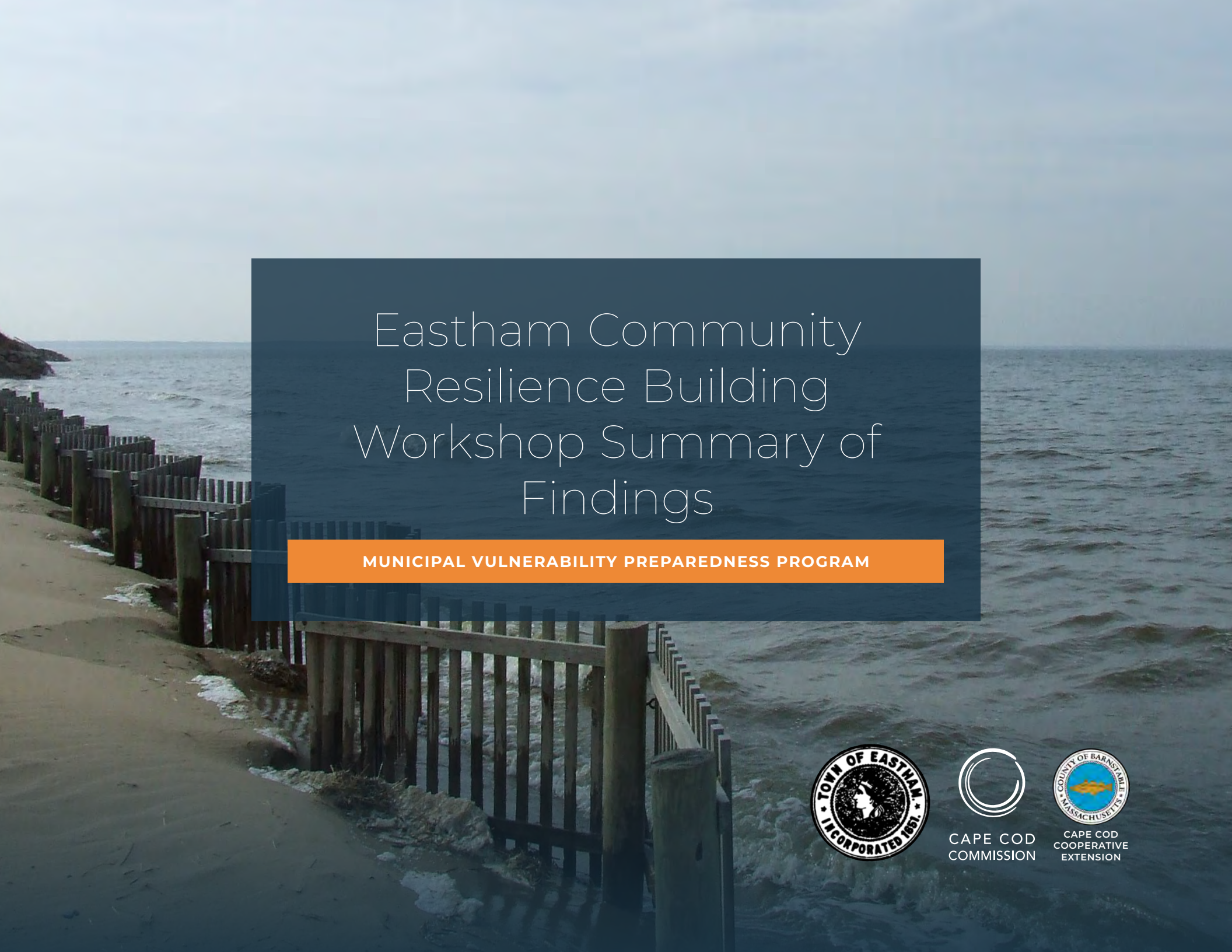

Eastham Community Resilience Building Workshop Summary of Findings

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

TOWN OF EASTHAM INCORPORATED 1651

CAPE COD COMMISSION

COUNTY OF BARNSTABLE MASSACHUSETTS

CAPE COD COOPERATIVE EXTENSION

ACKNOWLEDGEMENTS

Special thanks to the Town of Eastham for their willingness to embrace this process and provide the facilities and refreshments for the workshop, and to the participants for their invaluable input about the community.

This project was made possible through funding by the Municipal Vulnerability Preparedness Program from the Massachusetts Executive Office of Energy and Environmental Affairs.

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Introduction and Overview

The need for municipalities, regional planning organizations, states, and federal agencies to increase resilience and adapt to extreme weather events and climate change is evident, particularly in coastal communities. Cape Cod has already begun to experience effects of climate change and associated natural hazards, including sea level rise and extreme weather events. The strong nor'easters of 2018 unleashed a new sense of urgency to act. Massachusetts Governor Baker's Executive Order 569 aims to provide communities with technical support, climate change data, and planning tools to identify natural hazards and develop strategies to improve resilience. This resulted in the Massachusetts Municipal Vulnerability Preparedness (MVP) program, which provides communities with funding to identify vulnerabilities and develop plans to specifically increase resilience to climate change.

The Town of Eastham recognized the need to update its hazard mitigation plan and to align that effort with a plan to increase the community's resilience to climate change. As a coastal community bordered to the east by the Atlantic Ocean, and to the west by Cape Cod Bay, Eastham has a long history of dealing with the impacts of a dynamic coastal environment. These impacts will continue to be exacerbated by the effects of climate change. With 37.4 miles of tidal shoreline and natural resource areas, Eastham is highly susceptible to climate change and natural hazards such as coastal flooding, storm surge and erosion. As a tourist destination, the economy is highly seasonal. The year-round resident population is 4,956 and the seasonal population is conservatively estimated at 22,000. This huge fluctuation in population creates challenges for the community's emergency response staff. It also poses challenges to the Town's long-range planning efforts as the Town must maximize its relatively small staff and financial resources to compensate for the influx of its large seasonal population. The seasonal challenges

combined with Eastham's coastal geography reinforce the importance of planning for climate change adaption.

The Town is committed to taking a comprehensive approach to its planning efforts. A core component of the assigned duties of both the Town Planner and Conservation Agent is to oversee hazard mitigation planning and related efforts. With a $25,000 grant from the Massachusetts Executive Office of Energy and Environmental Affairs MVP Program, the Town of Eastham contracted with staff from the Cape Cod Commission and Woods Hole Sea Grant & Cape Cod Cooperative Extension, certified MVP providers, to conduct the Community Resilience Building workshop.

With the Town Planner as the lead, the Town established a Core Team to help prepare for and conduct the workshop. In addition to the Town Planner, the Core Team included representatives from the Eastham Department of Public Works, Police and Fire Departments, Council on Aging, Building Inspector, School Department and Health Department. For a complete list of Eastham Core Team members, see Project Team Members on pg. 17. The project team held a kickoff meeting with the Core Team in November to review the project scope and discuss ways to engage stakeholders to participate in the workshop. This early meeting with the Core Team helped to identify a broad range of interests to invite to the workshop.

After the kickoff meeting with the Core Team, the Eastham Town Planner met with the project team in December 2018 to discuss resource mapping, format, and timeframe for the workshop. At this meeting, the project team reviewed a draft storymap with the Town Planner that could be distributed to stakeholders prior to the workshop to help educate stakeholders about the purpose of the MVP planning effort, provide resource maps and data on climate change, and to help identify critical facilities in the community.

Several weeks before the workshop the Town sought community members/stakeholder participation through invitations to local board and committee members. The Town Planner also created a web page on the Town website with information about the workshop, including a public invitation to participate. To help prepare and inform community members about the workshop, the website provided a story map (produced by the Cape Cod Commission) with a data viewer that allowed users to review maps and data related to climate change and natural hazards. The Town Planner sent a brief survey to workshop participants before the workshop to understand their interest in/ knowledge of climate change effects.

The goal of the workshop was to engage community stakeholders to facilitate the education, planning and ultimately, implementation of priority adaptation actions.

The Workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

The workshop was conducted in accordance with CRB guidance and held on January 7 and January 8, 2019 in two four-hour sessions. In addition to the Core Team and project team members, approximately 25 stakeholder/community members participated in the workshops, including Town elected officials and board members, Town department staff including public works, planning, and board of health, public safety officials, school department, local organizations such as the council on aging, community development, local business owners and residents of the Town. Workshop participants were assigned to small diversified teams for the duration of the workshop.

This report provides a summary of the concerns, ideas, and priorities shared by these participants during Eastham's two-day CRB workshop. The summary of findings described in this report, including those that concern the evolving nature of risk assessment and associated action, are compiled from comments, corrections, and updates from workshop participants and Core Team members.

Hazards, Concerns, and Strengths

TOP HAZARDS AND VULNERABLE AREAS

On the first day of the workshop, participants learned about and discussed eight locally relevant climate hazards:

- Coastal erosion
- Flooding
- High winds
- Hurricanes
- Nor'easters
- Sea level rise
- Severe winter weather
- Thunderstorms

Greg Berman, Coastal Processes Specialist with the Woods Hole Sea Grant & Cape Cod Cooperative Extension, gave a PowerPoint presentation on top vulnerabilities/ hazards identified by the State, regional vulnerabilities/hazards, and climate change projections in Massachusetts with data from the Climate Change Clearing House for the Commonwealth (www.resilientma.org). (See Appendix).

The first day of the workshop focused on identifying top hazards, vulnerabilities, and strengths. The second day of the workshop focused on prioritizing actions. Workshop participants were directed to sit at any one of four tables (A, B, C, or D) and were joined by a project team member, acting as facilitator, and a Core Team member acting as scribe. Basemaps with critical town information such as infrastructure (e.g., stormwater pipes, hydrants, firefighting cistern locations, etc.), floodplains, public water supply areas, and conservation land were placed at each table (see Appendix). Each table worked on its own risk matrix through facilitated "small team" exercises and later worked together as a large team with all stakeholders to consolidate information (See Appendix for completed risk matrices). The combination of the Risk Matrix and the basemap provided decision-support and risk visualization to enable stakeholders to identify the community's strengths and

vulnerabilities and prioritize actions to reinforce strengths or mitigate vulnerabilities. The process resulted in informed input, shared experiences, and dialogue among stakeholders.

Using the basemaps and storymap resources as a guide, each small team engaged in a facilitated discussion to identify what it considered to be the top four hazards that pose the greatest current and future threats to Eastham. To help each group determine the priority hazards, facilitators asked participants to consider where, how often, and in what ways hazards have impacted the community; what hazards are impacting the community currently; what effects will these hazards have in the future; what is exposed to hazards and climate threats; what have been the impacts to municipal operations and budgets, planning and mitigation efforts; and other concerns/considerations related to impacts. Each team identified infrastructural, societal, and environmental community vulnerabilities and strengths.

Small teams discussed whether top hazards should be identified as those with the most impact, such as a hurricane, one that occurs more frequently such as flooding or high winds, hazards that the town was least prepared for or would impact the town's budget and/or impact the most people. Stakeholders also felt that there was significant overlap among the top hazards, such as high winds and hurricanes, or nor'easters and winter weather. Stakeholder discussion was focused primarily on current hazards; while sea level rise was identified as a top priority hazard by two of the four small teams, there was less consensus about this being a top hazard for the community.

TOP HAZARDS

Based on the results of the small team exercise, workshop participants identified the following as the top/priority hazards:

- Flooding
- Coastal erosion
- High winds
- Hurricanes
- Sea level rise

Flooding was identified as the hazard having the greatest direct impact on the Town of Eastham both currently and in the recent past, particularly the impact of flooding on regional and local roadways. As a community that depends greatly upon transportation access on U.S. Route 6, access to/from the community is severely impacted by flooding of this roadway as well as other routes such as Bridge Road which serve as a bypass in times of heavy seasonal traffic.

Coastal erosion was another top priority hazard as it impacts bayside beaches, parking lots that serve these beaches, and numerous private properties. Maintaining access to local beaches presents both natural resources and economic concerns for the community.

High winds and severe storms such as nor'easters and hurricanes were also identified as a major concern for the community as these events result in power

outages, downed tree limbs and place a strain on public safety resources and personnel.

AREAS OF CONCERN

Areas of concern identified during the workshop were grouped into the following categories:

TRANSPORTATION

Bridge Road by Boat Meadow and Herring River and Eastham/Orleans rotary; other low-lying roads such as Ellis Road – Town Cove area, South Sunken Meadow Road; Herring Brook Road herring run and Salt Pond culvert; Dyer Prince Road, and private roads.

OTHER INFRASTRUCTURE

New public water system that lacks sufficient human infrastructure in the event of an emergency; above-ground electrical and other utilities are vulnerable to damage/outage from storms/high winds; concern about singular service provider and lack of cell service in the event of a severe storm; tree trimming on private roads

PUBLIC AMENITIES/FACILITIES

Town beach parking lots - concerns about loss of parking facilities due to erosion; Bayside beaches – Thumpertown, First Encounter beach; maintenance of eroded beaches, parking lots is cost to town; Nauset Regional High School, Council on Aging – facility serves multiple functions/needs for the community; Town library – currently used as a warming shelter; need to ensure maintenance to facility; lack of local supermarket and reliance on small businesses to supply food during an emergency

ECOSYSTEMS

Wetlands in multiple locations, Mary Chase area, Nauset Marsh, Floodplains in multiple locations, Herring run off Herring Brook Road. Lack of regulations preventing development in flood zones, and areas for marsh migration needed; coastal dunes and banks with bayside erosion; Boat Meadow/Herring River marsh; development in floodplains; Nauset spit; concerns over how to undevelop or limit development to allow for natural migration of dunes; maintenance dredging is a cost to town

NEIGHBORHOODS

Bayside coastal development is vulnerable to erosion; senior population town-wide lack of access to communication, seasonal property owners lack of contact information for emergency notification

CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS AND CLIMATE CHANGE

The town of Eastham has experienced challenges during recent coastal storms. Hurricane Sandy (2012) and a series of winter storms in 2013 caused significant erosion of along the Atlantic Ocean shoreline. Large portions of the coast lost more than 5 vertical

feet of beach elevation; however, much of this beach elevation was soon redeposited, and most if it regained a few months later due to the uninterrupted flow of sediment in this area. Coastal bank erosion permanently removed sections of upland property; however, this provided the material for the dune and beach recovery. Flooding of the Cape Cod Bay shoreline also occurred during these events, as well as during the winter storms of 2018. The winter storm of January 4/5th, 2018 is the new record-breaking water level (Boston Tide Gauge), having exceeded the previous record (Winter storm of 1978) by 2 inches. The tide gauge record shows about 4.5 inches of sea level rise during the time between these two storms, meaning that the only reason 2018 was a record-breaking event was due to climate change. Another anomaly was the series of winter storms in early March 2018. The storm surge was 1-2' for over a week, which weakened many coastal resource areas and resulted in significant erosion. There are concerns that both long-duration and high water-level storms will be the "new normal".

The primary climate and natural hazards identified by the participants included winter storms and flooding. Nor'easters have impacted Eastham for many years, but storm frequency and intensity in recent years have increased. In addition to Nor'easters, several participants noted concern about hurricanes, which can have different impacts than a Nor'easter. Participants identified areas where flooding impacts local roadways, and expressed concern about anticipated flooding along Route 6, the major north/south highway. Participants also expressed concern about impacts from downed utility lines, communication lines and downed trees and limbs across roadways, hampering access/egress and communication during storm events. Erosion was also a concern, though there were fewer specific examples of erosion impacts than there were of flooding and winter storm damage. Looking forward, participants also recognized the threat of sea level rise as something their community will need to contend with.

SPECIFIC CATEGORIES OF CONCERNS AND CHALLENGES

LOW-LYING INFRASTRUCTURE (TRANSPORTATION)

Flooding along Bridge Road and Eastham/Orleans rotary limits access to emergency medical facilities and results in lack of egress options during flooding with limited evacuation transportation routes. These areas are critical points of access to medical facilities for Eastham and the rest of the Outer Cape (including Wellfleet, Truro, and Provincetown) in addition to Eastham. If the rotary is impassable, evacuation and emergency access is cut off. Additionally, there are several local roads that experience flooding, including but not limited to Bridge Road, which serves as the secondary egress route out of Eastham, Dyer Prince Road, and Samoset Road.

ISOLATION AND EMERGENCY ACCESS (NEIGHBORHOODS AND PUBLIC AMENITIES/FACILITIES)

Route 6 is the main thoroughfare through and within Eastham. It provides access to most neighborhoods, with limited other access points or routes. Many of the local roads in Eastham are private roads, which can be difficult to access due to narrower road widths and a lack of signage. Strong storms could cause fallen trees or flooding that could restrict or completely block access to these areas, isolating residents from emergency services.

Eastham does not have a local supermarket of sufficient size to provide adequate food supplies in the event of an emergency or prolonged power outage. Larger supermarkets are located in Provincetown and Orleans, which are accessible only via Route 6.

As with all Cape Cod communities, Eastham has a significant senior population. Many of these seniors may have difficulty moving around during intense weather and may be confined to a home with limited food, water, medical supplies, and heating and cooling during significant weather events. Eastham does have a system of checking in on certain seniors who have opted into their program, but it is unlikely that all seniors are on this list. With limited mobility, there may be several isolated individuals who need assistance and access to medications or other medical supplies that need assistance from the town during an emergency.

STAFFING RESOURCES

The Town of Eastham has a new public water system but does not have a water department. The town works with a contractor that responds to main breaks or other system needs. Participants identified this as a weakness as in times of emergency or severe weather, as it may be difficult or there could be delays in response times. Furthermore, if access points are flooded, the contractor may not be able to reach the town at all.

TELECOMMUNICATIONS/ UTILITIES

Eastham is primarily reliant on above ground utilities, which can become incapacitated with storms. Without power, residents may lose access to heat, food may spoil, and without telecommunications, it can be difficult to know if a household is okay or in need of help.

CURRENT STRENGTHS AND ASSETS

Workshop participants were aware of the community's strengths and how they relate to its vulnerabilities. It was a clear priority that these strengths be reinforced and expanded to increase preparedness and resiliency in the community.

EMERGENCY SERVICES

The Town of Eastham maintains a regional shelter at the Nauset Regional High School that functions as a shelter during emergencies, as well as warming stations at the Town library and other Town buildings.

The shelter is equipped to accommodate displaced residents in the event of extended power outages, though it is in need of some updates.

The Town operates a CodeRED system that is an alert system that enables town officials to send out notifications of emergencies to all users who have signed up for the service. This is an effective means of communication but is limited by the fact that only those who have signed up will get the notifications.

COMMUNITY

Eastham has an active citizenry committed to their community. There is an active Council on Aging, neighborhood watch programs, and other programs coordinated by the police and fire departments. The residents are educated, engaged and contribute their skills and knowledge to the community. There are also many strong local commercial establishments that support the community.

NATURAL ASSETS

The natural environment and assets are a key draw to residents and visitors in Eastham. Participants noted that the town's marshes are community strengths, as they help absorb floodwaters and potentially sea level rise. Fishing and shellfishing, as well as water-based recreation and tourism, are also community assets, though it was noted that these are potentially vulnerable to impacts from climate change and severe storms.

Recommendations and Next Steps

TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

In small groups, workshop participants developed recommended actions based on identified vulnerabilities. On the second day of the workshop, participants returned to the small teams they had been assigned to on day one to complete the following:

1. Generate potential actions to reduce vulnerabilities and reinforce the strengths identified during day 1 of the workshop;

2. Consider whether the actions address more than one top hazard, are intermediate steps, or strengthen existing initiatives;

3. Prioritize actions and differentiate them as short-term, long-term, and ongoing; and

4. Identify their top three recommendations to improve resilience to the top hazards in Eastham.

Recommended actions were then discussed as a large group to obtain consensus on the most important recommendations to benefit the community. Considerable overlap existed among the small groups. The top recommendations that follow represent a consensus among participants, organized by priority.

1. Improve the resilience of Route 6/Bridge Road to flooding

Workshop participants agreed that Bridge Road and Route 6/rotary flooding presents a significant transportation impediment. While raising the road appears to be a solution, the group felt that the town needs to conduct a feasibility study to understand potential impacts, costs, and other considerations of elevating the road as well as identifying other alternatives for mitigating the flooding.

2. Create a task force responsible for public education on local emergency preparedness

Workshop participants discussed concerns about being unprepared for hazard events, particularly emergency planning. With seasonal residents (a significant portion of Eastham's population) residing elsewhere during part of the year, many are unaware of the increases in storms and their impacts and are disconnected from community discourse. In addition, many residents – year-round as well as seasonal – do not know about the regional shelter at the high school and how to respond in case of an evacuation order. Many residents will not leave their homes due to concerns about their pets. A task force comprised of public safety officials and neighborhood representatives could develop educational materials about emergency planning and also explore additional/alternative shelter options to accommodate people and their pets. This effort would include a survey of existing warming/shelter capacity and emergency generator locations for small businesses and critical facilities.

3. Evaluate the needs/upgrades/ improvements to shelters and warming stations

Workshop participants agreed that Memoranda of Understanding with local businesses should be pursued with local grocery and pharmacies to ensure that these local businesses remain open in the event of power outages during storm events. In addition, the Town should evaluate the need for more back-up shelters centrally located (such as at the elementary school).

4. Develop conservation commission regulations that address Lands Subject to Coastal Storm Flowage (LSCSF)

Both the Massachusetts Wetlands Protection Act and the Eastham Conservation Commission regulations lack performance standards for Lands Subject to Coastal Storm Flowage, a coastal resource area within the flood zone. Standards are needed to preserve the characteristics of the landforms of the floodplain (e.g. slope, vegetative cover, permeability etc.) to protect the interests of storm damage prevention and flood control. With rising sea level, stronger storms, and continuing development pressure in these areas, the town needs to adopt standards as soon as possible.

5. Develop a Memorandum of Understanding with the water system operator for maintenance/repair (during storm events)

While the town has acquired a public water system, it does not operate it internally – it is operated by a contractor located outside of Eastham. During emergencies, the contractor would need to come to Eastham to address any problems. Having an MOU with the contractor to pre-position someone to address any break, emergency shutoff, or other issues during an event would help the town avert further problems during a disaster.

6. Develop a tree trimming program town-wide and/ or undergrounding utilities program

A regular tree trimming program will help reduce power outages during storm events by eliminating the risk of falling tree branches taking out power lines, as well as ensuring that access along roadways is maintained in the event of storms and emergencies. The town could improve coordination with Eversource, which already conducts regular tree trimming.

Additional recommendations included the following:

- Evaluate alternatives for inland beach parking
- Conduct tree inventory for local/private roads
- Evaluate septic systems in flood areas
- Offer free cellphones for elderly residents
- Development of medical facility for Outer Cape
- Research tidal flooding at herring run and potential solutions
- Develop seasonal property owner contact information
- Maintain/upgrade DPW gas pumps/generator
- Limit low-lying development/ redevelopment
- Acquire hurricane moorings for fishing/shellfishing fleet
- Underground utility lines
- Upgrade stormwater infrastructure
- Pursue culvert/stormwater upgrades at Salt Pond

CONCLUSION AND NEXT STEPS

The Town of Eastham will continue the MVP certification process by presenting and distributing this report to the public at a formal public information and listening session scheduled for May 29, 2019. This session will provide an opportunity for any member of the interested public to learn about the MVP process and provide feedback about the MVP workshop and recommended highest priority actions resulting from the workshop.

Priorities identified during the January 2019 workshop will be integrated into existing local planning efforts. The Town will consider pursuing grant funding to implement the priority actions as appropriate to continue to improve the Town's resilience to climate change.

CRB WORKSHOP PARTICIPANTS

- Dorothy Burritt
- Ellen Lariviere
- Peter Wade
- MaryLou Roberts
- Ed Schneiderhan
- Melissa Lowe Cestaro
- Deb Cohen
- Silvio Genao
- Bryan Horsley
- Thomas Thompsen
- Willow Shire
- Andrea Aldana
- Mary Shaw
- Jane Crowley
- John “Jeff” Bumby
- Kathy Bunnell
- Stephanie Ellis
- Maurice J Boisvert
- Jennifer Taylor
- Edward Kulhawik
- Randal Bol
- Susan Bol

CRB WORKSHOP PROJECT TEAM

PROJECT COORDINATOR

- Paul Lagg, Eastham Town Planner

CORE TEAM MEMBERS

- Paul Lagg, Town Planner
- Shana Brogan, Conservation Agent
- Ed Kulhawik, Police Chief
- Adam Bohannon, Deputy Police Chief
- Kent Farrenkopf, Fire Chief
- Dan Keane, Deputy Fire Chief
- Tom Wingard, Building Commissioner
- Jane Crowley, Health Agent
- Dorothy Burritt, Director, Eastham Council on Aging
- Silvio Genao, DPW Superintendent

MVP PROVIDER – CAPE COD COMMISSION

- Sharon Rooney, Chief Planner
- Heather McElroy, Natural Resources Manager
- Erin Perry, Deputy Director
- Chloe Schaefer, Community Design Planner
- Martha Hevenor, Planner II
- Anne Reynolds, GIS Director

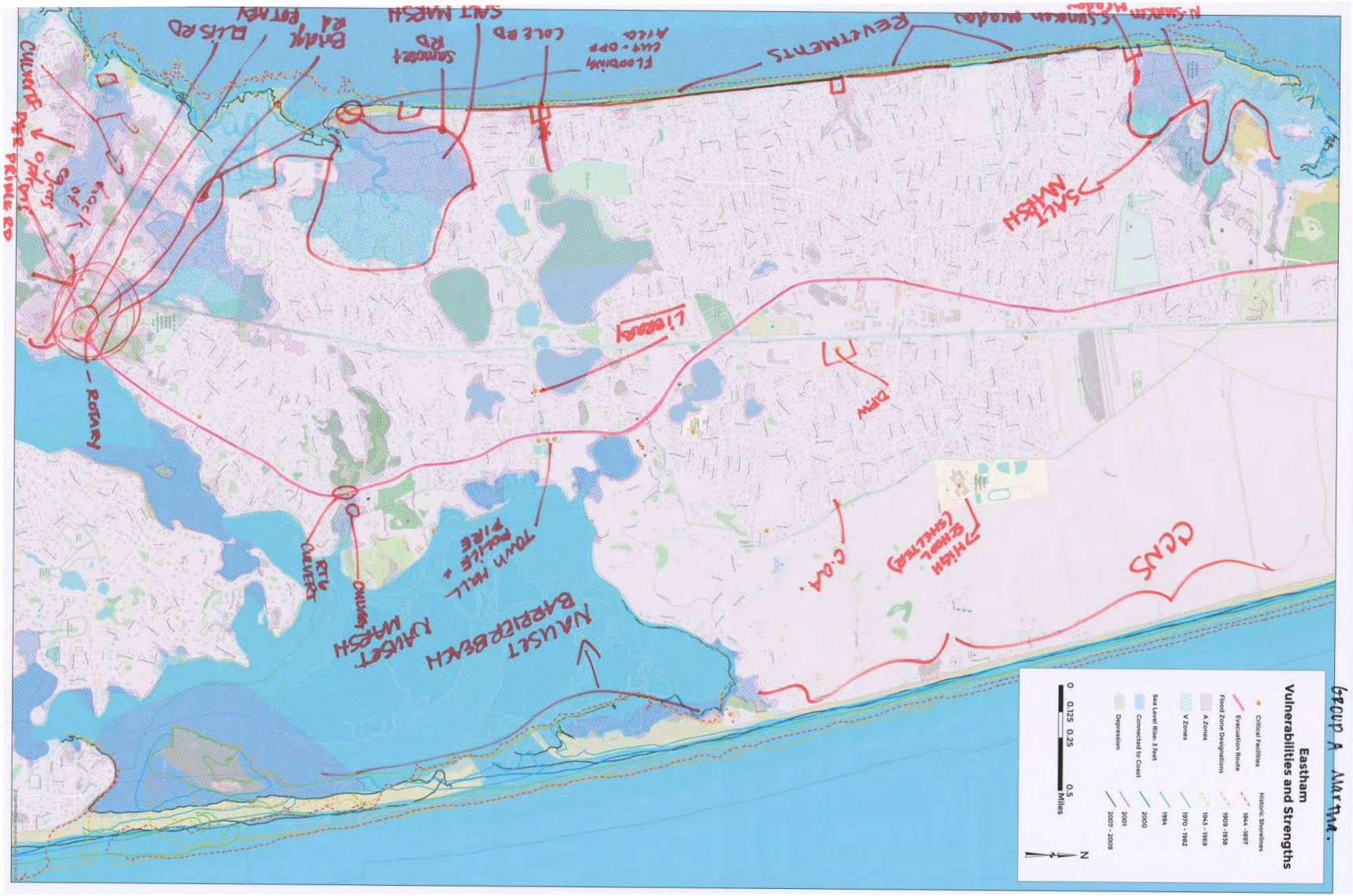
MVP PROVIDER – WOODS HOLE SEA GRANT/CAPE COD COOPERATIVE EXTENSION

- Greg Berman, Coastal Processes Specialist
- Shannon Jarbeau, Floodplain Specialist & CRS Coordinator

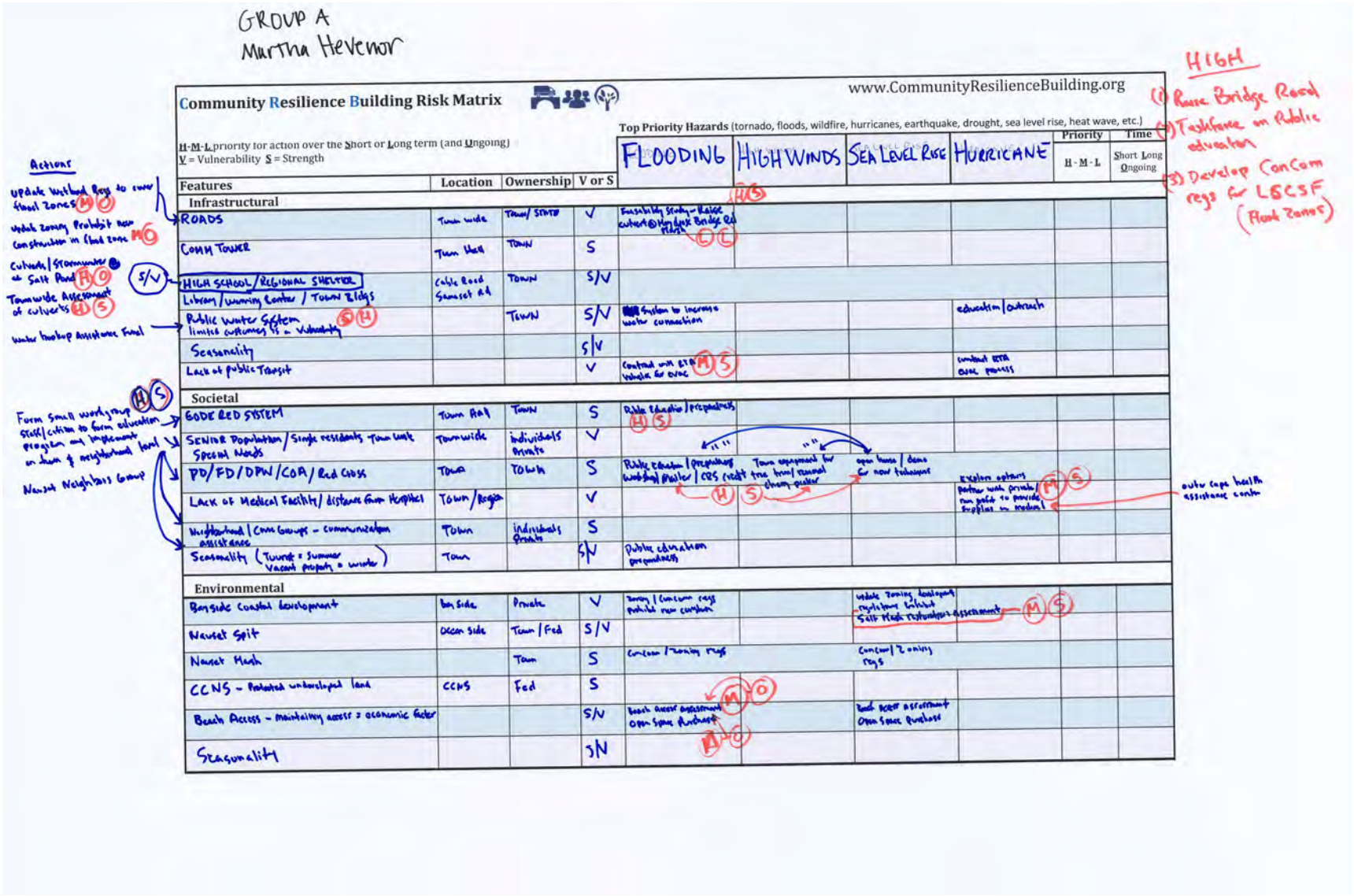
PROJECT SPONSOR

- Eastham Board of Selectmen
- Jacqueline Beebe, Town Administrator

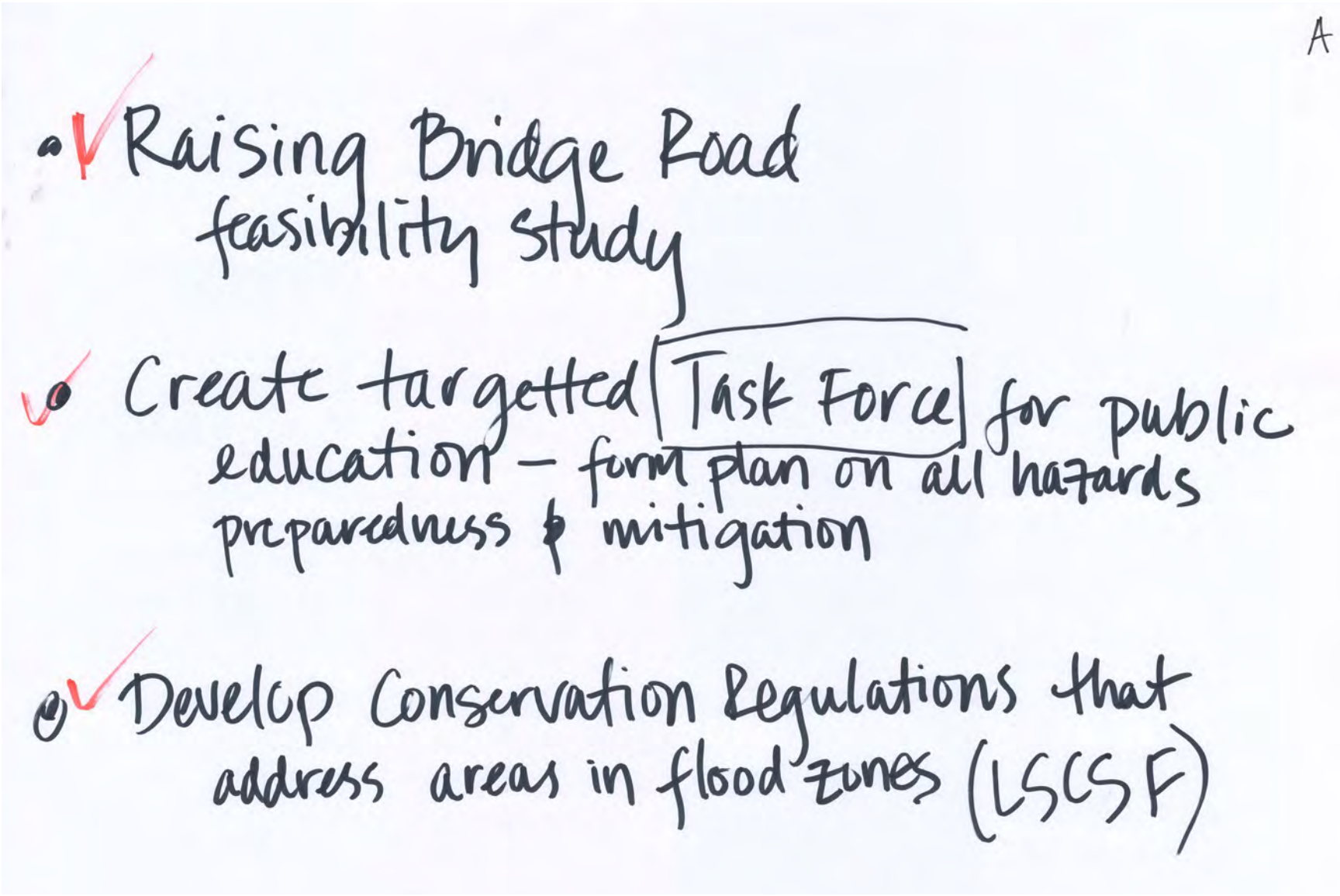
Appendix



GROUP A BASEMAP



GROUP A RISK MATRIX



GROUP A PRIORITIES

GROUP B BASEMAP

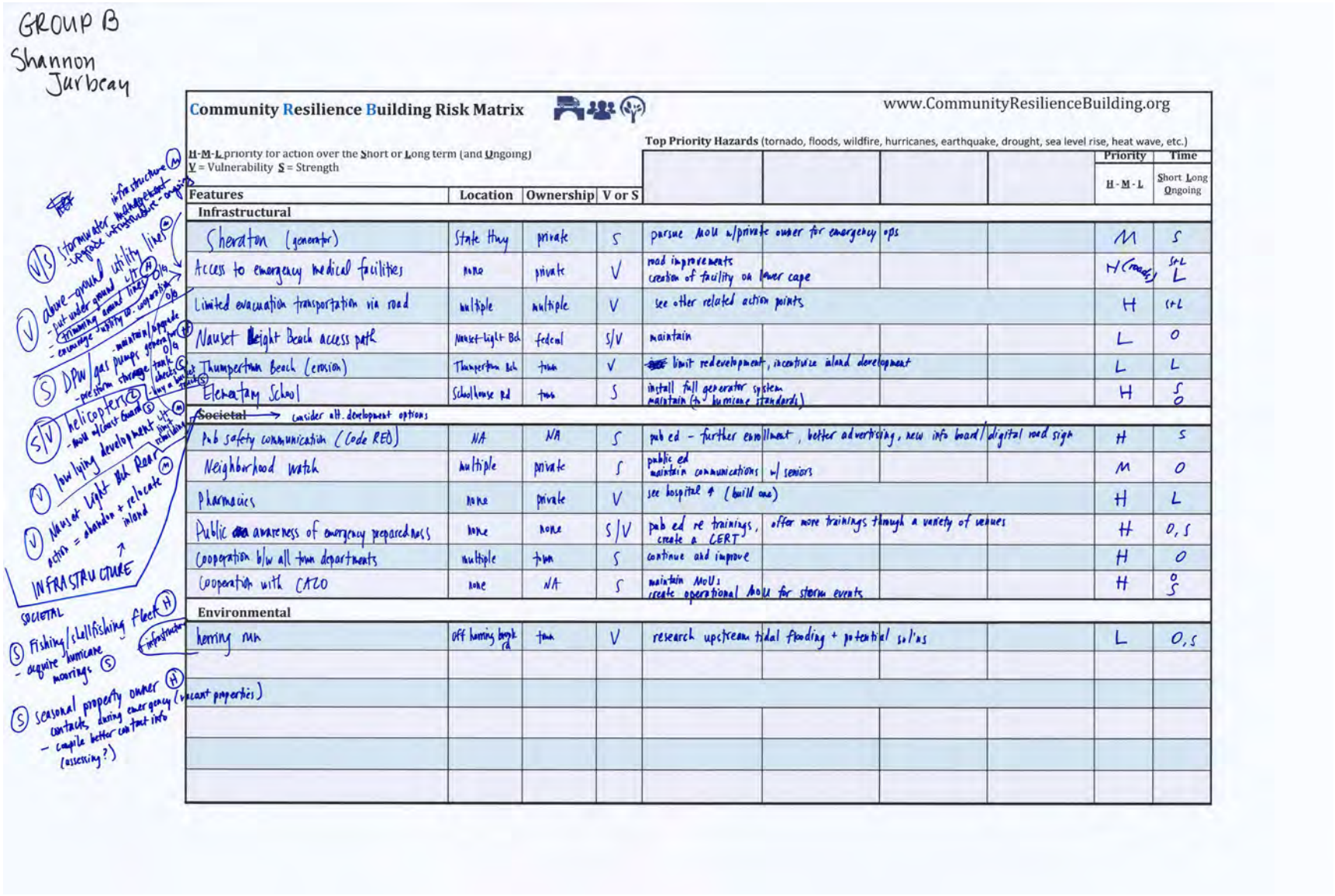
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Coastal erosion	Flooding	~~High winds~~ Hurricanes	keep Nor'easters	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Low lying roads	see map	state, local, private	V	state Hwy - elevate / barriers; other - evacuation plan	at many possible; and public education →S/T	flyover; long term retreat / abandon		H	S+L
Nauset Regional HS (shelter location)	Cable Road	regional	V/S	replace generator system	. upgrade entire facility			H	S
Library (warming location)	Samoset Rd	town	S	maintenance; public outreach				H	O
Council on Aging (emergency dispensing site)	Nauset Rd	town	S	eventual replacement built to hurricane standards				M	L?
Town Hall / Fire / PD campus ↓ "	State Hwy	town	S	New roof at Town Hall; regular maintenance	and basement windows			L	O
Municipal water system	multiple / Nauset Rd	town	S	keep operators on site during emergencies - put in contract				H	S
Societal									
Ace Hardware	State Hwy	private	S	MOU re storm protocol	stocking of store			H	S, O/G
Cumberland Farms (w/generator)	"	"	S	"	" ↓ gas			H	S, O
Superette	"	"	V	" add generator	"			H	S, O
Non-evacuees	multiple	NA	V	public education; legal agreements re non rescuability				H	O S
Public safety coordination PD / FD	State Hwy	town	S	maintain. Spread out	tactical response teams	pre-storm		H	O
Pub safety equipment	"	"	S	maintain / replace high water vehicles. More; maintain boats for shallow water ops		loaders @ DPW + bucket truck and appropriate staff		H	O, S
Environmental									
Wetlands - storm buffering, WQ	multiple	NA	S/V	provide areas for marsh; limit development.	migration. tidal; research on	restoration in Mary Chase area; floodwater constriction points		M	O
Nauset Marsh	east side	NA	V/S	pursue opportunities for migration. limit development				M-L	O
Coastal dunes (erosion) + banks	"	private, federal	V	underdevelop (incentivize ?), limit future development				L	LT
limited development in CACO (protect against high winds)	"	federal	S	continue				L	O
barrier beaches, shoaling	" + harbors many	town	V	promote natural functions; well-planned waterway maintenance + channel maintenance				L	O
flood plains	multiple	multiple	V	public ed, underdevelopment, zoning regs, WQ maintenance				L	O, L

GROUP B MATRIX 1



GROUP B
Shannon
Jurbcay

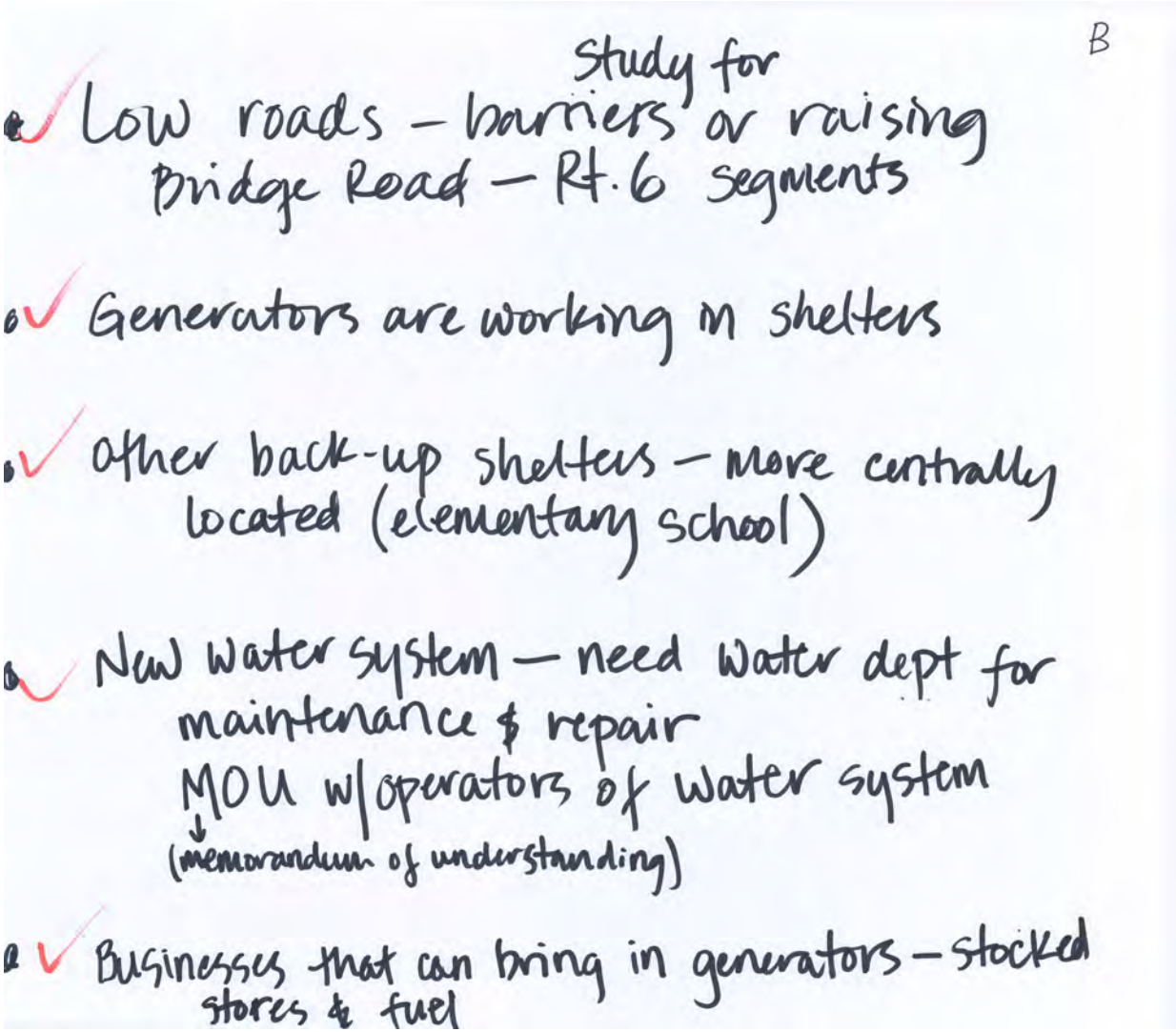
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

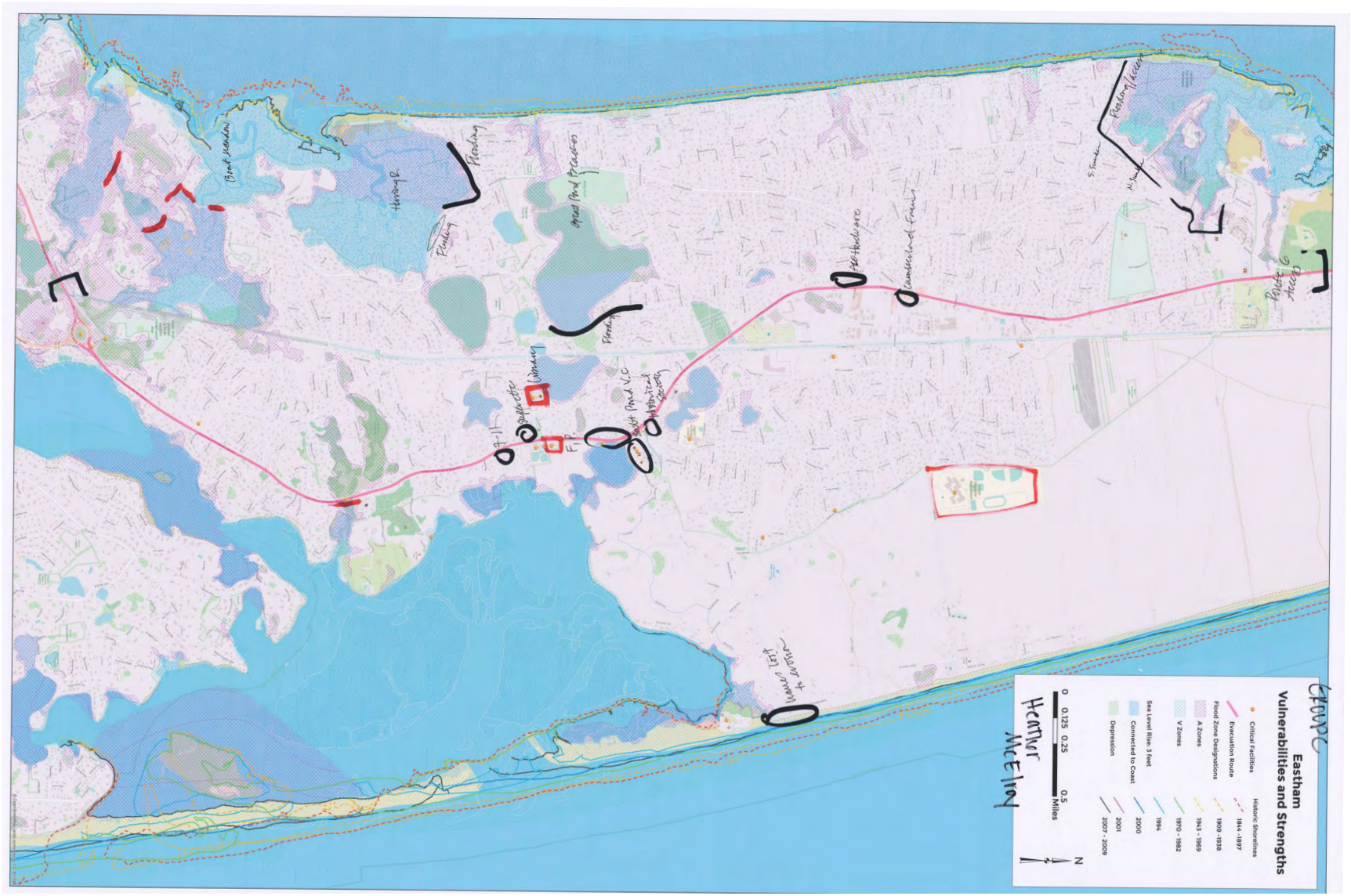
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S					Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Sheraton (generator)	State Hwy	private	S	pursue MoU w/private owner for emergency ops				M	S
Access to emergency medical facilities	none	private	V	road improvements creation of facility on lower cape				H (Creation)	S+L L
Limited evacuation transportation via road	multiple	multiple	V	see other related action points				H	S+L
Nauset Height Beach access path	Nauset Light Bch	federal	S/V	maintain				L	O
Thumpertown Beach (erosion)	Thumpertown Bch	town	V	~~use~~ limit redevelopment, incentivize inland development				L	L
Elementary School	Schoolhouse Rd	town	S	install full generator system maintain (to hurricane standards)				H	S O
~~Societal~~ → consider alt. development options									
Pub safety communication (Code RED)	NA	NA	S	pub ed - further enrollment, better advertising, new info board/digital road sign				H	S
Neighborhood watch	multiple	private	S	public ed maintain communications w/ seniors				M	O
Pharmacies	none	private	V	see hospital # (build one)				H	L
Public ~~dis~~ awareness of emergency preparedness	none	none	S/V	pub ed re trainings, create a CERT	offer more trainings through a variety of venues			H	O, S
Cooperation b/w all town departments	multiple	town	S	continue and improve				H	O
Cooperation with CATO	none	NA	S	maintain MoU; create operational MoU for storm events				H	O S
Environmental									
herring run	off herring brook rd	town	V	research upstream tidal flooding + potential sol'ns				L	O, S

GROUP B MATRIX 2



GROUP B PRIORITIES



GROUP C BASEMAP

GROUP C
Heather McELROY

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	NOR'EASTERS/ STORMS	FLOODING	SEA LEVEL RISE	COASTAL EROSION	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
ROUTE 6		STATE	V/S	FERRY/BOAT EVACUATION EVAC. [illegible]	ADVOCATE FOR RAISING ROTARY MAKING MORE RESILIENT (S) INF. DRAINAGE [H]			H	
NAUSET REGIONAL HIGH SCHOOL		REGIONAL	V/S	MAKE SHELTER UP TO DATE - GOOD GENERATOR - BIG GYM				H	S
LIBRARY		TOWN	S	LONG-TERM MAINTENANCE (S) OUTREACH TO VARIOUS AGE GROUPS (S) COORDINATION W/CHAPEL IN THE PINES (S)				H	
TELECOMMUNICATIONS / UTILITIES		PRIVATE	V/S	UNDERGROUNDING WIRES MAINTAIN VEGETATION/TREE TRIMMING				H	O
PRIVATE ROADS		PRIVATE	V	PRIVATE TREE TRIMMING (S) WIDENING/UP TO CODE (S/O) RESEARCHING POSSIBLE SOLUTIONS (EDUCATION) (S)				M	
BRIDGE RD., DRE PRINCE RD., SAMOSET, OTHER MAIN TOWN ROADS		PUBLIC	V	RAISING ROADS (PARTICULARLY BRIDGE) [H]				H	S
Societal									
CODE RED		TOWN	S	SIGNING ELDERLY UP @ VOTING PLACES, OTHERS				H	S
PART-TIME RESIDENTS		—	V						
ELDERLY POPULATION		—	V	URGENT CARE 24-HOUR				M	L
COUNCIL ON AGING		TOWN	S	BACK TO SHELTER STATUS				H	S
HIGH VALUE COASTAL/SEASONAL PROPERTIES → TAXES		PRIVATE	V/S						
LOCAL COMMERCIAL ESTABLISHMENTS SHERATON (ACE, SUPERETTE, CUMBERLAND FARMS, 7-11)		PRIVATE	S	USE SHERATON FOR SHELTER				H	S
Environmental									
ROCK HARBOR		TOWN	V/S						
LOW ELEVATION		—	V		BUY BACK EDUCATION (PART-TIME) (S) STILTS (S) EXPEDITING PERMITTING FOR RESILIENCY EFFORTS (S)			M	
BOAT MEADOW/HERRING RIVER MARSHES		TOWN	S						
VIGILANT CONSERVATION COMMISSION		TOWN	S						
BEAUTIFUL ENVIRONMENT/SURROUNDINGS		TOWN/ FEDERAL	S						
BAY/OCEAN/POND BEACHES		TOWN/ FEDERAL	S						

COASTAL EROSION + SHOALING
FLOODING
SEA LEVEL RISE
PRIVATE WELLS/STORM-RELATED FLOODING/WATER-TABLE
NOR'EASTERS → happens every year
HURRICANES → happens less frequently → design issue
FLOODING, DRAINAGE ISSUES ON STREETS
STANDARD DRAINAGE NOT SUFFICIENT
high winds → tree trimming

ENHANCED PRE-DISASTER COMMUNICATIONS. (S) (STORMS) [H]

TOWN COORDINATION W/OTHERS

SHERATON

GROUP C MATRIX 1

GROUP C
Heather
McElroy

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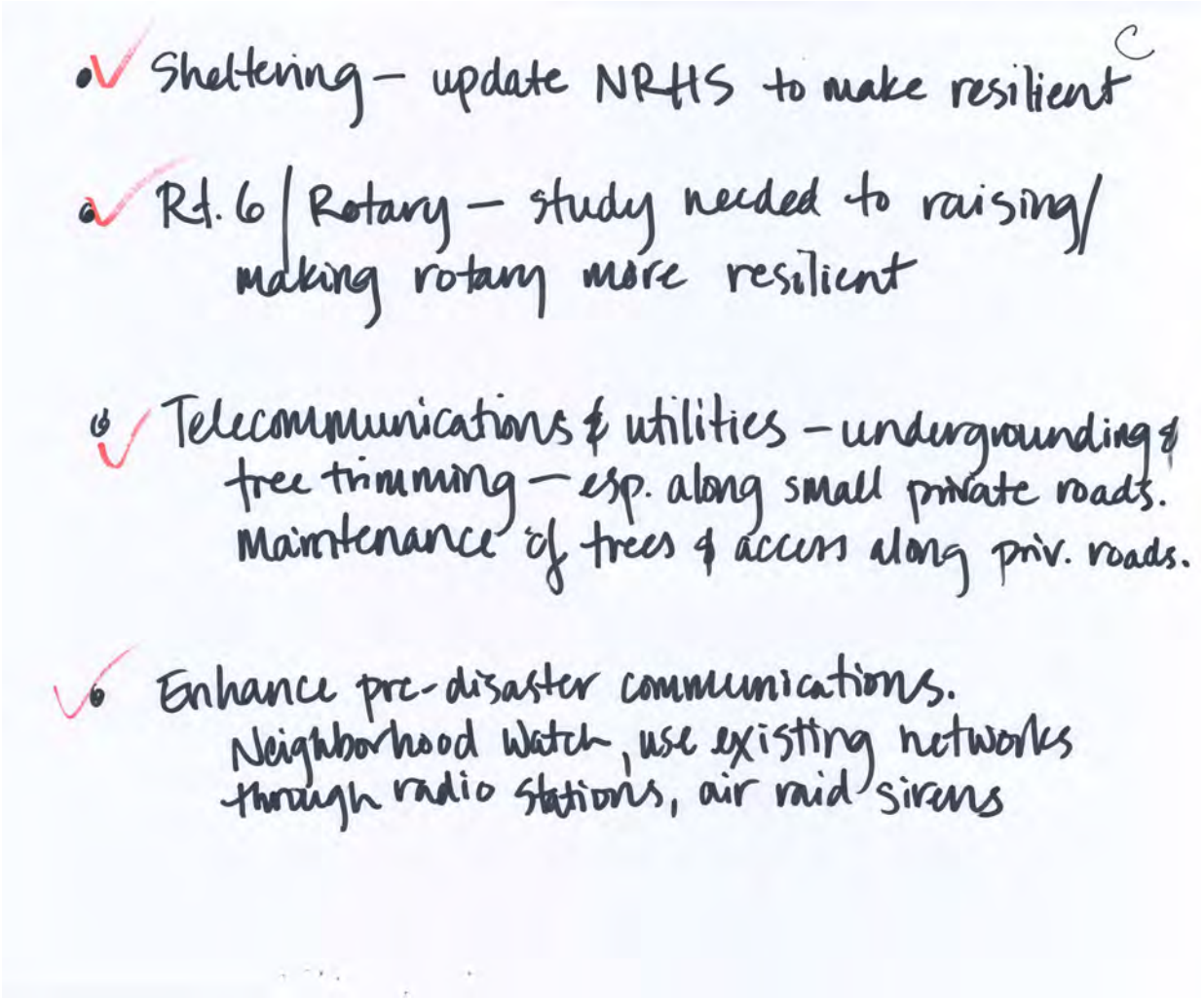
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

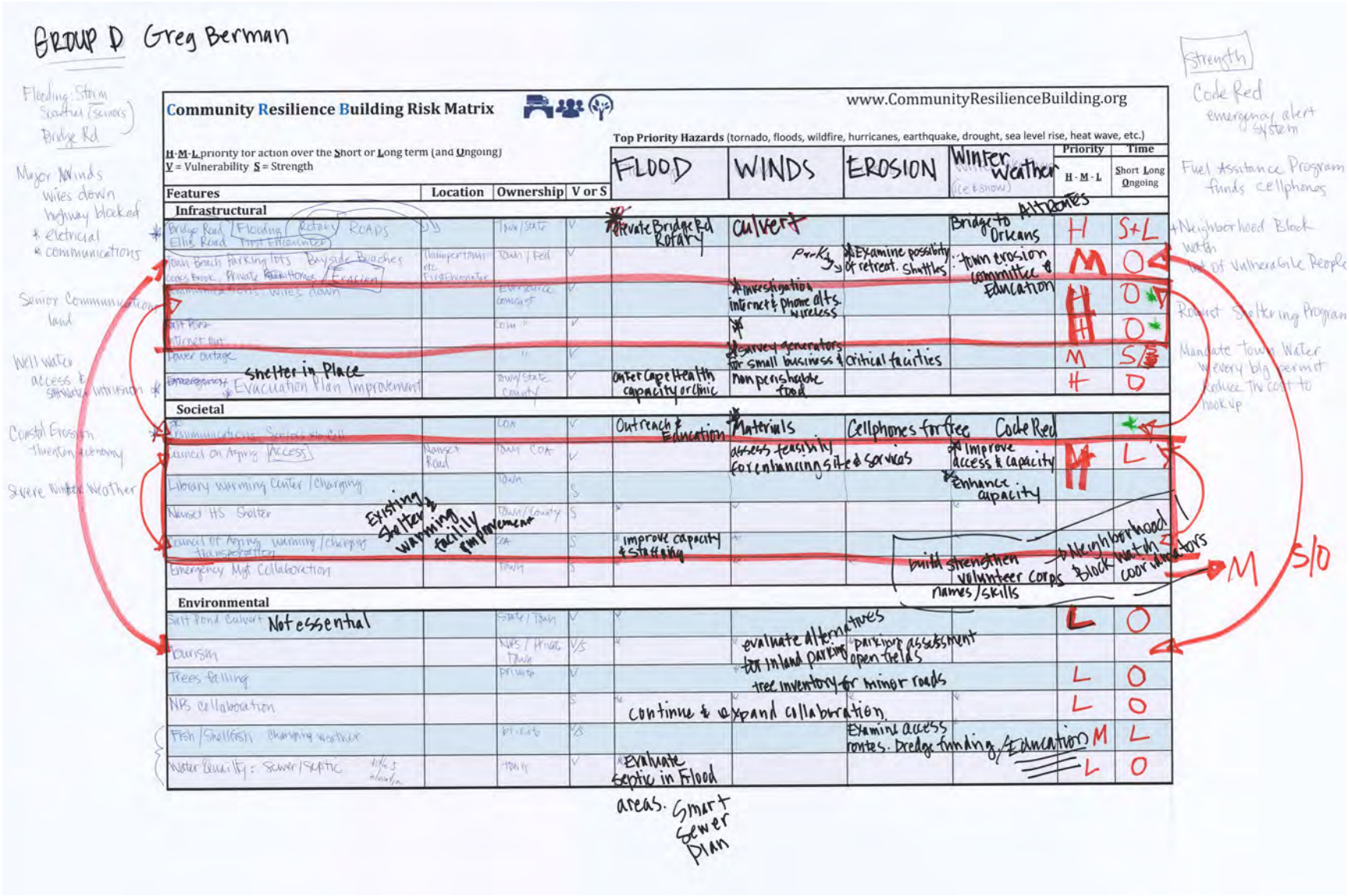
Features	Location	Ownership	V or S	STORMS	FLOODING	SEA LEVEL RISE	COASTAL EROSION	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
WASTEWATER MANAGEMENT				SEWERING / I/A				H	L
Societal									
HISTORICAL SOCIETY		TOWN	S						
LOWER CAPE TV				OUTREACH ON PREPAREDNESS				M	O
EASTHAM PD FACEBOOK PAGE				"				M	O
Environmental									
FISHING / SHELLFISHING		—	V/S	ROLE OF OYSTER REEFS				L	L
WATER RECREATION/TOURISM			V/S		DREDGING IN COORD W/ORLEANS			M	S/O
SALT POND VISITOR'S CENTER		FEDERAL	S						

GROUP C MATRIX 2



GROUP C PRIORITIES

GROUP D BASEMAP



GROUP D MATRIX 1

GROUP D Greg Berman

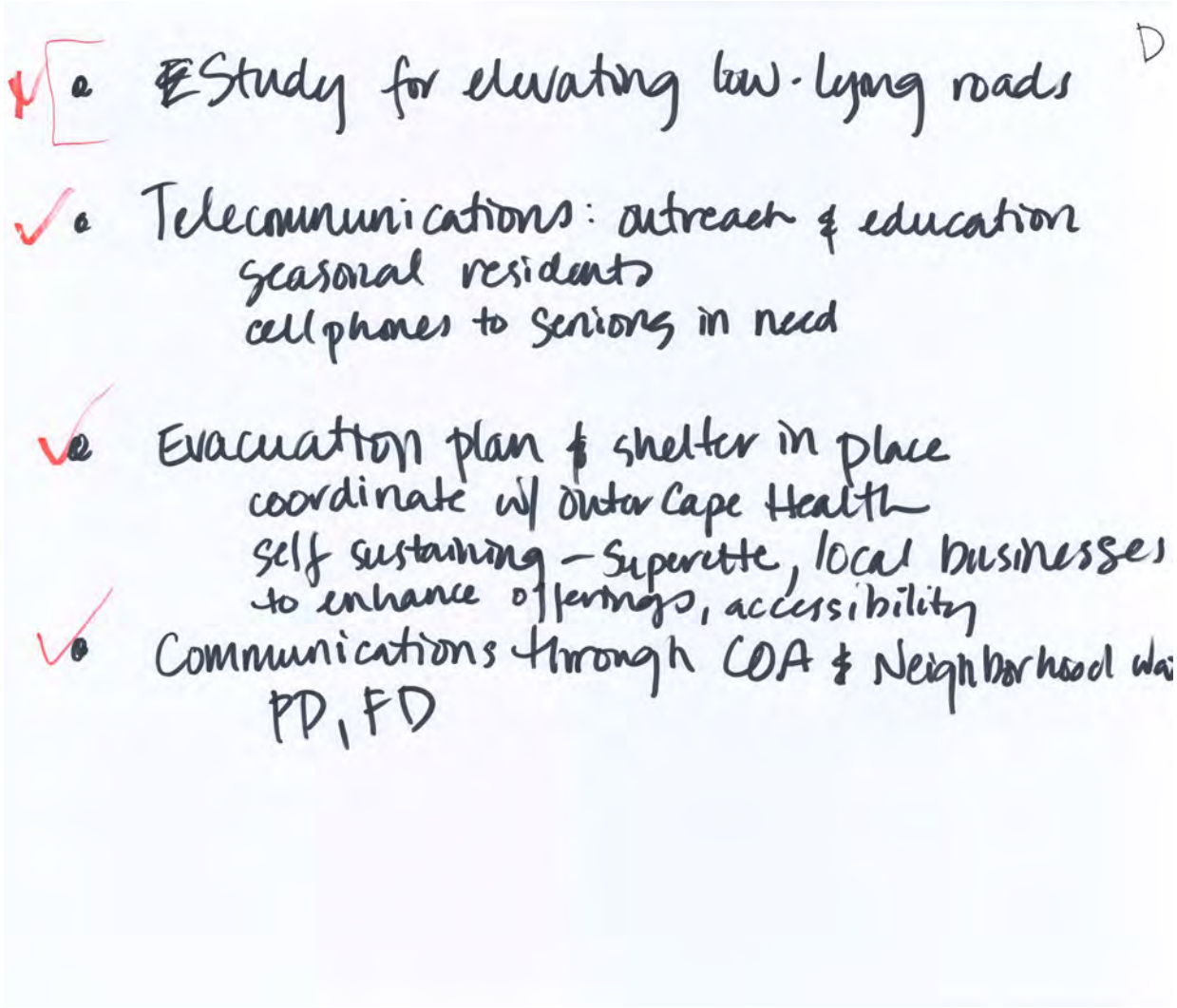
Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability S = Strength

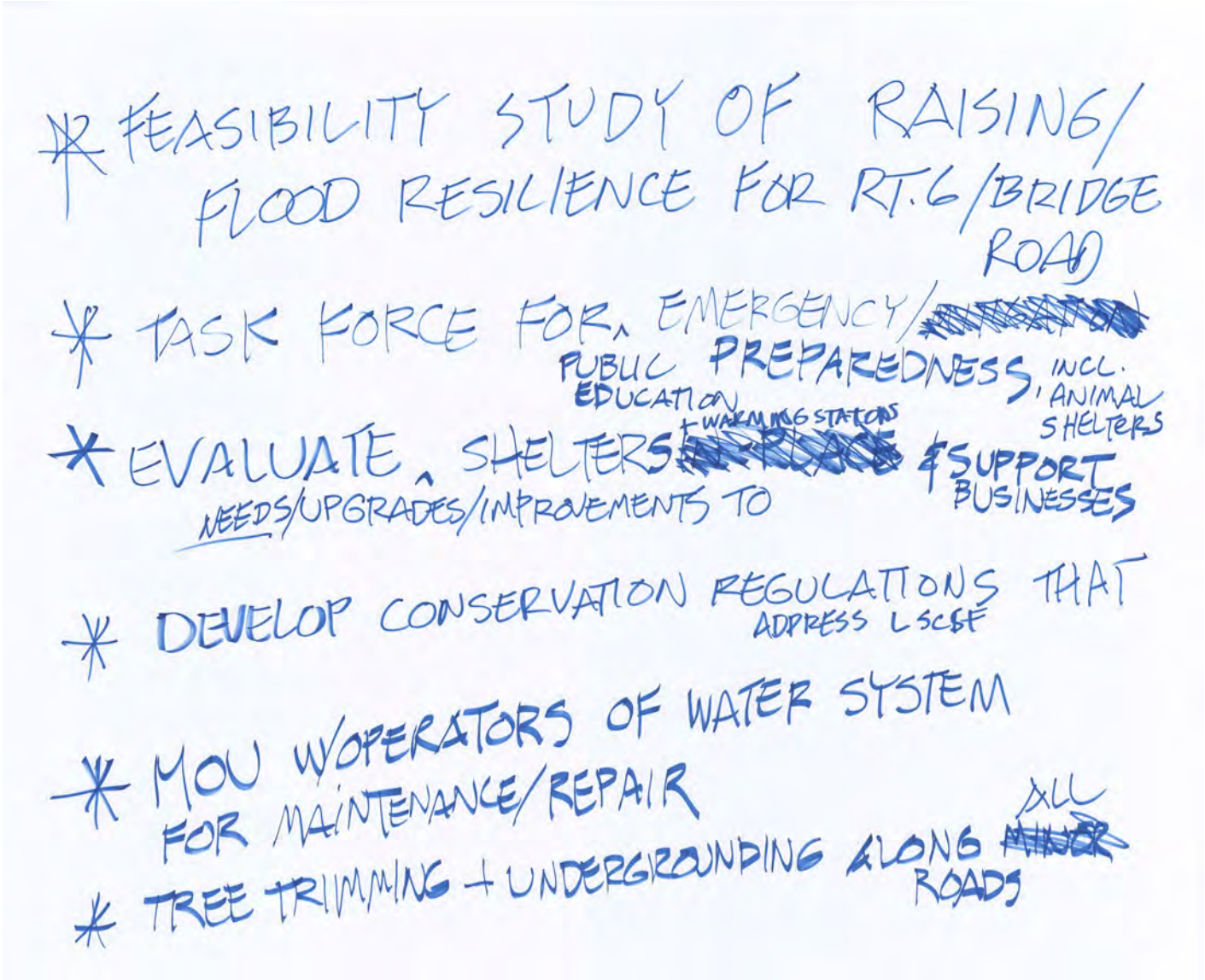
Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Flood	Winds	Erosion	Winter Weather	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Flooding Roads	Rotary, Ellis Bridge	Town / State	V	* elevate roads; evaluate sources of flooding (culverts); alternate routes (eg: Bridge)				H	
Communications lines down, lack of cellphone, singular service provider		Eversource Comcast, COA Verizon ATT Town	V	Outreach & Education ③ materials * Investigate internet & phone alternatives. Free Cell phones for coded				H	
Evacuation Plan Shelter in Place			V	* Outer Cape Health * capacity / Clinic; increase self sufficiency (eg: food)				H	
Societal									
Evacuation Plan Improvement									
Existing Sheltering & warming facility improvement				improve capacity & staffing, enhancing site & services enhance capacity - volunteers (neighborhood watch)					
Environmental									

GROUP D MATRIX 2



GROUP D PRIORITIES



ENTIRE GROUP PRIORITIES

Municipal Vulnerability Preparedness Workshop

TOWN OF EASTHAM
January 7-8, 2019

DAY 1

Today's Agenda

- 12:15 **Workshop Overview and Introductions** – Paul Lagg
- 12:30 **MVP Program Background** – Sharon Rooney
- 12:45 **Science, Climate Projections, Resources** – Greg Berman
- 1:05 **Short Break**
- 1:15 **Small Team Exercise**
  - Team Orientation
  - Discuss and Identify Priority Hazards
  - Identify Vulnerable Features and Strengths
  - Prepare for Report-out
- 2:45 **Break**
- 3:00 **Teams Report on Hazards, Vulnerabilities, Strengths**
- 3:30 **Summary Discussion**
- 3:45 **Wrap Up and Day 2 Overview**
- **Adjourn**

Project Team

MVP PROVIDER | CAPE COD COMMISSION

- Sharon Rooney - *Chief Planner*
- Heather McElroy - *Natural Resources Specialist*
- Erin Perry - *Special Projects Manager*
- Chloe Schaefer - *Community Design Planner*
- Martha Hevenor - *Planner II*
- Anne Reynolds - *GIS Director*

MVP PROVIDER | COOPERATIVE EXTENSION

- Greg Berman - *Coastal Processes Specialist, Woods Hole Sea Grant / Cape Cod Cooperative Extension*
- Shannon Jarbeau - *Floodplain Specialist & CRS Coordinator, Woods Hole Sea Grant / Cape Cod Cooperative Extension*

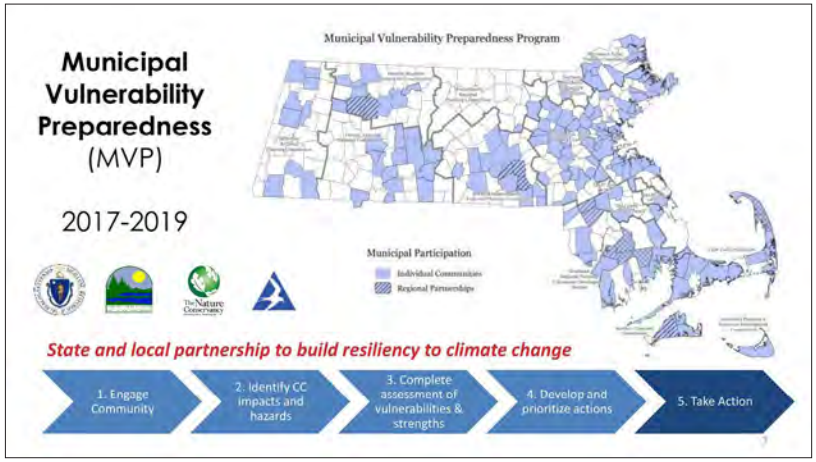
TOWN PROJECT MANAGER

- Paul Lagg - *Town Planner*

MVP Program Background

Sharon Rooney, Chief Planner
Cape Cod Commission

WORKSHOP PRESENTATION



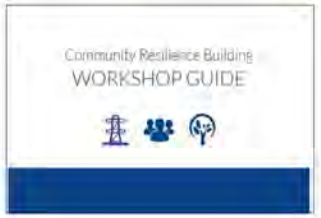
WORKSHOP PRESENTATION

MVP 2018

- 82 new planning grants, now 43% of the Commonwealth
- 39 Action Grant projects
- $7.2 million dollars committed
- Have budgeted $10 million for action grants next year in Governor Baker's Capital Plan

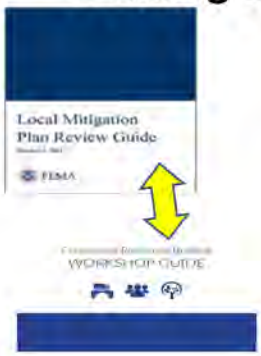
MVP Principles

- **Community-led process** that employs local knowledge and requires local buy-in and support
- **Accessible**
- **Utilizes partnerships** and leverages existing efforts
- **Mainstreams** climate change
- **See communities** as local innovators
- **Frames** coordinated statewide efforts.



Overview of the Process

Building Community Resilience



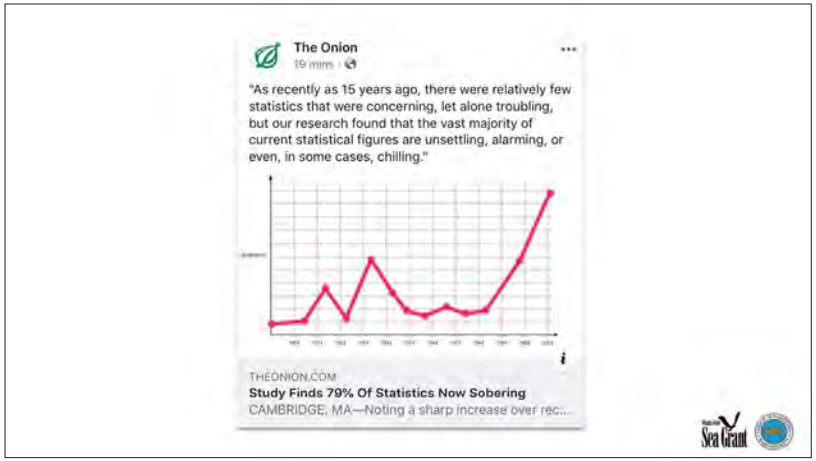
- Community Resilience Building process covers MOST of the steps needed to fulfill FEMA hazard mitigation plan requirements
- Communities could use state MVP grant funding to match FEMA PDM planning grants (*if the timing lines up*)
- MVP communities are required to roll their report into a plan...

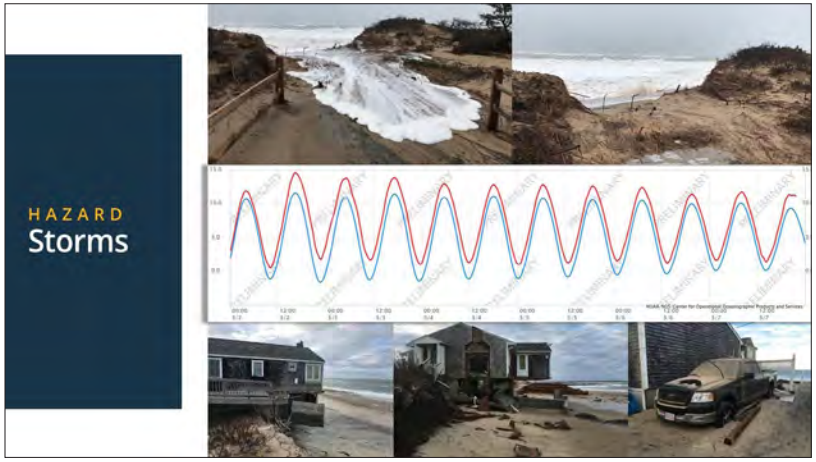
  Create/update your hazard mitigation plan!

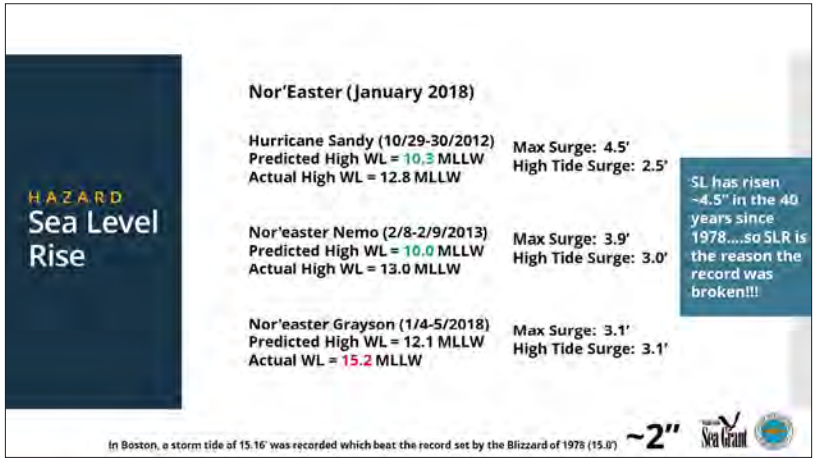
  Eligible for additional FEMA grant $$

WORKSHOP PRESENTATION

WORKSHOP PRESENTATION







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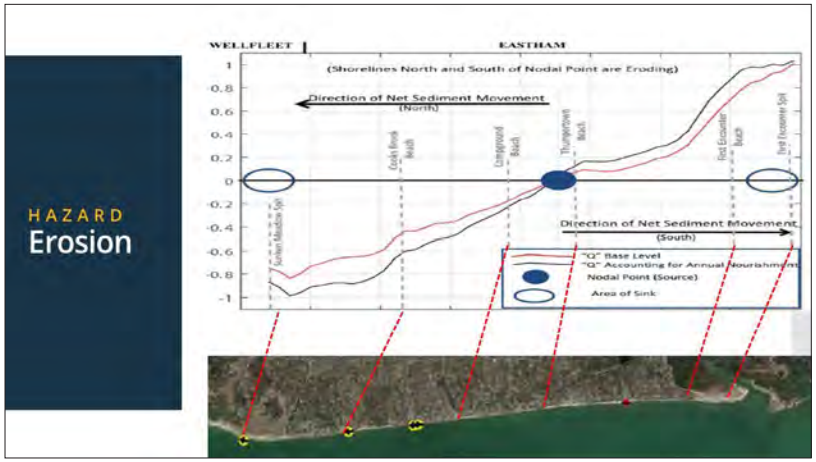
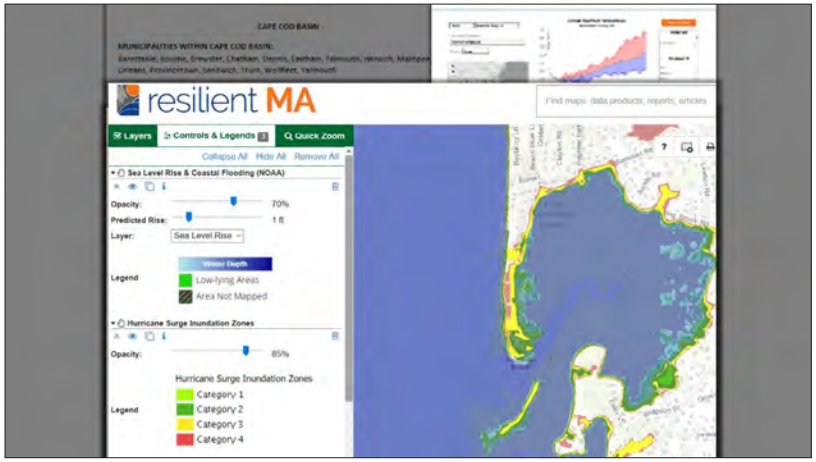
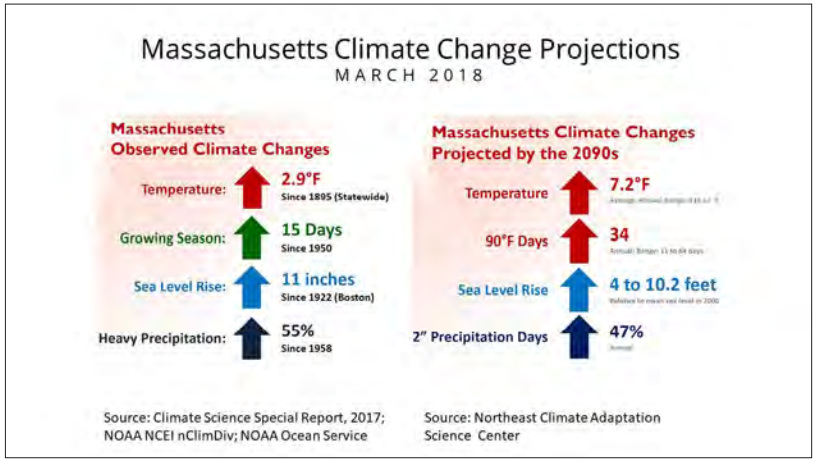
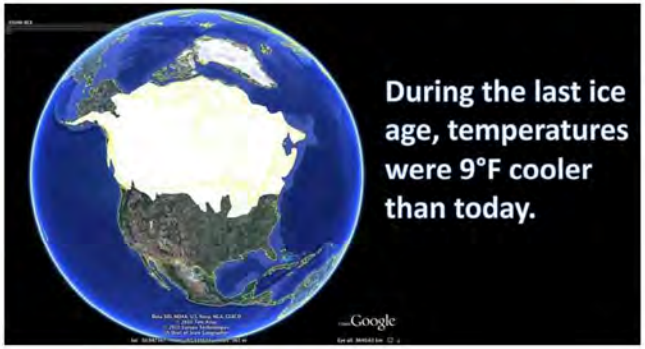




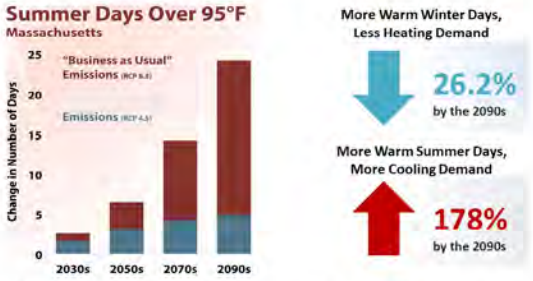


WORKSHOP PRESENTATION

Massachusetts Climate Changes Projected by the 2090s | **Temperature** ↑ 7.2° F



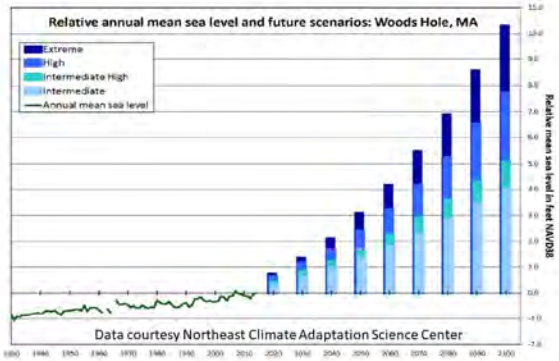
Massachusetts Climate Changes Projected by the 2090s | **Temperature** ↑ 7.2° F ↑ 34



Data courtesy A. Karmalkar, Northeast Climate Adaptation Science Center. Figure by D. Brown

Source: Northeast Climate Adaptation Science Center, ResilientMA.org, accessed 2018.

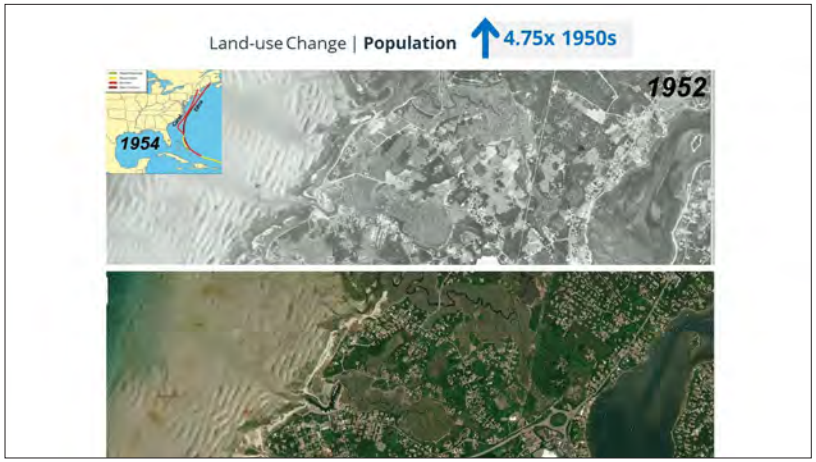
Massachusetts Climate Changes Projected by the 2090s | **SLR** ↑ 4 to 10.2 feet



Massachusetts Climate Changes Projected by the 2090s | **SLR** ↑ 4 to 10.2 feet

Scenario	2030	2050	2070	2100
Intermediate	0.6	1.3	2.3	4.0
Intermediate- High	0.8	1.7	2.9	5.1
High	1.1	2.4	4.2	7.7
Extreme (Maximum physically plausible)	1.3	3.1	5.4	10.3

Data courtesy Northeast Climate Adaptation Science Center



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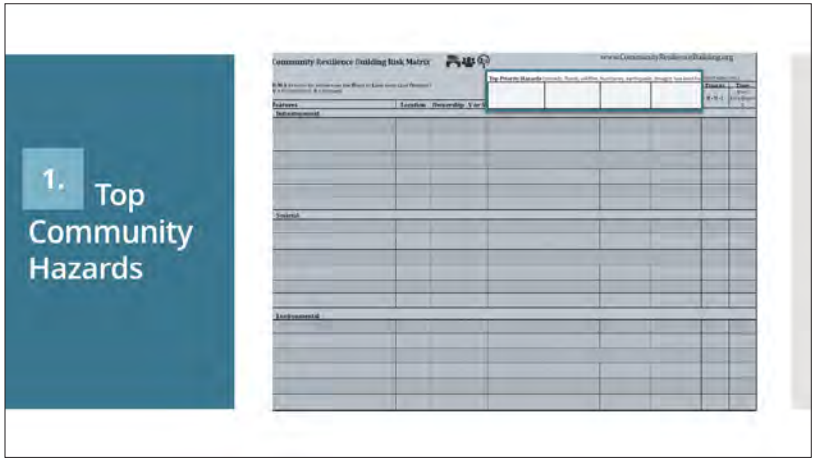

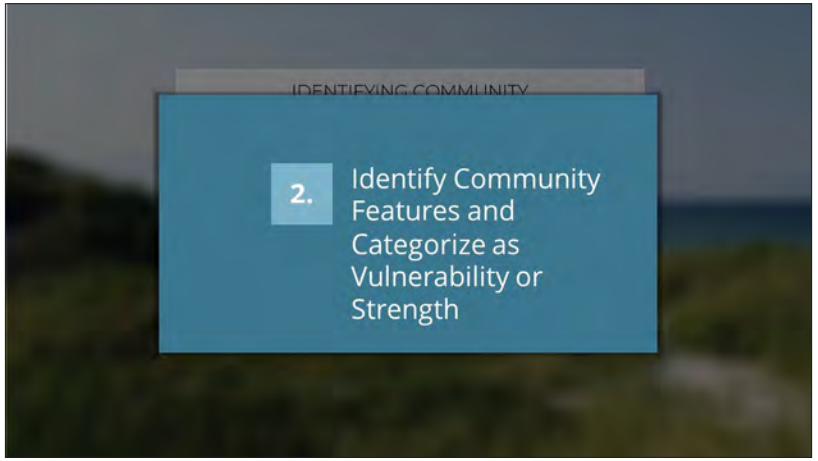

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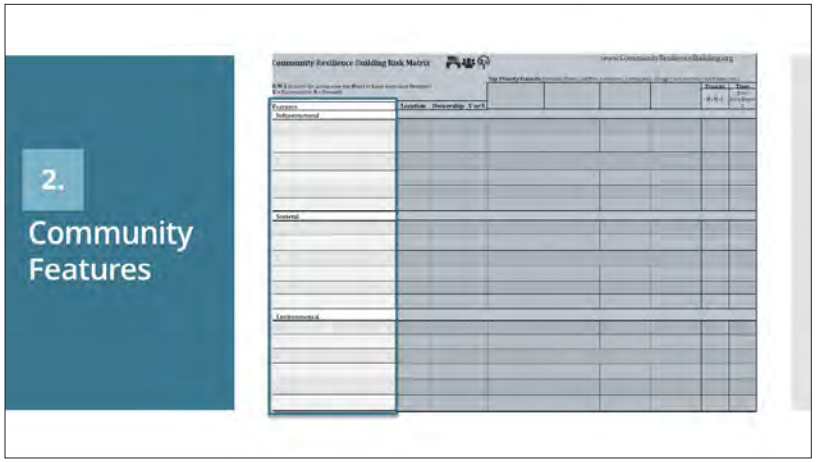

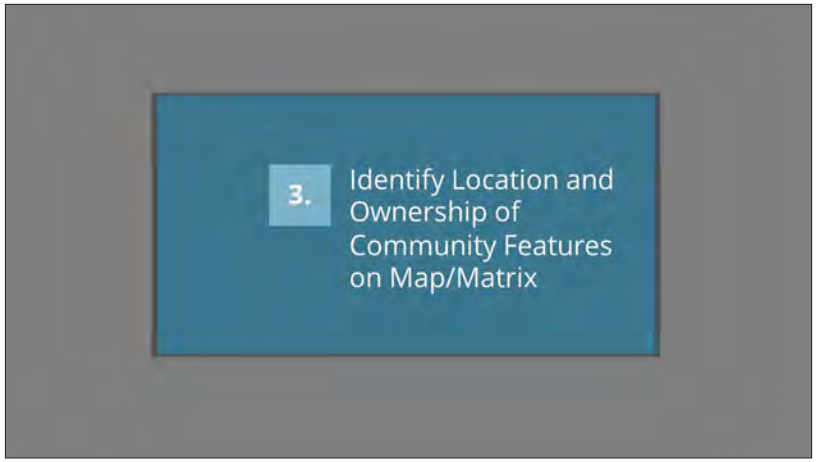

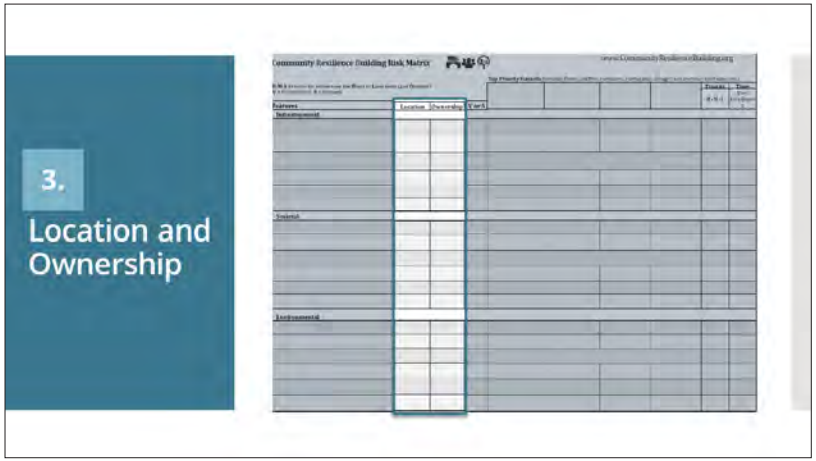

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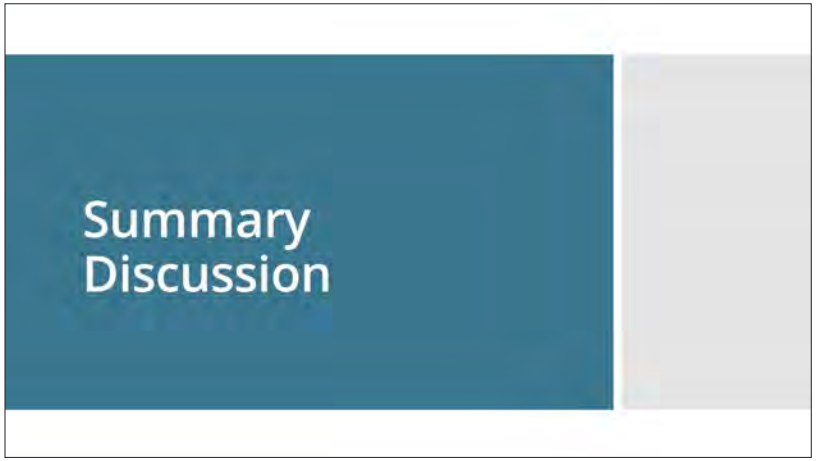

WORKSHOP PRESENTATION

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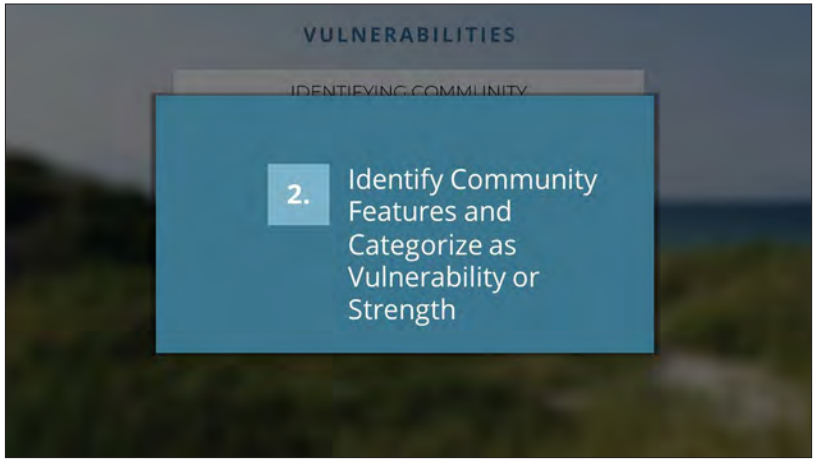
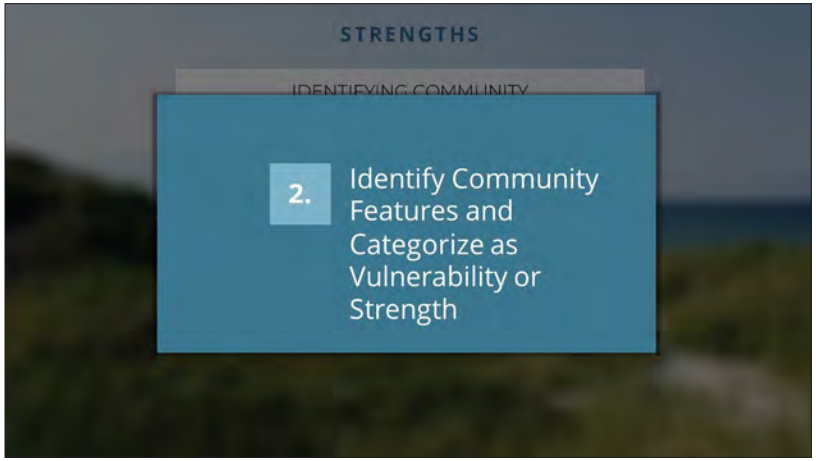




WORKSHOP PRESENTATION

Small Team Exercise

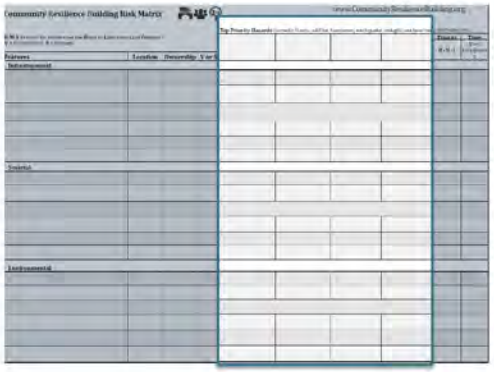
OVERVIEW

- Introductions – Facilitators and Scribes
- Identify Small Team Spokesperson
- Clarifying questions
- Revisit agreement reached on top priority hazards from Workshop #1

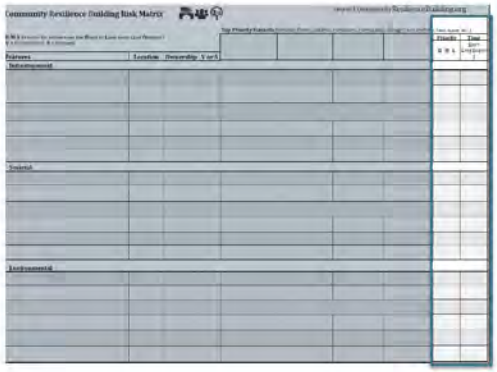
EXERCISE

1. Identify Actions to Reduce Vulnerability or Reinforce Strengths
2. Assign Priority and Urgency of Each Action
   - Infrastructure
   - Societal
   - Environmental
3. Identify Top 3 -4 Priority Actions

1. Identify Actions



2. Assign Priority and Urgency



3. Identify Top Priority Actions

WORKSHOP PRESENTATION

WORKSHOP PRESENTATION

WORKSHOP PRESENTATION

MVP STORYMAP (available at https://arcg.is/1CX4K9)

EASTHAM COMMUNITY RESILIENCE BUILDING WORKSHOP
SUMMARY OF FINDINGS

PREPARED BY THE CAPE COD COMMISSION & CAPE COD COOPERATIVE EXTENSION
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