



E&O Committee

T. Smith, Chair
Vacant, Vice Chair
R. Apodaca
S. Blois
M. Camacho
D. De Jesus
L. Dick
S. Faessel
R. Lefevre
J. Morris
J. Murray Jr.
G. Peterson
H. Repenning
H. Williams

**Engineering and Operations Committee
- Final**

Meeting with Board of Directors *

July 12, 2021

10:00 a.m.

Live streaming is available for all board and committee meetings on our mwdh2o.com website ([Click to Access Board Meetings Page](#))

Public Comment Via Teleconference Only: Members of the public may present their comments to the Board on matters within their jurisdiction as listed on the agenda via teleconference only. To participate call (404) 400-0335 and use Code: 9601962.

**Monday, July 12, 2021
Meeting Schedule**

10:00 a.m. E&O
11:30 a.m. Break
12:00 p.m. WP&S
01:30 p.m. C&L
02:30 p.m. OP&T

MWD Headquarters Building • 700 N. Alameda Street • Los Angeles, CA 90012

* The Metropolitan Water District's meeting of this Committee is noticed as a joint committee meeting with the Board of Directors for the purpose of compliance with the Brown Act. Members of the Board who are not assigned to this Committee may participate as members of the Board, whether or not a quorum of the Board is present. In order to preserve the function of the committee as advisory to the Board, members of the Board who are not assigned to this Committee will not vote on matters before this Committee.

1. Opportunity for members of the public to address the committee on matters within the committee's jurisdiction (As required by Gov. Code Section 54954.3(a))

**** CONSENT CALENDAR OTHER ITEMS -- ACTION ****

2. CONSENT CALENDAR OTHER ITEMS - ACTION

- A. Approval of the Minutes of the Meeting of the Engineering and Operations Committee held June 7, 2021

[21-280](#)

Attachments: [Meeting Minutes](#)

3. CONSENT CALENDAR ITEMS - ACTION

- 7-3** Authorize four actions for the Desert region communication system including: (1) an agreement with Nokia of America Corporation in an amount not to exceed \$5,297,000 for equipment procurement and design support to upgrade the wide area network; (2) an amendment to an agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 to provide specialized technical support for the upgrade; (3) an amendment to the Capital Investment Plan for fiscal years 2020/2021 and 2021/2022 to include additional communication system improvements at the Colorado River Aqueduct's Gene Pumping Plant; and (4) an agreement in an amount not to exceed \$275,000 with HDR Engineering, Inc. for design services related to the construction of a communication line; the General Manager has determined that the proposed actions are exempt or otherwise not subject to CEQA [21-248](#)

Attachments: [07132021 BOD 7-3 B-L.pdf](#)
[07122021 EO 7-3 Presentation.pdf](#)

**** END OF CONSENT CALENDAR ITEMS ****

4. OTHER BOARD ITEMS - ACTION

None

5. BOARD INFORMATION ITEMS

None

6. COMMITTEE ITEMS

- a. Power Operations and Planning update [21-274](#)
Attachments: [07122021 EO 6a Presentation.pdf](#)
- b. Apprenticeship Program Update [21-275](#)
Attachments: [07122021 EO 6b Presentation.pdf](#)
- c. Innovative approaches to seismic resilience for Metropolitan's pipelines and tunnels [21-250](#)
Attachments: [07122021 EO 6c Presentation.pdf](#)

7. MANAGEMENT REPORTS

- a. Water System Operations Manager's report [21-287](#)

Attachments: [07122021 EO 7a Presentation.pdf](#)

- b. Engineering Services Manager's report [21-288](#)

Attachments: [07122021 EO 7b Presentation.pdf](#)

8. FOLLOW-UP ITEMS

None

9. FUTURE AGENDA ITEMS

10. ADJOURNMENT

NOTE: This committee reviews items and makes a recommendation for final action to the full Board of Directors. Final action will be taken by the Board of Directors. Agendas for the meeting of the Board of Directors may be obtained from the Board Executive Secretary. This committee will not take any final action that is binding on the Board, even when a quorum of the Board is present.

Writings relating to open session agenda items distributed to Directors less than 72 hours prior to a regular meeting are available for public inspection at Metropolitan's Headquarters Building and on Metropolitan's Web site <http://www.mwdh2o.com>.

Requests for a disability related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting should be made to the Board Executive Secretary in advance of the meeting to ensure availability of the requested service or accommodation.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

MINUTES

ENGINEERING AND OPERATIONS COMMITTEE

June 7, 2021

Chair Smith called the teleconference meeting to order at 10:30 a.m.

Members present: Chair Smith, Directors Apodaca, Blois, Camacho, De Jesus, Dick, Faessel, Lefevre, Morris, Murray, Peterson, and Williams.

Members absent: Director Repenning.

Other Board members present: Chairwoman Gray, Directors Abdo, Ackerman, Atwater, Cordero, Dennstedt, Erdman, Goldberg, Hawkins, Hogan, Jung, Kurtz, Pressman, Record, and Tamaribuchi.

Committee staff present: Bednarski, Kightlinger, Molette, Scully, Upadhyay, and Yamasaki.

1. OPPORTUNITY FOR MEMBERS OF THE PUBLIC TO ADDRESS THE COMMITTEE ON MATTERS WITHIN THE COMMITTEE'S JURISDICTION

None

CONSENT CALENDAR ITEMS – ACTION

2. CONSENT CALENDAR OTHER ITEMS – ACTION

- A. Approval of the Minutes of the meeting of the Engineering and Operations Committee held May 10, 2021.

Chair Smith turned meeting over to Director Blois.

3. CONSENT CALENDAR ITEMS – ACTION

- 7-3 Subject: Authorize an agreement with Black & Veatch Corporation, Inc., in an amount not to exceed \$8 million, for engineering and technical studies to support the environmental planning activities of the Regional Recycled Water Program; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA
- Presented by: Bruce Chalmers, Regional Recycled Water Program Manager
- Motion: Authorize an agreement with Black & Veatch Corporation, Inc., in an amount not to exceed \$8 million for engineering and technical studies to support environmental planning activities of the Regional Recycled Water Program.

- 7-4 Subject: Adopt resolution to support Metropolitan's \$6,250,000 WaterSMART: Title XVI WIIN Water Reclamation and Reuse grant application and authorize General Manager to accept funding and enter contract if awarded; the General Manager has determined that the proposed action is exempt or otherwise not subject to CEQA
- Presented by: Raymond Jay, Water Resource Management Sr. Resource Specialist
- Motion: Adopt the Board Resolution supporting the grant application; and
- a. Authorize the General Manager to accept potential grant funding up to \$6,250,000.
 - b. Delegate authority to the General Manager to enter into a grant contract with Reclamation, subject to the approval of the General Counsel, if awarded.
 - c. Agree to fulfill the grant contract, including providing matching funds up to \$18.75 million with existing funding.
 - d. State that Metropolitan, if awarded a grant, will work with Reclamation to meet the established deadlines upon entering the cooperative agreement.

Director Smith stated that Agenda Item 7-3 involves authorization to increase an agreement for Black & Veatch and as he currently owns Black & Veatch stock, is recusing himself from Agenda Item 7-3.

Director Morris made a motion, seconded by Director Lefevre, to approve the consent calendar consisting of items 2A, 7-3 and 7-4:

The vote was:

- Ayes: Directors Apodaca, Blois, Camacho, De Jesus, Dick, Faessel, Lefevre, Morris, Murray, Peterson, Smith and Williams.
- Noes: Peterson (Item 7-3)
- Recusal: Smith (Item 7-3)
- Abstentions: None
- Absent: Director Repenning.

The motion for Items 2A and 7-4, passed by a vote of 12 ayes, 0 noes, 0 abstentions, and 1 absent.

The motion for Items 7-3, passed by a vote of 10 ayes, 1 no, 1 recusal, 0 abstentions, and 1 absent.

The following Directors provided comments or asked questions:

1. Lefevre
2. Morris
3. Abdo

Staff responded to the Directors' questions and comments.

END OF CONSENT CALENDAR ITEMS

Director Blois returns meeting to Chair Smith.

4. OTHER BOARD ITEMS – ACTION

None

5. BOARD INFORMATION ITEMS

None

6. COMMITTEE ITEMS

- a. Subject: Capital Investment Plan Quarterly Report for period ending March 2021
 Presented by: James Hong, Engineering Services Principal Engineer

- b. Subject: Shutdown Planning at Metropolitan
 Presented by: Arman Motavvef, Water System Operations Associate Engineer

- c. Subject: Applications of Hydraulic Modeling
 Presented by: Saurabh Shekhar, Engineering Services Senior Engineer

The following Directors provided comments or asked questions:

1. Smith

Staff responded to the Directors' questions and comments.

7. MANAGEMENT REPORTS

- a. Subject: Water System Operations Manager's report
- Presented by: Brent Yamasaki, Water System Operations Group Manager
- Mr. Yamasaki reported on the following:
- Current operational conditions
 - Direct Potable Reuse (DPR) framework and key comments on draft DPR criteria
 - Nitrification/ Chloramine Workshop
 - Water Section Manager Mic Stewart's retirement
 - Metropolitan providing assistance to another water agency
- b. Subject: Engineering Services Manager's report
- Presented by: John Bednarski, Engineering Services Group Manager
- Mr. Bednarski reported on the following:
- Construction and procurement contracts as of March 2021
 - West Valley Feeder No. 1 Desoto Ave valve upgrade project
 - Installation of air quality equipment in the Headquarters building
 - Upcoming Member Agency Engineering Managers meeting
 - Assistant Group Manager Cash Spradling's retirement

8. FOLLOW-UP ITEMS

None

9. FUTURE AGENDA ITEMS

None

Next meeting will be held on July 12, 2021.

Meeting adjourned at 11:30 a.m.



- Board of Directors
Engineering and Operations Committee

7/13/2021 Board Meeting

7-3

Subject

Authorize four actions for the desert region communication system including: (1) an agreement with Nokia of America Corporation in an amount not to exceed \$5,297,000 for equipment procurement and design support to upgrade the wide-area network; (2) an amendment to an agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 to provide specialized technical support for the upgrade; (3) an amendment to the Capital Investment Plan for fiscal years 2020/2021 and 2021/2022 to include additional communication system improvements at the Colorado River Aqueduct's Gene Pumping Plant; and (4) an agreement in an amount not to exceed \$275,000 with HDR Engineering, Inc. for design services related to the construction of a communication line; the General Manager has determined that the proposed actions are exempt or otherwise not subject to CEQA

Executive Summary

The desert region requires high-capacity carrier-grade communication links to provide reliable data, voice, and video transmission. The existing microwave network is over 14 years old and approaching the end of its useful service life. This action authorizes an agreement to procure equipment and furnish supplemental design services to upgrade the microwave radio wide-area network (WAN) communication system at Metropolitan's 24 most critical desert region microwave tower sites. This action also authorizes an amendment to an existing agreement for specialized technical expertise to supplement staff's review of design documents and submittals related to the project.

In addition, this action authorizes design services for construction of approximately two miles of communication line from Parker Dam to Colorado River Aqueduct's Gene Pumping Plant. This new pole-mounted fiber optic communication line will provide an alternative path to transmit critical communication to and from the Gene Pumping Plant. As this project was not included in the Capital Investment Plan (CIP) budget for fiscal years 2020/21 and 2021/22, this action amends the current CIP to include this project.

Details

Background

The Colorado River Aqueduct (CRA) is a 242-mile-long conveyance system that transports water from the Colorado River to Lake Mathews. It consists of five pumping plants; 124 miles of tunnels, siphons, and reservoirs; 63 miles of canals; and 55 miles of conduits. Given the remoteness and isolation of many of the facilities along the CRA, Metropolitan's wireless WAN provides the primary data transmission and communications path across the desert region.

Metropolitan's microwave radio WAN transmits telephone, voice, data, and video communication between all Metropolitan facilities, utilizing point-to-point microwave transmission. While microwave transmission is highly effective, it is limited to line-of-sight propagation; thus, it cannot pass through mountains or other similar obstacles. The WAN also transmits real-time data from the supervisory control and data acquisition system, automated meter reading system, security cameras and teleprotection, and system alarms to Metropolitan's control facilities, and provides access at remote sites to the email, geographical information system, Oracle financial, timekeeping, and PeopleSoft applications. Many of these systems run 24 hours per day, 7 days per week, as system operators rely on real-time communications to monitor and control Metropolitan's water delivery system.

Metropolitan's microwave radio WAN was constructed in the late 1990s, and presently comprises a network of 72 transmission tower sites located throughout Southern California, including 24 which support the CRA. Along the CRA, each tower is typically located 20 to 50 miles apart. Microwave radio relays transmit signals between two locations on a line-of-sight radio path. The network points are typically located at remote hilltops to provide point-to-point communication links. Each transmission site consists of a tower, directional antennas which transmit incoming and outgoing signals, microwave radio equipment which is typically housed in small masonry structures, and other infrastructure such as fiber optic cable. The remote sites have no redundancy for the transmission link, and, as a result, a malfunction of a single tower along the path can disrupt communications at multiple sites.

Metropolitan's microwave radio WAN is over 14 years of age and approaching the end of its useful service life. Typical life expectancy for these radios range from 12 to 15 years. Recently, reliability issues have caused intermittent network communication failures in the desert portion of the radio WAN system. Additionally, the existing microwave radio WAN does not provide carrier-grade transmission capabilities. This shortcoming effectively limits the amount of data that can be reliably transmitted through the communication system. Staff recommends moving forward with the procurement and initial development phase at this time to upgrade the desert microwave system to carrier-grade transmission capability.

The Gene Pumping Plant is located two miles southeast of Lake Havasu City, Arizona. Recent commercial and residential developments nearby have included the expansion of fiber optic communication connections to locations near Parker Dam. The opportunity now exists to bring high-speed, high-quality fiber optic communications capabilities to some of Metropolitan's desert facilities. Extending a new fiber optic connection from Parker Dam to the Gene Pumping Plant will: (1) provide critical redundancy to the existing desert microwave communications systems; (2) improve the speed and resolution of video surveillance at the Gene Plant; (3) allow desert facilities to access more innovative cloud applications; and (4) improve the communication system overall speed, reliability, and resiliency. This project initiates a long-term plan to install fiber optic communications at the CRA pumping plants.

In April 2020, the Board appropriated funds and authorized the General Manager to initiate or proceed with work on all capital projects identified in the CIP, subject to any limits on the General Manager's authority and CEQA requirements. The upgrades to the desert-wide-area network were included in the CIP, but the extension of fiber optic communications to the Gene Pumping Plant was not. This action amends the CIP to include the Gene fiber optic communication line upgrades. It is not anticipated that the addition of Gene fiber optic communication line upgrades to the CIP will increase CIP expenditures in the current biennium beyond those which have been previously approved by the Board. These projects have been reviewed in accordance with Metropolitan's CIP prioritization criteria and were approved by Metropolitan's CIP Evaluation Team to be included in the System Reliability Program.

Project No. 1 - Desert-Wide-Area Network Upgrade – Procurement and Final Design

This project will replace the current microwave system with a high-capacity carrier-grade microwave system that will provide reliable data, voice, and video transmission equipment in the desert region. The replacement microwave system is anticipated to be comprised of microwave radio equipment which includes: antennas, waveguides, routers, rectifiers, network management system, supporting networking equipment, and direct current power distribution with battery backup systems.

The equipment procurement and initial development phase of the project will be conducted by Metropolitan staff with the assistance of two consultants. Nokia of America Corporation (Nokia) will provide the new microwave radio equipment, conduct microwave path design, and assist staff with preparation of an installation contract. This approach for the project will allow Nokia to provide the microwave radio WAN equipment in advance of the main installation contract. Staff will return to the Board in the future to award this installation contract. The recommended procurement/installation approach will ensure that Metropolitan obtains high-quality equipment, and will also expedite the overall project schedule since much of this equipment consists of long lead time procurement items. Due to the specialized nature of microwave systems designs, Hatfield & Dawson Consulting Engineers, LLC (H&D Consulting) will supplement staff's existing capabilities by providing technical peer reviews and other technical support services related to the design, equipment procurement, and rehabilitation of microwave radio WAN facilities. Metropolitan staff will: (1) prepare drawings and specifications for the

installation of the microwave radio WAN equipment; (2) obtain local agency permits; (3) develop construction cost estimates; (4) prepare environmental documentation; and (5) advertise the installation contract for receipt of competitive bids, perform project control, and project management.

A total of \$8,011,000 is required for Project No. 1 work. Allocated funds include \$5,297,000 for furnishing microwave radio WAN equipment and integration services by Nokia; \$250,000 for technical support by H&D Consulting, as described below; and \$60,000 for tower structural analysis. The tower structural analysis will be performed by a specialty firm under a contract planned to be executed under the General Manager's Administrative Code authority to award contracts of \$250,000 or less. Allocated funds for Metropolitan staff activities include \$800,000 for drawings and specifications for equipment installation design; \$350,000 for technical oversight and bidding; \$100,000 for Metropolitan furnished equipment; and \$375,000 for project controls and project management. Allocated funds also include \$779,000 for remaining budget.

As described above, final design for the equipment installation contract will be performed by Metropolitan staff. Engineering Services' performance metric target range for final design with construction greater than \$3 million is 9 to 12 percent. For this project, the performance metric goal for final design is 12 percent of the total construction costs. The total estimated cost of construction for this project is anticipated to range from \$6.65 million to \$7.1 million.

Installation of specific components of the microwave system will be accomplished via a future competitively bid construction contract. Staff will return to the Board at a later date to award a contract for the installation of the equipment.

Microwave Equipment Procurement and Design Support (Nokia of America Corporation) – New Agreement

Metropolitan's teleprotection systems monitor the condition of the desert's high-power transmission lines and activate relay protection features in event a fault is detected. The teleprotection system relies on the microwave radio WAN system for real-time exchange of the line trip commands between protection relays. In addition, a portion of Metropolitan's electrical transmission facilities are integrated with the high voltage grid of other local desert power providers. Nokia has provided similar equipment to other electrical providers in the southwest power grid and is therefore best suited to provide a seamless, region-wide, interconnected system. Therefore, after thorough research of various microwave radio equipment vendors and performance of a pilot test, staff determined that Nokia was best suited to furnish new microwave radio equipment and assist in the preparation of site installation drawings.

Metropolitan initiated the procurement for the microwave radio equipment under Metropolitan Administrative Code Section 8140(1)(I), which allows Metropolitan to "piggy-back" (i.e., gain access to) contracts established by other public agencies that substantially follow Metropolitan's own competitive procurement process. In 2016, the State of Washington Department of Enterprise Services, as the lead agency, along with several other agencies, completed a competitive bid for microwave radio equipment and services. Currently, 22 states participate in this cooperative purchasing program, known as the National Association of State Procurement Officials (NASPO) ValuePoint Cooperative Purchasing Program for Public Safety Communications Support Equipment (Master Agreement Number 05715), including the State of California. Pursuant to section 8140(1)(I), Metropolitan's Office of the General Counsel has determined that the competitive process under which this contract was established substantially complies with Metropolitan's competitive procurement process. Metropolitan utilized the NASPO contract to obtain deep discounts for microwave radio WAN equipment and services. Staff has compared Nokia's prices under this contract to other vendors and concluded that this pricing was very competitive.

The planned activities for Nokia in the procurement and initial development phase of the desert WAN upgrade include: (1) preparing feasibility studies, path surveys, microwave path design, and coordination of radio frequencies; (2) providing site material requirements and equipment placement drawings; (3) furnishing necessary microwave radio WAN equipment including antennas, waveguides, routers, network management system, supporting networking equipment, and power distribution battery backup systems; and (4) providing assistance with the development of the equipment installation contract.

This action authorizes an agreement with Nokia for a not-to-exceed amount of \$5,297,000 to furnish WAN equipment and design support of the desert WAN upgrade. For this agreement, Metropolitan has not established a Small Business Enterprise participation level. There are no subconsultants planned for this work.

Specialized Technical Support (Hatfield & Dawson Consulting Engineers, LLC) – Agreement Amendment

An amendment to the agreement with H&D Consulting is recommended for specialized technical support during the procurement and initial development phase. H&D Consulting was initially selected through a competitive process via RFP No. 1179 to provide design services for the replacement microwave radio WAN system. This agreement currently has a maximum payable amount of \$480,000. Amendment of the existing agreement with H&D Consulting is consistent with the agreement's scope of work and with the planned approach for project implementation.

A specialized consultant is needed to supplement staff's existing capabilities by providing technical peer reviews and other technical support services related to the design, equipment procurement, and rehabilitation of microwave radio WAN facilities. Specific work activities will include technical review of drawings and specifications, support during leasing negotiations, and review of system frequencies.

This action authorizes an increase of \$250,000 to the existing agreement with H&D Consulting for a new not-to-exceed total of \$730,000 for specialized technical assistance during the procurement and final design phase for the desert WAN upgrade. For this agreement, Metropolitan has not established a Small Business Enterprise participation level.

Alternatives Considered

During the planning phase for this project, staff examined several alternatives in addition to the recommended project. One alternative involved undertaking a comprehensive in-place rehabilitation of the existing desert microwave radio WAN sites. This alternative would include removing and replacing individual components of the system, with the objective of upgrading as many of the existing components as possible, while leaving in place some of the critical structural elements of the existing systems. Staff determined that replacement of key components may extend the life of the microwave radio WAN system for a limited time but would not achieve the long-term rehabilitation goals of the project because many of the 14-year-old components would remain in place. Replacement of the microwave radio WAN equipment also provides an opportunity to standardize the systems across the desert region; thus, minimizing the capital cost, simplifying maintenance, and improving the interchangeability of parts. The recommended replacements using a single vendor is recommended to increase overall reliability of the system, reduce the risk of communications interruptions, and streamline future system maintenance and operational requirements.

Project No. 2 – Gene Communication System Upgrade - Design

The introduction of fiber optic-based communications equipment in the vicinity of Parker Dam offers Metropolitan the opportunity to connect to this high-quality, high-speed data system to improve a variety of technological challenges at the desert facilities. Planned upgrades under this project include installation of approximately 22 poles and two miles of fiber optic cable from Parker Dam to the Gene Pumping Plant administration building. The new line will be located predominately within existing Metropolitan fee property or will be connected to existing power poles located on private property.

The planned design activities will be conducted by Metropolitan staff and a specialized consultant and will include: (1) conducting field investigations including geotechnical analysis and aerial topographic survey; (2) establishing final design criteria, preparing drawings and specifications, and developing a construction cost estimate; (3) acquiring temporary right-of-way for the contractor staging and work areas; (4) permitting and shutdown planning with member agencies; and (5) advertising and receiving competitive bids. Staff will return to the Board at a later date to award a construction contract.

A total of \$665,000 is required for these activities. Allocated funds include: \$88,000 for field investigations as described above, including an aerial topographic survey to be performed by a specialty firm under a contract planned to be executed under the General Manager's Administrative Code authority to award contracts of \$250,000 or less; \$275,000 for design activities and technical assessments by HDR Engineering, Inc. under a new agreement; \$49,000 for technical review by Metropolitan staff; \$24,000 for preparation of temporary right-of-way

acquisition documentation needed for the contractor staging and work areas; \$178,000 for preparation of environmental documentation, project controls, and project management; and \$51,000 for remaining budget.

As described above, final design will be performed by HDR Engineering, Inc. Engineering Services' performance metric target range for final design with construction less than \$3 million is 9 to 15 percent. For this project, the performance metric goal for final design is 14.9 percent of the total construction costs. The total estimated cost of construction for this project is anticipated to range from \$1.2 million to 1.8 million.

Attachment 1 provides the allocation of the required funds. The total estimated cost of Project No. 2 work, including the funds allocated for the work described in this action and future construction costs, is anticipated to range from \$1.9 million to \$2.5 million. This is the initial action for the Gene Communication System Upgrade project. Staff will return to the Board at a later date for award of a construction contract.

Engineering Services (HDR Engineering, Inc.) – New Agreement

HDR Engineering, Inc. is recommended to provide engineering services for design of the Gene Pumping Plant Communication Upgrade. HDR Engineering, Inc. was selected through a competitive process via Request for Proposals No. 1252 based on the expertise of the firm's staff, technical approach and methodology, and cost proposal for the upgrade of the communication system.

The planned activities for HDR Engineering, Inc. include: (1) development of design criteria; (2) detailed design, preparation of plans and specifications; (3) development of construction cost estimates; and (4) technical support during the bidding period.

This action authorizes an agreement with HDR Engineering, Inc. for a not-to-exceed amount of \$275,000 to provide engineering design services for the Gene Pumping Plant Communication system upgrades. For this agreement, Metropolitan has established a Small Business Enterprise participation level of 25 percent. HDR Engineering, Inc. has agreed to meet this level of participation. The planned subconsultants for this work are DRP Engineering, Inc. and TJC and Associates.

Alternatives Considered

Early in the project development phase, staff considered multiple alternatives to improve the reliability and resiliency of the communication system at Gene Pumping Plant. One alternative included adding a third microwave path between Parker Dam and Gene Pumping Plant, and would include a microwave tower at the Metropolitan's Black Metal Mountain Communication site. This alternative was not selected because the Black Metal Mountain site is currently experiencing increased electrical demands from multiple communication companies which lease the site. As such, the site has limited capacity for expansion of the facility at this time. Additionally, continued reliance on microwave towers for desert communications would not allow Metropolitan to take advantage of the technology improvements that are offered by fiber optic communication pathways.

The selected option to install fiber optic cable will provide critical redundancy to the desert communications and will improve speed, reliability, and resiliency without negatively impacting Metropolitan's other communications facilities.

Summary

This action authorizes: (1) an agreement with Nokia for a not-to-exceed amount of \$5,297,000 to furnish new microwave radio equipment and network integration support; and (2) an agreement amendment with H&D Consulting for a not-to-exceed amount of \$730,000 for specialized technical support to upgrade the desert WAN. This action also authorizes: (1) amending the current CIP to include upgrades to the communication system at Gene Pumping Plant; and (2) a new agreement with HDR Engineering Inc. for a not-to-exceed amount of \$275,000 for design services.

These projects have been evaluated and recommended by Metropolitan's CIP Evaluation Team, and funds are available within the fiscal year 2020/21 capital expenditure plan. See **Attachment 1** for the Allocation of Funds, **Attachment 2** for the Location Map.

Project Milestones

September 2022 – Completion of procurement and final design of upgrades for desert region microwave radio WAN

June 2022 – Completion of design for the fiber optic communication system upgrades for the Gene Pumping Plant

September 2023 – Completion of commissioning and testing of all desert microwave radio WAN region sites

Policy

Metropolitan Water District Administrative Code Section 11104: Delegation of Responsibilities

Metropolitan Water District Administrative Code Section 8121: General Authority of the General Manager to Enter Contracts

Metropolitan Water District Administrative Code Section 8140: Competitive Procurement

By Minute Item 51353, dated October 9, 2018, the Board appropriated a total of \$290 million from projects identified in the Capital Investment Plan for fiscal years 2018/19 and 2019/20

California Environmental Quality Act (CEQA)

CEQA determination for Options #1 and #2:

The proposed action is categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action involves repair, maintenance, permitting, leasing, or minor alterations of existing public or private structures, facilities, mechanical equipment, or topographical features, involving negligible or no expansion of existing or former use, or replacement or reconstruction of existing structures and facilities that will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structures replaced. The proposed action may involve minor modifications in the condition of land, water, and/or vegetation, which does not involve removal of healthy, mature, scenic trees. In addition, the proposed action consists of basic data collection and resource evaluation activities, which do not result in a serious or major disturbance to an environmental resource. This may be strictly for information gathering purposes, or as part of a study leading to an action, which a public agency has not yet approved, adopted, or funded. Accordingly, the proposed action qualifies for Class 1, Class 2, Class 4, and Class 6 Categorical Exemptions (Sections 15301, 15302, 15304, and 15306 of the State CEQA Guidelines).

CEQA determination for Option #3:

None required

Board Options

Option #1

- a. Authorize an agreement with Nokia of America Inc for a not-to-exceed amount of \$5,297,000 for furnishing wide-area network equipment and design support to upgrade the desert region-wide-area network;
- b. Authorize increase of \$250,000 to the agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 for specialized technical support for the upgrade;
- c. Amend current CIP to include upgrades to the communication system at Gene Pumping Plant; and
- d. Authorize an agreement with HDR Engineering, Inc. for a not-to-exceed amount of \$275,000 for design services.

Fiscal Impact: Expenditure of \$8.676 million in capital funds. Approximately \$6.46 million will be incurred in the current biennium and has been previously authorized. It is not anticipated that the addition of Project No. 2 to the CIP will increase CIP expenditures in the current biennium beyond those which have been previously approved by the Board. The remaining funds from this action and for future construction costs will be accounted for and appropriated under the next biennial budget.

Business Analysis: These projects will enhance the reliability of the CRA and its communication networks.

Option #2

- a. Authorize an agreement with Nokia of America Inc for a not-to-exceed amount of \$5,297,000 for furnishing wide-area network equipment and design support to upgrade the desert region-wide-area network;
- b. Authorize increase of \$250,000 to the agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 for specialized technical support;
- c. Do not amend current CIP to include upgrades to the communication system at Gene Pumping Plant; and
- d. Do not authorize an agreement with HDR Engineering, Inc. for a not-to-exceed amount of \$275,000 for design services.

Fiscal Impact: Expenditure of \$8.011 million in capital funds. Approximately \$5.80 million will be incurred in the current biennium and has been previously authorized. The remaining funds from this action and for future construction costs will be accounted for and appropriated under the next biennial budget.

Business Analysis: These projects will enhance the reliability of the CRA and its communication networks. This option would not provide critical redundancy to the existing desert microwave communications systems at Gene Pumping Plant.

Option #3

Do not proceed with these projects at this time.

Fiscal Impact: None

Business Analysis: This option would extend the present risk of an unplanned outage of communication with desert facilities.

Staff Recommendation

Option #1



Charles Eckstrom
Group Manager, Information Technology

6/23/2021

Date



Jeffrey Kightlinger
General Manager

6/28/2021

Date

Attachment 1 – Allocation of Budgeted Funds

Attachment 2 – Location Map

Ref# ES12676881

Allocation of Funds for Desert Wide Area Network Upgrade

| | Current Board Action (July 2021) |
|---|---|
| Labor | |
| Studies & Investigations | \$ - |
| Final Design | 800,000 |
| Owner Costs (Program mgmt., envir. monitoring) | 350,000 |
| Submittals Review & Tech. Oversight | 350,000 |
| Construction Inspection & Support | - |
| Metropolitan Force Construction | - |
| Materials & Supplies | 100,000 |
| Incidental Expenses | 25,000 |
| Professional/Technical Services | - |
| Nokia | 5,297,000 |
| H&D Consulting | 250,000 |
| Speciality Consultant - Tower Analysis | 60,000 |
| Right-of-Way | - |
| Equipment Use | - |
| Contracts | - |
| Remaining Budget | 779,000 |
| Total | <u>\$ 8,011,000</u> |

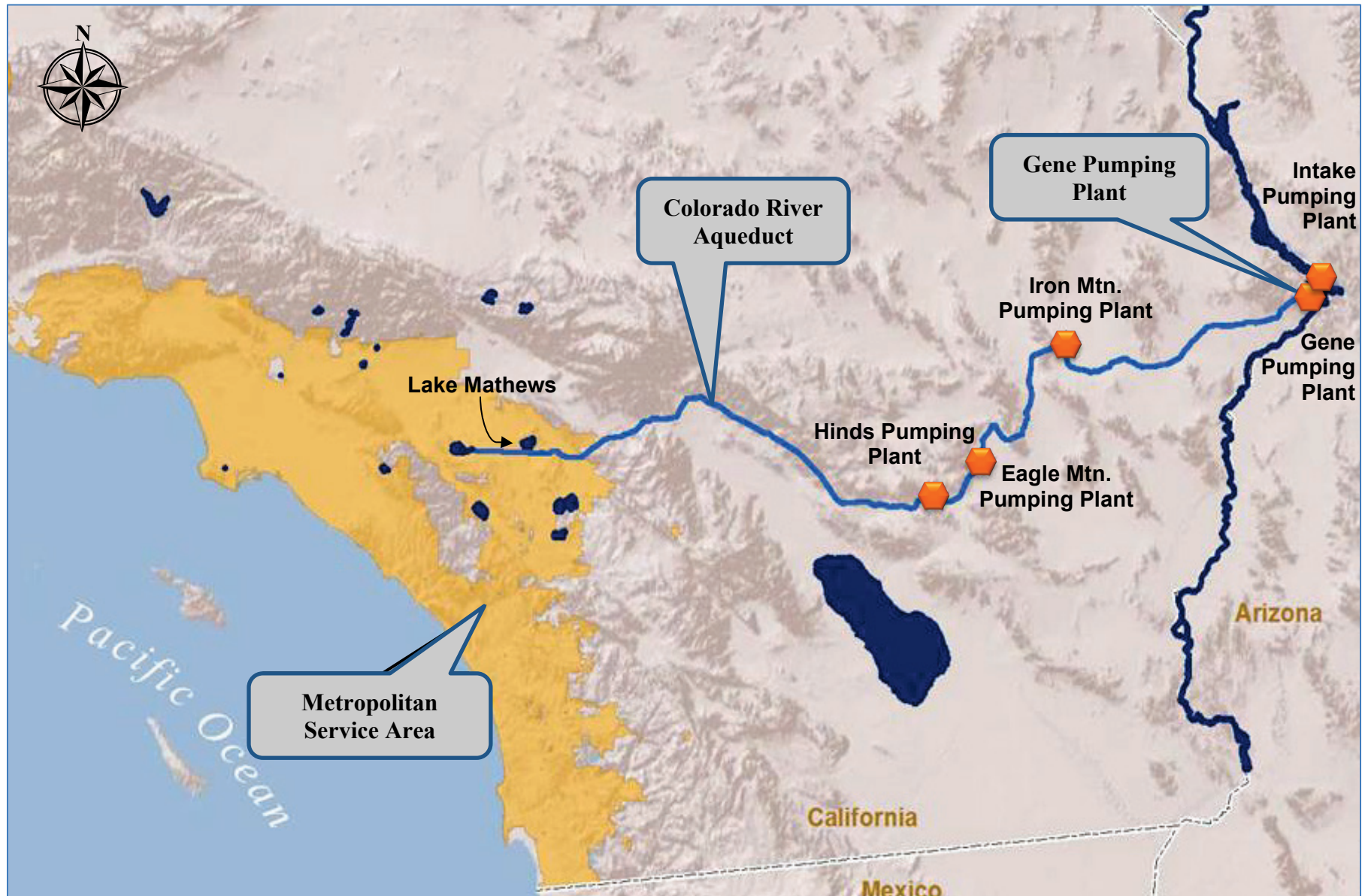
The total amount expended to date for the Desert Wide Area Network Upgrade is approximately \$500,000. The total estimated cost to complete this project, including the amount appropriated to date, funds allocated for the work described in this action, and future construction costs, is anticipated to range from \$15 million to \$16 million.

Allocation of Funds for the Gene Fiber Optic Communication System Upgrade

| | Current Board Action (July 2021) |
|---|---|
| Labor | |
| Studies & Investigations | \$ 59,000 |
| Final Design | 49,000 |
| Owner Costs (Program mgmt., envir. monitoring) | 178,000 |
| Submittals Review & Record Drwgs. | - |
| Construction Inspection & Support | - |
| Metropolitan Force Construction | - |
| Materials & Supplies | - |
| Incidental Expenses | 10,000 |
| Professional/Technical Services | - |
| HDR Engineering, Inc. | 275,000 |
| Rick Engineering Company | 29,000 |
| Right-of-Way | 14,000 |
| Equipment Use | - |
| Contracts | - |
| Remaining Budget | 51,000 |
| Total | \$ 665,000 |

This is the initial action for the Gene Communication System Upgrade. The total estimated cost to complete this project, including the amount appropriated to date, funds allocated for the work described in this action, and future construction costs, is anticipated to range from \$1.9 million to \$2.5 million.

Location Map





Desert Region Communications Systems Upgrades

Engineering and Operations Committee

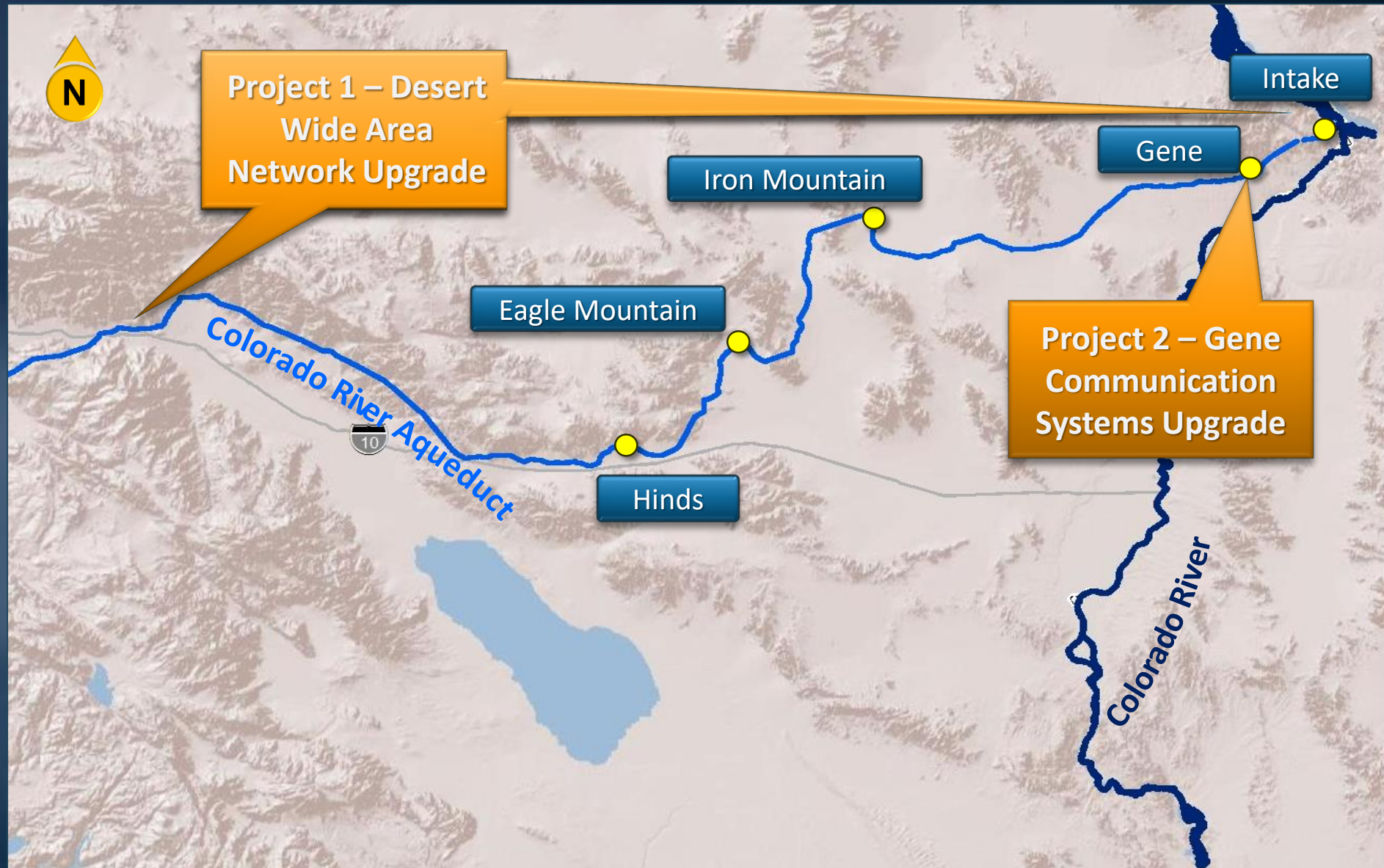
Item 7-3

July 12, 2021

Current Action

- Authorize an agreement with Nokia of America, Inc. in an amount not to exceed \$5,297,000 for equipment procurement & design support to upgrade the wide-area network
- Authorize increase of \$250,000 to the agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 for specialized technical support for the upgrades
- Amend current CIP to include upgrades to the communication system at Gene Pumping Plant
- Authorize an agreement with HDR Engineering, Inc. in an amount not to exceed \$275,000 for design services

Location Map



1. Metropolitan's Microwave Wide-Area Network



1. Metropolitan's Tele-protection Systems

- Essential to operation of high-power transmission lines
 - Transmission studies concluded need for tele-protection system
 - Clear electrical disturbances quickly to protect equipment and prevent electric grid instability
- Relies on WAN system that is connected to other regional electrical providers
- Other regional providers use Nokia of America, Inc. microwave radio equipment



1. Background

- Microwave radio WAN constructed in late 1990s
 - Transmit data, voice, video and command signals to operate its distribution and business systems
- Existing WAN equipment at end of useful service life
 - Typical life expectancy range from 12 to 15 years
 - Reliability decreased due to recurring intermittent failures
- Need to provide reliable carrier-grade system to transmit tele-protection, emergency radio, meter readings, security camera & security alarms

1. Alternatives Considered

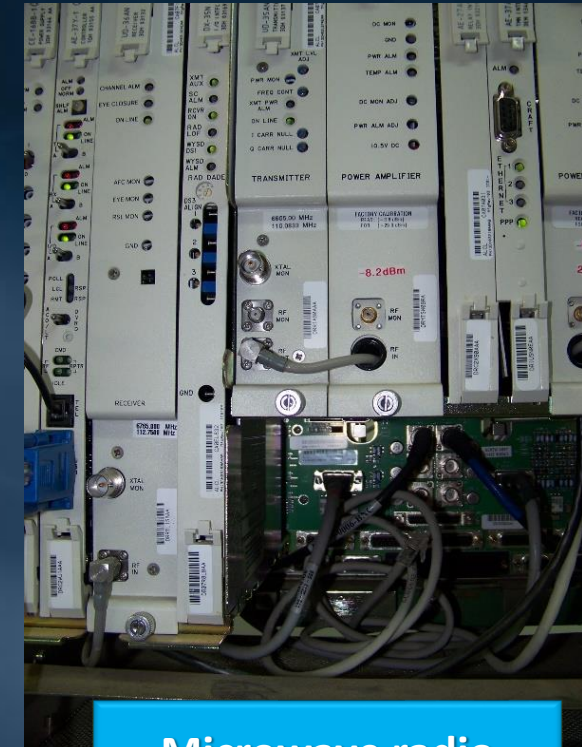
- Remove and replace individual components of the microwave radio system
 - Would maintain equipment from several different manufacturers
 - Two out of five are no longer in business
 - Continued risk of interoperability issues
- Selected option
 - Upgrade WAN to a single vendor platform
 - Opportunity to standardize microwave radio equipment
 - Simplifies maintenance and operations
 - Consolidates equipment from disparate manufacturers
 - Streamlines future upgrades and interoperability

1. Planned Work

- Replace current microwave system with a high-capacity carrier-grade system
 - Antennas
 - Waveguides
 - Routers
 - Microwave radio equipment
 - Battery systems
 - Network Management system



Tower/Waveguides



Microwave radio equipment

1. Selection Process

- Proof-of-concept of Nokia equipment conducted
- Nokia equipment recommended to enhance reliability of tele-protection
- Majority of the regional power providers Metropolitan interconnects with are/will be utilizing Nokia solutions



Proof-of-concept
around Diamond
Valley Lake

1. Recommended Procurement Process

- Utilize NASPO cooperative agreement procurement mechanism
 - Consistent with Metropolitan Administrative Code provision
- State of Washington Department of Enterprise Services solicited a competitive procurement of Public Safety Communication Support Equipment in 2015
 - Solicitation 05715 included microwave radio systems and services
 - Currently 22 states participate in this NASPO program

NASPO: National Association of State Procurement Officers



State of Washington
DEPARTMENT OF ENTERPRISE SERVICES
1500 Jefferson SE, PO Box 41411
Olympia, Washington 98504-1411 • (360) 407-2210
<http://www.des.wa.gov>

1. Nokia of America Corporation

New Agreement

- Selected using cooperative agreement
 - Solicitation 05715, completed in 2016
- Scope of Work
 - Provide new microwave radio equipment
 - Conduct microwave design
 - Assist with preparation of an installation contract
- NTE amount: \$5.297 M

1. Hatfield & Dawson Consulting Engineers, LLC Agreement Amendment

- Competitively selected under RFP 1179
- Scope of Work
 - Provide technical reviews of WAN drawings & specifications
 - Provide as-needed technical services (e.g., support during leasing negotiations, review of system frequencies, industry research)
- Amend agreement: \$250,000
- New NTE amount: \$730,000

1. Metropolitan Scope

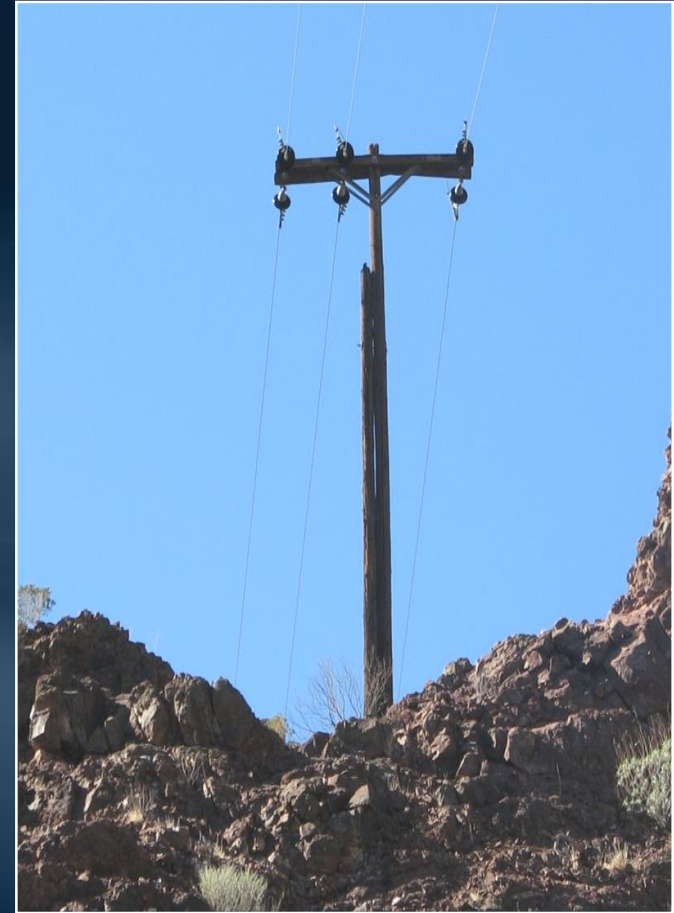
- Prepare drawings & specifications for installation of microwave radio WAN equipment
- Obtain local agency permits
- Develop construction cost estimates
- Prepare environmental documentation
- Advertise the installation contract
- Project controls & project management

2. Gene Communications System Upgrade



2. Background

- Provides critical redundancy to the existing desert WAN system
- Initiates long term plan to install fiber optic communications to desert facilities
- New fiber optic connection will
 - Improve speed & video surveillance resolution at the Gene Plant
 - Allow desert facilities to access more innovative cloud applications
 - Improve communication system overall speed, reliability & resiliency
- Staff recommends adding this project to current CIP
 - Sufficient funds are available



2. Alternatives Considered

- Add 3rd microwave path between Parker Dam & Gene Plant
 - Path has limited capacity for expansion of the facility at this time
 - Does not take advantage of the technology improvements offered by fiber optic communication
- Selected option
 - Install fiber optic cable to provide critical redundancy at Gene Plant
 - First step in bringing fiber optic cable communications to all CRA plants
 - Improves data transmission speed, reliability, & resiliency
 - Improves internet service for desert employees at Gene Plant

2. HDR Engineering, Inc.

New Agreement

- Competitively selected under RFP 1252
- Scope of work
 - Design criteria development
 - Detailed design
 - Plans & specifications development
 - Construction cost estimates
 - Technical support during bidding period
- SBE participation level: 25%
- NTE amount: \$275,000

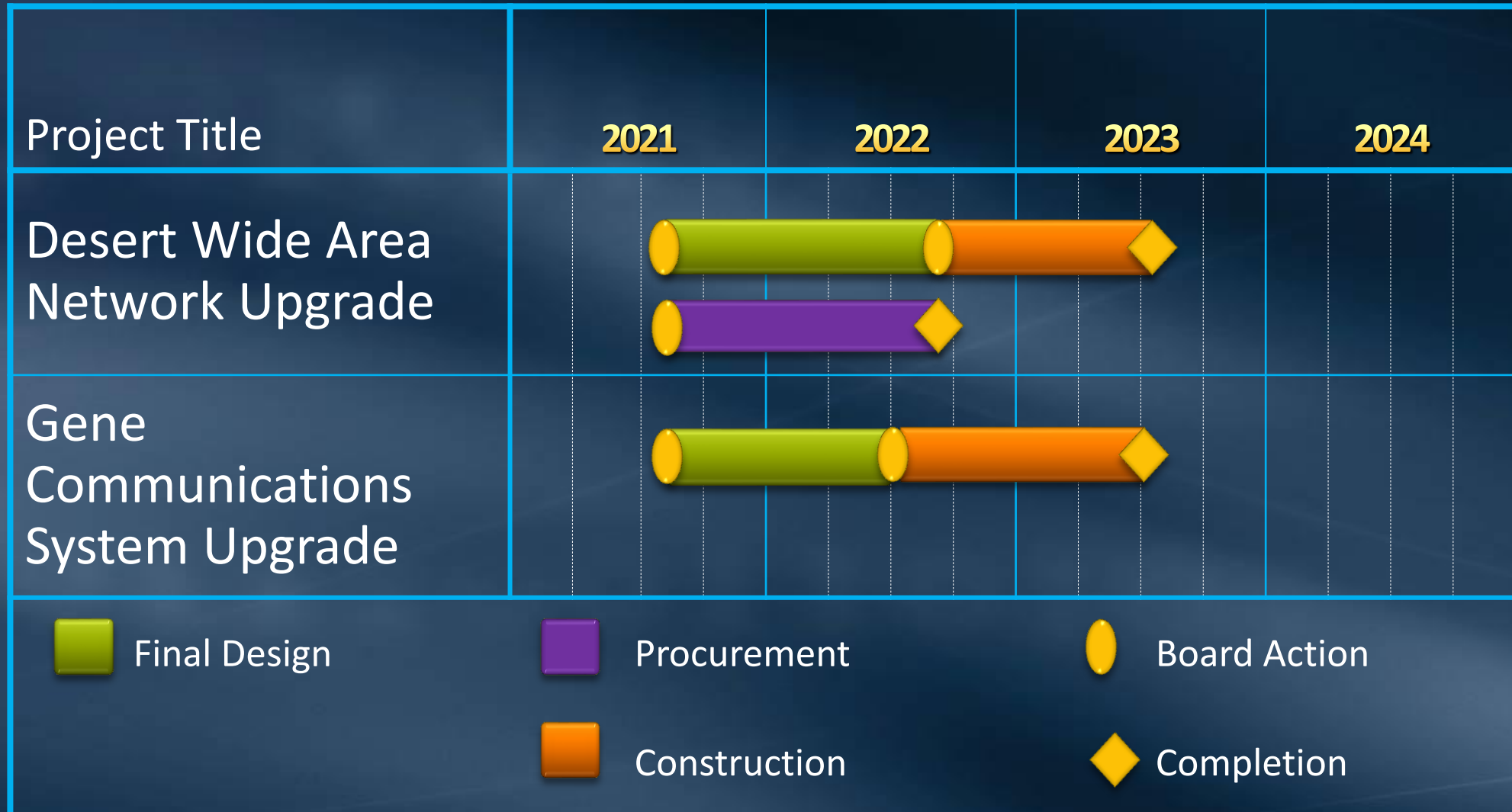
2. Metropolitan Scope

- Conduct field investigations
 - Geotechnical analysis
 - Aerial topographic survey
- Acquire temporary rights-of-way
 - Contractor staging
 - Work areas
- Permitting & agreement execution with service provider
- Review consultant work, project controls & project management
- Advertise & receive competitive bids

Allocation of Budgeted Funds

| | Desert WAN Upgrade | Gene Comm. System Upgrade |
|--|--------------------|---------------------------|
| Labor | | |
| Studies & Investigations | - | \$59,000 |
| Final Design and Specifications | \$800,000 | 49,000 |
| Owner Costs (Program mgmt., envir. monitoring) | 350,000 | 178,000 |
| Submittals Review and Technical Oversight | 350,000 | - |
| Materials & Incidentals | 125,000 | 10,000 |
| Professional Services | | |
| Nokia of America Corporation | 5,297,000 | - |
| H&D Consulting Engineers, LLC | 250,000 | - |
| HDR Engineering, Inc. | - | 275,000 |
| Rick Engineering Company (aerial survey) | - | 29,000 |
| Specialty Consultant - Tower Analysis | 60,000 | |
| Right-of-Way | - | 14,000 |
| Remaining Budget | 779,000 | 51,000 |
| Total | \$8,011,000 | \$665,000 |

Project Schedule



Board Options – Option #1

- Authorize an agreement with Nokia of America Inc for a not-to-exceed amount of \$5,297,000 for furnishing wide-area network equipment and design support to upgrade the desert region-wide-area network;
- Authorize increase of \$250,000 to the agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 for specialized technical support for the upgrade;
- Amend current CIP to include upgrades to the communication system at Gene Pumping Plant; and
- Authorize an agreement with HDR Engineering, Inc. for a not-to-exceed amount of \$275,000 for design services.

Board Options – Option #2

- Authorize an agreement with Nokia of America Inc for a not-to-exceed amount of \$5,297,000 for furnishing wide-area network equipment and design support to upgrade the desert region-wide-area network;
- Authorize increase of \$250,000 to the agreement with Hatfield & Dawson Consulting Engineers, LLC for a new not-to-exceed amount of \$730,000 for specialized technical support;
- Do not amend current CIP to include upgrades to the communication system at Gene Pumping Plant; and
- Do not authorize an agreement with HDR Engineering, Inc. for a not-to-exceed amount of \$275,000 for design services.

Board Options – Option #3

- Do not proceed with these projects at this time.

Staff Recommendation

- Option #1





Power Operations and Planning Update

Engineering and Operations Committee

Item 6a

July 12, 2021

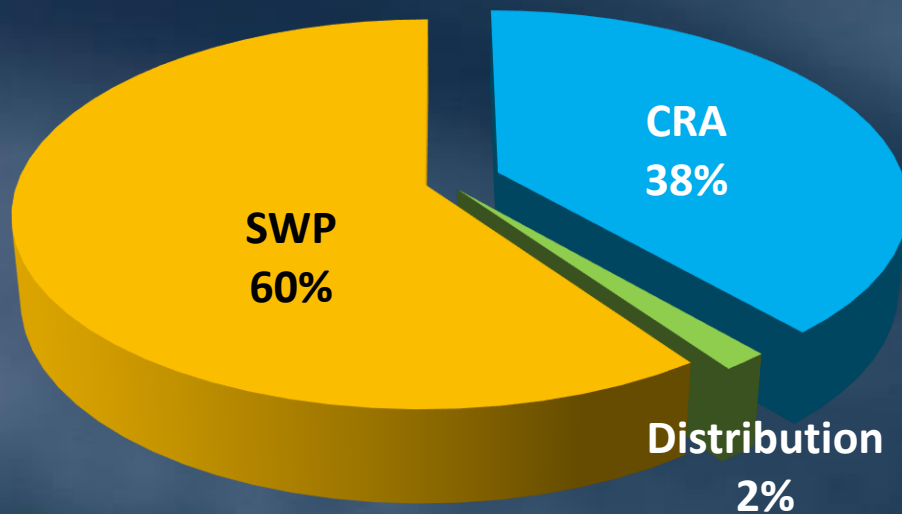
Metropolitan's Energy Requirements



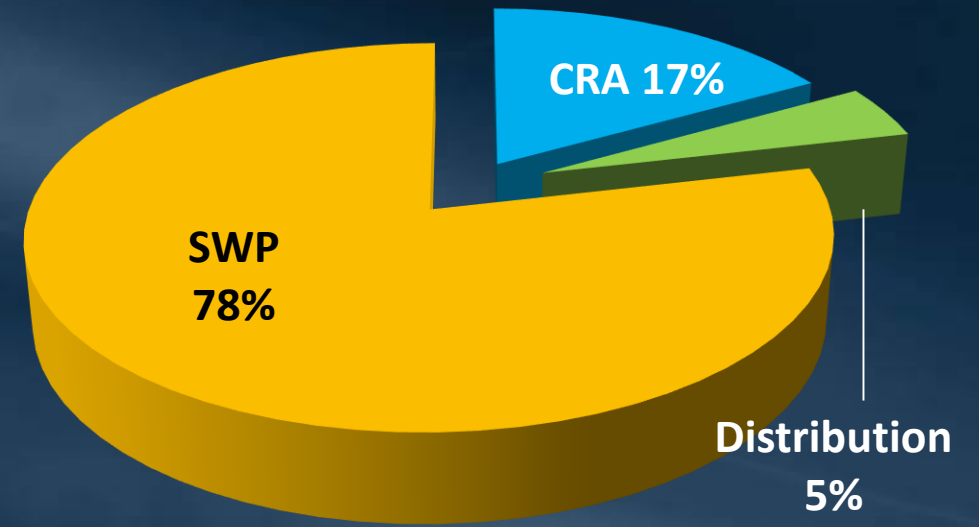
CRA and SWP – Cost and Energy

Higher “Fixed” SWP Energy Costs

Energy (MWh)



Cost (\$M)



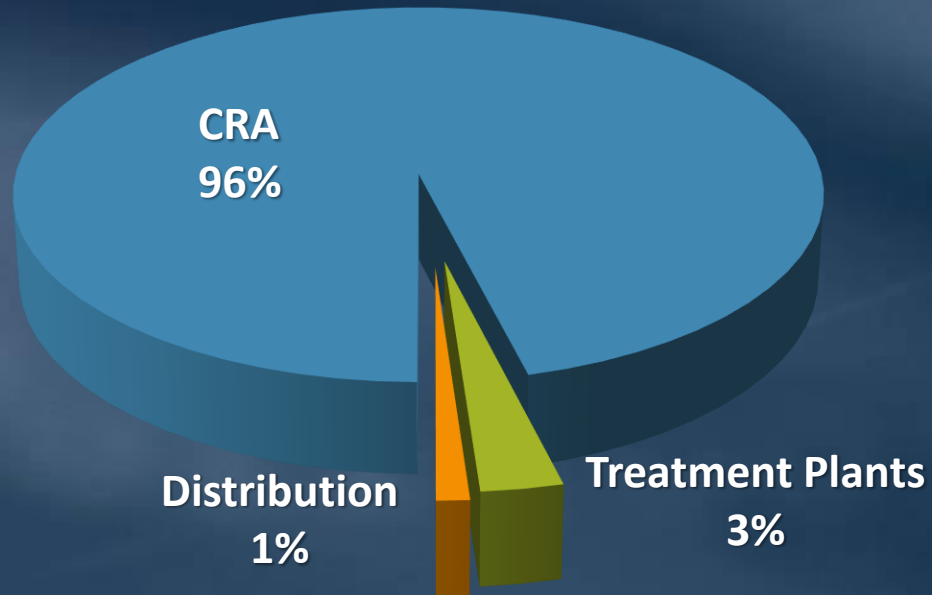
CY2010-2020 Average Annual Electricity Consumption = 4.52M MWh

CY2010-2020 Average Annual Electricity Cost = \$190M

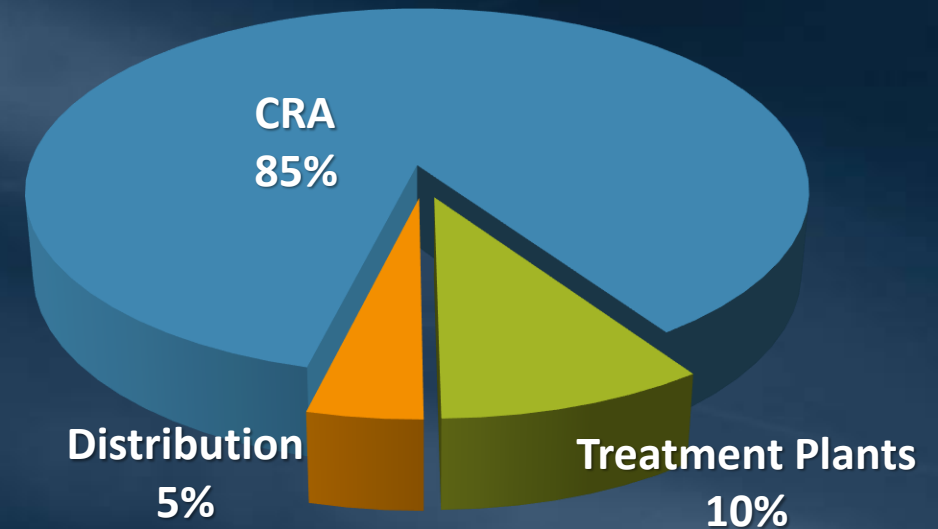
CRA is the Largest Direct Energy Cost

Pumping accounts for over 90% of energy use

Energy (MWh)



Cost (\$M)



CY2020 CRA and Treatment Plant/Distribution Electricity Consumption = 1.70M MWh

CY2020 CRA and Treatment Plant/Distribution Electricity Cost = \$48M

Metropolitan's CRA Transmission System



What Makes MWD Unique?

Flexibility, Access, Independence

\$\$\$



Imported
Generation

\$\$



Cal ISO
Energy Market

\$



Hoover &
Parker

Supplemental Energy

Base Supply

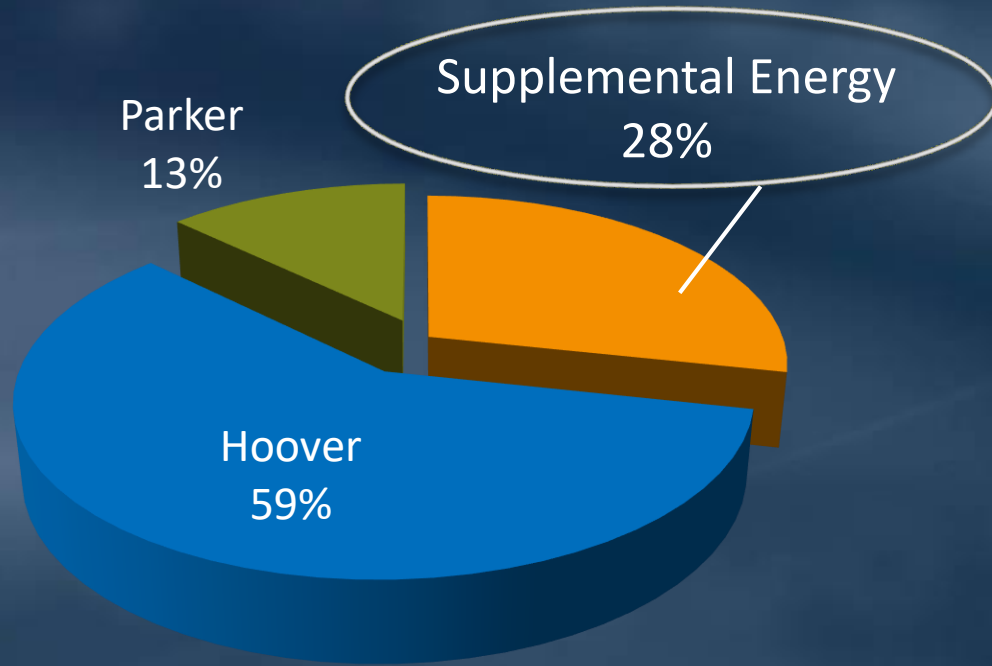
CRA Pump
Energy Use



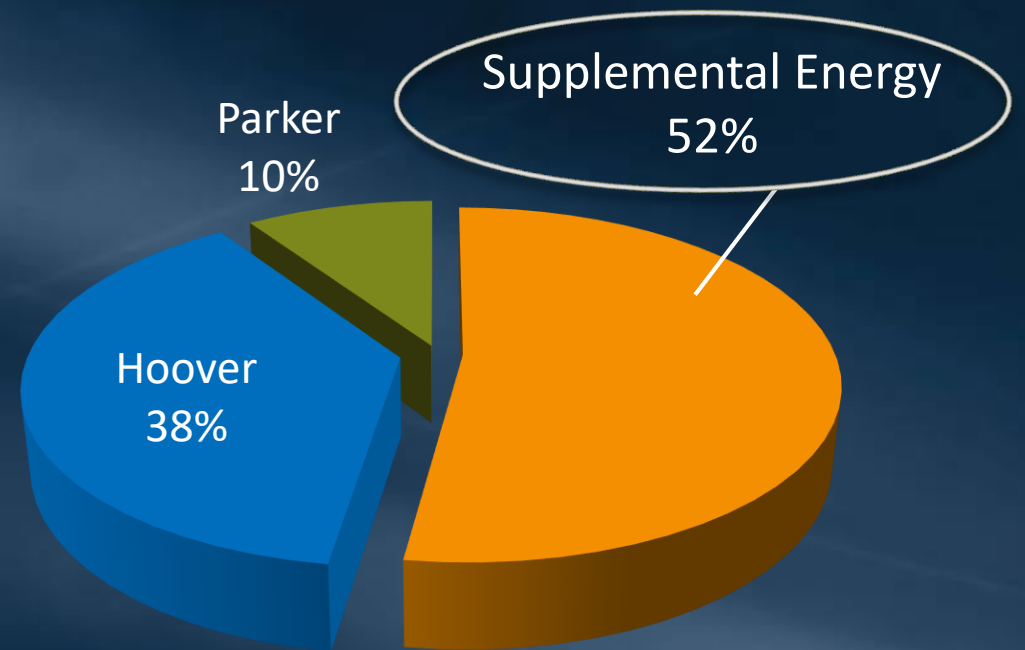
Managing Supplemental Energy Costs

Hoover and Parker Independence

2020 CRA Energy (MWhr)



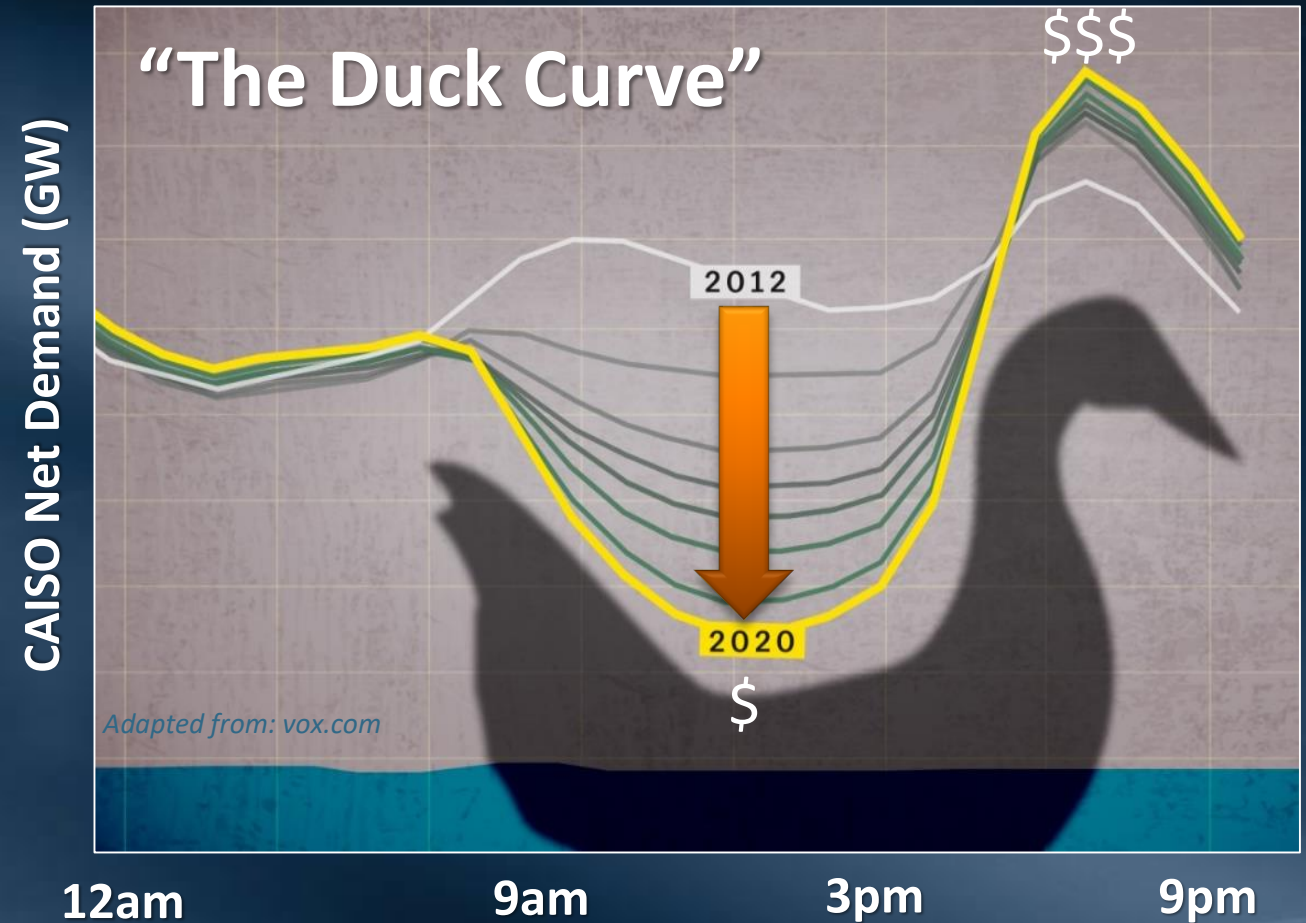
2020 CRA Energy Cost (\$M)



CY2020 CRA Electricity Consumption = 1.63M MWh
CY2020 CRA Electricity Cost = \$40M

Optimizing Power Management Strategies to Minimize Costs

- Metropolitan works with Arizona Electric Power Cooperative (AEPCO) and ACES Energy Management
- Overall Strategy:
 - Minimize CRA pumping costs
 - Optimize Hoover and Parker generation schedules



Preparing for Summer 2021

Lessons Learned From 2020

- Climate change-induced extreme heat wave
- Renewable generation didn't meet demand
- Day-ahead energy market exacerbated supply challenges under highly stressed conditions

<http://www.caiso.com/Documents/Final-Root-Cause-Analysis-Mid-August-2020-Extreme-Heat-Wave.pdf>



Metropolitan Actions in 2020

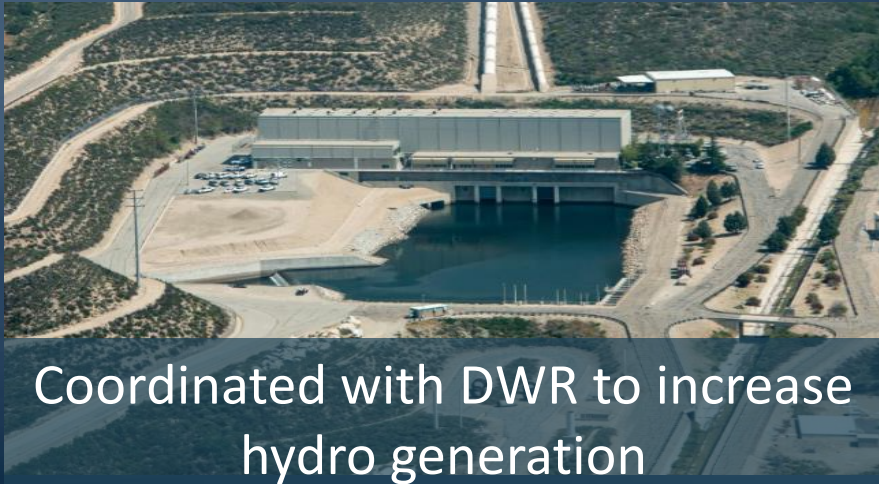
300 MW of Grid Relief During Statewide Energy Crisis



Reduced pumping on CRA



Initiated DVL hydro generation



Coordinated with DWR to increase hydro generation



Switched from ozone to chlorine disinfection

Summer 2021 Operating Conditions

Electric Grid is Still At Risk and Prices are High

- Cal ISO has implemented operational and market changes
- Grid still vulnerable to widespread heat events
- Energy markets reacted to the energy crisis with much higher prices for energy



Summer 2021 Operating Conditions

Managing Power Operations During a Record Drought

- Record low SWP allocation makes deferral of CRA pumping difficult
 - 8-pump flow planned through August and may continue through end of 2021
- Hoover generation declining due to Lake Mead levels
- Low hydro conditions and record heat across the West reduces generation imports available to Cal ISO
- Cycling pumps avoided due to aging CRA infrastructure
- Energy price forecasts significantly higher after 2020 energy crisis



Summer 2021 Energy Costs

Need to Pump + High Prices = Potential High Costs

CRA Energy
Costs By
Month (\$M)

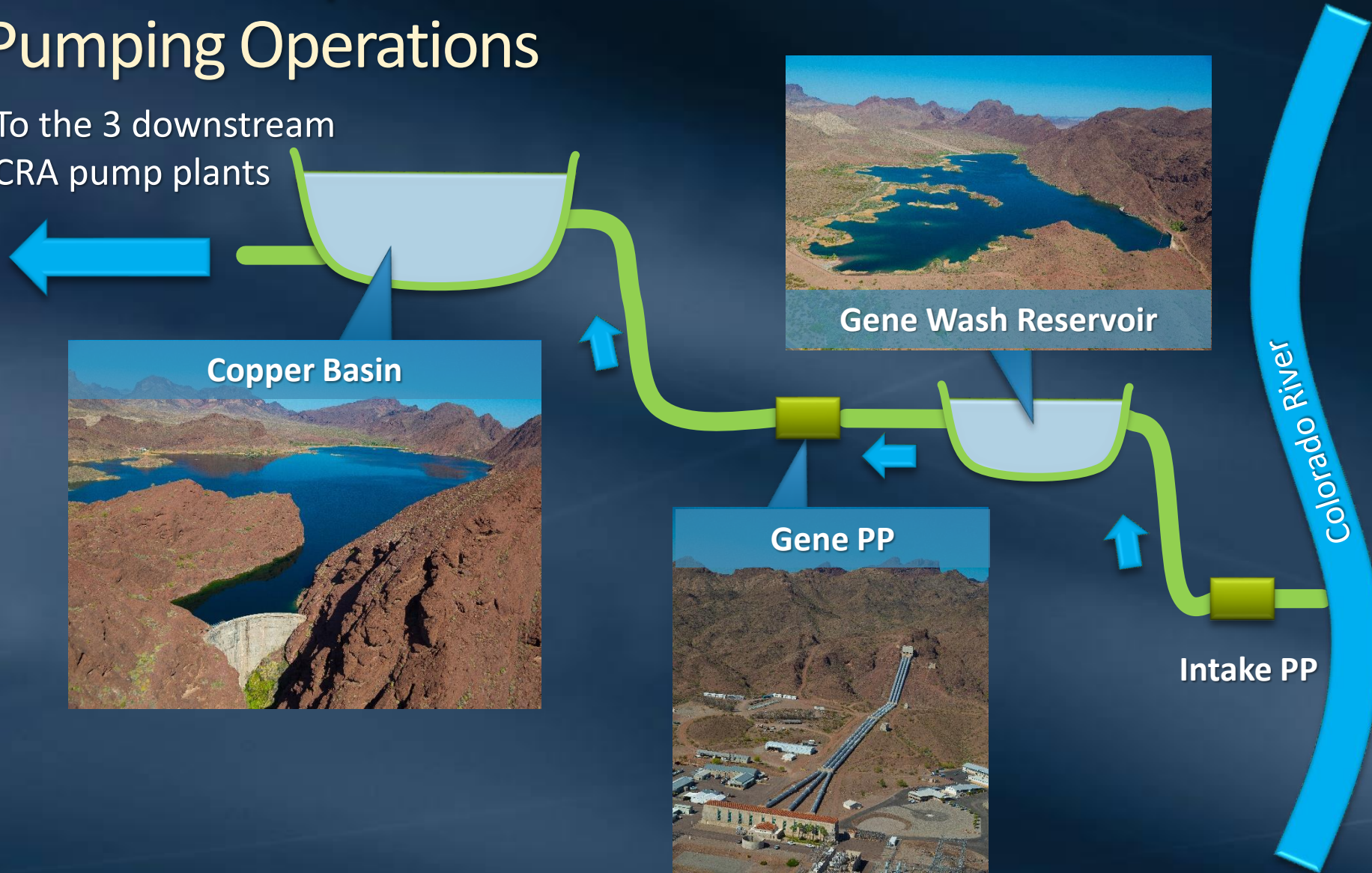


- 2020 CRA Energy Costs (Actual) - \$40 million
- 2021 CRA Energy Costs (Forecast) - **\$80-100 million**

How CRA Pump Reductions Work

Typical Pumping Operations

To the 3 downstream
CRA pump plants



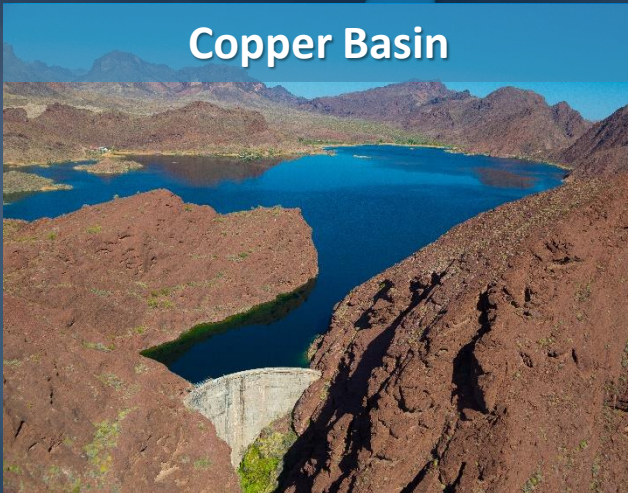
How CRA Pump Reductions Work

Dropping Pump Load

To the 3 downstream
CRA pump plants



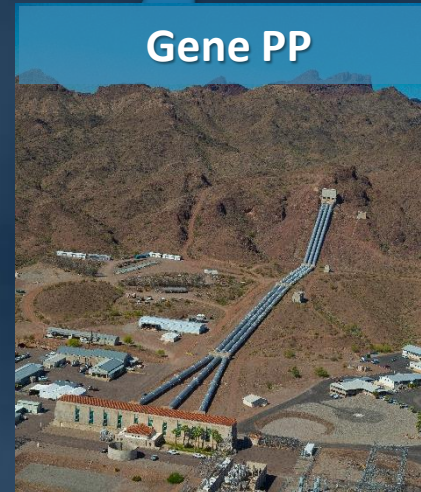
Copper Basin



Gene Wash Reservoir



Gene PP



Intake PP



= Load dropped at 2 pump plants
up to 110 MW total

Planning For The Future

Future Cal ISO Actions May Impact Metropolitan

- Cal ISO continues to study market for 2022 and beyond operational changes
- These may significantly impact Metropolitan
 - Require purchasing more than planned power to ensure a reserve margin
 - Change interruptible load rules which could affect CRA pump operations



Success Through Partnerships

- Working diligently with all of our partners, including:
 - AEPCO & ACES – Forecasting & market surveillance
 - CAISO – Visibility and operations
 - USBR – Managing hydro resources
- Leveraging our unique system attributes – Access, Independence, and Flexibility
- Focused on maintaining reliable and economic water deliveries for our member agencies during this time of unprecedented drought



Summary

Success Through Careful Planning

- The severe drought is impacting CRA operations
- Tight grid system conditions may lead to system emergencies and higher than normal energy prices
- CRA energy costs for 2021 will be higher than normal
- With careful planning, Metropolitan will meet water delivery goals and manage financial impact







Apprenticeship Program Update

Engineering and Operations Committee

Item 6b

July 12, 2021

What is Apprenticeship?

- Partnership between industry, education and government
- Comprehensive academic and on-the-job training (OJT) to achieve journey-level



Santiago Canyon College



CALIFORNIA COMMUNITY COLLEGES
CHANCELLOR'S OFFICE



Program Background

- Dwindling skilled labor market for electricians and mechanics
- Partnership between Water System Operations, Human Resources, and AFSCME Local 1902
- Promotes long-term workforce stability
- Certified by the State of California
- First class began 2003 – completed in 2007



Program Structure

- 4 year program
 - 7,280 hours
- 8 periods of study
 - Classroom training
 - On-the-job training
 - 36 units toward Associates Degree
- Diamond Valley Lake Training Center
- Local community colleges



Program Governance

- State Division of Apprenticeship Standards
- Local Education Agency
- Joint Apprenticeship and Training Committee
- Apprenticeship Policies and Procedures
- Program Administration

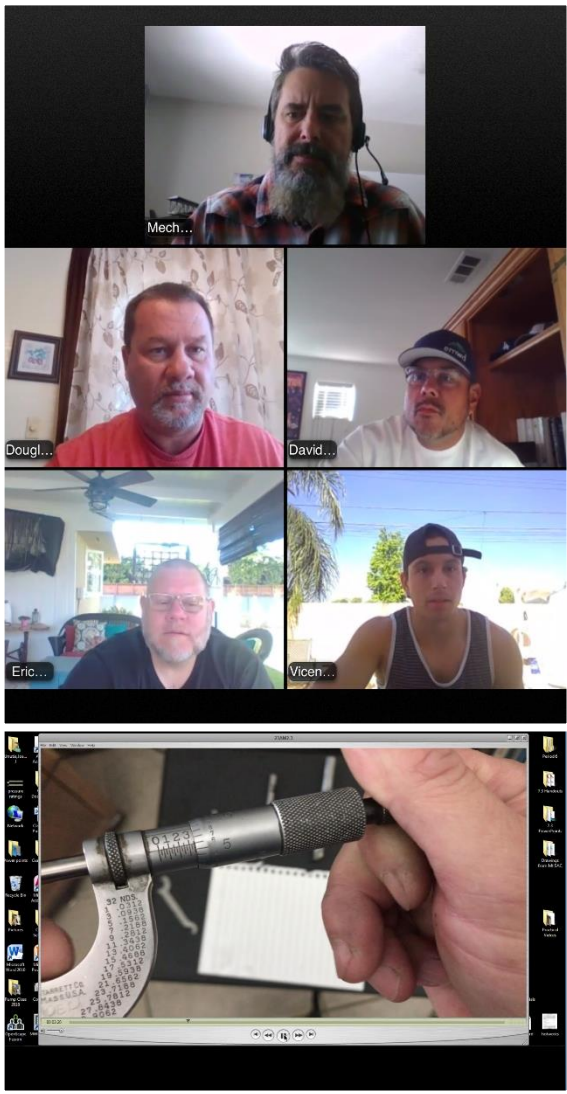


Classroom Training

- Program Instruction
 - Mechanical and electrical instructors
 - Adjunct faculty with Santiago Canyon College
 - Off-site specialized instruction
- Classroom and Practical Training
 - 640 hours of class
 - Exams
 - Home study



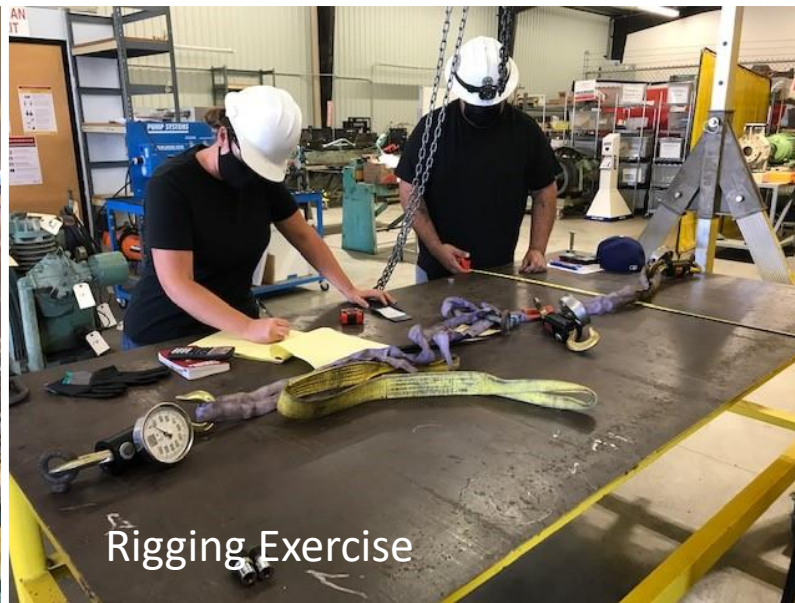
Classroom Training



Practical Training



Valve Demonstration



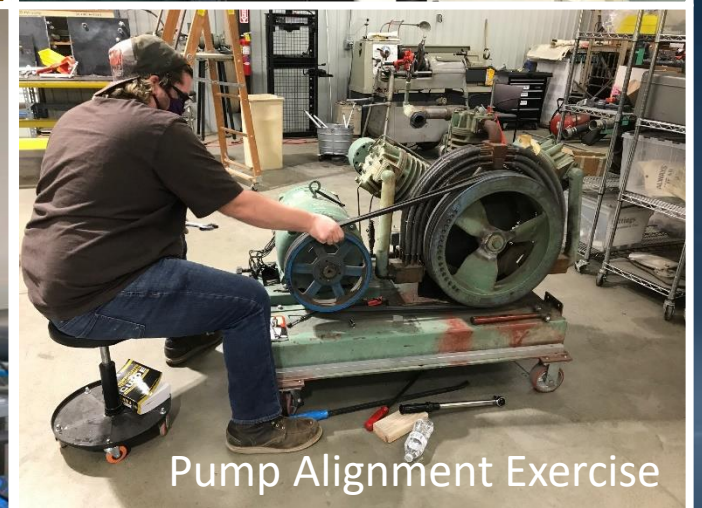
Rigging Exercise



Virtual Welding



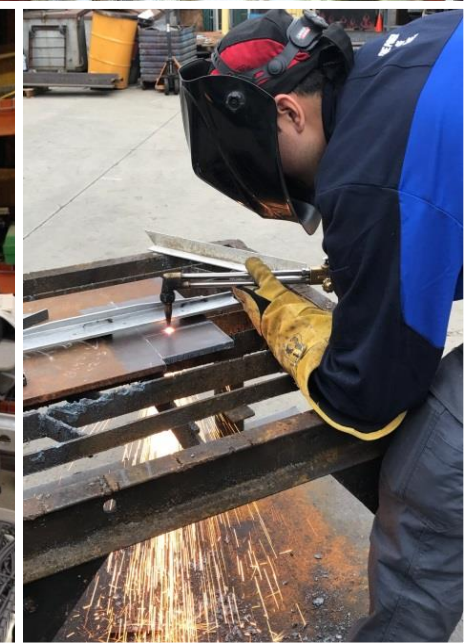
Electrical Wiring Exercise



Pump Alignment Exercise

On-the-Job Training

- Journey-level mentor
- Practical experience
- 6,640 hours of OJT



Congratulations Class of 2020

Q&A: What was the most valuable lesson in the apprenticeship?

“Probably just the confirmation that a person really can learn to do anything if they really apply themselves. I came into the apprenticeship with zero experience related to this field of work. But I wanted to learn these trade skills and build a new career. All it really takes to accomplish anything is desire and dedication.”

- Class of 2020 Apprentice



Recruitment Process



Recruitment Resources

- Recruitment January 2022
- Metropolitan Water District's Website



Recruitment

Human Resources
Group



Recruitment
Outreach

Equal Employment
Opportunity Office

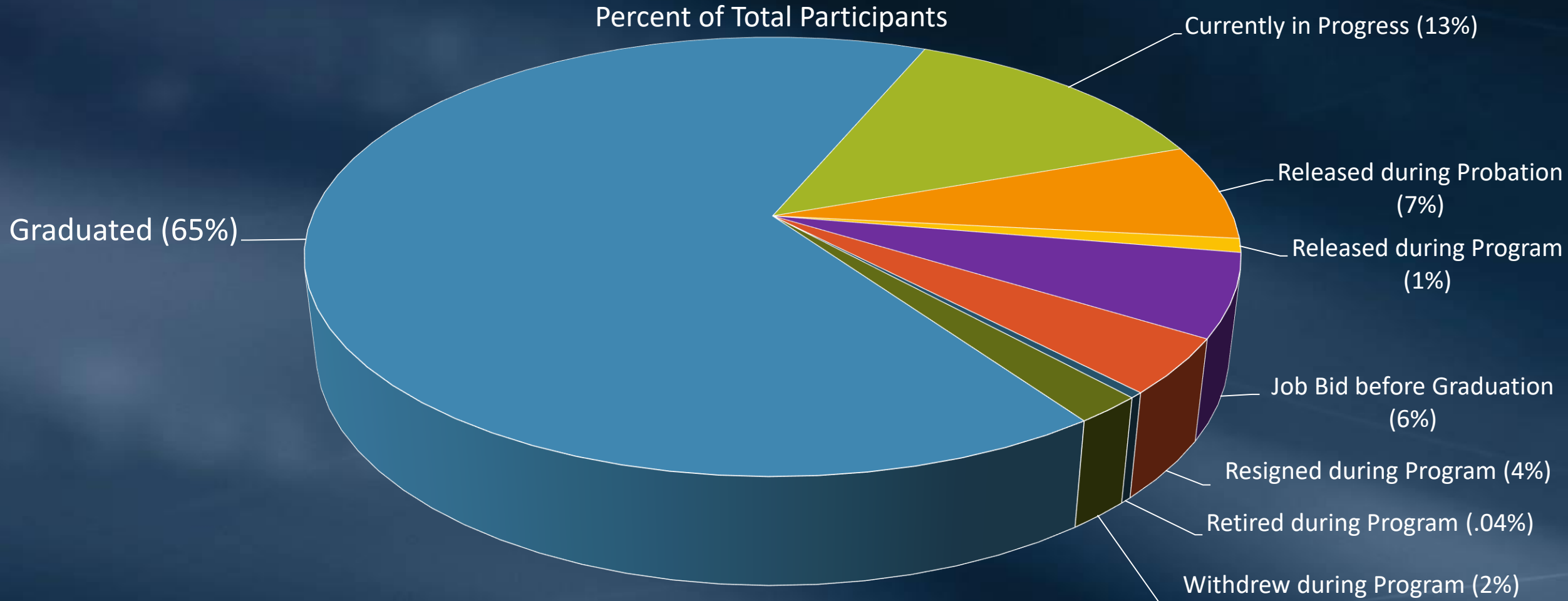


Frequently Asked
Questions

- General Program Information
- Recruitment
- Application / Testing Process
- Assigned Locations

Apprenticeship Program

218 total participants from 2003 to 2021



Apprenticeship Program Innovation

Virtual Learning



Apprentice Innovation

- Lake Mathews Forebay Operations
 - Class of 2016 Graduate
- Electric Cart and Trailer
 - Class of 2021 Graduate



Planned Relocation of Apprentice Training Center



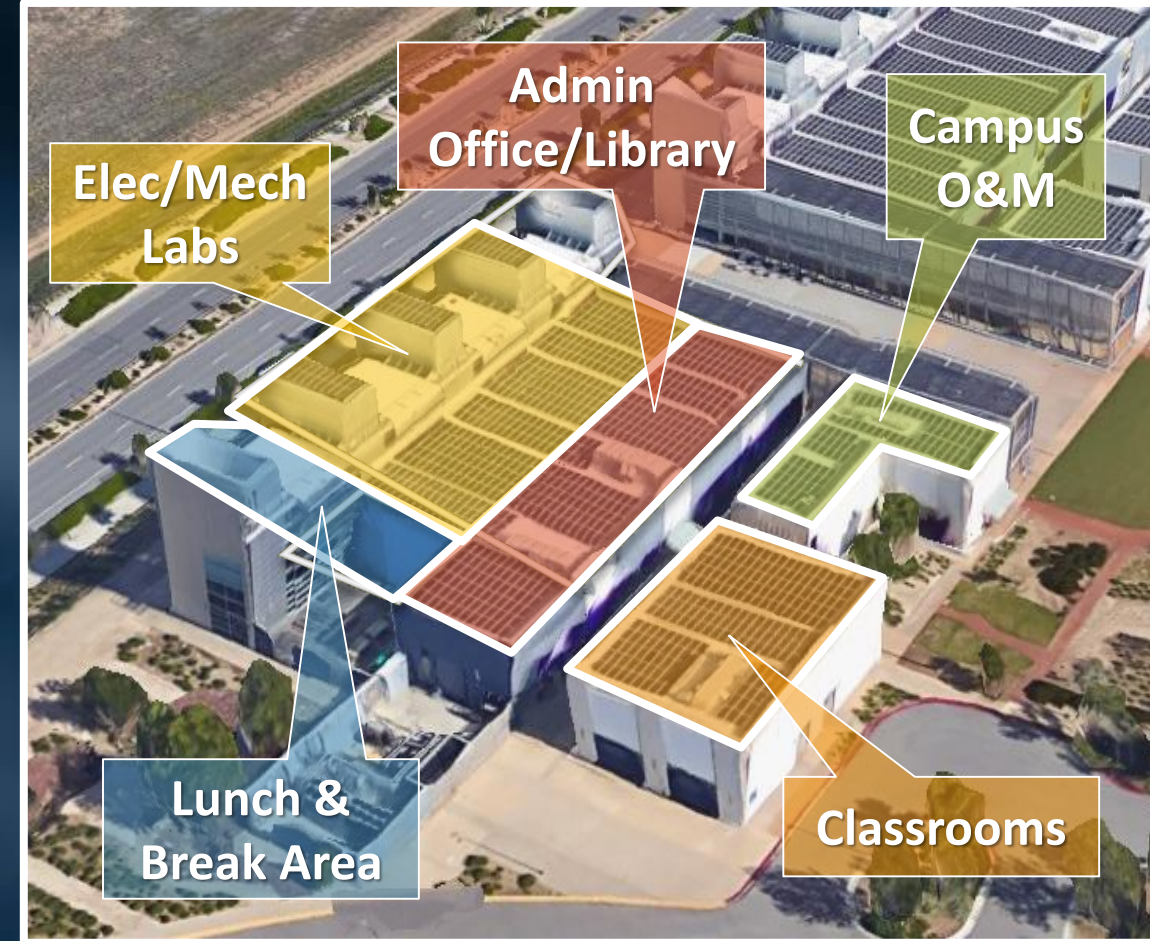
Apprentice Training Center



DVL Visitor Center Site

Future Apprenticeship Program Facilities

- Repurposed DVL Visitor Center building
 - Significant increase in shop and classroom space
 - Opportunities for additional equipment
 - Increased lunch and break areas
- Classroom relocation in 2022
- CIP planned for shop and other facility improvements



Summary - Upcoming Program Initiatives

- Expand program to journey-level skills development
- Update equipment, simulator trainers, and A/V equipment
- Perform comprehensive program review and update curriculum
- Relocate Apprenticeship Program facilities to new location at DVL Visitor Center site



Summary - Program Benefits

- Reliable supply of certified mechanics and electricians
- Diverse applicants reflect service area
- Training on Metropolitan systems and equipment
- Pathway for Associate's Degree
- Upon completion – fully prepared to “hit the ground running”







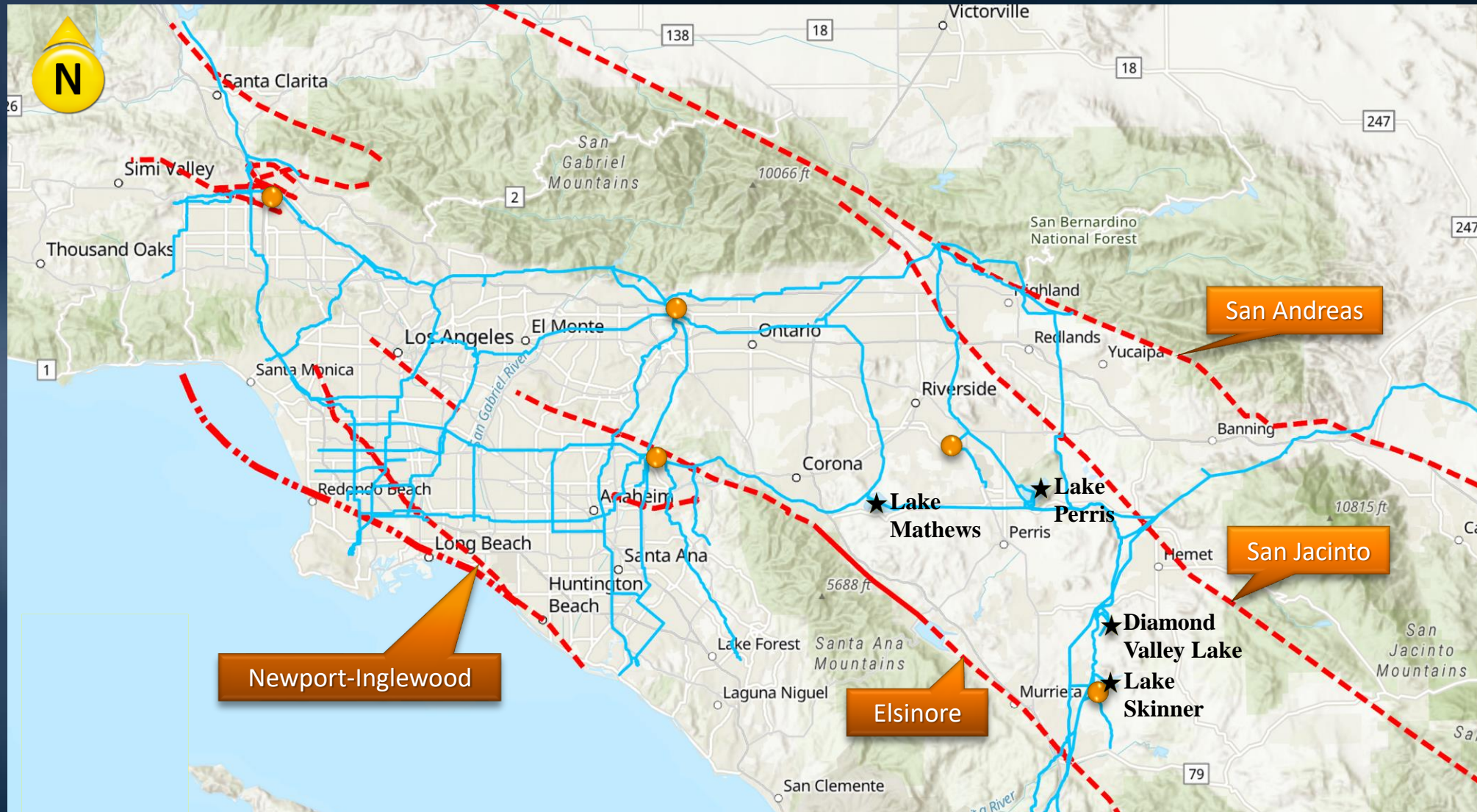
Innovative Approaches to Seismic Resilience for Metropolitan's Pipelines and Tunnels

Engineering and Operations Committee
Item 6c
July 12, 2021

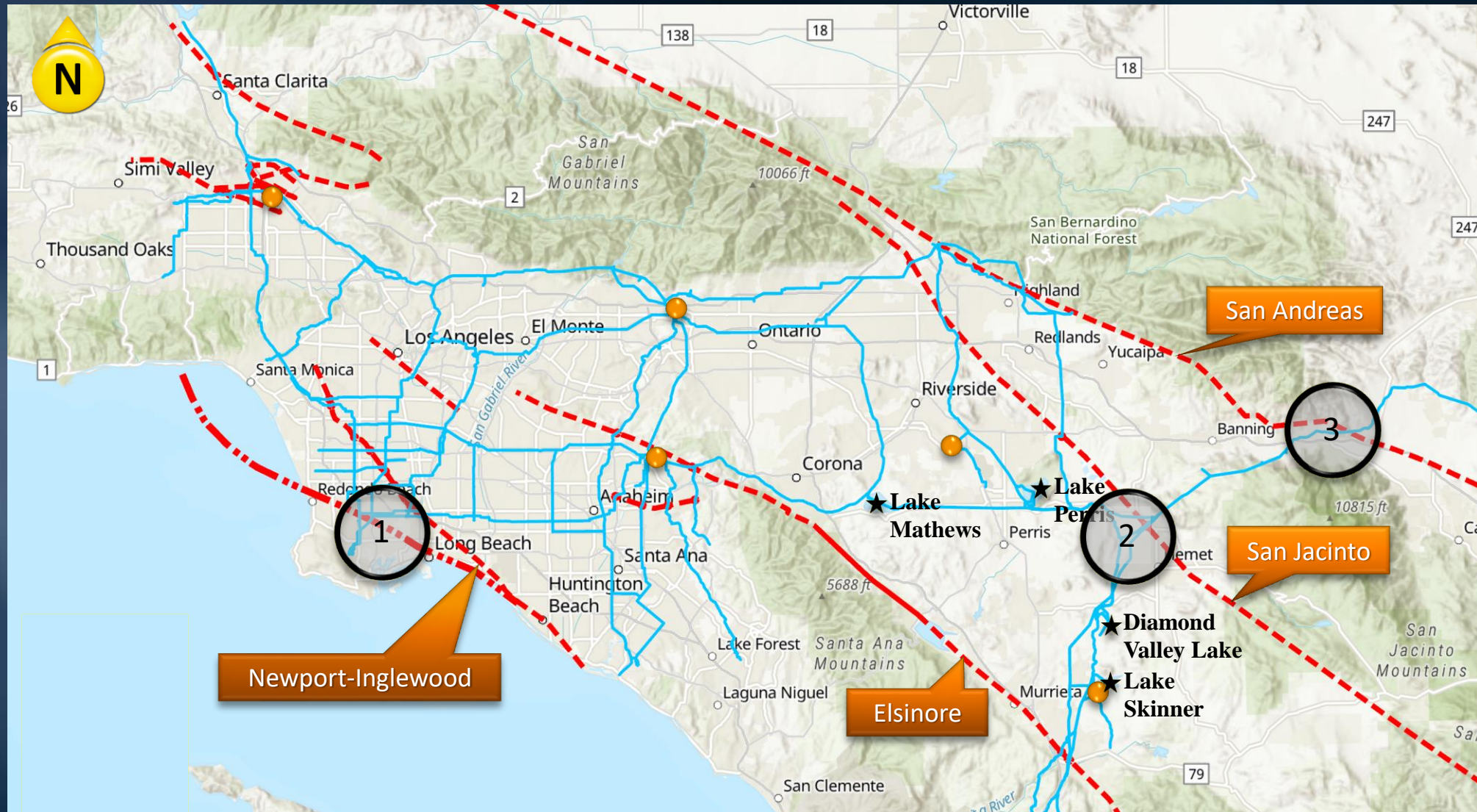
Overview

- Background
- Recent Advancements
- Seismic Risk Mitigation Approach
- Examples of Seismic Mitigation Design
- Conclusion/Next Steps

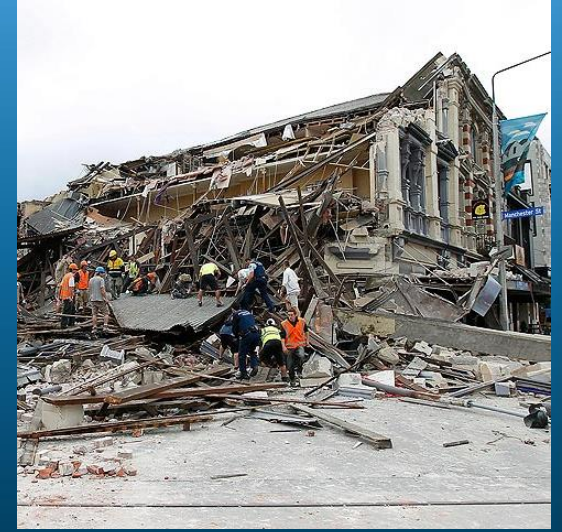
Regional Seismic Risk



Regional Seismic Risk



Steps Toward Overall Seismic Resilience



1930's
Construction of
Colorado River
Aqueduct



1971
San Fernando
Earthquake



1994
Northridge
Earthquake



2011
Christchurch
Earthquake

Seismic Hazard for Buried Pipelines

Risk

1. Shaking
2. Permanent Ground Displacement

Type of Failure

Pipe joint failure

Pipe joint failure, Pipe rupture



1971 San Fernando Earthquake

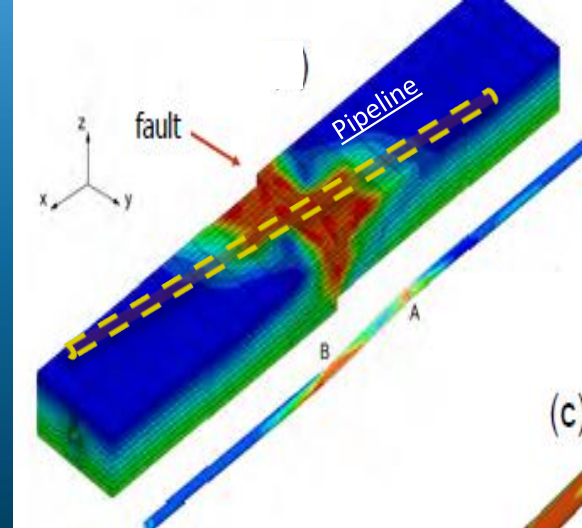
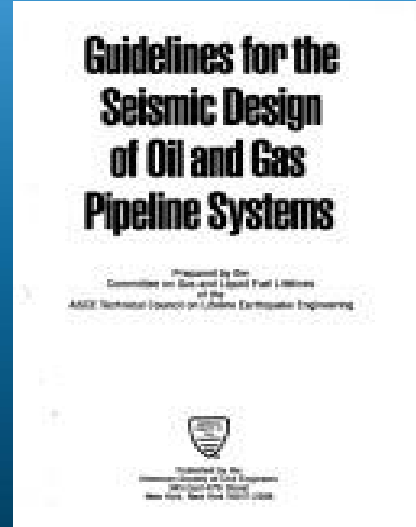


1994 Northridge Earthquake



1989 Loma Prieta Earthquake

Recent Advancements



1974:

First seismic resilient pipe joints installed in Japan

1984:

ASCE lifelines seismic design guidelines issued

1995:

Advanced analytical techniques became available

2012:

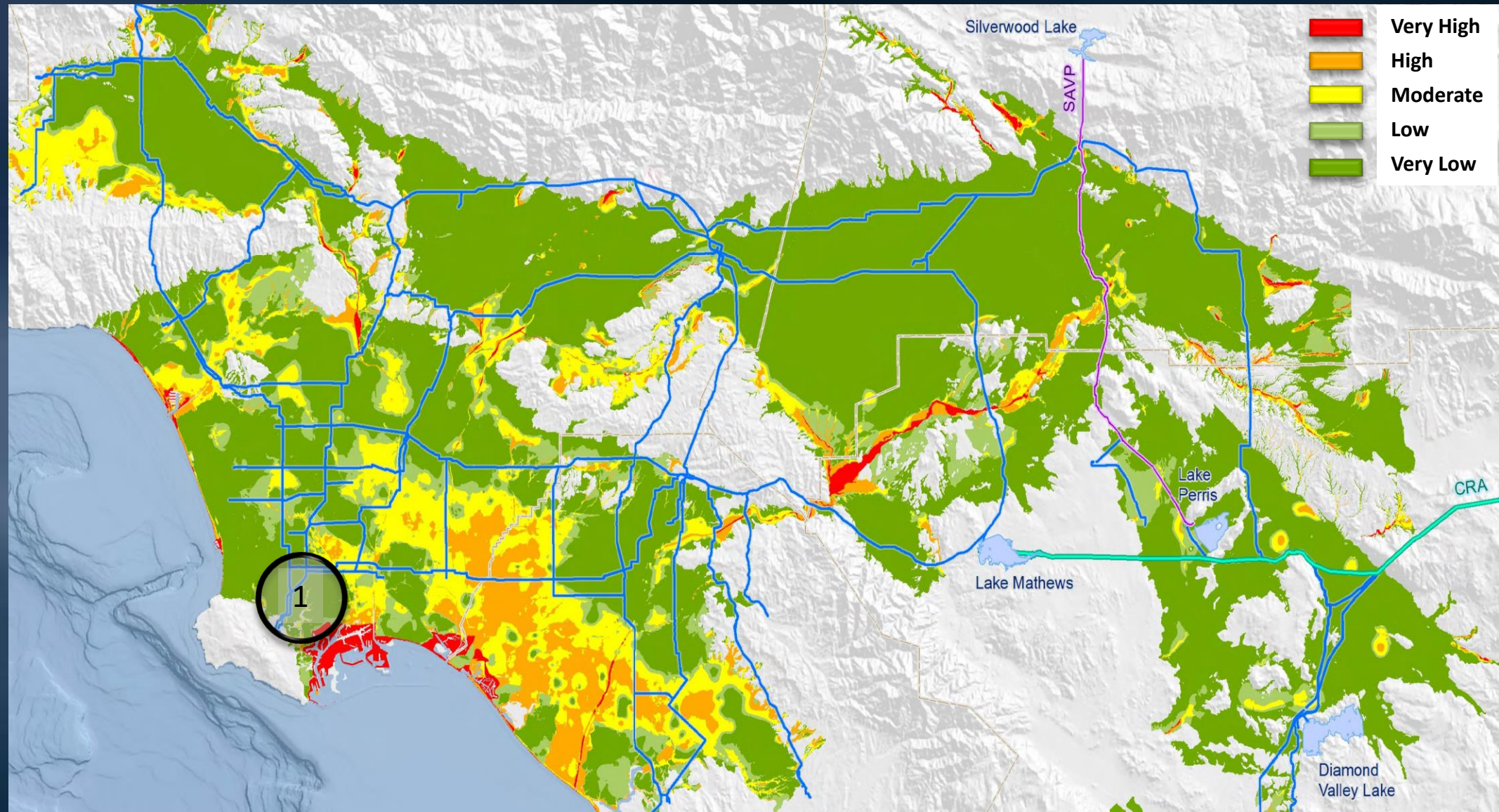
First seismic resilient pipe installation in U.S. (Los Angeles)

Seismic Risk Mitigation Approach

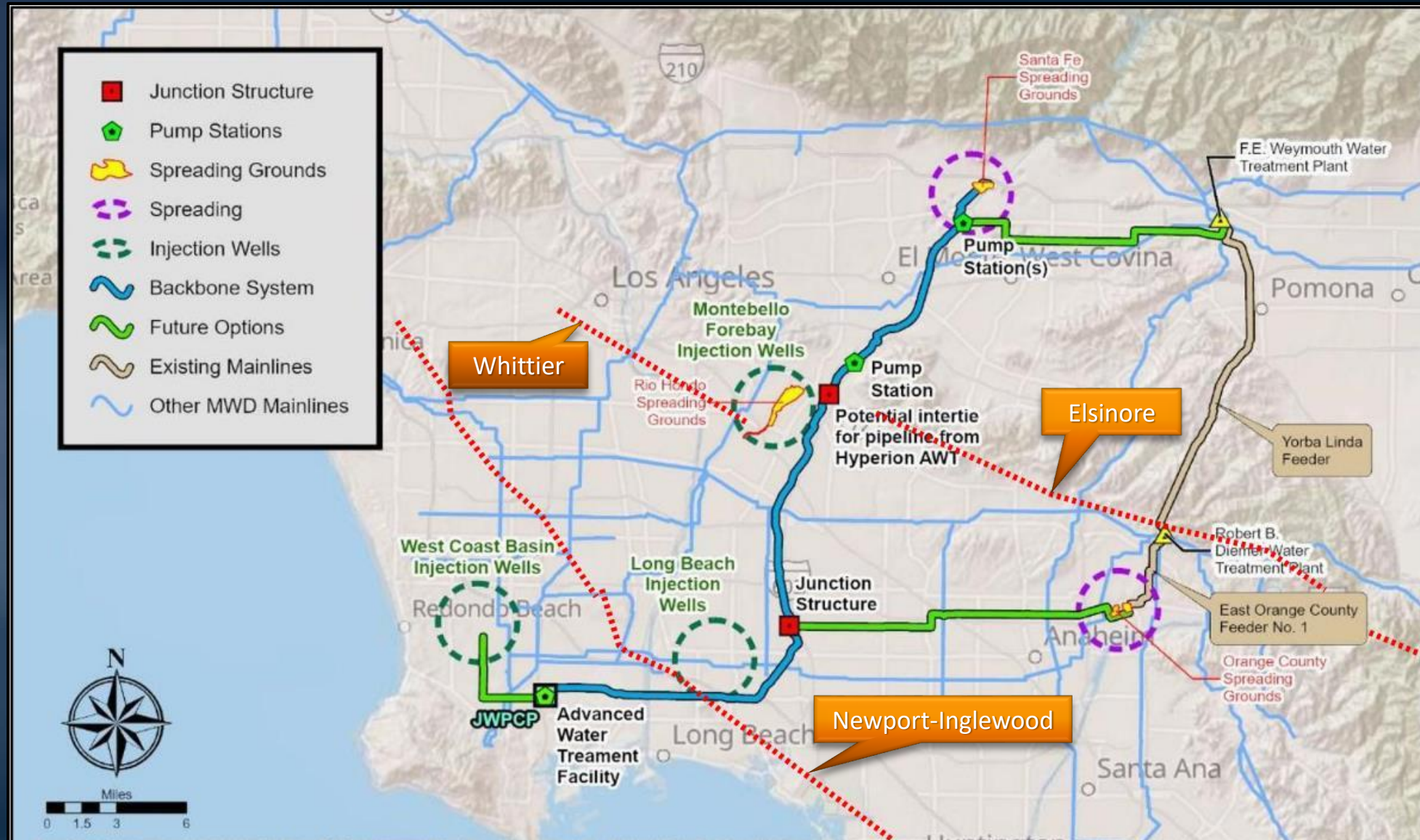
1. New Pipelines and Tunnels
 - Incorporate seismic resilience into design
2. Existing Pipelines and Tunnels
 - Prioritize mitigation efforts
 - Implement mitigation measures in R&R programs
3. Conveyance and Distribution System
 - Plan for post-event restoration



Liquefaction Susceptibility Mapping



Example 1: New Pipeline (Regional Recycled Water Program)



Seismic Resilience Mitigation Approach

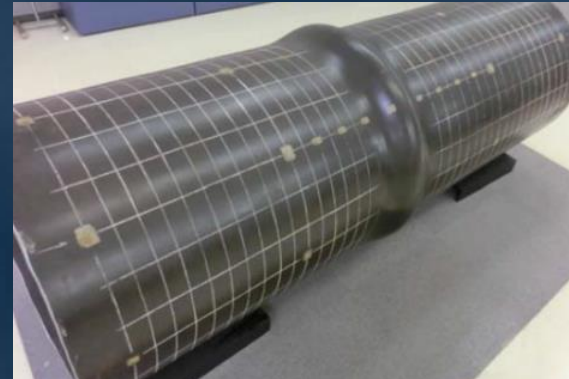
- Establish design performance criteria
- Evaluate conditions along multiple alignments
- Use advanced modeling to analyze pipeline response
- Strategic use of specialized joints and pipe sections



Fault Trenching Study



Flexible Ball Joint



Earthquake-Resistant Steel Pipe

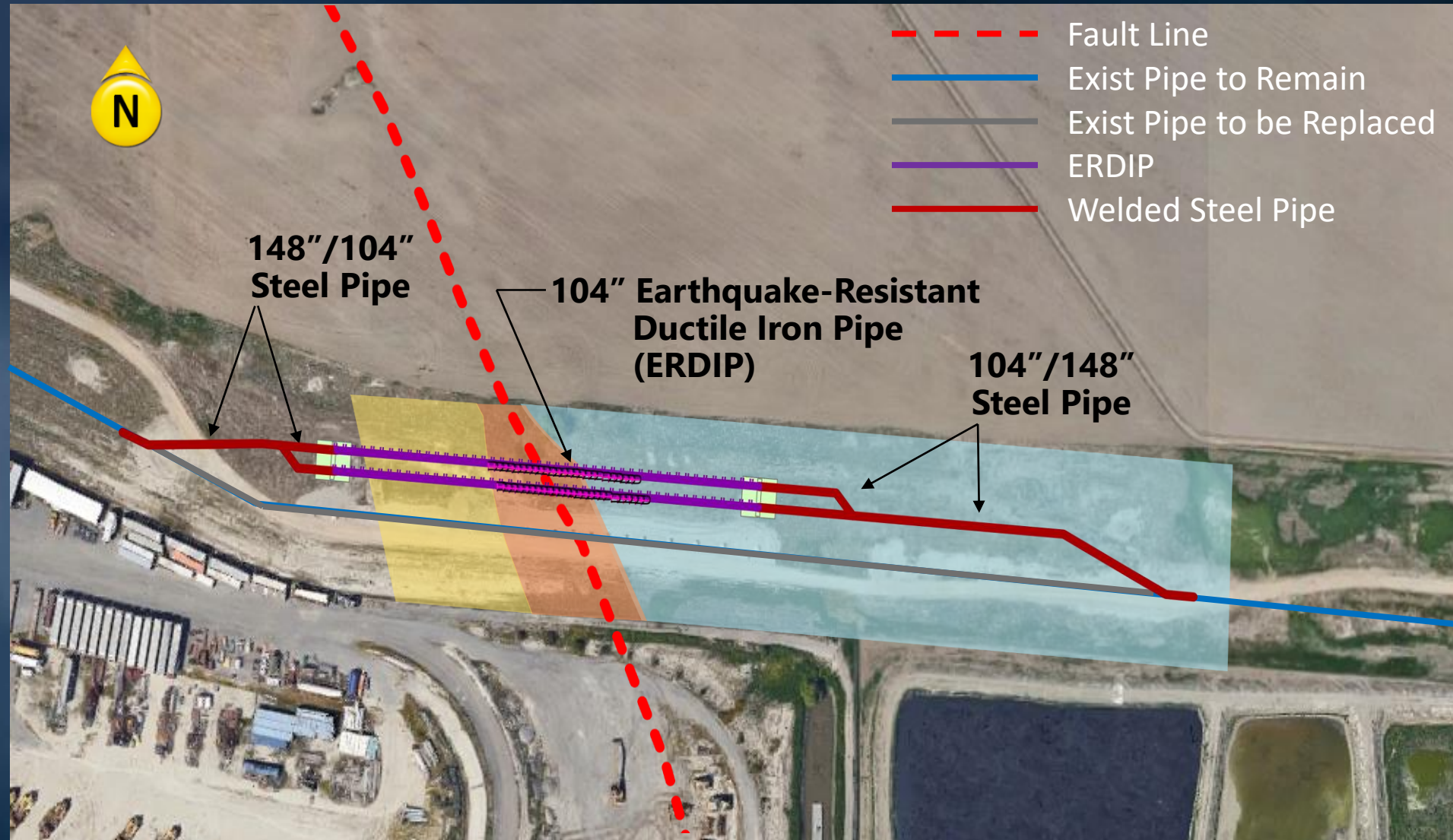


Welded Steel Pipe Joints

Example 2: Existing Pipeline (Casa Loma Siphon No. 1)

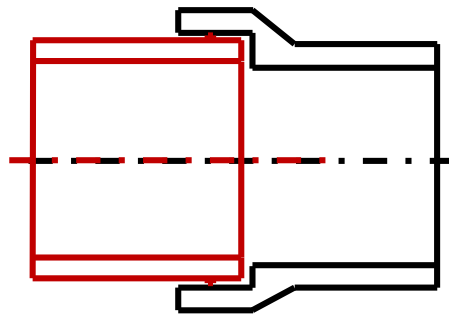
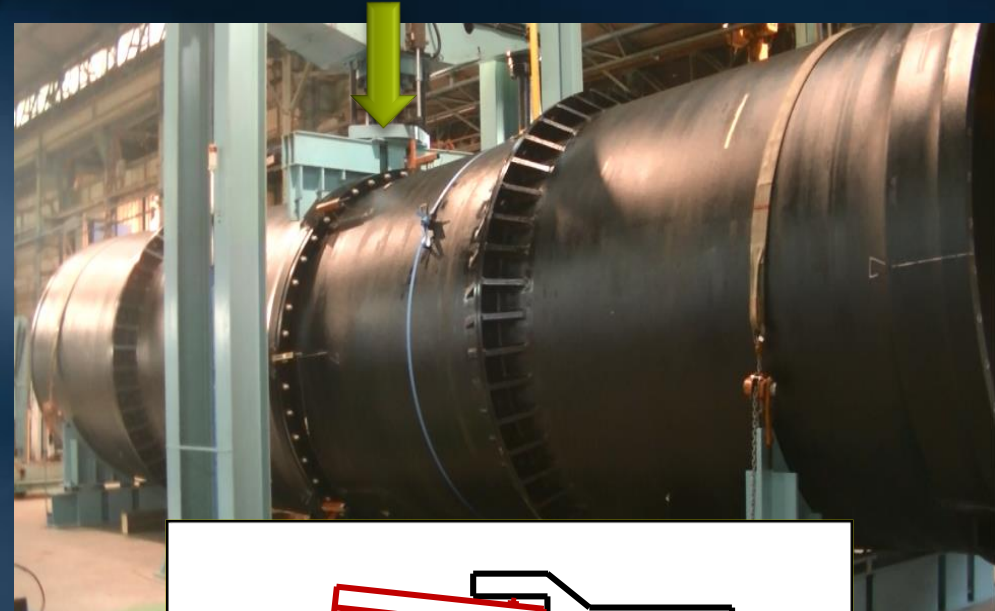


Casa Loma Siphon No. 1 Seismic Mitigation Design

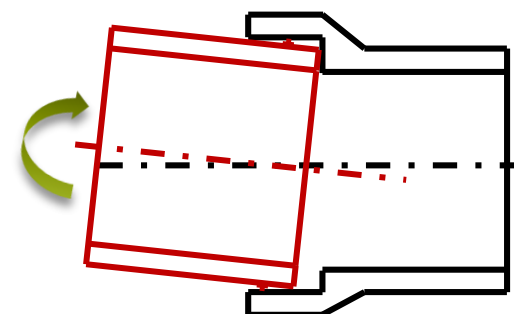


Full-Scale Testing of Large Diameter Seismic Pipe

Calibrate Model w/ Test Data



Initial position



Final deflection angle = 4.3 degrees

Project Implementation

Project Timing

- Welded Steel Pipe Procurement: Completed
- ERDIP Procurement: Completed
- Final Design: Late 2021
- Construction: Mid 2022



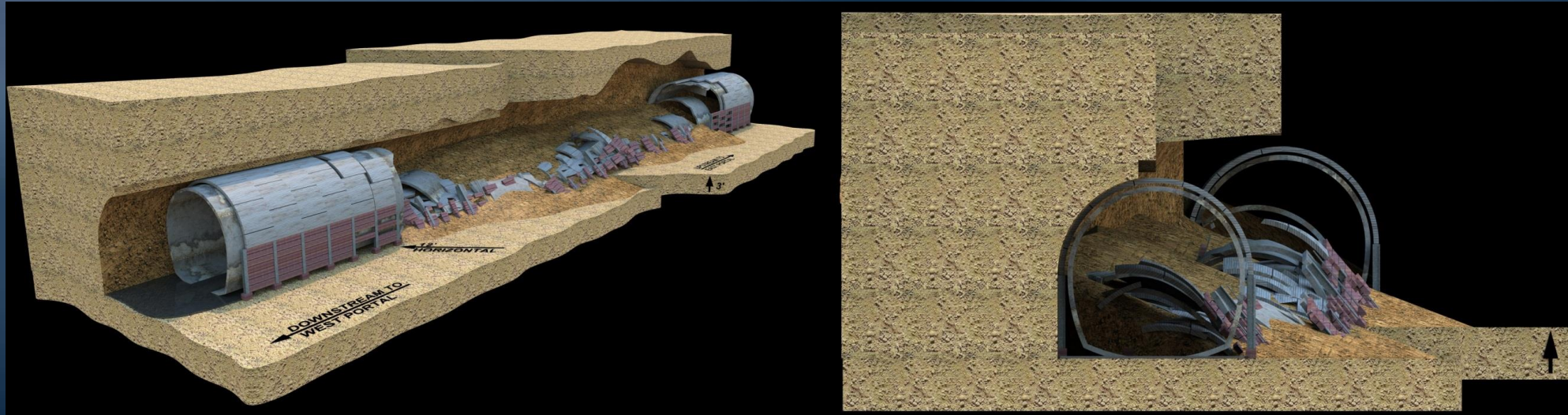
Earthquake Resistant Ductile Iron Pipe (ERDIP)



Welded Steel Pipe

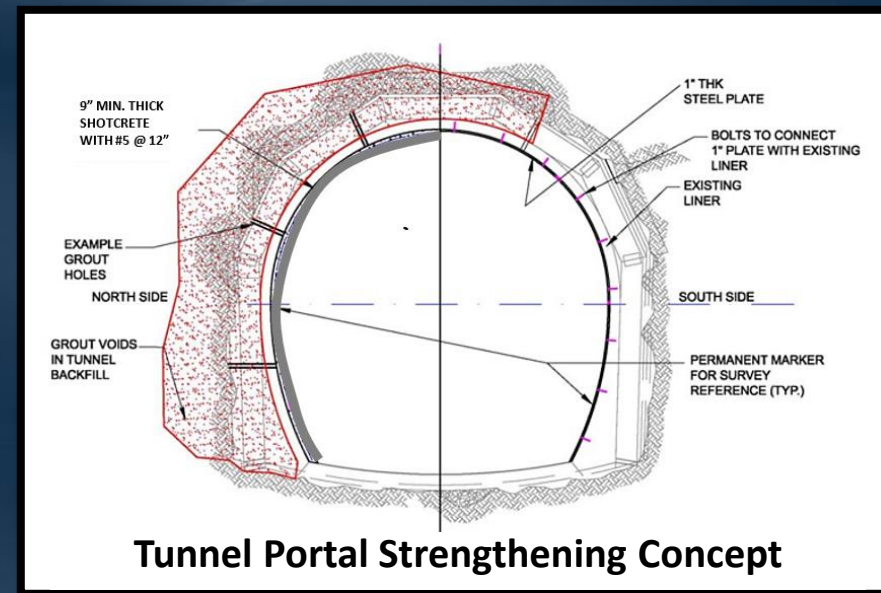
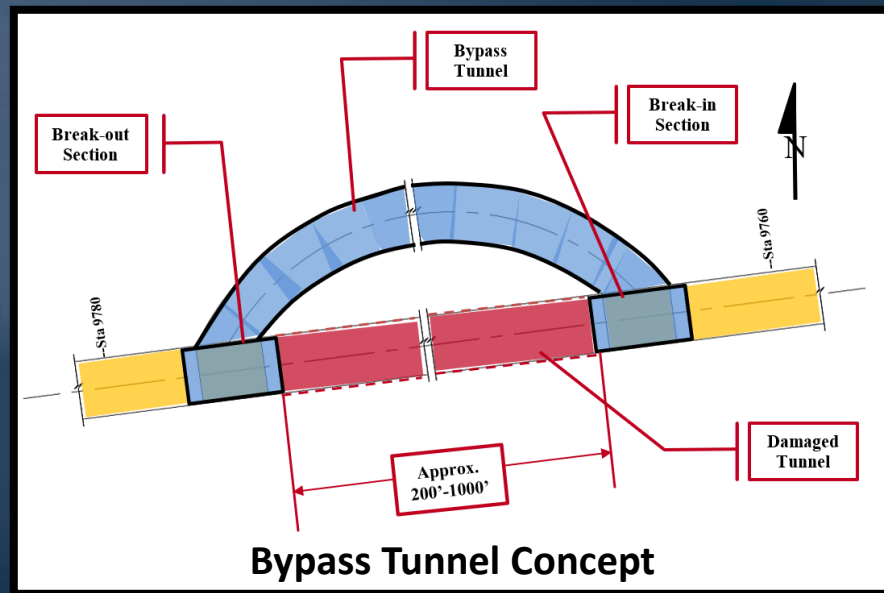
Example 3: Addressing System Vulnerabilities by Planning for Post-event Restoration (CRA Tunnel Restoration)

- CRA Whitewater Tunnel No. 2 at the San Andreas Fault could see up to:
 - 3-ft vertical displacement
 - 12-ft horizontal displacement
- Completed study to identify methods to decrease potential outage duration



Proposed Mitigation Strategies

- Pre-qualify tunnel contractors
- Pre-design of bypass tunnel
- Stockpiling of key repair materials
- Evaluate and strengthen vulnerable regions of the tunnel portals



Conclusion/Next Steps

- Metropolitan's system is unique
- Recent advancements expands the application of innovative solutions to large diameter pipelines and tunnels
- Metropolitan has become a leader in designing seismic mitigation of large diameter pipelines
- Metropolitan will:
 - Apply the latest seismic mitigation practices on the RRWP
 - Continue to improve seismic resilience of our system





Water System Operations Manager's Report

Engineering and Operations Committee
Item 7a

July 12, 2021

Current Operational Conditions

- 2021 SWP Allocation is 5%
- SWP blend targets are 0% at Weymouth, Diemer, and Skinner plants
- CRA is at 8-pump flow
- DVL to Mills drought operation continues to perform well
- Managing storage based on WSDM principles
- June 2021 deliveries of 155 TAF were 32 TAF higher than June 2020

Celebrating National Safety Month

WSO, Safety and Regulatory Services presents
Celebrating National Safety Month

Safety is Essential

Click here for ZOOM
Passcode: 466687

Or join by phone: (213) 338-8477
Webinar ID: 939 6546 5432
Passcode: 466687

June 30, 2021

Wednesday, 11:30am - 12:15pm

This event will allow for discussion on the following topics:

- Promoting Safety at Worksites
- Presented by Trudi DesRoches, Gary Syfers, Gene Patricio
- Improved Safety Measures at Union Station
- Presented by Mike Patel

For more information email: dguillory@mwdh2o.com

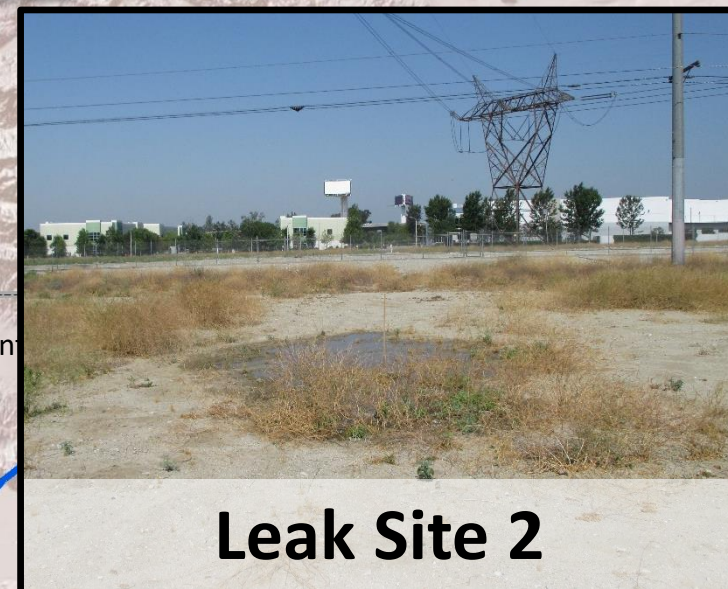
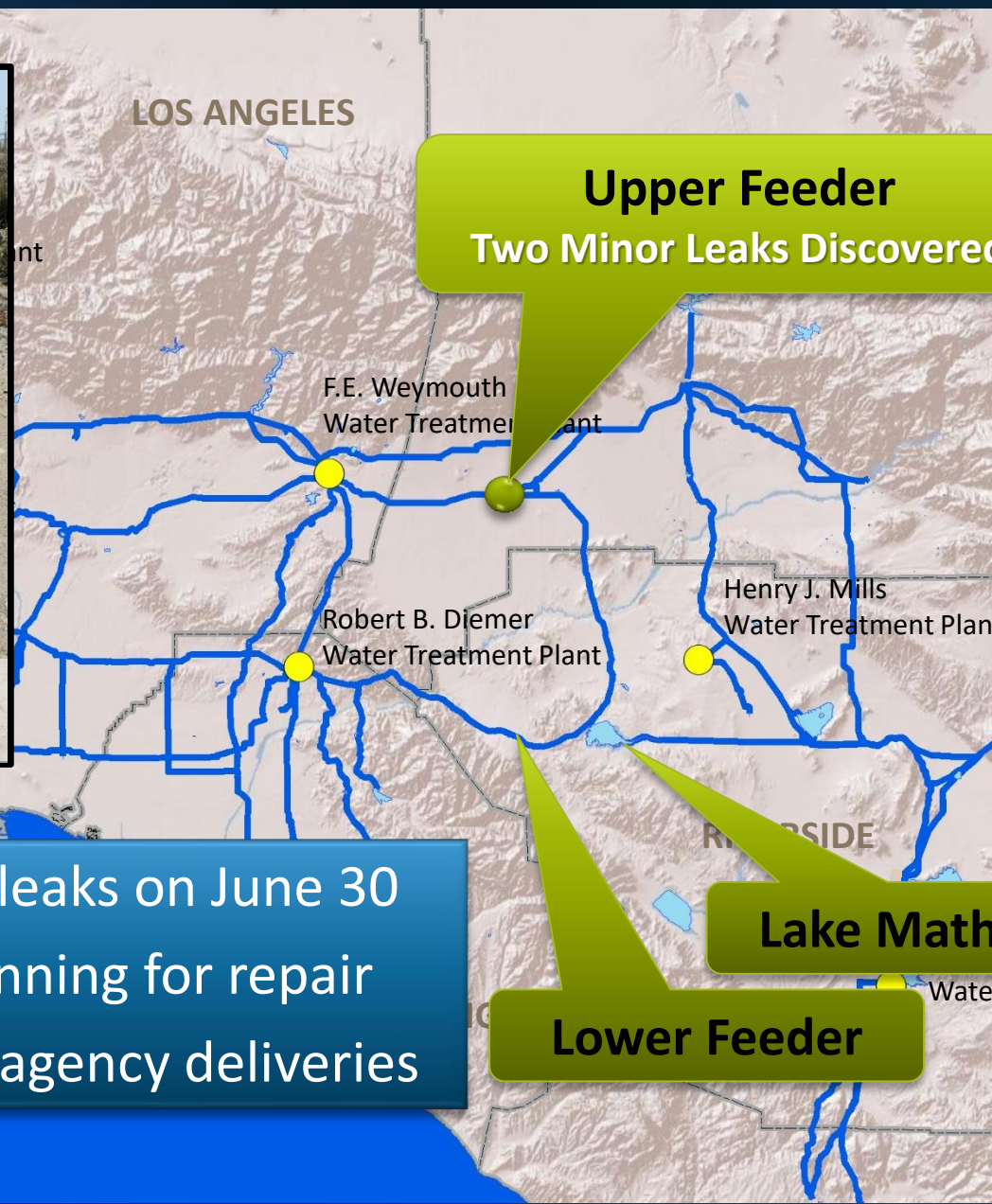
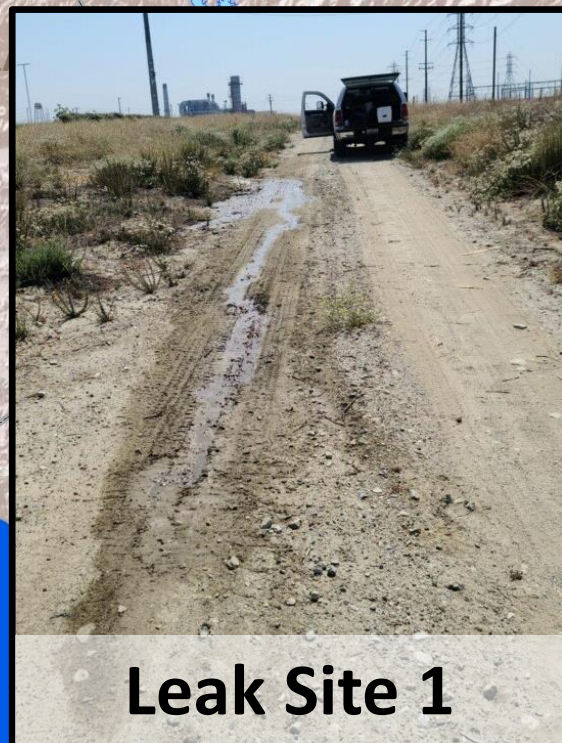
- June was National Safety Month - “Safety is Essential”
- Kickoff Memo from the General Manager
- Brown Bag Safety Webinar with invitation to all employees
- T-Shirt Design Contest
 - All participating employees receive a t-shirt with the winning design

Drought Operations Challenges



- Discovered two minor leaks on June 30
- Leak managed and planning for repair
- No impact to member agency deliveries

Drought Operations Challenges



- Discovered two minor leaks on June 30
- Leak managed and planning for repair
- No impact to member agency deliveries

Upper Feeder Leak Management Approach

Shifting Flow to the Lower Feeder Results in Spill

- Upper Feeder flow was reduced to reduce the leakage rate at both sites
- Lower Feeder flow was increased to continue delivering high flows of Colorado River water into the Central Pool
- A portion of the water spilled unexpectedly for about two hours at Corona Powerplant during the change in flow on the Lower Feeder
- No equipment or facilities were damaged and there were no safety issues, but police and fire responders temporarily evacuated a home near the path of the spill as a precaution
- External Affairs participated in the response and there was no impact to the home. Staff is performing a rapid root cause investigation of the incident

AWWA Source Magazine Editorial Award

- AWWA Source Magazine is published by the CA/NV Section quarterly
- The Editorial Award recognizes the writers of the most outstanding article of the year for the magazine
- Sepi Shirkhani from Engineering and Sergio Escalante from WSO were this year's award recipients
- Article on *Lessons Learned from Condition-Based Maintenance Program*



Spring is Awards Season *By Lynn Lipinski*

For Our Writers

The *SOURCE Magazine* Editorial Award, now in its third year, recognizes the writer or team of writers who contributed the most outstanding article to the magazine. A panel evaluated each article from 2020 on its research, readability and language, organization and overall presentation and chose a winner from three finalists.

Authors **Sepideh Shirkhani** and **Sergio Escalante**, both from Metropolitan Water District of Southern California, were this year's recipients. Their article *Lessons Learned from Condition-based Maintenance Program* (see below right) in the



Sepideh Shirkhani



Sergio Escalante





Engineering Services Manager's Report

Engineering and Operations Committee

Item 7b

July 12, 2021

Construction and Procurement Contracts

May 2021

| Construction & Procurement Contracts Through May 2021 | |
|--|--------|
| Number of Contracts at end of May 2021 | 38 |
| Total Bid Amount of Contracts in Progress at end of May 2021 | \$387M |
| Contracts Awarded in May 2021 | 1 |
| Contracts With Notice To Proceed Issued in May 2021 | 0 |
| Contracts Completed in May 2021 | 6 |
| Contract Gross Earnings in May 2021 | \$5.6M |

Diemer West Basin and Filter Building Rehabilitation

- Contract Amount:
 - \$38,539,196
- Contractor:
 - Environmental Const. Inc
- Anticipated Completion Date:
 - July 2021



Diemer West Basin and Filter Building Rehabilitation



Completed rehabilitations to treatment basins and filter pipe galleries

Second Lower Feeder PCCP Rehabilitation – Conical Plug Valve Procurement

- Contract Amount:
 - \$23,750,060
- Vendor:
 - Ebara Corporation
- Anticipated Completion Date:
 - June 2023



Second Lower Feeder PCCP Rehabilitation – Conical Plug Valve Procurement



48-inch valve fabrication and packaging prior to shipment

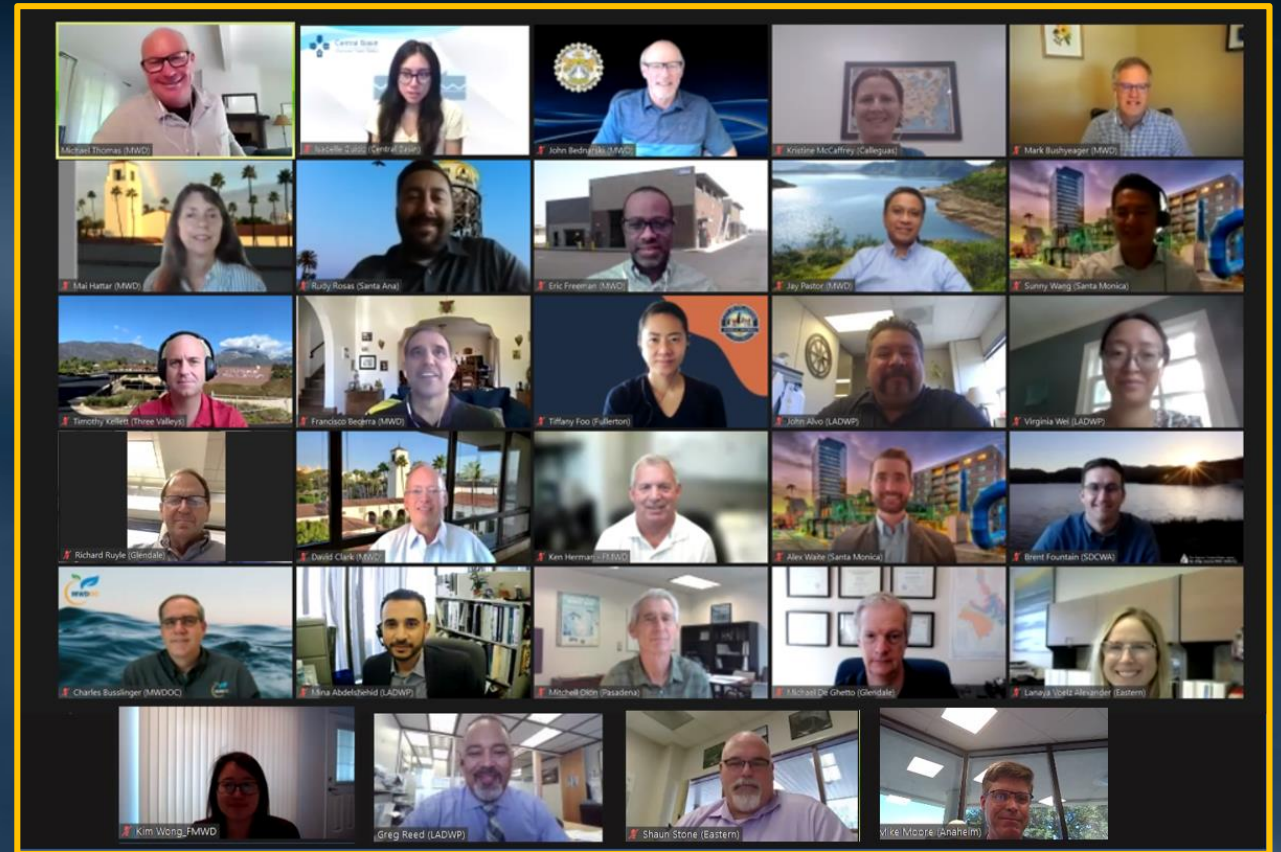
Second Lower Feeder PCCP Rehabilitation – Conical Plug Valve Procurement



Valve delivery at storage at La Verne warehouse

2021 Member Agency Engineering Managers Forum

- Co-hosted by:
 - Calleguas Municipal Water District
- Theme:
 - Challenges and Innovations
- Conducted on:
 - June 24, 2021
- 41 attendees:
 - Representing 17 Member Agencies



ASCE Region 9 Award Water & Wastewater Project of the Year June 24, 2021

Metropolitan Water District of Southern California Regional Recycled Water Program

Advanced Purification Center



