



Keys to Success in Managing a Complicated Tunnel Project

Big Walnut Sanitary Trunk Sewer Extension, Part 6F1
City Of Columbus, OH

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Presentation Overview

- ❖ Project Overview
- ❖ Construction Management Team (CMT)
- ❖ Project Challenges
- ❖ Benefits of the CMT
- ❖ Owner and Contractor Contributions
- ❖ “Partnering”

Project Overview

- ❖ **Project Budget: \$25 Million**
 - ❖ Combination of lump sum and unit cost pay items
- ❖ **Contractor – KMM&J Joint Venture**
- ❖ **Timeline**
 - Notice to Proceed – January 2007
 - Final Completion – November 2009
- ❖ **Unique Aspect – Encountered multiple Ground Conditions utilizing same TBM**

Project Overview

Construction Management Team (CMT)

- ❖ H.R. Gray
- ❖ DLZ, Inc.
- ❖ Jenny Engineering

Owner

- ❖ City of Columbus, Division of Sewerage and Drainage

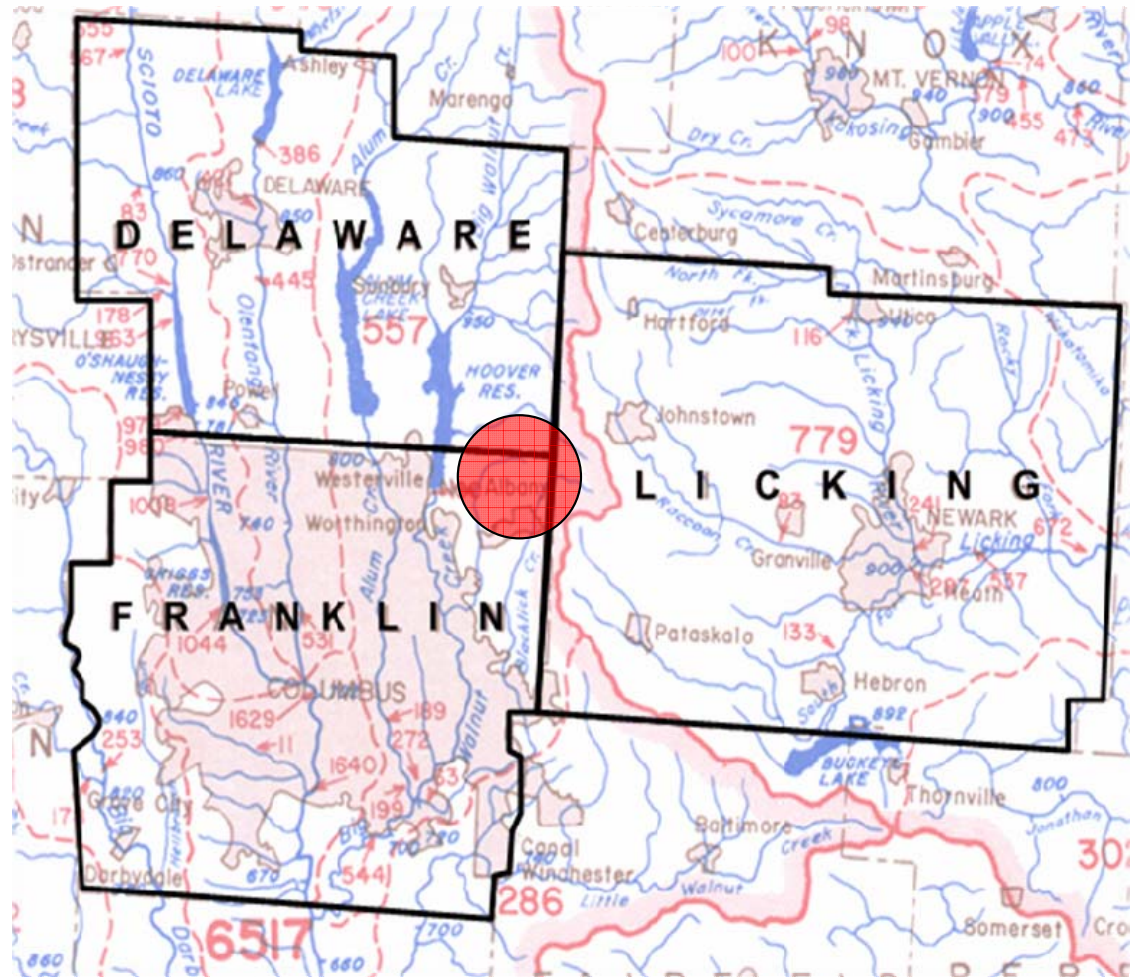
Project Overview: Location



Project Overview

Purpose:

- ❖ Provide Sanitary Service to three counties currently without service – Franklin, Licking and Delaware
- ❖ Delaware County is one of the fastest growing counties in US (census bureau)

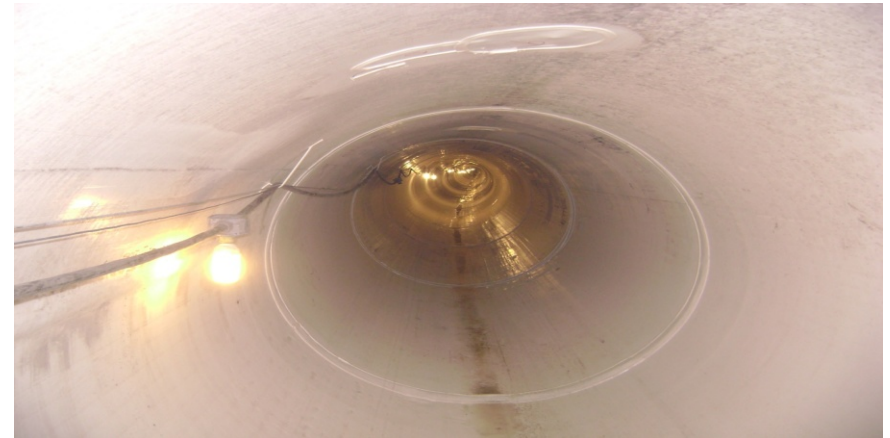


Project Overview

Installation of 10,000± lineal feet of 72" sanitary sewer tunnel using Reinforced Concrete Pipe (RCP) with PVC T-lock liner for tunnel lining



Reinforced Concrete Pipe (RCP)
T-Lock Liner



T-Lock PVC Corrosion
Protection Liner

Project Overview

Installation of five (5) access shafts/manhole structures and tangential inlet drop structure with associated deaeration chamber and appurtenances



Outfall Shaft – Tied into Existing 84-inch Sanitary Sewer



Shaft 4 Tangential Inlet – Tied into Existing 36-inch Sanitary Sewer

Project Overview

Utilized 105-inch diameter tunnel boring machine (TBM)

- ❖ 9500± linear feet of Ohio Shale
- ❖ 600± linear feet of soft ground/mixed-face conditions

TBM was a LOVAT Model RM 99/105

- ❖ Consisted of cutters, center cutters, shale rockers, front-loading “ripper” teeth and flood doors. TBM modified to perform both soft ground and rock excavation.

Project Overview

Tunnel Boring Machine



Rock



Soft Ground

Project Overview

Rock Supports



Soft Ground Support

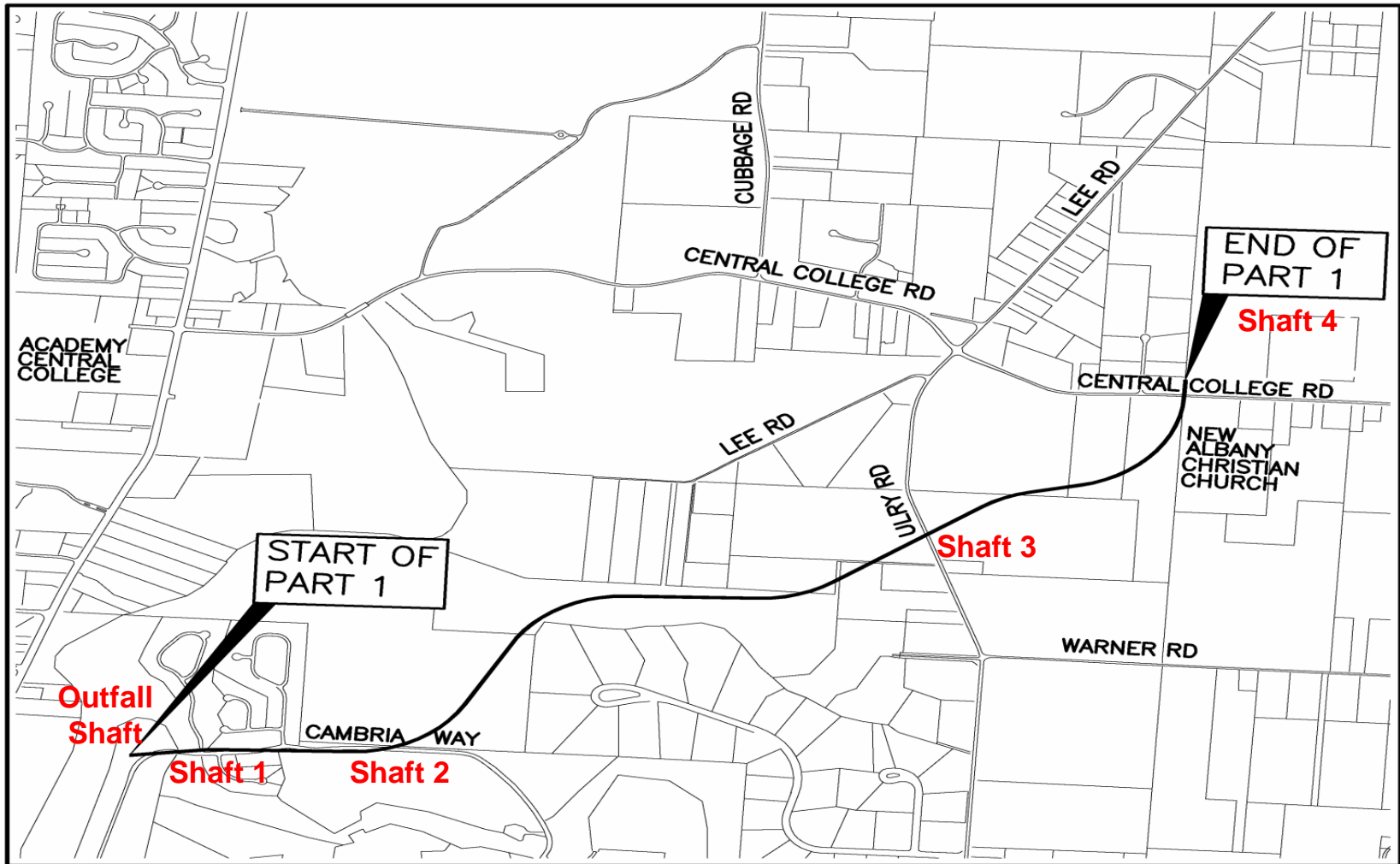


Rock Support



Project Challenges AND CMT Benefits

Project Map



LOCATION MAP

NOT TO SCALE



Project Challenges



600 If Soft Ground/Mixed Faced Conditions w/ Boulders

Launch Shaft



Contractor Means/Methods

Project Challenges



Boulders and Cobbles

Benefits of the CMT

Proactively Dealing With Claims

- ❖ Continuous review of schedule
- ❖ Knowledge of day-to-day changes/events
- ❖ Identify activities that could cause delays
- ❖ Identify activities early in process
- ❖ Excessive time on one particular activity
- ❖ Evaluate contractor means and methods

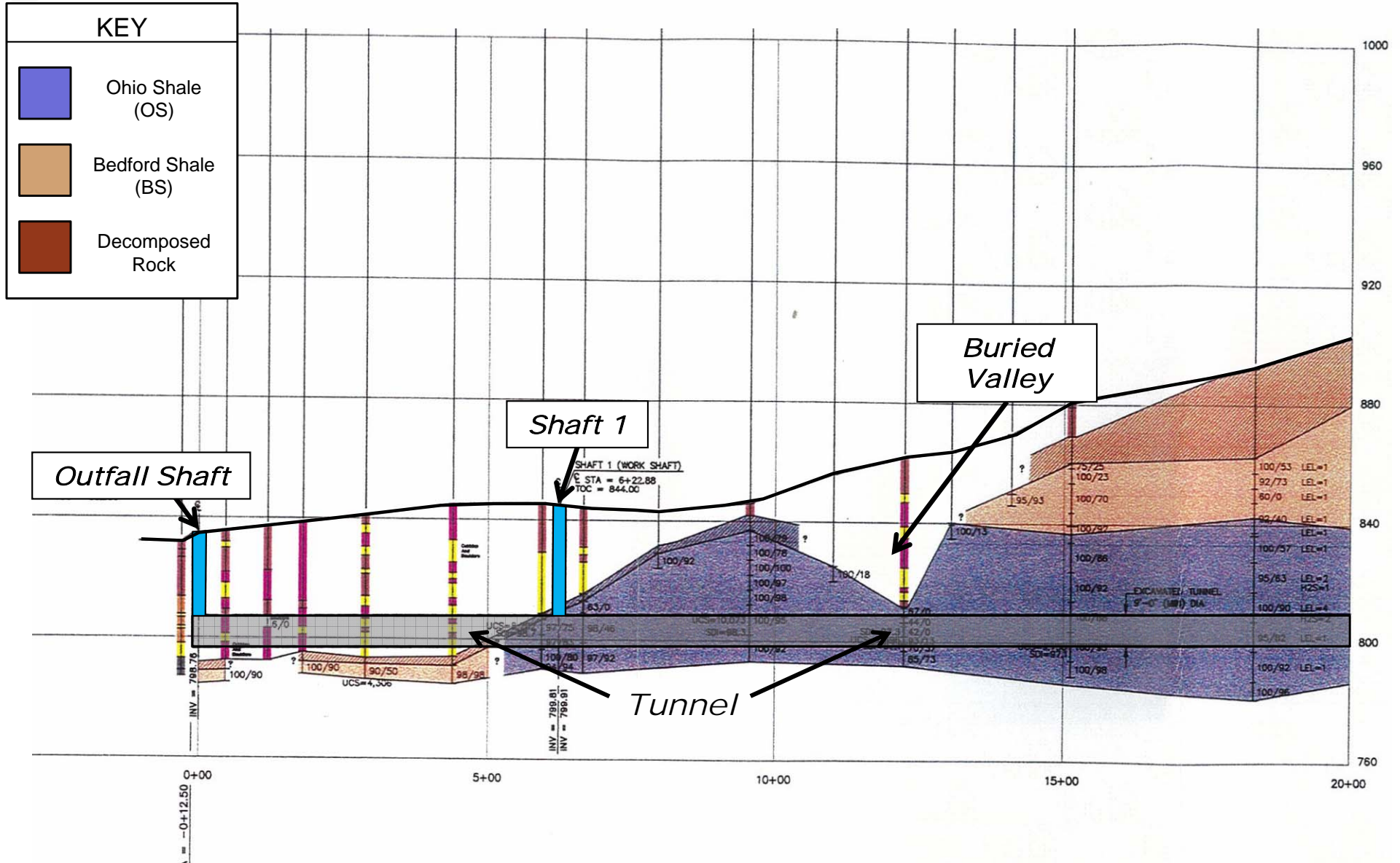
Project Challenge – Boulders and Cobbles

Solution:

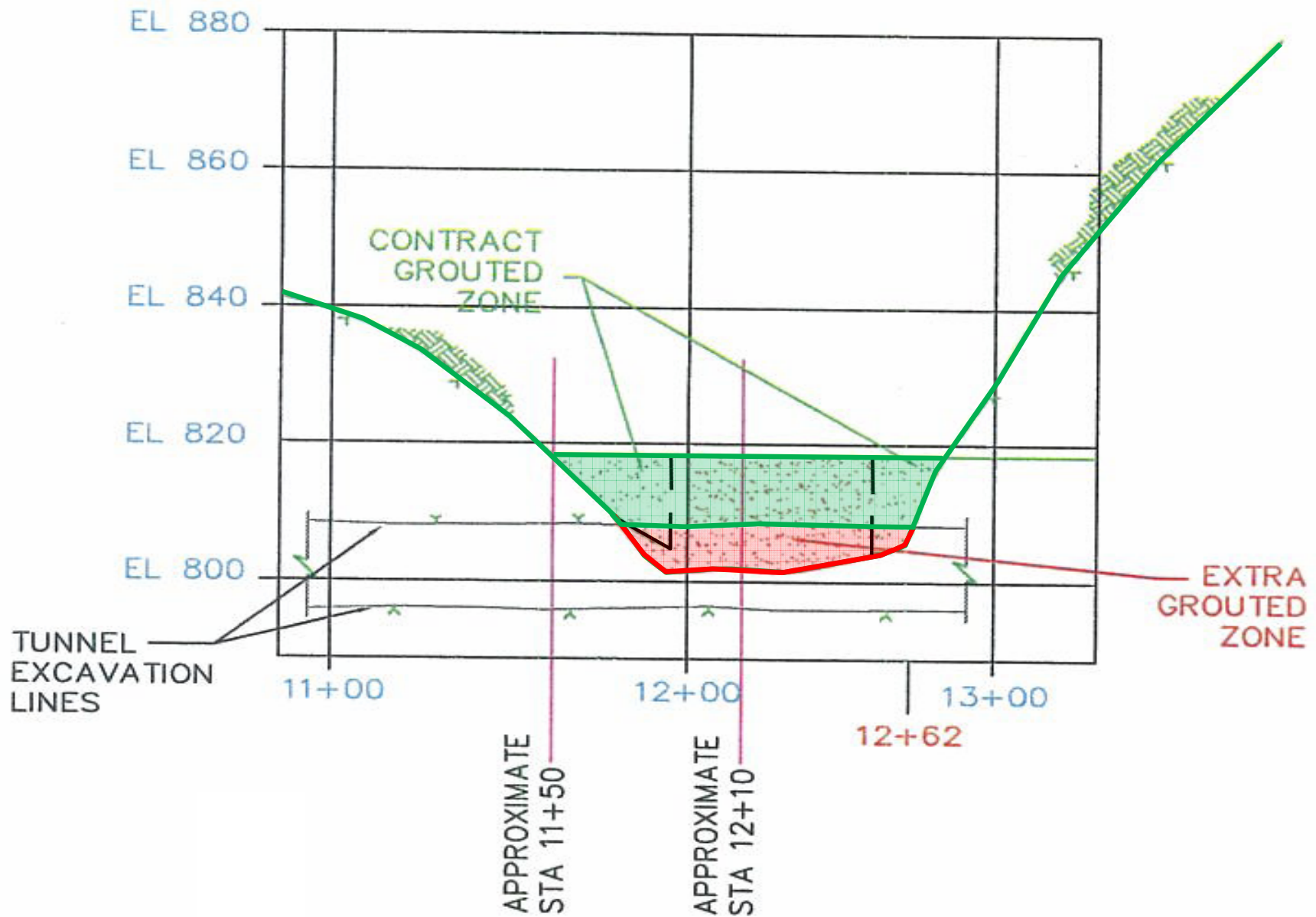
- ❖ CMT conducted actual measurements of boulders
- ❖ Reviewed contractor's daily reports
- ❖ Compared CMT notes with daily reports to insure consistency
- ❖ Based on documentation, the CMT was able to settle claim for minimal amount



Project Challenge – Buried Valley



Project Challenge – Buried Valley



Benefits of the CMT

Claims Avoidance

- ❖ Know the Contract Requirements
- ❖ Prepare a strategy to deal with problems
- ❖ Follow the Contract
- ❖ Contemporaneous Documentation
- ❖ Communication

Project Challenges – Buried Valley

Solution:

- ❖ CMT evaluated what contractor should have anticipated on bid
- ❖ Determined the differential
- ❖ CMT and contractor negotiated and settled for 1/3 of original claim amount
- ❖ Fieldwork continued during claim negotiation process.
- ❖ Issue resolved prior to TBM arrival – No Impact



Additional Benefits of CMT

Keys to Success

- ❖ Proactive communication addressed potential issues before they became problematic
- ❖ On-site managers and engineers provided extensive oversight
- ❖ 24/7 responsiveness to issues aided in community acceptance of the project and homeowner concerns



Additional Keys to Success

❖ Active Owner Participation

- ❖ RFIs, RFPs, and Change Orders were turned around quickly
- ❖ Quick resolution of potential risks as they arose
- ❖ Savings were realized as city was able to auction off property that was no longer needed

❖ Positive Contractor Contributions

- ❖ Proactive project approach, communication and knowledgeable superintendent led to foundation of cooperation and successful project

❖ Partnering

- ❖ Not formal, but understood between all parties



Questions