This vision consists of a regional resilience approach for the State's most impacted and distressed communities (New Haven and Fairfield Counties). The vision will be launched by two (2) pilot projects to address specific target areas in the Union Station Neighborhood in New Haven and South End East in Bridgeport.

**Future vulnerability** Connecticut has the second highest exposure of vulnerable coastal assets on the East Coast. With over 60% of the state's population living in coastal communities, 32,000 homes in the 100 year flood plain and over \$542 billion in assets (64% of properties) at risk, the State of Connecticut remains vulnerable to future storm events, an exposure that will be exacerbated by climate change. Following Sandy, roughly 7,270 property owners in the state applied for FEMA assistance, including 6,000 along the shoreline. Following Sandy, the State received \$159 million of Tranche 1, 2, and 3 CDBG-DR funds to address housing, infrastructure, administration, and planning needs and restore lost social cohesion. Through SAFR, CIRCA is charged with equating NOAA scenario guidance to CT

specific factors to develop localized sea level rise (SLR) projections. For this application, the State used the FEMA 100-year storm event plus an estimated 2050 SLR of 1 foot for design standards. In Connecticut, the historic rate of SLR is a slightly higher than average .10 inches per annum, due to post-glacial regional subsidence, and projected to increase.

**Target Geographies. Union Station Neighborhood, New Haven Target Area:**

The Union Station Neighborhood target area encompasses the Long Wharf and Hill to Downtown communities (census tracts 1401 (partial), 1402, 1403, 1404 (partial), 1422 (partial), 3614.01 (partial)). Long Wharf is a mixed-use area, home to over 120 commercial buildings, key infrastructure including I-95 and the New Haven Union Station Rail yard, the South Central Connecticut Regional Water Authority offices, and state facilities including CTDOT maintenance facilities. The Hill to Downtown neighborhood lies just to the north of Union Station.

During Hurricane Sandy, this community experienced extensive flooding from the Harbor with surge ranging from 1 to 7 feet high and as far inland as Church Street. The combination of a high storm surge coupled with a high-tide condition caused coastal waters to infiltrate the sanitary system running along Union Avenue and the combined sewer overflow (CSO) that outfalls into New Haven Harbor during storm events. Collecting water from a 580-acre upland watershed, the backflow over capacitated the system. The resulting backup flooded the Hill-to-Downtown community and converged with surge to exacerbate flooding within Long Wharf. The storm water flooding in the Hill-to-Downtown area inundated Route 34, Union Avenue, Church Street and many local streets in the community. Residents at the New Haven Public Meeting expressed the resulting difficulty and limitations to egress and evacuation in the area. Over 500 units of low income and elderly housing were damaged, including

many units in the Church Street South HUD Housing Complex<sup>2</sup>. Upland areas within the water shed also experienced flooding, resulting in damages to key community assets including the City's Central Business District, New Haven's Historic Green, the City Municipal Complex, Yale University Campus South, the New Haven Police Precinct, and Yale Medical Center. Although Sandy was unique in its ferocity, this community experiences chronic flooding whenever a rain event runs concurrent to a high tide condition, a problem that will only increase with sea level rise.

In Long Wharf, surge inundated from the Harbor, passing through I-95 underpasses at Long Wharf Drive and Canal Dock Road to converge with stormwater backup and flood the low-lying area, extending onto the New Haven Rail Yard. Surge levels reached as high as 7 feet, leaving the area inaccessible and causing damage to properties, including the South Central CT Regional Water Authority's main offices, which house their Emergency Operations Center. Flooding required the evacuation of this building, impairing the operation of the drinking water supply for the greater New Haven area. 17 properties in the area were classified as affected under FEMA Individual Assistance Inspection Damage, including the DPH office in Long Wharf, which suffered significant damage.

Similarly the rail yards at Union Station were inundated. Flooding led to damages to the station's low-lying power infrastructure and multiple buildings. Fortunately, service was preemptively halted prior to the onset of Sandy and cars were safely stored upland, limiting the damages incurred. Damage has been partially addressed by an \$8,978,750 FTA grant administered by the Connecticut DOT for New Haven Rail Yard Power Upgrades.

**Unmet Recovery Need & Future Resilience at Union Station Neighborhood, New Haven:**

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<sup>2</sup> Mitigation and Resiliency Projects for Union Avenue, CDBG-DR Tranche 2 Infrastructure Application, City of New Haven

A protected New Haven Union Station and Rail yard is vital to the future resilience of Long Wharf community. Servicing the busiest rail line in America, connecting commuters along the Northeast Corridor from Boston to Washington D.C. According to the Regional Plan Association's Report, *Getting Back on Track*, New Haven Union Station is Amtrak's tenth busiest station nationwide with over 746,000 ons and offs. With a direct trip between New Haven Union Station and Grand Central Terminal running approximately one hour and 45 minutes, Union Station is the second busiest departure point into Grand Central in the State, behind Stamford. Union Station is vital to the continued recovery, revitalization, and resilience of the target area communities. With both the Hill-to-Downtown and Long Wharf communities located directly adjacent to the rail yard, Union Station provides residents with commuting opportunities and increased mobility, as well as providing opportunities to bring visitors and economic opportunities to the target area. On a larger scale, the station and rail yard is vital to the economic foundation of the State and the entire North East Corridor, which is estimated to contribute more than \$50 billion annually to the national economy.

Over 200 buildings in the target area were located within the Sandy inundated area, with an additional 100 buildings located within the FEMA designated 100-year floodplain. Following Sandy, over \$1.7 million was spent on recovery efforts to homes and infrastructure across New Haven. Sub grantees including the City of New Haven, New Haven Housing Authority, and New Haven Parking Authority received \$1,153,681 in FEMA public assistance funds for 7 projects immediately following Sandy. While it received \$78,142 in FEMA Individual and Household Program grants, the city still faces an unmet need of \$142,679 for owner occupied housing. The recovery and repairs to homes and infrastructure in the area did not include resilient measures to protect these damages from future storm events. The affordable housing community directly adjacent to Union Station and the larger downtown area suffers from chronic repetitive loss from flooding during simultaneous high tide and heavy rain

conditions, stagnating economic growth in a community that is otherwise a strong candidate for economic investment. The community faces the continued threat of future storm events and sea level rise, as well as more chronic flooding from stormwater backup, an eroding shoreline, disconnected neighborhoods, vulnerable populations and a lack of affordable housing that hinder the community's resiliency and ability to recover from future events. Looking forward, the target area has continued recovery needs that if met, will enhance the resilience of community moving forward against current and future threats. (See Attachment I – MID-URN Checklist A (AttIMIDURNChecklist.pdf))

**Other Storm Events.** Hurricane Sandy emphasized the need for drainage improvements in the Union Station Neighborhood target area that would mitigate flooding during future coastal storm events as well as more regular lesser storm events. According to NOAA National Climatic Data Center, three flash floods and two severe storms were recorded in New Haven between 2005 and 2010. Following two storms in 2010, over 30 properties in the city applied for FEMA Individual assistance. More recently, a March 2013 Nor'easter resulted in \$8,249,992 FEMA public assistance funds granted to the city. The State of Connecticut has received \$4.5M in CDBG-DR Tranche 1 and 2 allocations for a Mitigation and Resiliency Project for Union Avenue, to address the feasibility study and design for a system to address the chronic flooding. The City of New Haven is currently using a portion of this funding to undertake a study of the existing stormwater management system and an additional \$2.5 million to help install bio swales and green infrastructure throughout the city. The project totals \$48 million in funding. \$20.5 million in funding has already been identified, leaving an unmet need of \$27.5 million to advance this project to implementation.

Hurricane Sandy revealed the need to develop drainage improvements in conjunction with layered natural coastal protection measures to reduce the risk of flooding in future events. Within the target area, the Long Wharf coastline is susceptible to erosion from sea level rise and wave action,

creating vulnerable points along the shoreline. The coastal edge along Long Wharf serves as a buffer zone protecting I-95, the key regional coastal interstate highway servicing the region between New York and Boston, and the greater Long Wharf area against storm surge and wave action. New Haven Harbor also contains oyster beds that contribute to the local ecology and regional economy<sup>3</sup>.

**Addressing the risk of storm and coastal flooding in the area sets the stage to address larger economic revitalization and social cohesion efforts that support long-term resilience.** The Long Wharf and Hill to Downtown communities are isolated from each other and from the surrounding neighborhoods by large scale infrastructure and a disconnected roadway network. Residents of Hill-to-Downtown cannot easily access the waterfront recreation opportunities in Long Wharf. This disconnection extends to the surrounding neighborhood, limiting the connection to, and between, key assets including Union Station, Yale-New Haven Hospital, Yale University, and the Downtown. This lack of community connectivity and social cohesion reduces the community's resilience to future flood events. The current isolation of the Hill to Downtown area limits residents' ability to mobilize or evacuate, or reach critical facilities, including nearby medical centers, during storm events. As discussed in New Haven's *Hill-to-Downtown Community Plan*, the existing conditions are limiting economic revitalization of the community. Much of the properties within Long Wharf and Hill to Downtown remain underused or neglected, and in the case of Long Wharf, at low-density. In addition to exacerbating the socio-economic conditions of the neighborhood, the lack of economic livelihood reduces the community's ability to quickly respond and recover following future events.

### **South End East, Bridgeport Target Area**

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<sup>3</sup> The Connecticut oyster industry represents 92% of the northeast production and accounts for a \$62 million industry.

South End East project area encompasses the eastern portion of South End as well as Downtown Bridgeport, extending north to just above Bridgeport Station (census tracts, 705, 706, and 704 (partial)). This waterfront community of historic residences and industrial uses sits very close to downtown Bridgeport, but is isolated by infrastructure and large footprint developments. With South End located on a barrier peninsula, and the downtown facing the Pequannock River, South End East remains one of the most vulnerable communities in Bridgeport.

Bridgeport was hit hard during Sandy, pummeled with sustained 70 mph gale force winds and experiencing the highest storm surge in the state, nearly 9.8 feet above normal high tide, that resulted in damages to over 570 single-family homes citywide. Within the target area, 31.2 acres containing 211 buildings were inundated resulting in over 100 FEMA Individual Assistance Household inspections completed in this area, with 89 properties affected.

Downtown Bridgeport, located to the north of the rail line, contains mostly commercial and institutional buildings. Surge from the Pequannock River ranged in height from 1 to 5 feet along the coastline, but only inundated the area as far inland as Water Street, sparing most properties in the Downtown from damage. Bridgeport Station and rail, located at an elevation of approximately 11' NAVD88, avoided damages. South of I-95, the community consists of single-family homes, industry, and critical infrastructure including the PSE&G Plant, Bridgeport Power, and the Fuel Depot. Surge as high as 7 feet inundated this area, flooding streets and damaging residential properties.

Throughout the target area, residents relayed accounts of power outages that lasted from a few hours to over a week. The United Illuminated Company, which serves the larger region, reported that over 250,000 customers experienced outages. Of the roughly 57,835 Bridgeport customers, over 41% or 23,414 still experienced outages 4 days following the onset of Sandy.

### **Unmet Recovery Need & Future Resilience in Bridgeport**



Up through the 1930s, the South End was an industrial center due to its favorable location near both port and rail. By the 1980s, the shift away from manufacturing and subsequent job loss resulted in an economic decline. Today, many of these former industrial buildings (24) along Railroad and Myrtle Avenues and Atlantic and Broad Streets remain vacant or underutilized, but have an effective land value of over \$750,000. Similarly, the housing stock has remained mostly unchanged, with only 34 units of housing constructed across the entire South End peninsula since 1990.

While the community has begun to recover with new businesses in the service industries and small light manufacturing shops, the full extent of development needed to revitalize the economy has been limited. With the future risk of storm events and flooding damages, the isolated street network and disconnection from downtown, the community has a difficult time attracting new development in the area. Over 66% of existing structures throughout the entire peninsula were built before 1940.

Over 200 buildings in the target area were inundated during Sandy, with an additional 100 located within the FEMA designated 100-year floodplain. Following Sandy, over \$1.9 million has been spent in recovery to homes and infrastructure in Bridgeport. Receiving \$1,317,104 in FEMA Individual and Household Program grants, Bridgeport still faces an unmet need of \$42,610,158 for owner occupied housing (\$1,110,158) and multi-family housing (\$41,500,000). Sub grantees including the City of Bridgeport and City of Bridgeport Housing Authority received \$637,031 in FEMA public assistance funds for 8 projects immediately following Sandy. The target area of South End East accounts for roughly \$350,000 in documented unmet recovery need for owner occupied housing. However, it is clear that the unmet need may be significantly greater. During the NDRC outreach process, many residents seemed unaware of opportunities to apply for assistance; many explained specific damages to their homes that had not been repaired; even community facilities, such as the Walter's African Methodist Episcopal Zion Church, a cultural landmark, suffered extensive damages

(\$500,000), which have precluded their reopening since Sandy. The recovery and repairs to homes and infrastructure often did not include resilient measures to protect from future storm events. The community faces the continued threat of future storm events and sea level rise, as well as socioeconomic challenges that hinder their resiliency from future events.

In South End East, as well as throughout the city, the sewer and stormwater system infrastructure is aging, including an existing outfall that runs along Singer Street in the target area and drains into Bridgeport Harbor during CSO events. Flooding can also occur on a more regular basis as stormwater flows south from a higher elevation at Downtown Bridgeport. Residents of South End East described extensive ponding under the Rail underpasses at Lafayette Street and Myrtle Street following rain events. East of Park Avenue, only 5 of the north-south running roadways pass under the elevated rail and I-95 to connect South End East with downtown Bridgeport. Of these, only Myrtle Avenue and Park Avenue far to the west of the community lie outside of the 100-year floodplain, with Myrtle susceptible to flooding from rain or drainage backup. The protection of these intersections is vital to resident egress and emergency evacuation and to the economy of the community.

Resiliency strategies in the South End East must also take into consideration, and reduce the risk of, power outages in the community, a chronic problem following storm events. Between March 2010 and February 2011, five events led to a total of 53,760 outages in this area. Following Sandy, the city of Bridgeport, including the South End East neighborhood, was selected to compete in HUD's Rebuild by Design National Competition. The Bridgeport Team developed a web of interventions to protect the larger Bridgeport Area, entitled Resilient Bridgeport: Claim the Edge, Connect the Center, and was awarded \$10 million in CDBG-DR funds in 2014. DOH is working to identify pilot projects to address the resiliency needs of Bridgeport's South End/Black Rock Harbor. Addressing the risk of storm and coastal flooding in the area creates the first layer of protection, creating opportunities to address larger

economic and community efforts that support resiliency in the long term. According to the South End Neighborhood Revitalization Zone (NRZ) Strategic Plan, as well as numerous resident accounts, the South End East community is isolated from its surrounding communities by a disconnected street network and large scale infrastructure. While lying just over one-half mile from downtown Bridgeport, it is cut off by I-95 and the MetroNorth/Amtrak railroad tracks. Similarly, running east-west, the University of Bridgeport interrupts the peninsula's street grid, creating disconnect between South End East and South End West. While the community has access to the shorefront recreational asset of via Seaside Park, it is cut off from the eastern shoreline by large-scale industrial uses. This isolation limits residents' ability to mobilize or evacuate during storm events. Additionally, as discussed the in NRZ Strategic Plan, the existing conditions limit the economic revitalization of the community, as well as Downtown Bridgeport. Protecting existing corridors between the two neighborhoods, such as Broad Street, as well as developing a resilient street network that connects north-south as well as east-west will increase residents' mobility and access to existing and potential commercial and economic opportunities in the downtown, as well as bring new development to the South End East as well. (See Attachment F (AttFBCA.pdf) Benefit-Cost Analysis, for measurable benefits and metrics for the Target Areas). (See Attachment I – MID-URN Checklist A (AttIMIDURNChecklist.pdf))

#### **Exhibit D.b. Resilience Needs within Recovery Needs**

##### **Exhibit D.b.1. Actions to Limit Effects of the Qualified Disaster Event**

As demonstrated by the two target areas, Sandy had resilience, economic, environmental, and social impacts within individual communities and municipalities, as well as across the region, state, and northeast corridor. Inundating the coast, the storm directly damaged homes, commercial centers, and key infrastructure. The State of Connecticut incurred an estimated \$70 billion in damages following Sandy. The costs have been felt by individuals, businesses, insurance, and local, state, and federal

government. A study by the UConn Connecticut Center for Economic Analysis found that from November 2012 to December 2014, approximately 7,103 jobs were lost, approximately half of these impacting small businesses.

These losses resulted in reduction in personal incomes from small businesses by \$90 million, disposable incomes by \$150 million, and government revenues by \$39 million during those 26 months. The State received roughly \$159 million of federal funding in the form of CDBG-DR funds, with unmet need still totaling more than \$158 million from housing (\$135,789,167) and infrastructure (\$22,360,508). The State has received additional federal funding in the form of \$220 million paid to homeowners and businesses from the National Flood Insurance Program, \$43 million in low-interest disaster loans from the Small Business Administration, \$42 million in FEMA aid to municipalities, \$14 million in emergency housing aid from FEMA, \$10.5 million administered by the Department of Social Services, and \$4.5 million in transportation funding for preparation and repairs, and \$3 million from the Department of the Interior for coastal resiliency and restoration.

In New Haven County, Sandy caused damages totaling over \$1.3 million to homes and infrastructure. While some unmet need remains, much of this “cost” was covered by insurance and the federal government including \$78,142 in FEMA Individual and Household Grants, and \$1,153,681 in FEMA Public Assistance Grants. In Bridgeport, Sandy caused damages totaling over \$3.1 million to homes and infrastructure, while some unmet need remains, much of this was covered by insurance and the federal government including \$1,317,104 in FEMA Individual and Household Grants and \$637,031 in FEMA Public Assistance Grants.

As described in Exhibit E.a.3 (ExhibitESoundnessofApproach), the State of Connecticut is proposing a multi-tiered strategy including 2 pilot projects, a regional initiative and a statewide strategy. If the proposed pilot projects in the New Haven and Bridgeport target areas had been

implemented prior to the qualifying disaster of Sandy, the communities would have had substantially reduced flooding damages.

In the Union Station Neighborhood, the \$59M *Union Station Resilient TOD* pilot project includes management of coastal and inland storm water convergence, street and neighborhood storm water improvements, rail yard protection, and a coastal protection strategy. If in place during Sandy, the project would have minimized surge inundation from the Harbor, as well as prevented flooding from stormwater backup. This would have limited the inundation area, home to over 200 residential and commercial buildings, including 500 units of affordable housing, as well as key infrastructure including the New Haven Union Station and Rail Yard. If implemented, the project would have mitigated damages to the 32 residential buildings in the target area that underwent a FEMA housing inspection, preventing at least \$600,000 damages (assuming the average FEMA Individual Assistance grant in New Haven).

In Bridgeport, the \$43M *South End East Resilient Network* pilot project includes the following measures: street raising and street improvements along University Avenue, community center restoration, earthen berm, flood design guideline recommendations, and district energy feasibility study. Consisting of both hard and soft coastal protection and drainage measures, the project would have protected the community from surge inundated from the Long Island Sound on both the south and eastern shoreline, reducing flooding and damages to households. If in place during Sandy, the project would have limited the inundation area, home to approximately 300 residential and commercial buildings, as well as key infrastructure including energy plants. If the *South End East Resilient Network* project had been implemented before Sandy, it would have mitigated damages to the 85 residential buildings in the target area that underwent a FEMA housing inspection, preventing at least \$2.2 million in damages (assuming the average FEMA Individual Assistance grant in Bridgeport).

#### **Exhibit D.b.2. Total Resilience Investment**

The Bridgeport *South End East Resilient Network* and *Union Station Resilient TOD* pilot projects are designed to create more vital, resilient neighborhoods in the present and future, ultimately allowing communities to withstand and recover more quickly from all future extreme events, shocks, and stresses. While these investments were developed specifically for each individual community, both present visions of how resiliency can be incorporated throughout Connecticut. The pilot projects will pave the way for a larger regional planning initiative that together will allow for an expanded state-wide strategy for resiliency and recovery. Together, these projects would require about \$115M NDRC investment to advance resiliency, recovery, and economic revitalization in the target areas, the larger New Haven and Fairfield County region, and the state.

In New Haven, the total investment in resilience needed is \$59M (see Exhibit E Soundness of Approach for detailed project description). In the future, this project would provide the following resiliency, recovery, and economic revitalization benefits, preventing the following costs in a future event: \$20.8 million in residential loss & damages; \$98.8 million in commercial loss & damages, as well as \$1 million in lost revenue; \$6.4 in road reconstruction; \$27.3 million in Parks & Beaches; \$3.4 million in railroad reconstruction, \$330.8 million in railcar replacement, and \$700,000 in loss of operation.

In Bridgeport, the total investment in resilience needed is \$43M (see Exhibit E Soundness of Approach for project description). In the future, this project would provide the following resiliency, recovery, and economic revitalization benefits, preventing the following costs in a future event: \$45.7 million in residential loss & damages; \$99.3 million in commercial loss & damages, as well as \$500,000 in lost revenue; \$1.8 million in road reconstruction; \$17,900 in Parks & Beaches.

The development and implementation of the Regional Initiative, the *CT Connections Coastal Plan*, requires \$6.5 million in funding, to fund and carry out resilience measures throughout New Haven and

Fairfield Counties, creating a network of resilient municipalities throughout the State, and setting the foundation for a state-wide initiative.

### **Exhibit D.b.3. Vulnerable Populations**

LMI populations in Connecticut were disproportionately affected by Hurricane Sandy, and remain especially vulnerable to risk from future storm events and rising sea levels. A CCM report on disproportionate burdens show that a small percentage (4 out of 25) distressed towns are located along the state's coast. In Fairfield and New Haven counties, over 1,298 multifamily housing developments sustained damage, with three public housing properties (581 units) sustaining the most damage. In total, eight public housing properties (815 units) in the FEMA 100-year floodplain need to be elevated, rehabilitated or relocated at a total cost of \$240,000 with an unmet need of \$150,000,000. These vulnerable populations will be disproportionately impacted by future storm events and SLR as LMI communities lack the means for preparedness and response, and the ability to recover as quickly after events as more financially secure communities.

In New Haven, the Union Station Neighborhood target area is home to roughly 16,700 residents. According to the HVRI Social Vulnerability Index, a majority of the Union Station Neighborhood target area is within the top fifth percentile of communities vulnerable to environmental hazards in the country. 7,990 residents or 65% of the population in the target area is considered LMI, with 15.27% of the population unemployed. The average area median household income is \$34,998, which is substantially lower than the statewide median household income of \$69,461.

The Union Station Neighborhood target area is home to LMI housing developments including the Robert T. Wolfe Apartment (93 units), Katherine Harvey Terrace (23 units), and the Church Street South Apartments (301 units) that face particular recovery and resiliency needs. The Robert T. Wolfe Apartments and Church Street South Apartments experience chronic flooding from rain events, especially when coupled with high tide conditions which will be exacerbated with sea level rise. During

Sandy, as well as during more regular flooding events, streets located within Church Street Village were flooded, limiting residents' access to evacuation routes and emergency egress.

While located across from Union Station, the Church Street South Apartments remain isolated from the larger community, which in turn creates a disconnect between the upland areas, Hill to Downtown, Medical Center, and Long Wharf neighborhoods. This lack of social cohesion hinders the community's ability to prepare and recover from events and remain resilient in the face of future shocks and stresses.

In Bridgeport, the target area is home to roughly 4,400 residents. According to the HVRI Social Vulnerability Index, a majority of the South End East target area is within the top fifth percentile of communities vulnerable to environmental hazards in the country. 85% of the population in the target area is considered LMI, with the average area median household come at \$21,102. 21.20% of the population is unemployed; 11% above 65 years old, and 30% have not graduated from high school. The target areas' biggest obstacle to continued recovery and resilience is economic redevelopment. Already experiencing economic downturn, Sandy resulted in flooding in the area that shut down or relocated remaining businesses and further exacerbated vacancies in the neighborhood. With over 24 properties vacant today, the vulnerability of the area to future storm events and sea level rise has limited the opportunities for redevelopment in the area.

#### **Exhibit D.b.4. Factors contributing to or hindering disaster recovery & resilience**

The following factors exacerbate and hinder disaster recovery and resiliency in the two target project areas, New Haven and Fairfield County, and across the state.

**Heavy reliance on an aging and interconnected transportation network in flood-prone areas:** The State's proposed project is predicated on the State's transportation dense transportation network that runs along the coastline. Low to moderate income neighborhoods often depend on public transportation for access to work and for egress during emergencies. During storms, floodwater can inundate critical transportation infrastructure such as rail line underpasses, making evacuation difficult or impossible



and hampering recovery efforts. While the two pilot projects protect sections of this critical infrastructure, vulnerable points along the system remain.

**Large income disparities and a shortage of affordable housing in communities of economic opportunity.** Many of the most vulnerable citizens are in need of quality affordable housing. In order to address these needs in an era of constrained resources it is important to add new housing as well as preserve affordable housing presently serving households in need. Connecticut has the second most unequal household income distribution in the country and has had the greatest growth in household income inequality (Hero, 2009). Connecticut's highest-income households (top 5%) received a quarter (24.9%) of all the income in the state. The poorest 20% received 3.3% of all income. The Gini Index (a measure of inequality) for Fairfield County in 2007 was 0.534, one of the highest in the nation.

**Challenged but improving inter-municipal coordination:** The home-rule structure of governance has limited inter-municipal planning for transportation, water management, and flood control.

**Extensive brownfields:** Connecticut's industrial history along rivers and the coastline left a legacy of contaminated properties. These contaminants can be quickly mobilized during floods or more gradually as water tables rise and shorelines erode.

**Environmental justice concerns:** Several municipalities with unmet needs have state-defined environmental justice communities and traditionally disenfranchised groups.

#### **Exhibit D.c. Appropriate Approaches to Improve Resilience**

To protect these communities, SAFR proposes a multi-tiered approach, beginning with two pilot projects in Union Station Neighborhood and South End East that will pave the way for an expanded regional planning initiative, *CT Connections Coastal Resilience Plan*. Together, these projects will illustrate innovative approaches to improve disaster recovery and resilience in the Union Station Neighborhood and South End East target areas, as well as the larger New Haven and Fairfield Counties region. These projects then serve as the first steps and lessons learned to form the foundation of an

(CDBG-NDR ineligible) expanded state-wide strategy. To advance this multi-tiered approach, SAFR's mission is grounded in the tenets of *Resilient TOD and Resilient Corridors*, which are described in more detail in Exhibit E, Soundness of Approach, ExhibitESoundnessofApproach.

**Resilient TOD:** Transit-oriented development (TOD) is a physical development influenced by, and oriented to, transit. TOD is inherently resilient; concentrated around transit, TOD allows for easier service and interaction with mass transit use, resulting in energy and land efficient development.

Resilient TOD provides an opportunity to increase economic resilience by tying back to the regional transportation network and regional economic opportunities.

**Resilient Corridors:** Resilient corridors are protected corridors that provide connections between resilient TOD areas, shorefront communities, and critical infrastructure to strengthen economic resilience while adapting to future flooding. These corridors will set new development datum for the future growth of communities that will rise up out of the floodplain and continue to thrive under sea level rise conditions.

**(a) Pilot Projects, Union Station Neighborhood & South End East target areas**

The State of Connecticut proposes two pilot projects as the optimal choice to improve disaster recovery and resilience in the Union Station Neighborhood and South End East target areas. As described in detail below (Exhibit E.a.1), the projects implement **resilient TOD** and **resilient corridors** to strengthen connections between transportation and local communities as a means to reduce future flood risk, promote social cohesion, and revitalize the community. The pilot projects include physical interventions including street raising, berms, and living shorelines, as well as begin to address and pilot new policies and practices including innovative stormwater management practices, building guideline feasibility studies, and integration of green street measures with existing complete street guides. The pilot projects represent interventions, lessons learned, and metrics that can be replicated through the region, but which individually contribute to the resiliency of the larger region as well.

**(b) Regional Initiative, *CT Connections Coastal Resilience Plan***

The regional initiative will expand the process undertaken during the NDRC application process, and build on the pilot projects to address the recovery, revitalization, and resiliency needs. Our regional initiative, the *CT Connections Coastal Resilience Plan*, will help organize, develop, and implement short and long-term resilience plans in 13 municipalities. The planning effort will allow each municipality to establish local advisory committees to shepherd the plan, identify all “shocks” and “stresses” impacting the community, and develop strategies that will solve for economic, social, and environmental challenges. These plans will “network” across the region to coordinate resiliency measures between communities, build off lessons learned from, and develop actionable projects that can be implemented using the funds dedicated in the State to support resilience actions.

**(c) Long-Term Statewide Initiative**

The pilot project and regional plan serves as the foundation for a Long-Term Statewide Initiative led by SAFR. Using the lessons learned from the pilot projects and regional plan, SAFR will modify existing, and create new, policies, plans, and programs to advance resiliency throughout the state as a whole.