QUALITY ASSURANCE PROGRAM (QAP)

AGENCY: City of Tehachapi

The purpose of this program is to provide assurance that the materials incorporated into the construction projects are in conformance with the contract specifications and/or City of Tehachapi Subdivision and Development Standards. This program should be updated every five years or more frequently if there are changes in the testing or testing frequencies. To accomplish this purpose, the following terms and definitions will be used:

DEFINITION OF TERMS

- Acceptance Testing (AT) · ·Sampling and testing, or inspection, to determine the degree of compliance with contract specifications and/or City of Tehachapi Subdivision and Development Standards.
- Independent Assurance Program (IAP) - Verification that AT is being performed correctly and accurately by qualified testers and laboratories.
- Quality Assurance Program (QAP) - A sampling and testing program that will provide assurance that the materials and workmanship incorporated into the construction project are in conformance with the contract specifications and/or City of Tehachapi Subdivision and Development Standards. The main elements of a QAP are the AT and IAP.
- Source Inspection - AT of manufactured and prefabricated products and materials at locations other than the job site, generally at the location of manufacturing.

MATERIALS LABORATORY

The City of Tehachapi will use a private consultant's materials laboratory to perform AT on Federal-aid and other designated projects. The materials laboratory shall be under the responsible management of a California registered Engineer with experience in sampling, inspection and testing of materials. The Engineer shall certify the results of all tests performed by laboratory personnel under the Engineer's supervision. The materials laboratory shall contain certified test equipment capable of performing the tests conforming to the provisions of the QAP.

The materials laboratory used shall provide documentation that the laboratory complies with the following procedures:

1 Correlation Testing Program - The materials laboratory shall be a participant in the following testing programs:
   a. AASHTO Materials Reference Laboratory (AMRL)
   b. Cement and Concrete Reference Laboratory (CCRL)
   c. Caltrans' Reference Samples Program (RSP)

2 Certification of Personnel - The materials laboratory shall employ personnel who are certified by one or more of the following:
   a. Caltrans District Materials Engineer
   b. Nationally recognized non-Caltrans organizations such as the American Concrete Institute, Asphalt, National Institute of Certification of Engineering Technologies, etc.
   c. Other recognized organizations approved by the State of California and/or recognized by local governments or private associations.

3 Laboratory and Testing Equipment - The materials laboratory shall only use laboratory and testing equipment that is in good working order. All such equipment shall be calibrated at least once each year. All testing equipment must be calibrated by impartial means using devices of accuracy traceable to the National Institute of Standards and Technology. A decal shall be firmly affixed to each piece of equipment showing the date of the last calibration.

ACCEPTANCE TESTING (AT)

AT will be performed by a materials laboratory certified to perform the required tests. The tests results will be used to ensure that all materials incorporated into the project are in compliance with the contract specifications and/or City of Tehachapi Subdivision and Development Standards.

Testing methods will be in accordance with a national recognized standard (i.e., AASHTO, ASTM, etc.) as specified in the contract specifications.

Sample locations and frequencies may be in accordance with the contract specifications and/or City of Tehachapi Subdivision and Development Standards. If not so specified in the contract specifications, samples shall be taken at the locations and frequencies as shown in Attachment 111 ("Material Acceptance Sampling and Frequency Testing" of the QAP Manual).

INDEPENDENT ASSURANCE PROGRAM (IAP)

IAP shall be provided by personnel from the consultant's certified materials laboratory. IAP will be used to verify that sampling and testing procedures are being performed correctly and accurately and that all testing equipment is in good condition and properly calibrated.

IAP shall be performed on each type of material test required for the project. Proficiency tests shall be performed on Sieve Analysis, Sand Equivalent, and Cleanness Value tests. All other types of IAP shall be witness tests.

Poor correlation between acceptance tester's results and other test results may indicate probable deficiencies with the acceptance sampling and testing procedures. In cases of unresolved discrepancies, a complete review of AT shall be performed by IAP personnel, or an independent materials laboratory chosen by the City ofTehachapi. IAP samples and tests are not to be used for determining compliance with contract requirements and/or City of Tehachapi Subdivision and Development Standards. Compliance with contact requirements is determined only by AT.

REPORTING ACCEPTANCE TESTING RESULTS

The following are time periods for reporting material test results to the Resident Engineer:

- When materials are sampled at the job site, test results for relative compaction and maximum density should be submitted to the Resident Engineer or his/her representative within 24 hours after sampling.
- When concretes are sampled at the job site:
    1. Test results for both 7-day and 28-day compressive strengths should be submitted to the Resident Engineer or his/her representative within 72 hours after testing is performed.
    2. Test results for slump testing and air content should be submitted to the Resident Engineer or his/her representative within 24 hours after sampling.

When sampling products such as Portland Cement Concrete (PCC), cement-treated base (CTB), hot mix asphalt (HMA), and other such materials; the time of such sampling shall vary with respect to the time of the day insofar as possible, in order to avoid a predictable sampling routine. The reporting of AT results shall be done on an expedited basis such as by fax or email.

TESTING OF MANUFACTURED MATERIALS

During the design phase of the project, the Project Engineer may submit a "Source Inspect ion Request",(Exhibit 16-V of the LAPM), to Caltrans for inspect ion and testing of manufactured and prefabricated materials by their materials laboratory. All certificates of compliance shall conform to the requirements of the contract specifications and/or City of Tehachapi Subdivision and Development Standards.

For Federal-aid projects on the National Highway System (NHS), Caltrans will assist in certifying the materials laboratory, and the acceptance samplers and testers. For Federal-aid projects off the NHS, Caltrans may be able to assist in certifying the materials laboratory, and the acceptance samplers and testers.

PROJECT CLARIFICATION

Upon completion of a Federal-aid project, a "Materials Certificate" shall be completed by the Resident Engineer. The City of Tehachapi sha ll include a "Materials Certificate" in the Report of Expenditures submitted to the Caltrans District Director, Attention: District Local Assistance Engineer. A copy of the "Materials Certificate" shall also be included in the City's construction records. The Resident Engineer in charge of the construction function for the City shall sign the certificate. All materials incorporated into the work which did not conform to specifications must be explained and justified on the "Materials Certification", including changes by virtue of contract change orders.

RECORDS

All material records of samples and tests, material releases and certificates of compliance for the construction project shall be incorporated into the Resident Engineer's project file. For a Federal-aid project:

- The files shall be organized in a manner similar to that found in Section 16.8 "Project Files" of the LocalAssistance Procedures Manual.
- It is recommended that the complete project file be available at a single location for inspect ion by Caltrans and Federal Highway Adm inistration (FHWA) personnel.
- The project files shall be available for at least three years following the date of final project voucher.

When two or more projects are being furnished identical materials simulta neously from the same plant, it is not necessary to take separate samples or perform separate tests for each project; however, copies of the test reports are to be provided for each of the projects to complete the records.

APPROVED BY:

Name: _____ **Date:** 6-29-16

CE#, Expiration: 65403 exp. 9/30/17

Title: CITY ENGINEER

Tehachapi
City/County

Appendix 1
Material Acceptance Sampling and Frequency Testing

GENERAL CONCRETE

Material or Product	Sampling/Test	Testing Standard	Sample / Testing Frequency
Concrete	Sampling	ASTM C31	Per Resident Engineer / 4 cylinders per 50 yds^3
Concrete	Strength Testing	ASTM C39	Per Resident Engineer / 4 cylinders per 50 yds^3
Concrete	Slump Testing	ASTM C143	At Strength Testing and As Required for Consistency
Concrete	Air Content Testing	ASTM C231	At Strength Testing and As Required for Consistency

EARTHWORK & SOILS

Material or Product	Sampling/Test	Testing Standard	Sample/Testing Frequency
Soil	In Place Density Testing	ASTM D1556 or D6938	Once Per Each Soil Type Encountered
Soil	Moisture/Density	ASTM D1557 or D698	Once Per Each Soil Type Encountered
Cohesionless Soil	Relative Density Testing	ASTM D4253, D4254	As Determined by Resident Engineer

ASPHALT CONCRETE AND AGGREGATE BASE

Material or Product	Sampling/Test	Testing Standard	Sample/Testing Frequency
Asphalt Concrete	In Place Density	ASTM D204/CT308	Per Resident Engineer / Once per 4 Hours of Production
Aggregate Base	Moisture/Density	ASTM D1557 or D698	Per Resident Engineer / Once per 4 Hours of Production
Aggregate Base	In Place Density Testing	ASTM D1556 or D6938	Per Resident Engineer/Once per 4 Hours of Production

MATERIAL ACCEPTED BY MANUFACTURER'S CERTIFICATE OF COMPLIANCE

Material or Product	Material Standard	Description or Comments
Reinforcing Steel	ASTM A615 or A706	
Wire Reinforcing	ASTM A185	
Joint Sealant	ASTM C920	
Cement	ASTM C150	
Aggregates	ASTM C33	
Admixtures	ASTM C260	Air-Entraining Admixture for Concrete Mixes
Admixtures	ASTM C494	Water-Reducing Admixture for Concrete Mixes
Admixtures	ASTM C618	Mineral Admixture (Fly Ash) for Concrete Mixes
Grout	ASTM C1 107	
Curing Compound	ASTM C309	
Brick	ASTM C216	
CMU	ASTM C90	
Mortar	ASTM C270	
Asphalt Binder	CT 368	
Aggregate	CT 202	
Asphalt Mixture	CT 367	
VCP	ASTM C700	
Plastic Pipe, Sewer	ASTM D3034. F679	
Plastic Pipe. Water	ASTM D1784	
Gravel/Rock	ASTM D1556, D2167, D3744	