

## CHAPTER 9

# TRENCHLESS INSTALLATIONS USING VITRIFIED CLAY JACKING PIPE

Clay pipe has high compressive strength to resist considerable jacking forces and possesses the needed abrasion resistance to prevent external damage as the pipe is pushed through the surrounding ground.

Additionally, clay pipe has the chemical resistance for longevity and tight joints to prevent leakage. Special low-profile joints are designed to facilitate trenchless installation.

ASTM C1208/C1208M *Vitrified Clay Pipe and Joints for Use in Jacking, Sliplining, Pipe Bursting and Tunnels*, is the first ASTM standard specification explicitly developed for vitrified clay jacking pipe.

For details on the trenchless installation methods of pilot tube guided boring, slurry microtunneling, and static pipe bursting, see Chapter 8 of the NCPI's *Vitrified Clay Pipe Engineering Manual*.

It is important to us that your project is successful. To ensure that success, please contact NCPI early in your design and planning phase.



**Figure 38:** Jacking pipes staged at the launch pit on a pilot tube project utilizing a powered cutter head.

## Reference Section

Allowable Bedding Material & Initial Backfill per Bedding Class					
Bedding Class	Allowable Bedding Material			Allowable Initial Backfill	
	Soil Class (Table 3)	Gradation	Size	Soil Class (Table 3)	Particle Size
Class D	N/A	N/A	N/A	I, II, III or IV	1"
Class C	I or II		1"	I, II, III or IV	1½"
Class B	I or II		1"	I, II, III or IV	1½"
Crushed Stone Encasement	I or II	- 100% passing a 1" sieve	1"	I, II, III or IV	1½"
		- 40 – 60% passing a ¾" sieve			
CLSM	I or II	- 0 – 25% passing a ⅜" sieve	1"	I, II, III or IV	1½"
Concrete Cradle	N/A	N/A	N/A	I, II, III or IV	1½"

**Table 1:** (As presented on page 12) Allowable Bedding Material and Initial Backfill per Bedding Class (from ASTM C12)

Bedding Thickness Under Barrel ( $B_C/6$ or 4" Minimum) Class C, B, Encasement and CLSM Bedding Classes		
Pipe Size	Outside Diameter ( $B_C$ ) (Varies by Manufacturer)	Bedding Required*
4"	5" to 5.3"	4"
6"	7.5" to 8"	
8"	9.7" to 10"	
10"	12.1" to 12.9"	
12"	14.5" to 15"	
15"	18" to 18.7"	
18"	21.8" to 22.5"	
21"	25.5" to 25.8"	
24"	28.9" to 29.8"	4¾"
27"	32.7" to 33.7"	5"
30"	36" to 37.5"	5½"
33"	39" to 39.5"	6"
36"	43" to 44"	6½"
39"	46" to 47"	7"
42"	50" to 51"	7½"

\* values are rounded up to the nearest ¼"

**Table 2:**  $B_C/6$  or 4" minimum (from ASTM C12)

Uniform Soil Groups for Pipe Installation from ASTM C12 <sup>1</sup>		
Soil Class	Definition	Symbols
Class I <sup>2</sup>	<b>Crushed Rock</b> 100% passing 1-1/2 in. sieve, <=/ 15% passing #4 sieve, <=/ 25% passing 3/8 in. sieve, <=/ 12% passing #200 sieve	
Class II <sup>3</sup>	<b>Clean, Coarse Grained Soils</b> Or any soil beginning with one of these symbols (can contain up to 12% fines) Uniform fine sands (SP) with more than 50% passing a #100 sieve should be treated as Class III material	GW, GP, SW, SP
Class III	<b>Coarse Grained Soils With Fines</b> Or any soil beginning with one of these symbols	GM, GC, SM, SC
	<b>Sandy or Gravelly Fine Grained Soils</b> Or any soil beginning with one of these symbols, with >/= 30% retained on #200 sieve	ML, CL
Class IV	<b>Fine-Grained Soils</b> Or any soil beginning with one of these symbols, with < 30% retained on a #200 sieve	ML, CL
Class V <sup>4</sup>	<b>Fine-Grained Soils, Organic Soils</b> High compressibility silts and clays, organic soil	MH, CH, OL, OH, Pt
<p>1 Soil Classification descriptions and symbols are in accordance with ASTM D2487 and ASTM D2488</p> <p>2 For Class I, all particle faces shall be fractured.</p> <p>3 Materials such as broken coral, shells, slag, and recycled concrete (with less than 12% passing a #200 sieve) should be treated as Class II soils.</p> <p>4 Class V soil is not suitable for use as a bedding or initial backfill material.</p>		

**Table 3:** Uniform Soil Groups for Pipe Installation (from ASTM C12)