

2026 NCDOT

Independent Assurance Program



January 1, 2026



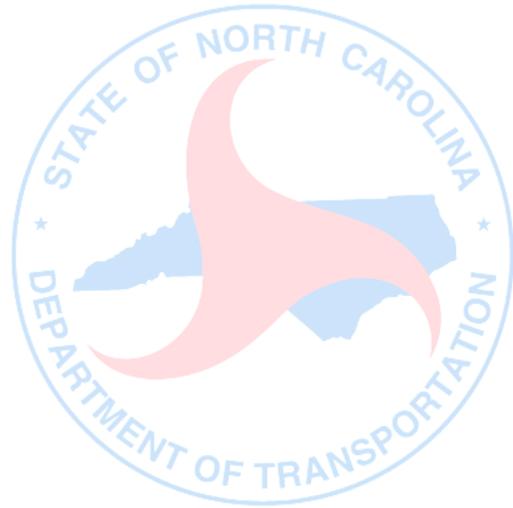
Independent Assurance Program Manual

January 1, 2026

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Purpose

The purpose of the NCDOT Independent Assurance (IA) Program is to assist Engineers, Technicians, and the Department in the administration of federally funded transportation projects. It provides guidance for the NCDOT oversight staff responsible for supporting this program.



FHWA Regulation 23 CFR 637 requires each state to have an IA Program and defines this as:

“Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.”

The Independent Assurance Program ensures the sampling and testing procedures are performed correctly and the testing equipment used in the program operates correctly and remains calibrated. It involves a separate and distinct schedule of sampling, testing and observation from that of the Quality Assurance Program.

Qualified sampling and testing personnel, other than those performing the verification and quality control (QC) sampling and testing, should perform the Independent Assurance (IA) tests. Likewise, equipment other than that used for verification and QC should be used for IA sampling and testing. Agency personnel or a Department designated accredited laboratory shall perform the testing.

While this Program provides detailed guidance regarding the IA Program, it is not a replacement for regular contact with NCDOT oversight staff. Please work closely with the Materials and Tests staff in the appropriate NCDOT Division office.

For inquiries regarding the Department’s Independent Assurance Program, contact the Materials and Tests Unit’s Independent Assurance Program Engineer, Christopher D. Whitley at cdwhitley@ncdot.gov.

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1 Abbreviations and Terms

AASHTO: American Association of State Highway and Transportation Officials

Acceptance Sampling and Testing: Sampling and testing performed by the agency or its designated agent, to determine the quality and acceptability of the materials incorporated in a project. Also called “verification sampling and testing” when specifically used to validate the contractor’s data.

Accredited Laboratories: See Section 8 of the program.

Active Sampling/Testing Technicians: Personnel who meet the requirements as established in the Independent Assurance Program. Technicians are considered active if they have sampled materials or performed tests that are used by the Department to accept material. They are evaluated for each of the test methods for which they are performing. There may exist a subset of smaller “qualified” testers that are unable to be assessed due to retirement, moved to other jobs, or resigned.

CFR: Code of Federal Regulations

FHWA: Federal Highway Administration

HiCAMS: Highway Construction and Materials System – this is the computer-based system utilized by NCDOT to collect and store data regarding project samples.

IA: Independent Assurance

IA Assessor: A qualified, full time, active certified, Materials & Tests employee, independent from QC and verification processes, who enforces the Independent Assurance program.

IA Certified Assessor: A qualified, full time, active certified, Non-Materials & Tests employee, who participates in the Independent Assurance program. This individual must be approved by the IA Program Engineer prior to any evaluation and/or assessments are conducted.

IA Evaluation: The process conducted by a M&T employee or IA Certified Assessor to evaluate a qualified technician’s ability to perform the required sampling/testing procedure accurately and proficiently. The IA Evaluation consists of both an IA Assessment and an IA Split Sample, in most cases.

IA Evaluation Equipment: The testing equipment for the IA Assessor’s half of the IA Evaluation shall be different than the equipment used in the Contractor’s quality control and Agency quality assurance and verification sampling and testing. The IA Assessor shall perform the comparison tests/split sample using their independent equipment.

IA Split Samples: Term representing either the IA Assessor’s physical sample of material simultaneously collected with the assessed technician’s comparison sample, **OR** the IA Assessor’s test which will be compared with the assessed technician’s test, to meet IA Program requirements. Department IA Split Samples are samples/tests that are independent of Department acceptance and verification samples and are used to ensure reported samples/tests are within the prescribed limits of variability.

IA Technician Assessment: The process conducted and documented by a qualified IA Assessor or IA Certified Assessor to assess a qualified technician's ability to perform the required sampling/testing procedure accurately and proficiently. An IA Technician Assessment will be conducted at a minimum frequency on all active testers performing sampling, acceptance testing or verification testing.

M&T: Materials & Tests Unit

NCDOT: North Carolina Department of Transportation

Qualified Laboratories: Laboratories which have been approved, by the Materials & Tests Unit, to perform testing activities for NCDOT projects.

SharePoint: Web based data tool for storing NCDOT documents and records

System-Based: A method of determining project testing frequencies that determines IA frequency on a time basis for all testers and equipment. The purpose is to cover all the testers and equipment over a period of one calendar year. The Department will set a practical goal of an average percent of the active testers for all test methods included in the program. The system-based approach can be a more effective means of performing IA since it ensures that most testers are reviewed and that the same testers are not continually reviewed.

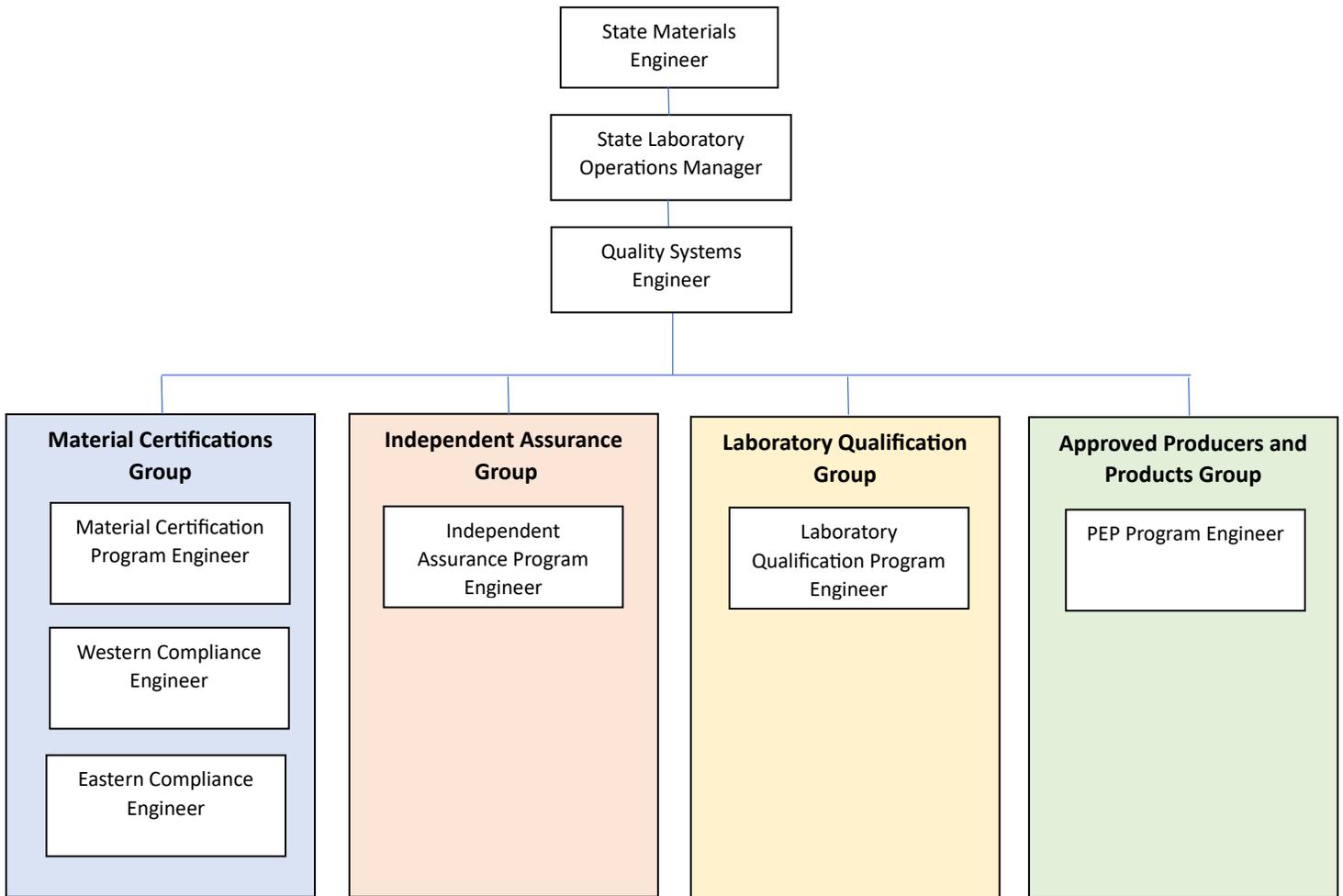
Vendor: The computer-based system utilized by NCDOT to monitor technician certification history and qualifications.

Verification Sampling and Testing: Sampling and testing used to validate the contractor's data (see acceptance sampling and testing) and results.

2 Quality Assurance Program Structure and Responsibilities

2.1 Organizational Structure

Figure 1 *Quality Systems Organizational Chart*



*The above positions may be located in regional areas across North Carolina.

2.2 Organizational Responsibilities

Table 1 *Position Titles and IA Related Duties*

Materials and Tests Unit's Quality Systems Group Responsibilities by Title	
Position	QAP Related Duties
State Materials Engineer	<p>Management of the Materials & Tests Unit which includes:</p> <ul style="list-style-type: none"> • Pavement Design • Field Operations • Laboratory Operations
State Laboratory Operations Manager	<p>Management of all laboratory staff and activities which include:</p> <ul style="list-style-type: none"> • Central laboratory operations • Regional laboratory operations • Quality systems operations
Quality Systems Engineer	<p>Management of the staff and activities, related to:</p> <ul style="list-style-type: none"> • Material certification • Independent assurance • Laboratory qualification • Product evaluation
Material Certification Program Engineer	<p>Management of the Material Certification Program which includes:</p> <ul style="list-style-type: none"> • Certification of materials used on NCDOT Projects including FHWA, State Funded, Local Administered Projects, and Rail • Monitors and maintains the material certification program
Western and Eastern Compliance & Assurance Engineer	<p>Daily oversight and assisting with the following:</p> <ul style="list-style-type: none"> • Certification of materials used on NCDOT Projects including FHWA, State Funded, Local Administered Projects, and Rail • Maintenance of material certification Forms
Independent Assurance Program Engineer	<p>Management and oversight with the following:</p> <ul style="list-style-type: none"> • Monitors and maintains the IA Program • Generates annual IA Program report to FHWA • Verification of qualified staff utilized in the IA Program • Monitors IA training and certification programs/operations • HiCAMS/Vendor IA Data Input and Analysis • Maintaining modifications to IA programs

Materials and Tests Unit's Quality Systems Group Responsibilities by Title	
Position	QAP Related Duties
Laboratory Qualification Program Engineer	<p>Manage the Materials and Tests Unit's <u>Laboratory Qualification Program</u> which includes:</p> <ul style="list-style-type: none"> • Ensuring all State Laboratories maintain accreditation by: <ul style="list-style-type: none"> ○ Ensuring compliance with AASHTO and ASTM Standards ○ Performing routine audits of the State Laboratories ○ Leading cross-functional teams in process and system reviews ○ Performing statistical analysis of proficiency sample trends ○ Reporting and addressing non-conformities. • Private Laboratory Certifications
Product Evaluation Program Engineer	<p>Management of the NCDOT Approved Producers and Products group which includes:</p> <ul style="list-style-type: none"> • Approved Products Program • Approved Producer Supplier Program • Resource Conservation Program • HiCAMS/Vendor IA Data Input and Analysis

3 General Program Requirements

The NCDOT's Independent Assurance Program is a system-based program developed to satisfy the independent assurance sampling and testing requirements of the Federal Highway Administration (FHWA) for the following materials: Aggregate, Concrete, Asphalt Mix, and Soil. Adherence to the IA Program is required for all NCDOT material sampling and testing covered within the IA Program manual and for all projects, whether State or Federally funded. For the system-based approach, the frequency of IA activities is based on a calendar year time interval and is not determined by: the quantity of material used on a project, the number of active projects that may be assigned to a technician, or the amount of State or Federal funds allotted.

Active Technicians who conduct acceptance sampling and/or testing for the Department must be qualified and have an active certification per the NCDOT Qualified Personnel Program (see Section 9). The status of the technician's certification will be maintained using the NCDOT Vendor system.

Active Technicians are those which meet all the following:

- Performed any sampling or testing methods shown in [Table 2](#), [Table 3](#), [Table 4](#), [Table 5](#), [Table 6](#), [Table 7](#), and [Table 8](#) in **Five** or more instances within the measured period (calendar year).
- The sampling or testing activities were on materials used by the Department for acceptance, agency verification testing, or contractor's QC testing.
- The technician must currently hold an "active" certification in the material discipline.

The need for an IA Evaluation is determined by using a HiCAMS query for each of the designated sampling and/or testing methods to determine current active technicians. The IA Program parameters are considered met if 90% of the active technicians for all test methods included in the program were evaluated at the end of the measured period.

Example:

IA Aggregate Laboratory Technician	87% of active technicians evaluated
IA Concrete Field Technician	96% of active technicians evaluated
IA Conventional Density Technician	89% of active technicians evaluated
IA QMS Asphalt Laboratory Technician	92% of active technicians evaluated

Average = **91%**, therefore goal was achieved

The IA Evaluation consists of two parts:

IA Technician Assessment – A documented observation of a qualified technician’s sampling and testing methods to determine competency. The assessment process also requires verification that testing equipment used by the assessed technician is in acceptable condition and is within required calibration limits.

IA Split Sampling – Process used to evaluate active technician’s testing results versus IA evaluation results. IA split sampling shall be conducted on site while the tester is in the process of performing testing, when possible. Independent Assurance samples shall be taken separately from other samples, as their results cannot be used in place of acceptance, verification, or quality control sample results. Active technicians and IA Assessors shall each use their own equipment to perform IA split sampling. In cases where IA split samples require testing in a laboratory, the assessed technician’s sample will be tested at their own approved lab, while the IA Assessors split will be tested at an M&T Regional Laboratory or M&T’s Central Laboratory.

Note: All evaluation outcomes (Satisfactory or Unsatisfactory) are based on the IA Assessor’s test results. For annual IA Program requirements to be fulfilled, the IA Technician Assessment and IA Split Sample shall have a satisfactory final result.

The IA Technician Assessment and IA Split Sample can be conducted on the same date or at separate times during the calendar year.

The IA Technician Assessment portion is conducted by an IA Assessor, who is an M&T employee. If an IA Assessor is not available, an IA Certified Assessor who has been approved by the IA Program Engineer may conduct the assessment. Additionally, an IA Assessor or IA Certified Assessor shall conduct the IA Split Sample test. At no time shall a technician be evaluated by a member of the same firm.

3.1 IA Technician Assessment

The IA Technician Assessment is a detailed evaluation of an active technician’s step-by-step procedure for conducting sampling/testing methods. It is recommended that the IA Technician Assessment be conducted prior to performing IA Split Sampling. An M&T representative will evaluate the technician, and their equipment, and verify each phase of the assessed test methods. The assessor will use a “Technician Assessment Form” specific to the test procedure being performed, and document each completed step as either “Satisfactory” or “Unsatisfactory” as the assessed technician conducts the test. Prior to the assessment beginning, the assessed technician may ask the assessor questions about the sampling and testing process, however, once the assessment has begun, the assessor may not assist, coach, or indicate in any way the correct sampling and testing methods. If the technician makes a mistake, or equipment is found faulty during the assessment, the assessor shall not stop the assessment and will let the technician continue the sampling/testing process to its completion. Upon completion, the assessor will share the overall results with the technician and indicate whether the assessment attempt was “Satisfactory” or “Unsatisfactory”. Only after the procedure is completed, may the assessor discuss what deficiencies occurred which led to an unsatisfactory result. Any single deficiency in the assessment process will result in the assessment trial being documented as “Unsatisfactory”.

Should the IA Technician Assessment be satisfactory, the IA Assessor shall document the attempt, and the annual IA Assessment requirement for the technician will be complete for that calendar year.

Should the first IA Technician Assessment attempt be unsatisfactory, the first attempt shall be documented, and a second attempt will be granted. For details on this reassessment process, refer to section 3.4 “Evaluation of Deficiencies”.

NOTE: If a technician attends and successfully passes a Department held certification class, it is counted as the IA Technician Assessment for that year but does not replace the requirement for an IA Split Sample. An IA Split Sample is required every year, even if an active technician has successfully completed the certification class.

3.2 IA Split Sample

The IA Split Sample process requires an IA Assessor, or IA Certified Assessor, and an Active Technician to perform a sampling or testing procedure simultaneously alongside one another. For materials such as asphalt, aggregates, and concrete cylinders, the IA Split Sample will be a physical sample. Other IA Split Samples, such as conventional density, concrete air, slump, and temperature, will be comparative test procedures. Both the technician and the IA Assessor will conduct their respective sampling/testing operations utilizing proper testing procedures. To the best of their ability, the IA Assessor should ensure the technician follows proper techniques while simultaneously obtaining their half of the IA Split Sample.

The IA Split Sample is conducted independent of the IA Technician Assessment. When possible, IA Split Sampling should be conducted after a technician successfully completes their IA Technician Assessment. There are situations where the IA Assessment and IA Split Sample processes can be conducted simultaneously, however, a single IA Assessor shall not attempt to evaluate a technician for an IA Technician Assessment and obtain the IA Split Sample at the same time. Two IA Assessors, or one IA Assessor and an IA Certified Assessor, will be required if the IA Technician Assessment and IA Split Sample are conducted at the same time (one shall conduct the assessment while the other collects the IA Split Sample).

Do not use the IA Split Sample results as a substitute for an acceptance or verification sample. IA Samples will be randomly obtained at the assessor’s judgment. The IA Split Sample shall be labeled as “Informational” in the HiCAMS “Material Type” category.

Once completed, the results from both halves of the IA Split Sample will be compared and graded to the IA Tolerance Limits for that material. The IA Assessor will communicate the results of the IA Split Sample with the assessed technician once the results are determined. These results will be documented as either “Satisfactory” or “Unsatisfactory”.

Should the IA Split Sampling attempt be satisfactory, the IA Assessor shall document the attempt, and the annual IA Assessment requirement for the technician will be complete for that calendar year.

Should the first IA Split Sampling attempt be unsatisfactory, the attempt shall be documented, and a second attempt granted. For details on this process refer to section 3.4 “Evaluation of Deficiencies”.

Reminder: Successful completion of a certification class **does not** fulfill the IA Split Sampling requirement for the annual IA evaluation period. Successful completion of a certification class may only count for the IA Technican Assessment.

3.3 Equipment Evaluation

Equipment used by any technician conducting sampling and testing for NCDOT projects must be evaluated using one or more of the following equipment verifications: equipment critical dimensions, calibration checks, observations, or split samples. It is critical that testing equipment be maintained such that it remains in good working condition and has been calibrated as frequently as necessary and at intervals not to exceed either the manufacture's recommendations or the governing agency's standard requirements. While conducting an assessment, the IA Assessor will record the equipment appearance and verification of condition on the "Technician Assessment Form".

If equipment used for sampling and testing is found to be inoperable before the IA Evaluation begins, it shall not be used and shall need to be repaired/replaced before an IA Technician Assessment or IA Split Sampling can be conducted. If during an IA Technician Assessment equipment is found to be out of calibration or have defects which could affect the accuracy of the sampling and testing results, the IA Assessor shall not alert the technician to the issue prior to or during the assessment operation. The assessed technician will be allowed to perform, to completion, the sampling/testing procedures which give the assessed technician the opportunity to identify that the equipment should not be used for testing in the current condition. If the assessed technician fails to recognize these issues, the assessment will be marked as unsatisfactory and the equipment issues, as well as any other procedural issues identified during the assessment, will be shared with the assessed technician. Such equipment issues will need to be resolved before a reassessment can be conducted. Additionally, if the equipment cannot be repaired or calibrated, it should be removed from service for future testing operations conducted for NCDOT reporting. For more information on equipment and procedural deficiencies, refer to section 3.4 "Evaluation of Deficiencies".

The IA Assessor shall utilize his/her own equipment when conducting comparison testing within the IA Evaluation process. It is critical that the IA Assessor's equipment be maintained in good working conditions and held to the same calibration requirements as the assessed technicians' equipment would.

For specific information on the requirements of equipment maintained in both NCDOT and non-NCDOT laboratories, refer to section 8 "Laboratories".

3.4 Evaluation of Deficiencies

Deficiencies are occurrences which cause the IA Technician Assessment or IA Split Sampling process to have an unsatisfactory result. Refusal to participate or a lack of cooperation in the IA Evaluation will be sufficient reason to consider an evaluation unsatisfactory. If a technician refuses to participate, a conduct and proficiency review will be conducted by a certification board. After the review, appropriate measures will be taken, up to loss of certification.

IA Assessment Deficiencies

IA Assessment deficiencies can be the result of an omitted step in the sampling/testing process, a step performed incorrectly, or a technician using equipment that is not calibrated, is faulty, in poor condition, and/or not approved for the procedure.

IA Assessment deficiencies will be scored as an “Unsatisfactory” step in the assessment process. Any such occurrence will result in an overall “Unsatisfactory” score on the first trial assessment. If a deficiency occurs during an assessment, the IA Assessor shall indicate the error on the assessment worksheet but not alert the technician that an error has been made. The assessor shall allow the technician to continue performing the sampling/testing procedure to its completion. Technicians should be encouraged to complete the entirety of the first trial assessment, even if the technician recognizes that an error has been made and wishes to restart the test method. Such recognition of an error by the technician will still count as an unsatisfactory assessment score, but continuing the assessment process to the end of the procedure will allow the IA Assessor to evaluate the entire procedure, during the first trial, to identify any other deficiencies which may need to be addressed before moving on to the reassessment.

The IA Assessor shall review any unsatisfactory items with the assessed technician immediately after the completion of the first trial assessment. A reassessment may be conducted immediately following this review. If, however, the IA Assessor feels that remedial training is required, the IA Assessor may allow time for training and then re-evaluate the technician on a later date.

When a reassessment is conducted, the entire procedure is required to be satisfactorily completed. Reassessments shall be conducted in the same manner as the initial assessment and must be conducted within the same annual evaluation period. It will be the responsibility of the assessed technician requiring the reassessment to establish a re-evaluation appointment at the IA Assessor’s convenience. The reassessment does not have to be conducted by the same IA Assessor as the initial assessment. If a reassessment is not conducted within the annual evaluation period, the technician’s certification may be revoked, and the technician will no longer be permitted to sample/test material on NCDOT or FHWA funded projects.

The IA Assessor will review and communicate the results of a reassessment with the technician immediately following the procedure. Should the reassessment be satisfactory, the IA Assessor shall document the attempt, and the annual IA Assessment requirement for the technician will be complete for that calendar year. The maximum number of allowed trials (including re-evaluations) on any test method shall not exceed two. If the technician does not successfully pass the assessment process within two trials, the assessor shall alert the IA Program Engineer who will initiate an investigation. For details on this investigation process, refer to section 3.5 “Investigation Process and Dispute Resolution”.

IA Split Sampling Deficiencies

IA Split Sampling deficiencies occur when the two samples/tests taken for IA Split Sampling purposes exceed the IA Program limits for that assessment type. In the event of an unsatisfactory IA Split Sample comparison, the IA Assessor shall perform the following actions before scheduling a second round of IA Split Sampling:

1. IA Assessor shall verify the calculations used to determine the test results of the first IA Split Sample.
2. IA Assessor shall inspect the equipment used for testing (Both IA Equipment and Assessed Technician equipment should be inspected).
3. IA Assessor shall review the "Technician Assessment Form" to see if the assessment phase might have indicated any potential cause for an unsatisfactory comparison.
4. IA Assessor shall review the test procedures with the assessed technician.

If a potential cause of the unsatisfactory comparison is identified, the issue should be addressed and resolved before conducting a second IA Split Sampling of the material. However, if no cause can be determined, a second IA Split Sampling should still be conducted.

The second attempt at IA Split Sampling shall be conducted in the same manner as the initial attempt and must be conducted within the same annual evaluation period. It will be the responsibility of the assessed technician to establish an appointment for this second attempt, at the IA Assessor's convenience. The second attempt at IA Split Sampling does not have to be conducted by the same IA Assessor as the initial split sampling. If the second attempt is not conducted during the annual yearly period, the technician's certification may be revoked, and the technician will no longer be permitted to sample/test material on NCDOT or FHWA funded projects.

The IA Assessor will review and communicate the results of the second IA Split Sampling with the technician once the test results are determined. Should the second attempt at IA Split Sampling be satisfactory, the IA Assessor shall document the attempt, and the annual IA Split Sampling requirement for the technician will be complete for that calendar year. The maximum number of allowed trials (including re-evaluations) on any test method shall not exceed two. If a satisfactory comparison cannot be made within two trials, the IA Assessor shall alert the IA Program Engineer who will initiate an investigation. For details on this investigation process, refer to section 3.5 "Investigation Process and Dispute Resolution".

3.5 Investigation Process and Dispute Resolution

If either step of the IA Evaluation process (IA Technician Assessment or IA Split Sample), has an unsatisfactory end result (2 consecutive unsatisfactory attempts), an investigation will be initiated at the discretion of the IA Program Engineer to determine the cause of the unsatisfactory result(s).

IA Technician Assessment Investigation

In the event of an unsatisfactory reassessment, the investigation will include the following steps:

1. The IA Assessor shall review the unsatisfactory steps of the assessment with the assessed technician. This review shall include a verification of the test results and calculations; inspection of equipment; evaluation of test procedures; review of the IA Assessor's report and comments; discussion with the technician concerning his/her knowledge of the test procedure.
2. The IA Assessor shall document the assessment in Vendor. All assessments, both first and second attempts, shall be documented in Vendor regardless of the result.
3. The IA Assessor shall alert the IA Program Engineer of the two unsatisfactory attempts. The IA Program Engineer will review these assessments and the conditions which lead to the unsatisfactory rating with the IA Assessor.
4. The IA Program Engineer will use the investigation information to determine what training will be required for the assessed technician, up to suspension of the technician's certification and having them reattend the certification class associated with the assessment type.
5. The IA Program Engineer will notify the technician that they shall not perform acceptance, verification, or QC sampling/testing for that material type, until successful completion of the required training. The IA Program Engineer will adjust the technician's credentials in Vendor to reflect the technician's inability to sample/test materials related to the unsatisfactory assessment, until further training has been completed.

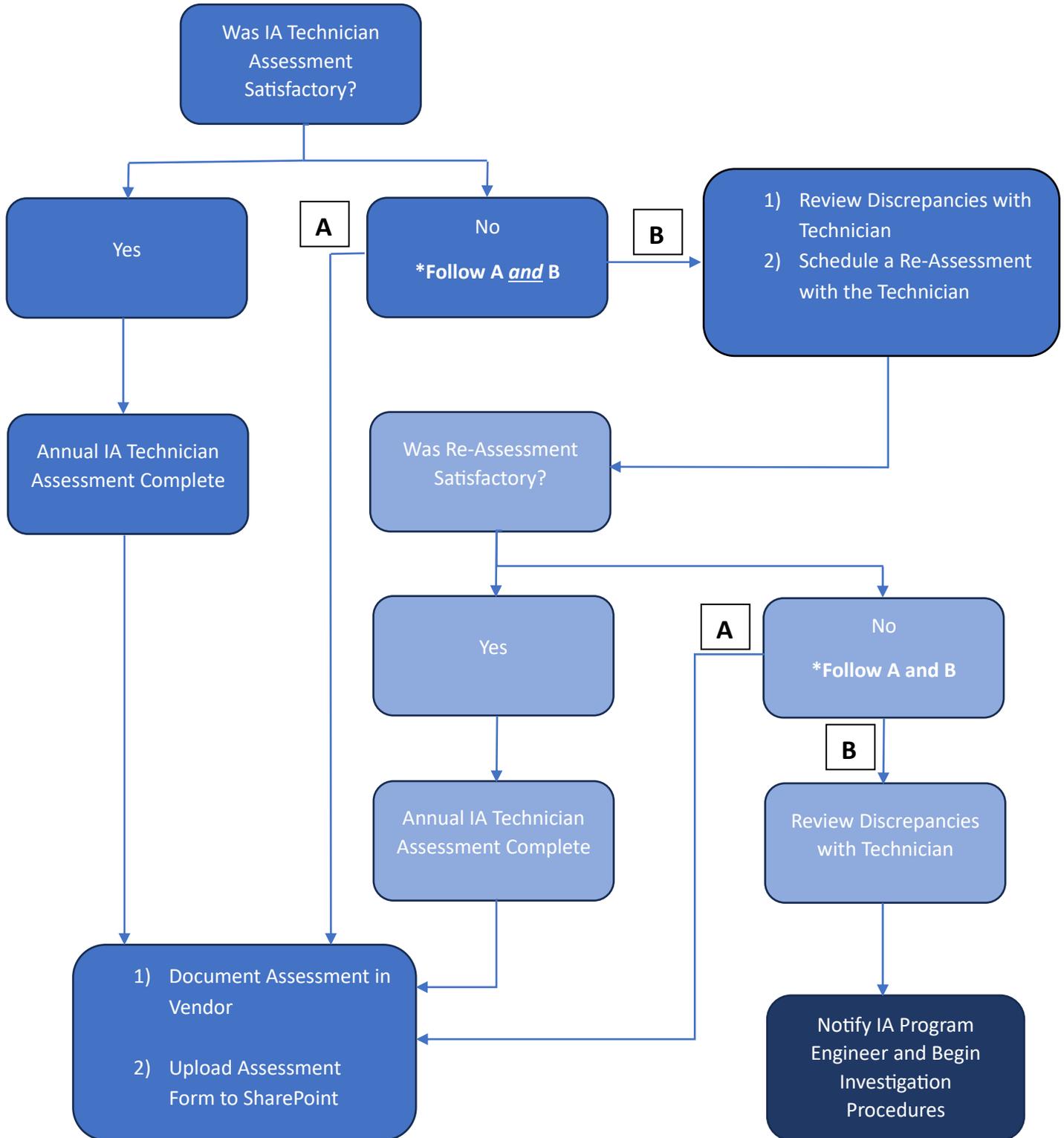
IA Split Sampling Investigation

In the event of an unsatisfactory second IA Split Sampling attempt, the investigation will include the following steps:

1. The IA Assessor shall verify the calculations used to determine the test results.
2. The IA Assessor shall document the second IA Split Sampling attempt in Vendor. Both the first and second attempts shall be documented in Vendor regardless of the result.
3. The IA Assessor shall alert the IA Program Engineer of the two unsatisfactory attempts. The IA Program Engineer will review all reports related to the IA Evaluation and the conditions which lead to the unsatisfactory rating with the IA Assessor(s) who conducted the evaluation.
4. The IA Program Engineer will use the investigation information to determine what training will be required for the assessed technician, up to suspension of the technician's certification and having them reattend the certification class associated with the assessment type.
5. The IA Program Engineer will notify the technician that they shall not perform acceptance, verification, or QC sampling/testing for that material type, until successful completion of the required training. The IA Program Engineer will adjust the technician's credentials in Vendor to reflect the technician's inability to sample/test materials related to the unsatisfactory IA Split Sampling, until further training has been completed.

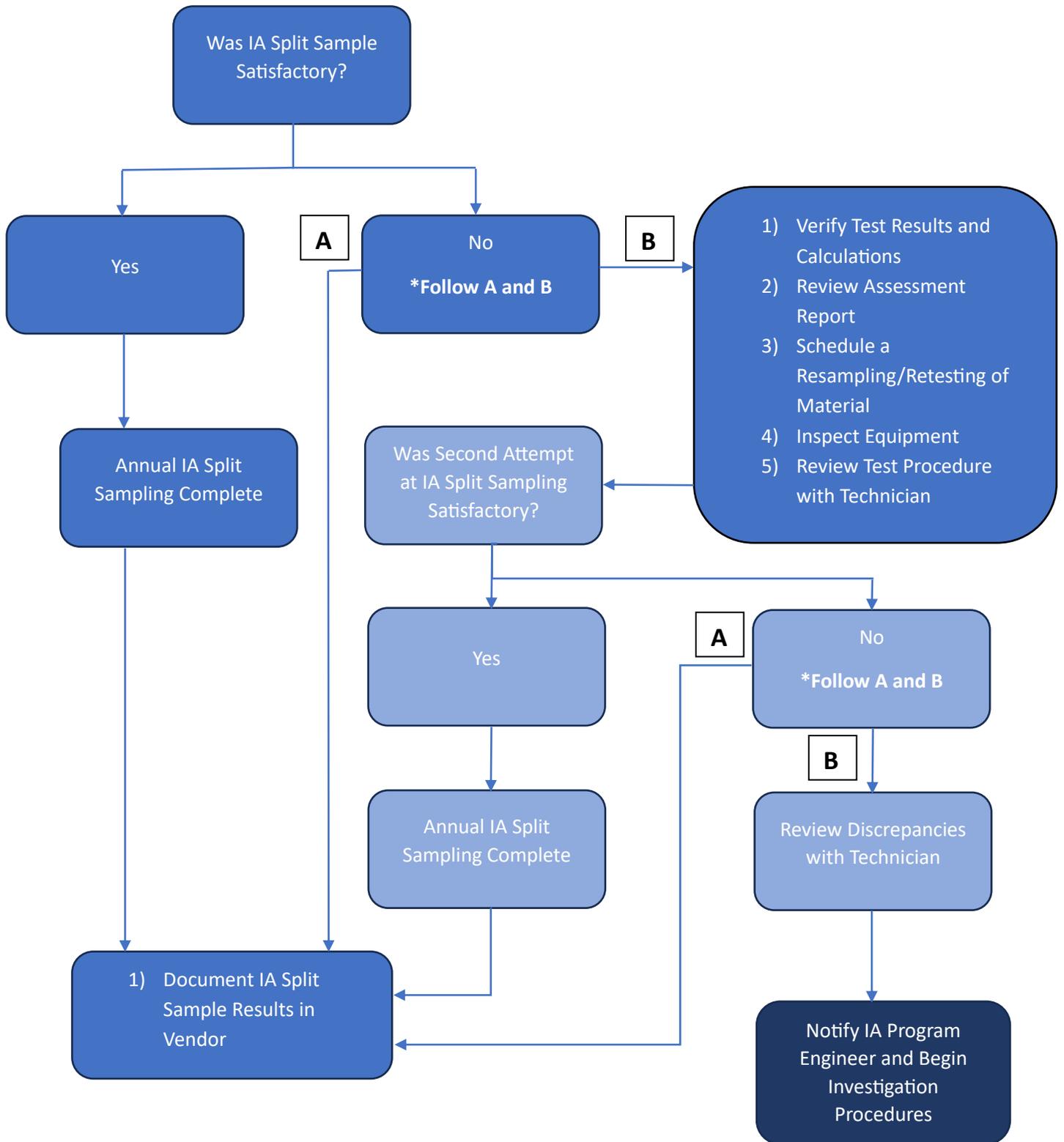
3.6 IA Technician Assessment Flowchart

Figure 2 IA Technician Assessment Flowchart



3.7 IA Split Sampling Flowchart

Figure 3 IA Split Sampling Flowchart



4 Specific Program Requirements

4.1 IA Aggregate Laboratory Technician Program

A. Qualification of IA Aggregate Laboratory Technician

At a minimum, the IA Aggregate Laboratory Technician must have successfully completed the following NCDOT Courses:

- QC/QA Aggregate Sampling Technician
- QC/QA Aggregate Testing Technician (*For technicians who will **only** sample aggregates, this class will not be required*)

B. Conducting IA Aggregate Laboratory Technician Test Procedures

1. An IA Evaluation is required for active Aggregate Laboratory Technicians each calendar year (*technicians are exempt from their annual IA Technician Assessment in years when they have successfully completed the corresponding certification course but must still complete the IA Split Sampling portion of the IA Evaluation*). The IA Evaluation is to be conducted as soon as practical after the active technician meets the requirements set forth in section 9.1.1 of this document.
2. IA Assessors shall conduct the IA Evaluation on at least one of the tests listed in [Table 2](#), [Table 3](#), and [Table 4](#). The test will be chosen at the discretion of the IA Assessor but shall be an aggregate product readily available at the aggregate facility the technician is assigned to.
3. The IA Assessment and the IA Split Sample do not have to be performed at the same time, but if they are, a second IA representative shall be present so the IA Assessor's full attention will be to assess the technician and not to physically perform the comparison test.
4. The assessed technician's half of the IA Split Sample shall be tested by the technician being evaluated at their laboratory. The IA Assessor's half of the IA Split Sample should be submitted to the closest M&T Regional or Central laboratory
5. Utilizing "IA Certified Assessors" is fully advantageous and approved within this IA Aggregate Program. This is only acceptable if the NCDOT Aggregate QC/QA Engineer, or his Aggregate Specialist, review and certify by signature the operations and results.

C. Evaluation of IA Aggregate Split Sample Test Results

The following limits should be used when evaluating IA Aggregate Laboratory Technician Split Sample test results. All deviations outside the acceptable tolerance are considered unsatisfactory and require an investigation.

Table 2 Aggregate Base Course (ABC) Required IA Evaluations and Tolerances

Aggregate Base Course (ABC) Required IA Evaluations and Tolerances						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Stockpile Sampling	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	No	N/A	N/A
Gradation AASHTO T 27	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 % per Sieve	> 10 % per Sieve
Loss By Washing AASHTO T 11	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 %	> 10 %

Table 3 Coarse Aggregate Required IA Evaluations and Tolerances

Coarse Aggregate Required IA Evaluations and Tolerances						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Stockpile Sampling	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	No	N/A	N/A
Gradation AASHTO T 27	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 % per Sieve	> 10 % per Sieve
Loss By Washing AASHTO T 11	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 %	> 10 %

Table 4 Fine Aggregate Required IA Evaluations and Tolerances

Fine Aggregate Required IA Evaluations and Tolerances						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Stockpile Sampling	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	No	N/A	N/A
Gradation AASHTO T 27	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 % per Sieve	> 10 % per Sieve
Fineness Modulus AASHTO T 27	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes		
Loss By Washing AASHTO T 11	Quarry QC Personnel	HiCAMS Query on QAP – Aggregates	Yes	Yes	≤ 10 %	> 10 %

4.2 IA Concrete Field Technician Program

A. Qualification of IA Concrete Field Technician

At a minimum, the IA Concrete Field Technician must have successfully completed the following NCDOT Courses:

- Concrete Field Technician (Testing)

B. Conducting IA Concrete Field Technician Test Procedures

1. One IA Evaluation, per test procedure that the tester will be performing, per active technician, per calendar year is required (*technicians are exempt from their annual IA Technician Assessment in years when they have successfully completed the corresponding certification course but must still complete the IA Split Sampling portion of the IA Evaluation*). The IA Evaluation is to be conducted as soon as practical after the active technician meets the requirements set forth in section 9.1.1 of this document.
2. Tests covered are those listed in [Table 5](#).
3. The IA Assessment and the IA Split Sample do not have to be performed at the same time, but if they are, a second IA representative shall be present so the IA Assessor's full attention will be to assess the technician and not to physically perform the comparison test.
4. The IA Split Samples for air content, slump, and temperature shall be tested simultaneously by the technician being evaluated and the IA Assessor/IA Certified Assessor using different equipment. Test specimens shall be sampled onsite and allowed to be cured there for a minimum of 24 hours. Afterward the initial curing, the IA Assessor shall take possession of both halves of the IA Split Sample test specimens and deliver the specimens to the closest M&T Regional or Central laboratory for testing. It is imperative that both halves of the IA Split Sample test specimens be cured, delivered, and tested in the same manner and time.

C. Evaluation of IA Concrete Split Sample Test Results

The following limits should be used when evaluating IA Concrete Field Technician Split Sample test results. All deviations outside the acceptable tolerance are considered unsatisfactory and require an investigation.

Table 5 Portland Cement Concrete Required IA Evaluations and Tolerances

Portland Cement Concrete Required IA Evaluations and Tolerances (Excludes Precast, Prestress, Pavement and Volumetric)						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Slump ASTM C 143	DOT Field Personnel	HiCAMS Query on Samples	Yes	Yes	≤ 1.0"	> 1.0"
Air Content: Air Pressure Meter ASTM C 231	DOT Field Personnel	HiCAMS Query on Samples	Yes	Yes	≤ 1 %	> 1 %
Temperature ASTM C 1064	DOT Field Personnel	HiCAMS Query on Samples	Yes	Yes	≤ 3°	> 3°
Specimen Fabrication ASTM C31	DOT Field Personnel	HiCAMS Query on Samples	Yes	Yes <small>*Based on compressive strength</small>	≤ 500 psi	> 500 psi

4.3 IA QMS Asphalt Laboratory Technician Program

A. Qualification of the IA QMS Asphalt Laboratory Technician

At a minimum, the IA QMS Asphalt Laboratory Technician must have successfully completed the following NCDOT Courses:

- Introduction to Asphalt Pavements
- QMS Level I Plant Technician

B. Conducting IA QMS Asphalt Laboratory Technician Test Procedures

1. One IA Evaluation, per test procedure that the tester will be performing, per active technician, per calendar year is required (*technicians are exempt from their annual IA Technician Assessment in years when they have successfully completed the corresponding certification course but must still complete the IA Split Sampling portion of the IA Evaluation*). The IA Evaluation is to be conducted as soon as practical after the active technician meets the requirements set forth in section 9.1.1 of this document.
2. Tests covered are those listed in [Table 6](#).
3. The IA Assessment and the IA Split Sample do not have to be performed at the same time, but if they are, a second IA representative shall be present so the IA Assessor's full attention will be to assess the technician and not to physically perform the comparison test.
4. The IA Split Sample shall be tested and evaluated at an appropriate M&T regional laboratory utilizing the laboratory's equipment. The maximum time for a split sample to be tested is five days.

C. Evaluation of IA QMS Asphalt Laboratory Technician Test Results

The following limits should be used when evaluating IA QMS Asphalt Laboratory Technician test results. All deviations outside the acceptable tolerance are considered unsatisfactory and require an investigation.

Table 6 QMS Asphalt Laboratory Technician Required IA Evaluations and Tolerances

QMS Asphalt Laboratory Required IA Evaluations and Tolerances						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Sampling and Quartering	Plant QC Technician	HiCAMS Query on QAP - Asphalt	Yes	No	N/A	N/A
Binder Content AASHTO T 308	Plant QC Technician	HiCAMS Query on QAP - Asphalt	Yes	Yes	≤ 1.0 %	> 1.0 %
Bulk Specific Gravity AASHTO T 312 and T 166 / T 331	Plant QC Technician	HiCAMS Query on QAP - Asphalt	Yes	Yes	≤ 0.060	> 0.060
Theoretical Maximum Specific Gravity AASHTO T 209 or D 6857	Plant QC Technician	HiCAMS Query on QAP - Asphalt	Yes	Yes	≤ 0.040	> 0.040
Recovered Aggregate Gradation AASHTO T 30	Plant QC Technician	HiCAMS Query on QAP - Asphalt	Yes	Yes	See Table 7	See Table 7

Table 7 Recovered Aggregate Gradation Sieve Analysis

Sieve Analysis	Acceptable Tolerance	Unacceptable Tolerance
25.0 mm (Base Mix)	≤ 20.0%	>20.0%
19.0 mm (Base Mix)	≤ 20.0%	>20.0%
12.5 mm (Intermediate Mix)	≤ 12.0%	>12.0%
9.5 mm (Surface Mix)	≤ 10.0%	>10.0%
4.75 mm (Surface Mix)	≤ 10.0%	>10.0%
2.36 mm (All mixes except S 4.75)	≤ 10.0%	>10.0%
1.18 mm (S 4.75A)	≤ 10.0%	>10.0%
0.075 mm (All Mixes)	≤ 4.0%	>4.0%

4.4 IA Conventional Density Technician Program

A. Qualification of Conventional Density IA Technician

At a minimum, the Conventional Density IA Technician must have successfully completed the following NCDOT Courses:

- Conventional Density

B. Conducting IA Conventional Density Test Procedures

1. One IA Evaluation, per active technician, per calendar year is required (*technicians are exempt from their annual IA Technician Assessment in years when they have successfully completed the corresponding certification course but must still complete the IA Split Sampling portion of the IA Evaluation*). The IA Evaluation is to be conducted as soon as practical after the active technician meets the requirements set forth in section 9.1.1 of this document.
2. Tests covered are those listed in [Table 9](#).
3. The IA Assessment and the IA Split Sample do not have to be performed at the same time, but if they are, a second representative shall be present so the Assessor’s full attention will be to assess the technician and not to physically perform the comparison test.
4. The IA Split samples shall be tested simultaneously by the technician being evaluated and the M&T representative using different equipment.

C. Evaluation Conventional Density IA Test Results

The following limits should be used when evaluating IA Conventional Density Technician test Results. All deviations outside the acceptable tolerance are considered unsatisfactory and require an investigation.

Table 8 Conventional Density Required IA Evaluation and Tolerance

Conventional Density Required IA Evaluations and Tolerance						
Item	Acceptance Sampled By	Determined By	Assessment Required?	Split Sample Required?	Split Sample Tolerance	
					Satisfactory Tolerance	Unsatisfactory Tolerance
Conventional Density ASSHTO T99	DOT Field Personnel	HiCAMS Query on Samples	Yes	Yes	≤ 5.0%	> 5.0%

5 IA Technician Assessment Forms (Assessment Forms Not Shown In Online Version)

IA Assessors will utilize checklists for the Technician Assessments. The purpose of the checklist is to provide assurance that acceptance sampling and testing procedures are accomplished in accordance with the specified procedures and to compare testing equipment. Assessment forms will be reviewed as needed to update the procedural steps in accordance with national and/or NCDOT standards and specifications. Assessment forms are located in the Appendix of this document.

Appendix A: IA Aggregate Laboratory Technician Assessment Forms (Aggregate Base Coarse)

Appendix B: IA Aggregate Laboratory Technician Assessment Forms (Coarse Aggregate)

Appendix C: IA Aggregate Laboratory Technician Assessment Forms (Fine Aggregate)

Appendix D: IA Concrete Field Technician Assessment Forms

Appendix E: IA QMS Asphalt Laboratory Technician Assessment Forms

Appendix F: IA Conventional Density Technician Assessment Forms

6 IA Data Storage

All material and technician acceptance information are stored in the Highway Construction and Materials System (HiCAMS), Vendor system, and SharePoint. These systems contain data retention, technician assessments, technician certification class enrollment and outcomes, ability to track material developments, and documentation management.

7 Annual Report on IA Program Results

The IA Program Engineer will compile and submit an annual report to the FHWA Division Administrator summarizing the results of the NCDOT system-based Independent Assurance Program. The report shall identify the number and type of tests performed, the number of sampling and testing personnel evaluated, and the number and type of equipment evaluations performed. In addition, the report shall identify the independent assurance evaluations found to be acceptable, the number found to be unacceptable, and a summary of any investigations and/or system-wide corrective actions taken.

8 Laboratories

8.1 Laboratory Qualifications

The requirements for laboratory qualifications are uniform for laboratories performing acceptance and verification testing for the NCDOT. Compliance with AASHTO R18, *Establishing and Implementing a Quality System for Construction Materials Testing Laboratories* is required for all NCDOT and 3rd party laboratories.

Qualification of the NCDOT Central and Regional Laboratories

The Central and Regional Laboratories are fully accredited in all testing performed when applicable. AASHTO resource is utilized to ensure compliance with R18. This involves AASHTO and CCRL inspections which are used to ensure compliance of laboratory testing equipment and review of personnel qualifications.

The Laboratory Qualifications Engineer is located at the Central Laboratory and works independently from any of the NCDOT Laboratory Supervisors. This position ensures NCDOT remains compliant with AASHTO resource by maintaining the required documents for AASHTO R18. This position and their team perform laboratory inspections of equipment, personnel, and test procedures.

All testing equipment that is not in compliance with applicable AASHTO or NCDOT Methods may not be used for acceptance evaluations.

Qualification for 3rd Party and Other Laboratories Providing Acceptance Data for NCDOT

When used for acceptance testing, all laboratories performing Aggregate, Asphalt, and/or Concrete testing will be required to be AASHTO accredited (or equivalent) to perform testing for the Department.

8.2 Producer Owned Laboratories

Producer owned laboratories are responsible for Quality Control testing of approved products/materials manufactured by the producer. Producer owned laboratories must be approved by the Department through the Materials and Tests Unit's approval and annual audit processes on a year-by-year basis. Producer approvals are maintained in the Department's Vendor database. Producer laboratories should have readily available their most current annual inspection documentation verifying the laboratory is up to date on their required certifications.

8.3 Laboratory Testing of IA Assessor's Half of IA Split Sample

IA Split Samples which require laboratory testing, such as concrete cylinders, aggregate gradations, and various asphalt properties, will be tested by the nearest NCDOT regional laboratory, or a laboratory that has been approved by the Laboratory Qualification Engineer as described in Section 8.2. The laboratory technician performing the comparison evaluation of the IA Split Sample must be certified in the procedures being evaluated.

All laboratory equipment will be calibrated/standardized/checked as required by the AASHTO test procedures and/or NCDOT policies. Verification of calibration and expiration will be documented and affixed to each applicable piece of equipment.

The M&T Regional and Central Laboratories will be active in the AASHTO Accreditation program and an accredited laboratory. The M&T Central Laboratory will review and qualify on-site laboratories and any CEI laboratory that conducts testing on NCDOT projects. A certificate of approval, with an expiration date, will be granted and must be displayed at the facility.

8.4 Laboratory Testing of Assessed Technician's Half of IA Split Sample

There are some materials, such as aggregate and asphalt mix, for which the Assessed Technician's half of the IA Split Sample will be tested at the producer owned laboratory which has been approved per Section 8.3. If during an IA Evaluation conducted at a producer owned laboratory, it is realized that the facilities laboratory approval has expired, the M&T technician assigned to the facility shall be notified and the IA Assessment and/or IA Split Sampling shall be rescheduled to a date following the approval of the laboratory.

IA Split Sample results for the Assessed Technician's half of the sample, will be compared to the IA Assessor's half of the sample, which will be tested as described in Section 8.4.

9 Qualified Personnel Program

9.1 General Information

Technicians who conduct acceptance sampling and testing for the Department must meet all requirements and certifications as described in the “NCDOT Qualified Personnel Program”. Qualifications and certifications will be maintained and verified using the NCDOT Vendor system. Other qualifications may apply as defined in the NCDOT Construction Manual, Special Provisions, or NCDOT Policies and Procedures. Test methods not covered by this program for acceptance are not included in the IA Program.

9.2 Active Certified Technicians

Active Certified Technicians are those which meet all the following:

- Performed any sampling or testing methods shown in [Table 2](#), [Table 3](#), [Table 4](#), [Table 5](#), [Table 6](#), [Table 7](#), and [Table 8](#) in **Five** or more instances within the measured period (calendar year).
- The sampling or testing activities were on materials used by the Department for acceptance, agency verification testing, or contractor’s QC testing.
- The technician must currently hold an “active” certification in the material discipline.

9.3 NCDOT Certification Training Requirements

The NCDOT active certified technician is responsible for various duties and responsibilities while conducting sampling and testing of materials on project sites or in an approved laboratory. These duties and responsibilities include: maintains NCDOT certifications required for sampling and testing; performs acceptance tests only for those materials the technician is currently certified to conduct (see Table 9 for certifications required to perform specific tests); ensures that equipment is functioning correctly; maintains proper calibration requirements and documentation; cleans and maintains test equipment to ensure that it is kept in an operable condition; and notifies the Materials and Tests staff when IA Evaluations are applicable.

For specific information concerning NCDOT training and certification courses, and for class registration, follow the link below:

<https://connect.ncdot.gov/resources/Materials/Pages/default.aspx>

Table 9 Certifications Required to Perform Specific Tests

Certifications Required to Perform Specific Tests		
Procedure	Required Certification Training	Certification Length
Aggregate Base Course		
Stockpile Sampling	Aggregate QC/QA (Sampling) MAT 400	5 years
Gradation	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Loss By Washing	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Coarse Aggregate		
Stockpile Sampling	Aggregate QC/QA (Sampling) MAT 400	5 years
Gradation	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Loss By Washing	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Fine Aggregate		
Stockpile Sampling	Aggregate QC/QA (Sampling) MAT 400	5 years
Gradation	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Fineness Modulus	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Loss By Washing	Aggregate QC/QA (Testing) MAT 405 & (Sampling) MAT 400	5 years
Portland Cement Concrete		
Slump	Concrete Field Technician (Testing) MAT 100	5 years
Air Content	Concrete Field Technician (Testing) MAT 100	5 years
Temperature	Concrete Field Technician (Testing) MAT 100	5 years
Specimen Fabrication	Concrete Field Technician (Testing) MAT 100	5 years
Asphalt QC Laboratory – Level I Plant		
Sampling & Quartering	QMS Level 1 Plant Technician (MAT 525)	5 years
Binder Content	QMS Level 1 Plant Technician (MAT 525)	5 years
Bulk Specific Gravity	QMS Level 1 Plant Technician (MAT 525)	5 years
Theoretical Maximum Specific Gravity	QMS Level 1 Plant Technician (MAT 525)	5 years
Recovered Aggregate Gradation	QMS Level 1 Plant Technician (MAT 525)	5 years
Roadway Core Specific Gravity	QMS Level 1 Plant Technician (MAT 525)	5 years
Soil Density Technician		
Conventional Density	Conventional Density MAT230	5 Years

9.4 Certification Responsibility

It is the responsibility of the technician to maintain their certifications and schedule re-certifications prior to expiration. If a technician fails an exam and/or loses a certification, it is the responsibility of the technician to contact the Materials & Tests Unit to reschedule a test or retake the class next session.

All certifications expire five years from the date that the certification was issued. If a field certification is required, this evaluation must be conducted no more than three months after passing the classroom exam. Provisional certifications will not be issued for technicians who have failed exams or allowed certifications to expire. Current certifications will be maintained in the Departments Vendor system and personnel changes should be updated when necessary. It is recommended to verify certifications prior to any IA Evaluation.