



Engineering, Operations, & Technology Committee

Center for Smart Infrastructure

Item 7-1

January 8, 2024

Item 7-1 Center for Smart Infrastructure

Subject

Authorize an agreement with the Center for Smart Infrastructure to fund the organization's startup costs and focused water innovation research

Purpose

This action authorizes an agreement with CSI to support the startup of the facility and to fund Metropolitan-focused research projects over the next four years

Recommendation and Fiscal Impact

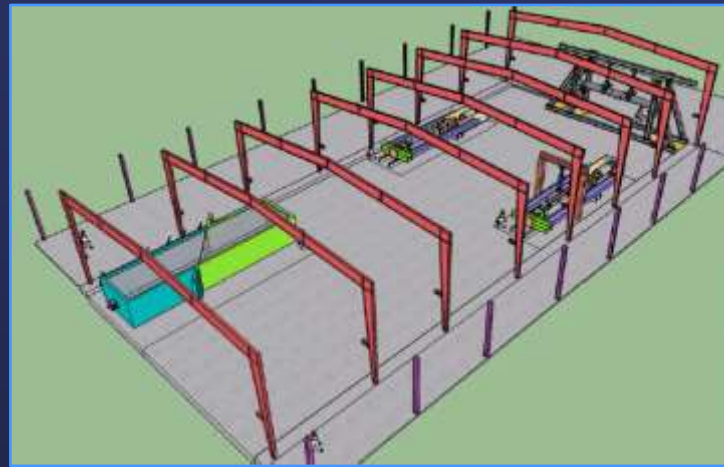
\$1 million in operating funds plus up to \$1 million in budgeted operating funds or capital funds under projects included in the CIP

Budgeted

Center for Smart Infrastructure

Background

- Located at UC Berkeley
 - Center was launched in 2021
 - UC Berkeley provided 23,000 sq ft building
 - UC Berkeley provides on-going operational and maintenance staff to the facility
- Only pipe testing facility on west coast



CSI Building Layout

Center for Smart Infrastructure

Background

- Partnership between infrastructure owners, academia & industry to solve problems through innovation
- Mission: Develop resilient systems through state-of-the-art lab/field testing equipment, smart sensors and robotics, gig data & machine learning/multi-scale computer modeling & simulation
- Predominantly supported by outside funding

Background - “Owner” Collaborators



U.S. Department of Transportation
**Pipeline and Hazardous Materials
Safety Administration**



CSI Startup & Peer Funding

EBMUD - \$1.5 M

LADWP - \$1.5 M

Activities – Phase 1

- Initial organizational development & staffing
- Capital improvements to existing UC Berkeley facility
 - Install seismic slip plane box
 - Strengthen floor
 - Add pipe bending equipment & overhead crane



Pre-Phase 1 CSI Building

Metropolitan and Member Agency Benefits



Polymer Pipe Testing

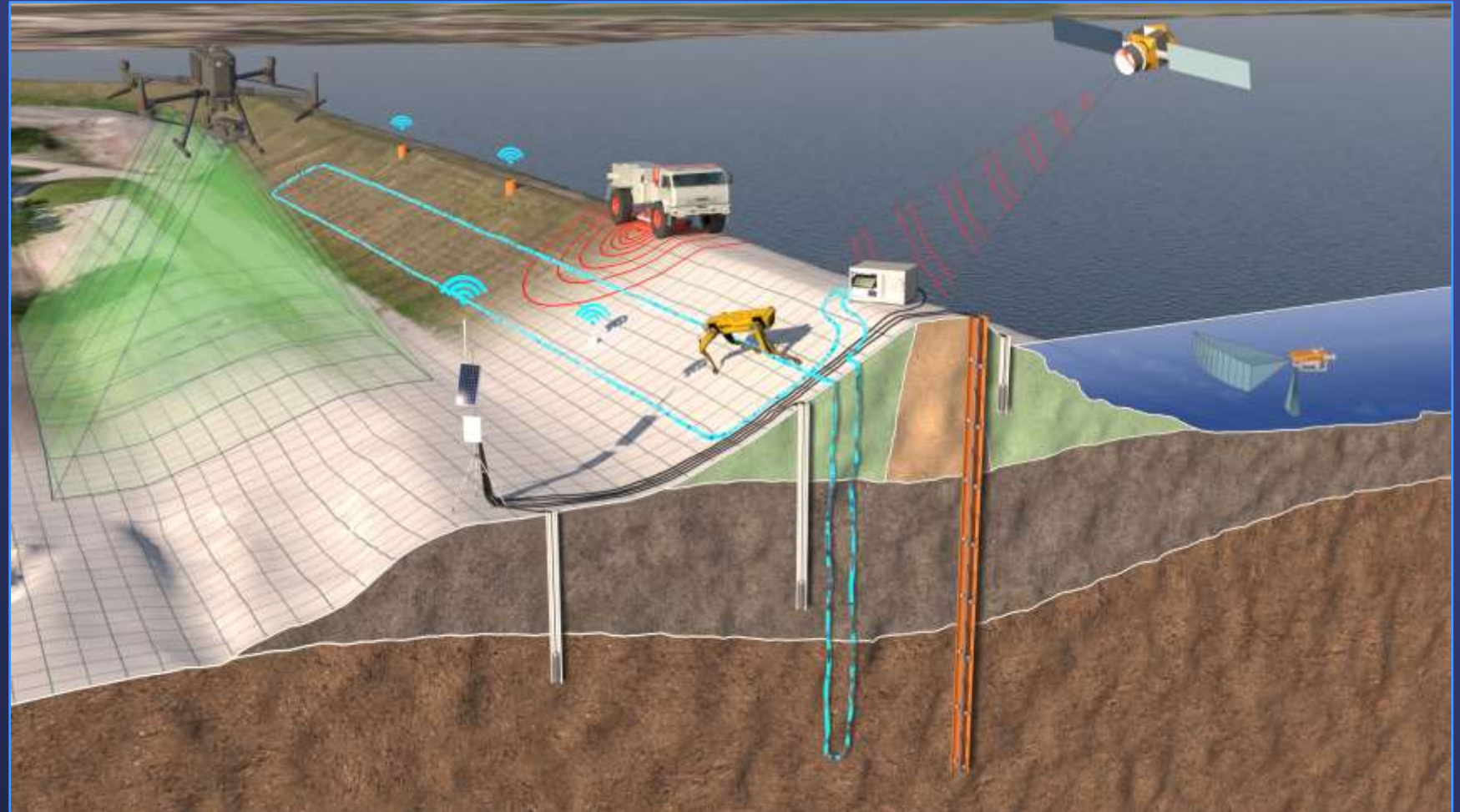
Examples of Water-related Research Beneficial to Metropolitan

- Fiber optic pipe deformation monitoring across faults and in landslide zones
- Automatic Metering Infrastructure (AMI) testing
- Post-earthquake system vulnerability assessments and dam inspection criteria development
- Spillway subdrain performance testing
- Testing different pipeline materials, designs, & manufacturers

Levee Condition Monitoring

Research & Innovation Projects

- Levee condition assessments using satellites, ground penetrating radar, smart sensors and drones
- Metropolitan currently piloting this tech with WaterStart in the Bay-Delta

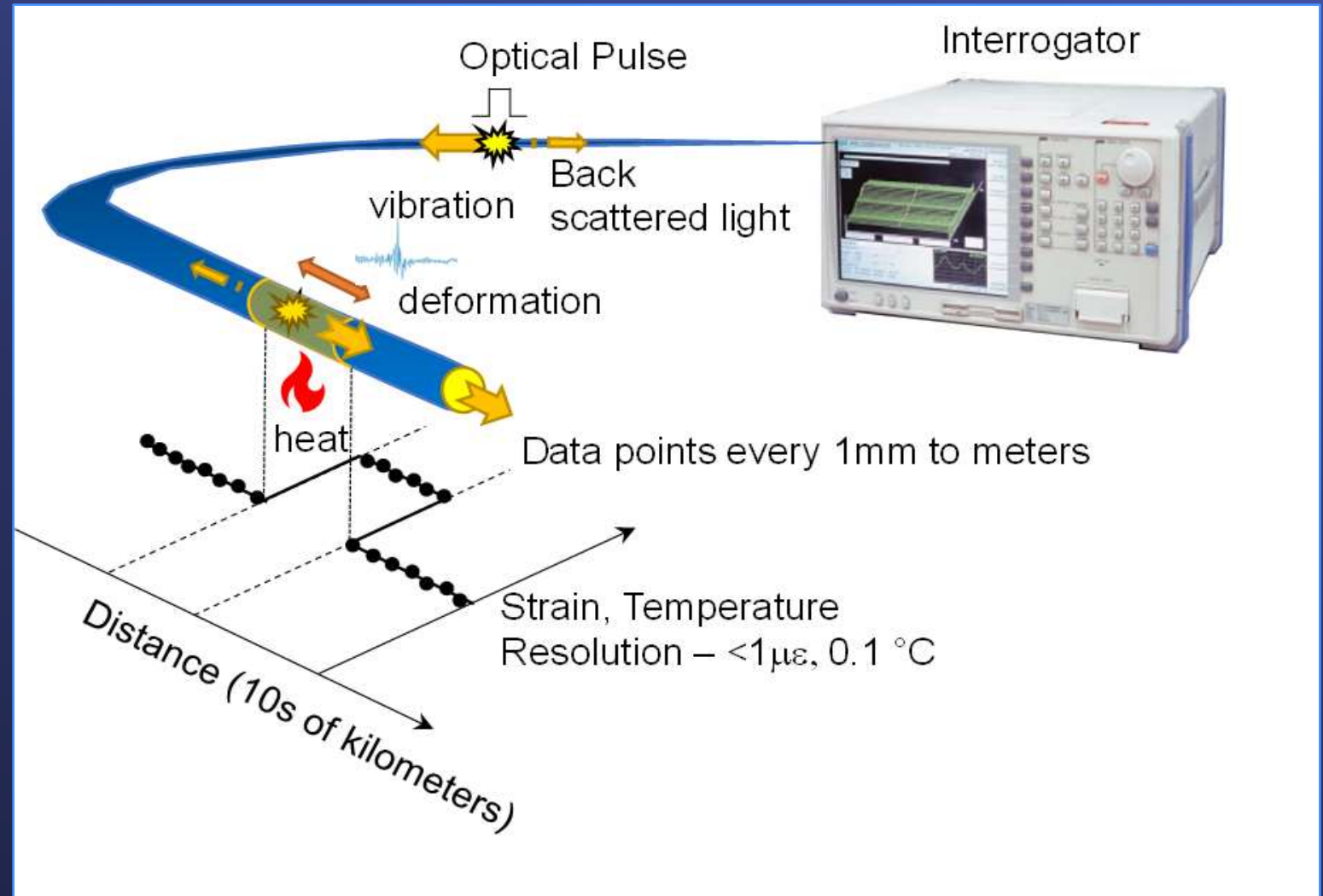


Technologies Used for Dam Assessment

Smart Infrastructure

Research & Innovation Projects

- Real-time fiber optic pipeline monitoring for deformation and strain
- CSI discussed this tech at Member Agency Engineering Managers annual meeting at IEUA on June 1, 2023



Fiber Optic Condition Monitoring

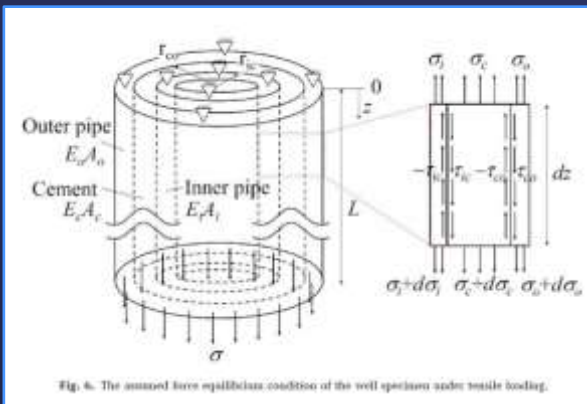
Earthquake Resistant Ductile Iron Pipe

Research & Innovation Projects

- Earthquake Resistant Ductile Iron Pipe (ERDIP) Testing – first ever test to failure
- Further development of technology



Center for Smart Infrastructure



Steel-lined PCCP Pipe in a Slide Zone

Future Opportunities for Metropolitan

- Testing other earthquake-resistant designs, fabricators, & products
- Testing PCCP slip-lining structure and developing in-house wire break risk curves
- Modeling and testing CRA cut/cover structural capabilities
- Analyzing Metropolitan service area water pipeline network for post-earthquake condition/response
- Developing advanced sensors, tools & analytics to monitor asset condition over time
- Recalibrating climate change & supply impact models with the latest climate data

Center for Smart Infrastructure

UC Berkeley
developing curriculum
specific to the water
business

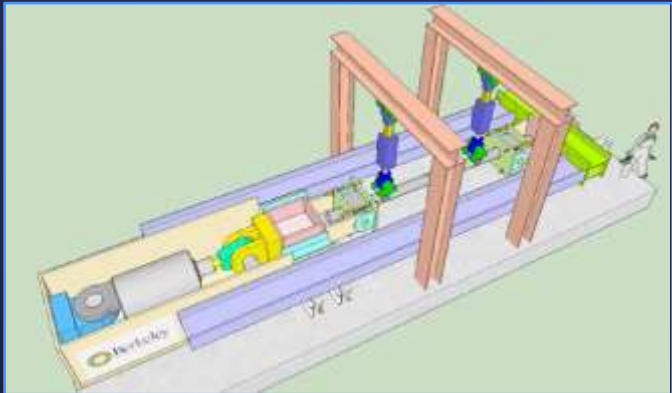
Looking at
participating in their
program, and
developing partner
programs in
Metropolitan service
area

Future Workforce Development



UC Berkeley Students at CSI

Center for Smart Infrastructure



Model of Bi-axial Pipe
Test Apparatus

Staff Recommendation

- Metropolitan to become a funding partner of the Center
 - Initial authority of \$250k/year for four years to support the Center's startup activities
 - Funded through budgeted O&M
 - Additional authority of \$250k/year for 4 years to fund focused research to benefit MWD or Member Agencies:
 - Funded by budgeted CIP projects or budgeted O&M

Board Options

- Option #1
Authorize an agreement with the Center for Smart Infrastructure in an amount not to exceed \$2 million for startup costs and focused research.
- Option #2
Authorize an agreement with the Center for Smart Infrastructure in an amount not to exceed \$1 million for focused research only.
- Option #3
Do not proceed with funding CSI at this time.

Staff Recommendation

- Option #1

