Appendix 1-1: Advisory Committee Meetings

1. Advisory Committee Meeting #1

- Agenda
- Meeting Minutes
- Presentations
- Attendees

2. Advisory Committee Meeting #2

- Agenda
- Meeting Minutes
- Presentations
- Attendees

3. Advisory Committee Meeting #3

- Agenda
- Meeting Minutes
- Presentations
- Attendees

City of Baltimore 2018 Disaster Preparedness Plan and Project (DP3) Update

Advisory Committee Meeting: June 22, 2018 (11:00 am – 12:00 pm) 8th Floor Boardroom, Benton building (417 E Fayette Street)*

Minutes

- I. Welcome and Introductions (David McMillan)
- II. Overview: David McMillan gave an overview of the work of his office (Emergency Management) during emergency or disaster events, contrasting it with the role of planning (specifically hazard mitigation planning) as a way to prepare in advance for such events.

Lisa McNeilly (Office of Sustainability) then shared an overview of the City's existing hazard mitigation plan – the DP3 (see attached slides #3-7). The 2013 DP3 included goals, strategies and actions based on detailed natural hazards inventory, risk assessment and vulnerability analysis. The hazards identified as posing a significant threat include flooding, hurricanes and high wind events, and extreme heat/air quality. Fifty strategies and 231 actions were identified in four sectors: Infrastructure, Buildings, Natural Systems, and Public Services. The current DP3 expires in November 2018. However, FEMA requires that hazard mitigation plans be updated every 5 years, so this DP3 update is on an accelerated schedule, since a draft is due to MEMA/FEMA approximately August 2018.

- III. Hazard mitigation planning process review: Ed Strouse (Office of Emergency Management) reviewed the required steps in the hazard mitigation planning process. He also shared guidance on how FEMA interprets the various requirements of the regulation for all Local Mitigation Plan reviews through a Regulatory Checklist.
- IV. DP3 update process: Lisa McNeilly reviewed the new elements being proposed for inclusion in the 2018 DP3 update, including an equity lens, food resilience, community resiliency planning, man-made hazards, and an increased focus on historic properties.

During this update process, the Advisory Committee will provide guidance, support and feedback in the development of goals, strategies and actions and will meet 2-3 more times (meeting dates TBD). Advisory Committee members and City agencies will be asked to review existing strategies and provide status updates before the next meeting. Volunteers are also needed to join two subcommittees:

Strategies: Phil Lee Equity and Outreach: Inez Robb, Rachelle Woods

Keys steps in the update process:

- Conduct hazard review and risk analysis; incorporate man-made hazards to the extent feasible
- Outline how an equity lens can be used during plan development, during strategy identification, and to improve the equity of plan implementation

- Solicit community input during plan update process
- Streamline and prioritize list of strategies and projects, with a focus on identifying new, defined projects to mitigate hazards
- Complete draft plan update by August 1 for public review; incorporate comments and prepare draft for MEMA and FEMA review by end of August
- Finalize plan, incorporating any requested MEMA and FEMA changes
- Continue community engagement, especially on the addition of man-made threats, until the end of the grant period
- October Obtain Sustainability (10/17) and Planning Commission (10/18 or 11/1) approval
- November Send back to FEMA for full approval
- 11/22/18 Final deadline for full approval
- V. Why is this important? The last part of the meeting included an update on the recent flooding around Frederick Avenue and a general discussion of the kinds of actions that can be included in the 2018 DP3 to mitigate damages and prepare for emergencies.

The meeting adjourned just after 12:00.

Next meeting date: TBD

* The meeting was also be live-streamed, and the recording can be accessed at: <u>http://livestream.com/accounts/17371294</u>

2018 DP3 ADVISORY COMMITTEE

BALTIMORE CITY DEPARTMENT OF PLANNING

June 22, 2018





Baltimore City Department of Planning

Welcome and Introductions (name and affiliation)	David McMillan, Tom Stosur
Overview Emergency management and disaster preparedness Review of 2013 DP3 	 David McMillan Tom Stosur Lisa McNeilly
 Hazard mitigation planning - process review Steps in the planning process Regulation checklist 	• Ed Strouse
 DP3 Update Process What's new in 2018? Role of Advisory Committee and subcommittees, agencies, consultants Outreach strategy Timeline for 2018 update Why is this important? 	Lisa McNeilly
Questions/Recap	All
Adjourn	

Next meeting date: TBD

* The meeting will also be live-streamed. To begin live streaming go to: <u>http://livestream.com/accounts/17371294</u>



Vision Statement

Baltimore will be a city whose daily activities reflect a commitment shared by government, business, and citizens to reduce or eliminate impacts from current and future natural hazards.



A COMBINED ALL HAZARDS MITIGATION AND CLIMATE ADAPTATION PLAN OCTOBER, 2013



\checkmark

Goals and Objectives

- Protect the health, safety and welfare of Baltimore City residents and visitors
- Prevent damage to structures, infrastructure, and critical facilities
- Build resilience and disaster prevention and planning into all programs, policies and infrastructure
- Enhance the City of Baltimore's adaptive capacity and build institutional structures that can cope with future conditions that are beyond past experience
- Promote hazard mitigation and climate adaptation awareness and education throughout the city of Baltimore
- Become a Community Rating System (CRS) classified community



Disaster Preparedness and Planning Project (DP3)

- Developed with the assistance of the original DP3 Advisory Committee and working groups.
- Included goals, strategies and actions based on detailed natural hazards inventory, risk assessment and vulnerability analysis.
- Hazards identified as posing a significant threat:
 - Flooding
 - Coastal Hazards—Hurricanes, Sea Level Rise, Storm Surge, Coastal Inundation
 - Precipitation Variability—Precipitation, Winter Storms, Drought, Dam Failure
 - Extreme Wind
 - Extreme Heat
 - Air Quality
- Focus on four sectors: Infrastructure, Buildings, Natural Systems, and Public Services.





Identified 50 strategies and 231 actions

IN 9: "Encourage development of Green Streets in flood prone areas and throughout the City"

- A Green Streets technical assistance workshop was hosted by EPA and attended by Baltimore officials.
- A number of bioretention/bumpout projects were identified as part of the MS4 Permit project implementation.

<u>PS 3: "Designate community leaders and organizations that can assist</u> and provide support during hazard events"

• As part of the effort to increase City's ability to respond to physical, social, and economic challenges, Baltimore City is developing Resiliency Hubs in some of our more vulnerable communities. Resiliency Hubs are a building or set of buildings and neighboring outdoor space that will provide a safe daytime location, access to fresh water, and resources such as food, ice and charging stations, etc. in the event of an emergency.





NS 3: "Convert vacant land and row houses into meaningful and connected open space" and "Certify Baltimore as a Community Wildlife Habitat through the National Wildlife Foundation"

- The Green Network Plan identifies Nodes and Corridors in areas with high concentrations of vacancy to create new permanent green space and better connect neighborhoods and open spaces with each other.
- The National Wildlife Federation and the National Aquarium in Baltimore are working together to certify properties in Baltimore City as wildlife habitats. The City is close to certification and anticipates completion of the process by spring 2018.

<u>BL 3: "Utilize open space category in zoning code to protect sensitive</u> areas (e.g. stormwater sites, steep slopes, floodways, etc.)"

• The new zoning code, TRANSFORM, passed, which includes an Open Space category.





- The current DP3 expires in November 2018.
- FEMA requires that hazard mitigation plans be updated every 5 years and there is grant funding for the update.
- This DP3 update is on an accelerated schedule, since a draft is due to MEMA/FEMA approximately August 2018.



Utilizing new technology to display flood information

Baltimore Office of Sustainability



7





Baltimore City Department of Planning

Figure 1: Steps in the Planning Process



REGULATION CHECKLIST This section provides detailed guidance on how FEMA interprets the various requirements of the regulation for all Local Mitigation Plan reviews through a Regulatory Checklist. The guidance is limited only to the minimum requirements of what must be in a Local Mitigation Plan, and does not provide guidance on how the community should develop a plan.

The Regulation Checklist includes the following Elements:

4.1 ELEMENT A: Planning Process
4.2 ELEMENT B: Hazard Identification and Risk Assessment
4.3 ELEMENT C: Mitigation Strategy
4.4 ELEMENT D: Plan Review, Evaluation, and Implementation
4.5 ELEMENT E: Plan Adoption
4.6 ELEMENT F: Additional State Requirements



WHAT'S NEW IN 2018: DRAFT TABLE OF CONTENTS

bold denotes a section that will be updated in 2018 *italics* denotes new section <u>underlined</u> changes will be added in future iterations

I. Introduction

Scope & Purpose of the Plan Equity Lens Relationship to the Sustainability Plan Relationship to the Climate Action Plan Relationship to Emergency Operations Planning

- II. Hazard Mitigation and Climate Adaptation
- III. Hazard Assessment

Identification and Profile of Current Natural Hazards in Baltimore City <u>Man-made Hazards</u>



WHAT'S NEW IN 2018: DRAFT TABLE OF CONTENTS

bold denotes a section that will be updated in 2018 *italics* denotes new section <u>underlined</u> changes will be added in future iterations

IV. Vulnerability and Risk Assessments

Assessing General Hazard Vulnerabilities for the City of Baltimore Detailed Vulnerability Assessment by Hazard: Flooding, Coastal Hazards, Precipitation Variability, Wind, Extreme Heat, Land, <u>Manmade Hazards</u> Selecting Key Vulnerabilities Adaptive Capacity

V. Strategies and Actions

Community Resiliency Plans and Resiliency Hubs Food resilience; Historic Properties

VI. Implementation, Maintenance, and Evaluation



ROLE OF THE ADVISORY COMMITTEE AND CONSULTANTS

The Advisory Committee:

- will provide guidance, support and feedback in the development of goals, strategies and actions
- will meet 2-3 more times (meeting dates TBD)
- form subcommittees: Strategies; Equity and Outreach
 - Volunteers?

The Advisory Committee and City agencies:

 review existing strategies and provide status updates (before next meeting)

Consultants:

- MES risk assessment/vulnerability analysis, mitigation strategy, and writing the plan document
- HealthCare Ready Community engagement and outreach strategy



KEY STEPS/TIMELINE

- Convene Advisory Committee (next meeting late July)
- Conduct hazard review and risk analysis; incorporate man-made hazards to the extent feasible
- Outline how an equity lens can be used during plan development, during strategy identification, and to improve the equity of plan implementation
- Solicit community input during plan update process
- Streamline and prioritize list of strategies and projects, with a focus on identifying new, defined projects to mitigate hazards
- Complete draft plan update by August 1 for public review; incorporate comments and prepare draft for MEMA and FEMA review by end of August
- Finalize plan, incorporating any requested MEMA and FEMA changes
- Continue community engagement, especially on the addition of man-made threats, until the end of the grant period
- October Obtain Sustainability (10/17) and Planning Commission (10/18 or 11/1) approval
- November Send back to FEMA for full approval
- 11/22/18 Final deadline for full approval



Recent Flooding on Frederick Avenue



According to the Mayor's Office of Emergency Management:

- 21 people rescued by Special Rescue Operations (SOC)
- Water levels 5-6 feet, per SOC
- Power outages
- 6 displaced residents
- 61 houses and 48 apartments affected

Baltimore City Department of Planning



May 27th Flood Event-Water Lines









Baltimore City Department of Planning

WHY IS THIS IMPORTANT?

May 27th Flood Event-Water Lines





Baltimore City Department of Planning

Questions?

Before next meeting (late July):

- 1. Participate in a subcommittee
- 2. Review 2013 strategies
- 3. Watch for other requests



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2018 Disaster Preparedness Plan and Project (DP3) Update Advisory Committee Meeting: June 22, 2018 (11:00 am – 12:00 pm) 8^{th} Floor Boardroom, Benton building (417 E Fayette Street)

SIGN IN SHEET

NAME	DEPARTMENT	EMAIL	SIGNATURE
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City of Baltimore 2018 Disaster Preparedness Plan and Project (DP3) Update

Advisory Committee Meeting #2: July 18, 2018 (1:00 pm – 3:00 pm) 8th Floor Boardroom, Benton building (417 E Fayette Street)*

TIME TOPIC PRESENTER David McMillan 1:00 Welcome and Introductions (name and affiliation) Tom Stosur Lisa McNeilly 1:10 Recap of June 22 Meeting Identification and Assessment of Hazards Process - Discussion of methodology that was used to select hazards Mark James Discussion - Review hazards documented in the Michael Baker Int. 1:20 previous plan and events that have occurred over the Ginny Smith Smith Planning & Des. past 5 years Evaluation - Conduct group exercise [1.] Identify any new hazards [2.] Prioritize Hazards Goals and Objectives Analysis Discussion - Review current plan for compliance with Mark James 2:00 CFR Ginny Smith Evaluation - Conduct group exercise and make recommendations for goal Introduction to Strategies and Capability Assessment Discussion - Brief out Distribution of current strategy spreadsheet and priority spreadsheet Mark James 2:30 Summary of high / low analysis Ginny Smith Homework assignment Volunteers needed - Strategy sub-committee meeting July 24, 2018 from 10:30-12 Updated: July 26, 3-4:30 Equity and Outreach Survey / Analysis Update Sarah Baker 2:40 Link: Baltimore City Community Perspectives on Risk - Survey Nicolette Louissaint URL: https://www.surveymonkey.com/r/KZKRPCW Healthcare Ready David McMillan 2:50 Next Steps / Meetings / Questions / Comments Tom Stosur 3:00 Adjourn

AGENDA

NEXT MEETING DATE: August 1, 2018

* The meeting will also be live-streamed. To begin live streaming go to: http://livestream.com/accounts/17371294

Meeting Minutes: DP3 Advisory Committee Meeting #2 07.18.18

Overview of the DP3 Update

- The 5-year update of the plan for the Fall deadline is more of a refresh, and we are looking to be compliant with new FEMA standards.
 - We need to be up to date with key hazards and risks, reprioritize the strategies that address them, look at the previous strategies and assess what have we ticked the box on, identify those which have not been pursued, determine which should become higher (or lower) priority, and develop some new strategies.
- After the fall, more time will be spent doing some heavier lifting on the additional work we hope to include in the plan (i.e. including man-made hazards, revisiting and readdressing how the strategies were ranked, further integration of community feedback, etc).

Presentation by Ginny Smith: Hazard Identification and Risk Assessment

- Why do a 5-year update?
 - There have been many hazards since the last plan, and there is a need to revisit which hazards were identified originally and which are new
- People's local risk perspectives tend to match up to with real risks, so the advisory team's survey responses will be looked at seriously to determine which perceived risks are aligned with real risks these will become a key focal point of the updated plan
 - I.e. Heat and air quality concerns were demonstrated as a high concern for local risk perspective (see slides).
 - Thus, we will be taking a deeper dive into heat and air quality hazards probability since it is a larger concern than is currently indicated in the plan
- Results of HIRA (Hazard Identification and Risk Assessment) will be integrated into Chapter 3 for the update. Preliminary HIRA assessment has been done.
 - Examples of updates
 - 'Landslide' was written as a hazard in the original plan, but the local issue Baltimore faces is really a 'land slump' caused by land subsidence- this will be updated in the plan
 - Winter storm was not identified as a local hazard risk perspective from survey results, but is listed as a high risk hazard in the preliminary HIRA results
 - Interesting to consider- incorporating this local risk perspective will be a great addition to the plan

Presentation by Mark James: Vision, Strategies and Goals

- For the Fall update, we must meet minimum requirements set forth in the CFR (Code of Federal Regulation)
- Looked at overarching goals that were identified in DP3 plan (see presentation)
 - Example: Met goal of becoming a CRS community (Community Rating System)
 - To keep or enhance goal? Decision to change verbiage to: enhance and provide support to increase efforts toward a greater CRS rating

- Goal 5 on increasing climate education and awareness: great goal to have and keep
- \circ $\;$ Comments on goals? Get in touch with Lisa and Aubrey $\;$
- Request for all to look at list of DP3 strategies along with associated action items
 - Four Classifications of Strategies: Infrastructure, Buildings, Natural Systems, Public Service
 - A lot of projects, especially in infrastructure, are not necessarily closely associated with climate action goals, thus we removed the CAP comparison as a prioritization ranking in the list
 - Request for everyone to look at current status of these strategies within the departments that are responsible for the strategies (are they pending, ongoing, completed)?
 - o Request for everyone to identify any new strategies or plans within departments
- Request for everyone to view shorter strategies list that shows the high and low priority strategies that have had **no movement over the last 5 years-** very important that these are revisited
 - Take back home to see if there are projects that haven't moved, whether low or high priority, and if there is anything that can be done within the next 5 years to identify those efforts so we can maybe have another column: this has to be done in order to meet this goal
 - **High priority, no movement strategies** were supposed to be done within 0-2 years, and it's been 5 for the no movement ones
 - Example of High Priority No Movement strategy under Infrastructure category: "Increase energy conservation efforts: Identify and collaborate with bicycle groups and repair shops to assist in emergency response and accommodate alternate transportation needs" – no movement in infrastructure
 - David McMillan: there might have been turnover with agency heads or changes in management structure- some of these actions might be agencies that weren't aware that they were responsible for it (fell through the cracks) or priorities were shifted- this needs to be revisited
 - Concern: A lot of lead agencies on the no-movement strategies are not Baltimore City led- more often than not state or federal agencies
 - It should be determined whether or not state agencies should be the agency involved with the action
 - Look at high priority no action strategies and determine whether they should stay high priority or not
 - Tom: Implementing agencies really need to be focused on these actions and that they reflect up to date information on where the agencies are headed
 - Mark: need these people at the table when the plan is updated
 - o Briefly went through low-priority no movement strategies
 - What to do with large scale infrastructure projects like seawalls? Important to keep as a strategy for future FEMA funding requests. If not listed in the plan, they won't fund it.

Comments

- Ginny Smith: Critical to look at what hazards are really affecting the people that live and work in Baltimore city, and important to determine how to get the most bang for your buck- which strategies touch the most hazards and maximize co-benefits?
- David McMillan: We need to look at the nature of the hazards and their likelihood- are they yearly hazards? Or every 10 years or so. If addressed, what is the return on these?
- Ginny Smith: The HIRA results should support the high priority strategies to nail down where money resources and time should be spent
- Tom Stosur: Is there any way to code the strategies to show which hazards they specifically address I.e. 27 different strategies for heat, which are the high priority strategies that address heat hazards? Consider reorganizing and restructuring the strategies so there is an easier way to see this

Presentation by Sarah Baker: Equity and Outreach Community Survey

- The goal is to use the community feedback from the survey to demonstrate diverse community perspectives in the DP3 update and:
 - o Gauge the public's perspective/level of concern on natural hazard risk
 - Gauge the public's perspective on equity and vulnerability of people and neighborhoods in the city to natural events and other hazards... are these risks distributed equally or not? Who are the communities/people of most concern?
 - Assess people's ranking of hazards
- An additional goal is to map and identify groups perceived by the general population as being exposed to hazards at disproportional rates

Wrap up: David McMillan

- Requested the group to make comments on the strategies spreadsheet and return to the committee and the consultants
- Stressed the importance of input from city agencies- your cooperation is important to the success of the initiative and meeting the deadline for the plan update

Hazard Identification & Risk Assessment (HIRA)

RECENT HAZARD EVENTS



1

Baltimore City Department of Planning

Hazard Identification 8 **RISK ASSESSMENT (HIRA)**

January 30, 2018 Extreme Cold Event

Forecast Low Temperatures Valid: January 31, 2018



May 27, 2018 Frederick Ave. Flood



May 27, 2018 flood in the Beechfield neighborhood

The May 27, 2018 flood on Frederick Avenue and Chedworth Lane in the Beechfield neighborhood. Courtesy of Crystal Mason Will)

May 15, 2018 - Jones Falls Floods at Meadow Mill



July 2, 2018 Extreme Heat

CODE RED

Extremely hot temperatures expected.

Take necessary precautions to stay safe & healthy.

2

BALTIMORE CITY HEALTH DEPARTMENT

Visit health.baltimorecity.gov for more information.



July 30, 2014 - Nuisance Flooding



March 4, 2016 Declared



July 4, 2016 Mulberry St. Sinkhole



View of the sinkhole that has formed on W Mulberry Street between Paca and Greene streets. (Barbara Haddock Taylor / Baltimore Sunt

December 17, 2016 Winter/Ice Event



dtermath of series of accidents on I-95 Saturday following a morning ice storm. (Video by Karl Merton Ferron)



DP3 Hazards Identified

Flooding: Flooding and Dam Failure **SEP Coastal Hazards:** Tropical Storms and Hurricanes; Sea Level Rise; and Storm Surge/Coastal Inundation; Tsunami

Precipitation Variability: Thunderstorms, with Lightning and Hail; Winter Storms and Nor'Easters; Drought

Wind: Thunderstorm Winds & Derechos; Tornados Extreme Heat: Heat and Air Quality Land: Earthquakes; Landslides/subsidence; Sinkholes



Local Hazard Risk Perspective Survey

Advisory Committee

- Distributed July 2-16, 2018
- Survey Results- (22) Participants
- Composite Score

Local Hazard Risk Perspective Survey Results

HAZARDS	LOCAL RISK PERSPECTIVE
Flooding	
Flood	Very Concerned
Dam Failure	Somewhat Concerned
Coastal Hazards	
Tropical Storms & Hurricanes	Very Concerned
Storm Surge/ Coastal Inundation	Concerned
Sea Level Change	Very Concerned
Tsunami	Not Concerned
Precipitation Variability	
Thunderstorms (Lightning & Hail)	Concerned
Winter Storms & Nor'Easter	Concerned
Drought	Somewhat Concerned
Wind	
Thunderstorm Winds & Derecho	Concerned
Tornados	Somewhat Concerned
Extreme H eat	
Heat & Air Quality	Very Concerned
Land	
Earthquakes	Not Concerned
Landslump/ Subsidence	Not Concerned
Sinkholes	Concerned



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2018 Risk Assessment Methodology

Five (5) rating parameters were used to develop hazard risk ranking for the (15) identified fifteen hazards.

Probability

Probability means the likelihood of the hazard occurring and are defined in terms of general descriptors, (for example, unlikely, somewhat likely, likely, highly likely), historical frequencies, statistical probabilities, and/or hazard probability maps.

Deaths

Hazard related deaths correlate to the severity of impact to the community from any specific hazards.

Injuries

Hazard related injuries correlate to the severity of impact to the community from any specific hazards.

Damages

Hazard related damages include both property and crop damages and correlate to the severity of impact to the community from any specific hazards.

Local Hazard Risk Perspective

A local hazard risk perspective provides a basis for determining those hazards that are of concern to people who work and/or live in the planning area. Levels of concern are defined in terms of general descriptors, (for example, not concerned, somewhat concerned, concerned, very concerned).

Risk Assessment Methodology

Specific rating criteria used in the analysis. All rating criteria are equally weighted

Carlosan	Serie -	Rat	ing Criteria	The survey of the survey of		
Probability	Rating	Local Risk	Perspective	Damages		
Rating	Criteria	Rating	Criteria	Rating	Criteria	
1	049 events/year	1	Not Concerned	4	\$0-49K	
2	.50-1 events/year	2	Somewhat Concerned	2	\$50K-99K	
3	1.1-2.5 events/year	3	Concerned	3	\$100-500K	
4	2.6 or more events/year	4	Highly Concerned	4	\$500K+	
No. of the second			N . 5 . 11	-		
Deaths	A Charles Inco	Injuries				
Rating	Criteria		Rating	Criteria		
1	None		E 147+	None		
4	1 or more		4	1 or more		

Preliminary 2018 HIRA Results

Hazards	Probability	Deaths	Injuries	Damages	Local Risk Perspective	Hazard Risk Ranking
Flooding						
Flood	3	4	4	4	4	19
Dam Failure	1	1	1	1	2	- 5
Coastal Hazards						Second Second Second Second
Tropical Storms & Hurricanes	1	1	1	4	4	15
Storm Surge/Coastal Inundation	2	1	1	2	3	9
Sea Level Change	4	1	1	4	4	14
Tsunami	1	- 1 -	1	1		5
Precipitation Variability						
Thunderstorms (Lightning & Hail)	1	4	4	1.1	3	13
Winter Storms & Nor'Easter	4	4	4	4	3	19
Drought	2	1	1	4	2	10
Wind						
Thunderstorm Winds & Derecho	4	4	4	4	3	19
Tornados	1	1	4	3	2	11
Extreme Heat						
Heat & Air Quality	4	4	4	3	4	19
Land		-	The second second			
Earthquakes	1	1 = 1	1	4		8
Landslump/Subsidence	1	- 1	1	1 1	1	- 5
Sinkholes	3	1 - 1 -	1	4	3	12

	Hazard Risk Ranking Criteria						
Low Risk	Medium Risk	High Risk					
0-6	7-13	14-20					

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Thick REDUCTO (Freminiary)	
Flood	
Sea Level Change	
Winter Storm	
Thunderstorm Winds & Derecho	
Heat & Air Quality	
	Flood Sea Level Change Winter Storm Thunderstorm Winds & Derecho Heat & Air Quality



Baltimore City Department of Planning

Code of Federal Regulation - Baltimore City Plan Requirement

C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)





Vision, Goals and Objectives for the Plan

VISION

Baltimore will be a city whose daily activities reflect a commitment shared by government, business, and citizens to reduce or eliminate impacts from current and future natural hazards.

GOALS

G	GOAL 1	Protect the health, safety and welfare of Baltimore City residents and visitors
G	GOAL 2	Prevent damage to structures, infrastructure, and critical facilities
G	iOAL 3	Build resilience and disaster prevention and planning into all programs, policies, and infrastructure (public and private)
G	ioal 4	Enhance the City of Baltimore's adaptive capacity and build institutional structures that can cope with future conditions that are beyond past experience
G	IOAL 5	Promote hazard mitigation and climate adaptation awareness and education throughout the City of Baltimore
G	OAL 6	Become a Community Rating System (CRS) classified community





Code of Federal Regulation - Baltimore City Plan Requirement

C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)

C5. Does the Plan contain an action plan that describes how the actions identified will be **prioritized** (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)





Strategies & Actions Review Request

Current Strategies and Actions

- Is the current status of implementation correct?
 - Not started
 - Progress / Postpone
 - Completed

Thoughts:

- Does the strategy/action need to be updated or it is no longer relevant?
- Was it too ambitious or did it not receive funding?





Strategies & Actions Review Request

Changes or Additions to Strategies and Actions:

- Changes to the prioritization given to the actions
- New strategies or actions that you would like to propose





Strategies & Actions Review Request

Input on High Priority Actions:

- Short term actions that are still in the early stages what can be done to further implementation
- High priority projects that were completed any detail on lessons learned or spin-off projects

Projects with no Movement (High and Low Priority):

- Review and discussion of High Priority & Low Priority Actions with no Documented Movement in past 5 years
 - 20 infrastructure
 - 1 Building
 - 1 Natural Systems
 - 3 Public Service





IN-2	2: Increase energy conservation efforts (L	ead Agency:	BoS)	
6	Identify and collaborate with bicycle groups and repair shops to assist in emergency response and accommodate alternate transportation needs	DOT		*Still Pending
IN-1	14: Integrate resiliency, redundancy, and	structural sta	ability into the City's drinking and water syste	em to ensure safe and
relia	able water storage and distribution (Lead	Agency: DP	W)	
4	Identify and document post damage responsibilities in memorandums of understanding as addendums to Reservoir Watershed Management Agreement	DPW		*Still Pending Coordinate with Baltimore County; Clear responsibilities for maintenance, repair and funding
9	Manage watershed forests to provide maximum benefits for water quality and to maintain resiliency during extreme weather events	MDNR	To Be Determined with Future Data	*Still Pending





N -	1 Protect and enhance the resiliency and	l redundancy	of electricity system (Lead Agency: MOEM)	
6	Develop a comprehensive maintenance and training program for City employees at facilities with backup generators to ensure proper placement, hook-up and function during hazard events.	MOEM		*Still Pending
N-9	9: Alter transportation systems in flood-p	prone areas i	n order to effectively manage stormwater (Le	ead Agency: DOT)
1	Prioritize infrastructure upgrades for roads identified at risk of flooding through the use of elevation data and Sea, Lake and Overland Surges from Hurricanes (SLOSH) model results	DOT	 Number of lane-miles of reconstructed, repaved, or resurfaced roadways in flood- prone areas Percentage of Baltimore's transportation assets adapted for climate change resiliency Stormwater management technologies implemented with transportation projects within flood-prone areas 	*Still Pending
2	Raise streets in identified flood prone areas as they are redeveloped	DOT	To Be Determined with Future Data	*Still Pending
9	Design and implement floodgates and barriers in transportation tunnels	MOEM	To Be Determined with Future Data	*Still Pending
11	Upgrade existing floodgate hardware and mechanisms to control rise rate of water into all city tunnels	MOEM, CSX, Amtrak, MTA FHWA	To Be Determined with Future Data	*Still Pending





IN-1 Ami	.0: Ensure structural stability of all transp trak. MTA)	portation tu	nnels to reduce impact from seismic activity (Lead Agency: CSX,
1	Repair cracks and leaks in all tunnels to reduce impact of seismic activity	CSX, Amtrak, MTA	 Database of all transportation tunnels and their vulnerability to seismic activity Construction and maintenance projects addressing vulnerability of tunnels to seismic activity 	*Still Pending
2	Follow Federal, State and Local criteria for the stabilization of Historic transportation tunnels (e.g. Howard Street)	CSX, Amtrak, MTA	To Be Determined with Future Data	*Still Pending
3	Install a seismically resistant fire standpipe, air monitoring, and automatic valve system in all tunnels to provide a fully automated and monitored fire suppression system	CSX, Amtrak, MTA	To Be Determined with Future Data	*Still Pending
IN-1 Age	1: Evaluate changes to road maintenanc ncy: DOT)	e and consti	ruction materials based on anticipated change	es in climate(Lead
4	Design pavement sections and materials that withstand longer periods of extreme heat events	DOT	To Be Determined with Future Data	*Still Pending





IN-1	L2: Enhance the resiliency of the City's wa	terfront to	better adapt to impacts from hazard events a	nd climate change (Lead
Age	ncy: DOT)			
1	Raise bulkhead height along shoreline areas most at risk	DOT	 Federal dollars secured for coastal protection projects Linear miles of coastal edge restored Number or percentage of buildings with reduced coastal risk due to coastal protection projects Map and database of waterfront edges Revisions to coastal area design guidelines that incorporate climate change 	*Still Pending
IN-1	13: Increase the resilience of all wastewate	er systems	and protect them from current and projected	extreme weather events
(Lea	ad Agency: DPW)			
3	Develop and adopt increased level of protection for construction, redevelopment, and design of all water and wastewater facilities that incorporate future climate projections	DPW		*Still Pending
4	Retrofit and harden low-laying pumping stations and treatment plants in flood hazard areas	DPW	To Be Determined with Future Data	*Still Pending
11	Retrofit wastewater treatment facility and methane gas storage system to withstand seismic activity to protect against earthquakes. Design facility to exceed current building codes	DPW	To Be Determined with Future Data	*Still Pending



IN-1	4: Integrate resiliency, redundancy, and	structural sta	ability into the City's drinking and water syste	m to ensure safe and
relia	able water storage and distribution (Lead	Agency: DP	W)	
6	Conduct a study to determine seismic design standards and seismic resiliency of drinking water distribution system (tunnels, piping, clean water pump stations, dams, shafts, and tanks)	DPW	To Be Determined with Future Data	*Still Pending
IN-1	8: Evaluate and support DPW's stream m	aintenance	program. (Lead Agency: DPW)	
4	Identify interdependencies and benefits of stream maintenance with other transportation programs	DOT	To Be Determined with Future Data	*Still Pending
IN-2	1: Encourage the integration of climate c	hange and n	atural hazards into private and State planning	g documents, systems,
ope	rations, and maintenance. (Lead Agency:	DOP)		
3	Ensure hazard scenarios, utilized in vulnerability assessments, are at a minimum 25% greater in intensity and impact than historical record events to date.	DOP	To Be Determined with Future Data	*Still Pending
4	Develop guidelines for hospital, health care facilities and other institutional entities (e.g. Universities).	MOEM	To Be Determined with Future Data	*Still Pending







Low Priority Actions with NO Movement – Building

B-5	: Improve wind resiliency of new and exis	ting structu	res. (Lead Agency: DCHD)	
2	Retrofit emergency shelter windows to withstand winds associated with coastal storm events	DGS	To Be Determined with Future Data	* Still pending





High Priority Actions with NO Movement – Natural Systems

NS-	2: Increase and enhance the resilience an	d health of E	Baltimore's urban forest. (Lead Agency: BCRP, F	orestry)
2	Evaluate and improve community health center strategies for communicating with patients during an emergency	MOEM	To Be Determined with Future Data	* Still pending





Low Priority Actions with NO Movement – Public Service

PS-4	4: Integrate climate change and natural h	azards plann	ing into all City and community plans (Lead	Agency: MOEM)
3	Partner with Maryland Department of Health and Mental Hygiene or other pertinent entity to develop institutional checklist and materials for health care specific resilience plans	Local Hospitals	To Be Determined with Future Data	* Still pending Block captains example in Philadelphia. Need to make sure that this information is constantly available, but also more available at specific times General preparedness?
PS-6 (Lea	5:Anticipate and address potential diseas ad Agency: BCHD)	e outbreaks	caused by extreme weather events and chan	ging climatic conditions
2	Evaluate existing programs that detect disease outbreaks to determine their flexibility to respond to new conditions	BCHD	To Be Determined with Future Data	* Still pending
PS-7	7: Protect Baltimore residents from the ef	fects of haza	ard events and plan for more frequent hazard	l instances (Lead Agency:
MO	EM)		1	
5	Include information about Code Red in the event permitting process, and incorporate language that allows BCHD to cancel outdoor events	MOEM, BCHD	To Be Determined with Future Data	* Still pending Continue to work with OEM, MTA, and the State VOADs and private partners. Encourage community groups to participate; neighborhood leader engagement



Strategy Sub-Committee

- If you interested in working on the strategies in more detail join the strategy sub-committee.
- Concentration groups will be on centered on the four sectors:
 - Infrastructure
 - Buildings
 - Natural Systems
 - Public Service





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Meeting Subject: DP3 Advisory Committe #2 Date: 07.18.18

Name	Organization	Phone	Email
MARYAME	BAKER	F#3 988047	MARE JANES CALALER LITE COM
BINNY SWITH	261D	301 724-7611	visiniting-d com
Michele King	5P4D	301 724-7611	mking @ smith o-d. con
PATRICK CAMPAZIC	BCFD	410 - 365 - 2633	PATRICK. CAMPBULLE BAGININGENTTY, GOUV
Edward Strouse	MOEM	410-396-3318	edward. Strause @ Baltimore oily. Gol
Jay Paice	DPW	410-396-3500	Temos, Paice OBalt more 174 , 200
MaryJaRcours	MIA	410-468-2091	mary c. Scouss marhand gov
Andrew Rosel	USACE	410-962-811-6	Gibren a. roach & LSGE. Crmymil
INEZ Robb	WDCRO	410-728-2726	irobb 918@ amaile lom
Bie Popula	MORATINICHA	A10 563-7300	WHY WARAT NICHA, CUN
mat oracle Hour	200	443-845-7485	marle Howe OB. 0 17more Polses - orde
LT. Brian Hoch	145 BPD	443-909 6821	This Holling Balt many le lice . etc.
Eileen Singleton	BINC	410-732-0500	esingleton Daltometro. 059
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Meeting Subject: DP3 Advisory Committee to Date: 07. 18. 18

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Name	SARAH BUTOGANY	Siliain Buller	Strem Meritae	Abud Pullen	ave Guignet	Rechelledos	Nicolal Luissint	Lanrie Chus	Kim Eshleman	JOHN QUINI		

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Name	SARAH BUTOGANY	Siliain Buller	Strem Meritae	Abud Pullen	ave Guignet	Rechelledos	Nicolal Luissint	Lanrie Chus	Kim Eshleman	JOHN QUINI		

City of Baltimore 2018 Disaster Preparedness Plan and Project (DP3) Update

Advisory Committee Meeting #3: August 1, 2018 (2:00 pm – 4:00 pm) 7th Floor, Chen Boardroom, Benton building (417 E Fayette Street)*

TIME	ТОРІС	PRESENTER
2:00	Welcome and Introductions (name and affiliation)	 Tom Stosur
2:10	Recap of July 18 Meeting	 Aubrey Germ
2:15	 Identification and Assessment of Hazards (Chapter 3) Risk Assessment - Results and Summary Next Steps Vulnerability Analysis (Chapter 4) Vulnerability Assessment – Preliminary Results and Summary What differentiates this update Next Steps 	 Ginny Smith & Michele King Smith Planning & Design
3:00	 Strategies and Actions (Chapter 5) Introduction of HIRA rankings and Identification of Priority actions Consolidated Actions Strategy Sub-Committee Update Members Results 	 Mark James Michael Baker Int.
3:30	Equity and Outreach Survey / Analysis Update Emerging Trends	 Sarah Baker Healthcare Ready
3:55	Next Steps / Meetings / Questions / Comments	 All
4:00	Adjourn	

AGENDA

NEXT MEETING DATE: Open for discussion

DP3 Advisory Committee Meeting #3

08.01.18

Recap

Hazard ID (Chapter 3)- Presentation by Ginny Smith + Michele King

Risk Identification- What are residents of Baltimore primarily going to be affected by?

- Beginning of chapter: HIRA
- Will have updated tables
- Data in old plan was mostly from Maryland's State Hazard Mitigation Plan from 2011
 - Really had to rebuild the data, so major update of hazard data in this plan
 - National Centers for Environmental Information from NOAA served as a data source for this update, as well as the Baltimore Sun
 - Vetted data that was specific to Baltimore
 - Chapter 3 will be accompanied by a large Appendix which serves as a reference document
- Next steps: will integrate new and updated text, data tables and graphics

Goals and Objective Analysis (Chapter 4)- Presentation by Ginny + Michele

Vulnerability- Who is vulnerable? What is vulnerable? (builds off of chapter 3)

- Need to pull from 2011 HAZUS data in 2011 State Hazard Mitigation Plan, 2000 Census data, default data
- Constraints: New FEMA flood maps are incomplete, as well as FEMA risk products
 Need to think through how to incorporate these into plan after FEMA review in Fall
- What changes in Chapter 4?
 - May 2015- Local hazard mitigation plan guidance from state of Maryland
 - Will cover essential facilities (EOCs, Fire/EMS, Police, Medical, Schools)
 - Protecting these facilities scores high on benefit cost analysis
 - Also will address flooding / coastal hazards and the critical facilities at risk
 - New FIRM Maps-will have elevation of flooding
 - Looked specifically at vulnerable populations through equity lens from Coastal Adaptation Planning and Implementation Plan document to assess social vulnerability
 - Still in the works: will overlay populations most at risk with the high hazard events
- Next steps
 - New data tables, new maps, associated text, plan integration, draft chapter 4

Strategies and Capability Assessment (Chapter 5)- Presentation by Mark James

Steps that were taken to prioritize DP3 Strategies and Actions

- Consolidated actions
 - o Many were near duplicates or had major overlaps within strategy or across strategies
 - o Reduced number of actions from 54 to 24

- Organized list by 'Action Lead Agency'
 - Spreadsheet was distributed to agencies for review
 - Strategy subcommittee meeting last Wednesday
 - Had good representation of lead agencies
 - Went over ¼ of the strategies in person at the meeting and updated them
 - Looked at status of actions- did they change?
- Introduction of HIRA rankings into strategy ranking
 - Added a column to the strategies list, showing which high risk hazards (identified in the HIRA) each action addresses
 - This will show: which actions address all hazards, or 3 or more, or 2 or more, etc.
 - Gave high priority score to actions that touch on "ALL HAZARDS" because more cobenefits or most bang for your buck if carried forward
- Ranking actions based on priority score and hazard rankings
- Critical facilities should be high priority category as well

Next steps for strategies and actions

- New mitigation strategies and actions will be added
 - Resiliency Hubs will be added
 - Heat vulnerability
 - Enhance and expand storm water infrastructure and systems
 - Infrastructure improvement- retrofit one pond and install a new pond in the back river watershed at North Point Road at Kane and Quad
 - Create an interconnected network of green spaces to support biodiversity and watershed based water quality management
 - Develop strategy that specifically addresses repetitive loss properties (and possibly specific to Frederick Avenue)
- Consult FEMA 'mitigation ideas' document

'Community Perspectives on Risk' Survey Update- Presentation by Sarah Baker

Equity and Outreach Sub-Committee

- Objective: Incorporate an equity lens and increase community engagement and input in DP3 update process
- Survey has been disseminated to various community groups over the last few weeks mostly with online form, but hard copies have also been pushed out (see presentation)
- Emerging Data Trends As of 07/31
 - o 144 respondents
 - 139 live in Baltimore
 - 85 both live and work in Baltimore
 - 18 are unemployed

Discussion with Port about Plan integration

Baltimore City DP3 SMITH

Chapter 3

What is Risk

extent.

Hazard Assessment

Risk & Vulnerabilty bility and

Risk Assessments

A risk assessment is a multi-faceted, 'stepped' process. When conducting a risk assessment, the first step is the completion of a through harard identification analysis, as was provided in Chapter 3. This hazard identification process reviewed cases of historiad, hazards in Baltimore — including current threats as



Haz	Chap	ter í	3 Up	dat	e	Local Risk Perspective	Hazard Risk Ranking	
Floo	oding	1-	1	-	-	-	-	
	Flood	3	4	4	4	4	19	
	Duin Fa <mark>ilure</mark>	1	1	1	1	2	2	
New Hazard Identificat	on &	1 0	1		1 .	1 .		
Risk Assessment	ropical Storing & Hurricanes	3	1	1	4	4	13	
	change	4	1	1	4	3	14	
- Local Risk Perspect	ive Tammi	1	1	1	1	1	5	
Ebedi Misk i cispect	Intration Vortability	1 *		-	1 -			
Suprove	under storms (Lightning & Hail)	1	4	4	1	3	13	
- Sui veys	Winner Strems & Nor'Easter	4	4	4	4	3	19	
Indated and/or Donlar	Drought	1	1	1	4	2	9	
opuated and/or Replac	eu	1	1 2	-	1	1	_	
Data Tables —	understoren Winds & Derecho	4	4	4	4	3	19	
	Lorne dos	1 1	1 1	4	3	2		
New Text associated w	th Data mality	4	4	4	1 1	4	17	
Tables	(
Tables	Earthquakes	2	1	1	4	1	9	
	Landslump/Subsidence	1	1	1	1	1	5	
	Sinkholes	3	1	1	4	3	12	

	Table 3-				
		Chapte	er 3 Data 🔤 🏙	IS	
	Count	y/City Tota	i injuries Total I	Deaths	
Previous Tables - Regio	nal, Baltimo	ore City	200	1	
Zone, or Normalized D	ata 🚥 🕬	le 3-37, Maryland Emerg	ency Management Agency, 201	1: 127- 128.	
2011 State of Maryland Hazard Mitigation Plan Updated Tables - Baltir	nore	New 201	8 Data Table		
City Specific Data	TABLE 3	17 THUNDERST	ORM - (LIGHTNING	& HAIL)	
NCEL Baltimore Sup E	adoral &	195	7-2017		
State Agencies	inty/City	Total Events	Total Injuries	Total Deaths	
Balt	imore City	22	1	2	
Source:	National Centers fo	r Environmental Informat	ion (NCEI)		

🖋 Edit × 🛛 A Story Map 🛸

		Chapter 3 - Arthouse the building boots June 19, 1995 - March 31, 2018			
Date	Area	Narrative	Deaths	Injuries	Propert Damage
June 19: 1996	Baltimore City	Lightning struck and killed a construction worker on a roof in downtown Baltimore. The worker died from	1	0	N/A
Appendix	Lakimove liky	Constant receiver at the constant of a lightning, and a home on Allendale Road which was also struck had its celling colleges. Just a structure lights were temporarily knocked out as a result of the storm. Baltimore Gas and Electron reported is COC pastomers without power in the metropolitan area.	Ō	0	30K
Large Re HIRA Mei Easily Up Grant Ap	terence D thodology dated plications	OCUMENT is under a combined with a surface trough, triggered a hot, humid, unstable air mass the second much of Mun and. Strong to severe thunderstorms developed rapidly in northern Maryland and including to subtraction of the second rapidly in a second during the early evening. The main children is a subtraction of the second rapidly in a second during the early evening. The main children is a subtraction of the second rapidly in a second during the early evening. The main children is a second rapidly in a second lightning, through a few occurrences of large hail were noted. The investor is a second rapidly in a second lightning in a second rapidly in a severe thunderstorm may read during unsumpture trees and large limbs on an east-southeast trek from Reisterstown. The second large limbs on an east-southeast trek from Reisterstown. The same can be available windown windows of several automobiles in Reisterstown. The same tand the second much of a vehicle; the shards had to be removed from his scalp.	1	1	N/A
July 27, 2005	Baltimore City	It call that move linearing the region during the late afternoon and evening. This cold front, combined with moist and unstable conditions, triggered widespread showers and storms across the region. The strongest of these storms downed trees and powerlines, as well as producing very large hail. Intense lightning caused fires and several personal injuries. Torrential rainfall flooded a few areas and was also responsible for sweeping away a young boy. Damage estimates by print media were in the hundreds of thousands, possibly more. Lightning the late discussed the binding of the print media were in the hundreds of thousands, possibly more.		*	N/A

				Edit × A Story Ma	
	Chapter	4			
And Annus	lized Loss Estin	astas by Occupancy	N .		
cational	Government	Industrial	, Religion/ Non-Profit	Residential	
\$ 21 Agency, 2011:	\$ 18,000 132.	\$ 71,000	\$ 35,000	\$ 2,121,000	
	//nd Annua icational 21 Agency, 2011:	Chapter Ind Annualized Loss Estim Icational Government 21 \$ 18,000 gency, 2011: 132.	Chapter 4 Ind Annualized Loss Estimates by Occupance Icational Government 21 \$ 18,000 gency, 2011: 132.	Chapter 4 Ind Annualized Loss Estimates by Occupancy Icational Government Industrial Religion/ Non-Profit 21 \$ 18,000 \$ 71,000 \$ 35,000 gency, 2011: 132.	











Draft Chanter 3	Mon	Tu	Next S	teps _{Thu}	Fri	Sat	
Integrate New/Updat Data Tables & Graphi	ed Text, cs		1	2	3	4	
Chapter 4 - New Data Tables	6	7	8	9	10	11	
- New Maps - Associated Text	13	14	15	16	17	18	
- Plan Integration - Draft Chapter 4	20	21	22	23	24	25	
26	27	28	29	30	31		1

Steps that were taken to Prioritize DP3 Strategies and Actions

- Consolidated Actions
- Break out by Agency
 - Spreadsheet Distribution
 - Strategy Sub-Committee
- Introduction of HIRA Rankings into Strategy Ranking
- Ranking Actions Based on Priority Score & Hazard Rankings

Next Steps for Strategies and Actions

- New Mitigation Strategies and Actions
- Mitigation Ideas





Consolidated Actions:

- Duplicate Actions
- Within Strategy / Across Strategy
- Reduced from 52 to 24

IN-5	MOEM	2	Increase and ensure fuel availability during distribution disruptions	MOEM	BCFD, BCPD, DES, DOT, DPW, MOE	All	Medium	To Be Determined with Future Data	*Still Pending
IN-5	MOEM	3	Ensure fuel for generators and delivery priority is given to critical facilities and emergency responders.	MOEM	BCFD, BCPD, DES, DOT, DPW, MOE	All	Medium	To Be Determined with Future Data	*Still Pending



IN-5 MOEM 2 Increase and ensure fuel availability during distribution disruptions. Priority givento critical facilities and emergency responders MOEM BCFD, DCT, DPW, MOE All Medium	IN-5	IN
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Break out By Agency

DG	S			I I							0	
STRATEGY =	STRATE GY LEAD AGENC Y	ACTION #	ACTION	ACTION LEAD AGENCY	TAKEHOLDERS	HAZARD	ED TIMEFRA ME (short 1- 2yrs_med 2-5wrs	FINANCING OPTIONS	PERFORMANCE METRICS	STATUSICOMMENTS	Priority Score (wh CAP Dverlap Values)	
IN-3 MED		1	Investigate off-gind, on-sile renewable energy systems, generators, and technologies for oritio facilities to ensure redundancy of energy syste	DGS ¢	BGE, DGS, DHMH, DOP, DOT, DPW, MDEM	All	Medium	• Baltimore Dity OP • Federal Programs	Nonber of creat actives with backup power generation sources - Percentage of hospital and healthcare facility patient capacity (e.g. hospital beds) in flood-prone areas meeting realilency requirements - City buildings with backup generators - Nu roher of critical facilities	*Currently in mid-stages	7	
IN-3	MED	2	Seek funding to purchase and install generator for all city building designated as critical to agency functions	DGS	DGS, DOP, DOT, DPW, MOIEM	Ali	Short	Federal Grants State Grants	To Be Determined with Fulure Data	*Currently in very early stages	7	
IN- 22	DOP	3	Use comprehensive infrastructure assessment to identify infrastructure in need of replacement and prioritize funding for those projects	DGS	BCHD, BCRP, DOP, DOP, DOT, DPW, Energy Office, MOEM	All	Short to Medium: Ongoing	-	To Be Determined with Future Data	*Currently in very early stages	8	
B-1	MDEM	4	Require pre-wring for generators at all facilities designated critical to agency operations and hazard response	DGS	BGE, DGS, DDP, Hospitals, Material Storage Sites	All	Medium	Existing Capitol Budgets	To Be Determined with Future Data	*Still Pending Not just in City. State and Federal facilities; include other critical facilities and buildings over a certain height	7	
B-5	DHCD	2	Retrofit emergency shelter windows to withstan winds associated with coastal storm events	DGS	Owners, DCHD, DGS, DCIP, MDE, MOEM, Private	Coastal Hazards	Long	Federal Emergency Management Funding	To Be Determined with Fulure Data	* Still pending	5	
8-6	DGS	1	Determine engineering effectiveness and cost- benefit of various earthquake mitigation measures using computer modeling	DGS	DCHD, MOEM, USGS	Land	Short	The analysis of City infrastructure is an ongoing priority and could be completed as part of this ongoing process. The City's existing capital plan	Completion of a study to evaluate potential effectiveness and feasibility of engineering measures.	"Still pending	10	
8-8	DGS	1	Install energy-efficient and low-water-use equipment during renovations in all City-owned buildings	DGS	MOE. BOPSS DCHD, DGS, DOP	All	Medium	•MEA's Jane E. Lawton Conservation Loan Program •MEA's State Agency Loan Program (SALP)	Plesource conservation measures used in city-owned buildings Mendale requiring resource conservation measures in city- owned buildings Energy efficiency and weatherization upgrades at Balimore Liby School #Perence of efficiency and weatherization upgrades within BCPSS Ten-Year plan	 Currently in early stages install hands-free sensors in restroom sinks, low-water use toilets and flush sensors, and low-flow plumbing fixtures. Additional actions in Appendix 	NREFI	
		-										
		-						-				
		-										
	. 1	All	Actions BCHD DGS DOP	DOT	DPW HCD	MEO	MOEM	PSC R&P BG	E State COMBO	COMBO Combilined CO	MBO Re	



Baltimore City Department of Planning

Break out By Agency

Strategy Sub-Committee Members

- Lisa McNeilly, DoP
- Aubrey Germ, DoP
- John Quinn, BGE
- Kimberly Eshleman, BCHD
- Ed Strouse, MOEM
- Ryan McByrne, DPW
- Mikah Zaslow, DOT
- Craig Keenan, DGS
- Phil Lee, Moffatt Nichol





Sub Committee Discussion Points

- Corrections to or Deletion of the action
- Are you still the Lead Agency for the action
- Has there been any changes in the Timeframe
 - Short
 - Mid
 - Long
- Has the Status of the action changed provide Reasons for why there was no movement in past 5 years or lessons learned from progress made - success stories
 - Still pending
 - Very early stages
 - Early stages
 - Mid stages
 - Advanced
 - Implemented / Ongoing
- Are there Performance Metrics that were developed and were implemented in the past 5 years
- Are there any known changes to the priority of this action





Introduction of HIRA Rankings into Strategy Ranking

Results from the 2018 HIRA to the Strategy provided top ranked hazards: Flooding, Sea Level Change, Winter Storms & Nor'Easter, Thunderstorm Winds & Derecho, and Heat & Air Quality

Hazards	Probability	Deaths	Injuries	Damages	Local Risk Perspective	Hazard Risk Ranking
Flooding	1		1			
Flood	3	4	4	.4	4	19
Dam Failure	1	1	1	1	2	5
Coastal Hazards	-			-		5-0-0
Tropical Storms & Hurricanes	1	1	1	4	4	- 11
Storm Surge/Coastal Inundation	2	1	1	2	3	9
Sea Level Change	4	1	1	4	4	14
Tsunami	1	1	1	1	1	5
Precipitation Variability			E			
Thunderstorms (Lightning & Hail)	1	4	4	1	3	13
Winter Storms & Nor Easter	4	4	4	4	3	19
Drought	2	1	1	4	2	10
Wind	-		-	-	-	-
Thunderstorm Winds & Dereche	4	4	4	4	3	19
Tornados	1	1	4	3	2	11
Extreme Heat						-
Heat & Air Quality	4	4	4	3	4	19
Land					-	
Earthquakes	1	1	1	4	1	B
Landslump/Subsidence	1	1	1	1	1	5
Sinkholes	3	1	1	4	3	12

Hazard Risk Ranking Criteria												
Low Risk	Medium Risk	High Risk										
0-6	7-13	14-20										



Introduction of HIRA Rankings into Strategy Ranking

DG	S										
STRATEGY #	STRATEGY LEAD AGENCY	ACTION #	ACTION	ACTION LEAD AGENCY	STAKEHOLDERS	HAZARD	E TIMAT TI IEFRAI short 1 21 s, med Sy i, long	ED ME I- FINANCING OPTIONS I 3- 6+)	PERFORMANCE METRICS	STATUS/COMMENTS	Priority Score (w/o CAP Overlap Values)
IN-3	MEO	1	Investigate off-grid, on-site renewable energy systems, generators, and technologies for critical facilities to ensure redundancy of energy systems	DGS	BGE, DGS, DHMH, I DOT, DPW, MOE	op, ali	Medium	• Baltimore City CiP • Federal Programs	Number of critical facilities with backup power generation sources Percentage of hospital and healthcan facility patient capacity (e.g. hospital beds) in flood-prone areas meeting resiliency requirements City buildings with backup generator Number of critical facilities connecte to CHP cogeneration systems	e *Currently in mid-stages d	7
IN-3	MEO	2	Seek funding to purchase and install generators for all city building designated as critical to agency functions	DGS	DGS, DOP, DOT, DF MOEM	N _r All	she t	Federal Grants State Grants	To Be Determined with Future Data	*Currently in very early stages	7
IN-22	DOP	з	Use comprehensive infrastructure assessments to identify infrastructure in need of replacement and prioritize funding for those projects	DGS	BCHD, BCRP, DOP, I DOT, DPW, Energ Office, MOEM	OP, All	Shi t to		Score	e each measure: High=3, Mediur	n=2, Low=1
8-1	MOEM	4	Require pre-wiring for generators at all facilities designated critical to agency operations and hazard response	DGS	BGE, DGS, DOP, Hospitals, Materi Storage Sites	All	STATUS,	COMMENTS	Financial Feasibility	Political Impact Public Feasibility Support	Priority Sco (w/o CAP Overlap Valu
8-5	DHCD	2	Retrofit emergency shelter windows to withstand winds associated with coastal storm events	DGS	Commercial Build Owners, DCHD, DO DOP, MDE, MOE! Private Develope	g Sr Coastal Hazard	s Long	Federal Emergency Management Funding	To Be Determined with Future Data	* Still pending	5
8-6	DGS	1	Determine engineering effectiveness and cost-benefit of various earthquake mitigation measures using computer modeling	DGS	DCHD, MOEM, US	S Land	Shert	The analysis of City infrastructure is an ongoing priority and could be completed as part of this ongoing process. The City's existing capital plan	Completion of a study to evaluate potential effectiveness and feasibility o engineering measures.	f *Still pending	10
8-8	DGS	1	install energy-efficient and low-water-use equipment during renovations in all City-owned buildings	DGS	MOE, BCPSS, DCH DGS, DOP	, All	Medium	• MEA's Iane E. Lawton Conservation Loan Program • MEA's State Agency Loan Program (SALP)	Resource conservation measures use in city-owned buildings Mandate requiring resource conservation measures in city-owned buildings Energy efficiency and weatherization upgrades at Baltimore City Schools/Reference of efficiency and weatherization upgrades within BCPSS Ten-Year plan	d • Currently in early stages Install hands-free sensors in restroom sinks, low-water use toilets and flush sensors, and low-flow plumbing fixtures. Additional actions in Appendix	#REF!





Ranking Strategies - Result 88 Priorities

• Fist: High Priority Score that is impacted by "All" Hazards

STRATEGY #	STRATEG Y LEAD AGENCY	ACTION #	ACTION	DESCRIPTION	ACTION LEAD AGENCY	STAKEHOLDERS	HAZA	ARD	ESTIMAT TIMEFRAI (s ort 1-2yrs 3- yrs, long	ED ME FINANCING 5, med OPTIONS 3 6+)	PERFORMANCE METRICS	STATUS/COMMENTS	Priority Score (w/o CAP Overlap Values)
IN-1	MOEM	2	Evaluate the City of Baltimore utility distribution system, and identify "underground utility districts" using BGE's May 2013 short term reliability improvement plan	Failure of key nodes in the energy distribution system can have widespread impacts on the City's energy systems, with significant repercussions for people, businesses, and communities. In May of 2013, BGE filed a short term reliability improvement plan with the PSC as a result of the Derecho Order. This plan addresses selective undergrounding throughout BGE's service area. BGE will work with the City of Baltimore to use this plan as a guide and work with the PSC to leverage potential opportunities.	PSC / DPW	BCRP (Forestry), IGE, Building Owners, IGS, DOT, DPW, Exelon, IGS Utility customers, Ve, II Wheelabrator	, , All a,	1 2	Sho	 Baltimore City CIP Federal Sources BGE's existing funds allocated through the Smart Grid Investment Grant 	To Be Determined with Future Data	*Currently in very early stages	10

• Second: High Priority Score that is impacted by "2 or more " Hazards

STRATEGY #	STRATEG Y LEAD AGENCY	ACTION #	ACTION	DESCRIPTION	ACTION LEAD AGENCY	STAKEHOLDEF	HAZARD	ESTIMATED MEFRAME (sht : 1-2yrs, me 3-5 : s, long 6+)	FINANCING I OPTIONS	PERFORMANCE METRICS	STATUS/COMMENTS	Priority Score (w/o CAP Overlap Values)
PS-9	FEMA /MEMA	3	Inform property owners who have paid off their mortgage that flood insurance is still necessary	Property owners and homeowners should be aware that their standard homeowners' policies generally do not provide flood coverage.	DOP	Community Groups, DHCD, DHMH, DOP, FEMA, MEMA, MC, M, MON, NFIP, NGO, MOEM	Flooding Coastal Hazards	Shq	• State and Foundation Grants	To Be Determined with Future Data	* Currently in early stages	11

• Third: Impacted by "2 or more " Hazards

STRATEGY #	STRATEG Y LEAD AGENCY	ACTION #	ACTION	DESCRIPTION	ACTION LEAD AGENCY	STAKEHOLDERS		HAZARD	ES TIM (sh. m 3-1	TIMATED AEFRAME FINANCING 1.1-2yrs, med OPTIONS rs, long 6+)	PERFORMANCE METRICS	STATUS/COMMENTS	Priority Sco CAP Overla Values)	re (w/o p
PS-6	BCHD	1	Support studies of heat and flood related vector borne diseases in the Baltimore the region based on changing temperature and moisture	Prevent injury or loss of life due to disease outbreaks through the exploration of studies regarding heat and flood related impacts.	BCHD	BCHD, CDC, DH MDNR, MEMA, Mi MOEM, State Agend	H, 1E, 2 S	Flooding Extream Heat	Onui	Federal Grants State Grants Foundation Grants	Identification of potential disease outbreaks and incorporation of prevention measures into ongoing health programs Revisions of existing programs to better detect and respond to disease outbreaks	* Currently in early stages Outlined in the EOP	8	



Baltimore City Department of Planning



New Mitigation Strategies

Resiliency Hubs

A Resiliency Hub is building or set of buildings and neighboring outdoor space that is a gathering place for residents during times of weather-related or major local emergencies.

- Increase number of Resiliency Hubs from six (6) to (10) in next 5 years.
- Develop guidance document for Resiliency Hub Leaders that detail the scope of services - Include checklist and instructions for opening, running, and closing.
- Provide technical assistance to Resiliency Hub Leaders and volunteers on best use of resources, information sharing with City staff, and equipment.
- Provide training and other community outreach initiatives to provide opportunities for community members to become involved in resiliency initiatives.




New Mitigation Strategies

Heat Vulnerability

Target mitigation efforts to reduce risks to vulnerable senior communities that are isolated and in poor physical condition.

 Initiate community resiliency planning, outreach, and support for seniors in heat events. Special emphasis targeted to the identified vulnerable area of Rosemont neighborhoods (South of North Avenue and East of Leaken Park).





New Mitigation Actions

Addition - IN-16 Enhance and expand stormwater infrastructure and systems

 Infrastructure Improvement- Retrofit one pond and install a new pond in the Back River Watershed at North Point Road @ Kane and Quad.

Addition - NS-3 Create and interconnected network of green spaces to support biodiversity and watershed based water quality management

• Reduce impervious surfaces by 5% over the next 5 years.





New Mitigation Actions

Addition - NS-4 Expand, protect and restore riparian areas in the city

- Complete Maidens Choice stream restoration project (Army Corps of Engineers, Baltimore District identified project).
- Key results of the project include:
 - Eliminate/minimize bank erosion from 30-foot high valley walls to improve water quality and reduce woody debris recruitment.
 - Reconnect channel to its floodplain to convey storm flows and maintain channel stability.





Disaster Preparedness and Planning Project (DP3)

Mitigation Actions - Ideas

Consult FEMA Document: Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards

- Concentrate on sample actions for 8 hazards:
 - Flooding
 - Coastal Hazard
 - Wind
 - Extreme Heat
 - Land
- Structured into 4 methods:
 - Local Planning and Regulation
 - Structure and Infrastructure
 - Natural Systems
 - Education and Awareness



Mitigation Ideas

A Resource for Reducing Risk to Natural Hazards

January 2013





Baltimore City Department of Planning

Mitigation Actions - Sample

Flood

Local Planning and Regulation:

Adopt Polices to Reduce Stormwater Runoff - Encouraging the use of permeable driveways and surfaces to reduce runoff and increase groundwater recharge.

Structure and Infrastructure:

Protect Infrastructure - Floodproofing wastewater / water treatment facilities located in flood hazard areas. (Resources FEMA P-259, 345, 543, B-797)

Natural Systems Protection:

Protect and Restore Natural Flood Mitigation Features - Developing a land banking program for the preservation of the natural and beneficial functions of flood hazard areas. (Resources FEMA 100, 268)

Education and Awareness:

Educate Property Owners about Flood Mitigation - Encouraging homeowners to install backflow valves to prevent reverse-flow flood damages.





Q1 Flood: Flooding occurs when rivers, creeks, streams, ditches, or other hydrological features receive too much water. Three categories of flood are common in the State of Maryland: flash, riverine, and coastal. In Baltimore, major flooding events are the result of riverine and flash flooding along the stream tributaries of the Patapsco River — including the Gwynns Falls and the Jones Falls, as well as their own tributaries — or from tidal flooding in the Northwest Harbor and Middle Branch of the Patapsco River. Please indicate your level of concern specific to the flood hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	63.64%	14
Concerned	36.36%	8
Somewhat Concerned	0.00%	0
Not Concerned	0.00%	0
TOTAL		22

Q2 Dam Failure: Dam failure is the collapse or breach of the dam structure, for which there is often either very little or no advance warning. While most dams in the Baltimore region have relatively small water volumes and failures would therefore have little or no repercussions, dams with larger storage volumes can have disastrous consequences should they fail. Please indicate your level of concern specific to the dam failure hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	9.09%	2
Concerned	18.18%	4
Somewhat Concerned	40.91%	9
Not Concerned	31.82%	7
TOTAL		22

Q3 Tropical Storms and Hurricanes: Tropical storms and hurricanes are very intense, low pressure wind systems that form over tropical or subtropical waters. Both tropical storms and hurricanes are considered tropical cyclones; the distinction, however, is based on wind speeds and, typically, on the amount of destruction produced (i.e. the "impact"). In Baltimore, hurricanes and tropical storms have produced wind damage, riverine flooding along tributaries, and inundation of shorelines and harbors by way of intense storm surges. Please indicate your level of concern specific to the tropical storm and hurricane hazards.



ANSWER CHOICES	RESPONSES	
Very Concerned	45.45%	10
Concerned	45.45%	10
Somewhat Concerned	9.09%	2
Not Concerned	0.00%	0
TOTAL		22

Q4 Sea Level Change: For a number of reasons — including climate change and an anticipated increase in global temperature — the world's sea levels have been rising in the past 100 years. In Baltimore, NOAA sea level gauges at Fort McHenry, as well as other official reports, have shown that relative sea level in the Harbor area has increased by 12 inches since 1900. Approximately 1.33 percent of Baltimore City land is within the projected sea level rise zone. Please indicate your level of concern specific to the sea level change hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	36.36%	8
Concerned	50.00%	11
Somewhat Concerned	13.64%	3
No Concerned	0.00%	0
TOTAL		22

Q5 Storm Surge/Coastal Inundation: Storm surge is the rise in water level above the regular high tide caused by a severe storm such as a hurricane or Nor'Easter. These storms bring rain and heavy wind, which drives larger waves and can blow water up the Chesapeake Bay, thus causing the rivers to rise. Storm surges can create extensive storm damage, erosion, and inundation of low-lying coastal areas. Due to the unpredictable nature of storms, Hurricane Category designation does not always accurately reflect a storm's potential damage in Baltimore. Indeed, severe damage has occurred to property and natural coastlines from less-than-major Category hurricanes. This damage is caused by a remnant storm surge decreasing more slowly than expected following the weakening of the land-falling storm. Please indicate your level of concern specific to the storm surge/coastal inundation hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	63.64%	14
Concerned	22.73%	5
Somewhat Concerned	13.64%	3
Not Concerned	0.00%	0
TOTAL		22

Q6 Tsunami: A tsunami is a series of sea waves caused by the displacement of a large volume or body of water. Tsunamis may result from local or distant large-scale seafloor displacement, including seismic activity, volcanic activity or landslides that generate uplift or drop in the ocean floor. A "geo-atmospheric" tsunami type event that upon closer investigation, could present a significant new hazard planning concern for vulnerable high population areas such as Baltimore City and surrounding areas. Please indicate your level of concern specific to the tsunami hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	0.00%	0
Concerned	4.55%	1
Somewhat Concerned	27.27%	6
Not Concerned	68.18% 1	5
TOTAL	2	22

Q7 Thunderstorms with Lightning & Hail: When atmospheric conditions combine to provide moisture, lift, and warm unstable air that rapidly elevates, a thunderstorm is formed. Thunderstorms can occur at any time of day and in all months of the year, but are most common during summer afternoons or evenings and in combination with frontal boundaries. Maryland experiences approximately 20-40 thunderstorm days per year and frequently occur in Baltimore. Every thunderstorm is accompanied by lightning; in fact, the actual sound of thunder is a direct result of lightning. In Baltimore, lightning strikes have been the cause of significant property damage throughout the years, and have even taken the lives of City residents. Hail is another dangerous by-product of severe thunderstorms. In Baltimore, the largest size hail measured between 1950 and 2012 had been 1.75 inches. Hail in Baltimore had not caused significant economic losses during that period. Please indicate your level of concern specific to the thunderstorm with lightning and hail hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	22.73%	5
Concerned	54.55%	12
Somewhat Concerned	22.73%	5
Not Concerned	0.00%	0

22

Q8 Winter Storms & Nor'Easters: Winter storms produce more than just snow. Winter weather can take many forms, including freezing rain, sleet, extreme cold and high winds. These conditions may occur singly or in any combination. Some of the most significant winter storms that affect Maryland are known as "Nor'easters" because they are accompanied by strong northeast winds. Over the past decade, Baltimore City has experienced several strong winter storms that have disrupted regular activities and caused a number of automobile accidents and power outages. Climate averages for Baltimore denote 21.1 inches of snowfall annually for any given year. Please indicate your level of concern specific to the winter storm and Nor'Easter hazards.



ANSWER CHOICES	RESPONSES	
Very Concerned	45.45%	10
Concerned	36.36%	8
Somewhat Concerned	13.64%	3
Not Concerned	4.55%	1
TOTAL		22

Q9 Drought: Droughts are extended periods of dry weather, caused by a natural reduction in the amount of precipitation over an extended period of time. Droughts may be classified as meteorological, hydrologic, agricultural, or socioeconomic events. While occurring less frequently in Baltimore City than in surrounding jurisdictions, meteorological and hydrologic droughts are natural hazards that present major threats to the City and regional water supply. Please indicate your level of concern specific to the drought hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	9.09%	2
Concerned	31.82%	7
Somewhat Concerned	36.36%	8
Not Concerned	22.73%	5
TOTAL		22

Q10 Thunderstorm Winds: Wind is the motion of air past a given point caused by a difference in pressure from one place to another. The effects can include blowing debris, interruptions in elevated power and communications utilities, and intensified effects of winter weather.
Downbursts cause the high winds in a thunderstorm. Measured between 1956 and 2010, Baltimore City reported a total of 30 wind related injuries. During the same time period, property damage from wind events totaled an average of \$15,601 a year. Please indicate your level of concern specific to the thunderstorm wind hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	9.09%	2
Concerned	50.00% 1	1
Somewhat Concerned	27.27%	6
Not Concerned	13.64%	3
TOTAL	2	2

Q11 Derechos: Derechos are large thunderstorm clusters that produce widespread and long-lasting winds which can be extremely damaging. The impact of a derecho is similar to that of a hurricane making landfall, and can be many miles wide and several hundred miles long. An event may be classified as a derecho if the swath of storms is more than 240 miles long and wind speeds of over 58 mph are maintained for at least six hours throughout the entire span of the storm front. In the Mid-Atlantic region, derechos are less common — occurring once every two to four years in Maryland. Consequently, residents have typically been less familiar with this type of storm designation. The term, however, was recently marked in the memories of many Baltimore residents following the devastation of a June 29, 2012 Mid-Atlantic and Midwest derecho. Please indicate your level of concern specific to the derecho hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	0.00%	0
Concerned	59.09%	13
Somewhat Concerned	27.27%	6
Not Concerned	13.64%	3
TOTAL		22

Q12 Tornados: A tornado is a violently rotating funnel-shaped column of air that extends from a thunderstorm cloud toward the ground. Tornadoes can touch the ground with winds of over 300 mph. While relatively shortlived, tornadoes are intensely focused and are one of nature's most violent storms. To date, the highest intensity tornado experienced in the Baltimore Region has been an F2. In October 1990, a F2 tornado injured 59 Reisterstown residents. Less than twenty minutes later, this tornado was followed by a less powerful, F1 tornado. Please indicate your level of concern specific to the tornado hazard.



ANSWER CHOICES	RESPONSES
Very Concerned	4.55% 1
Concerned	31.82% 7
Somewhat Concerned	45.45% 10
Not Concerned	18.18% 4
TOTAL	22

Q13 Heat & Air Quality: An extreme heat condition is identified when prolonged temperatures are 10° or more above the average high temperature for a region. In Baltimore's past, between the 1950's and the 1970's, an average of 60 percent of summer days had met the maximum temperature extremes. Health risks associated with heat particularly risks that worsen symptoms triggered by respiratory diseases — are further provoked by diminished air quality. Trees and other vegetation cool the surrounding air and are shown to help to improve air quality. The U.S. Forest Service conducted a study to quantify one health benefit of the urban tree canopy. Their study found that trees in Baltimore remove approximately 14 tons of pollution each year. Please indicate your level of concern specific to the heat and air quality hazards.



ANSWER CHOICES	RESPONSES	
Very Concerned	54.55% 1	12
Concerned	40.91%	9
Somewhat Concerned	0.00%	0
Not Concerned	4.55%	1
TOTAL	2	22

Q14 Earthquakes: An earthquake is ground shaking caused by a sudden movement of rock in the earth's crust. Such movements occur along faults, which are thin zones of crushed rock separating blocks of crust. When one block suddenly slips and moves relative to the other along a fault, the energy released creates vibrations called seismic waves that radiate up through the crust to the earth's surface, causing the ground to shake. While no earthquake epicenters have been located within the City of Baltimore, strong earthquakes are capable of being felt for hundreds of miles. Compared to other parts of the United States, the Baltimore region has relatively low probability of experiencing strong earthquakes.The strongest earthquake felt in the Baltimore region was the Virginia earthquake that measured an intensity of 5.8, originating in Louisa County on August 23, 2011. Please indicate your level of concern specific to the earthquake hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	0.00%	0
Concerned	9.09%	2
Somewhat Concerned	27.27%	6
Not Concerned	63.64%	14
TOTAL	2	22

Q15 Landslides/subsidence: A landslide is defined as the movement of a mass of rock, debris, or earth down a slope. Landslides are a type of "mass wasting," which denotes any down-slope movement of soil and rock under the direct influence of gravity. The Maryland Geological Survey (MGS) does not consider Baltimore to have a significant risk of landslide due to the lack of mountainous areas. Land subsidence is the gradual settling or sinking of the Earth's surface. Subsidence may be gradual or sudden and can range in extent—from broad, regional reductions in elevation to localized areas of collapses. Recent climate assessments have reported Baltimore's rate of land subsidence to have been roughly half a foot in the last century. Please indicate your level of concern specific to the landslide/subsidence hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	0.00%	0
Concerned	9.09%	2
Somewhat Concerned	31.82%	7
Not Concerned	59.09%	13
TOTAL	:	22

Q16 Sinkholes: Sinkholes can be induced through human actions. Human induced sinkholes can be triggered by simple alteration in the local hydrology. Inadequate drainage along highways and increased runoff from pavement can also be sources of sinkhole development. In Baltimore, infrastructure-related sinkholes have been the primary concern. Please indicate your level of concern specific to the sinkhole hazard.



ANSWER CHOICES	RESPONSES	
Very Concerned	18.18%	4
Concerned	31.82%	7
Somewhat Concerned	36.36%	8
Not Concerned	13.64%	3
TOTAL		22

Q17 From your department/agency perspective, please list the natural hazards considered as the "Highest Risk" to Baltimore City.

Answered: 21 Skipped: 1

#	RESPONSES	DATE
1	Flooding, coastal storms, extreme heat	7/16/2018 2:03 PM
2	Flooding, Storm Surge/Coastal Inundation, Heat and Air Quality.	7/16/2018 11:37 AM
3	flooding, tropical storm/hurricane, storm surge, winter storms, drought, heat/air quality	7/16/2018 10:26 AM
4	Flood, Heat, Winterstorm	7/16/2018 9:41 AM
5	Flood, Tropical Storms and Hurricanes, Sea Level Change, Storm Surge/Coastal Inundation, Winter Storms & Nor'Easters	7/16/2018 9:34 AM
6	Flooding Extreme Heat	7/16/2018 8:58 AM
7	Increasing incidences of higher velocity winds	7/16/2018 8:02 AM
8	NA	7/14/2018 5:10 PM
9	Heavy percipitation over short periods	7/13/2018 6:13 PM
10	Floods, winds, heat	7/13/2018 5:39 PM
11	Coastal storm, flood, tornado, winter storm	7/12/2018 4:44 PM
12	Flooding, Wind, Heavy Snow	7/9/2018 9:38 AM
13	Flooding around the Harbor, sea level rise	7/8/2018 9:10 AM
14	Flooding, SLR, heat waves	7/7/2018 1:00 PM
15	Flood, Coastal Hazards, and Precipitation Variability.	7/6/2018 10:47 AM
16	Flood and wind	7/3/2018 1:44 PM
17	Hurricanes, extreme droughts	7/3/2018 12:53 PM
18	Sea Level Rise	7/3/2018 10:40 AM
19	Storms and Flooding	7/3/2018 10:33 AM
20	Flooding	7/3/2018 10:02 AM
21	Flooding	7/3/2018 8:06 AM

Q18 Has your department/agency completed any projects to eliminate or lessen the impacts from natural hazards? If so, please provide information in the space below.

Answered: 16 Skipped: 6

#	RESPONSES	DATE
1	No	7/16/2018 2:03 PM
2	Strong local floodplain regulations.	7/16/2018 11:37 AM
3	my agency (BMC) works on plans that track and support the reduction of vehicle emissions to improve air quality; we are also involved in regional evacuation planning	7/16/2018 10:26 AM
4	Many storm risk, flood risk, and other studies and projects focused on the Baltimore region throughout the years.	7/16/2018 9:34 AM
5	Yessee office of Sustainability	7/16/2018 8:58 AM
6	Increased tree trimming, installed limb clearing line devices and increased under grounding.	7/16/2018 8:02 AM
7	NA	7/14/2018 5:10 PM
8	Yes	7/13/2018 6:13 PM
9	Yes, various city-wide plans to address these issues.	7/13/2018 5:39 PM
10	Department has equipped many stations with stand-by generators.	7/9/2018 9:38 AM
11	no	7/8/2018 9:10 AM
12	We recently completed guidance for local government on hazard mitigation planning for cultural resources and have funding similar planning efforts throughout the state. Several properties in Baltimore City have used the Maryland Heritage Structure Rehabilitation Tax Credit Program and included flood protection in their projects.	7/6/2018 10:47 AM
13	Citizen preparedness	7/3/2018 1:44 PM
14	Added generators in some locations.	7/3/2018 12:53 PM
15	Designing for the floodplain, particularly elevators.	7/3/2018 10:02 AM
16	Storm water management	7/3/2018 8:06 AM

Q19 Does your department/agency have any ideas for actions or projects that may be undertaken in the future to eliminate or lessen the impacts from natural hazards?

Answered: 14 Skipped: 8

#	RESPONSES	DATE
1	Yes	7/16/2018 2:03 PM
2	Exploring mitigation options.	7/16/2018 11:37 AM
3	at this time, we don't have other projects in mind other than what we are currently doing relative to air quality and evacuation planning; we are interested in supporting other projects	7/16/2018 10:26 AM
4	Baltimore Metropolitan Water Resources - Coastal Storm Risk Management Study - partner with USACE in investigating and proposing solutions to coastal storm risk in the Baltimore Metro Area.	7/16/2018 9:34 AM
5	yessee Office of Sustainability	7/16/2018 8:58 AM
6	Continue to innovate to apply technology to predict events, detect events and solve the impact of events. At the same time, looking to apply resiliency measures such as micro grids and distributed energy resources to deal with any system loss.	7/16/2018 8:02 AM
7	NA	7/14/2018 5:10 PM
8	Yes	7/13/2018 6:13 PM
9	Yes	7/13/2018 5:39 PM
10	Not at this time.	7/9/2018 9:38 AM
11	we don't really have responsibilities or resources in this area of work	7/8/2018 9:10 AM
12	Although we have no specific ideas for action at this time, MHT would like to see actions that address hazards on a community-wide basis, rather than individual properties, and more planning that involves protecting historic communities from natural hazards and climate change.	7/6/2018 10:47 AM
13	Purchase adequate and proper insurance	7/3/2018 1:44 PM



Baltimore City Department of Planning Meeting Sign- In Sheet

Meeting Subject: DP3 Advisory Committee #3 Date: 8-01-18

Name	Organization	Phone	Email
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