HOW A SUCCESSFUL PROJECT WOUND UP IN COURT

(A CASE STUDY OF THE MAGNOLIA FORCE MAINS RELOCATION PROJECT)

Presented at the Northern California Pipe Users Group

Sharing Technologies Seminar

February 13, 2025

MOTT MACDONALD

Today's Presenters

Patrick Fuss, PE

- the City of Healdsburg project manager for this project

MOTT MACDONALD

Justin Lianides, PE, GE

- the project manager for the design consultant, Mott MacDonald, on this project

It was all going so well…..

The week of 09/30/2019…

- I was on vacation.
- The microtunnel under Dry Creek was progressing
- All was good!

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

And then I returned from vacation…

The week of 10/07/2019…

- The MTBM stopped after 200 feet of the 300 foot bore path
- Alternative measures were needed!

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

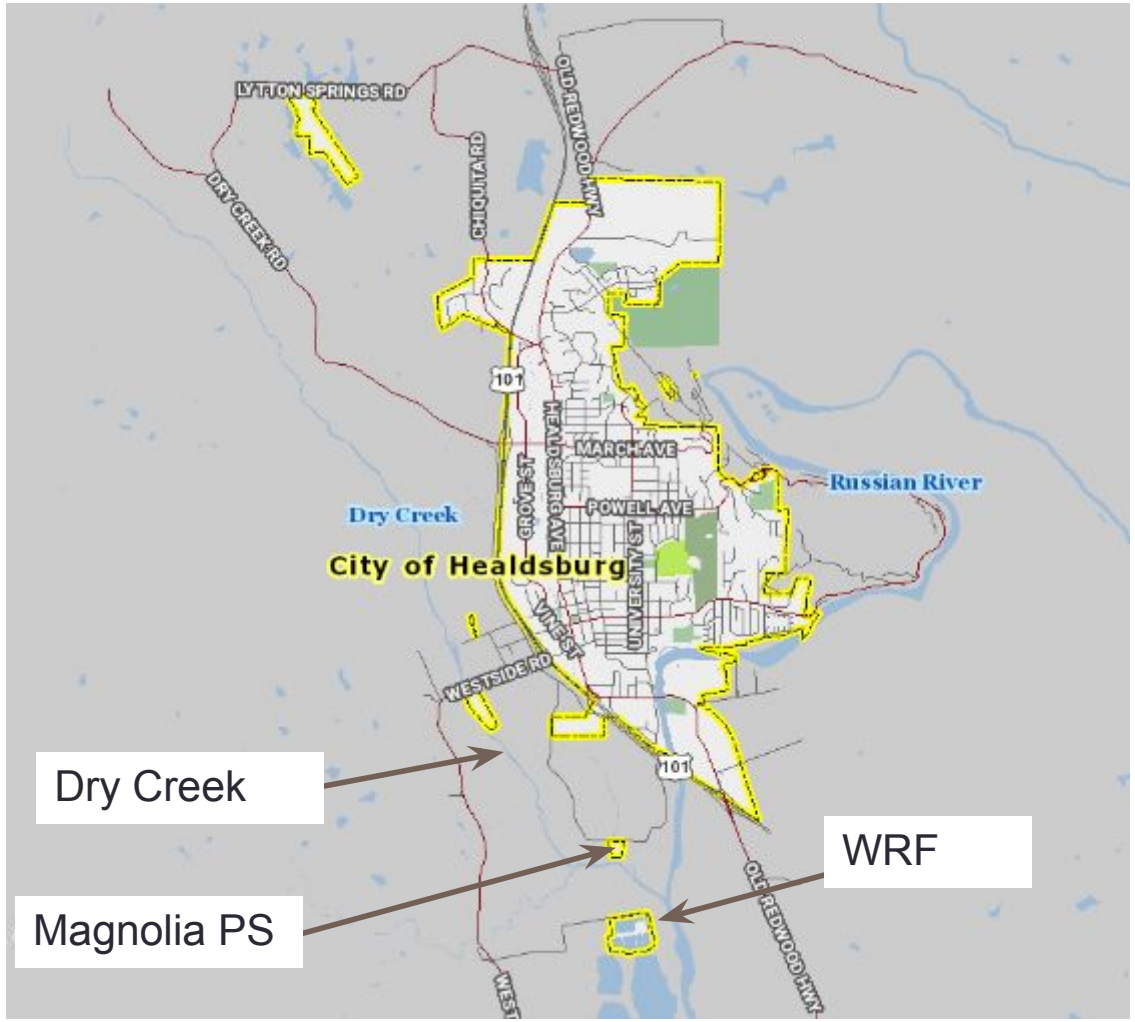
In this presentation, we will show you

- Why the Magnolia Force Mains Relocation Project was necessary
- What was the project as designed
- What happened during construction from both the City and Contractor perspectives
- How the court resolved the dispute
- Lessons learned

MOTT MACDONALD

Background

- The Magnolia Pump Station was constructed in the 1970's
- All of the wastewater from the City flows through the Magnolia Pump Station and its force mains
- A second force main was added in the 1980s



CITY OF HEALDSBURG
CALIFORNIA
SINCE 1867

MOTT MACDONALD

Background

- The original FMs were open-cut constructed prior to Warm Springs Dam.

- During RW bridge construction in 2014, one of the force mains was observed to be exposed.

Exposed pipeline at streambed is vulnerable to damage and corrosion.

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Background

- Reconstructing the force main using open-cut is not possible because of flow year round

- Bridge crossing over the creek is possible with new bridge, but has on-going maintenance and reliability issues

Dry Creek level rises routinely making an aerial crossing vulnerable to damage from floating debris

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Background

- City engaged Northwest Hydraulic Consultants to establish a reasonable scout depth
- Scour depth was established at approx. 27 feet below streambed to protect against scour

DRY CREEK SCOUR ANALYSIS UPDATE

Prepared for:

The City of Healdsburg, Healdsburg, CA

25 July 2017

nhc
northwest hydraulic consultants

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Background

- City also engaged Miller Pacific Engineering Group to determine if a trenchless crossing of Dry Creek was feasible.
- Trenchless construction using horizontal directional drilling and microtunneling were both identified as feasible

MILLER PACIFIC ENGINEERING GROUP

December 9, 2016
File: 2363.001trans.doc

City of Healdsburg Utilities Department
401 Grove Street
Healdsburg, California 95448-4723

Attn: Mr. Patrick Fuss, PE, Principal Water/Wastewater Engineer

Re: Evaluation of Conceptual Trenchless Crossing at Dry Creek
City of Healdsburg Magnolia Force Main Relocation
Healdsburg, California

Dear Mr. Fuss,

We are pleased to submit our evaluation of conceptual trenchless crossing alternatives for the relocation of the City of Healdsburg's Magnolia Force Main. The project will include relocating two existing 14-inch-diameter force mains that cross Dry Creek from the existing pump station at Magnolia Drive. The City is considering relocating the pipelines with either a bridge-mounted, aerial crossing over the creek or a trenchless undercrossing below the scour zone of the stream bed. The primary purpose of our evaluation is to assess if a trenchless undercrossing of Dry Creek is feasible and cost effective as compared with a bridge-mounted crossing which was prepared previously by others.

We appreciate the opportunity to work with the City of Healdsburg on this project. Please contact us if you have any questions regarding this report.

Very truly yours,
MILLER PACIFIC ENGINEERING GROUP

Rusty Arend
Geotechnical Engineer No. 3031
(Expires 6/30/17)

Scott Stephens
Geotechnical Engineer No. 2398
(Expires 6/30/17)

504 Redwood Boulevard, Suite 220 ■ Novato, California 94947 ■ T (415) 382-3444 F (415) 382-3450

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

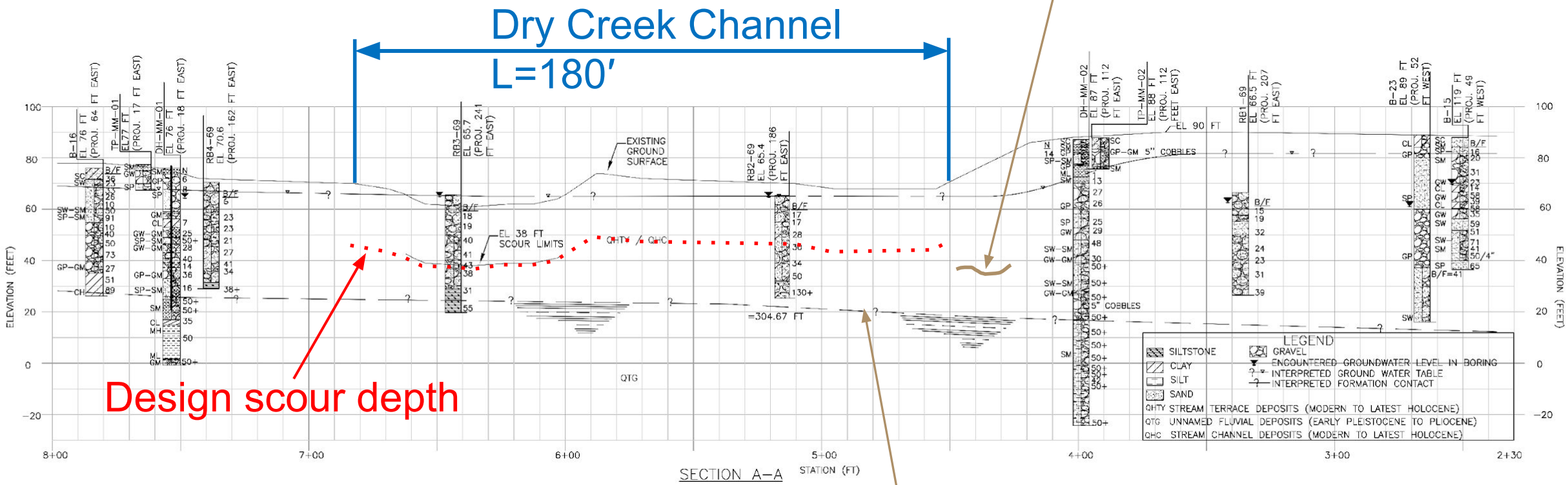
Site Overview

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Subsurface cross-section

Stream terrace deposits, (gravels and sands with trace cobbles)



Top of older fluvial deposits (silty sands, lean clays, elastic silts)

CITY OF HEALDSBURG

MOTT MACDONALD

Geotechnical Risks

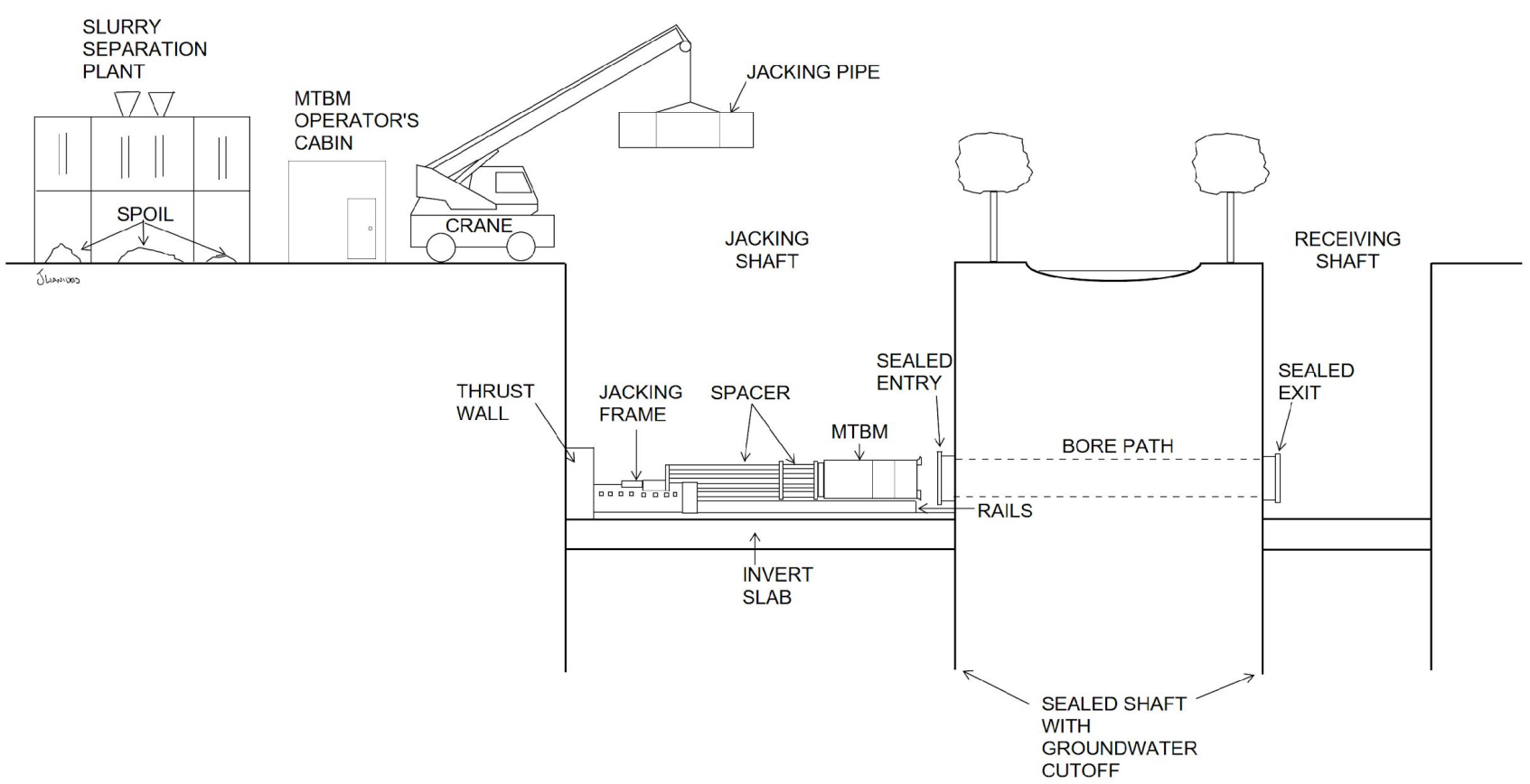
- Gravels and Cobbles
- Mixed-face ground conditions
- Flowing ground conditions
- Cutterhead clogging
- Abrasive soils
- Obstructions during tunneling
- High groundwater table

Contract documents included:

- **Interpretive subsurface profile**
- **Description of soils**
- **Discussion of raveling, running, and flowing ground behavior**
- **Acceptable shoring systems**
- **Specified trenchless method**

Trenchless Method Selection

- Risk factors:
  - Higher risk with horizontal direction drilling
  - Lower risk with microtunneling, includes more specialized work.
- Microtunneling selected.



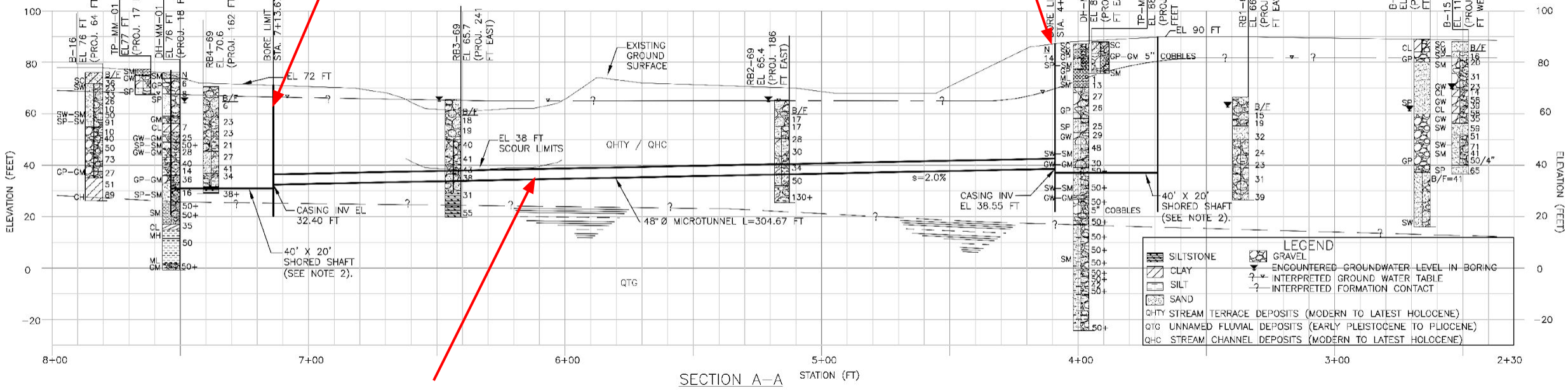
Microtunneling Diagram

MOTT MACDONALD

Selected Profile

52 ft deep retrieval shaft

40 ft deep jacking shaft



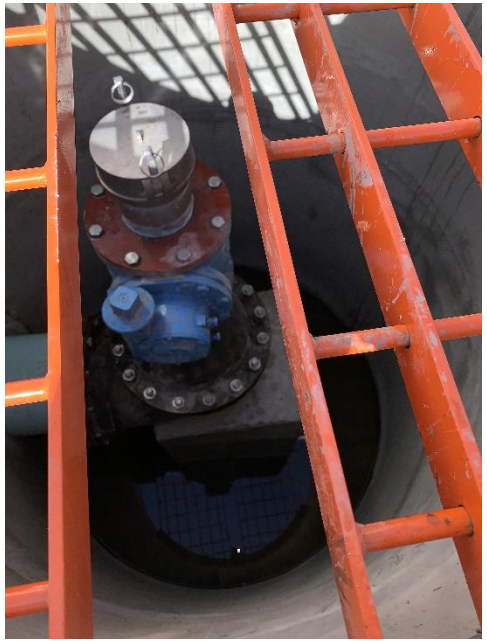
Microtunneled casing
Below scour zone within native gravels and sands
48″ dia, L = 305′

Open-Cut Construction

This project included

- 1,400 ft of open trench construction
- Ten valving structures

All constructed without a hitch!



Shaft Construction

- Watertight shoring using interlocking sheet piles and internal bracing
- Ground improvement at MTBM launch and retrieval areas using compaction grouting techniques

Microtunnel jacking pit

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Submitted MTBM Capabilities

The UNCLEMOLE, Iseki's flagship machine, was developed as a micro and medium diameter tunneling system which will cope with the widest range of soil conditions from soft clay through silts, gravels and rock with or without ground water with the same cutter head. More UNCLEMOLES have been manufactured than any other tunneling machine in the world.

What distinguishes the UNCLEMOLE from other shields is its patented cone-shaped crusher, driven by an epicyclical gear. This gearing produces very high torque and an eccentric rotation of the cone. The rotation crushes excavated material (including cobbles/boulders up to 30% of the machine diameter) between the cone and outer body of the shield. As the shield is pushed forward, the soil is compacted into the face of the machine, where the cone then crushes the soil and forces it through the throat of the shield and into a slurry chamber.

-Iseki, Inc.

MTBM Preparations for Launch

- Ø48″ Iseki Unclemole TCC 1000
- No automated recordkeeping (spec variance)

MTBM Launch Take

Removing sheet pile at entry

~60 cy of wet gravel enters entry point

MTBM thrusted into opening

Outcome:

- Ground-pretreatment determined ineffective
- 13 days lost

MTBM Launch Take 2

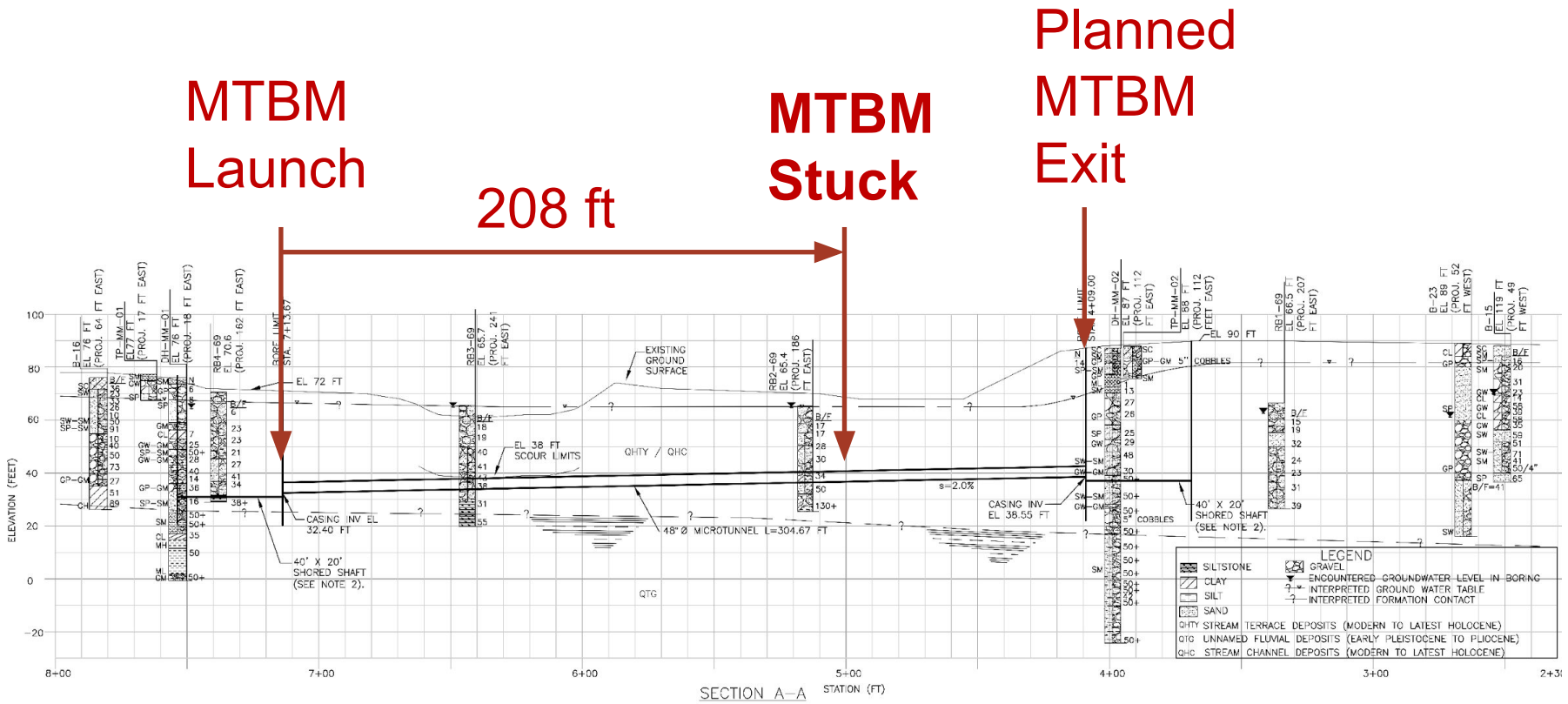
However, seal leakage issues and water sprays MTBM components

Outcome:

- MTBM advances 5 feet then stops because of motor issues.
- Motor rewound and reinstalled
- 8 days lost

MTBM Launch Take 3

- Mined 200 feet over 4 days.
- Machine gets stuck. No cutterhead rotation after encountering difficult zone and max torque.
- Pulled machine back 1.3 feet and still no luck rotating cutterhead.



MTBM Rescue

- A rescue trench was constructed and the MTBM pushed under water to the receiving shaft.

- Retrieval of the machine in the wet (diver work).

The Contractor's Claim

- Clearly, the effort to construct the rescue trench and complete the drive added costs to the Work
- Contractor claimed $816k for the rescue work and repairs to the MTBM
- Contractor claimed that "only mechanical failure of the gearbox or a differing site condition" (i.e., a steel object) could have stopped the advancement of the tunnel

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

City Response to the Claim

- While there is evidence of the MTBM being damaged, there is no evidence of when the damaged occurred (it was all internal damage), no evidence as to what caused the damage, and no evidence that the damage caused the stoppage.
- No metal parts were pulled from the rescue trench
- No foreign metal was found in the crushing chamber

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

City Response to the Claim

- Per Section 02623.3.3.B.2

  "The proposal of alternative methods for removing, clearing, or otherwise making it possible for the microtunneling equipment to progress past an object that does not allow for the direct observation and measurement of the object shall not be considered for additional payment."

  The additional work and damage to the machine were not shown to be caused by a differing site condition.

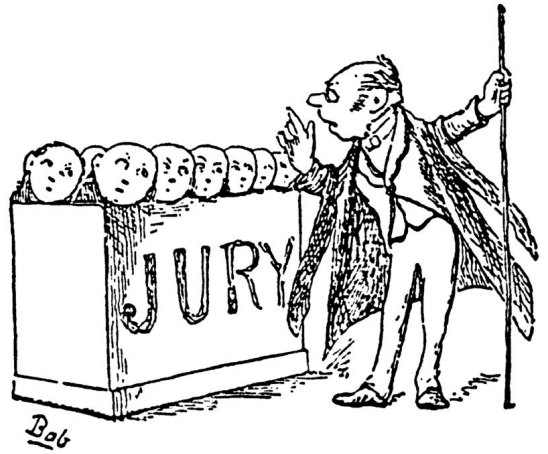
- The Contractor's claim was denied.

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

Claim Turns Into Lawsuit

- Contractor engaged an attorney and filed Notice of Intent for a Lawsuit
- Contractor and City participate in mediation – not fruitful
- Both sides presented testimony of involved parties and experts to a jury



CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

What was contended

Contractor	City
The machine was stopped by metal object(s)	No object was found

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

What was contended

Contractor	City
The metal object was present and not disclosed in the contract documents	The metal could have come from Contractor's own operation

CITY OF HEALDSBURG
CALIFORNIA SINCE 1867

MOTT MACDONALD

And what did the Jury find?

- City's expectation was that burden of proof was on contractor
- Both sides expected an all or nothing decision
- Jury decided to award half the claim amount to the contractor

Contractor	City
	

Lessons Learned

- Stand by the specs. Allowing variances can weaken the owner's position.
  - Contractor's manual MTBM records were never recovered.
  - Stay in your lane – A fair bit of testimony was who came up with the recovery solution versus who had the contract obligation to come up with it.
  - Implied waiving of required visual observation of obstruction.
  - Compaction grouting techniques were permitted as a variance to jet grouting and permeation grouting. It was ineffective.

MOTT MACDONALD

Lessons Learned

- Do diagnostic testing and inspection on site. If a piece of equipment is involved in a potential claim, do not allow it to leave site until it has been thoroughly inspected and tested.
- More emphasis on Contractor's responsibility to find cause.
- Try to not leave it in the hands of the jury. It was expected that the jury would connect the dots in the testimony of the experts to find a single responsible party, however the lack of physical evidence of a DSC created enough doubt in their minds.

MOTT MACDONALD

Fin