



Landslide Updates

Redwood Blvd &
Loma Alta

April 4, 2023



Redwood Blvd Landslide

1. Initial Incident Report – March 21, 2023
2. Threat Assessment
3. Water Utility Response
4. Current Conditions
5. Next Steps
6. Root Cause Analysis

Redwood Blvd Landslide – March 21, 2023



Map data ©2023 1 mi

Redwood Blvd Landslide – Initial Assessment



Image from San Francisco Chronicle



Image from Marin Municipal Water District

Redwood Blvd Landslide – Initial Assessment



Images from Marin Municipal Water District

Redwood Blvd Slide – Initial Assessment



Images from Marin Municipal Water District

Redwood Blvd Landslide – Threat Assessment

Within the slide...

Two PG&E high pressure gas pipelines along the top portion of the slide area

Estimated six foot deflection on one gas pipeline. Pressure lowered from 430psi to 60psi on impacted gas line

Electrical power lines in slide area de-energized.

30" North Marin Aqueduct at the toe of the slide, east of frontage road. Aqueduct isolated and secured as a precaution to reduce risk of potential water disruptions and flooding of highway 101



Image from Marin Independent Journal

Redwood Blvd Slide – Initial Water Utility Response

- Isolation of Kastania and Ignacio Pump Station and chemical feed
- Utilization of Stafford Lake for primary water supply for NMWD
- Pressure testing of isolated section of North Marin Aqueduct
- Flow testing of aqueduct at 4000gpm for 1.2 MG. No leaks reported.
- Field visits for identification of piping requirements for established intertie sites between NMWD/MMWD

Redwood Blvd Landslide – Current Conditions



Images from Marin Municipal Water District
Licensed Drone Operators

Redwood Blvd Landslide – Current Conditions



Image from Marin Municipal Water District Licensed Drone Operators

Redwood Blvd Slide – Water Utility Next Steps

- Caltrans estimates slide repair to take months
- NMWD developing 30-day and 6-month operation plans
- Upcoming internal ROV inspection to rule out pipe deflection
- Continued monitoring of pipeline pressures and performing flow tests
- Current expectations are that North Marin Aqueduct could be placed back in service in a limited way
- Preparing material specifications for potential North Marin Aqueduct bypass
- Standing Meetings with Novato Fire, Novato, NMWD, and MMWD
- Future meetings with Sonoma County Water Agency

Redwood Blvd Slide – Root Cause Analysis

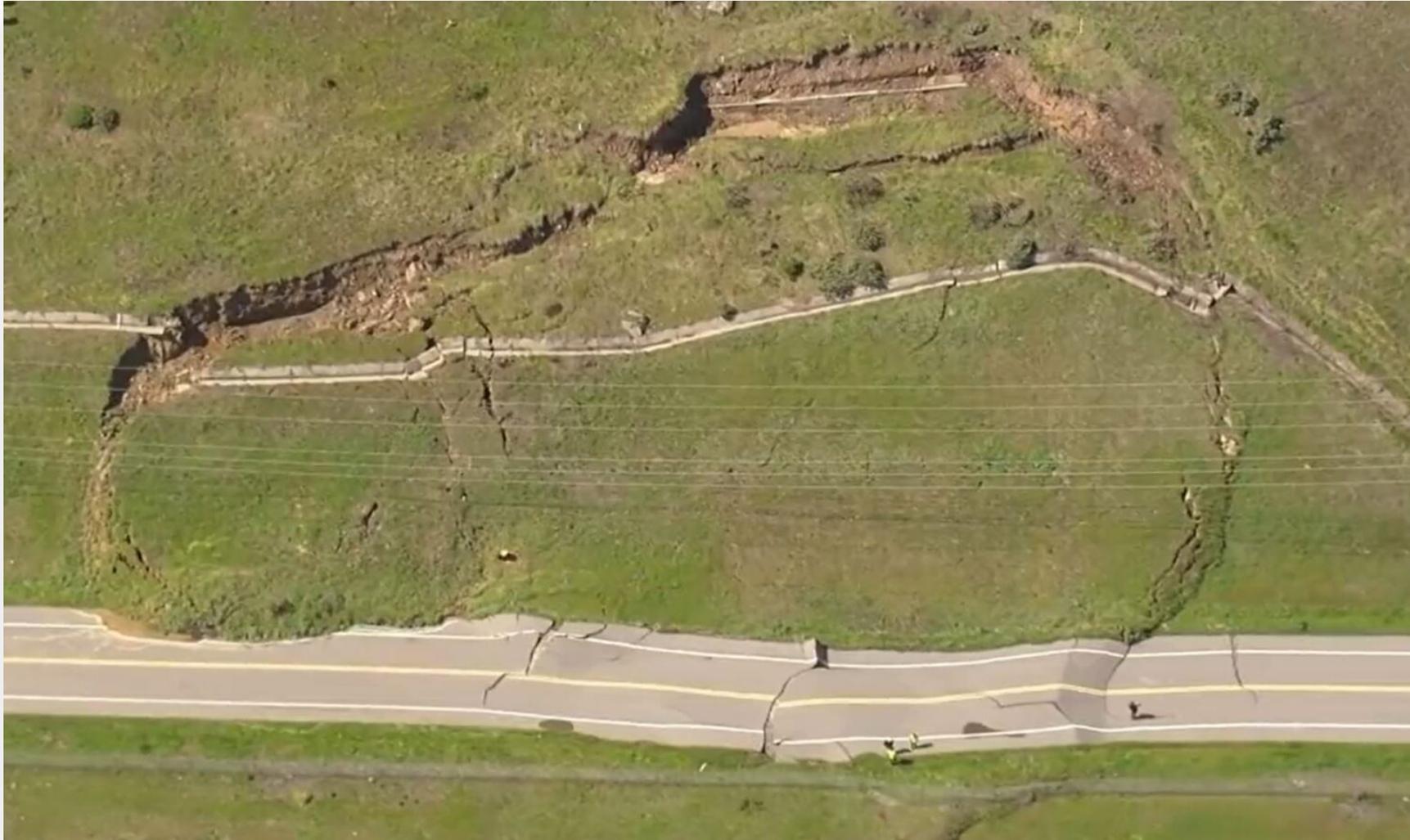
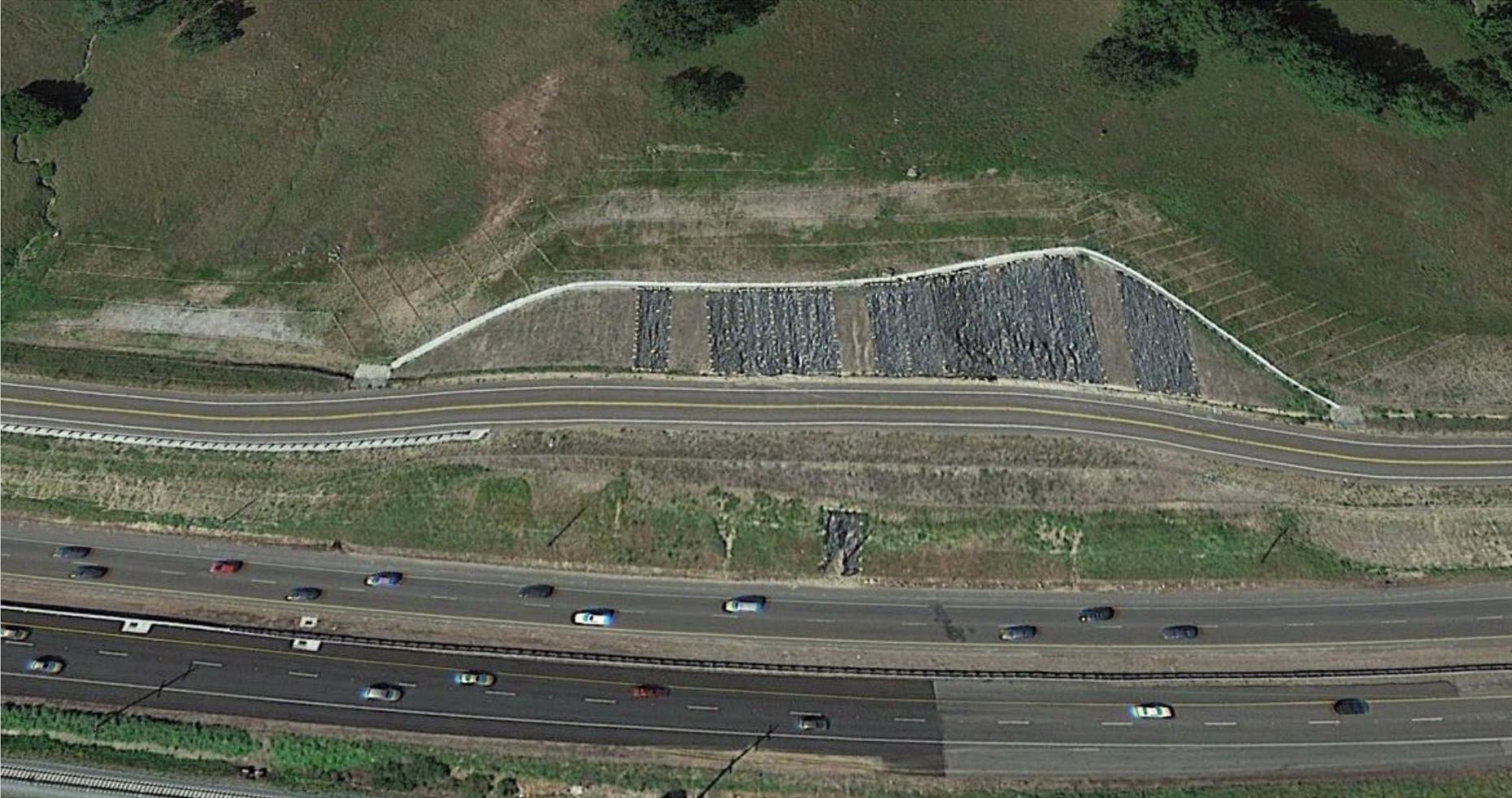


Image from NBC News, KTVU SkyRanger

Redwood Blvd – Root Cause Analysis

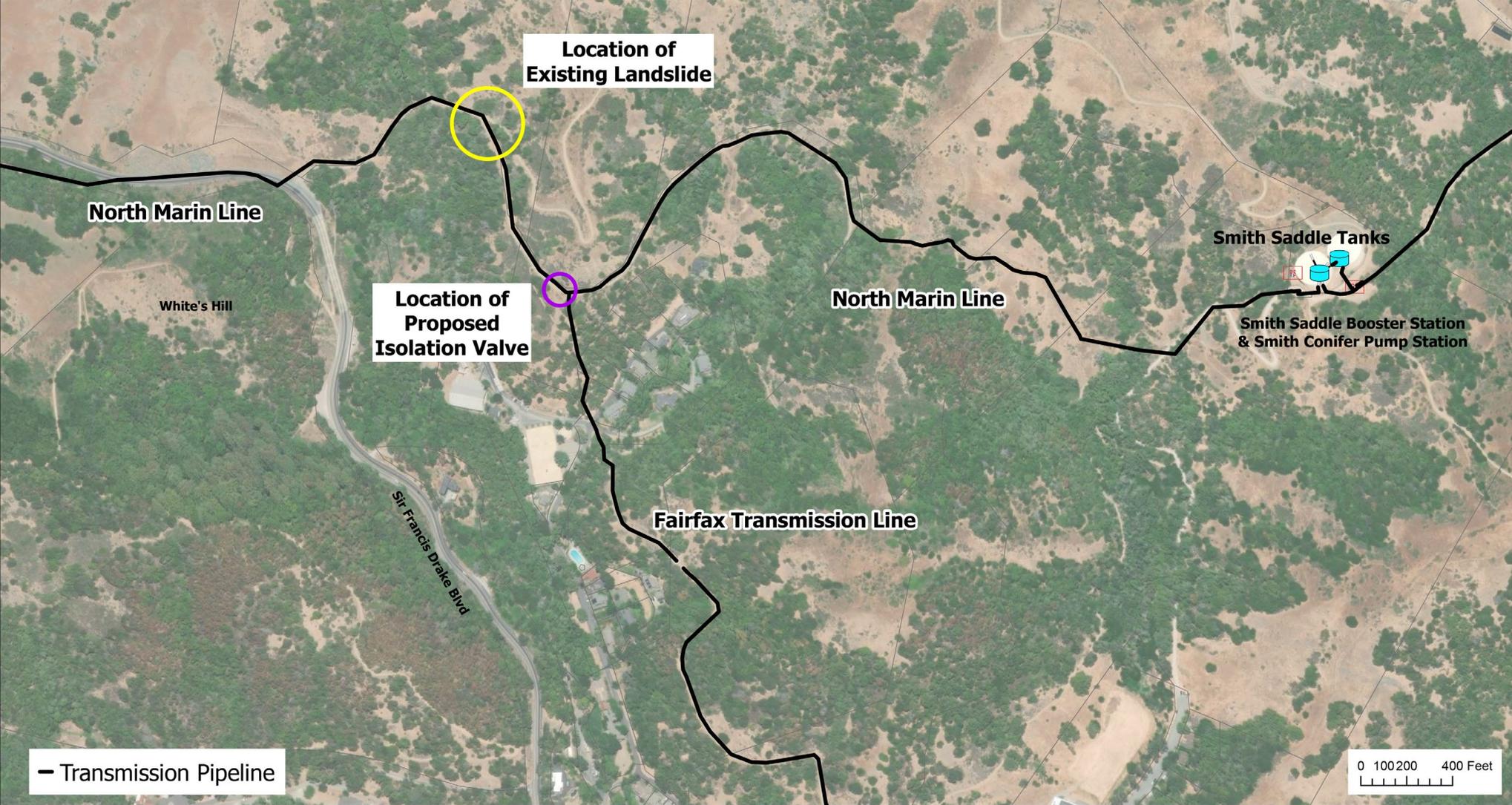


Google Earth Image from 2015 frontage road construction

Loma Alta Landslide

1. Initial Incident Report - Jan 17, 2023
2. Threat Assessment/Water Utility Response
3. Changing Condition - March 21, 2023
4. Water Utility Response
5. Next Steps

Loma Alta Slide – January 17, 2023



Loma Alta Landslide – Initial Assessment, Jan. 2023



Loma Alta Landslide – Initial Response



Loma Alta – Coordination with MCOSD Under Non-Emergency Conditions

- MMWD to lead surveying, geotech borings, and retaining wall design to ensure design meets district standards and there are no impacts to the pipeline from construction
- MCOSD to take the lead on bidding and construction of retaining wall as lead agency under CEQA

Loma Alta Landslide – Changing Conditions, March 21, 2023



Loma Alta Landslide – Changing Conditions

Monument Point (Typical)

North Marin Line - 27"
Concrete Cylinder Pipeline

Culvert



Loma Alta Landslide –MMWD Response to Changing Conditions



- Installed monuments for monitoring slide movement .
- Submitted Request for Public Assistance with FEMA.
- Dispatched leak detection team for audio leak monitoring which will be ongoing.
- Coordinated with MCOSD: If pipeline becomes compromised, MMWD to take the lead on construction under emergency declaration.
- Pulled as-builts drawings and began design for potential bypass and installation of isolation valve. Confirmed inventory on 1-24” butterfly valve, 24” welded steel pipe, and 45° bends. Preparing materials specifications for valve coupling and reducer couplings.

Loma Alta Landslide – Current Conditions, Monday April 3rd, 2023



Loma Alta Landslide –Next Steps

- MCOSD scheduled to remove tarps on Monday April 3 to allow for survey work to begin by MMWD on-call land surveyor
- Boring rig scheduled for geotechnical analysis next Thursday and Friday
- Meeting with assigned FEMA Program Delivery Manager on April 4 for initial impact assessment
- Operations to excavate pipeline to confirm OD for material specifications
- Expedite landslide repair design, potential bypass design, and future installation of isolation valves at Fairfax Transmission Main connection. Ordering two additional 24” butterfly valves and couplings for long term operational flexibility.