



Back Cove South CSO Storage Facility (BCSSF)

Innovative Business Case Evaluation & CSO Alternatives

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Agenda

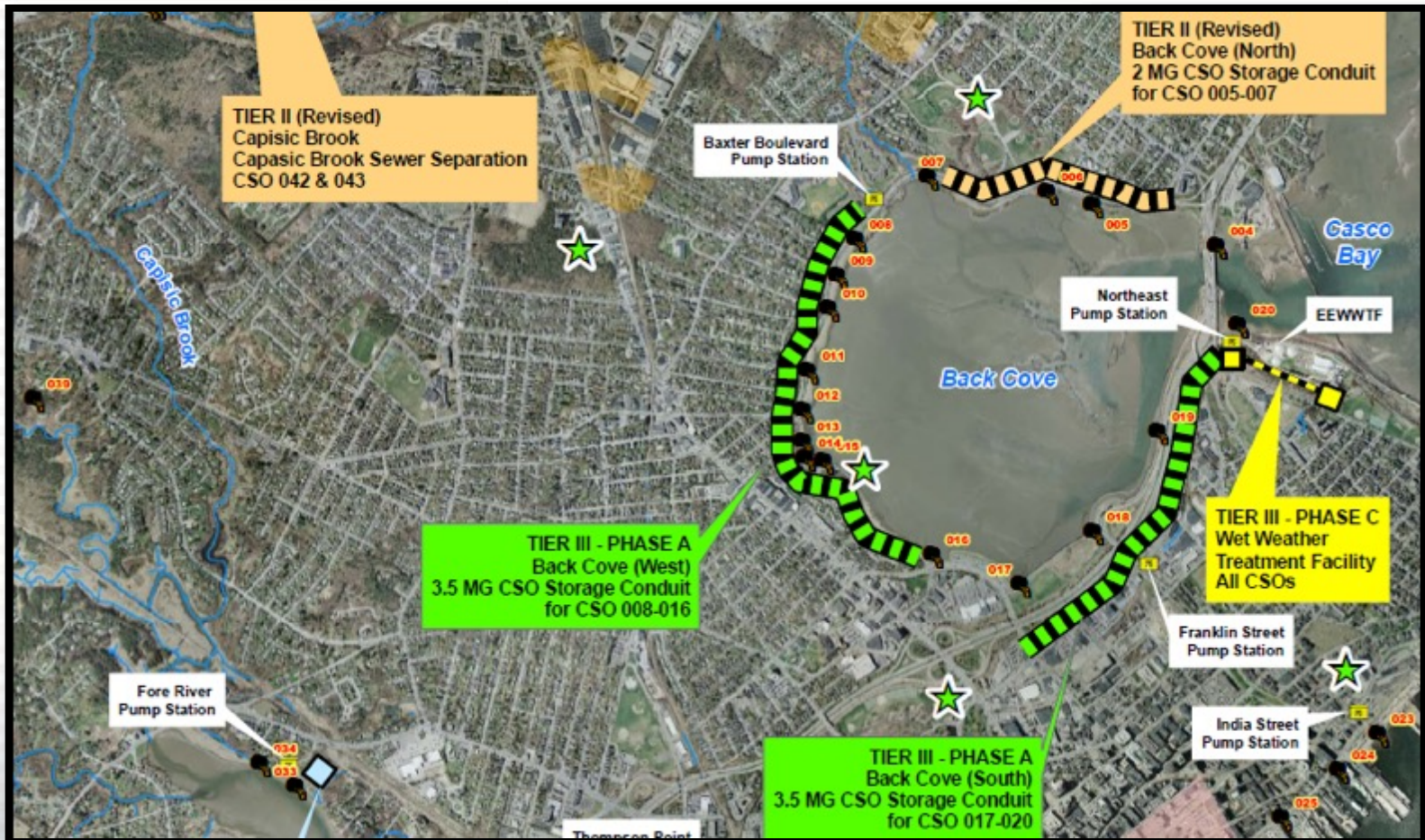
- Background
- Alternatives
- Business Case Evaluation
- Conclusions and Lessons Learned



Background



BACK COVE BACKGROUND LONG TERM CONTROL PLAN



INITIAL BCSSF PROJECT

- 2013 CSO Tier III Long Term Control Plan (LTCP)
 - Defined the Back Cove South Storage Facility (BCSSF)
 - City coordinated consent decree with Maine DEP
- PDR (May 2015) recommended the BCSSF
 - Provide 3.5 million gallons (MG) of storage
 - Reduce annual overflow volume from 150 MG to 18 MG.
- 2015 Design Proposed
 - Linear conduit storage project under Marginal Way
 - Estimated project cost of **\$32,225,000 (2015 dollars)**

Business Case Evaluation (BCE)

- BCE is basically a benefit-cost analysis
 - Evaluates actions/alternatives in relation to a base case (without-project alternative)
 - Determine if the actions are cost effective
- Cost-effectiveness Analysis
 - Evaluates alternatives that reach a specific objective
 - Determines which alternative is least costly
- Incorporate triple bottom line elements
 - Economic
 - Social
 - Environmental

BUSINESS CASE EVALUATION

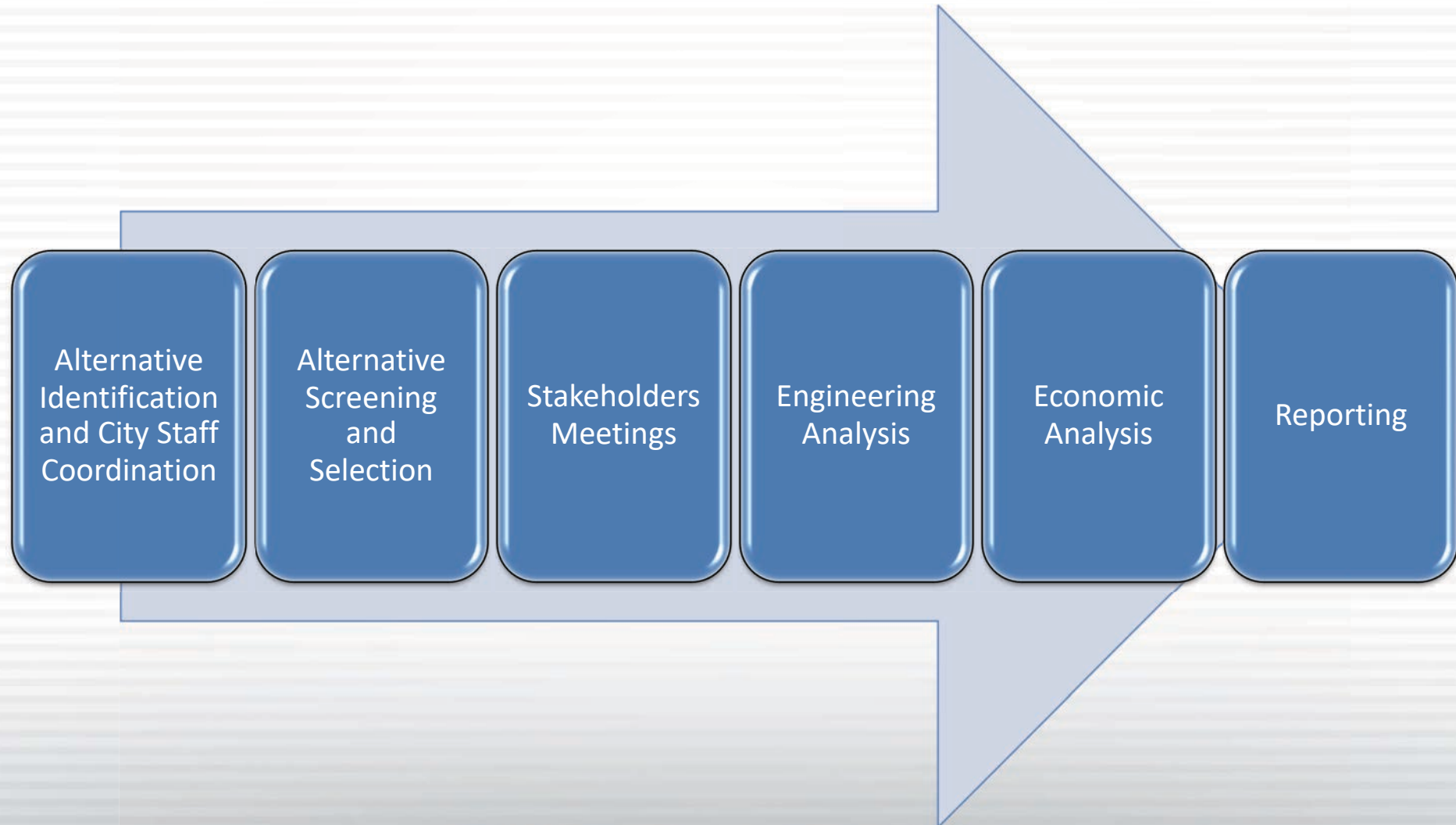
WHY?

- Anticipated significant impacts to community during construction
- Estimated project cost was substantially higher than LTCP anticipated
- Evaluate alternatives based on capital costs, social and economic impacts

How?

- Build upon work already completed
- Identify additional alternatives for consideration
- Conduct preliminary review of engineering and technical requirements
- Evaluate alternatives based on elements of Triple Bottom Line (TBL) - economic, social and environmental impacts

PROCESS



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Alternatives

SEBAGO
TECHNICS



ALTERNATIVE IDENTIFICATION AND SELECTION

- Alternative identification
 - Reviewed alternatives considered in 2015 study
 - Identified other viable alternatives
 - Conducted workshop with the City
 - Identified 12 alternatives for consideration
- Alternative selection
 - Reviewed constructability
 - Reviewed land ownership and ROW issues
 - Reviewed conveyance characteristics
 - Selected 5 alternatives for further evaluation

Alternatives Considered

- Single conduit under Bayside Trail
- Tank under Kennedy Park
- Tank under Marginal Way Park & Ride
- Double conduit under Marginal Way
- Single conduit under Marginal Way
- Single conduit under Marginal Way and Somerset Street
- Tank under Back Cove Park (CSO 17 only)
- Tank under Back Cove Park (CSO 17 and 18)
- Partial sewer separation
- Full sewer separation
- Extend 96-inch conduit under Marginal Way
- Convert Franklin Street Pump Station to dry and wet weather

ALTERNATIVES CHOOSEN FOR BCE

1. Marginal Way storage conduit

- Construct a linear conduit (12' by 10') under Marginal Way between Preble Street and Franklin Street
- Construct a 60-inch diameter conduit under Marginal Way between Franklin Street and Plowman Street
- Two traffic scenarios were considered – compressed lanes and rolling closure

2. 2.5 MG storage tank in Back Cove Park for CSO 017 and High-Level East Marginal Way conduit for CSO 018

- Construct a 2.5MG tank under Back Cove Park
- Construct new force main from tank to Franklin Street for dewatering
- Construct a shallow 84-inch diameter conduit under Marginal Way to the east of Franklin Street (1 MG storage).
- Construct a 72-inch storm drain outlet to CSO-018 to replace the existing outlet pipe

ALTERNATIVES CHOOSEN FOR BCE

2a. 2.5 MG storage tank in Back Cove Park for CSO 017 and Low-Level East Marginal Way conduit for CSO 018

- Construct a 2.5 MG tank under Back Cove Park
- Construct new force main from tank to Franklin Street for dewatering
- Construct a deep 84-inch diameter conduit under Marginal Way to the east of Franklin Street (1MG storage)
- Construct a 72-inch storm drain outlet to CSO-018 to replace the existing outlet pipe

3. 3.5 MG tank in Back Cove Park for CSOs 017 and 018

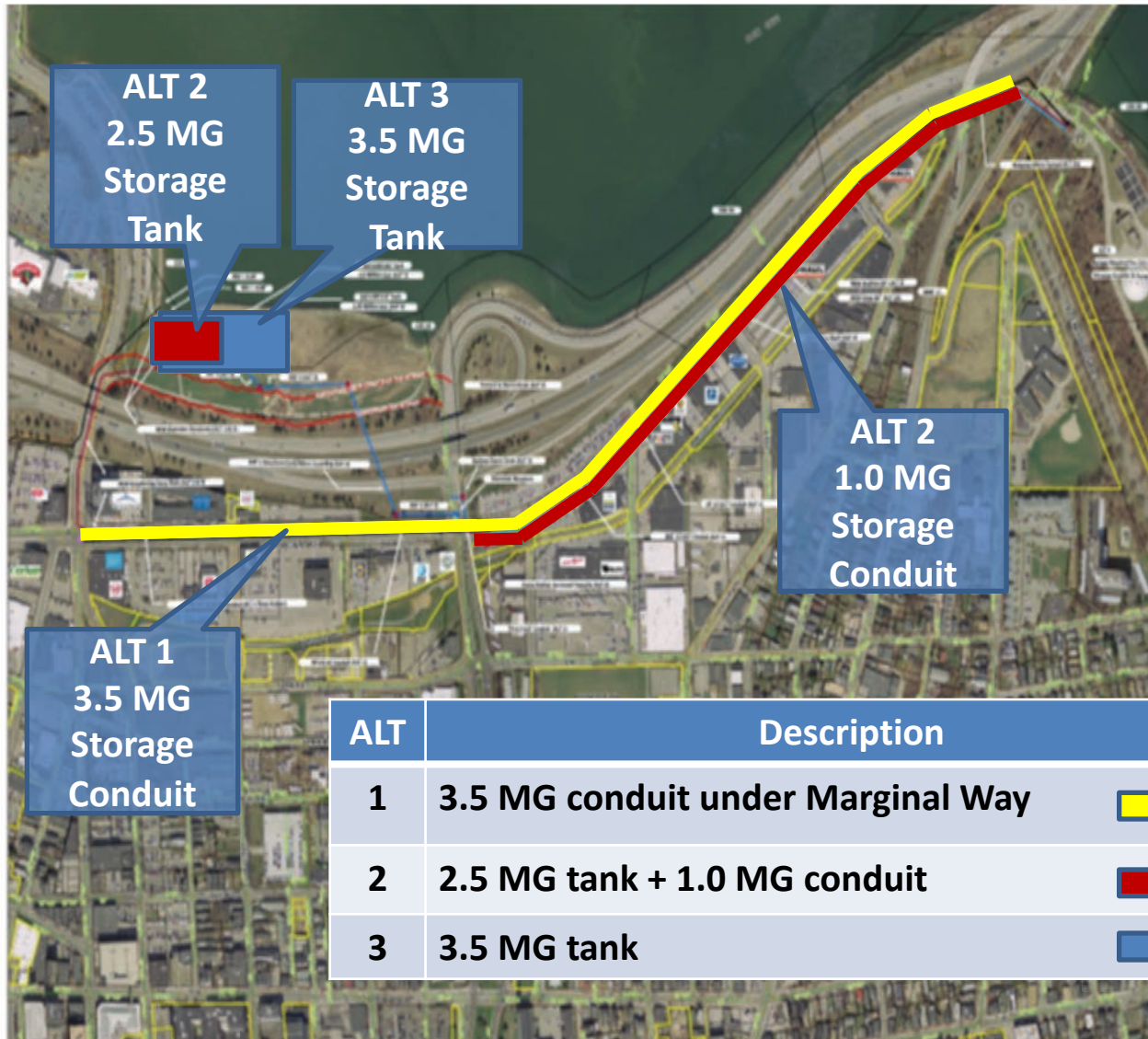
- Construct a 3.5 MG tank under Back Cove Park
- Construct new force main from tank to Franklin Street for dewatering
- Construct a 72-inch storm drain outlet to CSO-018 to replace the existing outlet pipe

ALTERNATIVES CHOOSEN FOR BCE

4. Expand Franklin Street Pump Station for relocation of CSO 018

- CSO 017 would be controlled via a Preble Street to Franklin Street conduit or Back Cove tank
- Excess flow above the capacity of the Northeast PS would be pumped and either:
 - (a) stored (in the vicinity of CSO 020), or
 - (b) treated by an excess wet weather treatment facility at the East End Wastewater Treatment Plant.

* Analysis completed following the initial selection indicated that Alternative 4 was not feasible due to the extent of work that would be required in the vicinity of CSO 020 or at the EEWTP.






ALT 2
2.5 MG
Storage
Tank

ALT 3
3.5 MG
Storage
Tank

ALT 2
1.0 MG
Storage
Conduit

ALT 1
3.5 MG
Storage
Conduit

ALT	Description	
1	3.5 MG conduit under Marginal Way	
2	2.5 MG tank + 1.0 MG conduit	
3	3.5 MG tank	

Business Case Evaluation



BCE CONSIDERATIONS

Translating Impacts into Monetary Terms



Economic Impacts	Social Impacts	Environmental Impacts
Capital Cost	Health & Safety	Greenhouse Gases
Operation & Maintenance	Property Values	Criteria Air Pollutants
Repairs & Replacement	Community Satisfaction	Ecosystem Services
Avoided Costs	Aesthetics	Water Quality
Decommissioning	Education	Nutrient Pollution

BCSSF IMPACTS

TRAFFIC

- Marginal Way
- Rolling Closures
- Compressed Lanes
- Detour Costs

BUSINESS

- Revenue Loss in Work Zone
- Revenue Loss Outside of Work Zone

SOCIAL

- Recreation

CONSTRUCTION

O&M COSTS

- Construction
- Operations and Maintenance

BUSINESS IMPACTS

- Identified businesses located in study area (summer 2017)
- Estimated business revenue based on research
- Estimated revenue reduction during construction
 - Based on business type
 - Type of work zone impact
 - Two roadway scenarios – rolling closure and compressed lanes
 - Revenue reductions ranged from 5% to 70%
- Property owners reviewed estimates

TRAFFIC IMPACTS

- Identified average annual daily traffic (AADT)
- Estimated detour route and increased drive time from Google maps
- Estimated through traffic vs destination traffic
- Evaluated
 - Increased vehicle operating costs
 - Increased travel time
 - Inputs based on standard values (i.e., FHWA, AAA)



RECREATION IMPACTS

- Primary impact to Preble Street field
 - Used by Portland High teams (400 hours)
 - Used by public (570 hours)
- Evaluated
 - Loss of revenue
 - Value of recreational experience
- Did not evaluate
 - Benefits from raising field
 - Impacts to parking during construction
 - Loss of small adjacent field during construction
- Alternatives would not impact Back Cove Trail

Estimated Construction and Annual O&M Costs and Schedule

Alternative	Total	2018	2019	2020
Alternative 1 - Rolling Closure				
Duration (months)	16	10	6	0
Construction Cost	\$30,927,000	\$19,329,000	\$11,598,000	\$0
Annual O&M	\$25,000			
Present Value (3% discount rate)	\$30,022,000			
Present Value (7% discount rate)	\$28,414,000			
Alternative 1 – Compressed Lanes				
Duration (months)	24	10	12	2
Construction Cost	\$32,224,000	\$13,427,000	\$16,112,000	\$2,685,000
Annual O&M	\$25,000			
Present Value (3% discount rate)	\$30,981,000			
Present Value (7% discount rate)	\$29,012,000			
Alternative 2				
Duration (months)	12	0	12	0
Construction Cost	\$28,099,000	\$0	\$28,099,000	\$0
Annual O&M	\$120,000			
Present Value (3% discount rate)	\$28,042,000			
Present Value (7% discount rate)	\$25,597,000			
Alternative 2a				
Duration (months)	12	0	12	0
Construction Cost	\$27,180,000	\$0	\$27,180,000	\$0
Annual O&M	\$60,000			
Present Value (3% discount rate)	\$26,398,000			
Present Value (7% discount rate)	\$24,267,000			
Alternative 3				
Duration (months)	12	0	12	0
Construction Cost	\$24,262,000	\$0	\$24,262,000	\$0
Annual O&M	\$110,000			
Present Value (3% discount rate)	\$24,295,000			
Present Value (7% discount rate)	\$22,158,000			

BCE FINDINGS

Results of Impact Analysis (2017\$)

Alternative	Traffic Impacts	Business Impacts	Recreation Impacts	Total
7% Discount Rate				
Alt. 1 - Rolling Closure	-\$2,165,000	-\$13,577,000	\$0	-\$15,742,000
Alt. 1 - Compressed Lanes	-\$3,561,000	-\$8,173,000	\$0	-\$11,734,000
Alternative 2	\$0	-\$2,580,000	-\$195,000	-\$2,775,000
Alternative 2A	\$0	-\$2,580,000	-\$195,000	-\$2,775,000
Alternative 3	\$0	\$0	-\$195,000	-\$195,000
3% Discount Rate				
Alt. 1 - Rolling Closure	-\$2,249,000	-\$14,126,000	\$0	-\$16,375,000
Alt. 1 - Compressed Lanes	-\$3,722,000	-\$8,620,000	\$0	-\$12,342,000
Alternative 2	\$0	-\$2,784,000	-\$214,000	-\$2,998,000
Alternative 2A	\$0	-\$2,784,000	-\$214,000	-\$2,998,000
Alternative 3	\$0	\$0	-\$214,000	-\$214,000

Note: Values rounded to the nearest thousand dollars

BCE FINDINGS

Evaluation of Alternatives (2017\$)

Alternative	Costs	Impacts	Net Present Value
7% Discount Rate			
Alt. 1 - Rolling Closure	-\$28,414,000	-\$15,742,000	-\$44,156,000
Alt. 1 - Compressed Lanes	-\$29,012,000	-\$11,734,000	-\$40,746,000
Alternative 2	-\$25,597,000	-\$2,775,000	-\$28,372,000
Alternative 2A	-\$24,267,000	-\$2,775,000	-\$27,042,000
Alternative 3	-\$22,158,000	-\$195,000	-\$22,353,000
3% Discount Rate			
Alt. 1 - Rolling Closure	-\$30,022,000	-\$16,375,000	-\$46,397,000
Alt. 1 - Compressed Lanes	-\$30,981,000	-\$12,342,000	-\$43,323,000
Alternative 2	-\$28,042,000	-\$2,998,000	-\$31,040,000
Alternative 2A	-\$26,398,000	-\$2,998,000	-\$29,396,000
Alternative 3	-\$24,295,000	-\$214,000	-\$24,509,000

Note: Values rounded to the nearest thousand dollars

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TECHNICALS

Recommendation and Lessons Learned



RECOMMENDED BCE ALTERNATIVE No. 3

Lowest Cost Alternative



O&M – One Confined Facility
with Improved Ease of Access



Avoids Impacts to Traffic and
Business Along Marginal Way



Lessons Learned

- Time and money in planning saves in construction and life-cycle costs
- Be open-minded- it was not too late to save money
- Critical stakeholder and public outreach
- Evaluating “non-monetary” factors
- Monetizing traffic and business impacts effects the true cost of alternatives

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Questions

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Back Cove South CSO Storage Facility (BCSSF)

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Kate Mignone, AECOM

Discussion!