BALTIMORE METROPOLITAN COUNCIL

BRTB
Baltimore Regional Transportation Board

Overview of Regional Resilience Activities

Presentation to Baltimore City Commission on Sustainability
July 19, 2023

Agenda

- Overview of BMC
- Overview of Climate Resilience Work
  - Electric Vehicle Infrastructure
  - Climate Resilience Documents
  - Reservoir Protection
  - Regional Proposals

BMC

Overview of Baltimore Metropolitan Council

- Private nonprofit organization committed to **identifying regional interests** and **developing collaborative strategies** through plans and programs, which will **improve the quality of life and economic vitality** throughout the region.

- Board of Directors:
  - Mayor of Baltimore City
  - Executives of Anne Arundel, Baltimore, Harford and Howard counties, a Carroll County Commissioner, a Queen Anne's County Commissioner
  - Delegate and Senator from the State of Maryland, and a gubernatorial appointee

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Overview of Baltimore Metropolitan Council

- Work of BMC staff includes:
  - Transportation Planning
  - Economic and Demographic Research
  - Computer Mapping and Geographic Analysis
  - Air and Water Quality Programs
  - Cooperative Purchasing
  - Workforce Development
  - Housing
  - Rideshare Coordination
  - Emergency Preparedness

www.baltometro.org

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Overview of Baltimore Metropolitan Council

- Transportation Planning committees:
  - Baltimore Regional Transportation Board
  - Baltimore Region GIS Committee
  - Baltimore Regional Safety Subcommittee
  - Bicycle and Pedestrian Advisory Group
  - Congestion Management Process Committee
  - Cooperative Forecasting Group
  - Freight Movement Task Force
  - Interagency Consultation Group
  - Public Advisory Committee
  - Technical Committee
  - Traffic Incident Management Committee
  - Traffic Signal Subcommittee
  - Transportation & Public Works Committee
- Other BMC committees:
  - BMC Board of Directors
  - Baltimore Regional Cooperative Purchasing Committee
  - Energy Board
  - Executive Committee
  - Housing Affordability Preservation Task Force
  - Housing Committee
  - Regional Fair Housing Group
  - Reservoir Technical Group
  - Watershed Protection Committee
  - Food and Water Security

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The Baltimore Regional Transportation Board (BRTB) is the federally designated metropolitan planning organization (MPO) for the Baltimore region. The BRTB works with local, state, regional, and federal partners to coordinate plans and planning activities, provide data and analysis to decision makers, and coordinate regional programs to advance transportation, safety, freight movement, budgeting for future transportation projects and programs. The BRTB's efforts are based on a continuing, cooperative and comprehensive (3-C) planning process. All transportation projects and programs that receive federal surface transportation funding in our region go through this planning process. The BRTB is housed at and staffed by the Baltimore Metropolitan Council (BMC).

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Regional Transportation Planning

- BMC staff provides technical support to the Baltimore Regional Transportation Board (BRTB).
- BRTB is the designated Metropolitan Planning Organization (MPO) for the Baltimore region.
- BRTB members include representatives from:
  - Baltimore City, City of Annapolis, Anne Arundel County, Baltimore County, Carroll County, Harford County, Howard County, and Queen Anne's County
  - Maryland Department of Transportation, Maryland Department of the Environment, Maryland Department of Planning, MDOT Maryland Transit Administration, and Central Maryland RTA.

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Regional Transportation Planning Storymap

- Overview of
  - *Resilience 2050*: Long Range Transportation Plan
  - 2024-2027 Transportation Improvement Program
  - Air Quality Conformity analysis
    - Emission Reduction Strategies
- BRTB will vote on these 3 documents on July 25th

https://storymaps.arcgis.com/stories/aa7dcd845cf84b2c9ac6b26f6bbb5260

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Overview of Climate Resilience Work

- Electric Vehicle Infrastructure
- Climate Resilience Documents
- Reservoir Protection
- Regional Proposals

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Electric Vehicle Infrastructure

- Staff Contact:
  - Anna Marshall
    amarshall@baltometro.org
- Project funded through BMC
- RFP to be issued soon
- View description in Unified Planning Work Program
  https://www.baltometro.org/sites/default/files/bmc_documents/general/transportation/upwp/UPWP_FY2023_Addendum_to_FY2022-2023_UPWP.pdf.pdf

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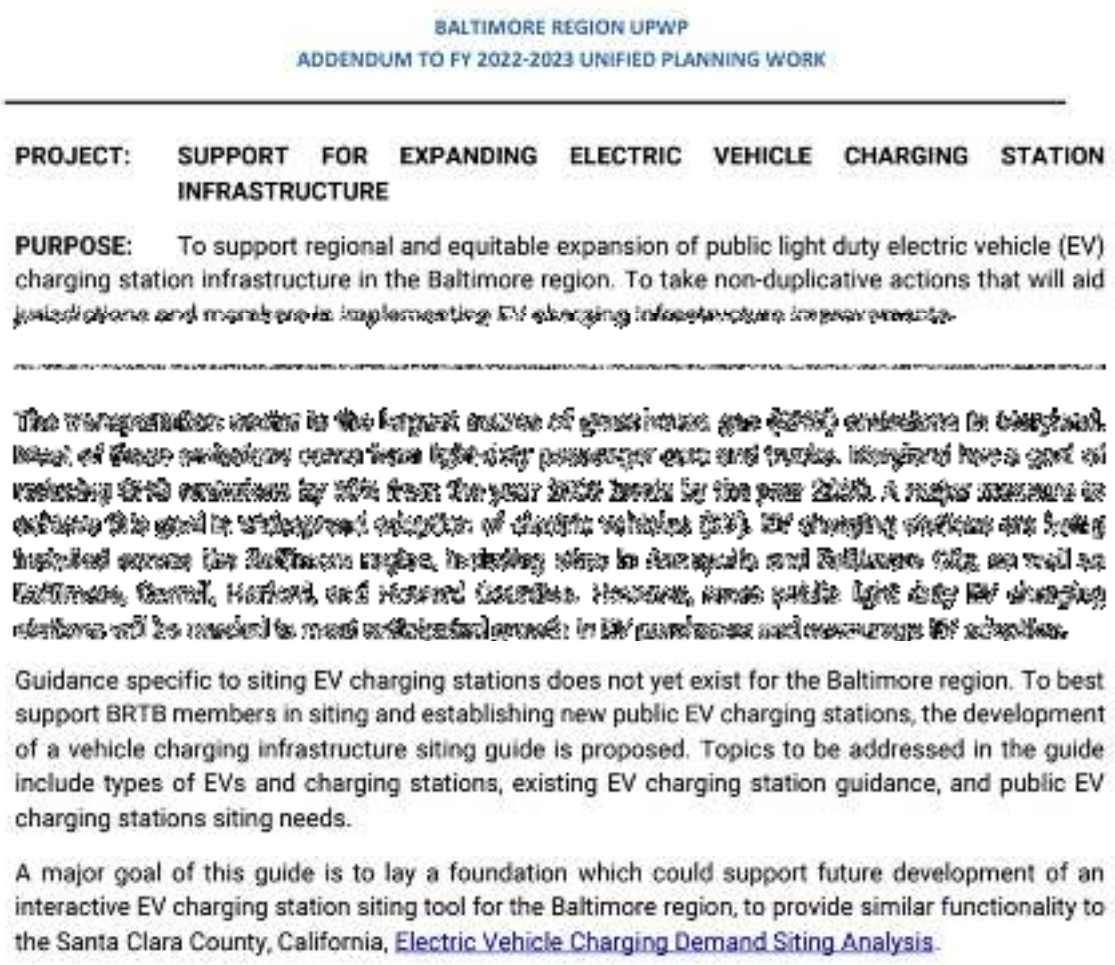

BALTIMORE REGION UPWP
ADDENDUM TO FY 2022-2023 UNIFIED PLANNING WORK

PROJECT: **SUPPORT FOR EXPANDING ELECTRIC VEHICLE CHARGING STATION INFRASTRUCTURE**

PURPOSE: To support regional and equitable expansion of public light duty electric vehicle (EV) charging station infrastructure in the Baltimore region. To take non-duplicative actions that will aid jurisdictions and municipalities implementing EV charging infrastructure improvements.

Guidance specific to siting EV charging stations does not yet exist for the Baltimore region. To best support BRTB members in siting and establishing new public EV charging stations, the development of a vehicle charging infrastructure siting guide is proposed. Topics to be addressed in the guide include types of EVs and charging stations, existing EV charging station guidance, and public EV charging stations siting needs.

A major goal of this guide is to lay a foundation which could support future development of an interactive EV charging station siting tool for the Baltimore region, to provide similar functionality to the Santa Clara County, California, Electric Vehicle Charging Demand Siting Analysis

Climate Resilience Documents

- Staff Contact:
  - Eileen Singleton
    esingleton@baltometro.org

Climate Change Resilience

A significant aspect of managing and operating the transportation system is the ability for agencies to anticipate, prepare for, and continue operating in the event of a disruption, which could be short-term (such as traffic incidents, flooding, severe storms, terrorist act) or long term (such as impacts from increasingly stronger storms, warming climate, and rising sea levels); this is referred to as resilience. Resilience is defined by FHWA Order 5520 as, "... the ability to anticipate, prepare for and adapt to changing conditions and withstand, respond to and recover rapidly from disruptions." BMC works with our partners to identify potential disruptions as well as actions that can be employed to increase the resilience of agencies and the transportation system components that they plan, operate, and maintain.

In May 2016, BMC hosted an Extreme Weather Forum that included presentations on trends of extreme weather in Maryland as well as related activities by local, state, and federal agencies. Presentations and resources from the event have been posted online.

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Resilience Planning Activities:

After development of the Climate Change Resource Guide, the region undertook the next step to develop more detailed guidance and develop recommendations to institutionalize ongoing inter-jurisdictional coordination on climate resilience. The following documents were developed in February 2022:

CLIMATE RESILIENCE GUIDANCE FOR LOCAL JURISDICTIONS

RECOMMENDATIONS FOR INTERJURISDICTIONAL COORDINATION ON CLIMATE RESILIENCE

In October 2021, the **Climate Change Resource Guide** was completed to provide a resource to local jurisdictions on adaptation options to consider as they plan, design, operate, and maintain their local infrastructure. The Guide includes an overview of projected changes to the climate, documentation of how the changing climate has already impacted them, adaptation options, and a **Toolkit** that makes the content of each chapter actionable for users. The project also included a summary **presentation** that can be used by any agency to inform them about the Guide.

CLIMATE CHANGE ADAPTATION TOOLKIT

CLIMATE CHANGE RESOURCE GUIDE

FINAL PRESENTATION FOR CLIMATE CHANGE RESOURCE GUIDE

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https://www.baltometro.org/environment/planning-areas/climate-change-resilience

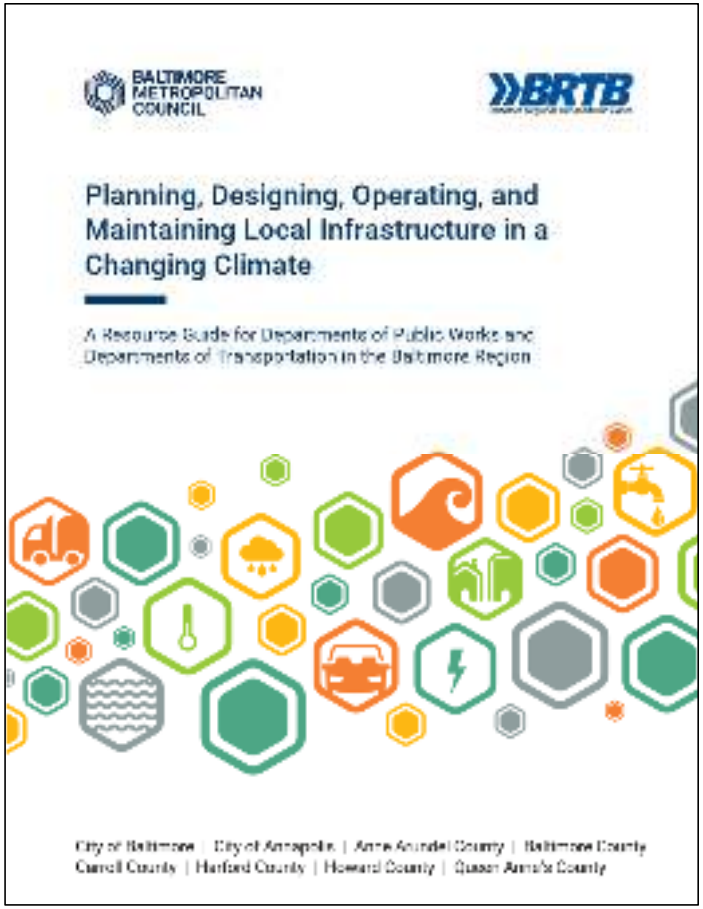
Introduction - Climate Change Resource Guide

- Climate Change Resource Guide and Toolkit support local DPWs and DOTs efforts to prepare for climate change
  - Climate Change Resource Guide
    - Includes toolkit questions
  - Toolkit:
    - Writable PDF

- Covers 6 infrastructure service areas

Resource Guide Overview

- The Resource Guide consists of six chapters to support climate resilience planning:
  - Ch1: Introduction and Toolkit
  - Ch2: The Changing Climate
  - Ch3: Climate Change Impacts
  - Ch4: Policies
  - Ch5: Adaptation Options
  - Ch6: Funding and Financing



https://www.baltometro.org/sites/default/files/bmc_documents/general/transportation/climate-change/Climate%20Change%20Resource%20Guide.pdf

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Toolkit Overview

- The Toolkit, within the Resource Guide, is a worksheet that **makes the content from each chapter actionable** for users, by including questions to consider

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Toolkit Questions: The Changing Climate

1) What climate hazards are relevant to your work or project?

- For each climate hazard, certain variables may be highly relevant to your service area or project (e.g., number of days above 90°F for worker safety; heating/cooling degree days for facilities; freeze/thaw days for transportation).

2) For each of the climate hazards: What are the historical climate conditions? How are the climate conditions changing in your jurisdiction?

- Consider your planning timeframe or asset's useful life when reviewing the projected climate conditions (e.g., maintenance decisions or replacement of facility mechanical components should consider medium-term projections (centered around 2050); construction of new long-lived infrastructure should consider long-term projections (end of century and beyond)).

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Toolkit Questions: Climate Change Impacts

3) Given changing climate conditions, what are anticipated impacts to your service area or project? Consider impacts that your service area or project has recently experienced.

- Which anticipated impacts are priorities to address? Consider prioritizing impacts based on potential damage, disruption of public services, and cost of repair.

4) Have climate impacts to your service area or project disproportionally affected vulnerable populations? Review the BMC Vulnerable Populations Index.

- Are there areas where infrastructure investments could both reduce climate impacts and enhance social equity?

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Toolkit Questions: Policies

5) Are there state and local policies on climate impacts that affect your work or project?

- Are there policies that would help facilitate climate adaptation measures if approached from a climate perspective (e.g., environmental justice policies may help show progress or build support when addressing climate)? On the flipside, are there policy or planning barriers that limit your ability to address climate impacts?

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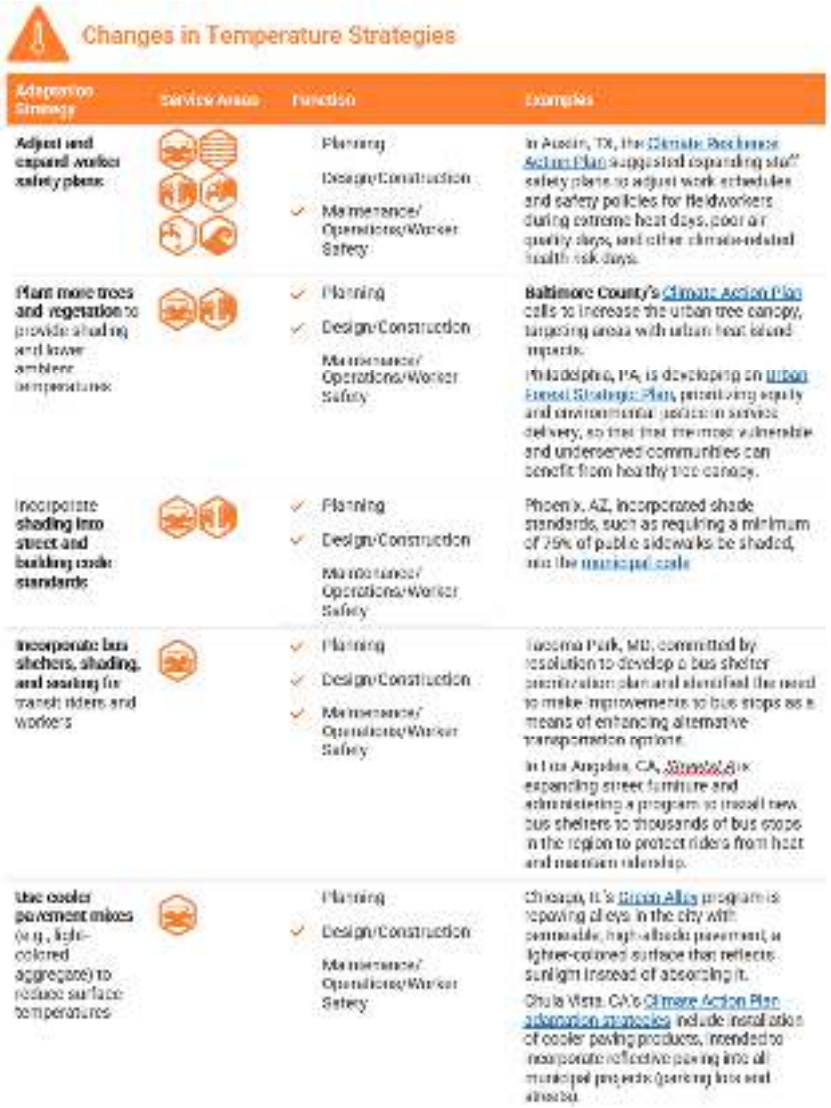
Ch5: Climate Adaptation Options

- Menu of climate adaptation options by hazard and across service areas

- A multi-faceted approach to adaptation spans functions:
  - Planning
  - Design/Construction
  - Maintenance/Operations/Worker Safety



Toolkit Questions: Climate Adaptation Options

6) Given the projected climate impacts, what are potential adaptation strategies within your service areas or for your project, across relevant functions (e.g., design, maintenance)?

- What adaptation options are no-regrets (i.e., generate benefits regardless of future climate) and/or could be implemented in the near-term? What adaptation options are no or low cost?

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Toolkit Questions: Funding and Financing Sources

7) What funding and financing sources are available to help implement the adaptation options?

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Toolkit Questions: Next Steps

8) What are your next steps to address these climate impacts and plan for these adaptation options?

- For the selected adaptation strategies, would there be implications to other service areas? Are there other agencies or departments (inside or outside your jurisdiction) your DPW or DOT should coordinate with?

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Resilience Planning Activities:

After development of the Climate Change Resource Guide, the region undertook the next step to develop more detailed guidance and develop recommendations to institutionalize ongoing inter-jurisdictional coordination on climate resilience. The following documents were developed in February 2022:

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CLIMATE CHANGE ADAPTATION TOOLKIT

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FINAL PRESENTATION FOR CLIMATE CHANGE RESOURCE GUIDE

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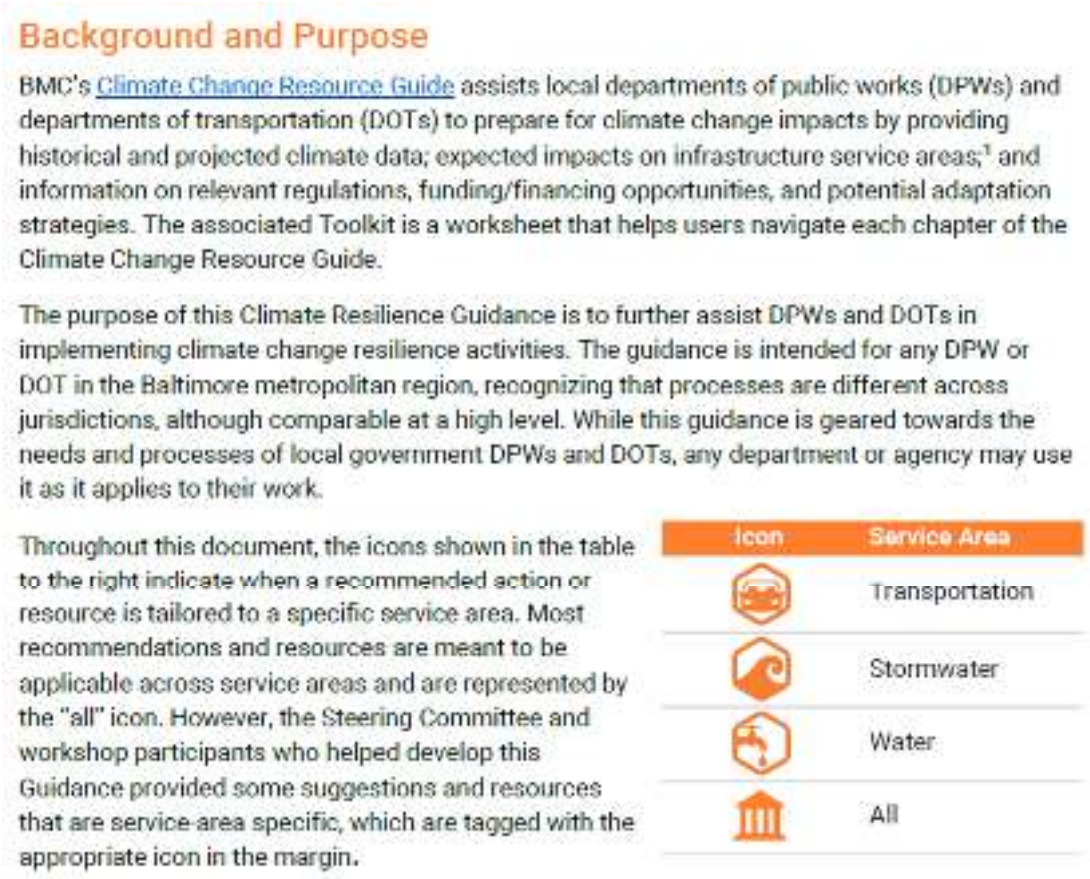
Climate Resilience Guidance For Local Jurisdictions

- Document developed to further assist DOTs/DPWs to incorporate climate resilience strategies
  - Follow up to *Climate Change Resource Guide*

https://baltometro.org/sites/default/files/bmc_documents/general/transportation/climate-change/Climate-Resilience-Guidance.pdf



Background and Purpose

BMC's Climate Change Resource Guide assists local departments of public works (DPWs) and departments of transportation (DOTs) to prepare for climate change impacts by providing historical and projected climate data; expected impacts on infrastructure service areas;[1] and information on relevant regulations, funding/financing opportunities, and potential adaptation strategies. The associated Toolkit is a worksheet that helps users navigate each chapter of the Climate Change Resource Guide.

The purpose of this Climate Resilience Guidance is to further assist DPWs and DOTs in implementing climate change resilience activities. The guidance is intended for any DPW or DOT in the Baltimore metropolitan region, recognizing that processes are different across jurisdictions, although comparable at a high level. While this guidance is geared towards the needs and processes of local government DPWs and DOTs, any department or agency may use it as it applies to their work.

Throughout this document, the icons shown in the table to the right indicate when a recommended action or resource is tailored to a specific service area. Most recommendations and resources are meant to be applicable across service areas and are represented by the "all" icon. However, the Steering Committee and workshop participants who helped develop this Guidance provided some suggestions and resources that are service-area specific, which are tagged with the appropriate icon in the margin.

Icon	Service Area
	Transportation
	Stormwater
	Water
	All

Checklist

Navigating Use of Regional Resilience Resources

BMC has developed three key resources to support regional resilience efforts: (1) Climate Change Resource Guide and accompanying Toolkit, (2) Climate Resilience Guidance for Local Jurisdictions (this document), and (3) Recommendations for Interjurisdictional Coordination.

This checklist is a high-level guide to navigate these three regional resilience resources, providing steps for how local governments and associated departments can use these resources to understand and create an approach to increase resilience within their jurisdiction and across other jurisdictions. Each checklist item addresses different aspects of this process. You can refer back to the checklist regularly to track progress and identify next steps.

	Step	Who?
✓	**Get the Big Picture**	
	Read the **Climate Change Resource Guide** (or read this presentation providing an overview)	Staff involved in DPW/DOT planning and design
	Answer the **Toolkit** questions	Point person(s) coordinating across DPW/DOT planners and designers
✓	**Take Action**	
	Read this document, **Climate Guidance for Local Jurisdictions**	Staff involved in DPW/DOT planning, design, project management, and maintenance
	Create an approach to documenting climate risk and identifying recommended projects, policies, and procedures that will increase resilience across DPW/DOT infrastructure • Your local Climate Action Plan, Hazard Mitigation Plan, capital improvement plan, stormwater management plan, etc. can provide insight on climate risks and ideas for projects or policies	Point person(s) coordinating across DPW/DOT planning, design, project management, and maintenance staff
	Identify one or more strategies from the Climate Guidance for Local Jurisdictions to pursue	Leadership and staff teams (planning, project management, maintenance)
	Identify relevant stakeholders for each selected strategy and associated recommendations (more details in strategies below)	Planning teams
	Create a timeline for implementation	Project teams
	Identify resources necessary for implementation	Leadership and staff teams
	Meet with decision makers/department leads/elected officials to make the case for needed changes	Leadership and staff teams
✓	**Coordinate Regionally**	
	Read the Recommendations for Interjurisdictional Coordination document	Staff involved in DPW/DOT climate-related efforts
	Identify the most relevant actions for implementation	Staff involved in DPW/DOT climate-related efforts
	Participate in regional coordination discussions	Point person(s) for DPW/DOT staff involved in climate-related efforts
	Maintain regular communication with other jurisdictions to share information and lessons learned, and build regional resilience	Point person(s) for DPW/DOT staff involved in climate-related efforts
	Work with others to create regional dashboard and achievable, meaningful performance measures to track progress on climate initiatives	Point person(s) for DPW/DOT staff involved in climate-related efforts

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Introduction

This Climate Resilience Guidance focuses on implementation of priority resilience strategies identified during meetings with the project Steering Committee and workshops with transportation, water, and stormwater practitioners across the region (though note there are other adaptation strategies in the Climate Change Resource Guide that may also be considered). Specifically, this Guidance provides information on the following recommended resilience strategies:

1. Develop and adopt climate change resilience design standards and codes; updating existing or creating new standards and codes as needed
2. Screen new and existing capital projects for climate change risk and opportunities
3. Identify and obtain dedicated funding and financing for resilience infrastructure and activities
4. Monitor, maintain, harden, and retrofit assets to promote resilience and prevent damage

Each strategy includes a description of what it is, why it is relevant for local DOTs and/or DPWs, how a department might implement the strategy, and resources to help with implementation. Additionally, the following apply to all four strategies:

- The timeline for implementing these recommendations is largely context-specific to the local jurisdictions, and is dependent on interjurisdictional coordination and other factors, including staff capacity, funding, and political will.
- Relevant stakeholders for implementing these recommendations include but are not limited to state and local DOTs and planning departments, local DPWs and sustainability offices, Maryland Department of the Environment, elected officials, FHWA, EPA, FEMA, community-based organizations, nonprofits, contractors, and engineering consulting firms. Note that project considerations for resilience will likely involve a more varied group of stakeholders than traditional DPW/DOT projects.

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Priority Regional Climate Resilience Strategies

1. Develop and adopt climate change resilience design standards and codes, updating existing or creating new standards and codes as needed
   - Recommended Action #1:Review example climate resilience design standards
   - Recommended Action #2: Identify which design standards and codes can and should be updated, and if new standards and codes need to be developed and adopted to help ensure new infrastructure is designed to be resilient to climate change
   - Recommended Action #3: Identify relevant design inputs for your jurisdiction
2. Screen new and existing capital projects for climate change risk and opportunities
   - Recommended Action #1: Incorporate climate considerations into the project development and selection process
   - Recommended Action #2: Improve documentation of internal discussions and knowledge of risks
   - Recommended Action #3: Identify climate resilience projects outside the traditional CIP development process based on vulnerability of infrastructure and communities as well as available funding
3. Identify and obtain dedicated funding and financing for resilience infrastructure and activities
   - Recommended Action #1: Identify relevant opportunities to fund and finance resilience
   - Recommended Action #2: Develop strategies to overcome barriers of technical and staffing capacity in seeking resilience financing and funding
   - Recommended Action #3: Evaluate and communicate lifecycle costs and benefits of resilience to help with financing
4. Monitor, maintain, harden, and retrofit assets to promote resilience and prevent damage
   - Recommended Action #1: Include climate change in maintenance prioritization frameworks
   - Recommended Action #2: Increase frequency of monitoring of infrastructure for potential damage
   - Recommended Action #3: Prioritize retrofits, repairs, and hardening based on level of risk and criticality

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Resilience Planning Activities:

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FINAL PRESENTATION FOR CLIMATE CHANGE RESOURCE GUIDE

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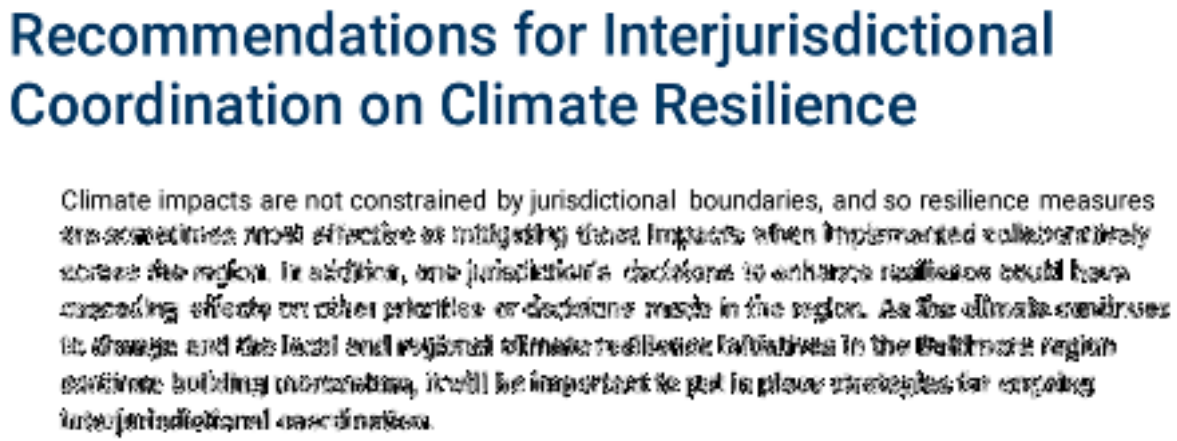
Recommendations for Interjurisdictional Coordination on Climate Resilience

- Developed to enhance interjurisdictional resilience coordination



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Recommendations for Interjurisdictional Coordination on Climate Resilience

Institutionalize regional coordination for ongoing consideration and support of resilience solutions

1. Develop a resilience strategy to be implemented collaboratively
2. Consider opportunities to build on ongoing efforts of interjurisdictional collaboration
3. Create a new and cohesive group specific to climate efforts, such as an internal technical group or regional compact
4. Create information-sharing databases on climate impacts and resilience efforts at the state, regional, and local levels

Funding

1. Identify opportunities for sharing state/Federal grants and funding

Role for the State and BMC

BMC

Reservoir Protection

- Staff Contact:
  - Sara Tomlinson
    stomlinson@baltometro.org

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Regional Proposal: EPA Climate Pollution Reduction Grant

- Baltimore-Towson-Columbia MSA Planning grant application
- BMC leading the program working closely with the City
- Support of 7 jurisdictions including City of Baltimore – geographic coverage
- Schedule to begin late summer

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Regional Proposal: EPA Climate Pollution Reduction Grant

- 3 Key Products:
  - Priority Climate Action Plan, due March 31, 2024;
  - Comprehensive Climate Action Plan, due two years from the date of the award; and,
  - Status Report, due at the close of the 4-year grant period.
- Effects on low income disadvantaged communities to be assessed.

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Regional Proposal: PROTECT Program Proposal for a Regional Resilience Improvement Plan

- USDOT Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program has four subgrants:
  - Planning Grants ($140 million)
  - Resilience Improvement Grants ($980 million)
  - Community Resilience and Evacuation Route Grants ($140 million)
  - At-Risk Coastal Infrastructure Grants ($140 million)
- Proposing Regional Resilience Improvement Plan
  - Under “Planning Grants”
  - Proposals due August 18th

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For More Information

Eileen Singleton, P.E. | Principal Transportation Engineer

410.732.0500 x 1033 | esingleton@baltometro.org | www.baltometro.org

Sara Tomlinson, P.E. | Senior Water Resources Engineer

410.732.0500 x 1035 | stomlinson@baltometro.org | www.baltometro.org

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Pluvial flooding in Baltimore, MD on 6 August 2019. Photo by Sarah Balt.

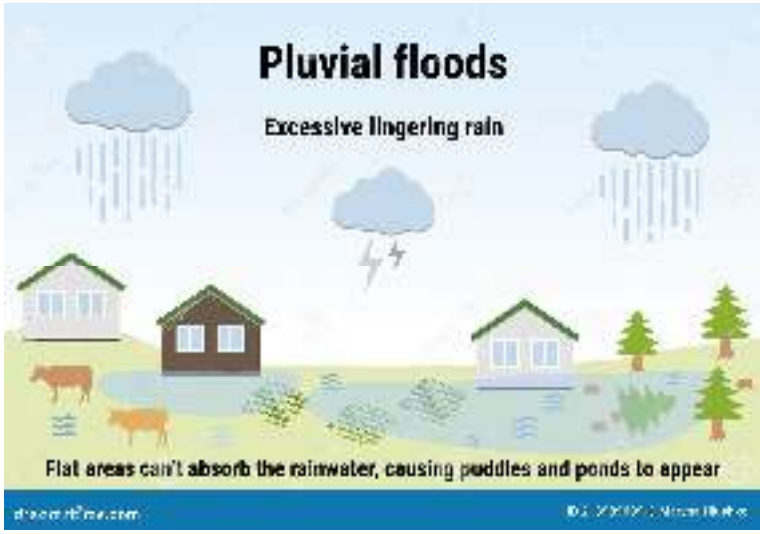
BURIED STREAM AND URBAN FLOODING IN BALTIMORE

Background

Pluvial Flooding, or urban flooding, is when flooding occurs **independent** of an overflowing water body.

This type of flooding can occur as flash flooding or when the stormwater drainage system can't handle volume or speed of the rainfall from a storm.

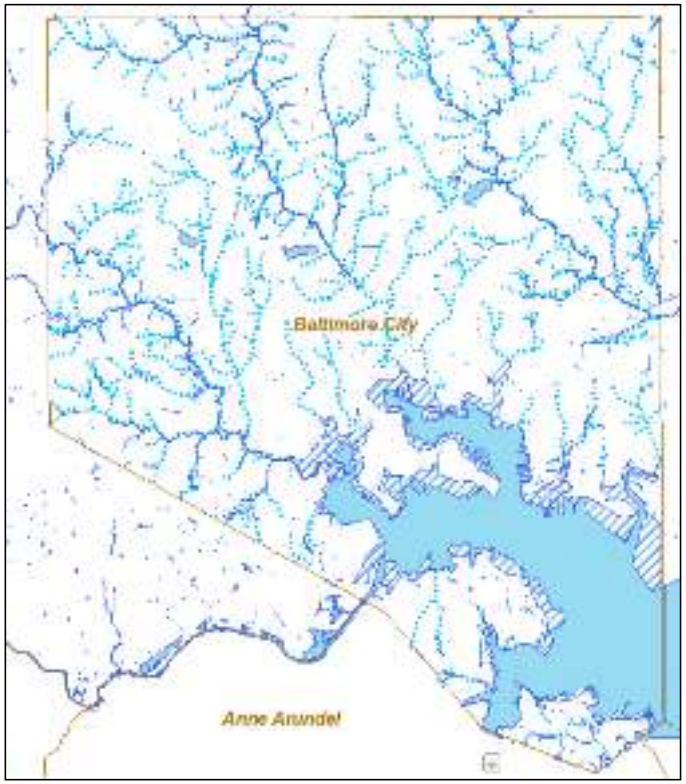
The nature of pluvial flooding can make it difficult to predict but the city has some data to help support areas of the city more likely to experience pluvial flooding.

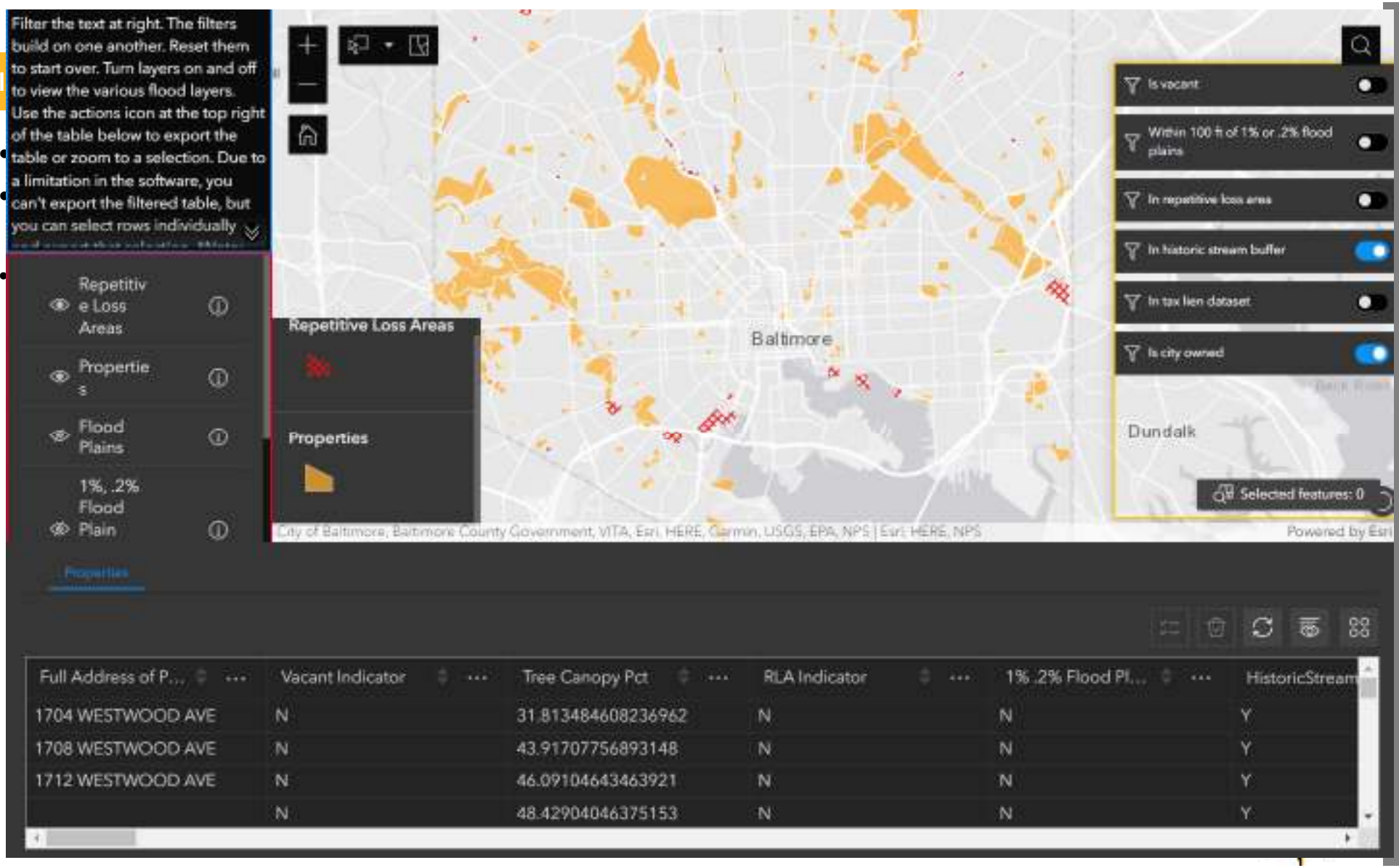


City Resources & Proactive Steps

- GIS data for historic streams
- Repetitive Loss Data – maintained by FEMA, properties with multiple flood insurance claims regardless of floodplain boundaries.
  - This data is used to generate areas of multiple properties that could be susceptible to the same flooding as specific RL addresses.
- Historic flooding information – comes from a variety of sources:
  - internally maintained documentation,
  - NOAA storm events database,
  - 311 customer service requests
  - My Coast app data
- Communications
  - Annual mailings to all properties contained within the Special Flood Hazard Area (SFHA)
  - Annual mailings to properties located in Repetitive Loss Areas

Our Streets are our streams… but not our floodplains




Filter the text at right. The filters build on one another. Reset them to start over. Turn layers on and off to view the various flood layers. Use the actions icon at the top right of the table below to export the table or zoom to a selection. Due to a limitation in the software, you can't export the filtered table, but you can select rows individually
Repetitive Loss Areas
Properties
Flood Plains
1%, .2% Flood Plain
Repetitive Loss Areas
Properties
Baltimore
Dundalk
Is vacant
Within 100 ft of 1% or .2% flood plains
In repetitive loss area
In historic stream buffer
In tax lien dataset
Is city owned
Selected features: 0
City of Baltimore, Baltimore County Government, VITA, Esri, HERE, Garmin, USGS, EPA, NPS | Esri, HERE, NPS
Powered by Esri
Properties
Full Address of P...
Vacant Indicator
Tree Canopy Pct
RLA Indicator
1% .2% Flood Pl...
HistoricStream
1704 WESTWOOD AVE N 31.813484608236962 N N Y
1708 WESTWOOD AVE N 43.91707756893148 N N Y
1712 WESTWOOD AVE N 46.09104643463921 N N Y
N 48.42904046375153 N N Y

Future Steps

- Include properties that have been impacted by pluvial flooding in annual mailings
- Expand upon available GIS data to the public
- Flag properties within the Repetitive Loss areas for floodplain permit review during the permitting process
- Complete hydraulic and hydrologic (H & H) modeling the City's storm drain system
- Continue applying for grants and loans to:
  - Assess and implement remedial actions (green and gray)
  - Develop policies related related to pluvial flooding
  - Acquire properties especially hazardous to maintain as open space.

Questions / ideas

Joanna Birch
Office of Sustainability
Joanna.Birch@baltimorecity.gov