

## **Appendix A – Meetings and Outreach**

### **Meetings Contents:**

Prince George's County – Laurel, MD Multi-Jurisdictional HMP Update Kick-Off  
Meeting 12-2-16 Presentation

Prince George's County – Laurel, MD Multi-Jurisdictional HMP Update Kick-Off  
Meeting 12-2-16 Sign-In Sheet

Prince George's County-Laurel, MD Multi-Jurisdictional HMP Update HIRA Results  
Meeting 3-10-2017 Presentation

Prince George's County-Laurel, MD Multi-Jurisdictional HMP Update HIRA Results  
Meeting 3-10-2017 Sign-In Sheet

LEPC Roster

### **Outreach Contents:**

Capital Heights Roundtable Agenda

Capital Heights Roundtable Sign-In Sheet

Capital Heights Day Photos

Proclamation of "Flood Awareness Month"

# Prince George's County – Laurel MD Multi-Jurisdictional Hazard Mitigation Plan Update

KICK-OFF MEETING

DECEMBER 2, 2016

Prince George's County  
and  
The City of Laurel  
Maryland

*Hazard Mitigation Plan*



2010 Update

# Agenda

1. Welcome & Introductions
2. Schedule and Plan Update Process
3. Hazard Prioritization
4. Data Needs
5. Committee Member Responsibilities
6. MAC HMP Update Aspirations
7. Next Steps
8. Wrap Up & Future Meetings

# Introductions

- ▶ Name
- ▶ Department/Role



# Hazard Mitigation Plan Update

## ► Project Scope:

Update the *Prince Georges County – City of Laurel 2010 Hazard Mitigation Plan* to remain compliant with Maryland Emergency Management Agency and FEMA requirements

# Prince George's County, City of Laurel and Dewberry

**Committee members need to:** ensure that this is your plan through MAC engagement with Prince George's County and Laurel OEM and Dewberry

- ▶ Critical facilities update to Dewberry
- ▶ Capacity assessment survey and 2010 mitigation actions update to Dewberry
- ▶ 2017 new mitigation actions (in-person meetings/calls)
- ▶ Support draft review and outreach
- ▶ **Participate & make the final decisions**

# Prince George's County OEM, MAC and Dewberry

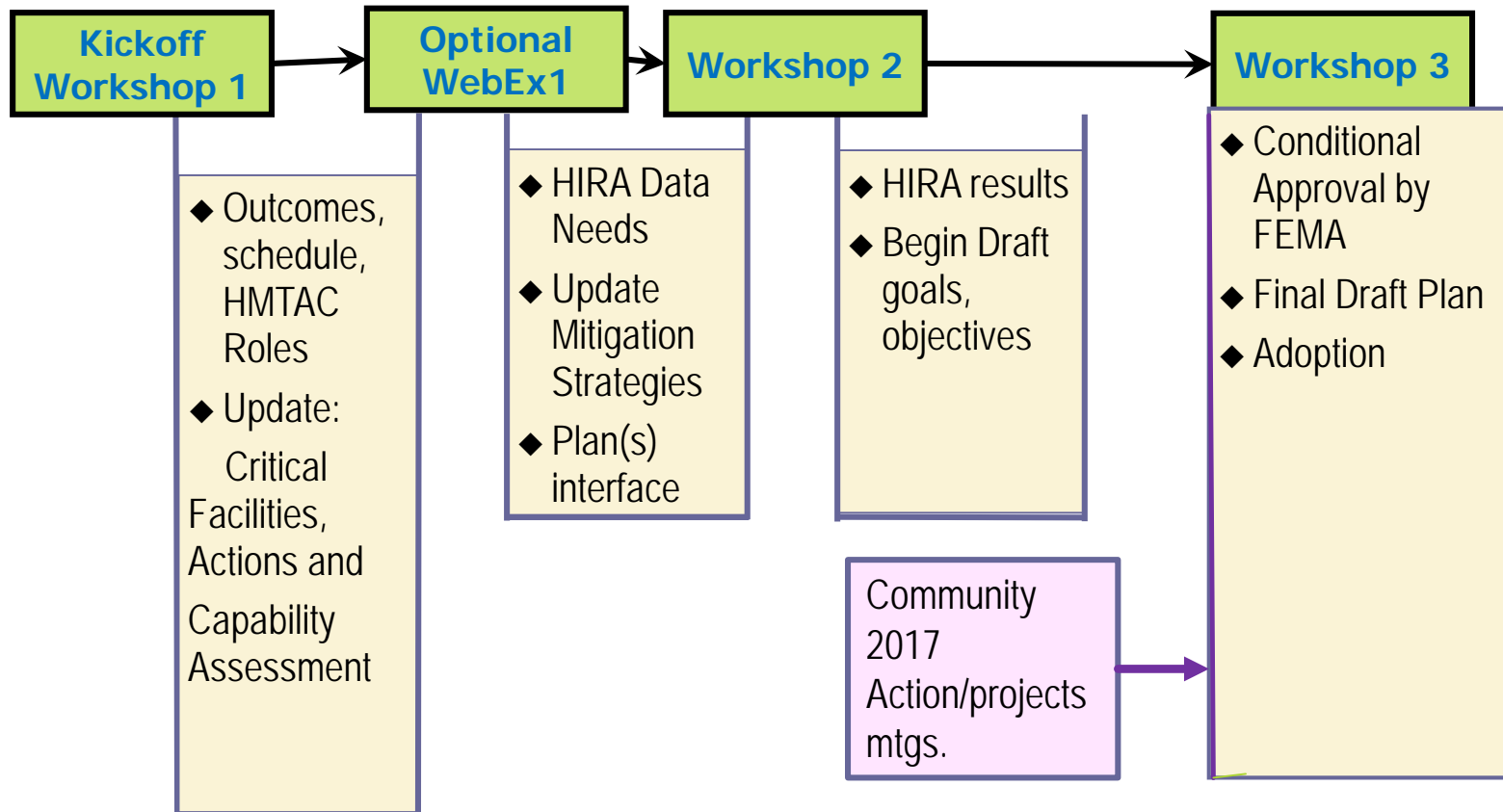
- ▶ Prince George's County OEM team is here to:
  - ▶ Assist departments with new plan actions
  - ▶ Coordinate Public Outreach and participation (social media emphasis)
  - ▶ Facilitate communication and project scheduling/reporting with Maryland Emergency Management Agency and Dewberry

# Mitigation Action Committee and Dewberry

- ▶ Dewberry is here to:
  - ▶ Lend technical expertise and consultation
  - ▶ Partner with PG County and Laurel staff and local government staff to update all required sections of the plan
  - ▶ Prepare and crosswalk the draft and final plan sections

*We will do the heavy lifting to assure you receive a compliant, relatable plan that positions your region and community to become more resilient.*

# Project Approach: Planning Process



# Schedule

Task	Dec	Jan	Feb	Mar	April	May	June	Jul
Kick-off Meeting	1							
HIRA Update/Development				2				
Capability Assessment								
Draft Plan/ Mitigation Strategies				✕				
Final Meeting & Implementation Kick-off						3		
MEMA/FEMA Review				★		★	★	
Plan Submittal/Adoption Support/Close Out								

1 – 3

MAC Workshops – HIRA Results/Mitigation workshop



Department on-site/call Mitigation Strategies Meetings/WebEx



Draft Plan review submittal and meeting with MEMA if needed

# Mime Cast Large File Submittal

FW: HIRA link via mimecast - Message (HTML)

FILE MESSAGE MIMICAST

Ignore Delete Reply Reply All Forward More Meeting 404-406 Mitigat... To Manager Team Email Done Reply & Delete Create New Rules OneNote Actions Move Mark Unread Categorize Follow Up Translate Find Related Select Zoom

Wed 11/30/2016 11:32 AM

Jackie Stewart <jstewart@richmondregional.org>  
FW: HIRA link via mimecast

To: Mills, Deborah

Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

This message originated from outside your organization

Jackie S. Stewart, AICP | Richmond Regional PDC – Administration – Manager, Special Projects | 9211 Forest Hill Ave., Suite 200, Richmond, VA 23235 | w. 804-323-2033 | c. 804-380-8301 | f. 804-323-2025 | [www.richmondregional.org](http://www.richmondregional.org)

From: [sduncan@dewberry.com](mailto:sduncan@dewberry.com) [mailto:[sduncan@dewberry.com](mailto:sduncan@dewberry.com)]  
Sent: Friday, November 18, 2016 10:08 AM  
To: Jackie Stewart <[jstewart@richmondregional.org](mailto:jstewart@richmondregional.org)>  
Subject: HIRA link via mimecast

**Large File Send**  
Invitation to Access Shared Files

Duncan, Stephen ([sduncan@dewberry.com](mailto:sduncan@dewberry.com)) has shared files with you using Mimecast Large

Click a photo to see recent emails and social updates.

Jackie S. Stewart AICP Aol account User id: ...  
Director of Planning an... Associate; Emergency ...

2:27 PM  
12/1/2016



# Why does hazard mitigation matter?

## Hazard Mitigation

*...is a sustainable action that will reduce or eliminate injury to citizens, damages to structures and allow continuity of critical society functions...*

## Resiliency Definition

*...capacity to maintain/regain functionality & vitality from natural, climate-induced, or man-made stressors and disturbances. Resiliency strategies can provide communities with tools for bouncing back more quickly from extreme weather or other high-impact events.*

*Resiliency planning provides communities with the ability to adapt and thrive despite changing environmental, social, and economic conditions.*

# BREAK - Hazard Rankings

Hazard Type	2010 HMP Planning Consideration Level	2017 PG County – City of Laurel Update MAC Kick-off Meeting
<b>Natural</b>		
Winter Storms	Medium - High	High
Flooding (river, stream, coast)	High	High
Wind (including Hurricanes, Thunderstorms)	Medium - High	Medium
Drought	Medium - High	Low
Wildland Fire (brush, forest)	Medium	Low
Tornado	N/A	Combined w/wind
Earthquake	N/A	Low
Land Movement	Medium - High	Low
Stream bank Erosion	Medium - High	Low
Extreme heat/cold	Heat - medium	Low
<b>Human-Caused</b>		
Dams (Impoundment Failure)	Medium - High	High

# HIRA Update

- ▶ What natural hazard events have occurred since 2010?
- ▶ What specific vulnerabilities exist in the County and City that may not have been captured in the previous plan?
- ▶ Please provide any updates to areas of concern noted in HIRA narrative.

# Critical Facilities

- ▶ Critical facilities include public safety, buildings used for sheltering, schools, health care (hospitals and long-term care), correctional facilities, utilities and other vital to community continuity of services after a disaster.
- ▶ MPO can be added to this list – transportation, drainage, etc.
- ▶ Existing list will be emailed next week. Please review and provide deletions/modifications/additions by August 19, 2016.

# Capability Assessment

- ▶ We will update information provided in tables and text in Hazard Identification, Risk Assessment and Vulnerability (HIRA) Chapter
- ▶ Develop a master table for summary program/plan initiative data customized to 2010 HMP actions included in the Appendix.
- ▶ We will reach out to you with specifics for your Department in December.
- ▶ Target completion late-January.

# Mitigation Actions Status

- ▶ ID completed, deleted, or deferred actions or activities from the 2010 plan as a benchmark for progress.
- ▶ Existing list will be distributed during December.
- ▶ Please review and provide deletions/modifications/additions by January 16, 2017 to Jillian Browning [jbrowning@dewberry.com](mailto:jbrowning@dewberry.com) copied to Deborah Mills at [dmills@dewberry.com](mailto:dmills@dewberry.com).

# Public Involvement in Plan Update

- ▶ Document how the community was kept involved during the plan maintenance process over the previous five years.
  - ▶ What has been done since 2011?



# MAC Hazard Mitigation Plan Update Aspirations

- ▶ What keeps you up at night?
- ▶ What do you like about current plan?
- ▶ To enable cross-cutting mitigation themes and actions/projects are the necessary people/departments ready to participate?
- ▶ Are there other efforts currently going on in your community that we should be aware of?
- ▶ What would some positive outcomes be?
- ▶ What information/expertise can you contribute?

# What's Next?

- ▶ Data gathering for HIRA (MEMA, PG and Laurel staff and Dewberry)
- ▶ Data gathering for Capability Assessment
- ▶ Initiation of Public Outreach
- ▶ Reporting and updates to 2011 Plan Accomplishments
- ▶ Vulnerability analysis Update and Kick-off for Goals, Objectives and Mitigation actions Workshop (early March)



# Questions, Comments, Discussion

Deborah G. Mills, C.F.M.

Associate

Dewberry

804.335.9946

[dmills@dewberry.com](mailto:dmills@dewberry.com)

# MEETING SIGN-IN SHEET

**Project:** Prince George's County – City of Laurel

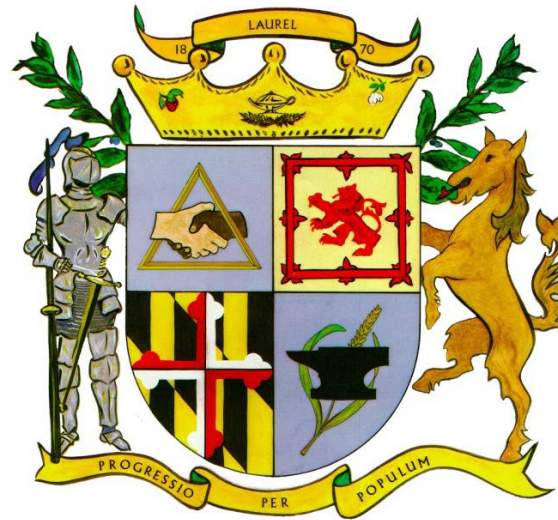
**Meeting Date:**

**Purpose:** Project Kick-off

December 2, 2016

Name	Title	Agency	Phone	E-Mail
Gwen Clerkley	Associate Director	Dept of Public Works <sup>Transparency</sup>	3/499-8523	gtclerkley@co.pg.md.us
<del>Kerry</del> McLean	LT	PGPD	301 772 4740	KLMCFANE@CO.PG.MD.US
Jack Brock	Planning Director	City of Laurel	301-725-5300	jbrock@laurel.md.us
STEPHEN ALLEN, SR.	EMERGENCY MANAGER	CITY OF LAUREL	301-725-5300 <sup>x2244</sup>	sallen@laurel.md.us
Todd Addis	Security Manager	OIT	301-883-3351	wtaddis@co.pg.md.us
CHRIS AKINBOBOLA	SPECIAL ASST.	DOE	301-883-7157	caakinbobola@co.pg.md.us
Catherine Escarpeta	GIS Analyst	DOE	301 883 5990	crescarpeta@co.pg.md.us
Diana Jenkins	Associate Director	DOE	301. 883. 5835	djenix@co.pg.md.us
Joe Perez	CAPTAIN	PGPD	202-957-8822	JRPEREZ@CO.PG.MD.US
Vernon L. Stinnett	Division Chief	DNET OHM SMD	301-499-8556	VLStinnett@co.pg.md.us
Debbie Tyner	Deputy Director	MNCPPC	(301) 699-2580	debbie.tyner@pgparks.com
Charles Hamby	Major	PGPD	301 583 7170	CEHAMBY@CO.PG.MD.US
William Alexander	Major	PGPD	410 310 1297	WAALEXANDER@CO.PG.MD.US
Theresa Martin	GIS Analyst	City of Laurel	301-725-5300 x2214	tmartin@laurel.md.us
Chris Akinbobola				caakinbobola@co.pg.md.us
Bill Goddard	Depty. City Admin.	City of Laurel		

Prince George's County and the City of Laurel Hazard Mitigation Plan Update Kick Off Meeting December 2, 2016 Sign-In Sheet				
Jurisdiction	Name	Position	Email	Phone
Office of Homeland Security - Office of Emergency Management	Ronald Gill	Deputy Director	<a href="mailto:regill@co.pg.md.us">regill@co.pg.md.us</a>	(240) 619-6497
Office of Homeland Security - Office of Emergency Management	Courtney Mariette	Regional Planner	<a href="mailto:cemariette@co.pg.md.us">cemariette@co.pg.md.us</a>	301-324-4453
Department of Environment	Dawn Hawkins-Nixon	Associate Director	<a href="mailto:dhnixon@co.pg.md.us">dhnixon@co.pg.md.us</a>	301-883-5839
Department of Environment	Chris Akinbobola	Special Assistant	<a href="mailto:caakinbobola@co.pg.md.us">caakinbobola@co.pg.md.us</a>	301-883-7157
Department of Environment	Catherine Escarpeta	GIS Analyst	<a href="mailto:crescarpets@co.pg.md.us">crescarpets@co.pg.md.us</a>	301-883-5990
PGPD	Kirk McLean	LT	<a href="mailto:clmclean@co.pg.md.us">clmclean@co.pg.md.us</a>	301-772-4740
PGPD	Joe Perez	Captain	<a href="mailto:jrperez@co.pg.md.us">jrperez@co.pg.md.us</a>	202-957-8822
PGPD	Charles Hamby	Major	<a href="mailto:cehamby@co.pg.md.us">cehamby@co.pg.md.us</a>	301-583-7170
PGPD	William Alexander	Major	<a href="mailto:waalexander@co.pg.md.us">waalexander@co.pg.md.us</a>	410-310-1297
Department of Public Works and Transportation	Gwen Clerkley	Associate Director	<a href="mailto:gtclerkley@co.pg.md.us">gtclerkley@co.pg.md.us</a>	301-499-8523
Department of Public Works and Transportation	Vernon L. Stinnett	Division Chief	<a href="mailto:vlstinnett@co.pg.md.us">vlstinnett@co.pg.md.us</a>	301-499-8556
Office of Information Tech.	Todd Addis	Security Manager	<a href="mailto:wtaddis@co.pg.md.us">wtaddis@co.pg.md.us</a>	301-883-3351
MNCCPPC	Debbie Tyner	Deputy Director	<a href="mailto:debbie.tyner@pgparks.com">debbie.tyner@pgparks.com</a>	301-699-8556
City of Laurel	Jack Brock	Planning Direcor	<a href="mailto:jbrock@laurel.md.us">jbrock@laurel.md.us</a>	301-725-5300
City of Laurel	Stephen Allen, Sr.	Emergency Manager	<a href="mailto:sallen@laurel.md.us">sallen@laurel.md.us</a>	301-725-5300, ext. 2246
City of Laurel	Theresa Martin	GIS Analyst	<a href="mailto:tmartin@laurel.md.us">tmartin@laurel.md.us</a>	301-725-5300, ext. 2214
City of Laurel	Bill Goddard	Deputy City Administrator	-	-



# Prince George's County & City of Laurel, Maryland

## **Hazard Mitigation Plan Update**

Hazard Identification and Risk Assessment

Results Meeting  
March 10, 2017



# Agenda

- 1. Welcome**
- 2. Project Schedule**
- 3. Risk Assessment**
- 4. Mitigation Goal Refresh and Strategies**
- 5. County and Laurel Mitigation Action Update**
- 6. Outreach Brainstorming**
- 7. Potential Project evaluation - May**
- 8. Next Steps**



# Schedule

Task	Dec	Jan	Feb	Mar	Apr	May	Jun- Oct	Jan
Kick-off Meeting	1							
HIRA Update/Development				2				
Capability Assessment								
Draft Plan/ Mitigation Strategies					✿			
Resiliency Integration & Implementation Kick-off							3	
VDEM/FEMA Review						★	★	
Plan Submittal/Adoption Support								

1 – 3

HMTAC Workshops – HIRA Results/Mitigation Goals/Implementation workshop/Resiliency Incorporation



Local on-site Mitigation Strategies Meetings/WebEx



Draft Plan review session with VDEM/ RR and Crater PDC if needed

# Major HIRA Components

Identify and profile hazards affecting the region:

***Vulnerability*** to critical facilities and estimate losses

***Vulnerability*** for current and future land use and development



# Plan Update Requirements

- **Hazard Identification and Risk Assessment**

- Describe all hazards that affect the region; rationale for omitting recognized hazards from analysis
  - Hazard Profiles
  - Location
  - Extent
  - Previous occurrences
  - Probability of future events
- Vulnerability Assessment
  - Summary of the County and City's vulnerability to each hazard
  - Summary of potential hazard impacts

# 2017 Plan Update Changes

New analyses and updates: Updated each hazard profile

- Hazard profile
- NCDC storm events data
- 2010 – present storm/disaster occurrences
- Summary risk by jurisdiction using new data

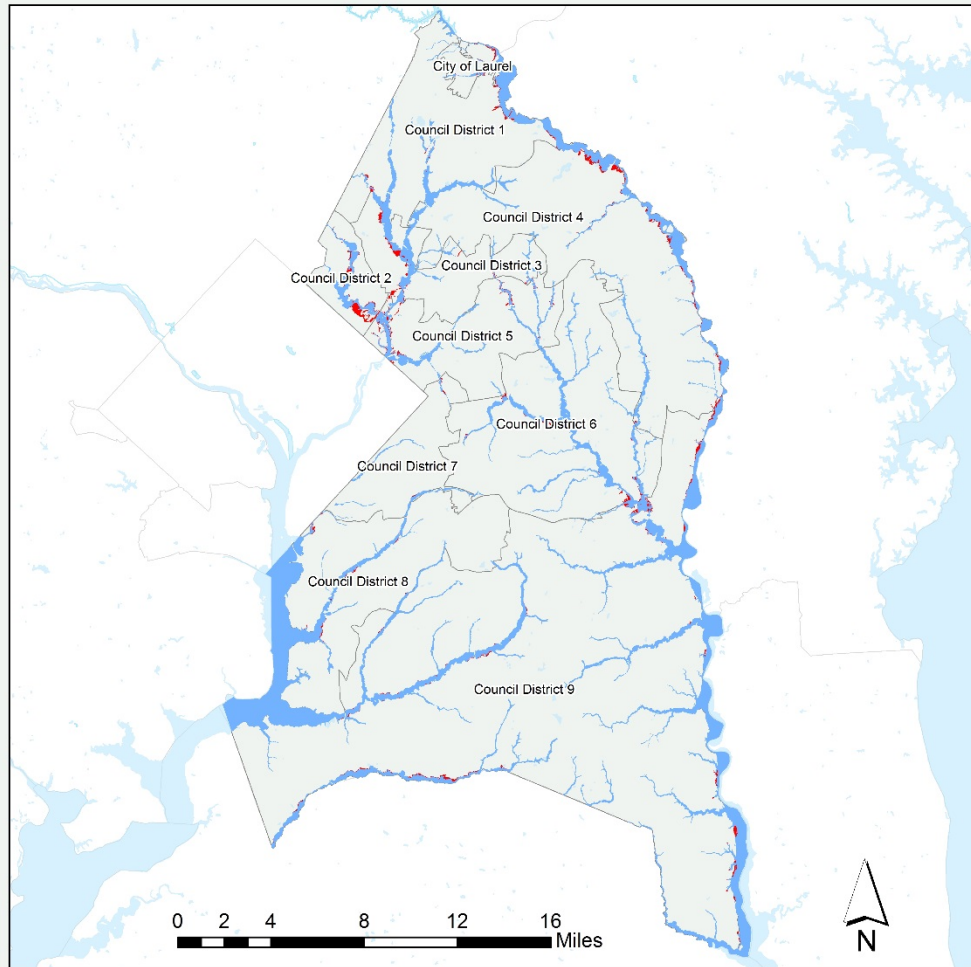
New maps based on updated data

- HIRA summary that includes overall relative risk and critical facility risk comparison by hazard.



# Riverine Flooding

# 100/500 YEAR FLOODPLAINS FOR FRINCE GEORGE'S COUNTY



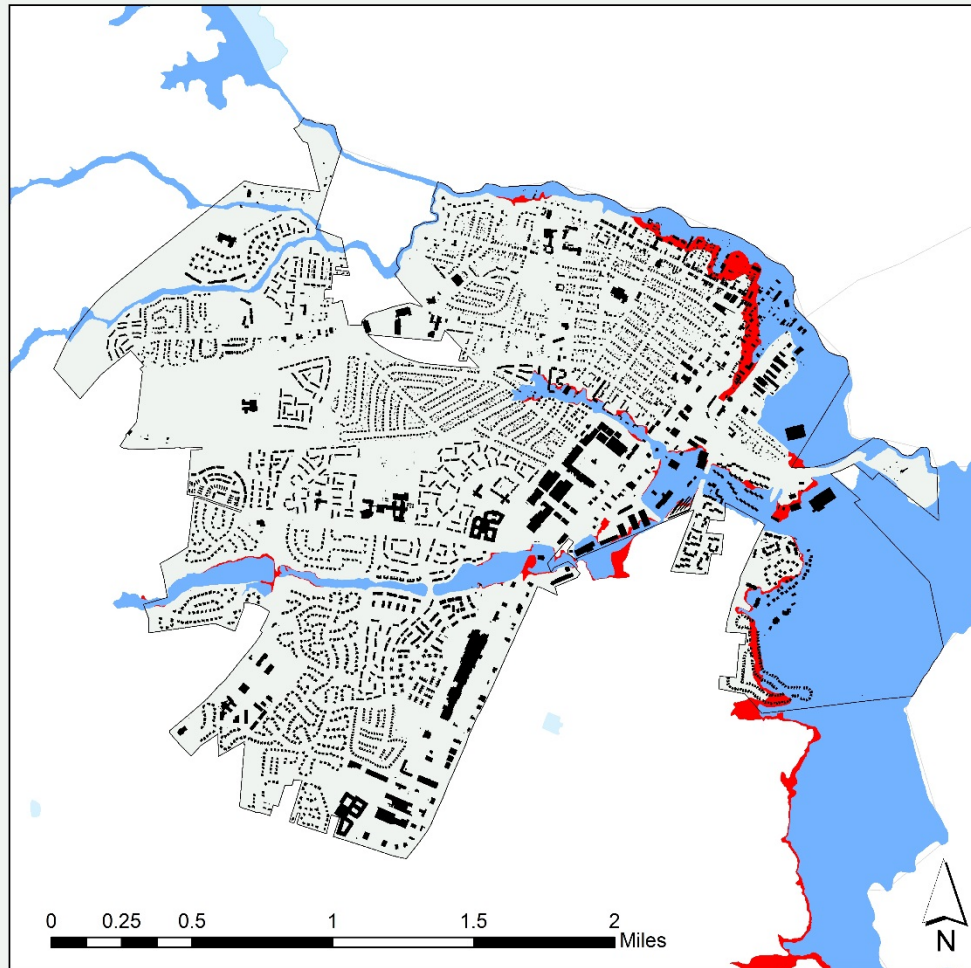
## Floodplain Boundaries

- 100 Year Flood
- 500 Year Flood

Floodplain boundaries for 100-year-flood and 500-year-flood by Council Districts in Prince George's County and the City of Laurel.



## 100/500 YEAR FLOODPLAIN FOR THE CITY OF LAUREL



### Floodplain Boundaries

-  100 Year Flood
-  500 Year Flood

Floodplain boundaries for 100-year-flood and 500-year-flood in the City of Laurel.





# FEMA NFIP Participation Dates

Jurisdiction	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date
City of Laurel	9 Aug 1974	1 Nov 1978	16 Sep 2016
Prince Georges County	N/A	4 Aug 1972	16 Sep 2016

## NFIP Policies in Force

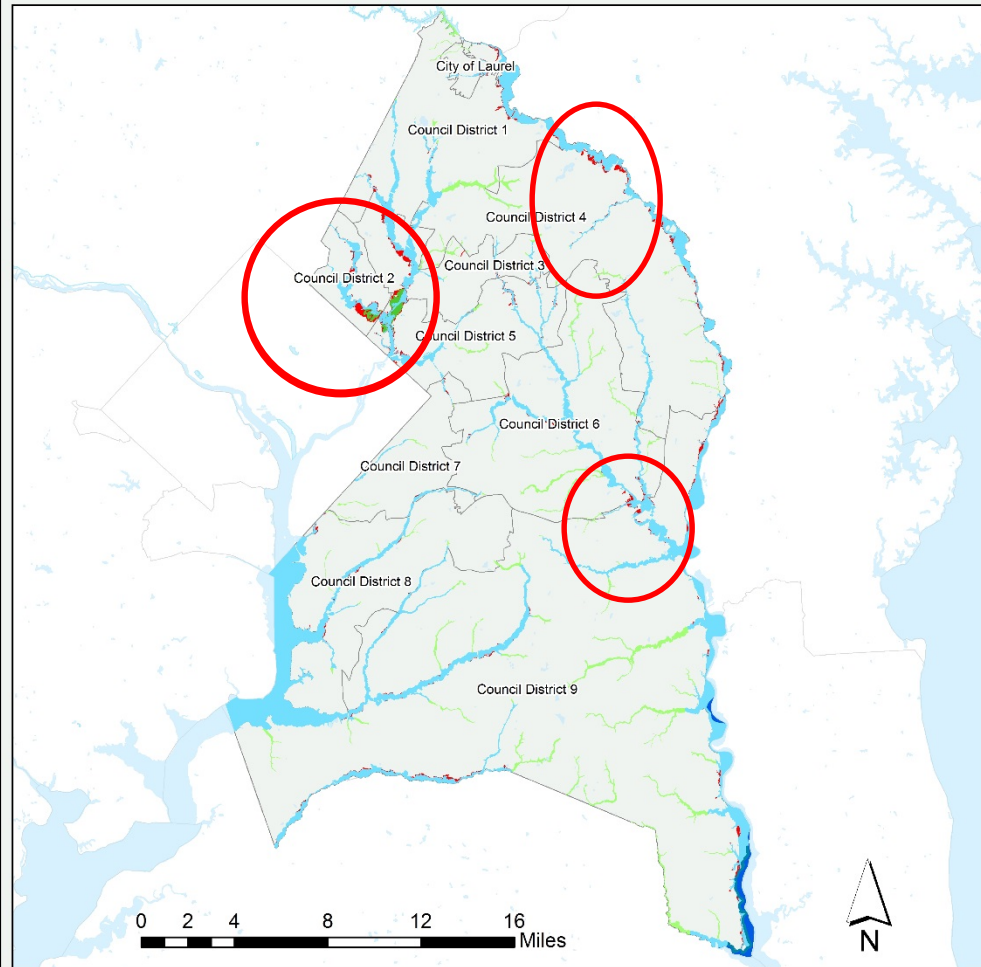
Jurisdiction	Policies in Force	Insurance In-Force Whole	Written Premium In-Force
City of Laurel	150	\$36,977,200	\$185,372
Prince Georges County	3,387	\$778,365,800	\$2,232,266

## NFIP Claims as of 31 Dec 2016

Jurisdiction	Total Losses	Closed Losses	Open Losses	CWOP Losses	Total Payments
City of Laurel	17	5	0	12	\$99,871
Prince Georges County	680	384	2	294	\$4,168,896
Maryland Totals	18,145	13,223	49	4,873	\$289,719,855

PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE

# FEMA FLOOD ZONES IN PRINCE GEORGE'S COUNTY

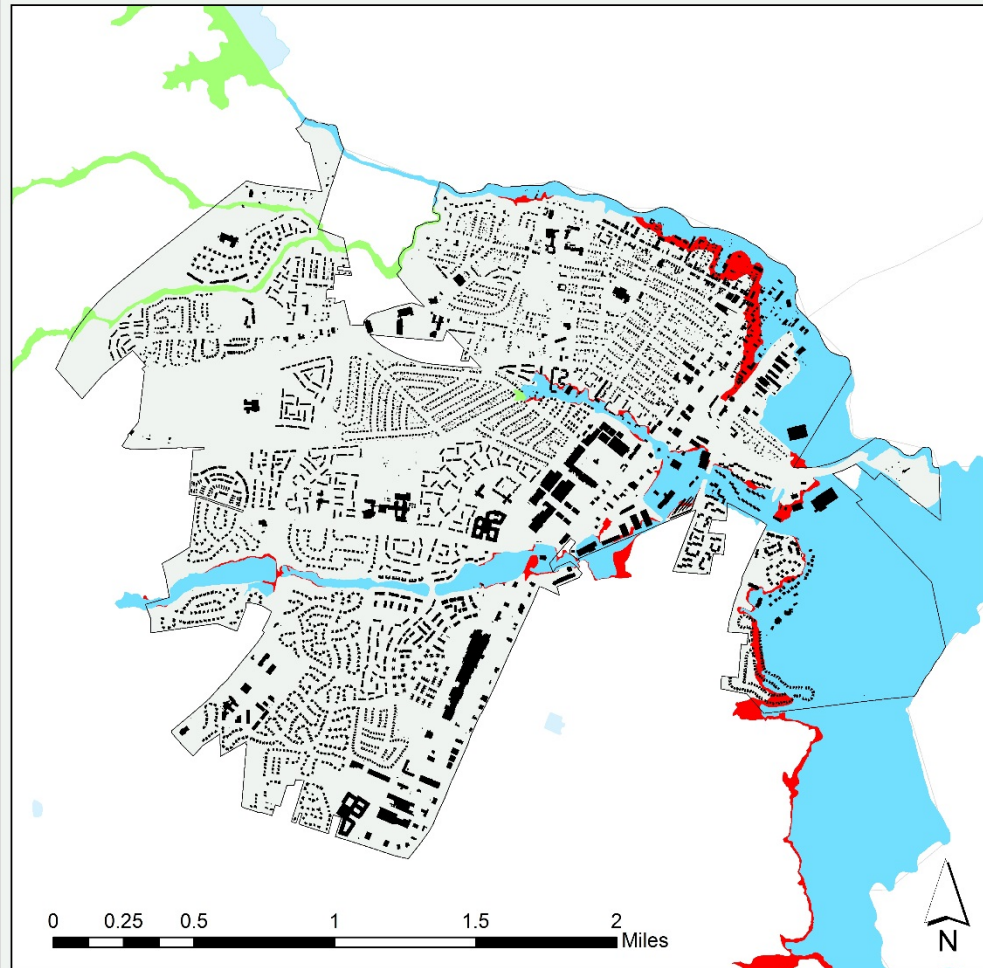


## Percent Annual Change of Flooding



PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE

## FEMA FLOOD ZONES IN THE CITY OF LAUREL



### Percent Annual Chance Flooding

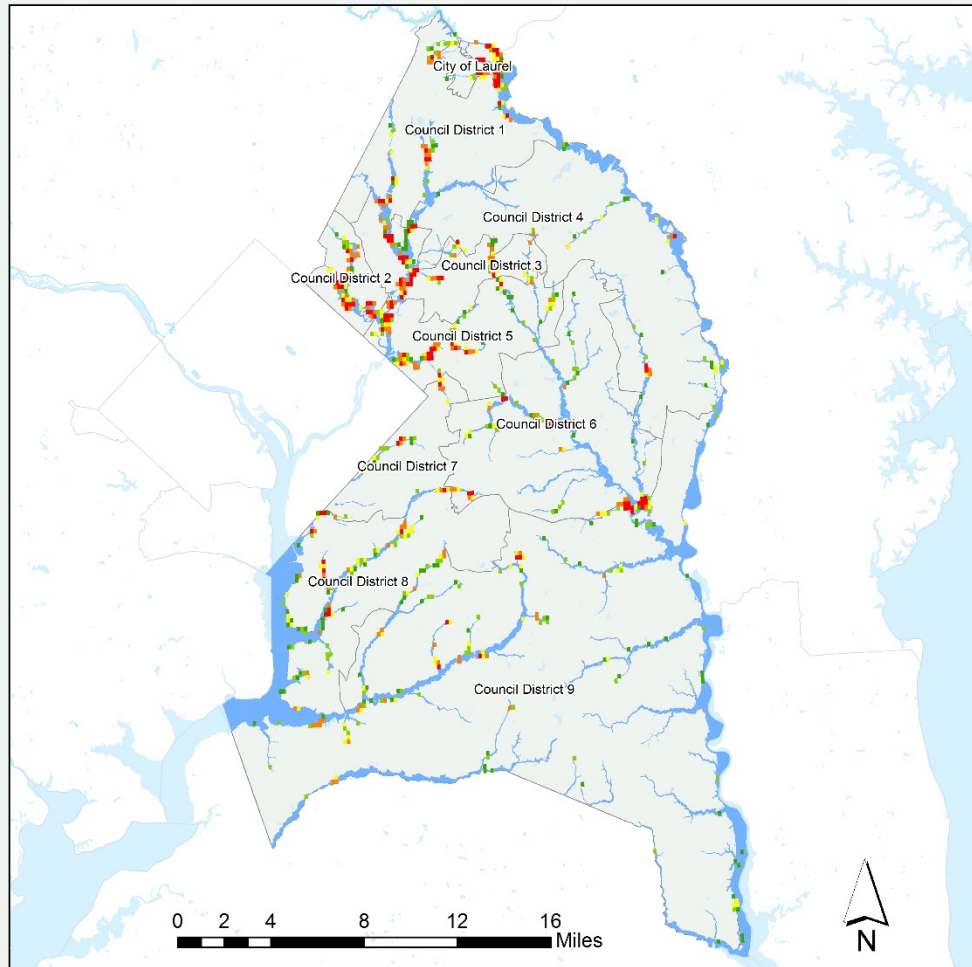
<span style="color: red;">■</span> X - 0.2% FLOOD HAZARD	<span style="color: lightblue;">■</span> AO - 1% SHALLOW DETAILED (SLOPING TERRAIN)
<span style="color: lightgreen;">■</span> A - 1% APPROXIMATE FLOOD HAZARD	<span style="color: blue;">■</span> OPEN WATER
<span style="color: lightblue;">■</span> AE - 1% DETAILED FLOOD HAZARD	<span style="color: darkblue;">■</span> VE - 1% COASTAL DETAILED
<span style="color: mediumblue;">■</span> AH - 1% SHALLOW DETAILED (PONDING)	<span style="color: green;">■</span> X - PROTECTED BY LEVEE



# Total Exposure In Floodplain (TEIF) by Political Areas

Political Area	TEIF 100 Yr	TEIF 500 Yr
City of Laurel	\$14,300,000	<b>\$250,000,000</b>
Council District 1	<b>\$22,500,000</b>	<b>\$348,000,000</b>
Council District 2	<b>\$17,700,000</b>	<b>\$542,000,000</b>
Council District 3	<b>\$20,900,000</b>	<b>\$316,000,000</b>
Council District 4	\$2,560,000	\$29,800,000
Council District 5	\$14,800,000	<b>\$224,000,000</b>
Council District 6	\$3,050,000	\$109,000,000
Council District 7	\$2,410,000	\$35,100,000
Council District 8	\$7,400,000	\$91,100,000
Council District 9	\$7,670,000	\$169,000,000
<b>Total</b>	<b>\$113,000,000</b>	<b>\$2,110,000,000</b>

## TEIF 100 YR WITH 1000 FT GRIDS



### Total Exposure in Grid



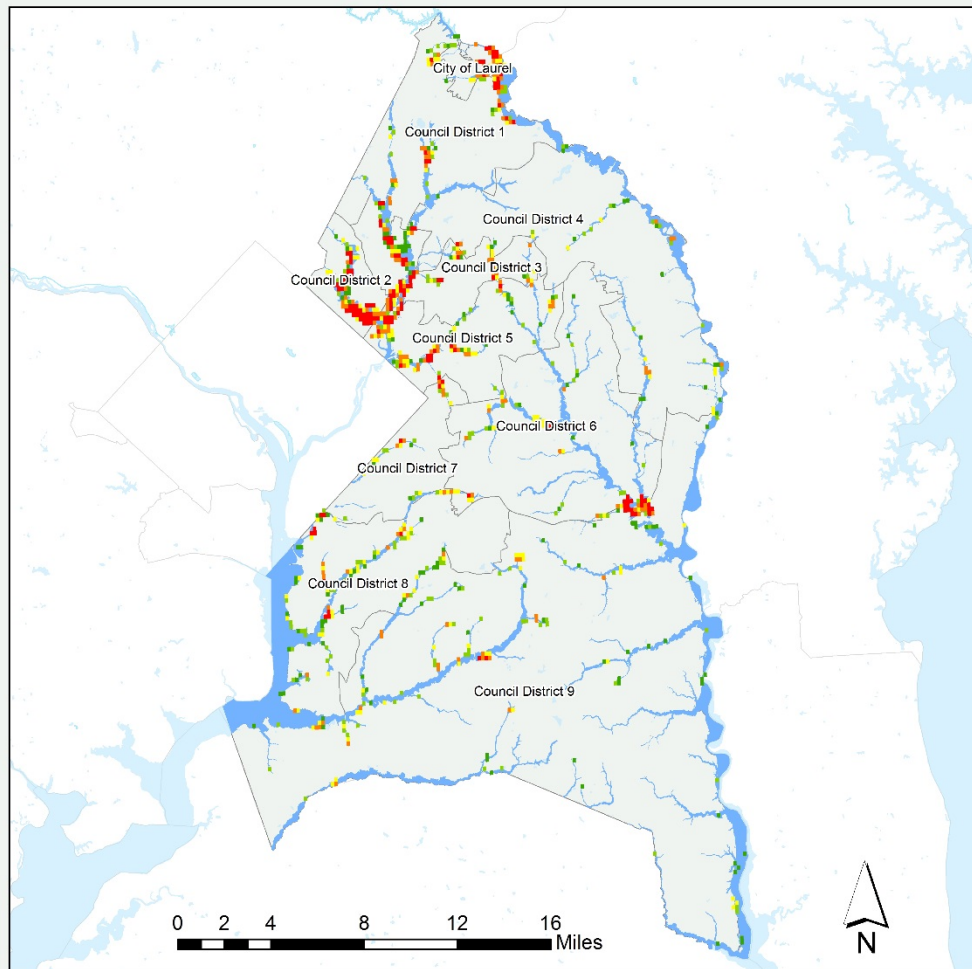
1000 ft. square grids generalizing the total building exposure in floodplain (Low to High) by Council Districts in Prince George's County and the City of Laurel.



1000 sq. foot  
Grids showing general  
Floodplain exposure  
1% Special Flood  
Hazard Area  
(regulated floodplain)



## TEIF 500 YR WITH 1000 FT GRIDS



### Total Exposure in Grid

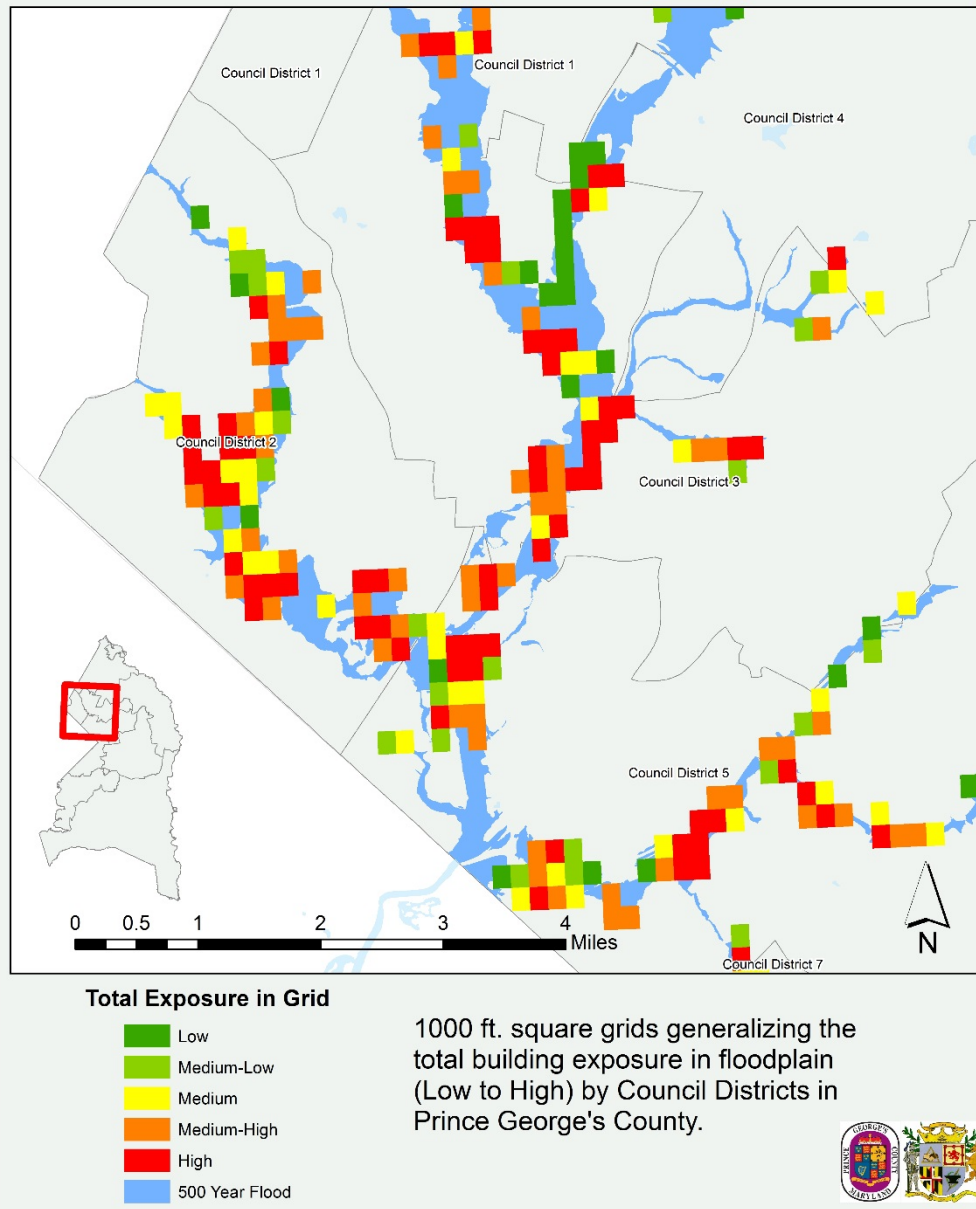


1000 ft. square grids generalizing the total building exposure in floodplain (Low to High) by Council Districts in Prince George's County and the City of Laurel.



1000 sq. foot  
Grids showing general  
Floodplain exposure  
0.02% Special Flood  
Hazard Area  
(regulated floodplain)

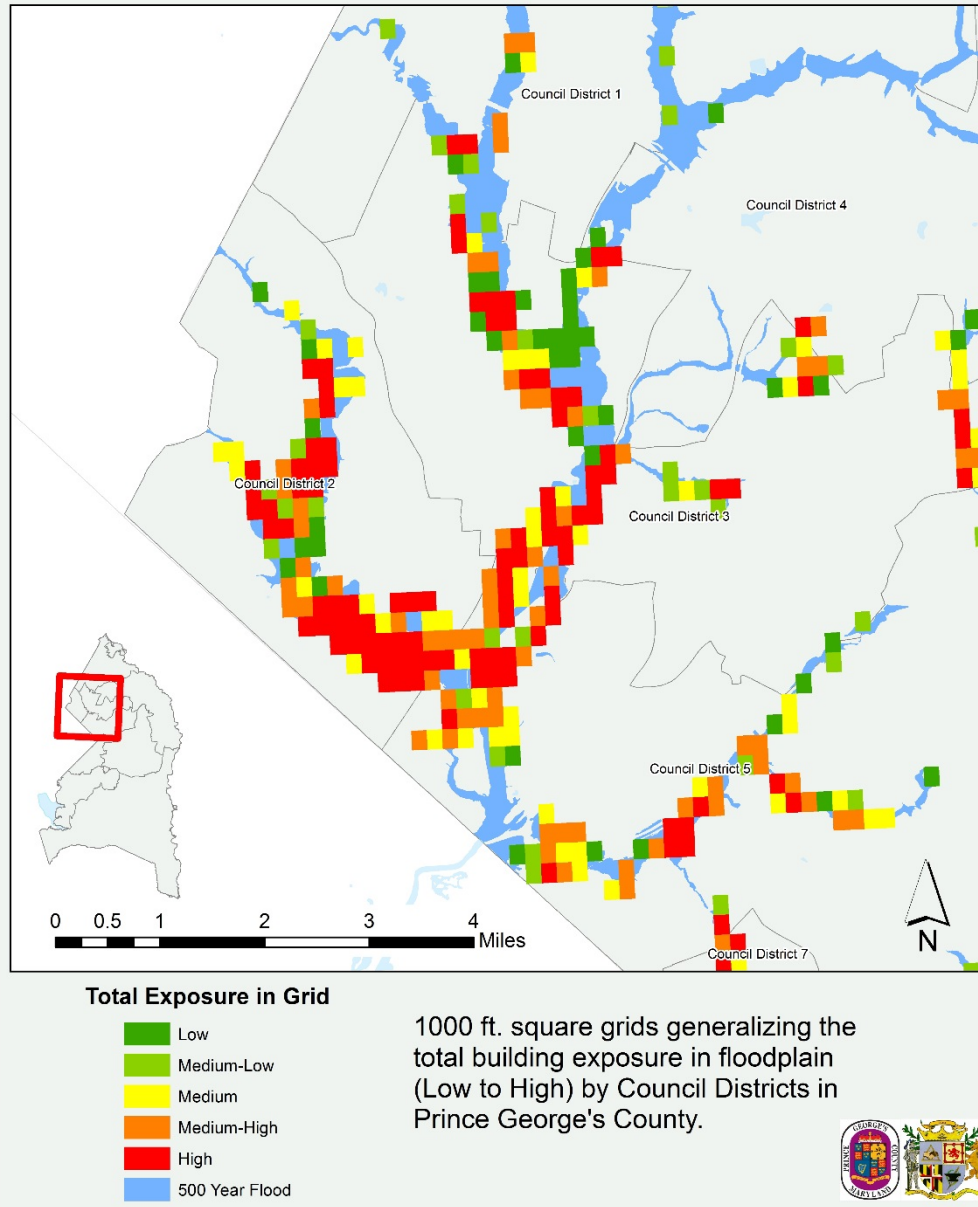
## TEIF 100 YR WITH 1000 FT GRIDS



Zoomed in 1%  
Floodplain exposure –  
Council Districts 1 - 5

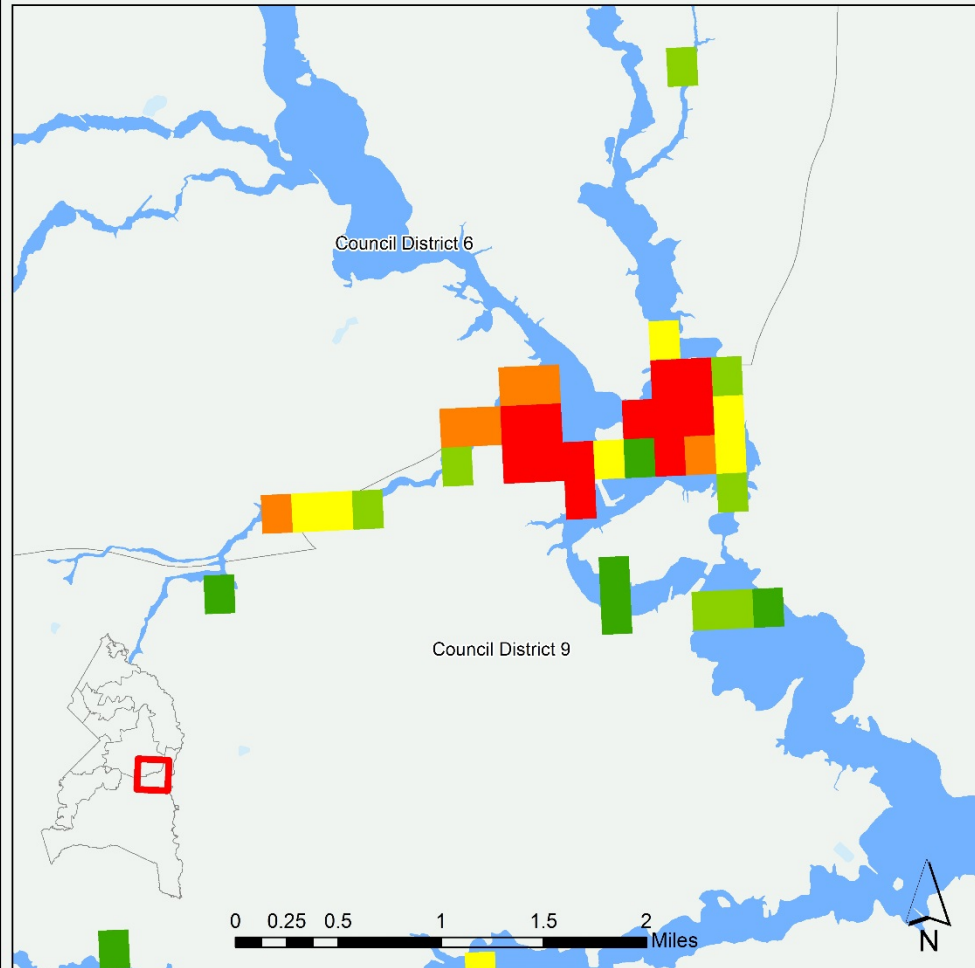


## TEIF 500 YR WITH 1000 FT GRIDS



Zoomed in 1%  
Floodplain exposure –  
Council Districts 1 - 5

## TEIF 100 YR WITH 1000 FT GRIDS



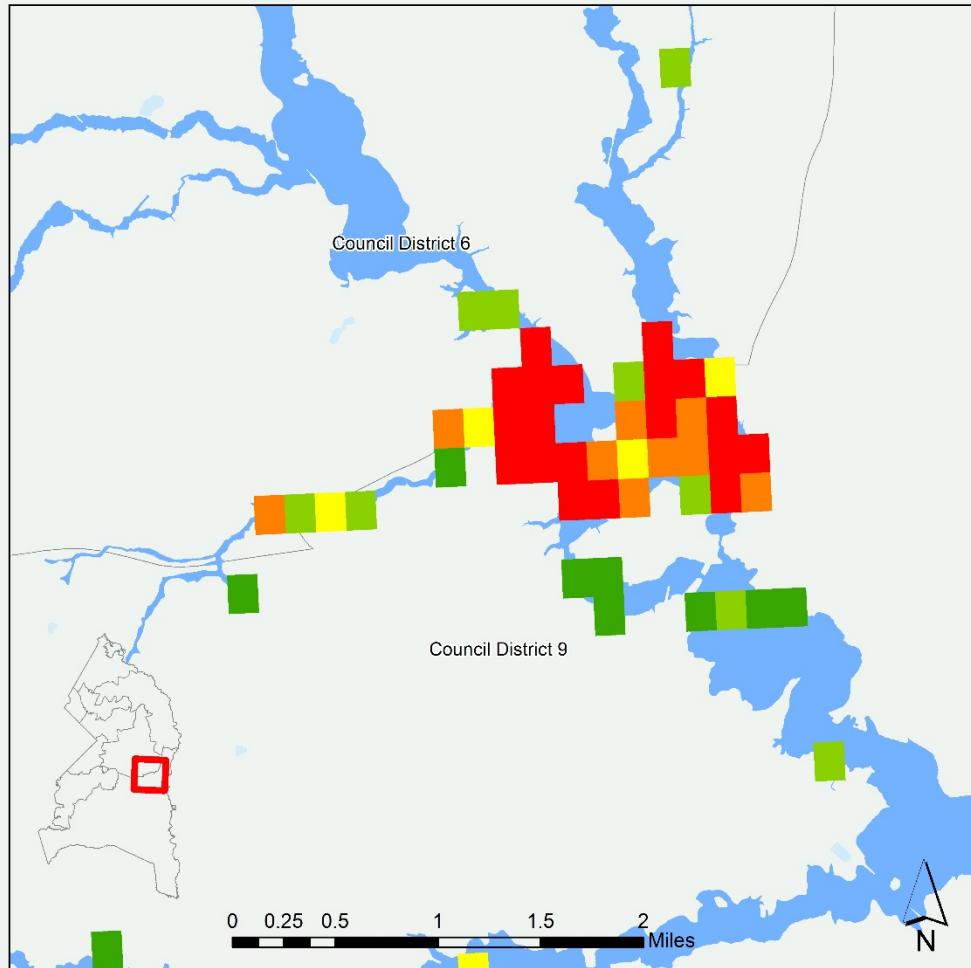
### Total Exposure in Grid



1000 ft. square grids generalizing the total building exposure in floodplain (Low to High) by Council Districts in Prince George's County.



# TEIF 500 YR WITH 1000 FT GRIDS



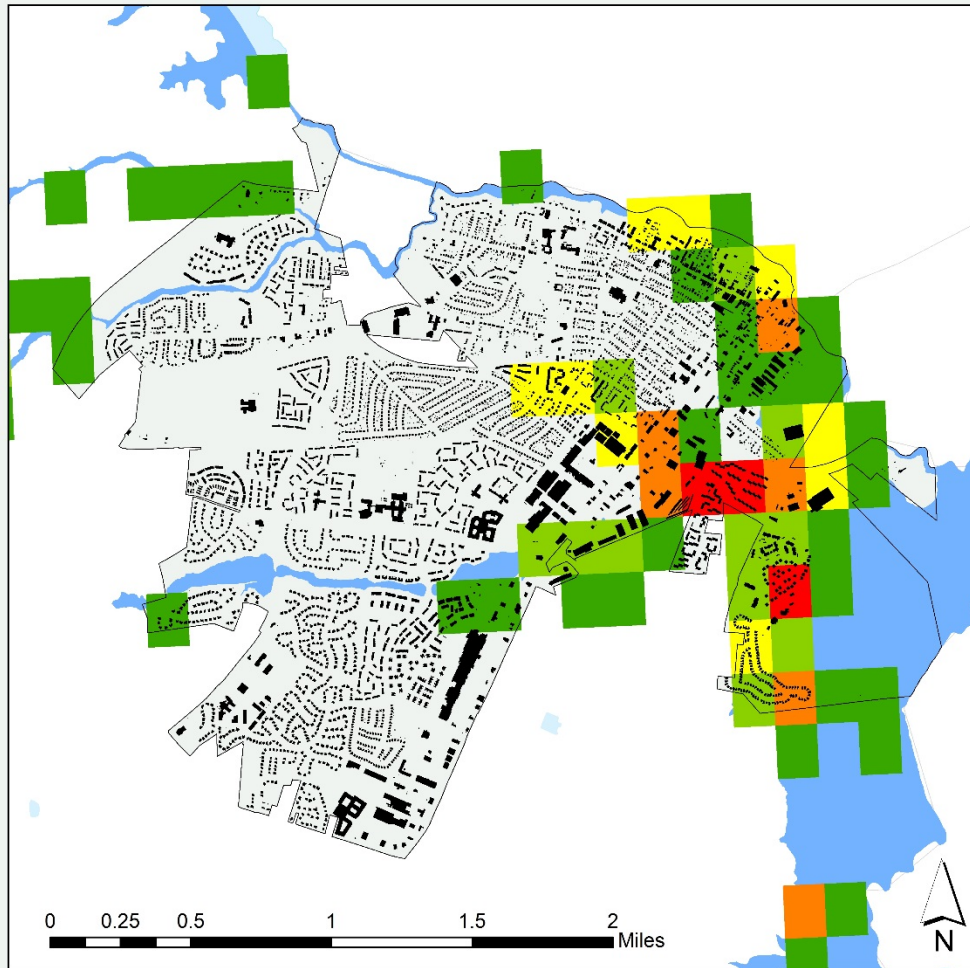
## Total Exposure in Grid

- Low
- Medium-Low
- Medium
- Medium-High
- High
- 500 Year Flood

1000 ft. square grids generalizing the total building exposure in floodplain (Low to High) by Council Districts in Prince George's County.



## TEIF 100 YR WITH 1000 FT GRIDS



1% floodplain exposure  
shown with building footprints  
City of Laurel

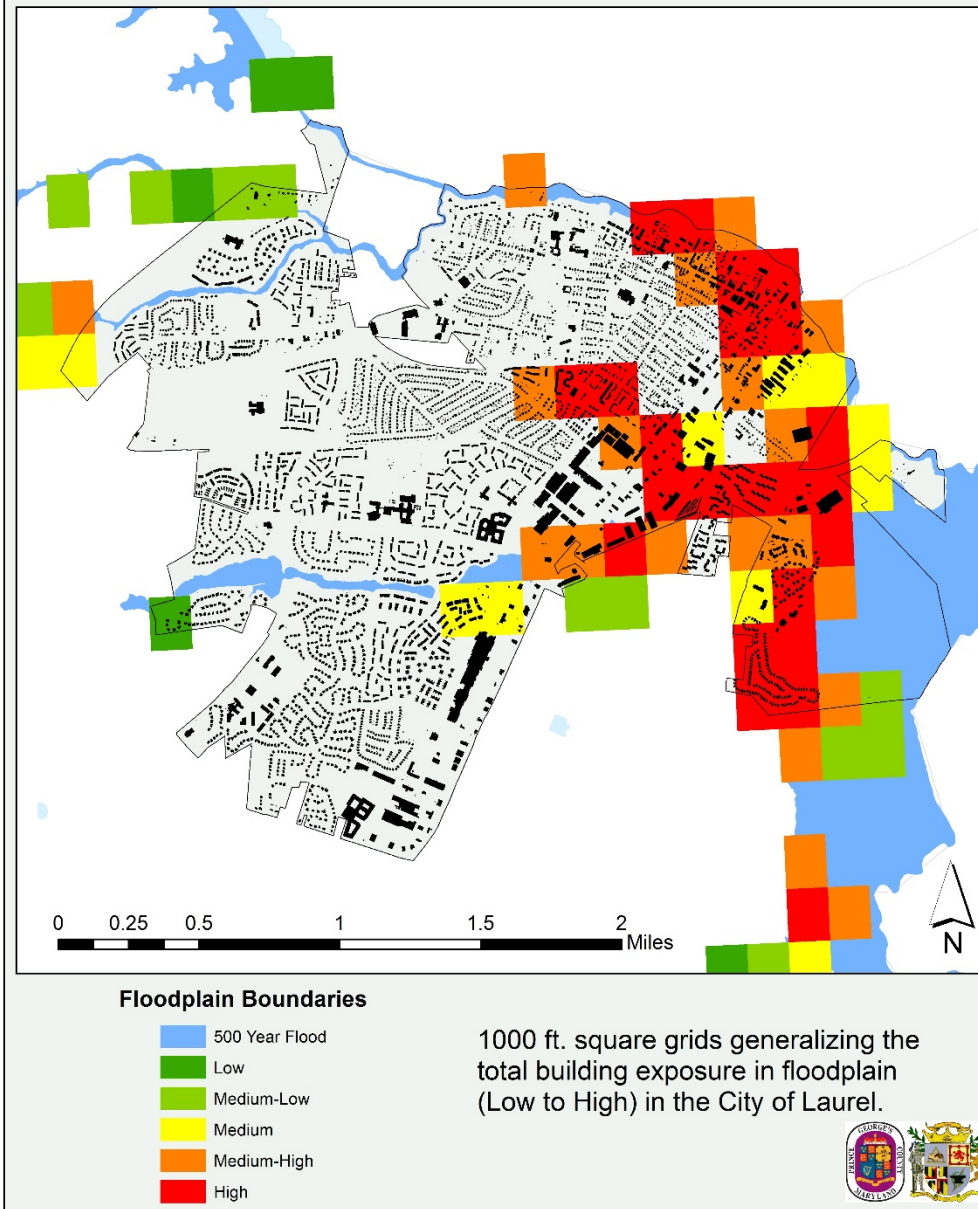
### Floodplain Boundaries

<span style="color: green;">■</span> Low	<span style="color: orange;">■</span> Medium-High
<span style="color: lightgreen;">■</span> Medium-Low	<span style="color: red;">■</span> High
<span style="color: yellow;">■</span> Medium	<span style="color: blue;">■</span> 500 Year Flood

1000 ft. square grids generalizing the total building exposure in floodplain (Low to High) in the City of Laurel.



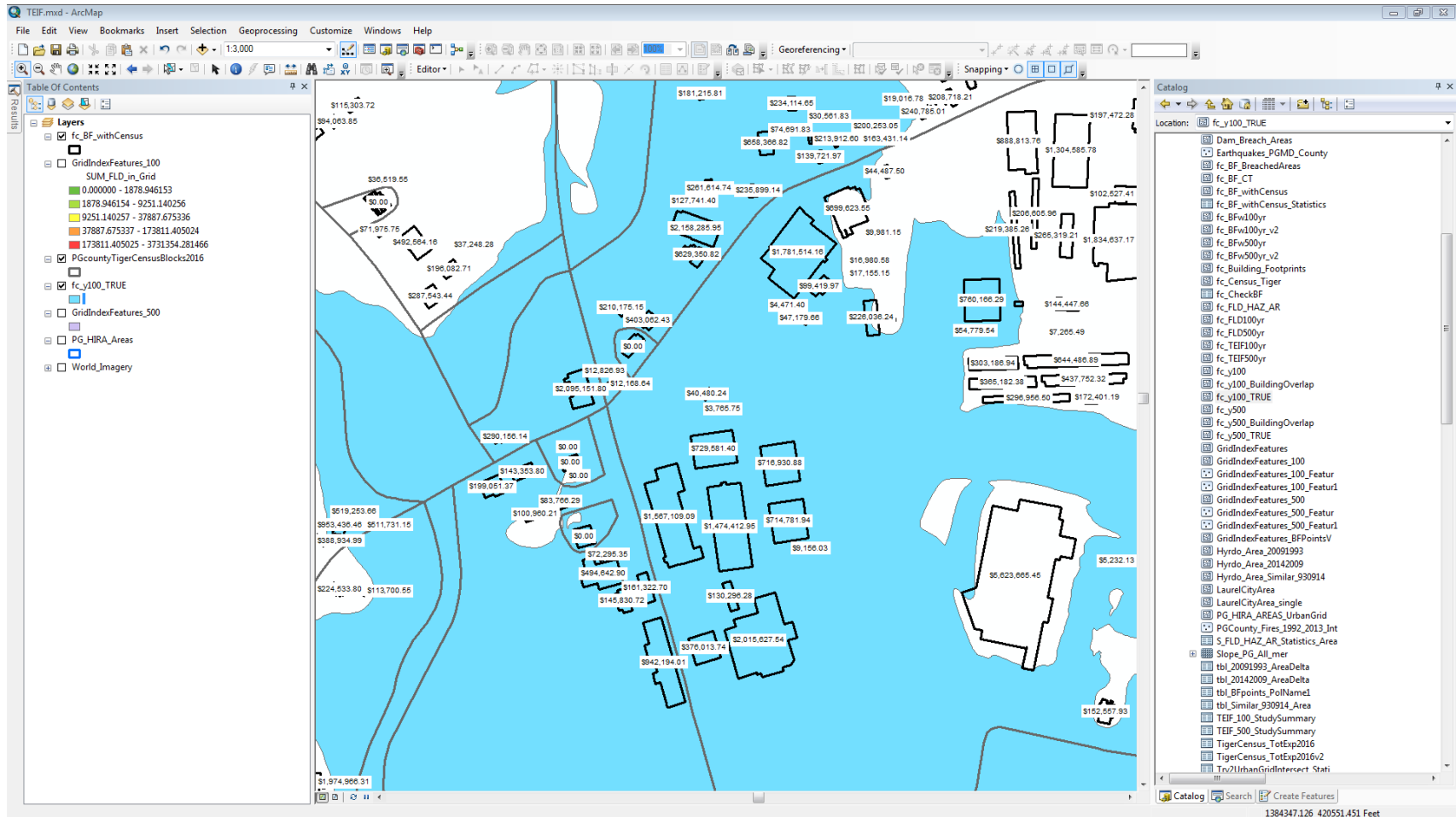
## TEIF 500 YR WITH 1000 FT GRIDS



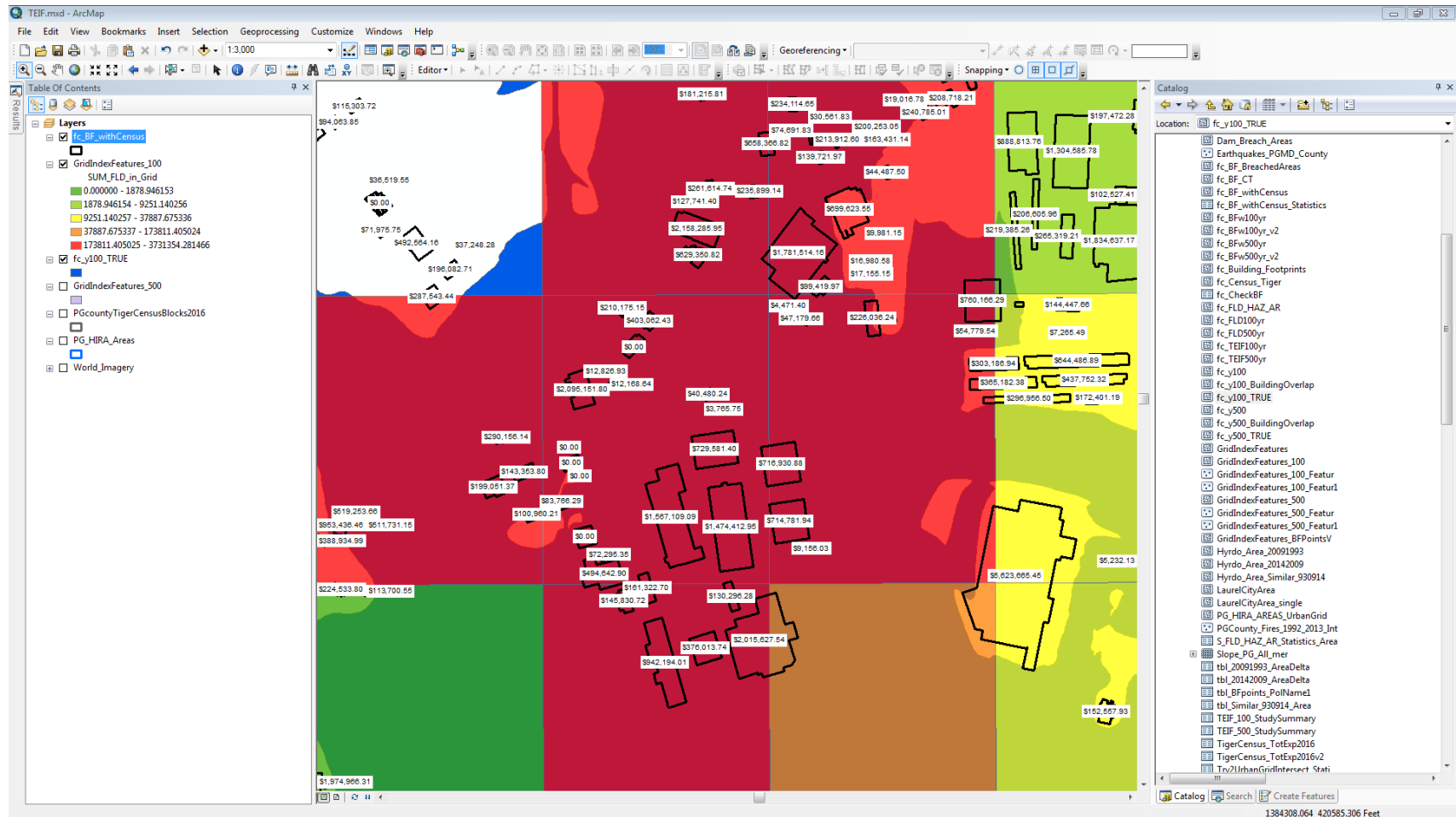
0.02% Floodplain exposure  
with building footprints  
City of Laurel



# TEIF 2.0 – Prince George's County

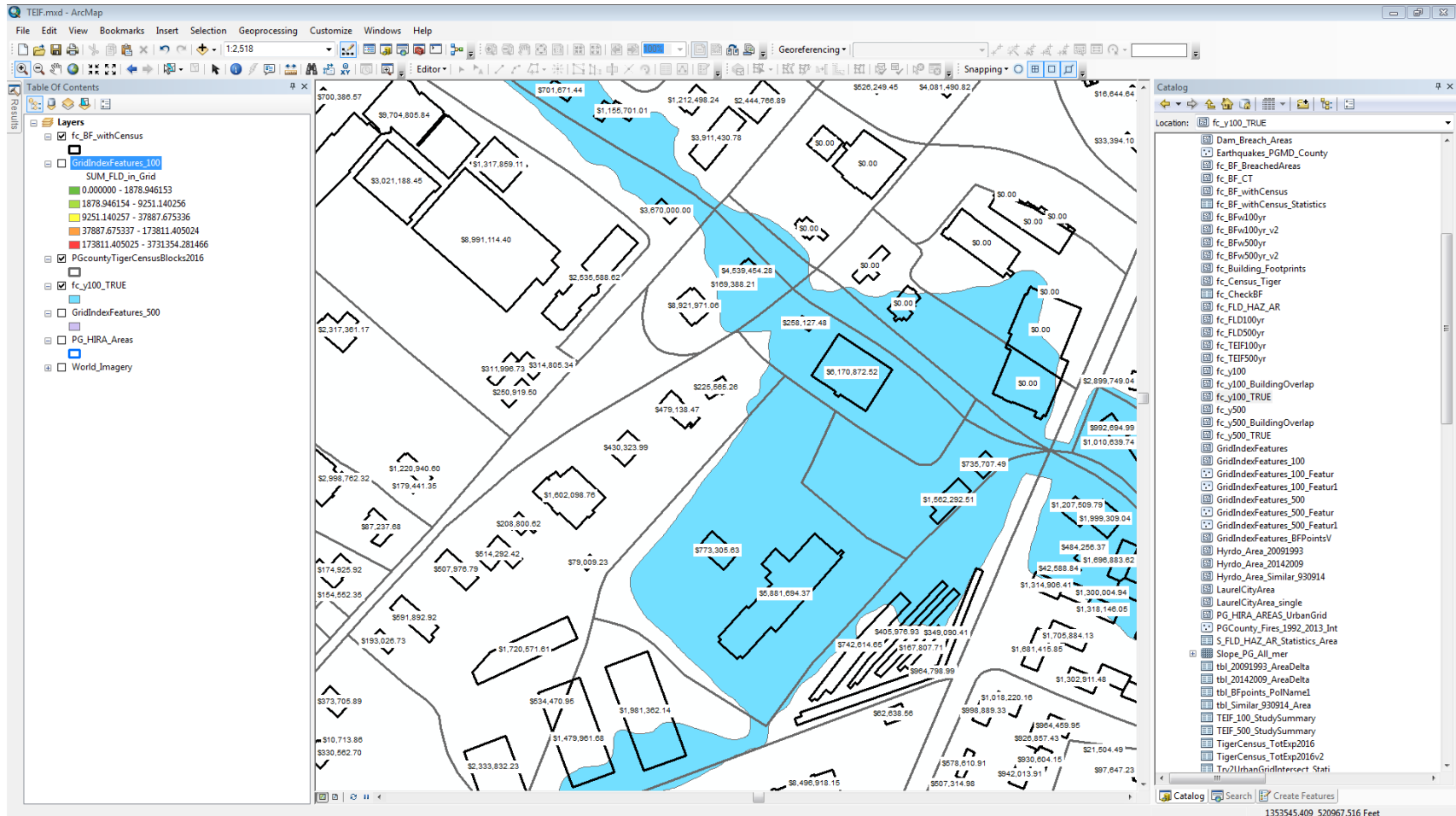


# TEIF 2.0 – Prince George's County

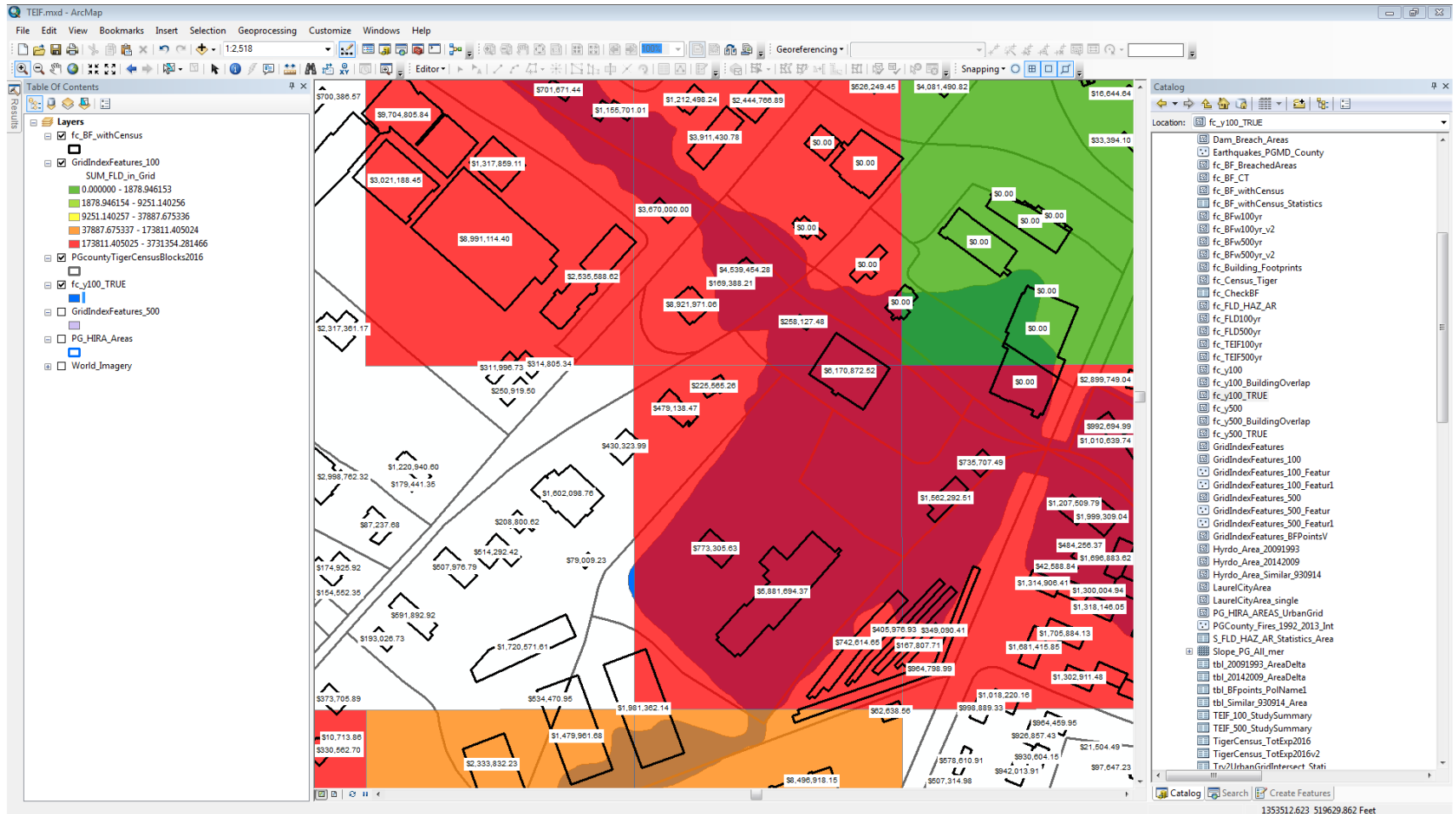




# TEIF 2.0 – City of Laurel



# TEIF 2.0 – City of Laurel





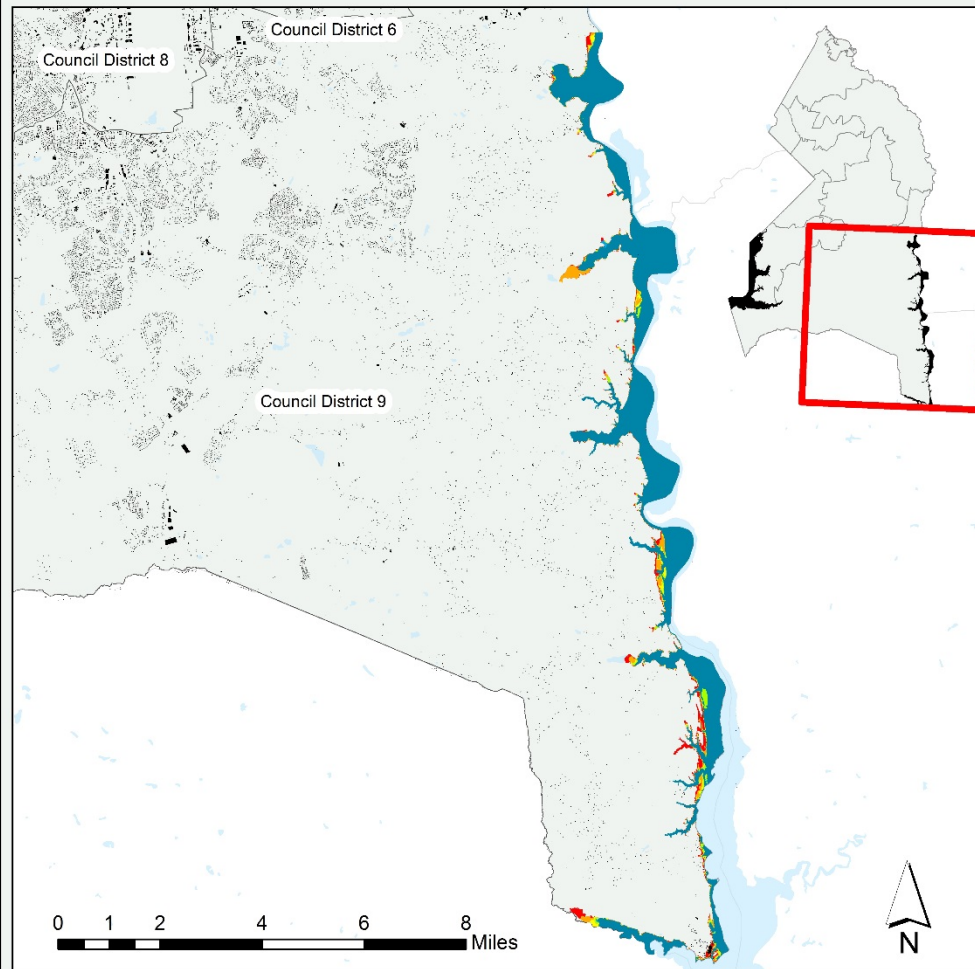
# Coastal Flooding

# Coastal Flooding

## Coast Smart Exposure Summary

Sea Level Rise Scenario	Weighted Average BFE	Number of Buildings Affected	Approximate Value of Affected Buildings
2	6.34	105	\$12,700,000
3	6.53	107	\$13,000,000
4	7.90	167	\$21,600,000
5	9.00	205	\$25,700,000
6	10.4	238	\$31,400,000
7	12.8	382	\$56,400,000

## PATUXENT RIVER 100 YEAR COASTAL FLOODPLAINS



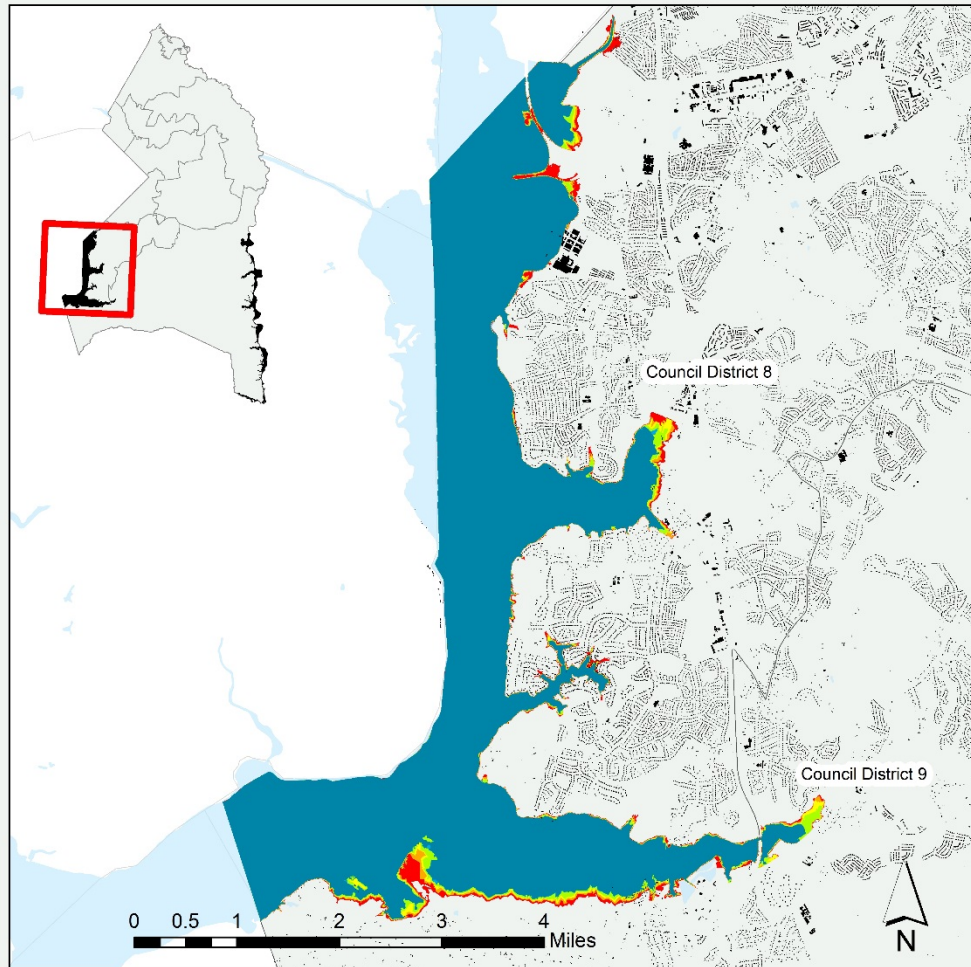
### CoastSmart Scenarios

- Scenario 2
- Scenario 3
- Scenario 4
- Scenario 5
- Scenario 6
- Scenario 7

Coastal floodplain boundaries for 100-year-flood with building footprints based off the CoastSmart Flood Hazard Analysis of the Patuxent River. Shows predictive models of sea level rise for different scenarios in the Council Districts of Prince George's County.



## POTOMAC RIVER 100 YEAR COASTAL FLOODPLAINS



### CoastSmart Scenarios

- Scenario 2
- Scenario 3
- Scenario 4
- Scenario 5
- Scenario 6
- Scenario 7

Coastal floodplain boundaries for 100-year-flood with building footprints based off the CoastSmart Flood Hazard Analysis of the Potomac River. Shows predictive models of sea level rise for different scenarios in the Council Districts of Prince George's County.





# Dam Hazard Risk



## Duckett Dam – Sunny Day Scenario Low Risk Scenario

Political Area	Buildings Affected	Total Exposure Value
City of Laurel	650	\$425,000,000
Council District 1	772	\$487,000,000
Council District 4	125	\$9,210,000
<b>Total</b>	<b>1547</b>	<b>\$921,210,000</b>

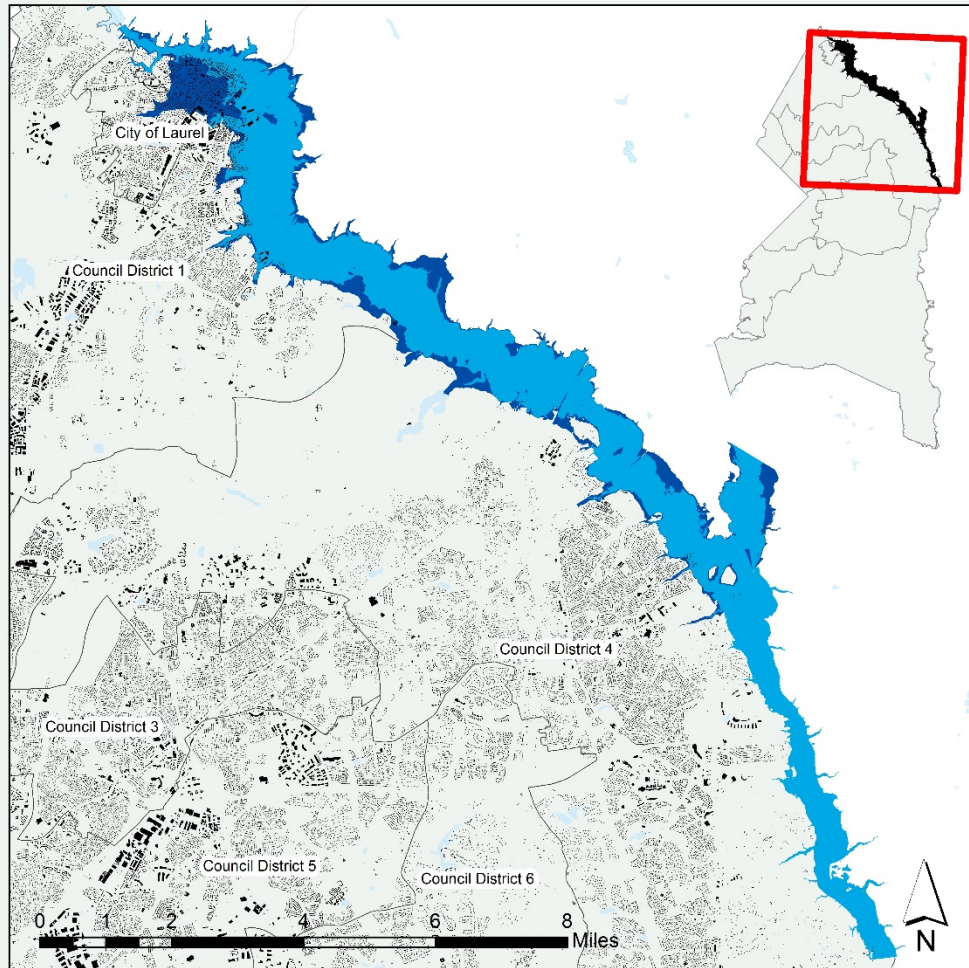
## Brighton and Duckett Dam High Risk Scenario

Political Area	Buildings Affected	Total Exposure Value
City of Laurel	2736	\$1,040,000,000
Council District 1	3036	\$1,170,000,000
Council District 4	282	\$10,300,000
<b>Total</b>	<b>6054</b>	<b>\$2,220,300,000</b>

# Small Dam Inundation Zones

Dam Breach Area	Political Area	Buildings Affected	Building Exposure
Heritage Glen Dam Breach Area	Council District 6	14	\$3,800,000
Indian Creek 2 & 3 Dam Breach Area	Council District 1	163	\$38,700,000
Lake Arbor Dam Breach Area	Council District 6	99	\$25,300,000
Largo Town Center Dam Breach Area	Council District 6	1	\$52,500,000
Laurel Lake Dam Breach Area 1	City of Laurel	40	\$44,400,000
	Council District 1	41	\$44,500,000
Laurel Lake Dam Breach Area 2	City of Laurel	35	\$62,900,000
	Council District 1	39	\$79,700,000

## DAM INUNDATIONS IN PRINCE GEORGE'S COUNTY



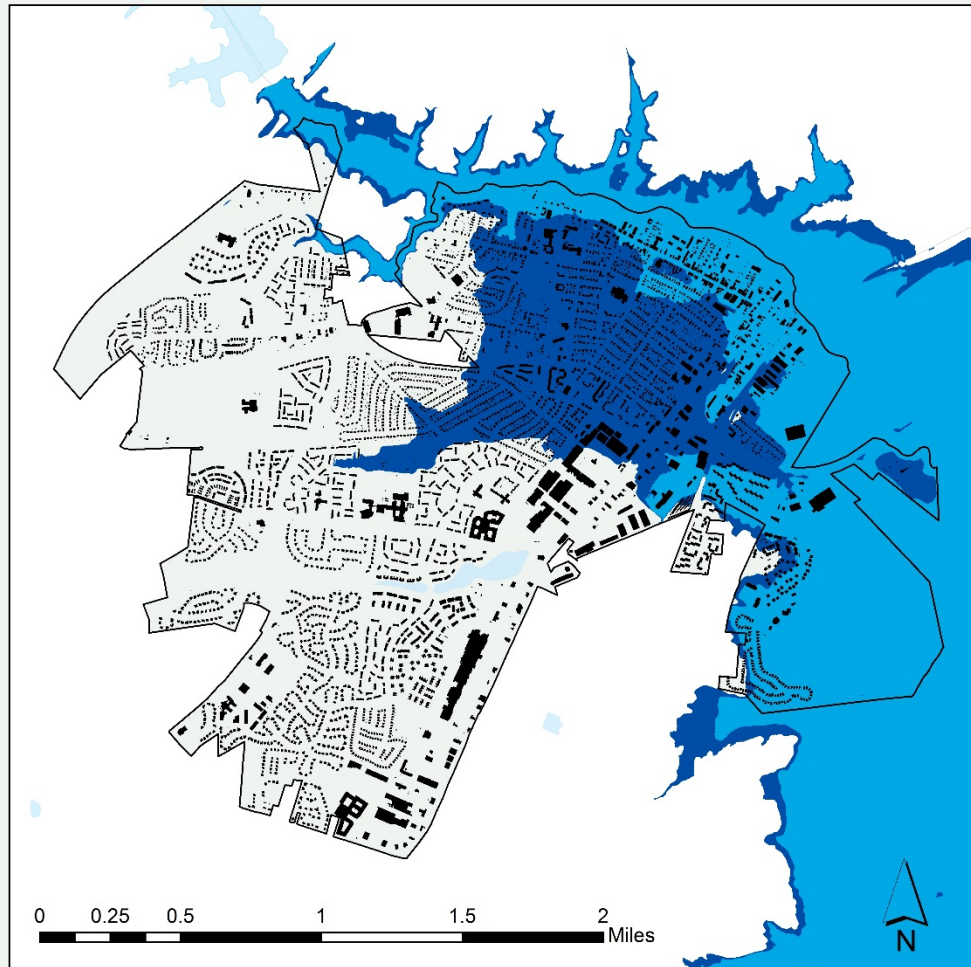
### Dam Inundations Zones

■ Duckett Dam - Sunny Day Scenario ■ Brighton - Duckett Dams - Flood Scenario

Dam Inundation Zones for the Sunny Day Scenario of Duckett Dam and the Flood Scenario for both Duckett and Brighton Dams by Council Districts in Prince George's County and in the City of Laurel.



## DAM INUNDATIONS IN THE CITY OF LAUREL



### Dam Inundations Zones

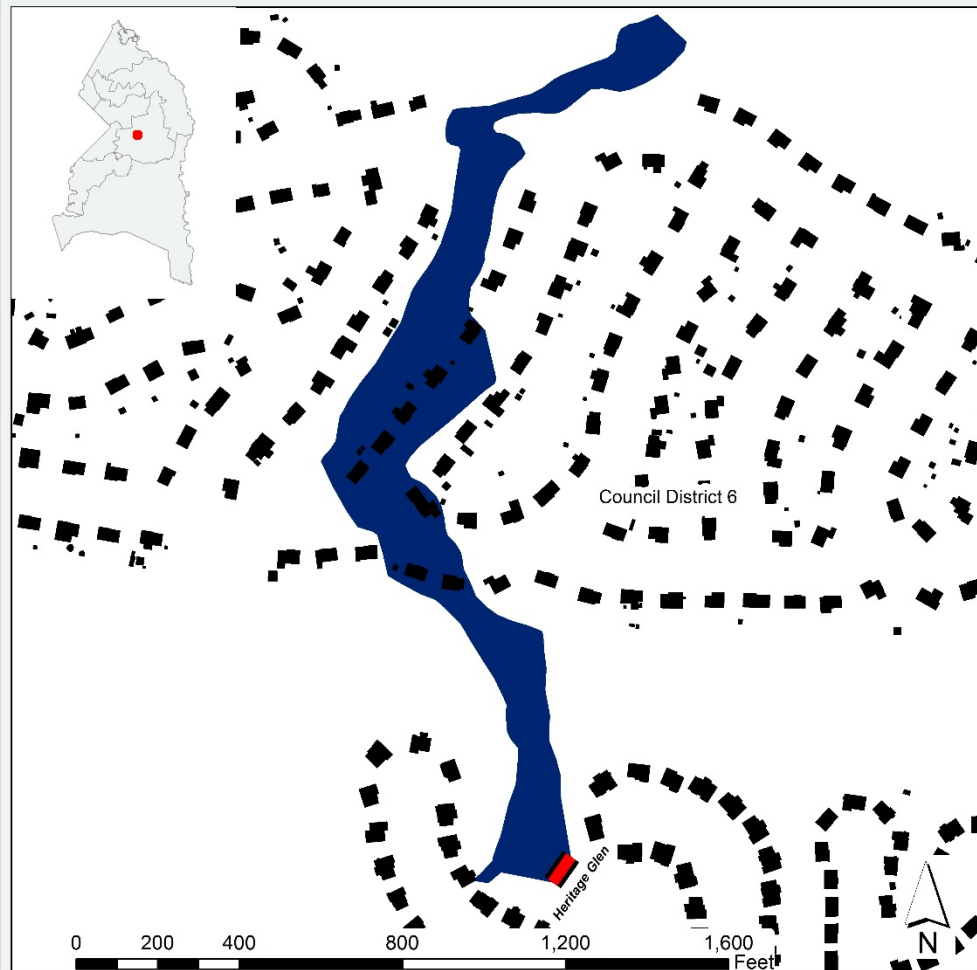
Duckett Dam - Sunny Day Scenario  Brighton - Duckett Dams - Flood Scenario

Dam Inundation Zones for the Sunny Day Scenario of Duckett Dam and the Flood Scenario for both Duckett and Brighton Dams in the City of Laurel.



PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE

**HERITAGE GLEN DAM INUNDATION ZONE IN PRINCE GEORGE'S COUNTY**



**Dam Inundation Zone**

-  High Hazard Dams
-  Heritage Glen Dam Breach Area

Heritage Glen Dam Inundation Zone by  
Council Districts in Prince George's County.





PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE

INDIAN CREEK DAMS INUNDATION ZONE IN PRINCE GEORGE'S COUNTY



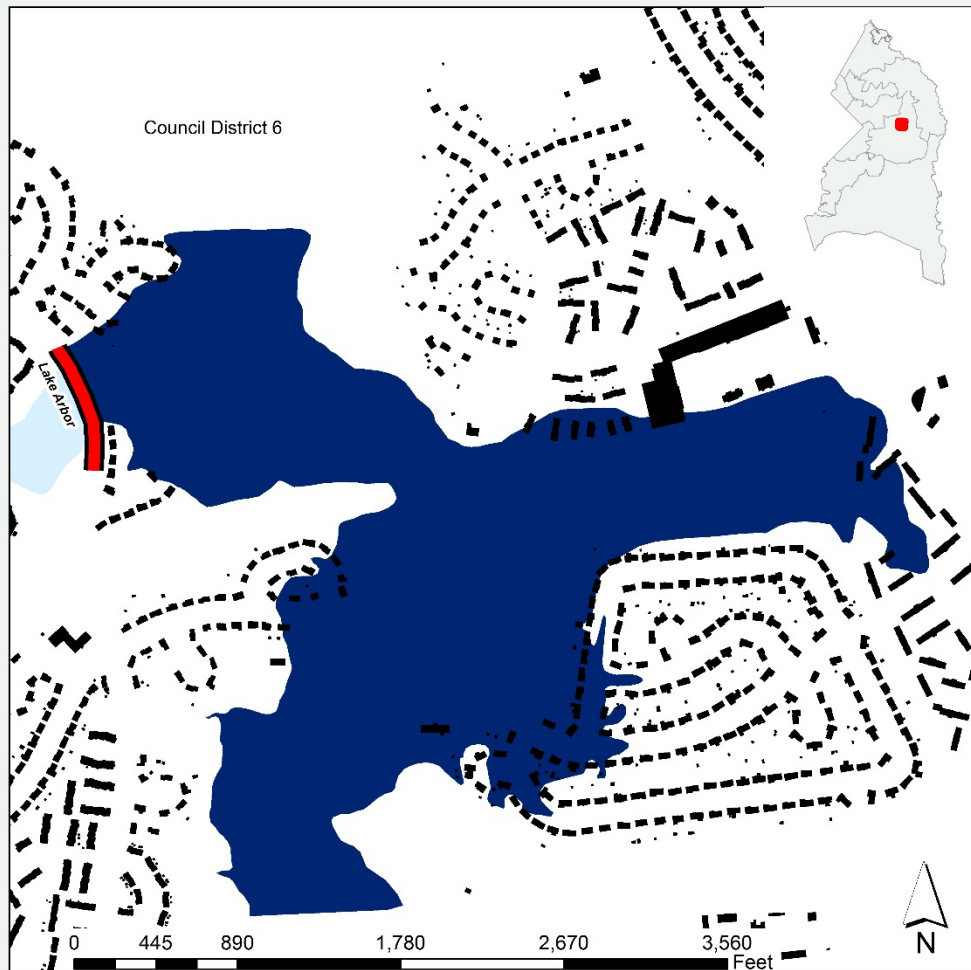
**Dam Inundation Zone**

- █ High Hazard Dams
- █ Indian Creek Dam Breach Area

Indian Creek Dam Inundation Zone by Council Districts in Prince George's County.



LAKE ARBOR DAM INUNDATION ZONE IN PRINCE GEORGE'S COUNTY



**Dam Inundation Zone**

-  High Hazard Dams
-  Lake Arbor Dam Breach Area

Lake Arbor Dam Inundation Zone by  
Council Districts in Prince George's County.





LAUREL LAKE DAM INUNDATION ZONE IN PRINCE GEORGE'S COUNTY



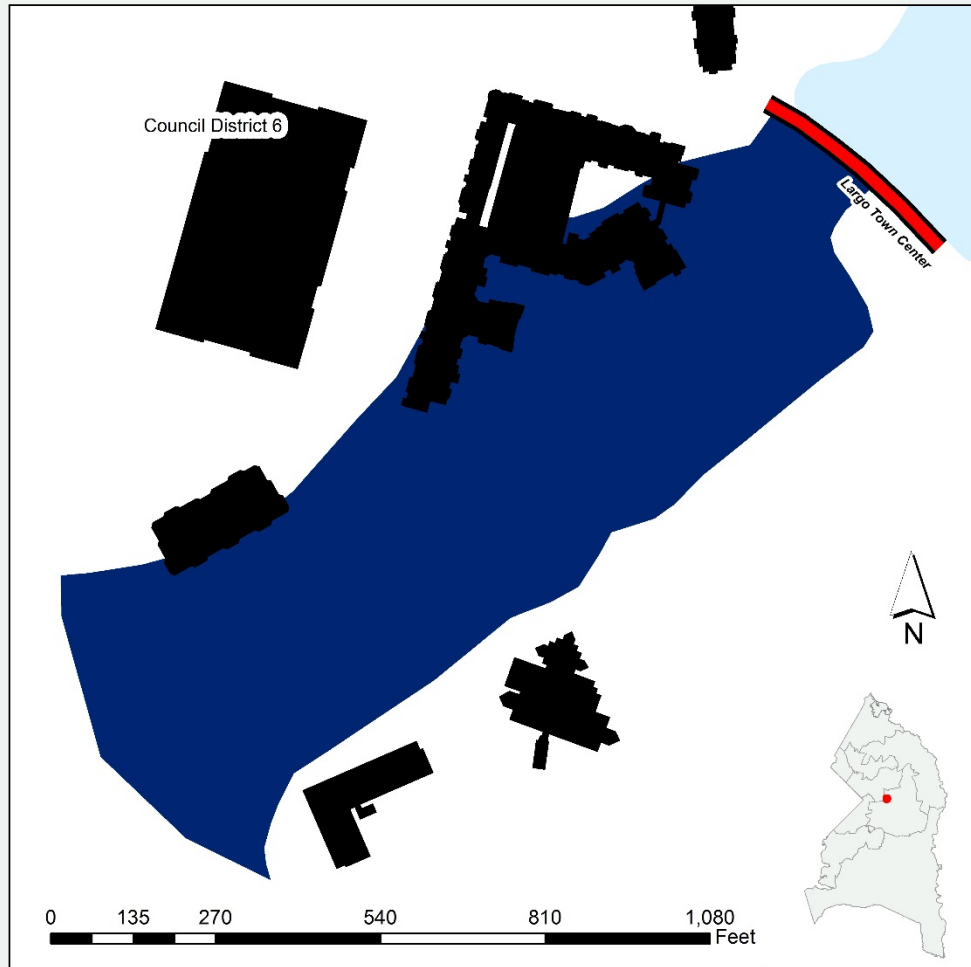
**Dam Inundation Zone**

-  High Hazard Dams
-  Laurel Lake Dam Breach Area



Laurel Lake Dam Inundation Zone by  
Council Districts in Prince George's County.



PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE  
LARGO TOWN CENTER DAM INUNDATION ZONE IN PRINCE GEORGE'S COUNTY



**Dam Inundation Zone**

-  High Hazard Dams
-  Largo Town Center Dam Breach Area

Largo Town Center Dam Inundation Zone by  
Council Districts in Prince George's County.





# Levee Hazard Risk

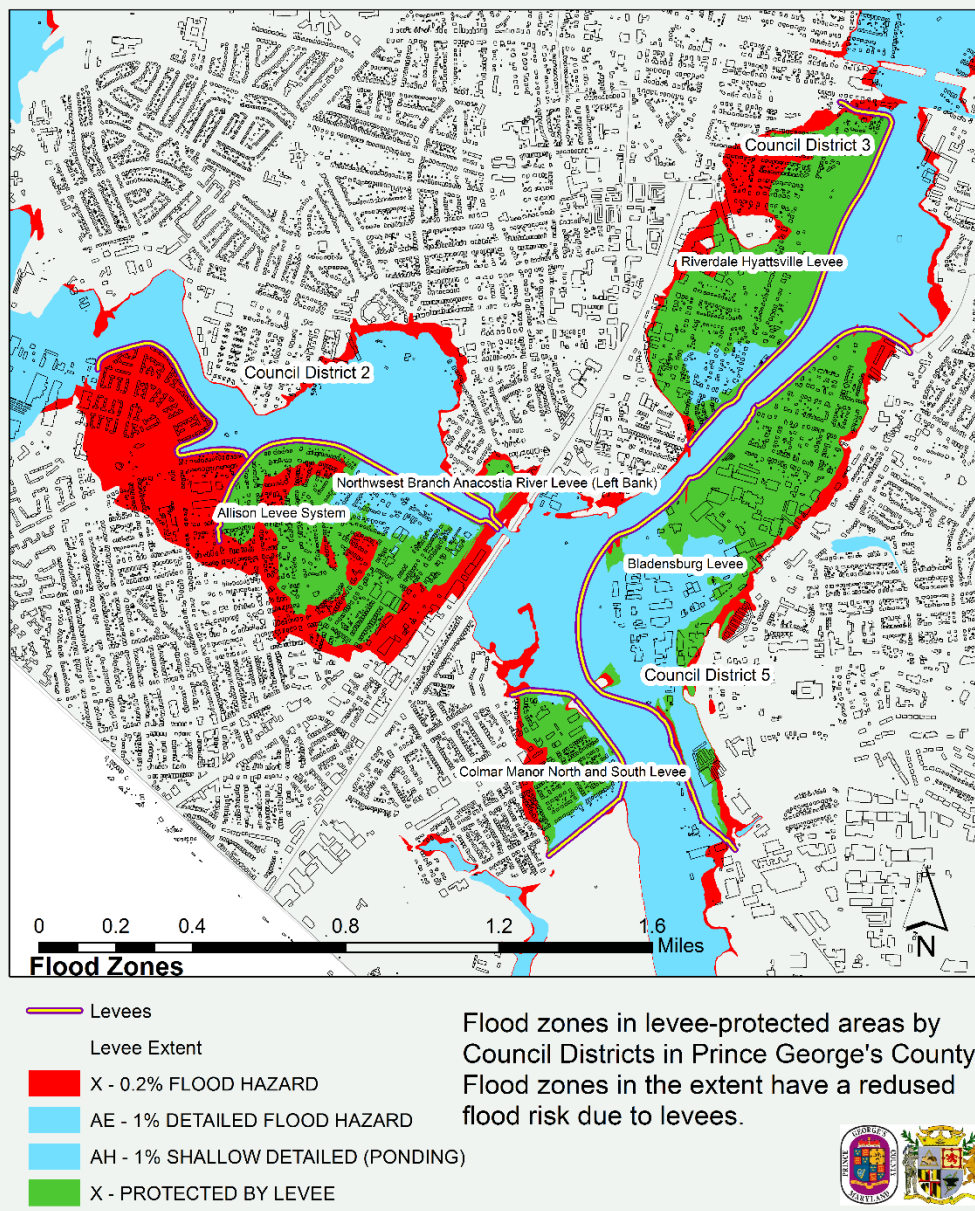
# Levee Area Risk Exposure

Levee System	Political Area	SFHA Flood Zone	SFHA Flood Zone Subtype	Building Count	Building Exposure
Allison Levee System	Council District 2	AE		11	\$3,370,000
		AH		131	\$19,000,000
		X	0.2 Pct Annual Chance	724	\$265,000,000
		X	Reduced Flood Risk Due To Levee	580	\$161,000,000
Colmar Manor North and South Levee	Council District 5	AH		24	\$3,360,000
		X	0.2 Pct Annual Chance	50	\$10,400,000
		X	Reduced Flood Risk Due To Levee	257	\$52,800,000
Bladensburg Levee	Council District 5	AE		13	\$4,410,000
		AH		48	\$43,700,000
		X	0.2 Pct Annual Chance	44	\$19,200,000
		X	Reduced Flood Risk Due To Levee	376	\$74,900,000
Northwest Branch Anacostia River Levee (Left Bank)	Council District 2	AH		1	\$61,000
		X	0.2 Pct Annual Chance	6	\$2,390,000
		X	Reduced Flood Risk Due To Levee	7	\$940,000
Riverdale Hyattsville Levee	Council District 3	X	0.2 Pct Annual Chance	166	\$23,400,000
		X	Reduced Flood Risk Due To Levee	274	\$41,900,000
	Council District 5	AE		4	\$666,000
		AH		69	\$7,510,000
		X	0.2 Pct Annual Chance	14	\$9,990,000
		X	Reduced Flood Risk Due To Levee	212	\$33,400,000

# Levee Area Total Exposure Summary

SFHA Zone	Building Count	Building Exposure
AE, AH	301	\$82,077,000
0.2 Pct Annual Chance Flood Hazard	1004	\$330,380,000
Reduced Flood Risk Due To Levee	1706	\$364,940,000

## REDUCED RISK LEVEE AREAS IN PRINCE GEORGE'S COUNTY





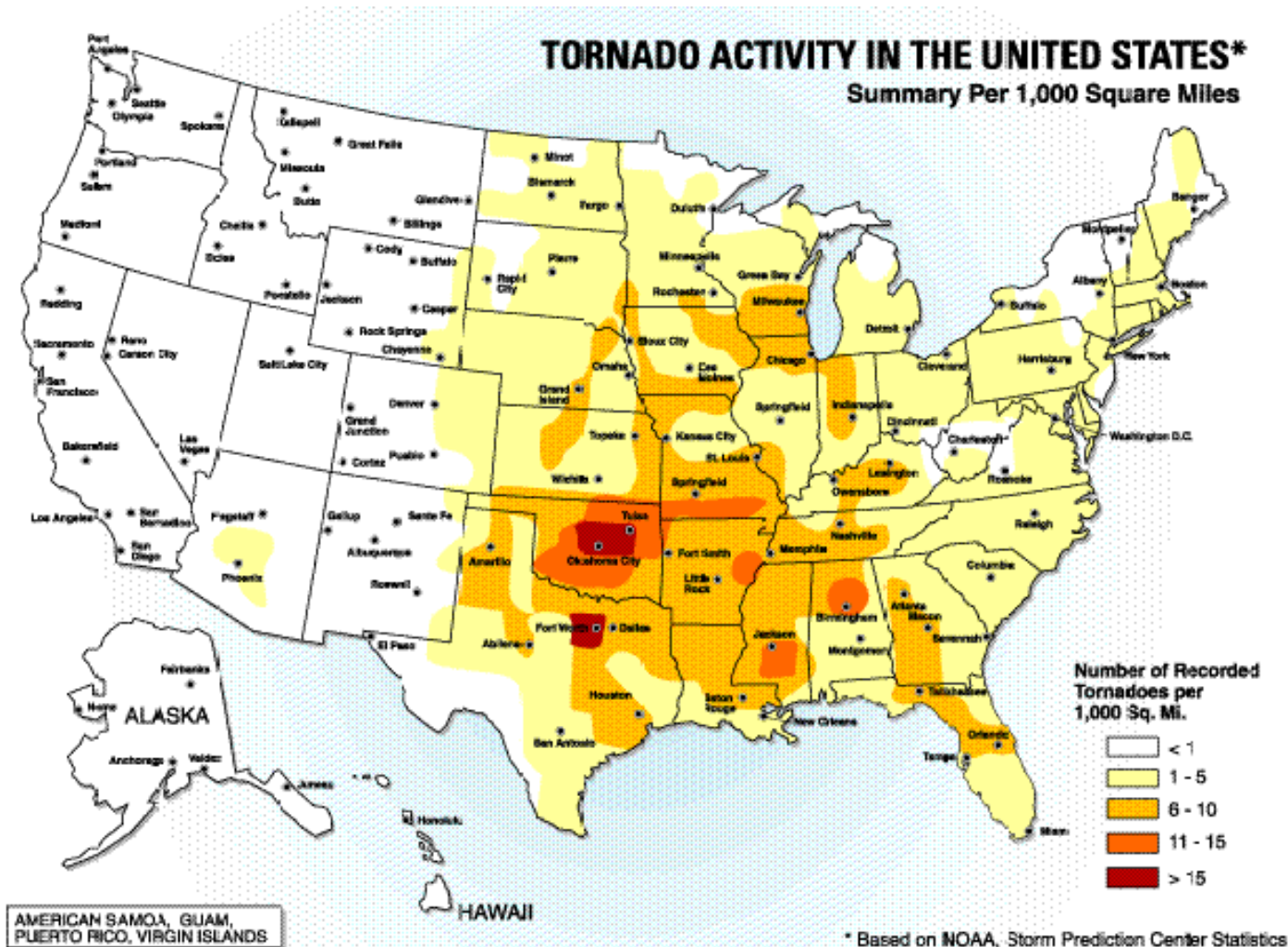
# Tornado Hazard Risk



# Tornado Damage Scale

Enhanced Fujita Scale	Wind Speeds (mph)	F-Scale	Wind Speeds (mph)	Damage	Frequency
EF0	65 to 85	F0	40 to 72	Light Damage. Some damage to chimneys, TV antennas, roof shingles, trees, and windows	29%
EF1	86 to 110	F1	73 to 112	Moderate Damage. Automobiles overturned, carports destroyed, trees uprooted	40%
EF2	111 to 135	F2	113 to 157	Considerable Damage. Roofs blown off homes, sheds and outbuildings demolished, mobile homes overturned	24%
EF3	136 to 165	F3	158 to 206	Severe Damage. Exterior walls and roofs blown off homes. Metal buildings collapsed or severely damaged. Forests and farmland flattened.	6%
EF4	166 to 200	F4	207 to 260	Devastating Damage. Few walls, if any, standing in well-built homes. Large steel and concrete missiles thrown far distances.	2%
EF5	Over 200	F5	261 to 318	Incredible Damage. Homes leveled with all debris removed. Schools, motels, and other larger structures have considerable damage with exterior walls and roofs gone. Top stories demolished.	Less than 1%

# National Tornado Risk



# Tornado History 1995-2015

Fujita Scale	Date	Community Affected	Deaths	Injuries	2016 Property Damages	2016 Total Damages
EF0	29 Sep 2015	Laurel	0	0	\$0	\$0
EF0	01 Jul 2013	Crestview Manor	0	0	\$513	\$117,000
EF0	19 Apr 2013	Westphalia	0	0	\$25,600	\$1,200,000
EF0	01 Jun 2012	Buena Vista	0	0	\$2,080	\$2,080
EF0	27 Apr 2011	Andrews Manor	0	0	\$5,310	\$5,310
EF0	27 Apr 2011	Friendly Pg Arpk Arp	0	0	\$106,000	\$106,000
EF0	27 Apr 2011	Westchester Estates	0	0	\$106,000	\$106,000
EF0	05 Apr 2011	Collington	0	0	\$2,120	\$2,120
EF0	08 May 2008	Clinton Hyde Fld Arp	0	0	\$111,000	\$111,000
EF0	08 May 2008	Woods Corner	0	0	\$55,500	\$55,500
EF1	20 Apr 2008	University Park	0	0	\$44,400	\$44,400
<b>F3</b>	<b>24 Sep 2001</b>	<b>Hyattsville</b>	<b>2</b>	<b>55</b>	<b>\$135,000,000</b>	<b>\$135,000,000</b>
F1	25 May 2001	Brandywine	0	0	\$33,700	\$33,700
F1	21 Jun 2000	Laurel	0	0	\$208,000	\$208,000
F1	13 May 2000	Brandywine	0	0	\$139,000	\$139,000
F0	24 Jun 1996	Andrews Afb	0	0	\$304,000	\$304,000
F1	24 Jun 1996	Upper Marlboro	0	0	\$761,000	\$761,000
F2	05 Oct 1995	Temple Hills	0	3	\$7,830,000	\$7,830,000
F1	18 May 1995	Cheverly	0	2	\$3,130,000	\$3,130,000

# Local Tornado Risk

EF Scale Rating	Estimated Tornado Counts in Prince Georges County (1950-2014)
EF0	20
EF1	29.39
EF2	8.33
EF3	2.00
EF4	0.72
EF5	0

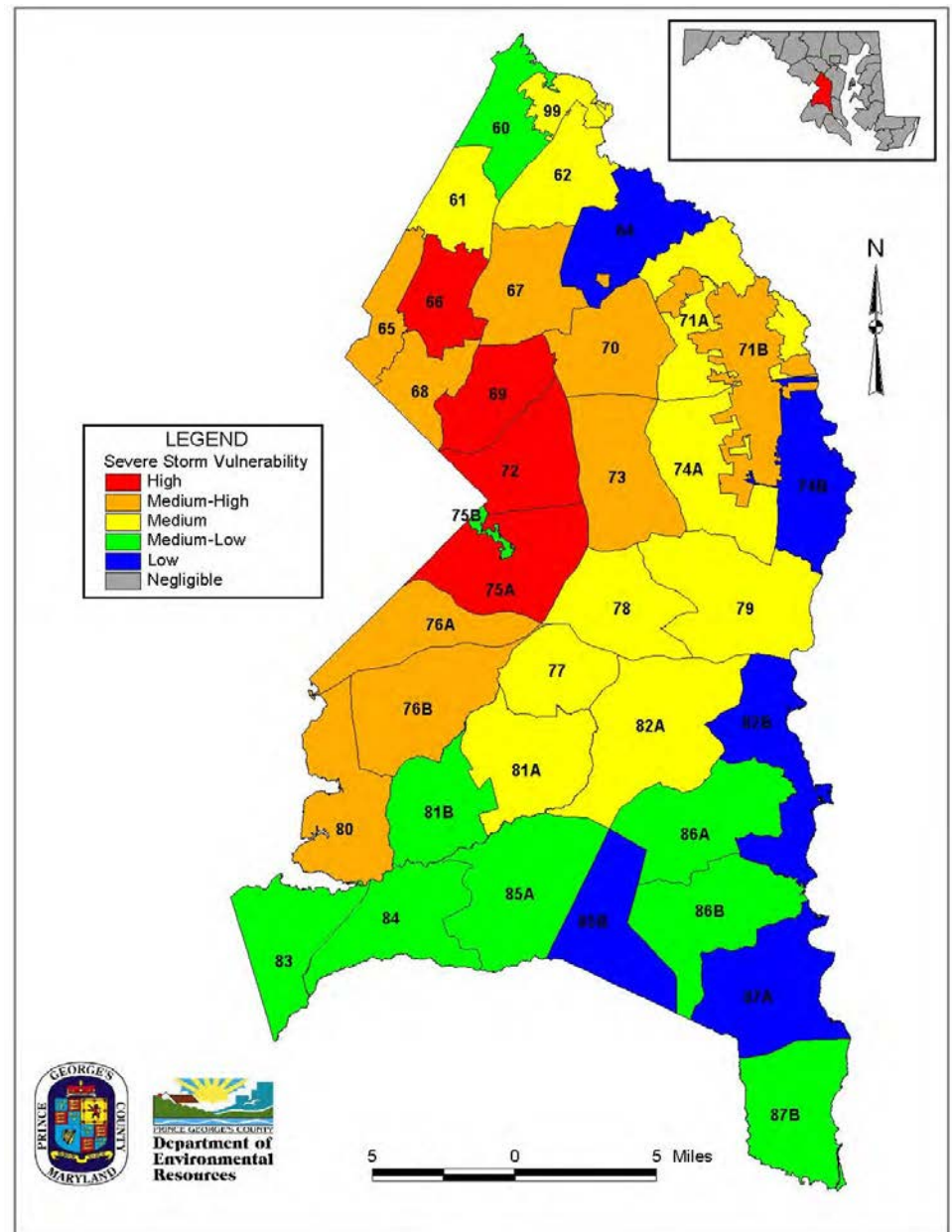
**Source:** Analysis of tornado records for Prince Georges County, MD taken from the FEMA Benefit-Cost Analysis Tool – Version 5.3.0.2 (Build Date 12/22/2016)



# Severe Storms Hazard Risk

# Severe Storm Hazard Vulnerability

**Source:** Severe Storm Vulnerability Map by Planning Area, Prince George's County and City of Laurel Maryland Hazard Mitigation Plan (2010 Update)





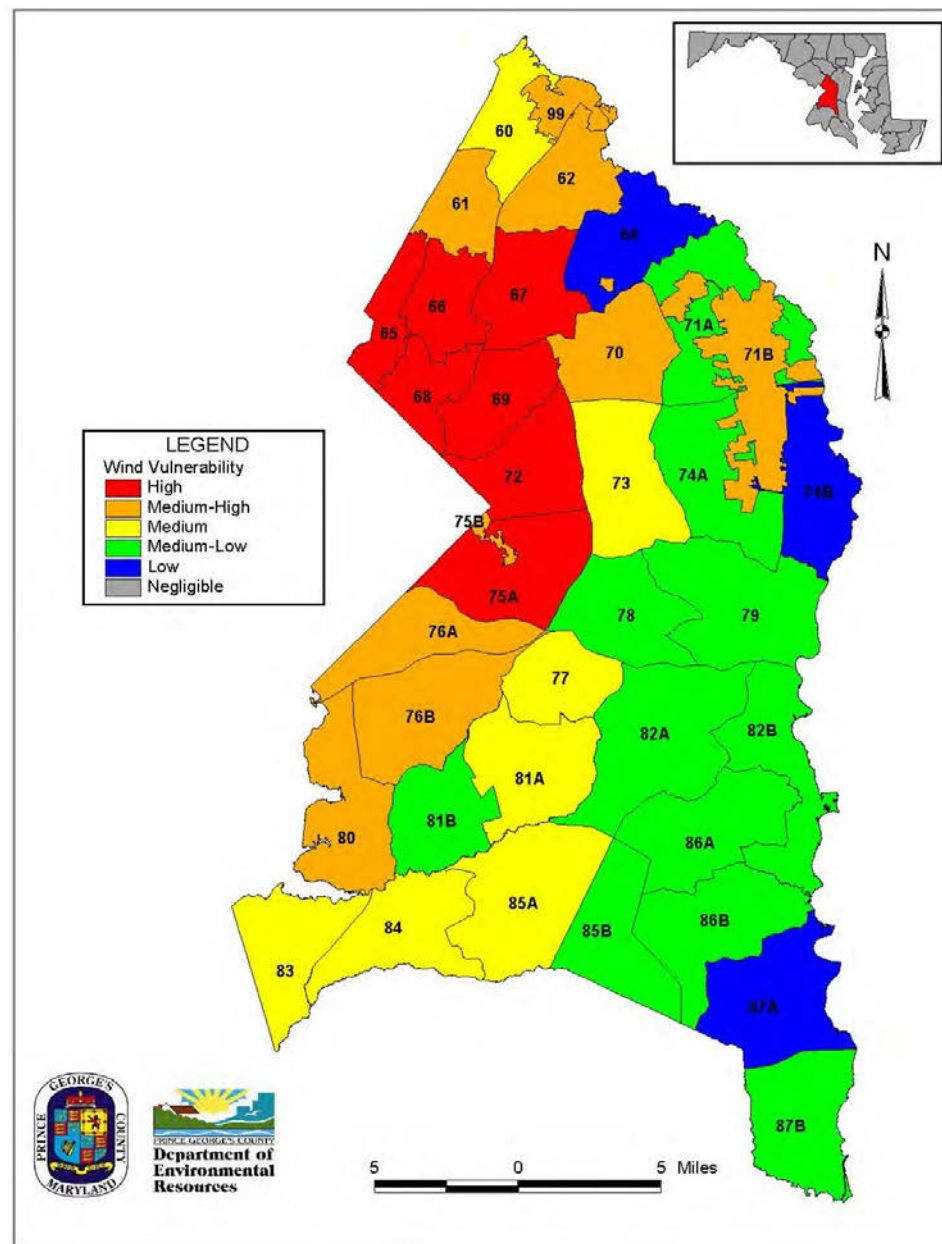


# High Wind Hazard



# High Wind Hazard Vulnerability

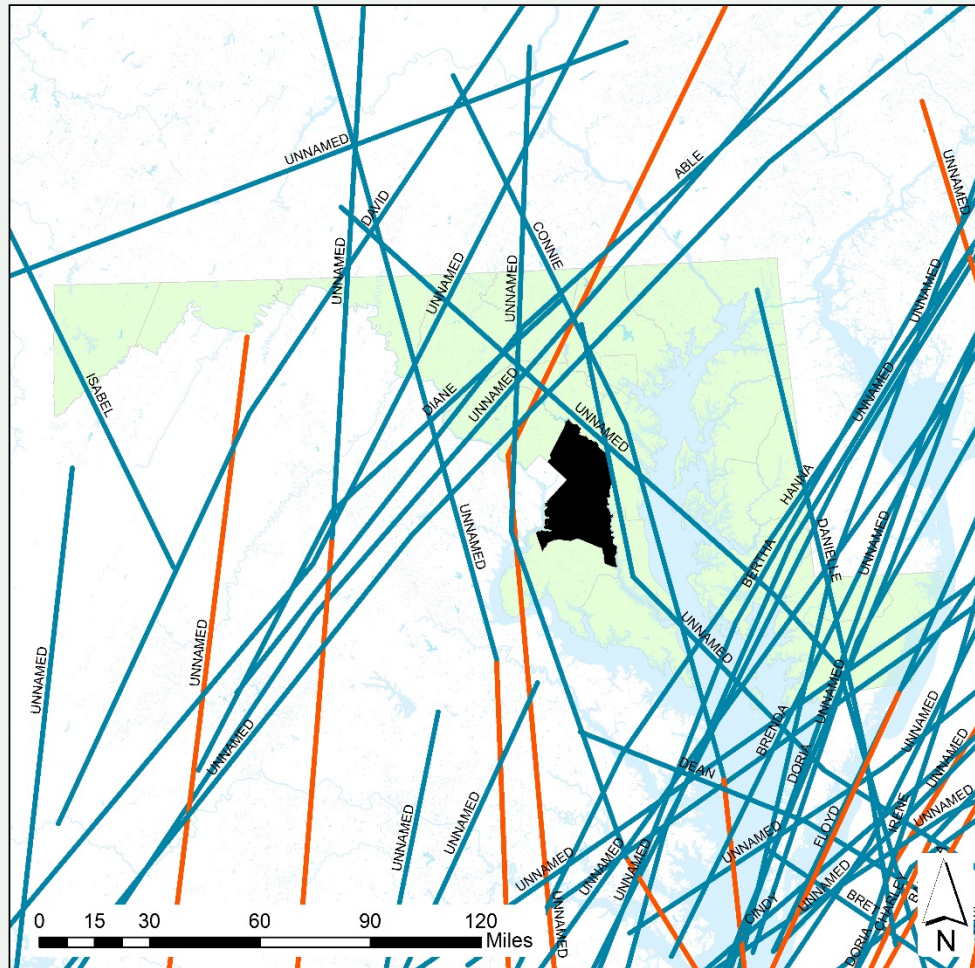
**Source:** Wind Vulnerability Map by Planning Area, Prince George's County and City of Laurel  
Maryland Hazard Mitigation Plan (2010 Update)





# Hurricanes and Tropical Storm Risk

# STORM TRACTS FOR PRINCE GEORGE'S COUNTY



## Map Legend

- TROPICAL STORM
- CATEGORY 1 HURRICANE
- Prince George's County
- Maryland

Storm Tracts in and around Prince George's County and the City of Laurel.





# Winter Hazard Risk



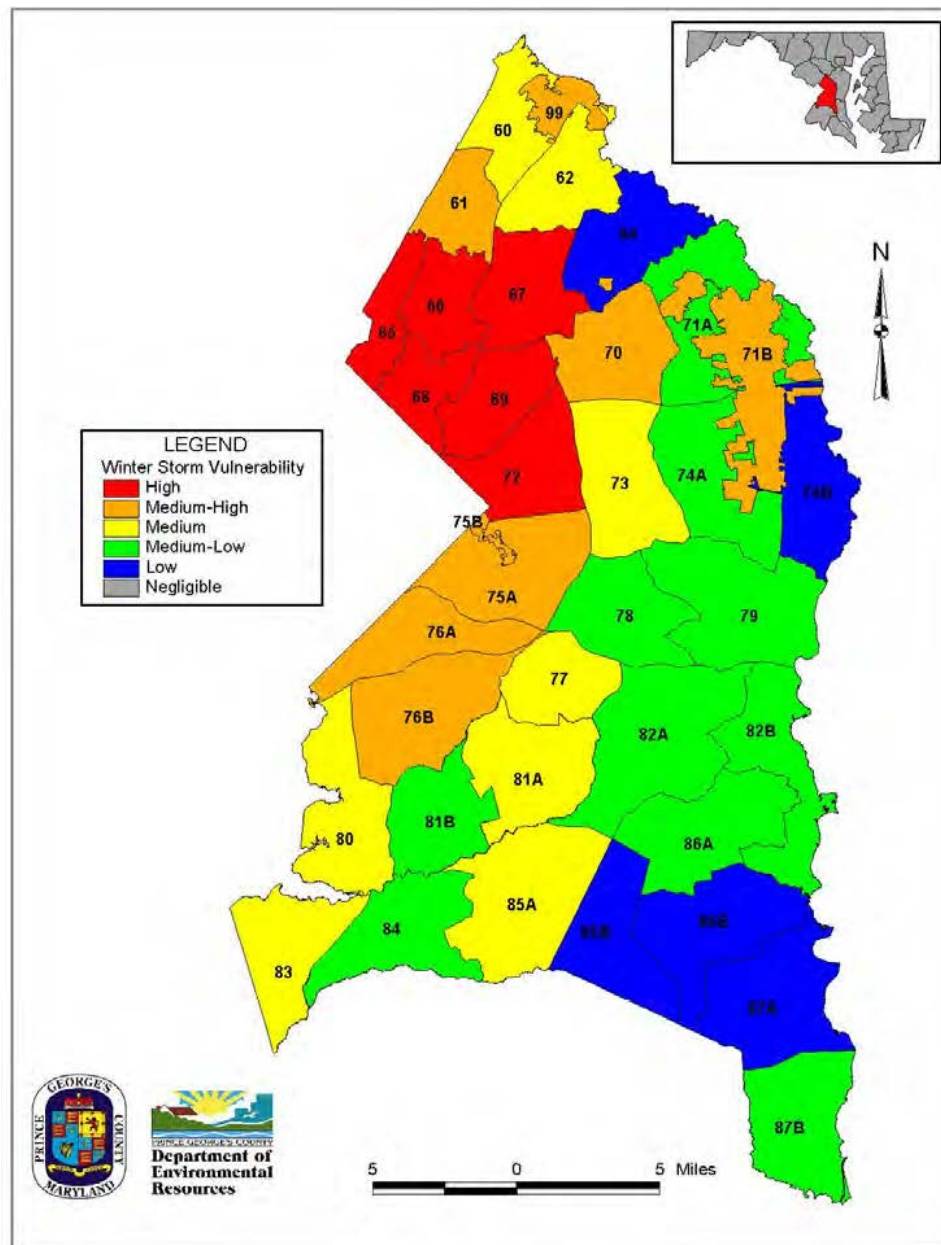
# Winter Storm Hazard Risk

**Winter storms are a persistent problem for Prince Georges' County and in the Washington, DC metropolitan area. Recent notable storms include:**

- January 2016 - Winter Storm Jonas dropped upwards of 2 feet of snow in Maryland, causing at least one death in Prince George's County
- February 2010 – North American Blizzard “Snowmageddon” pummeled the region with 18-24 inches of snow, causing widespread travel delays, business and school closings, METRO outages and extended power loss as well as several deaths in Maryland
- December 2009 – Blizzard left Maryland, DC and Virginia with 18-24 inches of snow, causing massive travel delays and power outages

# Winter Storm Hazard Vulnerability

**Source:** Winter Storm Vulnerability Map by Planning Area, Prince George's County and City of Laurel Maryland Hazard Mitigation Plan (2010 Update)



# Wildfires 1992-2013

Political Area	Fire Size Code	Fire Description	Number of Fires
City of Laurel	--	--	--
Council District 1	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	3
	C	10.0 to 99.9 Acres	1
Council District 2	B	0.26 to 9.9 Acres	1
Council District 3	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	5
<b>Council District 4</b>	<b>A</b>	<b>0.25 Acres or less</b>	<b>4</b>
	<b>B</b>	<b>0.26 to 9.9 Acres</b>	<b>11</b>
Council District 5	B	0.26 to 9.9 Acres	2
Council District 6	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	1
Council District 7	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	2
Council District 8	B	0.26 to 9.9 Acres	2
	C	10.0 to 99.9 Acres	1
<b>Council District 9</b>	<b>A</b>	<b>0.25 Acres or less</b>	<b>18</b>
	<b>B</b>	<b>0.26 to 9.9 Acres</b>	<b>26</b>
	C	10.0 to 99.9 Acres	2
	E	300 to 999 Acres	2
<b>Total</b>			<b>85</b>

# Community Wildfire Protection Plan Area Exposure

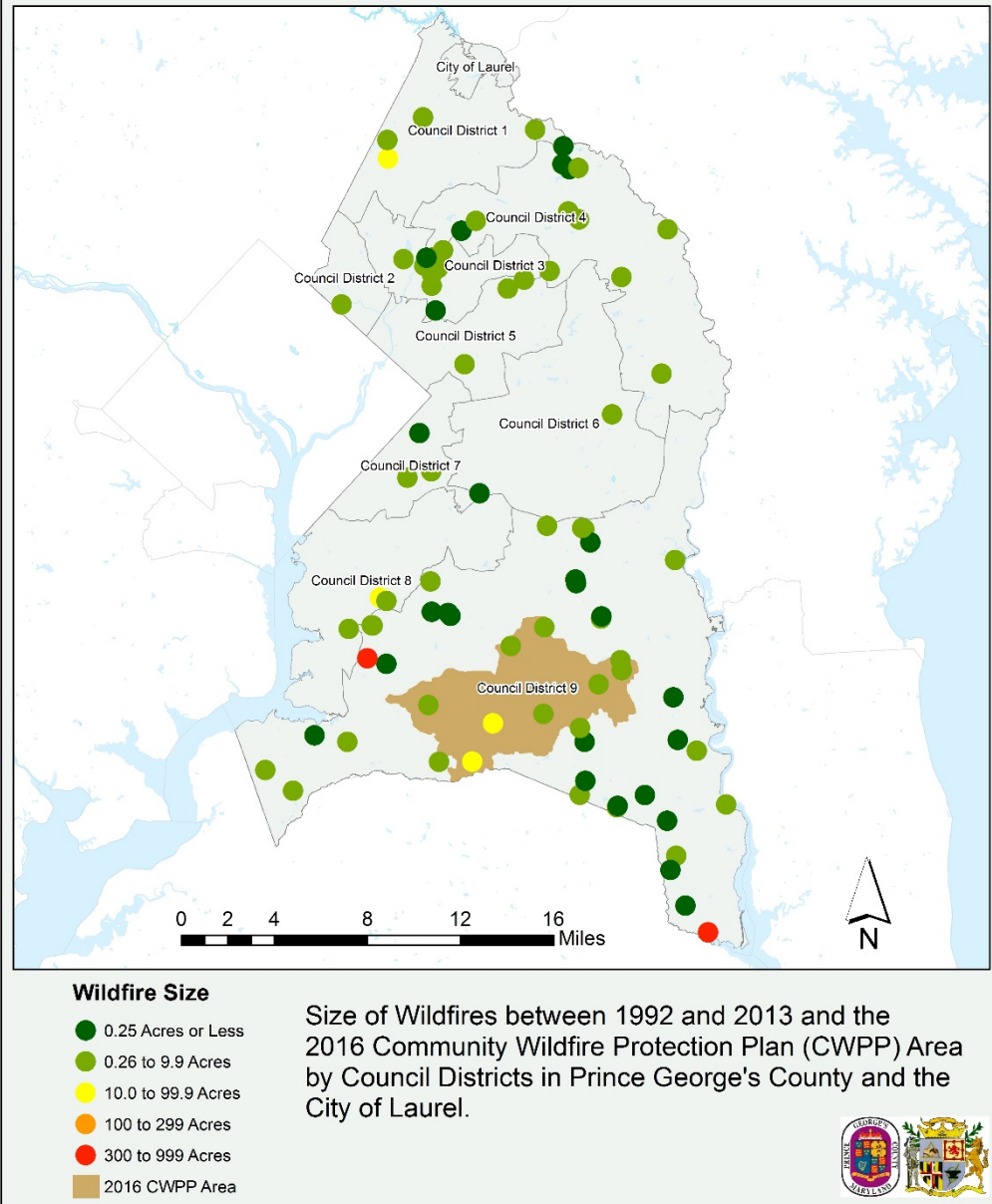
Political Area	Approximate Building Count	Approximate Building Value
Council District 9	8206	\$1,360,000,000

# Wildfire Risk

- Prince George's County has an Average Wildfire Burn Recurrence Interval of 2 years (see NOTE)
- However, as shown in the map on the right, most wildfires are small and are quickly extinguished

**NOTE:** Burn Recurrence Interval based on analysis of LANDFIRE data Prince Georges County, MD zip code 20782 taken from the FEMA Benefit-Cost Analysis Tool – Version 5.3.0.2 (Build Date 12/22/2016)

## PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE SIZE OF 1992-2013 WILDFIRES FOR PRINCE GEORGE'S COUNTY





# Drought Risk

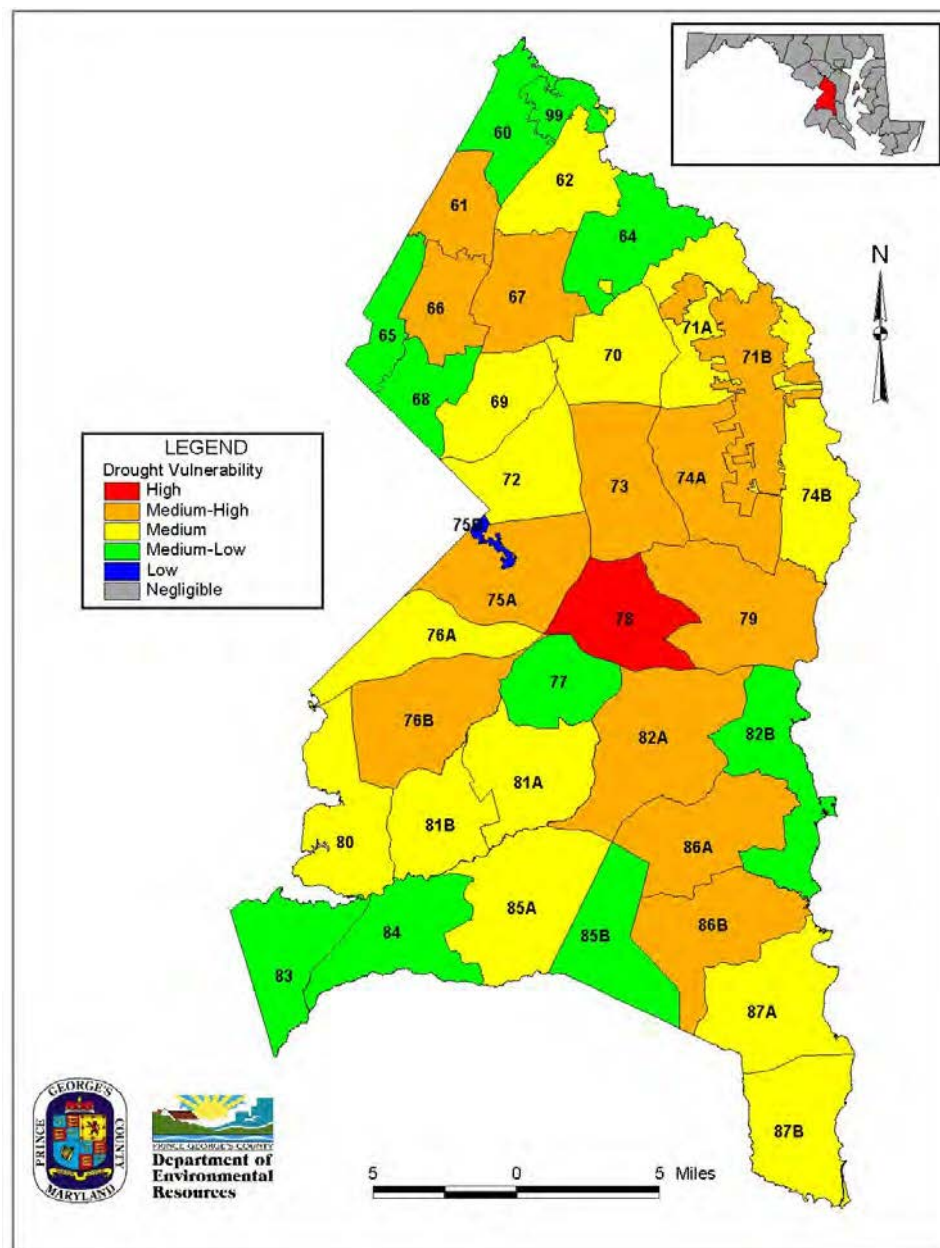


# Drought Categories

Category	Description	Possible Impacts
D0	Abnormally dry	Going into a drought: short-term dryness slows planting, growth of crops or pastures; fire risk above average. Coming out of a drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low; some water shortages develop or are imminent; voluntary water use restrictions requested.
D2	Severe drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.
D3	Extreme drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.

# Drought Hazard Vulnerability

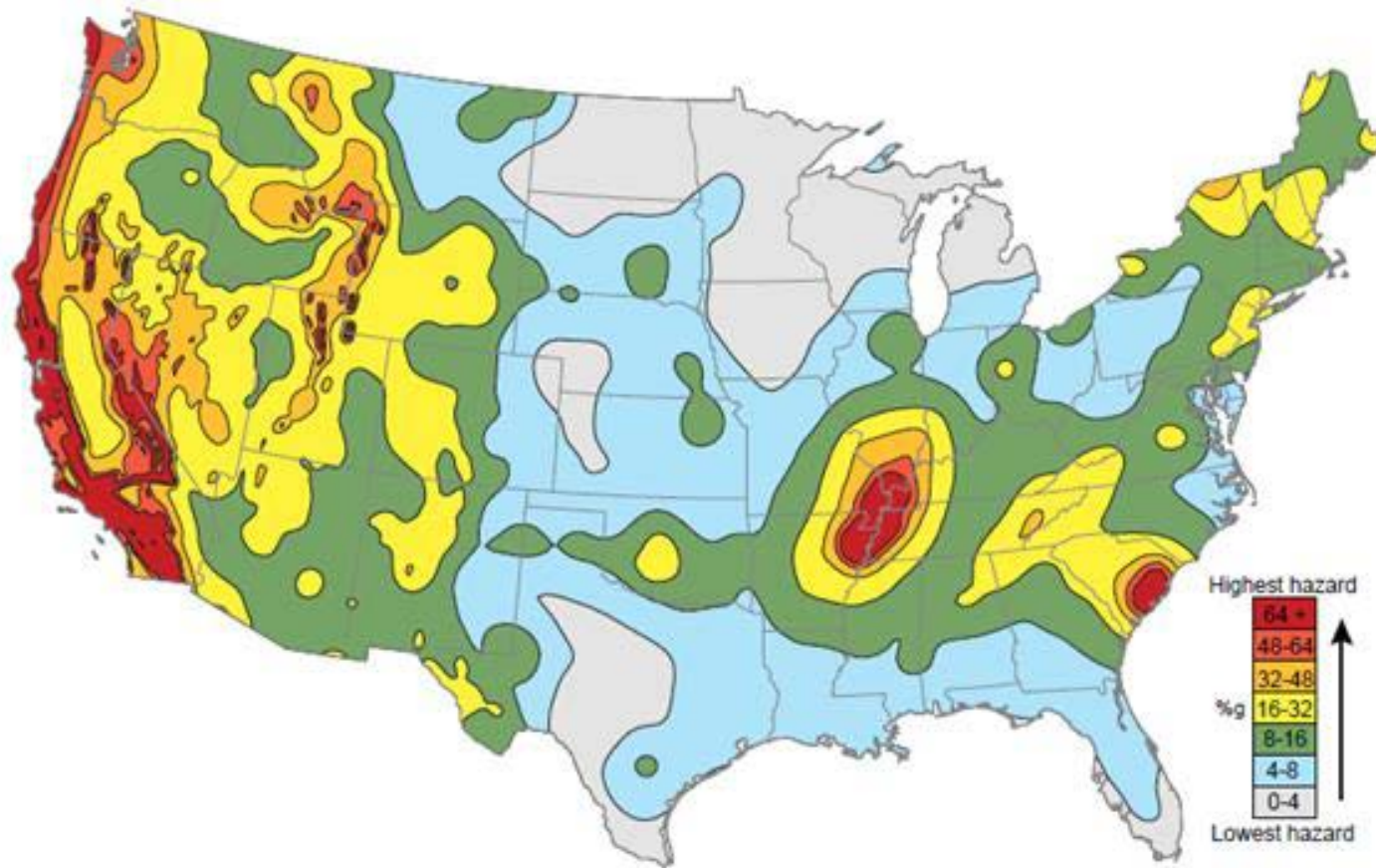
**Source:** Drought Vulnerability Map by Planning Area, Prince George's County and City of Laurel Maryland Hazard Mitigation Plan (2010 Update)





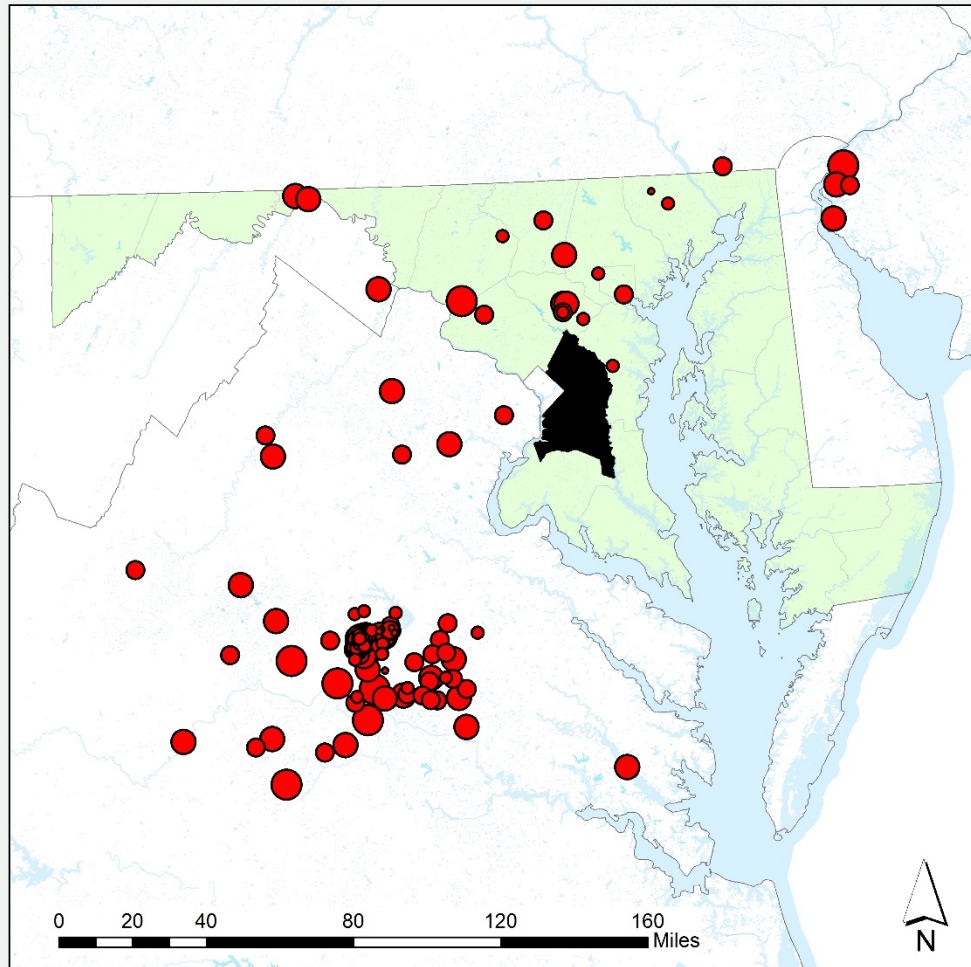
# Earthquake Hazard Risk

# National Earthquake Risk

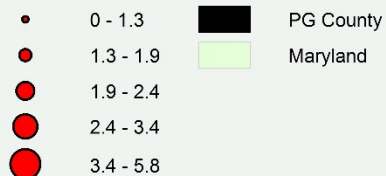


**Source:** United States Geological Survey (USGS) Earthquake Map (based on peak ground accelerations for a 2% probability event in the next 50 years), with earthquake ground accelerations expressed as a percentage of gravity, g (32.2 ft/s<sup>2</sup>)

# EARTHQUAKES IN AND AROUND PRINCE GEORGE'S COUNTY



## Earthquakes by Magnitude



Earthquakes from 1900 - 2016 in and around Prince George's County.



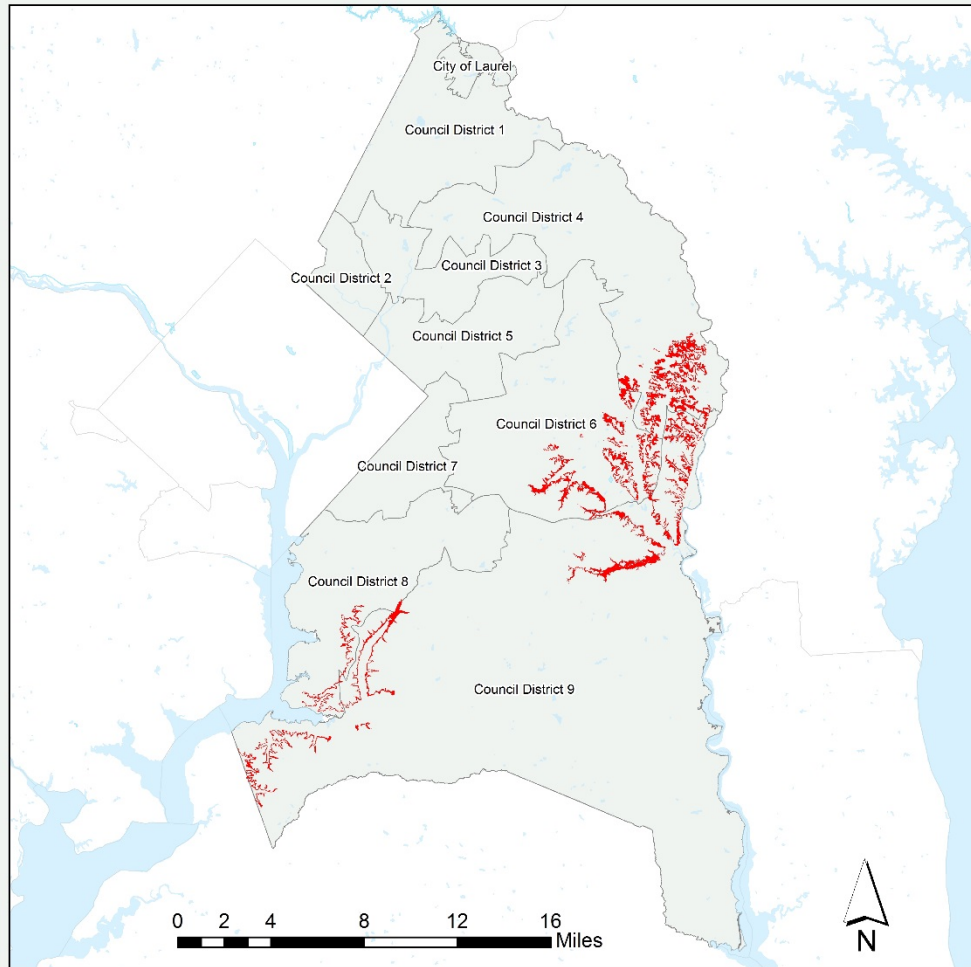


# Landslide Hazard Risk




PRINCE GEORGE'S COUNTY AND CITY OF LAUREL HAZARD MITIGATION PLAN 2017 UPDATE

**LOCATION OF MARLBORO CLAYS IN PRINCE GEORGE'S COUNTY**



**Clays**

 Marlboro Clays

Location of Marlboro Clays by Council Districts in Prince George's County and the City of Laurel.



# Hazard Priority Ranking Criteria

**Table V-1. Hazard Ranking Priority Criteria**

<b>Probability/History</b>	<b>Vulnerability</b>	<b>Maximum Threat (Geographic Area Affected)</b>	<b>Warning Time</b>	<b>2011 Ranking</b>
<b>Unlikely</b> No documented occurrence with annual probability <0.01	<b>Negligible</b> 1 to 10% of people or property	<b>Isolated</b> < 5% of community impacted	<b>Extended</b> Three days or more	<b>Limited</b>
<b>Somewhat Likely</b> Infrequent occurrence with at least one documented event and annual probability between 0.5 and 0.01	<b>Limited</b> 10 to 25% of people or property	<b>Small</b> 5 to 25% of community impacted	<b>Limited</b> 2 days	<b>Moderate</b>
<b>Likely</b> Frequent occurrence with at least 2 documented events and annual probability between 1 and 0.5	<b>Critical</b> 25 to 50% of people or property	<b>Medium</b> 25 to 50% of community impacted	<b>Minimal</b> 1 day	
<b>Highly Likely</b> Common events with annual probability >1	<b>Catastrophic</b> >50% of people or property	<b>Large</b> >50% of community impacted	<b>No Notice</b> < 24 hours	<b>Significant</b>

	State Ranking	MAC Ranking (Dec 16)	2017 HIRA Ranking
Riverine Flooding	High	High	High
Coastal Flooding	Medium – High	Low	Medium-Low
Severe Storms - Heavy Rain	High	High	High
Flood Risk - Dam Failures	High	High	Medium
Flood Risk - Levee Failures	High	N/A	Medium
Tornadoes	High	Medium - Low	High
Severe Storms - Thunderstorm Wind, Lightning, and Hail	High	N/A	Medium -High
High Winds	High	Medium - Low	Medium -High
Hurricanes/Tropical Storms	High	N/A	High
Winter Storms/Blizzards	High	High	Medium -High
Wildfire	Medium – High	Low	Medium-Low
Drought	Medium – High	Low	Medium-Low
Earthquakes	Low	Medium - Low	Medium
Landslide	Low	Low	Low
Sinkholes	Low	N/A	Low

# Mitigation Goal Refresh

## Prince George's County Mitigation Goal

*It is the goal of Prince George's County, Maryland, to protect and improve public health, safety and welfare, and to expand livable communities by:*

- Increasing public awareness of natural hazards and risk reduction measures; and*
- Mitigating risks due to natural hazards.*

# Prince George's County/Laurel Revised HMP Goal March 10, 2017

*It is the goal of Prince George's County and the City of Laurel, Maryland, to protect and improve the public health, safety, and welfare of its communities, and to expand the resiliency of livable communities by:*

- Increasing public awareness of natural hazards and risk reduction measures; and*
- Mitigating risks due to natural hazards.*

# 2017 – 2022 Actions

- Include 2011 “Carry-forward” actions
- Actions must include:
  - Strategy/action statement
  - Responsible Department
  - Priority
  - Goals supported
  - Hazard Addressed
  - Timeframe
  - Resources – funding source, staff, etc.



# Mitigation Actions

- Preventative Measures
- Property Protection
- Emergency Services
- Structural Projects
- Natural Resources Protection
- Public Information Programs



# Outreach Brainstorming

# Potential Project Site Visit

- Funds in budget for site visits – several days
- Project sheet can pre-position you for FEMA Hazard Mitigation Assistance Funds
- May, 2017



# Next Steps

- Draft HIRA chapter comments to Deborah Mills (dmills@dewberry.com) by March 31, 2017
- 2011 Mitigation Action Status to Jillian Browning (jbrowning@dewberry.com) by March 31, 2017
- 2017 – 2022 Mitigation Actions to Jillian Browning by March 31, 2017
- Draft Plan to Prince Georges County and City of Laurel mid-April
- Project site visits in May

HIRA-Goals Mtg 3.16.2017

● Prince George's County Government ●

● Office of Emergency Management ●  
Hazard Mitigation Advisory Committee

First Name	Last Name	Agency	Title	Phone Number	Email	Kick Off-Meeting	Second MTG.
Todd	Addis	Office of Information Technology	Security Manager	301-883-3351	<a href="mailto:wtaddis@co.pg.md.us">wtaddis@co.pg.md.us</a>	X	Emailed 3/6 & Called
Chris	Akinbobola	Department of Environment	Special Assistant	301-883-7157	<a href="mailto:caakinbobola@co.pg.md.us">caakinbobola@co.pg.md.us</a>	X	X
William	Alexander	Prince George's County Police Department	Major	410-310-1297	<a href="mailto:waalexander@co.pg.md.us">waalexander@co.pg.md.us</a>		X
Stephen	Allen, Sr.	City of Laurel	Emergency Manager	301-725-5300, ext. 2246	<a href="mailto:sallen@laurel.md.us">sallen@laurel.md.us</a>	X	X
Jack	Brock	City of Laurel	Planning Director	301-725-5300	<a href="mailto:jbrock@laurel.md.us">jbrock@laurel.md.us</a>	X	No Response
James	Carter	Office of Emergency Management	N/A	301-352-1443	<a href="mailto:JACarter@co.pg.md.us">JACarter@co.pg.md.us</a>		
Gwen	Clerkley	Department of Public Works and Transportation	Associate Director	301-499-8523	<a href="mailto:gtclerkley@co.pg.md.us">gtclerkley@co.pg.md.us</a>	X	Email- Not able
Catherine	Escarpeta	Department of Environment	GIS Analyst	301-883-5990	<a href="mailto:crescarpeta@co.pg.md.us">crescarpeta@co.pg.md.us</a>	X	X
Ronald	Gill	Office of Emergency Management	Director	240-619-6497	<a href="mailto:regill@co.pg.md.us">regill@co.pg.md.us</a>	X	X
Charles	Hamby	Prince George's County Police Department	Major	301-583-7170	<a href="mailto:cehamby@co.pg.md.us">cehamby@co.pg.md.us</a>		X
Dawn	Hawkins-Nixon	Department of Environment	Associate Director	301-883-5839	<a href="mailto:dhnikson@co.pg.md.us">dhnikson@co.pg.md.us</a>	X	X
Courtney E.	Marlette	Office of Emergency Management	Regional Planner	301-324-4453	<a href="mailto:cemarlette@co.pg.md.us">cemarlette@co.pg.md.us</a>	X	X
Theresa	Martin	City of Laurel	GIS Analyst	301-725-5300, ext. 2214	<a href="mailto:tmartin@laurel.md.us">tmartin@laurel.md.us</a>	X	No Longer w/Laurel
Kirk	McLean	Prince George's County Police Department	Lieutenant	301-772-4740	<a href="mailto:kimclean@co.pg.md.us">kimclean@co.pg.md.us</a>	X	Email- Not able
Deborah	Mills	Dewberry	Consultant	804-823-6971/804-823-6971	<a href="mailto:gtclerkley@co.pg.md.us">gtclerkley@co.pg.md.us</a>	X	X
Joe	Perez	Prince George's County Police Department	Captain	202-957-8822	<a href="mailto:jrperez@co.pg.md.us">jrperez@co.pg.md.us</a>	X	NO-email/DM
Sean	Sheffield	Prince George's County Police Department		301-772-4975			X
Vernon L.	Stinnett	Department of Public Works and Transportation	Division Chief	301-499-8556	<a href="mailto:VLStinnett@co.pg.md.us">VLStinnett@co.pg.md.us</a>	X	X
Debbie	Tyner	Maryland-National Capital Park and Planning Commission	Deputy Director	301-699-8556	<a href="mailto:debbie.tyner@pgparks.com">debbie.tyner@pgparks.com</a>	X	Surgery/No Designee
Eddie	Walters	Office of Emergency Management	N/A	301-352-1442	<a href="mailto:EAWalters@co.pg.md.us">EAWalters@co.pg.md.us</a>		X

DTSHEFFIELD@CO.PG.MD.US  
CEHAMBY@CO.PG.MD.US

✓ = here

• = spoke to this person (Courtney)

**Prince George's County  
Local Emergency Planning Committee  
Agency Membership List**

**Committee Chairperson**

Ronnie Gill –Committee Chair  
TBD – Vice Chair

**Agency List**

Office of Homeland Security & Office of  
Emergency Management  
7915 Anchor Street  
Landover, MD 20785

Fire/EMS  
9201 Basil Court  
Largo, MD 20774

Public Works & Transportation  
9400 Peppercorn Place  
Largo, MD 20774

Health Department  
9201 Basil Court  
Largo, MD 20774

Police Department  
7600 Barlowe Road  
Palmer Park, MD 20785

Department of the Environment  
9400 Peppercorn Place  
Largo, MD 20774

Largo Government Center  
9201 Basil Court  
Largo, MD 20774

County Council Member - (TBD)  
14741 Governor Oden Bowie Drive  
Upper Marlboro, MD 20772

MEMA  
5401 Rue Saint Lo Drive  
Reisterstown, MD 21136

**Non-Government & Volunteer Organizations**

RACES  
4910 Ashford Drive  
Upper Marlboro, MD 20772

Bowie Health Campus  
15001 Health Center Drive  
Bowie, MD 20716

PEPCO  
P.O. Box 341010  
West Bethesda, MD 20827

Baltimore Gas & Electric (BGE)  
47 State Circle  
Annapolis, MD 21401

Washington Suburban Sanitary Commission  
14501 Sweitzer Lane  
Laurel, MD 20707

City of Laurel  
Laurel Municipal Center  
8103 Sandy Spring Road  
Laurel, MD 20707



American Red Cross  
National Capital Region  
8550 Arlington Boulevard  
Fairfax, VA 22031

City of Bowie-City Council Member (TBD)  
15901 Excalibur Road  
Bowie, MD 20716

Prince George's County Public Schools  
507 Largo Road  
Largo, MD 20774

City of Bladensburg  
4229 Edmonston Road  
Bladensburg, MD 20710

## **Sub-Committees**

Administration Subcommittee  
Hazardous Materials/Vulnerability Analysis Subcommittee  
Community Preparedness/Public Education Subcommittee  
Plan Development/Exercise Planning Subcommittee

## **Business Partners (contacts being made)**

## Capital Heights Day Photos





## Public Works Round Table Workshop-5/23/17

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- 9:00-9:05 AM Welcome
- 9:05-9:15 AM Introductions
- 9:15- 9:30 AM Ice Breaker
- 9:30- 10:15 AM Public Works – Who are we? – Gwen Clerkley, PGC -DPW&T
- 10:15-10:30 AM Break
- 10:30-11:15 AM Project Management- Shonte Eldridge , City of Baltimore
- 11:15-12 PM Media / Social Relations
- 12 – 1 PM Lunch
- 1- 1:30 PM APWA
- 1:30-1:45 PM Break
- 1:45-2:15 PM Office of Emergency Management, Courtney Mariette
- 2:15- 2:30 PM Break
- 2:30- 3:00 PM Round Table Discussion



[illegible]





COUNTY COUNCIL  
Derrick Leon Davis  
Mel Franklin  
Dannielle M. Glaros  
Andrea C. Harrison  
Mary A. Lehman  
Obie Patterson  
Deni Taveras  
Karen R. Toles  
Todd M. Turner

# A Proclamation

**WHEREAS**, the month of June signals the advent of hurricanes, tropical storms, tornadoes and other related severe weather occurrences including the likelihood for flooding; and

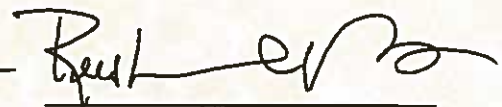
**WHEREAS**, the Prince George's County Department of the Environment conducted floodplan studies identifying at least 4,300 floodprone structures Countywide; and

**WHEREAS**, the Department of Environment is taking measures to inform local residents about the hazards of flooding; and

**WHEREAS**, it is important to renew public awareness of floods and flood disasters, and that local residents become aware of the potential for flooding and how to reduce the impact of a major flood.

**NOW, THEREFORE**, Be It Proclaimed by the Prince George's County Council and County Executive, Rushern L. Baker, III, that the month of June 2017, is declared "**Flood Awareness Month**" in Prince George's County. **FURTHER**, all citizens are encouraged to become aware of the programs and services the County offers through the Department of the Environment, the Offices of Emergency Management, and the Police and Fire/EMS Departments, which protect the community from floods and flood disasters.

  
DERRICK LEON DAVIS  
COUNCIL CHAIRMAN

  
RUSHERN L. BAKER, III  
COUNTY EXECUTIVE

## **Appendix B – HIRA**

Please note:

Historic flood and wind information for historic storms is often included with historic tropical depressions, hurricanes and severe storms.



## HAZARD HISTORIES, TIMELINE BEFORE 2010

### FLOOD RELATED HAZARDS

Event Date	Description
August 1971	FEMA Major Disaster declaration (FEMA-DR-309-MD) issued beginning August 17, 1971 for flooding and severe storms.
June 1972	FEMA Major Disaster declaration (FEMA-DR-351-MD) issued beginning June 23, 1972 for flooding from remnants of Hurricane Agnes.
October 1975	FEMA Major Disaster declaration (FEMA-DR-489-MD) issued beginning June 23, 1972 for flooding and severe storms.
September 2003	FEMA Major Disaster declaration (FEMA-DR-1492-MD) issued beginning September 18, 2003 for flooding from remnants of Hurricane Isabel.
December 2009	Remnants of Hurricane Ida (or the November 2009 Mid Atlantic nor'easter) contributed to gusty winds and heavy rain. The NOAA NCEI Storm Events Database indicates one flood event was reported in Temple Hills

### WIND RELATED HAZARDS

Fujita Scale	Date	Community Affected	Deaths	Injuries	2016 Property Damages	2016 Total Damages
EF0	08 May 2008	Clinton Hyde Fld Arp	0	0	\$111,000	\$111,000
EF0	08 May 2008	Woods Corner	0	0	\$55,500	\$55,500
EF1	20 Apr 2008	University Park	0	0	\$44,400	\$44,400
F3	24 Sep 2001	Hyattsville	2	55	\$135,000,000	\$135,000,000
F1	25 May 2001	Brandywine	0	0	\$33,700	\$33,700
F1	21 Jun 2000	Laurel	0	0	\$208,000	\$208,000
F1	13 May 2000	Brandywine	0	0	\$139,000	\$139,000
F0	24 Jun 1996	Andrews AFB	0	0	\$304,000	\$304,000
F1	24 Jun 1996	Upper Marlboro	0	0	\$761,000	\$761,000
F2	05 Oct 1995	Temple Hills	0	3	\$7,830,000	\$7,830,000
F1	18 May 1995	Cheverly	0	2	\$3,130,000	\$3,130,000

## **Appendix C – 2011 Mitigation Actions**

The following tables provide updated to the actions committed to by Prince George's County and the City of Laurel for the 2011 Prince George's County and the City of Laurel Hazard Mitigation Plan. The county's Actions are presented first with the city's following.

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 1	A-1	Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. Public Information. Use the revised flood maps to refine DER's mailing list for public information efforts to owners of property determined to be impacted by flood hazards.	Lead: Department of Environmental Resources Support: Maryland-National Capital Park & Planning	Riverine Flooding; Coastal Flooding	High	No Action	Annually, DoE mails letters to residents occupying flood prone structures to inform them about flood hazards, recommend precautionary measures and advise on how to protect their property from flood damage. DoE's mailing list of flood prone properties will be updated to include additional
County - 2	A-2	Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. At-Risk Buildings. Use the revised flood maps to refresh details on at-risk buildings, such as predicted depths of water for different frequency flood events.	Lead: Department of Environmental Resources Support: Maryland-National Capital Park & Planning	Riverine Flooding; Coastal Flooding	High	Continued	The new FIS and FIRM recently became effective on September 16, 2016. Work on this action is progress.

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 3	A-3	Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. Private Nonprofit Buildings. Search the updated list of flood-prone properties to determine if any are owned by private nonprofit organizations.	Lead: Department of Environmental Resources Support: Maryland-National Capital Park & Planning	Riverine Flooding; Coastal Flooding	High	Continued	The new FIS and FIRM recently became effective on September 16, 2016. Staff may now proceed with addressing this action item.
County - 4	B-1	Stream Corridor Assessment. Work with The M-NCPPC to analyze the Stream Corridor Assessment data in order to generate a report of the Assessment. Use the resulting report to prioritize stabilization projects, especially if funding from outside resources is available for mitigation of environmental impacts.	Department of Environmental Resources The Maryland-National Capital Park & Planning Commission - Debbie Tyner	Streambank Erosion	High	Continued	

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 5	C-1	Conduct Flood Audits of Selected Buildings. Flood Audits. Conduct flood audits of +16 public buildings (County, The M-NCPPC, and City of Laurel) and 14 non-residential buildings of owners who accept an offer for the audit. Additional audits may be conducted if more owners express interest. See Section 5.5.1 and Appendix D for the summary report of audits conducted in Spring 2010.	Department of Environmental Resources	Riverine Flooding; Coastal Flooding	High	Completed	The County obtained grant funds to support this action in 2008. Using the existing flood data to identify buildings predicted to have flood depths of more than 3 feet for the future condition, 100-year flood, more than 80 non-residential property owners were contacted and offered free flood audits. Owners of 14 properties responded, including a church. A number of public buildings in the County have been identified for audit, including 13 buildings and structures and the two schools that were identified in the 2005 Plan as having some degree of flood risk. The City of Laurel requested inclusion of the building recently acquired for the police station. In 2010, all of above flood audits had been completed and a Summary Report of Floodproofing Audits was completed in March, 2011. The County completed a repetitive loss area analysis in 2015 and conducted audits of residential structures as part of this analysis.
County - 6	D-1	Anacostia Levee Improvements. Work with the Corps of Engineers to pursue funding to implement the levee improvement work.	Department of Environmental Resources Department of Public Works & Transportation	Riverine Flooding/Levee Failure	High	Continued	The levee improvement work has been completed for the Brentwood, Edmonston-Bladensburg and Riverdale-Hyattsville levee systems. FEMA has accredited these improved levee systems. The County continues to make progress towards accreditation of the Allison Street Flood Protection

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
							System [levee]. This project is at 100% design and the project has been awarded. The anticipated start date of the construction is October 2016.
County - 7	E-1	Expansion of Flood Warning Notifications. Update the flood warning system notification lists used in the W.A.R.N. system with the list of flood-prone properties based on revised flood maps.	Department of Environmental Resources Office of Emergency Management	Riverine Flooding; Coastal Flooding	High	Continued	The new FIS and FIRM recently became effective on September 16, 2016. Staff may now proceed with addressing this action item.

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 8	F-1	Hazardous Materials, Pollutants, and Flood Hazard Areas. Using the revised Flood Maps, check locations of HazMat sites, NPDES sites, and other land uses; if found to be in flood hazard areas, communicate with owner/handler regarding risk and appropriate response and protection measures.	Fire/EMS Department of Environmental Resources Maryland Department of the Environment	Riverine Flooding; Coastal Flooding	High	Continued	While the County sends annual mailings to occupants of flood prone structures to inform them that their structures are at risk for flooding and to provide advice on how to protect their persons and properties, guidance on how to reduce incidents of flood-related pollution has not been provided for occupants of properties where hazardous materials are handled or stored. The new FIS and FIRM recently became effective on September 16, 2016. An updated list of properties which are located in the FEMA flood hazard area may be generated using the September 16th mapping data. Staff will assess how best to communicate with the subject property owners about risk, appropriate response and protection measure to reduce chances for waterborne pollution.
County - 9	G-1	Continue to Support Regional Drought Response and Planning. Continue the County's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated.	Department of Environmental Resources Washington Suburban Sanitary Commission	Drought	High	Continued	MWCOG continues to monitor along with WSSC.



**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 10	H-1	Senior Citizens and Extreme Weather. Family Services should continue its outreach to seniors about health and safety during periods of extreme heat and extreme cold. Information could be added to the Family Services' web page.	Department of Family Services	Winter Storm	High	Continued	DFS provides the following to senior citizens regarding extreme cold: 1. PSA on News Channel 8 and CTV; 2. Fact Sheets including: 7 Winter Safety Tips; Dressing Warmly; Times for Keeping Warm Inside and Winter Weather Preparedness. Senior Citizens that participate in the daily nutrition program are provided extra frozen meals during the winter months of January, February and March in addition to the hot meals they receive daily.
County - 11	I-1	Evaluate Options to Address Existing Buildings Subject to Unstable Soils. Identify existing buildings that are located on Marlboro Clays and that are reported to be experiencing or likely to experience foundation damage. Examine and share information about options that may be considered by owners, including foundation stabilization, foundation	Department of Environmental Resources	Land Movement/Unsafe Lands	High	Completed	Seven properties in the Fort Washington area were acquired through FEMA Hazard Mitigation Assistance funds during the planning period.

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
		reconstruction, relocation of buildings, or demolition/acquisition. If determined appropriate, pursue funding to facilitate mitigating future damage.					

**Prince George's County 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
County - 12	J-1	Coordinate the Building Code & Floodplain Ordinance. Review materials to be provided by the Maryland Department of the Environment to compare the flood-resistant provisions of the Maryland building code and the County's Floodplain Ordinance and determine the best way to avoid conflicts.	Department of Environmental Resources Department of Public Works & Transportation	Riverine Flooding; Coastal Flooding	High	Continued	The building code has been updated to cite the 2015 editions of International Building Code, International Residential Code for One- and Two-Family Dwellings, International Mechanical Code etc. Also, the County Council introduced Bill CB-38-2016 on June 7, 2016 for the purpose of amending the County's Floodplain Ordinance to be consistent with the State of Maryland's Model Floodplain Management Ordinance (May 2014), which meets the requirements of the National Flood Insurance Program (the "NFIP"). This bill was adopted September 13, 2016.
County - 13	K-1	Flood Mitigation Projects. The County periodically updates data on floodprone buildings. After flood events, the County will evaluate whether to pursue funding to implement flood mitigation projects.	Department of Environmental Resources	Riverine Flooding; Coastal Flooding	High	Continued	After 2011's TD Lee, damage assessment reports included identification to determine mitigation needs

**City of Laurel 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
Laurel - 1	A-4	Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. Continue to Pursue Flood Map Revision. Use the revised flood maps to encourage property owners to purchase flood insurance and take steps to mitigate future flood damage.	Development Management Office; City Administrator's Office	Riverine Flooding; Coastal Flooding	High	Complete	The revised flood studies have been completed and approved by FEMA on September 16, 2016. A new FIRM has been completed and approved by FEMA. The delineations of the flood elevations and floodplain boundaries have been established. A complete evaluation of the new expanded floodplain along with the structures identified within this floodplain must be completed.

**City of Laurel 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
Laurel - 2	C-1	Conduct Flood Audits of Selected Buildings. Flood Audits. Conduct flood audits of +16 public buildings (County, The M-NCPPC, and City of Laurel) and 14 non-residential buildings of owners who accept an offer for the audit. Additional audits may be conducted if more owners express interest. See Section 5.5.1 and Appendix D for the summary report of audits conducted in Spring 2010.	Department of Environmental Resources	Riverine Flooding; Coastal Flooding	High	Complete	The County obtained grant funds to support this action in 2008. Using the existing flood data to identify buildings predicted to have flood depths of more than 3 feet for the future condition, 100-year flood, more than 80 non-residential property owners were contacted and offered free flood audits. Owners of 14 properties responded, including a church. A number of public buildings in the County have been identified for audit, including 13 buildings and structures and the two schools that were identified in the 2005 Plan as having some degree of flood risk. The City of Laurel requested inclusion of the building recently acquired for the police station. In 2010, all of above flood audits had been completed and a Summary Report of Floodproofing Audits was completed in March, 2011. The County completed a repetitive loss area analysis in 2015 and conducted audits of residential structures as part of this analysis.

**City of Laurel 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
Laurel - 3	D-2	Anacostia Levee Improvements. Expansion of Flood Warning Notifications. Pending approval of new flood maps. Hazard Addressed: Riverine Flooding and Coastal Flooding.	Department of Environmental Resources Department of Public Works & Transportation	Riverine Flooding/Levee Failure	Medium	Cancelled	This action item does not affect the City of Laurel. Remove from List.
Laurel - 4	E-2	Expansion of Flood Warning Notifications. Provide new floodplain mapping to WSSC and update coordination and flood warning notification procedures.	Department of Environmental Resources Office of Emergency Management	Riverine Flooding; Coastal Flooding	High	Complete	WSSC completed revised Emergency Action Plans for both Brighton and Duckett Dams in March, 2016. Dam emergency notifications procedures have been reviewed and updated and shared with the City of Laurel. The new notification procedures must be tested and exercised within the City of Laurel and Prince George's County to identify any shortfalls or procedures that need to be amended. Expanded floodplain areas must be addressed in relationship to areas effected by a release of water from the dams.

**City of Laurel 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
Laurel - 5	G-2	Continue to Support Regional Drought Response and Planning. Continue the City's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated. Examine appropriate water conservation measures for City Office buildings.	Department of Environmental Resources Washington Suburban Sanitary Commission	Drought	High	Continue	The MWCOG in cooperation with WSSC has addressed the need for water conservation efforts during drought conditions within the City of Laurel and surrounding areas. The City of Laurel is now a full member of MWCOG and will work within the numerous committees in preparing for, responding to, and mitigating drought conditions within the City of Laurel.
Laurel - 6	G-3	Continue to Support Regional Drought Response and Planning. Hazard Addressed: Drought.	Department of Environmental Resources Washington Suburban Sanitary Commission	Drought	Medium	Continue	The MWCOG in cooperation with WSSC has addressed the need for water conservation efforts during drought conditions within the City of Laurel and surrounding areas. The City of Laurel is now a full member of MWCOG and will work within the numerous committees in preparing for, responding to, and mitigating drought conditions within the City of Laurel.



**City of Laurel 2011 Mitigation Actions**

Action Number	Previously	Action Strategy	Lead Office	Hazard Addressed	Priority	2017 Action Update (continued/ cancelled /completed?)	2017 Notes - Individual Actions
Laurel - 7	K-2	Flood Mitigation Projects. Flood Mitigation Projects. After flood events, the City will evaluate whether to pursue funding to implement flood mitigation projects.	Department of Environmental Resources	Riverine Flooding; Coastal Flooding	High/ Medium	Continue	The City of Laurel has started 2 major projects earmarked to assist in identifying Flood Mitigation Projects. The first project is to enroll in FEMA's Community Rating System (CRS). This ISO led program will enhance the City's flood insurance rating which directly equates into lower costs for both the City and the citizens currently enrolled in the NFIP. The second project is a contract for the development of the City's first Hazard Mitigation Project which will identify specific risk reduction projects and assist in applying for Federal and State sponsored grants to support these projects.

## **Appendix D – 2017 to 2022 Mitigation Actions**

The following tables provide the new and updated actions committed to by Prince George's County and the City of Laurel for the 2017 Prince George's County and the City of Laurel Hazard Mitigation Plan. The county's Actions are presented first with the city's following.

### Prince George's County 2017 to 2022 Mitigation Actions

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Prevention	County - 1	Continue to partner with FEMA/MDE to promote use of Updated Flood Hazard Maps. Updated Mapping will continue to inform Risk Reduction and mitigation of at-Risk Buildings such as repetitive loss structures.	Lead: Department of Environment Support: Maryland-National Capital Park & Planning	High	X	X				X	Riverine Flooding; Coastal Flooding	Ongoing	Staff
Prevention	County - 2	Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. Private Nonprofit Buildings. Search the updated list of flood-prone properties to determine if any are owned by private nonprofit organizations.	Lead: Department of Environment Support: Maryland-National Capital Park & Planning	Medium	X	X					Riverine Flooding; Coastal Flooding	Ongoing	Staff
Prevention	County - 3	Using the revised Flood Maps, check locations of HazMat sites, NPDES sites, and other land uses; if found to be in flood hazard areas, communicate with owner/handler of hazardous materials and known pollutants regarding risk and appropriate response and protection measures.	Fire/EMS Department of Environment Maryland Department of the Environment	High	X				X	X	Riverine Flooding; Coastal Flooding	Ongoing	Staff

**Prince George's County 2017 to 2022 Mitigation Actions**

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
<b>Prevention</b>	County - 4	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms such as comprehensive plans and capital improvement plans.	Office of Homeland Security - Office of Emergency Management; Department of Environment	Medium	X	X	X		X	X	All Hazards	Ongoing	Staff
<b>Prevention</b>	County - 5	Collect flood depth information to support a grant to provide elevation certificates in areas newly included in Special flood hazard areas to assist residents in obtaining elevation certificates to support LOMAs or reduced risk NFIP premiums.	Department of Emergency Management	High	X	X				X	Flood	ongoing	Staff, grant funding
<b>Property Protection</b>	County - 6	Continue to coordinate the Building Code & Floodplain Ordinance whenever either is updated.	Department of Environment Department of Public Works & Transportation	High	X	X					Riverine Flooding; Coastal Flooding	Ongoing	Staff

**Prince George's County 2017 to 2022 Mitigation Actions**

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
<b>Property Protection</b>	County - 7	Support mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of floodprone property 2. Elevation of floodprone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard prone areas 5. Retrofitting of existing buildings, facilities and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation	Office of Homeland Security - Office of Emergency Management; Department of Environment, DPWT	High	X	<b>X</b>	X	X	X	X	All Hazards	Ongoing	Staff

**Prince George's County 2017 to 2022 Mitigation Actions**

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
<b>Property Protection</b>	County - 8	Promote appropriate mitigation measures for hazard-vulnerable priority critical facilities	Office of Emergency Management; Dept of Environment	High		<b>X</b>					All Hazards	Ongoing	Staff, grants, CIP
<b>Property Protection</b>	County - 9	Update Upper Marlboro Emergency Response Plan to address flooding, including evacuation, emergency response, mitigation, etc.	Department of Emergency Management	Medium	X	X	X	X	<b>X</b>	X	Flood	1 -3 years	Staff, county funding
<b>Property Protection</b>	County - 10	Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the SFHA, including RL structures.	Department of Emergency Management	High	X	<b>X</b>				X	Flood	annually	Staff, county funding

**Prince George's County 2017 to 2022 Mitigation Actions**

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Natural Resource Protection	County - 11	Continue implementation of Best Management Practices and Low Impact Development practices to meet NPDES water pollution requirements. The County has EPA-listed Total Daily Maximum Load (TMDL) stream segments due to high levels of Nitrogen, Phosphorous, Sediment and Trash which it continues to mitigate.	Department of Emergency Management	High	X		X			X	Flood	ongoing	County funding through Capital Improvement Plan budgeting; grants to local NGOs
Natural Resource Protection	County - 12	Use the M-NCPPC 2016 water quality biological stream assessment studies to prioritize stabilization projects, especially if funding from outside resources is available for mitigation of environmental impacts.	Department of Environmental Resources The Maryland-National Capital Park & Planning Commission - Debbie Tyner	Medium	X		X				Flood	ongoing	Staff; consulting resources



**Prince George's County 2017 to 2022 Mitigation Actions**

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
<b>Structural</b>	County - 13	<b>Anacostia Levee Improvements.</b> Work with the Corps of Engineers to pursue funding to implement the levee improvement work. Four of five levee systems have been FEMA-accredited. Complete accreditation of Arundel Street Levee System. Maintain accreditation through O & M Plan implementation as prescribed by USACE.	Department of Environment Department of Public Works & Transportation	High				<b>X</b>			Riverine Flooding/Levee Failure	1 - 3 years	Staff
<b>Emergency Services</b>	County - 14	Update the flood warning system notification lists used in the Everbrite system with the list of flood-prone properties based on revised flood maps. Distribute general warnings to all County citizens using traditional and social media platforms such as the ORM website, Twitter and Facebook.	Department of Environment Office of Emergency Management	High	X				<b>X</b>	X	Riverine Flooding; Coastal Flooding	Ongoing	Staff, program maintenance costs for Everbrite
<b>Emergency Services</b>	County - 15	Complete disaster recovery plan, family reunification plan.	Office of Emergency Management	High	X				<b>X</b>	X	All Hazards	Ongoing	Staff

### Prince George's County 2017 to 2022 Mitigation Actions

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Emergency Services	County - 16	The Department of Family Services Agency on Aging will continue its outreach to seniors about health and safety during periods of extreme heat and extreme cold. Information will be added to the Family Service's web page and frozen meal distribution with supplement provision of hot meals during severe weather periods from January through March.	Department of Family Services	High	X				X	X	Winter Storm	ongoing	Staff, county funding
Emergency Services	County - 17	Continue to Support Regional Drought Response and Planning. Continue the County's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated.	Department of Environmental Resources Washington Suburban Sanitary Commission	Medium	X				X	X	Drought	ongoing as necessary	Staff, county funding

### Prince George's County 2017 to 2022 Mitigation Actions

Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Education & Outreach	County - 18	Continue participation in community and neighborhood events to promote hazard awareness and mitigation options.	Office of Emergency Management; Dept of Environment	High	X					X	All Hazards	Ongoing	Staff
Education & Outreach	County - 19	Expand use of Social Media for natural hazard awareness and hazard mitigation messaging.	Office of Emergency Management	High	X					X	All Hazards	Ongoing	Staff
Education & Outreach	County - 20	Work with County municipalities to provide hazard awareness messaging and information on storm preparedness and mitigation for promotion using local newspapers, municipal websites, etc.	Office of Emergency Management	High	X					X	All Hazards	Ongoing	Staff
Education & Outreach	County - 21	Distribute Citizens' Preparedness Guide and Business Preparedness Guides at community events. Upon updating, incorporate new HMP Hazard information ...	Office of Emergency Management	Medium	X					X	All Hazards	Ongoing	Staff

City of Laurel 2017 to 2022 Mitigation Actions													
Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Prevention	Laurel - 1	Continue to partner with FEMA/MDE to promote use of Updated Flood Hazard Maps. Updated Mapping will continue to inform Risk Reduction and mitigation of at-Risk Buildings such as repetitive loss structures.	Emergency Manager; Department of Economic & Community Development	Medium - High	X						Flood	Ongoing	Staff, MDE
Prevention	Laurel - 2	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms such as comprehensive plans and capital improvement plans.	Emergency Manager; Department of Economic & Community Development	Medium - High	X				X		All Hazards	Ongoing	Staff
Property Protection	Laurel - 3	Support mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of floodprone property 2. Elevation of floodprone structures 3. Minor	Emergency Manager; Department of Economic &	Medium - High	X	X	X	X		X	All Hazards	Ongoing	City staff, Consultant, and FEMA HMA grants, Capital Improveme

City of Laurel 2017 to 2022 Mitigation Actions													
Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
		structural flood control projects 4. Relocation of structures from hazard prone areas 5. Retrofitting of existing buildings, facilities and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation	Community Development										nt Budgeting
Property Protection	Laurel - 4	Seek mitigations solutions for city facilities including: the flood-prone municipal swimming pool; Department of Public Works flood-prone buildings and the City of Laurel Police Department Building. Determine pro-active preventive mitigation actions and seek grant funds for permanent solutions.	Emergency Manager; Department of Economic & Community Development ; Department of Public Works,	High		X					Flood	1 - 5 y	Staff, grant resources, Capital Improvement Plan budgeting

City of Laurel 2017 to 2022 Mitigation Actions													
Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
			Laurel Police Department, Department of Recreation.										
<b>Property Protection</b>	Laurel - 5	After flood events, the City of Laurel will evaluate whether to pursue funding to implement flood mitigation projects.	Prince George's County Department of Environment	High/ Medium		X			X		Riverine Flooding; Coastal Flooding	Ongoing	City staff, consultants, FEMA HMA grants
<b>Property Protection</b>	Laurel - 6	Pursue participation in the FEMA Community Rating System to reduce the cost of National Flood Insurance Policy premiums.	Emergency Manager	High	X					X	Riverine Flooding; Coastal Flooding	1 -3 yrs.	City staff, consultant, potential city or state grant funding (MD Department of Environmental Services)

City of Laurel 2017 to 2022 Mitigation Actions													
Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Emergency Services	Laurel - 7	Continue to support regional drought response and Planning.	Prince George's County Department of Environment Washington Suburban Sanitary Commission Emergency Manager	Medium	X						Drought	Ongoing (as needed)	Staff
Emergency Services	Laurel - 8	Continue to support regional drought response and planning by continuing the City's commitment and participation with MWCOG and WSSC when drought awareness responses are activated. Examine appropriate water conservation measures for City office buildings.	Prince George's County Department of Environment Washington Suburban Sanitary Commission Emergency Manager	High	X				X	X	Drought	Ongoing (as needed)	Staff



City of Laurel 2017 to 2022 Mitigation Actions													
Primary Mitigation Project Type	Action Number	Action Strategy	Lead Office	Priority	Project Type - lead type in boldface						Hazard(s) Addressed	Timeframe	Resources
					Prevention	Property Protection	Natural Resource Protection	Structural	Emergency Services	Education & Outreach			
Emergency Services	Laurel - 9	The new notification procedures must be tested and exercised within the City of Laurel and Prince George's County to identify any shortfalls or procedures that need to be amended. Expanded floodplain areas must be addressed in relationship to areas effected by a release of water from the dams.	Emergency Manager	High	X			X	X	X	Dam Impoundment Breach; Flood	Ongoing	City staff, Everbrite and budget
Education & Awareness	Laurel - 10	Continue outreach efforts to promote recently completed bilingual Citizens Emergency Preparedness Guide	Emergency Manager, CERT volunteers	High					X	X	All Hazards	Ongoing	Staff, CERT teams
Education & Awareness	Laurel - 11	Work with City closed circuit television network to produce seasonal hazard awareness and topical mitigation programming.	Emergency Manager, Department of Communications	Medium					X	X	All-Hazards	Ongoing	Staff

## **Appendix E – Record of Changes**

## Record of Changes

2017 Plan Section	Heading Section	Changes Made
<b>SECTION I. EXECUTIVE SUMMARY</b>	Executive Summary	Brief description of update
	1.1 Authority	Abbreviated FEMA regulatory history from 2010 plan update
	1.2 Planning Area	Plan areas for Prince George's County changed from small planning units to County Council Districts per direction from Office of Emergency Management
	1.3 Planning Committee Membership	Updated Mitigation Advisory Committee names and agencies
	1.4 Hazard Identification & Risk Assessment	Updated summary
	1.5 Mitigation Goals & Strategies	Updated revised goal, described strategy groupings
	1.6 Capability Assessment, Implementation & Maintenance	Revised to reflect Prince George's County and City of Laurel new General Plans, how HMP will be implemented and maintained.
	1.7 Acknowledgements	Updated
	1.8 Conclusions	Updated
<b>SECTION II. INTRODUCTION</b>	2.1 Mitigation	Updated
	2.2 The Local Mitigation Planning Impetus	Updated
	2.3 Organization of the Plan	Updated
<b>SECTION III. PLANNING PROCESS AND COMMUNITY PROFILE</b>	3.1 Planning Process	Process description revised
	3.1.3 Incorporation of Existing Plans and Studies	Updated to include new general plan information
	3.2 Community Profile	New section. Revised US Census, American Community Survey and General Plan demographic information and data
	3.2.1 Introduction	Updated Introduction to reflect new 2015 TIGER Census data.
	3.2.2 Physiography	Information expanded.
	3.2.3 Hydrology	Information expanded.
	3.2.4 Climate	Information expanded.
	3.2.5 Land Use and Development Trends	Updated to reflect land use as of the publication date of the Prince George's County General Plan (2014) and City of Laurel's 2016 General Plan.

## Record of Changes

2017 Plan Section	Heading Section	Changes Made
<b>SECTION III. PLANNING PROCESS AND COMMUNITY PROFILE</b>	3.2.6 Population	Updated section to reflect current estimates from the 2015 TIGER Census data.
	3.2.7 Housing	Updated section to reflect current estimates from the 2015 TIGER Census data.
	3.2.8 Business and Labor	Created section and listed of major employers.
	3.2.9 Transportation	Created section.
	3.2.10 Infrastructure	Created section.
<b>SECTION IV. HIRA</b>	Introduction	Hazards reorganized per MEMA HMP guidelines
	Summary of Changes	General update described
	Hazard Identification	Updated
	Vulnerability Assessment Overview	Updated
	1- Flood Related Hazards	Updated
	Flooding	new FIRM and FIS data, TEIF 2.0 analysis for 1 % and 0.2% flood hazard risk
	Coastal Flooding	Updated with SLR information
	Severe Storms (Flood-Related)	Updated
	Flood Risk - Dam Failures	Updated based on Laurel and Prince George's County data
	Flood Risk - Levee Failures	Updated
	2 - Wind Related Hazards	Updated
	Tornadoes	Updated
	Severe Storms (Wind-Related)	Updated
	High Winds	Updated
	Hurricanes/Tropical Storms (Wind-Related)	Updated
	Winter Storms/Blizzards	Updated
	3 - Fire Related Hazards	Updated
	Wildfire	Updated
	Drought	Updated
	4 - Geologic Hazards	Updated
	Earthquakes	Hazard added and assessed.
	Land Movement	Data and text Updated.
	Sinkholes	Hazard added and assessed.
	5 - Extreme Temperature Hazards	Updated
	Extreme Heat	Updated
	Extreme Cold	Updated
	Summary/Conclusions on Vulnerability Assessment	Revised to reflect new analytical analysis with Updated hazard data.

## Record of Changes

2017 Plan Section	Heading Section	Changes Made
<b>SECTION V. MULTIPLE HAZARD MITIGATION STRATEGY</b>	5.1 Introduction	Explains update
	5.2 Existing policies and authorities	Updated
	5.3 Setting Mitigation Goals	2017 - 2022 goal update
	5.4 Selecting policies and prioritizing	Process Update described
	5.5 Developing Strategies	Process Update and new strategies category organization presented
	5.6 Implementation of ongoing actions	Introduces Section 6.0
<b>SECTION VI. PLAN IMPLEMENTATION AND MAINTENANCE</b>	6.1 County Government Structure	Capability analysis and program update
	6.2 Summary of Existing Mitigation Activities	Summarizes recent HMA projects and other work
	6.3 Plan Implementation and Maintenance	Update includes annual MAC meeting, reporting and continued outreach
<b>SECTION VII. ADDITIONAL STATE REQUIREMENTS</b>	State Requirements	References two MEMA HMP guides
<b>SECTION VIII. CITY OF LAUREL PLAN</b>	8.1 Community Profile	New section. Basic information taken from 2011 Plan.
	8.1.1 Land Use and Development Trends	Updated to reflect land use as of the publication date of the Laurel's 2016 Master Plan.
	8.1.2 Population	Updated section to reflect current estimates from the 2015 TIGER Census data.
	8.1.3 Housing	Updated section to reflect current estimates from the 2015 TIGER Census data.
	8.1.4 Business and Labor	Created section and listed of major employers.
	8.1.5 Transportation	Created section.
	8.1.6 Infrastructure	Created section.
<b>SECTION IX. REFERENCES</b>	List of References	Updated to include demographic sources and revised local general plans

## **Appendix F – Sample Adoption Resolutions**

# Resolutions of Adoption

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## COUNTY COUNCIL OF PRINCE GEORGE'S COUNTY, MARYLAND 2010 Legislative Session

Resolution No.

---

Proposed by

---

Introduced by

---

Co-Sponsors

---

Date of Introduction

---



## **RESOLUTION**

A RESOLUTON concerning

### **Hazard Mitigation Plan**

For the purpose of adopting the County-wide Hazard Mitigation Plan as required by the Federal Emergency Management Agency in order to be eligible for Federal assistance for any natural hazards.

WHEREAS, the Robert T. Stafford Disaster Relief and Emergency Assistance Act, at 42 U.S.C. § 5165, and 44 CFR Part 201.6 of the Federal Disaster Mitigation Act of 2000, require the County to adopt a mitigation plan in order to be eligible for grants to implement certain mitigation projects; and

WHEREAS Prince George's County has experienced past flooding and other natural hazard events that pose risks to public health and safety, may cause serious property damage, and a plan is needed to address the results of these events: and

WHEREAS the planning process fostered by the Maryland Emergency Management Agency and set forth by the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards; and

WHEREAS the State of Maryland has provided federal Hazard Mitigation Assistance program funds to support development of the mitigation plan; and

WHEREAS a Hazard Mitigation Plan (the "Plan") has been updated by the Mitigation Action Committee and staff from County departments and other entities; and

WHEREAS the Hazard Mitigation Plan recommends several mitigation actions that will help minimize and reduce safety threats and damage to private and public property; and

WHEREAS a public meeting was held on \_\_\_\_\_, 2017, to present the Plan and proposed mitigation actions and to solicit questions and comments.

NOW THEREFORE BE IT RESOLVED by the County Council of Prince George's County, Maryland, that the Hazard Mitigation Plan is hereby adopted as an official plan of Prince George's County.

BE IT FURTHER RESOLVED that the County offices identified in the Plan are hereby directed to pursue implementation of the recommended priority actions that are assigned to their agencies.

BE IT FURTHER RESOLVED that any action proposed in the Plan shall be

subject to and contingent upon budget approval, if funding is required, and this resolution may not be interpreted so as to mandate any such appropriations.

BE IT FURTHER RESOLVED that the Prince George's County Department of Environmental Resources is designated to coordinate with other offices and entities and shall periodically report on the activities, accomplishments, and progress, and shall prepare a progress report as required by the Maryland Emergency Management Agency.

Adopted this \_\_\_\_\_ day of \_\_\_\_\_, 2017.

[insert standard signature blocks

**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION TO ALLOW THE CITY OF LAUREL TO ADOPT THE HAZARD MITIGATION PLAN OF PRINCE GEORGE'S COUNTY AS THE CITY'S OFFICIAL PLAN.**

*Sponsored by the President at the request of the Administration.*

WHEREAS the City of Laurel has experienced past flooding and other natural hazard events that pose risks to public health and safety and which may cause serious property damage;

WHEREAS the planning process fostered by the Maryland Emergency Management Agency and set forth by the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future impacts of such hazards;

WHEREAS the State of Maryland provided federal Hazard Mitigation Assistance program funds to Prince George's County to support development of a multi-jurisdictional mitigation plan;

WHEREAS a *Hazard Mitigation Plan* has been developed by the Mitigation Action Committee and staff from the City, County departments, and other entities;

WHEREAS the *Hazard Mitigation Plan* recommends several mitigation actions that will help minimize and reduce safety threats and damage to private and public property; and

WHEREAS a public meeting was held on \_\_\_\_\_, 2017, to solicit questions and comments and to present the plan and the proposed mitigation actions.

NOW THEREFORE BE IT RESOLVED by the City Council of the City of Laurel that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official plan of the City of Laurel.
2. The City offices identified in the Plan are hereby directed to pursue implementation of the recommended priority actions that are assigned to their agencies.
3. Any action proposed in the Plan shall be subject to and contingent upon budget approval, if funding is required, and this resolution shall not be interpreted so as to mandate any such appropriations.
4. The Deputy City Administrator is designated to coordinate with other City offices and Prince George's County and shall periodically report on the activities, accomplishments, and progress, and shall prepare a progress report as required by the Maryland Emergency Management Agency.

AND BE IT FURTHER RESOLVED, that this Resolution shall take effect on its passage

PASSED this \_\_\_\_\_ day of \_\_\_\_\_, 2017.  
[insert standard signature blocks]

## **Appendix G – REDACTED**

### **Critical Facilities and Dams**

A substantial master workbook of all critical facilities was used as the basis for this summary analysis. It is available upon request from FEMA.

Dam information has also been redacted.

## Critical Facilities

**Table 1. Critical Facilities by Type and Location**

Facility Type	Prince George's County	City of Laurel
Airport	--	3
Amusement	--	6
Energy	--	10
Federal	--	27
Fire/EMS	2	45
Health	--	12
Military	1	7
Police Station	1	36
Public Safety	--	2
Religious	1	31
School	10	376
State	--	1
<b>Grand Total</b>	<b>15</b>	<b>556</b>

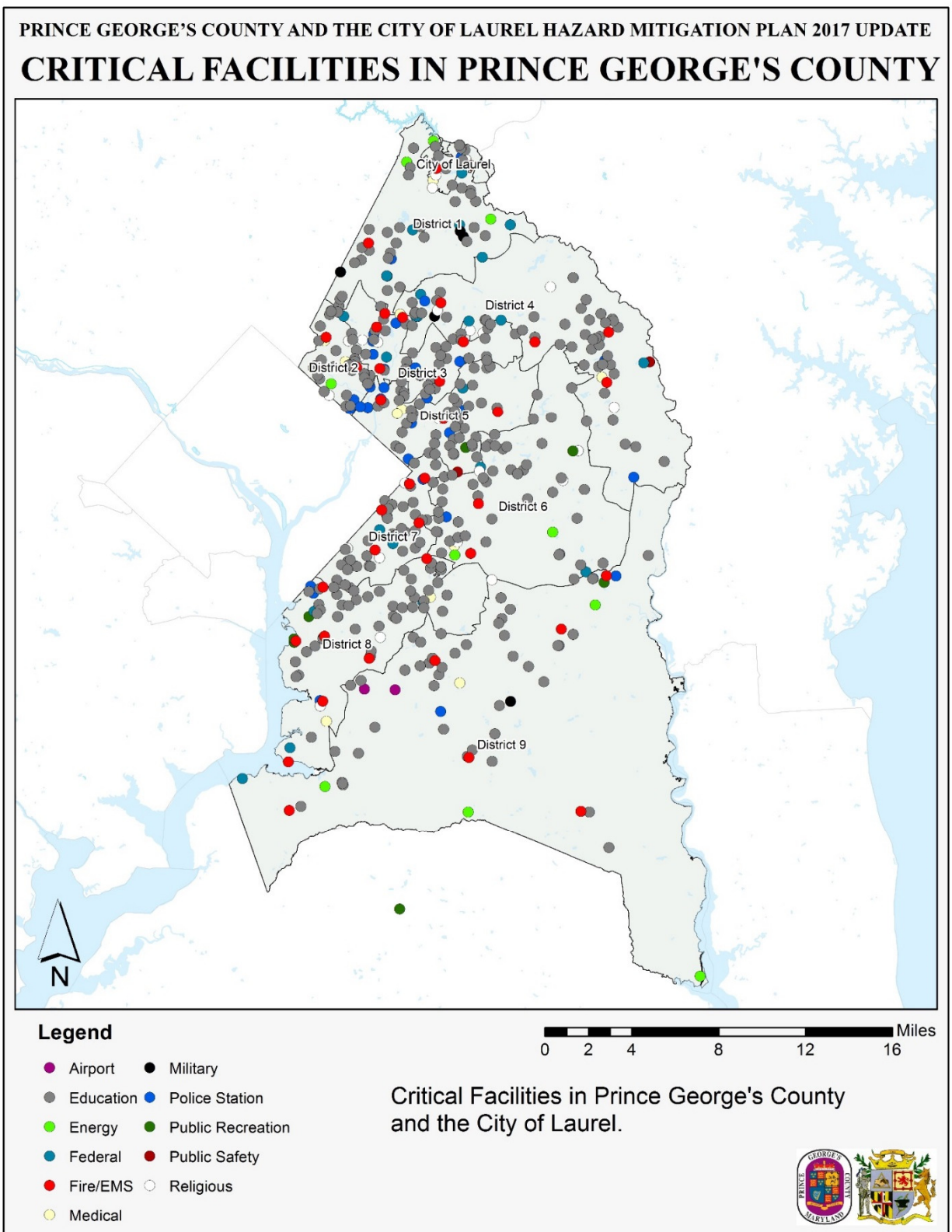


Figure 1. Critical Facility Locations

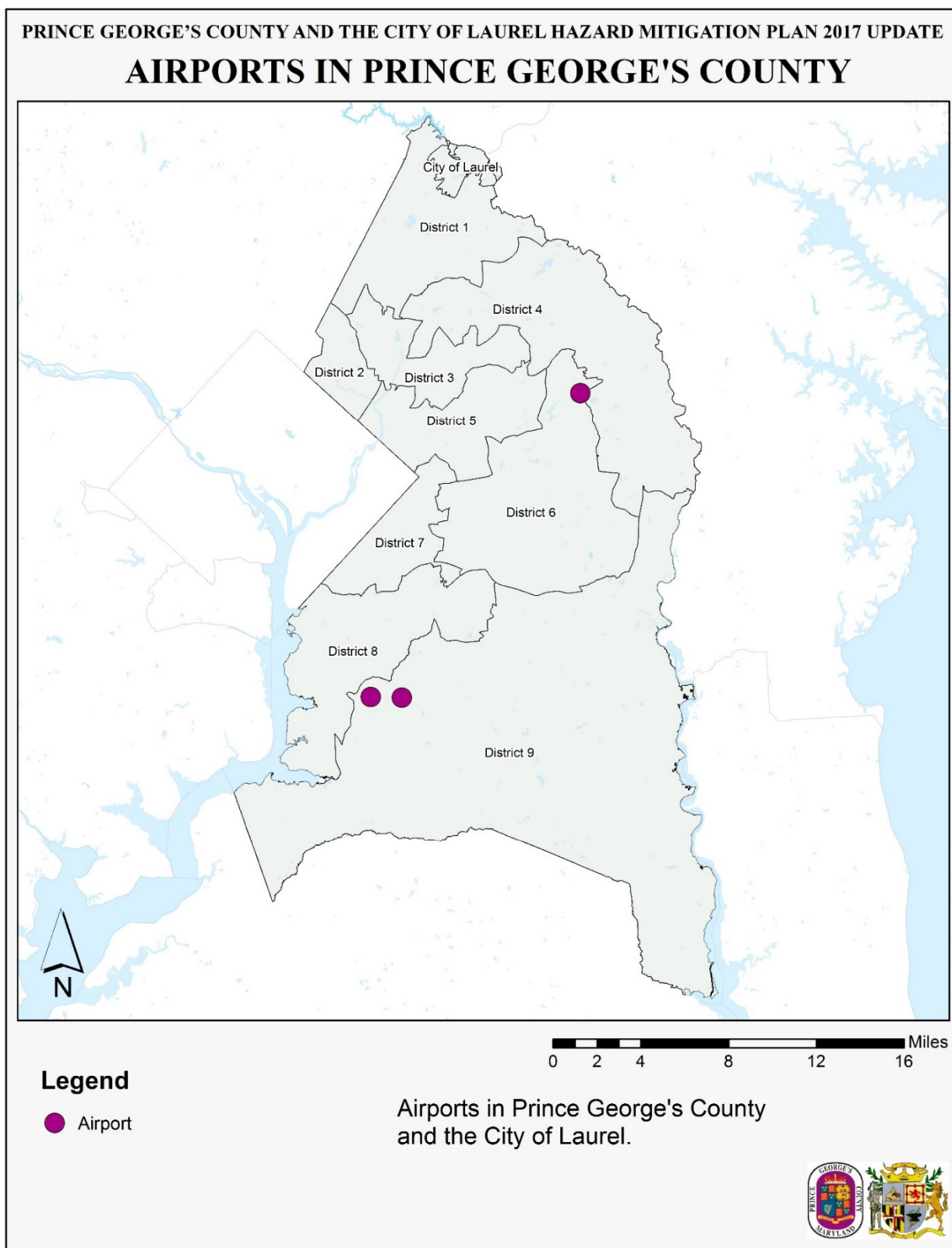


Figure 2. Airport Locations



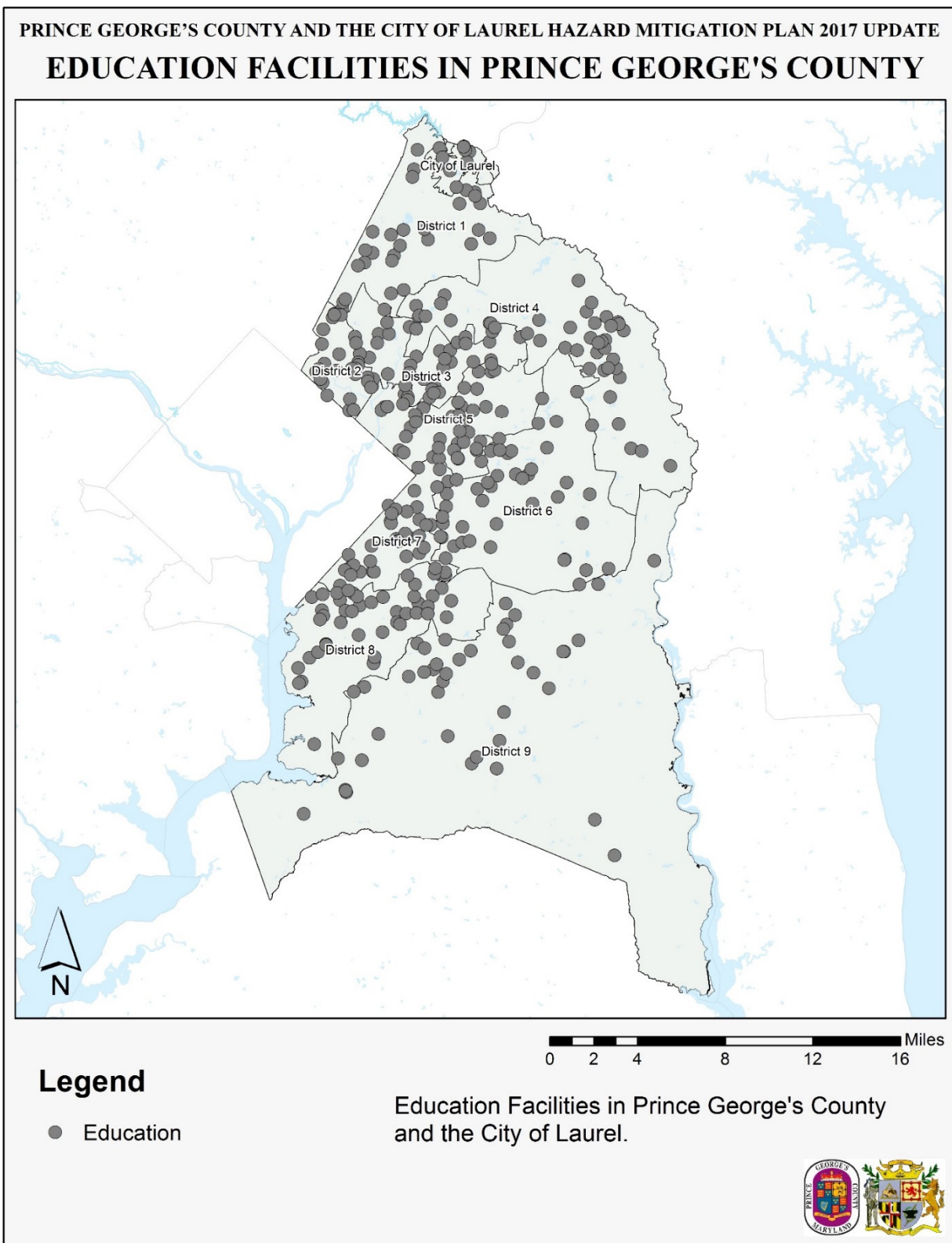


Figure 3. Educational Facility Locations

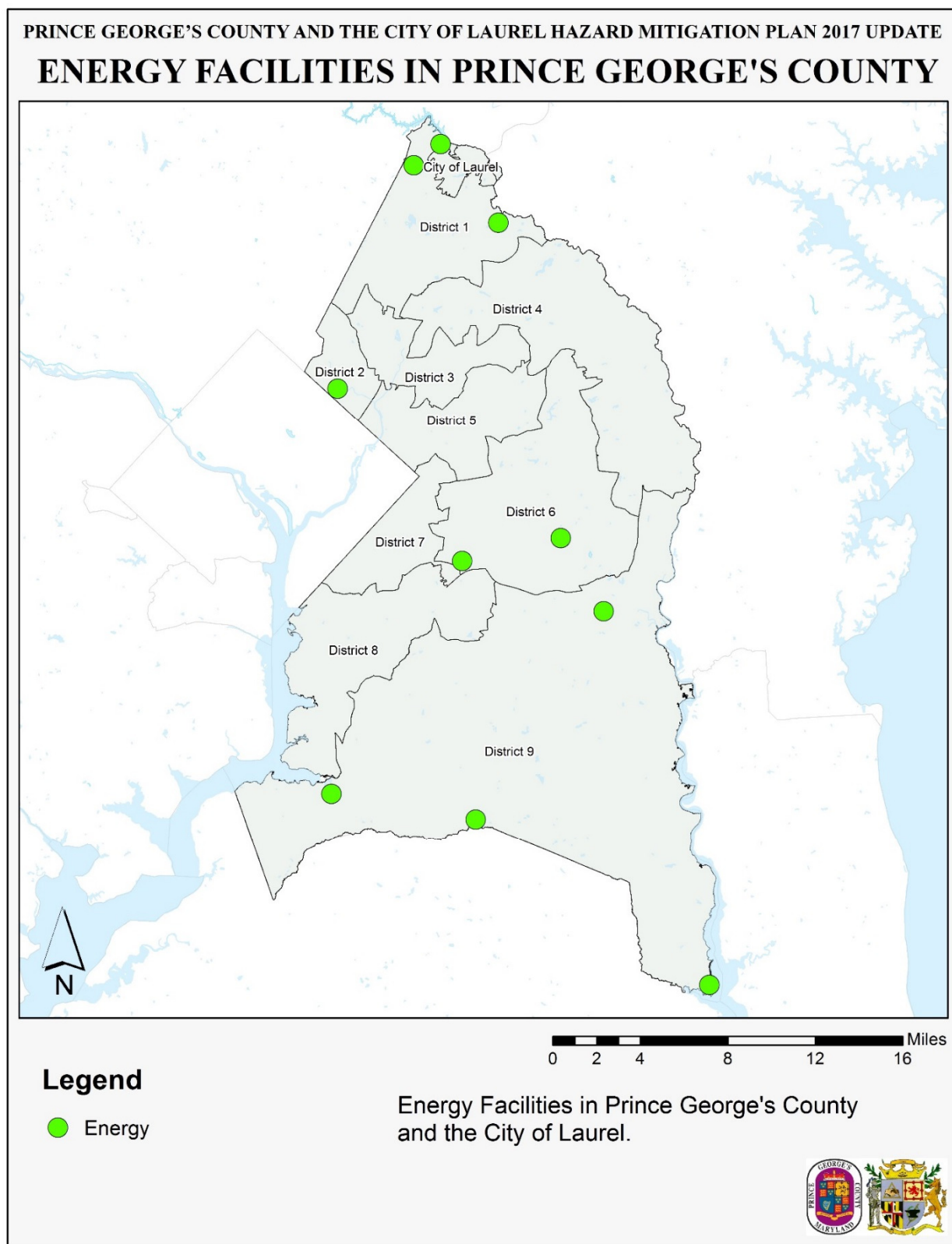


Figure 4. Energy Facility Locations

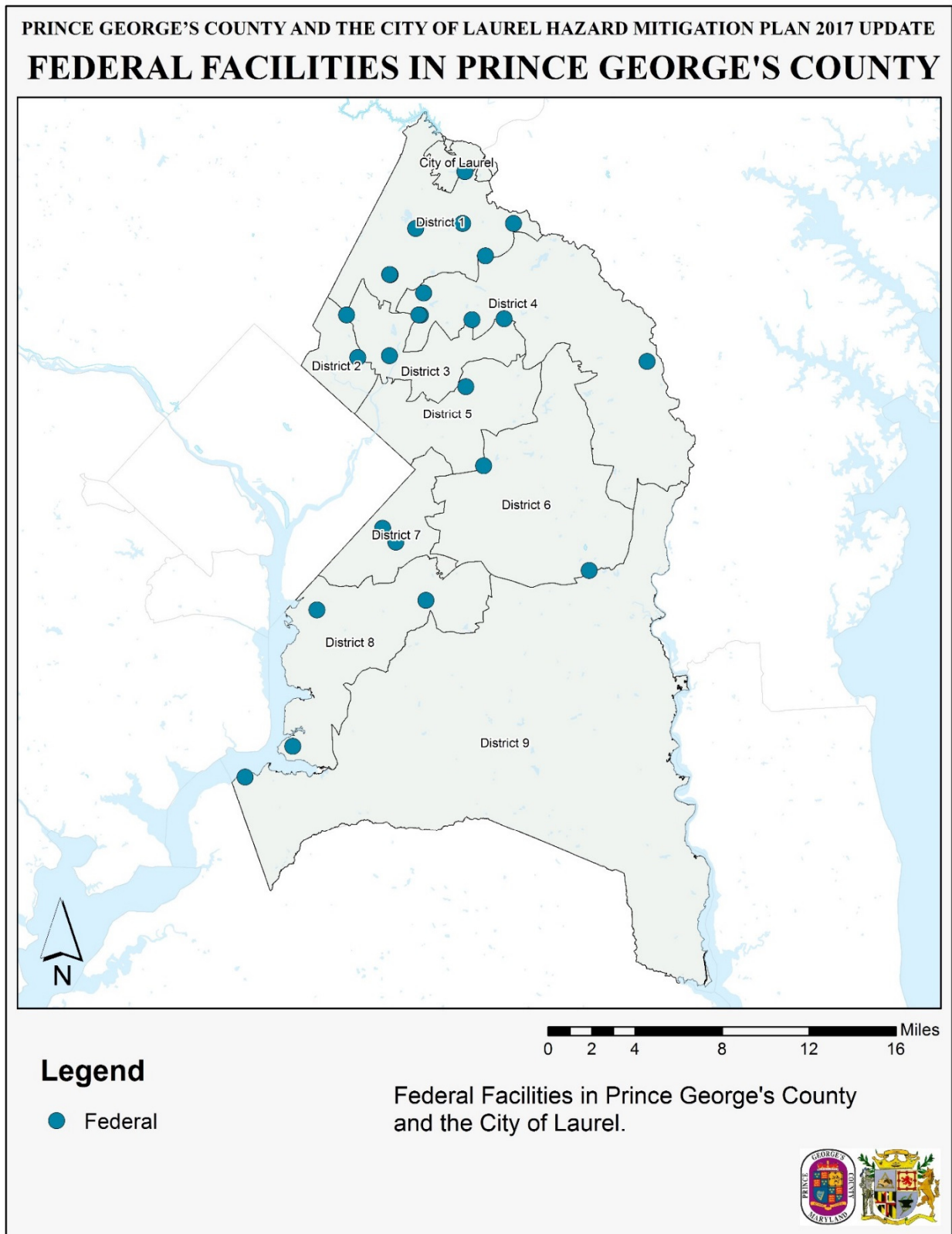


Figure 5. Federal Facility Locations

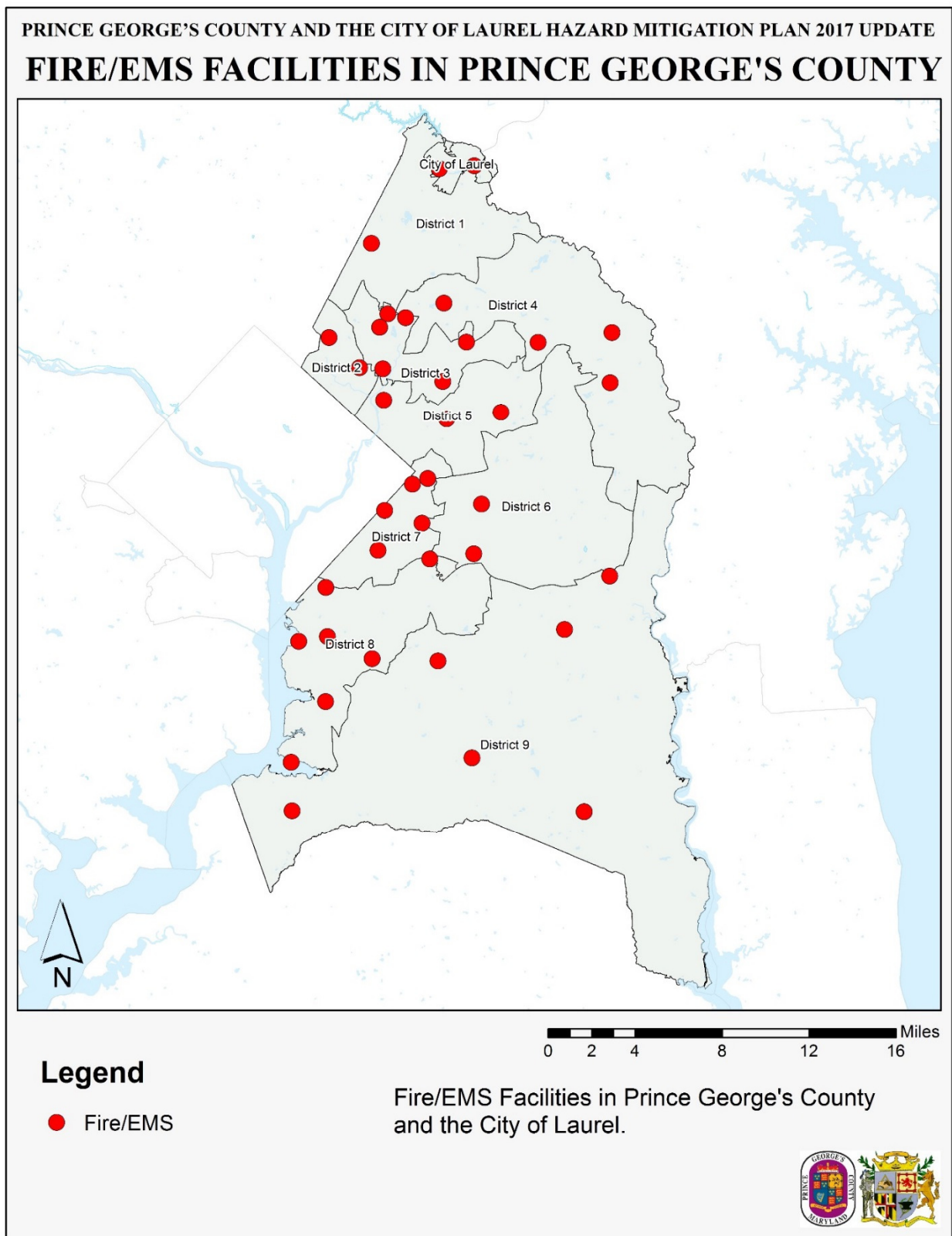
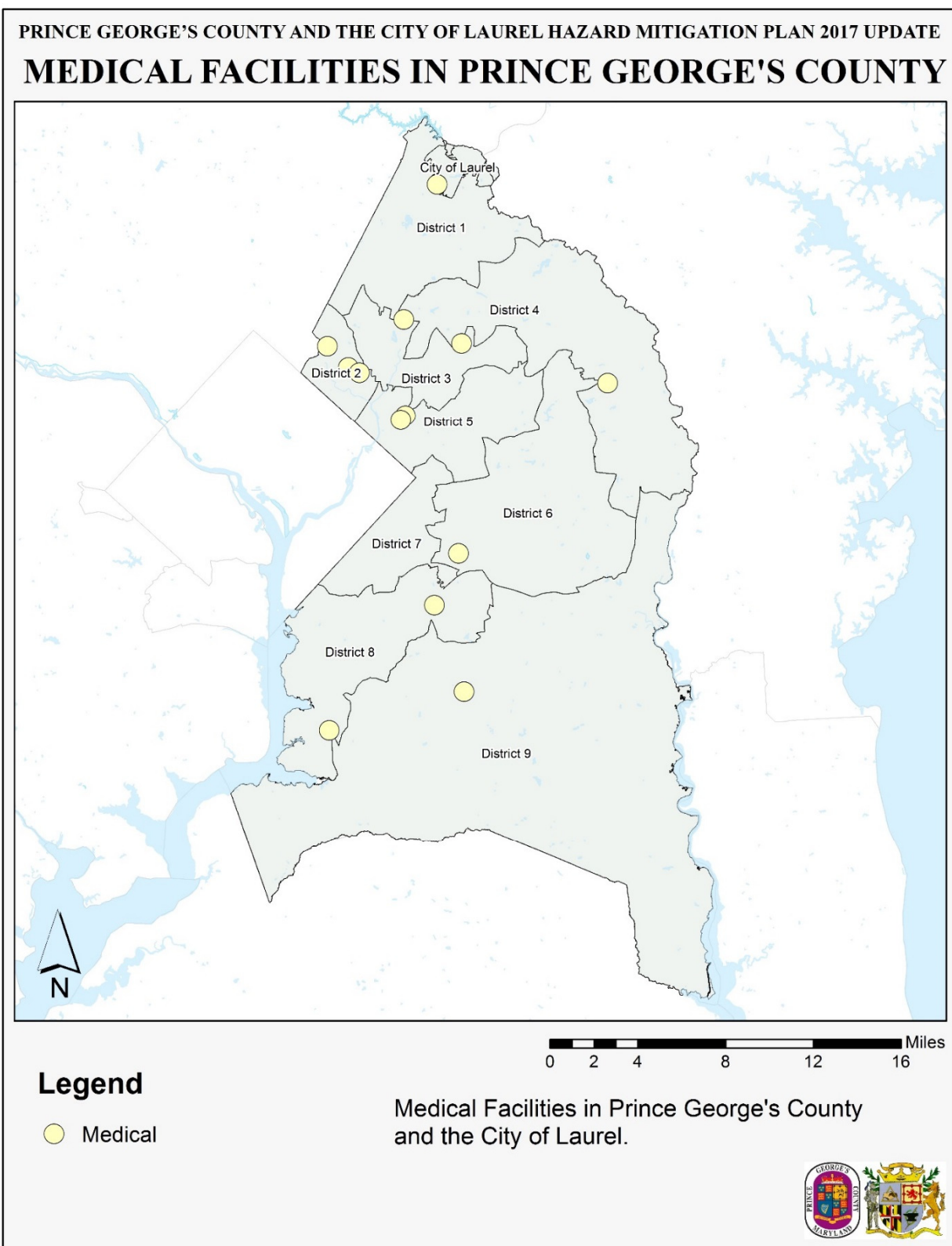


Figure 6. Fire/EMS Facility Locations





**Figure 7. Medical Facility Locations**

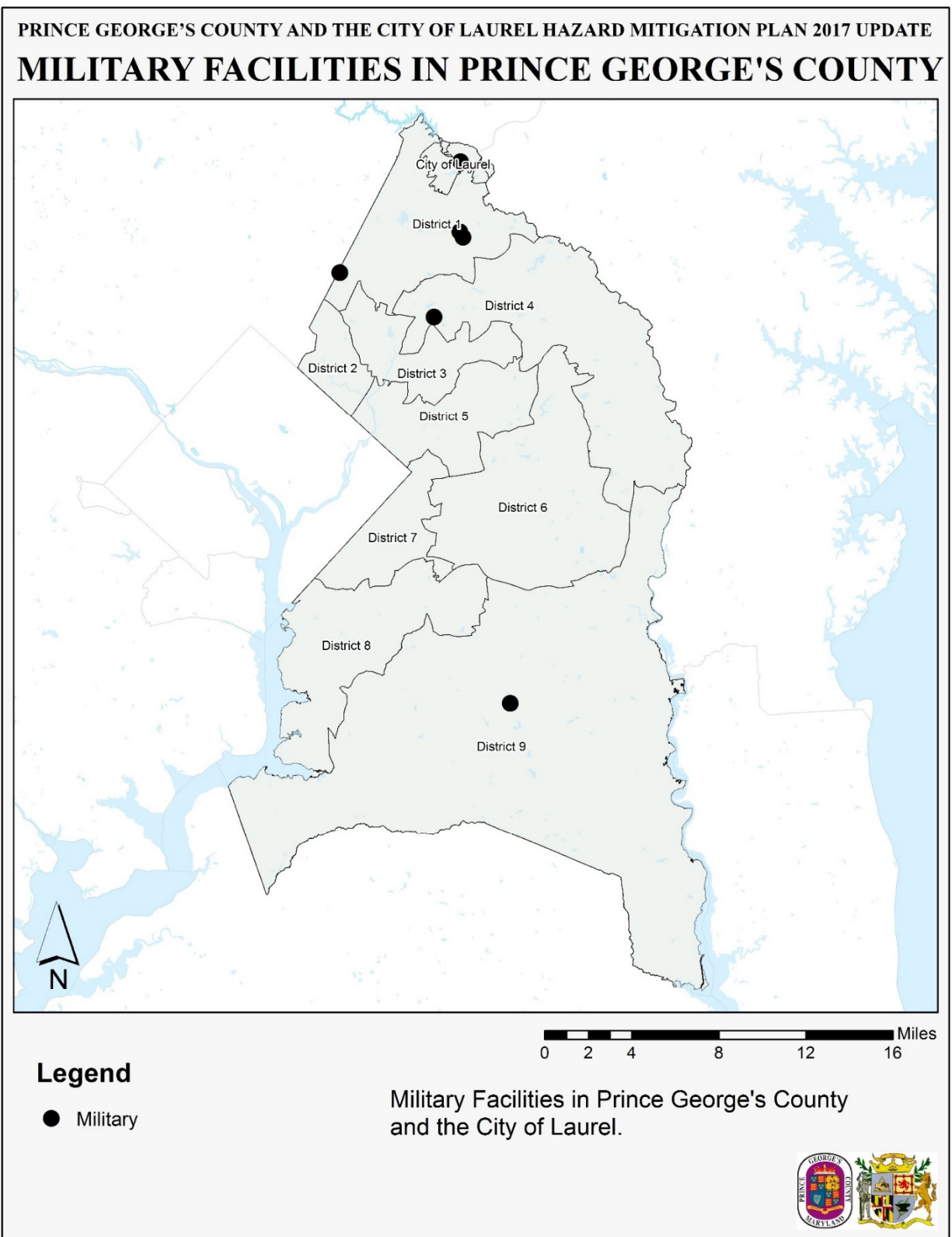


Figure 8. Medical Facility Locations

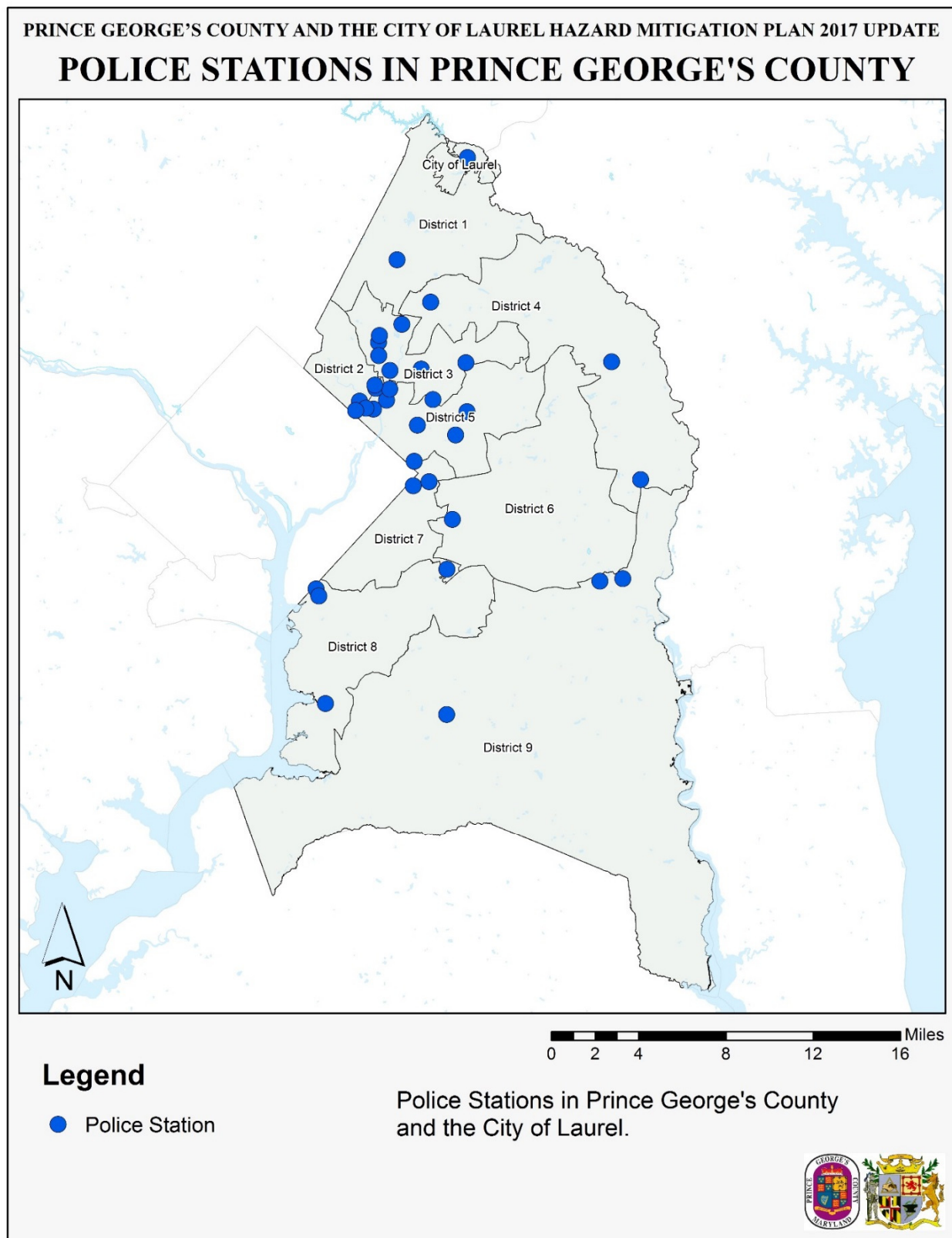
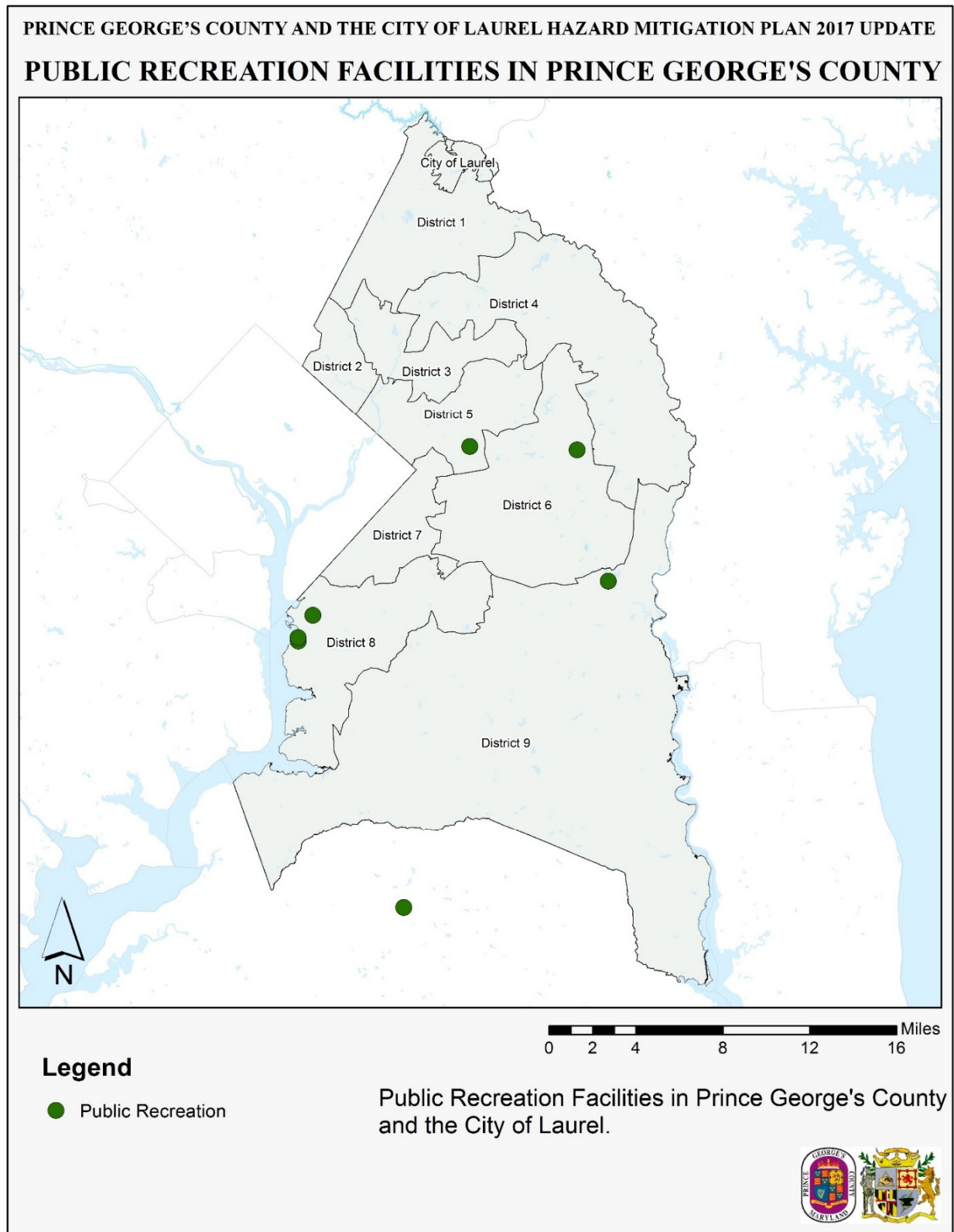
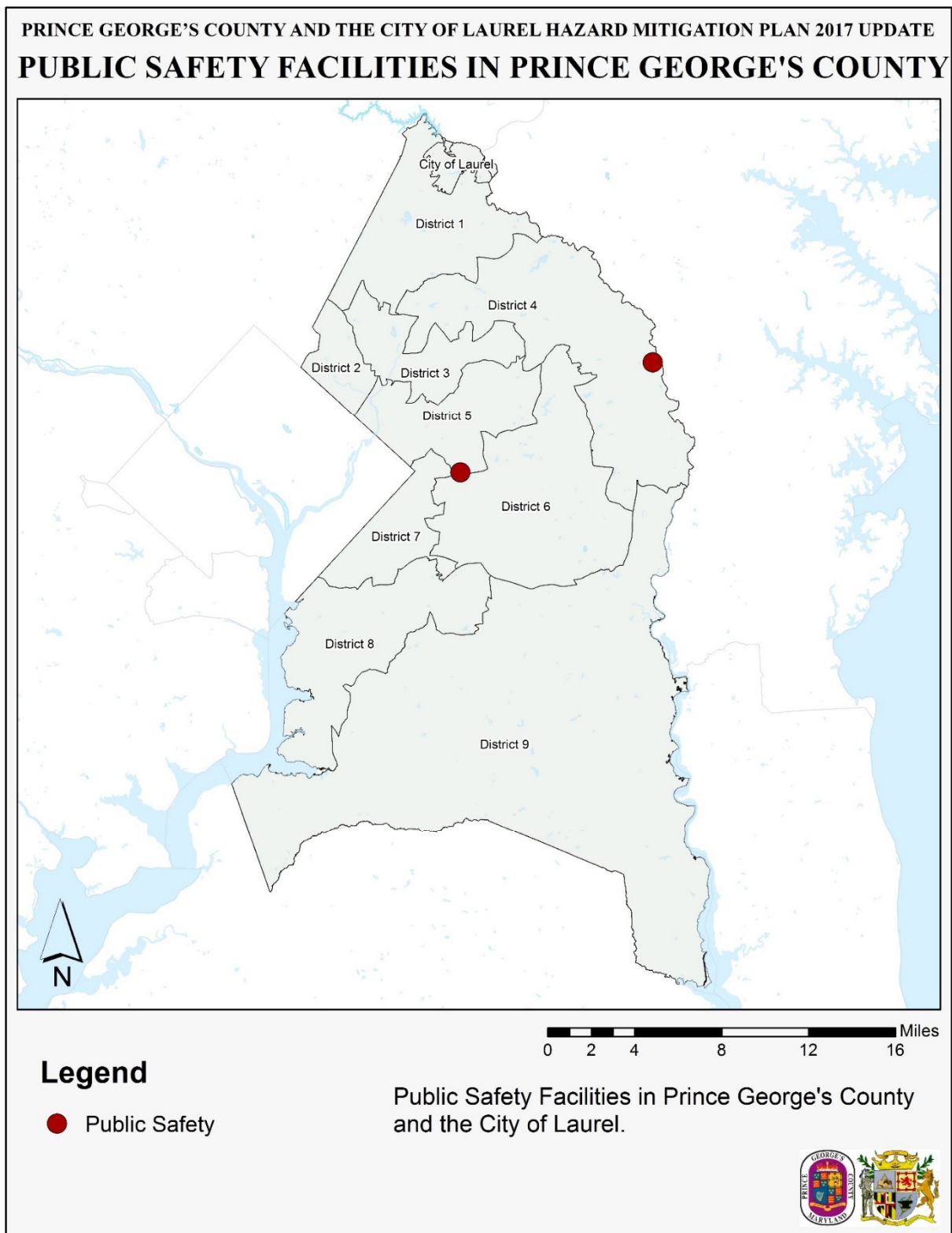


Figure 9. Police Facility Locations

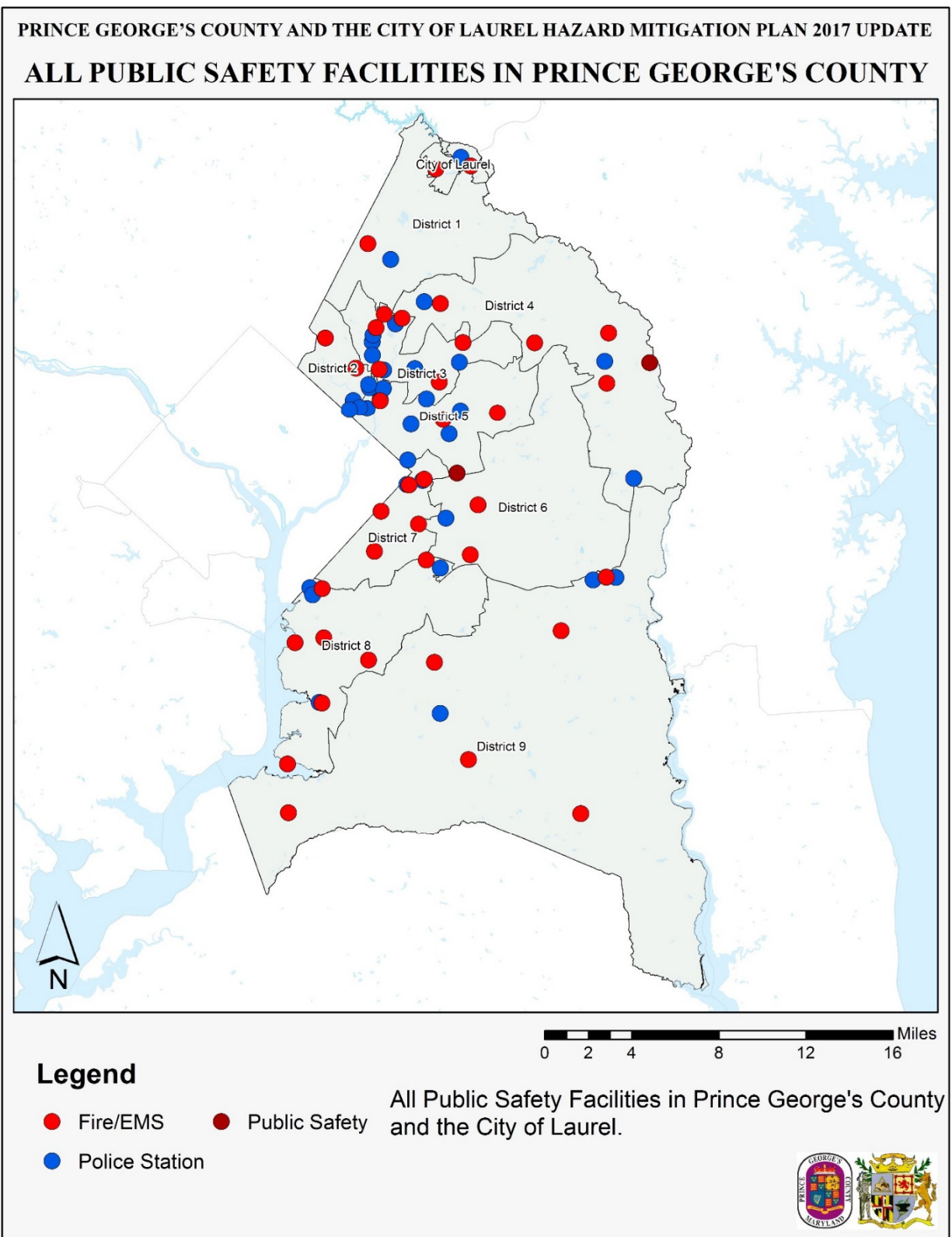




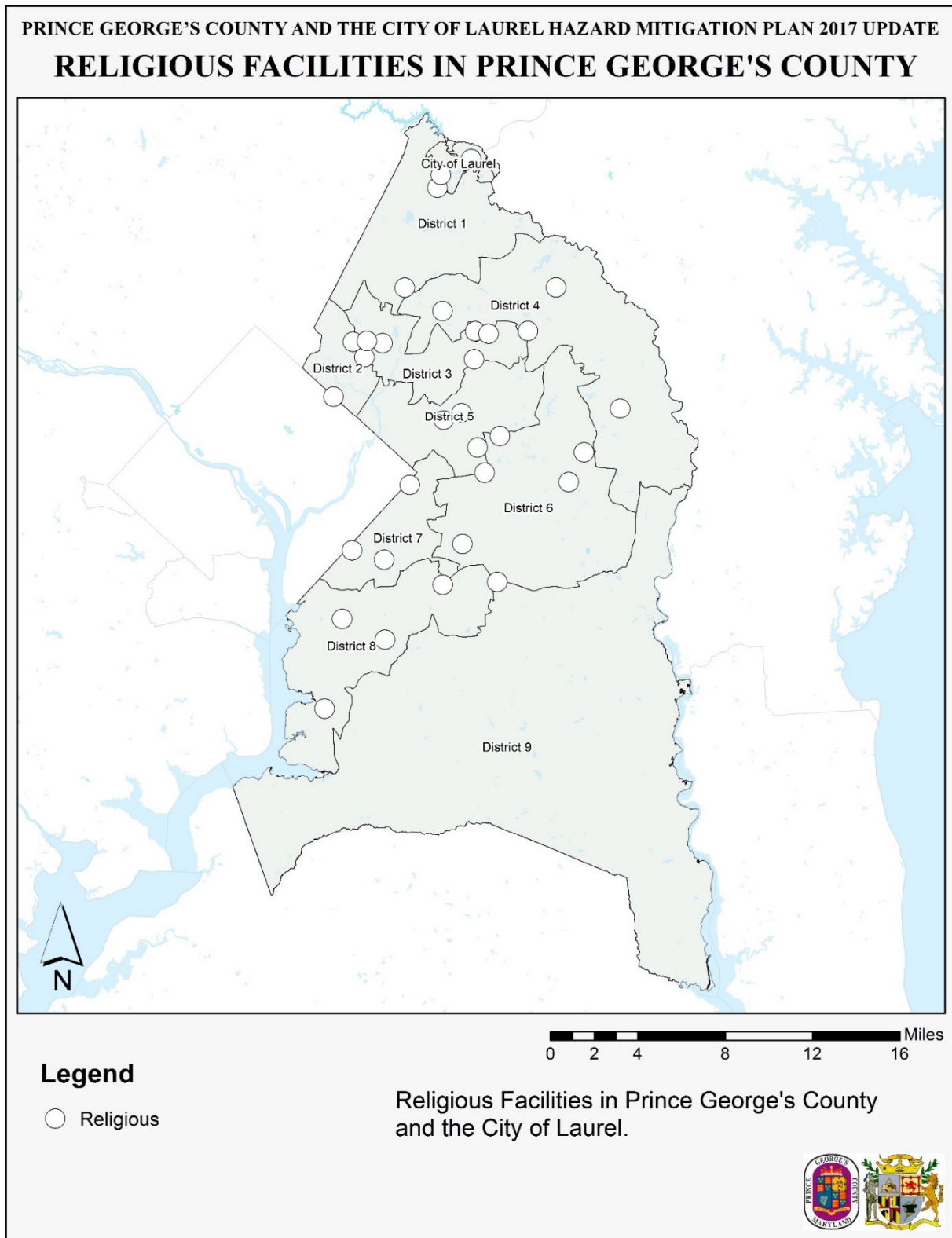
**Figure 10. Public Recreation Facility Locations**



**Figure 11. Public Safety Facility Locations**



**Figure 12. All Public Safety Facility Locations**



**Figure 13. Religious Facility Locations**

**Dams****Table 2. Duckett Dam – Sunny Day Break Scenario (Lowest Risk)**

Political Area	Buildings Affected	Total Exposure Value
City of Laurel	650	\$425,000,000
Council District 1	772	\$487,000,000
Council District 4	125	\$9,210,000
<b>Total</b>	<b>1547</b>	<b>\$921,210,000</b>

**Table 3. Brighton and Duckett Dams – Flood Scenario (Highest Risk)**

Political Area	Buildings Affected	Total Exposure Value
City of Laurel	2736	\$1,040,000,000
Council District 1	3036	\$1,170,000,000
Council District 4	282	\$10,300,000
<b>Total</b>	<b>6054</b>	<b>\$2,220,300,000</b>

**Table 4. Summary of Individual Dam Breach Area Exposure**

Dam Breach Area	Political Area	Buildings Affected	Building Exposure
Heritage Glen Dam Inundation Zone	Council District 6	14	\$3,800,000
Indian Creek 2 & 3 Dam Inundation Zone	Council District 1	163	\$38,700,000
Lake Arbor Dam Inundation Zone	Council District 6	99	\$25,300,000
Largo Town Center Dam Inundation Zone	Council District 6	1	\$52,500,000
Laurel Lake Dam Inundation Zone 1	City of Laurel	40	\$44,400,000
	Council District 1	41	\$44,500,000
Laurel Lake Dam Inundation Zone 2	City of Laurel	35	\$62,900,000
	Council District 1	39	\$79,700,000



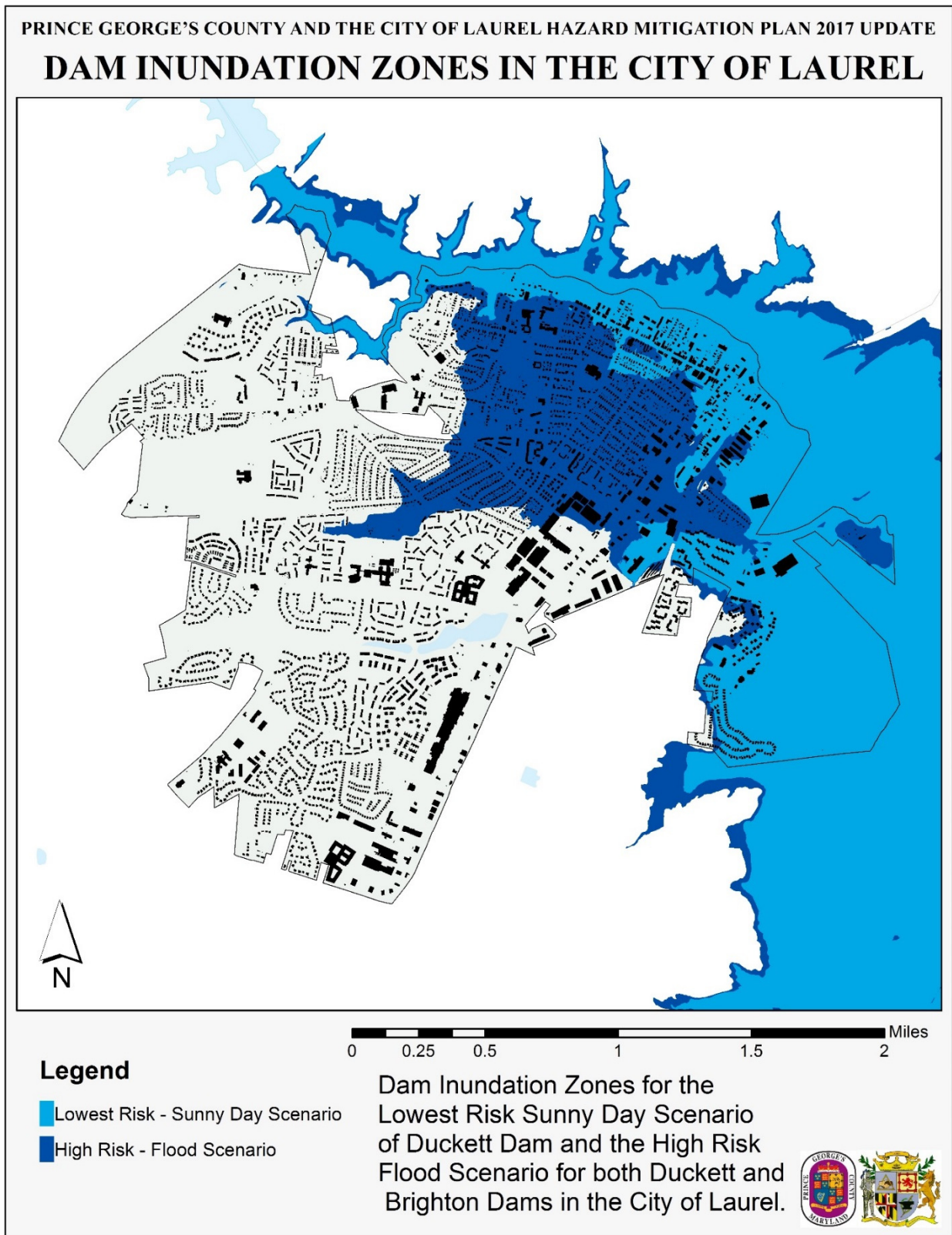
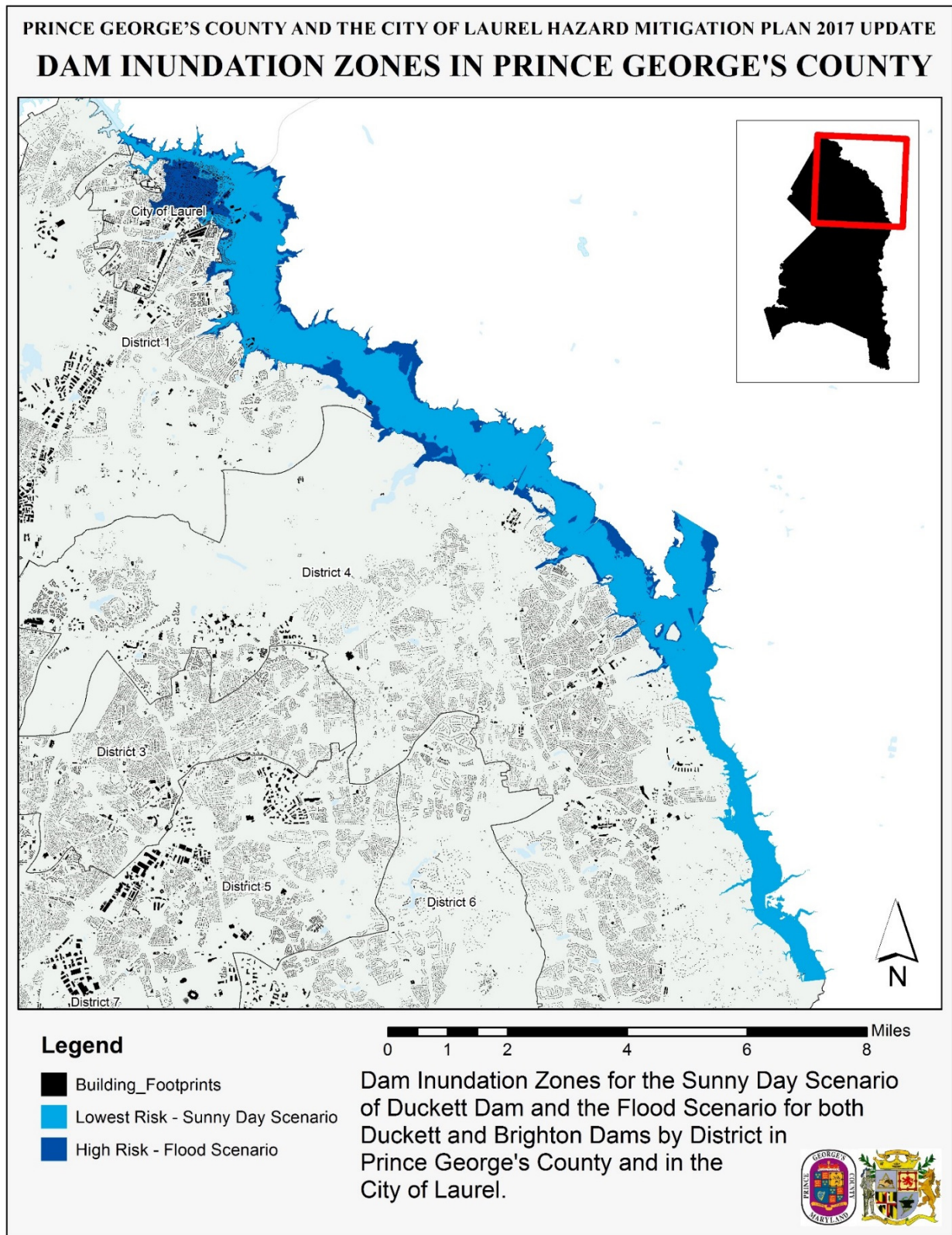


Figure 14. Dam Inundation Zones in City of Laurel



**Figure 15. Dam Inundation Zones in Prince George's County**



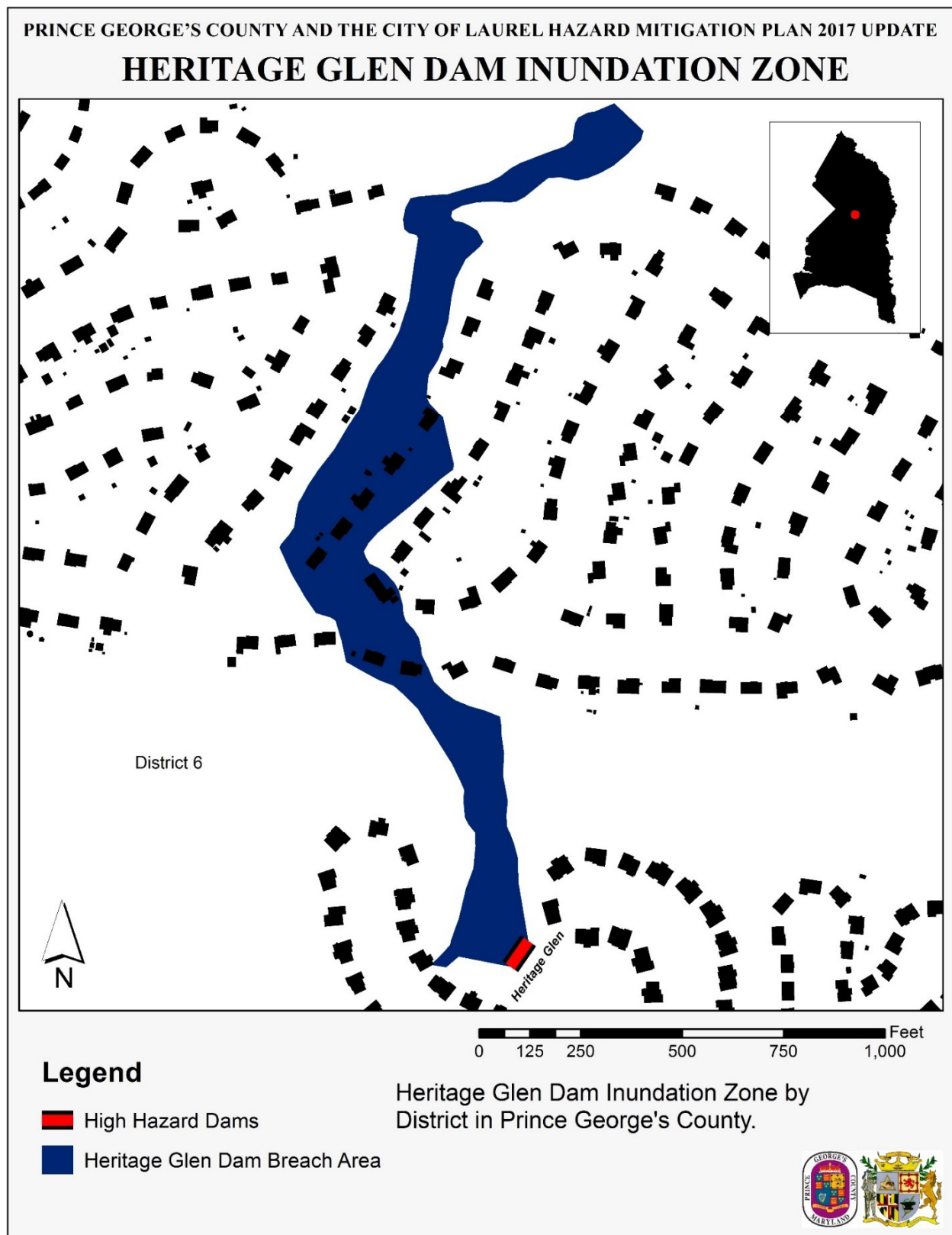


Figure 16. Heritage Glen Dam Inundation Zone

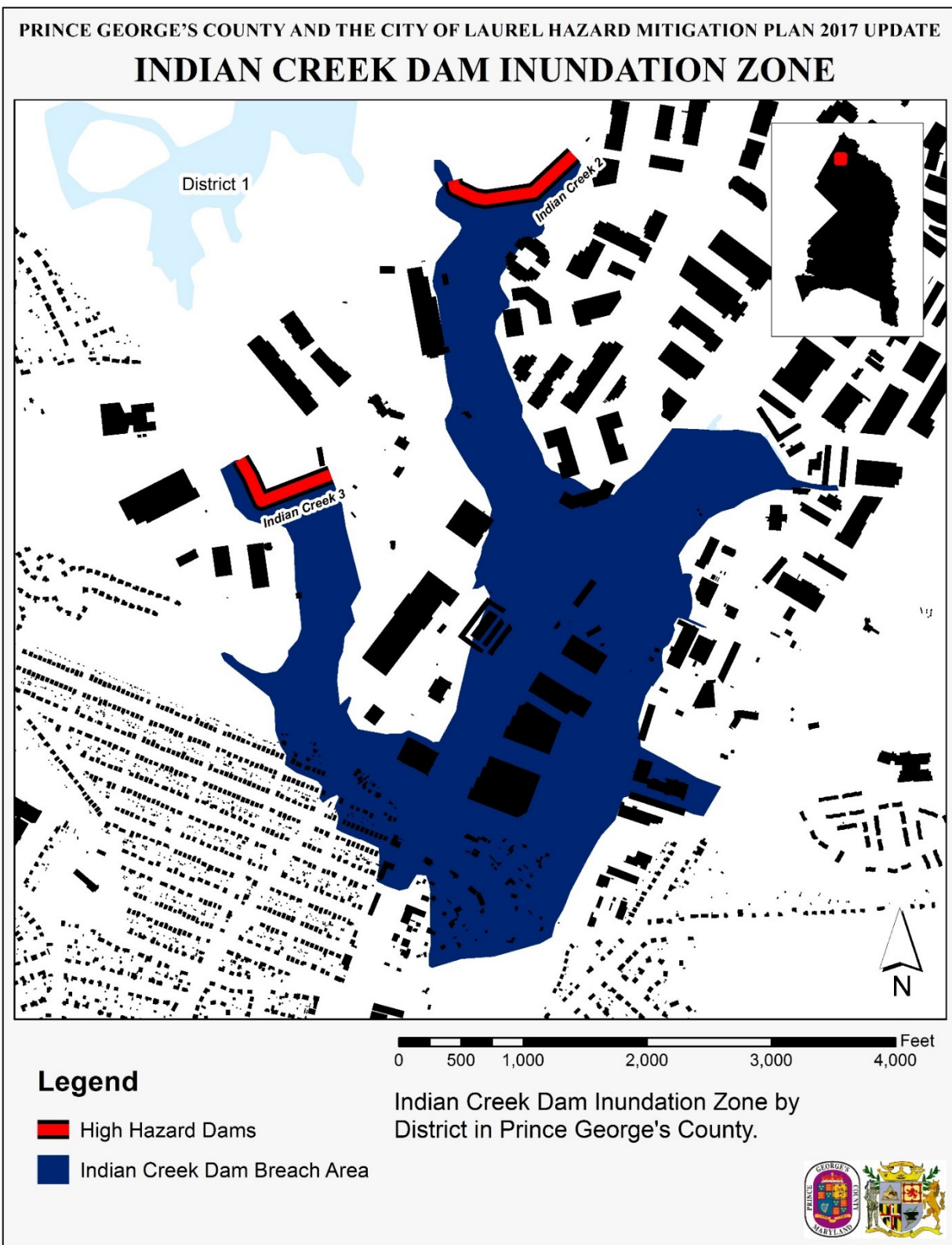


Figure 17. Indian Creek Dam Inundation Zone

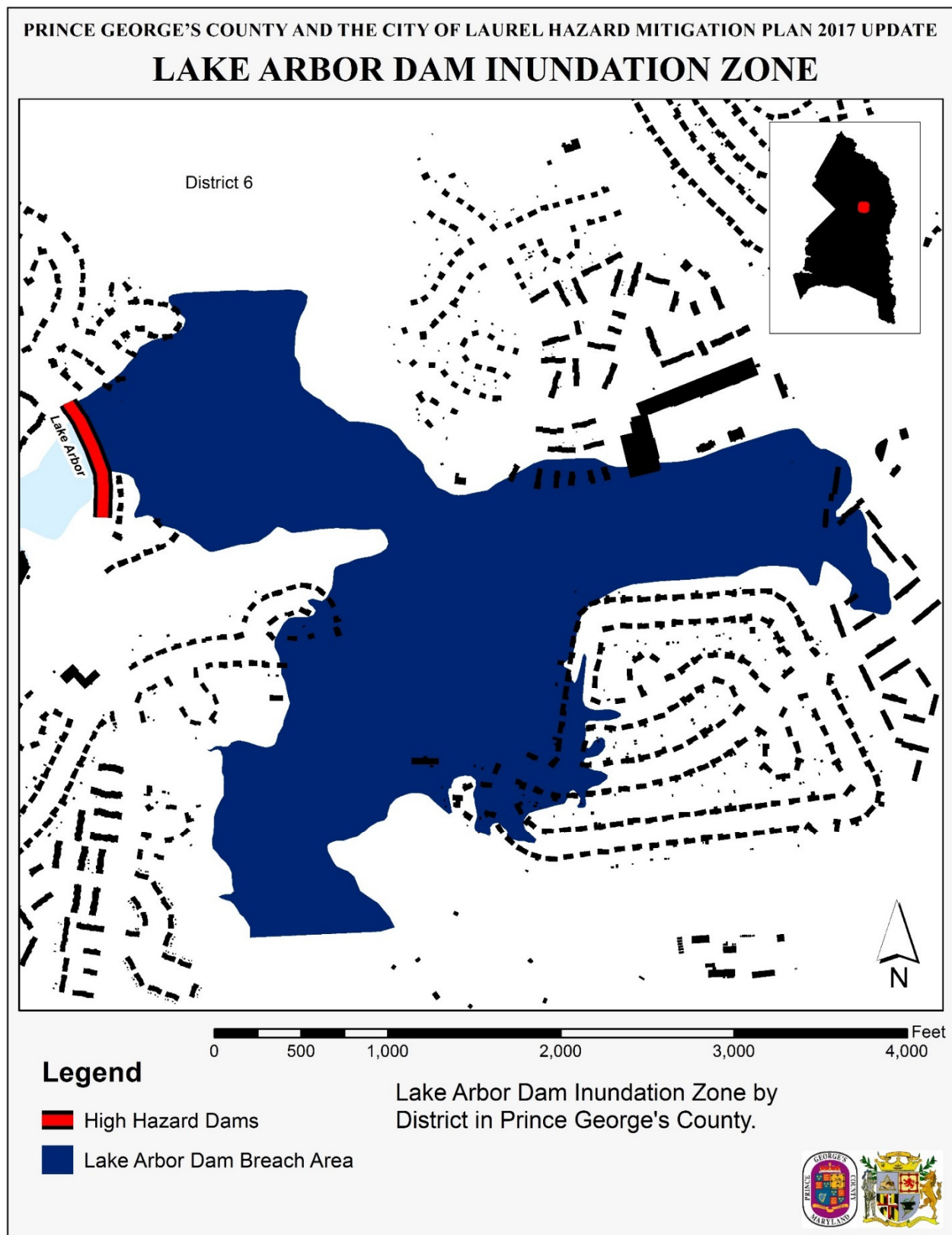


Figure 18. Lake Arbor Dam Inundation Zone



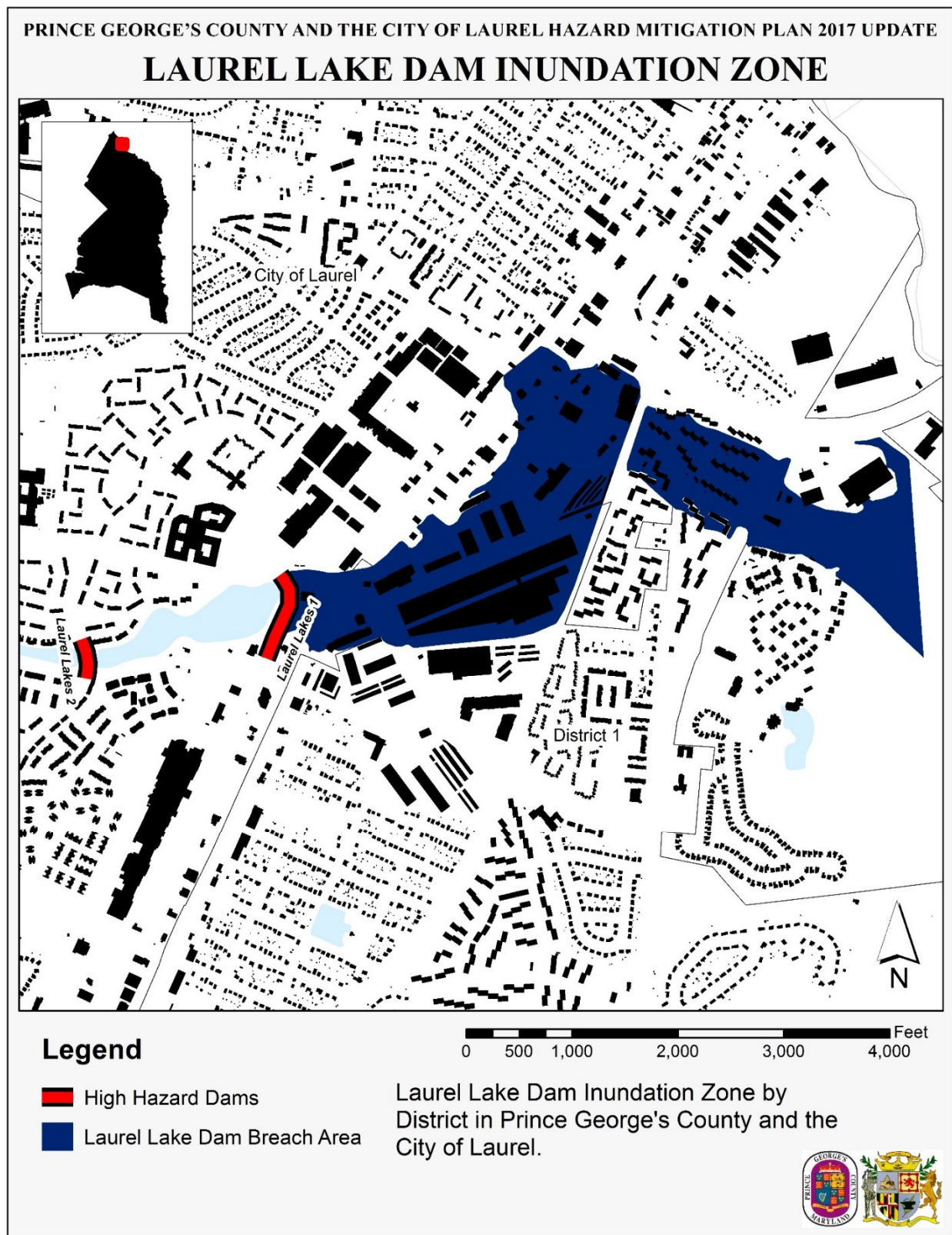


Figure 19. Laurel Lake Dam Inundation Zone

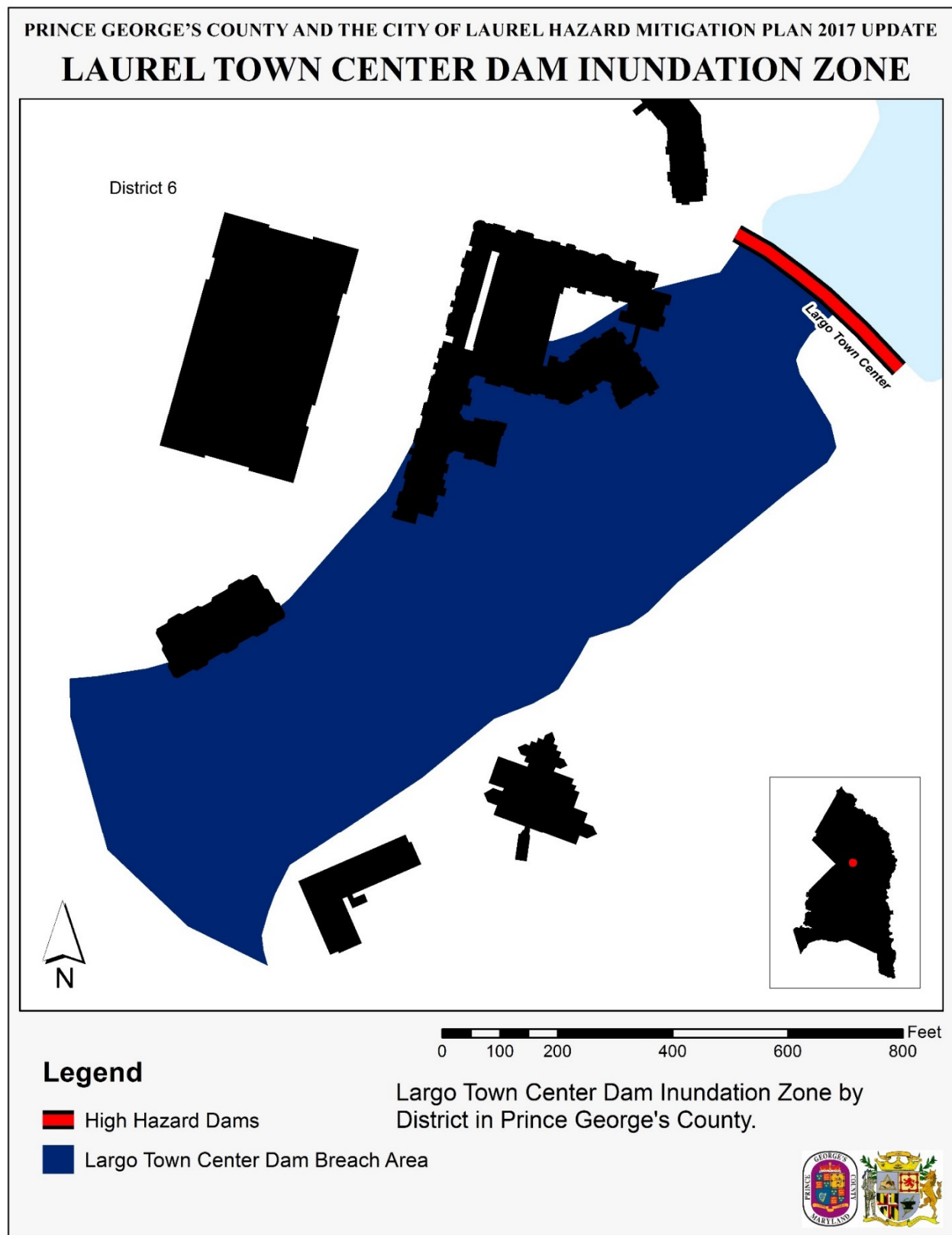


Figure 20. Largo Town Center Dam Inundation Zone

## Appendix H List of Abbreviations

BFE	Base Flood Elevation
CIP	Capital Improvement Program
COOP	Continuity of Operations
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
DMA	Disaster Mitigation Act
EAS	Emergency Alert System
EF Scale	Enhanced Fujita Scale
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Maps
FIRM	Flood Insurance Rate Map
GIS	Geographic Information System
HAZUS-MH	FEMA's loss estimating software for floods, earthquakes, and hurricane winds
HIRA	Hazard Identification and Risk Assessment
HMGP	Hazard Mitigation Grant Program
MAC	Mitigation Advisory Committee
NCDC	National Climatic Data Center
NFHL	National Flood Hazard Layer
NFIP	National Flood Insurance Program
NLCD	National Land Cover Data
NOAA	National Oceanic Atmospheric and Atmospheric Administration
NWS	National Weather Service
PDC	Planning District Commission
PRISM	Parameter-elevation Regressions on Independent Slopes Model
Risk MAP	Risk Mapping, Assessment, and Planning
RL	repetitive loss
SFHA	Special Flood Hazard Area
SRL	severe repetitive loss
STAPLE/E	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
UASI	Urban Areas Security Initiative
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VA DCR	Virginia Department of Conservation and Recreation
VDEM	Virginia Department of Emergency Management
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation