



400 AIRWAYS AVENUE
SAVANNAH, GA 31408
912.964.0514

TO: All Plan Holders
Dodge Data & Analytics
Construction Market Data Group
ISQFT
Savannah Entrepreneurial Center
Construction Journal

A handwritten signature in black ink that reads "James Aiello".

FROM: James Aiello
Assistant Director of Engineering

DATE: May 1, 2024

SUBJ: SAC 30565
Terminal Concourse Expansion
Savannah Airport Commission

Attached please find Addendum No. 2 to the contract documents. All bidders shall acknowledge the receipt of Addendum No. 2 in the place provided in the bid proposal.

CM
ENCL: SAC 30565 – Addendum No. 2
CC: Engineering Files



SAVANNAH AIRPORT COMMISSION

SAC 30565 Terminal Concourse Expansion Addendum No. 2

The following amendments, additions, deletions shall be made to the contract documents. In so far as these documents are at variance with this Addendum No. 2 dated May 1, 2024, the addendum shall govern:

Questions & Answers

Pre-Bid Conference No. 2 Agenda, Minutes, and Record of Attendance

Questions 1 through 12 are from Ken Johnson of Carroll Daniel Construction:

1. Please provide detail for construction joint reinforcement requirements at Slab-on-Grade. There are details shown for the concrete pavement, but none we have been able to find for the Apron level slab-on-grade.

Response: Refer to details 1 and 2 on sheet S1.4

2. "Detail J/S4.5 shows C8X13.75 Fascia Channels with a 3/16" plate on the outside flange. Please advise on the following:

1)Please advise if a 1/8" continuous weld (both sides) connecting the 3/16" plate to the C8x13.75 is correct (this would be approximately 500+ Linear Inches of weld per each channel/plate for at 95 conditions) or if this should be a 1 1/2" of weld at every 12".

Response: The weld could be 2" at 12" o.c

2)Please provide the width of the 3/16" plate."

Response: The dimension of the plate depends on curtain wall supplier and will be determined during shop drawings.

3. Please provide a description of what the security & access requirements will be for delivery drivers who will not be performing work onsite and clarify whether they will be allowed to be escorted from laydown/staging area down the taxiway to construction site or if they will all be required to be badged, if deliveries will be limited to certain hours, etc. Examples include dumpster deliveries/pulls, concrete trucks, material deliveries, etc.

Response: It is not a requirement for delivery drivers to be badged. All trucks will be inspected by Operations personnel before being escorted to the construction site.

Deliveries will not be limited to certain hours but should be coordinated with the GC to ensure that Operations personnel are on site to perform inspections and escort.

4. Please advise if any below grade shoring will be required.

Response: Not required.

5. Please advise if structural engineer has provided or will provide a shoring study.

Response: Not Applicable

6. Please advise if there are any hazardous materials that will require abatement as part of the demo scope (i.e. in existing portions of structure to be demo'd)

Response: To the best of our knowledge there is no hazardous materials present at the airport. However, if hazardous materials are uncovered stop work in the area and contact the airport who will contract with an abatement firm.

7. Please provide geotech report.

Response: Please see attachment in Addendum No. 1

8. Please advise if conventional auger cast piles will be acceptable in lieu of the displacement piles referenced in the Structural drawings.

Response: Auger cast piles have been previously approved on other projects, however this will need review and approval by the geotechnical engineer during the shop drawing phase.

9. There is a demountable partitions specification section. We have been unable to locate this scope in the drawings. Please advise where this scope is located.

Response: The demountable partitions are provided at the ramp level walls at Ops Spaces 131, 132, 133, 134, and 135. The exterior walls are masonry at these offices.

10. Please advise if there are any specific systems where a specific vendor will be required due to proprietary systems i.e. Johnson Controls, etc.

Response: See specification 23 09 00 Section 2.2 for information on the existing controls system

11. Please advise if there are any specific systems where a specific vendor will be required in order to not invalidate existing warranties.

Response: None noted

12. Please confirm construction workers will not have to be badged as long as they are escorted to and from the secured construction area.

Response: In order to access the construction area workers will need to be badged or escorted by a badged individual. Once in the fenced construction area, workers will not need to be badged. However, if they need to leave the controlled fenced construction area they will need to be escorted by a badged individual until they get to a nonsecure location.

13. Specifications reference safety requirements per 29 CFR Part 1910 which is general industry standards, as opposed to 1926 which is construction related. There are many differences between the two which may have a significant impact on scope & pricing. Please advise if we need to comply with 1910 or if 1926 is acceptable.

Response: The contractor is required to prepare a construction safety and phasing plan prior to the start of any construction and submit this plan to the Owner and Engineer for approval as a shop drawing. This document, with appropriate references included, will govern.

Question 14-16 are from Juan Salcedo from Precision 2000 Inc.

14. The Bid Schedule is presented as a Lump Sum price. Could you please confirm if the total amount bid will be a Lump Sum, or if there is a list of items to bid for this project? If there is a list of items, could you please provide it?

Response: The project is to be bid as a lump sum.

15. Could you please confirm the thickness of the PCC pavement and provide information about the type of materials laying under it that conform the full structure of the pavement, including their thickness?

Response: The PCC pavement is 15” thick in the Terminal Concourse Expansion area. Refer to Borings S2 and S3 in the geotechnical report that was issued with Addendum No. 1 for additional soils information.

16. Could you please add a specification on Technical Specifications for the P-306 Econocrete? It would be helpful to determine the exact composition of it.

Response: Please see attached P-306 Technical Specification.

Question 17 is from Saira Seldo from O’Keeffe’s Inc.:

17. O’Keeffe’s Inc. has produced quality aluminum ladders since 1956. O’Keeffe’s Inc. respectfully asks for your approval for substitution on the Terminal Concourse Expansion project.

Response: The request for approval for consideration as an equal is not clear. In each of the two concourse level Janitor spaces there is a steel ladder which extends to the bottom of a roof hatch. We have specified an aluminum extension which connects at the top of the steel ladder. This ladder extension is capable of extending upward to assist personnel more safely to access the roof. The steel ladder shall remain steel. If O’Keeffe’s makes a ladder extension that is compatible with the steel ladder and the roof hatch, then you are free to bid on the ladder extension.



SAVANNAH AIRPORT COMMISSION

SAC 30565 TERMINAL CONCOURSE EXPANSION
PRE-BID CONFERENCE AGENDA, MINUTES, AND RECORD OF ATTENDANCE
APRIL 23, 2024 – 1:30 PM EST

I. SIGN-IN SHEET

Attendees were asked to sign in on the sheet provided.

II. INTRODUCTIONS

Jim Aiello, Assistant Director of Engineering, began the meeting and introduced the Savannah Airport Commission staff members in attendance and the Design Engineer Firm and Architect.

- a. Airport Staff & Project POCs
- b. Design Engineer – AECOM
- c. Architect – John Ruth & Associates, LLC

III. SCOPE OF WORK

Bill Prange, P.E., AECOM, and John Ruth, Architect, discussed the scope of work, project schedule, and other important elements of the project. The scope of work consists of a 4-gate expansion to the east end of the existing concourse.

- a. Project Schedule
 - **554 calendar days (Total Contract Time)**
 - Phase 1 – 540 calendar days
 - Substantial Completion – 14 calendar days
 - All phases shall be completed within the allotted contract time or be subject to liquidated damages (*See General Provisions Section 80-08*)

b. Major Work Elements

The project consists of demolition of the concrete for the footprint of the building. Then, construction of the two-level building. The second level will consist of the extension of the Terminal Concourse, and the lower level will consist of tenant spaces and airport offices.

A temporary fence will be constructed surrounding the project site to be designated as the Contractor's lay down area.

The Airport will remain operational during construction and will have six additional ground boarding gates surrounding the temporary fence. The Contractor must have extreme caution during the project as they will be working near active aircraft, runways, and taxiways.

Contractor must identify long lead items have been identified at the start of the project and submit shop drawings/product data quickly to ensure materials are procured in a timely manner. SAC will not accept time delays due to long lead items not procured in a timely manner.

c. Control of Work

- Materials Testing
 - QC testing shall be completed by the Contractor.
 - QA testing and Special Inspections shall be completed by the Owner.
- Maintenance of Work
 - The Contractor is responsible for the site and the work until final acceptance.
- Utilities
 - The Contractor is responsible for locating all utilities prior to construction, plan locations are approximate locations only.
 - The Contractor is responsible for any damage to any utilities.

d. Control of Materials

- Construction Materials
 - by Contractor per Specifications
- The Contractor is ultimately responsible for the quality and quantity of materials. See bid item C-100, Contractor QC Program. A Contractor Quality Control Program (CQCP) document is required as per the specification.

IV. SAFETY/SECURITY

a. CSPP Requirements

- Project is subject to FAA Construction Safety and Phasing Plan (CSPP) requirements.
- Site Access
 - See CSPP for safety and security requirements.
 - Escort Suppliers and Deliveries
 - Vehicle and pedestrian access routes used for construction shall be controlled to prevent entry of unauthorized persons, vehicles, or animals.

- Staging Area Location – **The staging area is called out in the plans and is located off of Daniel J. Coe Dr. on the west side of Taxiway G through Security Gate 19. The Contractor will be utilizing the taxiways as a route to the project site. The Access Gate must remain secure at all times. A guard must be posted at the access point into the AOA at all times in which the gate is not locked to keep the AOA secured. Taxiways, runways, apron, ramp, and project site must remain clean and free of debris at all times.**
 - Material Stockpile Locations – **All material deliveries will be confined to the Staging Area.**
 - Hauling – **Haul route will be along Gulfstream Rd and Daniel J. Coe Dr onto Taxiway A.**
- b. Badging
- **Contractor will need to have some personnel to be badged. The project site will be fenced in but depending on the work some personnel will have to be escorted. Only badged personnel can escort. If a badged individual is escorting, then he or she can only escort and cannot perform any other duties/work.**
- c. Part 139 Safety and Airfield Security
- **Airport Operations shall provide escorting – Airport Operations will provide escorting to/from project site along the active taxiway.**
 - **NOTAMS – will be issued by Airport Operations as necessary.**
 - **Dust / Foreign Object Debris (FOD) Control – Contractor must have an automated mechanical sweeper to ensure staging area, haul route, and project site is free of debris. Any loose items that may fly away in the lay down area must be tied down properly.**
 - **Temporary Barricades – Barricades will be in place for this project.**

IV. BID PROPOSAL

- a. General Requirements: One copy with original signatures and corporate seals
- b. Addenda: Must Acknowledgement Receipt of all. Final addendum will be issued on Tuesday, May 7th, 2024, by 3 PM EST.
- c. **Deadline for Questions is Tuesday, April 30th, 2024, by 3 PM EST.** All questions must be submitted in writing via email to Crystal Mercado, Engineering Administrator, cmercado@flysav.com
- d. **Bids are due Tuesday, May 14, 2024, at 1:30 PM EST.**
 - Bids must be time and date stamped by the Savannah Airport Commission prior to 1:30pm. Late bids will be considered non-responsive.
 - Bids must be hand delivered or mailed to:

Savannah Airport Commission, 400 Airways Ave., Savannah, GA 31408.
Office Hours are from 9AM-5PM EST. SAC is not responsible for delivery issues.

- e. Must be a plan holder to automatically receive addenda.
- f. Out-of-State contractors must have a Georgia State Tax Registration ID#
- g. Out of state contractors must be registered with the Secretary of State to do business in the state of Georgia.
- h. Include E-Verify form for Prime Contractor
- i. Bid Bond is required.
- j. Awarding the Contract – **SAC participates in competitive bidding. Upon bid opening, all the bid proposals are reviewed, and the lowest qualified bid is named the Apparent Low Bidder. The bid proposal must be approved by the Savannah Airport Commission Board of Commissioners, then it must go before the City of Savannah City Council for final approval. This process takes approximately two months. During this time, the Contract is prepared then executed after final approval.**

V. GENERAL ITEMS

- a. Insurance Requirements
 - See Supplementary General Conditions for Insurance details.
- b. Federal Requirements
 - **DBE Requirements - 8.01% DBE Participation (UCP Certified) – DBE Subcontractors must be Georgia DOT UCP Certified. A directory of UCP Certified DBEs can be found on GDOT’s website.**
 - If goal cannot be met, a detailed good-faith effort must be documented and submitted with the bid proposal.
 - List of DBE Subcontractors shall be submitted within five (5) days of notice of award. Certifications from each DBE of their DBE status shall be included.
 - **Davis-Bacon Act Applies – The current Davis Bacon Wage Rates are included in the Specifications. Certified Payrolls will be required by the Contractor and all subcontractors.**
 - **Buy American Act (steel / products) – The Buy American Act applies to this project. If the Contractor cannot find a specified material made in America, then it must be listed on the Exceptions List as part of the bidding documents.**

Contractor must review the “Contract Provision Guidelines for Obligated Sponsors and Airport Improvement Program Project” (Section 130 in the Specifications) and complete the Certification of Compliance forms that must be submitted with the bid proposal. (Page 10-15).

c. Payment and Performance Bonds will be required for this project.

VI. QUESTIONS/ANSWERS

VII. ON-SITE VISIT

Jim Aiello asked if any attendees were interested in visiting the project site. The attendees agreed and were escorted to the site.

Any bidders interested in an on-site visit. Please email Crystal Mercado, cmercado@flysav.com, dates and times and we will coordinate the visit. Please give at least one week’s advance notice requesting a site visit.

VIII. ADJOURN



SAVANNAH AIRPORT COMMISSION
SAVANNAH / HILTON HEAD INTERNATIONAL AIRPORT

RECORD OF MEETING ATTENDANCE

SUBJECT: SAC 30565 Terminal Concourse Expansion Pre-Bid Conference **No. 2**

DATE - TIME: April 23, 2024 - 1:30 PM

NAME & TITLE	ORGANIZATION & ADDRESS	TELEPHONE NUMBER	EMAIL ADDRESS
Jim Aiello, E.I.T., Assistant Director of Engineering	SAC, 400 Airways Ave, Savannah, GA 31408	Ext. 3352	jaiello@flySAV.com
Crystal Mercado, Engineering Administrator	SAC, 400 Airways Ave, Savannah, GA 31408	Ext. 4478	cmercado@flySAV.com
Jerry McLean, Senior Engineering Inspector	SAC, 400 Airways Ave, Savannah, GA 31408	Ext. 3377	jmclean@flySAV.com
Bill Prange, P.E., Aviation Civil Engineer	AECOM, Tampa, FL 33607	813-286-1711	bill.prange@aecom.com
John Ruth, Architect	Ruth & Associates, Neptune Beach, FL	904-866-7356	johnrutharchitect@gmail.com
ANUP SINGHAR, OPERATIONS	SAC	912-303-6924	ASINGHAR@CMSAV.COM
Steve Thomas	Low Voltage Design Assoc.	404.468.7171	sthomaselvd@engineering.com
Michael Bostic	Low Voltage Design Assoc.	470-557-4594	mbostic@lvdengineering.com
Jarrod Akins COO	AKINS Construction 520 Park Ave Statesboro, GA 30458	(912) 764-6925	jarroda@akinsco.com

SAVANNAH AIRPORT COMMISSION

ITEM P-306 - LEAN CONCRETE BASE COURSE

DESCRIPTION

306-1.1 This item shall consist of a lean concrete subbase material that is composed of aggregate and cement uniformly blended together and mixed with water. The mixture may also include approved cementitious additives, in the form of fly ash or slag, and chemical admixtures. The mixed material shall be spread, shaped, and consolidated using concrete paving equipment in accordance with these specifications and in conformity to the lines, grades, dimensions, and typical cross-sections shown on the plans.

MATERIALS

306-2.1 Aggregate. The coarse aggregate fraction shall be crushed stone, crushed or uncrushed gravel, crushed and adequately seasoned, air-cooled, iron blast furnace slag, crushed recycled concrete, or a combination thereof. The fine aggregate fraction may be part of the natural aggregate blend as obtained from the borrow source or it may be natural sand that is added at the time of mixing. The aggregate shall meet the gradation and material requirements in the tables below.

Aggregate Material Requirements

Material Test	Requirement	Standard
Coarse Aggregate Portion (retained on the No. 4 (4.75 mm) sieve)		
Resistance to Degradation	Loss: 40% maximum	ASTM C131
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88
Flat Particles, Elongated Particles, or Flat and Elongated Particles ¹	10% maximum, by weight, for fraction retained on the ½ inch (12.5mm) sieve and 10% maximum, by weight, for the fraction passing the 1/2-inch (12.5 mm) sieve	ASTM D4791
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Fine Aggregate Portion (passing the No. 40 (425µm) sieve)		
Clay lumps and friable particles	Less than or equal to 3 percent	ASTM C142
Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate	Loss after 5 cycles: 10% maximum using Sodium sulfate - or - 15% maximum using magnesium sulfate	ASTM C88

¹ A flat particle is one having a ratio of width to thickness greater than five (5); an elongated particle is one having a ratio of length to width greater than five (5).

Aggregate Gradation for Lean Concrete

Sieve (square openings)	Size	Percentage by Weight Passing Sieves
		Gradation [*]
1-1/2 inch (37.5 mm)		--
1 inch (25.0 mm)		100
3/4 inch (19.0 mm)		70-100
No. 4 (4.75 mm)		35-65
No. 40 (425 μm)		15-30
No. 200 (75 μm)		0-15

306-2.2 Sampling and testing.

a. Aggregate base materials. The Contractor shall take samples of the aggregate base stockpile in accordance with ASTM D75 to verify initial aggregate base requirements and gradation. Material shall meet the requirements in paragraphs 306-2.1 and 306-2.2. This sampling and testing will be the basis for approval of the aggregate base quality requirements.

306-2.3 Cement. Cement shall conform to the requirements of ASTM C150-Type 1.

306-2.4 Cementitious additives. Pozzolanic and slag cement may be added to the lean concrete mix. If used, each material must meet the following requirements:

a. Pozzolan. Pozzolanic materials must meet the requirements of ASTM C618, Class F, or N with the exception of loss of ignition, where the maximum shall be less than 6%.

b. Slag cement (ground granulated blast furnace (GGBF) slag). Slag shall conform to ASTM C989, Grade 120.

306-2.5 Chemical admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all the requirements listed below. In addition, the RPR may require the Contractor to submit complete test data showing that the material to be furnished meets all the requirements of the cited specification.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260.

b. Water-reducing admixtures. Water-reducing, set-controlling admixtures shall meet the requirements of ASTM C494, Type A, D, E, F, or G. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures in accordance with the manufacturer's printed instructions. The air entrainment agent and the water-reducing admixture shall be compatible.

c. Retarding admixtures. Retarding admixtures shall meet the requirements of ASTM C494, Type B or D.

d. Accelerating admixtures. Accelerating admixtures shall meet the requirements of ASTM C494, Type C.

306-2.6 Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

306-2.7 Curing materials. For curing lean concrete, use white-pigmented, liquid membrane-forming compound conforming to ASTM C309, Type 2, Class B, or clear or translucent Type 1-D, Class B with white fugitive dye.

COMPOSITION OF MIXTURE

306-3.1 Mix design. The lean concrete mix design shall be based on trial batch results conducted in the laboratory. The lean concrete shall be designed to meet the criteria in this section.

Compressive strength shall not be less than 500 pounds per square inch (3,445 kPa) nor greater than 800 pounds per square inch (5,516 kPa) at seven (7) days. Compressive strengths shall be taken as the average of two compressive strength test results. All compressive strength specimens shall be prepared and tested in accordance with ASTM C192 and ASTM C39, respectively.

The percentage of air entrainment shall be 6%, $\pm 1/2\%$. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

If there is a change in aggregate sources, type of cement used, or pozzolanic materials, a new mix design must be submitted

306-3.2 Submittals. At least 30 days prior to the placement of the lean concrete, the Contractor shall submit certified test reports to the RPR for those materials proposed for use during construction, as well as the mix design information for the lean concrete material. The certification shall identify the specifications and test standard, the name of the testing laboratory, the date of the tests, and a statement that the materials comply with the applicable specifications. Tests older than six (6) months shall not be used. The submittal package shall include the following:

- a. Sources of materials, including aggregate, cement, admixtures, and curing and bond breaking materials.
- b. Physical properties of the aggregates, cement, admixtures, curing and bond breaking materials.
- c. Mix design:
 - Mix identification number
 - Weight of saturated surface-dry aggregates (fine and coarse)
 - Combined aggregate gradation
 - Cement factor
 - Water content
 - Water-cementitious material ratio (by weight)
 - Volume of admixtures and yield for one cubic yard (cubic meter) of lean concrete
 - Laboratory test results:
 - Slump
 - Unit weight
 - Air content
 - Compressive strength at 3, 7, and 28 days (average values)

Where applicable, the Contractor shall submit a jointing plan for transverse joints in the lean concrete layer for approval by the RPR.

During production, the Contractor shall submit batch tickets for each delivered load.

EQUIPMENT

306-4.1 All equipment necessary to mix, transport, place, compact, and finish the lean concrete material shall be furnished by the Contractor and is subject to inspection and approval by the RPR. The Contractor shall provide certification that all equipment conforms to the requirements of ASTM C94.

306-4.2 Forms. Straight side forms shall be made of steel and shall be furnished in sections not less than 10 feet (3 m) in length. Forms shall have a depth equal to the pavement thickness at the edge. Flexible or curved forms of proper radius shall be used for curves of 100 feet (30 m) radius or less. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the RPR. The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when accepted by the RPR.

306-4.3 Concrete pavers. A fixed form or slip-form concrete paver may be used to place lean concrete. The paver shall be fully energized, self-propelled and capable of spreading, consolidating, and finishing the lean concrete material, true to grade, tolerances, and cross-sections. The paver shall be of sufficient weight and power to construct the maximum specified concrete paving lane width, at adequate forward speed, without transverse, longitudinal or vertical instability or without displacement. Slip-form pavers shall be equipped with electronic or hydraulic horizontal and vertical control devices. Bridge deck pavers are approved as paver-finishing machines for lean concrete, provided they are capable of handling the amount of lean concrete required for the full-lane width specified, and capable of spreading, consolidating, and finishing the lean concrete material, true to grade, tolerances, and cross-sections.

306-4.4 Vibrators. For fixed-form construction, vibrators may be either the surface pan type or internal type with either immersed tube or multiple spuds for the full width of the slab. They may be attached to the spreader, the finishing machine, or mounted on a separate carriage. They shall not come in contact with the subgrade or forms.

For slip-form construction, the paver shall be accomplished by internal vibrators for the full width and depth of the pavement being placed. The number, spacing, frequency, and eccentric weights of vibrators shall be provided to achieve acceptable consolidation without segregation and finishing quality. Internal vibrators may be supplemented by vibrating screeds operating on the surface of the lean concrete. Vibrators and screeds shall automatically stop operation when forward motion ceases. An override switch shall be provided.

Hand held vibrators may be used in irregular areas.

306-4.5 Joint saws. The Contractor shall provide a sufficient number of saws with adequate power to cut contraction or construction joints to the required dimensions as shown on the plans. The Contractor shall provide at least one standby saw in good working order.

CONSTRUCTION METHODS

306-5.1 Control Strip. The first half-day of construction shall be considered the control strip. The Contractor shall demonstrate, in the presence of the RPR, that the materials, equipment, and construction processes meet the requirements of the specification. Control strips that do not meet specification requirements shall be removed and replaced at the Contractor's expense. Full operations shall not continue until the control strip has been accepted by the RPR. Upon acceptance of the control strip by the RPR, the Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the RPR.

306-5.2 Weather limitations. The Contractor shall follow the recommended practices in American Concrete Institute (ACI) 306R, Guide to Cold Weather Concreting. The temperature of the mixed lean concrete shall not be less than 50°F (10°C) at the time of placement. The lean concrete shall not be placed when the ambient temperature is below 40°F (4°C) or when conditions indicate that the temperature may fall below 35°F (2°C) within 24 hours. The lean concrete shall not be placed on frozen underlying courses.

The Contractor shall follow the recommended practices in ACI 305R, Guide to Hot Weather Concreting. The lean concrete temperature from initial mixing through final cure shall not exceed 90°F (32°C). When the maximum daily air temperature exceeds 85°F (30°C), the forms and/or the underlying material shall be sprinkled with water before placing the lean concrete.

The Contractor should stop operations prior to and during rain allowing time to cover and protect any plastic lean concrete. Areas damaged by rain shall be refinished or replaced at the Contractor's expense.

306-5.3 Maintenance. The Contractor shall protect the lean concrete from environmental or mechanical damage. Traffic shall not be allowed on the pavement until test specimens made per ASTM C31 have attained a compressive strength of 500 psi (3445 kPa) when tested per ASTM C39. The Contractor shall maintain continuity of the applied curing method for the entire curing period.

306-5.4 Form setting. Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/4 inch (6 mm) at any joint. The top face of the form shall not vary from a true plane more than 1/8 inch (3 mm) in 10 feet (3 m), and the upstanding leg shall not vary more than 1/4 inch (6 mm). Forms shall be cleaned and oiled prior to the placing of lean concrete.

306-5.5 Preparation of underlying course. The underlying course shall be checked and accepted by the RPR before placing operations begin. Prior to placing the material, the final grade should be firm, moist and free of frost. Use of chemicals to eliminate frost will not be permitted. The underlying course shall be wetted in advance of placing the lean concrete base course.

306-5.6 Grade control. Grade control shall be as necessary to construct the layer to the profile and cross-sections as shown on the plans.

306-5.7 Mixing. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials.

All lean concrete shall be mixed and delivered to the site per the requirements of ASTM C94. The mixing time should be adequate to produce lean concrete that is uniform in appearance, with all ingredients evenly distributed. Mixing time shall be measured from the time all materials are emptied into the drum (provided all the water is added before one-fourth the preset mixing time has elapsed) and continues until the time the discharge chute is opened to deliver the lean concrete.

If mixing in a batch plant, the mixing time shall not be less than 50 or greater than 90 seconds. If mixing in a truck mixer, the mixing time shall not be less than 70 or more than 125 truck-drum revolutions at a mixing speed of not less than six (6) or more than 18 truck-drum revolutions per minute.

The elapsed time from the addition of cementitious material to the mix until the lean concrete is deposited in place at the work site shall not exceed 45 minutes when the concrete is hauled in non-agitating trucks, or 90 minutes when it is hauled in truck mixers or truck agitators.

Re-tempering lean concrete will not be permitted, except when delivered in truck mixers. With truck mixers, additional water may be added to the batch materials if the addition of water is added within 45 minutes after the initial mixing operations and the water/cement ratio specified in the mix design is not exceeded.

306-5.8 Placing. The lean concrete material shall be placed continuously at a uniform rate on the underlying course minimizing segregation and handling of the mix. Rakes shall not be allowed for spreading the lean concrete.

306-5.9 Finishing. Shape the finished surface of the lean concrete base layer to the specified lines, grades, and cross-section. Hand finishing will not be permitted except in areas where the mechanical finisher cannot operate.

306-5.10 Construction limitations. All placement and finishing operations shall be completed within two (2) hours from the start of mixing. Material not completed within the 2-hour time limit shall be removed and replaced at the Contractor's expense.

At the end of each day's construction and/or when operations are interrupted for more than 30 minutes, a straight transverse construction joint shall be formed by a header or by cutting back into the compacted material to form a true vertical face.

Completed portions may be opened to light traffic when it has achieved its 7-day strength and the curing is not damaged.

306-5.11 Joints. Locate all longitudinal and transverse construction joints as shown on the plans. Longitudinal joints shall be within 6 inches (150 mm) of planned joints in the overlaying concrete pavement and transverse joints shall be within 3 inches (75 mm) the planned joints of the overlying concrete surface. Joints shall be sawn as soon as the base can support the saws without damage to the lean concrete base. Joints shall be constructed by sawing the hardened lean concrete to a depth of at least one-third the thickness of the lean concrete base, or 1/5th the depth of the lean concrete base when constructed using early entry saws.

306-5.12 Curing. Immediately after the finishing operations are complete and within two (2) hours of placement of the lean concrete, the entire surface and edges of the newly placed lean concrete shall be sprayed uniformly with white pigmented, liquid membrane forming curing compound conforming to ASTM C309, Type 2, Class B or clear or translucent Type 1-D, Class B with white fugitive dye in accordance with paragraph 306-2.7. The layer should be kept moist using a moisture-retaining cover or a light application of water until the curing material is applied. The curing compound shall not be applied during rainfall.

The curing material shall be applied at a maximum coverage of 200 square feet per gallon (5.0 m²/l) using pressurized mechanical sprayers. The spraying equipment shall be a fully atomizing type equipped with a tank agitator. At the time of use, the curing compound in the tank shall be thoroughly and uniformly mixed with the pigment. During application, the curing compound shall be continuously stirred by mechanical means. Edges of the lean concrete layer shall be sprayed with curing compound immediately following placement with slip-form pavers or when side-forms are removed. Hand spraying of odd widths or shapes and lean concrete surfaces exposed by the removal of forms is permitted.

The lean concrete temperature during curing shall be in accordance with paragraph 306-5.2.

If the curing material becomes damaged from any cause, including sawing operations, within the required 7-day curing period or until the overlying course is constructed, the Contractor shall immediately repair the damaged areas by application of additional curing compound or other means approved by the RPR.

306-5.13 Surface tolerance. The Contractor shall perform smoothness and grade checks daily. Any area not meeting smoothness and grade shall be corrected by the Contractor at the Contractor's expense. The Contractor shall provide smoothness and grade data to the RPR on a daily basis.

a. Smoothness. The finished surface shall not vary more than $\pm 3/8$ -inch (9 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline, and, moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid. The Contractor shall correct any high spots more than $3/8$ inch (9 mm) in 12-foot (3.7-m) with a grinding machine or remove and replace the material at the Contractor's expense. Any areas that have been ground shall have curing compound reapplied.

b. Grade. The grade shall be measured on a 50-foot (15-m) grid and shall be within ± 0.05 feet (15 mm) of the specified grade. When the surface is more than $1/2$ inch (12 mm) above the grade shown in the plans, the surface shall be corrected at the Contractor's expense to an elevation that falls within a tolerance of $1/4$ inch (6 mm).

306-5.14 Bond-breaker. Liquid membrane forming compound per paragraph 306-2.8 shall be placed on the surface of the lean concrete to prevent bonding. The liquid membrane forming compound when used as a bond breaker shall be applied at least eight (8) hours and not more than 24 hours before placement of the concrete pavement.

The curing material shall be applied at a maximum coverage rate of 200 square feet per gallon (5.0 m²/l) using pressurized mechanical sprayers.

MATERIAL ACCEPTANCE

306-6.1 Sampling and testing. Acceptance sampling and testing to determine conformance with the requirements specified in this section will be performed by the RPR for each 1200 square yards (1000 square meters). Sampling locations will be determined by the RPR on a random basis per ASTM D3665.

a. Compressive Strength. One sample of freshly delivered lean concrete will be taken for compressive strength for each 1200 square yards (1000 square meters) in accordance with ASTM C172 and air content tests in accordance with ASTM C231. Two test cylinders will be made and cured from the sample per ASTM C31 and the 7-day compressive strength of each cylinder determined per ASTM C39. The compressive strength will be computed by averaging the two 7-day compressive strengths.

The Contractor shall provide for the initial curing of cylinders in accordance with ASTM C31 during the 24 hours after molding.

b. Thickness. Cores shall be drilled by the Contractor at two different sampling locations for thickness determination for each 1200 square yards (1000 square meters). Thickness will be determined by measuring the depth of core holes and computed by averaging the thickness determination of the two locations.

Core holes shall be filled by the Contractor with lean concrete base or non-shrink grout. Thickness will be determined as an option by survey on a 25-foot by 25-foot grid.

306-6.2 Acceptance.

a. Strength. If the lean concrete fails to meet the minimum compressive strength requirements, the Contractor shall remove and replaced the material at the Contractor's expense.

b. Thickness. If the average thickness is not deficient by more than 1/2 inch (12 mm) from the plan thickness, full payment shall be made. When such measurement is deficient by more than 1/2 inch (12 mm) but less than one inch (25 mm) from the plan thickness, the area **represented by the test** shall be removed and replaced at the Contractor's expense or shall be permitted to remain in-place at an adjusted payment of 75% of the contract unit price.

METHOD OF MEASUREMENT

306-7.1 The quantity of lean concrete base course will be determined by the number of square yard (m²) of lean concrete actually constructed and accepted by the RPR as complying with the plans and specifications.

BASIS OF PAYMENT

306-8.1 The accepted quantities of lean concrete will be paid for at the contract unit price per square yard (m²) for lean concrete base. The price and payment shall be full compensation for furnishing and placing all materials, provided; however, for any pavement found deficient in thickness as specified in paragraph 306-6.2b, the reduced unit price shall be paid.

Payment will be made for:

Item P-306-8.1	Lean Concrete Base Course (6" Thick) - per square yard
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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.

ASTM International (ASTM)

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the
Field ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for
Concrete ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Specification for Coal Fly Ash and Raw and Calcined Natural Pozzolans for Use in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregates (Accelerated Mortar- Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

American Association of State Highway and Transportation Officials (AASHTO)

AASHTO T136	Standard Method of Test for Freezing-and-Thawing Tests of Compacted Soil- Cement Mixtures
ASTM D3665	Standard Practice for Random Sampling of Construction Materials

American Concrete Institute (ACI)

- ACI 305R Guide to Hot Weather Concreting
- ACI 306R Guide to Cold Weather Concreting