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Administration and Finance

The Administrative and Finance Cabinet (A&F) has prioritized these next steps to recognize and address the impact of Climate Change on City operations:

- 1.) The Office of Budget Management (OBM) will actively encourage Departments to address climate change impacts in their capital and operating budget proposals, review financial feasibility, and support practical improvements.
- 2.) Work with the Department of Innovation and Technology (DoIT) to refine A&F's Continuity of Operations Plans, specifically regarding alternative work locations for City Hall operations.
- 3.) Continue to maximize cost-efficient financial protection from possible catastrophic events, working with changing catastrophe modeling.

Finance Area/Issue	General Description	Current	Next Steps
Continuing Operations Plans (COOP)	A&F Cabinet needs to be prepared to continue essential operations during an emergency.	Have COOP Plan in place, relying on DoIT for back-up systems	Refine A&F COOP plan with DoIT, specifically alternative work site.
Capital Budget	Capital Budget is source of funding for major property improvements to prepare for climate change and also to repair damages incurred after a damaging event.	Contribute to Hazard Mitigation Plan, request that Departments consider hazard mitigation in capital plan, and flag projects that address climate/energy issues.	Actively encourage Departments to address climate change in their capital budget proposals, review financial feasibility and support practical improvements.
Operating Budget	Operating Budget is source of on-going operating costs which may be increased due to Climate Change.		Review operating budget financial implications of Operating Departments' plans for Climate Preparedness and support practical improvements.
Revenue - Other	Major sources of revenue include Property Taxes, State Aid, and Other Revenue including taxes, fees, and fines.	City budgeting and financial management is conservative, as reflected in bond ratings, to allow flexibility in the face of unexpected financial changes.	Continue conservative financial practices to remain nimble and able to respond to financial shocks.
Operating Budget - Risk Finance	Property Insurance, and FEMA, provide funding in case of major catastrophe where internal resources are inadequate.	Property Insurance premiums significantly increasing due to catastrophe models.	Continue to improve building data related to catastrophe modeling, and increase self-insurance and reserves.

Boston Centers for Youth & Families

Boston Centers for Youth & Families (BCYF) operates 35 facilities across the city. In addition to its primary role in providing programs and services to residents of all ages, BCYF plays a significant part in supporting emergency shelter operations during severe weather or other emergency response situations.

BCYF's Climate Preparedness committee has taken a two-pronged approach: 1) prioritizing vulnerabilities that have the potential to impact operations during a catastrophic weather event; and 2) assessing how program operations might need to be adjusted to plan for gradual but significant climate changes.

Catastrophic Events: When severe weather impacts residents, BCYF centers may be called upon to operate emergency shelters. Examples include large winter or tropical storms forcing school closures, or heat emergencies that may include power outages impacting populations who are especially vulnerable. In the event of a large or catastrophic weather event, BCYF would likely be called upon to provide emergency shelters or support other emergency response efforts.

Highest Priority Vulnerabilities:

- 5 BCYF facilities are vulnerable to +5 feet of flooding and 10 sites are vulnerable at +7.5 feet of flooding;
- Sites do not have generators to maintain operations at shelters should a power outage occur;
- Limited snow removal equipment prevents timely access to sites;
- No access to 4WD vehicles needed to move staff to locations where they are needed; and
- Limited staff trained in Shelter Operations to meet staffing needs during a large scale emergency.

Climate Change Impacts to Programs: BCYF currently operates programming at indoor and outdoor facilities, pools, and parks across the city. The highest volume of programs and attendance takes place in the summer months, when thousands of youth on summer vacation are enrolled in BCYF summer camps, sports or recreation programs, swimming in BCYF pools, or employed in summer internships and jobs.

Highest Priority Vulnerabilities:

- Increasing summer temperatures will require added supplies, including greater demand for access to drinking water, shade or spray tents;
- Increasing temperatures will also require operational planning decisions such as adjusting the location or hours of programs to minimize excessive heat and sun exposure;
- Currently most BCYF gymnasiums do not have air-conditioning. Access to AC or large fans will be necessary both to maintain regular gym programming as well as to allow for gym use as a large space for emergency shelter operations when needed.

Facility, Program, Service or Policy Name OPERATIONS, SERVICES & PROGRAMS	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
BCYF Shelter Operations	Centers close to housing complexes (such as BHA) where Community Centers would need to serve as shelters if complexes needed to be evacuated	immediate	high	Work with BHA and other property managers to set up procedures and plans on how to shelter large numbers of residents during weather emergencies or extreme climate changes.	
Snow Removal	The departments ability to clear large amounts of snow from sites.	5-10 years	medium	purchase additional snow blowers	Would like to strategically store additional snow blowers. Right now a small number of snow blowers need to be transported across the city.
Equipment Storage	Lack of storage space for emergency/snow/flood equipment	5-10 years	medium	purchase storage sheds/locate additional storage space for equipment	Would like to provide storage sheds at sites that lack storage for snow clearing and shelter equipment
BCYF Shelter Operations	Not enough staff trained in Shelter Operations to handle large scale weather catastrophe	immediate	High	Work to train all BCYF employees through Red Cross and OEM shelter trainings.	Expand shelter trainings
Water Disbursement for Outdoor Programs	Lack of water and ice supply for outdoor programs during extreme heat	immediate	High	Establish regional ice/water distribution stations. Purchase ice machines that can be placed at 4 accessible sites.	Includes ROCK Out Sites and sports camps. Currently only have one disbursement station at 125 Magazine Street. Demand is too high for this one site to handle. May need to stop providing water to other organizations.
Elderly Programs/BCYF Golden Age Center	Being able to serve this vulnerable population during extreme heat.	immediate	medium	Determine which sites have elderly programs and make sure there are cool places available to the elderly.	
ROCK OUT Sites/Sports Camps	Lack of shade/lack of water access	immediate	medium	Purchase additional pop-up tents for each ROCK Out site. Provide sprinklers, hoses or mist fans for these programs to help keep kids cool during extreme heat. Include water features in capital projects.	Current plan provides outdoor programs with an indoor location to get out of heat or rain. Billings Field and Sports Camps lack an indoor site within close vicinity.
Availability of Water	Ensure all sites have access to drinking water	immediate	low	Review water assessment conducted by BPHC	
Cooling Centers	Even sites with AC do not have AC in their gyms. Gyms get extremely hot in the summer. If sites need to serve as a shelter during extreme heat sites would not be able to handle large groups of people.	5-50 years	high	Work on including AC in gyms in capital plans. Budgeting money to pay for increased costs associated with running AC in a large area like a gym.	Climate change will bring about more extreme heat and a greater demand for cooling centers, will need these large spaces to accommodate increased demand.

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
CPR/First Aid/AED	Not all staff are CPR/First Aid/AED Certified. In the event of a large scale storm staff may not be able to provide these life saving actions.	1-5 years	high	Provide training to all BCYF staff so they are CPR/First Aid/AED certified. Possibly include some sort of CPR/First Aid training at BCYF Academy.	All sites currently have AED's, but not everyone is certified to use them.
Communication	if phones and computers were to go down staff and sites would have no way to communicate with one another.	1-10 years	high	Provide alternate forms of communication/CB radios. Set up conference call line so expanded leadership can communicate and prepared for major weather events. Set up procedure on how to plan for major weather events (i.e. set up check in times, when planning starts, who is part of the planning).	
Vehicles	Some BCYF Vehicles are in fair to poor shape and lack AC. In an emergency BCYF would need reliable means of transportation to respond to extreme weather.	1-10 years	medium	BCYF has a fleet of approximately 60 Vehicle total & we upgraded in FY'13 by purchasing 16 2013 Vans & in FY'14 are scheduled to purchase 8 more New Vehicles (4 cars & 4 vans) which will be a 40% fleet turnover. Looking to continue this program until 100% turnover also.	
Increase demand for Pools	Demand for pools will increase as extreme heat increases.	immediate	medium	Consider opening all pools 7-days a week during summer. Implement procedures for rotating patrons in and out of the pool to handle large volume.	Currently increase pool hours during heat emergencies, have opened select pools 7-days a week during summer.
Storm Preparation	Making sure the appropriate operation plan is in place to ensure safety of staff and constituents during extreme weather.	immediate	medium	Work with OEM to predict extreme weather. BCYF leadership team meets leading up to event to determine appropriate operational plan for sites.	Currently work with OEM on weather and city-wide emergencies.
Pre-School Programs	Ensuring the safety of young children who are in our centers during the daytime.	immediate	medium	Making sure children have cool place during extreme heat. Provide a safe place for children during extreme weather that was unpredicted.	
Capital Projects	In extreme conditions can cause delays to projects timelines and completion dates meaning buildings are closed to public for longer amounts of time, neighborhoods get disenfranchised from community centers etc.	immediate	low		
Various Sites	Centers that have sea-level impacts cannot be used as emergency shelters in any major weather related event. Would limit the number of BCYF sites available to act as shelters.	immediate	medium	Set up regional shelters	

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
FACILITIES					
BCYF Citywide	No back-up generators	5-50 years	High	Work to include generators in capital projects or purchase mobile generators	Only BCYF Shelburne currently has a generator
BCYF Curley CC, BCYF Paris Street CC, BCYF Paris Street Pool, BCYF Pino CC, and BCYF Mirabella Pool (5 sites)	These sites are vulnerable to +5 feet of flooding. All BCYF sites in East Boston would be vulnerable.	20-50 years	medium	Identify alternate locations to serve as shelters in these areas. Work to include climate preparedness in to Capital Project at BCYF Paris Street slated for 2015.	BCYF Paris Street serves as emergency Shelter.
BCYF Curley CC, BCYF Paris Street CC, BCYF Paris Street Pool, BCYF Pino CC, BCYF Charlestown CC, BCYF Golden Age, BCYF Blackstone, BCYF Mason Pool, BCYF Leahy-Holloran and BCYF Mirabella Pool (10 sites)	These sites are vulnerable to +7.5 feet of flooding. All BCYF sites in East Boston and Charlestown would be vulnerable.	50-100 years	medium	Identify alternate locations to serve as shelters in these areas. Work to include climate preparedness in Capital Project at BCYF Paris Street slated for 2015. Identify Shelters in East Boston and Charlestown.	
BCYF Nazarro CC, BCYF Quincy, BCYF Tyman and BCYF Condon	At 7.5 feet of flooding these sites become surrounded by water and become islands	50-100 years	medium	Identify alternate sites to serve these areas. Remove resources and equipment from these areas.	
BCYF Archdale CC	Flooding potential - site is in a (very) bad drainage plain/area	5-10 Years	M	Needs New Mechanical Systems	Site completed Capital Project Summer 2013 - New Roof & Gym Floor. HVAC & other Aesthetic Upgrades
BCYF Clougherty Pool	Summer Pool Only - Severely Outdated Mechanical Systems	1-3 years	L	Need New Mechanical System & Pool Shell & Gutter Upgrades ASAP	In BCYF 5-Year Capital Plan to have these upgrades but may not survive even this short timeline
BCYF Curley CC	Flooding Potential - site located on beach, would not survive any type of Storm Surge. Also need New Mechanical System & Interior Renovations	5-50 Years	M	Figuring out how to keep Ocean Water out of facility - it is in lower basement year-round	Location is not changing so will continue to look to do upgrades to facility. In BCYF 5-Year Plan to have interior Upgrades done
BCYF Curtis Hall CC	Possible Flood Plain only in extreme flooding/storm surges. Swimming Pool AND Mechanical Systems are located in basement & sub-basement areas respectively. Site also has an Elevator with basement level usages	N/A	L	Continue upgrades as needed	Site completed major Capital Project within past 3 years - complete renovations to all Mechanical Systems, Interior & Exterior Areas
BCYF Draper Pool	Possible Flood Plain only in extreme flooding/storm surges. Site is a Swimming Pool AND Mechanical Systems are located in basement/sub-basement areas respectively	N/A	L	Major Renovation Upcoming	Site is Closing for BCYF Capital Project - major renovations from September 2013-June 2014
BCYF Flaherty Pool	Lack of indoor shelter to shelter patrons from pop-up storm	immediate	medium	Identify shelter in close proximity	

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
BCYF Flaherty Pool	Possible Flood Plain only in extreme flooding/storm surges. Site is a Swimming Pool AND Mechanical Systems are located in basement/sub-basement areas respectively	N/A	L	Continue upgrades as needed	Site recently completed major Capital Project - complete renovations to all Mechanical Systems, Interior & Exterior Areas
BCYF Gallivan CC	Flooding Potential - site located on low lying flood plain & would not survive any major Storm Surge. Also needs New Mechanical System & Interior/Exterior Renovations	1-10 Years	M	Site will be Closing in 2014 for BCYF Capital Project - new roof, gym floor & other upgrades as needed	Site will need New Mechanical System in next 5-10 years also
BCYF Golden Age Center	Possible Flood Plain only in most extreme flooding/storm surges. Mechanical Systems located in basement area	N/A	L	N/A	Facility is owned by BHA, will look to work with them on it
BCYF Hyde Park CC	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement. Site also has an Elevator with basement level usages also	5-50 Years	L	Continue upgrades as needed	Site completed major Capital Project within past 3 years - complete renovations to all Mechanical Systems, Interior & Exterior Areas
BCYF Martin Pino CC	Possible Flood Plain only in extreme flooding/storm surges - locate on high ground in East Boston. Mechanical Systems are located in basement/sub-basement areas respectively	5-10 years	L	Need New Mechanical Systems	Site completed Capital Project Summer 2010 - New Roof & Gym Floor Only
BCYF Mason Pool	Possible Flood Plain only in extreme flooding/storm surges. Site is a Swimming Pool AND Mechanical Systems are located in basement/sub-basement areas respectively	10-20 Years	M	Continue upgrades as needed	Site completed major Capital Project back in 2007 - complete renovations to all Mechanical Systems, Interior & Exterior Areas
BCYF Mirabella Pool	Lack of indoor shelter to shelter patrons from pop-up storm	immediate	medium	Identify shelter in close proximity	Possibilities include the Coast Guard Base and Department of Conservation & Recreation (DCR) Skating rink
BCYF Mirabella Pool	Summer Pool Only. Major Flooding Potential - site is located right next to Atlantic Ocean on Commercial Street with only small wall between it. Would not survive any type of Storm Surge. Mechanical Systems are in bathroom	N/A	H	Continue upgrades as needed	Site had major pool area work completed in 2011 & New bathhouse was built in 2003

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
BCYF Nazarro CC	Major Flooding Potential - site is located in middle of North End & would not survive any type of major Storm Surge. Mechanical Systems are in basement; Site has Elevator with basement mechanicals also	5-10 Years	H	Continue upgrades as needed	Site had a New Roof & Exterior Work done in 2003
BCYF Orchard Garden Building	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement/sub-basement areas respectively		M	Continue upgrades as needed	Site completed Capital Project Summer 2010 - New Roof & Gym Floor. HVAC & other Aesthetic Upgrades
BCYF Paris Street CC	Flooding Potential - site located on low lying flood plain & would not survive any major Storm Surge. Also needs New Mechanical System & Interior/Exterior Renovations	2-3 Years	M	Site will be Closing in 2015 for BCYF Capital Project - major interior renovations including upgrades to all mechanical systems	Site has had a New Roof & Major Exterior Masonry & repointing Work completed in past 3 years.
BCYF Paris Street Pool	Flooding Potential - site located on low lying flood plain & would not survive any major Storm Surge. Also needs New Mechanical System & Interior/Exterior Renovations	1-2 Years	M		Site needs New Pool Mechanical System - will be looking to upgrade them in 2014-2015
BCYF Roche CC	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement. Site also has an Elevator with basement level usages also	N/A	M	Continue upgrades as needed	Building is Owned by the City's Trust Office so we will continue to work with them to perform building upgrades as needed but cannot do any major work without their approvals also.
BCYF Roslindale CC	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement. Site also has an Elevator with basement level usages also	10-20 Years	M	Continue upgrades as needed	Site completed major Capital Project in 2009 - complete renovations to all Mechanical Systems, Interior & Exterior Areas
BCYF Shelburne CC	Possible Flood Plain <u>only</u> in extreme flooding/storm surges. Mechanical Systems are located in basement. Site also has an Elevator with basement level usages.	10-20 Years	L	Continue upgrades as needed	Site just completed major capital Project in 2012 including upgrades to all Mechanical Systems & Elevator. Shelburne is only BCYF Building with Emergency Generator which also just had upgrades made to it
BCYF Thomas Johnson Building	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement.	5-10 years	L	Continue upgrades as needed	Site is in the BCYF 5-Year Plan to have a New Roof & Gym Floor installed as well as some HVAC upgrades in 2015-6

activity, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
BCYF Tobin CC	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement. Site has an Elevator with basement level usages also	5-10 years	L	Continue upgrades as needed	Site is scheduled for New Boiler this Fall 2013. Site also had New Roof & Gym Windows installed as well as interior upgrades to community center side of facility in 2012
BCYF Vine Street CC	Possible Flood Plain only in extreme flooding/storm surges. Mechanical Systems are located in basement. Site also has an Elevator with basement level usages.	3-5 Years	L	Site will be Closing in 2016 for BCYF Capital Project - major interior renovations including upgrades to all mechanical systems	Site has had a New Roof & Major Exterior Masonry & repointing Work completed in past 3 years.
BCYF Walsh Building	Possible Flood Plain only in extreme flooding/storm surges. State owns Courthouse Facility but City "leases/owns" gymnasium building in back & Mechanical Systems are located on State-Side so they maintain them in their basement areas	N/A	M	Continue to work with the State Courthouse Facilities staff to do upgrades as needed & at some point separate the Mechanical Systems	Site completed Capital Project last year - New Roof & Gym Floor as well as other aesthetic upgrades

Boston Housing Authority

DEV #	Facility	Address	Units	Vulnerability Area (Time Frame)	Priority	Ongoing/Next Steps
261	Ausonia	185 Fulton St. Boston	100	Flooding, Old heating and water systems in basement will be destroyed (20-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	H	
277	Bellflower	24 Bellflower St., Dorchester	114	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	H	BHA will begin to incorporate in its Annual and Five year Capital Construction Plans measures to address the impact of the climate change and consequences of flooding resulting from the projected seawater rise and catastrophic storm and tidal surges. The planning process will address the most at risk developments first. Health and safety of the residents, durability and sustainability of the affected buildings will provide the matrix for the planning process. The plan will include, but not limited to, the following: <ul style="list-style-type: none"> • Building Evacuations • Temporary Power • Short Term Plans for Occupying buildings with limited functional utilities <ul style="list-style-type: none"> ○ Food & water ○ Medical issues ○ Sanitation • Capital Planning <ul style="list-style-type: none"> ○ Relocation of HVAC equipment to locations above projected sea water rise and/or storm surge ○ Reinforce building shell where needed to address storm surge.
252	Heritage	209 Summer St., East Boston	301	Recently upgraded HVAC and water. Many systems placed aboveground so may be safe until later years (30-80yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs). Flooding in area will make access to transportation difficult (10-50yrs).	H	
pvt	Maverick Landing	31 Liverpool St., East Boston	323	Flooding: Heating systems in basement (20-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs).	H	
236	West 9 th St.	195 West 9 th St., South Boston	84	Flooding: Old heating and water systems in basement will be destroyed (20-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs). Extreme heat will cause need for reliable AC in all units (immediate-5yrs)	H	
501	West Broadway	81 Orton Marotta Way, South Boston	486	Flooding: Old heating and water systems in basement will be destroyed (20-50yrs). Extreme heat will cause need for reliable AC in all units (immediate-5yrs).	H	
pvt	West Broadway Homes	73 Crowley Rogers Way, South Boston	133	Flooding: Old heating and water systems in basement will be destroyed (20-50yrs). Extreme heat will cause need for reliable AC in all units (immediate-5yrs).	H	
Developments						

On Border of 50 yr Floodplain	606	Basilica	160 Thirteenth Street, Charlestown	5	Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs).	M	
101	Charlestown	55 Bunker Hill St., Charlestown	1149	78	Flooding, New heating systems installed in basement may be secured for now (20-50yrs).	M	BHA will begin to incorporate in its Annual and Five year Capital Construction Plans measures to address the impact of the climate change and consequences of flooding resulting from the projected seawater rise and catastrophic storm and tidal surges. The planning process will address the most at risk developments first -Health and safety of the residents, durability and sustainability of the affected buildings will provide the matrix for the planning process. The plan will include but limited to the following, <ul style="list-style-type: none"> • Building Evacuations • Temporary Power • Short Term Plans for Occupying buildings with limited functional utilities <ul style="list-style-type: none"> ◦ Food & water ◦ Medical issues ◦ Sanitation • Capital Planning <ul style="list-style-type: none"> ◦ Relocation of HVAC equipment to locations above projected sea water rise and/or storm surge ◦ Reinforce building shell where needed to address storm surge.
244	Frederick Douglas	755 Tremont St., Roxbury	78	96	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	M	
230	Foley	199 H St., South Boston	96	78	Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs). Floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs).	M	
298	Hampton House	155 Northampton St., Roxbury	78	1016	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	M	
123	Mary Ellen McCormack	10 Kemp St., South Boston	1016		Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs).	M	

124	Old Colony	265 East 9 th St., South Boston	843	Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs). Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs).	M
Pvt	Old Colony Phase I	25 James O'Neil St., South Boston	116	Most HVAC systems 2 nd story or above	M
pvt	Old Colony Phase II			Under construction see Phase I	M
508	Orient Heights	30 Vallar Rd., East Boston	329	Flooding: New heating systems installed in basement may be secured for now (20-50yrs).	M
106	Ruth Barkley Apts	1472 Washington Street, South End	422	Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs).	M
174	Rutland/Springfield	94 West Newton Street, South End	14	Flooding: Currently have very old, outdated systems below ground in need of replacement. Below ground systems are not sustainable long term (immediate-50yrs). Electrical mains and switchboards will all need to be located to higher elevation (20-30yrs).	M
253	St. Botolph	70 St. Botolph Street, Back Bay	133	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	M
249	Torre Unidad	80 West Dedham Street	204	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-	M

299	Washington Manor	1701 Washington St., Roxbury	78	30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs). Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	M	
636	West Concord	94 West Newton Street, South End	73	Flooding, Old heating and water systems are at ground level on slab and will be destroyed (40-50yrs), electrical mains and switchboards will all need to be located to higher elevation (20-30yrs), floods in pit elevator will cause disruption/damages where the elderly/disabled who need access to elevator will become immobilized (15-30yrs), extreme heat will cause need for reliable AC in all units (immediate-5yrs).	M	

Wide Spread Impacts			
Category	Vulnerability Area (Time Frame)	Priority	Ongoing/Next Steps
Capital Improvements Projects	Limited resources to meet the growing deferred maintenance and capitol improvement needs (immediate). As a result, buildings are more prone to deteriorating conditions, resulting in potentially creating health, safety and building durability issues with the resulting increase in maintenance and repair costs long-term (immediate - 50yrs).	H	The BHA Capitol Planning Process must take into account the deferred maintenance list and capitol project needs in the short term and medium term. In addition, the Capital Plan will address climate change impacts on BHA sites, buildings, maintenance, health, and durability. BHA is investigating additional resources to develop a more comprehensive approach to specifically address the impact of climate change while continuing to invest in a proactive planning and green repair/construction to ensure our buildings are efficient, healthy, and safe and will remain operational in the long term.
Staffing	BHA will need to incorporate address the effects of temperature raise and the potential impact of heat stress its employees (immediate). Project timelines and site maintenance needs will be impacted due to heat and extreme weather events (immediate).	M	Consider changes to work hours and job functions for outdoor employees. Plan for longer project timelines, especially during summer months. Increase budget for custodial and snow removal in anticipation of more extreme winter storm events
Freeze/Thaw Structures	Increased freeze/thaw cycles will increase structural damages (immediate).	M	Allocate additional resources to address capital repairs, especially pointing and masonry. Build in anticipated needs to the Capitol plan.
Sea Level Rise & Flooding	Based on sea level maps, numerous sites (see list above) are prone to flooding due to sea level rise (15-50yrs) and several others near rivers already flood on a regular basis (immediate). Flooded sites will be inaccessible, will suffer repeated water damage, and may need to be abandoned.	M	The BHA Capital Plans must address flooding potential as well as related impacts (mold growth, structural deterioration, and cost for repairs) and make recommendations for flooding prone sites as it relates to building and site infrastructure. Flooding and storm surge potential needs to be a factor when making alterations, repairs or capitol repairs at the identified vulnerable sites.
Snow, Wind, & Rain Storms	Older roofs and large flat roofs prone to issues (leaks, fly off, collapse) due to strong winds and severe winter storms (immediate). Storms with heavier rainfall are already causing increased leaks and water retention in the basements of affected buildings, which weakens the building structure and creates mold/mildew growth (immediate).	H	Annual assessments of roof conditions completed. All roof replacement projects should account for the likelihood of heavier snowfalls, increased storm intensity, and increased winds. Solar systems and other rooftop equipment should also account for this. Will need to prioritize roof repairs in order to reduce mold growth and further building damage.

Boston Police Department

The mission of the Boston Police Department is “*to work in partnership with the community to fight crime, reduce fear, and improve the quality of life in the neighborhoods of Boston.*” As the City of Boston’s lead public safety agency, however, we must be able to adapt our mission in emergency circumstances. With that, flooding and extreme heat are two such circumstances for which we must consider thinking more broadly in order to adapt quickly and with flexibility. In these circumstances, beyond our efforts to prevent and respond to crime, our focus will shift largely to **emergency response**, to ensure public safety in the face of panic and harsh environmental conditions. Response may include directing traffic around flooded zones, rescuing people who may become trapped in their homes or at work, and working with other city agencies and first responders to set up emergency shelter options and other emergency response centers. While these activities are taking place, we must also plan for crime to continue, and in that respect, our mission will play out through sound deployment planning, **responding to crime** and **reducing fear** - temporarily lessening the focus on improving quality of life. Furthermore, the *nature* of crime is likely to change, as will be discussed in more detail below.

Emergency response

Based on other cities’ experiences with natural disasters (e.g., New Orleans, New York, New Jersey, etc.), we know that the largest role the BPD will play in the event of extreme flooding or sustained heat waves will be emergency response. For example, under the latter circumstance—heat—we will be particularly concerned with assisting elders who may not have access to air conditioning. We know that during the Chicago heat wave of 1995,¹ resident deaths were most concentrated among the elderly, as well as among low-income and African-American individuals. Undoubtedly, in the event of an extended heat wave here in Boston, the BPD will spend a considerable amount of time identifying, communicating with and locating our own vulnerable populations, and ensuring that, when necessary, these individuals are taken to shelters with air conditioning. Similar, in the case of flooding, Boston police officers will spend a

¹ Klinenberg, E. (1999). Denaturalizing disaster: A social autopsy of the 1995 Chicago heat wave. *Theory and Society*, 28(2), 239-295.

considerable amount of time directing traffic around flooded zones, rescuing and assisting people who may become stranded, responding to other emergency-related calls for service, and working with other city agencies and first responders to set up emergency shelter options and other emergency response centers.

Fighting crime

Even in the midst of natural disasters, some people are still going to commit crime. Based on past analysis of crime patterns during natural disaster, BPD generally expects crime to increase when the weather is nice; crime tends to go down when it gets too hot or cold, and in the event of extreme weather, such as flooding, heat or cold, street crime tends to go down, as people are likely to stay in their homes. However, when street crime goes down, we sometimes see an increase in domestic disputes, including **domestic violence**, as people are cooped up together for extended periods of time. Also, when flooding has occurred in the past businesses become vulnerable to **looting**, as was seen in New Orleans during/after Katrina. With this knowledge of crime trends in extreme weather, the Boston Police Department will continue its efforts to anticipate crime patterns based on past experience and prepare for those inevitabilities through directed patrols, and by responding to 911 calls for service in a timely manner.

Reducing fear

Finally, a large role of the BPD in the event of flooding or extreme heat will be to reduce fear among the citizens of Boston. In circumstances such as these, residents of Boston are sure to feel concern and fear about their safety and the safety of their loved ones. Hopefully, by planning for these extreme conditions well in advance, and being well-prepared, we will be able to maintain confidence in our ability to respond to the situation and ensure public safety. In essence, we need to make sure the public knows that we are able to continue achieving our first two goals of emergency response and fighting crime. A key component of this will be having in place plans to ensure that we can maintain open lines of communication in times of extreme weather—to ensure that citizens can contact us and that we can respond and reach out to them. In addition, we must be able to maintain communication with each other internally, including communication with officers on foot and in their cars, as well as conducting meetings, debriefings, and outreach in order to coordinate our efforts and ensure that resources are used as

efficiently as possible. Furthermore, it will be critical to have in place plans for maintaining mobility, so that officers can get to all locations where they are needed.

We know from our experiences with the Boston Marathon bombings that social media will likely play a huge role in our communications in the event of extreme weather. Social media has significantly enhanced our efforts with respect to homeland security, as seen in the enormous influx of information throughout the Boston Marathon bombing incident. In a more general sense, it enables us to maintain an open dialogue with Boston residents, even when other forms of communications—such as phone lines—are not working. It was through the BPD *Twitter* account that we were able to get accurate information out to the public following a false report from CNN ‘that arrests had been made’ the day after the Boston Marathon bombings. Through the use of social media, we will ensure that our community receives information directly from us, and that this information is accurate and up-to-date. We will improve public trust in police, while strengthening relationships between officers and the communities they serve. And with sufficient resources, we will also ensure that communication with the community is a two-way dialogue, responding to community comments and inquiries in a timely fashion. In this way, we will reduce fear among the residents of Boston, and maintain their confidence in our ability to ensure their safety.

BPD Facility	Address	Vulnerability/Time frame	Priority (H,M,L)	Ongoing steps/Next steps/Comments
BPD Headquarters	1 Schroeder Plaza, Bos	Will flood in 7' of water	H	<ul style="list-style-type: none"> The Primary Public Safety Answering Point (PSAP) for the City of Boston is located BPD HQ. The location of 911 Operations at HQ makes this location the highest priority. Electrical system for the entire building is located on the first floor, making the building vulnerable to flooding. Two independent electrical lines (NStar) run underground and feed into the building, running simultaneously. Would need to check with NStar to find out how vulnerable these lines are to flooding. Need to check if generator on first floor can operate if submerged in a few feet of water – is it high enough off the ground? In the event of loss of electrical power to the generator, it can be kept running indefinitely if we keep re-filling the gas tank. And if the generator goes out, we have batteries that could support the building for about four hours. In order to protect the building in the event of a 7-foot flood, we would need to either raise the electrical system to above the first floor, or establish a back-up electrical system other than the backup PSAP that is currently located at 59 Fenway (the Fire Alarm location is even more susceptible to flooding than BPD HQ).
District A-1 Station	40 New Sudbury St, Bos	Not vulnerable up to 7' of water	M	<ul style="list-style-type: none"> Also need to check on vulnerability of City Hall. If City Hall goes down, then HQ will lose internet and most of its phone lines. HQ is also important because this is where Command Staff gather during emergencies. We have identified the new B-2 BPD Station as a suitable back-up location from which Command Staff can operate in the event of flooding at HQ, as this is a new building with advanced technological capabilities, and is located on a higher elevation, and is located near HQ.
District A-7 Station	69 Paris St, E. Bos	Will flood in 5' of water	M	<ul style="list-style-type: none"> Alternate sites for A-7 is A-1. Need to determine at what point we would lose the Callahan, Sumner, and Ted Williams tunnels. At that point, East Boston basically becomes an island. According to the A-7 Captain, East Boston High School may serve as a temporary station in emergency situations if getting through the tunnels proves impossible.

District A-15 Station	20 Vine St, Charlestown	Will flood in 7' of water	M	<ul style="list-style-type: none"> • Alternate sites for A-15 is A-1
District B-2 Station	2400 Washington St, Rox	Not vulnerable up to 7' of water	M	
District B-3 Station	1165 Blue Hill Ave., Mat	Not vulnerable up to 7' of water	M	
District C-6 Station	101 W. Broadway, So. Bos	Will flood in 5' of water	M	<ul style="list-style-type: none"> • C-6 Station already has an issue with flooding due to heavy rains, and is likely to fare very poorly in the event of sea level rise.
District C-11 Station	40 Gibson St., Dor	Not vulnerable up to 7' of water	M	
District D-4 Station	650 Harrison Ave, S. End	Will flood in 7' of water	M	<ul style="list-style-type: none"> • Alternate site for D-4 is B-2
District D-14 Station	301 Washington St., Bri	Not vulnerable up to 7' of water	M	
District E-5 Station	1708 Centre St., W. Rox	Not vulnerable up to 7' of water	M	
District E-13 Station	3345 Washington St., JP	Not vulnerable up to 7' of water	M	
District E-18 Station	1249 Hyde Park Ave, HP	Not vulnerable up to 7' of water	M	
Academy Training	85 Williams Ave, HP	Not vulnerable up to 7' of water	M	
Anti-Corruption	1960 Washington St, Rox	Will flood in 7' of water	L	<ul style="list-style-type: none"> • Alternate site for Anti-Corruption is Schroeder Plaza
Bomb Squad	170 Hancock St., Dor	Not vulnerable up to 7' of water	L	
Central Supply	1555 Hyde Park Ave, HP	Not vulnerable up to 7' of water	L	
Electrical Services	400 Frontage Rd, Bos	Will flood in 5' of water	L	<ul style="list-style-type: none"> • Alternate site for Electrical is Schroeder Plaza
Facilities Management	400 Frontage Rd, Bos	Will flood in 5' of water	L	<ul style="list-style-type: none"> • Alternate site for Facilities Management is Schroeder Plaza
Family Justice Center	989 Comm Ave, Bos	Not vulnerable up to 7' of water	L	
Fleet	400 Frontage Rd, Bos	Will flood in 5' of water	L	<ul style="list-style-type: none"> • Back-up plan for Fleet is to distribute their workload to the various districts
Harbor Patrol	9 Terminal St, S. Bos	Will flood in 5' of water	L	
K-9 Unit	40 Allendale Rd, JP	Not vulnerable up to 7' of water	L	
Pistol Range	Moon Island, Quincy	Will flood in 5' of water	L	<ul style="list-style-type: none"> • Alternate site for Pistol Range is Academy
Recruit Investigation	10 Linden St, Dor	Not vulnerable up to 7' of water	L	
Sexual Assault Unit	989 Comm Ave, Bos	Not vulnerable up to 7' of water	L	
SORI Unit	40 New Sudbury St, Bos	Not vulnerable up to 7' of water	L	
Special Operations	364 Warren Ave, Rox	Will flood in 7' of water	H	<ul style="list-style-type: none"> • Special Operations is considered high-priority because it is where all of our specialized equipment (e.g., motorcycles, trucks, etc.) are located – many of which are located on the ground floor. Fortunately, most of this equipment is mobile and can simply be moved to a dry location in the event of a flood.
Stress Unit	249 River St, Mat	Not vulnerable up to 7' of water	L	
Tele-	400 Frontage Rd, Bos	Will flood in 5' of water	H	<ul style="list-style-type: none"> • Communications is a critical facility as the equipment there

communications

supports all of our telephone and computer communication. The electrical system for this facility is located at the ground level. In order to protect the building in the event of a 5-foot flood, we would need to either raise the electrical system to above the first floor, or establish a back-up electrical system other than the one that is currently located at right next door (as that location is also susceptible to flooding).

Truck Unit	364 Warren Ave, Rox	Not vulnerable up to 7' of water	L
YVSF (Gang Unit)	170 Hancock St, Dor	Not vulnerable up to 7' of water	L

* For more information, please see the *Boston Police Department's Continuity of Operations Plan (COOP)* and the *City of Boston PSAP Contingency Plan*.

Boston Public Health Commission

Over the past several months, BPHC has engaged in a process of assessing organizational vulnerabilities to the potential serious long-term impacts of climate change; particularly sea level rise, heat waves, and more frequent extreme weather events. Taking into account our infrastructure vulnerabilities, disproportionate impacts on the community, and the existing services we provide to meet the needs of some of the city's most vulnerable residents, the Commission has identified the following four priority concerns in planning for climate change adaptation.

1. Continuity of direct care service to those most at risk

BPHC provides a number of critical direct care services to individuals in the city who are at risk of adverse health outcomes. Climate change impacts will mostly likely manifest in the near future as increased frequency and severity of extreme weather events (heat waves, blizzards, intense rain storms) which will have a two-fold effect of increasing need for services and disrupting BPHC's ability to provide those services due to infrastructure disruptions such as flooding. Planning for these stressors is a priority in emergency planning. Specific areas of focus include:

- Ensuring EMS ambulance service capacity and accessibility during storms, floods, and heat waves. Current cooperative agreements and continuity of operations plans provide for service coverage during the occasional weather disruption. However, these plans should be reviewed in light of worst case scenario situations, similar to Hurricane Sandy, possible in the next 20 to 30 years with a focus on contingency planning and more frequent practice drills for providing critical life-saving services when roads are impassible or calls are so numerous as to exceed capacity.
- Preserving BPHC's ability to provide addiction treatment services. Extreme weather events might make it impossible for individuals in outpatient drug treatment to access services because they cannot get to the facility or because staff/supplies cannot get there. Such a sudden discontinuation of treatment may put some people at medical risk. Annual review of continuity of operations plans should take into account the increased risk of these types of events to verify that suitable contingency plans are in place including communication to clients and staff about relocation of services.
- Continuity of services at the Tuberculosis Clinic in the event of a major weather-related disruption will be critical to the health of clinic patients and the greater Boston population. Treatment of tuberculosis requires an extensive course of medication spanning as long as a year. Interruption or discontinuation of this treatment before it is complete can result not only in the patient experiencing the ill health effects of the returning infection but also in an increased risk of disease transmission and development of an antibiotic-resistant tuberculosis infection. Existing continuity of operations plans already address short-term disruption to operations, but will need to be reviewed to ensure they are sufficient for disruptions of greater duration, severity, and frequency.
- Homeless Services continuity of shelter operations. More frequent severe weather events will tax the shelter service system as additional homeless individuals may seek shelter and those that still remain outside will be at greater risk and in need of more services. Resources may also be pulled to staff temporary emergency shelters for people displaced

from their homes by a weather disaster and the same event may reduce the availability of staff who may themselves be displaced by it. A reevaluation of capacity and resources should be undertaken to ensure that continuity of operations plans are adequate and that potential “tipping points” of demand for services vs. capacity are identified and plans made to address the most likely possibilities. An assessment should also be conducted of capacity options in various scenarios during which weather emergencies could make different sets of shelter resources unavailable.

2. Major infrastructure vulnerability – Long Island Bridge

Though many BPHC facilities are potentially vulnerable to flooding or storm damage in the future, the bridge to Long Island is the highest priority due to its current vulnerability and the number of programs and individuals that would be impacted by its damage or loss. This aging span is a choke point connecting the BPHC Homeless Services campus, addiction treatment programs, a camp, an organic farm, and several other essential programs and properties on the island to the mainland. Due to its current condition, deliveries of fuel oil for the various steam boilers and emergency electrical generators on the island are significantly restricted by weight limits. As it stands now, heavy storm events can stop transportation on or off the island over the bridge. Sea level rise and more frequent storms will exacerbate this problem, leaving open the potential of clients and staff trapped on the island without power and access to medical services and clients at the Woods Mullen shelter in Boston without food and linen service (that is done on the island). An extreme storm event similar to Hurricane Sandy could have the potential to not only temporarily close the bridge but to destroy it or damage it beyond repair – leaving hundreds of vulnerable Bostonians without access to critical resources including addiction treatment, job training programs, and basic shelter. Exploring options for the repair or replacing of the bridge should be a priority and will likely require the involvement of the City of Quincy and the Massachusetts Department of Transportation as well as City of Boston agencies.

3. Impacts of climate change on the most vulnerable

Both the gradual and acute affects of climate change will have a profound effect on a number of historically vulnerable populations including communities of color, recent immigrants, speakers of languages other than English, children, the elderly, the incarcerated, and medically vulnerable individuals in private homes and health care institutions. Ensuring that these populations do not experience a disproportionate economic or health burden from climate change is an important public health and environmental justice concern. This will take many forms and all of these will require collaboration by a number of agencies at the local, state, and federal level:

- Coordination to provide access to resources for low-income waterfront communities to prevent/reduce flooding and storm damage.
- Planning for the long-term economic impacts that sea level rise will have on jobs and property values in low-lying vulnerable communities.
- Establishment of additional cooling centers throughout the city to provide relief for the medically vulnerable during more frequent and intense heat waves and increased outreach to ensure those at risk can access these centers if needed.
- Additional education and outreach about long-term health impacts of climate change such as increased pollen and mold levels increasing asthma attack frequency/severity.

- Planning for disaster response and recovery that includes explicit protocols for relocation/rescue of incarcerated populations and those in medical care facilities.
- Planning for disaster recovery that ensures that low income residents, the linguistically isolated, and communities of color have equal access and appropriate additional assistance accessing resources such that they are not the last to ‘bounce back’.
- Strengthening of community resources to build resilience to gradual and acute effects of climate change as well as other stressors. These resources can include open/green spaces, opportunities for physical activity, access to fresh nutritious food, neighborhood organizations, and stronger social connections between neighbors in a community.

4. Extreme event response capacity

When extreme weather events such as the storms, flooding, and heat waves predicted with climate change occur, BPHC is among the agencies that respond to provide information and critical health resources to the residents of Boston. This includes mobilization of staff and supplies from Public Health Preparedness to set up emergency shelters, emergency response by EMS, or Environmental Health response to chemical spills and other hazardous conditions created by flooding and storms. All of these services could be stressed by climate change either through the need to utilize them more frequently or through disruption of operations by a major natural disaster. This makes assessment of staffing/resource levels and current response and continuity of operations plans for these programs a priority. Additionally, these programs should participate, along with other city, state and national agencies, in regular tabletop exercises or simulations to test such plans and resources in the face of expected climate change scenarios. This planning and training should explicitly include consideration of vulnerable populations.

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
<p>All programs located at Northampton Square/Miranda Creamer (particularly Public Health Preparedness and EMS) and tenants of the apartment towers at Northampton.</p>	<p>Flooding in the area may cause damage to electrical service connections and other utilities on the ground floor that could interrupt operations at the building for several days after flood waters recede.</p> <p>Flooding in this area could isolate the numerous tenants of the residential towers from necessary services. Low income tenants may be particularly vulnerable due to lack of alternate resources for evacuation or shelter in place.</p> <p>The Office of Public Health Preparedness coordinates emergency response and recovery for the Boston Public Health Commission as well as among public health, EMS, healthcare, and social service providers through the Stephen M. Lawlor Medical Intelligence Center (MIC) located in the Miranda Creamer Building/Boston EMS Headquarters</p>	<p>20+ years</p>	<p>H</p>	<p>BPHC has evaluated the COOP including the vulnerability of backup resources in the COOP with the Office of Public Health Preparedness. Resident evacuation should be part of the larger city planning for mass evacuation in the event of a natural disaster.</p> <p>Potential impacts on public health preparedness and emergency response infrastructure such as Boston EMS resources and OPHP/MIC should be further evaluated and amended in the COOP including alternative/backup locations and surge capacity for more frequent and prolonged activations.</p>
<p>Finland Building and Woods Mullen Shelter (773-780 Albany Street)</p>	<p>BMC had flooding in the basement of the Mallory Building (774 Albany Street) a few years ago. The flooding was groundwater infiltration that, upon testing, was found to be seawater/salt water. These properties are in the same area and at the same elevation and thus vulnerable to water table rise which is much less temporary than a flood.</p> <p>Building systems in basement space are at risk (electrical, heating, elevator, etc.), occupants are at risk of poor indoor air quality from mold growth, and building structure may be compromised by water table impacts on soil/foundation.</p>	<p>Current to 5+ years</p>	<p>H</p>	<p>BPHC will coordinate with BMC on flooding prevention efforts in the area and incorporate this risk into COOP.</p>

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
All programs at 1010 Mass. Ave (HIV/AIDS, ITS, Communicable Disease, Env. Health, Chronic Disease, Finance & Administration, etc.)	1010 Massachusetts Ave. is located in an area identified as potentially vulnerable to flooding and sea level rise in the future. Flooding at the 1010 Mass Ave. location may cause damage to electrical service connections at the ground floor and below ground that may stop operations at the building for several days after flood waters recede. Water damage and mold growth in the building may extend this period of time. BPHC office and field staff (outreach workers, inspectors, etc.) may be unable to access the office or needed assets at the office and flooding may hamper field staff travel through the city.	20+ years	L	Disruption of operations for 1-2 days is not likely to have a serious negative impact. Continuity of Operations Plan addresses maintaining emergency response capability and connectivity of inspectors and management from scattered locations in the event of a snow storm/blizzard and this could be adapted to flooding as well.
Information & Technology Services	Commission data center has been moved from 1010 Mass Ave. (low/no backup power capacity and HVAC/heat issues) to Boston City Hall on the first floor. This location has power generation backup, but is it vulnerable to flooding?	30+ years	M	Issue addressed by DoIT at City Hall as part of their climate change vulnerability assessment
Emergency Medical Services	Ambulance garaging locations throughout city could be vulnerable to flooding. Some ambulances don't have a proper garage but remain out on the roads; possibly at risk in an extreme storm. Operation of ambulance service during widespread flooding or severe winter storm is part of EMS operational planning and should be addressed in separate EMS climate vulnerability assessment.	20 years	H	EMS maintains standing agreements with Boston Properties and other private entities for emergency garaging of ambulances during extreme storms. Evaluation of vulnerable facilities to sea level rise and storm flooding is ongoing as part of the COOP process.
Homeless Services – Long Island	There is no air conditioning at the Long Island shelter making prolonged heat waves a risk, particularly when combined with medically vulnerable clients and the long distance back to the mainland medical services.	20 years	M	Need to upgrade infrastructure or identify resources on mainland to provide services and heat relief to 400+ clients if a prolonged heat wave forces closure of the shelter.
Homeless Services – Long Island	Heavy storms and winds currently disrupt electrical power to the island which runs across the bridge.	Current	L	The island has electrical generation capability to run for up to 3 days that does not appear to be vulnerable to

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
Homeless Services – Long Island	Facilities on Long Island supply clean linen and prepared food for the Woods Mullen shelter which lacks facilities for this. Flooding or storm isolation of the island cuts off these services to the 160-200 clients at Woods Mullen.	Current	M	flooding even in extreme sea level rise scenarios. But longer disruption with an inability to get more fuel would require evacuation or additional infrastructure. Woods Mullen has some food storage but no means for cooking/prep. Hot meals would depend on infrastructure improvements or on emergency services/evacuation for clients. Current planning calls for cold meals and relocation.
Homeless Services – Long Island	Storms, wind, and flooding can close off the bridge either trapping staff and clients (about 450 people) on the island or preventing staff/clients from accessing the island. Transport of clients to/from the island is also disrupted when the MBTA stops service (as happened with the Marathon bombing).	Current	M	If the island is not accessible there is a need to find some other location to provide services to 400+ homeless clients on the mainland. Currently, staff may work double or triple shifts if isolated on the island due to a storm (Sandy, etc.) but prolonged closure would exceed staffing capacity and need some way to get people off. Loss of access to the island for short duration is covered in the COOP and planning for prolonged/indefinite loss will be part of future COOP drafts and will include exploration of options for boat transportation of clients/staff to/from the island.
Homeless Services – Long Island	Transportation disruption to/from the island puts medically vulnerable clients at risk – currently have as many as 5 ambulance calls per day on a routine basis. Also issues of clients who use alcohol/drugs detoxing (potentially life threatening) or clients cut off from methadone treatment if the island is isolate. Finally, risk of	Current	H	Currently, an ambulance and crew are stationed on the island in preparation for major storms and medication/treatment can also be procured from BFD and drug detox programs located on the island. Such on-site resources are only sufficient for a day or so. Currently planning for

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
	issues with mentally ill clients and clients going through withdrawal trapped on the island being possible safety hazard.			long-term disruption involves evacuation by boat as infrastructure (a dock capable of accepting larger ships/barges) is in place.
Homeless Services	Increased frequency and severity of extreme weather (heat waves and winter storms particularly) may force additional homeless individuals who currently remain on the streets to seek shelters which may require additional capacity. There will also always be those who choose to remain outside the shelter who will more frequently be at greater risk to life and health – thus requiring additional resources.	10+ years	L	Increase in shelter use likely to only be marginal, but should be assessed more fully in the context of any capacity/budget “tipping points.” Some individuals will also be served through existing heat wave response plans that activate city cooling centers. Preparing for those who remain on the streets to be more frequently at greater risk of harm should be part of longer term planning similar to existing response plans for winter storms and extreme cold.
Addiction services (Frontage Road)	Addiction services runs methadone treatment clinics that could be impacted by flooding or flooding could prevent clients from accessing services; putting clients at risk of adverse health outcomes from withdrawal and/or relapse.	10+ years	M	COOP planning includes anticipated disruptions to service, but additional evaluation based on longer closure scenarios should be conducted.
Infectious Disease	Extensive flooding could prevent patients in treatment for tuberculosis from accessing the clinic, causing a gap in treatment that could contribute to risk to the individual patient, risk of spreading illness to others, and increased risk of developing antibiotic resistant TB	10+ years	L	Current COOP includes planning for extended closure. Most critical patients would be visited in their homes by outreach staff to insure continued treatment. It is important to note that the clinic is part of the Boston Medical Center facilities and thus benefits from all actions and plans in place to ensure that resource remains available to the residents of the city despite climate change/emergency.
Infectious Disease	Vaccines and some medications require temperature controlled (refrigerated) storage at	10-20 years	L	Most facilities have backup power generation which, combined with

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
	undisclosed emergency response storage facilities, hospitals, and health centers. Flooding, storm, or heat wave induced power outages put these supplies at risk of spoilage. This is particularly of concern during a serious flu season. Could also impact storage at health centers across the city.			insulation, allow for storage for long enough to ride out most small disruptions. Should plan contingencies around longer disruptions and assess flood vulnerability of backup generators.
Environmental Health	Flooding in various areas of the city could result in contamination of homes with flood waters, sewage, home heating fuel (floating oil tanks in basements), and other chemicals. This will require a massive response to insure proper cleanup protective of the public health.	20+ years	M	Coordinate with BWSC and ISD on educating the public about resiliency measures that can be taken to prevent these hazards. Coordinate with Public Health Preparedness, BFD, BPD, and EMS to insure first responders are trained and aware of hazards and how to deal with them.

Boston Public Health Commission Clients/Community Climate Change Vulnerability Assessment

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
Public Health Preparedness and EMS	More frequent extreme weather events (floods, storms, blizzards, heat waves) will require more preparedness and mitigation, frequent mobilization of staff and resources for appropriate large-scale responses (evacuation, cooling centers, emergency shelter, mass care/health and human services) and emergency response to individual medical emergencies (heart attacks, asthma attacks, drowning, injuries, etc.).	20+ years	M	Long-term planning for additional staff and equipment, more frequent training for response scenarios based on severe weather, public education and outreach about how/when warnings/information will be issued in advance of a storm or heat wave and appropriate action to take. Identify additional emergency cooling centers and shelter/evacuation sites and a plan for activating them as needed.

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
Public Health Preparedness	Socially vulnerable populations dependent upon public health services and the healthcare system experience disproportionate physical, psychological, economic, and social impacts from emergencies of any size or type. People who have been identified as socially vulnerable include those who are children, older adults, people of color, low-income, living alone, single parents, non-English speaking as well as those who suffer from chronic physical and mental illness, disabilities, low-literacy, among others. The services and systems that support these populations experience higher demand and therefore need to have coordinated surge capability and capacity in response to more severe weather patterns.	Current	H	The Office of Public Health Preparedness has been coordinating with public health, social service, and healthcare providers to enhance capabilities and capacity to meet the needs of vulnerable populations. Additionally, OPHP has partnered with community, faith-based, and private sector partners who provide services, products, and employment for vulnerable populations. Efforts such as the Boston Healthcare Preparedness Coalition, Community Preparedness, and the Boston Health Resilience Network must continuously be supported to reduce negative health outcomes after emergencies and strengthen health resilience in the City of Boston, particularly for those most vulnerable.
Homeless Services	More frequent and severe extreme weather (storms, heat waves, etc.) may put short-term increased demand on shelter services as conditions become so harsh that homeless individuals who may have remained on the streets in the past are forced to the shelters. Additionally, those who still remain on the street will be at even greater risk of exposure-related adverse health effects.	10+ years	L	Increase in shelter use likely to only be marginal, but should be assessed more fully in the context of any capacity/budget “tipping points”. Preparing for those who remain on the streets to be more frequently at greater risk of harm should be part of longer term planning of services as well.
Infectious Disease, Environmental Health, BPHC in general	Climate change can increase risk of mosquito-borne diseases such as EEE, WNV, etc. due to longer warm mosquito seasons and changed precipitation patterns. This could be an increased threat to the population in general. Widespread infection of any disease(s) could reduce BPHC staffing available to respond.	20-30 years	M	Mosquito control efforts are the responsibility of Suffolk County Mosquito Control (spraying) in coordination with Boston Water and Sewer (larvacides in catch basins) and possibly Parks Department (treatment of ponds). Possibility of a need for

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
	Response to concerns by city residents about pesticide exposure may tax staffing capacity.			additional public education efforts on control by eliminating breeding sites. Environmental Health coordinates with these agencies to plan mosquito control responses and public education/information.
Chronic Disease Division	Warmer temperatures overall will likely increase growing seasons and thus the pollen season which can cause problems for individuals with asthma and allergies. Warmer and wetter (climate change) is predicted to alter the patterns of precipitation) could increase mold growth and promote the spread of insects that are also asthma triggers. Heat waves can also trigger asthma attacks, as can exposure to dust and indoor air pollution from remaining indoors during hot weather or storms.	10+ years	M	Existing infrastructure is in place to inform the public of bad air quality days. This system can be continually expanded and improved to “get the word out.” Existing efforts of the BPHC work with health centers and physicians around patient education for proper asthma management following individualized asthma management plans. Outreach and public education programs can be expanded as needs and resources change.
Chronic Disease Division	Heat waves and more frequent storms may promote a more sedentary lifestyle as people remain indoors more often during inclement weather. This could contribute to reduced physical activity, obesity, and all the health problems that come with it including heart disease, hypertension, diabetes, stroke, etc.	30+ years	L	Existing outreach and education efforts promote physical activity and access to healthy food. Interventions that promote these are also tied to climate change adaptation; specifically green space for physical activity reduces urban heat island effect and improves storm water management.
Health Care System Infectious Disease Role – both those issues intersecting with BPHC and those not directly addressed by BPHC	Longer warmer weather can promote the spread of deer ticks which could increase the incidence, prevalence, and geographic range of Lyme Disease and other illnesses. Climate change will also drive increased contact between humans and wildlife	10+ years	L	Existing disease surveillance and response systems by public health and health care systems (hospitals, health centers, federal agencies, etc.) should be sufficient to address the risk for the

Facility/Program	Vulnerability	Timeframe	Priority (L, M, H)	Comments, next steps, ongoing efforts
	<p>which will increase risk of zoonotic infections such as rabies or expand the range of vector-borne illnesses.</p> <p>Climate change will alter water and crop/food production patterns which could contribute to spread of food- and water-borne illness.</p>			foreseeable future.

Boston Public Schools

Boston Public Schools (BPS) is a leader within the City of Boston in reducing the use of natural resources and since 2005, has reduced its municipal GHG emissions by 12 percent. Important initiatives such as single stream recycling, energy efficiency technology upgrades, energy management through a district-wide building management system and student led green teams, are all important efforts to maintain BPS' GHG reductions, even while we expand enrollment and increase the number of hours our buildings are in operation.

In FY 2014-2015, BPS climate vulnerability goals are to:

1. Incorporate climate vulnerability into annual needs assessment when setting capital project priorities.
2. Develop a process for ensuring that the potential for climate vulnerability, (especially flooding, severe storms, and increased heat waves) is considered when conducting repair and small renovation projects.
3. Prioritize 1970's era schools that are in the capital plan for renovation. Develop a process for ensuring that the potential for climate vulnerability, (especially flooding, severe storms, and increased heat waves) is considered in the capitol construction projects taking place at the following schools:
 - Charlestown High School (HVAC renovation in progress, to be completed 2014)
 - Mario Umana (roof and building structure)
 - Jackson Mann (HVAC replacement)
 - West Roxbury Education Complex (HVAC replacement)
4. Ensure that climate vulnerability is integrated into the conversation during the planning, design and construction of BPS' new school projects:
 - Dearborn STEM School (proposed demolition, summer 2014)
 - Quincy Upper/Boston Arts Academy building in Chinatown (proposed completion, fall 2016)

2050 Flooding - 3 ft Sea Level Rise	Vulnerability Area (time frame)	Priority	Ongoing/Next Steps
QUINCY UPPER SCHOOL at ABRAHAM LINCOLN BLDG	152 Arlington St. 140 Arlington St.	M	Future work at these schools and surrounding sites must address climate change and the potential for flooding as well as related impacts (mold growth, structural deterioration, cost for repairs). Abraham Lincoln & Quincy Annex buildings will be repurposed once students from the Quincy Upper move (2-5yrs).
QUINCY UPPER at ANNEX/CHURCH	20 Church St.	M	
DEVER ES	315 Mt. Vernon St.	M	
EEC E BOSTON	135 Gove St.	M	
KENNEDY ACADEMY FOR HEALTH CAREERS at FARRAGUT	10 Fenwood Rd.	M	
HURLEY K-8	70 Worcester St.	M	
KENNEDY P J ES	343 Saratoga St.	M	
PERKINS ES	50 Rev. Burke St.	M	
SNOWDEN HS	150 Newbury St.	M	
OTIS ES	218 Marion St.	M	
MCCORMACK MS	325 Mt Vernon St	M	
MCKAY K-8	122 Cottage St.	M	
ORCHARD GARDENS	906 Albany St.	M	
MCKINLEY ES MACKEY	90 Warren Ave.	M	
2050 - 3 ft Sea Level Rise & Cogen systems	Vulnerability Area (time frame)	Priority	Ongoing/Next Steps
HARVARD KENT ES	50 Bunker Hill St.	M	Future work at these schools and surrounding sites must address climate change and the potential for flooding as well as related impacts (mold growth, structural deterioration, cost for repairs). Replacing roof at Umana (immediate). Seawall needs to be rebuilt and a complete HVAC upgrade needed at Umana.
MURPHY MS	1 Worrell St.	M	
MARIO UMANA MS	312 Border St.	H	

2100 - 6 ft Sea Level Rise	Vulnerability Area (time frame)	Priority	Ongoing/Next Steps
CARTER DEVELOPMENT CENTER	96 Northampton St	M	Raising funds for a renovation/addition to the school, which would at minimum meet LEED Silver certification. New rooftop HVAC systems planned for replacement in FY14.
ADAMS ES	165 Webster St.	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
BURKE HS	60 Washington St.	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects. Roof replacement in FY13-15 capital project list.
EDWARDS MS	28 Walker St.	M	HVAC upgrade in 2012-2013. Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
BOSTON LATIN SCHOOL	78 Louis Pasteur Ave.	M	School is fundraising for a Rooftop Sustainability Learning Laboratory and should consider wind and storms when engineering the design.
MASON ES	150 Norfolk Ave.	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
PERRY K-8	745 E. Seventh St.	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
Community Centers		Priority	Ongoing/Next Steps
ALL	NA	NA	All community center sites have emergency generators, which are tested on a regular basis. Each site should be considered for a back up generator in the case of loss of electricity. AC should be considered for gymnasiums at these sites in the case of a summer shelter event.
WEST ROXBURY HIGH SCHOOL	1205 VFW PKWY	H	Paving and site work is needed. Work will take into account flooding vulnerability.
CHARLESTOWN HS	240 Medford St. / 255 Medford St.	M	Complete lighting & HVAC retrofit 2012-2014 are locating boiler rooms on higher elevation.
CONDON ES	220 D St.	H	Electrical switch gear needs replacing and a study should be done to determine cost for relocating on higher floors.
HARVARD KENTES	50 Bunker Hill St.	M	HVAC upgrade in FY13-15 capital project list.

MURPHY K-8	1 Worrell St.	School is a community center - must remain open during emergencies. HVAC and pool are on the first floors. Elevator is subject to breakdown due to flooding or loss of electricity.	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
MARIO UMANA MS	312 Border St.	School is a community center - must remain open during emergencies. HVAC systems are in need of replacing (1-5yrs). Roof failing and needs replacing (immediate).	H	Replacing roof. Seawall needs to be rebuilt. Complete HVAC upgrade needed.
MADISON PARK VOC TECH HS / O'BRYANT MATH & SCIENCE HS	55 New Dudley St. / 75 New Dudley St. / 75 Malcolm X BLVD.	Flooding potential from sea level rise and storm surge (50-100yrs). School is a community center - must remain open during emergencies. Switchgear needs replacing (immediate). Elevator is subject to breakdown due to flooding or loss of electricity (immediate).	M	Switchgear replacement and masonry restoration in FY13-15 capital project list.
HARBOR MS & CASH HS at CLEVELAND NEW	9 Charles St.	School is a community center - must remain open during emergencies. Elevator is subject to breakdown due to flooding or loss of electricity.	M	New chiller, tower and pumps being completed 2013-2014. Switchgear moved from basement to first floor in FY13-14.
BLACKSTONE ES	380 Shawmut Ave.		M	
HENNIGAN ES	200 Heath St.		M	
HOLLAND ES	85 Olney St.		M	
JACKSON/MANN K-8	40 Armington St.		M	
JOSEPH LEE ES	155 Talbot Ave.		M	
LILLA FREDRICK MS	264 Columbia Rd.		M	
MATTAHUNT ES	100 Hebron St.		M	
MILDRED AVE.	1 Mildred Ave.		M	
OHRENBERGER	1 Willers St.		M	
QUINCY ES	885 Washington St.		M	
Other			Priority	Ongoing/Next Steps
ELIOT K-8	18 Charter St.	Flooding potential from storm surge (immediate).	H	Renovation/addition being planned for the school 2013-2015. Flooding and storm surge potential will be a factor when designing the project.
TECHBOSTON at DORCHESTER HS	9 Peacevale Rd.	Neponset River runs under building and sump pumps run continuously in basement to keep space dry. Elevator is subject to breakdown due to flooding or loss of electricity (immediate).	M	Flooding and storm surge potential will be a factor when making alterations, repairs or implementing capital projects.
ELIOT at COMMERCIAL STREET	585 Commercial St.	Flooding potential from storm surge (immediate). Elevator is subject to breakdown due to flooding or loss of electricity (immediate).	H	Building being renovated to house Eliot school students. 1st phase being completed for Sept 2013, other floors will be renovated 2013-2015.
FENWAY HS / BOSTON ARTS ACADEMY	174 Ipswich St.	Basement floods often and a sump pump is required. No trees or pervious surface nearby. Elevator is subject to breakdown due to flooding or loss of electricity (immediate).	M	Relocation proposed for the Arts Academy & Fenway HS (the two school programs in the building). The future use of the building will consider climate change and flooding potential.

	Vulnerability Area (time frame)	Priority	Ongoing/Next Steps
CAPITAL IMPROVEMENT PROJECTS	Limited resources to meet the growing deferred maintenance and capital improvement needs (immediate). As a result, buildings are deteriorating - leading to unhealthy learning and working environments and increased maintenance and repair costs longterm (immediate - 50yrs).	H	The BPS capital Plan must take into account the deferred maintenance list and capital project needs in the short term and medium term. In addition, the Plan should address climate change impacts on school sites, buildings, maintenance, health, and more. Additional resources should be invested in proactive planning and green repair/construction to ensure schools are efficient, healthy, safe and can remain open into the future.
STAFFING	The majority of school construction takes place over the summer causing concern for heat stress for workers (immediate). Project timelines and site maintenance needs will be impacted due to heat and extreme weather events (immediate).	M	Consider changes to work hours and job functions for outdoor workers. Plan for longer project timelines, especially during summer months. Increase budget for custodial and snow removal in anticipation of more extreme winter storm events.
FREEZE THAW - STRUCTURAL	Increased freeze/thaw cycles will increase structural damages (immediate).	M	Allocate additional resources to address capital repairs, especially pointing and masonry. Build in anticipated needs to the Capital plan.
SEA LEVEL RISE & FLOODING	Based on sea level maps, 18 schools are prone to flooding due to sea level rise (15-50yrs) and several others near rivers already flood on a regular basis (immediate). Flooded schools will be inaccessible, will suffer repeated water damage, and may need to be abandoned.	M	The BPS Capital Plan must address flooding potential as well as related impacts (mold growth, structural deterioration, cost for repairs) and make recommendations for flooding prone sites as it relates to building and site infrastructure. Flooding and storm surge potential needs to be a factor when making alterations, repairs or capital repairs at schools.
SNOW, WIND & RAIN STORMS	Older roofs and large flat roofs prone to issues (leaks, fly off, collapse) due to strong winds and severe winter storms (immediate). Storms with heavier rainfall are already causing increased leaks and water retention in the basements of schools, which weakens the building structure and creates mold/mildew growth (immediate).	H	Annual assessments of roof conditions completed. All roof replacement projects should account for the likelihood of heavier snowfalls, increased storm intensity, and increased winds. Solar systems and other rooftop equipment should also account for this. Will need to prioritize roof repairs in order to reduce mold growth and further building damage.

Boston Redevelopment Authority

The Boston Redevelopment Authority (the “BRA”) considers Climate Preparedness an integral part of building sound and responsible development in the City of Boston. One of the BRA’s top priorities as it relates to Climate Preparedness is the development of Climate Change Resiliency and Preparedness Guidelines (the “Guidelines”) for developers in Boston. As developers continue to do business in Boston, the BRA, along with the Mayor’s Environment Department, must make sure there are standards and policies by which developers abide by when addressing Climate Preparedness. The BRA believes these Climate Change Resiliency and Preparedness Guidelines will set a standard for development nationwide.

Some of the most vulnerable properties within the BRA’s property portfolio are the Boston Marine Industrial Park and the Charlestown Navy Yard. These properties are at a greater risk of flooding due to their proximity to the Boston Harbor, the threat of sea level rise, and greater storm intensity. As landowner of these properties, it is an important priority for the BRA to work with the lessees of these properties to conduct a thorough inventory of the vulnerabilities of these properties caused by climate change. This inventory will serve as the basis for the BRA to develop an Action Plan for evacuation and relocation of the lessees.

A positive development project in the movement towards Climate Preparedness is the Spaulding Rehabilitation Center (the “Center”) in the Charlestown Navy Yard. Adjacent to the Center, the Parcel 5 Park (the “Park”) will also be a model for sustainability in public spaces. The Park has been designed with proper elevations to mitigate coastal flooding impact and surging tides. Also, the Park’s permeable surface will help mitigate flooding to the direct abutting areas. In the future, the BRA will use this Park as a model for open spaces within close proximity to flood plains.

The BRA’s ultimate priority is to make sure that the development community delivers sound and responsible buildings that can better serve the citizens of Boston and the environment.

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Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
Boston Marine Industrial Park (BMIP) (BRA, Property Management)	The BMIP is at a greater risk of flooding due to its proximity to the harbor, the threat of sea level rise and greater storm intensity	10-20 years to be in 100-year flood plain	High	Conduct a thorough inventory of properties and leases within the coastal flooding area and their uses. Coordinate an Action Plan with leasees for relocation and evacuation. A stockpile of barrier and sand bags in key areas of BRA properties to prepare for storm surges is being planned	All businesses are above anticipated flood levels due to loading docks at first floors. Also of note is that the BMIP has no basements
New Nstar Power substation @BMIP (BRA, Property Management)	Construction on the New Nstar Power substation in the BMIP is underway. Sea level rise could compromise the substation's operation and in turn that of the businesses in the BMIP	In Progress	High	New Nstar Power substation in the BMIP to be designed and built to deal with storm surges and rising tides. Portable standby electrical generators with associated switch gears are planned to be purchased. These generators could assist getting business in the BMIP up and running during extended power outages, such as seafood and food producers	
Sewer and Storm water system @BMIP (BRA, Property Management - in conjunction with Boston Water & Sewer)	BMIP's storm drains have potential to cause flooding in event of sea level rise	In Progress	High	Implementation of storm drain and sewer improvements	
BRA gas pump location adjacent to Dry-dock #3 (BRA, Property Management)	Sea level rise could potentially compromise gas pump at Dry-dock #3	In Progress	Medium	A review of the gas pump location is underway along with a study of possible relocation	
Charlestown Navy Yard (BRA, Property Management)	The Charlestown Navy Yard is at a greater risk of flooding due to its proximity to the harbor, the threat of sea level rise and greater storm intensity	10-20 years to be in 100-year flood plain	High	Conduct a thorough inventory of properties (outside of the Historic Monument Area) and leases within the coastal flooding area and their ground floor uses. Coordinate an Action Plan with leasees for relocation and evacuation	For leasees with major electrical uses consider relocation to building levels above floodplain
Permits under Article 80 Review (BRA, Policy)	The threat of Coastal Flooding will affect all projects approved by the BRA within proximity of the floodplain	In Progress	High	The BRA is currently working on developing a set of Climate Preparedness guidelines that developers will adopt within their development plans.	

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
Harbor wide Floating Docks (BRA, Property Management)	The threat of Sea Rise could affect the mooring of Floating Docks on BRA property	In Progress	Medium	Study to inventory current stock of floating docks and other marine facilities to determine impacts of storm surge in the Harbor and necessary corrective actions	
Parcel 5 Park (BRA, Property Management)	Construction on the new Parcel 5 Park is underway. Sea Level Rise could compromise the park facilities	In Progress	High	New Parcel 5 Park to be designed with proper elevations to avoid coastal flooding impact and surging tides. The Park's permeable surface will help mitigate flooding to the abutting area	
Long Wharf / Central Wharf / Sargent Wharf (BRA, Property Management)	The wharves will be greatly impacted as a result of storm surge and coastal flooding	In Progress	High	A vulnerability analyses and sample preparedness plans for Long and Central Wharves was drafted in 2013 through a collaboration between the Barr Foundation, Boston Harbor Association and UMASS Boston Urban Harbors Institute	

Boston Transportation Department

Climate Preparedness Task Force

Transportation

Ambitious yet attainable goals to reduce the City of Boston's greenhouse gas emissions 25 percent by 2020 has city officials and employees focused on measures that will help to slow and limit emissions throughout the Boston metropolitan region. These efforts, however, work hand in hand with practices, technologies, and techniques that address the macro-planning needed to adapt our transportation assets for imminent threats of climate change. These include sea-level rise, storm surge, temperature variations and other disruptive natural weather events that can be unpredictable.

As suggested by the U.S. DOT Climate Adaption Plan, 2013 report, the City of Boston will address preparedness for climate change planning and policy by focusing on:

- Existing Infrastructure Resilience – design standards, service life decisions (replace or abandon)
- New Infrastructure Resilience – projected climate changes incorporated into planning & design
- System Resilience – transportation modes & multi-system owner coordination

BTD will continue to move towards fully integrating considerations of climate change and variability in department policies, programs and operations. Additionally, as part of the newly adopted Boston Complete Streets Guidelines, a decision-making framework will be created that more adequately accommodates uncertainty and incorporates more probabilistic approaches to assessing risk and making investment choices.

The following identifies climate preparedness transportation planning and policy priorities acting in concert with the attached 'Operations Matrix.'

Priorities

1. Network

BTD will develop objectives during all stages of emergencies to include prior-to, during and post-emergencies. BTD will focus on its role in larger efforts of coordination with State and Federal Emergency Management offices to assist in overall emergency objectives. An inventory of BTD transportation infrastructure has been initiated. BTD assets representing the infrastructure and its value (both economic and physical replacement value) will be planned accordingly based on the susceptibility of the infrastructure to damage from the hazards. This action will help to maintain network performance in light of climate change projections to determine whether, when, and where the impacts of projected changes could be consequential.

Network Examples:

- City interconnectivity with transit, state (tolling, transit payments, on-time technologies, cameras)
- Road closings, alternative routes
- On-time messaging for asset failure or closures in emergency

2. Planning & Review

The location of transportation infrastructure can help shape the long-term development patterns and markets well beyond the 30-year time frames of many public-sector capital improvements and private sector capital budgeting analyses. In accordance with the Transportation Research Board's report on *Potential Climate Change Impacts*, the City will consider the context of each development and assess potential hazards, threats or conditions. BTD will continue to enforce climate action planning in its Transportation Access Plan Agreements (TAPA) with new developments.

Planning & Review Examples:

- Identify long, medium, and short-term planning- new projects to be considered: (city-car share, re-location of city assets based on sea-level rise)
- TAPA agreements (emergency management plans as considerations for TMAs, and building owners)
- Emergency management & coordination agreements as back-up options for failed city assets: (Duck boats, TMA shuttle-buses)

3. Operations Coordination

The greater the extent of the vulnerability, the greater the risk is for transportation systems and infrastructure. BTD transportation vulnerabilities to climate impacts will be evaluated alongside other risks to ensure better management of assets, and ultimately ensure the long-term viability of City assets. Operations Coordination and its assets are further explained in the attached inventory 'Operations Matrix'.

Operations Coordination Examples:

- Emergency management plans & coordination with Public Works & BTD Operations Yard (assets, new purchases, site locations, accessible vehicle types during inclement weather, back-up power generation...)
- Emergency response, evacuation plan coordination, and modifications to these plans will be anticipated based on different service disruption scenarios

4. Stop-Gap Measures

BTD will develop and implement a program of adaptation strategies for the near and long terms. These programs will periodically assess the effectiveness of adaptation strategies and determine long-term investment.

Stop-Gap Measure Examples:

- Short-term/pilot projects: examples of solar charging ports for phones, solar back-up for EV car-charging)
- Testing technologies, materials, and other hazard-related tools to prepare of use or bulk purchases (examples include inflatable barriers to block asset flooding)

Facility, Program, Service or Policy Name	Describe Vulnerability	Priority (High, Medium, Low)	Ongoing or next steps
State & City Intergovernmental Coordination	Avoid planning in vacuum to avoid duplicate investments, etc.	H	high level kick-off & guidance, for example: determine what state plan is for state transit & highway tunnels, establishment of communication protocols; planning for temporary transit service in event subway systems are compromised; Develop standard plans for implementing high-occupancy-vehicle requirements
Snow Emergency Plan	"Snow Plan" is BTD template. Examine whether additional emergency plans need to be developed	H	Any enhancements to Snow Plan will be iterative and in tandem with efforts below
Frontage Rd Enforcement and Southampton St Operations Facilities	flooding	M	Can / should both facilities be moved (& combined)? Examine costs & benefits
Southampton St Operations facility	flooding	M	Draft a continuity-of-operations plan. Brainstorm re: intra and inter departmental coordination; prioritize continuity of services & functions; various scenarios such as abandon building (evacuation protocol) or carry-on w/generator power; Where do generators need to be purchased; Examine feasibility of establishing emergency operations at BPW maintenance yard; etc.
Frontage Rd Enforcement Facility	flooding	M	Draft a continuity-of-operations plan. Brainstorm re: intra and inter departmental coordination; prioritize continuity of services & functions; various scenarios such as abandon building (evacuation protocol) or carry-on w/generator power; Examine feasibility of establishing emergency operations at DPW maintenance yard; etc.

Facility, Program, Service or Policy Name	Describe Vulnerability	Priority (High, Medium, Low)	Ongoing or next steps
Traffic Management Center & Southampton St Operations facility	flooding - control box physical exposure	M	Brainstorm re: increasing the height of concrete foundations (typically about 6- 8 inches) for new installations. Explore feasibility & cost/benefit of retrofitting vulnerable locations - neighborhood issues with esthetics
Traffic Management Center & Southampton St Operations facility	control box functionality along evacuation routes	M	Review inventory in terms of age of control boxes & functionality (e.g., can box be controlled remotely, etc.)
Traffic Management Center & Southampton St Operations facility	flooding - Underground conduit exposure	M	Develop plan for NEW construction to install waterproof conduits
Traffic Management Center & Southampton St Operations facility	power loss: Back-up (battery) power at key locations	M	Review inventory re: key locations functionality; Determine where battery backups should be installed; Determine where additional master control backups should be installed (for a cluster of signals); Investigate installation of power inverters in vehicles to allow vehicle to provide electrical power to critical signals in event power is lost
Traffic Management Center & Southampton St Operations facility	Back-up local control for key signal clusters when connection to TMC is lost	M	Review inventory re: key locations functionality
Traffic Management Center & Southampton St Operations facility	wind - traffic signals and signal mast arm damage	M	Review inventory and determine exposure level
Southampton St Operations facility & Frontage Rd Enforcement facility	wind: traffic & parking sign damage	M	Determine efficiency & effectiveness of existing record system in terms of replacing signs that are taken down by high winds
Highway tunnels & underpasses (Central Artery state-owned, Rutherford Ave city-owned, etc.)	flooding	M	Identify and assess. Update traffic detour plans - Work with MassDOT to develop coordination plan

Facility, Program, Service or Policy Name	Describe Vulnerability	Priority (High, Medium, Low)	Ongoing or next steps
Flood prone roadways (Morrissey Blvd, etc.)	flooding	M	Assess and update traffic detour plans - Work with MassDOT to develop coordination plan
MBTA tunnels	flooding	M	Assess and update traffic detour plans - Work with MassDOT to develop coordination plan
Field operations -- A large % of BTD staff work in the field = potential staff health vulnerability issues in non-emergency situations	hotter weather: potential respiratory issues - functioning AC in vehicles important	M	review fleet issues
Field Operations	Colder weather: increase of employee injuries in snow/ice conditions	M	Examine training, procedures, equipment & clothing (e.g., non-slip boots, etc.)
Field Operations	Colder weather: issues with staff mobility without 4 wheel drive vehicles	M	increase number of 4 wheel drive vehicles
Evacuation routes	review routes and update as appropriate	H	Consult with regional agencies working on this issue for updates
Communications	review wireless reliability	H	City-wide effort
Communications	review 2 way reliability	H	City-wide effort
Office of Parking Clerk	Potential disaster scenario at data processing vendor facility in New York	M	Review data processing vendor's emergency management, data protection, and data center continuity of service plan
Office of Parking Clerk	Loss of City Hall electric / power and access to City Hall	M	Draft a continuity-of-operations plan.
Street Occupancy Management - Permit System	Loss of City Hall electric / power and access to City Hall	M	Draft a continuity-of-operations plan.

Housing and Neighborhood Development

Priority 1: Minimize disruption of vulnerable neighborhood businesses and commercial districts

There are a number of neighborhood commercial districts that include a large number of small businesses that are vulnerable to flooding along Boston's coast line. These businesses are typically within low-rise/one story commercial buildings that would be particularly vulnerable in the event of a catastrophic coastal flood. The small business commercial districts within the projected flood zone would include: Dorchester, South Boston, Charlestown, East Boston and the North End. There are hundreds of small businesses within these areas that are particularly at risk due to their location and building type. These small businesses also provide important services and products to residents of these neighborhoods and would be greatly disrupted in the event of a flood. In addition, these small businesses employ thousands of people from across Greater Boston whose jobs and financial security would also be a risk.

There were a number of important lessons and resources that enabled the city to successfully support businesses and employees after the Marathon bombing. Similar challenges and disruptions that the small business sector and their employees would experience could be: building and structural damage, business interruption insurance and other insurance related claims and questions, inventory loss, and employees' lost wages. All these would be even more challenging given the extended time a business would be closed in the event of a catastrophic event that could include extensive repairs to low-rise and other similar building types.

In preparation for such an event, public engagement and education of the small business sector would be vital to successful preparedness. Key planning with the small business community would, in advance, help businesses prepare their buildings/businesses for a catastrophic event.

Next steps could include:

- Research on key insurance available for businesses/commercial building owners within the identified flood zone area.
- Research what state and federal support services/insurance are available to businesses and their employees.
- Engagement of leaders within the Chamber of Commerce, Board of Trade, Main Streets district programs, and other business organizations within vulnerable areas.
- Host community forums with businesses in each neighborhood to hear their concerns and educate them on best business practices to prepare for such an event.
- Identifying building experts that could speak to improving infrastructure to prevent future events from having widespread impact.
- Creating a Climate Preparedness Resource/Best Practices document for small business.

Priority 2: Prepare and Educate Boston's Homeowners and Assistance Program Participants

Many homeowners live in areas that may be impacted by climate change, severe storms, or severe flooding. These homeowners need to be educated about the risks associated with climate change and their options for mitigating these risks. This includes pursuing appropriate insurance products to protect their investments in their homes. DND will work to better link the homeowners we serve throughout the City with insurance brokers and firms offering assessments to minimize the risk of loss.

Additionally, programs through DND's HomeCenter such as home repair funding, and foreclosure prevention assistance would be disrupted in a severe weather event. Access to office-based client records and information would also stop for the duration of the impact. Seniors participating in the Minor Home Repair or Emergency Home Repair programs would be particularly vulnerable. As a proactive measure, staff at the HomeCenter should educate this constituency on ways to keep safe during a storm, resources needed in its aftermath and the proper insurance needed to protect their property. The Home Center could also work with their community partners: Neighborhood of Affordable Housing (NOAH), Kit Clark Senior Center, ESAC, and United South End Settlements to expand their outreach to seniors.

Priority 3: Evaluate Supportive Housing and Housing Development Projects and Programs

Rental Housing Assistance, Supportive Housing, Housing Development and Openspace Programs that serve clients, fund development, and manage construction activities could be disrupted during severe storms or flooding associated with climate change. These programs serve vulnerable client populations through direct and indirect services to homeless persons, seniors, persons with AIDS and families and produce or renovate dwelling units for them as well.

The Supportive Housing Division works with a large number of residents that have their housing subsidized through these DND programs. If funding for these programs were disrupted for a significant time period, these services could be interrupted for lack of funding. A proactive conversation needs to happen with community partners to ensure continuity of payments in the event DND is inoperable.

For housing development and construction activities, DND will work with funded organizations to understand the risks associated with extreme weather events and assist them with implementing assessment tools and construction practices which can be used to minimize the risk of property damage, building failure, and the long term displacement of residents.

Priority 4: Prepare properties under DND Management

Maintenance and property management activities of city owned properties including both building and land under DND management would be disrupted in a severe weather event for the duration of the event's impact. Emergency property management planning and coordination for properties located along projected flood zones and otherwise at risk in a severe weather event is ongoing.

Facility, Program, Service or Policy Name	Describe Vulnerability	Priority (High, Medium, Low)	Ongoing or next steps/Comments
DND Offices at Court Street	Inaccessible/ basic operations would stop	Low	Identify location where DND staff could work in the event the building remains inaccessible for several weeks. Ramp up efforts to provide staff with technology to effectively work from home or alternative locations.
DND Offices In Hyde Park	Inaccessible/ basic operations would stop	Low	Identify location where DND staff could work in the event the building remains inaccessible for several weeks. Ramp up efforts to provide staff with technology to effectively work from home or alternative locations.
Neighborhood Housing Development, Rental Housing Assistance, Supportive Housing, Housing Development and Open space Programs	Client services and program funding disruptions, construction activities disrupted	Supportive Housing Funding Programs would be a HIGH priority. Construction related projects MEDIUM.	If funding for Supportive Housing programs were disrupted, a number of community partners could potentially make rental payments to landlords for a limited amount of time. A proactive conversation needs to happen with potential community partners to ensure that continuity of payments could happen if DND were unable to.
BHC Homeowner Repair, Homebuyer Assistance Programs and Home Center Office	Client services, Senior Homeowners, construction activities	Low, Medium for Senior Homeowners	As a proactive measure, the Home Center could educate Seniors and other homeowners while a project is ongoing on ways to keep safe during a storm, resources needed in its aftermath and the proper insurance needed to protect their property. The Home Center could also work with their community partners: Neighborhood of Affordable Housing (NOAH), Kit Clark Senior Center, ESAC, and United South End Settlements to expand their outreach to seniors.
Office of Business Development/Boston Main Streets	Client services, business activities	Medium	In preparation for such an event, public engagement and education of the small business sector would be vital to successful preparedness. Key planning with the small business community would, in advance, help businesses prepare their buildings/businesses for a catastrophic event.
DND Real Estate Management Portfolio	DND Maintained Land and Buildings	Low	Maintenance and property management activities of city owned properties both building and land under DND management would be disrupted in a severe weather event for the duration of the event's impact. Emergency property management planning and coordination for properties located along projected flood zones and otherwise at risk in a severe weather event is ongoing.

Department of Innovation and Technology

Final assessment to be release shortly.

Environment Department

As the department responsible for developing and overseeing the City's climate action plan, the Environment Department's highest climate preparedness priority is the continued monitoring of existing climate preparedness policies and practices, as delineated in the current plan, and making preparedness a primary focus of the 2014 Climate Action Plan update, as directed by the Mayor.

Regarding more specific areas of responsibility, Environment has identified four high-priority items:

1. Development of guidelines for property owners on how to reduce climate vulnerability. Environment has already started work with the Green Ribbon Commission and other external partners and with ISD, Public Health, Emergency Preparedness, and other offices. As these materials are available, Environment will use the Greenovate Boston platform and other communication tools to raise awareness of climate preparedness throughout the city and facilitate needed action.
2. Incorporation of climate preparedness into environmental review processes. In particular, Environment will continue its work with BRA and through its membership on the Article 37 Interagency Green Building Committee to complete formalization of the Committee's role in review of climate preparedness measures of new projects and of incorporation of climate preparedness criteria into the Article 80 review process. This will ensure that projects being built now will be ready for environmental conditions later in the century.
3. Development of local wetlands ordinance for proposal to the City Council. In February 2013, the Mayor directed the Environment Department to take this step toward explicitly incorporating climate change—in this case, sea-level rise—into the City's analysis of new projects. The department expects that the tools developed in this process—for example, projected floodplain maps for planning purposes—will be useful for other formal planning processes.
4. Increased documentation of historic sites on Boston Harbor Islands. For obvious reasons, the Harbor Islands are very vulnerable to sea-level rise and larger storms. They contain numerous historic sites, of which our knowledge is inadequate and which could easily disappear by the end of the century.

Facility/ Program, service/ Policy	Vulnerability/Time frame	Priority (H,M,L)	Ongoing steps/Next steps/Comments
<i>Historic Preservation</i>			
Aberdeen Architectural Conservation District	No immediately apparent concerns with regard to flood issues. The district is large and there may be areas that have local problems.	L	Research other potential climate change impacts.
Back Bay Architectural District	Built on fill. Potential for flooding from the Charles River as well as inland flooding and sewage back flow.	M	Review predicted flood maps and begin to develop a series of suggestions for owners of historic properties in areas likely to be impacted. Begin outreach to most threatened properties.
Bay State Road/Back Bay West Architectural Conservation District	Built on fill. Potential for flooding from the Charles River as well as inland flooding and sewage back flow. Within the Groundwater Conservation Overlay District. Develop procedures for working with the Groundwater Trust on overlapping issues.	M	Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
Bay Village Historic District	Built on fill. Potential for flooding from the Charles River as well as inland flooding and sewage back flow. Within the Groundwater Conservation Overlay District so develop procedures for working with the Groundwater Trust on overlapping issues.	M	Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
Historic Beacon Hill District	While much of the neighborhood on a hill part of it is on the flat. Temperature increases could have public health effects.	M/L	Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
Fort Point Channel Landmark District	Built on fill. Potential for flooding from Fort Point Channel. Within the Groundwater	M	Review predicted flood maps and begin on outreach to most threatened properties. Develop a

	Conservation Overlay District. Develop procedures for working with the Groundwater Trust on overlapping issues.		series of suggestions for owners of historic properties in areas likely to be impacted.
Mission Hill Triangle Architectural Conservation District	No immediately apparent concerns with regard to flood issues.	L	Research other potential climate change impacts.
South End Landmark District	Within the Groundwater Conservation Overlay District. Develop procedures for working with the Groundwater Trust on overlapping issues.	M	Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
St. Botolph Architectural Conservation District	Within the Groundwater Conservation Overlay District. Develop procedures for working with the Groundwater Trust on overlapping issues.	M	Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
Individual COB Landmarks	Varies.		Review predicted flood maps and begin on outreach to most threatened properties. Develop a series of suggestions for owners of historic properties in areas likely to be impacted.
<i>Archaeology program</i>			
Boston Harbor Islands	Erosion, inundation, burial recovery. Now-20 years.	H	Documentation, Data recovery through archaeological excavation of threatened sites and burial grounds.
-26 post-1630 historic military, maritime, medical, and burial sites			
-48 pre-1630 Native American sites			
-Unknown undocumented sites			
Faneuil Hall and Long Wharfs	Inundation 10-20 years.	M	Documentation of historic sites, archaeological excavation.
East Boston Waterfront	Erosion, inundation 10-20 years	M	Documentation of historic sites, archaeological excavation.
Maritime and lumber industries of the 17 th -19 th centuries			

***Conservation
Commission***

All wetlands and related areas subject to coastal flooding	Sea-level rise will increase frequency and extent of coastal flooding	H	Complete development of local wetlands ordinance, regulations, and flood-planning maps
Boston floodplain as delineated by FIRM maps	Coastal and inland flooding will increase; flood insurance will rise in cost.	M	Coordinate with other departments to qualify Boston with a higher rating under the Community Rating System to lower federal flood insurance rates.
Urban wilds owned by ConComm	Increased flooding and heat may affect health of urban wilds	L	Work with Parks and Recreation to identify urban wilds particularly at risk.

***Climate and
Environmental
Planning***

Environmental review of development projects	Increased flooding, storms, and heat will affect physical integrity, human safety, energy use in almost all projects in Boston	H	Work with BRA and Interagency Green Team to complete formalization of Green Team role and incorporation of climate preparedness into Article 80 review process.
Existing buildings throughout Boston	Same as above.	H	Work with Green Ribbon Commission, BRA, ISD, and other agencies to develop guidance for property owners, residential, commercial, and institutional, on steps they can take to reduce climate vulnerability.
Underground parking subject to APCC regulation	Subsurface parking in Seaport, Financial District, and other parts of Boston may be particularly vulnerable to increased frequency and extent of flooding	M	APCC will incorporate SLR-related questions in its permit application process and send climate information to current permit holders.

Office of Food Initiatives

Note: The Office of Food Initiatives endeavors to expand Boston’s capacity to produce, distribute and consume local food through urban agriculture and distribution models to supply schools and local businesses; and build a strong local food economy through financing and supporting local food retail and distribution businesses; and increase constituents’ access to healthy and affordable food in schools, farmers markets, and stores, educate the public about healthy choices, and promote food benefits to reduce hunger and obesity. Climate change has the capacity to impact the resiliency of the businesses and systems we are putting in place and our ability to create an environment that is able to provide access to healthy and affordable food for all of our residents.

Facility/ Program, Service/ Policy	Vulnerability/ Time Frame	Priority (H,M,L)	Ongoing steps/ Next steps/ Comments
Food Access	Urban kitchens are not designed for extensive food storage. During an extended shutdown residents will need access to additional foodstuffs. This is especially true of our seniors and homebound adults.	H	An assessment of food access points, including food banks and pantries in Boston’s flood plain needs to be performed.
	A number of Boston’s largest food pantries are located in the flood zone. Their food storage and capacity to operate will be impacted by 50 and 100 year floods.	M	Convene a food bank and pantry summit to explore their facility’s vulnerabilities and develop emergency contingency plans.
		L	Continue to support Boston residents’ personal knowledge of, and ability to grow, glean, and produce their own food.
		L	Continue to support the development of Boston-based urban agriculture endeavors, including community and traditional farming, aquaculture, aquaponics, hydroponics, rooftop and greenhouse farming, community gardens, urban orchards, and public fishing locations.

<i>Food Access (continued)</i>	Ensure that our most vulnerable residents have access to the food and resources they will need in order to cope with such an emergency.	H	Work with the Boston Public Health Commission, as well as the Office of Emergency Management, EMS, and Elder Affairs to assess what systems are in place to determine where our most vulnerable residents live and whether or not those organizations that currently feed these residents have emergency contingency plans.
Estimates suggest that there is enough food in the Boston food system, at any given time, to last between 3 to 5 days.	M	We need to better understand how our regional food system would be able to support the food needs of the city.	
<i>Economic Development</i>	Boston and Massachusetts have one of the largest and most robust seafood economies. Flooding could incapacitate the regional seafood infrastructure.	M	A statewide and regional food system assessment is underway. Evaluate facility vulnerabilities and determine emergency plans. The planning for such work would need MassPort's support and leadership.
<i>Urban Agriculture</i>	Destruction of crops due to flooding and/ or excessive heat	M	Evaluate which parcels will be affected by flooding so that farmers can begin to plan for such contingencies. Pilot storm water retention and in-ground wells with BWSC.

Constituent Services

Constituents in need of access to food call 4500 and are directed to Project Bread's Food Pantry Hotline. In an extended emergency of this nature, it is unclear how this system will be able to provide constituents with the information they will need to supplement their food needs.

M

Work with the Mayor's Office of New Urban Mechanics to develop a more robust communications protocol and infrastructure to determine and be able to communicate which pantries are able to open and can provide food and water resources.

Inspectional Services Department

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
ISD staff and Offices at 1010 Massachusetts Avenue	ISD Offices, records, IT and vehicles housed here, staff of 220+ report here, extreme weather events may prevent staff from coming to work, require evacuation or shelter in place. In addition, extreme weather may impact field staff who are generally off-site from 9-3 M-F as well as overnight staff. High-heat emergencies will affect field staff in particular.	next 18 months	high	need to update relocation and continuity of service plans, review 1010 evacuation plan as well as plans for "essential personnel only" events and extreme heat/weather safety training.	ISD offices are on the 3rd, 4th and 5th floors of 1010 Mass Ave, a former industrial building. While the site is some distance from water and ISD assets are largely 30 feet or more above the ground plane, access to the site may be limited and the building configuration and many windows make make it vulnerable to wind damage and projectiles. A significant portion of the ISD staff live outside of Boston and may have difficulty getting to 1010 in a weather emergency.
Building Division-Construction Permitting: ISD issues 30-40,000 building/elect/plumbing permits with work valued in excess of \$4 billion annually	Loss of access to electronic or paper records at 1010 Mass Ave will cause delays in issuance of new permits and Certificates of Occupancy (C/O)	next 18 months	medium	need to update continuity of service plan to include remote access to electronic files, ability to accept applications and payments at a remote location and restore "retail" component of ISD permitting	ISD has gone to a "paper" system of permitting during emergencies, allowing qualified inspectors to issue permits for repair work until the Hansen software system is back up and running.
Building Division-Inspections: C/O	Loss of telecom/data access, Nextel and two-way radio will make it difficult to coordinate emergency inspections post-disaster. Longer term loss of access to 1010, data and files will impede closure of open building permits and issuance of C/O	next 18 months	high (for emerg. Response)	need to update relocation and continuity of service plans, develop new protocol for marshalling site and alternative to telecom/data/radio communication.	ISD inspectors have trained for mass disaster scenarios and have been deployed in real life situation such as recent storm events, Back Bay power outage and the Marathon bombings. However, in those instances, Nextel/Cell communications were available.
Housing Division- inspections/condemnations	Loss of telecom/data access, Nextel and two-way radio will make it difficult to coordinate response and emergency inspections post-disaster. Housing inspectors may lack ability to communicate with disaster relief agencies. All non-emergency inspections cancelled until emergency over.	next 18 months	high	need to update relocation/continuity of service plan, revise strategy for condemning buildings on an emergency basis	same as above
Housing Division-"No-heat" calls	Extreme blizzard/cold weather emergency may overwhelm ISD Housing staff ability to respond to calls for "no-heat" in rental units.	next 18 months	medium	coordinate with 24hr service to review protocol for response, explore opportunities to use PWD plows/equip to get access to no-heat tenants	Housing inspectors have considerable experience with "no-heat" calls, however not on a massive scale since the Blizzard of '78.
ISD Envir. Services facility at White Stadium	board-up materials/equip storage may not be accessible	next 18 months	low	identify other sources for materials/equip in other areas of the City	site seem fairly secure and could be accessed, could also be a good secondary/tertiary marshalling site for ISD staff, etc.

Facility, Program, Service or Policy Name	Describe Vulnerability	Timeframe	Priority (High, Medium, Low)	Ongoing or next steps	Comments
ISD-Rodent Control	widespread flooding may dislocate rodents and large new food supplies (from rotting food, etc.) may exacerbate the problem. ISD staff may not have access to supplies at 1010 Mass Ave.	next 18 months	medium	consider relocating some rodent control supplies/equip to alternate site, develop plan for response to high rodent activity areas.	It may be useful to study impacts to pest populations from other extreme weather events such as Katrina.
Health Division-food safety	loss of 1010 or power/data outage will make regular food service licensing/inspections difficult if not impossible for the duration. Health Division staff may be overwhelmed by calls for inspections post-disaster when establishments attempt to re-open. In addition, tainted food may be made available for consumption without widespread enforcement (e.g. Back Bay power outage).	next 18 months	medium	need to update relocation and continuity of service plans, develop protocol for triage of food service establishments/stores/institutions	
Weights and Measures Division	loss of 1010 or power/data outage will make regular inspections of scales, scanners and fuel pumps difficult of not impossible	next 18 months	low	need to update relocation and continuity of service plans, utilize staff to support other divisions for duration	
Board of Appeals	loss of 1010 or power/data outage will make public hearings for variances from zoning code impossible for the duration	next 18 months	low	consider developing plan to resume ZBA hearings and expedite via administrative review/a approval as community begins to recover	

Office of Emergency Management

Included below are the top three climate preparedness priorities for the Office of Emergency Management (OEM).

Priority 1: Invest in a new City of Boston Emergency Operations Center (EOC)

Climate change is expected to increase the frequency and intensity of severe weather, thereby placing a greater burden on response operations. This includes overtaxing the already limited capacity of the City's EOC in terms of accommodating all OEM staff as well as supporting more frequent and lengthy activations (e.g. showers, restrooms, cots, food, HVAC system, etc.).

The City's current EOC (85 Bragdon Street) is inadequate for Boston's needs due to spatial and infrastructure requirements, as illustrated by the findings of the comprehensive needs assessment performed on Boston's EOC in 2010. Findings included: the three-room EOC space is too small, building systems need replacement, there are no facilities for sustained operations (kitchen, sleeping areas), the condition of the building is poor (as evidenced by roof leaks and other structural deficiencies) and there is limited parking. Of the three rooms, one is cubicle space for only six emergency management staff, one fits a single, eight-seat conference table, and the third room is the Operations Room with space for forty workstations – each of these rooms is insufficient to accommodate the coordination needs of a Tier-1 city. The number of agencies (local, state, federal) that can operate from the EOC is severely limited. Under these conditions, the ability to support City operations in an effective manner is severely hampered. Moreover, as a leased facility, Boston must receive permission from the landlord before making any changes to the facility.

In addition to the EOC limitations to current response operations, OEM is unable to co-locate all staff at the EOC because of space restrictions. The increased flood footprint, as illustrated by the ARCGIS map produced for this project, indicates that OEM's current office location (City Hall) for planning and administrative staff is susceptible to +7.5 feet of flooding, either directly or because of accessibility issues. Co-locating all OEM staff in one location would streamline and maximize efficiency of daily operations.

It is critical that the City invest in an EOC that has the capacity to handle increased activations for longer durations and accommodate more people and agencies on-site. OEM will continue to work with the Mayor's Office and Property Management to identify a property within the City limits that allows for the necessary space and accommodations to maintain continuous operations without disruption, regardless of the scope or length of activation.

Priority 2: Review and update emergency management plans to reflect potential impact resultant from climate change

Refined analyses and understanding of climate change impacts may drive emergency management plan updates and the development of additional hazard annexes. OEM reviews and updates its emergency management plans on a yearly basis in accordance with the OEM Emergency Management Plans Maintenance Policy (OEM-2011-011). As part of this review OEM will evaluate and update its emergency management plans (e.g. Hazard Identification and Risk Assessment [HIRA]; Flood Hazard Annex; Extreme Temperature Annex) to reflect the potential impacts that may result from climate change.

As part of this process, refined analyses and understanding of climate change impacts may require the revision of mitigation projects and priorities as outlined in the City of Boston Hazard Mitigation Plan. OEM will work with City Departments to identify possible climate change impacts and reduce vulnerability to such hazards through implementation of mitigation recommendations within the Hazard Mitigation Plan.

Additionally, refined analyses and understanding of climate change impacts may hinder a department's ability to complete mission essential functions (e.g. alternate facility location now vulnerable to flooding or storm surge). OEM will assist City Departments with COOP plan updates to ensure that they consider how climate change impacts may impede their ability to complete mission essential functions.

Priority 3: Review and update evacuation routes and the City's Evacuation Plan

The increased floodplain, flooding footprint, and anticipated impact of climate change may require updates to evacuation routes due to roadway flooding and accessibility issues. OEM will work with City Departments to identify possible climate change impacts to City evacuation routes and procedures. Boston's Evacuation Plan will be updated accordingly to reflect a zoned-evacuation approach that takes into account potential climate change impacts to route identification, traffic management, and traffic control points.

Priority 4: Evaluate identified shelter locations and identify additional City shelters, as necessary

The increased floodplain, flooding footprint, and anticipated impact of climate change; as illustrated by the ARCGIS map produced for this project; indicates that at least one-third of identified emergency City shelters are vulnerable to +7.5 feet of flooding, either directly or because of accessibility issues. Over the past four years, the City has activated six shelters, with the longest activation lasting four days. With the expected rise in frequency and intensity of severe weather due to climate change, there is an increased likelihood that City residents will require sheltering services in the aftermath of a severe weather incident. OEM will work with the Boston Centers for Youth & Families (BCYF) and Boston Public Schools (BPS) to evaluate identified shelter locations to determine the possible climate change impacts to the use of these facilities as emergency shelters. Additionally, OEM will work with City leadership to identify additional City shelters, as necessary, to address any shelter location gaps created as a result of the climate change impacts.

Facility/ Program, service/ Policy	Vulnerability/Time frame	Priority (H,M,L)	Ongoing steps/Next steps/Comments
Emergency Operations Center	Increased frequency and intensity of severe weather will affect response operations. This includes overtaxing the capability of the Emergency Operations Center in terms of supporting more frequent and lengthy activations (e.g. showers, restrooms, cots, food, HVAC system, etc.).	H	Invest in a new Emergency Operations Center that has the capacity to handle increased activations for longer durations and accommodate more agencies on-site.
OEM Offices	Increased flood footprint and anticipated impact of climate change, as illustrated by the ARCGIS map produced for this project, indicates that OEM's current office location (City Hall) for planning and administrative staff, is susceptible to +7.5 feet of flooding, either directly or because of accessibility issues.	H	<p>Locate all OEM staff (administrative, planning, and operational) at the Emergency Operations Center for day-to-day operations.</p> <p>Invest in a new Emergency Operations Center that has suitable office space for OEM staff and daily operations.</p>
Evacuation Routes	Refined analyses and understanding of climate change impacts may require updates to evacuation routes due to roadway flooding and accessibility issues.	H	<p>Consider climate change impacts to:</p> <ol style="list-style-type: none"> 1. The physical Emergency Operations Center location, 2. Accessibility of the Emergency Operations Center to other parts of the City. <p>Work with City departments to identify possible climate change impacts to evacuation routes and procedures.</p>
Comprehensive Emergency Management Program	Refined analyses and understanding of climate change impacts may drive emergency management plan updates and the development of additional hazard annexes.	M	<p>Develop and update the City of Boston Evacuation Plan to reflect potential climate change impacts.</p> <p>Review and update emergency management plans to reflect potential impact resultant from climate change (e.g. Hazard Identification and Risk Assessment [HIRA]; Flood Hazard Annex; Extreme Temperature Annex).</p>

Hazard Mitigation Plan	Refined analyses and understanding of climate change impacts may require revision of mitigation projects and priorities.	M	Work with City Departments to identify possible climate change impacts and reduce vulnerability to such hazards through implementation of mitigation recommendations within the Hazard Mitigation Plan.
Departmental Continuity of Operations Plans	Refined analyses and understanding of climate change impacts may hinder a department's ability to complete mission essential functions (e.g. alternate facility location now vulnerable to flooding or storm surge).	M	Assist City Departments with COOP plan updates to ensure that they consider how climate change impacts may impede their ability to complete mission essential functions.
Emergency Shelters	Increased floodplain and anticipated impact of climate change, as illustrated by the ARCGIS map produced for this project, indicates that at least four shelters are susceptible to flooding. Increased flood footprint and anticipated impact of climate change, as shown by the ARCGIS map produced for this project, indicates that at least 20 shelters are vulnerable to +7.5 feet of flooding, either directly or because of accessibility issues.	M	Work with BCYF and BPS to evaluate identified shelter locations. Work with City leadership to identify additional City shelters, as necessary.
Equipment	Increased occurrence and intensity of extreme heat events may overtax the electric grid and cause more frequent brownouts and blackouts.	L	Assess whether the City should procure additional large-capacity generators for critical facilities as identified by public safety leadership.

Parks & Recreation Department

The Parks and Recreation Department will continue to modify its schedules and procedures as timeframes and conditions warrant. We have identified these areas as our current high priority issues:

- Increase storm water retention capacity in all of our parks through our Capital Budget Program. Working with the Boston Water & Sewer Commission to invest in infrastructure to reduce storm water run-off and retain water on site to reduce flooding hazards and provide irrigation for trees and plants.
- Working with the Boston Public Health Commission, develop educational materials and a campaign directed at park users and staff regarding the health risks of mosquitos (EEE and West Nile Virus currently) and high exposure to sunlight. Will utilize permitting system to outreach athletic, special events groups and schools. Continue to work with schools and others about potential schedule changes that may be required to lessen risk.
- Replace or increase tree canopy on sidewalks and open spaces to reduce heat island effect. Update survey of tree canopy coverage and continue to direct resources for replanting and arbor-care as needed to ensure shade.
- Reduce energy consumption for field lights and fountains by upgrading energy efficient systems and equipment through our Capital Budget Program.

Parks & Recreation Department

Facility Program, Service/ Policy	Vulnerability/Time Frame	Priority (H,M,L)	Ongoing/Next steps
Street Tree Planting	<p>1)Species of trees may have to adapt to heat, drought, pests and wind. Vulnerable trees may pose safety risk</p>	H	<p>Continue to review scientific research and continue to revise planting plans as we have for disease such as Cankor Stain which is killing London Planes.</p>
Park Planting Plans	<p>2)Increase in pollen will have effect on air quality</p> <p>1)Species of plants and turf may have to change to adapt to heat, drought, wind</p> <p>2) Increased need for inclusion of irrigation systems</p>	H	<p>Same as above</p>
Storm Water Retention Flooding in Parks	<p>2)Increase in pollen will have effect on air quality</p> <p>Retain storm water on site as required and where appropriate prepare for flooding. Parks are drainage areas in dense neighborhoods. Affects playability if flooded.</p>	M	<p>Review scientific information and research, then revise planting plans</p>
		H	<p>Same as above</p>
		M	<p>Assess infra-structure of each park for vulnerability and action required</p>

Workforce Safety	Increases in heat creates dangerous health risk	H	Review work schedules & modify times.
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Facility Program, Service/ Policy	Vulnerability/Time Frame	Priority (H,M,L)	Ongoing/Next steps
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Athletic Permits	Increases in heat and heat waves create dangerous health risk for athletics and exercise	M	Review schedules and potentially extend hours/will have additional cost for lights.
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Construction Work	Increase in heat and heat waves create dangerous health risk for contractors.	M	Review current contracts and adjust days and hours as required.
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Power/Tele-Communications Outages	<p>1)Will affect lighted fields, street lighting, fountains, irrigation systems within parks. Scheduling issues will arise.</p> <p>2)Administrative systems shutdown and lack of payroll or accounts payable create hardship for employees and</p>	M	Create back up systems within parks where feasible and improve communication network for permit holders.
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	City-wide back system	M	
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limit our ability to purchase goods and services.

3) Enhance workforce backup systems for communication.

M Assess radios and phones and upgrade where necessary.

Coastal Flooding

1) Parks located near harbor or rivers may see increase in flooding creating negative impacts on plantings and make parks unusable for long period.

M Accommodate as much drainage as possible in design. Use hardy coastal plant materials and locate utilities in safe location.

Property Management

Final assessment to be release shortly.

Public Works Department

Please find listed below the Public Works Department's top three priorities that climate change may affect:

Additional Snow Farms

With the likelihood of increased snow storms, intensity and duration, there will be a need for "snow farms" (vacant land throughout the City). Following such intense and long storms, the snow farms currently used will fill up quickly, necessitating identifying other places or means (e.g. melters) to dispose of snow.

Coastal Roadway

There is a greater risk of flooding due to rise in sea-level and intensity of oceanic storms.

Need to establish coordination mechanism between first responders and PWD to block flooded roadways and to identify alternate routes.

Coastal Roadway

There is a greater risk of flooding due to rise in sea-level and intensity of oceanic storms.

Roadways may become flooded during large oceanic storms. This scenario would require appropriate signage and emergency personnel to help the public to safety. If there is a loss of power during such large oceanic storms, alternate methods to communicate with the public regarding flooded roadways will need to be identified.

(H,M,L)

Rank

1	Frontage Rd Central Maintenance facility	Greater risk of flooding due to rise in sea level and intensity of oceanic storms. (Immediate)	H	Nowadays, during high tide, the water bubbles out of cracks in the parking lot pavement. A rise in sea level may flood the facility making it unoperational. We can discuss the importance of the facility to City services.
2	Snow Farms	Lack of locations to remove and relocate snow after large storm events (Immediate)	H	With large amounts of snow like we had this past winter, PWD was forced to remove snow from many city streets. Locations to dump snow (snow farms) filled up quickly and snow melting machines became clogged with debris from the snow.
3	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes, (10 to 50 years)	H	Coordination with emergency vehicles and first respondents to block flooded roadways and to find alternate routes.
4	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes (immediate)	H	During large oceanic storms, if the roadways become flooded, there should be signage, electronic communications , and emergency personnel to help the public into safety.
5	Spectacle Island Landfill	Risk of erosion and exposure of the landfill (10 year)	H	A rise in sea level and storm surge may deteriorate parts of the landfill cap or the controls for the leachate pumping system.
	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes (10 to 50 years)	H	Some coastal communities have combined sewer/storm systems. During astronomical tides and intense storms, the Deer Island facility is overwhelmed and the streets become flooded by sewage contaminated waters . Who is responsible for such drainage system, is it the MW/RA?
	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes. (10-20 years)	H	Residents, businesses or government agencies may install sand bags around structures, businesses or areas of concern to protect from rising water. clean and remove the debris after each event.
	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes. (10-20 to be in 100 year floodplain)	H	Flooding may create hazardous conditions when the basements are flooded, the AST's and other hazardous material present there, (such as lead and asbestos) may be pumped into the roadways. In the event of clearing sand bags, do we treat the sand as contaminated soil?

		(H,M,L)		
Rank	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes. (10-50 years)	H	During large oceanic storms, <u>erosion</u> may occur, jeopardizing our roadways. We need to determine the areas where such a phenomena may take place
	Coastal Roadway	Greater risk of flooding due to rise in sea level and intensity of oceanic storms, such as hurricanes (10-50 years)	H	During large oceanic storms, the ocean may <u>dump</u> boulder, sand and debris into the roadway making them impassable. We need to determine the areas where such a phenomena may take place, so PWD prepares for such events
	Coastal Roadway	Greater risk of damaged roadways due to rise in sea level. (To be made part of the 100 years floodplain)	H	If the ocean rises by approximately six feet, the <u>ground water table</u> near the ocean may rise as well creating unforeseen problems as described below.
	Coastal Roadway	Greater risk of damaged roadways due to rise in sea level (to be made part of the 100 years floodplain)	H	If the ground table rises, the utility lines may be compromised. In low areas, <u>the ground table my be very close to the street surface</u> and may freeze, creating heaving conditions, making the roadways impassable.
	Coastal Roadway	Greater risk of damaged roadways due to rise in sea level (to be made part of the 100 year floodplain)	H	If the ground table rises, the ground table will be too close to the road surface and within the frost line. <u>The roads pavement may be ruined due to frost thaw cycle.</u>
	Roadways, throughout the City	Greater risk of untreated roadways due to long lasting winter storms. (immediate)	H	The city's crews clearing the roadways, will be <u>fatigued</u> . We will be forced to rest the crews, while the storm is raging, making the streets impassable due to snow accumulation.
	Inner Roadways	Greater risk of flooding due to intensity and duration of storms. (immediate)	H	Increase in <u>flooding in low areas.</u>
	Frontage Rd Central Maintenance facility	Greater risk of flooding due to rise in sea level and intensity of oceanic storms. (Immediate)	H	A shallow groundwater table will leave the same devastating effect on the facility as described earlier.
	Many of the COB services operates from the Central maintenance Facilities at Frontage Rd. Any problem at the facility will interrupt and may stop the			