February 19, 2020
*Revised July 7, 2020*

Mr. Neil Hanlon, Development Associate
Greystar
450 Sansome Street, Suite 500
San Francisco, California 94111

Via E-Mail: neil.hanlon@greystar.com

Subject: UC Hastings Law Campus Housing, 198 McAllister, San Francisco, California 94102 \#10-36983
Materials Testing and Construction Inspection Services

Dear Mr. Hanlon:
is pleased to submit our cost proposal to provide materials testing and construction inspection services for the UC Hastings Law Campus Housing project, located at 198 McAllister in San Francisco, California. would be proud to be part of your team, helping to ensure the construction quality and success of this project.

Following are our cost estimate and scope of services. We assembled this proposal based on the following sources:

- $50 \%$ DD Structural drawings prepared by Rutherford + Chekene, dated August 22, 2019;
- 50\% DD Architectural drawings prepared by Perkins + Will, dated August 22, 2019;
- Construction schedule prepared by Clark Construction dated January 19, 2020.

Thank you for giving the opportunity to be a part of your project team. We are committed to providing our clients the very best service possible to fulfill their testing and inspection needs, and are eager to prove this commitment to you. Should you have any questions or require additional information, please do not hesitate to contact me.

Respectfully submitted,

## SCOPE OF SERVICES

## Auger Cast Piles

Non-Shrink Grout Placement

Our inspector's duties will include the following:

- Review mill test certifications of reinforcing steel;
- Inspect reinforcing steel of cages prior to placement in piles;
- Monitor the placement of the grout;
- Test the flow of each batch of grout using a flow cone;
- Cast cubes for compression tests at the required frequency.


## Compression Testing

We will transport all samples to our laboratory for testing in strict accordance with the American Society for Testing and Materials (ASTM) requirements. Reports of compression tests will be distributed to the appropriate parties.

## Reinforced Concrete

## Mix Design Review

We will review the proposed concrete mixes in our laboratory for conformance with the specifications.

## Reinforcing Steel Placement

Prior to the pours, our inspector will inspect the reinforcing steel placement to determine that it is according to plans and specifications. Our inspector will check:

- Size and spacing of bars;
- Location and length of splices;
- Clearances;
- Cleanliness of bars;
- Spacing tolerances;
- Proper support of steel with ties.


## Concrete Placement and Sampling

During the pours, our inspector will be on-site continuously, as required by Code, to monitor the placement. Our inspector will:

- Determine that no bars are displaced during pouring;
- Observe cleanliness of steel;
- Determine adequacy of placement and vibratory equipment;
- Determine proper delivery rate of concrete and monitor batch times;
- Determine the correct mix is being utilized;
- Monitor slump of each truck;
- Record temperature of air and concrete;
- Cast five $(4 \times 8)$ cylinders for compression tests per 150 cubic yards;
- Perform air checks, if required by specifications, during concrete placement;
- Observe anchor bolt/dowel installation operations to determine hole depth, embedment and cleanliness, as well as materials and workmanship. We will inspect to determine all dowels are installed in accordance with contract documents and/or manufacturer's requirements.


## Concrete Compression Testing

We will transport all samples to our laboratory for compression testing in strict accordance with the American Society for Testing and Materials (ASTM) requirements. Compression test reports will be distributed to the appropriate parties.

## Post-Tensioned Concrete

## Mix Design Review

We will review the proposed concrete mixes in our laboratory for conformance with the specifications.

## Tendon and Reinforcing Placement

The day before a scheduled pour, we will dispatch a qualified inspector to check the tendon and reinforcing placement for conformance to the drawings and good construction practices. Our inspector will determine that the path of strands is the same as on the approved plans, and that tendons are securely tied and placed.

## Concrete Placement and Sampling

During the pours, our inspector will be on-site continuously, as required by Code, to monitor the placement. Our inspector will:

- Determine that no bars are displaced during pouring;
- Observe cleanliness of steel;
- Determine adequacy of placement and vibratory equipment;
- Determine proper delivery rate of concrete and monitor batch times;
- Determine the correct mix is being utilized;
- Monitor slump of each truck;
- Record temperature of air and concrete;
- Cast six cylinders for compression tests per 150 cubic yards;
- Perform air checks, if required by specifications, during concrete placement;
- Observe anchor bolt/dowel installation operations to determine hole depth, embedment and cleanliness, as well as materials and workmanship. We will inspect to determine all dowels are installed in accordance with contract documents and/or manufacturer's requirements.


## Stressing

Continuous inspection will be required during the stressing operations. All elongations and jacking forces will be recorded as the work proceeds. Elongation measurements not within the five percent ( $5 \%$ ) tolerance will be noted and immediately brought to the attention of the contractor, engineer and owner.

## Compression Testing

We will transport all samples to our laboratory for compression testing in strict accordance with ASTM requirements. Reports of compression tests will be distributed to the appropriate parties.

## Structural and Miscellaneous Steel

## Shop Inspection

- Review of welding procedure specifications;
- Material identification and mill certificate review;
- Observe the utilization of certified welders and approved welding procedures;
- Visual inspection of welding to determine compliance with contract documents;


## Exhibit E

- Nondestructive testing of moment welds and column splices;
- Confirm approximate preheat temperature;
- Continuous inspection of multi-pass fillet welds, groove welds and reinforcing steel welding.


## Field Inspection

- Observe the utilization of certified welders and approved procedures;
- Confirm approximate preheat temperature;
- Nondestructive testing of moment welds and column splices;
- Inspect to determine and observe proper installation and tightening of high strength bolts;
- Visual inspection of welding to determine compliance with contract documents;
- Continuous inspection of multi-pass fillet welds, groove welds and reinforcing steel welding.


## Metal Deck|Shear Studs

Intermittent visual inspection will be conducted for metal deck and shear stud welding.

## High Strength Bolting

Prior to installation, our inspector will confirm that fastener components are properly stored. Our inspector will perform pre-installation verification testing daily where applicable to confirm the suitability of the completed fastener assembly and confirm the procedure and proper use by the bolting crew of the pretensioning method to be used. A representative sample of not fewer than three complete fastener assemblies of each combination of diameter, length, grade and lot to be used shall be checked to confirm the proper pretension is achieved. Our inspector will then observe the pretensioning methods used are in accordance with the specifications and that joints are brought to a snug tight condition and then tightened systematically from the most rigid part of the joint. Our inspector will document the testing and observations performed and locations of accepted and rejected connections.

## Epoxy Dowels and ANchors

As required, we will perform visual examination of dowel/anchor placement to determine dowel/anchor holes are clean, of the proper depth and diameter, and installed as specified by the manufacturer. In addition, we will perform proofload testing of the epoxy dowels/anchors at the percentage defined by the plans and specifications.

NOTE: These estimates assume that adequate access will be provided for performing the work at maximum production, i.e., scaffolding. Should any dowel/anchor fail, additional tests will be required per plans.

## Fireproofing

California Building Code (CBC) 1704.12 requires thickness verification of twenty five percent ( $25 \%$ ) of structural steel columns and primary beams on each story, and on 10 percent (10\%) of secondary beams. Floor decking requires four readings per 1,000 square feet. In addition, the substrate will be verified prior to the application of all fireproofing material. Density will be checked on one beam, column and floor per 2,500 square feet of floor area in accordance with American Society for Testing and Materials (ASTM) E-605. If specified, Adhesion/Cohesion testing will be performed.

## Alternate Scope of Services

## Shotcrete and Pre-Production Test Panel

## Inspection

We will provide continuous inspection of shotcrete, as required by Code. We will be performing the following:

- Determine that the reinforcing steel is placed properly prior to the arrival of concrete on-site.
- Monitor the temperature of the concrete as it is being placed;
- Check batch tickets as they arrive on-site to determine that the proper mix is being delivered;
- Monitor and control slump and water cement ratios;
- Check for rebound effects and determine that the nozzleman on-site is qualified to perform the work he is performing that day;
- Control and monitor rebound effects, nozzle distance, and velocity;
- Witness the fabrication of test panels for conformance with American Concrete Institute (ACI) standards, and observe that the test panel is shot in a manner similar to placement of shotcrete for the structure;
- The test panel(s) will be cored at our laboratory, and three samples will be tested at 28 days for compression testing.

Pre-production test panels are required to certify shotcrete nozzleman. The pricing is based on qualifying four nozzlemen and includes:

- Inspection of pre-production panel placement;
- Coring of test panel for nozzleman grading;
- Compression testing;
- A staff engineer, in accordance with ACl procedure, will perform grading.

Additional certification of prospective nozzlemen shall be billed at rates noted herein.

