Savannah Airport Commission

Bidding & Contract Documents,
General Conditions, & Technical
Specifications for

Material Testing & Quality Control for

Demo Air Cargo/Construct Apron/Construct SE Taxilane

SAC JOB ID: 30616

November 2022

SAVANNAH AIRPORT COMMISSION

NOTICE TO BIDDERS

Proposals will be received by the Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission via email until December 6th, 2022, 1:30 pm EST.

Bidders are invited to submit proposals for:

Material Testing & Quality Control for

Demo Air Cargo/Construct Apron/Construct SE Taxilane

SAC JOB ID: 30616

Bidders are invited to submit proposals for this work on the proposal forms provided. Other proposal forms will not be accepted.

The complete examination and understanding of the construction plans, specifications, contract documents and site of the proposed work is necessary to properly submit a proposal. Construction plans, specifications and contract documents are available for examination and may be obtained from the offices of the Savannah Airport Commission, 400 Airways Avenue, Savannah / Hilton Head International Airport, Savannah, Georgia 31408, Phone (912) 964-0514, ext. 4478

No Bid Bond will be required.

The Savannah Airport Commission, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that, in any contract entered into pursuant to this advertisement, Disadvantaged Business Enterprises will be afforded equal opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

The Contractor agrees to ensure that Disadvantaged Business Enterprises as defined in 49 CFR Part 26 have an equal opportunity to participate in the performance of this contract. In this regard all Contractors shall take all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises have an equal opportunity to compete for and perform contracts. Contractors shall not discriminate on the basis of race, color, or national origin or sex in the award or performance of this contract.

No bid may be withdrawn after closing time for the receipt of proposals for a period of ninety (90) days.

This bid is a bid for construction and therefore the City's local vendor preference ordinance will not apply.

The Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission reserve the right to waive any informalities or irregularities in or reject any or all bids and to award or refrain from awarding the Contract for the Work.

SAVANNAH AIRPORT COMMISSION

INSTRUCTIONS TO BIDDERS

I. GENERAL

A. Licenses. The successful Bidder must be a licensed Contractor as required by the Georgia State Licensing Board and will be required to obtain any and all necessary licenses or permits to conduct the work as may be prescribed by the State of Georgia and by the City of Savannah.

B. Testing Lab Accreditation. All federally funded construction projects costing $250,000 and more require that the testing laboratory be accredited in accordance with AC 150/5370-10H, dated December 21st, 2018.

C. Examination of Conditions Affecting Work. Prior to submitting a Proposal, each Bidder shall examine and thoroughly familiarize himself with all existing conditions including all applicable laws, codes, ordinances, rules and regulations that will affect his work. Bidders shall visit the site, examine the grounds and all existing buildings, utilities, and roads, and shall ascertain by any reasonable means all conditions that will in any manner affect the work. The drawings have been prepared on the basis of surveys and inspections of the site and represent an essentially accurate indication of the physical conditions at the site. This, however, shall not relieve the Bidders of ascertaining for themselves the conditions or expected site conditions for construction of the project. The Owner will not be responsible for any unforeseen conditions of the site encountered during construction.

D. Nondiscrimination and Segregated Facilities

1. Bidders must comply with the President's Executive Order No. 11246, amended by 13672 on July 21, 2014, which prohibits discrimination in employment regarding race, creed, color, sex or national origin.

2. Each Bidder shall complete, sign and include in his Bid Proposal the Equal Opportunity Report Statement. When a determination has been made to award a Contract to a specific Contractor, such Contractor shall, prior to award, after award or both, furnish such other pertinent information regarding his own employment policies and practices as well as those of his proposed subcontractors as the FAA, or the Secretary of Labor, the City of Savannah or the Savannah Airport Commission may require. All such information required of a subcontractor shall be furnished by the Contractor.

3. The Equal Opportunity Report Statement, Certification of Non-segregated Facilities, Equal Opportunity Clause, and all other EEO requirements shall be included in all non-exempt subcontracts entered into by the Contractor. Subcontracts entered into by the Contractor shall also include all other applicable labor provisions. No subcontract shall be awarded to a non-complying subcontractor.

4. In addition, the Contractor will also insert in each of his subcontracts a clause requiring the subcontractor to include these provisions in any lower tier subcontracts that may in turn be made.

E. Compliance with Law

1. Bidders must comply with Title IV of the Civil Rights Act of 1964, the Davis-Bacon Act, the Anti-Kickback Act and the Contract Work Hours Standard Act.

2. Bidders shall comply with all state laws and local ordinances, except that any preferential consideration of local in-state bidders is not allowed.

3. Employment Eligibility Verification

Pursuant to the "Georgia Security and Immigration Compliance Act of 2006," O.C.G.A. Section 13-10-91, public employers and their contractors and subcontractors are required to verify the work eligibility of all newly hired employees through an electronic federal work authorization program. The Georgia Department of Labor has added a new Chapter 300-10-1, entitled "Public Employers, Their Contractors and Subcontractors Required to Verify New Employee Work Eligibility Through a Federal Work Authorization Program," to the Rules and Regulations of the State of Georgia.
(See website: http://www.dol.state.ga.us/pdf/rules/300_10_1.pdf.)

The new rules designate the "Employment Eligibility Verification (EEV) Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U. S. Department of Homeland Security as the electronic federal work authorization program to be utilized for these purposes.

The EEV/Basic Pilot Program can be accessed at: https://www.vis-dhs.com/EmployerRegistration. Bidders shall comply with this new rule, and submit with their bid the form titled, "Contractor Affidavit and Agreement", page I-3. After the contract has been awarded, the Contractor shall secure from all subcontractors the form titled "Subcontractor Affidavit and Agreement", page I-4, which must be submitted to the Savannah Airport Commission prior to the subcontractor beginning work at the site.

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with the Savannah Airport Commission has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with the Savannah Airport Commission, contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the Savannah Airport Commission the time the subcontractor(s) is retained to perform such service.

_____	_____
Company Name	EEV/Basic Pilot Program* User Identification No.
_____	_____
Signature: Authorized Officer or Agent	Date
_____	_____
Printed Name of Authorized Officer or Agent	Title of Authorized Officer or Agent of Contractor

SUBSCRIBED AND SWORN BEFORE ME

ON THIS THE _____ DAY OF _____, _____.

Notary Public: _____

(Notary Seal)

My Commission Expires: _____

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV/Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U. S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

G. General Bond Requirements

1. No Bid Bonds required.

II. PREPARATION AND SUBMISSION OF PROPOSALS

A. Sealed proposals for the construction of the project will be received **until 1:30 PM,** local time, **December 6th, 2022.** Proposals shall be delivered to Crystal Mercado, Engineering Coordinator, Savannah Airport Commission, **via email cmercado@flysav.com.** Bids received after 1:30pm will be considered non-responsive.

B. The Proposal shall be on the "Proposal Form" provided; no other forms are acceptable.

C. Each Bidder shall present his Proposal in a sealed opaque envelope and marked at the lower left hand corner Proposal for Airport Improvements, **"MATERIAL TESTING & QUALITY CONTROL FOR DEMO AIR CARGO/CONSTRUCT APRON/CONSTRUCT SE TAXILANE at the Savannah / Hilton Head International Airport, SAC 30616"** with the name of the bidder.

D. The Bidder's envelope shall contain the signed original and one complete copy of the following documents:

1. Proposal Form
2. Bid Schedule
3. Equal Employment Opportunity Report Statement
4. Certificate of Non-Segregated Facilities
5. E-Verify Form for Prime Contractor

E. Proposals shall be submitted as indicated by the "Proposal Form" and shall be signed in ink by an official of the firm submitting the proposal.

F. Erasures or other changes in a Proposal shall be explained or noted over the signature of the Bidder.

G. Proposals containing reservations, conditions, omissions, unexplained erasures or alterations, items not required in the Bid, or irregularities of any kind, may be rejected by the Owner as being incomplete and not qualified for consideration.

H. Each proposal shall indicate the full business name and address of the Bidder and shall be signed by him with the usual signature.

I. A Proposal submitted by a partnership shall list the names of all partners and shall be signed in the partnership name by one of the members of the partnership.

J. A Proposal submitted by a Corporation shall be signed by the legal name of the Corporation, followed by the state of incorporation and the title designation of the Corporation in legal matters. The name of each person signing the proposal shall be typed or printed below the signature.

K. A Power of Attorney or other satisfactory evidence of the authority of the officer signing on behalf of the Corporation shall be furnished for the Owner's records.

L. Acknowledgment of receipt of all Addenda shall be made by each Bidder in the space provided in the Proposal Form.

M. The Bidder is required to fill in all the blank spaces on the Proposal and Bid Schedule.

III. INTERPRETATIONS

A. Each Bidder shall carefully examine the Contract Documents consisting of the Plans and Specifications, and all addenda or other revisions and thoroughly familiarize himself with the detailed requirements prior to submitting a Proposal. Should a Bidder find discrepancies or ambiguities in, or omission from Contract Documents, or should he be in doubt as to their meaning, he shall at once and, in any event not later than ten (10) days prior to bid date, notify the Savannah Airport Commission who will send written addenda to all Bidders. The Savannah Airport Commission will not be responsible for any oral instructions. All addenda sent to Bidders will become a part of the Contract Documents.

B. All inquiries shall be directed to the Engineering Department, Savannah Airport Commission, Savannah / Hilton Head International Airport, 400 Airways Avenue, Savannah, Georgia 31408, Telephone Number (912) 964-0514. No allowance will be made after Bids are received for oversight by Bidder.

C. Where a discrepancy occurs between the prices quoted in words and/or in numbers, the unit price written in words shall govern the final costs or award of Contract.

IV. MODIFICATIONS AND/OR WITHDRAWALS OF PROPOSALS

A. A bid may not be modified, withdrawn, or canceled by the Bidder during a ninety (90) calendar day period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting his bid.

B. Negligence on the part of the Bidder in the preparation of his Proposal shall not be grounds for the modification or withdrawal of a Proposal after the time set for Bid opening.

V. ACCEPTANCE/REJECTION OF BIDS

A. This is a bid for construction and therefore the City's local vendor preference ordinance will not apply.

B. The Owner proposes to award the Contract to the lowest qualified Bidder, Prospective Contractor or Contractor submitting a reasonable Bid provided the Bidder, Prospective Contractor or Contractor has met the goals for DBE participation or, if failing to meet the goals, the Bidder, Prospective Contractor or Contractor has documented an acceptable good-faith effort to meet the established goals for the DBE participation. The Bidder, Prospective Contractor or Contractor is advised that the Owner has sole authority to determine if the Bidder, Prospective Contractor or Contractor has made an acceptable good effort toward meeting DBE goals to qualify for Contract award. The Owner has the right to reject any and all bids submitted.

C. The Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission reserve the right to waive any informalities, irregularities, or technicalities in or reject any and all bids and/or to award or refrain from awarding the Contract for the Work.

END OF INSTRUCTIONS TO BIDDERS

SAVANNAH AIRPORT COMMISSION

PROPOSAL FORM

TO: Mayor and Aldermen of the
City of Savannah and the
Savannah Airport Commission

FROM: _____
Bidder's Name

_____
Address

_____
City, State and Zip Code

_____ _____
Phone Number E-mail Address

A. The undersigned, as Bidder, does hereby declare that he has familiarized himself with the local conditions affecting the cost of the work, the Contract Documents including the "Notice to Bidders", "Instructions to Bidders", "Proposal", "Bid Schedule", "General Provisions", and the specifications and drawings and other related construction documents, together with any addenda to such construction documents as listed herein and hereby proposes to furnish all material and perform all work required in strict accordance with the provisions of documents noted above for the consideration of prices quoted in the "Bid Schedule."

B. The undersigned understands that the quantities shown in the Bid Schedule are approximate only, are intended principally to serve as a guide in evaluating Proposals and are subject to either increase or decrease.

C. The undersigned affirms that in making such Bid, neither he nor any company that he may represent, nor anyone on behalf of him or his company, directly or indirectly, has entered into any combination, collusion, undertaking or agreement with any other Bidder or Bidders to maintain the prices of said work, or any compact to prevent any other Bidder or Bidders from bidding on said contract or work and further affirms that such bid is made without regard or reference to any other Bidder or Proposal and without any agreement or understanding or combination, either directly or indirectly, with any other person or persons with reference to such bidding in any way or manner whatsoever.

D. The undersigned, when notified of the acceptance of this Proposal, does hereby agree to enter into a construction contract with the Owner, within ten (10) calendar days from the date on the Notice of Acceptance, for the execution of the work described in the period of time, and he shall furnish the required Certificates of Insurance, Performance Bond and Payment Bond, with good and sufficient Surety.

E. The undersigned further agrees that if awarded the Contract he will commence the work within ten (10) calendar days after the date of the Notice to Proceed.

F. In submitting this Bid, it is understood that the right is reserved by the Owner to waive formalities, technicalities, and irregularities, and to reject all Bids and to negotiate with apparent qualified low Bidder if necessary. It is agreed that THIS BID MAY NOT BE WITHDRAWN FOR A PERIOD OF NINETY (90) DAYS AFTER the opening thereof.

H. The undersigned affirms that he has completed, signed, and included in their Bid Proposal the following:

1. Proposal Form
2. Bid Schedule
3. Equal Employment Opportunity Report Statement
4. Certificate of Non-Segregated Facilities
5. E-Verify Form for Prime Contractor

A bid shall be considered unresponsive and shall be rejected if it fails to include these fully executed statements or if the Bidder fails to furnish required data. When a determination has been made to award a Contract to a specific Contractor, such Contractor shall, prior to award, furnish such other pertinent information and assurances regarding his own employment policies and practices as well as those of his proposed subcontractors as the FAA, the Savannah Airport Commission, the City of Savannah, the Secretary of Labor, or the Office of Federal Contract Compliance (OFCC) may require.

I. The undersigned affirms that he has completed all the blank spaces in the Bid Schedules with an amount in words and/or numbers and agrees that where a discrepancy occurs between the prices quoted in words and/or in numbers, the unit price written in words, unless obviously incorrect, shall take precedence and govern the final costs or Award of Contract. In the case of a tie Bid Price, the Owner may negotiate a price with each low tie Bidder.

J. The undersigned acknowledges receipt of the following addenda:

ADDENDA NUMBER	DATED
_____	_____
_____	_____
_____	_____

continued if required...

K. The legal status of the undersigned is: (The Bidder shall complete appropriate portion of form (1., 2., or 3.) and strike out the other two.)

1. A corporation duly organized and doing business under the laws of the State of _____, for whom bearing official title of

_____, whose signature is affixed to this Bid, is duly authorized to execute contracts.

If a Foreign Corporation or non-State of Georgia Corporation: date of qualification in _____ (State).

Name and address of Agent for Process: _____
(Process in the State of Georgia): _____

(Out of State Contractor shall also provide name and address of process agent in the State of Georgia.)

2. A partnership, all of the members of which, with addresses are: (Designate general partners as such.)

_____

_____

_____

If all partners are non-residents of Georgia: Designate name and address of agent required for service of process located in the state Georgia.

3. An individual, whose signature is affixed to this bid. (If non-residents of Georgia. (Designate name and address of agent required for service of process located in the state of Georgia.)

_____

_____

_____

Dated and signed this _____ day of _____, 2021.

NAME OF BIDDER: _____

BY: _____

TITLE: _____

BUSINESS ADDRESS: _____

_____

PHONE NO. ( )_____

GEORGIA TAX
REGISTRATION NO. _____

WITNESS:

_____

_____

END OF PROPOSAL FORM

Demo Air Cargo/Construct Apron/Construct SE Taxilane - SAC Job ID 30616				
Test Description	**Quantity**	**Unit**	**Unit Price**	**Total**
I. SOIL TESTING:				
A. ASTM D1557 Proctor	3	Each		
B. ASTM D6938 Nuclear Density*	20	Each		
C. Natural Sample Moisture Content	5	Each		
D. ASTM C117 Grain-Size Analysis (Full Gradation)	5	Test		
E. On-Site Soil Observation	10	Hour(s)		
F. Technician Standby Time	10	Hour(s)		
II. P-209 CRUSED AGGREGATE BASE COURSE				
A. ASTM D1557 Proctor	1	Each		
B. ASTM C88 Sodium Soundness	1	Test		
C. ASTM C1331 L.A. Abrasion	1	Test		
D. ASTM C117 & C136 Gradation	1	Test		
E. ASTM D6938 Nuclear Density*	15	Test		
(To Include Depth Checks)				
F. Technician Standby Time	5	Hour(s)		
III. P-501 CONCRETE MATERIALS:				
A. ASTM C78 Flexural Strength **	46	Each		
B. Technician Standby Time	10	Hour(s)		
IV. AGGREGATE TESTING: CONCRETE				
A. ASTM C88 Sodium Soundness	1	Test		
B. ASTM C131 L.A. Abrasion	1	Test		
C. Grain Size Determination - Fine Aggregate				
C-1. Full Grain Size (8 Sieves)	5	Test		
C-2. Wash Through (#200)	5	Test		
D. Sieve Analysis - Coarse Aggregate	5	Test		
E. Specific Gravity & Absorption of Fine or Coarse Aggregate	5	Test		
V. OTHER:				
A. Engineering Services	10	Hour(s)		
TOTAL AMOUNT OF BID:				
* Minimum of three (3) tests per visit.				
** Minimum of two (2) beams per sub-lot.				
~~** Minimum of four (4) cylinders per sub-lot. Prepare cylinders and slump test on-site and deliver to laboratory.~~				
Standby time will be used at the discretion of the Savannah Airport and only if there is a delay caused by unforeseen circumstances. This time is not to be used for a basis of time compilation for scheduled trips to the site for testing. Technician time shall be included in the costs for each respective test.				
Each test shall also include all time for mileage, travel, administrative duties, reviews, material reports, and all other items associated with testing.				
Tests shall be taken as directed by SAC Engineering. This work is meant to provide Quality Assurance Testing for the Demo Air Cargo/Construct Apron/Construct SE Taxilane project. Testing frequency shall be based on SAC Engineering guidelines.				
For Flexural Strength (P-501 Concrete) we want two (2) beams per sub-lot … to include Slump (C172) and Air (C231).				
The majority of work will be scheduled at night.				

SAVANNAH AIRPORT COMMISSION

BID SCHEDULE

In accordance with all bid documents, addenda, plans, and specifications, the undersigned proposes to furnish all services, material labor, tools, equipment, and other means of construction required for the **MATERIAL TESTING & QUALITY CONTROL FOR DEMO AIR CARGO/CONSTRUCT APRON/CONSTRUCT SE TAXILANE, SAC JOB ID 30616**

TOTAL AMOUNT BID: $_____

TOTAL AMOUNT BID WRITTEN IN WORDS: _____

_____

NAME OF BIDDER: _____

BY: _____

TITLE: _____

BUSINESS: _____

ADDRESS: _____

WITNESS: _____

WITNESS: _____

END OF BID SCHEDULE

SAVANNAH AIRPORT COMMISSION

EQUAL OPPORTUNITY REPORT STATEMENT

As Required By 41 CFR 60-1.7(b)

The Bidder (Proposer) shall complete the following statement by checking the appropriate boxes. Failure to complete these blanks may be grounds for rejection of bid:

1. The Bidder (Proposer) has _____ has not _____ developed and has on file at each establishment Affirmative Action Programs pursuant to 41 CFR 60-1.40 and 41 CFR 60-2.

2. The Bidder (Proposer) has _____ has not _____ participated in any previous contract or subcontract subject to the Equal Opportunity Clause prescribed by Executive Order 11246, as amended.

3. The Bidder (Proposer) has _____ has not _____ filed with the Joint Reporting Committee the annual compliance report on Standard Form 100 (EEO-1 Report).

4. The Bidder (Proposer) does _____ does not _____ employ fifty (50) or more employees.

NAME OF BIDDER: _____

BY: _____
(SIGNATURE)*

TITLE: _____

DATE: _____

**** Must be same signature on Bid Proposal***

SAVANNAH AIRPORT COMMISSION

CERTIFICATE OF NON-SEGREGATED FACILITIES

CERTIFICATION TO BE SUBMITTED BY CONSTRUCTION CONTRACTORS OF APPLICANTS AND THEIR SUBCONTRACTORS (APPLICABLE TO CONSTRUCTION CONTRACTS AND RELATED SUBCONTRACTS EXCEEDING TEN THOUSAND ($10,000.00) DOLLARS (US) WHICH ARE NOT EXEMPT FROM THE EQUAL OPPORTUNITY CLAUSE.)

The federally assisted Construction Contractor certifies that he does not maintain or provide, for his employees, any segregated facilities at any of his establishments and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted Construction Contractor certifies that he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location under his control, where segregated facilities are maintained. The federally assisted Construction Contractor agrees that a breach of this certification is a violation of the equal opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting room, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directives or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally assisted Construction Contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding ten thousand ($10,000.00) dollars (US) which are not exempt from the provisions of the equal opportunity clause and that he will retain such certifications in his files.

_____ _____

Signature of Contractor Title

_____

Printed Name of Contractor

SAVANNAH AIRPORT COMMISSION

CONTRACT

This AGREEMENT, made and entered into this _____ day of _____, _____, by and between the Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission, hereinafter designated the Owner, party of the first part, and _____ of the City of _____, and State of _____, hereinafter designated the Contractor, party of the second part,

W I T N E S S E T H:

THAT THE PARTIES to these presents, each in consideration of the undertakings, promises and agreements on the part of the other, herein contained, have undertaken, promised and agreed, and do hereby undertake, promise, and agree; the party(ies) of the first part for itself, its successors, and assigns, and the party(ies) of the second part for its, itself, and its, their heirs, executors, administrators, successors, and assigns; as follows:

That the party(ies) of the second part in consideration of the sums of money herein specified to be paid by said party of the first part to said party(ies) of the second part, shall and will at its, their own cost and expense furnish all labor, materials, tools, and equipment for **MATERIAL TESTING & QUALITY CONTROL FOR DEMO AIR CARGO/CONSTRUCT APRON/CONSTRUCT SE TAXILANE** at the Savannah / Hilton Head International Airport, in accordance with the Notice to Bidders, Instructions to Bidders, Proposal, Bid Schedule and in accordance with the Plans, Specifications, General Conditions all therein referred to as the Contract Documents, are hereby made a part of this Contract, all of said work to be fully completed to the acceptance of and by the Mayor and Aldermen of the City of Savannah, and the Savannah Airport Commission in the amount of _____Dollars/Cents ($_____ USD).

If the Contractor fails to comply with any of the terms, conditions, provisions, or stipulations of this Contract, according to the true intent and meaning thereof, then the party of the first part may avail itself of any or all remedies provided in that behalf in the Contract and shall have the right and power to proceed in accordance with the provisions thereof.

IN WITNESS WHEREOF, the parties to the agreement have hereunto set their hands and seals and have executed this agreement the day and year first above written.

OWNER
(Party of the First Part) SAVANNAH AIRPORT COMMISSION

BY: _____
Gregory B. Kelly, Secretary

CONTRACTOR
(Party of the Second Part)

_____
Company Name

BY: _____
Name (Signature)

TITLE: _____
Title

_____
Name (Print/Type)

ATTEST: _____
Name (Signature)

TITLE: _____
Title

_____
Name (Print/Type)

Contractor must indicate whether Corporation, Partnership, Company or Individual

Corporation: □ Partnership: □

Company: □ Individual: □

_____
Out-of-state contractors must affix Georgia tax registration number.

The person signing shall in his own handwriting sign the principal's name, his own name, and his title. Where the person signing for a corporation is other than the President or Vice President, he must, by affidavit, as contained herein, show his authority to bind the corporation.

Corporate seal is required for all companies that are incorporated.

SAVANNAH AIRPORT COMMISSION

GENERAL CONDITIONS

1. SUMMARY OF WORK

a. The work consists of furnishing all necessary labor, material, and testing equipment to perform testing and quality control as required in the scope of work for **MATERIAL TESTING & QUALITY CONTROL for DEMO AIR CARGO/CONSTRUCT APRON/CONSTRUCT SE TAXILANE.**

b. The location of the project is at the Savannah/Hilton Head International Airport, Savannah, Georgia.

c. The Owner for whom this work shall be executed is the Savannah Airport Commission, 400 Airways Avenue, Savannah, Georgia 31408.

2. WORKING CONDITIONS

The testing laboratory will furnish on 12-hour notice person or persons to perform required testing. Testing will be performed throughout the time that testing laboratory is performing work that requires testing as shown on Bid Schedule.

The testing laboratory will not be expected to retain personnel on the work site after placement of material requiring testing has been completed during a workday.

3. TESTING PROCEDURES

If a test can be satisfactorily performed in the testing laboratory's home office, it will be permitted.

The results of all tests shall be furnished to the Savannah Airport Commission and the General Contractor on the same day that tests are made, with the exception of such tests on strength of concrete beams or cylinders.

Sand cone or comparable method shall be used to correlate the density and moisture with a nuclear device. When a satisfactory correlation has been established, a nuclear device may be used to test density and moisture.

Testing shall be performed in accordance with the project specifications and testing standards for each item tested.

The testing lab shall furnish technical advice and certified reports on the test results.

4. BILLING PROCEDURE FOR SERVICE PERFORMED UNDER BID SCHEDULE

Billing will be for the actual number of tests performed and at the unit price quoted in the bid proposal. Unit price per bid item will include all trips to project site to make tests, pick up of concrete beams, laboratory technician's time, administration, bookkeeping, record keeping, travel time, and report submittal. Hours of charges for engineering and technician time will not be paid unless contracted for under separate agreement.

5. INSURANCE REQUIREMENTS

The testing laboratory shall maintain such insurance with insurance companies satisfactory to the Savannah Airport Commission as will protect the Savannah Airport Commission and the Mayor and Aldermen of the City of Savannah from claims under Workmen's Compensation acts and other employee benefit acts and from claims for damages because of bodily injury, including death, and from claims for property damage which may arise either out of or during operations whether such operations be by the bidder or by any subcontractor or by anyone directly or indirectly employed by any of them. Such insurance shall not be less than the following amounts and shall include the described coverages.

a. Workmen's Compensation

Applicable Federal and State	Statutory
Employer's Liability,	$ 100,000.00

b. Contractor's Liability (Comprehensive General)

Including Explosion, Collapse, and Underground Coverages and Care, Custody, and Control.

1.	Bodily Injury-Each Occurrence	$1,000,000.00
2.	Property Damage Including Completed Operations Broad Form-Each Occurrence	$1,000,000.00
3.	Person Injury Including Hazards A, B, and C, Not to Exclude Employees	$ Included
4.	Automobile Liability, Owned, Non-Owned and Hired	
	Bodily Injury-Each Occurrence	$1,000,000.00
	Property Damage-Per Occurrence	$1,000,000.00

c. These policies shall insure bidder and Savannah Airport Commission against all claims for injury or death to persons or damage to property and shall contain an appropriate cross liability clause insuring Savannah Airport Commission against any loss or damage to Savannah Airport Commission property resulting from any acts of bidder, its officers, employees, servants or subcontractors, and waiving any right of subrogation against the Savannah Airport Commission.

d. The Savannah Airport Commission requires that ALL LIABILITY POLICIES must be **ENDORSED** to include **the Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission, its officers, directors, agents and employees as ADDITIONAL INSURED**. This must be reflected on the Certificate of Insurance which shall be furnished to the Commission. The Certificate of Insurance shall evidence proper limits of coverage as set forth herein and that the policy or policies will not be cancelled or modified without thirty (30) days prior written notice thereof is given to the Savannah

Airport Commission. The Certificate shall also reflect that all policies have been endorsed to include waivers of any and all subrogation. The testing laboratory shall also require its subcontractors and subcontractors/subcontractors to endorse their policies to include **the Mayor and Aldermen of the City of Savannah and the Savannah Airport Commission, its officers, directors, agents and employees as ADDITIONAL INSURED**.

e. Immediate notification must be given to the Savannah Airport Commission and/or its agent upon receiving any knowledge or notification of claim or litigation on which the Savannah Airport Commission may be named.

f. The testing laboratory shall indemnify, protect, defend, and hold completely harmless the Commission, and its officers, agents and employees from and against any and all liabilities, losses, suits, claims, judgments, fines, or demands arising by reason of injury or death of any person or damage to any property, including all reasonable costs for investigation and defense thereof (including but not limited to attorney fees, court costs, and expert fees), of any nature whatsoever arising out of or incident to this contract and/or the use of occupancy of the leased premises or the acts or omissions of Testing laboratory's officers, agents, employees, contractors, subcontractors, licensees, or invitees, regardless of where the injury, death, or damage may occur, unless such injury, death or damage is caused by the sole negligence of the Commission. The Commission shall give to Testing laboratory reasonable notice of any such claims or actions. The Testing laboratory shall also use counsel reasonably acceptable to Commission in carrying out its obligations hereunder.

g. All policies shall be endorsed to include waivers of any and all subrogation.

6. AIRPORT RULES AND REGULATIONS

Testing laboratory(s) shall be responsible for informing all employees concerning pertinent airport and Federal Aviation Administration rules and regulations. Testing laboratory(s) shall conform with all rules and regulations and directives issued either orally or in writing by the Owner or his representative. All pertinent local, state and federal safety requirements shall be observed by the Testing laboratory(s) and Testing laboratory(s)' personnel. Testing laboratory(s) shall execute a Hold Harmless Agreement with the Savannah Airport Commission; which form shall be furnished by the Airport Commission.

7. ACCIDENTS

All accidents causing personal injury or property damage shall be reported to the Executive Director or his representative immediately. The testing laboratory(s) shall provide, at the site, such equipment and medical facilities as are necessary to supply first aid service to anyone who may be injured in connection with the performance of the work, whether on or adjacent to the site, which causes death, personal injury, or property damage, giving full details and statements of witnesses. in addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone to the Executive Director or his representative and the Project Engineer.

8. NOTICE TO PROCEED

The Notice to Proceed shall state the date on which it is expected the Testing laboratory will begin the work and from which date the contract time will be charged. The Testing laboratory

shall begin the work to be performed under the contract within ten (10) calendar days of the date written by the Owner in the Notice to Proceed, but in any event, he shall notify the Owner at least 24-hours in advance of the time actual construction operations will begin.

9. SAFETY & SECURITY

The Testing Laboratory shall be responsible for the security of his equipment and materials. He shall be responsible for the security of all perimeter security gates, terminal doors and hatches leading to secure areas utilized by him. As directed by the Executive Director, locks shall be placed on each gate used by the Testing Laboratory. The locks must be marked in a manner showing company ownership and a key or combination provided to the Airport Police Department. The gates shall be locked at all times or guards posted at the gates to control access through them. Gate guards shall have a radio or cellular phone which will enable them to call the Police to report security problems or Testing Laboratory to verify identities, etc. For joint use gates, if a lock is found unsecured, the company owning the lock is in violation of Airport Rules and Regulations. In addition, unauthorized entry to the Air Operations Area through the gates may result in the responsible party being cited for violating Airport Regulations.

a. The Federal Aviation Act of 1958, Section 901, 49 USC 1471, gives the Federal Aviation Administration authority to place a fine on any airport found to be in breach of a security requirement.

b. The Testing Laboratory shall reimburse the Airport Commission for the full amount of any fines placed on the Airport Commission due to negligence on the part of the Testing Laboratory. Fines may be placed on the Airport Commission for such things as security gates being unlocked, terminal doors not secure, fences torn down, and Air Operations Area not being properly secured. These are only examples of items causing fines and not limitations. There could be other related items.

c. It is the Testing Laboratory's responsibility to prevent any breach of security within his area of construction or any route of entry to area of construction.

d. Security Clearances - All personnel having unescorted access to any security restricted area shall wear valid Savannah/Hilton Head International Airport identification badges so they are visible on their outer garments in such areas at all times to permit ready recognition by Airport Public Safety Officers. The Testing Laboratory's employees may be issued any one of the below listed Security Identification, etc. badges.

1. The Airport Identification Badges are issued to approved personnel in several colors:

a. BLUE – Issued to personnel requiring unlimited access inside the SIDA.

1. Effective December 6, 2002, the TSA requires anyone requesting unescorted access to the SIDA shall be fingerprinted, a background check performed, and results returned prior to ID Badge being issued. **No exceptions.** This process takes 2 – 3 weeks. Anyone applying for badges shall submit application as soon as possible to ensure fingerprints / criminal history records are returned prior to start date of project.

2. The cost for processing is $30.00 per person. Everyone receiving a blue ID Badge must be fingerprinted.

b. YELLOW – Issued to contractors working in the vicinity of the aircraft movement area in order to perform their required duties. Persons with yellow badges may NOT enter the SIDA.

c. GREY – Issued to general aviation and tenants who require incidental access to the 1542.203 areas. Persons with Blue/Graybadges may NOT enter the SIDA.

2. The color of the badge signifies the area on the airport where the badge holder may operate.

a. Identification badges must be controlled at all times. When personnel are terminated, upon completion of the construction project, and when badges expire, the Testing Laboratory is responsible for returning identification badges to the Airport Public Safety Department. Before a new badge is issued to any person, their expired or invalid badge must be returned to the Airport Public Safety Department.

Upon completion of a project, it will be the responsibility of the Testing Laboratory to collect all badges issued under his contract. Subcontractors are responsible for collecting their badges. Before final payment is made on the project, a written notification from the Airport Public Safety Department will be given to the Director of Engineering. The written notice will state the number of badges issued and the number of badges returned.

b. A fee of $20.00 (without reader), $25.00 (with reader), payable in advance, is charged for each badge issued. The Testing Laboratory shall make a cash deposit of $200 prior to receiving any badges. This deposit is refundable providing all badges have been returned. For each badge not returned by the Testing Laboratory, $200.00 will be deducted from any monies due the Testing Laboratory or his surety. All costs, i.e., ID Badge, fingerprint requirements, and deposit(s) shall be paid in advance.

c. The Testing Laboratory shall be required to comply with the Transportation Security Administration Amendment to Part 1542.209 prior to commencing work. All personnel hired after December 6, 2002, who have unescorted access to any area on the airport controlled for security reasons shall have background checks to the extent allowable by law, including at a minimum, references and prior employment histories to the extent necessary to verify representations made by the employee/applicant relative to employment in the preceding ten (10) years. The Testing Laboratory shall certify to the Commission by using SAC Form 513 that such checks were conducted and are on file in the Testing Laboratory's office for inspection by the Transportation Security Administration (TSA) or Savannah Airport Commission representatives.

d. The Testing Laboratory shall provide the Savannah Airport Commission a list of all employees having access to the Air Operations Area on SAC Form 513.

e. SAC Form 513 shall be used by the Testing Laboratory whenever applying

for the identification badges. Only the Testing Laboratory or representative, who shall be designated in writing, shall sign SAC Form 513.

f. All badge requests and background forms shall be turned in forty-eight (48) hours in advance. Once approved, all badge holders shall attend SIDA Contractor's badge and/or airfield drivers training classes.

g. Any person found within any security restricted area without proper identification shall be in violation of Federal law and the Airport Rules and Regulations. All such persons shall be escorted off the Air Operations Area and may be cited by the Airport Public Safety Department. In addition, the person may have their identification badge revoked.

h. Any delay in construction of project due to violations of Federal or Airport Regulations shall be absorbed by the Testing Laboratory and not the Airport Commission.

i. Motorized Vehicles

No personal vehicles (POV's) are allowed in the AOA. Only company vehicles with the company name displayed will be permitted access to the AOA.

Vehicular traffic crossing active aircraft movement areas (runways, taxiways or aircraft parking aprons) shall be controlled either by two-way radio contact with the control tower, by escort, flagman, signal lights, or other appropriate means as approved by the FAA Control Tower Chief. After receiving clearance from the Control Tower, the driver's personal observation that no aircraft is approaching his position will be made before he makes any crossing of active taxiway or runway. **THE TESTING LABORATORY SHALL BE RESPONSIBLE FOR SUPPLYING THEIR OWN RADIOS.**

If it is desirable to clearly identify the vehicles for control purposes by either assigned initials or numbers, then the identifying symbol shall be of eight (8) inch minimum, block-style character of a color easily read. Symbols may be applied by use of tape or water-soluble paint.

Motorized vehicles and equipment operating in the AOA shall not exceed fifteen (15) miles per hour.

Aircraft shall have priority over all motorized vehicles and equipment.

10. INDEMNIFICATION

a. Governing Law

This Agreement shall be deemed to be made in and construed in accordance with the laws of the State of Georgia.

b. The Testing laboratory shall protect, defend, and indemnify Commission and its officers, agents and employees from an against any and all liabilities, losses, suits, claims, judgments, fines or demands arising by reason of injury or death of any person, or

damage to any property, including all reasonable costs for investigation and defense thereof (including but not limited to attorney fees, court costs, and expert fees), of any nature whatsoever arising out of or incident to this Agreement and/or the use or occupancy of the Premises or the acts or omissions of testing laboratory's officers, agents, employees, contractors, subcontractors, licensees, or invitees, regardless of where the injury, death or damage may occur, unless such injury, death, or damage is caused by the sole negligence of the Commission. The Commission shall give to testing laboratory reasonable notice of any such claims or actions. The Testing laboratory shall also use counsel reasonably acceptable to Commission in carrying out its obligations hereunder. The provisions of this section shall survive the expiration or early termination of this Agreement.

11. TERMINATION OF CONTRACT

The provisions of this contract may be terminated by either party without cause, in which event at least thirty (30) days prior written notice of such termination shall be given to the other. In the event the Savannah Airport Commission causes abandonment, termination, or suspension of this Contract, or parts thereof, the Testing laboratory shall be compensated for services rendered up to the time of such abandonment, termination, or suspension. Compensation to the Testing laboratory shall be for any reasonable costs incurred by the Testing laboratory up to the time of abandonment, termination, or suspension. The Testing laboratory shall submit full documentation of costs incurred.

12. NONDISCRIMINATION

(As required by Title VI of the Civil Rights Act of 1964; Department of Transportation 49 CFR Part 21; and Section 520 of the Airport and Airway Improvement Act of 1982).

The Testing laboratory shall comply with and shall ensure that the following Non-Discrimination clause is inserted in all subcontracts, subleases, and other agreements at all tiers:

"The Testing laboratory assures that it will comply with pertinent statutes, Executive Orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance."

13. TECHNICAL REQUIREMENTS

a. Engineering Date shall include, but not be limited to, the following:

   1. Keeping records of test results with sample lot / location recorded.

   2. Sorting and compiling data to meet requirements set forth in computing the pay factor for P-401 and P-501 material.

   3. Keeping account of lots and locations of lots to meet acceptance criteria for flexural strength on P-501 PCC and mat density on P-401 asphalt.

b. Guideline set out in specification AC 150/5370-10A for P-401 and P-501 Section 401-5.2 Acceptance Criteria and P-501 Section 501-5.1 and 501-8.1 and Section 110 Method of Estimating Percentage of Material within Specification Limits. (PWL).

c. Reports shall be sealed by a Professional Engineer registered in Georgia. Test results shall be communicated to the Owner by the most expeditious means practicable as soon as same become available, with hard copy to follow as specified herein.

14. ENGINEERING SERVICES

This item is to be utilized for professional service needs when material and/or job conditions warrant the use of such personnel in advising the Owner and Contractor as to cause and/or solution of geotechnical problem(s) on the project. This service must be requested by the Owner. This service does not include general advice or conversation pertaining to routine testing results, scheduling, or procedures related to testing as such services are covered by this Agreement and are not considered an extra charge thereunder.

U.S. Department
of Transportation
Federal Aviation Administration

Memorandum

Subject: **ACTION:** Testing Laboratory Evaluation, AC 150/5370-10A

Date: January 23, 2004

From: Manager, Airport Engineering Division, AAS-100

Reply to Attn. of:

To: All Regions
ATTN: Manager, Airports Division

In certain specifications and program guidance, we require testing laboratories to meet standards published in the American Society for Testing and Materials (ASTM) C 1077 and ASTM D 3666. These standards set forth the criteria for evaluating the capability of a laboratory to perform designated tests on concrete and bituminous materials. Both standards require inspection and/or accreditation by a national authority. Effective with this memorandum, we recognize the U.S. Army Corps of Engineers, Engineer Research and Development Center, Materials Testing Center (MTC), Waterways Experiment Station, Vicksburg, MS as a national authority capable of determining that laboratories meet the requirements of ASTM C 1077 and ASTM D 3666. We recognize a current validation report from the MTC that includes these tests as evidence that a laboratory meets the requirements of these standards. Laboratories that have been validated under this program are listed on the MTC homepage at http://www.wes.army.mil/SL/MTC/mtc.htm.

Attached is an example of a validation report issued by the MTC (used by permission). If you have any questions, please contact Jeff Rapol on 202-267-7474.

ORIGINAL SIGNED BY

Rick Marinelli, P.E.

Attachment

15. TESTING LAB ACCREDITATION

a. Mandatory standards contained in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5370-10A, Standards for Specifying Construction of Airports, paragraphs 401-3.5 and 401-5.1 for plant mix bituminous pavements and paragraphs 501-2.1, 501-3.4, and 501-5.1 for Portland cement concrete pavement, require that testing firms be accredited by national authorities as evidence of the firm's competence to perform certain tests.

The FAA Southern Region will require compliance with ASTM D 3666, Standard Specifications for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials and ASTM C 1077, Standard Practice for Laboratories Testing Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation, for all paving projects (includes subbase, base and surface courses, as appropriate) over $250,000.

For asphalt projects in the state of Florida, the FAA has approved substitution of Florida Department of Transportation (FLDOT) accreditations for national accreditations. It is anticipated that FLDOT accreditations for Portland cement concrete will also be substituted for national accreditations in the near future. However, only national accreditations will be acceptable on Airport Improvement Program (AIP) projects outside the state of Florida.

b. FAA, Airports Division, Southern Region is issuing the following timetable for implementing lab accreditation requirements:

Effective January 1, 1996:

Any testing firm employed to develop mix formulas and/or to perform acceptance and sampling testing on airport paving projects exceeding $250,000 within the FAA Southern Region must provide evidence that it has begun the accreditation process and has requested an inspection of its laboratory facilities by a "qualified national authority" such as the AASHTO Accreditation Program (AMRL), the American Association for Laboratory Accreditation (AALA), the National Voluntary Laboratory Accreditation Program (NVLAP), etc. Firms working in Florida must possess FLDOT accreditation on plant mix bituminous paving.

Effective January 1, 1997:

Any testing firm employed to develop mix formulas and/or to perform acceptance and sampling testing on airport paving projects exceeding $250,000 within the Southern Region must fully comply with ASTM D 3666 and/or ASTM C 1077 requirements. Firms working in Florida must possess FLDOT accreditation on plant mix bituminous paving and Portland cement concrete paving.

c. National Accreditation Authorities

Cement and Concrete Reference Laboratory (CCRL)
National Institute of Standards and Technology, Bldg. 226, Room A365
Gaithersburg, MD 20899
301/975-6704 Dave Savage

National Voluntary Laboratory Accreditation Program (NVLAP)
National Institute of Standards and Technology, Bldg. 411, Room A124
Gaithersburg, MD 20899
301/975-4016 Paul Martin

American Association for Laboratory Accreditation (AALA)
656 Quince Orchard Road, Suite 203
Gaithersburg, MD 20878-1409
301/670-1377

AASHTO Accreditation Program (AMRL)
444 N. Capitol St. NW, Suite 225
Washington, DC 20001
202/624-5800

16. SECTION 110: METHOD OF ESTIMATING PERCENTAGE OF MATERIAL WITHIN SPECIFICATION LIMITS (PWL)

a. GENERAL.

When the specifications provide for material to be sampled and tested on a statistical basis, the material will be evaluated for acceptance in accordance with this section. All test results for a lot will be analyzed statistically, using procedures to determine the total estimated percent of the lot that is within specification limits. This concept, termed percent within limits (PWL), is a statistically based evaluation method, whereby the PWL is computed on a lot basis, using the average (X) and standard deviation (Sn) of the specified number (n) of sublot tests for the lot and the specification tolerance limits (L for lower and U for upper) for the particular acceptance parameter. From these values, the respective Quality index(s) (QL for Lower Quality Index and/or QU for Upper Quality Index) is computed and the PWL for the specified n is determined from Table 1.

b. METHOD FOR COMPUTING PWL.

The computational sequence for computing the PWL is as follows:

- Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

- Locate the sampling position within the sublot in accordance with the random sampling requirements of the specification.

- Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

- Average all sublot values within the lot to find X by using the following formula:

$X = (x1 + x2 + x3 + \ldots xn) / n$

Where:

X = Average of all sublot values within a lot

x1, x2 = Individual sublot values

n = Number of sublots

- Find the standard deviation Sn by use of the following formula:

$Sn = SQRT[(d1*d1 + d2*d2 + d3*d3 + \ldots dn*dn) / (n-1)]$

Where:

Sn = standard deviation of the number of sublot values in the set

d1, d2 = deviations of the individual sublot values X1, X2 . . . from the average value X

that is: d1 = (x1 - X), d2 = (xn - X) . . dn = (xn - X)

n = number of sublots

- For single sided specification limits (i.e., L only), compute the Lower Quality Index QL by use of the following formula:

  QL = (X - L) / Sn

  Where:

  L = specification lower tolerance limit

  Estimate the percentage of material within limits (PWL) by entering Table 1 with QL, using the column appropriate to the total number (n) of measurements. If the value of QL falls between values shown on the table, use the next higher value of PWL.

- For double sided specification limits (i.e. L and U), compute the Quality Indexes QL and QU by use of the following formulas:

  QL = (X - L) / Sn and QU = (U - X) / Sn

  Where:

  L and U = specification lower and upper tolerance limits

  Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with QL and QU, using the column appropriate to the total number (n) of measurements, and determining the percent of material above PL and percent of material below PU for each tolerance limit. If the values of QL fall between values shown on the table, use the next higher value of PL or PU. Determine the PWL by use of the following formula:

  PWL = (PU + PL) - 100

  Where:
  PL = percent within lower specification limit
  PU = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project
Test Item: Item P-401, Lot A.

A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

   A-1 96.60
   A-2 97.55
   A-3 99.30
   A-4 98.35

   n = 4

2. Calculate average density for the lot.

   X = (x1 + x2 + x3 + . . xn) / n

   X = (96.60 + 97.55 + 99.30 + 98.35) / 4

   X = 97.95 percent density

3. Calculate the standard deviation for the lot.

   Sn = SQRT[((96.60 - 97.95)*(96.60 - 97.95) +
   (97.55 - 97.95)*(97.55 - 97.95) +
   (99.30 - 97.95)*(99.30 - 97.95) +
   (98.35 - 97.95)*(98.35 - 97.95)) / (4 - 1)]

   Sn = SQRT[(1.82 + 0.16 + 1.82 + 0.16) / 3]

   Sn = 1.15

4. Calculate the Lower Quality Index QL for the lot. (L=96.3)

   QL = (X -L) / Sn

   QL = (97.95 - 96.30) / 1.15

   QL = 1.4348

5. Determine PWL by entering Table 1 with QL= 1.44 and n= 4.

   PWL = 98

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

   A-1 5.00
   A-2 3.74
   A-3 2.30
   A-4 3.25

2. Calculate the average air voids for the lot.

   X = (x1 + x + x3 . . n) / n

   X = (5.00 + 3.74 + 2.30 + 3.25) / 4

   X = 3.57 percent

3. Calculate the standard deviation Sn for the lot.

   Sn = SQRT[((3.57 - 5.00)*(3.57 - 5.00) +
   (3.57 - 3.74)*(3.57 - 3.74) +

(3.57 - 2.30)*(3.57 - 2.30) +
(3.57 - 3.25)*(3.57 - 3.25))/(4 - 1)]

Sn = SQRT[(2.04 + 0.03 + 1.62 + 0.10) / 3]

Sn = 1.12

4. Calculate the Lower Quality Index QL for the lot. (L= 2.0)

   QL = (X - L) / Sn

   QL = (3.57 - 2.00) / 1.12

   QL = 1.3992

5. Determine PL by entering Table 1 with QL = 1.40 and n = 4.

   PL = 97

6. Calculate the Upper Quality Index QU for the lot. (U= 5.0)

   QU = (U - X) / Sn

   QU = (5.00 - 3.57) / 1.12

   QU = 1.2702

7. Determine PU by entering Table 1 with QU = 1.27 and n = 4.

   PU = 93

8. Calculate Air Voids PWL

   PWL = (PL + PU) - 100

   PWL = (97 + 93) - 100 = 90

TABLE 1. TABLE FOR ESTIMATING PERCENT OF LOT WITHIN LIMITS (PWL)

Percent Within (PL and PU)	Positive Values of Q (QL and QU) Limits n=3	n=4	n=5	n=6	n=7	n=8
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4716
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075

88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630
87	1.0597	1.1100	1.1173	1.1191	1.1199	1.1204
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015
83	0.9939	0.9900	0.9785	0.9715	0.9672	0.9643
82	0.9749	0.9600	0.9452	0.9367	0.9325	0.9281
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747
70	0.6787	0.6000	0.5719	0.5583	0.5504	0.5454
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592
66	0.5563	0.4800	0.4545	0.4424	0.4354	0.4310
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4031
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1592
55	0.1806	0.1500	0.1408	0.1363	0.1338	0.1322
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0792
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264
50	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 2. TABLE FOR ESTIMATING PERCENT OF LOT WITHIN LIMITS (PWL)

Percent Within (PL and PU)	Negative Values of Q (QL and QU) Limits n=3	n=4	n=5	n=6	n=7	n=8
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0792
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057
45	-0.1806	-0.1500	-0.1408	-0.1363	-0.1338	-0.1322
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1592
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122

41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4031
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4354	-0.4310
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164
30	-0.6787	-0.6000	-0.5719	-0.5583	-0.5504	-0.5454
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9325	-0.9281
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9672	-0.9643
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794
13	-1.0597	-1.1100	-1.1173	-1.1191	-1.1199	-1.1204
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4716
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520

SAVANNAH AIRPORT COMMISSION

P-501 MATERIAL ACCEPTANCE

I. Acceptance Sampling and Testing. All acceptance sampling and testing, with the exception of coring for thickness determination, necessary to determine conformance with the requirements specified in this section will be performed by the Engineer. Concrete shall be accepted for strength and thickness on a lot basis.

A lot shall consist of 4,800 square yards.

Testing organizations performing these tests shall meet the requirements of ASTM C 1077. The Contractor shall bear the cost of providing curing facilities for the strength specimens, per paragraph 501-5.1a(3), and coring and filling operations, per paragraph 501-5.1b(1).

1. Flexural Strength

a. **Sampling.** Each lot shall be divided into four equal sublots. One (1) specimen shall be taken for each sublot from the plastic concrete delivered to the job site. Sampling locations shall be determined by the Engineer in accordance with random sampling procedures contained in ASTM D 3665. The concrete shall be sampled in accordance with ASTM C 172.

b. **Testing.** Specimens shall be made in accordance with ASTM C 31 and the flexural strength of each specimen shall be determined in accordance with ASTM C 78.

c. **Field Test Specimens.** Concrete samples shall be taken and furnished by the Contractor and tests shall be taken in the field to determine the consistency, air content, and strength of the concrete. Flexural test beams shall be made each day that the concrete is placed. Each group of test beams shall be molded from the same batch of concrete and shall consist of a sufficient number of specimens to provide two flexural strength tests at each test age. One group of specimens will be made during the first half of each shift, and the other during the last portion of the shift. The specimens shall be made in accordance with ASTM C 31. However, at the start of paving operations and when the aggregate source, aggregate characteristics, or mix design is changed, additional groups of test beams may be required until the Engineer is satisfied that the concrete mixture being used complies with the strength requirements of these specifications.

Test ages will be seven (7) and twenty-eight (28) days.

The flexural strength of the concrete shall meet the following requirements:

The average of any four (4) consecutive strength tests, tested at the end of twenty-eight (28) days, shall have an average flexural strength equal to or greater than the specified flexural strength.

Not more than twenty (20%) percent of the beams tested at the end of twenty-eight (28) days shall have a flexural strength less than the specified strength. Specimens which are obviously defective shall not be considered in the determination of the strength. When it appears that the test specimens will fail to conform to the requirements for strength, the Engineer shall have the right to order changes in the concrete sufficient to increase the strength to meet these requirements. When a satisfactory relationship between seven (7) day and twenty-eight (28) day strengths has been established and approved, the seven (7) day test results may be used as an indication of the 28-day strengths. However, the seven (7) day test results will not replace the results of the twenty-eight (28) day tests if the twenty-eight (28) day results fall below the requirement.

d. **Curing.** The Contractor shall provide adequate facilities for the curing of beams. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60 to 80°F, and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather or in heavyweight closed plastic bags, or use other suitable methods, provided the temperature and moisture loss requirements are met.

   The Contractor shall also provide all materials necessary for the sampling, making, storing, and curing the beams in accordance with ASTM C 31, at facilities set up and furnished by the Contractor at the worksite. Steel beam molds shall be 6" x 6" with a length of 22 inches. Beam molds which are unacceptable to the Engineer shall be replaced by the Contractor at no cost to the Owner. Curing facilities shall include the furnishing and operating of satisfactory water tanks equipped with heating or cooling devices that will automatically maintain the temperature of the water at 73°F ± 5° for curing beams for strength tests.

e. **Acceptance.** Acceptance of pavement for flexural strength will be determined by the Engineer in accordance with paragraph 501-5.2b. No additional cores or samples taken from the cured concrete will be considered for acceptance testing.

2. Pavement Thickness

a. **Sampling.** Each lot shall be divided into four equal sublots and one core shall be taken by the Contractor for each sublot. Sampling locations shall be determined by the Engineer in accordance with random sampling procedures contained in ASTM D 3665.

   Cores shall be neatly cut with a core drill. The Contractor shall furnish all tools, labor, and materials for cutting samples and filling the cored hole. Core holes shall be filled by the Contractor with a non-shrink grout approved by the Engineer within one day after sampling.

b. **Testing.** The thickness of the cores shall be determined by the Engineer by the average caliper measurement in accordance with ASTM C 174.

c. **Acceptance**. Acceptance of pavement for thickness shall be determined by the Engineer in accordance with paragraph 501-5.2c.

d. **Partial Lots.** When operational conditions cause a lot to be terminated before the specified four tests have been made for the lot, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they shall constitute a lot. Where one or two sublots have been produced, they shall be incorporated into the next lot or the previous lot and the total number of sublots shall be used in the acceptance criteria calculation, i.e., **n=5 or n=6.**

II. Acceptance Criteria

1. General. Acceptance will be based on the following characteristics of the completed pavement:

a. Flexural strength
b. Thickness
c. Smoothness
d. Grade
e. Edge slump
f. Dowel bar alignment

Flexural strength will be evaluated for acceptance by the Engineer in accordance with paragraph 501-5.2b. Thickness will be evaluated for acceptance by the Engineer in accordance with paragraph 501-5.2c. Smoothness will be evaluated by the Engineer in accordance with paragraph 501-5.2e(3).

Acceptance for flexural strength and thickness will be based on the criteria contained in paragraph 501-5.2e(1). Acceptance for thickness will be based on the criteria contained in paragraph 501-5.2e(2). Acceptance for smoothness will be based on the criteria contained in paragraph 501-5.2e(3). Acceptance for grade will be based on the criteria contained in paragraph 501-5.2e(4).

The Engineer may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if he can demonstrate in the laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

2. **Flexural Strength.** Acceptance of each lot of in-place pavement for flexural strength shall be based on the percentage of material within specification limits (PWL). The PWL plan considers the variability (standard deviation) of the material and the testing procedures, as well as the average (mean) value of the test results. The standard deviation shall be determined from the Contractor's own data or from historic data. If a material with high variability is produced, then a higher average strength must be maintained in order to achieve a PWL of 80 percent or more.

3. **Pavement Thickness.** Acceptance of each lot of in-place pavement shall be based on the percentage of material within specification limits. The standard deviation shall be determined from the Contractor's own data or from historic data. If a pavement with a high thickness variability is placed, then a higher average thickness must be maintained in order to achieve a PWL of 90 percent or more.

   Concrete will be accepted for thickness based on cross-section survey of subbase and surface course prepared by an independent licensed surveyor in the State of Georgia hired by the Contractor and approved by the Savannah Airport Commission. When the measurement indicates deficiency not more than 0.2 inch (5 mm) from the plan thickness, full payment will be made. When such measurement is deficient more than 0.2 inch (5 mm) and not more than 0.5 inch (25 mm) from the plan thickness, an adjusted unit price, as provided in paragraph 501.2.2 will be paid.

4. **Percentage of Material Within Specification Limits (PWL).** The percentage of material within specification limits shall be determined in accordance with procedures specified in Section 110 of the General Conditions.

The lower specification limit (L) for flexural strength and thickness shall be:

	Lower Specification Limit (L)
Flexural Strength	Design strength given in paragraph 501-3.1.
Thickness	0.97 x Plan thickness for the lot

5. **Acceptance Criteria**

   a. **Flexural Strength.** If the PWL of the lot equals or exceeds 80 percent of the flexural strength the pay factor for the lot shall be 1.0, as determined in accordance with paragraph 501-8.1a. If the PWL is less than 80 percent the pay factor for the lot shall be less than 1.0, as determined in accordance with paragraph 501-8.1a.

   b. **Thickness.** If the PWL of the lot equals or exceeds 90 percent for thickness, the pay factor for the lot shall be 1.0, in accordance with paragraph 501-8.1b. If the PWL is less than 90 percent the factor for the lot shall be less than 1.0, as determined in accordance with paragraph 501-8.1b.

c. **Smoothness.** As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 16-foot straightedge or other specified device. Surface smoothness deviations shall not exceed 1/4 inch from a 16-foot straightedge placed in any direction, including placement along and spanning any pavement joint edge.

Areas in a slab showing high spots of more than 1/4 inch but not exceeding 1/2 inch in 16 feet shall be marked and immediately ground down with an approved grinding machine to an elevation that falls within the tolerance of 1/4 inch or less. Where the departure from correct cross section exceeds 1/2 inch, the pavement shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.

d. **Grade.** An evaluation of the surface grade shall be made by the Engineer for compliance to the tolerances contained below.

e. **Lateral Deviation.** Lateral deviation from established alignment of the pavement edge shall not exceed plus or minus 0.10 foot in any lane.

f. **Vertical Deviation.** Vertical deviation from established grade shall not exceed plus or minus 0.04 feet at any point.

g. **Edge Slump.** When slip-form paving is used, not more than 15 percent of the total free edge of each five hundred feet (500) of pavement, or fraction thereof, shall have an edge slump exceeding 1/4-inch, and none of the free edge of the pavement shall have an edge slump exceeding 3/8-inch. (The total free edge of 500 feet of pavement will be considered the cumulative total linear measurement of pavement edge originally constructed as nonadjacent to any existing pavement; i.e., 500 feet of paving lane originally constructed as a separate lane will have 1,000 feet of free edge, 500 feet of fill-in lane will have no free edge, etc.) The area affected by the downward movement of the concrete along the pavement edge shall be limited to not more than 18 inches from the edge. When excessive edge slump cannot be corrected before the concrete has hardened, the area with excessive edge slump shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.

6. Dowel Bar Alignment. Dowel bars and assemblies shall be checked for position and alignment. The maximum permissible tolerance on dowel bar alignment in each plane, horizontal, and vertical shall not exceed 2 percent of 1/4 inch per foot of dowel bar.

a. **Removal and Replacement of Concrete.** Any area or section of concrete that is removed and replaced shall be removed and replaced back to planned joints to the greatest extent possible. The Contractor shall replace damaged dowels and the requirements for doweled longitudinal construction joints in paragraph 501-4.10 shall apply to all contraction joints exposed by concrete removal.

Any concrete that develops a crack prior to final acceptance shall be removed and replaced at no cost to the Owner. The minimum size of replacement area shall be 12’-6” x 25’.

III. CONTRACTOR QUALITY CONTROL

1. **Quality Control Program.** The Contractor shall develop a Quality Control Program in accordance with Section 100 of the General Conditions. The program shall address all elements which effect the quality of the pavement including but not limited to:

   a. Mix Design
   b. Aggregate Gradation
   c. Quality of Materials
   d. Stockpile Management
   e. Proportioning
   f. Mixing and Transportation
   g. Placing and Consolidation
   h. Joints
   i. Dowel Placement and Alignment
   j. Flexural or Compressive Strength
   k. Finishing and Curing
   l. Surface Smoothness

2. **Quality Control Testing.** The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Program. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content slump, and air content.

   A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

   a. **Fine Aggregate**

      i. **Gradation.** A sieve analysis shall be made at least twice daily in accordance with ASTM C 136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

      ii. **Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C 70 or ASTM C 566.

   b. **Coarse Aggregate**

Gradation. A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C 136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

i. **Moisture Content.** If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C 566.

ii. **Slump.** Four slump tests shall be performed for each lot of material produced in accordance with the lot size defined in Section 501-5.1. One test shall be made for each sublot. Slump tests shall be performed in accordance with ASTM C 143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C 172.

iii. **Air Content.** Four air content tests shall be performed for each lot of material produced in accordance with the lot size defined in Section 501-5.1. One test shall be made for each sublot. Air content shall be performed in accordance with ASTM C 231 for gravel and stone coarse aggregate and ASTM C 173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the plant site. Material samples shall be taken in accordance with ASTM C 172.

3. Control Charts. The Contractor shall maintain linear control charts for fine and coarse aggregate, gradation, slump, and air content.

Control charts shall be posted in a location satisfactory to the Engineer and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and Suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory action, the Engineer may halt production or acceptance of the material.

a. **Fine and Coarse Aggregate Gradation.** The Contractor shall record the mining average of the last five gradation tests for each control sieve on linear control charts. Specification limits contained in Tables 1 and 2 shall be superimposed on the Control Chart for job control.

b. **Slump and Air Content.** The Contractor shall maintain linear control charts both for individual measurements and range (i.e., difference between lightest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.

CONTROL CHART LIMITS

Control Parameter	Individual Measurement Action Limit	Suspension Limit	Range Suspension Limit
Slump	± 1 inch (25 mm)	± 1.5 inches (38 mm)	± 2.4 inches (61 mm)
Air Content	± 1.2%	± 1.8%	± 2.8%

The individual measurement control charts shall use the mix design target values as indicators of central tendency.

1. **Corrective Action.** The Quality Control Plan shall indicate that appropriate action shall be taken when a process is believed to be set out of control. The Plan shall detail what action will be taken to bring a process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

    a. **Fine and Coarse Aggregate Gradation.** When two consecutive averages of five tests are outside of the Tables 1 or 2 specification limits, immediate steps, including a halt to production, shall be taken to correct the gradation.

    b. **Fine and Coarse Aggregate Moisture Content.** Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5 percent, the scale settings for the aggregate batcher(s) and water batcher shall be adjusted.

    c. **Slump.** The Contractor shall halt production and make appropriate adjustments whenever:

        i. One point falls outside the Suspension Limit line for individual measurements or range; or

        ii. Two points in a row fall outside the Action Limit line for individual measurements.

    d. **Air Content.** The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

        i. One point falls outside the Suspension Limit line for individual measurements or range; or

        ii. Two points in a row fall outside the Action Limit line for individual measurements.

        iii. Whenever a point falls outside the Action Limits line, the air-entraining admixture dispense shall be calibrated to ensure that it is opening correctly and with good reproducibility.

IV. METHOD OF MEASUREMENT

1. **Portland Cement Concrete Pavement.** Measurement shall be by the number of square yards adjusted in accordance with paragraphs 501-8.1a,b, and c. Payment shall be full compensation for all labor, materials, tools, equipment and incidentals including all joint sealing work required to complete the work as specified herein and on the drawings.

V. BASIS OF PAYMENT

1. **General.** Payment for an accepted lot of concrete pavement shall be made at the contract unit price per square yard in place adjusted in accordance with paragraphs 501-8.1a,b, and c. Payment shall be full compensation for labor, materials, tools, equipment, and incidentals including all joint sealing work required to complete the work as specified herein on the drawings. Payment for over strength concrete will not be made. Maximum payment for P-501 is 100 percent of the bid price per square yard.

   a. **Basis of Adjusted Payment for Flexural Strength (PFs).** Any pay factor for flexural strength shall be determined in accordance with the following schedule when the percent within specification limits (PWL) equals or exceeds 60 percent.

Percent within Limits (PWL)	Pay Factor for Flexural Strength (PFs)
80-100	1.0
60-79	$0.00017\ PWL^2 - 0.0105\ PWL + 0.75$

   When the PWL is below 60 percent the lot shall be removed and replaced. However, the Engineer may decide to accept the deficient lot. In that case, if the Engineer and Contractor agree in writing that the lot shall not be removed, it will be paid for at 50 percent of the contract unit price.

   b. **Basis of Adjusted Payment for Thickness (PF_T).** A pay factor for thickness shall be determined in accordance with the following schedule when the percent within specification limits (PWL) equals or exceeds 25 percent.

Percent within Limits (PWL)	Pay Factor for Thickness (PF_T)
90-100	1.0
25-89	$0.000034\ PWL^2 - 0.00006\ PWL + 0.72$

   When the PWL is below 25 percent the lot shall be removed and replaced. However, the Engineer may decide to accept the deficient lot. In that case, if the Engineer and contractor agree in waiting that the lot shall not be removed, it will be paid for at 50 percent of the contract unit price.

c. **Lot Pay Factor.** The percent payment for an accepted lot shall be arrived at by successively multiplying the contract unit price by both factors determined in paragraphs 501-1a and b.

PF_s x PF_T x Contract unit price = Adjusted payment for lot

2. Payment will be made under:

BASE BID

Items dependent on Bid Schedule.