City of Fort Lauderdale Watershed Asset Management Program (WAMP) 2020 FSA Annual Conference – July 2020



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Presentation Agenda

- 1. Why Reasons to create the WAMP
- 2. How Funding mechanism, Strategy
- 3. What Major Components, Roadmap
 - i. Maturity & Gap Assessment
 - ii. Level of Services
 - iii. Condition Assessment
- 4. Who Roles, responsibilities & recommendations
- 5. Q/A Session





WATERSHED ASSET MANAGEMENT PLAN (WAMP)

PUBLIC WORKS DEPARTMENT SUSTAINABILITY DIVISION STORMWATER & ENVIRONMENTAL SERVICES

Prepared by: Hazen and Sawyer, PC and GHD Project P12482, Task Order 14

ASSET MANAGEMENT



CONTROL VERSION TABLE Version 1.0 Date: Dec 2019



1. Reasons for creating the WAMP





Multiple Challenges & Geographic limitations







CITY'S STORMWATER HARD ASSETS - HIGHLIGHTS







CITY'S STORMWATER NATURAL & SOFT ASSETS - HIGHLIGHTS









REASON # 1 – WAMP serves meeting City Press Play Strategic 2024 Plan



Infrastructure Focus Area

GOAL 1: Build a Sustainable & Resilient Community Objectives:

- <u>Proactively</u> maintain our water, wastewater, <u>stormwater</u>, road and bridge infrastructure
- Reduce Flooding and <u>Adapt</u> to Sea Level Rise

The Internal Support Focus Area

GOAL 8: Build a Sustainable & Resilient Community Objectives:

- Provide safe, <u>well-maintained</u>, and efficient facilities and <u>capital assets</u>
- Integrate sustainability and <u>resiliency</u> into <u>daily operation</u>





REASON # 2

WAMP serves reaching the Division's Flood Resilience & Environmental Vision, Mission, and Goals



City of Fort Lauderdale Flood Resilience and Environmental Vision, Mission, and Goals

VISION

To provide flood protection and waterway pollution control through efficient and sustainable management of the City's stormwater and related natural assets

MISSION

Proactively manage our stormwater and environmental resources through best asset management practices GOAL 1 Reduce flooding and adapt to sea level rise

GOAL 2 Improve water quality and our natural resources

GOAL 3 Proactively maintain the City stormwater infrastructure

30

GOAL 4 Maintain and improve the community's rating system (CRS) score

GOAL 5

Collaborate with stakeholders to mutually understand and address our community's flooding risks













Integrating climate change response with the BC Asset Management Framework



REASON # 4 – WAMP helps combat climate change





A Sustainable Service **Delivery Primer**

> A companion document to Asset Management for Sustainable Service **Delivery: A BC** Framework

2019



- The purpose of Asset Management (AM) is sustainable 1. service delivery, and Climate Change (CC) is a threat to sustainable service delivery
- 2. AM practices can increase a community's resilience to the impacts of CC and improve response to natural disasters.
- 3. AM decisions will impact CC.
- 4. AM helps local governments make decisions about CC response in the broader context of local government service delivery and other priorities.
- 5. Integrating CC response into AM is a practical approach to managing liability risks.





REASON # 5 – WAMP serves Prioritizing Work



5 Consequence of Failure (CoF) Frequent Immediate Assessment Action 4 Regular Monitoring 3 High Priority Renewal 2 Mid Sample Priority Assessment Renewal 1 2 з 4 5 1 Likelihood of Failure (LoF)

BRE = LoF X CoF



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Figure ES.5: Typical Risk Matrix and Associated Management Approaches

2. How – WAMP Funding Strategy







Budget Evaluation to Create a Watershed Asset Management Plan

City of Fort Lauderdale Public Works Stormwater Operations Department

Feb 2018 – Public Works asked GHD for a budget study to create the WAMP and evaluate potential savings from implementation **April 2018 – GHD** completed the budget study





Forecasted \$1.5M Annual WAMP Savings by FY 2023





Last Update: 06/21/2018 Total Request: 1.405.000.00

FY 2019 BUDGET MODIFICATION FORM
Public Works - 470 Stormwater Operations

Priority No: 5
Title of Request: Establish Watershed Asset Management Plan (WAMP)
Request Type: Program - New
Interdistingtof Response Ford

New Position(s) Requested:	Position(s) Eliminated:	Change in Part-Time:	Total Change in FTEs:
0.00	0.00	0.00	0.00

Basis of justification: Improvement, revenue generating, mandated, cost reduction, workload change. Please state

what will be the consequence if this request is not funded?

This for adding \$1,405,000 annually to the Stomwater Operations (STW OPS) Budget for a program to develop a Watershed Asset Management Program (WAMP) to compliment and expand an existing City effort to compile existing stormwater (STW) infrastructure data into the Cityworks Asset Management Software.

The City of Fort Lauderdale's STW system was built mostly during the mid-20th century and not designed to address the
challences posed by climate chance, sea level rise and drowing impervious surface faced by the coastal City it is today. As a

June 2018 – Budget Office approves \$1.4M Annual funding for WAMP

By funding and establishing a WAMP, the PWD will be able to achieve these goals through the STW and environmental groups

So introdge to establishing a version rule event will be able to achieve these goals introdge the 5 rw and environmental groups.
 Save the City about \$2 Million in avoided costs from years 1 through 5 and about 28% annual savings of STW O&M costs for years 5 through 10

 Establish a sustainable financial framework for STW management, including risk-based decision making process and data-driven budgeting justifications

Implement asset management and business process improvements to help the City's STW OPS and environmental
programs be better prepared for extreme weather events and sea level rise

Establish asset management objectives including those for lifecycle costs; management of risks; organizational improvement, including knowledge management; business operations; maintenance and reliability; use of technology; and service level enhancement

 Establish a state-of-the-art maintenance and reliability program enhanced by Cityworks™ asset management software implementation





3. What is the WAMP? - Components & Roadmap



CITY OF FORT LAUDERDALE PUBLIC WORKS DEPARTMENT | ASSET MANAGEMENT



The City Has Performed Extensive Work Related to Stormwater System Mapping and Asset Attribute Surveys...







Attributes field surveyed for over 5,000 stormwater features









...and was Ready to Formalize its Asset Management Practices and Procedures in Alignment with Industry Standards

All Industry Asset Management Frameworks Focus on:

- **Minimizing total costs** of acquiring, operating, maintaining, and renewing assets
- Continuously delivering the levels of service your customers desire and regulators require
- **Minimizing** the overall risk to the organization







The IAM Conceptual Model (Anatomy) was Selected as a Best-Fit Framework for the City's Watershed Asset Management Program





A Maturity Assessment Was Conducted to Compare the City's Existing AM Practices to the IAM Anatomy Requirements

Maturity Scores across 39 IAM Elements

IAM Conceptual Model Elements

Group 3 - Life Cycle Delivery Group 1 - Strategy & Group 5 - Organisation & Planning People 11. Technical Standards & Legislation 12. Asset Creation & Acquisition 26. Procurement & Supply Chain 13. Systems Engineering Management Maturity Level Scoring Framework 14. Configuration Management 27. Asset Management Leadership 15. Maintenance Delivery 28. Organisational Structure 16. Reliability Engineering 29. Organisational Culture Industry 17. Asset Operations 30. Competence Management Developing Competent Mature Leader 18. Resource Management 19. Shutdown & Outage Management 20. Fault & Incident Response Maturity Level 0 Maturity Level 1 Maturity Level 2 Maturity Level 3 Maturity Level 4 Maturity Level 5 Group 6 - Risk & Review Group 2 - Asset Management 21. Asset Decommissioning & Disposal The City has identified The City has not he City has identified The City can demonstrate The City can demonstrate **Decision-Making** The City can 31. Risk Assessment & Management recognized the need the need for this he means of that it systematically and that it is systematically and demonstrate that it 32. Contingency Planning & Resilience for this requirement requirement and there is systematically and consistently achieves consistently optimizing its employs the leading and/or there is no evidence of intent to consistently achieving the relevant requirements set out in the IAM Anatomy asset management practice, practices and achieves in line with the City's evidence of progress it requirements and can maximum value from the Group 4 - Asset Information commitment to put it in demonstrate that these objectives and operating management of its place are being progressed context assets, in line with the Lifecycle Value Realisation 22. Asset Information Strategy with credible and City's objectives and 35. Asset Performance & Health esourced plans in place operating context **Resourcing Strategy** 23. Asset Information Standards 10. Shutdowns & Outage Strategy 24. Asset Information Systems 25. Data & Information Management 37. Management Review, Audit 38. Asset Costing & Valuation 39. Stakeholder Engagement

The City's existing asset management policies, practices, and procedures were compared to the IAM requirements in each of the 39 elements and scored for maturity.



Maturity Assessment Results Drove Development of the City's Watershed Asset Management Program Roadmap...



WAMP Fig. 1.1, Page 1-3





...and Culminated with the Watershed Asset Management Plan Ver. 1.0



- **Purpose:** to document the current state of the City's stormwater assets and to project the short- and long-range asset renewal and replacement needs aligned with ongoing and future operations and maintenance requirements
- **Intention:** The WAMP is intended to be a planning document used to provide a rational framework for:
 - **Understanding** the existing risk and stewardship requirements of the City's stormwater asset portfolio;
 - **Planning** for the appropriate standard of care necessary to provide an acceptable level of service; and
 - **Decision-making** to provide a justifiable basis to support long-range organization, operations, and asset management decisions.





The IAM Conceptual Model Maturity Assessment and the WAMP Ver. 1.0 are Supported by the USEPA Model for Implementation

- 1. What is the current state of my assets?
 - What do I own?
 - Where is it?
 - What condition is it in?
 - What is its performance?
 - What is its remaining useful life?
 - What is its remaining economic value?
- 2. What is my required level of service (LoS)?
 - What is the demand for my services by my stakeholders?
 - What do regulators require?
 - What is my actual performance?

- 3. Which assets are critical to sustained performance?
 - How does it fail? How can it fail?
 - What is the likelihood of failure?
 - What does it cost to repair?
 - What are the consequences of failure?
- 4. What are my best O&M and CIP investment strategies?
 - What alternative management options exist?
 - Which are the most feasible for my organization?
- 5. What is my best long-term funding strategy?





The WAMP Ver. 1.0 Contents Mirrors the USEPA Model Elements



EXECUTIVE SUMMARY SECTION 1 – INTRODUCTION SECTION 2 – OVERALL STORMWATER SYSTEM SECTION 3 – CITY FLOOD PROTECTION AND COMMUNITY INVESTMENT PLAN SECTION 4 – STANDARD OF CARE, LEVEL OF SERVICE, AND KEY PERFORMANCE INDICATORS SECTION 5 – ASSET INVENTORY UPDATING PROCEDURES SECTION 6 – HOW MUCH WILL THE WAMP COST? SECTION 7 – HOW CAN THE CITY PAY FOR IT? SECTION 8 – WATERSHEDS SECTION 9 – REFERENCES





3. What – Levels of Service





Levels of Service (LoS) Help to Identify the Right Response at the Right Time within Each Watershed



WAMP Fig. 7.6, Page 7-9



CITY OF FORT LAUDERDALE

Lower Cost of Operating & Maintaining Assets through:

- Most <u>Efficient</u> to Respond to or Maintain Assets within each Watershed
- Most <u>Effective</u> use of Resources to Meet Citizen Expectations
- <u>Optimal</u> Level of Service Performance and Standard of Care (Efficient and Effective) for each Watershed
- <u>Tolerable</u> Risk of Function Failures

Research was conducted on how other communities across the country identify and monitor stormwater LoS



Levels of Service (LoS) are an Essential Element of the WAMP Ver. 1.0



What is the demand for services by my stakeholders within each watershed?

What do regulators require?

What is the actual performance?

WAMP Fig. 4.1, Page 4-2





Reactive Level of Service (LoS): Right Level of Response, Right Time



Correctly sets citizen \checkmark expectations

✓ Establishes the appropriate level and type of response to satisfy citizen requirements

	Watershed goals can be met by focusing on the most critical stormwater infrastructure and high priority areas, while addressing environmental compliance	Watershed goals require an improved level of inspection and preventive and corrective maintenance	Watershed goals require maximum level of inspection and preventive and corrective maintenance.
Asset	LoS C	LoS B	LoS A
Control Valve	Within 24 hours	Within 8 hours	Within 2 hours
Inlet	Within 7 business days	Within 3 business days	Within 24 hours
Manhole	Within 72 hours	Within 48 hours	Within 24 hours
Gravity Main	Within 7 business Days	Within 72 hours	Within 24 hours
Pollution Control Structure	Within 72 hours	Within 48 hours	Within 24 hours
Pump Station	Within 24 hours	Within 8 hours	Within 2 hours





Proactive Level of Service (LoS): Maintain Right Asset, Right Time



- ✓ Establishes the appropriate level and type of resources to satisfy LoS requirements
- Establishes most efficient utilization of resources through effective planning & scheduling

	Watershed goals can be met by focusing on the most critical stormwater infrastructure and high priority areas, while addressing environmental compliance	Watershed goals require an improved level of inspection and preventive and corrective maintenance	Watershed goals require maximum level of inspection and preventive and corrective maintenance.
Asset	LoS C	LoS B	LoS A
Control Valve	Inspect & test once annually	Inspect & test twice annually	Inspect & test quarterly
Inlet	Clean annually	Clean quarterly	Clean monthly
Manhole	Clean annually	Clean quarterly	Clean monthly
Gravity Main	WS 1,2,3,4,6,7,8, & 10 annual	WS 5 Semi-annual	WS 9 Quarterly
Pollution Control Structure	Inspect annually	Inspect quarterly	Inspect monthly
Pump Station	PS #3 quarterly	PS #4&5 monthly	PS #1&2 semi- weekly





Watershed-Based Levels of Service (LoS) for each Asset Class Help to Identify the Level of Effort (and Resources) Required - *Example*

Level of Effort 1 Individual Cost of Service 1				
Level of Effort 2 Individual Cost of Service 2		LoS C	LoS B	LoS A
Level of Effort 3 Individual Oost of Service 3	Risk Tolerance	High	Medium	Low
Strategy may warrant an equipment costs for each Level of Effort increased Level of Effort	Percentage of Total Assets	50	30	20
	Asset Class	Pollution Control Device	Manhole	Tidal Control
	# Assets in Class	76	1,192	150
	Proactive Inspection Frequency	Annual	Quarterly	Monthly
	Duration/Inspection	0.5 Hours	1 Hour	2 Hours
	Inspections/Year	1	4	12
	Cost/Inspection (assuming avg. labor rate/hour = \$30)	\$15	\$30	\$60
	Total Cost per Year	\$15	\$120	\$720





3. What – Risk-Based Condition Assessment





Focusing on the most critical assets will solve major problems first







Consequence of Failure (CoF) Determines an Asset's Failure Impacts and is Used to Prioritize Capital and O&M Planning

CR	FAILURE IMPACT	DESCRIPTION	INSPECTION FREQ.
1	FAILURE LEAST DISRUPTIVE	DRAINAGE TO PARKS AND OPEN SPACES	AS NEEDED
2	LOW DISRUPTION	LOCAL ROADS, SMALL PIPES	15-20 YRS
3	MODERATE DISRUPTION	MEDIUM SIZE PIPES, COLLECTOR ROADS	10-15 YRS
4	SIGNIFICANT DISRUPTION	LARGE PIPES, ARTERIAL ROADS, COMMERCIAL PROP.	5-10 YRS
5	FAILURE MOST DISRUPTIVE	LARGEST PIPES, MAJOR CORRIDORS & PUMP STATION	1-5 YRS

WAMP Table 2.8, Page 2-5





Likelihood of Failure (LoF) Determines an Asset's Existing Condition and Remaining Useful Life (RUL)

GRADE	CONDITION	RESPONSE	RUL	
0	NOT RATED	ABANDONED	N/A	
1	VERY GOOD	NO IMMEDIATE	60-100%	
2	GOOD	CLEANING	35-60%	
3	FAIR	ADDRESS DEFECTS	20-35%	
4	POOR	REHAB OR RENEWAL	10-20%	
5	VERY POOR	RENEWAL / REPLACE	0-10%	



WAMP Table 2.5, Page 2-1





Risk Assessment Drives Work Prioritization and Planning Efforts

$BRE = LoF \times CoF$





4. Who – Roles, Responsibilities, Recommendations





The IAM Conceptual Model Maturity Assessment Identified Several Immediate-Term Recommendations/Responsibilities



No.	Key Immediate Term Recommendations	Responsibility
1	Develop organization-wide Asset Management Policy statement	Executive Leadership, Asset Management
2	Establish capital prioritization and formalized business case evaluation methodology	Financial Services and Stormwater Adaptation & Design
3	Implement "Identify-Plan-Schedule-Execute-Close-Analyze" (IPSECA) Process for O&M	Stormwater Operations
4	Implement problem, cause, remedy codes into Cityworks	IT/GIS and Stormwater Operations
5	Track equipment use and associated costs by Work Order	Stormwater Operations
6	Develop and implement an asset onboarding workflow	Asset Management, IT/GIS
7	Formalize process and workflow for requirements analysis, design and evaluation of asset systems and components	Stormwater Adaptation and Design
8	Determine and implement schedule for attribute update, including using Cityworks/GIS to edit attributes	IT/GIS
9	Formalize procedures for engineering principles throughout life cycle to ensure asset performance	Stormwater Adaptation and Design, Stormwater Operations
10	Standardize asset and equipment inspection forms with drop-down menus identifying required information prior to closing out work orders	Asset Management, Stormwater Operations
11	Leverage Cityworks in field (tablet mode) for data collection	IT/GIS, Stormwater Operations, Asse Management
12	Develop, align and assign roles and responsibilities to fully support a formalized asset management program	Executive Leadership, Asset Management
12	Implement triple bottom line (TBL) elements (financial, social, and environmental) into formalized Business Risk Exposure tool	Financial Services and Stormwater Adaptation & Design
13	Establish AM Program Levels of Service	Executive Leadership, Asset Management, Stormwater Operations
14	Identify Effective Useful Life for all asset classes	Asset Management, Stormwater Adaptation & Design, Stormwater Operations





Each Operating Group within Public Works Has a Role to Ensure the Successful Implementation of the WAMP

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Table 1.1: Flood Resilience and Environmental Groups Functional Capabilities

WAMP Pages 1-6 through 1-10





The IAM Conceptual Model Maturity Assessment and the WAMP Ver. 1.0 are Supported by the USEPA Model for Implementation







With the Completion of the Vision, Implementation Roadmap, and WAMP Ver. 1.0, the City is Prepared for Phase 2 - Implementation



- ✓ WAMP helps the City to meet its Press Play Strategic 2024 Plan Goals
- WAMP serves to achieve the Division's Flood Resilience & Environmental Vision, Mission, and Goals
- ✓ WAMP helps to build up the City's resilience
- ✓ WAMP helps to combat climate change
- ✓ WAMP serves to prioritize stormwater work





WAMP Presentation Recap

Presented the WAMP basics (AM Framework & AM Standards)

Presented how the WAMP was funded through a STW OPS budget modification

Presented the WAMP Levels of Service & Asset Risk Assessment

Previewed a suggested WAMP Roadmap for Implementation

Questions?





Thank You!



