

## STAFF SUMMARY

**TO:** Board of Directors  
**FROM:** Frederick A. Laskey, Executive Director   
**DATE:** February 16, 2022  
**SUBJECT:** Metropolitan Redundancy Interim Improvements Projects Update

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**COMMITTEE:** Water Policy and Oversight

X  INFORMATION  
  VOTE

Valerie Moran, P.E., Director of Waterworks  
John P. Colbert, P.E., Chief Engineer  
Lisa Hamilton, P.E., Assistant Director, Engineering  
Preparer/Title

  
David W. Coppes, P.E.  
Chief Operating Officer

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### RECOMMENDATION:

For information only. This staff summary provides an update on the Metropolitan Interim Improvements projects. These projects are being implemented to reduce the risk of failure of surface pipe components of the three Metropolitan Tunnels (City Tunnel, City Tunnel Extension and Dorchester Tunnel) and to improve MWRA's ability to respond in the event of a failure that requires shut down of any part of the Metropolitan Tunnel system. These projects were developed at the direction of the Board of Directors to provide interim improvements to mitigate the risk of a failure while staff proceed with planning, design, construction and ultimately start-up of the new tunnels. A presentation will be provided to the Board on the construction activities for these projects.

### DISCUSSION:

Each of the existing Metropolitan Tunnels consists of concrete-lined deep rock tunnel sections linked to the surface through steel and concrete vertical shafts. The tunnels and shafts themselves require little or no maintenance and represent a low risk of failure. The shafts are located in Weston, Chestnut Hill, Allston, Somerville, Malden, West Roxbury, and Dorchester. At the top of each shaft, cast iron or steel pipe and valves connect to the MWRA surface pipe network. These pipes and valves are accessed through subterranean vaults and chambers. The piping and many of the valves are in poor condition. Interim improvements as detailed below are being implemented to strengthen the physical assets at top of shaft structures and to provide additional flow capacity and redundancy in the event of an emergency due to a tunnel failure.



Corroded air valve at Shaft 9A

1. Commonwealth Avenue Pumping Station Improvements – This project added pumps and piping to provide a means of supply independent of the City Tunnel, by adding a pipeline connection to MWRA’s Low Service system and two new pumps capable of pumping from the Low Service grade line. This project was completed in July 2021 at a final cost of \$7,977,169.



*New Pumps Commonwealth Avenue*

2. Tunnel-shaft Pipeline Improvements – Modifications are being implemented to protect the valves and piping in the chambers at the tops of the tunnels shafts and to reduce water infiltration that is contributing to corrosion and can require significant pumping in order to access valves for operation. Construction was recently completed at Shafts 6, 8, and 9A at a cost of \$2,391,500 that provided protection of all exposed piping, shaft caps, end caps, nuts, bolts, and valve bodies with corrosion protection tape or exterior carbon fiber wrapping; removed and replaced corroded nuts and bolts; and reduced or eliminated water infiltration in eight vaults through waterproofing and grouting. Improvements for Shaft 5 are currently in design with an anticipated construction award in October 2022. The design scope for the upgrades to Shafts 7, 7B, 7C, and 7D is in progress.



*Flooded Shaft 7D valve chamber*

3. Weston Aqueduct Supply Main (WASM) 3 Rehabilitation - This ten-mile steel pipe, installed in the 1920s and 1930s, is a critical supply line to over 250,000 customers in the Northern High, Northern Extra High, and Intermediate High supply systems. In the event of a loss of the City Tunnel or City Tunnel Extension, this large pipeline can provide emergency flow to the Gillis Pump Station, which would serve the Northern High and Northern Intermediate High communities. The first of two contracts is currently in construction that will rehabilitate over 2.5 miles of 56-inch and 60-inch piping at an estimated cost of \$19,487,850. Construction is currently scheduled to be completed in May 2023 significantly ahead of the contract schedule. The second phase of the WASM 3 rehabilitation is currently under design with



*WASM 3 Cleaned and Lined Piping*

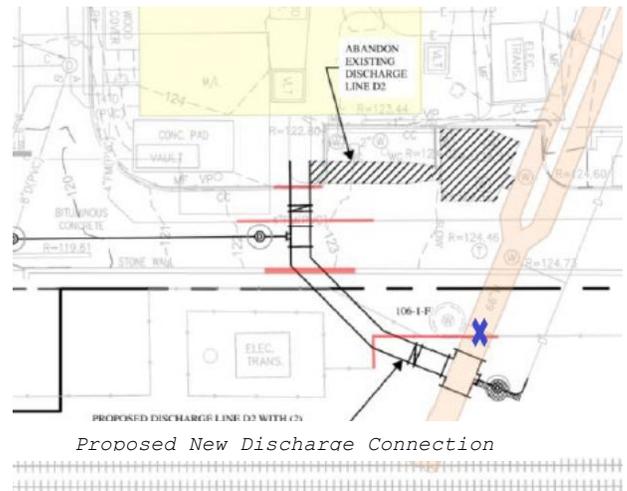
an anticipated construction award in January 2023.

- 4. Low Service Pressure Reducing Valve Improvements - This project is currently under construction at a cost of \$11,326,000, and will increase the size of pressure reducing valves on the WASM 4 pipeline at Nonantum Road in Boston and the WASM 3 pipeline at



Mystic Valley Parkway in Medford. This will increase the capacity of flow from these High Service mains to the Northern Low service area and ultimately to the Spot Pond and Gillis Pumping Stations in an emergency condition with either the City Tunnel or the City Tunnel Extension out of service. With this increased capacity, these stations will be capable of supplying the Northern High and Northern Intermediate High service areas without the need to pump from the open Spot Pond emergency reservoir. This project is currently in construction and anticipated to be completed in July 2023.

- 5. The Chestnut Hill Pumping Station Design Upgrade – This project includes a new discharge connection and vault to provide isolation of the pump station in the event of failure of the City Tunnel or the Dorchester Tunnel. The Chestnut Hill Pumping Station would be utilized to pump water from the open Chestnut Hill Reservoir to supply the Southern High and Southern Extra High service areas. The new pump station discharge connection and vault will be installed on Section 106 downstream of an existing valve. The anticipated construction award is November 2022.



**BUDGET/FISCAL IMPACT:**

The cost of these projects are included in the Capital Improvement Program budget.