



# Microtunneling Specifications



28<sup>TH</sup> ANNUAL

**MICROTUNNELING  
SHORT COURSE**

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# Presentation Outline

- Specifications – overview
- Specifications Content
  - General Format
  - Key Items, Specifics
- Summary

Focus is on conventional Design-Bid-Build

MICROTUNNELING	32 05 23.19 - 1
SECTION 33 05 23.19 MICROTUNNELING	
PART 1 - GENERAL	
1.1	RELATED DOCUMENTS
A.	Plans and general provisions of the Contract, including General Provisions for Construction Contracts; Supplementary General Provisions for Construction Contracts, and Division 01 Specification Sections, apply to this Section.
B.	Contract 16, Fremont Avenue Storm Drain Relocation, Geotechnical Data Report (GDR).
1.2	SUMMARY
A.	Section Includes:
1.	Microtunnel Boring Machine (MTBM).
2.	Jacking frame.
3.	Intermediate jacking station.
4.	Pipe lubricant.
5.	Entry and exit seals.
6.	Grout.
B.	Related Sections:
1.	Section 02 32 00 Geotechnical Investigations
2.	Section 03 30 00 Cast-in-Place Concrete.
3.	Section 31 05 00 Common Work Results for Earthwork.
4.	Section 31 09 13 Geotechnical Instrumentation and Monitoring.
5.	Section 31 23 00 Excavation and Fill.
6.	Section 32 23 20 Groundwater Control.
7.	Section 31 50 00 Excavation Support and Protection.
8.	Section 33 41 00 Storm Utility Drainage Piping; for jacking pipe.
9.	Section 33 49 00 Storm Drainage Structures; for precast concrete utility structures.
1.3	DEFINITIONS



## Specifications - Overview

- What are specifications?
  - Detailed instructions and requirements
- Where do specifications fit in the contract?
  - Drawings
  - **Specifications**
  - GBR (if applicable)
  - Reference Documents (not binding/enforceable)





## Specifications – Overview (continued)

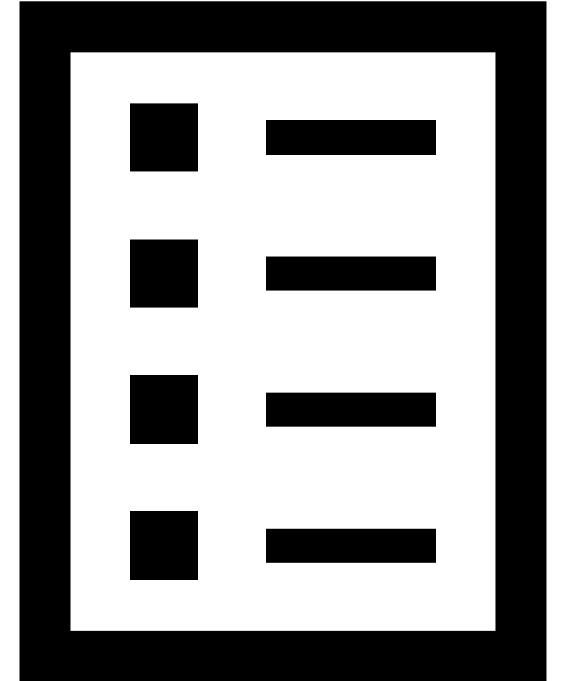
- Specs are:
  - A critical part of the contract documents
  - Part of the risk management approach (formal or informal)
  - Minimum requirements (Competitive bids)
  - Often neglected or not given appropriate due diligence





## Specifications Content – General format

- Generally 3 parts to a specification
- Part 1 – General
  - Definitions
  - Related documents and references
    - Related Spec Sections
    - GBR (if applicable)
    - Reference data/documents (Geo, enviro)
  - Submittal requirements
  - QA/QC requirements







## Specifications Content – General format (continued)

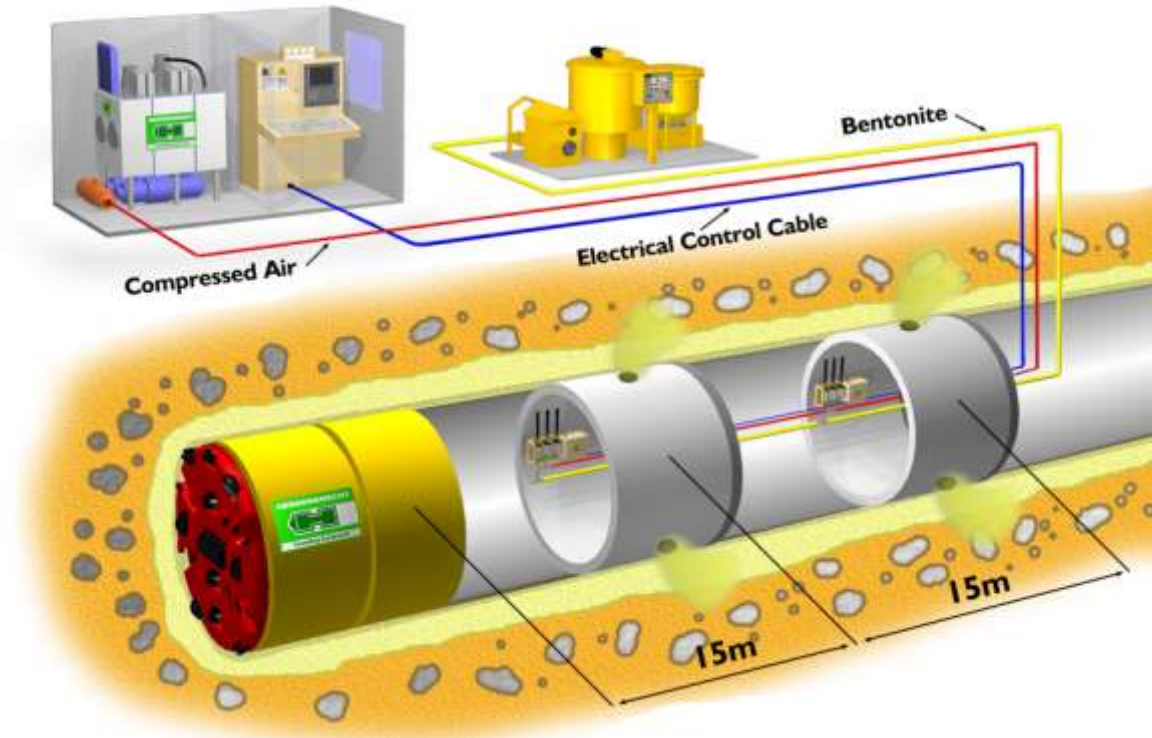
- Part 2 - Products
  - Permanent work items
    - Pipe materials
    - Grout mixes
  - May include equipment or temporary work items:
    - MTBM, equipment, seals
    - Mixes – slurry, grout, etc.





## Specifications Content – General format (continued)

- Part 3 - Execution
  - Mobilization
  - Pre-work: pre-con inspection, I&M installation
  - Performance of the work
    - Break-in/break-out stabilization
    - Ground control, settlement control
    - Guidance, tolerances (May be in Part 1 QA/QC)
    - Reporting
    - Finishing – grouting, Carrier pipe installation
  - Post-construction inspections, Cleanup & restoration





## Specifications – Key items, General

- General
  - Not a standard spec - Tailor to the project
    - Appropriate to geotechnical data
    - Appropriate for project conditions
      - Opportunity to highlight risks
  - Be specific where appropriate, but avoid over-prescriptive
  - Avoid “last job syndrome”
  - Be reasonable and fair







## Specifications – Key items, General (continued)

- General

- Coordinate w/ “external requirements”

- Permits, third party approvals/requirements
- Ex: Work hour limitations

- Coordinate with other documents

- Conform with Drawings
- Coordinate with other specs – SOE, earthwork, etc.

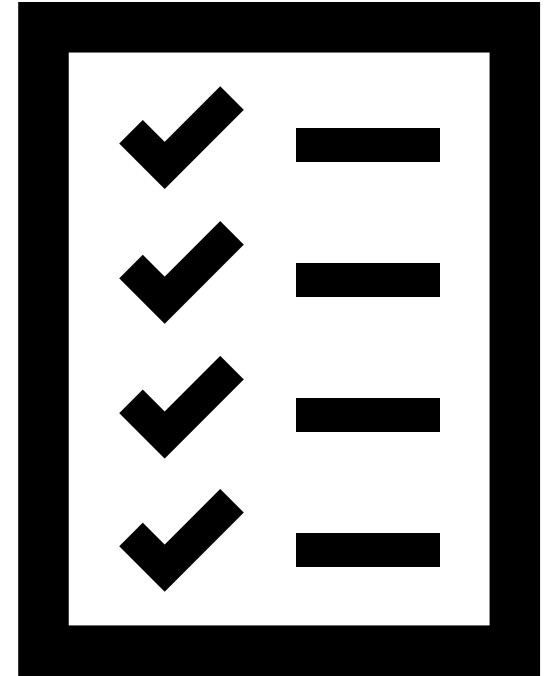
- Coordinate submittal requirements

- Shaft, microtunnel, and/or I&M are often different contractors

- Avoid repeating or conflicting with other sections

- Coordinate w/ RMP (formal or informal)

- “we’ll require the contractor to do X,Y,Z” – this is where that requirement is made





## Specifications – Key items, Specifics

- Contractor Qualifications
  - Part 1 - Submittals or QA/QC
  - typically 3 - 5 “similar” projects in last 5 years
    - What is “similar”
      - Ground conditions?
      - Length of Drive?
      - Surface infrastructure/features?
      - Ex: *Similar projects must include at least 1 project under interstate highways; projects in mixed face conditions; drives over XXX feet, etc.*





## Specifications – Key items, Specifics (continued)

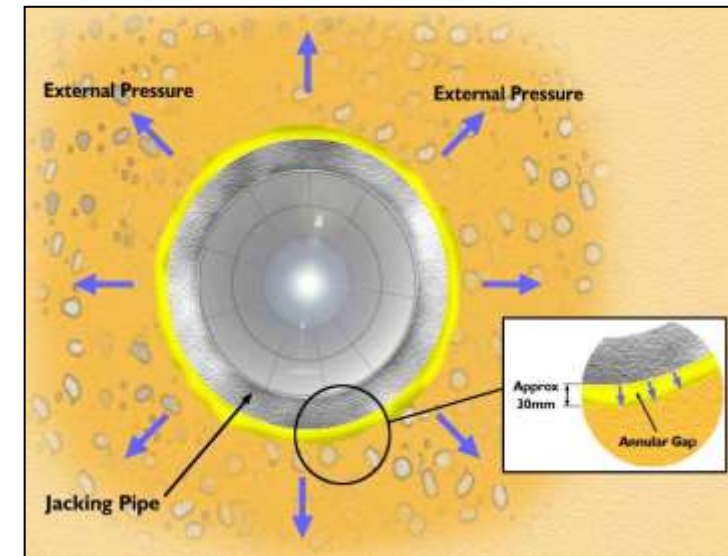
- Installation/work plan examples
  - Have the Contractor explain (Part 1) how he will do the required work (Part 3)
    - Intent: work is adequately planned, risks addressed
    - Opportunity: highlight specific risks or issues
  - Overall approach
    - Pit and work areas – constraints?
    - Shoring design/shop drawings for pits
      - Coordinate with Shaft or SOE spec
      - Specific loads, issues? Ex: Adjacent RR





## Specifications – Key items, Specifics (continued)

- Installation/work plan examples (continued)
  - Calculations/assessments
    - Settlement control plan, calculations
    - I&M plan or coordination with I&M spec
      - Minimum requirements (types, quantities, locations)
      - Threshold movement values (may be in Part 3)
- Identify structures of concern
  - Adjacent or overlying structures (RRs, utilities, buildings, etc.)

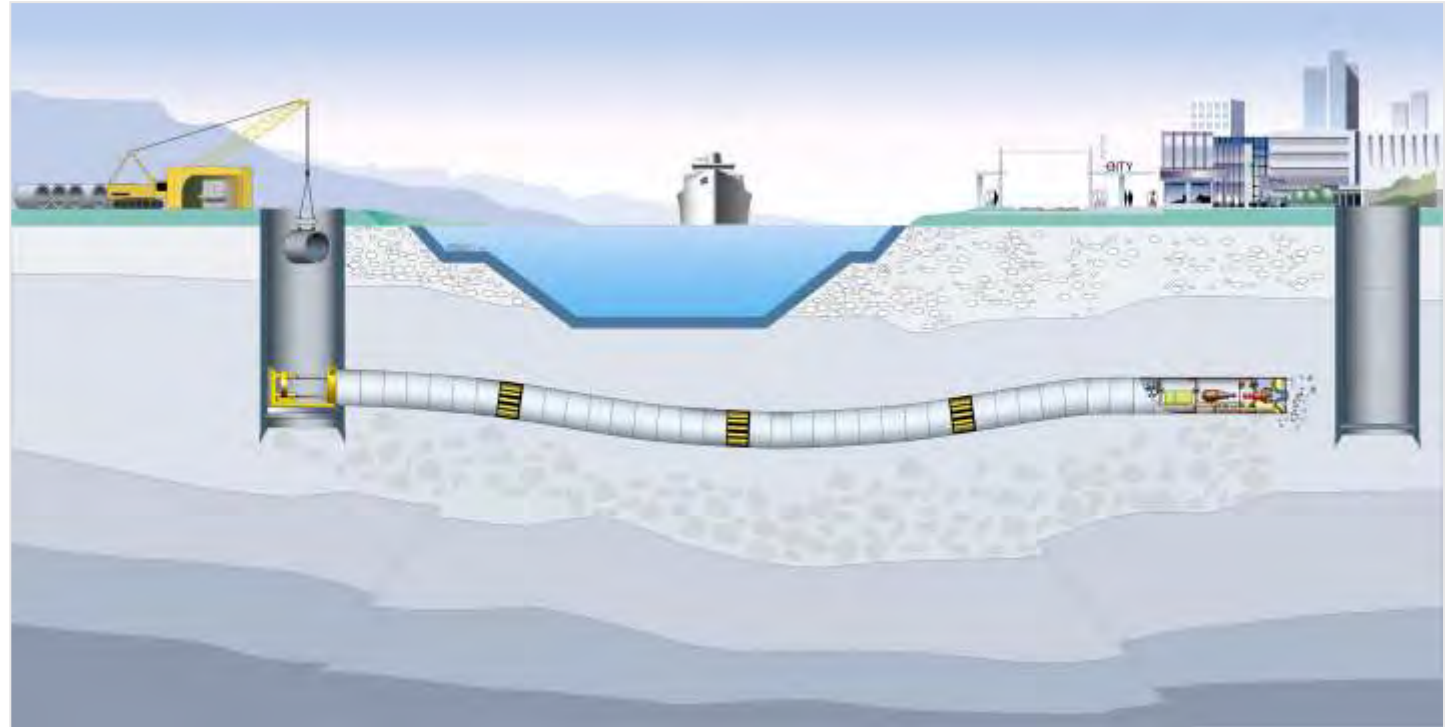






## Specifications – Key items (continued)

- Installation/work plans (continued)
  - Other issues –
    - Project specific risks
      - Frac out concerns
      - Lack of surface access, etc.
      - Requirements for contingency plans







## Specifications – Key items, Specifics (continued)

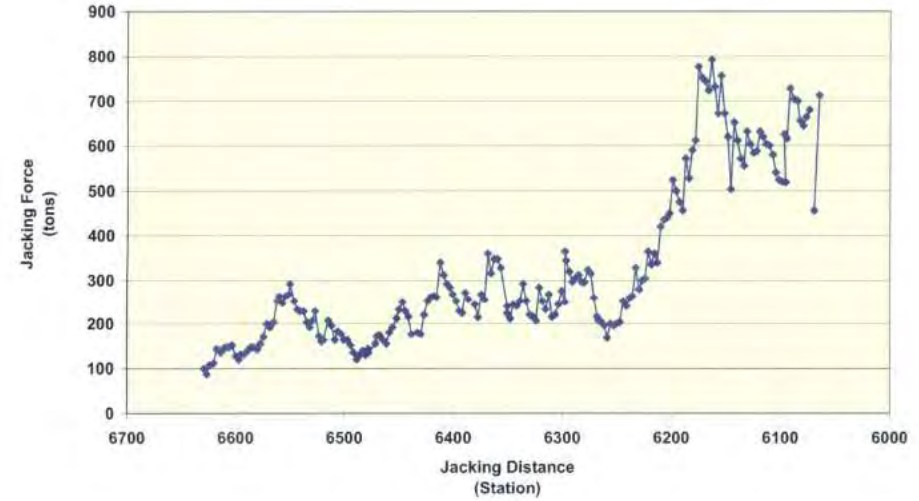
- Equipment and capabilities
  - MTBM, jacking system, etc.
- Project specific requirements
  - Ability to cut rock? Strength of rock? (effectively a baseline)
  - Rear access to cutterhead for changing cutters?
  - Capacity for cobbles, boulders (effectively a baseline)
  - IJS required? Requirements for installation?





# Specifications – Key items (continued)

- Other submittals
  - Reports (Part 1 Submittals and Part 3 Execution)
    - All part of risk management/mitigation
    - Pre- and post-construction inspections
    - Daily reports – machine outputs, daily reports, etc.
    - I&M readings
    - Installation records, survey



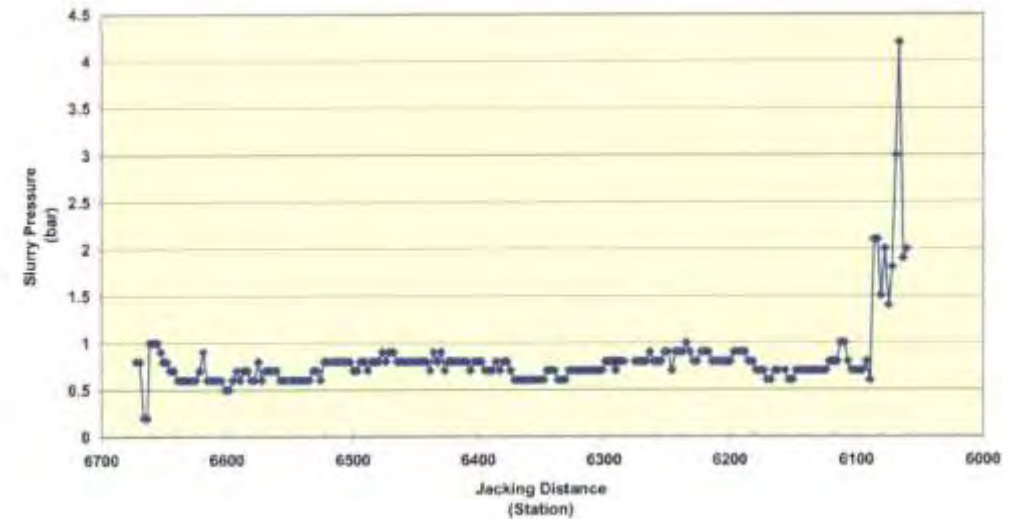
Settlement Monitoring Log

BASELINE READING					
Date Measured:	8/26/2020		HI	2/5/2021	
Measured By:	C. Harding		135.59	D. Eberth	
Point ID	Elevation (ft)	Δ (ft)	Rod Reading	Elevation (ft)	Δ (ft)
SM 1	129.58	0.00	6.05	129.54	-0.04
SM 2	129.69	0.00	5.94	129.65	-0.04
SM 3	129.79	0.00	5.82	129.77	-0.02
SM 4	129.48	0.00	6.14	129.45	-0.03
SM 5	129.57	0.00	6.08	129.51	-0.06
SM 6	129.69	0.00	5.93	129.66	-0.03
SM 7	129.27	0.00	6.38	129.21	-0.06
SM 8	129.35	0.00	6.32	129.27	-0.08
SM 9	129.45	0.00	6.16	129.43	-0.02
SM 10	129.35	0.00	6.29	129.30	-0.05



# Specifications – Key items, Specifications (continued)

- Execution (Part 3)
  - Pre-Construction meeting
  - Examination
    - Highlight key concerns
      - Ex: CCTV of storm drains
  - Contingency measures, Obstructions
    - Address depending on risk





# Specifications – Summary

- Microtunneling Specification
  - Critical part of contract documents & RMP
  - Coordinate with other documents
    - Drawings, other specs, GBR
  - Must be project-specific
  - Opportunities:
    - Work is adequately planned
    - Identify project specific risks
  - Give specification the attention it deserves

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1.2 SUMMARY

- A. Section Includes:
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  2. Jacking frame.
  3. Intermediate jacking station.
  4. Pipe lubricant.





# Thank You! Questions?



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