

**Use and Limitation:** The Sponsor may use this document as a guide in preparing a construction management program for their specific project. Sponsors and Consultants are cautioned that the provision of this suggested sample construction management program by the FAA is not an implied or explicit guarantee of grant obligation compliance. The Sponsor is solely responsible for the preparation and submittal of compliant construction management program in accordance with the grant condition outlined in their grant agreement.

# Construction Management Program

*[Date]*

*[Location]*

*[Project Name]*  
*[AIP Project Number]*

**Prepared For**  
*[       ]*

**Prepared By**  
*[       ]*

## PROJECT INFORMATION

This Construction Management Program (CMP) details the measures and procedures required to assure compliance with the quality assurance and acceptance provisions of the paving construction contract for AIP Project No. [ - - - ] at the [airport name], [city, State]. The work to be accomplished in this project consists of:

*[List major project work items]*

PROJECT SPONSOR:	<b><i>[Name &amp; contact information for sponsor]</i></b>
CONTRACT ADMINISTRATION:	<b><i>[Name of firm Responsible for Const. Observation &amp; QA testing]</i></b> <b><i>[NAME]</i></b> _____, Project Manager (# years Earthwork experience) (# years Base/Subbase experience) (# years experience Pavement Construction) <b><i>[NAME]</i></b> _____, Assistant Project Manager (# years Earthwork experience) (# years Base/Subbase experience) (# years experience Pavement Construction) <b><i>[NAME]</i></b> _____, Construction Observer (# years Construction Observation) <b><i>[NAME]</i></b> _____, Construction Observer (# years Const. Observation)
ACCEPTANCE TESTING FOR GRADING, SUBGRADE & BASE	<b><i>[Name of QA firm]</i></b> – Field tests <b><i>[Name &amp; contact info for QA lab]</i></b> – Lab tests
ACCEPTANCE TESTING FOR PAVEMENT	<b><i>[Name &amp; contact info for QA lab]</i></b> – Lab tests
CONTRACTOR:	<b><i>[Name of Contractor, contact information and name of superintendent]</i></b>
CONTRACTOR QUALITY CONTROL MANAGER	<b><i>[Name of Contractor Quality Control Manager]</i></b>
CONTRACTOR'S QUALITY CONTROL TESTING LAB	<b><i>[Name &amp; contact info for QC lab]</i></b> – Lab tests

## RESPONSIBILITIES

### ***Project Manager/Engineer***

***[Name of Project Manager / Engineer]***, on behalf of ***[Name of CM Firm]*** represents the sponsor as the person with overall responsibility for contract administration of this project. ***[Name of Project Manager / Engineer]*** has the authority to take the necessary actions to monitor the compliance with the contract documents. ***[Name(s) of Assistant Project Managers]***, shall assist ***[Name of Project Manager / Engineer]*** with the contract administration of this project, as Assistant Project Managers.

### ***Construction Observer***

The responsibilities of ***[Name of Construction Observer]***, Construction Observer, shall include monitoring all aspects of the job, sampling materials for acceptance, conducting tests on embankment and excavation areas, reviewing and analyzing all test results, assuring that work is within specification limits, advising the Contractor's Superintendent and Project Engineer of nonconformance and possible corrective actions, and measuring quantities for payment.

### ***Quality Acceptance Laboratory***

***[As appropriate clarify which firm is responsible for what QA duties]***, testing lab duties shall include sampling materials for acceptance and conducting tests on: ***[embankment, excavation, subbase, base, HMA, PCC]***. ***(If responsibilities for testing of materials split between different organizations list which firm is responsible for which QA tests.)***

***[QA Lab name]*** personnel assigned to construction testing have received certified training from the ***[Name of appropriate certifications]*** (e.g. ***Troxler Nuclear Equipment Seminar and the American Concrete Institute (ACI)***).

All QA testing shall be performed by an (ASTM C1077 and D3666) accredited laboratory and a copy of the current accreditation shall be supplied to the Engineer and Owner, for approval, prior to submitting test results.

Laboratory accreditations for ***[Name of QA firms]*** and resumes of personnel are attached in Appendix A.

## QUALITY ASSURANCE INSPECTION PROCEDURES

1. Quality Assurance Tests: A list of tests required by the contract specifications can be found in the attached Appendix B. The list includes the referenced specification section, responsible party and testing requirements. All parties will be informed of their responsibilities. This information will be reviewed at the preconstruction conference and monitored throughout the project.
2. Submittals: The Engineer shall maintain a file containing certifications and submittals required by contract as provided by the contractor, as well as approvals from the Engineer.
3. The Project Manager or Assistant Project Manager will be on site at the beginning of the placement of the: ***[subbase, base course, asphalt base course, asphalt surface course, and concrete pavement placement]*** for the ***[runway, taxiway and apron]*** initial installation of ***[runway lights, taxiway lights, PAPI's, work in electrical vault]*** and prior to and during initial installation of ***[runway / taxiway]*** markings.
4. ***[Names of firm(s) responsible for QA test reports]*** will provide acceptance test reports to the ***[Owner / Engineer]*** as soon as the results are available, electronically. Typed copies shall be made available within ***[one]*** working day ***[delivered via electronic mail]***.
5. Material Test Reports: Material test results shall be verbally made available to the ***[Owner / Engineer]*** within ***[one hour]*** after the test report is completed and typed copies shall be made available within one working day ***[delivered via electronic mail]***.
6. Test Reports Which Require Corrective Actions: Should test results or observations indicate noncompliance with the project contract, plans, or specifications the following communication and follow-up action will be implemented, as applicable:
  - Verbal notification to the sponsor, Construction Superintendent, work area foreman and/or plant operator.
  - Calibration check on equipment used to determine the noncompliance item, if applicable.
  - Confirmation of noncompliance through retesting and/or follow-up observations.
  - If a solution to the nonconformance issue is not reached in a reasonable time frame, additional qualified contractor personnel will be contacted to assist in identifying and correcting the problem.
  - If a severe nonconformance problem is detected and a reasonable solution cannot be implemented in a reasonable time frame, the Construction Superintendent will consult with the Project Engineer and the work will be suspended.
  - The work will not begin again until the Construction Superintendent and Project Engineer concur that a solution to the problem has been found and successfully implemented.

- On restarting the work, the nonconforming testing element or observation will be monitored at an appropriate higher frequency for a reasonable amount of time, e.g. double the testing frequency listed.
  - After the area in noncompliance has been repaired, acceptance retesting will resume. The test reports will include failed test number for tracking.
7. Daily Reports: The project manager or his representative will maintain a daily diary summarizing pertinent construction items. Items recorded shall include (as a minimum):
    - a) Date
    - b) Weather Conditions
    - c) Brief Summary of Work Performed
    - d) Number of workers on site
    - e) Type and Amount of Major Equipment being utilized
    - f) Running total of working/calendar days used on project
    - g) Significant Directives/Communication with contractor (e.g. regarding construction procedures or material quality)
    - h) Summary of QA tests performed that day
    - i) Arrival / Departure Time On Site Inspection Staff
  8. Weekly Reports: A summary of weekly construction status shall be prepared weekly (on FAA form 5370-1 or other approved form) and submitted to **[owner / FAA]** every **[list day, e.g. Friday]**. Report shall include summary of work completed that week, summary of QA test results, discussion of any controversial issues that came up, work anticipated next reporting period.
  9. Submittal Schedule: The attached Appendix C lists required submittals, referencing the pay item, description, and specification section for the submittal. All required submittals will be reviewed and approved by the Engineer prior to placement of the material.
  10. **[Name of firm doing surveys]** will provide survey staking for horizontal and vertical control. The contractor's survey staking will be reviewed by the resident observer and approved prior to placement of materials.
  11. The finish grade of **[Runways / Taxiways / Aprons]** will be verified by the **[contractors / owners]** licensed surveyor. The documentation shall be provided to the owner prior to the final acceptance of the subject pavement.
  12. The resident observer and acceptance testing lab personnel shall maintain all acceptance test reports and provide copies to the owner/engineer as soon as results are available.
  13. **[Name of firm responsible for final construction report]** will prepare a final project construction material testing and acceptance report that includes a summary of: all acceptance tests results, quantity of materials, and all weekly reports. (Actual test reports will be available upon request).

## APPENDIX A

### Resumes and Lab Certifications

***[Include resumes or summary of experience that clearly shows the pavement construction experience of the inspection staff. Minimum recommended experience levels for various project personnel are listed below.]***

#### **[Name of Project Manager] Project Manager**

**EDUCATION:** (year) (Degree)\_ (name of school)

**REGISTRATIONS:** Registered Engineer (*List states registered in*)

**CERTIFICATIONS:** (E.G. ACI Concrete Field Testing – Grade I)  
(State Field Inspector Level I)  
(State Certified Inspector # \_\_\_\_\_)

**PAVEMENT CONSTRUCTION EXPERIENCE: (# years experience in all phases of airport pavement construction or pavement construction as appropriate)**

\_\_\_ Yrs Earthwork, Subbase & Base Construction  
\_\_\_ Yrs. Concrete Paving  
\_\_\_ Yrs. Bituminous paving

#### **[Name of Construction Observer/Inspector]**

**EDUCATION:** (year) (Degree) (name of school)

**REGISTRATIONS:** Registered Engineer (*List states registered in*)

**CERTIFICATIONS:** (E.G. ACI Concrete Field Testing – Grade I)  
(State Field Inspector Level I)  
(State Certified Inspector # \_\_\_\_\_)

**PAVEMENT CONSTRUCTION EXPERIENCE: (# years experience in all phases of airport pavement construction or pavement construction as appropriate)**

\_\_\_ Yrs Earthwork, Subbase & Base Construction  
\_\_\_ Yrs. Concrete Paving  
\_\_\_ Yrs. Bituminous paving

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## **Minimum recommended qualifications for oversight staff**

### **Project Engineer/Manager:**

The Project Engineer/Manager shall be a Professional Engineer, licensed in the state where construction takes place (or a reciprocal state), and shall have overall responsibility for construction observation of the project.

The engineer must be on the project site at the beginning of any critical operations and shall supervise all additional construction observation personnel. Critical operations shall be specifically defined in the Construction Management Program (CMP).

The engineer shall have authority to make decisions regarding the project, subject to approval of the sponsor/owner. Official project documents (i.e. change orders, inspection reports, etc.) shall always be signed by the Project Engineer.

Unless otherwise approved by the FAA, the Project Engineer should meet the following minimum requirements:

Earthwork - 3 years' experience in earthwork construction.

Base and Subbase - 3 years' experience in base and subbase construction

Concrete or Asphalt - 5 years' experience in airport or highway pavement construction.

### **Construction Observer/Inspector**

The engineering consulting firm may supplement the Project Engineer with a resident observer/inspector. The use of a Resident Observer/inspector does not diminish the responsibility of the Project Engineer. The Project Engineer must be present at the start of all critical operations to assure contractor compliance. The Resident Observer/inspector may assist the Project Engineer with construction observation but shall not assume the overall responsibility of the Project Engineer. The qualifications for construction observation/inspection personnel will vary depending upon the material being placed, however a minimum of two years' experience is recommended. Consult the minimum standards for materials to determine the minimum qualifications required for the resident observer/inspector.

### **Field Testing Personnel**

Unless otherwise specified, field-testing personnel shall have a minimum of one-year experience in field-testing of the material being placed or constructed. In lieu of working experience, a certificate of completion from an acceptable training course may be accepted subject to airport/owner approval.

### **Laboratory Personnel**

The supervisors of the main testing laboratory and field laboratory shall have as a minimum; two years of prior employment with the official

project testing laboratory or other testing laboratories with approved accreditation. The supervisor is ultimately responsible for the testing activity, but need not be present for field sampling or field-testing.

### **Testing Laboratory**

The laboratory furnishing testing services for the project shall be tested for proficiency by a nationally recognized accreditation program i.e. AASHTO, NVLAP or A2LA certifying compliance under ASTM D1077 and/or D3666 as appropriate. If a testing laboratory can show evidence that it has applied for and paid necessary fees to an acceptable laboratory accreditation program, such evidence may on an interim basis, satisfy this requirement. The laboratory shall only be required to have accreditation for tests required in the project.

Testing functions occurring in the field such as density testing, material sampling, or specimen preparation may be performed by accredited laboratory personnel or other qualified personnel. Field-testing personnel shall have as a minimum, one year of experience with the appropriate material and construction methods.

### **Surveying**

The surveying included in this portion of the construction management program is limited to that required for construction of the project. All field notes and data collected during design should be made available to the Project Engineer regardless of who designs the project. The survey party shall consist of a qualified party chief and survey crew. All survey equipment shall be verified for proper working operation prior to use. If property surveying is required, the party chief shall be a registered land surveyor.

**Horizontal and Vertical Control:** Per Section 50-06 of AC 150/5370-10, the Sponsor's engineer shall be responsible for establishing horizontal and vertical control. Occasional spots shall be required to assure the integrity of the control monuments. Due to accuracy requirements for aeronautical information, the construction monuments for runway projects shall be tied into the National Geodetic Service (NGS) Survey Datums. For horizontal control, the referenced datum shall be NAD83. For vertical control, the referenced datum shall be NAVD88. The construction monuments shall be adequately protected throughout the duration of the project.

**Construction Layout and Staking:** The Contractor shall accomplish construction layout and staking by using horizontal and vertical control monuments established by the Sponsor's surveyor. The Sponsor shall avoid situations that use the engineering consultant to accomplish construction layout and staking. The responsibility and risk associated with construction layout and staking shall remain with the Contractor.



During the course of the project work, the Sponsor's survey party may make spot checks on alignment, verify proper cross sections of the completed pavement layers (subgrade, subbase, base course and surface course) and verify final cross sections for computing final pay quantities. Prior to final acceptance of pavement the contractor shall provide documentation signed by a licensed surveyor of cross-sections at 50' intervals plus all breaks in grade.

SAMPLE

## **Subgrade, Subbase, and Base Course Construction Personnel**

### **Field Construction Observer:**

The Sponsor's Engineer shall provide at least one on site construction observer/inspector per shift with a minimum of 2 years experience in earthwork, and aggregate subbase/ base course construction. Subject to owner/airport approval, a four-year college degree in engineering or a certificate of completion from an acceptable training course may be substituted for up to one year of experience. If additional assistant construction observers/inspectors are required they shall have a working knowledge of earthwork and subbase/base coarse construction procedures.

### **Field Testing Personnel:**

Unless otherwise specified, field testing personnel shall have a minimum of one year experience in field testing of subgrade, subbase, and base courses. In lieu of working experience and subject to owner/airport approval, a certificate of completion from an acceptable training course may be accepted.

### **Laboratory Personnel:**

The supervisor(s) of the main testing laboratory and field laboratory shall have as a minimum; two years of prior employment with the official project testing laboratory or other testing laboratories with approved accreditation. The supervisor is ultimately responsible for the testing activity, but need not be present for field sampling or field testing.

## **Bituminous Paving Observation Personnel**

### **Field and Plant Inspectors:**

The Sponsor's Engineer shall furnish a sufficient number of observers/inspectors to adequately observe plant and field lay down operations. A minimum of one on site observer/inspector per shift shall have at least five years of experience in the field of bituminous pavement construction. Subject to owner/airport approval, a four-year college degree in engineering or a certificate of completion from an acceptable training course may be substituted for up to one year of experience. Additional assistant observers/inspectors must have a working knowledge of the appropriate construction procedures. This includes observers/inspectors for construction of bituminous seal coats and surface courses.

### **Field Testing Personnel:**

Unless otherwise specified, field-testing personnel shall have a minimum of one year experience in field testing and sampling of bituminous concrete. In lieu of working experience and subject to owner/airport approval, a certificate of completion from an acceptable training course may be accepted.

### **Laboratory Personnel:**

The supervisor(s) of the main laboratory and field laboratory shall have a minimum of two years of supervisory employment with this laboratory or other laboratories with approved accreditation.

Additional laboratory personnel shall have a working knowledge of bituminous mixture testing. The supervisor is ultimately responsible for the testing activity, but need not be present for field sampling or field testing.

## Concrete Paving and Structural Concrete Observation Personnel

### **Field Observers:**

The Sponsor's Engineer shall furnish a sufficient number of observers/inspectors to adequately observe plant and field placement operations. A minimum of one on site observer/inspector per shift shall have at least 5 years experience in concrete pavement construction. Subject to airport/owner approval, a four year college degree in engineering or a certificate of completion from an acceptable training course may be substituted for up to one year of experience. The observer/inspector shall be on site during the placing, initial sawing and initial curing operations. Additional assistant observers/inspectors shall have a working knowledge of concrete paving procedures.

### **Field Testing Personnel:**

Unless otherwise specified, field-testing personnel shall have a minimum of one-year experience in field testing and sampling of portland cement concrete. In lieu of working experience and subject to airport/owner approval, a certificate of completion from an acceptable training course may be accepted.

### **Testing Laboratory Personnel:**

The supervisor of the main laboratory and field laboratory shall have a minimum of two years of employment with this laboratory or other laboratories that have approved accreditation. Additional laboratory personnel shall have a working knowledge of concrete testing. The supervisor is ultimately responsible for the testing activity, but need not be present for field sampling or field-testing.

## **Manufactured Materials**

For manufactured items such as cement, asphalt, steel, lime, flyash and etc., the Project Engineer may accept the vendor's certification that the materials meet the specifications or may require the material to be tested for compliance to the specifications.

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## APPENDIX B

### List of Tests

Include listing of all QC/QA tests required by the contract specifications

Recommend including the following information in your listing

- Specification Section
- Responsibility: Who is responsible for doing the test
- Specification reference paragraph
- Material
- Test Required
- Sampling location
- Frequency
- Test Requirements
- ASTM procedure
- Notes

Summary of Material Acceptance Tests									
Specification	Spec Section	Test By	Material	Test Procedure	Tests Required	Sampling Locations	Minimum Test Frequency	Requirements	Notes
P-152 Excavation and Embankment	152-2.2e	QA	Excavation	ASTM D 2922, D 1556, or D 2167	Density & Moisture	In-place	1 per [1,000] SY	95% non-cohesive; 90% cohesive; +/- 2% Optimum	ASTM D698 <60K; ASTM D 1557 >60K Expansive soils D698
P-152 Excavation and Embankment	152-2.2f	QA	Excavation	Proof Roller as specified on project	Proof roll	In-place		Deflection < 1" and no permanent deformation > 1". No unstable material	20 T Tandem Dual Wheel or Proof Roller or Pneumatic Roller
P-152 Excavation and Embankment	152-2.6	QA	Embankment	ASTM D 2922, D 1556, or D 2167	Density & Moisture	In-place	1 per [1,000] SY	95% non-cohesive; 90% cohesive; +/- 2% Optimum	ASTM D698 <60K; ASTM D 1557 >60K Expansive soils D698
P-152 Excavation and Embankment	152-2.9	QA	Areas under subbase or base course	Straightedge Survey Results	Grade Tolerance	In-place		≤ 1/2" deviation (using 16' straight-edge); +/- 0.05' from true grade	
P-152 Excavation and Embankment	152-2.9	QA	Safety areas	Survey Results	Grade Tolerance	In-place		+/- 0.10' from true grade	
P153 Controlled Low Strength Material	153-4.3	QA	CLSM	ASTM D4832	Proportions	In-place	1 per [1000] CY	verify material conforms with mix design	Since takes 28 days for strength primary concern is proportions meet JMF
P-154 Subbase Course	154-3.7	QA	Subbase Course	ASTM D 2922, D 1556, D4718; or D6938 Procedure A	Density & Moisture	In-place	1 per [4,000] SY	100% ASTM D698 < 60K, 100% ASTM D1557 > 60K +/- 2% Optimum	If > 30% retained on 3/4" then D4718 or 6938

## APPENDIX C

### List of Submittals

Include listing of all submittals required by the contract specifications

Summary of Submittals									
Specification	Spec Section	Submittal By	Material	Test Standard	Tests Required	Sampling Locations	Minimum Test Frequency	Requirements	Notes
Section 100	100-01	All	QC/QA Workshop					> \$250K QC/QA workshop w/Engineer / Contractor / Testing Laboratories / Owner / (FAA)	Note may need to adjust to \$500K to match with AIP handbook on when CMP required
GP-100 Contractor Quality Control Program	100-02b 100-03 100-04 100-05 100-06 100-07 100-08	C	Contractors Quality Control Program		Contractors Quality Control Program with a Quality Control Testing Plan shall be submitted 10 days prior to Preconstruction meeting			a. QC Organization b. Progress Schedule c. Submittals Schedule d. QC Inspection Requirements e. QC Testing Plan f. QC Documentation Plan g. Corrective Action Plan	Contractor QC program to assure conformance with specifications. Adequate Quality Control is key to a successful project. If deficiencies found by QA that means QC not happening
P153 Controlled Low Strength Material (CLSM)	153-3.1	C	CLSM	ASTM D 4832 ASTM C150/C150M ASTM C618	Mix Design / Verification by 1,000 CY	Project	JMF	Mix design including proportions, source of aggregate, fly ash, cement, water and any admixtures 100-200 psi @ 28 days no significant gain after 28	Consistency ~8" spread w/ no segregation See 153-3.1c Mix Design verification confirmation that correct proportions being used
P154 Subbase Course	154-2.2	C	Subbase Course	ASTM C 155 ASTM C 177 ASTM D 1348	Gradation & Atterburg Limits	Project	1/day	Gradation limits per 154-2.1	Material passing No 40 LL < 25 and PI < 6 per ASTM D4318
P-155 Lime Treated Subgrade	155-2.1	C	Hydrated Lime	ASTM C977	Quality	Source	Approved by Engineer	High Calcium quicklime, low calcium quicklime or hydrated lime	Lime not produced by calcining limestone not permitted
P-155 Lime Treated Subgrade	155-3.1	C / E	Lime Treated Subgrade		Application rate		Project	-Amt lime / SY - Amt Water / SY -Application & Mixing Procedures -Compaction Equipment and Procedure	Depending upon project application rate may be determined by the contractor or it may be as specified by the Geotech Engineer. Note if to be determined by contractor must have a % lime to use for bidding purposes