ISSUE DATE: September 10, 2020

Bidders are hereby notified that the Bidding and Contract Documents for the above project, for which Bids are to be received on **Tuesday, September 15, 2020**, are amended as follows:

**SECTION I – REVISED DOCUMENTS ISSUED WITH THIS ADDENDUM:**

1.1 Section I – Informative, Subsection (4) Supplementary Conditions

   A. Supplementary Conditions Section 5. **INDEMNIFICATION OF CITY AGAINST LIABILITY** (Pages S.C. - 2 to 3)
      - Delete in its entirety and replace with Attachment A, 5. **DEFENSE AND INDEMNIFICATION**

   B. Supplementary Conditions Section 6. **CONTRACTOR’S INSURANCE REQUIREMENTS** (Pages S.C. - 3 to 6)
      - Delete in its entirety and replace with Attachment A, 6. **CONTRACTOR’S INSURANCE**

1.2 Revised Project General and Technical Specifications

   A. Specification Section 033000 – Cast in Place Concrete
      - Add section 2.1 F Color Pigment Sheet 033000-5
      - Replace Specification Section 03300 in its entirety with the attached revised Technical Specification Sections, Attachment B.

   B. Specification Section 110-3.8 – Sheet GP-88
      - Replace Specification Section C-104-3.1B Sheets C-104-2 and C-104-3 with the attached revised Technical Specification Sections, Attachment B.

   C. Specification Section 110 – Sheets GP-107 and GP-108
      - Replace Sheets GP-107 and GP-108 with the attached revised Technical Specification Sections, Attachment B.

1.3 Revised Drawing Sheets

   A. A.C-105 to A.C-109 - Project Phasing and Barricade Plan
• Replace drawing sheets in their entirety with the attached.

B. A.EL-100 Electrical Site Lighting Plan
   • Revised Note ED007

C. A.CP-103 Joint Details 1
   • Revised Detail 6 – Position of Dowel at Panel Joint

D. A.AS-100 Architecture Site Details – Site Walls
   • Revised to include additional notes for construction.

SECTION II – QUESTIONS AND ANSWERS:

Q1: With PCCP paving occurring during the summer months will there be any variance allowed on the concrete temperature specification of 90 degrees?

A1: No variance will be granted in relief of the technical specifications for material requirements. Contractor will be responsible for incorporating all costs that may be associated with concrete temperature in the bid price to achieve the requirements in the specifications.

Q2: Will slip form paving be allowed using ready mix during hot weather months?

A2: Per the technical specifications the Contractor may choose to use either slip formed, fixed form or a combination of both after submittal for review and approval of the RPR.

Q3: Sheet A.C-105 shows the fence shifting to the east to allow for 3A construction. With this shift in the fence the service road beneath taxiway S and T would become airside as well as the 3A work. Since the completion of phase 3 could be concurrent with phase 3A does that mean during 3A and during phase 4 fence set that the only access to the site (concourse and apron contractor) will come through airside?

A3: Phase 3A has been deleted from the project and work has now been added to either Phase 3 construction to be completed landside or Phase 4B construction to be completed partially landside and partially airside. See revised attached phasing sheets included with this Addendum No. 3.

Q4: Sheet A.C-106 shows the service road on the new PCCP paving and transitioning off the paving to the existing taxiway S. However, future phase 4B/4C will not be constructed. Will temp AC be required to make this transition through this area? If so where should this cost be included?

A4: Temporary transitions of asphalt pavement will be required to facilitate construction access, grade differential, and daily airport operations. Requirements for these temporary asphalt transitions and associated earthwork have been added to the project phasing plans and detailed in the revised Federal General Provisions section GP-110. Payment for this item shall be included in bid item GP-110-7.1 “Airfield Safety and Security” as outlined in the revised specifications.

Q5: Sheet A.C-106 shows the current fence alignment will intersect the fence alignment for phase 4A in the NW corner. Will micro phasing be required to put the phase 4 fence line in?

A5: See attached revised phasing sheets for phasing requirements, in Attachment C.

Q6: Sheet A.C-108 moves the fence to the west side of the trash compactors. Specification C-104-3.1B states that the contractor shall maintain access to the trash compactors.
Does this apply even with the compactors landside?

**A6:** Trash Compactors will, at all times, remain airside with continuous access to the Owner and airport tenants. See attached revised phasing sheets in Attachment C. Revised Plan Sheets.

**Q7:** Sheet A.C-108 Phase 4D extends into the TOFA on group V and VI. Will Taxiway S be restricted to group IV during phase 4D construction?

**A7:** See Specification Section C-104-3.1B – Phase 4D on page C-104-3

**Q8:** Please provide the duration of time required for the installation of the phase 4 barrier/fence (including approval) and removal of phase 3 barrier/fence.

**A8:** The contractor shall use 4 weeks for the relocation, reestablishment, and approval of the new temporary security fence by the Concourse Contractor. Notification to the RPR shall be provided within the time periods specified in the technical specifications section C04-3.1

**Q9:** Specification 110-3.8 page GP-88 paragraph 3 states that the contractor is to provide guards for the project. Please confirm that this will not be contractor cost and provide any guard scheduling restrictions.

**A9:** See Specification Section C-104-13(b). Section 110-3.8 paragraph 2 in the attached revised technical specs has been replaced for continuity.

**Q10:** Specification Page C-104-2 references gate “D1”. Please clarify the location of this gate.

**A10:** Answer provided in Project Aerials supplies in Addendum 2.

**Q11:** Specification C-104-3.1A states that the NTP is anticipated and has a hard completion date (247 CD). Will the contract be written as 247 CD regardless of NTP date?

**A11:** The Contract will be written as 247 Calendar Days completion from NTP to substantial completion, based on the date of the NTP issued.

**Q12:** Specification C-104-3.1B states that phase 3 east won’t be available until March 26, 2011, please confirm 2021.

**A12:** The date now reads March 26, 2021. See attached revised Technical Specifications Section C-104-3.1B in Attachment B.

**Q13:** Specification C-104-3.1B states that “The contractor shall maintain access to the concourse during the entirety of phase 3”. Please define what access will be required. Will there be exterior concourse work taking place during phase 3, need access throughout phase 3, require any laydown locations or access the new slabs prior to substantial completion?

**A13:** Due to site logistics, cooperation and communication between contractors will be required. The owner anticipates the apron contractor to maintain access to the north end of the concourse from the vehicle service road. Contractor’s should assume that there will not be any exterior access to the east, west, and south sides of the concourse after the dates listed in the technical specifications.
Q14: *Will boarding bridge installation begin after 8/24/21?*

A14: Boarding bridge installation will begin after or on the date of the approval of the fence relocation after Phase 3 to be completed no later than August 1, 2021. The apron contractor should not anticipate continuing work in the landside area, except as ingress and egress to complete airside work. The date listed in the technical specifications is reflective of the date the required to turn over Phase 3 to the Owner and Concourse contractor.

Q15: *Will any laydown area be provided onsite outside of the work zone footprints?*

A15: No laydown area onsite outside the work zone footprints will be allowed. Contractor laydown area will be provided offsite or onsite within the active work area footprint.

Q16: *Will all personnel working airside (Phase 3A, Phase 4) need to be badged to enter this area? Will escorting be allowed?*

A16: Any work on the project to be completed inside the airport security areas will comply with all requirements listed in the technical specification sections 104 and 110 of the general provisions, and Sky Harbor International Airport's Security and Operation guidelines. Non badged personnel and escorts will only be afforded to transient material or equipment delivery drivers.

Q17: *Will 100% sweeper coverage be required while working airside?*

A17: See Specification Section 110-5.1 (12) on Sheets GP-103 and GP-104. “The Contractor shall be required to have a sweeping machine and operator on site, ready always during construction activity.” Other contractor maintenance requirements are listed in the contract documents.

Q18: *There are Solar Powered obstruction lights to be mounted to construction fencing at every 75'. What pay item will that fall under?*

A18: The solar powered obstruction lights on the existing and new temporary security fence will be supplied and installed by others.

Q19: *Bid item 66 says, installation of power from obstruction lights to terminal building. I assume this is the feeder from the concourse. Will the concourse building contractor be providing this conductor?*

A19: Note 4 on Sheet A.EL-103 states the underground conduit is provided by the concourse contractor. Conductors indicated on sheet A.EL.105 are to be provided by the Apron contractor under the respective bid item.

Q20: *Drawing A.EL-100, key note ED007 & ED008 says demolition to be completed by concourse contractor. Please confirm*

A20: Note ED007 on sheet A/EL-100 has been revised in the attached. The apron contractor will be responsible for completing this work. Note ED008 on sheet A.EL-100 is correct as written. This work will/is completed by the concourse contractor.

Q21: *Drawing AE.2.7.0 shows grounding static receptacles w/ #4/0 copper conductor to building rebar being installed. What pay item will this work fall under?*
A21: Installation of the aircraft ground receptacle and connection to the ground loop is by the Concourse Contractor, and not a part of this project.

Q23: The plans show access ramps that appear to have truncated domes. Please confirm if this is included in this bid’s scope of work.

A23: The ramps, sidewalk and curb surrounding the concourse building are not in the scope of work of the apron contractor and will be completed by others.

Q24: It would appear that the cantilever portion of the blast wall foundation is on the north side of the wall. No removal/replacement of asphalt or other surfacing is shown on the western portion of the blast wall. This will be required for construction, and we would need to know the limits and how it is to be paid. If the foundation is to the south side of the wall, would removal / replacement of the PCCP panels be required and if so how would it be paid?

A24: The foundation toe is to the non-retaining side of the blast wall, with the heel (larger footing portion) below the retaining side. Removals required for the foundation have either been detailed on the plans or fall beneath the apron contractors scope of work for replacement area. The portion below the vehicle service road will have not been constructed as in the scope of apron contractor in Phase 5. Excavation, backfill, and grading will be paid in their respective bid items per the specifications.

Q25: Is the north-south portion of the blast wall to be constructed per the detail provided for the main portion (east-west)? Additionally, is the handrail shown on the detail incidental to the wall?

A25: All sections of the blast wall will be constructed per the construction documents and details. The handrail referenced is actually a blast screen wall with HSS and glazing, and shall be incidental to the Blast Wall bid item.

Q26: The blast wall pictures that were included for reference appear to show colored concrete. I was unable to find anything in the specifications regarding colored concrete for the blast wall. Please confirm colored concrete is not required, if it is required, please provide the specification.

A26: The new blast wall shall match finishes to the existing, as shown in example on A.AS-101 and project documents. It is anticipated that colored concrete will be required to match existing. Specification Section 03300 – 2.1 F. has been added to the specifications to clarify integral color requirements. The Contractor shall provide color samples and mockups for review and acceptance by the Owner prior to installation which match the provided sample.

Q27: There appears to be a discrepancy with the spacings shown in the dowel detail vs dowel matrix. Please advise.

A27: Dowel Matrix, Detail 6 on Sheet A.CP-103 has been revised, see attached revised Plan Sheets, Attachment C.

Bidders must acknowledge receipt of this Addendum by listing the number and date, where provided, on the PROPOSAL P. -1

Attachments:
All other terms and conditions remain unchanged.

Samantha B. Ansmann  
Contracts Specialist II  
602-681-5361  
samantha.an smann@phoenix.gov  
City of Phoenix, Design and Construction Procurement
5. **DEFENSE AND INDEMNIFICATION**

To the maximum extent allowed by law, including Title 34 A.R.S., Contractor (“Indemnitor”) agrees to defend, indemnify, and hold harmless the City of Phoenix and its officers, officials (elected or appointed), agents and employees (and any jurisdiction or agency issuing permits for any work included in the project, and its officers, agents and employees) (“Indemnitee”) from any and all claims, actions, liabilities, damages, losses or expenses, (including but not limited to court costs, attorney fees, expert fees, and costs of claim processing, investigation and litigation) of any nature or kind whatsoever (“Losses”) caused or alleged to be caused, in whole or in part, by the wrongful, negligent or willful acts, or errors or omissions of Indemnitor or any of its owners, officers, directors, members, managers, agents, employees, or subcontractors (Indemnitor’s Agents”) arising out of or in connection with this Contract. This defense and indemnity obligation includes holding Indemnitee harmless for any Losses or other amount arising out of or recovered under any state’s workers’ compensation law or arising out of the failure of Indemnitor or Indemnitor’s Agents to conform to any federal, state or local law, statute, ordinance, rule, regulation, or court decree. Indemnitor’s duty to defend Indemnitee accrues immediately at the time a claim is threatened or a claim is made against Indemnitee, whichever is first. Indemnitor’s duty to defend exists regardless of whether Indemnitor is ultimately found liable. Indemnitor must indemnify Indemnitee from and against any and all Losses, except where it is proven that those Losses are solely as a result of Indemnitee’s own negligent or willful acts or omissions. Indemnitor is responsible for primary loss investigation, defense and judgment costs where this indemnification applies. In consideration of the City’s award of this Contract, Indemnitor agrees to waive all rights of subrogation against Indemnitee for losses arising from or related to any work performed by Indemnitor or Indemnitor’s Agents for the City of Phoenix under this Contract. The obligations of Indemnitor under this provision survive the termination or expiration of this Contract.

6. **CONTRACTOR’S INSURANCE**

The Contractor and Subcontractors must procure insurance against claims that may arise from or relate to performance of the work hereunder by Contractor and its agents, representatives, employees and subcontractors. Contractor and subcontractors must maintain that insurance until all of their obligations have been discharged, including any warranty periods under this Contract.

The City in no way warrants that the limits stated in this section are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under this Contract by the Contractor, its agents, representatives, employees, or subcontractors and Contractor may purchase additional insurance as they determine necessary.

A. **Scope and Limits of Insurance**

The Contractor must provide coverage with limits of liability not less than those stated below. An excess liability policy or umbrella liability policy may be used to meet the liability limits provided that (1) the coverage is written on a “following form” basis, and (2) all terms under each line of coverage below are met.

1. **Commercial General Liability – Occurrence Form**
The policy must name the City of Phoenix as an additional insured with respect to liability for bodily injury, property damage and personal and advertising injury with respect to premises, ongoing operations, products and completed operations, and liability assumed under an insured contract arising out of the activities performed by, or on behalf of the Contractor, related to this Contract.

Policy must not contain any restrictions of coverage with regard to operations on or near airport premises.

Coverage must include XCU coverage.

There shall be no endorsement or modification which limits the scope of coverage or the policy limits available to the City of Phoenix as an additional insured.

City of Phoenix is an additional insured to the full limits of liability purchased by the Contractor.

The Contractor’s insurance coverage must be primary and non-contributory with respect to any insurance or self-insurance carried by the City.

Contractor’s policies must be endorsed to provide an extension of the completed operations coverage for a period of nine years.

2. **Automobile Liability**

   Bodily injury and property damage for any owned, hired, and non-owned vehicles used in the performance of this Agreement.

   **Combined Single Limit (CSL)** $5,000,000

   a. The policy must be endorsed to include the following additional insured language: “The City of Phoenix is named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Contractor, including automobiles owned, leased, hired or borrowed by the Contractor”.

   b. Policy must not contain any restrictions of coverage with regard to operations on or near airport premises.

3. **Worker's Compensation and Employers' Liability**

   **Workers’ Compensation**

   **Employers’ Liability**

   Each Accident $100,000

   Disease – Each Employee $100,000

   Disease – Policy Limit $500,000
a. Policy must contain a **waiver of subrogation** against the City of Phoenix.
b. This requirement does not apply when a Contractor or subcontractor is exempt under A.R.S. 23-902(E), AND when such Contractor or subcontractor executed the appropriate sole proprietor waiver form.

4. **No Builders' Risk Insurance required.**

B. **Additional Insurance Requirements**

The policies must include, or be endorsed to include, the following provisions:

1. On insurance policies where the City of Phoenix is named as an additional insured, the City of Phoenix is an additional insured to the full limits of liability purchased by the Contractor even if those limits of liability are in excess of those required by this Contract.

2. The Contractor’s insurance coverage must be primary insurance and non-contributory with respect to all other available sources.

3. With regard to general liability, the City of Phoenix is named as an additional insured for both products completed operations and premises operations.

C. **Notice of Cancellation**

For each insurance policy required by the insurance provisions of this Contract, the Contractor must provide to the City, within two business days of receipt, a notice if a policy is suspended, voided or cancelled for any reason. Such notice will be sent directly to the City of Phoenix Contracts Specialist listed on Page I.F.B. - 1 of these specifications and will be sent by certified mail, return receipt requested.

D. **Acceptability of Insurers**

Insurance is to be placed with insurers duly licensed or authorized to do business in the state of Arizona and with an A.M. Best rating of not less than “B+VI”. The City in no way warrants that the above-required minimum insurer rating is sufficient to protect the Contractor from potential insurer insolvency.

E. **Verification of Coverage**

Contractor must furnish the City with certificates of insurance (ACORD form or equivalent approved by the City) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.

All certificates and any required endorsements are to be received and approved by the City before work commences. Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.

All certificates required by this Contract will be sent directly to Design and Construction Procurement via email at str.title34.procure@phoenix.gov. The City project number, contract number and project description must be noted on the certificate of insurance. The City reserves the right to require complete, certified copies of all insurance policies required by this Contract, at any time. **DO NOT SEND CERTIFICATES OF INSURANCE TO THE CITY’S RISK MANAGEMENT DIVISION.**
F. **Subcontractors**

Contractor’s certificate(s) must include all subcontractors as additional insured under its policies or subcontractors must maintain separate insurance as determined by the Contractor, however, subcontractor’s limits of liability will not be less than $1,000,000 per occurrence / $2,000,000 aggregate.

G. **Approval**

Any modification or variation from the insurance requirements in this Contract must be made by the Law Department, whose decision is final. Such action will not require a formal Contract amendment, but may be made by administrative action.

H. **Off-Duty Police Officer Requirements**

It is required that the City provide off-duty police officers for construction projects as defined in the most recent edition of the City of Phoenix Traffic Barricade Manual. The Engineer must competitively procure Off Duty Police with vendors who are Authorized Traffic Coordinators with the City of Phoenix Police Department Off Duty Coordinator. The following requirements must be included in the procurement:

1. Hourly fees charged

2. Administrative fees (administrative fees to be charged as a part of the hourly rate, not billed separately)
   a. Pay applications requesting reimbursement for Off Duty Police hours worked will be accompanied with itemized documentation indicating officer name, date worked, hours worked, time of day worked and location.
   b. For audit purposes, contractor’s files will contain documentation from the successful off duty vendor that the above items are accounted for in the vendor’s price proposal.

3. Insurance Requirements:
   a. Commercial General Liability – Occurrence Form

       Policy must include bodily injury, property damage and broad form contractual liability coverage.

       | Coverage Type                          | Amount          |
       |---------------------------------------|-----------------|
       | General Aggregate                     | $5,000,000      |
       | Products – Completed Operations Aggregate | $5,000,000    |
       | Personal and Advertising Injury        | $5,000,000      |
       | Each Occurrence                        | $5,000,000      |

       The policy must be endorsed to include the City of Phoenix as an additional insured with respect to liability arising out of the activities performed by, or on behalf of, the contract worker.

   b. Non-owned Auto Liability $5,000,000

       Coverage must be provided if a City of Phoenix Police vehicle is being used in the performance of the off-duty traffic control services.
The policy must be endorsed to include the City of Phoenix as an additional insured with respect to liability arising out of the use and operation of a City vehicle.

c. Worker's Compensation and Employers' Liability

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<td>Each Accident</td>
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<td>$100,000</td>
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<tr>
<td>Disease – Policy Limit</td>
<td>$500,000</td>
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Policy must contain a waiver of subrogation against the City of Phoenix.

4. For Aviation Department Projects:
Off Duty Police needs at Phoenix Sky Harbor International Airport (boundaries include 24th Street to 143 and Air Lane Road to Old Tower Road) require that the Officers:

- Must be City of Phoenix Police Officers with Phoenix Sky Harbor International Airport all areas badge – preference for Airport Bureau police officers
- Have experience working in active airport environment

For all other areas at Phoenix Sky Harbor International Airport and Phoenix Deer Valley Airport, it is requested that Off Duty City of Phoenix Police be given preference over others due to their familiarity with City of Phoenix laws and procedures.
ATTACHMENT B-
TECHNICAL SPECIFICATION SHEETS

(ATTACHED)
PHOENIX SKY HARBOR INTERNATIONAL AIRPORT
TERMINAL 4 51 APRON
TERMINAL 3 AND TERMINAL 4
DESIGN BID BUILD
PROJECT NO. AV08000083 FAA
AIP 3-04-0029-0XX-20XX
ADDENDUM NO. 3
SEPTEMBER 10TH, 2020

REVISED TECHNICAL SPECIFICATIONS

REVISED TECHNICAL SPECIFICATIONS:
SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

REVISED CIVIL SPECIFICATIONS:
GENERAL PROVISIONS SECTION 110-3.8
GENERAL PROVISIONS SECTION 110-7.1
PROJECT SPECIFIC SPECIAL PROVISIONS C-104
SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. The drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section only applies to the construction of the Blast Fence foundation and Blast Wall as depicted in the Contract Documents, all else shall follow civil technical specifications.

Section Features:
1. Cast-in-place structural concrete
2. Concrete mix design
3. Concrete placement procedures
4. Concrete finishing
5. Concrete curing
6. Repair of surface defects

B. Related Sections:
1. 031000 – Concrete Forming and Accessories
2. 032000 – Concrete Reinforcing

1.3 REFERENCE STANDARDS
A. The latest versions of the publications listed below form a part of this specification; comply with provisions of these publications except as otherwise shown or specified.

1. ACI 117 Standard Specification for Tolerances for Concrete
2. ACI 301 Standard Specifications for Structural Concrete, including other standards referred to in ACI 301, such as ASTM, etc.
3. ACI 305.1 Standard Specification for Hot Weather Concreting
4. ACI 306.1 Standard Specification for Cold Weather Concreting
5. ACI 308.1 Standard Specification for Curing Concrete
6. ASTM C1116-03 Standard Specification for Fiber-Reinforced Concrete

1.4 SUBMITTALS
A. General: Make submittals in accordance with Section 013300, "Submittal Procedures."

B. Concrete Mix Design Proportions: Submit concrete mixture proportions and characteristics. Submit the concrete mix design to the local building officials where required. Do not begin concrete production until concrete mix designs have been reviewed and approved. Mix designs shall include proportions of all ingredients, including admixtures added at time of batching or at job site. Include the following:
1. Specify the locations for each mix design.
2. Specify the method used to determine proposed concrete mix design. Include field test records or trial mix test data used to establish the average compressive strength of the concrete mixture.
3. For aggregates, submit types, pit or quarry locations, producers’ names, gradings, specific gravities, certification, and evidence not more than 90 days old demonstrating compliance with this specification. Aggregate weights shall be based upon saturated surface dry conditions. Include concrete mix gradation of fine and coarse aggregates.
4. For admixtures, submit types, brand names, producers, manufacturer’s technical data, and certification data.
5. Submit the cement type and certification, fly ash type and certification, water/cementitious materials ratio, and source of water supply.
6. Submit the slump.
7. Submit the air content of freshly mixed concrete.
8. Submit the concrete compressive strength at 7, 28, and 56 days. The 56-day strength is required only when specified in the Concrete Mix Specification Table in the General Notes.
9. Submit the chloride ion content of concrete.
10. For fibrous reinforcing, submit the type, fiber length, dosage rate, and dosage procedures.

C. Curing Methods: Submit written methods, procedures, and products for curing of all concrete.

D. Repair Methods: Submit the proposed methods of repair, along with repair material specification, manufacturer's data on the proposed patching material, and the proposed preparation and application procedure.

E. Construction Joints: Submit information for acceptance of proposed location and treatment of construction joints proposed but not indicated on the Construction Documents.

F. Qualification of Finishers: Submit qualifications of the finishing contractor and the finishers who will perform the Work.

G. Matching Sample Finish: When required by Contract Documents, submit sample finish.

H. Samples: For each of the following materials:

1. Finish free form liners.
2. Colored concrete for cylindrical columns.

I. Exposed-Aggregate Surface: When an exposed-aggregate surface is specified and a chemical retarder is proposed, submit specification and manufacturer's data for the retarder and the proposed method of use.

J. Records: Retain records of all concrete poured, including exact mix proportions, slumps, test strength, date, time, location of the placement, weather conditions at time of placement, and the source of concrete. Submit copy to Owner’s Representative and Building Official.

1.5 QUALITY ASSURANCE

A. The Contractor is responsible for correcting Work that does not conform to the specified requirements, including strength, tolerances, and finishes. The Contractor shall submit the proposed solution for review and approval.
B. Unless otherwise noted, maintain the allowable tolerances in ACI 117.

C. Maintain records verifying materials used are of the specified and accepted types and sizes and are in conformance with the Contract Documents.

D. Special Inspection and Testing: Concrete work is subject to special inspection and testing as specified; notify the Testing Agency at least 48 hours before inspection is required.

E. Single Source Responsibility: Provide materials for concrete work made or produced from a single source of supply; no mixing of brands or types of cement will be allowed; no substitution of aggregate type or size from those approved will be permitted.

F. Concrete Contractor Qualifications: An experienced concrete contractor who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

G. Concrete Producer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C94. Producer must be certified according to the National Ready Mixed Concrete Association’s Certification of Ready Mixed Concrete Production Facilities.

H. Pre-Construction Conference: At least 30 days prior to start of concrete work, the Contractor shall hold a meeting to review the finish appearance requirements, reveal locations, joint spacings, concrete design mixes, requirements for submittals, construction procedures, schedules for testing, inspection, and certifications.

1. Notify attendees 10 days prior to the scheduled date of the meeting.
2. Required in attendance:
   a. Contractor and Subcontractors
   b. Testing Laboratory representative
   c. Concrete subcontractor
   d. Ready-mix producer
   e. Architect
   f. Engineer
   g. All subcontractors with work to be installed in or affected by concrete work
   h. Building official or appointed representative

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cementitious Materials: Store cementitious materials in dry, weather-tight buildings, bins, or silos that will exclude contaminants.

B. Aggregates: Store and handle aggregate in a manner that will avoid segregation and prevent contamination with other materials or other sizes of aggregates. Store aggregates to drain freely. Do not use aggregates that contain frozen lumps.

C. Admixtures: Protect stored admixtures against contamination, evaporation, or damage. Protect liquid admixtures from freezing and from temperature changes that will adversely affect their characteristics. Store and handle products in a manner to retain original quality. Do not use products stored beyond the manufacturer's recommended shelf life.

D. Delivery of Materials: Deliver site applied materials, such as joint and curing materials, in original factory packaging and unopened containers and protect from damage and
contamination.

E. Place concrete within the time limits specified. Concrete shall possess the specified characteristics in the freshly mixed state at the point of placing.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: Portland cement shall conform to ASTM C150, Type I or Type II.

1. The cement shall be of the same brand and type and from the same plant of manufacture as the cement used in the concrete represented by the submitted field test records or used in the trial mixtures.
2. For architectural concrete, use one brand of cement throughout project, unless otherwise acceptable to the Architect.
3. Type III cement may be used for cold weather construction.

B. Aggregate: Aggregates and aggregate grading requirements shall conform to ASTM C33. Aggregates shall be free from any substance that may be deleteriously reactive with the alkalis in the cement in an amount sufficient to cause excessive expansion of the concrete. Aggregates used in concrete shall be obtained from same sources and have the same size ranges as the aggregates used in the concrete represented by submitted historical data or used in trial mixtures.

C. Fly Ash: Pozzolanic mineral admixture conforming to ASTM C618. Maximum loss on ignition to be 3%. Use fly ash from one single source for the whole project. When fly ash is used, the maximum amount shall be 30% by weight of the total cementitious materials, unless otherwise noted in the Construction Documents.

D. Admixtures: The use of admixtures shall be the responsibility of the Contractor. When more than one admixture is used in the mix, furnish satisfactory evidence to the Architect that the admixtures to be used are compatible in combination with the cement and aggregates. Provide only one brand of each type of admixture. Admixtures shall be free of calcium chloride and thiocyanate (not more than 0.05% chloride ions). The following types of admixtures are approved:

4. Retarding Admixture: Master Builders "Pozzolith Series or Delvo Series," W. R. Grace & Co. "Daracem, Mira, or ADVA Series," Sika "Plastiment ES" or approved equal conforming to ASTM C494, Type B.
5. Accelerating Admixture: Master Builders "Pozzolith NC 534 or Pozzutec 20+," W. R. Grace & Co. "Daraset Series, DCI, PolaSet, or Lubricon NCA", Sika "SikaSet NC", or approved equal conforming to ASTM C494, Type C.
entrainable), Sika “Sika Control 40”, or approved equal conforming to ASTM C494, Type S.

7. Corrosion Inhibiting Admixture: Master Builders "Rheocrete CNI or Rheocrete 222+," W. R. Grace & Co. "DCI or DCI-S", Sika "Sika CNI", or approved equal conforming to ASTM C494, Type S. Calcium Nitrite based with solids content of 30 +/- 2%. Dosage rate varies between 2 and 4 gallons/cubic yards. Contact manufacturer’s representative for corrosion-protection guidance based on chloride exposure level.

E. Water: Water shall be in conformance with ASTM C94.

F. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments, or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. ChemMasters.
   b. Davis Colors.
   c. Dayton Superior Corporation.
   d. Hoover Color Corporation.
   e. Lambert Corporation.
   f. QC Construction Products.
   g. Rockwood Pigments NA, Inc.
   h. Scofield, L. M. Company.
   i. Solomon Colors, Inc.

2. Color: Match Architect’s sample – Davis Colors; Pebble 641.

2.2 RELATED MATERIALS

A. Dissipating Resin Curing Materials: Liquid type membrane-forming curing compound complying with ASTM C309, Type I. Curing compound must be of a type that does not inhibit subsequent moist curing operations. The film shall chemically break down in a 6- to 8-week period and shall not affect adhesion of coverings or membranes. Acceptable products are Dayton Superior "Burke Aqua Resin Cure or Day-Chem Rez Cure (J-11-W)," Euclid Chemical Co. "Kurez DR," or approved equal.

B. Cure and Seal Combination Materials (Exposed Interior Concrete Slabs, including Garage Slabs): Use curing and sealing compounds that conform to ASTM C309 (Types 1 and 1D, Class B) or ASTM C1315. Acceptable products are Master Builders "Acryseal or Kure-N-Seal," Euclid Chemical Co. "Rez-Seal," or approved equal. Cure and seal material for use in parking garages must resist de-icing chemicals.

C. Moisture Retaining Cover: Use waterproof sheet materials that conform to ASTM C171.

D. High Density Insulation Fillers: Extruded polystyrene foam insulation complying with ASTM D6817 as noted in the Construction Documents. Where no type is indicated use ASTM D6817 EPS22.

E. Commercial Bonding Grout and Repair Materials: Use products in accordance with manufacturer’s recommendations. Products include, but are not limited to, the following:

1. Portland-cement mortar modified with a latex acrylic, non-re-emulsifiable bonding agent conforming to ASTM C1059 Type II. Acceptable products include Euclid Chemical Co. "Flex-Con," Dayton Superior "Day-Chem Ad Bond (J-40)," or approved equal.
2. Epoxy mortars and epoxy compounds that are moisture-insensitive during application and after curing and that embody an epoxy binder conforming to ASTM C881. The type, grade, and class shall be appropriate for the application as specified in ASTM C881.


F. Vapor Retarders – Sheet Vapor Retarder: ASTM E1745, Class A. Include manufacturer’s recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, provide one of the following:
   b. Raven Industries, Inc.: Vapor Block 15.
   c. Stego Industries, LLC: Stego Wrap 15 mil Class A.

2.3 PROPORTIONING AND DESIGN REQUIREMENTS OF CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete by Field Experience Method or, if not available, by Laboratory Trial Batch Methods as specified in ACI 301. Mix proportions shall produce consistent and workable concrete that can be worked readily into forms and around reinforcement without segregation or excessive bleeding.

1. Field Experience Method: If field test data is available, in accordance with ACI 301, submit for acceptance the mixture proportions along with the field test data.

2. Trial Batch Method: Use an independent, qualified Testing Facility for preparing and reporting proposed mix designs. All expenses connected with such testing and submittals shall be borne by the Contractor.

B. Concrete Mixes: Provide concrete mixes conforming to the requirements as indicated in the Structural Drawing General Notes.

1. Strength Requirements: Compressive strength requirements are indicated on drawings and are based on cylinder tests at indicated age. Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type III Portland cement.

2. Cement Content for Slabs: Not less than those indicated in ACI 301.


4. Air Entrainment: Use air-entraining admixture in exterior exposed concrete as indicated on the Structural Drawings.

5. Slump: The Contractor shall determine slump. Each concrete mix submitted shall have the slump specified. Slump tolerances shall meet the requirements of ACI 117.

6. Admixtures: Concrete may contain admixtures, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete. When admixtures are specified or required for workability for particular parts of the Work, use the types specified.

7. Chloride Ion: Maximum water-soluble chloride ion concentrations in hardened concrete at ages 28 to 42 days contributed from the ingredients, including water, aggregates, cementitious materials and admixtures, shall not exceed a maximum, by weight of cement, of 0.06% for prestressed concrete and 0.30% for other concrete.
C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to the Owner. New field data, data from new trial mixtures, or evidence that indicates that the change will not adversely affect the relevant properties of the concrete shall be submitted for acceptance before use.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not place concrete until the Architect approves all required submittals.

B. Remove snow, ice, frost, water, and other foreign materials from form surfaces, reinforcement, and embedded items against which concrete will be placed.

C. Place concrete on properly prepared and unfrozen sub-grade or forms and only in dewatered excavations and forms.

D. Do not allow mud or foreign materials into the concrete during placement operations.

E. When the ambient temperature necessitates the use of cold or hot weather concreting, make provisions in advance of concrete placement.

F. Do not begin placing concrete when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing.

G. Do not begin placing concrete while rain, sleet, or snow is falling unless adequate protection is provided. Do not allow rainwater to increase mixing water or to damage the surface of the concrete.

3.2 JOINTS

A. Construction Joints: Locate construction joints as indicated on the structural drawings or as approved by the Architect. Remove laitance and thoroughly clean and dampen construction joints prior to placement of fresh concrete.

B. Bonded Construction Joints: Coat concrete joined with new concrete, including topping, with a concrete bonding compound. Mix and apply in strict accordance with manufacturer’s recommendations for the conditions of the application. Concrete surfaces to which other concrete is to be bonded shall be roughened in an approved manner that will expose sound aggregate uniformly without damaging the concrete; remove all laitance and loose particles.

C. Control Joints in Slabs-on-Ground: Construct control joints in slabs-on-ground to form panels of patterns as approved. Use inserts 1/4-inch-wide by depth indicated on the drawings. Where saw-cut joints are required or permitted, start cutting as soon as concrete has hardened sufficiently to prevent dislodgment of aggregates. Saw a continuous slot to the depth indicated on the drawings. Complete sawing within the timeframe indicated on the drawings. The aspect ratio of the slab panels should be a maximum of 1.5:1. "L" and "T" shaped panels should be avoided. If an alternative method, timing, or depth is proposed for saw cutting, submit detailed procedure plans for review and acceptance.

3.3 INSTALLATION OF EMBEDDED ITEMS
A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.

1. Embedded items include, but are not limited to, expansion joints, joint fillers, waterstops, anchor bolts, embedded plates, dovetail anchor slots, etc.
2. Items shall be free of oil, loose scale, rust, etc.
3. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent the entry of concrete into the voids.
4. Do not embed aluminum in concrete, except where the aluminum is protected from direct contact from the concrete.

3.4 CONCRETE DELIVERY

A. Ready-Mix Concrete: Comply with requirements of ASTM C94 and as herein specified.

1. Elapsed time from start of batching at plant to completed discharge at job site shall not exceed 90 minutes or more than 300 revolutions, whichever comes first after introducing mixing water.
2. When air temperature is between 85°F and 90°F, reduce mixing and delivery time from 90 minutes to 75 minutes. When air temperature is above 90°F, reduce mixing and delivery time to 60 minutes.
3. The concrete temperature shall be monitored in the truck. A rise in temperature of 5°F within 10 minutes or less indicates concrete setting has started before discharge and the load shall be rejected.
4. Ready-Mix Concrete: Provide certificate signed by authorized official of supplier with each load of concrete, stating the following:
   a. Time truck left plant
   b. Mix of concrete
   c. Amount of water and cement in mix
   d. Amount and type of admixtures
   e. Time truck is unloaded at site
   f. Additional water amount allowed at the project site

5. A truck without batch tickets will be rejected.

B. Control of Mixing Water: Water may be added once to increase the slump of the concrete within the first 15 minutes after the truck arrives at the jobsite, provided the following requirements are adhered to:

1. The specified slump and maximum allowable water/cement ratio is not exceeded.
2. The Independent Testing Agency is present to monitor the amount of water added to compare with the amount of water added at the plant. Testing Agency shall keep written record of the amount of water added at the jobsite to each truckload delivered.
3. The drum shall be turned an additional 30 revolutions, or more if necessary, until the added water is uniformly mixed into the concrete.
4. Water shall not be added to the batch after the taking of test cylinders, unless new test cylinders are taken at the expense of the Contractor.
5. Do not add water to concrete after adding high-range water-reducing admixtures to mix.

C. Admixtures: Add admixtures within an accuracy of 3%. Where two or more admixtures are used in the same batch, they shall be added separately and must be compatible. Approved admixtures must be added at the appropriate time in strict compliance with manufacturer’s directions. Concrete that shows evidence of total collapse or segregation caused by the use of...
admixtures shall be removed from the site.

3.5 CONCRETE PLACEMENT

A. Pre-Placement Inspection: Before concrete placement operation begins, perform the following procedures:

1. Inspect and complete formwork installation and all reinforcing and embed items. Notify other crafts to permit installation of their work.
2. Ensure that the reinforcing will be maintained in the proper position during concrete placement operations.
3. Moisten wood forms immediately before placing concrete where form coatings are not used.
4. At topping slabs, thoroughly saturate base slab just prior to placing topping, but do not leave pools of water.
5. Verify all dimensions and elevations.

B. Conveying: Methods of conveying concrete is the responsibility of the Contractor. Convey concrete from mixer to the place of final deposit rapidly by methods that prevent segregation or loss of ingredients and that will ensure the required quality of concrete. Do not use aluminum pipes or chutes. Use acceptable conveying equipment of a size and design that will prevent cold joints from occurring. Clean conveying equipment before each placement.

1. Provide runways or other means for wheeled equipment to convey concrete to deposit points. Do not run wheeled equipment used to deposit concrete over reinforcement; do not support runways on reinforcement.
2. Belt Conveyors: Use belt conveyors that are horizontal or at a slope that will not cause excessive segregation or loss of ingredients. Protect concrete to minimize drying and effects of temperature rise. Use an acceptable discharge baffle or hopper at the discharge end to prevent segregation. Do not allow mortar to adhere to the return length of the belt.
3. Chutes: Use metal or metal-lined chutes having rounded bottoms and a slope between 1:2 and 1:3 (vertical:horizontal). Chutes more than 20 feet long and those not meeting slope requirements may be used, provided they discharge into a hopper prior to distributing into the forms.
4. Pumping or Pneumatic Conveying: Use pumping conveying equipment that permits placement rates that avoid cold joints and prevent segregation in discharge of pumped concrete. In addition:
   a. Pipeline shall be steel pipe or heavy-duty flexible hose.
   b. Inside diameter of the pipe shall be at least three times the maximum size of the coarse aggregate.
   c. Distance to be pumped shall not exceed the limits recommended by the pump manufacturer.
   d. Provide continuous supply of concrete to the pump.
   e. When pumping is completed, the concrete remaining in the pipeline shall be ejected without contaminating the concrete in place.

5. Cleaning: Do not discharge rinse water into forms or areas to receive concrete.

C. Depositing: Deposit concrete continuously in one layer, or in multiple layers if the fresh concrete is deposited on in-place concrete that is still plastic. Do not deposit fresh concrete on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joint as specified. Deposit concrete as near to its final location as practicable to avoid segregation. In addition:
1. There shall be no vertical drop greater than 3 feet, except where suitable equipment is provided to prevent segregation and where specifically authorized.
2. Do not use concrete that has surface-dried or partially hardened or that contains foreign material.
3. Place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at the same time as concrete for slabs.

D. Consolidating: Consolidate concrete by vibration. Thoroughly work concrete around reinforcement and embedded items and into corners of forms, eliminating air and stone pockets that may cause honeycombing, pitting, or planes of weakness.

1. Workers shall be experienced in use of the vibrators.
2. Vibrators shall have a frequency of not less than 8,000 vibrations per minute, and the head diameter and amplitude shall be appropriate for the concrete mix being placed. A spare vibrator shall be kept at the job site during all concrete placing operations.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniform spacing over the area of placement; distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just vibrated area by a few inches. Do not place vibrators within 2-1/2 inches of form face.
4. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set; if there is a delay of more than 15 minutes, vibrate previous lift prior to placing the new concrete. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix. Withdraw vibrators slowly.
5. Consolidation of slabs shall be obtained with vibrating screeds, rolling pipe screeds, or internal vibrators.

E. Re-tamping of concrete that has taken its initial set is not allowed.

F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306.1 and as specified herein.

1. When air temperature has fallen to or is expected to fall below 40°F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F and not more than 80°F at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators.

G. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305.1 and as specified herein. Loss of slump, flash set, or cold joints due to temperature of concrete as placed are not acceptable.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F. Mixing water may be chilled or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.
2. When temperature of steel reinforcement, embeddings, or forms is greater than 120°F, fog steel reinforcement, embeddings, and forms with water immediately before placing concrete. Remove standing water before placing concrete.
3. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, if approved by the Architect.

3.6 FINISHES FOR FORMED SURFACES

A. General: After removal of forms, give each formed surface one or more of the finishes described below. When Contract Documents do not specify a finish, finish surfaces as required by Unspecified Finishes.

B. When the finish is required by the Contract Documents to match a sample panel furnished by the Contractor, reproduce the sample finish on an area at least 100 square feet in a location designated by the Architect. Obtain acceptance before proceeding with that finish in the specified locations.

C. As-Cast Finishes: Coordinate finishes of all “as-cast” concrete finishes with construction of formwork. Produce as-cast form finishes in accordance with the following requirements:

1. Rough-Form Finish: Patch tie holes and defects. Chip or rub off fins exceeding 1/2 inch in height. Leave surfaces with the texture imparted by the forms.
2. Smooth-Form Finish: Patch tie holes and defects. Remove fins exceeding 1/8 inch in height. Leave surfaces with the texture imparted by the forms.

D. Rubbed Finishes: Remove forms as early as permitted, and produce one of the following finishes on concrete specified to have a smooth form finish:

1. Smooth-Rubbed Finish: Patch tie holes and defects and remove fins. Produce finish on newly hardened concrete no later than the day following formwork removal. Wet the surface and rub it with carborundum brick or other abrasive until uniform color and texture are produced. Use no cement grout other than the cement paste drawn from the concrete itself by the rubbing process.
2. Grout-Cleaned Finish: Patch tie holes and defects and remove fins. Begin cleaning operations after contiguous surfaces to be cleaned are completed and accessible. Do not clean surfaces as work progresses. Wet the surface and apply grout consisting of 1-part Portland cement and 1-1/2 parts fine sand with enough water to produce the consistency of thick paint. Add white cement as needed to match color of surrounding concrete. Scrub grout into voids and remove excess grout. When grout whitens, rub the surface. Keep the surface damp for 36 hours afterward.
3. Cork-Floated Finish: Patch tie holes and defects and remove fins. Wet the surface and apply stiff grout of 1-part Portland cement and 1-part fine sand, filling voids. Add white cement as needed to match color of surrounding concrete. Use enough water to produce a stiff consistency. Compress grout into voids by grinding the surface with a slow-speed grinder. Produce the final finish with cork float, using a swirling motion.

E. Sandblast Finish: After removal of forms and while concrete is still "green," apply a light abrasive blast finish to exposed-to-view surfaces to match approved sample. Perform abrasive blasting in a continuous operation, utilizing same work crew to maintain continuity of finish on each surface. Use wet sandblasting operations. Use same type and grading of abrasives as that used on approved sample. Continually wash off abraded mortar from sandblasted areas to prevent staining.

F. Unspecified Finishes: When a specific finish is not specified in Contract Documents for a concrete surface, apply the following finishes:

1. Rough form finish on concrete surfaces not exposed to public view.
2. Smooth form finish on concrete surfaces exposed to public view.

G. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent surfaces, unless otherwise indicated.

3.7 FINISHES FOR UNFORMED SURFACES

A. General: Finish slab surfaces in accordance with one of the finishes noted below, as designated in the Contract Documents. Finish all joints and edges with proper tools as approved.

B. Placement: Place concrete at a rate that allows spreading, straight edging, and darbying or bull floating before bleed water appears. Screed all slabs, topping fills to true levels and slopes. Work surfaces as required to produce specified finish. Do no finishing in areas where water has accumulated; drain and re-screed. In no case use a sprinkling of cement and sand to absorb moisture.

C. Tolerances: Measure floor slabs for suspended floors and slabs-on-grade to verify compliance with the tolerance requirements of ASTM E 1155 and ACI 117. Measure floor finish tolerances within 72 hours after slab finishing and before removal of supporting formwork or shoring.

D. Scratch Finish: Place, consolidate, strike off, and level concrete, eliminating high spots and low spots. Roughen the surface with stiff brushes or rakes before the final set. Produce a finish that will meet Moderately flat (Ff flatness = 25) requirements of ACI 117.

E. Float Finish: Place, consolidate, strike off, and level concrete, eliminating high spots and low spots. Do not work concrete further until it is ready for floating. Begin floating with a hand float, a bladed power float equipped with float shoes, or a powered disk float when the bleed water sheen has disappeared, and the surface has stiffened sufficiently to permit the operation. Produce a finish that will meet Moderately flat (Ff flatness = 25) requirements of ACI 117, then refloat the slab immediately to a uniform texture.

F. Light Steel Troweled Finish: Float concrete surface, then power trowel the surface. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until all "shine" has disappeared from surface; no final troweling is required. Tolerance for concrete floors shall be Moderately flat (Ff flatness = 25) in accordance with ACI 117.

G. Full Steel Trowel Finish: Float concrete surface, then power trowel the surface. Hand trowel the surface smooth and free of trowel marks. Continue hand troweling until a ringing sound is produced as the floor is troweled. Finished surface shall be free of trowel marks, uniform in texture and appearance. Tolerance for concrete floors shall be Moderately flat (Ff flatness = 25) in accordance with ACI 117.

H. Broom or Belt Finish: Immediately after concrete has received a floated finish, give the concrete surface a coarse transverse scored texture by drawing a broom or burlap belt across the surface. Degree of texture shall be as approved by the Architect. Tolerance for concrete floors shall be Moderately flat (Ff flatness = 25) in accordance with ACI 117.

I. Raked Finish: Immediately after concrete has received a floated finish, draw closely spaced rake across surface with ribs perpendicular to traffic flow. Notify Architect at time of finishing so that they may be present to approve the final degree of texture required. Tolerance for concrete floors shall be Moderately flat (Ff flatness = 25) tolerance in accordance with ACI 117.
J. Dry-Shake Finish: Blend metallic or mineral aggregate specified in Contract Documents with Portland cement in the proportions recommended by the aggregate manufacturer, or use bagged, premixed material specified in Contract Documents as recommended by the aggregate manufacturer.

1. Float-finish the concrete surface.
2. Apply approximately 2/3 of the blended material required for coverage to the surface by a method that ensures even coverage without segregation. Float-finish the surface after application of the first dry-shake.
3. Apply the remaining dry-shake material at right angles to the first application and in locations necessary to provide the specified minimum thickness. Begin final floating and finishing immediately after application of the dry-shake.
4. After selected material is embedded by the two floatings, complete operation with a broomed, floated, or troweled finish, as specified in the Contract Documents.

K. Exposed-Aggregate Finish: Immediately after surface of the concrete has been leveled to meet the Moderately flat (Ff flatness = 25) tolerance requirements of ACI 117 and the bleed water sheen has disappeared, spread aggregate of the color and size specified in Contract Documents uniformly over the surface to provide complete coverage to a depth of one stone.
L. Non-specified Finish: When the type of finish is not specified in Contract Documents, use one of the following appropriate finishes and accompanying tolerances.

1. Scratched Finish: For surfaces intended to receive bonded cementitious mixtures.
2. Floated Finish: For walks, drives, steps, ramps, and for surfaces intended to receive waterproofing, roofing, insulation, or sand-bed terrazzo.
3. Full Steel Troweled Finish: For floors intended as walking surfaces, floors in manufacturing, storage, and warehousing areas, or for reception of floor coverings.

3.8 CONCRETE CURING AND PROTECTION

A. General: Cure concrete in accordance with the Curing Methods noted below for a minimum of 7 days after placement. Cure high-early strength concrete for a minimum of 3 days after placement. Alternatively, moisture retention measures may be terminated when any of the following criteria are met:

1. Tests made on at least two cylinders kept adjacent to the structure and cured by the same methods as the structure indicate 70% of f\(c\), as determined in accordance with ASTM C39, has been attained.
2. The compressive strength of laboratory-cured cylinders, representative of the in-place concrete, exceeds 85% f\(c\), provided the temperature of the in-place concrete has been maintained at 50°F or higher during curing.
3. Strength of concrete reaches f\(c\) as determined by accepted nondestructive test methods.

B. Additional Curing Periods: When the 7-day compression test cylinders, representative of parts of a structure already placed, indicate that the 28-day strengths may be less than 85 percent of the design strengths, give those parts of the structure additional curing.

C. Protection: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

1. Protect concrete during the curing period such that the concrete temperature does not fall below requirements of ACI 306.1. The concrete shall be maintained with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and to ensure the necessary strength development for structural safety.
2. Maintain protection in such a manner that the maximum decrease in temperature measured at the surface of the concrete in a 24-hour period shall not exceed the following:
   a. 50°F for sections less than 12 inches in the least dimension.
   b. 40°F for sections from 12 to 36 inches in the least dimension.
   c. 30°F for sections 36 to 72 inches in the least dimension.
   d. 20°F for sections greater than 72 inches in the least dimension.
3. Measure and record concrete temperature using a method acceptable to the Architect/Engineer. When the surface temperature of the concrete is within 20°F of the...
ambient temperature, protection measures may be removed.

D. Curing Unformed Concrete Surfaces: Apply one of the Curing Methods after completion of placement and finishing of concrete surfaces not in contact with forms.

E. Curing Formed Concrete Surfaces: Keep absorbent wood forms wet until they are removed. After formwork removal, cure concrete by one the Curing Methods.

F. Curing Methods: After placing and finishing, use one or more of the following methods to preserve moisture in concrete. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing, or as soon as marring of the concrete will not occur. When one of the curing procedures is used initially, the curing procedure may be replaced by one of the other procedures when concrete is 1 day old, provided the concrete is not permitted to become surface-dry at any time. Avoid rapid drying at end of final curing period.

1. Ponding, continuous fogging, or continuous sprinkling.
2. Application of mats or fabric kept continuously wet.
3. Continuous application of steam (under 150°F).
5. Application of a curing compound conforming to ASTM C309 or C1315.
   a. Apply the compound in accordance with manufacturer’s recommendation as soon as water sheen has disappeared from the concrete surface and after finishing operations.
   b. For rough surfaces, apply curing compound in two applications at right angles to each other.
   c. Do not use curing compound on any surface where concrete or other material will be bonded unless the curing compound will not prevent bond or unless measures are to be taken to completely remove the curing compound from areas to receive bonded applications.
   d. The Contractor shall be responsible for removing any traces of the dissipating curing compound that remains on the substrate prior to applying subsequent floor finish. This shall include, but is not limited to, removing the curing compound using power scrubbers and industrial strength detergents and using fresh water to remove the detergents. Comply with any additional instructions and recommendations of the manufacturer whose products are to be applied directly over concrete slab.
6. Application of other accepted moisture-retaining method.

3.9 CONCRETE SURFACE REPAIRS

A. General: All surface defects shall be reported to the Architect. Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Architect.

B. Repair of Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, stains, and other discolorations that cannot be removed by cleaning.

   1. Repair concealed formed surfaces that contain defects that affect the durability of concrete.
   2. Repair tie holes and surface defects immediately after formwork removal. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing.
C. Repair of Unformed Surfaces: Surface defects include crazing, cracks in excess of 0.01-inch-wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

1. Repair finished unformed surfaces that contain defects that affect durability of concrete.
2. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope.
3. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days. Depth or removal shall not exceed 1/4 inch without scanning the affected area to verify required concrete cover will be maintained over reinforcing, post-tensioning tendons, or other embedment.
4. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Architect.

D. Repair of Tie Holes: Plug tie holes except where stainless steel ties, non-corroding ties, or acceptably coated ties are used. When Portland cement patching mortar is used for plugging, clean and dampen tie holes before applying the mortar. When other materials are used, apply them in accordance with manufacturer's recommendations.

E. Repair of Surface Defects: Submit Method Statement of Repair that includes proposed repair product, surface preparation procedures, inspection schedule and application procedures prior to the commencement of work.

1. Surface Preparation: Unless otherwise directed by the repair product's manufacturer:
   a. Outline honeycombed or otherwise defective concrete with a 1/2- to 3/4-inch-deep saw cut and remove such concrete down to sound concrete.
   b. When chipping is necessary, leave chipped edges perpendicular to the surface or slightly undercut. Do not feather edges.
   c. Dampen the area to be patched, plus 6 inches around the patch area perimeter.
   d. Prepare bonding grout and thoroughly brush grout into the surface.
   e. When the bond coat begins to lose water sheen, apply patching mortar and thoroughly consolidate mortar into place. Strike off mortar, leaving the patch slightly higher than the surrounding surface to permit initial shrinkage.
   f. Leave the patch undisturbed for 1 hour before finishing. Keep the patch damp for 7 days.

2. Partially Exposed Reinforcement: The surface of partially exposed reinforcement where exposed less than and equal to 3/8-inch shall be cleaned of detritus material. Where reinforcement is exposed more than 3/8-inch, concrete shall be removed around the entire circumference of the reinforcement for a minimum of 1/4 inch plus the maximum aggregate size and cleaned of detritus material.

F. Removal of Stains: Remove stains, rust, efflorescence, and surface deposits considered objectionable by the Architect by acceptable methods.

G. Crack Repair: The Contractor shall carry an allowance for concrete crack repair. Submit crack map and repair procedures for review and approval prior to commencing work.

1. Flexible Repair: Prepare, treat rout and fill cracks according to ASTM C1127 and the manufacturer's recommendations. Prior to coating surfaces, remove debris and dust according to ASTM D4258. Comply with the recommendations in ASTM C1193 for joint
sealant installations.

2. **Structural Repair:** Cracks shall be repaired by epoxy injection conforming to ASTM C881.

3. **Repair full length of cracks if any part of the crack exceeds the widths specified in this Article.**

4. **Actual crack repair required shall be based on crack width as measured a minimum of 28 days after crack appears.** Repair cracks as follows:

   a. **Permanently Exposed Walls:** Repair all cracks greater than 0.035 inch in width.
   b. **Exterior Elevated Slabs:** All cracks greater than 0.035 inch in width.
   c. **Slab on Grade:** Repair all cracks greater than 0.0625 inch in width.
   d. **Interior Elevated Slabs:** Repair all cracks greater than 0.0625 inch in width.

**H. Site-Mixed Repair Materials:**

1. **Bonding Grout:** Mix approximately 1-part cement and 1-part fine sand with water to the consistency of thick cream.

2. **Repair Mortar:** Mix repair mortar using the same materials as concrete to be patched with no coarse aggregate. Do not use more than 1-part cement to 2-1/2 parts sand by damp loose volume.

   a. For repairs in exposed concrete, make a trial batch and check color compatibility of repair material with surrounding concrete. Blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding.

   b. Use repair mortar at a stiff consistency with no more mixing water than is necessary for handling and placing. Mix repair mortar and manipulate the mortar frequently with a trowel without adding water.

**I. Commercial Repair Products:** Acceptable commercial repair products other than site-mixed repair materials may be used for repair, as specified in Part 2. Use repair products in accordance with manufacturer’s recommendations.

**3.10 MISCELLANEOUS CONCRETE ITEMS**

A. **Curbs:** Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations lightly rounded.

B. **Equipment Bases and Foundations:** Form bases for the mounting of equipment shown on drawings. Coordinate sizes and requirements for bases with trade requiring same; make bases a minimum of 4 inches high, unless otherwise noted on drawings, and finish to match adjacent floor finish. Set anchor bolts for machines and equipment to correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

C. **Steel Pan Stairs:** Provide concrete fill for steel pan stair treads and landings and associated items. Screed, tamp, and finish concrete surfaces with light broom finish.

**END OF SECTION**
The airport is operated in strict compliance with Federal, State and local rules and regulations, which prohibits unauthorized persons or vehicles in the AOA. Equipment and personnel will be restricted to the work areas defined on the plans. Any violations by Contractor’s personnel will subject the Contractor to the contract non-compliance assessments imposed by FAA and the Aviation Department.

Airport restricted areas are fenced and must always remain fenced. No temporary airport perimeter security fencing is required for this project. If, as the project progress, any temporary security fences and/or gates are required they shall be constructed by the Contractor according to specifications set by Airport Operations. The temporary fence and gate must be approved by Airport Operations before any of the regulated perimeter security fence may be altered. The gates will remain closed and locked, or if used continuously for ingress and egress, the Contractor will provide approved guards trained by Airport Operations to monitor access to the Airport. The Contractor shall provide guards with a roster of his personnel and ensure that each individual has adequate identification. Contractor locks are not permitted on any airport gate. Gates will be staffed during shift working hours and will be secured when there is no activity at that location with a Security approved control device. The Contractor will be responsible for at a minimum a 24-hour advance notification to Airport Operations regarding the scheduling of the use of the various security check point gates. There will be a communications system for emergency responses, security breaches, etc.

Entrance to the airfield is subject to strict security regulations. All personnel entering the airfield must obtain and display Airport security identification badges (PHX SIDA) and all vehicles must meet minimum identification requirements and have proof of insurance on file with the Airport Security Office. All vehicles will be searched upon entering the AOA. All vehicles will be searched each time prior to passing the security check points and may be subject to random searches while operating in the AOA. Due to these TSA mandatory searches, throughput of vehicles entering the AOA at these check points may be severely reduced, thereby possibly affecting the execution of some construction activity. The Contractor must account for the possible loss of time associated with these vehicle searches in his/her bid. No additional time or compensation will be permitted for actions resulting from these vehicle searches.

Airport restricted areas are fenced and must always remain fenced. Relocation and maintenance of the Temporary airport perimeter fencing as required for this project will be the responsibility of the Concourse Contractor. If, as the project progresses, any temporary security fences and/or gates are required for access to the airside area, it shall be coordinated with the Concourse Contractor and Airport Operations and Security. All gates will remain closed and locked, unless continuously used for ingress and egress, the Apron Contractor will request approved guards, contracted by the Owner to control access to the Airport through requests made to the Owner, at no expense to the Contractor. The Contractor shall provide the Owner with a roster of his personnel and badge numbers and ensure that each individual has adequate identification. Contractor locks are not permitted on any airport gate. Gates will be requested to be staffed during shift working hours and will be secured when there is no activity at that location with a Security approved control device. The Contractor shall be responsible for moving and replacing required vehicle barriers during days of operation. The Contractor will be responsible for at a minimum a 48-hour advance notification to Airport Operations regarding the scheduling of the use of the various security check point gates. There will be a communications system for emergency responses, security breaches, etc.
BASIS OF PAYMENT

110-7.1 Airport safety and security shall be paid for at the contract lump sum price in a proportionate manner, on the basis of current estimates. This price shall constitute full compensation for furnishing material and equipment, including but not limited to flagpersons, temporary gates, warning markers, temporary drainage items, low level barriers, other traffic control devices and necessary equipment, safety area support materials, and other material and equipment list herein, and the maintenance thereof and all other labor, materials, equipment, tools and incidentals including Landside Traffic Control and Uniform off-duty Officers necessary to accomplish this item.

The contractor shall also include in this lump sum bid item, up to 800 square yards of 6-inch thick temporary asphalt pavement transitions to facilitate access through the site and at temporary gate locations in the security fence when determined necessary by the RPR. The pavement shall be temporary asphalt pavement with a native subbase material as shown on the Phasing Plans. This inclusion shall constitute full compensation for furnishing material and equipment, necessary to perform the work. Work shall include all excavating, grading, native subbase, new pavement, and demolition and removal and disposal of the temporary pavement. No additional compensation will be made for temporary asphalt transitions up to 800 square yards.

Payment will be made under:

Item GP-110-7.1 Airfield Safety and Security – per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only

City of Phoenix Public Transit Department

AR 4.45 Security, Access, Controls and Badging Information

FAA Advisory Circular (AC)

AC 150/5345-55A Specification for L-893 Lighted Visual Aid to Indicate Temporary Runway Closure

AC 150/5370-2G Operational Safety on Airports During Construction

AC 150/5300-13A Airport Design With Change 1

AC 70-7460-1L Obstruction Marking and Lighting

Code of Federal Regulations (CFR)

CFR 49 Part 1542 Airport Security
Existing taxiway lighting systems, manholes, fuel system, pull boxes and other utility systems shall be protected and maintained at all times unless noted in the project plans.

All Airport Service Roads and air carrier access to all open gates shall remain in operation at all times, along with airside access points, and truck fueling racks.

104-3.1A Notice to Proceed to start construction is anticipated for March 1, 2021. The entire project shall be substantially complete no later than November 3, 2021.

104-3.1B Phase Conditions

Phase 3 – Work on the west and south sides of the Concourse, identified on the plans, shall commence on construction Notice to Proceed. Work on the east side of the Concourse will not be available until March 26, 2021. Gate D1 will be closed for the construction of the Blast Wall and surrounding pavement. The maximum duration during Phase 3 for a Gate D1 closure is thirty (30) calendar days.

During Phase 3, there will be no shift or calendar day work restrictions, other than listed in the moratoriums in Section 120-5, Construction and Maintenance Work Moratoriums. The Contractor shall maintain access to the Concourse during the entirety of Phase 3.

Joint widening and sealing along and punch list work along the outer fifty (50’) of Phase 3 concrete pavement shall be substantially completed no later than August 1, 2021. The Contractor shall notify the RPR a minimum of four (4) weeks prior to the intended start of Phase 4A to enable the Concourse Contractor to install and obtain TSA approval for a new Temporary AOA fence installation adjacent the perimeter of Phase 3.

All of Phase 3 shall be substantially completed no later than August 24, 2021. Liquidated Damages in accordance with Section 80 will be assessed for failure to complete the work by August 24, 2021.

Phase 3A—Work identified on the plans as Phase 3A cannot start until the trash compactor has been installed by the Concourse Contractor and is functional. This Concourse work should be completed no later than August 1, 2021. AOA fencing must also be relocated to permit construction of Phase 3A. The Contractor shall notify the RPR a minimum of four (4) week notice prior to their intended start date of Phase 3A to permit time for the AOA fence relocation along with TSA approvals to be completed. The Contractor shall always maintain tenant access to the Trash Compactor.

During Phase 3A, there will be no shift or calendar day work restrictions, other than listed in the moratoriums in Section 120-5, Construction and Maintenance Work Moratoriums.

Phase 3A shall be substantially completed no later than November 3, 2021. Liquidated Damages in accordance with Section 80 will be assessed for failure to complete the work by November 3, 2021.
Phase 4A – Phase 4A shall consists of closing Taxiway S between Taxiway C and Taxiway D along with the relocation of the airside VSR road along the outer perimeter of Phase 3. This one (1) night shift operation to shift VSR traffic shall not commence until the new temporary AOA fencing installed by the Concourse Contractor near the end of Phase 3, is acceptable to the RPR.

Phase 4B – Phase 4B consists of pavement demolition, grading, drainage, and new pavement construction within the Object Free Area of Taxiway S and construction of the blast fence foundation, paving, and blast fence installation. A VSR crossing through Phase 4B must always remain operational. During Phase 4B, there will be no shift or calendar day work restrictions, other than listed in the moratoriums in Section 120-5, Construction and Maintenance Work Moratoriums.

Work in the vicinity of the blast fence cannot start until the permanent trash compactor has been installed by the Concourse Contractor and is functional. This Concourse Contractor scope of work should be completed no later than August 1, 2021. The Contractor shall always maintain tenant access to the existing and permanent trash compactor.

The maximum allowable time permitted for a Taxiway S full closure will be sixty (60) calendar days for combined Phase 4B and Phase 4C.

Phase 4C – Phase 4C consists of removal and construction of the VSR crossing left in place during Phase 4B construction. VSR traffic will be shifted to Phase 4B. During Phase 4C there will be no shift or calendar day work restrictions, other than listed in the moratoriums in Section 120-5, Construction and Maintenance Work Moratoriums.

The maximum allowable time permitted for a Taxiway S full closure will be sixty (60) calendar days for combined Phase 4B and Phase 4C durations. Liquidated damages will be assessed in accordance with Section 80 for failure to complete combined Phases 4B and 4C within sixty (60) calendar days from the start of Phase 4B.

Phase 4D – Phase 4D restricts Taxiway D to ADG Group III. Phase 4D work consists of the apron construction within Taxiway D Object Free Area. Phase 4D does not contain any shift or calendar day restrictions, except for work within 65’ to 93’ of Taxiway D centerline which shall be constructed at night between 2200 hours and 0600 hours daily. Phase 4D may be constructed concurrently with Phases 4B and 4C.

All of Phase 4D work shall be substantially completed by November 3, 2021. Liquidated damages will be assessed in accordance with Section 80 for failure to complete Phase 4D by November 3, 2021.

Phase 5 - Phase 5 construction shall start no earlier than the start of Phase 4. Unless otherwise approved by the RPR, Phase 5 shall be constructed during night hours only (2100 hours – 0600 hours). Phase 5 is anticipated to be concurrent with Phase 4.
ATTACHMENT C-
REVISED PLAN SHEETS

(ATTACHED)
END OF ADDENDUM NO. 3
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