



CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

January 27, 2021
AGENDA ITEM #9

Discuss and consider approving a contract with Nortex Concrete Lift and Stabilization, Inc. for concrete slab lifting and stabilization on the Manor Expressway (290 Toll)

Strategic Plan Relevance: Regional Mobility

Department: Engineering

Contact: Mike Sexton, P.E., Acting Director of Engineering

Associated Costs: not to exceed \$400,000

Funding Source: FY 2021 Operating Budget – Renewal and Replacement

Action Requested: Consider and act on draft resolution

Background – As part of the Mobility Authority’s Asset Management Program, data is collected to evaluate and determine the facility’s pavement condition. The “ride quality”, whether the pavement is rough or smooth, is one of the measurements we use to evaluate pavement condition. In 2019 the data collected along the 290E corridor (the 6-mile toll road along US 290 from US 183 to SH 130 in east Austin) indicated that several areas have degraded ride quality. These areas are nearing unsatisfactory conditions as defined by our Pavement Management Information System.

The Texas Multiple Award Schedule system is administered by the State Comptroller’s Office. Pursuant to Article 15 of the Mobility Authority Policy Code and in accordance with Section 2155.204, Government Code, and Subchapter D, Chapter 271, Local Government Code, the Mobility Authority participates in the cooperative purchasing program established by State Comptroller’s Office. Nortex Concrete Lift and Stabilization, Inc, is the only provider through the TXMAS program in Texas SmartBuy who performs the required services and is therefore the lowest best value provider.

Previous Actions – The Central Texas Regional Mobility Authority approved the Fiscal Year 2021 Operating Budget on June 24, 2020. The approved FY21 Capital Budget – Renewal and Replacement identified funds for addressing ride quality issues on the 290E corridor.

Action requested/Staff Recommendation – Staff recommends the Board approve the contract with Nortex Concrete Lift and Stabilization, Inc to perform foam injection for slab stabilization and associated traffic control services on the 290E corridor for an amount of \$305,558 with a

contingency amount of \$94,442 for a total not to exceed amount of \$400,000.

We expect the work to start in February and be completed in March.

Funding - Funding for this item will be provided by the FY 2021 Operating Budget - Renewal and Replacement.

Backup provided: Draft Resolution
 Draft Contract

**GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**

RESOLUTION NO. 21-0XX

**APPROVING A CONTRACT WITH NORTEX CONCRETE LIFT AND
STABILIZATION, INC. FOR CONCRETE SLAB LIFTING AND STABILIZATION ON
THE MANOR EXPRESSWAY (290 Toll)**

WHEREAS, the Mobility Authority performs regular inspections of its toll facilities to ensure their safety and quality are appropriately maintained for the traveling public; and

WHEREAS, in the course of these inspections the Mobility Authority has observed a degraded ride quality on the Manor Expressway (290 Toll) between US 183 and SH 130; and

WHEREAS, by Resolution No. 20-037, dated June 24, 2020 the Board of Directors approved Fiscal Year 2021 Operating Budget which included funds for addressing ride quality issues on the 290E corridor; and

WHEREAS, Nortex Concrete Lift & Stabilization, Inc. participates in the Texas Multiple Award Schedule (“TXMAS”) Program administered by the State Comptroller’s Office as part of Texas SmartBuy Membership Program (formerly known as the “State of Texas CO-OP Purchasing Program”); and

WHEREAS, in accordance of with Article 15 of the Mobility Authority Policy Code, purchases made through a cooperative program such as the Texas SmartBuy Membership Program are deemed to have satisfied Mobility Authority procurement requirements; and

WHEREAS, in order to address the ride quality issues on the Manor Expressway (290 Toll), the Interim Executive Director has negotiated a scope of work with Nortex Concrete Lift & Stabilization, Inc. in the amount of \$305,558 which is attached hereto as Exhibit A, and requests an additional contingency amount of \$94,442 for a total not to exceed amount of \$400,000 for concrete slab lifting and stabilization services; and

WHEREAS, the Interim Executive Director recommends that the Board approve the proposed scope of work in the form or substantially the same form attached hereto as Exhibit A and requests authorization to contract with Nortex Concrete Lift & Stabilization, Inc. through the TXMAS Program for contract slab lifting and stabilization services on the Manor Expressway (290 Toll).

NOW THEREFORE, BE IT RESOLVED that the Board hereby approves the proposed scope of work with Nortex Concrete Lift & Stabilization, Inc. in the form or substantially the same form attached hereto as Exhibit A; and

BE IT FURTHER RESOLVED that the Board hereby authorizes the Interim Executive Director to enter into a contract with Nortex Concrete Lift & Stabilization, Inc. in the amount of \$305, 558

through the TXMAS Program, and approves an additional contingency amount of \$94,442 for a total not to exceed amount of \$400,000 for concrete slab lifting and stabilization services to address the degraded ride quality issues identified on the Manor Expressway (290 Toll).

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 27th day of January 2021.

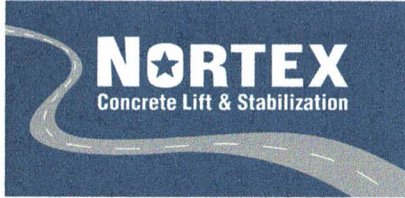
Submitted and reviewed by:

Approved:

Geoffrey Petrov, General Counsel

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A



201 NW 26th St.
Fort Worth, TX 76164
(817) 831-1240 office
(817) 831-1245 fax

Central Texas Regional Mobility Authority
3300 N. IH 35, Suite 300
Austin, TX 78705

Attn: John Jones

Subject: Central Texas Regional Mobility Authority with use of contract number TXMAS-19-03FAC07 for concrete pavement lifting and stabilization with polyurethane foam injections.

Date: January 8, 2021

Dear Mr. Jones:

This is an Agreement between Nortex Concrete Lift & Stabilization, Inc., and the Central Texas Regional Mobility Authority, for concrete pavement lifting and stabilization services with polyurethane foam injections to properly repair dips, heaves, and bridge approach slabs on the 290 Toll main lanes from US 183 to SH 130 at specific locations described in the documentation.

Enclosed you will find the following documents:

1. TXMAS-19-03FAC07 price list for all associated services under the contract.
2. Scope of work to be performed at specified locations including 2 year warranty.
3. Price list for repairs on expressway main lanes under contract TXMAS-19-03FAC07
4. Individual location breakdown with measurements of each work area
5. TXDOT special spec 3061 for "raising and undersealing concrete slabs with foam systems"
6. Nortex Material spec sheet which complies with all requirements of TXDOT ss3061

Compensation to be paid based on actual pounds of polyurethane foam material pumped at each location as specified in the contract documents. Once approved and executed, the purchase order for polyurethane injections repairs must be issued in the Texas SmartBuy online purchasing portal to receive the specified contract pricing.

Nortex requests the Executive Director's signature to execute this agreement in the signature area below.


Signature _____ Date 1/8/21

Casey DeRosa
Asst GM
Nortex Concrete Lift & Stabilization, Inc.

Signature _____ Date _____

William Chapman
Interim Executive Director
Central Texas Regional Mobility Authority



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RAISING & UNDERSEALING CONCRETE PAVEMENT SCOPE OF WORK AND QUALITY CONTROL PLAN

Nortex Concrete Lift & Stabilization, Inc. is committed to maintaining an effective Quality Control Plan that reinforces our commitment to deliver a consistent high quality product and service to our customers.

This plan addresses the following:

- Equipment**
- Work Site Preparations**
- Construction Methods**
- Monitoring Procedures**
- Clean Up Procedures**
- Spill Clean Up Procedures**
- Material Information**
- Warranty Information**

Equipment: A listing of lifting and undersealing equipment, this list is a minimum and shall not preclude the use of additional equipment.

- A. Pneumatic drills and electric drills capable of drilling 5/8-inch diameter holes.
- B. Truck mounted pumping units (Gusmer H20/35 Hydraulic Proportioner Pumps) capable of injecting high-density polyurethane foam between the concrete pavement and the sub-base, and capable of controlling the rate of rise of the pavement.
- C. Hilti Self Leveling Laser Level unit and lifting gages to ensure that pavement is lifted to an even plane.

Work Site Preparations: Shall be specified per contract documents and/or general accepted practices and procedures.

- A. The contractor shall review a profile of the pavement and footing provided by the owner to determine where the slab and footing need to be raised or void filled.

Construction Methods:

- A. Drilling: A series of 5/8" holes shall be drilled at four to six foot intervals through the concrete pavement. The contractor will determine the exact location and spacing of holes based on site conditions and scope of work.
- B. Injecting: The injector on the discharge guns shall make a tight seal in the injection hole. The polyurethane foam is two-component mixtures that meet at the discharge gun and is injected beneath the concrete pavement with approximately 1000 psi. The polyurethane foam initially remains in liquid form for approximately 15 – 20 seconds, which allows the material to move laterally beneath the concrete filling all voids in the area. The polyurethane foam then begins to set up and expand into its solid form exerting the necessary lifting force.

Monitoring Procedures:

- A. Controlling rise: The amount of rise shall be controlled using the pumping unit, by regulating the rate of injection of material. Lifting gages and Laser shall be used to monitor the rise and ensure pavement is lifted to an even plane. Mix Ratio's on Gages must be monitored periodically to ensure proper mixture of material being pumped along with monitoring of heat to keep foam somewhere in the vicinity of 80 to 140 degrees Fahrenheit (depending on outside air temperature).
- B. Drain inlets, asphalt shoulders, MSE walls, etc...will be monitored frequently to ensure material below ground has not traveled to an area it is not intended to go.
- C. Supervisor shall be on site during entire operation and be fully trained in mechanical operation of equipment. Supervisor shall be responsible for safety of his crew at all times and responsible for monitoring lifting procedures.

Clean Up Procedures:

- A. All excess polyurethane material will be removed from the job site.
- B. All injections holes will be re-drilled to a depth of 2-3" and then non shrink cementitious grout will be to close over all holes.
- C. Entire work area will be cleaned and cleared to properly restore the operation lane.

Spill Clean Up Procedures:

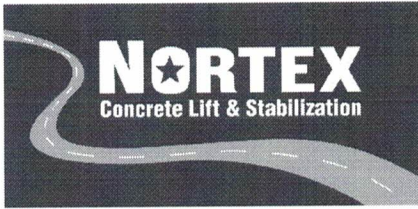
- A. Entire area of spill to be covered and dispersed evenly with absorbent material kept on hand.
- B. After setting phase absorbent material is cleaned up and disposed of in thick trash bags and tied off for proper disposal.
- C. Process can be repeated until spill is sufficiently cleaned.

Material Information:

- A. All material used is certified for compliance with all state, and local authorities pertaining to the contract documents or special provisions. TXDOT ss3061 is provided as well as Delta Urethanes Norfill spec sheet and NCFI Polyurethanes 24-003 spec sheet to show material compliance.

Warranty Information:

- A. All locations repaired under this contract stand by an industry standard two year warranty that if a slab settles more than 1/2" in that period then it will be repaired free of charge. Traffic control and other incidental services would not be covered under the warranty.



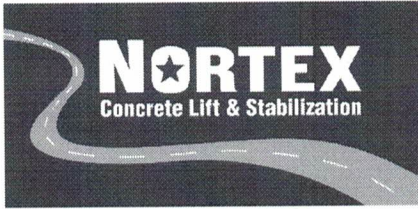
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**TXMAS-19-03FAC07 concrete pavement lifting and stabilization
 with polyurethane injections and value added services**

Price Sheet Per Location

Item Number	Description/Measurement	Unit	Price per Unit	Quantity	Total
	EB Hwy 290 at Tuscany Way Departure Slab				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	3,100	\$13,826.00
	EB Hwy 290 at pavement located at MM 589.8				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	2,500	\$11,150.00
VA-6	Soil Densification/Deep Injections at 5-10 ft	LB	\$5.83	1,200	\$6,996.00
	EB Hwy 290 at pavement located at MM 589.88				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	11,000	\$49,060.00
VA-6	Soil Densification/Deep Injections at 5-10 ft	LB	\$5.83	2,400	\$13,992.00
	EB Hwy 290 at pavement at MM 590.3				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	10,500	\$46,830.00
VA-6	Soil Densification/Deep Injections at 5-10 ft	LB	\$5.83	2,400	\$13,992.00
	EB Hwy 290 at pavement at MM 590.7				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	7,800	\$34,788.00
VA-6	Soil Densification/Deep Injections at 5-10 ft	LB	\$5.83	1,200	\$6,996.00

	EB Hwy 290 at Harris Branch Approach Slab				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	3,400	\$15,164.00
	WB Hwy 290 at Harris Branch Departure Slab				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	3,000	\$13,380.00
	WB Hwy 290 at Little Walnut Creek Dep. Slab				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	3,000	\$13,380.00
	WB Hwy 290 at Tuscany Way Approach Slab				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	3,300	\$14,718.00
	WB Hwy 290 at US 183 Abutment				
1000003346	Polyurethane Injections (10,001 LBS and above)	LB	\$4.46	600	\$2,676.00
Total Purchase Price =				\$256,948.00	



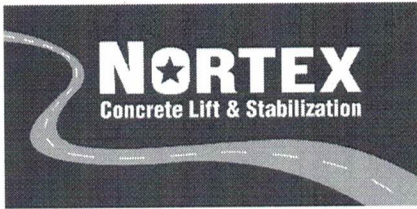
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**TXMAS-19-03FAC07 concrete pavement lifting and stabilization
 with polyurethane injections and value added services**

Price Sheet Per Location for Traffic Control

Item Number	Description/Measurement	Unit	Price per Unit	Quantity	Total
Incidental	Message Board	Night	\$70	17	\$1,190
Incidental	Message Board Delivery/Pickup	Each	\$75	4	\$300
	EB Hwy 290 at Tuscany Way Departure Slab				
Incidental	2 LLC w/ swap to 1 RLC	Night	\$2,450	1	\$2,450
	EB Hwy 290 at pavement located at MM 589.8				
Incidental	2 LLC 1 RLC	Night Night	\$2,450 \$1,708	1 1	\$4,158
	EB Hwy 290 at pavement located at MM 589.88				
Incidental	2 LLC 1 RLC	Night Night	\$2,450 \$1,708	2 1	\$6,608
	EB Hwy 290 at pavement at MM 590.3				
Incidental	2 LLC 1 RLC	Night Night	\$2,450 \$1,708	2 1	\$6,608
	EB Hwy 290 at pavement at MM 590.7				
Incidental	2 LLC 1 RLC	Night Night	\$2,450 \$1,708	2 1	\$6,608
	EB Hwy 290 at Harris Branch Approach Slab				
Incidental	2 LLC w/ swap to 1 RLC 1 RLC	Night	\$2,450	1	\$2,450

	WB Hwy 290 at Harris Branch Departure Slab				
Incidental	2 LLC w/ swap to 1 RLC 1 RLC	Night	\$2,450	1	\$2,450
	WB Hwy 290 at Little Walnut Creek Dep. Slab				
Incidental	2 LLC w/ swap to 1 RLC 1 RLC	Night	\$2,450	1	\$2,450
	WB Hwy 290 at Tuscany Way Approach Slab				
Incidental	2 LLC w/ swap to 1 RLC 1 RLC	Night	\$2,450	1	\$2,450
	WB Hwy 290 at US 183 Abutment				
Incidental	1 RLC	Night	\$1,708	1	\$1,708
Total Purchase Price =					\$39,430.00



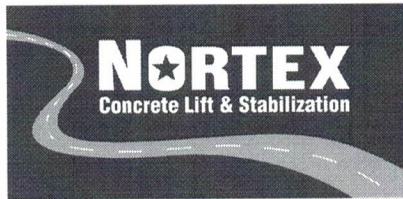
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**TXMAS-19-03FAC07 concrete pavement lifting and stabilization
 with polyurethane injections and value added services**

Price Sheet Per Location for Off Duty Officers

Item Number	Description/Measurement	Unit	Price per Unit	Quantity	Total
	EB Hwy 290 at Tuscany Way Departure Slab				
Incidental	1 Off Duty Officer	Hour	\$60	9	\$540
	EB Hwy 290 at pavement located at MM 589.8				
Incidental	1 Off Duty Officer	Night	\$60	18	\$1,080
	EB Hwy 290 at pavement located at MM 589.88				
Incidental	1 Off Duty Officer	Night	\$60	27	\$1,620
	EB Hwy 290 at pavement at MM 590.3				
Incidental	1 Off Duty Officer	Night	\$60	27	\$1,620
	EB Hwy 290 at pavement at MM 590.7				
Incidental	1 Off Duty Officer	Night	\$60	27	\$1,620
	EB Hwy 290 at Harris Branch Approach Slab				
Incidental	1 Off Duty Officer	Night	\$60	9	\$540
	WB Hwy 290 at Harris Branch Departure Slab				
Incidental	1 Off Duty Officer	Night	\$60	9	\$540
	WB Hwy 290 at Little Walnut Creek Dep. Slab				
Incidental	1 Off Duty Officer	Night	\$60	9	\$540
	WB Hwy 290 at Tuscany Way Approach Slab				
Incidental	1 Off Duty Officer	Night	\$60	9	\$540

	WB Hwy 290 at US 183 Abutment				
Incidental	1 Off Duty Officer	Night	\$60	9	\$540
Total Purchase Price =					\$9,180



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TO: Central Texas Regional Mobility Authority (CTRMA)
 3300 N. IH-35, Suite 300
 Austin, TX 78705

Estimate

ATTN: John Jones
 Senior Maintenance Coordinator

DATE: December 22, 2020

RE: TXMAS-19-03FAC07 Polyurethane Injection Repairs

LOCATIONS: See Below

EB Tuscany App/Dep Slabs (Ref Marker 589)

Departure Slab, 75x55, 2" Lift	3,100 LBS	\$13,826.00
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EB Mainlane Dip (Ref Marker 589.8)

Heave after Walnut Departure Slab		
56x45, 2" Lift	2,500 LBS	\$11,150.00
56x15 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00

EB Mainlane Dip (Ref Marker 589.88)

Double Heave		
80x56, 1.5" Lift	2,800 LBS	\$12,488.00
15x56 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00
120x56, 3" Lift	5,500 LBS	\$24,530.00
15x56 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00
70x56, 1.5" Lift	2,700 LBS	\$12,042.00

EB Mainlane Heaving (Ref Marker 590.3)

Double Heave		
80x72, 1.5" Lift	3,000 LBS	\$13,380.00
15x56 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00
120x72, 3" Lift	4,500 LBS	\$20,070.00
15x56 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00
80x72, 1.5" Lift	3,000 LBS	\$13,380.00

EB Mainlane Heaving (Ref Marker 590.7)

80x56, 3" Lift	4,800 LBS	\$21,408.00
15x56 Soil Densification/Deep Injection	1,200 LBS	\$6,996.00
65x56, 2" Lift	3,000 LBS	\$13,380.00

Harris Branch App/Dep Slab (Ref Marker 592.2)

EB Approach Slab, 70x65, 2" Lift	3,400 LBS	\$15,164.00
WB Departure Slab, 70x65, 1" Lift	3,000 LBS	\$13,380.00

WB Little Walnut Dep Slab (Ref Marker 589.49)

70x56, 2" Lift	3,000 LBS	\$13,380.00
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WB Tuscany Approach Slabs (Ref Marker 589)

Approach Slab 60x68, 2" Lift	3,300 LBS	\$14,718.00
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WB US 183 Bridge Abutment (Ref Marker 599.25)

Right Lane + Shoulder		
20x20, 2" Lift @ Expansion Joint	600 LBS	\$2,676.00
Cracking + Sprawling up against wall		

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION
1000003346	Concrete Pavement Lifting and Stabilization with Polyurethane Injections 10,001 LBS and above	LB	48,200	\$4.46	\$214,972.00
VA-6	Deep Injection (Polyurethane Injection Depth 5-10 Feet)	LB	7,200	\$5.83	\$41,976.00

Total: \$256,948.00

Purchases must be made through Texas Smart Buy online purchasing portal. All pricing is from Smart Buy contract number: TXMAS-19-03FAC07.

Casey DeRosa
Asst GM

Special Specification 3061

Raising and Undersealing Concrete Slabs with Foam Systems



1. DESCRIPTION

Raise and underseal concrete slabs at locations shown on the plans and as directed.

2. MATERIAL

Furnish a closed cell hydro-insensitive, high-density polyurethane foam system with a minimum free rise density of 3.0 lb./cu. ft., with a minimum compressive strength of 50 psi. Use epoxy material meeting the requirements of DMS-6100, "Epoxies and Adhesives," Type III, Class C.

3. EQUIPMENT

Provide machinery, tools, and equipment necessary for proper execution of the work. At a minimum, provide the following:

- 3.1. **Drill.** Use a drill capable of drilling holes of the required diameter and depth.
- 3.2. **Pump.** Furnish a pump unit with the appropriate attachments capable of injecting the polyurethane:
 - Under the concrete slab at the depth(s) required in the plans.
 - At a controlled flow rate with a digital reading of the cumulative pounds used.
- 3.3. **Level.** Provide control equipment to indicate when the final grade has been achieved and to monitor slab movement.

4. CONSTRUCTION

- 4.1. **Preparation.** Prepare a profile of each area to determine the extent of the concrete slab that requires adjustment or raising. Ensure that the finished concrete slabs will conform to the grades and cross-section of the slabs as shown in the plans or as directed. Determine the exact locations of the injection holes for each treated area. Obtain approval for the injection hole locations.
- 4.2. **Drilling.** Use drilling operations that do not damage the surrounding concrete. Drill injection holes with diameters less than or equal to 3/4 in. through the concrete as proposed or as directed. When an injection point is through a terminal anchor slab and sleeper slab, provide a tube to insure the polyurethane material does not migrate between the two slabs.
- 4.3. **Injection.** Inject high-density polyurethane formulation directly under the slab. Do not extend the nozzle end below the bottom of the concrete. Cease injection when directed, no improvement is observed, or material extrudes from locations other than slab penetrations. Take precautions to prevent the intrusion of injected material into any drainage facility and other structures. Remove any excessive polyurethane material after the nozzle is removed from the hole. Seal the hole with an approved method and material.
- 4.4. **Grade Control.** Control the final elevations within 1/4 in. of the proposed profile elevations. The Engineer may check the treated area to confirm that the pavement has been aligned properly to facilitate drainage.

- 4.5. **Repairs.** As directed, repair any pavement slab or bridge approach/departure slab that has cracked or did not achieve required grades as a result of the Contractor's operation at no additional cost to the Department.

Fill injection holes with epoxy or approved concrete patching materials.

5. SET TIME

Formulate the high-density polyurethane to set and obtain 90% of its compressive strength within 15 min. after injection. Attain the manufacturer's recommended compressive strength unless otherwise shown on the plans.

6. MEASUREMENT

This Item will be measured by the pound of high-density polyurethane injected and accepted.

7. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Raising and Undersealing Concrete Slab." This price is full compensation for furnishing and injecting polyurethane material, concrete repairs, labor, materials, tools, and incidentals.

Nor-Fill Grout

Product Description:

Nor-fill Grout is a two component, closed cell polyurethane hydrophobic grout system used for soil stabilization, lifting foundations, road beds, driveways or any surface that needs to be secured or lifted to grade. The product is formed by the reaction of a resin blend and polymeric methylene diphenyl diisocyanate. The resin blend is comprised of polyols, additives and blowing agents. The unique composition of Nor-Fill Grout allows the material to perform well in wet environments frequently found below grade.

Typical Chemical Attributes:

	<u>Isocyanate</u>	<u>Resin</u>
Viscosity	190 cps	820 cps
Density	10.3 lbs./gal	8.5 lbs./gal
Appearance	brown liquid	dark grey liquid

Typical Reaction Profile:

	<u>Hand Mix</u> <u>@ 72 °F</u>	<u>Machine Mix</u> <u>@120°F</u>
Cream Time (sec)	19	7
Gel Time (sec)	70	-
Tack Free Time (sec)	90	14-16
Rise Time (sec)	110	20-22
Density (Free Rise)	4.1 pcf	3 - 4 pcf

Typical Physical Properties:

Restrained Core Density (ASTM D1622)	5.3 pcf
Compressive Strength (ASTM D1621)	85 psi
Tensile Strength (ASTM D1623)	105 psi
Closed Cell Content (ASTM 2856)	>93%
Water Absorption (ASTM D2842)	<0.04 lbs./sq.ft.
Dimensional Stability (ASTM D2126)	Volume change
Heat age, 93°C, 7 days	- 1.6%
Humid age 70°C, 97% R.H. 7 days	- 1.0%
Cold age, -40°C, 7 days	0.1%
Resistance to Solvents	Excellent
Resistance to Mold and Mildew	Excellent
Maximum Service Temperature	200°F

*These are typical values obtained from laboratory experiments and are provided as general information only.

Processing Parameters:

Nor-Fill is designed to be applied by trained contractors using high pressure, plural component proportioners. The proportioner must be able to maintain the designed temperature and pressure for Nor-Fill Grout™ products:

Pressure	1000 to 1750 psi
Pre-heater temperature	95 to 125°F
Hose temperature	95 to 125°F

Optimal settings will vary with proportioner, hose dimensions, gun configuration and ambient conditions. It is critical for installers to understand the limitations associated with their equipment.

Storage & Shelf Life:

Nor-Fill Grout™ components have an optimal shelf life of 6 months when stored in unopened containers at temperature between 50° and 70°F. Excessively high temperatures may reduce optimal shelf life. Store the isocyanate and the resin components in a conditioned area, away from exposure to direct sun light and precipitation. Keep material containers tightly closed. Material in opened containers should be kept under a blanket of dry air or nitrogen.

Store material at 70° – 80°F for 48 hours prior to application.

Safety and Handling Information:

It is critical to read and become familiar with the Material Safety Datasheets prior to working with Nor-Fill Grout™ liquid components. When handling these materials and during application, always use appropriate personal protective equipment. Avoid prolonged breathing of vapors; avoid contact with skin, eyes and mucous membranes. In case of chemical contact with eyes, flush with water for at least 15 minutes and get medical attention. For more information, consult the Material Safety Datasheets.

The descriptions, data, designs and information contained herein are presented in good faith and believed to be accurate. This information is provided for guidance ONLY. Many factors will affect the processing or application of Delta Urethanes LLC products. It is necessary that you make tests to determine ultimate suitability for Delta Urethanes LLC products for your particular application. No warranties of any kind, either expressed or implied, including warranties of merchantability or fitness for a particular purpose, are made regarding products described, data or designs presented. In no case shall the descriptions, information, data or designs provided be considered a part of our terms and conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. You expressly agree to release Delta Urethanes LLC from all liability in tort or contract based on the technical information provided. All such information is accepted at your own risk.

TERRATHANE™ Polyurethanes

TerraThane™ Polyurethanes by NCFI are uniquely formulated for a variety of geotechnical applications. Each batch goes through stringent testing and quality assurance standards to ensure reliability in the field.

About 24-003

TerraThane™ 24-003 is a hydrophobic/hydro-insensitive, MDI-based polymer formula that is specially designed for exceptional flow or spread under concrete structures when water is present. The 24-003 flowability ensures voidfill and support before lifting. 24-003 is available with an NSF/ANSI 61 Section 5 - 2017 certification.

24-003 APPLICATIONS

- Bridge Approaches and Departures
- Highway and Streets
- Airport Runways and Taxiways
- Concrete Slab Lifting
- Joint Matching
- Void Filling
- Deep Soil Injection

REACTIVITY AT 110°

Cream Time	7 seconds
Gel Time	13 Seconds
Tack Free Time	19 seconds
Rise Time	26 seconds



Physical Properties

Physical Properties	Test Method	Free Rise	Restrained
Density	ASTM D1622	4.0 pcf	5-6 pcf
Compressive Strength	ASTM D1621	68 psi	80-100 psi
Compressive Modulus	ASTM D1621	1900 psi	2400-3200 psi
Tensile Strength	ASTM D1623	79 psi	100-120 psi
Tensile Modulus	ASTM D1623	1446 psi	3100 psi
Water Absorption	ASTM D2842	≤ 0.04 lbs/ft ²	≤ 0.04 lbs/ft ²
Closed Cell Content		>92%	>92%
Max Service Temp		200°F	200°F
Elongation	ASTM D1623	5.1%	
Shear Strength	ASTM C273	52.0 psi	90 psi
Shear Modulus	ASTM C273	602 psi	677 psi
Flexural Strength	ASTM D790	80 psi	387 psi
Flexural Modulus	ASTM D790	1625 psi	13502 psi

TerraThane Geotechnical Division • NCFI Polyurethanes

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TERRATHANE™
24-003
 Technical Data Sheet

Special Testing/Certifications

NYDOT Hydro-insensitivity test, GTP-9		>96% density retention >93% comp str retention	
Dimensional stability, % volume change, 28 day aging (ASTM D-2126)	Heat age at 158°F	Freezer at -20°F	Humid age at 100% RH & 120°
	-1.5%	-0.1%	-1.0%

Performance

Wet Environments... **Excellent**

Lifting Capacity... **Excellent**

Chemical Resistance

Solvents... **Excellent**

Mold and Mildew... **Excellent**

Component Properties

Component	B-24-003	A2-000
Appearance	Transparent Liquid	Clear Brown Liquid
Brookfield Viscosity @ 20rpm	500 cps at 72°	200 cps at 72°
Specific Gravity	1.07	1.24
Weight per Gallon	8.9 lbs	10.3 lbs
Storage Temperature	50° - 100°F	50° - 110°F

Processing Parameters

ISO Temperature	100° - 120°F
Poly Temperature	100° - 120°F
Mixing Pressure	800 psi static, 600 psi dynamic, 1000/800 preferred

Mix Ratio

By weight...100 parts poly : 116 parts iso

By volume...100 parts poly : 100 parts iso

Storage and Handling

Store the poly from 50°F to 90°F. Avoid moisture contamination during storage, handling, and processing. For both components, pad containers and day tanks with either nitrogen or dry air (desiccant cartridge or air dryer @ -40°F dew point). For optimum shelf life, the recommended storage temperature for iso is 50°F to 110°F. **Do not expose iso to lower temperatures – freezing may occur.** Store components at 70°F to 90°F for several days prior to use to minimize components being too viscous at time to take to field. Shelf life of Resin is 6 months and ISO is 2 years for factory sealed containers.

Application Cautions

Careful consideration should be given to selection and application of any NCFI Polyurethane foam system where excessive foam mass build-up can occur. Excessive polyurethane foam lift thickness will result in high internal temperatures within the injected foam, which can result in degraded foam properties, or in extreme cases, fire or spontaneous combustion. **Any flammability rating contained in this literature is not intended to reflect hazards presented by this or any other material under actual fire conditions.** Each person, firm or corporation engaged in the application, installation or use of any polyurethane product should carefully determine whether there is a potential fire hazard associated with such product in a specific usage, and utilize all appropriate precautionary and safety measures. Please consult NCFI Polyurethanes for safety considerations, polyurethane system selection and application recommendations.

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