

Pennsylvania Ave. Water Main Break

CASE STUDY

Consequences of pipeline failure of an 8-inch water main on the 4700 & 4800 Blocks of Pennsylvania Ave.

BACKGROUND

On August 4, 2019, CVWD experienced a major water main break on an existing 8-inch pipeline on Pennsylvania Ave. between El Caminito Street and Stevens Street that was installed in 1946. The water main break started about 2:00 am and water from the pipeline was isolated by 8:00 am. As a result of the water main break:



- 925,000 gallons of water was lost
- 15 homes were without water
- Damage to the plumbing at house near main break.
- Excessive damage to the pavement on Pennsylvania Ave from El Caminito Street to Fairesta Ave.
- Road closure of a portion of the street to traffic
- Increased paving costs as Pennsylvania Ave. was recently repaved by the City of Glendale and there was a five-year moratorium for new construction on the street

CHALLENGE

CVWD was faced with the challenge of restoring the street to thru traffic while at the same time repairing a large section of existing pipeline. There were two approaches to tackling the repair of the pipeline. Either repair the pipe in place or replace the existing pipeline, which was over 70 years old, with a new pipeline in an emergency situation. In addition, the pavement on Pennsylvania Ave. would have to be repaired as soon as possible to open the roadway to traffic.

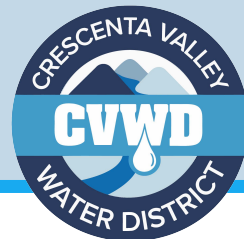
- Field crews repaired the leak with a repair clamp to restore water service in the area. However, there were additional leaks on the pipeline that were revealed when water was being restored.
- The condition and age of the pipeline warranted its replacement in this emergency situation and CVWD could take advantage of replacing the pipe during the pavement restoration.
- CVWD would have to repair about 23,000 SF of pavement to get the roadway back into condition for normal traffic on Pennsylvania Ave.

SOLUTION

CVWD worked with Los Angeles County and City of Glendale personnel to determine the extent of pavement area that would need to be replaced in the short-term. CVWD contracted with a paving construction contractor to repair the roadway.

Pennsylvania Ave. was repaved and repaired within two weeks after the event and traffic was returned to normal. In addition, CVWD coordinated the pavement work with the start of the 2019-20 school year and provided detour routes for dropping off school children.





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SOLUTION (Continued)

CVWD staff prepared plans and specifications for replacement of 850 feet of pipeline, met with contractors for quotes and coordinated with Los Angeles County and City of Glendale within a month after the event. Construction began in October 2019 and was completed in 30 days, which included removal of a portion of the existing pipeline to reuse the existing alignment. There were three (3) water services that were replaced and these people were back to full service within the 30 days.

BENEFITS

The benefit to the District and the community was that CVWD has the ability to respond and react to a major water main break and complete the project within a three month period. However, this event should be seen as a one-time occurrence and not be seen as a normal way to do business as CVWD's pipeline infrastructure deteriorates over time.

The overall cost for emergency pipeline replacement of the pipeline as shown below resulted in a cost of \$914 per foot of pipeline replaced:

Description	Amount
CVWD - Labor, Equipment & Material Cost	\$17,000
Temporary Steet Repair and Traffic Control	\$8,633
AC Pavement Restoration - Phase 1	\$306,537
Personal Property Replacement	\$3,750
Pipeline Replacement Cost	\$325,605
AC Pavement Restoration - Phase 2	\$115,000
Total Cost	\$776,525
Cost per LF - 850 LF	\$914

As compared to the cost for a typical pipeline replacement as part of the CIP program that show a \$364 per foot of pipeline replaced as shown below:

Description	Amount
Pothole Utility Crossings	\$2,750
Excavation and Backfill	\$80,100
Trench Resurfacing	\$26,700
Remove Existing 8-inch pipeline	\$8,925
8" CML & CMC Steel Pipe - 850 LF	\$57,750
8" Line-Stop Gate Valve	\$10,000
1-inch Water Services	\$6,000
Traffic Control	\$12,475
Subtotal	\$204,700
Contingency - 20%	\$40,940
Total Construction	\$245,640
Total Materials	\$32,000
Soils Eng	\$5,400
Engineering/Permits	\$26,000
Total Construction	\$309,040
Contractor Cost/LF	\$289
Total Cost/LF	\$364

SUMMARY

This case study gives a great demonstration of the significance of deferring maintenance until there is a pipeline main break taking place instead of properly planning for pipeline replacement. As shown about, the overall replacement cost during an emergency situation could be at least three times as much as a typically pipeline replacement. As the District moves forward addressing the issue of aging infrastructure, we can reflect on this case study to show the consequence of delaying the replacement of pipeline over a 200-year period.

RESULTS

The results of this event are an example of what happens if a pipeline reaches the end of its useful life and starts leaking. Typically, a steel pipeline has a life expectancy of 75 years before the pipeline will experience leaks due to metal fatigue and corrosion. This main break showed that an unplanned event has a high probability of resulting in higher costs including pipeline repair under emergency conditions; replacement of the damaged public right-of-way and possible damage to personal property.

