

FY 2018-2023 STORMWATER CIP CITY COUNCIL BRIEFING

MARCH 14, 2017

STORMWATER CIP AGENDA

- Stormwater Overview
- Stormwater Funding
- Recent Accomplishments & Major Initiatives Underway
- Proposed FY 18-23 SW Program – Summary Table
- Above Target Summary Table
- Flood Control
 - Projects within the Proposed CIP
 - Other Above Target Projects
- Water Quality
- Operations & Maintenance
- Summary

STORMWATER OVERVIEW

- Just What is Stormwater Management?
 - Is it drainage?
 - Is it flood control?
 - Is it water quality?
 - Is it regulatory compliance?
 - Is it asset management and O&M?
 - Is it a program?
 - Yes, yes, yes, yes, yes, yes, and more!

STORMWATER OVERVIEW

- Stormwater Management – A working Definition:
 - Handling (managing) excess rainfall (runoff) in a manner that prevents flooding and water quality degradation.
- An effective Stormwater Management Program addresses flood control, water quality control / stormwater regulatory compliance, and infrastructure management including O&M.
- The foundational elements of SWM remain flood control / drainage and the operations and maintenance needed to assure adequate flood control / drainage.
- Stormwater quality / regulatory compliance is the newest element, first appearing in the 1970's. The first major regulations appeared in the 1980's. Since then, the implementation of more stringent regulatory requirements have brought about the many specific regulatory programs of today.
- Sea Level Rise and the apparent increase in the frequency of storms with major rainfall is revealing those areas (now or soon to be) experiencing Recurrent Flooding.

STORMWATER MANAGEMENT FUNDING

- The City of Virginia Beach funds most of its Stormwater Management program via the Stormwater Enterprise Fund.
- Current annual fund revenue is \$40,059,683.
- Within current revenue the SW FY 18-23 CIP is funded at approximately \$22.35 M annually.



2017 CURRENT CONSTRUCTION PROJECTS

- Cape Henry/ Cape Story/ Lynnhaven Colony Tidal & Rainfall Flooding Interim Improvement (Tide Gates)
- North Lake Holly Section IV
- South Lake Holly Section I & II
- Thalia Drive Culvert Improvements



Cape Henry Tide Gates



South Lake Holly



Thalia Drive Culvert

MAJOR INITIATIVES UNDER WAY: SEA LEVEL RISE / RECURRENT FLOODING

- Development of the Comprehensive Citywide Response Plan to SLR is well underway.
- Citywide SWM Master Planning, Analysis and Inventorying is well underway.
- These two initiatives are being closely and carefully coordinated.
- Using Engineering, Scientific, and Academic expertise for both of these major initiatives.

ODU

Georgetown Law School

Virginia Tech

W & M

Navy

DEQ

HRPDC

CDM

Dewberry

PROPOSED FY 2018-2023 STORMWATER PROGRAM – SUMMARY TABLE

CIP	Project Title	FY 18	FY 19	FY 20	FY 21	FY 22	FY 23	Total
7400	Aragona Drainage Improvements	0	0		0			0
7036	Baker Road Culvert & Ditch Improvements	0	0		0			0
7037	Bellamy Manor Outfall Ditch	0	0		0			0
7041	Central Resort District Drainage Improvements	0	0	0	0			0
7030	Citywide Sea Level Rise/Recurrent Flooding Analysis	0	0	0	0			0
7402	College Park/Level Green Drainage Improvements	0	0	0	0	0	0	0
7152	Dam & Spillway Structural Improvements						0	0
7151	Eastern Shore Drive Drainage	1,000,000	1,200,000	1,200,000	1,200,000	0	0	4,600,000
7406	Elizabeth River TMDL Implementation Plan	200,000	200,000	200,000	200,000	200,000	200,000	1,200,000
7032	Flood Mitigation Assistance Grant Program						0	0
7415	Lake Management II	4,947,652	4,947,652	4,947,652	4,947,652	4,947,652	4,947,652	29,685,912
7153	Lynnhaven Watershed Restoration	309,068	309,068	309,068	311,762	311,762	311,762	1,862,490
7413	Neighborhood Storm Water Infrastructure Improvements - II	550,000	1,150,000	550,000	550,000	3,550,000	3,550,000	9,900,000
7005	North Lake Holly Watershed	1,400,000	1,200,000	1,800,000	1,800,000	0	0	6,200,000
7411	Oceanfront Storm Water Facilities Maintenance	750,000	750,000	750,000	750,000	750,000	750,000	4,500,000
7023	Primary System Infrastructure Improvements II	2,270,000	2,270,000	2,270,000	2,270,000	2,270,000	2,270,000	13,620,000
7026	Residential Drainage Cost Participation Program II	50,000	50,000	50,000	50,000	50,000	50,000	300,000
7200	Severe repetitive Loss Grant Program	0	0	0	0	0	0	0
7016	South Lake Holly Watershed	600,000	0	0	0	0	0	600,000
7024	Southern Canal/Lead Ditch and Culvert Improvements	300,000	300,000	300,000	300,000	300,000	300,000	1,800,000
7410	Southern River TMDL Implementation Plan	200,000	200,000	200,000	200,000	200,000	200,000	1,200,000
7412	Storm Water Pump Station Modifications	1,250,000	750,000	750,000	750,000	750,000	750,000	5,000,000
7414	Storm Water Quality Enhancements - II	1,152,694	1,152,694	1,152,694	1,150,000	1,150,000	1,150,000	6,908,082
7034	Stormwater Operations Modular Building						0	0
7042	Surface Water Regulatory Compliance Program I	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000	1,100,000	6,600,000
7416	SW Infrastructure Rehabilitation & Improvements II	5,750,000	5,750,000	5,750,000	5,750,000	5,750,000	5,750,000	34,500,000
7027	SWM Master Planning, Analysis, and Inventory	1,300,000	800,000	800,000	800,000	800,000	800,000	5,300,000
7043	Water Quality and Restoration Participation Projects II	50,000	50,000	50,000	50,000	50,000	50,000	300,000
7028	Windsor Woods Drainage	0	0	0	0	0	0	0
		23,179,414	22,179,414	22,179,414	22,179,414	22,179,414	22,179,414	134,076,484

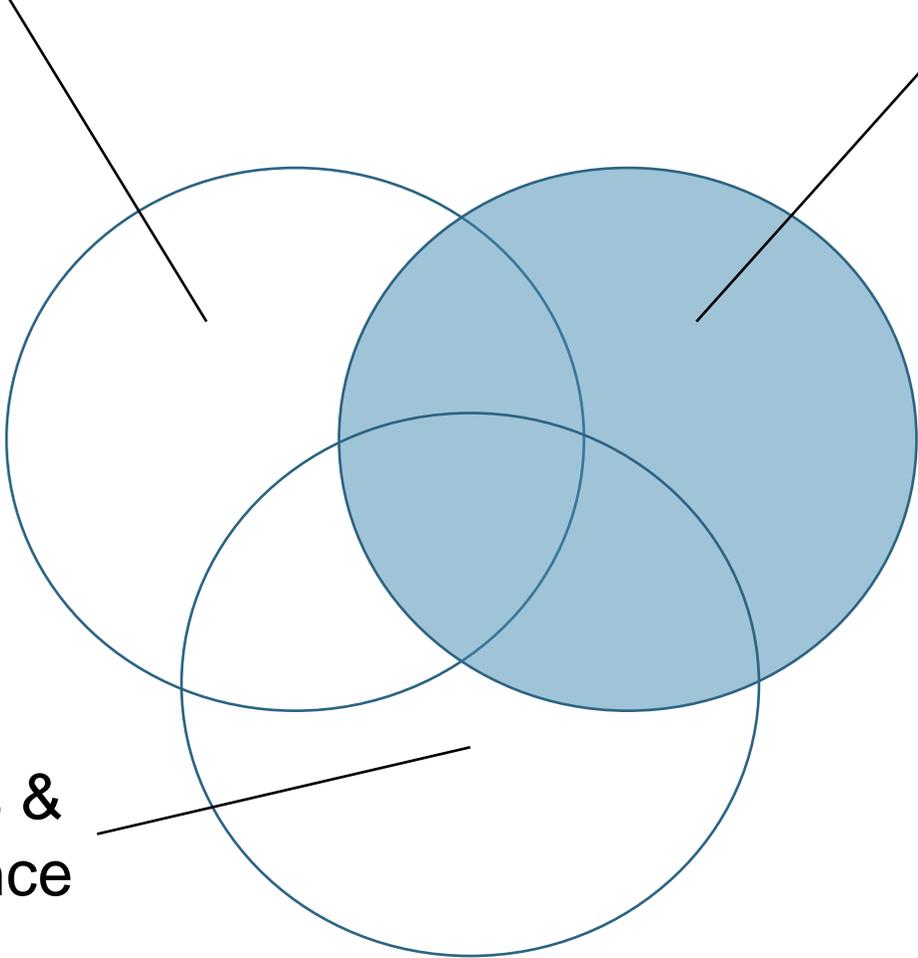
ABOVE TARGET SUMMARY TABLE

Flood Control Projects Related to Recent Major Storm Events	
Ashville Park Drainage Improvements (SW-FC1)	\$ 35,000,000
Sherwood Lakes Drainage Improvements (SW-FC2)	\$ 20,000,000
The Lakes Drainage Improvements (SW-FC3)	\$ 28,000,000
Princess Anne Plaza/PG Drainage Improvements (SW-FC4)	\$ 66,000,000
Windsor Woods Drainage (7-028)	\$ 31,100,000
	Sub-Total = \$ 180,100,000
Flood Control Legacy Projects	
Aragona Drainage Improvements (7-400)	\$ 1,400,000
Central Resort District Drainage Improvements (7-041)	\$ 113,000,000
Eastern Shore Drive Drainage - Phase II (7-029)	\$ 65,400,000
SW Master Planning (7-027)	\$ 2,300,000
	Sub-Total = \$ 182,100,000
Water Quality and Regulatory Compliance Projects	
Elizabeth River TMDL Implementation Plan (7-406)	\$ 5,500,000
Lynnhaven Watershed Restoration (7-153)	\$ 4,400,000
Southern River TMDL Implementation (7-410)	\$ 1,250,000
Storm Water Quality Enhancements II (7-414)	\$ 14,050,000
Surface Water Regulatory Compliance Program (7-042)	\$ 7,800,000
Water Quality and Restoration Participation Projects II (7-043)	\$ 750,000
	Sub-Total = \$ 33,750,000
Operations and Maintenance Projects	
Canal Management (SW-OM2)	\$ 12,000,000
Lake Management Ph II (7-415)	\$ 3,000,000
Oceanfront Storm Water Facilities Maintenance (7-411)	\$ 5,400,000
Primary Infrastructure Improvements Ph II (7-023)	\$ 3,000,000
Residential System Infrastructure Improvements II (7-026)	\$ 600,000
Shore Drive/Hollis Road Drainage (SW-OM1)	\$ 3,000,000
Storm Water Pump Station Modifications (7-412)	\$ 6,000,000
SW Infrastructure Rehab. & Improvements Ph II (7-416)	\$ 22,500,000
	Sub-Total = \$ 55,500,000
	Total = \$ 451,450,000

PROPOSED FY 2018 – 2023 SW CIP PROGRAM FLOOD CONTROL PROJECTS

Water
Quality &
Regulatory
Compliance

Flood Control
Mike Mundy

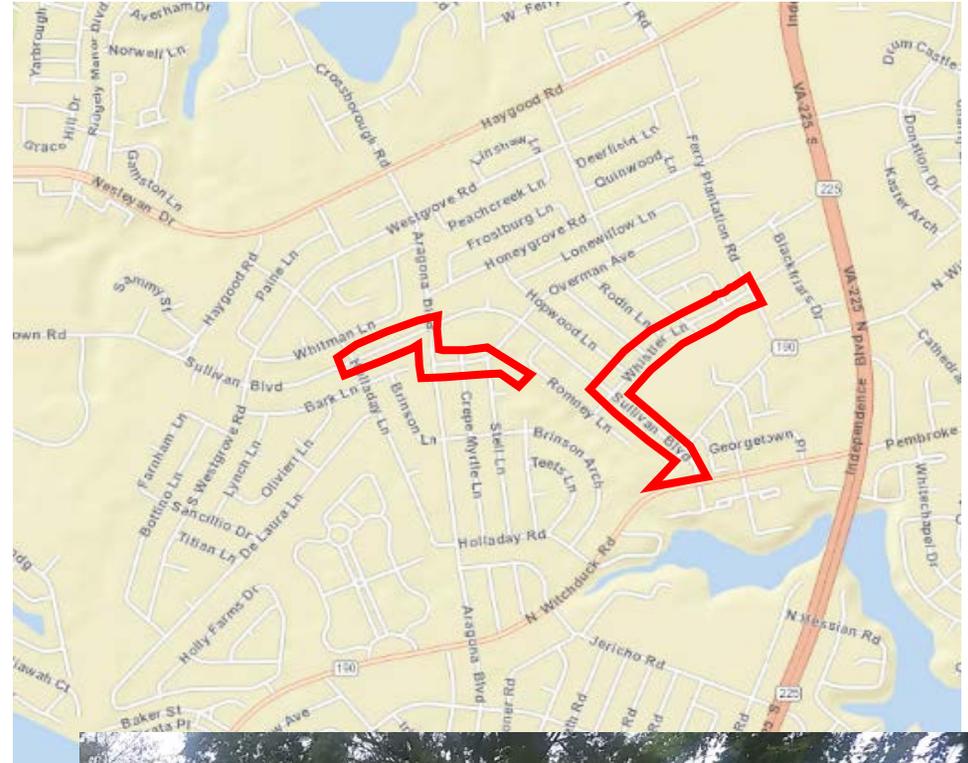


Operations &
Maintenance



7-400 ARAGONA DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and property flooding
- Rescoped in 2015
- Under Design
- Construction: 1/2018 – 7/2019

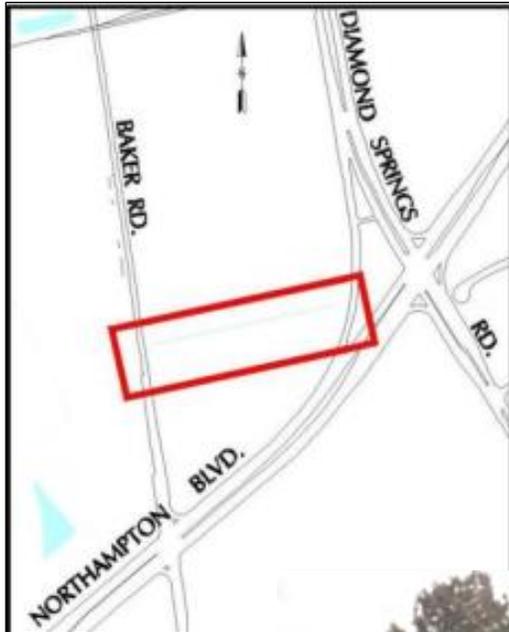


**Programmed
Funding: \$2.3 M**

\$1.4 M BTC



7-036 BAKER ROAD CULVERT AND DITCH IMPROVEMENTS



- Storm drain pipe and ditch improvements from Baker Rd. to Diamond Spring Rd. north of Northampton Blvd.
- Coordinating with Burton Station SGA
- Acquisition phase
- Construction: 1/2018 – 6/2019

**Programmed
Funding: \$450 K**

7-037 BELLAMY MANOR OUTFALL DITCH



**Programmed
Funding: \$750 K**

- Drainage improvements to the existing primary drainage system within Bellamy Manor
- Under design & acquisition
- Advertise for Construction: 5/2017 (1 Year Construction)

7-041 CENTRAL RESORT DISTRICT DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and structural flooding
- Includes tide gate, pump station & ocean outfall
- Includes internal pump stations and back-bone drainage pipe improvements
- Interim Project: Redirect approx. 15 ac area of 21st St and Baltic Ave. to exist. 16th St. Pump Station



**Programmed
Funding: \$300 K**

**Additional Above
Target Need: \$113 M**



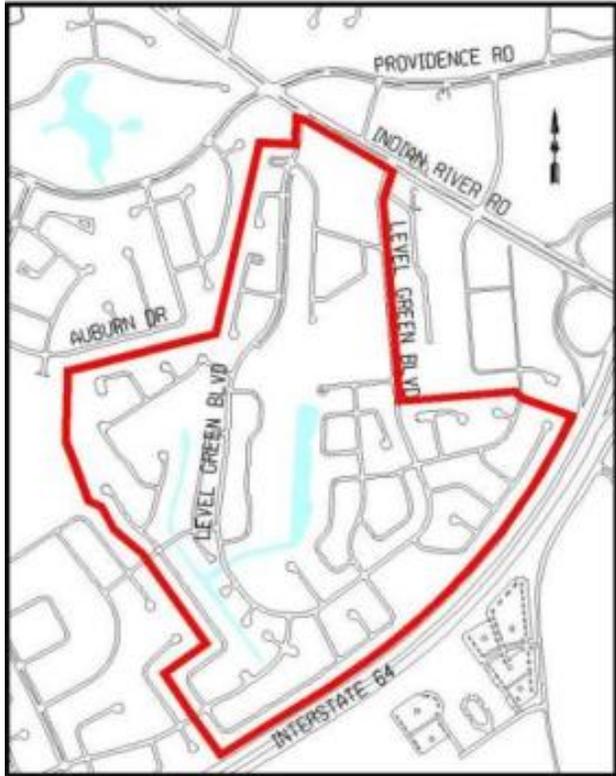
7-030 CITY WIDE SEA LEVEL RISE (SLR) / RECURRENT FLOODING (RF) ANALYSIS



**Programmed
Funding: \$3.8 M**

- Identify the probable extent of SLR / RF impacts
- Evaluate appropriate adaptation strategies in the vulnerable areas; and
- Identify budgetary costs for engineered protection measures and other adaptation

7-402 COLLEGE PARK/LEVEL GREEN DRAINAGE IMPROVEMENTS



- Improve neighborhood storm drain system
- Under Preliminary Design
- PW Operations is cleaning and inspecting critical pipe locations
- First phase of construction improvements scheduled for Fall 2018



**Programmed
Funding: \$500 K**

7-151 EASTERN SHORE DRIVE DRAINAGE

- Interim – Tide Gate Phase under construction - completion (June 2017)
- Phases I and II design & partial acquisition underway – (construction is not funded)
- Includes tide gates & pump stations
- Includes canal improvements and drainage pipe improvements

**Programmed
Funding: \$17.7 M**

**Additional Above
Target Need: \$65.4 M**



7-413 NEIGHBORHOOD STORMWATER INFRASTRUCTURE IMPROVEMENTS II

**Programmed
Funding:
\$550 K FY18**

Current Projects

- 24th-1/2 Street Drainage Imp'ts
- Thalia Drive Culvert Replacement

Completed Projects

- Indian River Rd. Culvert Imp't
- Muddy Creek Rd. Culvert Imp'ts
- Ocean Park Drainage Imp't
- Southside Rd. Drainage Imp't
- Oak Street Drainage



Indian River Rd. Culvert

Before



After

7-005 NORTH LAKE HOLLY WATERSHED

Legend Completed

- Section I-A** \$1.43 M
- Section I-B** \$2.47 M
- Section II** \$3.95 M

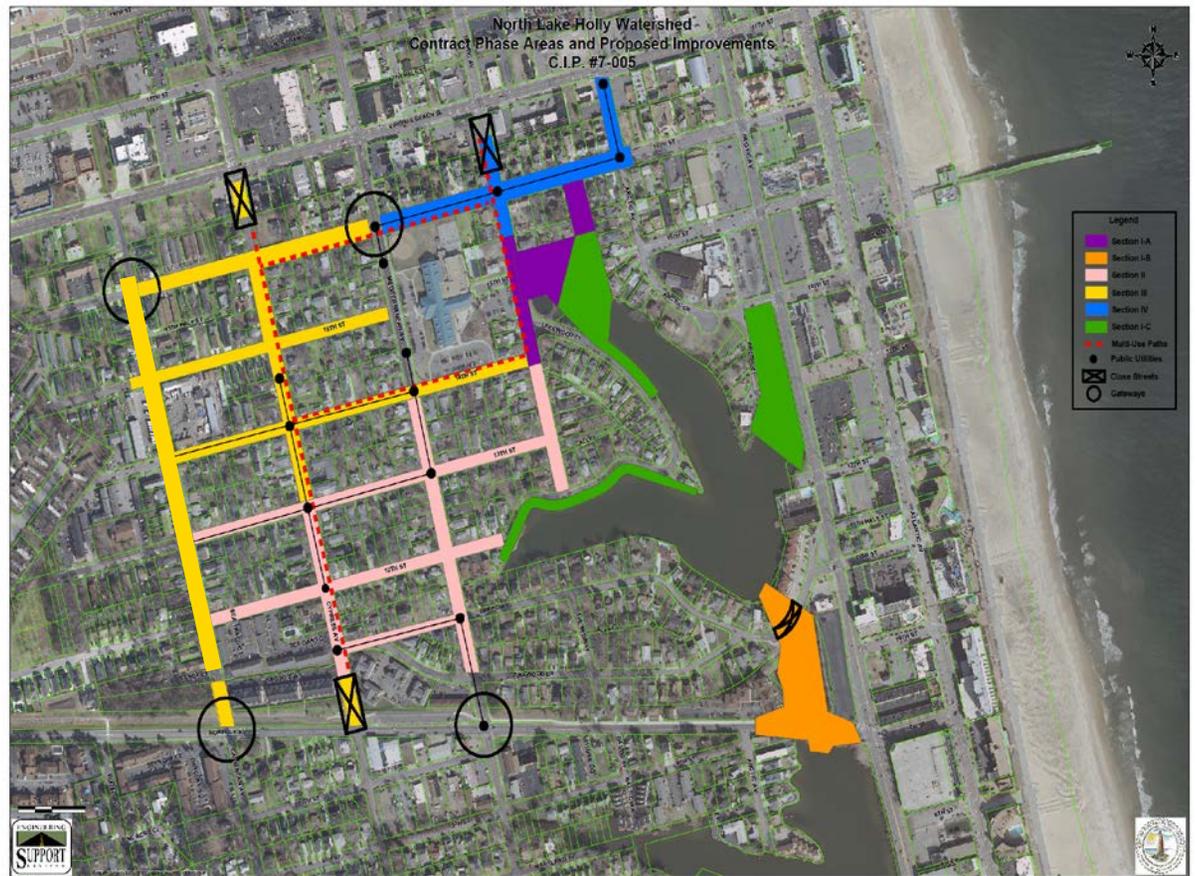
Under Construction

- Section IV** \$3.44 M
Const. 9/2016–12/2017

Under Design

- Section I-C** \$2.70 M
Const. 1/2019–12/2019
- Section IIIA** \$ 4.62 M
Const. 6/2017–6/2019
- Section III B** \$ 4.86 M
Const. 1/2019–12/2020

**Programmed
Funding: \$23.47 M**

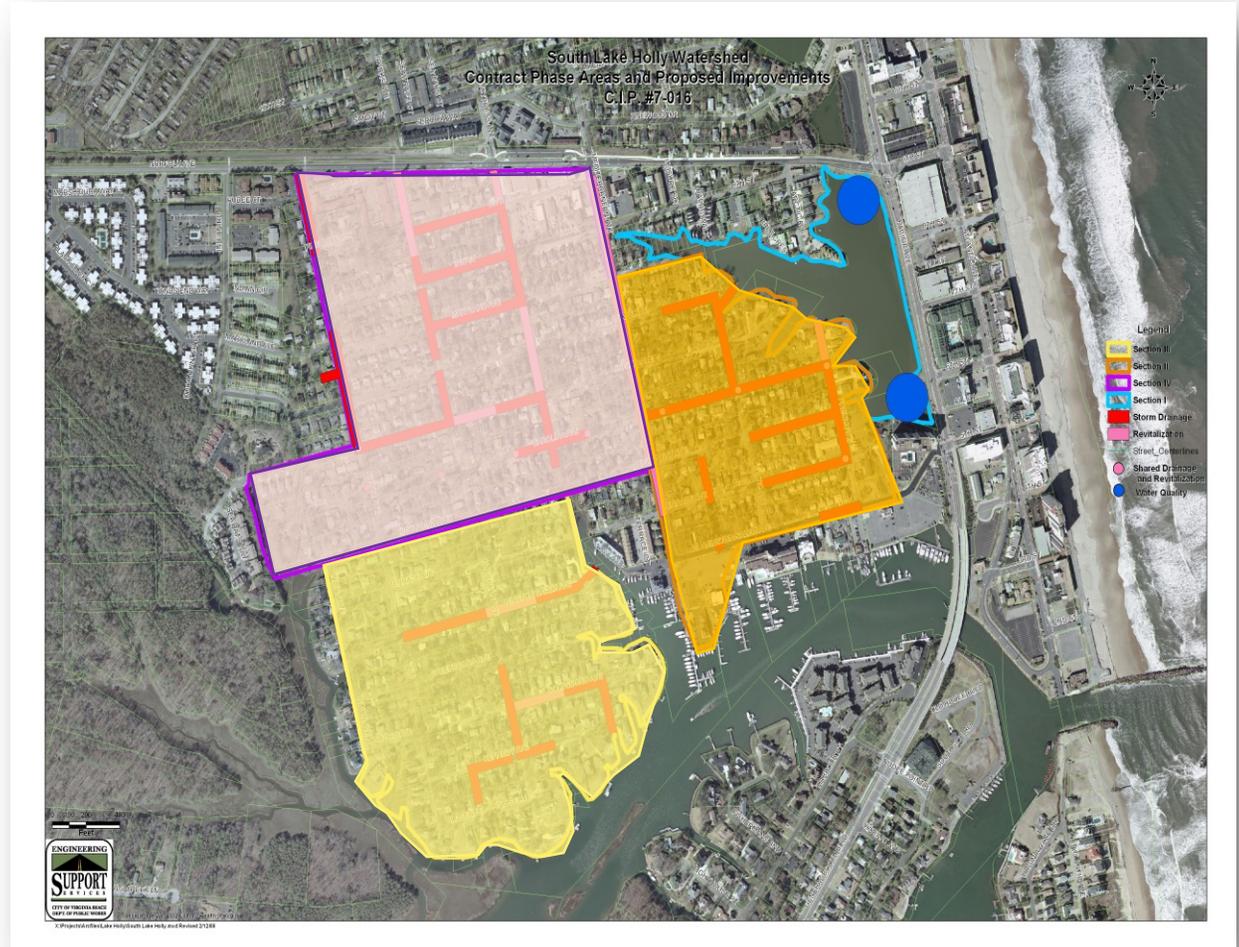


Completion in December 2020

7-016 SOUTH LAKE HOLLY WATERSHED

Legend	
Completed	
	Section III \$2.3 M Const. 9/2013
Under Construction	
	Section II \$4.71 M Const. 9/2014– 6/2017
	Section I \$0.60 M Const. 9/2014 –6/2017
Under Design	
	Section IV \$9.0 M Const. 7/2017 –10/2019

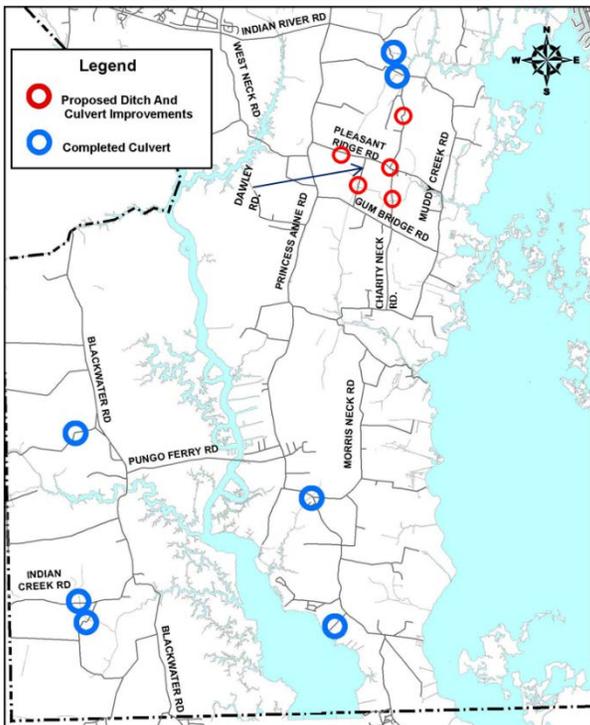
**Programmed
Funding: \$16.61 M**



Completion in October 2019

7-024 SOUTHERN CANAL / LEAD DITCH AND CULVERT IMPROVEMENTS

- Canal / Lead Ditch and Culvert Improvements within southern watersheds
 - 5 Completed Culvert Improvement Projects
 - 2 New Culvert / Ditch Improvement Projects
 - Charity Neck Rd.
 - Pleasant Ridge Rd.



**Programmed
Funding:
\$300 K/year**

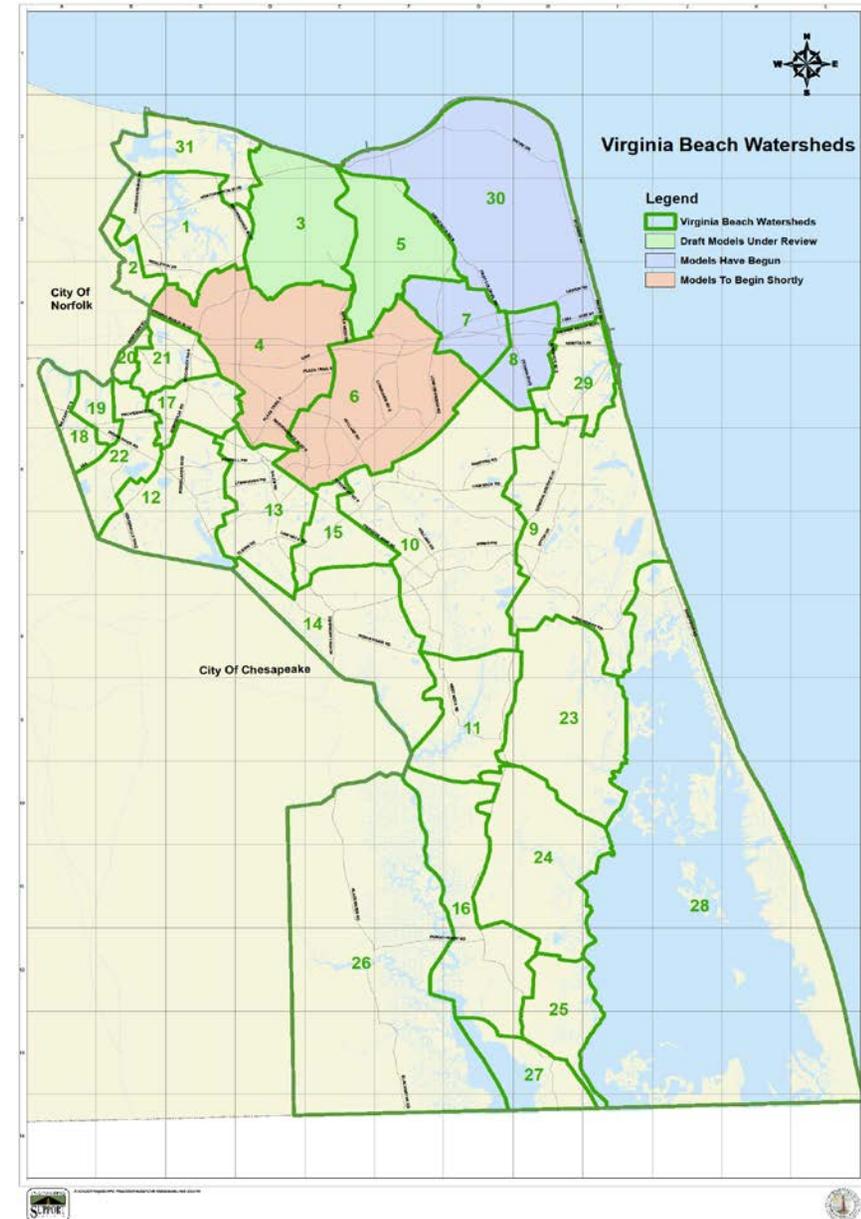


7-027 SWM MASTER PLANNING, ANALYSIS, AND INVENTORY

- Updating the City's 31 Stormwater Watershed Models
- Includes Preliminary Drainage Analysis to identify future Capital Drainage Projects
- Models will be live and reside in the Center of SW Excellence
- Funding necessary to accelerate the project

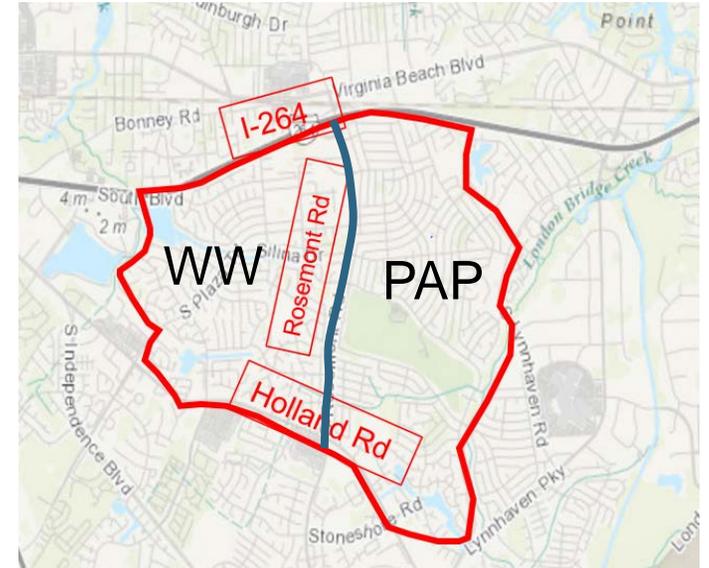
**Programmed
Funding: \$10.6 M**

**Additional Above
Target Need: \$2.3 M**



7-028 WINDSOR WOODS DRAINAGE

- Storm drain improvements to address severe roadway and structural flooding
- Includes tide gate & pump station
- Includes internal pump station
- Includes drainage pipe improvements
- First phase of construction 5/2017 – 4/2018



**Programmed
Funding: \$3.9 M**

**Additional Above
Target Need: \$31.1 M**

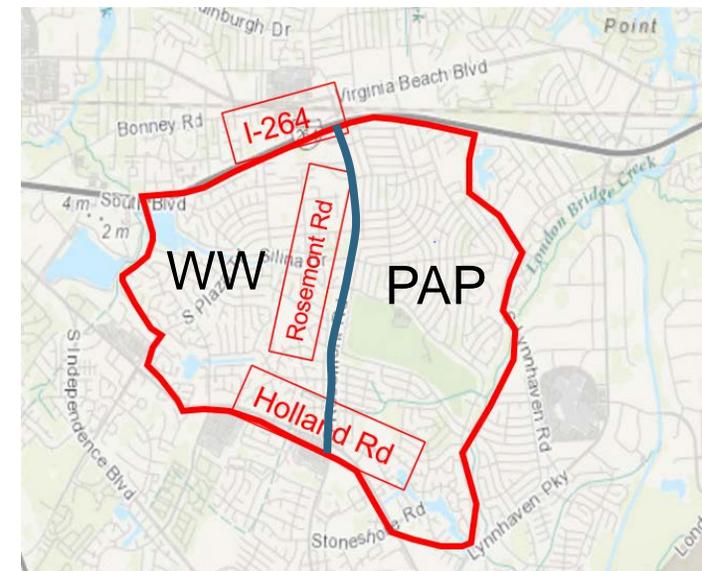


ABOVE TARGET SW-FC4 PRINCESS ANNE PLAZA DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and structural flooding to the highest level of service practicable
- Includes multiple pump stations
- Includes tide gates
- Includes drainage pipe improvements



**Additional Above
Target Need: \$66 M**



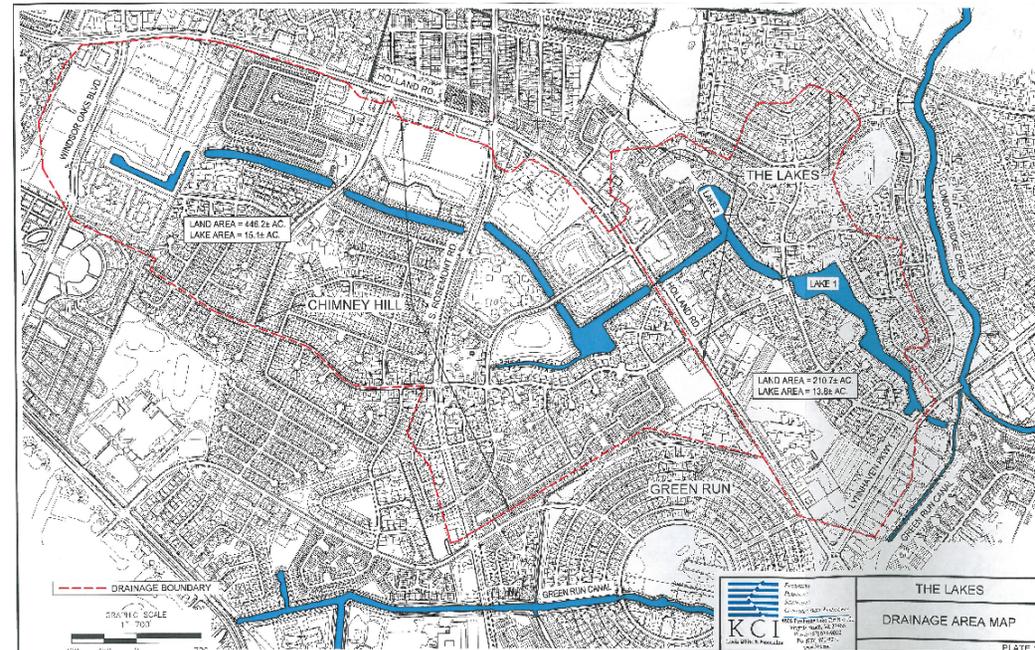
ABOVE TARGET SW-FC3 THE LAKES DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and structural flooding
- Includes tide valves & pump station
- Includes diverting Holland Road drainage away from the Lakes - directly to London Bridge Creek

Hurricane
Matthew



**Additional Above
Target Need: \$28 M**



ABOVE TARGET SW-FC1 ASHVILLE PARK DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and property flooding
- Includes tide gate & pump station
- Includes additional culvert interconnections between lakes

**Additional Above
Target Need: \$35 M**



ABOVE TARGET SW-FC2 SHERWOOD LAKES DRAINAGE IMPROVEMENTS

- Storm drain improvements to address severe roadway and property flooding
- Includes pump station
- Includes interconnecting two lakes

**Additional Above
Target Need: \$20 M**

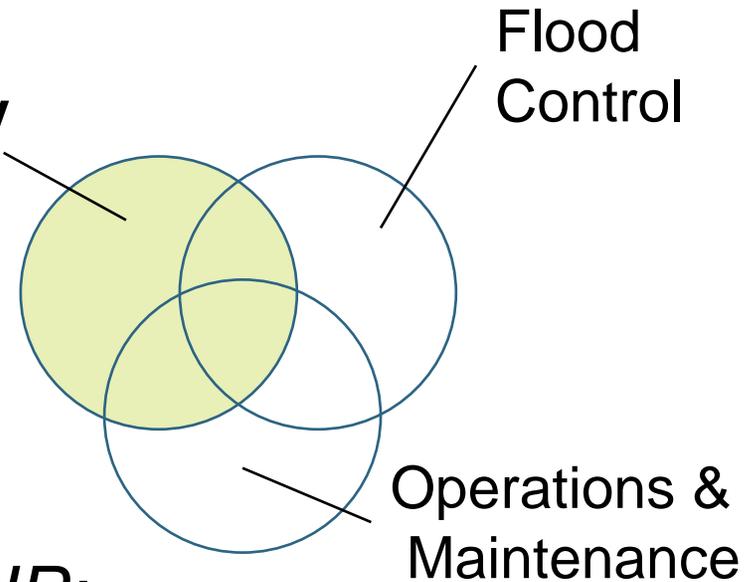


WATER QUALITY & REGULATORY COMPLIANCE CIP



**Water Quality
& Regulatory
Compliance**

Melanie Coffey



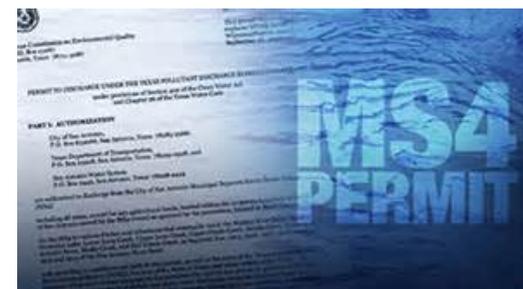
Primary Functions related to the CIP:

- Implementation of the Operational Components of the Municipal Separate Stormwater System (MS4) Permit
- Project Implementation to Reduce Pollutants for the Local Water and the initial Chesapeake bay Total Maximum Daily Loads (TMDLs) Requirements

7-042 SURFACE WATER REGULATORY COMPLIANCE PROGRAM

Operational compliance activities for the new MS4 Stormwater Permit

- **Program Administration and Reporting**
Annual Compliance Report, Program Plan Implementation and Updates, Staff Training, City Facility Management
- **Operational Requirements**
Illicit Discharge & Improper Disposal Program, Industrial Stormwater Program Oversight, Private SWMF Inspection and Enforcement Program, Floatable Litter Reduction Program, Dry Weather Screening Program
- **Infrastructure Data Management**
System Inventory Collection, Outfall and Drainage Area Mapping, GIS Data Development
- **Public Outreach and Education**
Outreach Programs, Website, & Residential SWMF Program



**Programmed
Funding
\$1.1 M/year**

**Additional Above
Target Need:
\$1.3 M/year**

7-414 STORM WATER QUALITY IMPROVEMENTS II

Pollutant reduction and water quality monitoring activities for all watersheds

- Identification ~ Design ~ Construction of water quality improvement projects in all watersheds
 - Includes Regional Stormwater Management Facilities (SWMFs) and Cost Participation for SWMF Projects
- Initial Chesapeake Bay TMDL Action Plan
 - Estimated First Phase (2016-2021) Pollutant Reductions
 - ~ 390 lb/yr Phosphorus
 - ~ 1610 lb/yr Nitrogen
 - ~ 150,220 lb/yr Sediment
 - Second and Third Phases may be reduced by HRSD SWIFT plan
- Citywide Local TMDL Action Plan for Bacteria
- Comprehensive Water Quality Monitoring Program



**Programmed
Funding:
\$1.15 M/year**

**Additional Above
Target Need:
\$2.34 M/year**

7-153 LYNNHAVEN WATERSHED RESTORATION

- Identification ~ Design ~ Construction for the Chesapeake Bay TMDL
 - SWMF Retrofit Projects
 - Constructed Wetland Projects
 - Shoreline Management Projects
 - Stream Restoration Projects
- Local Bacteria TMDL Action Plan Implementation

**Programmed
Funding:
\$309 K/year**

**Additional Above
Target Need:
\$733 K/year**



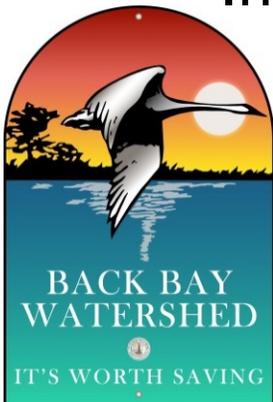
Mill Dam Creek
Before Construction



Mill Dam Creek
Stream Restoration
After Construction

7-410 SOUTHERN RIVER TMDL IMPLEMENTATION PLAN

- Identification ~ Design ~ Construction of projects for waterways with Local Phosphorus TMDLs
 - SWMF Retrofit Projects
 - Constructed Wetland Projects
 - Shoreline Management Projects
 - Stream Restoration Projects
- Local Bacteria TMDL Action Plan Implementation



**Programmed
Funding:
\$200 K/year**

**Additional Above
Target Need:
\$208 K/year**

7-043 WATER QUALITY AND RESTORATION PARTICIPATION PROJECTS II

Lynnhaven River Basin Ecosystem Restoration Project Joint Venture with the Army Corps of Engineers (USACE)

- Phase I – Design and Acquisition
 - Design of reef habitat, submerged aquatic vegetation, and wetlands
 - Cost Participation Agreement
65% ACOE / 35% City
 - \$2.25 M City Share
- Future Phase II – Design, Acquisition, Construction
 - Total Project Cost Estimate ~ \$38M



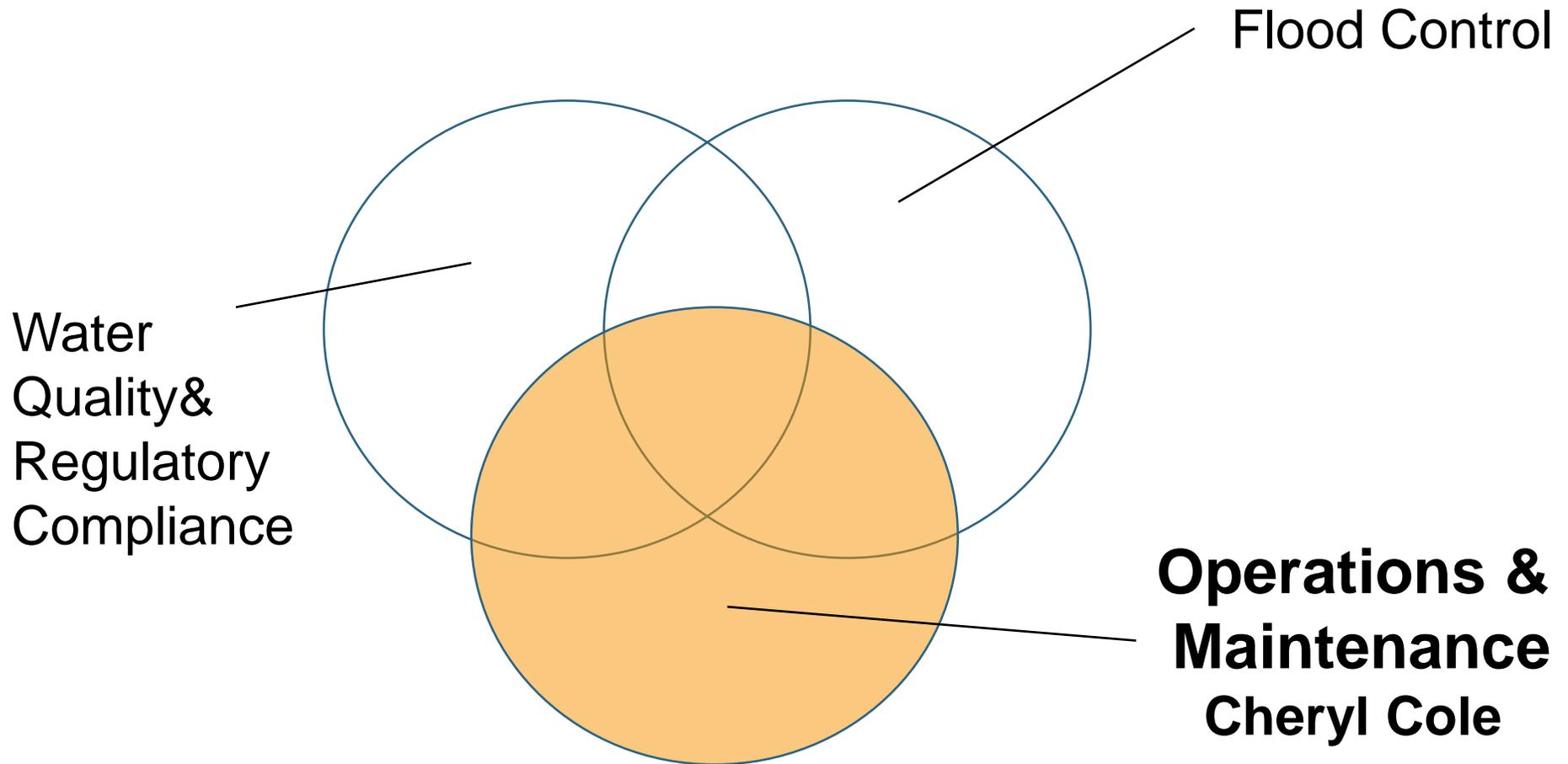
Oyster Reefs in the Lynnhaven River



**Programmed Funding:
\$50 K/year**

**Additional Above Target Need:
\$750 K one time**

STORMWATER FY 2018-23 SW CIP PROGRAM OPERATIONS & MAINTENANCE



7-415 LAKE & CANAL MANAGEMENT II

Completed Lakes:

- 2014 – Cinnamon Ridge, Brigadoon 2 & 8, Salem 2
- 2015 – Brigadoon 1
- 2016 - Brigadoon 3-7

FY17 Construction:

- Windsor Oak Canals 1&2
- Green Run 2

FY18 Planned Construction:

- Windsor Oak Canal 3
- Green Run 3-5
- Brookside 1
- Greenview Lake 1
- Centre Point 1



**Programmed Funding:
\$4.95M per FY**

**Additional Above Target
Need: \$500 K/year**

7-411 OCEANFRONT SW FACILITIES MAINTENANCE

For FY 18:

- Seawall Concrete Joint Sealants - \$100K
- Pump Station Slab Repairs - \$50K
- Full Depth Boardwalk Repairs - \$50K
- Stair Nosing Replacements - \$200K
- Pump Station Repairs - \$100K
- Outfall Repairs - \$250K

**Programmed Funding:
\$750K/yr**

**Additional Above Target Need:
\$900 K/year**

To accelerate repair rate to remain compliant



7-023 PRIMARY SYSTEM INFRASTRUCTURE IMPROVEMENTS II

Off Road Ditch Maintenance Program with Miles by Fiscal Year

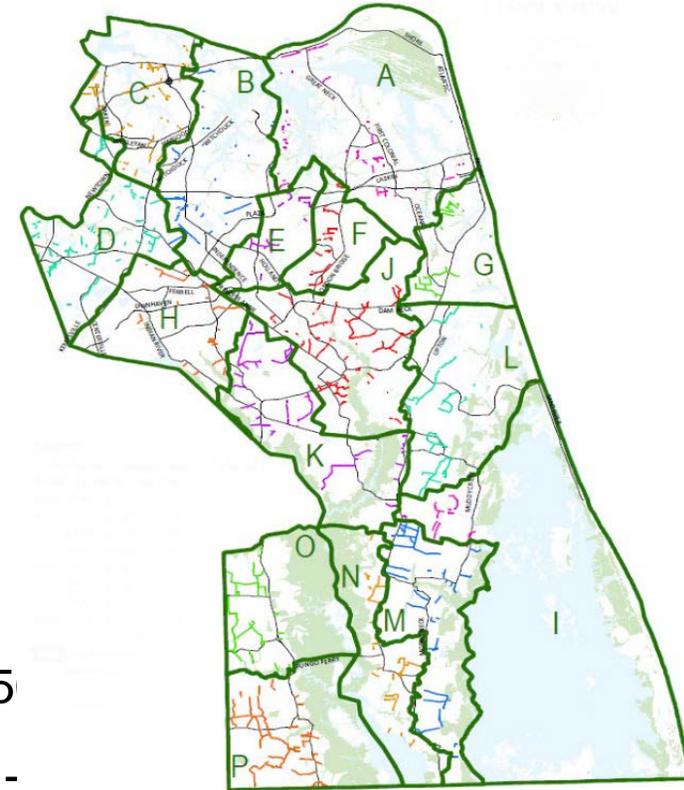
YEAR	(ZONES)	MILES
FY14:	(F, J)	21
FY15:	(B, M)	23
FY16:	(C, N)	16
FY17:	(D, L)	25
FY18:	(E, K)	17
FY19:	(A, I)	10
FY20:	(G, O)	17
FY21:	(H, P)	23
TOTAL		152

Ditch Cleaning Cycles:

- 16 years - Original Cycle
- 8 years - Goal Cycle
- 12 years - Current Cycle

Other FY 18 Projects:

- Canal #2 Inspect/Repair - \$300K
- Salem Canal Inspect/Repair - \$25
- West Neck Creek Inspect/Repair -



Programmed Funding:
\$2.27M/yr

**Additional Above Target
Need: \$500 K/year**

7-026 RESIDENTIAL COST PARTICIPATION

- Citizen cost participation programs for road-side pipe and lake algae control
- 600+ lakes eligible for time treatment at \$5-10K per lake
- Treatment is a one-time 50/50 cost share
- Lake Dowdy will be first treated this Spring

**Programmed Funding:
\$50K/yr**

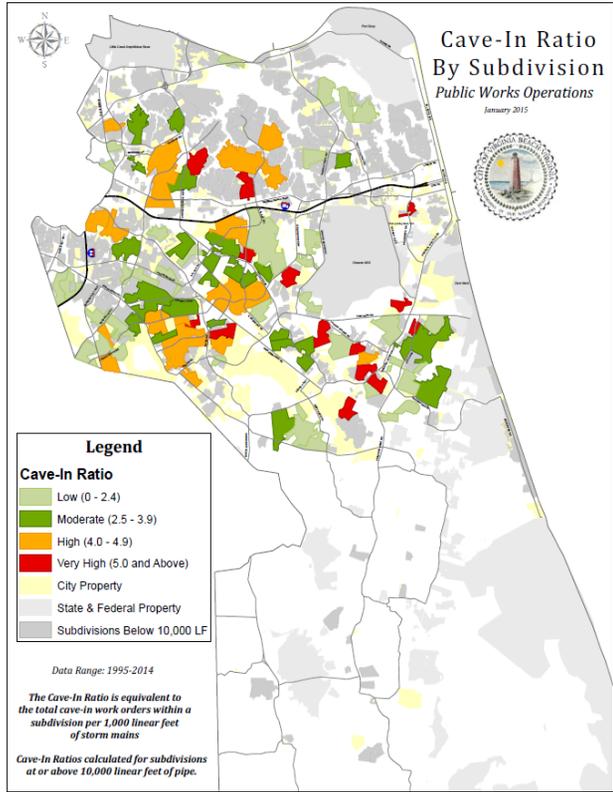
**Additional Above Target
Need: \$100 K/year**



7-416 SW INFRASTRUCTURE REHABILITATION & IMPROVEMENTS II

- **Neighborhood Pipe Rehabilitations**
 - Green Run \$2.7M – complete
 - Glenwood \$1.4M & Pine Ridge \$1.8M – underway
 - FY 18: Kings Grant \$.75M & Magic Hollow \$1.5M
- **Corrugated Steel Pipe Repairs**
- **CCTV & Sliplining Funds**
- **Cave Repairs**
- **Small Projects (<\$500k)**

**Programmed
Funding:
\$5.75M per FY**



**Additional Above
Target Need:
\$4.0 M/year**



7-412 SW PUMP STATION MAINTENANCE

- The 15 stations are aging
- Rehab/overhaul program developed

Current plan:

- FY 18 - 79th Street Station
- FY 19 - Goodspeed Rd & Ocean Park Stations
- FY 20 - Cape Story Station
- FY 21 - Ocean View Station
- FY 22 - 16th Street Station
- FY 23 - 42nd Street Station

**Programmed Funding: \$1.25M FY 18
\$750K/yr FY 19+**

**Additional Above Target Need:
\$1.0 M/year**

Reduces rehab cycle from 15 yrs to 7 yrs



ABOVE TARGET

SW-OM1 HOLLIS AND PLEASURE HOUSE ROADS / SHORE DRIVE / CHURCH POINT DRAINAGE

- Address severe roadway and property flooding
- Address initial system capacity limitations

**Additional Above
Target Need = \$3 M**



ABOVE TARGET SW-OM2 CANAL MANAGEMENT

- 47 miles of canal & 25 year cycle
- Restore urbanized canals to original drainage capacity and flow rates
- Dedicated funding mechanism to address canals without impacting lake dredging cycles
- Typical projects similar to Windsor Oaks canal projects

**Additional Above
Target Need = \$2 M/yr**



Windsor Oaks 1 Canal

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Canal Management (SW-OM2)	\$ 12,000,000
Lake Management Ph II (7-415)	\$ 3,000,000
Oceanfront Storm Water Facilities Maintenance (7-411)	\$ 5,400,000
Primary Infrastructure Improvements Ph II (7-023)	\$ 3,000,000
Residential System Infrastructure Improvements II (7-026)	\$ 600,000
Shore Drive/Hollis Road Drainage (SW-OM1)	\$ 3,000,000
Storm Water Pump Station Modifications (7-412)	\$ 6,000,000
SW Infrastructure Rehab. & Improvements Ph II (7-416)	\$ 22,500,000
	Sub-Total = \$ 55,500,000
	Total = \$ 451,450,000

DISCUSSION