City of Mission Request for Proposals
Floor Slab Pressure Grouting and Foundation Underpinning

Construction Specification

1. PRESSURE GROUTING - INTERIOR

1. SCOPE

The work shall consist of drilling grout holes and injecting grout under pressure to fill voids and raise, to a more nearly level condition, the floor slab, and shall include furnishing of all materials, labor, and equipment required.

It is the intent that the grout will be placed immediately below the existing floor slab. The Contractor may, if they desire, place the grout at a greater depth, but no additional compensation will be paid for this procedure.

2. MATERIALS

The materials proposed to be used for pressure grouting shall be approved prior to use. The Owner may direct tests be performed by the Contractor and witnessed by the Engineer. Document the results of all tests and inspections and make a copy available to the Engineer upon request. Take prompt action to correct conditions which have resulted in, or could result in, the submission of materials, products, or completed construction which do not conform to the requirements of the specifications.

Acceptable grouting materials include:

Polymer The material used for raising concrete slabs shall be a polymer, such as water blown high-density polyurethane. The material shall be hydrophobic, closed cell, and shall exhibit the following minimum physical characteristics and properties:

Density (lb/Ft.3) ASTM1622	Compressive Strength (psi) ASTM 1621
3.0	40 PSI
3.5	50 PSI
4.0	60 PSI
5.0	110 PSI

The polymer foam system will have a free rise density of 3.0 – 3.2 lb/ft3, with a minimum compressive strength of 40 psi.

The polymer will meet the criteria of NSF/ANSI 61 for use around public water supply systems.

Portland Cement Type I and II Cement shall conform to the requirements of ASTM C 150.

Pulverized lime stone Lime stone shall conform to the requirements of ASTM C5-10.

Fly-Ash Fly-ash shall conform to the requirements of ASTM C 618, Standard Specification for Fly-ash and Raw or Calcined Natural Pozzolan Class C Fly-ash for use as a Mineral Admixture in Portland Cement. Specifically, it shall conform to all requirements of Table 1 and Table 2 as outlined therein.

The concrete supplier shall furnish a notarized certificate from the fly-ash marketer at the time of submittal of concrete mix designs for approval indicating conformance with these requirements. Also, a copy of the most recent chemical analysis shall be provided.

At no time during the course of the project will a change of fly-ash source (plant) be permitted without the prior written consent of the Engineer.

Water. Water used in the grout mix shall be clean and free from injurious amounts of oil, acid, organic matter, or other deleterious substances. Potable water will be provided by the Owner for use on the project site at no cost to the Contractor.

Sand. Sand for grout shall meet current TXDOT specifications for fine-aggregate and shall be free of deleterious substances.

Bulk Fillers. Bulk fillers other than sand shall be free of deleterious substances.

Admixtures. Admixtures shall be compatible with the grouting equipment, grout, and the existing facility.

Storage and Supply. A sufficient quantity of all materials shall be on hand to ensure that grouting operations will not be interrupted or delayed. Materials shall be stored and protected at all times and at all locations in such a manner that the quality of the materials is maintained.

Labeling. Materials shall be packaged and labeled such that they can be readily identified.

3. EQUIPMENT

All drilling and grouting equipment shall be of a type and capacity, and in condition, to perform the work described.

4. ARRANGEMENT OF GROUTING EQUIPMENT

The arrangement of grouting equipment shall to the extent practical shall minimize any disruption of the on-going operations of the Library.

5. COMMUNICATIONS

A suitable voice communications system between individuals at the pump units and the

holes shall be maintained by the Contractor.

6. SUBMITTALS

Contractor to submit the following for review by the Engineer prior to mobilizing.

Work Plan-A Work Plan detailing the Grouting Contractor's proposed schedule broken out by each area to be grouted, materials and equipment to be used. The Work Plan shall include a drawing showing the proposed layout of the grout injection points.

Description of the procedure to be used to avoid existing utilities in, or below, the floor slab.

Description of the techniques to be used to monitor the elevation of the slab during the grouting to avoid over lifting the slab.

Description of the techniques that will be used to control dust from drilling holes in the slab, grinding offsets at joints, and other operations.

Materials:

Description of the materials to include:

Product Name

Manufacturer

Manufacturer's certification that the material provided meets the industry standards for the material

The composition and mix ratios of the grout(s) to be used

MSDS for all materials to be used at the site. The Owner reserves the right to reject materials that are not compatible with the continued use of the office and second floor areas of the Convention Center during the work, or any area of the facility after the completion of the work.

Upon completion of the work a certification that all utilities located below the floor slab in the work area; including but not limited to electrical power, communications, water supply, and sanitary sewer (to include kitchen floor drains) have been tested, and found to be in good working order.

7. OWNER PROVIDED

The Owner will provide at no cost to the Contractor:

Lay down area of at least 2,000 square feet in the parking lot for material and equipment.

Potable water: a hose bib will be designated for the Contractor's use during the duration of the project.

Electricity: 110 volt 15 amp service at various locations in the vicinity of the work area in the interior of the building.

8. GROUTING PROCEDURE

Grouting, shall be accomplished with caution to prevent over lifting of the floor slab or excessive leakage of grout at the surface.

Grout injection holes shall be located close enough together that grout injected in one hole is observed at adjacent holes to verify that the grout is forming a continuous mass under the floor slab.

The quantity of grout prepared in advance shall be kept to a minimum. Grout, which has remained in the mixer or holdover tank with or without agitation for greater than the time recommended by the manufacturer, shall be discarded.

If special ventilation, or other, measures are required to use particular materials the Contractor is to provide these measures incidental to the performance of their work. The Owner reserves the right to direct the Contractor to stop work and take additional measures, as required, to maintain a safe and healthy environment for others working in the Convention Center, at no cost to the Owner.

9. RECORDS

The Contractor shall keep complete records of all grouting operations. These records include the area in which the work was performed, the weight of grout in pounds used, time logs of grout mixes and admixtures used in each batch of grout.

The Contractor shall cooperate in providing all information related to grouting activities required by the contract.

A copy of the records shall be provided the Engineer at the completion of each shift via email.

10. CLEANUP

All grout holes to be filled with a plug a minimum of 2 inches thick of Portland cement grout. The surface of the plug shall be struck off level with the slab. Plugs extending above the slab shall be ground to be flush. Plugs that are depressed relative to the slab shall be reworked to be flush.

Vertical off-sets at joints or cracks in the floor slab greater than 1/16 inch at joints and cracks in the floor slab shall be ground to a uniform slope over a width of at least 50 times the height of the vertical off-set.

After grouting is completed, the Contractor shall remove the grouting plant and all related parts, equipment, and supplies from the site, including unused materials and waste.

The work area, including the lay down area, shall be broom clean.

11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices or lump sum prices are established in the contract, such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the completion of the work.

Work Stoppage for Convenience of Owner Payment for work stoppage for the convenience of the Owner will be made at the contract lump sum price. Such payment will include compensation for moving grouting equipment and materials to a designated location on-site. No compensation will be paid for stop work orders issued due to failure of the Contractor to execute work in accordance with the approved work plan.

Slab Elevation Recovery. Compensation for slab elevation recovery shall be paid as a percentage of the recovery required to restore the slabs in the Speer Memorial Library to a level condition. The percentage recovery for each area to be determined based on the difference between the pre-construction survey and a post-construction survey conducted by the Owner of that area. The Engineer will schedule the post-construction survey upon written notification from the Contractor that they desire the survey to be conducted. Areas of the slab, if any, that have been lifted above “level” will be regarding as being low by an amount equal to that which they are high.

The Contractor may at their own cost retain a professional land surveyor to conduct pre- and post- construction surveys of the slab elevation. If the Contractor retains a PLS to perform these surveys the average of the Contractor’s and the Owner’s surveys shall be used to determine the compensation. The methods used by the Contractor’s PLS must equal those used by the Owner’s surveyor for accuracy and precision.

The Contractor may elect to perform additional grouting to achieve greater recovery of the floor slab following the post-construction survey by the Owner. In this case the Contractor will be required to pay for the Owner’s surveyor to perform an additional

post-construction survey following the additional grouting which would then become the basis for payment.

For grouting of the other areas of the interior the basis of payment shall be pounds of polymer grout or cubic feet of Portland cement grout used in those areas

Subsidiary Items. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Testing to verify that utilities, including drains, communication, data, and electrical lines in the floor slab function properly upon completion of the work, and repairs to any damaged utilities are incidental and included in the lump sum, or unit price, for grouting of each area.

3. UNDERPINNING OF INTERIOR WALLS

1. SCOPE

As a turn-key design-build project install underpinning piers to a minimum depth of ?? feet below the existing grades to raise, to a more nearly level condition, the interior slab supported walls around the Library shall include furnishing of all materials, labor, and equipment required. The underpinning piers can either be installed prior to pressure grouting the floor slabs and be used to lift the walls to the desired elevations, or installed after the floor slabs have been pressure grouted and lifted to the desired elevation. Prior to lifting the floor slab all material, such as caulk or mortar, previously used to fill cracks that had opened in the partition walls is to be removed.

After the lifting is completed soil, or gravel, shall be compacted back into the holes excavated to install underpinning piles, a 4 inch layer of gravel placed over the compacted soil, and a 6mil poly vapor barrier placed over the gravel and the hole in the slab patched with a minimum of 4 inches thick of 3,000 psi Portland cement concrete attached to the adjacent areas of the floor slab with two #4 dowels on each side of the hole extending a minimum of 6 inches into the existing slab. Patches shall be flush with and finished to match the adjacent areas of the floor slab.

2. MATERIALS

The materials proposed to be used for underpinning shall be approved prior to use. Take prompt action to correct conditions which have resulted in or could result in the submission of materials, products, or completed construction which do not conform to the requirements of the specifications.

Steel Pipe Steel pipe with a minimum outside diameter of 2.8 inches with a minimum wall thickness of 0.22 inches and a minimum yield strength of 50 ksi. Connections may be threaded, welded, or bolted.

Underpinning Brackets Underpinning brackets compatible with the underpinning pile with an allowable load of 20 kips.

Coating All steel, including pipe, brackets, bolts, and other components that are not encapsulated in Portland cement grout to be hot dip galvanized. Coat welds or damage to the HDG with ZRC Cold Galvanizing Compound, or approved equal, in accordance with the manufacturer's recommendations.

Portland Cement Type I and II Cement shall conform to the requirements of ASTM C 150.

Water. Water used in the grout mix shall be clean and free from injurious amounts of oil, acid, organic matter, or other deleterious substances. Potable water will be provided by the Owner for use on the project site at no cost to the Contractor.

Admixtures. Admixtures shall be compatible with the grouting equipment, grout, and the existing facility.

Materials shall be stored and protected at all times and at all locations in such a manner that the quality of the materials is maintained.

Labeling. Materials shall be packaged and labeled such that they can be readily identified.

3. EQUIPMENT

All drilling and grouting equipment shall be of a type and capacity, and in condition, to perform the work described.

4. ARRANGEMENT OF EQUIPMENT

The arrangement of the drilling and grouting equipment shall be made to minimize the disruption of the on-going operations of the Convention Center.

5. COMMUNICATIONS

A suitable voice communications system between individuals at the pump units and the holes shall be maintained by the Contractor.

6. SUBMITTALS

Contractor to submit the following for review by the Engineer prior to mobilizing.

Work Plan-A Work Plan detailing the materials and equipment to be used.

Materials:

Description of the materials to include:

Product Name

Manufacturer

Manufacturer's certification that the material provided meets the industry standards for the material

The composition and mix ratios of any grout(s) to be used

MSDS for all materials to be used at the site. The Owner reserves the right to reject materials that are not compatible with the continued use of the office and second floor areas of the Convention Center.

7. OWNER PROVIDED

The Owner will provide at no cost to the Contractor:

Lay down area of at least 2,000 square feet in the parking lot for material and equipment, and access to at least one bay of the loading dock.

Potable water: a hose bib will be designated for the Contractor's use during the duration of the project.

Electricity: 110 volt 15 amp service at various locations in the vicinity of the work area in the interior of the building.

8. DRILLING AND GROUTING PROCEDURE

Underpinning piers may be installed by pre-drilling using augers, air, or mud rotary techniques and lowering the underpinning pier into the pre-drilled hole, or by drilling with the underpinning pier using a single use bit and air or mud rotary. Helical or push (reaction) type piers may be used. All piers, regardless of type must terminate at a minimum depth of ?? feet. Helical or push piers that are made of open-ended pipe that would create a potential pathway for water to travel through must be filled with grout.

Grouting of underpinning piers shall be accomplished either with a tremie pipe extending to the bottom of the drilled hole, or by pumping grout through the interior of the underpinning pier. Grouting is to continue until clean grout is emerging from the hole having flushed out the cuttings and completely filled both the interior and exterior annular spaces to the ground surface.

The quantity of grout prepared in advance shall be kept to a minimum. Grout, which has remained in the mixer or holdover tank with or without agitation for greater than one (1) hour, shall be discarded.

Brackets may be installed on underpinning piers prior to the grout setting, but load shall not be transferred to the bracket for a minimum of 72 hours.

After the grout has cured for a minimum of 72 hours the structure being underpinned may be lifted to the maximum extent practical. Helical or push type piers may be lifted immediately after installation, even if they are to be filled internally with grout.

If special ventilation, or other, measures are required to use particular materials the Contractor is to provide these measures incidental to the performance of their work. The Owner reserves the right to direct the Contractor to stop work and take additional measures, as required, to maintain a safe and healthy environment for others working in the Convention Center, at no cost to the Owner.

9. RECORDS

The Contractor shall keep complete records of all underpinning operations. These records include the date, number, and depth to which each underpinning pier was installed.

The Contractor shall cooperate in providing all information related to underpinning activities required by the contract.

A copy of the records shall be provided the Engineer at the completion of each shift via email.

10. CLEANUP

After underpinning pier installation and grouting is completed, the Contractor shall remove the drilling equipment, grouting plant and all related parts, equipment, and supplies from the site, including unused materials and waste.

The work area, including the lay down area, shall be broom clean. Landscaped areas shall be free of debris and raked.

11. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices or lump sum prices are established in the contract, measurement and payment for pressure grouting will be made as described below. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the completion of the work.

Underpinning Piers. Compensation for underpinning piers shall be paid as a unit price for supplying, installing, and grouting (if required by the pier design) an underpinning pier to a depth of ?? feet below the existing floor slab, installing a bracket to transfer load from the structure to the underpinning pier, and performing lifting.

Subsidiary Items. Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Excavation to install piers, chipping and cutting of existing footings to install brackets, backfilling excavations with compacted fill, and replacing concrete slabs (if removed to install underpinning piers) are incidental and included in the base price for underpinning.

Floor Slab Pressure Grouting and Drilled Underpinning Pier Installation
Bid Sheet

Item	Unit Cost	Unit	Number	Extended Cost	Estimated Duration (days)
Pressure Grouting Slab		Lump Sum	1		
Underpinning Piles		Each	76		N/A
Total	N/A	N/A	N/A		