

ADAPTATION FORUM

Resilience in Practice | July 20, 2018



INTRODUCTION

John Millspaugh, Arcadis





Resilience is...

“ the capacity of individuals, communities, institutions, businesses, and systems ... to **survive, adapt, and grow** no matter what kinds of **chronic stresses and acute shocks** they experience. ”

—Rockefeller Foundation

Amina Rahill-Marier
Virginia Beach Office



Katie Coleman
Long Island City Office



Agenda

1 Introduction

2 The Reality of Using an Interdisciplinary Approach

- Breakout Session #1

3 New Solutions to Old Problems

- Breakout Session #2

4 Construction Under Pressure

- Breakout Session #3

5 Group Report Out

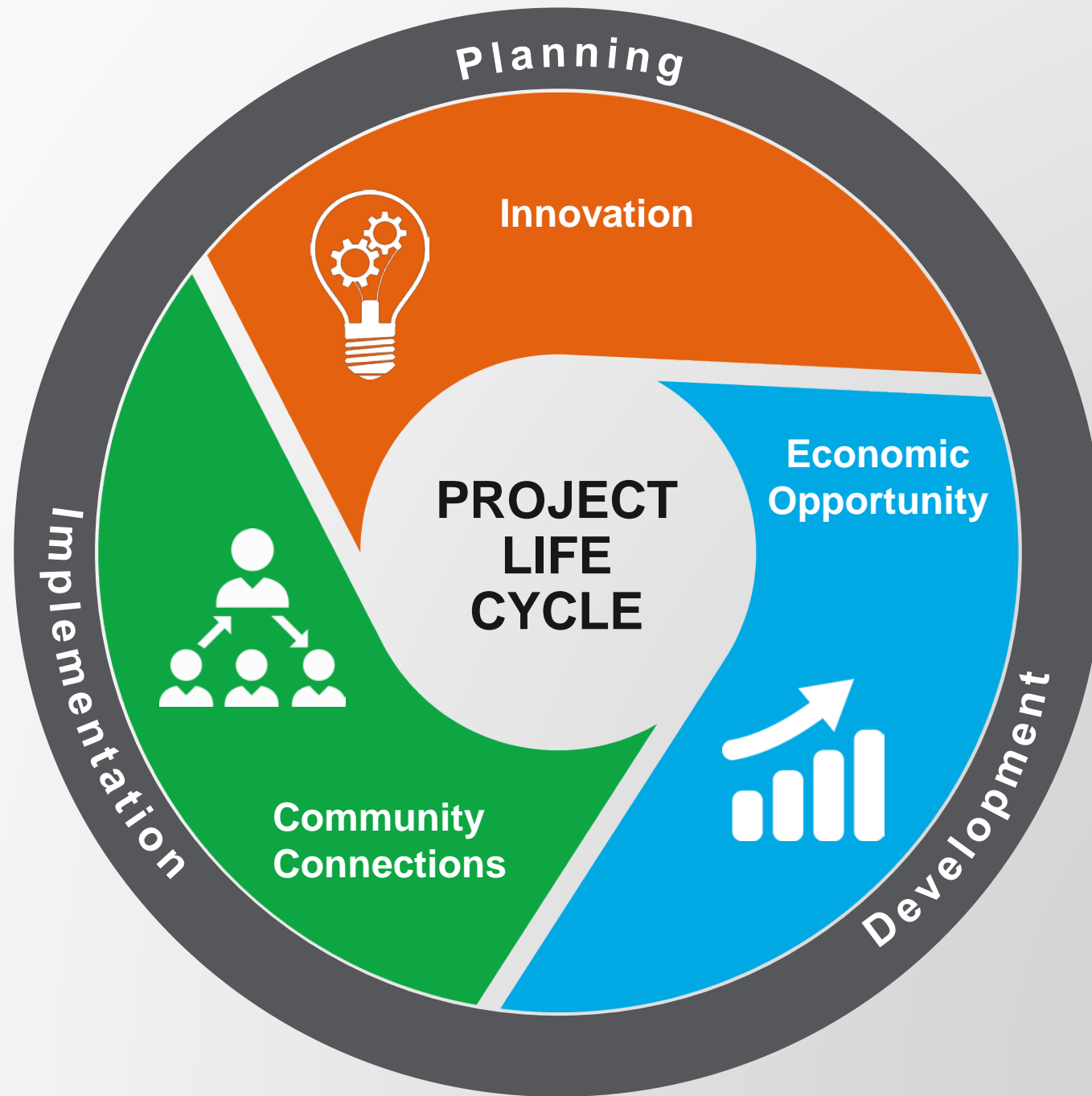
6 Conclusions



THE REALITY OF USING AN INTERDISCIPLINARY APPROACH

Kris Edelman, Arcadis

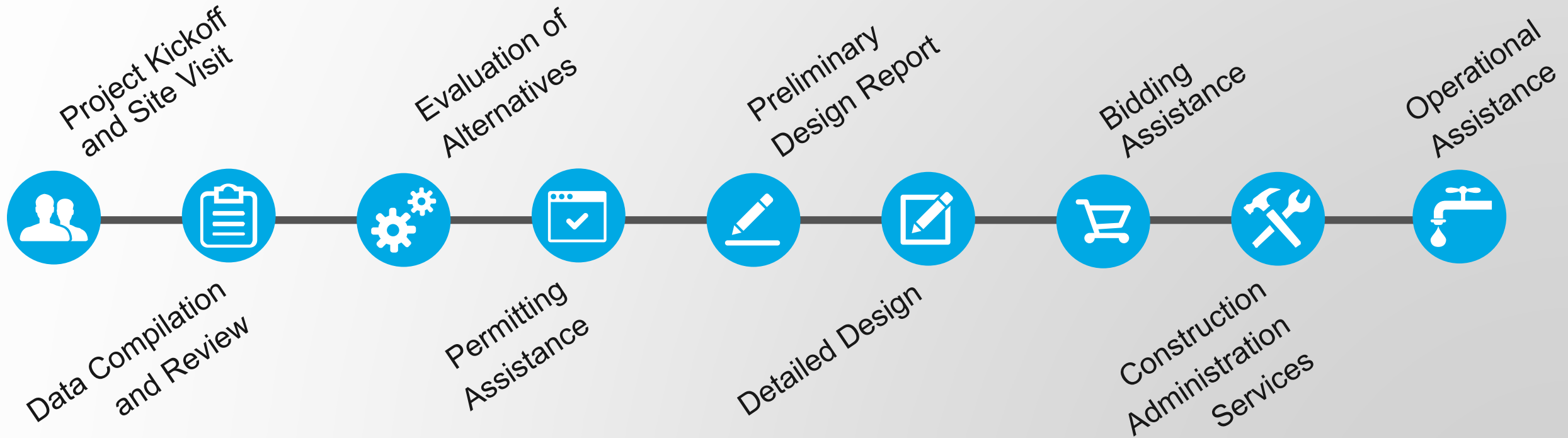




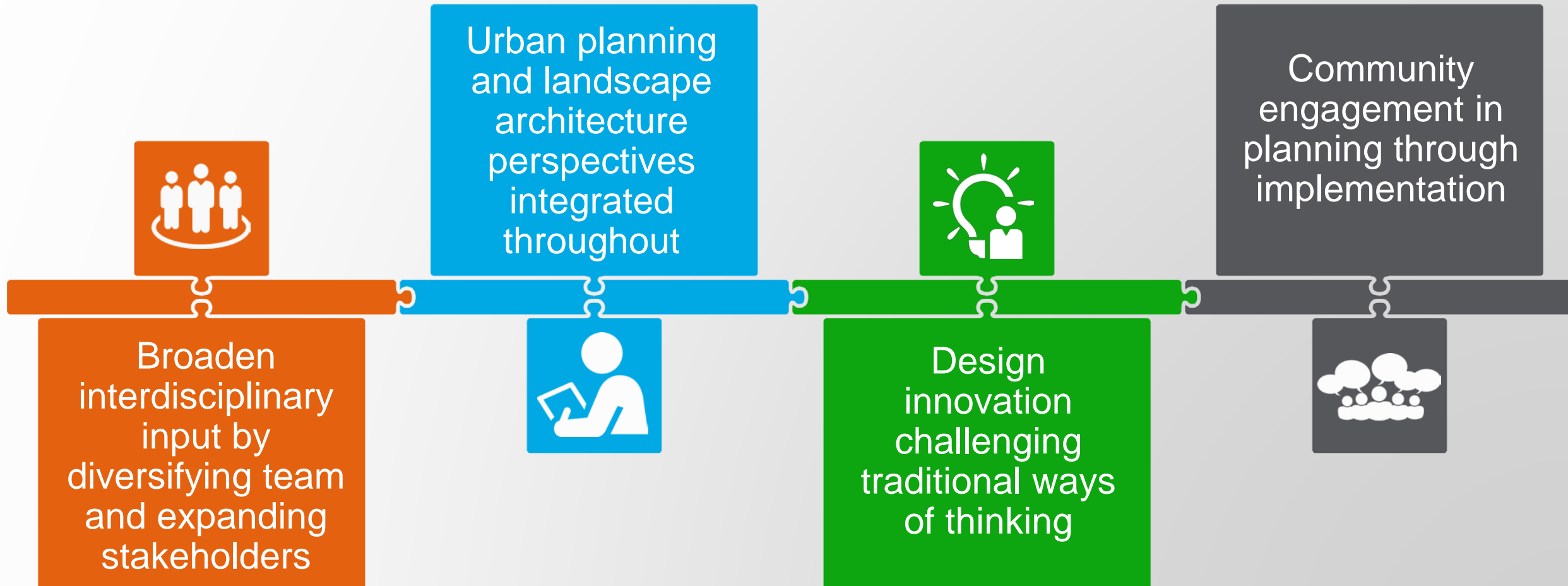
The capital project blueprint...



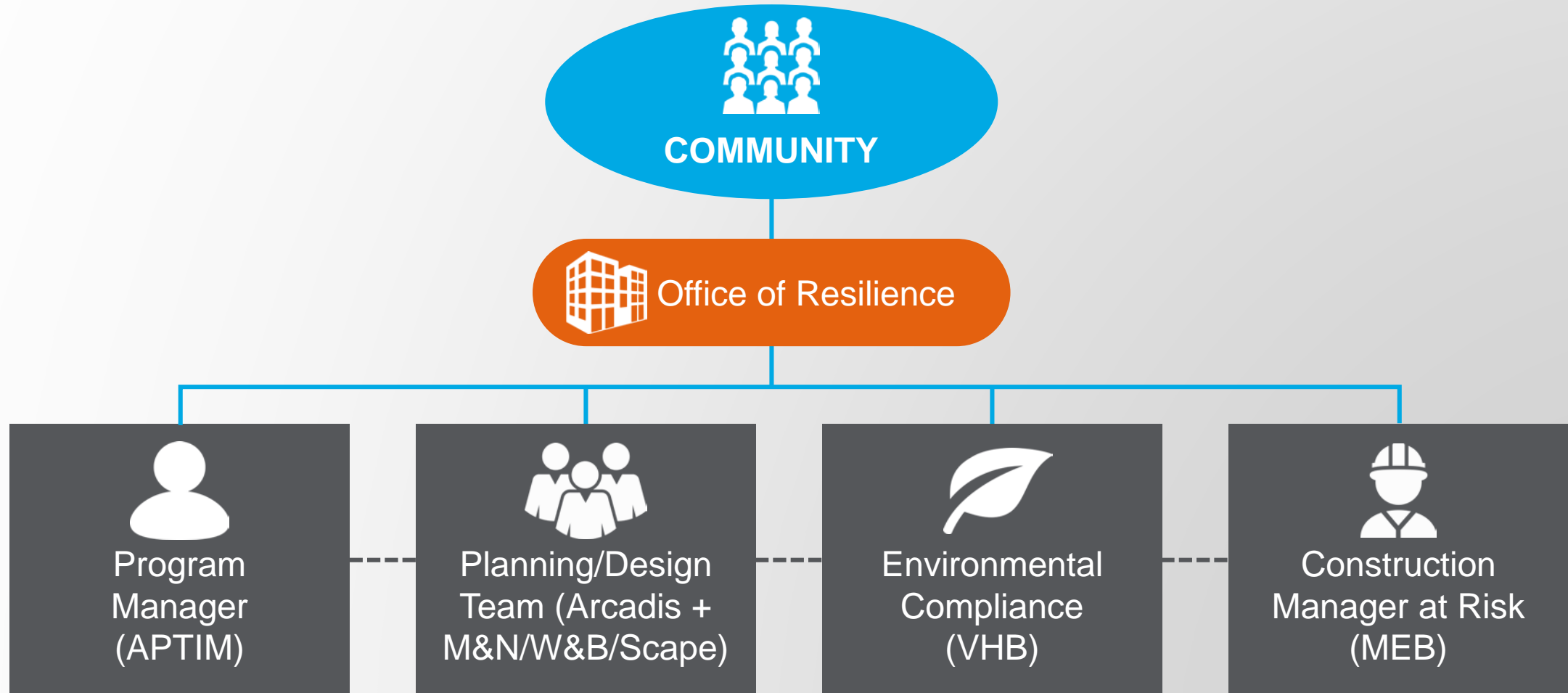
...and the linear delivery approach



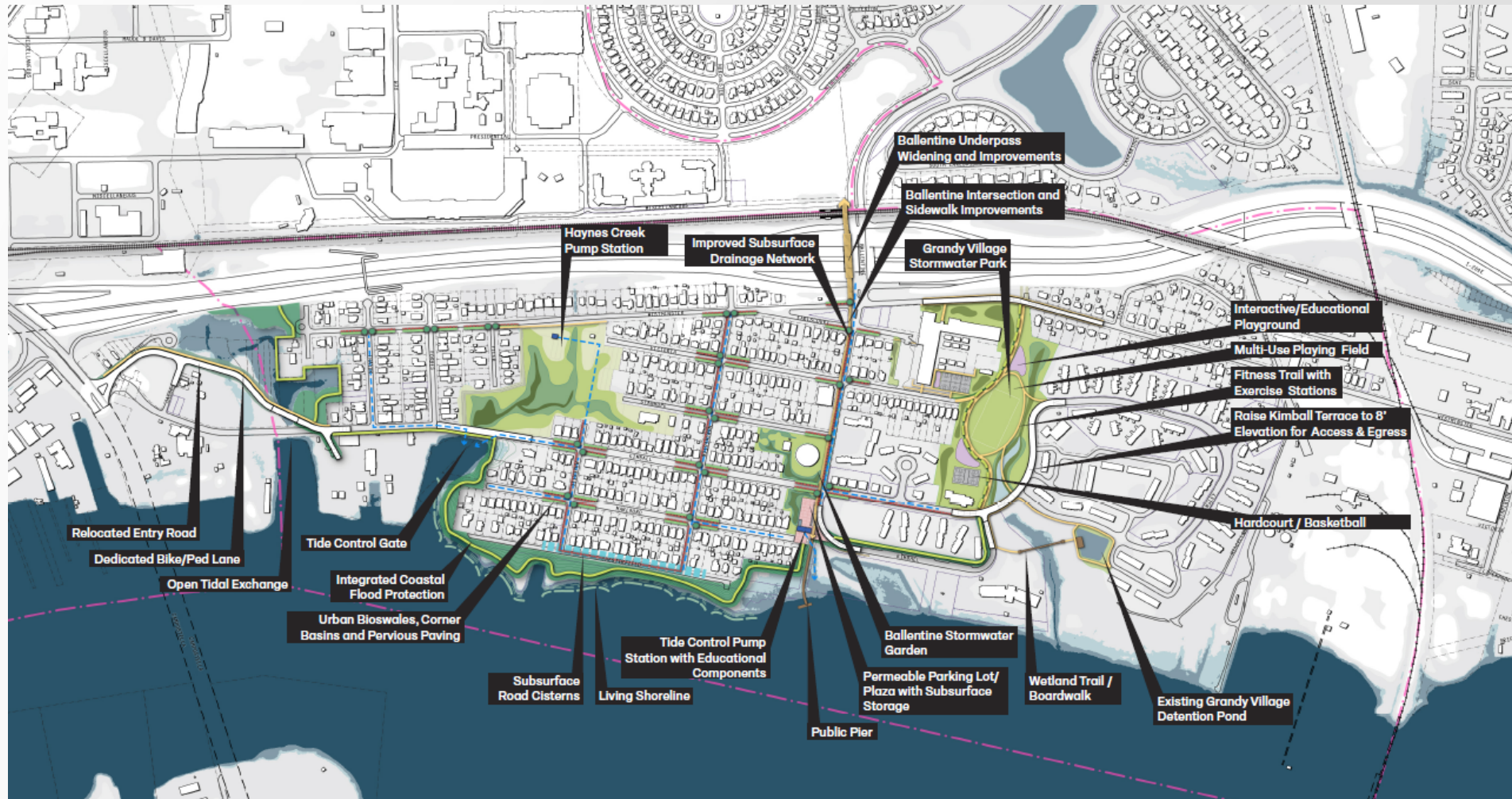
An adapted approach



Norfolk Interdisciplinary Team



From vision to reality....



Envision Rating System



5 Categories - 14 Subcategories



Checklist - 55 groups of questions



Rating System - 60 Credits
5 Innovation credits



5 Levels of Achievement ~
Improved, Enhanced, Superior,
Conserving, Restorative



**QUALITY
OF LIFE**
13 Credits



LEADERSHIP
10 Credits



**RESOURCE
ALLOCATION**
14 Credits

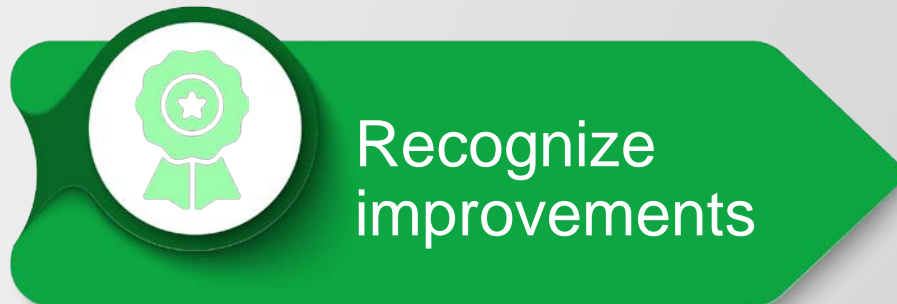
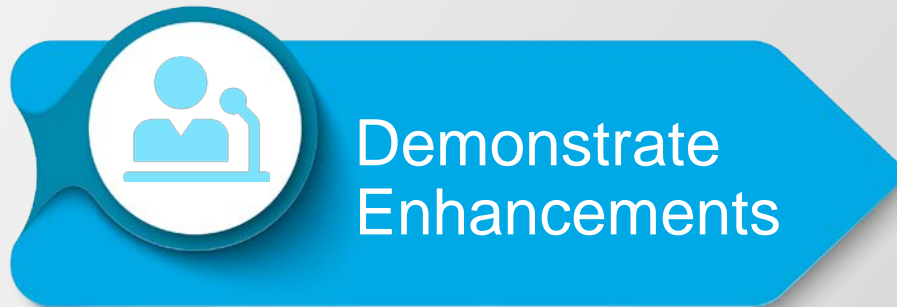
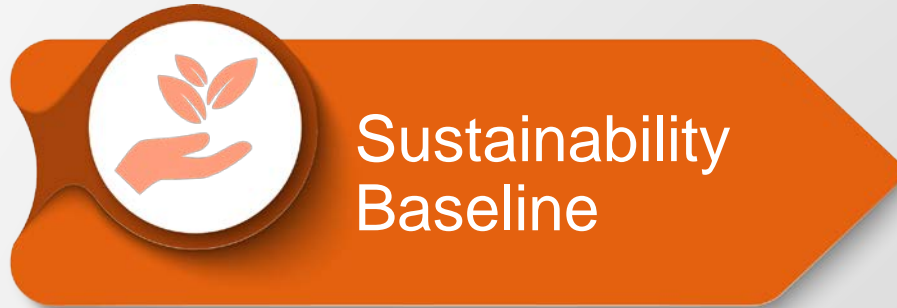


**NATURAL
WORLD**
15 Credits



**CLIMATE
AND RISK**
8 Credits

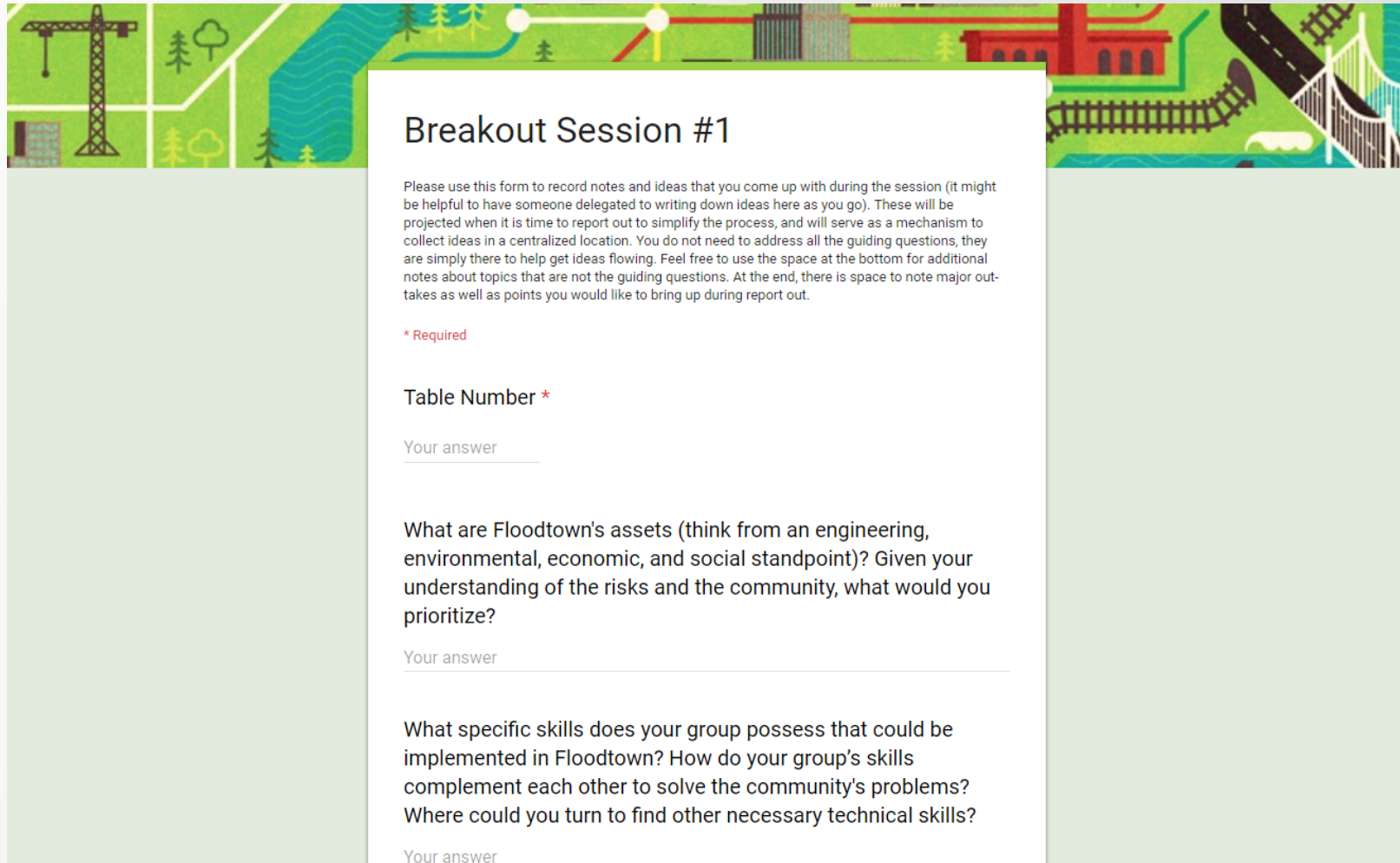
How is Envision being used?



Floodtown



Google Forms Feedback



Breakout Session #1

Please use this form to record notes and ideas that you come up with during the session (it might be helpful to have someone delegated to writing down ideas here as you go). These will be projected when it is time to report out to simplify the process, and will serve as a mechanism to collect ideas in a centralized location. You do not need to address all the guiding questions, they are simply there to help get ideas flowing. Feel free to use the space at the bottom for additional notes about topics that are not the guiding questions. At the end, there is space to note major out-takes as well as points you would like to bring up during report out.

* Required

Table Number *

Your answer

What are Floodtown's assets (think from an engineering, environmental, economic, and social standpoint)? Given your understanding of the risks and the community, what would you prioritize?

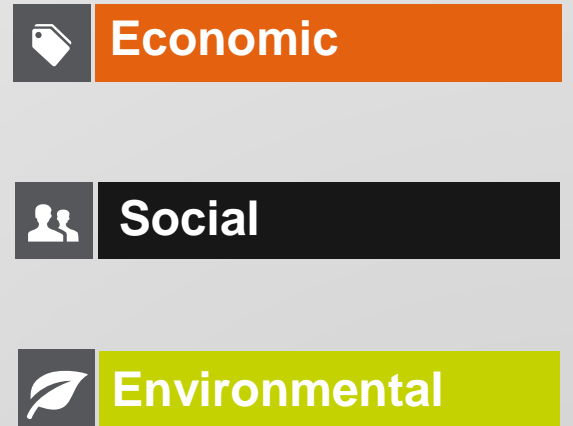
Your answer

What specific skills does your group possess that could be implemented in Floodtown? How do your group's skills complement each other to solve the community's problems? Where could you turn to find other necessary technical skills?

Your answer

Breakout Session #1

Floodtown, our fictitious municipality, suffers from serious flooding during rain events, and its coastal location makes it susceptible to worsening conditions such as sea level rise and more frequent and severe storms. Floodtown is uniquely susceptible to various environmental, economic, and social issues, as outlined on the factsheet. The team assembled today represents a group of diverse specialists. Together, you must propose an interdisciplinary solution to Floodtown's problems. How will you put your skills to work to address resilience of the following three asset types: environment, economic, and social? Focus especially on how interdisciplinary work will directly impact quality of life of those in Floodtown. Address some initial action items as well as ways to maintain the plan over time.



“IMPROVING QUALITY OF LIFE”

NEW SOLUTIONS TO OLD PROBLEMS

Brian Joyner, Moffat & Nichol



Street & Property Flooding Resilience

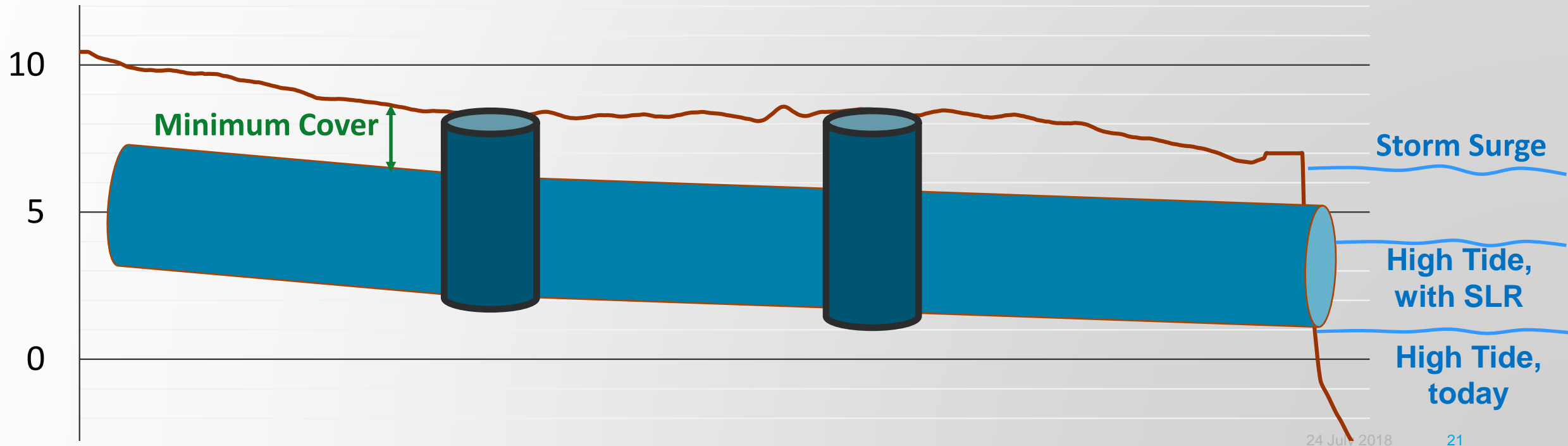
- Maintain and build economic / social resilience
- Why new solutions?
- Green infrastructure, storage, landscaping, and pumping



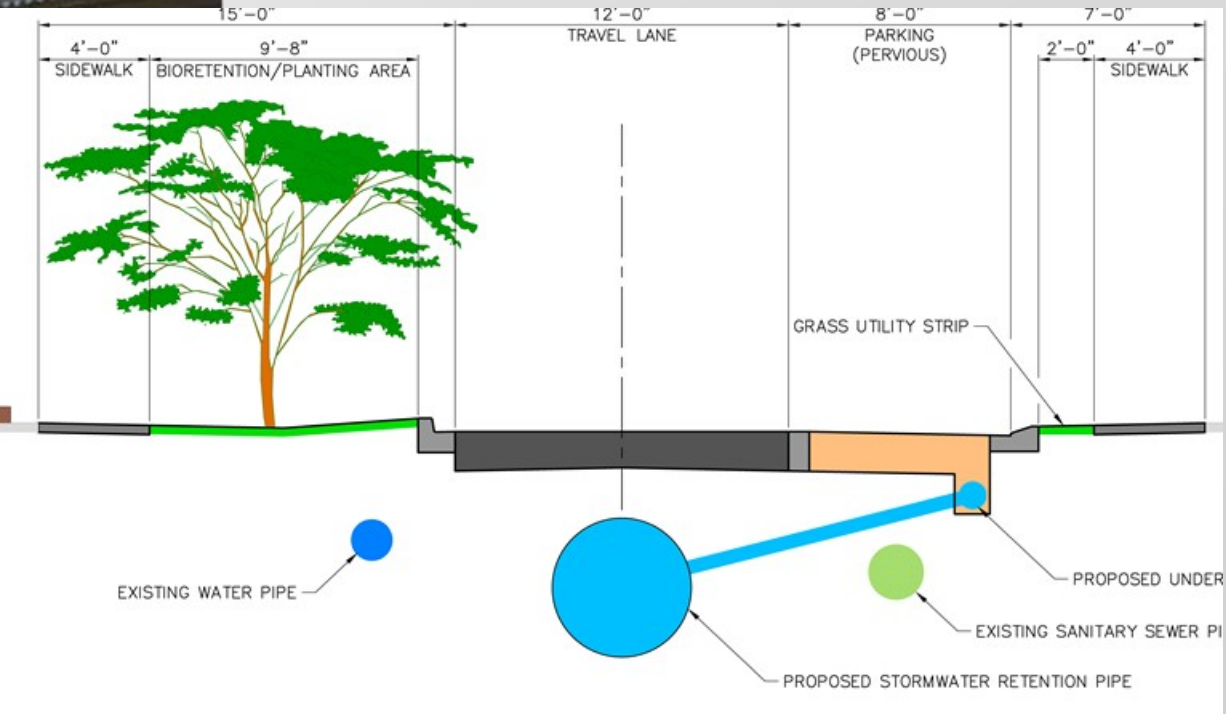
Why Do We Need New Solutions?

Or why can't we just use bigger pipes?

- Constrained conveyance and in-pipe storage capacity
- Evidence toward increased rainfall intensities
- Drawing out peak flows has real benefit

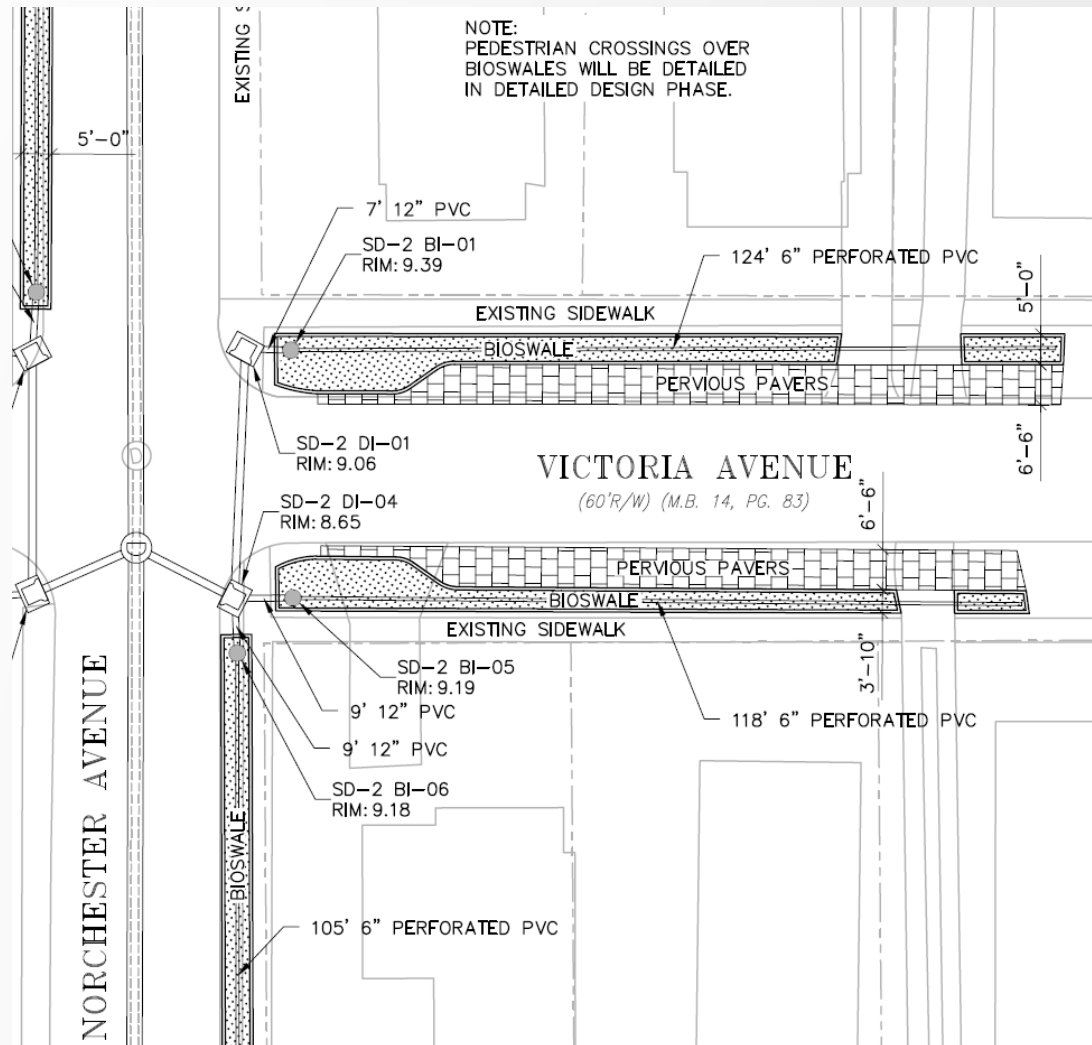


Micro-storage Using Green Infrastructure (GI)



- St. Roch Parish (New Orleans)

Micro-storage Using Green Infrastructure (GI)



Above Grade Storage

Bioswale Section

Below Grade Storage

Engineered Soil

Stone Reservoir

Above Grade Storage

Pervious Parking

PA & Bedding

Stone Reservoir

Micro-storage Using Green Infrastructure (GI)

Existing Condition



With Intersection-level GI



Micro-storage Using Green Infrastructure (GI)

Without GI



With Intersection-level GI

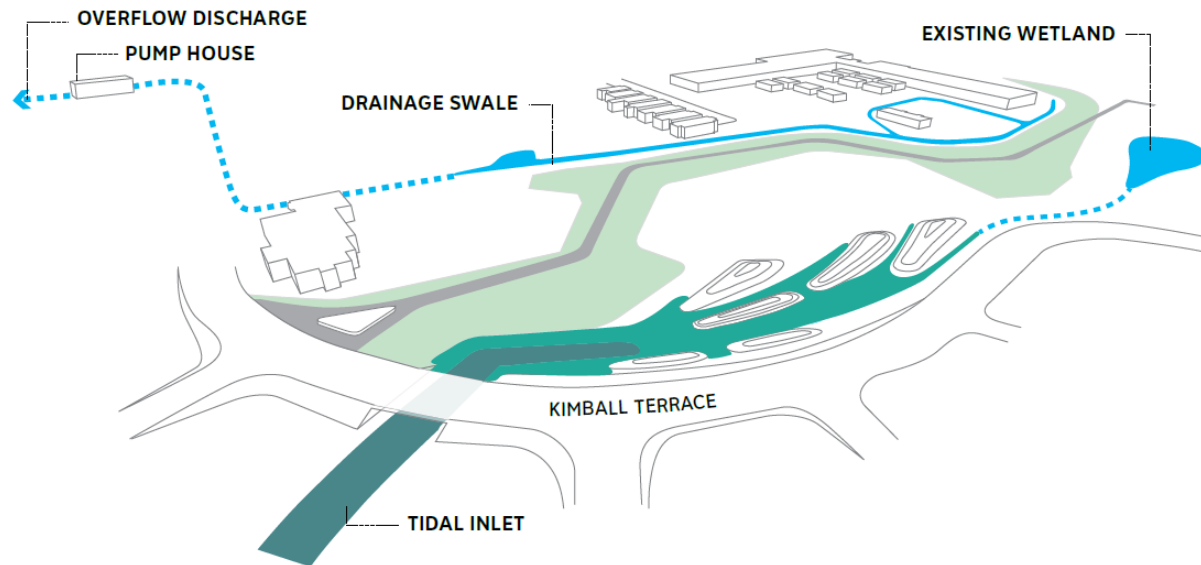


Landscaping with Water



Landscaping with Water

TOPOGRAPHY: FLOOD PROTECTION + DRAINAGE



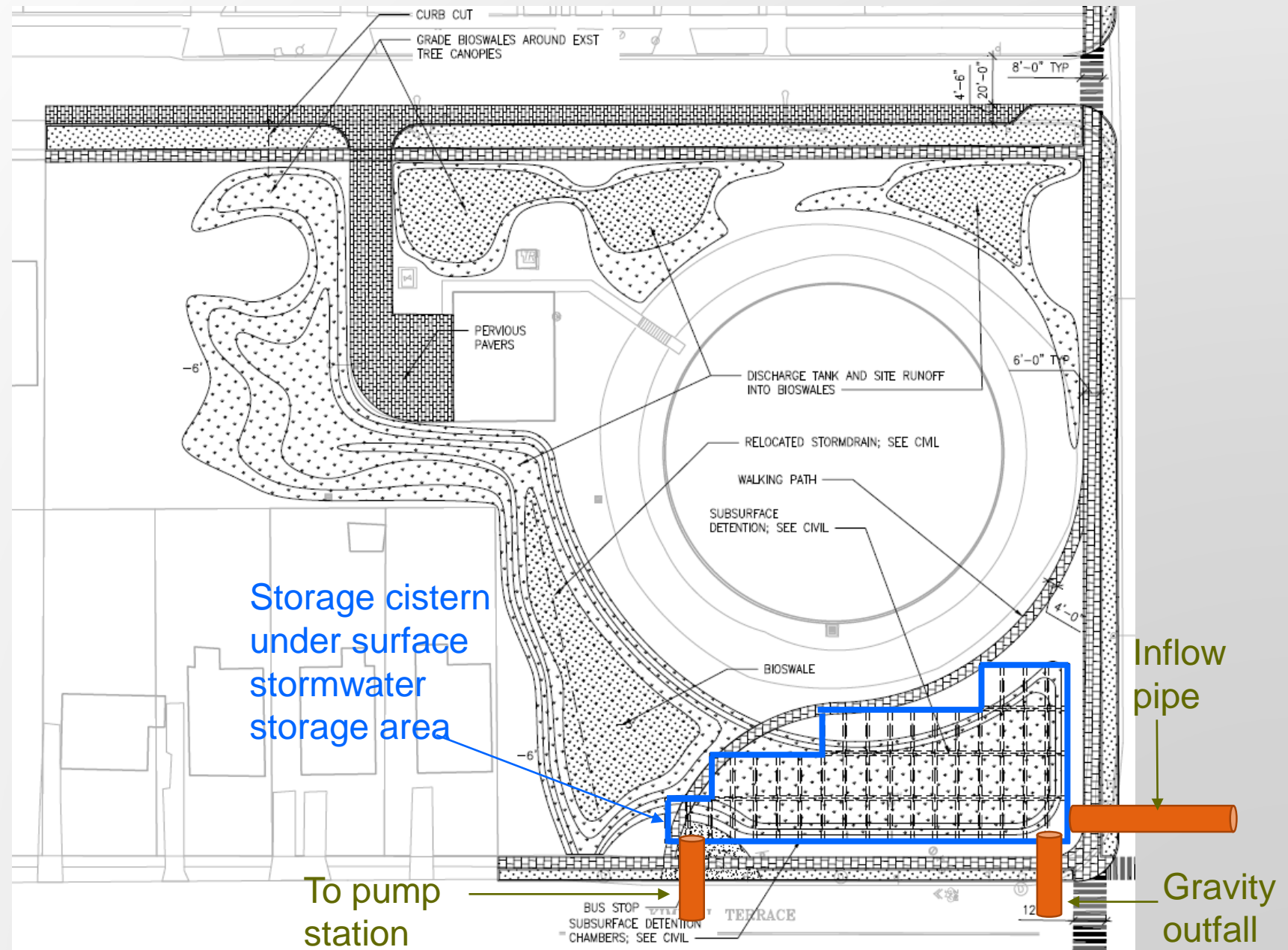
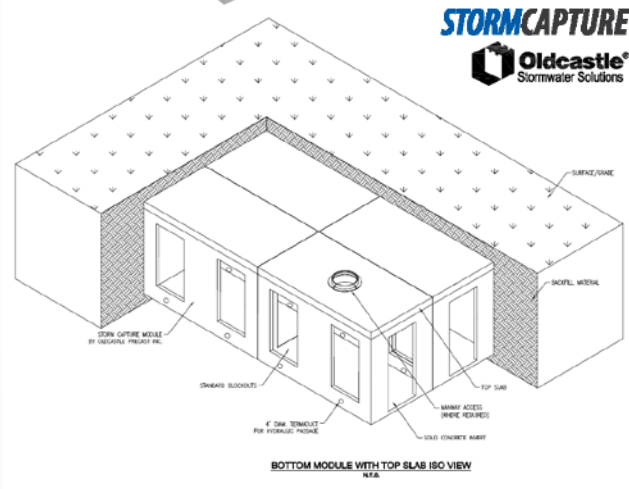
Landscaping with Water

WILD WETLAND WALK

CONCEPT: A winding eco-path provides unique educational and hands-on experiences that connect users to the ecology and natural history of the tidal stream that once existed here.

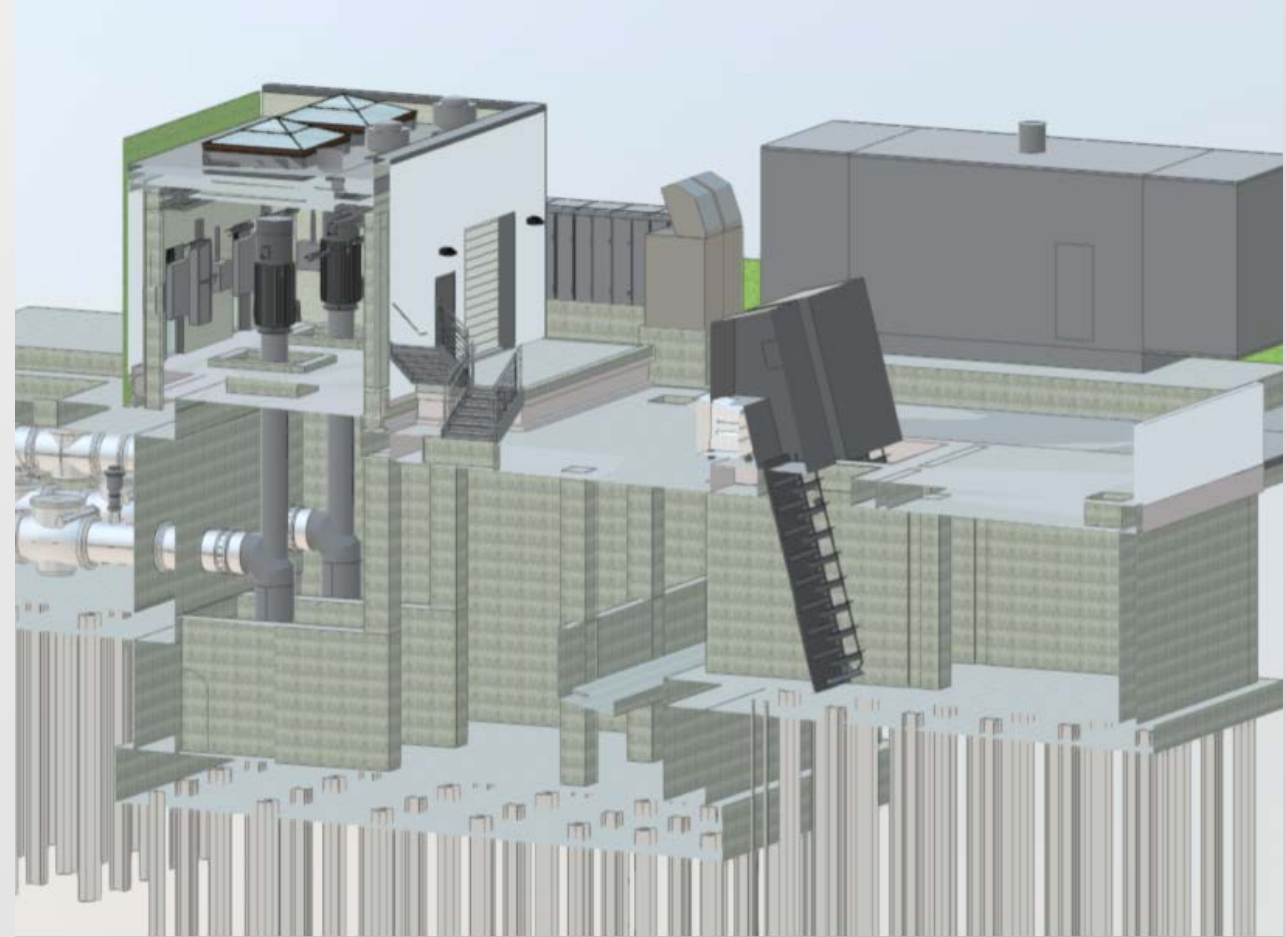


Underground Storage Cisterns



Pumping Systems

- Required for interior drainage of the berm-protected area
- Inter-disciplinary design



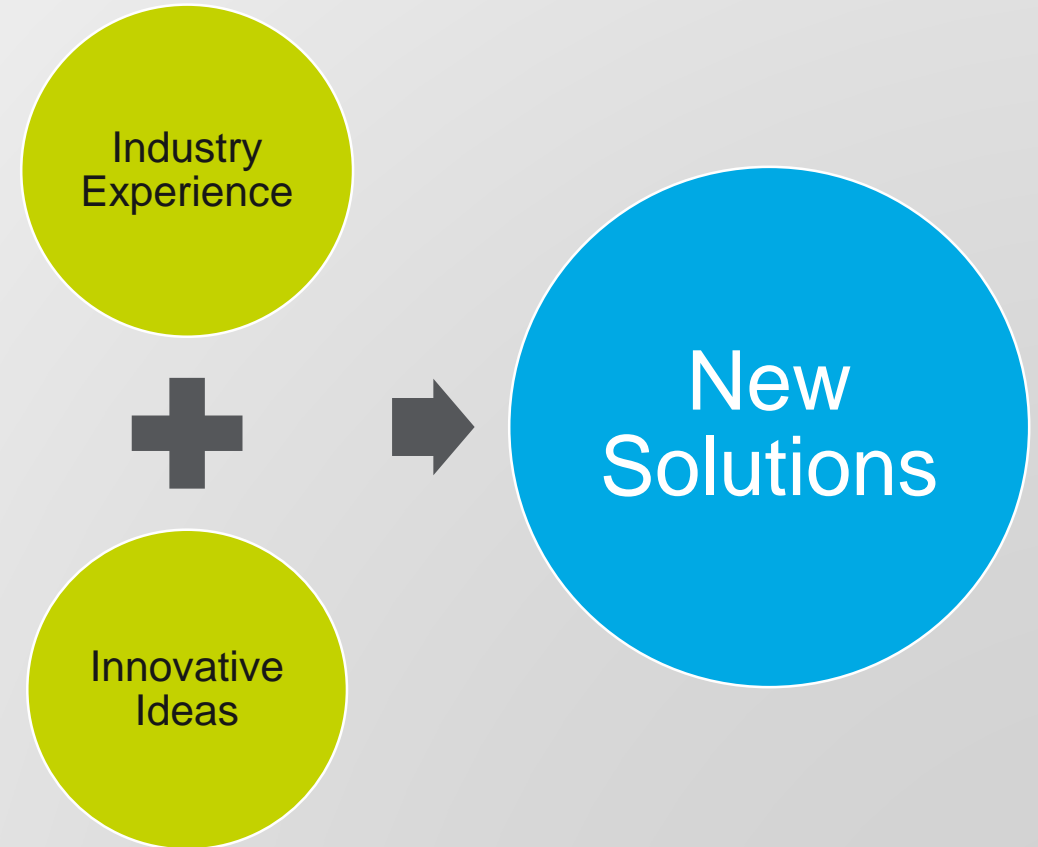
Pumping Systems



- Groundwater lowering at Whalehead (NC)

Breakout Session #2

The 21st century has already brought innumerable technological improvements to our world, ranging from having self-driving cars hit the roads to making huge strides forward in artificial intelligence applications. The infrastructure sector, however, has remained more traditional. As technical specialists in the industry, we are in the position to push for increased implementation of new technologies. On the neighborhood scale of Floodtown, where do you see room for improvements like those presented (green infrastructure, cisterns, landscaping, pumping systems)? Do you have any ideas for other new solutions? For example, how can growing industries such as big data and AI be woven in to infrastructure over the coming years? Or, how can local high schools, universities, or start-ups contribute to projects? Think outside the box, be creative.



“CREATIVE PEOPLE, PRACTICAL SOLUTIONS”

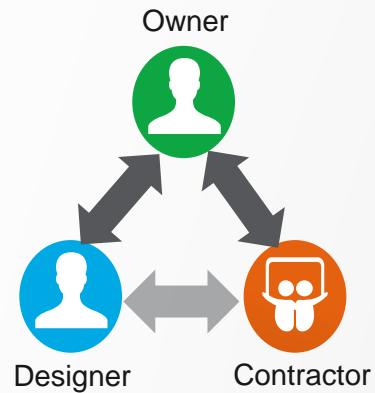
CONSTRUCTION UNDER PRESSURE

Scott Smith, City of Norfolk



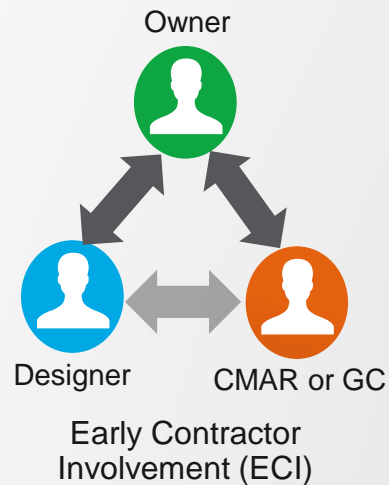
Typical APD Methods

Design-Bid-Build
(DBB)

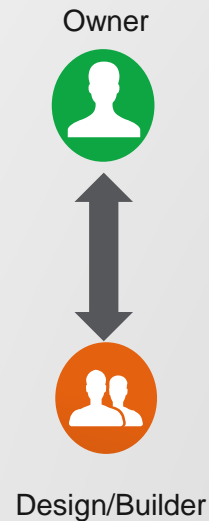


Traditional

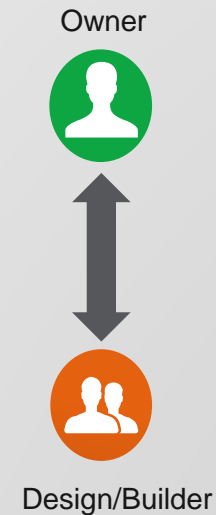
Construction
Management At-Risk
(CMAR)



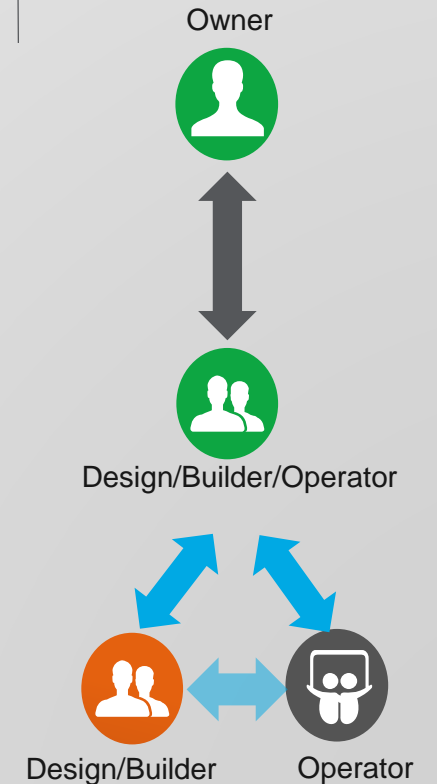
"Progressive" Design-
Build (GMP)



Lump Sum
Design-Build
(LS)



Design-Build-Operate
(DBO)

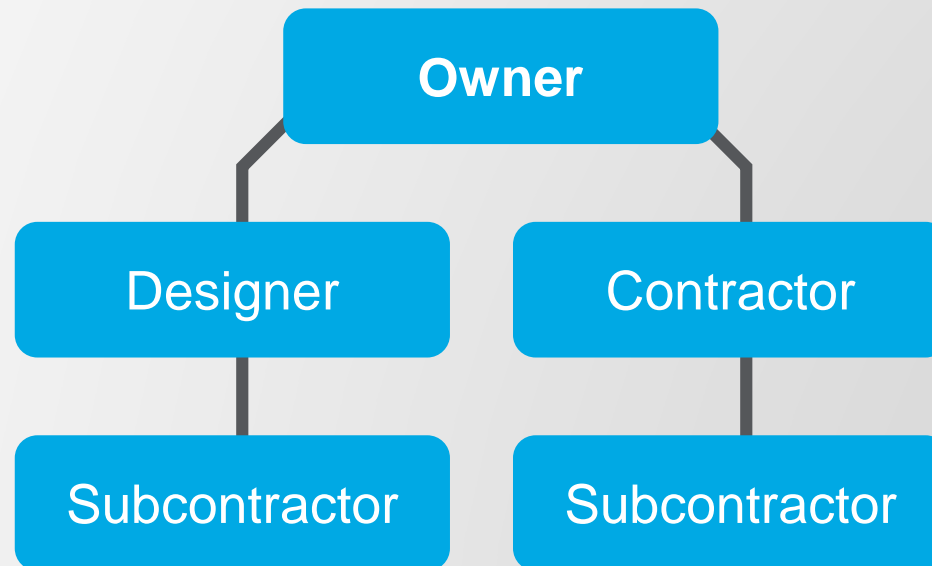


Alternative Project Delivery

Construction Methods



TRADITIONAL PROJECT DELIVERY



Construction Methods



DESIGN-BUILD PROJECT DELIVERY

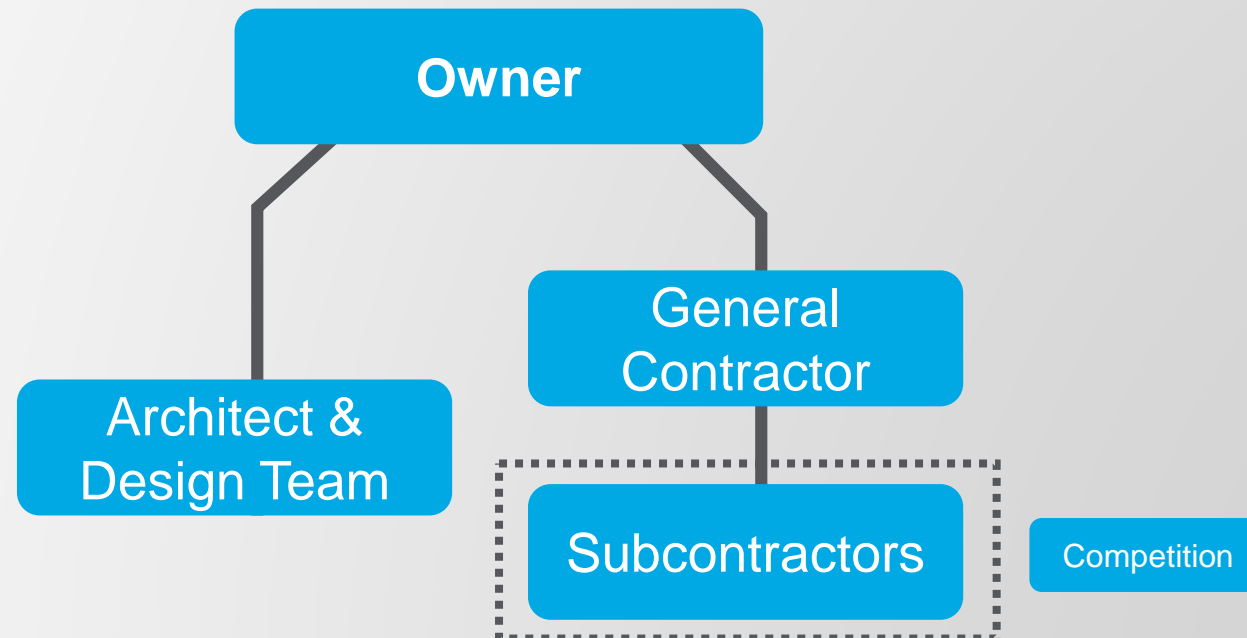
Owner

Design-Build Entity

Subconsultants

Construction Methods

CONSTRUCTION MANAGER AT RISK



Project Delivery

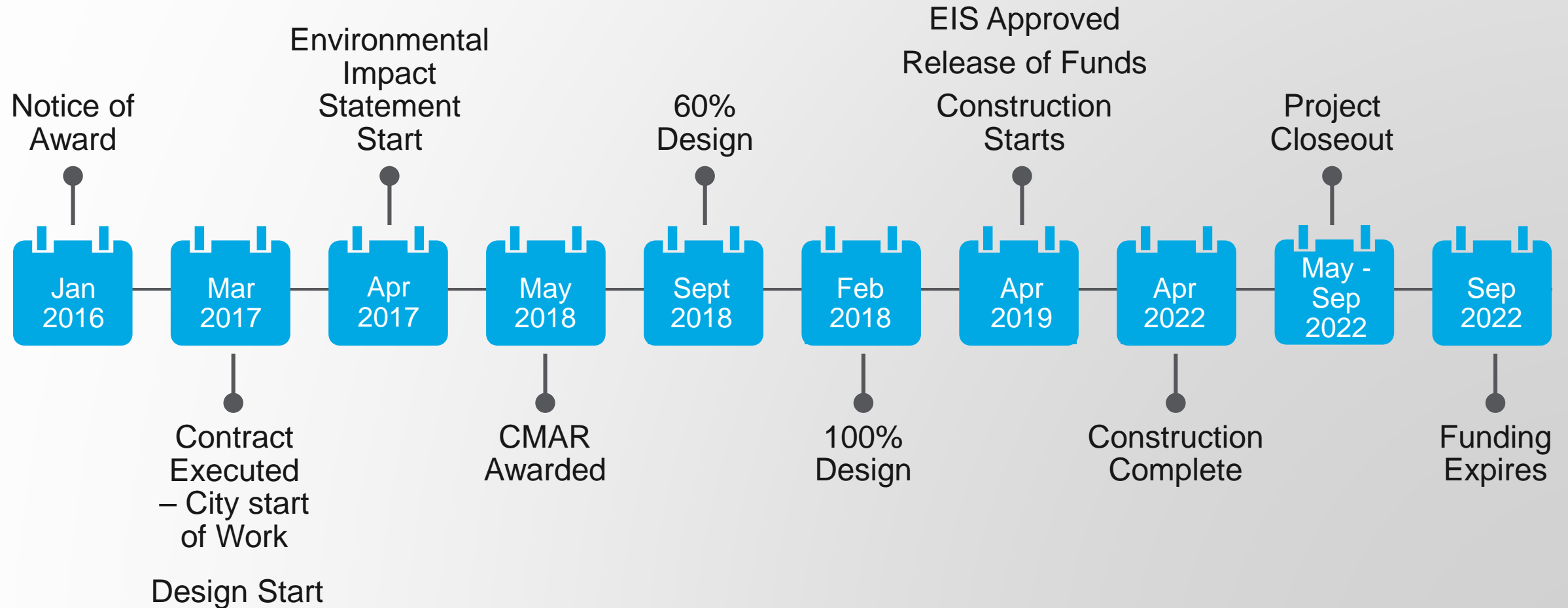


Project Delivery Constraints

- Schedule 3 years to implement
- No construction activity to occur until Release of Funds
- City Procurement Regulations
- HUD Procurement Regulations

Funding expires September 2022, Congress needs to take action to extend deadline

Project Schedule





Summary of Major Advantages

DBB	CMAR	FPDB	PDB
<ul style="list-style-type: none">• QBS of designer; cost-based selection of constructor• Well-known method• Owner- controlled• Well-defined project (low risk premium)	<ul style="list-style-type: none">• QBS for designer• Select CM on quals and \$• CMAR bids out work• GC input during design• GMP established collaboratively with contractor	<ul style="list-style-type: none">• Select on quals, cost, and other criteria• Single point of DB responsibility• Design efficacy risk transfer for testing/ warranty period• Potential for schedule reduction• GC design input• Guaranteed price at proposal receipt• Project configuration and detail known at proposed recipient stage	<ul style="list-style-type: none">• Select on quals, cost, and other criteria• Single point of DB responsibility• Design efficacy risk transfer for testing/ warranty period• Potential for schedule reduction• Collaborative approach for finalizing designs• GC design input• Construction pricing negotiated after initial stage



Summary of Major Disadvantages

DBB	CMAR	FPDB	PDB
<ul style="list-style-type: none">• No design efficacy guarantee• No single point of responsibility• Least risk transfer• Cost uncertain until bids rec'd• Change orders• Low bidder• No O&M guarantees	<ul style="list-style-type: none">• No design efficacy guarantee• No single point of responsibility• Scope & quality must be well defined when GMP established• Extensive coordination req'd• Add'l cost of CM• No O&M guarantees• Additional procurement effort	<ul style="list-style-type: none">• Scope & quality must be well defined before design complete• Reduced control• Critical to shift design risk & have warranty period – market may resist• No O&M guarantees• Additional procurement effort	<ul style="list-style-type: none">• Final designs not known until initial stage is completed• Less competitive pricing opportunity as compared to Lump Sum DB• Some states do not allow PDB• No “design competition”

SAMPLE DECISION-MAKING MATRIX FOR SELECTION OF A PROJECT DELIVERY METHOD

Owner Objectives, and Project Drivers and Priorities	Priority Weighting	Design-Bid-Build	CMAR	Fixed Price Design-Build	Progressive Design-Build
Reliability & Operational Flexibility	TBD				
Single Point of Responsibility	TBD				
Budget Constraints and Uncertainty	TBD				
Treatment Processes - Innovation	TBD				
Operator Involvement and Input	TBD				
Schedule Compliance – Time Requirements	TBD				
Risk allocation	TBD				
Owner-Engineer Control/Trusted Relationship	TBD				
Score Total					
Weighted Total	100%				

Breakout Session #3

Construction can often prove to be the riskiest part of a project when it comes to timelines and budget. Using a Construction Manager at Risk (CMAR) can help mitigate these risks by shortening the timeline and setting a cap on potential costs. Discuss whether Floodtown should use a CMAR to implement the changes discussed in your previous sessions. What are the anticipated benefits and possible challenges to your choice? How will the goal of maximizing resilience be supported by your choice?

Towards the end of this session, take some time to discuss what you will be reporting back to the group and who will be speaking. Results from Google Forms will be projected for the room.



Group Report Out



CONCLUSIONS



Feedback Survey

Please provide feedback from this afternoon's forum at the following link:

<https://goo.gl/forms/AVTtqlpo9rrpitOF2>

