Installing Clay Pipe Through Sandstone with Guided Boring in Houston

January 29, 2019

Presenters:

David Ellett, V.P., BRH Garver Construction, LP

Mark Bruce, Pres., Can Clay Corp.

Project:

City of Houston, Pump and Lift Station R/R - Package 1 -Consolidation of Post Oak, Stablewood and Buckingham

Scope:

"Work of the Contract is for the consolidation of the service areas of the North Post Oak Lane, Stable Wood, and Buckingham Lift Stations by construction of gravity sanitary sewers and demolition of the North Post Oak Lane, Stable Wood, and Buckingham Lift Stations, …"

Project Dates and Value:

- Bid Date: May 21, 2015
- Estimate: $12,700,000
- Duration: 495 Calendar Days
- Low Bid: $14,594,955.72
- Pre-Con Meeting: February 16, 2016
- NTP: March 14, 2016

Addendum Timeline and Value

CONTRACT PRICE SUMMARY	DOLLAR AMOUNT	PERCENT
Original Contract Price	$14,594,955.72	100.00%
Previous Change Orders	$60,000.00	0.41%
Contract Price	$19,585,348.47	134.19%

CONTRACT TIME SUMMARY	DURATION	COMPLETION DATE
Original Contract Time	495 Days	Saturday, July 22, 2017
Previous Change Orders	0 Days	Saturday, July 22, 2017
This Change Order	493 Days	Tuesday, November 27, 2018
Contract Time	988 Days	Tuesday, November 27, 2018

Site Conditions

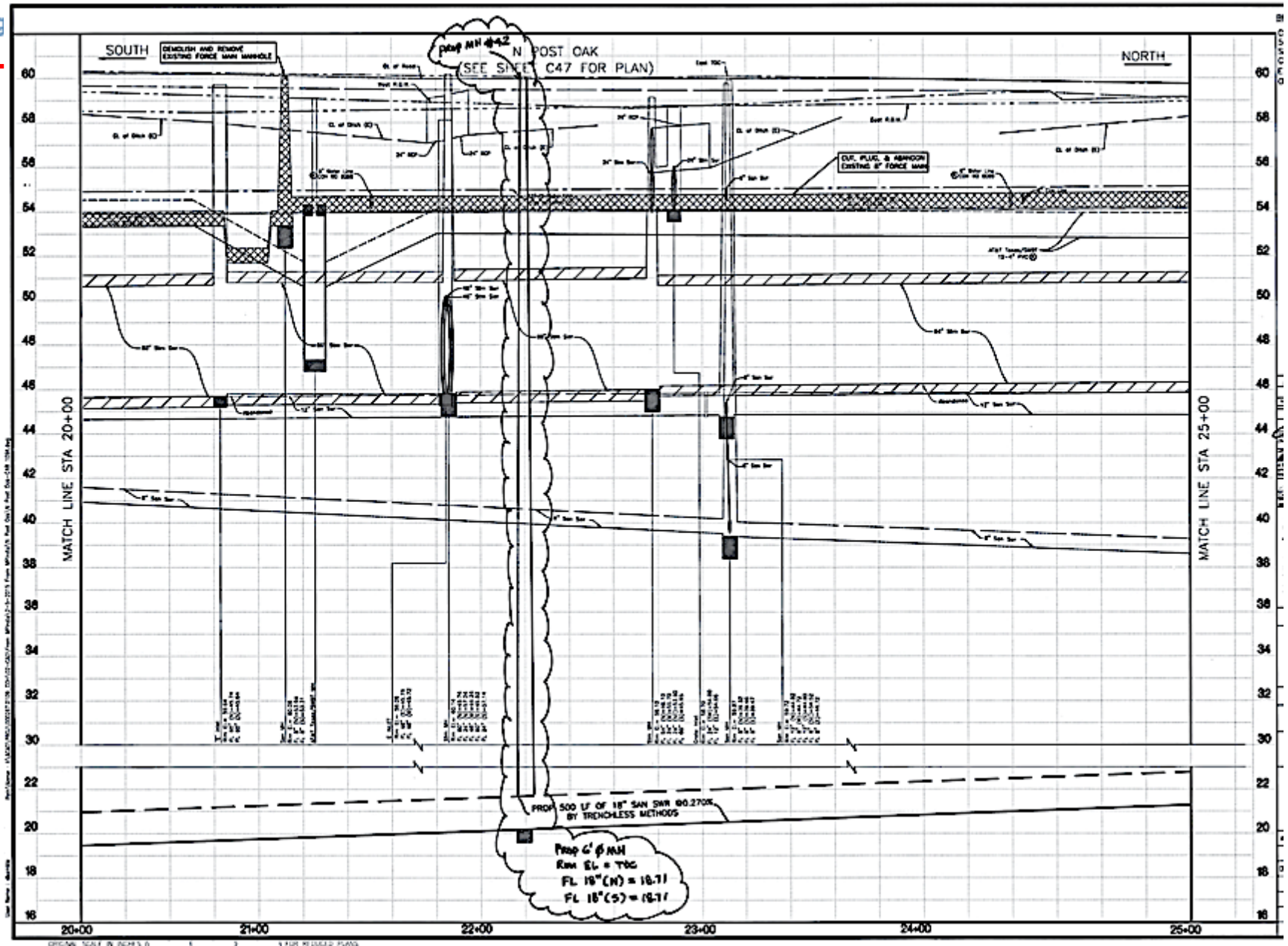
Site Conditions

Site Conditions

Site Conditions

Interesting Elements of the RFP:

- The bore logs call out dense sand in places, but nothing about rock.
- Comparing the profile drawing to the bore log, the bores do not go as deep as the pipe invert.
- Question 20 in Addendum 1 addresses the insufficient bore logs.

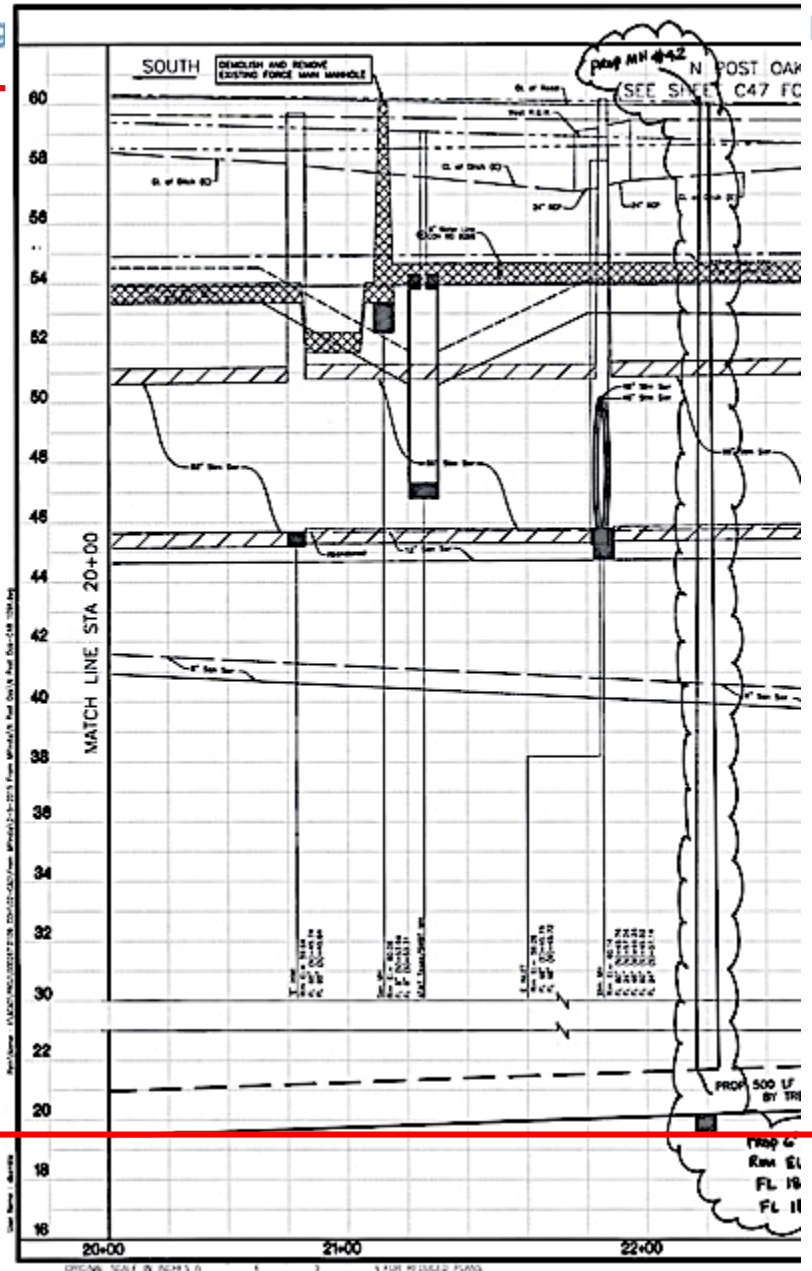

SOUTH
NORTH
DEMOLISH AND REMOVE EXISTING FORCE MAIN MANHOLE
Prop MH #42
N POST OAK
(SEE SHEET C47 FOR PLAN)
CUT, PLUG, & ABANDON EXISTING 8" FORCE MAIN
MATCH LINE STA 20+00
MATCH LINE STA 25+00
PROP 500 LF OF 18" SAN SWR @0.270%
BY TRENCHLESS METHODS
Prop 6' ϕ MH
Rim EL = TOC
FL 18"(N) = 18.71
FL 18"(S) = 18.71
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
30
22
20
18
16
20+00
21+00
22+00
23+00
24+00
25+00

Depth 46 ft

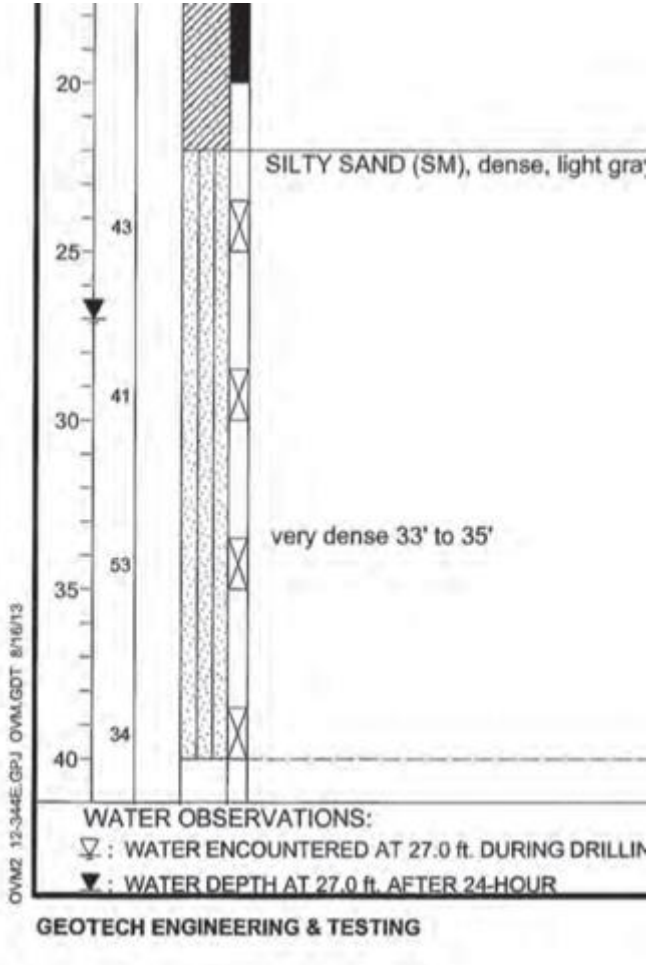
Underg

Fort Worth, TX

Depth 46 ft



Gap 6 ft



Pre-Bid Q&A, Question 20

20. Question from Contractor: Along N. Post Oak Lane, the geotechnical data is limited to the upper 30 feet, ideally geotechnical data is preferred at deep depths?

Response: The Contractor has the option to not submit a bid for this work should he feel existing geotechnical data is inadequate; similarly, per section 00320 that Contractor has the option to conduct additional soil investigations as the bidder deems appropriate.


1-13-17
37' MH25
TUNNEL
1-16-17
42' MH25
TUNNEL 43' MH25
01-16-17
44' MH25
TUNNEL

Sandstone Items in CO

• Complete drilled shafts by hand:	$113,589.91	14 days
• Incomplete GBM Drive:	$ 65,460.00	5 days
• Recover Iseki MTBM:	$720,501.72	68 days
• Complete drilled shaft by hand:	$ 57,674.05	33 days
• GBM Bit Acquisition:	$ 56,299.14	14 days
• Sandstone Excavation & Shaft:	$ 38,625.86	11 days

- continued on next slide -

Sandstone Items in CO, continued:

• GBM Pilot Tube Recovery tunnel:	$219,320.56	65 days
• Diminished Production Pilot Tube:	$ 60,839.15	7 days
• Diminished Production Pilot Tube:	$ 86,307.82	16 days
• Geotech investigation:	$ 55,183.17	12 days
• Diminished Production	$149,212.35	23 days
• Diminished Production; GBM Tunnel:	$230,000.00	48 days
• Diminished Production, Shafts:	$150,000.00	40 days

Addendum Timeline and Value

CONTRACT PRICE SUMMARY	DOLLAR AMOUNT	PERCENT
Original Contract Price	$14,594,955.72	100.00%
Previous Change Orders	$60,000.00	0.41%
This Change Order	$4,930,392.75	33.78%
Contract Price	$19,585,348.47	134.19%

CONTRACT TIME SUMMARY	DURATION	COMPLETION DATE
Original Contract Time	495 Days	Saturday, July 22, 2017
Previous Change Orders	0 Days	Saturday, July 22, 2017
This Change Order	493 Days	Tuesday, November 27, 2018
Contract Time	988 Days	Tuesday, November 27, 2018

Shaft Drilling

Shafts –CMP

ISEKI UNCLEMOLE L Ø600~1000

A Long Distance Runner with Sharp Curved Line Pipe Jacking Tunnelling Machine applicable to a long distance, sharp curved line

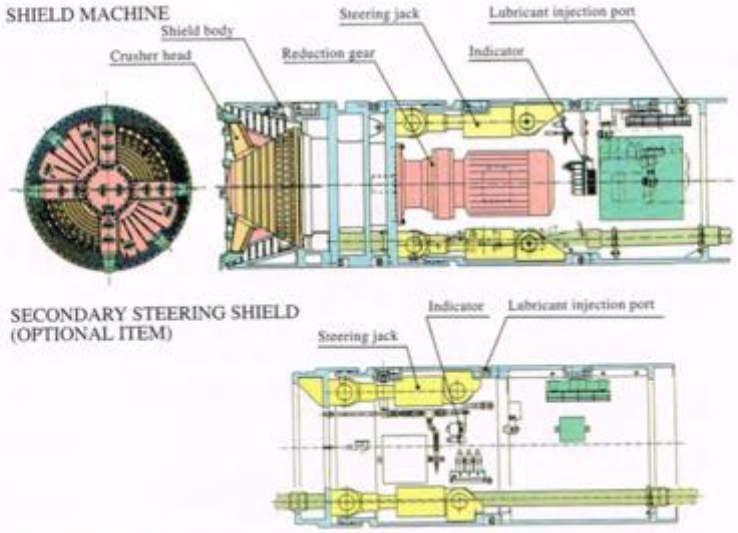
Advantages of using the Iseki Unclemole "L" tunnelling method

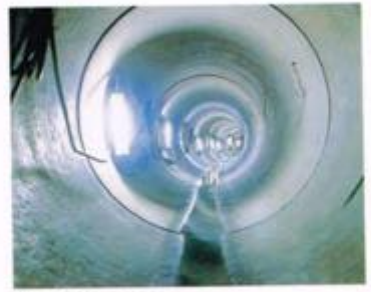
1. The system can achieve a long jacking distance of approx.400 m without an intermediate jacking station.
2. The system can achieve a sharp curved line for approx.70 times of the nominal diameter of pipes using the short length pipes.
3. The system is applicable in a wide range of soils including cohesive soil, sandy, gravel, gravely ground mixed with boulders and soft rock, up to unconfined compressive strength o as is the case with the Unclemole tunnelling method.
4. The cutter head at the front of the tunnelling machine has a wide opening. The maximum diameter of the boulders that can be taken into the microtunnel machine is approx.30% of the machine OD.

UNCLEMOLE L

SLURRY SHIELD MACHINE FOR LONG DISTANCE & CURVED LINE !!

UNCLEMOLE "L" Structure Sketches of Shield Machine





Pipe Laying Construction for Sewerage

Akkerman GBM

Installing Tunnel Machine - Iseki

Iseki Cutter Head – New and After 400 ft.

Thank You!

Questions?