

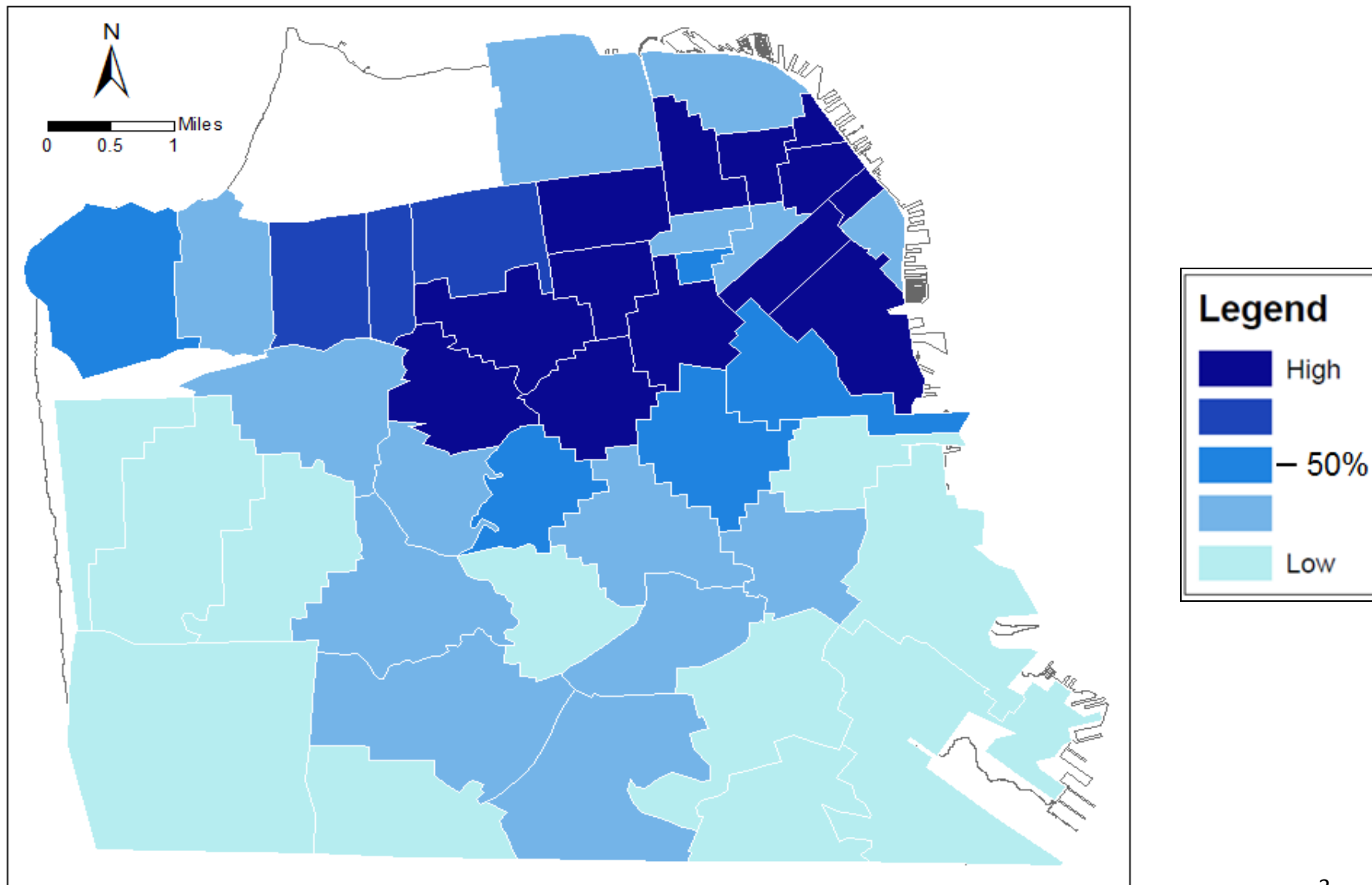
Assessment of Fire Suppression Options for Westside

John Scarpulla

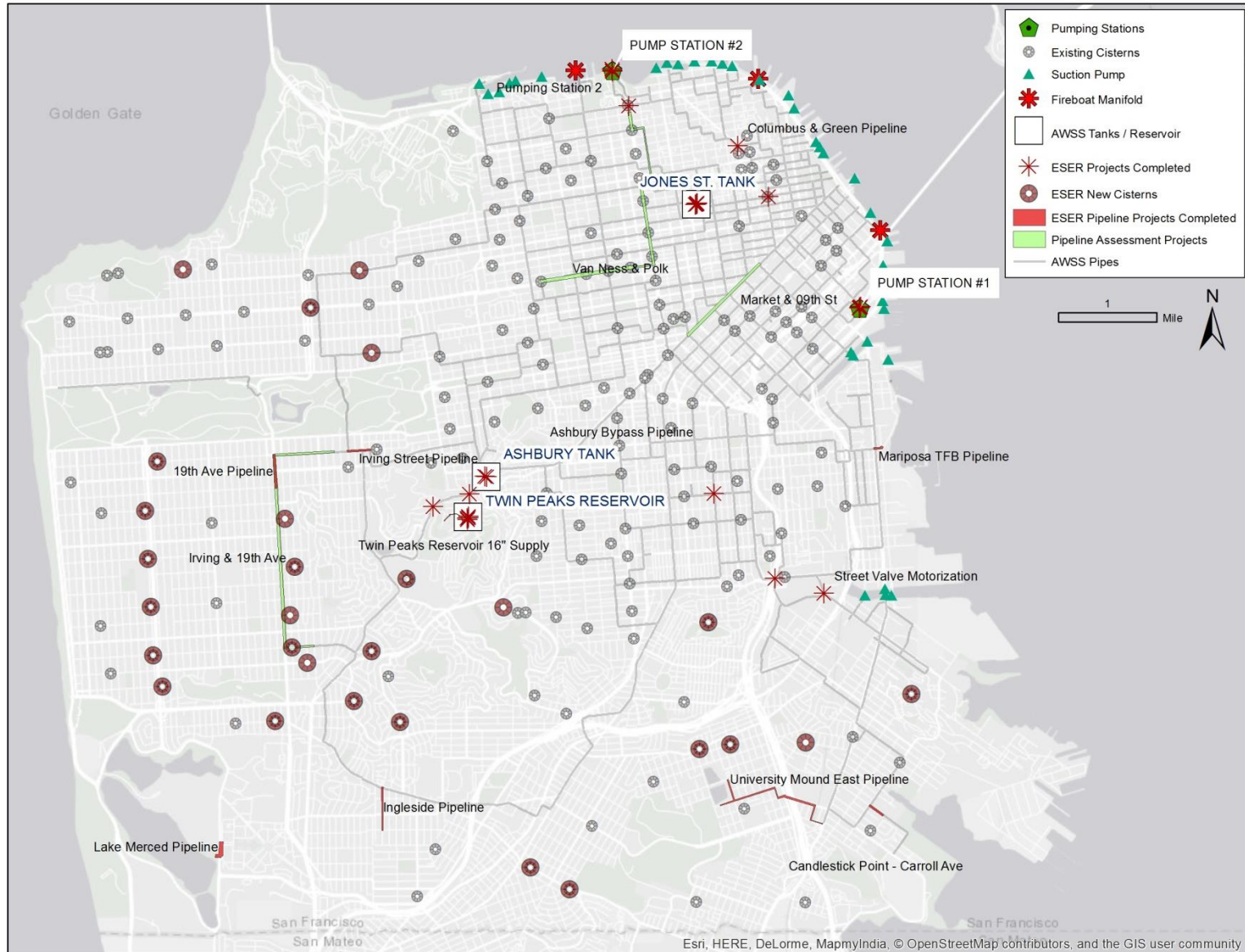
San Francisco Public Utilities Commission

- Since 2010 - SFPUC, SFFD, and Public Works have been implementing projects to improve the AWSS.
- SFFD is the end user: System improvements and expansion **must meet SFFD quality standards.**
- SFPUC employs the City's experts in the design, construction, operation & maintenance of water systems.
- SF Public Works provides project management expertise and guidance.
- Hydraulic Modeling utilized to guide decision making.

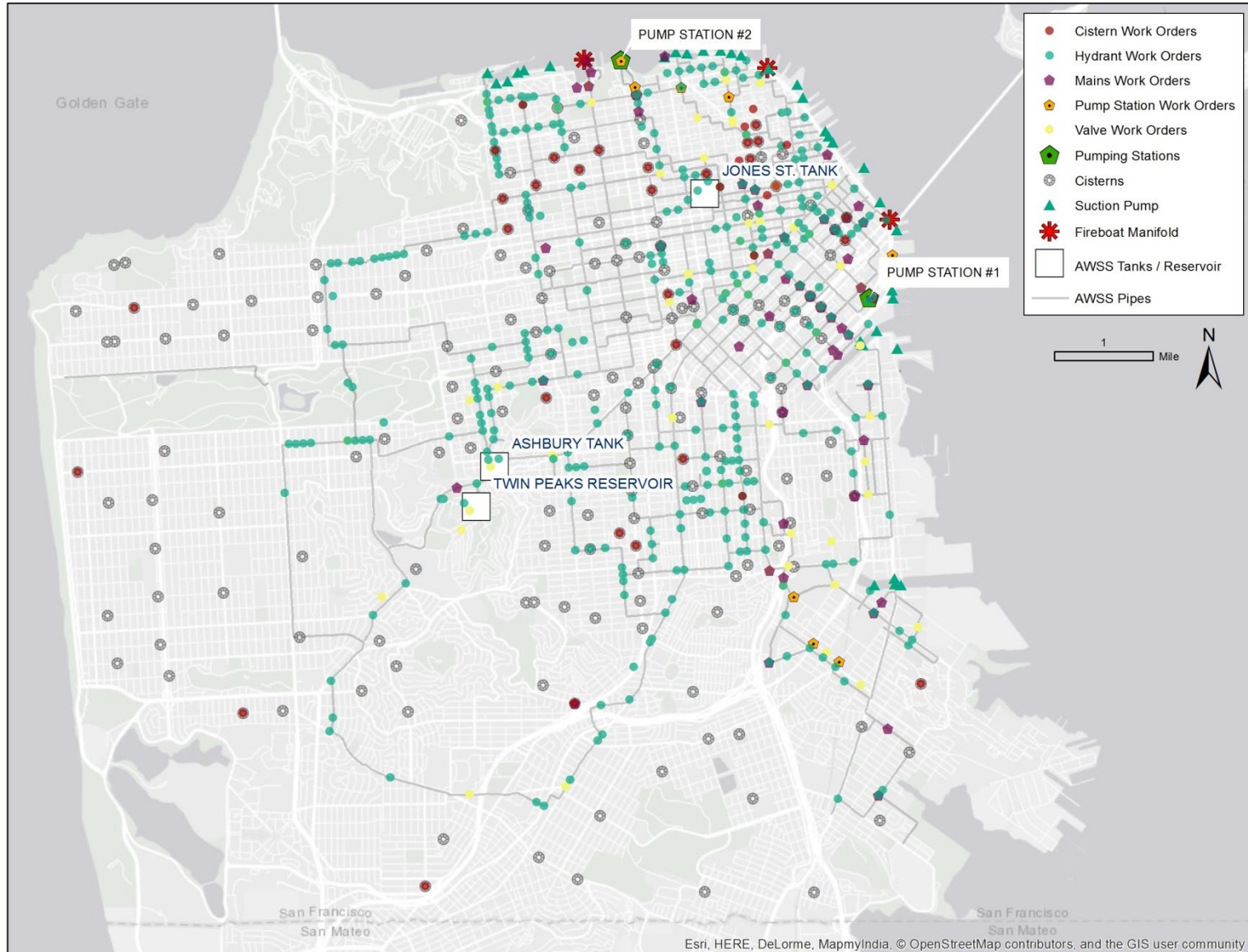
Reliability in 2010



Achievements – Capital Projects



Achievements – Maintenance



Work in Progress

- Connecting the 70 million gallon South Basin of the University Mound Reservoir to AWSS;
- 16 pipeline and tunnel projects;
- Continued motorizing of valves for remote control, and improvement of their electronic control system;
- Structural and seismic upgrades of Seawater pump station #2; and
- Design of pump station at Lake Merced.

GAO Committee Request

March 2017 - Government and Audit Oversight Committee request:

1. Report analyzing options for Westside :
 - a) AECOM Contracted to analyze 12 options:
 - i. Expansion of AWSS – 7 options
 - ii. Installation of a Potable AWSS – 5 options
 - b) Collaborative review of report by SFPUC & SFFD
 - c) Final recommendation by Chief and General Manager
2. Independent Review by 3rd party expert
 - a) Professor Charles Scawthorn to perform review

- **Designed to meet the robust performance standards required by SFFD to fight large fires.**
- Utilizes the **same** earthquake resistant pipes, seismically-reliable valves, hydrants, and components utilized by the AWSS.
- In addition, system rated to meet drinking water standards:
 - During non-fires, minimal connections to low-pressure water system by seismically reliable valves.
 - If fire occurs, valves are closed and the pressure of the system is increased via redundant pumps.
 - **Main Ancillary Benefit:**
After firefighting following an earthquake, system is able to provide drinking water to the Sunset and Richmond Districts even if the City's low-pressure drinking water distribution system incurs numerous breaks and leaks.

Criteria for Analysis

- Options 1-7: Expansion of AWSS
- Options 8-12: Potable AWSS
- **Criteria for Analysis:**
 - Modeled and analyzed for hydraulic performance fighting fires after a 7.8 earthquake.
 - Reliability of water supplies
 - Design of piping network
 - Impacts to other areas served by AWSS
 - Ancillary benefits
 - Cost

Analysis of AWSS Options

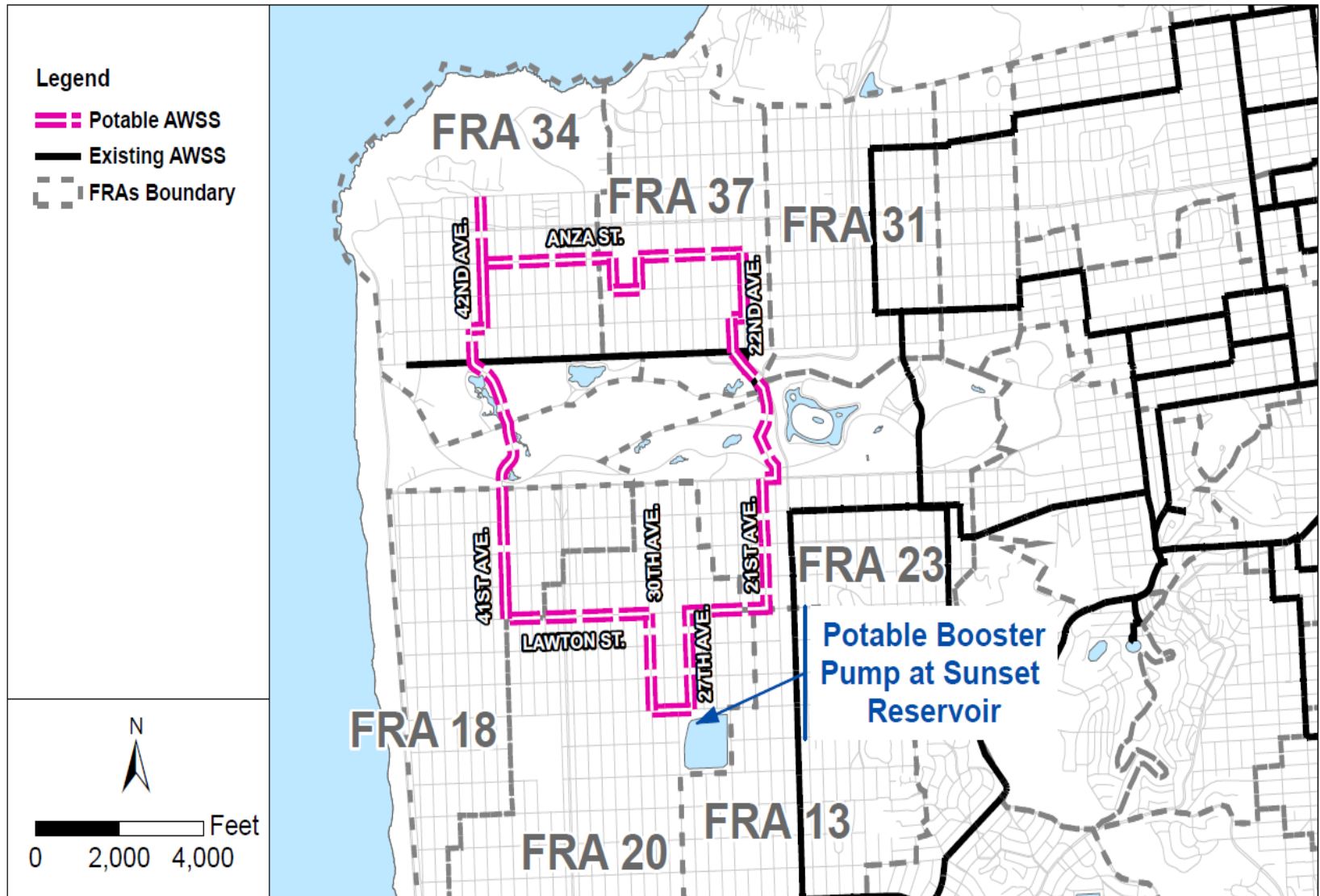
- Modeling results show there is **not enough supply and pressure in the current AWSS** to effectively serve the Richmond District.
- Piping network can be configured to increase pressure in Richmond District, but it reduces pressures to below performance levels in other areas of City.
- There is **not enough pressure to reach the Sunset District.**
- Need to add supplies from Sunset Reservoir or Lake Merced.
- For about the same cost of an AWSS for Richmond District only, both the Richmond and Sunset districts can be served using a Potable AWSS network.

Analysis of Supply of Potable AWS

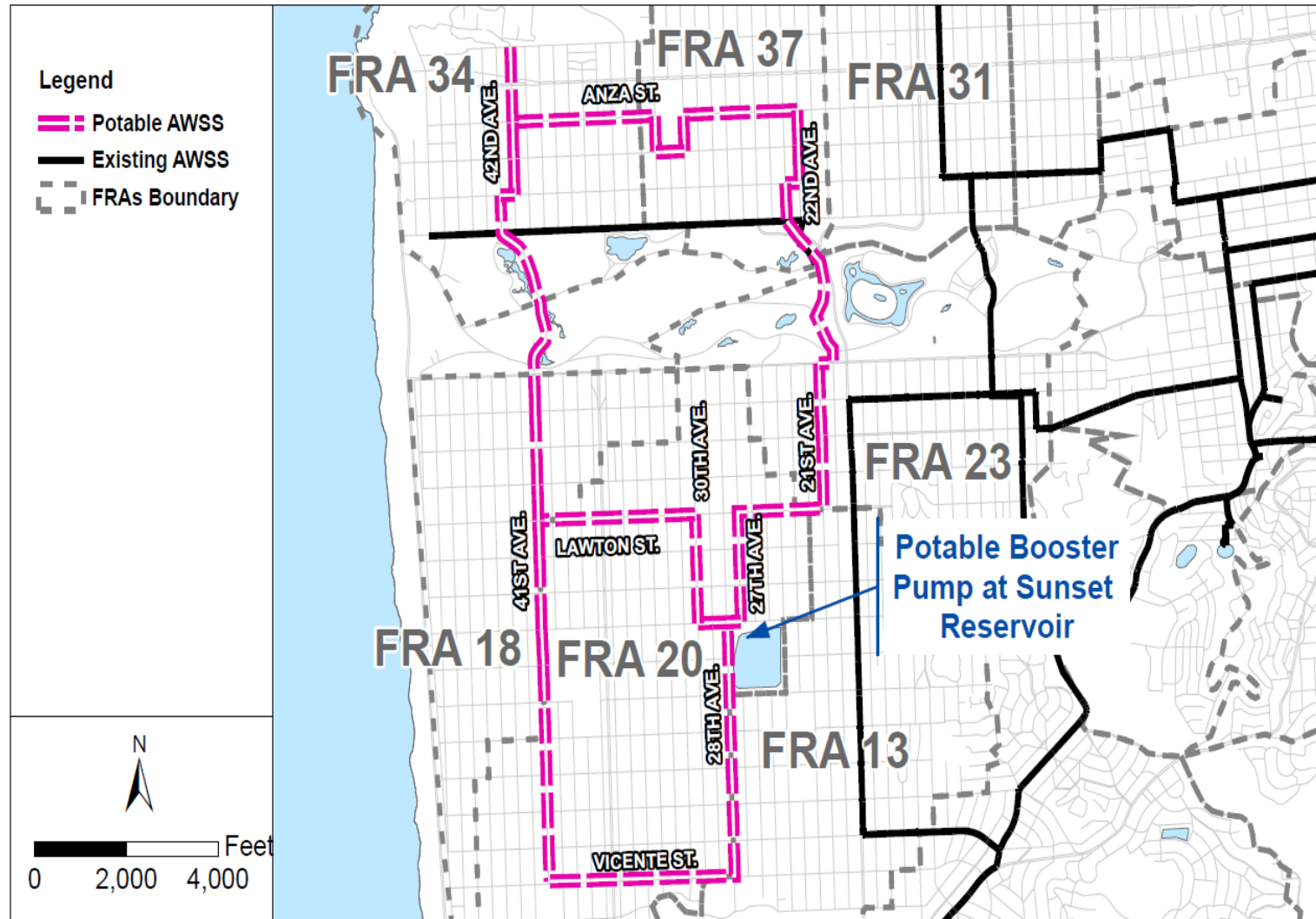
- Sunset Reservoir is the supply for Potable AWS:
 - Connects to the seismically reinforced North Basin of Sunset Reservoir
 - The North Basin contains 90 million gallons of water, and is isolated from the South Basin.
 - The reservoir is constantly being replenished by the seismically strengthened Hetch Hetchy system, and will receive water within 24 hours of a big earthquake.
 - To empty the reservoir, ALL of the fire department's engines pumping at maximum capacity for 24 hours, with no refill from Hetchy System:
 - SFFD Confirmed they would never have all engines pumping from this reservoir.
 - Hetchy will refill it within 24 hours.

Potable AWSS Piping Analysis

- **Potable AWSS options 8-10:**
 - Lack redundancy in their pipe networks.
- **Potable AWSS options 11-12:**
 - Inherently greater reliability due to redundant looped pipe networks.
 - Meet the performance requirements of SFFD and SFPUC.
 - Do not negatively impact performance of existing AWSS.
 - Can be designed to assure post-earthquake reliability comparable to the existing AWSS reliability.



Option 12





SFPUC & SFFD Recommendation

- SFPUC and SFFD Mgmt. recommend Option 12
- Perform detailed design and analysis to ensure performance requirements of SFFD are met.
- **Design for agility and the flexibility to add new technologies and water sources to the system in the future.**
- **Design to allow the piping network to be extended in the future to serve additional areas.**



Cost of Preferred Option

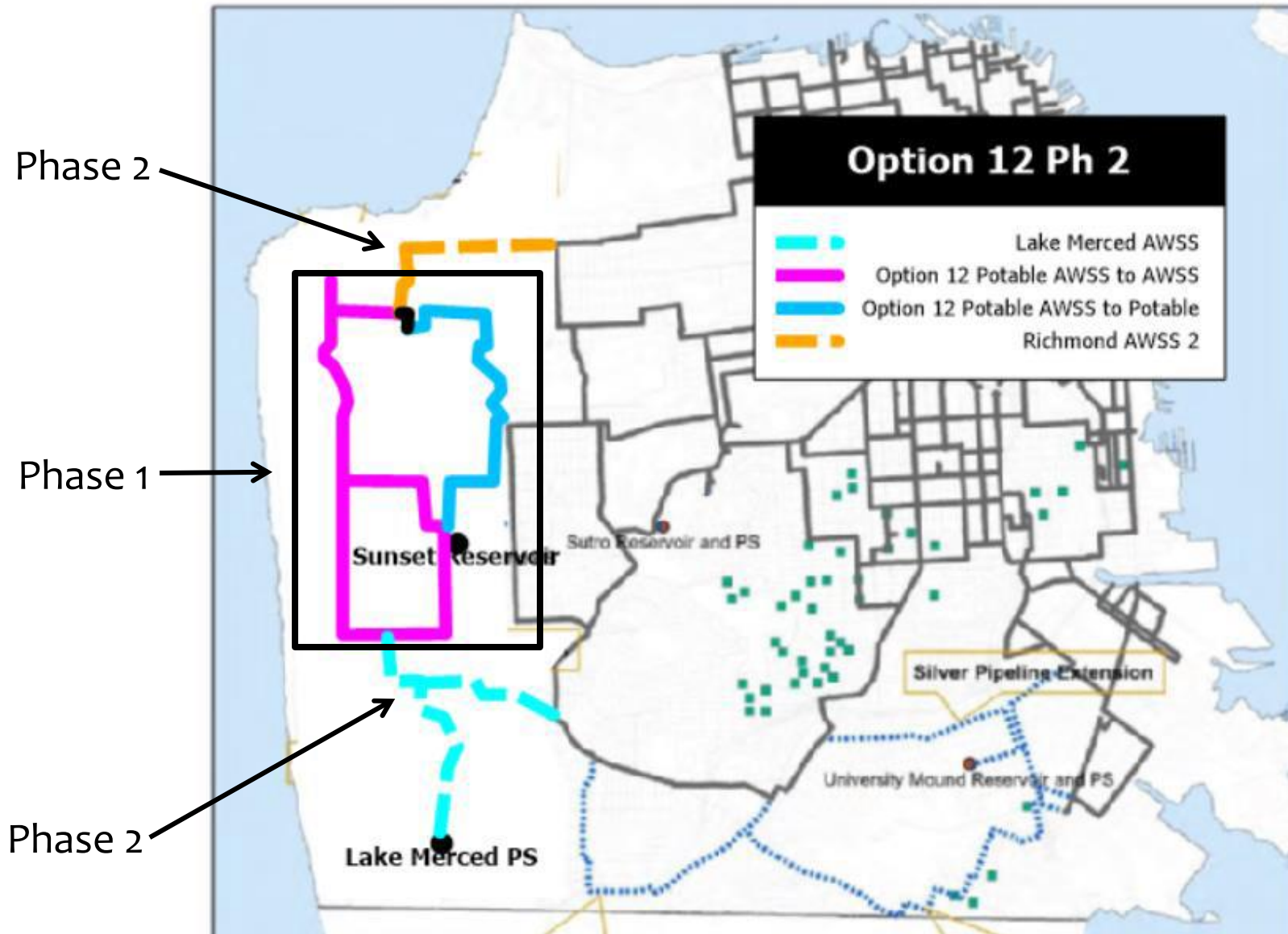
Total Estimated Cost:	\$109 Million
Available Funding from SFPUC Operating Budget:	\$40 million (\$10 million/year for 4 years)
Total amount of Bond Funding Needed:	\$69 million

Use SFPUC funds to begin work ASAP.

Professor Scawthorn Findings

- Analyses are reasonable and a valuable source of information to select an option for further design and analysis.
- A fundamental shortfall of capacity exists in the current AWSS to serve the Richmond and Sunset districts.
- For about the same cost of AWSS for Richmond District only, both the Richmond and Sunset districts can be served using a Potable AWSS network.
- Due to its location, size and recent seismic reinforcement, Sunset Reservoir could be a reasonable source.
- **A phased implementation program for option 12 is suggested resulting in an integrated, multi-sourced, redundant, highly reliable fire-suppression system for the Richmond and Sunset Districts.**

Option 12 – Conceptual Future Integration



- February 7th – presentation at Government Audit and Oversight Committee.
- Work with CPC to analyze funding options for balance of project (\$69 million).
- Determine priority equipment and their cost.
- Begin design work for Option 12, including thorough review of components (pumps, valves, etc.) by agencies.

Questions?