



**Integrated Testing and Engineering Company of San Antonio, L.P.**

Geotechnical & Environmental Engineering • Construction Services • Geologic Assessment

E.A. Palaniappan, Ph.D., P.E.  
Murali Subramaniam, Ph.D., P.E.  
Kausi Subramaniam, B.S.

November 6, 2023

Boerne Medical Center, LTD  
C/o:  
Barry Sanditen  
500 N. Cap. of Tex. Hwy. Bldg. 7  
Austin, TX 78746

**Re:** Construction Materials Testing  
Waterline Installation – Backfill Compaction  
Boerne Professional Center  
Frontage Rd. IH 10 West to Switchback Trail Boerne  
Kendall County, Texas 78006

**InTEC Project #: S232861-1**

Gentlemen:

The Laboratory Compaction and Field Density Tests results at the above referenced project site are presented for your review.

We appreciate and wish to thank you for the opportunity to be of service to you on this project. If we can be of additional assistance, or if you have any questions, please call us.

Respectfully Submitted,  
**InTEC of San Antonio, L.P.**

Murali Subramaniam, Ph.D., P.E.

Copies Submitted: Above (1)



*[Signature]*  
11/07/2023



# Moisture Density Relationship

**InTEC of San Antonio**  
12028 Radium  
San Antonio, TX 78216  
Phone: 210-525-9033

**Client:**  
V.K. Knowlton Construction and Utilities, Inc.  
18225 FM 2252  
San Antonio, TX 78266

**Project:**  
S232861  
Boerne Professional Center  
29.8139704,-98.7532319  
Boerne, TX

## SAMPLE DATA

**Sample Number:** 22717

**Sample Date:** 05/25/2023

**Technician:** Olson, James

**Material Use:** Utility Backfill

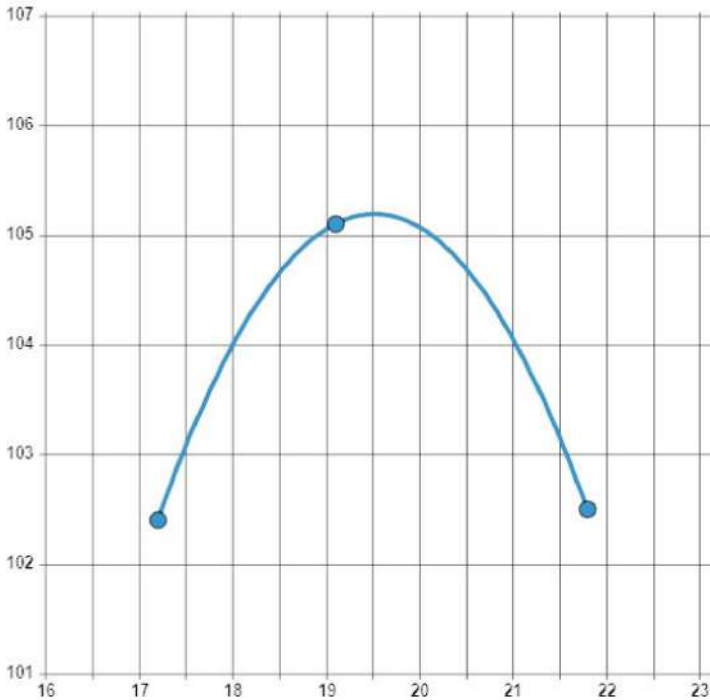
**Sample Location:** On site backfill

**Material Description:** Dark Brown Clay with Gravel

## LAB DATA

**Test Method:** ASTM D1557 - Method C

**Proctor Curve:**



**Maximum Dry Density (pcf):** 105.2

**Optimum Moisture (%):** 19.5

**Soil Classification:** CH Clay with gravel

**Test Completed Date:** 05/30/2023

**Test Completed By:** Efediya, Eugene



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Boerne, TX

## SAMPLE DATA

**Sample Number:** 22718

**Sample Date:** 05/25/2023

**Technician:** Olson, James

**Material Use:** Utility Backfill

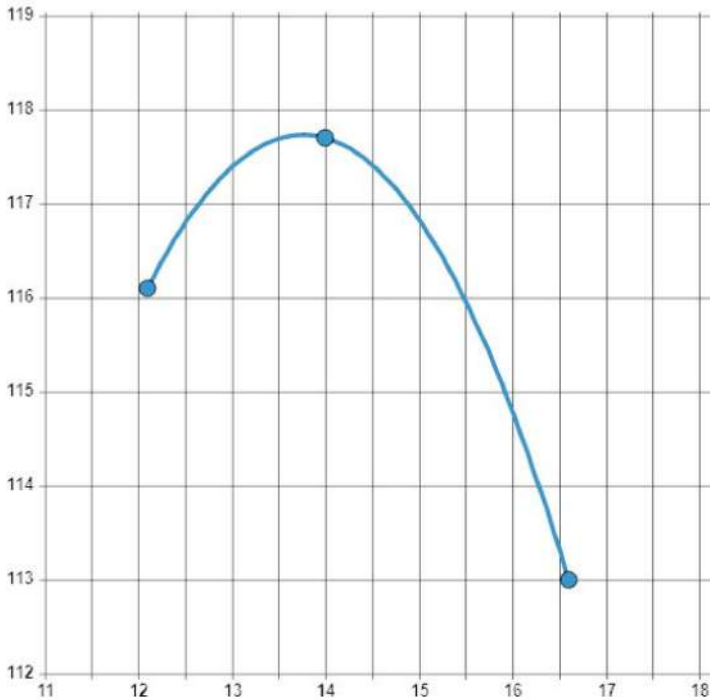
**Sample Location:** On site backfill

**Material Description:** Brown Clay with Gravel

## LAB DATA

**Test Method:** ASTM D1557 - Method C

**Proctor Curve:**



**Maximum Dry Density (pcf):** 117.7

**Optimum Moisture (%):** 13.8

**Soil Classification:** CH Clay with gravel

**Test Completed Date:** 05/30/2023

**Test Completed By:** Efediya, Eugene



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29.8139704,-98.7532319  
Boerne, TX

## SAMPLE DATA

**Sample Number:** 22719 **Sample Date:** 05/25/2023

**Technician:** Olson, James **Material Use:** Utility Backfill

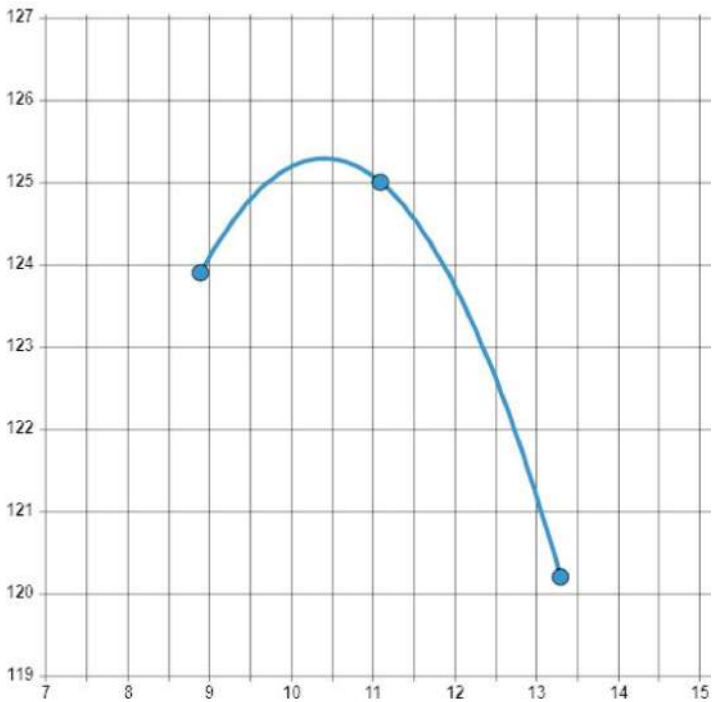
**Sample Location:** On site backfill

**Material Description:** Tan to Brown Gravelly Clay

## LAB DATA

**Test Method:** ASTM D1557 - Method C

**Proctor Curve:**



**Maximum Dry Density (pcf):** 125.3

**Optimum Moisture (%):** 10.4

**Soil Classification:** GC Gravelly Clay

**Test Completed Date:** 05/30/2023

**Test Completed By:** Efediyi, Eugene



InTEC of San Antonio  
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## Compaction Evaluation

Report Date: 07/27/2023  
Test Method: ASTM D6938, Tex 115E

### Client:

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### Project:

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Test Results														
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Remark
60		07/11/23	22718		CH	13.8	117.7	13.5	114.7	130.2	6	97	95	C
61		07/11/23	22718		CH	13.8	117.7	13.7	113.5	129.0	6	96	95	C
62		07/11/23	22718		CH	13.8	117.7	13.2	114.8	130.0	6	98	95	C
63		07/11/23	22718		CH	13.8	117.7	13.6	113.7	129.2	6	97	95	C
64		07/12/23	22718		CH	13.8	117.7	14.2	115.8	132.2	6	98	95	C
65		07/12/23	22718		CH	13.8	117.7	13.5	116.4	132.1	6	99	95	C
66		07/12/23	22718		CH	13.8	117.7	13.8	119.2	135.6	6	101	95	C
67		07/12/23	22718		CH	13.8	117.7	13.5	118.2	134.2	6	100	95	C
Test Information														
Test #	Test Location						Elevation	Reference		Gauge Make / Model / SN / Calibrated			Field Technician	
60	Water Main: 12" Water Main South of Switchback Trail at 200' L.F.							1st Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
61	Water Main: 12" Water Main South of Switchback Trail at 400' L.F.							1st Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
62	Water Main: 12" Water Main South of Switchback Trail at 200' L.F.							2nd Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
63	Water Main: 12" Water Main South of Switchback Trail at 400' L.F.							2nd Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
64	Water Main: 12" Water Main South of Switchback Trail at 200' L.F.							3rd Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
65	Water Main: 12" Water Main South of Switchback Trail at 400' L.F.							3rd Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
66	Water Main: 12" Water Main South of Switchback Trail at 200' L.F.							4th Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
67	Water Main: 12" Water Main South of Switchback Trail at 400' L.F.							4th Lift		Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro	
Remarks				Comments										
C: Compliant				Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.										

Testing performed when called in.  
InTEC did not observe the installation of the material.  
Testing directed by the City Inspector when present.  
Test results apply only to the specific locations and materials noted and may not represent any other locations or elevations.



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Test Results														
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min Comp. (%)	Remark
68		07/13/23	22718		CH	13.8	117.7	13.7	118.5	134.7	6	101	95	C
70		07/13/23	22718		CH	13.8	117.7	13.3	115.8	131.2	6	98	95	C
73		07/14/23	22718		CH	13.8	117.7	13.3	116.8	132.3	6	99	95	C
74		07/14/23	22718		CH	13.8	117.7	13.5	115.9	131.5	6	98	95	C
76		07/14/23	22718		CH	13.8	117.7	14.1	116.3	132.7	6	99	95	C
77		07/17/23	22718		CH	13.8	117.7	14.2	116.8	133.4	6	99	95	C
Test Information														
Test #	Test Location						Elevation	Reference	Gauge Make / Model / SN / Calibrated			Field Technician		
68	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 100' L.F.							1st Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
70	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 100' L.F.							2nd Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
73	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 100' L.F.							3rd Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
74	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 400' L.F.							1st Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
76	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 400' L.F.							2nd Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
77	Water Main: 12" Water Main North of Switchback Trail Cul-de-sac at 400' L.F.							3rd Lift	Troxler / 3430 / 62183 / 08/29/2022			Cisneros, Ramiro		
Remarks				Comments										
C: Compliant				Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.										

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