Planning for Adaptation

A Case Study of How Project Planning and Collaboration Allows for Adaptation in All Phases on a Tunneling Project

Presenter Introduction

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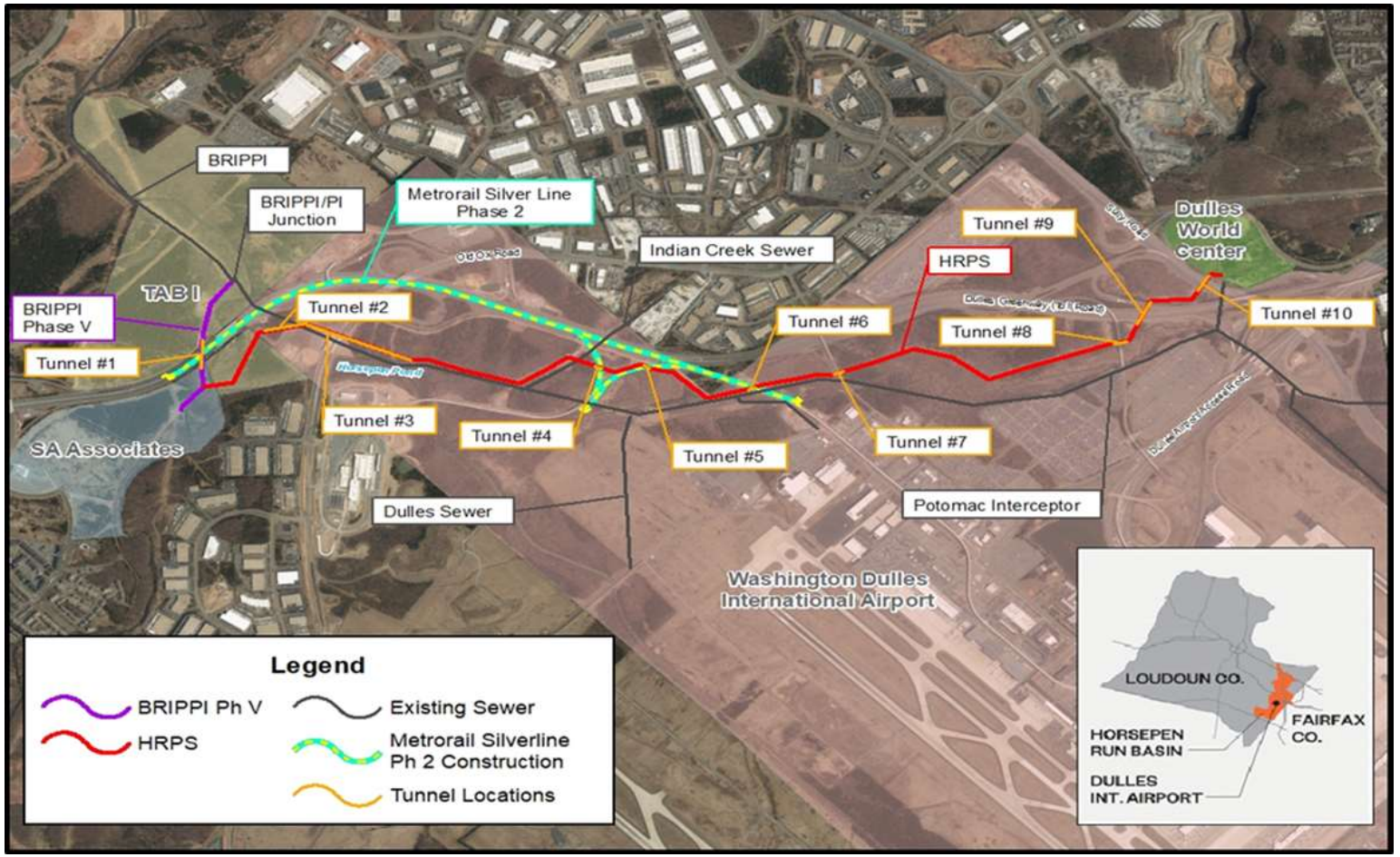
Case Study Owner

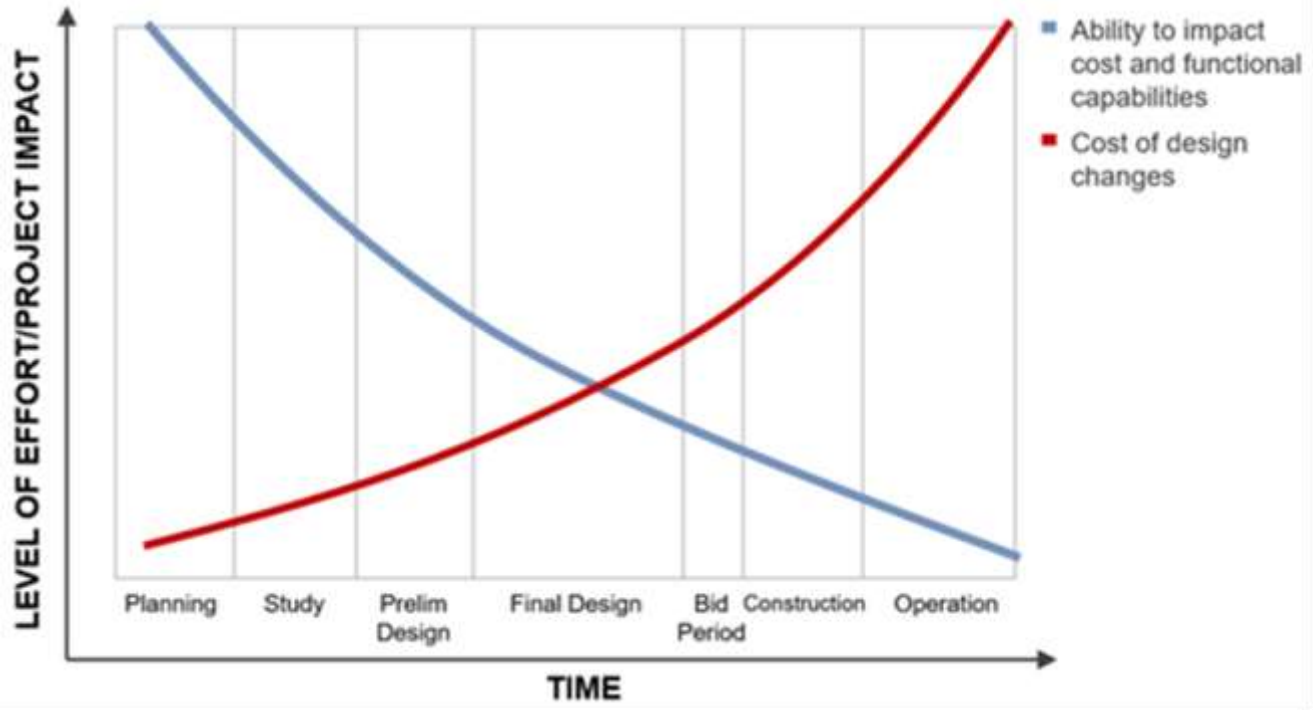
Loudoun Water

- Public water and sewer authority
- Loudoun County, VA
  - Suburb of Washington, DC
  - Serves ~275,000 residents
  - High growth area

Case Study Project

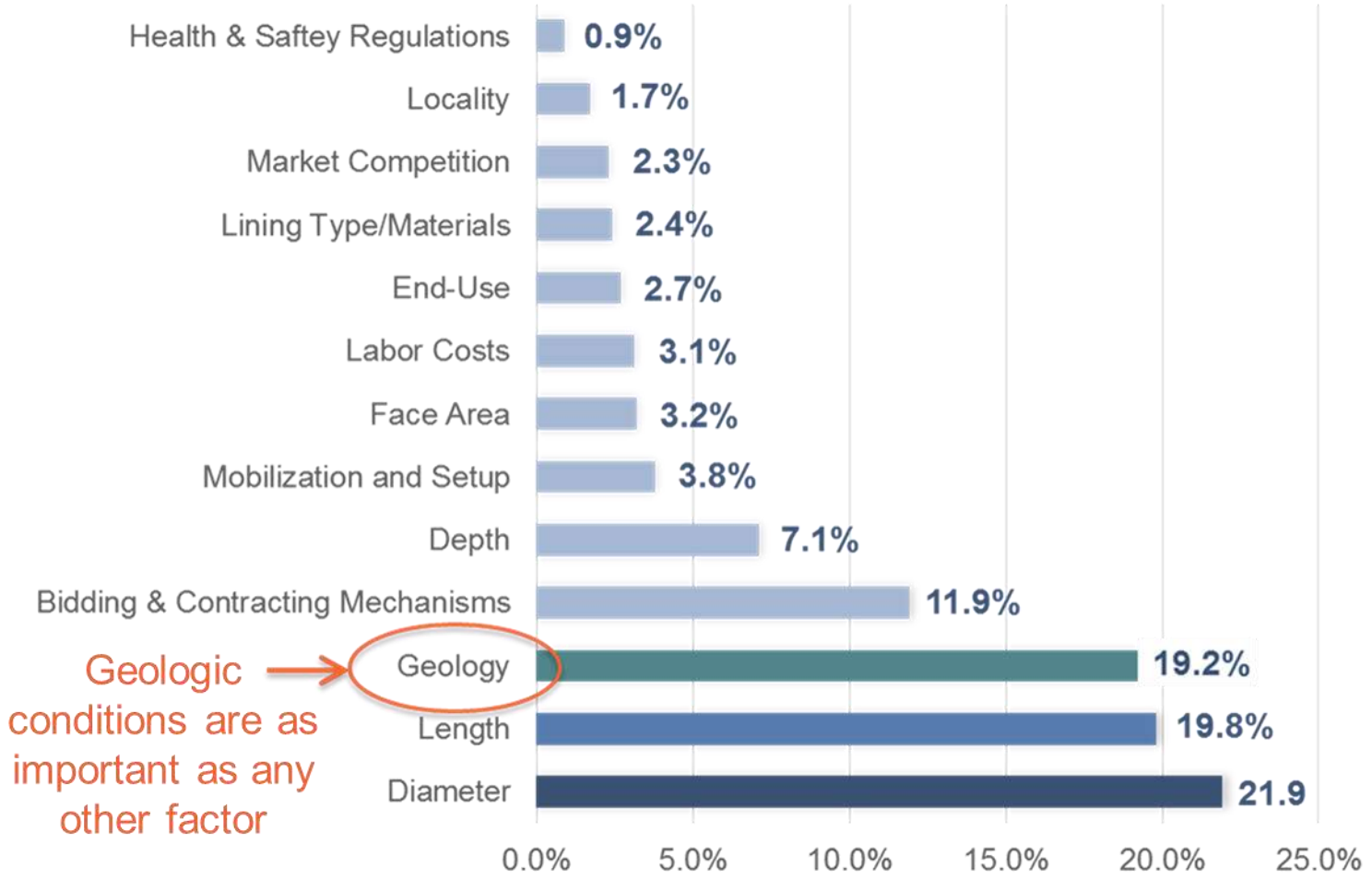


Planning for Adaptation



Geotechnical

- Geological Desktop Study
- Scope
- Geotechnical Investigation
  - Reports and data included as a technical document instead of a GBR.



Stakeholders and Permitting

- Early engagement with permitting agencies and stakeholders
- Ensuring design flexibility where possible

Contract Front End Modifications

Bidder Experience Qualifications

3.02 *Experience Qualifications for Tunnels 1-10 of the Work*

A. The Bidder must demonstrate in writing, requisite past project experience in constructing tunnels with one or more of the following Tunneling Methods:

1. Tunnel by Tunnel Boring Machine
2. Tunnel by Slurry Microtunnel Boring Machine
3. Tunnel by Pipe Jacking with Shield Method
4. Utility Hand Tunneling

1.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall include the following with its Bid:

A. Photocopy of Bidder's Virginia Contractor's License;

B. Completed Attachments A, B, and C (attached hereto), which includes providing all information required in these attachments. Incomplete attachments, or omission of information required in the attachments, will render the Bid non-responsive.

Contract Front End Modifications

To Avoid Paying for Unrealized Risks

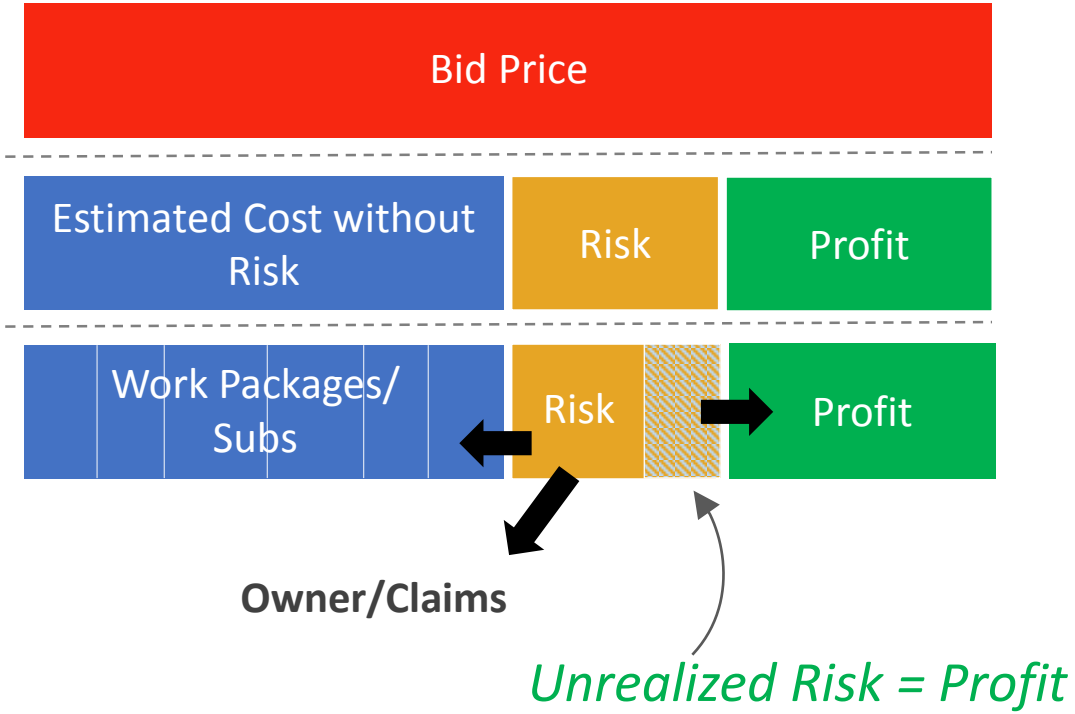
"Contractors Don't Absorb Risk, They Price It"

What the Owner Sees

What the Contractor Plans

Contractor Continues to Shed Risk:

- Subcontractors
- Claims
- Unrealized Risk



Contract Front End Modifications

Define Key Terms

- Obstruction
- Standby Time

9. Obstruction: An Obstruction is defined as any buried object that meets all of the following conditions:

   a. lies within the cross section of the tunnel,

   b. that impedes continued forward progress along the design path,

   c. is an object that is greater than 1/3 the diameter of the base tunneling machine, and

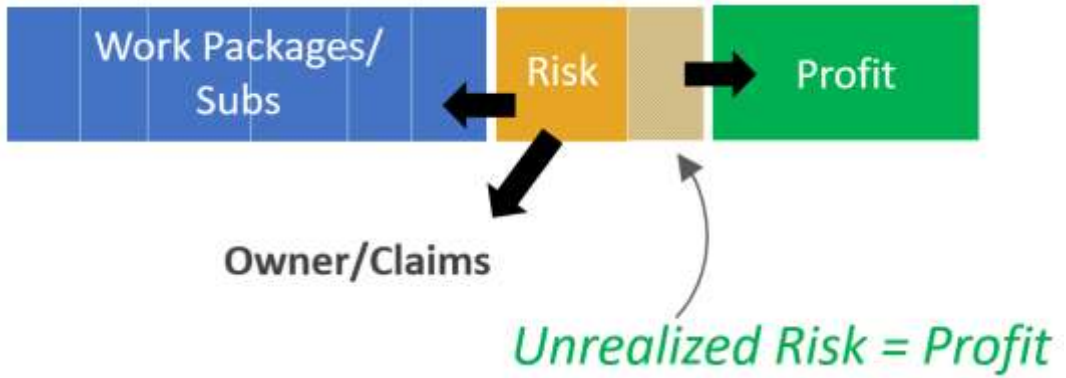
   d. is a rock fragment having an unconfined compressive strength of 20,000 psi or greater or an impediment of foreign material that cannot be crushed or ingested such as metal or other foreign material not naturally occurring.

11. Obstruction Removal Standby Time: Duration of work stoppage resulting from Obstruction encounter and removal. Contractor Hourly Rate provided in Bid for Obstruction Removal Standby Time shall include all costs of specialist labor only, materials, equipment, production loss and other non-labor related costs associated with the work stoppage caused by an encountered Obstruction. See Section 00520 – Agreement for defined measurement and payment procedures for Obstruction Removal Standby Time.

Contract Front End Modifications

Contingency Allowances

- Obstruction Removal Standby Time
- Obstruction Removal Shafts



Bidders Lump Sum Bid Price				$
Contingency Allowances				
Description	Unit	Estimated Quantity	Allowance Unit Price	Contingency Allowance
Contingency Allowance for Obstruction Removal Standby Time[1]	HR	100		
Contingency Allowance for Obstruction Removal Shaft[2]	VF[3]	45		

Technical Specifications

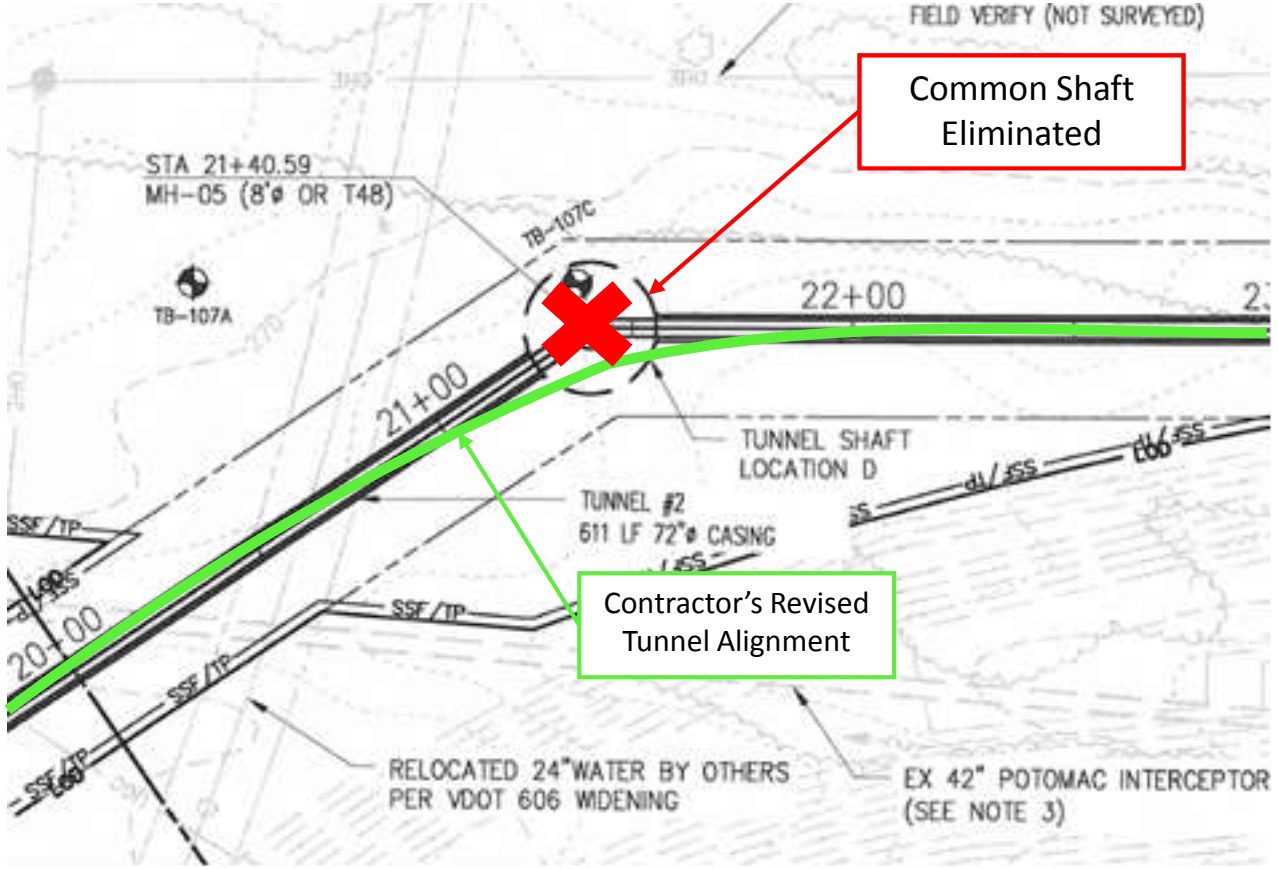
Multiple tunnel methods allowed

- Permitted
- Bid Flexibility / Competitiveness




Potential Contractor Proposals

Ensure design accommodates method flexibility



Work Sequencing

Interim milestone

- Necessary for coordination with adjacent construction
- No requirements for work sequencing

Interim Milestone (see the Summary of Work): within 730 days of the Notice to Proceed.
Substantial Completion of the Remainder of the Work: within 1,000 days of the Notice to Proceed.
Final Completion: within 70 days of the latter of (1) the Interim Milestone or (2) Substantial Completion of the Remainder of the Work.

Conclusions

Planning for Adaptation

- Allow Method Flexibility when Appropriate
- Geotech Considerations
  - GBR vs Technical Document
  - Scope of Investigation
  - Client Risk Tolerance
- Utilize Contingencies
- Plan for Proposals
- Work Sequencing

Questions?

Hazen