HAMILTON COUNTY
BOARD OF COUNTY COMMISSIONERS

WWIP PHASE 2A PROPOSED PLAN SUMMARY

May 25, 2018

BOARD OF COUNTY COMMISSIONERS
MSD PHASE 2A PROPOSED PLAN SUMMARY

Executive Summary Overview

- The MSD Consent Decree is implemented in multiple phases to schedule projects as "expeditiously as practicable" according to community affordability criteria. The Board of County Commissioners (Board) is the lead Consent Decree defendant and the City of Cincinnati (City), as agent for the Board and the current operator of MSD, is its co-defendant. Work is conducted under the supervision of U.S. EPA, Ohio EPA and ORSANCO (Regulators).

- Phase 1 ends December 31, 2018 and is estimated to cost $1.14 Billion (in 2006$) or $1.51B in current dollars. The Regulators have recently agreed to a suite of additional Consent Decree projects during 2018-2020, referred to as Bridge projects, estimated to cost an extra $62 Million (2006$) or $82.5M in current dollars[1], subject to Court approval.

- Phase 2A will begin January 1, 2020, and the Board proposes that it will last five (5) years until December 31, 2024. Phase 2B would begin in 2025 and its scheduling and project list would be due June 30, 2023.

- Phase 2A Capital Projects and Allowances are estimated to cost about $163M (2006$) or $217M in current dollars, including project planning, design and/or construction of 28 projects, and $6M/year for "allowances" used across broad areas of the MSD service area. A List of Phase 2A projects and a program schedule is shown below. Adding Sewer Back Up (SBU) Operating Allowance costs of $7.4M/year (2006$) brings the total Phase 2A Consent Decree cost up to $40M/year (2006$)($53.2M in current dollars). Adding $50M/year (2006$) for

[1] The MSD Consent Decree and its Wet Weather Implementation Program (WWIP) used year 2006 dollar cost estimates, and their use continues into Phase 2A. However, the Board also includes "current dollar" estimates so the public can see costs expressed in updated dollar amounts (current for First Quarter of 2018).

Asset Management brings the total cost to approximately $450M (2006$) or $599M in current dollars.

- The costs of constructing Phase 2 in its entirety (estimated to cost $2.3B (2006$), or $3.1B in current dollars)(including projects and Allowances) exceeds U.S. EPA's 2.0% Residential Indicator threshold and is unaffordable. To lessen the impact to what U.S. EPA's criteria calls a "high burden" community, the use of a multi-step Phase 2, starting with Phase 2A, is justified and wise.

Board's Policy Goals

The Board governs MSD and sets its policies, budgets, rules and rates. The Board is acutely aware of its duties under the Consent Decrees and the impact of a $3B+ program on ratepayers. Taking into account input from the public and MSD and County staff, the Board set the following Policy Goals for Phase 2 and Phase 2A:

- COMPLIANCE: Comply with the requirements of the Consent Decrees to address Combined and Sanitary Sewer Overflows and improve water quality within the constraints of community affordability, asset management to continue MSD operations, and practicability.

- RATEPAYER PROTECTION: Protect MSD ratepayers and the community from unaffordable program costs.

- IMPROVEMENT: Focus work on the existing list of WWIP projects, but creatively adapt those to lessons learned, special wet weather needs, new technologies, integrated watershed planning, and changed circumstances from the start of Phase 1.

- FLEXIBILITY: Keep Phase 2A brief enough to accomplish major work and develop new and improved projects for construction in Phase 2B. Meanwhile, protect the community by avoiding a lengthy program of mandated projects (each with schedule penalties) regardless of actual costs. Retain flexibility for Phase 2B scheduling by requiring another affordability analysis in 2023 prior to Phase 2B scheduling in 2024, a key to controlling costs from 2025 onward.

SUMMARY OF BOARD'S PROPOSED 5-YEAR WWIP PHASE 2A PROJECTS

PLANNING, DESIGN AND CONSTRUCTION

WWIP Project Numbers	Description	Cost 2006$	Current ($)
215	Muddy Creek WWTP Pump Station/EHRT (proposed change to WWIP)	$65.8M	$87.6M
218, 219, 220, 221, 222	Muddy Creek CSOs 402 – 406 Improvements	$9.7M	$12.9M
235	Addyston Extraneous Stormwater Removal (proposed change)	$5.3M	$7.1M
236	CSO 198 Partial Sep/SBU Mitigation (proposed change)	$8.2M	$10.9M
317	Mt. Washington Source Control	$8.2M	$10.9M
195, 196, 198, 205, 206	Little Miami WWTP PS Upgrades for EHRT Part 1 (proposed change)	$17.0M	$22.6M
204	Little Miami WWTP - Standby Power Installation	$4.3M	$5.7M
204	Little Miami WWTP Standby Power – Address Duke Rider Cost	$0.8M	$1.1M
248	Mill Creek WWTP EHRT complete diversion chamber (proposed change)	$4.6M	$6.1M
16 Construction Projects	**Total 5-year Phase 2A WWIP Construction Projects Estimated Cost:**	**$123.9M**	**$164.9M**

PLANNING & DESIGN ONLY

WWIP Project Numbers	Description	Cost 2006$	Current ($)
193	CSO 552 Partial Separation Little Miami tributary area (proposed change)	$0.3M	$0.4M
195, 196, 198, 205, 206	Little Miami WWTP PS Upgrades for EHRT Part 2 (proposed change)	$2.6M	$3.5M
240, 241, 242, 243, 244	East Branch Muddy Creek Interceptor (Part 1)	$1.0M	$1.3M
248	Mill Creek WWTP – New Wet Weather Pump Station to future EHRT (proposed change)	$4.6M	$6.1M
12 Planning/ Design Projects	**Total 5-year Phase 2A WWIP Planning & Design Projects Estimated Cost:**	**$8.5M**	**$11.3M**

Phase 2A will build many major projects and design other major projects to be built at the start of Phase 2B. Key Phase 2A projects include major additional capacity to treat Wet Weather flows through Enhanced High Rate Treatment (EHRT) systems at MSD's major treatment plants. The EHRTs and other Phase 2A projects will add significant new control of Combined Sewer Overflows and are focused first in areas prone to Sewer Back Ups and overflows. Other major Phase 2A projects are located in the Muddy Creek watershed on Cincinnati's West side and Mount Washington on Cincinnati's East side.

In addition, Phase 2A focuses on integrated watershed planning to prioritize investments needed to meet all Clean Water Act obligations. Integrated watershed planning allows our limited funds to be spent on green infrastructure or source control to manage rainwater where it falls and more traditional gray infrastructure at the end of the pipe. The BOCC Phase 2A focus on keeping rainwater out of combined and sanitary sewers will save money on both capital projects and operating costs, while meeting Clean Water Act obligations. This balanced plan will result in high benefit overflow volume reductions and address surface flooding and basement backups. Phase 2A integrated watershed planning will allow for proper sizing of Phase 2B projects.

SCHEDULE OF BOARD'S PROPOSED 5-YEAR WWIP PHASE 2A PROJECTS

5-Year Program

Planning Design Construction

WWIP $33M Per Year Encumbrance Projects Schedule (2006$)[4]

WWIP Index Line No.	Project Description	Estimated Total Cost (2006$)[1]	Y2020 1	Y2021 2	Y2022 3	Y2023 4	Y2024 5
WWIP Phase 2A Proposed Schedule		**$ 162,487,445**					
193R	CSO 552 Partial Separation (Little Miami)	$ 316,290					
195-196, 198, 205-206	Little Miami WWTP PS Upgrades for EHRT (Part 1)	$ 17,007,903					
195-196, 198, 205-206	Little Miami WWTP PS Upgrades for EHRT (Part 2)	$ 2,637,139					
204	Little Miami WWTP Standby Power	$ 4,285,071					
204	Little Miami WWTP Standby Power – Duke Rider Cost	$ 822,454					
215R	Muddy Creek WWTP Pump Station (for EHRT)	$ 32,898,173					
215R	Muddy Creek WWTP EHRT	$ 32,898,173					
218-222	Muddy Creek CSOs 402 – 406 Wet Weather Improvements	$ 9,732,447					
235R	Addyston Extraneous Stormwater Removal	$ 5,319,573					
236B	CSO 198 Partial Separation/SBU Mitigation	$ 8,200,000					
240-244	East Branch Muddy Creek Interceptor (Part 1) - Based on Integrated Planning Results[2]	$ 1,000,000					
248R	Mill Creek WWTP CEPT (Pump Station) - complete diversion chamber	$ 4,585,111					
248R	Mill Creek WWTP CEPT (Pump Sta.)	$ 4,585,111					
317R	Mt Washington Source Control Implementation	$ 8,200,000					
	Annual WWIP Allowances	$ 30,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000	$ 6,000,000
	Asset Management - $50M per year[3]		$ 50,000,000	$ 50,000,000	$ 50,000,000	$ 50,000,000	$ 50,000,000
	WWIP Encumbrance per year		**$ 28,432,487**	**$ 20,469,304**	**$ 54,438,029**	**$ 52,989,481**	**$ 6,158,145**

###R = Proposed adaptive management replacement project for WWIP listed Index project

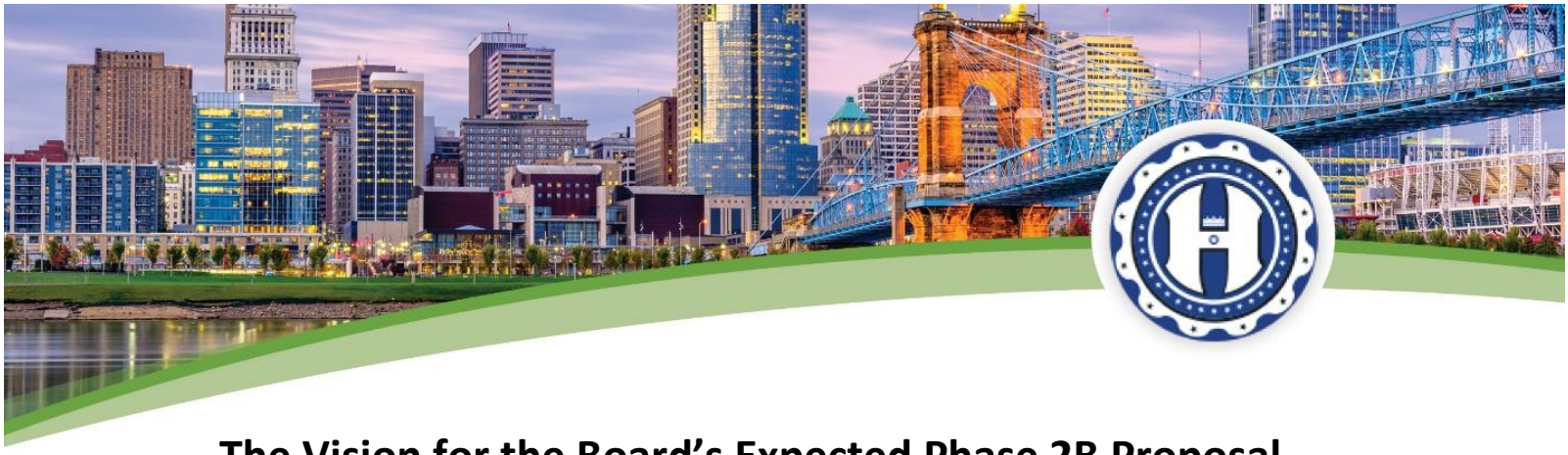
###B = Proposed adaptive management partial replacement project for WWIP listed index project

[1] MSD provided costs unless noted otherwise. For planing & design only costs, 20% of the MSD total project cost was assumed.

[2] Estimated costs of planning and design may change based upon initial planning work.

[3] Average annual cost for Asset Management is $50M, but actual annual cost will vary year to year.

[4] Consent Decree mandated SBU costs have recently averaged $7.4M/year (2006$) or $10M in current dollars. Depending on rainfall, the SBU Phase 2A costs may fluctuate in any given year. These fluctuating Consent Decree costs are in addition to the encumbrances identified in this Phase 2A proposal.



The Vision for the Board's Expected Phase 2B Proposal

The Board believes it is imperative to take advantage of integrated watershed planning and that Phase 2B naturally grow out of, and benefit from, the information and lessons learned from Phase 2A. As indicated above, the Board intends to utilize integrated watershed planning, in part, by building EHRTs at the major MSD treatment plants. Staggering design and construction schedules of these EHRTs ensures that successive projects are right-sized and scoped based on the outcomes of integrated watershed planning.

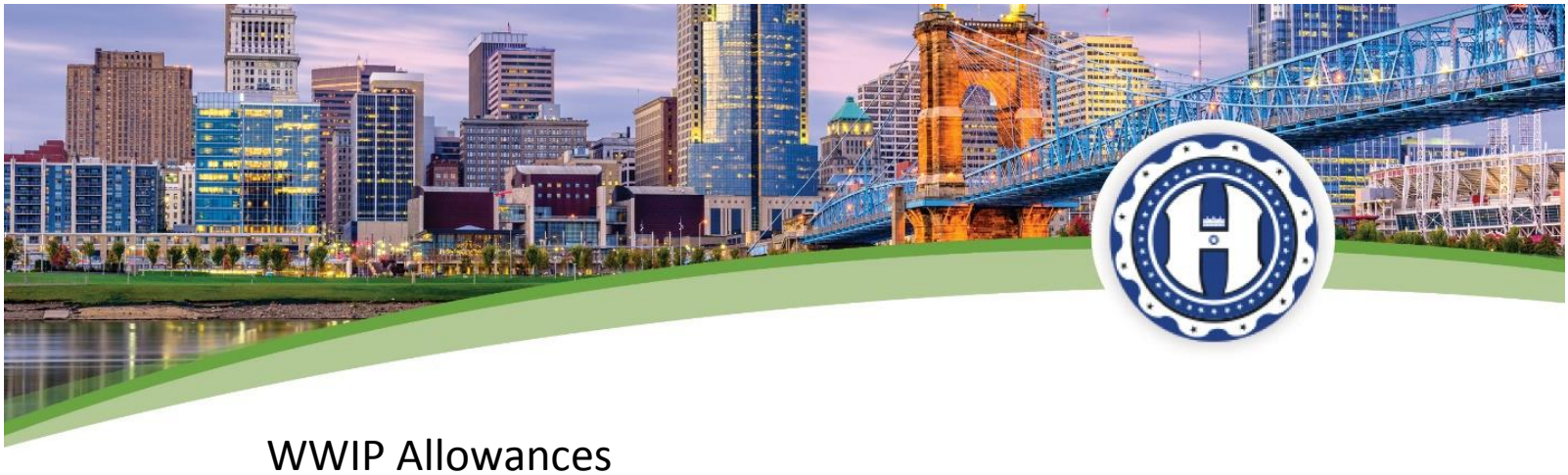
EHRTs can treat large volumes of overflows from the collection system that would otherwise be released untreated into the environment. EHRT's are smaller and less expensive than conventional treatment facilities, can process wastewater more quickly, operate on an as-needed basis, and can be designed to fit into the surrounding neighborhood. They improve local water quality, reduce sewer odors and debris, and result in an overall cleaner environment. Successfully operated EHRTs could also significantly reduce the overall WWIP projects to be built, further decreasing costs to MSD ratepayers. Thus, the Board's expected proposed Phase 2B capitalizes on these less expensive, environmentally friendly solutions.

Phase 2B will be based on an Affordability Analysis completed near the end of Phase 2A. As a result, the specific activities and costs cannot be completely predicted at this time. However, it is the Board's current vision, consistent with the chart on the next page, that Phase 2B would include the following projects to be planned, designed, and/or constructed:

PROJECTS CONSIDERED IN THE BOARD'S WWIP PHASE 2B VISION

Index Line No.	Description	Activity
193R	CSO 552 Partial Separation (Little Miami)	Design / Construction
195-196, 198, 205-206	Little Miami WWTP PS Upgrades for EHRT (Part 2)	Construction
200R	Little Miami WWTP (EHRT)	Design / Construction
201-203	Little Miami WWTP (Remaining Bundle Part 1)	Design / Construction
201-203	Little Miami WWTP (Remaining Bundle Part 2)	Design
215	Lower Muddy Creek Interceptor (Tunnel Alternative)	Planning / Design
216	Muddy Creek Pump Station Upgrade & Force Main	Planning / Design / Construction
223	West Branch Muddy Creek Interceptor - Based on IWAP Results	Planning / Design
227B	SSO 700 IWAP Early Action Projects	Planning / Design / Construction
233, 234	Upper Muddy Creek Interceptor (Part 2) - Based on IWAP Results	Planning / Design / Construction
235	Addyston Pump Station Elimination	Planning / Design / Construction
238R	CSO 410 Separation	Planning / Design / Construction
238, 239, 245	CSO 415, 416 Separation (Part 1)	Planning / Design / Construction
239, 245	CSO 411, 412, 413, 414 Separation	Planning / Design / Construction
240-244	East Branch Muddy Creek Interceptor (Part 1) - Based on IWAP Results	Construction
240-244	East Branch Muddy Creek Interceptor (Part 2) - Based on IWAP Results	Planning / Design / Construction

The Board fully expects that the list of projects it will submit to the Regulators with a schedule for Phase 2B may include additions to and/or different projects than the list above. Consistent with both its philosophy for Phase 2A and with its vision for Phase 2B, the Board will consider affordability, necessity, cost, new technology, model updates, design lessons or improvements, policy changes, and overall lessons learned from Phase 1 and Phase 2A when submitting its proposed Phase 2B schedule of projects to the Regulators.



WWIP Allowances

Phase 2A will include Allowances to implement projects under subject matter programs that address, reduce and/or eliminate overflows and improve water quality under the Consent Decree, such as Sewer Relining, Manhole Rehabilitation, and Home Sewage Treatment System replacements with public sewers. These Allowances are on the Regulator-approved list. The Board proposal averages $6M/year (2006$) or $8M/year in current dollars, totaling $30M (2006$) or $40M in current dollars for Allowances. The Board's annual MSD budget will identify the specific types and amounts for each Allowance.

Sewer Back Up (SBU) Program

The first in the Nation SBU Program currently provides prevention devices, clean-up costs, damage reimbursement, and other activities. Although currently funded from MSD's Operating Budget, the SBU Program is a Consent Decree Allowance. Recently, it has cost about $7.4M/year (2006$) or $10M/year in current dollars, which annual cost is projected to continue during 2020-2024. This amount may fluctuate, depending upon rainfall. The total SBU Program cost over 5 years is projected to be $37M (2006$) or $50M in current dollars.

Asset Management Continues

The primary maintenance, repair and replacement of the aging MSD system comes from non-Consent Decree spending known as "Asset Management". The Board proposal averages $50M/year (2006$) or $66.5M in current dollars, totaling $250M (2006$) or $332.7M in current dollars for Asset Management. The Board's annual MSD budget will identify the specific types and amounts to be spent on Asset Management projects and allowances.

Rate and Affordability Impacts

Estimated rate impacts

The Board has heard the protests of ratepayers regarding the massive cumulative MSD rate increases and their heavy burden on people and families. The Board designed its proposal to minimize rate increases while investing the hundreds of millions of dollars necessary to comply with the Consent Decree.

Rate increases have been significant. MSD estimates its rates are nearly 2.5 times those of neighboring communities and were the 4th highest in the Country as of 2015. Ratepayers experienced a nearly 8.5% average annual rate increase between 2006-2015 (which is a 108% cumulative increase), and a cumulative rate increase of 800% since the first MSD consent decree in 1985.

The Board's Phase 2A is currently estimated to result in a 5-year cumulative rate increase of about 3%. Multiple factors impact the need to increase revenues and decrease expenses all of which will be analyzed and adjusted to ensure rates will be increased only when absolutely necessary. The Board will scrutinize all Consent Decree Project and Allowance budgets and all Asset Management spending to ensure all work is designed, engineered, and constructed with best management practices for productivity and efficiency and to eliminate unnecessary costs.

Affordability impacts

The pace of Consent Decree work and spending is governed by so-called "Affordability Considerations", including multiple criteria evaluating a community's financial and social health. As part of this process, a calculation evaluates the financial burden on residential customers as if the entire Program was constructed in a certain time period.

Constructing the entire Phase 2 is estimated to cost $2.3B (2006$) or $3.1B in current dollars, and is unaffordable -- well beyond the "Heavy Burden" threshold. Moreover,

there are major populations in the MSD Service Area (City of Cincinnati; other high poverty areas and groups) which are already suffering severe burdens due to MSD costs. As a "high burden" community, it is justified and wise to initiate Phase 2 with a short Phase 2A.

Looking ahead, the Board is committed to a much shorter Phase 2A than the 10-year Phase 1. Keeping Phase 2A at 5 years will grant the community the right to have its overall financial health surveyed again prior to Phase 2B. History has demonstrated that project cost estimates beyond 5 years can be grossly underestimated. A 5-year Phase 2A will protect the community from making guaranteed project construction commitments with no guaranteed protection against major cost spikes.

Advantages of Board's Phase 2A Proposal

- *HUMAN HEALTH AND WATERWAY IMPROVEMENTS*

The Board's proposed Phase 2A projects aim at two major targets:

(1) Water quality improvements in our creeks, streams and rivers, and

(2) Relief from sewer-related surface flooding and basement backups.

The Board's proposed projects will address multiple water quality and public health issues with significant, focused investments. The major EHRT projects will cost-effectively treat millions of gallons of otherwise overflowing Combined Sewers. Adding this capacity to the system, coupled with targeted stormwater separation and green infrastructure work in heavily impacted areas, should provide relief to our neighbors experiencing sewer-related flooding and back-ups as well as improve water quality.

- *FOCUS NOW ON MUDDY CREEK AND LITTLE MIAMI WATERSHEDS*

The Board's proposed projects will focus major spending to improve water quality and human health protections in two major watersheds which need special attention. While spending will continue on Mill Creek and Ohio River-related issues, needed work will occur on our West and East sides where population density is high, residential impacts significant, and special attention is overdue.

- *MEASURE COSTS AND BENEFITS WISELY*

  Project investment should be measured both on cost per overflow gallon reduced and on cost per increased number of days of water quality standard compliance. If the cost-benefit for both metrics is not favorable, dollars should be redirected to projects with higher cost-benefit for both metrics. The Board's proposal scores high on both counts – and this should be the key calculation used to evaluate other spending. One result of this metric is a balance of green infrastructure with gray infrastructure to not only focus on controlling and managing rainwater where it falls, but also keeping it out of our combined sewers – saving the costs of "treating rainwater" at our large treatment plants. This approach should decrease overflows and back-ups while sustainably managing stormwater and improving overall instream water quality.

- *APPLY INTEGRATED WATERSHED ACTION PLANNING*

  The Board's Phase 2A projects are focused on project selection that maximize overflow reduction while also mitigating sewer-related surface flooding and basement backups. The Board requires that integrated watershed planning be applied during Phase 2A to guide the planning and design of Phase 2B projects to be constructed in year 6 and beyond.

- *ADDRESS WATER QUALITY AND QUANTITY/OVERFLOW ISSUES TOGETHER*

  The Board's proposed Phase 2A plans, designs, and constructs projects that achieve measurable water quality improvements while also addressing immediate issues of surface flooding and basement backups. The Board's proposed projects are consistent with the existing list of Phase 2 projects and will address multiple water quality and public health issues with single project investments. The Clean Water Act requires MSD to meet both Consent Decree project performance criteria and NPDES permit limits. The Board's projects and approach aims to meet both requirements.

- *AVOID UNNECESSARY RATE INCREASES*

  The Board is committed to ensuring that rates will be increased only when necessary. Under the Board's 5-year Plan as currently estimated, the Average Annual MSD Bill would increase from $660.63 (2018) to approximately $680.65 (2024). A longer Phase

2A Plan, particularly with higher spending, would cause rates to rise significantly more. The MSD ratepayer cannot afford an excessive rate increases. Controlling duration and spending is the key to controlling rates and avoiding continued, unnecessary rate hikes.

- *FINANCIALLY PROTECT RATEPAYERS*

  The longer the Phase 2A timeframe, the more likely it is that MSD rates will be raised sooner and/or higher than necessary. The history of Phase 1 proves this. It is clear from rate evaluations, changes in MSD project budgets and, historically, MSD's actual annual spending versus projections, that accurately predicting relevant financial impacts beyond 3-4 years is extremely difficult.

- *AVOID LOCKING INTO PROJECTS WITH UNDERESTIMATED COSTS*

  A shorter Phase 2A minimizes the risk of underestimated project costs. A long term Phase 2A locks in projects even if there are better, cheaper methods identified later. Multiple EHRTs and other projects beyond year 5 need time during years 1-5 to better estimate costs. We know from Phase 1 that MSD's original EHRT cost estimates were far lower than later estimates based on detailed planning and design. The lessons learned in years 1-5 of Phase 2A should result in improved cost estimate accuracy for the 2nd in-plant EHRT in Phase 2B (after year 5) and then a 3rd in-plant EHRT.

- *RIGHT-SIZE PROJECTS FOR PHASE 2B*

  Additional planning (including more accurate modeling and integrated planning) should influence and hopefully shrink the sizing of "Grey projects" after year 5. Guaranteeing to construct such projects in Phase 2A risks improper sizing, insufficient performance, and unanticipated costs. The risk of over-sizing falls entirely on MSD ratepayers.

- *DOES NOT TIE THE HANDS OF THE NEW, PERMANENT MSD DIRECTOR*

  The transition of MSD operations and the hiring of a new, permanent Director should be allowed to occur before any long-term (over 5-year) part of Phase 2 is locked in. The new Director and Citizen Board should be given discretion to shape and negotiate Phase 2 work after year 5 and not have to wait for 10 years.

- *ADAPT TO NEW CIRCUMSTANCES*

  Locking now into projects beyond year 5 would limit opportunity to fairly negotiate changes in year 6 and beyond to apply new information (i.e., climate change), implement integrated planning, use new technologies (green or otherwise), and respond to regulatory changes. A long Phase 2A will limit flexibility for its entire term, missing out on the benefits of new information, technologies and policy changes identified in its early years.