

VENDITTI LLC

GEOTECHNICAL ANALYSIS & REMEDIATION PROPOSAL

Riverside Commons Mixed-Use Development

Project: Riverside Commons Mixed-Use Development

Location: 4820 Riverside Drive, Austin, TX 78741

Client: Greenfield Development Partners, LLC

Report No.: VND-2025-0847

Prepared By: Scott Gheen | (512) 430-0973 | scott@vendittillc.com

Date: February 26, 2025

Executive Summary

Site Overview: The 3.4-acre property located at 4820 Riverside Drive, Austin, TX 78741 is proposed for a 4-story mixed-use development comprising ground-floor retail and three floors of residential units. Our geotechnical investigation included six soil borings to depths of 20–30 feet and laboratory testing of 18 bulk and undisturbed samples.

Key Findings: Subsurface conditions consist of highly plastic Taylor Group clay (CH classification) extending 8–14 ft below existing grade, overlying weathered limestone. Potential Vertical

Rise (PVR) values ranged from 1.8 to 4.2 inches across test locations, significantly exceeding the maximum allowable threshold of 1.0 inch. Moisture content averaged 22%, with Liquid Limits of 68–84 and Plasticity Indices of 38–52.

Recommendation: A three-phase lime stabilization and moisture conditioning program is recommended covering the full building footprint plus a 5-foot perimeter buffer. All work must be performed per TxDOT Item 260 specifications before foundation placement. Estimated project investment: **\$184,750**.

Site Investigation Summary

Subsurface Conditions

BORING ID	DEPTH (FT)	SOIL CLASSIFICATION	PVR (IN)	LL / PI	STATUS
B-01	25	CH – Fat Clay (Taylor Group)	3.8	78 / 48	CRITICAL
B-02	20	CH – Fat Clay w/ Caliche Seams	4.2	84 / 52	CRITICAL
B-03	25	CL – Lean Clay transitioning to CH	2.1	62 / 36	CRITICAL
B-04	30	CH – Fat Clay / Weathered Limestone	1.8	68 / 38	CRITICAL
B-05	20	CH – Fat Clay (High Plasticity)	3.5	80 / 50	CRITICAL
B-06	25	CL/CH – Mixed Clay, Cobbles at 18 ft	2.4	71 / 43	CRITICAL

Identified Problems & Solutions

#	IDENTIFIED PROBLEM	LOCATION	SEVERITY	RECOMMENDED SOLUTION
1	Highly expansive clay – PVR >4.0 in	NE Quadrant (B-01, B-02)	HIGH	Deep lime injection + moisture conditioning to 14 ft

#	IDENTIFIED PROBLEM	LOCATION	SEVERITY	RECOMMENDED SOLUTION
2	Elevated moisture content (22–28%)	Site-wide	MODERATE	Pre-wetting 48 hrs prior to lime mixing
3	Caliche seams disrupting stabilization	B-02 at 6–8 ft depth	MODERATE	Mechanical scarification before lime application
4	Differential settlement risk at limestone transition	SW Quadrant (B-04)	MODERATE	Overexcavate 2 ft, replace with lime-stabilized fill
5	Perimeter shrink-swell risk	All exterior edges	MODERATE	5-ft buffer lime treatment + soil moisture barrier

PVR Analysis & Soil Modification Program

⚠ CRITICAL ZONE IDENTIFICATION

All six boring locations exceeded the maximum acceptable PVR threshold of 1.0 inch, with the northeast quadrant registering values up to 4.2 inches. Without remediation, foundation movement, slab cracking, and structural distress are highly probable within the first 3–5 years of occupancy. Immediate remediation is required across 100% of the building footprint.

Soil Modification Phases

Phase 1 — Site Preparation & Pre-Wetting (Days 1–5)

Area: Full 3.4-acre building pad plus 5-ft perimeter buffer (~160,000 SF)

Activities: Strip and stockpile topsoil (6 in), scarify existing subgrade to 12-in depth, apply pre-wetting irrigation at 1.5 gal/SF over 48 hours to bring soil moisture to within 2% of optimum.

Equipment: D6 Dozer, 48-in rotary mixer, water truck (4,000-gal)

Phase 2 — Lime Application & Mixing (Days 6–14)

Area: Full pad — two lifts of 6-in each (12-in total treatment depth)

Activities: Spread agricultural quicklime at 6% by dry weight (~35 lb/SF per lift), mix to uniform distribution with rotary mixer, proof-roll with 25-ton pneumatic roller, allow 48-hr cure period between lifts. NE Quadrant (B-01/B-02 zones) receives supplemental pressure-injection lime slurry at 14-ft depth via 8-ft grid pattern.

Equipment: Lime spreader, CAT RM500 reclaimer/mixer, 25-ton pneumatic roller

Phase 3 — Compaction, Testing & Certification (Days 15–20)

Activities: Final compaction to 95% Standard Proctor density, nuclear gauge density testing at 1 test per 5,000 SF minimum, post-treatment soil sampling and PVR recalculation, engineer site walk and written certification of completion.

Acceptance Criteria: PVR \leq 1.0 in across all tested zones, density \geq 95% Standard Proctor, moisture within $\pm 2\%$ of optimum.

Material Specifications

MATERIAL	SPECIFICATION	APPLICATION	QUANTITY
Agricultural Quicklime (CaO)	ASTM C977 / TxDOT Item 260; min 90% CaO purity	Primary stabilizer – mixed into subgrade	420 tons
Lime Slurry (35% solution)	ASTM C977; pressure injected @ 30 PSI	Deep stabilization NE Quadrant, 8–14 ft depth	18,000 gal
Geotextile Moisture Barrier	HDPE, 60-mil; ASTM D7176	Perimeter soil moisture control	3,200 LF
Lime-Stabilized Select Fill	Plasticity Index \leq 15 after treatment; TxDOT Item 132	Overexcavation backfill (SW Quadrant, B-04 zone)	180 CY
Irrigation Water	Potable; pH 6.0–8.5	Pre-wetting and curing moisture	240,000 gal

Project Cost Estimate & Timeline

Cost Breakdown

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
1	Site Preparation – Strip & Scarify	3.4	Acre	\$4,200	\$14,280
2	Pre-Wetting Irrigation Application	160,000	SF	\$0.04	\$6,400
3	Quicklime (CaO) – Furnished & Applied	420	Ton	\$185	\$77,700
4	Lime Slurry – Pressure Injection (NE Quadrant)	18,000	Gal	\$1.85	\$33,300
5	Rotary Mixing – Two 6-in Lifts	320,000	SF	\$0.06	\$19,200
6	Compaction – Pneumatic Roller	3.4	Acre	\$1,800	\$6,120
7	Overexcavation & Select Fill (B-04 Zone)	180	CY	\$48	\$8,640
8	HDPE Perimeter Moisture Barrier	3,200	LF	\$4.25	\$13,600
9	Density & Moisture QC Testing (Nuclear Gauge)	32	Tests	\$85	\$2,720
10	Post-Treatment Lab PVR Recalculation (6 borings)	6	EA	\$265	\$1,590
11	Engineer Site Certification & Report	1	LS	\$1,200	\$1,200
TOTAL PROJECT INVESTMENT					\$184,750

TOTAL PROJECT INVESTMENT**\$184,750**

Estimated based on site conditions and Texas market rates. Valid for 30 days from date of report (expires March 28, 2025).

Project Timeline

Phase	Activity	Duration	Start	Complete
Phase 1	Site Prep, Strip & Pre-Wetting	5 days	Mar 10, 2025	Mar 14, 2025
Phase 2	Lime Application, Mixing & Curing	9 days	Mar 17, 2025	Mar 25, 2025
Phase 3	Final Compaction, QC Testing & Cert.	5 days	Mar 26, 2025	Mar 31, 2025
Total Schedule		~20 Working Days	Mar 10	Mar 31, 2025

Data Gaps & Compliance Review**Identified Data Gaps & Limitations**

Gap / Limitation	Potential Impact	Recommended Action
No groundwater monitoring — seasonal high not confirmed	Elevated moisture may reduce lime effectiveness	Install 2 piezometers; monitor 30 days prior to construction
Cobbles encountered at B-06 / 18 ft — extent unknown	May obstruct lime injection equipment	Probe grid at 10-ft spacing in SW corner before Phase 2

GAP / LIMITATION	POTENTIAL IMPACT	RECOMMENDED ACTION
No buried utility survey within treatment zone	Risk of damage to existing utilities during scarification	811 call + GPR scan required before Phase 1 mobilization
Imported fill (0–3 ft) in SE corner — provenance unknown	Variable compressibility; possible contamination	Remove and replace; collect 2 samples for Atterberg testing
Sulfate content not tested (risk of lime-induced heave)	Soluble sulfates >3,000 ppm can cause ettringite expansion	Test all six boring locations for water-soluble sulfates before lime order

Building Code Compliance

CODE / STANDARD	REQUIREMENT	STATUS
IBC 2021 – Chapter 18	Soil investigation required for expansive soils; PVR ≤ 1.0 in	IN PROGRESS
TxDOT Item 260	Lime treatment spec: 6% min by dry weight, 95% compaction	PENDING WORK
City of Austin Land Dev. Code §25-12	Geotechnical report required for structures >3 stories	COMPLIANT
ASTM D6270 – Lime Stabilization	Lab mix design required prior to field application	COMPLIANT
TCEQ Stormwater Permit (CGP)	SWPPP required for disturbed area >1 acre	OWNER RESPONSIBLE
OSHA 29 CFR 1926 Subpart P	Excavation safety — protective systems for depths >5 ft	COMPLIANT

Professional Certification

This report has been prepared in accordance with generally accepted geotechnical engineering practices in the State of Texas. The analyses, conclusions, and recommendations contained herein are based on site-specific subsurface conditions encountered during the investigation conducted January 14–17, 2025. Field and laboratory procedures conform to applicable ASTM standards. The soil modification program outlined herein, when executed per the specifications described, is expected to achieve and maintain a PVR ≤ 1.0 inch across the entire building pad area and perimeter buffer zone.

This report is intended for the exclusive use of Greenfield Development Partners, LLC and their designated representatives for the referenced project. Use of this report for any other project or purpose is not authorized without written consent from Venditti LLC.

Prepared By: Scott Gheen, P.E. | TX License No. PE-112847
Venditti LLC | (512) 430-0973 | scott@venditillc.com
Report Date: February 26, 2025

VENDITTI LLC

PROPOSAL TERMS & EXCLUSIONS

- This proposal is valid for 30 days and includes applicable Texas Sales Tax.
- Venditti, LLC is licensed and insured for your protection and will perform all work in accordance with City, State and Federal regulations.
- Thank you for the opportunity! We look forward to working with you on this project.

Demolition & Site Exclusions:

Any Scope Not Detailed in This Document, Bonding, Lab Testing, ACM Abatement or Disposal of Hazardous Material, Permits, Permit Fees, Inspections, Inspection Fees, ROW Permits, ROW Usage Fees, SWPPP of Any Kind, Engineering of Any Kind, After Hours Work, Repairs Indicated By Plans, Demolition Notifications, Gas or Electric Utility Disconnects, Salvage For Owner, Patching, Landscaping of Any Kind, Traffic Control, Traffic Control Plans, Backfill, Topsoil, Water, Water Meters, Shoring, Demolition of Piers More Than 4 Feet Below Existing Grade, Laydown Areas, Temporary Access Roads, Lab Testing, SWPPP Maintenance After Demolition Unless Contracted To Do So, Costs, Fees or Fines From Damage to Trees, Unmarked Underground Utilities, or Any Other Unforeseen Conditions.