WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

ACCEPTANCE OF MATERIALS
VIA APPROVED PRODUCTS LIST

1. PURPOSE

1.1 To set forth instructions for the acceptance of materials on projects via the WVDOH Approved Product List (APL).

1.1.1 This document is a general guideline for the acceptance of any material on a project via the APL. Specific materials may have additional acceptance criteria not listed in this document. If specific material acceptance criteria conflict with this document, those criteria override this document.

2. REFERENCED DOCUMENTS

2.1 MP 106.00.02 - Procedure for Evaluation of New Products for Use in Highway Construction

2.2 MP 106.00.03 - Guidelines for Establishing and Maintaining Approved Product Lists of Materials, Systems and Sources

3. ACCEPTANCE OF MATERIALS ON APPROVED SOURCE

3.1 When accepting material on the project, the contractor must provide proof of the source of origin. The contractor shall provide an invoice which clearly includes the following information:

1. The name of the original producer/supplier*
2. The common name of the material
3. The quantity of shipped material
4. The current WVDOH approval number or inspection number

*Note: The original producer/supplier is the "Approved Source" as documented on the WVDOH APL.

3.2 The invoice must be legible and clearly show all the required information.

3.3 The project shall review the submission and confirm that the company and approval number appear on the APL.

3.3.1 Any producer/supplier wishing to submit their material for consideration for the APL shall follow the guidelines of MP 106.00.02 and MP 106.00.03.

4. DOCUMENTATION OF ACCEPTANCE

4.1 The acceptance shall be documented in AWP on the Daily Work Report (DWR).

4.2 The producer/supplier, as well as the approval number shall be included on the DWR.

4.3 A scan or original version of the invoice shall be placed in the ProjectWise project folder.

5. E-TICKETING

5.1 For APL materials requiring an E-Ticket, this ticket shall be provided in addition to the paper ticket.

5.2 The E-Ticket shall only document the final shipment of the material to the project from the seller.

5.2.1 For example, if a pipe is created in one location (A), shipped to a second or tertiary supplier (B^i), then to a project, the E-Ticket would document the transportation from location B^i to the project.

5.3 The E-Ticket shall include all the required information.

5.4 A PDF of the E-Ticket shall also be placed in ProjectWise.

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MP 106.00.05 Steward – Materials Control Section
MM:B

106.3-SAMPLES:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

All materials will be inspected, tested and approved prior to incorporation into the work. Any work which incorporates materials prior to the above evaluation shall be performed at the Contractor's risk, and may subsequently be considered as unacceptable. Unless otherwise specified, the materials shall meet the applicable Standard or Interim Specifications of the American Association of State Highway and Transportation Officials (AASHTO), the Standard or Tentative Specifications of the American Society for Testing and Materials (ASTM), or Standards adopted by other specifying agencies, with preference given in the same order in which the above agencies are listed. The specification which is current at the time of advertisement for bids shall govern, except that, with the approval of the Engineer, subsequent revisions or adoptions may govern. All materials being used are subject to inspection, testing or rejection at any time prior to final acceptance of the completed work.

The Contractor shall be responsible for the quality of construction and materials incorporated. When called for in the Specifications and/or Materials Procedure, the Contractor shall perform all necessary process control inspection, sampling and testing. All materials will be approved for acceptance through the Division's acceptance procedures. The Division has the exclusive right and responsibility for determining the acceptability of the construction and materials incorporated. The Division may use the results of the Contractor's inspection, sampling and testing for acceptance purposes.

Tests shall not be considered complete until they are submitted by the Contractor to the Division. The submission of test results shall be provided in a timely manner as specified in MP 109.00.21. Failure to submit test results by the established guideline will result in a price penalty assessed based on MP 109.00.21.

The Contractor may submit for acceptance, materials that appear on the Division Approved Source/Product Lising (APL). These submissions shall include a clear and legible invoice from the manufacturer and contain the product's approved lab number. Products that are not on the approved product list may be used on projects as long as these products meet the requirements for that material. Prospective new products for the approved product list shall follow the guidelines of MP 106.00.02 and MP 106.00.03._

Acceptance of materials via the APL shall be in accordance with MP 106.00.05. APL acceptance documentation shall include an E-ticketing for the following materials: all precast concrete products, all pipe, and all reinforcing steel. These E-tickets shall follow all guidelines established in Section 109.20.

Lot or sublot sizes will normally be designated. In the event that operational conditions cause work to be interrupted, or only partially completed before the lot size designated has been achieved, the lot or sublot may be redefined by the Engineer as being either the amount of work accomplished within the day or that work partially completed combined with the next lot or sublot of work. It is the intent of these Specifications that the number of samples required to evaluate each lot or sublot will be unchanged even when the lot or sublot is redefined.

When an acceptance plan is cited, it shall be in accordance with 106.3.1.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

WVDOH BUY AMERICA ACCEPTANCE GUIDELINES

1. PURPOSE

1.1 To set forth instructions for compliance with both State and Federal Buy America Requirements (henceforth referred to as "Buy America Requirements"), as listed in this document.

2. REFERENCED DOCUMENTS

2.1 PUBLIC LAW 117–58—NOV. 15, 2021, Infrastructure Investment and Jobs Act.

2.2 Build America, Buy America Act (BABA).

2.3 23 U.S.C. 313 and 23 CFR 635.410 "Buy America Requirements".

2.4 2 CFR part 184 Buy America Preferences for Infrastructure Projects.

2.5 M-22-11 Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.6 M-24-02 Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.7 Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled "West Virginia American Steel Act of 2001."

2.8 West Virginia Notary Handbook, Current Edition.

2.9 MP 106.10.51 – WVDOH Buy America Waiver Guidelines.

3. ACCEPTANCE OF MATERIALS

3.1 This procedure applies to the following:

1. Steel and Iron
2. Manufactured Products
3. Construction Materials
4. Section 70917(c) Materials

3.2 An article, material, or supply shall only be classified into a single category listed in Section 3.1. In some cases, an article, material, or supply may not fall under any of these categories. Classification of the category must be made based on the status of article, materials, or supply at the time it is brought to the work site for incorporation into the project. The work site is generally the location of the project at which the materials will be incorporated. An article, material, or supply permanently incorporated into a project must meet the Buy America Preference for only the single category in which it is classified.

3.3 A Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to a project. As such, it does not apply to

tools, equipment, and supplies, such as temporary scaffolding brought to the construction site and removed at or before the completion of the project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished project but are not an integral part of the structure or permanently affixed to the project.[1]

3.3.1 Buy America preference does not apply to materials such as temporary paint or temporary traffic control devices.

4. STEEL AND IRON

4.1 Pursuant to Buy America Requirements, all manufacturing processes for steel and iron materials must take place in the United States.

4.2 Definition

4.2.1 "Iron or steel products" means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

4.2.1.1 "Predominantly of iron or steel or a combination of both" means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

4.3 Standard

4.3.1 This includes all processes from the initial melting stage through application of coatings occurs in the United States.

5. MANUFACTURED PRODUCTS

5.1 Pursuant to Buy America Requirements, all Manufactured Materials are required to be produced in the United States. All manufacturing processes shall occur in the United States.

~~5.1 The Federal Highway Administration (FHWA) has a longstanding waiver in effect exempting Manufactured Products from Buy America Requirements.~~

5.2 Definition

5.2.1 Manufactured products means:

1. Articles, materials, or supplies that have been:
   A. Processed into a specific form and shape;
   B. or Combined with other articles, materials,
   C. or supplies to create a product with different properties than the individual articles, materials, or supplies.

2. If an item is classified as an iron or steel product, or a construction material, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under 2 CFR 184.4(e) and paragraph (1) of

[1] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 4

this definition may include components that are construction materials, iron or steel products, or Section 70917(c) materials.

5.3 Standard

5.3.1 Pursuant to Buy America Requirements, all manufactured products used in the project are produced in the United States; this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product.[2]

5.3.1.1 In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

1. For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued).
2. For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1), plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

6. CONSTRUCTION MATERIALS.

6.1 Pursuant to Buy America Requirements, all Construction Materials are required to be produced in the United States. All manufacturing processes for the Construction Materials shall occur in the United States.

6.2 Definition

6.2.1 Construction materials means articles, materials, or supplies that consist of only one of the items listed in Section 6.2.1.1, except as provided in Section 6.2.1.2. To the extent one of the items listed in Section 6.2.1.1 contains as inputs other items listed in this section, it is nonetheless a construction material.

6.2.1.1 The listed items are:

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Fiber optic cable (including drop cable);
5. Optical fiber;
6. Lumber;
7. Engineered wood; and

[2] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 15-16.

8. Drywall.

6.2.1.2 Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

6.3 Standard

6.3.1 The Buy America Preference applies to the following construction materials incorporated into projects. Each construction material is followed by a standard for the material to be considered "produced in the United States."

1. Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
2. Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.
3. Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
4. Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.
5. Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.
6. Lumber. All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
7. Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.
8. Engineered wood. All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

6.3.2 Except as specifically provided, only a single standard under this section should be applied to a single construction material.

7. SECTION 70917(C) MATERIALS

7.1 The standards developed under BABA 70915(b) (1) shall not include cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives as inputs of the construction material. These are referred to as 70917(C) materials.

7.2 Definition

7.2.1 Section 70917(c) materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See section 70917(c) of the Build America, Buy America Act.

7.3 These materials are exempt from Buy American Requirements.

8. BUY AMERICA COMPLIANCE.

8.1 On a given project, the Division shall not accept, approve, authorize, or make any payments to any Contractor not fully compliant with Buy America.

8.1.1 When Buy America Requirements apply, the Contractor shall furnish a notarized Certificate of Compliance signed by their official with knowledge and authority to certify that all applicable materials and products to be incorporated into the project, including those of any subcontractors and suppliers, are compliant with Buy America Requirements. This shall be done prior to the permanent incorporation of the materials into the project.

8.1.2 The notarized Certificate of Compliance shall contain the following information:

8.1.2.1 Title: Buy America Certification of Compliance.

8.1.2.2 The Name, Address and Contact Information for the Contractor.

8.1.2.3 A contractor statement that demonstrates compliance with Buy America Requirements.

8.1.2.4 The Contract ID for the Material (if applicable).

8.1.2.5 Both the Federal and State Project Number for the Material (if applicable).

8.1.2.6 The name of the material referenced in the Certificate of Compliance. This material name shall be a clear, common name for the material as stated in the proposal. Part Numbers, etc., may also be on the document if the contractor wishes.

8.1.2.7 The Line Item for the Material (if applicable).

8.1.2.8 The Bid and/or Placed Quantity of the Material.

8.1.2.9 Signature of the Contractor and date.

8.1.2.10 A list of materials on the project that “Buy America” applies but are not Buy America compliant.

8.1.2.11 The document must be notarized as per the “West Virginia Notary Handbook.”

8.2 Attachment 1 shows a sample Certificate of Compliance.

8.2.1 Multiple items may be listed on the Certificate of Compliance, though all the information for each line must be on the document.

8.2.2 A list of these materials may be referenced on an attached page as long as that page is also signed and notarized.

9. BUY AMERICA WAIVERS

9.1 Buy America Waivers are outlined in MP 106.10.51 as per "§ 184.7 Federal awarding agency's issuance of a Buy America Preference waiver" and "23 CFR 635.410(c)".

10. BUY AMERICA MATERIALS

10.1 Attachment 2 includes a list of materials and products used in WVDOH construction projects and the applicability of Buy America Requirements. This attachment also shows each category of each based on Section 3.1 of this document. Finally, if the material is not applicable to Buy America Requirements, justification is given. Example exemptions are as follows:

1. Historic Waiver: Manufactured Product is waived by FHWA as per Section 5 of this Document.
2. Temporary Material: Material is not permanently incorporated into the project.

10.1.1 This materials and products list may be updated by the Director of MCS&T as needed to ensure compliance with Buy America Requirements. Any update to this form will be in accordance with guidance from and through an affirmation process with FHWA.

10.1.2 Glass added to a permanent paint product requires a Certificate of Compliance.

10.1.3 Attachment 3 includes OMB Memorandum M-24-02[3], dated October 25, 2023, for additional guidance and as the source material for WVDOH's compliance.

[3] https://www.whitehouse.gov/wp-content/uploads/2023/10/M-24-02-Buy-America-Implementation-Guidance-Update.pdf

11. DOCUMENTATION OF BUY AMERICA CERTIFICATION OF COMPLIANCE

11.1 The Certificate of Compliance shall be placed in the QC Plan Folder in ProjectWise (or the current WVDOH approved document retention software) under the contract.

Michael Mance, P.E.
Director
Materials Control, Soils and Testing Division

MP 106.10.50 Steward – Materials Control Section
ATTACHMENTS

Buy America Certification of Compliance

Acme Construction Company
123 Main Street
Charleston, WV 25302

Ship Date: 10/31/2023

The below listed materials and products meets all the requirements of all Federal and State Laws for Buy America, including but not limited to: Chapter 5, Article 19 and Chapter 5A, Article 3 Section 56 of the West Virginia Code; 23 U.S.C. 313 Buy America, 23 CFR 635.410 Buy America Requirements, and Build America, Buy America Act, Section 70914.

This Certification of Compliance is for the material and project listed below:

CID: 22000005R1
Federal Number: B-0010(000)X
State Number: U002-00-1.00

Line: 0020	Widget, Part Q^{i}	500 Cubits
Line: 0025	Widget, Part H^{r}	300 Cubits

Non-Compliant Buy America Materials

Line: 0055	Widget, Part I^{z}	300 Cubits

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA

Charleston, WV 25304
My Commission Expires October 16, 2027

Janie Doe, Contractor President

Attachment 2: Full document is available at the WVDOH MCST Toolbox[4].

[4] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

WVDOH BUY AMERICA WAIVER AND EXCEPTION GUIDELINES

1. PURPOSE

1.1. To set forth instructions for Waivers and Exceptions for Buy America Materials.

2. REFERENCED DOCUMENTS

2.1. MP 106.10.50 – WVDOH Buy America Acceptance Guidelines.

2.2. West Virginia Code | §5A-3-56[1]

2.3. West Virginia Code | §5-19[2]

3. OVERVIEW OF BUY AMERICA WAIVERS

3.1. In certain circumstances, waivers may be applied to materials exempting them from both Federal and State Buy America requirements.

3.2. For each type of material as described in MP 106.10.50, a separate process is described.

3.3. If the contractor chooses to use foreign material for steel and iron, aluminum and glass, both Federal and State laws require Buy America waivers. These waivers are independent of each other. Compliance and acceptance of one waiver does not in any way shape or form demonstrate compliance with the other waiver.

Commented [DB1]: Need to be consistent with steel and iron or Steel and Iron, Manufactured manufactured materials etc.

3.4. If the contractor chooses to use foreign material for construction materials, Federal law requires Buy America waivers.

3.5. There are two different types of waivers

1. The General Waiver. Note – Hao to fill in this definition
2. The Individual Waiver. Note – Hao to fill in this definition
   a) Non-Availability
   b) Public Interest

4. FEDERAL BUY AMERICA WAIVERS FOR STEEL AND IRON

4.1. Public Interest and Unavailability Waiver (PIUW)

4.2. As provided for in 23 CFR 635.410(c)(1), WVDOH may request a waiver from Federal Buy America requirements for steel and iron materials if:

[1] http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=hb2207%20intr.htm&yr=2001&sesstype=RS&i=2207
[2] https://code.wvlegislature.gov/5-19/

(1) the application of Buy America requirements would be inconsistent with the public interest; or

(2) steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

4.3. If a contractor wishes to apply for a PIUW, they will contact the Division with justification. This will be reviewed by the WVDOH and will be sent to FHWA for approval.

5. STATE BUY AMERICA WAIVERS FOR STEEL AND IRON

5.1. As provided for in H. B. 2207, West Virginia Code | §5A-3-56, the Director of the West Virginia State Purchasing Division may authorize in writing the use of a minimal amount of foreign steel products if either of the following is true:

5.2. The director of the purchasing division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

Commented [DB2]: Break this section up if we do Waiver, then Exception?

6. BUY AMERICA WAIVERS FOR CONSTRICTION MATERIALS AND MANUFACTURED PRODUCTS

6.1. There is a long-standing, general waiver for Manufactured Products.

6.2. There are currently no additional exceptions for Federal Buy America Requirements for Construction Materials or Manufactured Products.

7. OVERVIEW BUY AMERICA EXCEPTIONS

7.1. Federal Minimal Use Exception

7.1.1. As provided for in 23 CFR 635.410(b)(4), an exception from Federal Buy America requirements exists for the minimal use of steel and iron materials "if the cost of such materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or $2,500, whichever is greater. For the purposes of this paragraph, the cost is that shown to be the value of the steel and iron products as they are delivered to the project".

7.2. State Minimal Use Exception

7.3. As provided for in Chapter 5A, Article 3 Section 56 of the West Virginia Code, an exception from West Virginia domestic steel preference requirements exists for the minimal use of foreign steel products, when authorized in writing by the director of Purchasing Division, if "The cost for each contract item used does not exceed one tenth of one percent of the total contract cost or $2,500, whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project."

7.3.1. There are no Buy America exceptions for Construction Materials and Manufactured Products.

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MP 106.10.51 Steward – Materials Control Section
MM:B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL AND ACCEPTANCE REQUIREMENTS FOR PORTLAND CEMENT CONCRETE

1. PURPOSE

1.1 To establish minimum requirements for Contractor's Quality Control (QC) system and the Division's Acceptance Plan. It is intended that these minimum requirements be followed in detailing the inspection, sampling, and testing deemed necessary to maintain compliance with all Specification requirements.

2. SCOPE

2.1 This Materials Procedure (MP) is applicable to all Portland Cement Concrete (PCC) items, and it outlines the quality control procedures for both plant and field operations and includes procedures for approving and using Master and/or Project Specific QC Plans. This procedure also aids in documentation and retention of QC Plans in ProjectWise.

3. REFERENCED DOCUMENTS

3.1 AASHTO M 201 - Standard Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes.

3.2 AASHTO T 22 - Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens.

3.3 AASHTO T 231 - Standard Method of Test for Capping Cylindrical Concrete Specimens.

3.4 ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.

3.5 ASTM C1231 - Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Cylindrical Concrete Specimens.

3.6 ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

3.7 ASTM C511 - Standard Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes.

3.8 ASTM C617 - Standard Practice for Capping Cylindrical Concrete Specimens.

3.9 MP 109.00.21 - Basis for Charges for Non-Submittal of Sampling & Testing Documentation by the Established Deadline.

3.10 MP 300.00.51 - Procedural Guidelines for Maintaining Control Charts for Aggregate Gradation.

3.11 MP 601.03.52 – Procedural Guidelines for Maintaining Control Charts for Portland Cement Concrete.

3.12 MP 601.04.20 - Curing Concrete Test Specimens in The Field.

3.13 MP 601.05.50 - Quality Assurance Procedures for Portland Cement Concrete.

3.14 MP 700.00.54 - Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results.

4. GENERAL REQUIREMENTS

4.1 The Contractor shall provide and maintain a quality control system that will provide reasonable assurance that all materials and products submitted to the Division for acceptance will conform to the contract requirements whether manufactured or processed by the Contractor or procured from suppliers, subcontractors, or vendors. The Contractor shall perform or have performed the inspections and tests required to substantiate product conformance to contract document requirements and shall also perform or have performed all inspections and tests otherwise required by the contract. The Contractor's quality control inspections and tests shall be documented and shall be available for review by the Engineer throughout the life of the contract. The Contractor shall maintain standard equipment and qualified personnel as required by the Specifications to assure conformance to contract requirements. Procedures will be subject to the review of the Division before the work is started.

5. QUALITY CONTROL PLAN

5.1 The Contractor shall prepare a QC Plan detailing the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of materials and construction governed by the Specifications. As a minimum, the sampling and testing plan should detail sampling location, sampling techniques, and test frequency to be utilized. Quality control sampling and testing performed by the Contractor may be utilized by the Division for acceptance.

5.1.1 A QC Plan must be developed by the Contractor and submitted to the Engineer prior to the start of construction on every project. Acceptance of the QC Plan by the Engineer will be contingent upon its concurrence with these guidelines.

5.1.2 As work progresses, an addendum(s) may be required to a QC Plan to keep the QC program current. Personnel may be required to show proof of certification for testing.

5.2 Quality Control Plan Guidelines

5.2.1 The Plan shall identify the personnel responsible for the Contractor's quality control. This should include the company official who will act as the liaison with Division personnel, as well as the Certified Portland Cement Concrete Technician who will direct the inspection program at the plant or in the field depending if it is a plant or field QC Plan. Their phone number and email address must also be included as a means for contact by the Division personnel.

5.2.2 All classes of concrete and corresponding mix design numbers, which may be used, shall be listed on the Plant QC Plan. All classes of concrete, which may be used, shall be listed on the Field QC Plan.

5.2.3 Process control sampling, testing, and inspection should be an integral part of the contractor's quality control system. In addition to the above requirements, the Contractor's QC Plan should document the process control requirements shown in Table 1 of Attachment 1. The process control activities shown in Table 1 are considered to be normal activities necessary to control the production and placement of a given product or material at an acceptable quality level. To facilitate the Division's activities, the Contractor, as per ML-25, shall retain all completed gradation samples until further disposition is designated by the Division.

5.2.4 All concrete producers shall provide an e-ticket that meets the requirements of Section 109.20.1 of the Specifications.

~~5.2.4~~5.2.5 All sampling and testing shall be in accordance with the methods and procedures required by the Specifications. Measuring and testing equipment shall be standard and properly calibrated as per the specified test procedures. If alternative sampling methods, procedures, and inspection equipment are to be used, they shall be detailed in the QC Plan. Any QC testing that is not performed in accordance with the methods and procedures required by the Specifications shall be considered an invalid test, and the applicable penalty for the cost associated with that test, in accordance with MP 109.00.20, will be assessed to the contractor, along with the applicable price adjustment in Section 105.3. The test specimen(s) represented by an invalid test shall be considered as not meeting Specifications and documented accordingly. The Division may, however, use the results of an invalid test to determine if material may be accepted and allowed to remain in place and if payment may be made for the material represented by the invalid test.

~~5.2.4.1~~5.2.5.1 Any individual who samples or tests plastic concrete for quality control purposes shall be certified as a WVDOH PCC Inspector.

~~5.2.4.2~~5.2.5.2 Any Laboratory which tests the hardened concrete cylinders for the Contractor, for quality control purposes, shall be listed in the Contractor’s QC Plan for field operations. This Laboratory shall provide evidence that it meets the applicable requirements in

ASTM C1077, pertaining to testing hardened concrete cylinders, for a concrete testing laboratory, including curing facilities, testing equipment, technician proficiency, participation in the Cement and Concrete Reference Laboratory (CCRL) Concrete Proficiency Sample Program (PSP), Quality Management System documentation, and recordkeeping. The only test required for these laboratories, in the CCRL Concrete PSP, is ASTM C39 (AASHTO T22), but it is recommended that the laboratory perform all the field test portions of these Proficiency Samples and maintain the results of these tests, in order to evaluate any root cause issues pertaining to compressive strength. Each Laboratory shall be inspected and evaluated initially, and at least once every regular inspection tour cycle (approximately 30 months) by the CCRL. The ASTM standards pertaining to testing concrete cylinders, with which the subject laboratory must comply, include ASTM C39 (AASHTO T22), ASTM C617 (AASHTO T231) or ASTM C1231, and ASTM C511 (AASHTO M201). The Personnel Qualification requirements in Section 6 of ASTM C1077 regarding PE direction, Laboratory Supervisors, and concrete laboratory personnel testing certifications also apply, except that a Laboratory Supervisor with at least five years' experience in construction materials testing shall be a permissible substitution for the licensed professional engineer. Subsequent documentation shall be provided to the Division showing that the subject Laboratory and personnel meet the applicable requirements of ASTM C1077, pertaining to testing concrete cylinders, for a concrete laboratory. In addition any laboratory conducting concrete surface resistivity testing must be evaluated by CCRL for AASHTO T358.Any Laboratory which desires to test Contractor hardened concrete QC specimens on WVDOH projects shall submit the evidence/documentation, required in Section 4.2.4.2, confirming compliance with ASTM C1077, with regards to testing concrete cylinders, to MCS&T Division at the following e-mail address: DOHMCSnTconcretelab@wv.gov. MCS&T Division will review this submittal. In this submittal, the subject Laboratory shall also explain how all deficiencies noted in the CCRL Laboratory Inspection Report have been addressed. All deficiencies noted in the CCRL Laboratory Inspection Report shall be resolved to the satisfaction of the Division within 90 days from the date of the CCRL Laboratory Inspection Report. Once MCS&T Division determines that the subject Laboratory is in compliance with the applicable requirements of ASTM C1077, and all deficiencies have been adequately resolved, that Laboratory will be placed on the Division's Approved List of Concrete Cylinder Testing Labs. All laboratories which test contractor hardened concrete QC specimens on WVDOH projects must be listed on the Division's Approved List of Concrete Cylinder Testing Labs. Laboratories that are certified to run AASHTO T358 will be indicated by an asterisk associated to the applicable footnote on the APL. A listing of these laboratories is available on the WVDOH MCS&T Webpage[1]. All Division Approved Laboratories shall provide the Division with the CCRL Lab Number for their laboratory and agree to allow DOH, CCRL, and AASHTO re:source to freely share information about assessment reports, proficiency samples, corrective actions

[1] https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

, quality management system, and personnel competency and certification records.

~~5.2.5~~5.2.6 When calculating the compressive strength of concrete cylinders in accordance with AASHTO T22, the following procedure shall be used:

$$CS = \frac{ML}{0.25 \times \pi \times D^2}$$

Where:

CS = Compressive Strength of the specimen
ML = Maximum load carried by the specimen during the test
π = Mathematical constant PI
D = Diameter of the cylinder being tested (in accordance with AASHTO T 22)

Note: The calculation for CS shall be performed in one continuous step (without any rounding), either by the testing machine, or by calculating device, and only the final value (CS) is permitted to be rounded (to the accuracy specified in AASHTO T 22). The value for π shall be the manufacturer's pre-programmed value in a calculating device or the testing machine.

~~5.2.6~~5.2.7 Miscellaneous Concrete:

The contractor is not required to perform the process control testing required by Part C of Table 1 of the Attachment on miscellaneous concrete (as defined in section 4.2.6.1), provided that the concrete in question is being supplied by an A1 or A2 plant (as defined in MP 601.05.50, formerly numbered as IM-18), and provided that the requirements of section 4.2.6.2 are met for each project on which the reduced testing of miscellaneous concrete is applied.

~~5.2.6.1~~5.2.7.1 Miscellaneous concrete shall be defined as relatively small quantities, not exceeding 25 yd^3 per day, incorporated into items that will not adversely affect the traffic carrying capacity of a completed facility. Such items would not include any concrete intended for major structures, permanent mainline or ramp pavements, or any other structurally critical items part of, or adjacent to the roadway.

The following items are suggested as a guideline in establishing items that may be categorized as miscellaneous concrete:

Note: Concrete testing for certain items below is waived, in some cases, by the referenced section of the specifications.

1 Sidewalks
2. Curb and Gutter
3. Slope walls for under drain outlet pipes

4. Temporary pavements and pipe crossings
5. Building floors
6. Slope paving and headers
7. Paved ditch or gutter
8. Small (less than 36" diameter) culvert headwalls
9. Catch basins, manhole bases, inlets, and junction boxes (and adjustments of such items) not located in the roadway
10. Foundations for breakaway supports
11. Utility trench fills
12. Cast-in-place survey markers

~~5.2.6.2~~5.2.7.2 One sample per two days of production (for the same project) shall be tested (beginning on the first day of production) for compressive strength, air content, and consistency. On a minimum of ten percent of the samples outlined above, the Division will observe the batching operation at the plant (that is producing the concrete to be sampled) and check the operational control.

~~5.2.6.3~~5.2.7.3 When placing miscellaneous concrete and no testing is required, an Approved Source Sample will be generated in SiteManager. The C###### representing the test from the previous day of production shall be entered in the intended use field. Miscellaneous Concrete will be entered in remarks. Miscellaneous Concrete will be written on all batch tickets for which testing is not required, per the miscellaneous concrete provisions of this MP, prior to scanning and placing in ProjectWise.

~~5.2.7~~5.2.8 Documentation:

The Contractor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and number of observations made, the number and type of deficiencies found, the quantities approved and rejected, and the nature of corrective action taken as appropriate. The Contractor's documentation procedures will be subject to the review and approval of the Division prior to the start of the work and to compliance checks during the progress of the work.

~~5.2.8~~5.2.9 Charts and Forms:

All conforming and non-conforming inspections and test results shall be kept complete and shall be available at all times to the Division during the performance work. Forms shall be on a computer-acceptable medium where required. Batch ticket data shall be documented in accordance with the applicable section of MP 601.03.50, with a copy to be submitted to the District Materials Section within 72 hours of the concrete placement. Gradation data shall be documented on WVDOH form T300 using the material codes listed in the online computer systems user guide. The original gradation data shall be submitted to the District Materials Section within 72 hours of obtaining the gradation sample. Test data for (PCC) shall be charted in accordance with the applicable requirements of MP 601.03.52. Gradation test data shall be plotted in

accordance with the applicable requirements of MP 300.00.51. The Contractor may use other types of control charts as deemed appropriate by the Division. It is normally expected that testing and charting will be completed within 48 hours after sampling. The Contractor shall also ensure that all Material Suppliers prepare and submit the HL-441 form (weekly supplier report) in a timely manner

~~5.2.8.1~~5.2.9.1 All charts and records documenting the Contractor's quality control inspections and tests shall become property of the Division upon completion of the work.

~~5.2.9~~5.2.10 Batch Tickets

Each batch of Structural Concrete, including miscellaneous concrete (as defined in section 4.2.6.1), delivered at the project shall be accompanied by one batch ticket with all of the items of information listed in Section 4.2.9.1 pre-populated on the ticket. In the case of (PCC) Pavement, each batch of concrete delivered at the project on which a test in accordance with Table 1 of Attachment 1 is to be performed shall be accompanied by a batch ticket. This batch ticket shall have all of the items listed in section 4.2.9.1 pre-populated on the ticket unless non-agitator trucks or truck agitators are used. In this case, the batch ticket shall have all of the items listed in section 4.2.9.2 pre-populated on the ticket.

~~5.2.9.1~~5.2.10.1 All batch tickets for Structural Concrete and (PCC) Pavement Concrete transported by truck mixers shall have all the following items pre-populated on the ticket:

1. Producer/Supplier Code
2. Producer/Supplier Name
3. Producer/Supplier Location
4. Mix Design Laboratory Reference Number
5. Date
6. Sequence Number
7. Volume (yd^3/m^3)
8. Time Batched
9. Contract Identification Number (CID #)
10. Federal Project Number (If applicable)
11. State Project Number
12. Material Code/Name
13. Water Allowed (gal/L)
14. Water at Plant (gal/L)
15. Weight of Ice at Plant (lb/kg)
16. Weight of Cement (lb/kg)
17. Supplementary Cementitious Material(s) (SCM) (lb/kg)
18. Weight of Fine Aggregate (lb/kg)
19. Weight of Coarse Aggregate (lb/kg)
20. *Admixture Name(s) and Dose (oz/L)

21. Cylinder I.D.
22. Initial Counter
23. Target Consistency (in/mm)
24. Target Air (%)
25. License Number of Haul Unit.

* If admixtures are added at the jobsite, these shall be entered by the project.

The following information shall be documented on the ticket by the project:

1. Contract Item Number
2. Contract Line Number
3. Time Unloaded
4. Water at Job (gal/L)
5. Concrete Temperature (°F/°C)
6. Final Counter
7. Actual Consistency (in/mm)
8. Actual Air (%)

~~5.2.9.2~~5.2.10.2 All batch tickets for concrete delivered by means of non-agitator trucks or truck agitators shall have all of the following items pre-populated on the ticket:

1. Producer/Supplier Name
2. Mix Design Laboratory Reference Number
3. Date
4. Sequence Number
5. Volume (yd^3)
6. Time Batched
~~7.~~ Contract Identification Number (CID #)
8. Federal Project Number (If applicable)
9. State Project Number
10. Material Code/Name
11. Water Allowed (gal/L)
12. Water at Plant (gal/L)
13. Weight of Ice at Plant (lb/kg)
14. Weight of Cement (lb/kg)
15. Weight of SCM (lb/kg)
16. Weight of Fine Aggregate (lb/kg)
17. Weight of Coarse Aggregate (lb/kg)
18. *Admixture Name(s) and Weight(s) (oz/L)
19. Target Consistency (in/mm)
20. Target Air (%)
21. License Number of Haul Unit.

* If admixtures are added at the jobsite, these shall be entered by the project

The following information shall be documented on the ticket by the project:

1. Item Number
2. Line Number
3. Time Unloaded
4. Temperature (°F/°C)
5. Actual Consistency (in/mm)
6. Actual Air (%)

~~5.2.9.3~~5.2.10.3 The batch ticket in the case of either type of concrete shall be a batch ticket prepared by the plant. This ticket must be computer generated with blank fields provided in which all of the required data shall be recorded. The data items listed above that are completed in the field (such as Time Unloaded, Actual Consistency, etc.) must have a field on the batch ticket for completion. Volume is to be reported to the nearest 0.01 yd^3. Consistencies are to be reported to the nearest 0.25 inch. Target and Actual Air are to be reported to the nearest 0.1% (to the nearest 0.25% if the volumetric method is used).

~~5.2.9.4~~5.2.10.4 As per the requirements of Section 109.20.1 of the Specifications, an e-ticket shall be provided to meet these requirements.

~~5.2.10~~5.2.11 Corrective Action:

The Contractor shall take prompt action to correct conditions, which have resulted, or could result, in the submission to the Division of materials and products, which do not conform to the requirements of the Contract documents.

~~5.2.11~~5.2.12 Non-Conforming Materials:

4.2.11.1 The Contractor shall establish and maintain an effective and positive system for controlling non-conforming material, including procedures for its identification, isolation and disposition. Reclaiming or reworking of non-conforming materials shall be in accordance with procedures acceptable to the Division. All non- conforming materials and products shall be positively identified to prevent use, shipment, and intermingling with conforming materials and products. Holding areas, mutually agreeable to the Division and the Contractor shall be provided by the Contractor.

~~5.2.12~~5.2.13 Types of QC Plans:

~~5.2.12.1~~5.2.13.1 QC Plans which are intended for use on more than one project shall be defined as Master QC Plans. Section 4.3 outlines the procedures for Master QC Plan submittal and approval.

~~5.2.12.2~~5.2.13.2 QC Plans which are intended for use on a single project shall be defined as Project Specific QC Plans. Project Specific QC Plans shall contain a cover letter which includes the following: project description, CID#, Federal and/or State Project Number.

~~5.2.12.3~~5.2.13.3 A Contractor may submit a Master QC Plan for Plant and/or Field operations instead of a Project Specific QC Plan.

~~5.2.12.4~~5.2.13.4 Once any QC Plan is approved for a project, the key date shall be entered in SiteManager by the appropriate District Materials personnel. The first date entered shall be the date the Project QC Plan letter is received. The second date shall be when the District approves the QC Plan for use on the project.

5.3 Master QC Plan

5.3.1 The intent of Master QC Plans is to facilitate the approval process in a more uniform manner. Master QC Plans can be submitted to the Division by the Contractor when their workload in a given District is routinely repetitive for the year.

5.3.2 The Contractor shall submit a Master Field QC Plan yearly to each District in which they have work (see Attachment 2). If the Contractor does not have work in a given District for the year, then a Master Field QC Plan does not need to be submitted to that District.

5.3.3 The Producer/Supplier shall submit a Master Plant QC Plan at the beginning of each year to the District in which their plant is located (see Attachment 3).

5.3.4 The District will review the submitted Master QC Plans to see if they meet the applicable requirements of Sections 4.2 thru 4.2.11.1 and assign a Laboratory Reference Number to each QC Plan upon approval, for future referencing. The District will acknowledge approval of each Master QC Plan to the Contractor and/or Producer/Supplier by letter (see Attachment 4), which will include the Laboratory Reference Number and a copy of the approved Master QC Plan. This will then be scanned and placed in ProjectWise under the appropriate District's Org for that Contractor and/or Producer/Supplier.

5.3.5 Once a project has been awarded, if a contractor elects to use the approved Master Plant and Master Field QC Plans on that project, the Contractor shall submit a letter requesting to use the Master QC Plans for that project. This letter must be on the Contractor's letterhead, be addressed to the District Engineer/Manager or their designee, and contain the following information: project number, CID#, project description, type of Quality Control Plan and the laboratory reference number for the Master QC Plan. See Attachment 5 for an example of a plant letter and Attachment 6 for an example of a field letter.

5.3.5.1 The District shall review the referenced Master QC Plans to ensure they cover all items in that project. If the referenced Master QC Plan is found to be insufficient for some items on that project, the District shall request the Contractor to submit additional information for quality control of those items as an addendum on a project specific basis. When the District is satisfied with the QC Plan for that project, a letter shall be sent to the Contractor acknowledging approval (see Attachment 7), with the following attached: the contractor's project QC Plan request letter and the Master QC Plan approval letter. This shall then be placed in the project's incoming-mail mailbox in ProjectWise.

5.3.5.2 A Master QC Plan that has been approved for project use shall be good for the duration of that project.

5.3.5.3 For the use of Division Personnel, the District approval letter for this project must state the ProjectWise link to the referenced Master QC Plan for that Contractor (for example: WVDOT ORGS > District Organization #> Materials > Year > Master QC Plans).

5.3.6 The Master Field and Plant QC Plans shall be valid for the duration of one calendar year beginning on January 1st and ending on December 31st. The Master Plant QC Plan will also cover maintenance purchase order concrete for the year.

6. ACCEPTANCE SAMPLING AND TESTING

6.1 Acceptance sampling and testing is the responsibility of the Division. Quality control tests by the Contractor may be used for acceptance.

6.2 The Division shall sample and test for applicable items completely independent of the contractor at a frequency equal to approximately ten (10) percent of the frequency for testing given in the approved QC Plan. Witnessing the contractor's sampling and testing activities may also be a part of the acceptance procedure, but only to the extent that such tests are considered "in addition to" the ten (10) percent independent tests.

6.3 Results from independent tests conducted by the Division for gradation, entrained air, consistency, and strength will be plotted on the Contractor's quality control charts with a red circle but are not to be included in the moving average. When the Contractor's tests are witnessed, the results are circled on the control chart in red and are to be included in the moving average calculations.

6.4 Results from both independent tests and witnessed tests will be evaluated in accordance with MP 700.00.54. If a dissimilarity is detected, an investigation shall be immediately initiated to determine the cause of the dissimilarity.

7. ABSENT TESTING OF MATERIAL

7.1 If the Contractor fails to perform testing of the material in accordance with the Contractor's Division Approved Quality Control Plan, payment for the portion of the item represented by the absent test shall be withheld, pending the Engineer's decision whether or not to allow the material to remain in place. Testing includes both performing the test and submitting the results as per MP 109.00.21.

7.1.1 If the Engineer allows the material to remain in place, the Division shall not pay for the material represented by the absent test. However, the Division shall pay for the cost of the placement of the material, including labor and equipment. The invoice or material supplier cost (if applicable), determined at the time of shipment, shall be used to calculate the cost of material when evaluating the total cost of labor and equipment.

~~8. TEST DATA ENTRY~~

~~8.1 The Contractor's Quality Control Plan shall clearly state the name(s) of the individual(s) entering test data as outlined in MP 109.00.21.~~

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Director
Materials Control, Soils and Testing Division

MP 601.03.50 Steward – Cement and Concrete Section
MAM:T
Attachments

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES FOR PRECAST CONCRETE PRODUCTS

1. PURPOSE

1.1. To set forth procedures for the inspection and acceptance of precast concrete products, including inlets, manholes, box culverts, 3-sided bridge units, retaining wall panels, headwalls, wingwalls, lagging, junction boxes, and any other precast products, and the approval of the plants at which they are fabricated.

2. SCOPE

2.1. This procedure will apply to all precast concrete products supplied for use on West Virginia Division of Highways projects and to all precast concrete product fabricators that supply material for use on West Virginia Division of Highways projects.

2.2. For prestressed concrete members refer to MP 603.10.40 “Inspection and Acceptance Procedure for Prestressed Concrete Bridge Beams.”

3. FABRICATOR APPROVAL

3.1. All precast concrete product fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin to initiate the approval process.

3.2. In order for a Fabricator to be approved and listed on the WVDOH Approved List of Precast Concrete Fabricators, they must be NPCA (National Precast Concrete Association) certified, QCAST (American Concrete Pipe Association) Certified, or have an equivalent type of certification.

3.2.1. All fabricators must set up their invoicing as a E-tickets that meet the requirements of Section 109.20.1 of the Standard Specification prior to approval.

3.3. The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the fabrication facility, the Quality Control (QC) lab, and meet with QC and other key personnel from the Fabricator. Component materials which will be used in the fabrication of precast items shall be sampled for testing. Batch scales shall be calibrated in accordance with MP 700.00.03 at a minimum once per year.

3.3.1. Sampling and testing of component materials shall be done in accordance with MP 603.02.10. Copies of recent component delivery tickets should be presented on the day of sampling. All component materials must be approved prior to the start of fabrication.

3.3.1.1. Any Fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the Approved Fabricator list. After removal from the approved list, before a Fabricator can again produce for the WVDOH, they must repeat the approval process. Sampling of component materials will not continue when the plant is not listed on the Approved Fabricator list.

3.3.2. Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedure (MP's), Standard Details, and QC/QA Inspections shall be addressed at this meeting.

3.3.3. The Fabricator must submit the Quality Control Manual/Plan for review at this meeting.

3.4. All Concrete Mix Designs which will be used on products fabricated for the WVDOH must be submitted for review & approval, prior to the start of fabrication. Any design mix with an aggregate(s) that has a reactivity classes R1, R2, or R3, as shown as in Approved Aggregates Source List, shall be developed in accordance with WVDOH specifications, subsection 601.3.1.1. If an aggregate Source is not listed on the Approved Aggregates Source List, the Division will test the fine and coarse aggregate from the Source, in accordance with AASHTO T 303, to determine the reactivity class of the aggregate prior to its use on any WVDOH project. The Division will inform the Fabricator of the reactivity class of aggregates that they are proposing to use. If a cement Source and/or a SCM Source are not listed on the Approved Source List, the Division will test cement and/or SCM from that Source prior to its use on any WVDOH project.

3.5. The Fabrication Plant QC Personnel, as a minimum, shall be a certified ACI Grade I Concrete Field Testing Technician and/or a WVDOH PCC Inspector. In addition, if Self-Consolidating Concrete (SCC) is used, Fabrication Plant QC Personnel shall be a certified ACI SCC Testing Technician.

3.6. All Precast Concrete items shall be accepted by Direct or Master Coverage except when a Fabricator is certified as an Approved Source of concrete lagging as defined in Section 7.

4. FABRICATION & INSPECTION OF PRODUCTS FOR DIRECT & MASTER COVERAGE

4.1. Prior to beginning fabrication of any precast concrete products, the Fabricator shall provide written or email notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin.

4.1.1. Depending upon the precast items being fabricated, MCS&T Division may choose to monitor fabrication. Fabrication of structurally significant products such as box

culverts and 3-sided bridge units shall be monitored. Other items may be monitored at the discretion of MCS&T.

4.1.2. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.

4.2. Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to start of any work by the Fabricator.

4.3. Concrete cylinders shall be made for compressive strength testing with 6-inch by 12-inch or 4-inch by 8-inch molds. The cylinders are to be cured in the same area as the products for which they represent (Field Cured as outlined in AASHTO R100) until tested to create a curing environment similar to the product that they represent. A compressive strength test shall consist of the average result of a set of cylinders, which is at least two cylinders. Form removal for wet cast concrete is not permitted until concrete has reached 50% of the design strength, unless otherwise specified. If forms are stripped from box culverts at 50% of the design strength, another curing method from section 601.12, or ASTM C1577 must be used until 70% of the design strength is obtained. Form removal limitations do not apply to elements fabricated with dry cast concrete. Dry cast concrete is defined as concrete with a slump less than 1-inch.

4.3.1. For both conventional wet cast concrete and SCC mixes, a minimum of one set of compressive strength cylinders shall be fabricated from every 7 yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. Both the form removal strength and the 28-day strength must be confirmed by a set of cylinders. Cylinders shall be the same size as those used in the initial approved mix design. For conventional concrete, slump, temperature, and air content tests shall be conducted on the first batch of concrete each day and every time that cylinders are fabricated. For SCC mixes, spread, temperature, and air content tests shall be conducted on every batch. For all types of concrete, unit weight and yield tests shall be conducted on the first batch of concrete each day and thereafter as deemed necessary by Quality Control and Quality Assurance Personnel.

4.3.2. For dry cast mixes, the 28-day strength shall be confirmed by a set of compressive strength cylinders. Compressive strength testing for form removal is not required for dry cast mixes. A minimum of one set of compressive strength cylinders shall be fabricated for each item fabricated. The cylinders are to be fabricated in the molds on the vibration table in accordance with ASTM C497. For dry cast mixes, slump testing is not required, and concrete temperature testing shall be performed on the first batch of concrete each day and every time that cylinders are fabricated.

4.4. For precast manholes fabricated with wet cast and SCC mixes, absorption tests are to be conducted in accordance with ASTM C642. Tests should be conducted on a weekly basis for each mix design used, at a minimum, unless otherwise specified.

4.5. For precast products fabricated with dry cast mixes, absorption tests are to be conducted in accordance with ASTM C642, and tests should be conducted on a weekly basis for each mix design used. The maximum allowable absorption shall be 9%.

4.6. Unless otherwise specified, for conventional wet cast and SCC mixes, plastic concrete shall have an air content measured at 7.0 ± 2.0%. For dry cast concrete, the air content test requirement is waived.

4.6.1. Prior to the use of Self-Consolidating Concrete in precast items all mix designs must be submitted to MCS&T for approval and meet the requirements of the following table. Test results from trial batches produced by the laboratory which designed it shall be included in the submittal. The compressive strength of the design mix shall be at least 15% above the specified design strength.

Table 4.6.1 - SCC Mix Design Acceptance

Fresh Property	**Mix Design Batch Acceptance Criteria**
Air Content	7.0± 1.5%
Spread (ASTM C1611)	Target ± 1.5 inches 2 seconds $\leq T_{50} \leq$ 7 seconds Visual Stability Index ≤1.0
Passing Ability (ASTM C1621)	J-Ring Value $\leq$ 1 inch
Segregation Resistance (ASTM C1610)	Segregation ≤ 12%
Unit Weight and Yield	±2% of Theoretical

4.6.2. The following table lists the criteria for SCC production.

Table 4.6.2 - SCC Production Acceptance

Fresh Property	**Production Acceptance Criteria**
Air Content	7.0± 2.0%
Spread (ASTM C1611)	Target ± 2 inches 2 seconds $\leq T \leq$ 7 seconds Visual Stability Index ≤1.0
Concrete Temperature	<90°F
Unit Weight and Yield	±2% of Theoretical

4.6.3. SCC should only be given minimal vibration; and shall not be dropped from a distance greater than 4 feet relative to the top of the form.

4.6.4. Precast products fabricated with dry cast concrete shall be limited to a maximum wall thickness of 12 inches when single sided vibration is used and 18 inches when double sided vibration is used.

5. FINAL INSPECTION

5.1. After fabrication is completed and prior to shipment, the precast items will be stored on dunnage. The Fabricator shall provide MCS&T Division with a written or email request for final inspection a minimum of one calendar week prior to the desired date of inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is the key to avoiding any scheduling conflicts regarding final inspection.

5.2. At the final inspection, the fabricator shall provide the inspector with documentation of required data pertinent to the product(s) being produced. Attached to this document is a sample inspection sheet to be used as a guide for presenting this information. This documentation is also available on the MCS&T Division Website[1].

5.2.1. For the final inspection, the Inspector may witness compressive strength tests if required, inspect repairs as needed, and conduct a thorough visual examination of each member. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.

5.2.2. For box culverts, trial fitting of adjacent pieces, prior to shipping, will be required as part of the final inspection process. Each adjacent box culvert will be trial fitted in pairs horizontally or vertically; the gaps between each pair will be measured. Dunnage will be placed on a smooth level surface below the bottom of the culvert to prevent damage.

[1] https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx

The maximum gap between the adjacent pieces shall not exceed ½ inch (13 mm), unless otherwise stated in the construction plans.

6. ACCEPTANCE & REJECTION

6.1. Upon completion of final inspection, if a precast product meets all specification requirements and does not contain any defects, the Inspector will stamp the precast product as accepted by MCS&T Division and provide a 7-digit Laboratory Reference Number for shipment.

6.1.1. Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an e-ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

6.2. If, however, the precast product does not meet all specification requirements due to damage, defect, or dimensional tolerance, the product must be further evaluated before potential acceptance by the MCS&T Division as described in the following subsections.

6.2.1. Minor defects may be repaired in accordance with the pre-approved repair procedures which should be incorporated within the Fabricator QC Plan. Cracks 4 mils or less shall be sealed by silane; and cracks between 4 mils and 16 mils shall be repaired by epoxy injection in accordance with Section 603.10.2. Any crack exceeding 16 mils shall be considered a major defect and the item shall be rejected by MCS&T. If repairs have been approved, and appear satisfactory and all other specifications are met, the Inspector shall stamp the product as approved for shipment and issue a 7-digit Laboratory Reference Number for acceptance.

6.2.2. Major defects shall include: dimensions that exceed tolerances, failure to reach required compressive strength, cracks greater than 16 mils, and any defect that could be considered structural. Lagging dimensions shall be within ± ¼'' from the specified dimension, and all other items must meet relevant tolerances in AASHTO and ASTM Standards. Items with major defects shall be rejected by MCS&T Division, and a 7-digit Laboratory Reference Number will be assigned documenting MCS&T Division's rejection. When items are load bearing, they shall be evaluated by the Designer for structural adequacy and then may be accepted by DMIR, pending concurrence by the District, and or the Engineer of Record. If a product is approved for repair, and if repairs appear satisfactory, the Inspector shall proceed with a final shipping inspection of the piece. Any items found to be not acceptable by the Engineer of Record, Designer, or the District/Division; shall be rejected by the Division.

6.2.3. When an item does not achieve the specified 28-day compressive strength prior to shipment, and if it is accepted by a DMIR, the following formula for the price adjustment shall be used in the DMIR, plus any administrative fee.

f'_c —28 Day Compressive Strength (psi)
$\overline{X}$ — Average 28 — day Compressive Strength (psi)
IC - The invoiced cost of the precast item only.

Formula 1 (Constructed by Contractor)

Price Reduction = $\left[\frac{f'_c - \mathbf{X}}{.5\, f'_c}\right] x$ 40% Unit Bid Price

Formula 2 (Constructed by Division)

Price Reduction = $\left[\frac{f'_c - \mathrm{X}}{.5\, f'_c}\right] x$ IC

7. PROCEDURE FOR APPROVED SOURCE OF PRECAST CONCRETE LAGGING

7.1. Precast concrete Fabricators may be classified as an Approved Source of precast concrete lagging if they have met the requirements of Section 3 and are producing lagging which is made in accordance with the relevant WVDOH Standard Details. Once classified as an Approved Source of precast concrete lagging, an Approved Source Lab Number will be assigned to the Fabricator for material tracking.

7.2. MCS&T Division may perform regular quality assurance inspections prior to shipment and/or, monitor fabrication of lagging from a Fabricator that is an Approved Source. The Approved Source Lab Number shall be noted on all shipping documents from the fabricator, and material coverage will be requested under the assigned Approved Source Lab Number. All relevant concrete test data, component material information, QC inspection data, and shipping information shall be kept on file at the Fabricator for the last three years of fabrication and shall be available upon request by the Division. Failure to produce requested documentation may result in revocation of the Fabricator's Approved Source certification status.

7.3. Approved Sources will be evaluated by the Division by random audits. Audits will be conducted on the material that is available to the Inspector at the time of the audit. All documentation and records for the pieces must be made available to the Inspector on the day of the audit and must be complete, current, and accurate. Failure to produce records shall be a cause for decertification.

7.3.1. All shipping documentation, concrete test data, and component material certifications shall be made available to the Inspector for review. These documents shall include all documents from material that has been shipped to state projects since the last audit. If data indicates that any material did not conform to this MP, the applicable Specifications, or Standard Detail; and was used in a state project, then the Fabricator will be de-certified as an Approved Source of precast concrete lagging.

7.3.2. In addition to documentation, the audit will consist of fabrication monitoring, test observance, and a visual inspection of material that is stocked for shipping on the day of the audit.

7.3.2.1. Each material test monitored during the audit must be performed in accordance with the applicable Standards, and Specifications. Visual inspection of stocked material will include quality checks of surface finish for cracks, spalls, and other surface blemishes after all repairs have been performed and dimensional checks. The material shall be properly stored to avoid handling damage and be accessible to the Inspector. Audits shall be graded on a point system deducted from 100 and weighted based on the Non-Conformance Points found per Table 7.3. A minimum score of 75 shall be considered passing.

TABLE 7.3

Audit Category	**Non-Conformance Points**
Material Test Data Review	10 (per error)
Component Material Certification Review	10 (per error)
Shipping Documentation	10 (per error)
Stocked Material Visual Inspection	15 (per defect)
Dimension Check	20 (per error)
Test Performance Check	15 (per Test)

7.4. When a Fabricator, which is an Approved Source, fails an audit, the Fabricator must submit a written corrective action plan to bring their QC program back into compliance with this MP and corresponding Specifications during a probationary period of one month during which time the fabricator must prove they have fulfilled the corrective actions they submitted before supplying the material again. If the Fabricator fails to bring their material back into compliance within the probationary period, the Approved Source status will be revoked for a minimum of one year from the date of the end of the probationary period, or until the Fabricator has corrected the nonconformances listed during the failed audit. Two failing audits in a year shall result in revocation of the Fabricator's Approved Source status for one year from the date of the last failed audit. Any evidence of document falsification shall result in immediate loss of Approved Source status, and removal from the Approved List of Concrete Fabricators for a minimum 2 years. Depending on the severity and the legality of the falsified documents the removal may be permanent.

7.5. Non-Conforming material received by WVDOH projects and reported to MCS&T shall result in an immediate failing audit and will require the Fabricator to submit corrective actions. If the Fabricator fails the subsequent audit, it will result in the loss of their Approved Source status.

Michael Mance, P.E.
Interim Director

MP 604.02.40 Steward – Cement and Concrete Section
MM:T
ATTACHMENT

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION

SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

NPCA (National Precast Concrete Association) Certification _____

CONCRETE COMPONENTS

Mix Design Lab # (if applicable): _____

Cement Source: _____ **Fly Ash Source:** _____

Coarse Aggregate Source 1: _____ **Coarse Aggregate Source 2:** _____

Cement Type: _____ **Approved/Tested:** _____

Fly Ash Type: _____ **Approved/Tested:** _____

Coarse Aggregate 1: _____ **Approved/Tested:** _____

Coarse Aggregate 2: _____ **Approved/Tested:** _____

Fine Aggregate 1: _____ **Approved/Tested:** _____

Fine Aggregate 2: _____ **Approved/Tested:** _____

Batch Water Source: _____ **Approved/Tested:** _____

Admixtures: _____

STEEL COMPONENTS

Reinforcement: Supplier(s): _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Inserts: Supplier(s): _____

Description: _____ **Lab Number:** _____

_____

_____

SHIPLOOSE MATERIAL

Grates: Fabricator: _____

Mill Certs.: _____ **Galvanize Cert.:** _____ **Lab Number:** _____

Mastic: Fabricator: _____

Inspected at: _____ **Lab Number:** _____

SHOP DRAWING REVIEW

Approval Date: _____ **Approved By:** _____

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION
SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

POST POUR WORK

Repairs: **Approved Repair Procedures: ____**

Approved by: _____ **Approval Date: _____**

Repair Witnessed: _____

Comments: _____

Sample Form Inspection (Pre-Placement of Concrete)

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Depth of form (ft-inch)				
Inside Width of form (inch)				
Outside Width of form (inch)				
Inside Length of form (inch)				
Outside Length of form (inch)				
Wall Thickness (inch)				
Forms Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product Type(s)		**Form Properly sealed at joints & edges (√)**	
Framework Constructed of metal on concrete foundation (√)		**Form Clean & Free of debris (√)**	
Form dimensionally correct (√)		**Release Agent applied (√)**	
Other Information:			

Reinforcing Steel	
Reinforcing Steel (Condition)	
Fill in steel information (if applicable)	
Size & Grade	
Location & Lapping Length (√)	
Spacing and Clearances (√)	
Chairs, Spacers properly used	

Sample Concrete Placement & Curing

Quality Control Concrete Testing			
Concrete Truck Arrival Time		**Concrete Truck Departure Time**	
Concrete Temp		**Ambient Temp, Weather Conditions**	
Slump/Spread (inch)		**Air Content (%)**	
QC Tests performed per Specifications & Passing		**Number & diameter (inch) of Cylinders**	
Comments:			

Placement of Concrete			
Lift	**Start Time**	**Completion Time**	**Vibrated (External/Internal/Both)**
1st			
2nd			
3rd			
4th			
Placement of Concrete Completion Time			
Comments:			

Curing/Finishing of Concrete	
Top Surface Finished Per Specification	
Lifting loops/inserts accessible	
Product Curing Location (Inside/Outside)	
Product Covered & Heat Applied (Time Start & Time Finished)	
Heat Sensors Installed (√)	
Compressive Strength Cylinders Stored with Product under Curing/Normal Environment (√)	
Compressive Strength Test Conducted when curing was discontinued (√)	
Comments:	

Sample Concrete Post Pour Product Inspection

Product	
Visual Inspection for Damage (√)	
Notes (Size & Location of cracks, spalls, honeycomb, etc.)	
Products in Need of Repair (√)	
Repair Method Approved (√)	
Comments:	

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Inside Width of product (inch)				
Outside Width of product (inch)				
Inside Length of product (inch)				
Outside Length of product (inch)				
Wall Thickness (inch)				
Product Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product	
Dimensional Tolerances Met? (yes or no)	
Heights (yes or no)	
Widths (yes or no)	
Depths (yes or no)	
Wall Thickness(es) (yes or no)	
Inserts, sleeves, lifting points, etc. (yes or no)	
All Concrete Finishes per specification (yes or no)	
Product properly transported (yes or no)	

Product stored on proper dunnage (yes or no)	
Design Shipping Strength met (yes or no)	
Repairs Satisfactory (yes or no)	
Product Stamped for Final Inspection (yes or no)	
Comments:	

Sample Inspection Sheet

Inspection Date_____ QC Personnel_____ QC Signature_____

Fabricator_____ Location_____

Project Name_____ WV State Project #_____ Federal Project #_____

Authorization # _____ Inspection done by_____

Steel Reinforcement

Reinforcement Supplier _____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Product Description	Quantity	Date Cast	Slump/ Spread (inch)	Air Content (%)	Design Strength (psi)	Cylinder Breaks (psi)	Date Of Break	Absorption (%)
Type "D" inlet								
Type "G" inlet								
36-inch Manhole (base, riser, top)								
48-inch Manhole (base, riser, top)								
10'0"x 12'0" Box Culvert								NA
Lagging 8"x24"x54"								NA
Type A Reinforced Panel								NA
6'0" Coping								NA
24-inch Wing wall								

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

QUALITY ASSURANCE OF REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE

1. PURPOSE

1.1 To set forth the procedures which govern the Quality Assurance of Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

1.2 To set forth manufacturers' Quality Control requirements.

1.3 To set forth acceptance inspection procedures.

1.4 To set forth documentation and shipping procedures.

2. SCOPE

2.1 This procedure will apply to all manufacturers of Reinforced Concrete Culvert, storm pipe, and sewer pipe for use in West Virginia projects.

2.2 This procedure will establish the basis for acceptance of reinforced concrete pipe.

3. APPLICABLE SPECIFICATIONS

3.1 All standard types of reinforced concrete pipe are to be manufactured and tested in accordance with Section 714.2 of the WVDOH Specifications for Roads and Bridges.

3.2 Each LOT of reinforced concrete pipe having a wall thickness of 4.5 inches (110 mm) or less, which is manufactured in accordance with the applicable specifications is treated in the following manner to determine acceptability.

3.2.1 The three-edge bearing test (AASHTO T 280) shall be used to determine the force required to produce the 0.01-inch (0.25 mm) crack and the minimum specified ultimate load.

3.2.1.1 50% of the LOTs of Class III and Class IV concrete pipe 24 inches (610 mm) in diameter and less, and conforming to WVDOT Specifications, will be accepted based on the Fabricator's certification, provided they are QCast Certified by the American Concrete Pipe Association (ACPA). Testing of Class III and Class IV concrete pipe greater than 24 inches (610 mm) in diameter shall be witnessed by the Division.

3.2.1.2 50% of the LOTs of Class V Concrete Pipe with a diameter less than 24 inches (610 mm), and conforming to WVDOT Specifications, will be accepted based on the Fabricator's certification, provided they are QCast Certified by the ACPA. Testing of Class V Concrete Pipe, with a diameter greater than or equal to 24 inches (610 mm), shall be witnessed by the Division.

3.2.2 The absorption test (AASHTO T 280) shall be conducted on samples selected from the wall of the pipe.

3.2.3 A plant inspection of the finished product is conducted to determine dimensional conformance and freedom from defects.

3.2.3.1 For LOTs of concrete pipe accepted on the Fabricator's certification, the inspection, including the three-edge-bearing test, will be performed and recorded by the Fabricator's Quality Control person. These LOTs shall be as defined in Table 1, but the sizes shall be based on the criteria in the QCast Certification program.

3.3 Each LOT of reinforced concrete pipe fabricated with dry cast concrete having a wall thickness greater than 4.5 inches (110 mm), which is manufactured in accordance with the applicable specifications, is treated in the following manner to determine acceptability.

3.3.1 The compressive strength of the concrete will be determined by testing cores taken from the wall of the pipe. The manufacturer may choose to test this pipe as specified in Section 3.2.1, in which event the requirements for the 0.01-inch (0.25 mm) crack and the minimum specified ultimate load shall be met. This choice shall not be applied to a LOT (refer to Table 1) of pipe, which has been previously cored and found unacceptable.

3.3.2 The absorption test (AASHTO T 280) shall be conducted on samples selected from the wall of the pipe.

3.3.3 A plant inspection of the finished product will be conducted by the Division to determine dimensional conformance, and freedom from defects.

3.4 Each LOT of reinforced concrete pipe fabricated with wet cast concrete can be accepted on the basis of compressive strength from cylinder breaks (cylinders made per AASHTO R 100 and tested per AASHTO T 22) reaching the required 28-day compressive strength or by the three-edge bearing test (AASHTO T 280) as detailed in Section 3.2.1.

3.4.1 The absorption test (AASHTO T 280) for wet cast pipe shall be conducted on samples cored from the wall of the pipe or by making cylinders (4-inch x 8-inch (100 mm x 200 mm) minimum in accordance with AASHTO R 100).

3.5 Flared end sections will be accepted by either the inspection method or Fabricator certification method, with the same size criteria as outlined in Section 3.2.

3.5.1 Acceptance by the inspection method of precast concrete flared end sections is to be based on verification of compressive strength of concrete as determined from cylinders or cores. Flared end sections must also meet the dimensional requirements listed on the standard detail and on appearance. The testing frequency for compressive strength cores and steel verification coring is 1 out of every 40 pieces, but cylinders shall be fabricated and tested for each piece, if cylinders are used for strength acceptance instead of cores.

3.5.2 In order to accept flared end sections by the Fabricator certification method, the Fabricator must be QCast Certified by the ACPA. The fabricator will take photos/videos showing correct steel placement and cover for one piece in each LOT. All flared end sections must

be fabricated within the dimensions listed on the standard detail and have an acceptable finish free of bug holes, spalls, cracks and other surface defects.

TABLE 1

SAMPLING AND TESTING FREQUENCY FOR REINFORCED CONCRETE PIPE

A production "LOT" is defined as follows:

It is a pipe of the same size and class that is manufactured using the same process and similar materials during consecutive days of production, excluding weekends and holidays. The production LOT shall not exceed the specified value of 1% of the LOT and the minimum number tested per LOT is as follows:

Number of Pipe Sections in the LOT	Number of Pipe Sections to be Tested
0 to 300	1
301 to 800	2
801 to 1500	3
over 1500	3 plus 1 section per each 600 pieces or fraction thereof over 1500 pc.

When the tests indicate that a production LOT is acceptable for WVDOH use, the LOT should be inspected by the Division's representative.

4. QUALITY CONTROL REQUIREMENTS

4.1 Quality Control is the responsibility of the manufacturer and shall include the following:

4.1.1 Ensure all component materials used in the fabrication of the pipe have been sampled, tested, and approved (MP 603.02.10).

4.1.2 Ensure quality workmanship as well as a quality product throughout the production.

4.1.3 To scribe into each piece of pipe the following:

(a) Cast Date
(b) Class and Wall Type
(c) Manufacturer's Trademark

4.1.4 Notify the Division's representative upon the completion of casting of a LOT (Refer to Table 1) of pipe so the Division may select a representative sample and witness the testing.

4.1.5 To conduct the three-edge bearing test or to secure cores to ensure strength requirements are met (Section 3.2 and 3.3).

4.1.6 To conduct the absorption test (AASHTO T 280) on samples selected from the wall of the pipe.

4.1.7 Any LOT of pipe or portion of a LOT of pipe failing to meet the specification requirements will be stored separately from acceptable pipe.

4.1.8 Accurate inventory records containing the information required in Section 6.1.2 will be kept and maintained by the manufacturer.

5. ACCEPTANCE CRITERIA

The Division will:

5.1 Sample and test the component materials to be used in the manufacturer of the reinforced concrete pipe in accordance with MP 603.02.10.

5.2 Select representative samples of the LOT to be tested and:

(a) Witness the three-edge bearing test and/or the coring procedure
(b) Verify dimensional conformance
(c) Verify actual steel placement
(d) Determine the steel area

5.3 Ensure each piece comprising the LOT is scribed as stated in 4.1.3.

5.4 Make a visual inspection of the LOT and designate unacceptable units to be removed or set apart from the approved pipe in the LOT.

6. SHIPPING REQUIREMENTS

6.1 The approved LOT of pipe or portion of the LOT can be shipped by the manufacturer providing the following provisions have been met:

6.1.1 The manufacturer will notify the Division's representative prior to each shipment so that the Division may maintain a current inventory with the manufacturing plant.

6.1.2 The manufacturer will supply one copy of the shipping invoice to Materials Control, Soils and Testing Division and one copy to the Division's representative at the project site. The invoice shall contain the following information.

(a) Cast date of the approved LOT
(b) Master laboratory reference number
(c) Size, class, and wall type
(d) Project number
(e) Number of pieces

7. ACCEPTANCE PRACTICE

~~7.1~~ Ensure the information on the shipping invoice, as required in Section 6.1.2, agrees with the shipment it accompanies. (Number of pieces, class, size, and type, etc.). All ~~precast shall provide an~~Division invoicing must be submitted as an e-ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

~~7.2~~7.1 ~~All precast shall provide an e-ticket that meets the requirements of Section 109.20.1 of the Specifications.~~

~~7.3~~7.2 Check each piece of pipe for the proper identification markings (Section 5.3) and make a visual inspection of each piece to ensure there is no evidence of damage during shipment.

8. COVERAGE REQUEST FROM PROJECT SITE

8.1 Request for coverage shall include the information as referenced on the shipping invoice, Section 6.1.2

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Interim Director
Materials Control, Soils and Testing Division

MP 714.03.30 Steward – Cement and Concrete Section
MAM:T

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES FOR PRESTRESSED CONCRETE BRIDGE MEMBERS

1. PURPOSE

1.1 To set forth procedures for the inspection and acceptance of prestressed concrete bridge members, including beams, pier caps, deck panels, and any other prestressed members, and the approval of the plants at which they are fabricated.

2. SCOPE

2.1 This procedure will apply to all prestressed concrete bridge members supplied for use on West Virginia Division of Highways projects and to all prestressed concrete bridge member fabricators that supply material for use on West Virginia Division of Highways projects.

3. REFERENCED DOCUMENTS

3.1 MP 603.02.10 - Guide for Approval of Component Materials At Precast and Prestressed Concrete Plants

3.2 MP 700.00.30 - Certification of Batch Scales and Calibration of Standard 50 Pound Test Weights

4. INSPECTION

4.1 All prestressed concrete bridge member fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control, Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin.

4.1.1 The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the

fabrication facility and Quality Control (QC) lab, meet with QC and other key personnel from the Fabricator, and sample component materials which will be used in fabrication of precast items.

4.1.1.1 Sampling and testing of component materials shall be done in accordance with MP 603.02.10. All component materials shall be approved prior to the start of fabrication. Batch scales shall be calibrated in accordance with MP 700.00.30 at a minimum once per year.

Commented [DB1]: TYPO

4.1.1.2 Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an e-ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

~~4.1.1.2~~4.1.1.3 Any fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the approved fabricator list and the fabricator will need to be approved again before they can do work. Sampling of component materials will not continue when the plant is removed from the approved fabricator list.

~~4.1.1.3~~4.1.1.4 Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator personnel shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedures, Standard Details, and QC/QA Inspections shall be addressed at this meeting.

~~4.1.1.4~~4.1.1.5 Prior to beginning fabrication of any prestressed concrete bridge members, the Fabricator shall provide written notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.

4.1.2 Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to ~~start~~the start of any work by the Fabricator.

4.1.3 The Inspector, as a minimum, shall be registered with the Precast/Prestressed Concrete Institute (PCI) as a Level II Quality Control Technician.

4.2 The Inspector shall be present at any or all times during fabrication including casting bed layout, steel placement, stressing operations, concrete testing, placing, and

finishing, detensioning operations, camber measurements, testing hardened concrete cylinders, post-pour inspections, and repairs.

4.2.1 Fabricators must provide adequate lighting to illuminate the casting bed to allow for visual inspection of the entire rebar assembly and setup. Fabricators must make forms safely accessible for visual inspection of the setup down in the form for the entire length of the bed.

4.3 After fabrication is completed and prior to shipment, the Fabricator shall provide MCS&T Division with a written request for Final Inspection a minimum of one calendar week prior to the desired date of inspection. This written request may be in the form of an e-mail. Upon receipt of the written request for Final Inspection from the Fabricator, MCS&T Division will notify the Fabricator of the earliest possible date of this inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is key to avoiding any scheduling conflicts regarding Final Inspection.

4.4 At Final Inspection, the Inspector shall witness any compressive strength tests which may be required, inspect repairs as needed, and conduct a thorough visual examination of each member. After the Final Inspection is completed, the Inspector shall provide the Fabricator with a copy of the inspection report. This report shall include the findings of the Final Inspection and any other observations or notes taken by the Inspector during fabrication, including a completed copy of the Inspector's checklist. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.

4.5 The Inspector shall use the checklist and inspection forms which are included as Attachments to this MP. The Fabricator shall also document all required information on the applicable Attachments.

5. ACCEPTANCE

5.1 Upon completion of the inspection of a member, the subject member shall be classified in one of two ways. The first way is that the member does not contain any defects. The second way is that the member contains some type of defect.

5.1.1 If a member meets all specification requirements and does not contain any defects, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2 If a member contains some type of defect, it will be classified into one of the following three categories. These categories are: Category I (Cosmetic Defects), Category II (Dimensional Tolerances), and Category III (Structural Defects).

5.2.1 Category I defects include cosmetic defects such as minor spalls with no exposed reinforcing steel or prestressing strand, bug holes, and minor surface irregularities, etc. Category I defects also include cracks up to and including 16 mils in width for which repair procedures are addressed by the standard specifications. Prior to the start of fabrication, the Fabricator shall submit to MCS&T Division, for approval, the proposed repair procedures for Category I defects which may be encountered.

5.2.1.1 Any Category I defect(s) will first be noted by the Inspector and may be subsequently repaired by the Fabricator as per the Fabricator's pre-approved repair procedure. The Inspector shall inspect the repair(s), and if the repair(s) is satisfactory, and if all other aspects of the member meet specifications, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2.2 Category II addresses any aspect of a member which exceeds the dimensional tolerances set forth in the Specifications. The Inspector will document the variance(s) and notify the Fabricator. At this point, the Fabricator may seek acceptance of the subject member by sending a written notification to the Contractor including a copy of the Inspector's report and any other pertinent data.

If the Contractor agrees to accept the subject member with the defect at the original contract price, then the Contractor shall provide a written statement to District Construction personnel and MCS&T Division stating such.

5.2.2.1 The Contractor, or his designated representative (i.e. the Fabricator), shall then contact MCS&T Division and provide them with a report containing all relevant information and a detailed summary of the dimensional variation(s) in the subject member for which the Fabricator is seeking acceptance. MCS&T Division shall then contact the Designer (either Engineering Division, or the appropriate District, or Engineer of Record) and District Construction personnel and forward this information to them. If the member was designed by a Consultant, Engineering Division may forward the information to the appropriate Consultant. The Designer will then analyze the dimensional variation(s) and provide a written statement to the Contractor, the Fabricator, MCS&T Division, and District Construction personnel as to whether it will affect the structural performance of the subject member. After receipt of that statement from the Designer, District Construction personnel shall then provide a written statement to the Contractor, the Fabricator, and MCS&T Division as to whether the dimensional variation will create construction difficulties.

5.2.2.2 If the Designer states that this dimensional variation(s) will adversely affect the structural performance of the member, or if District Construction states that it will create construction difficulties, or if the Contractor does not agree to accept the subject member with the defect at the original contract price, MCS&T Division will not accept the subject member. MCS&T Division will assign a laboratory number to this subject member~~,~~ which notes that the member does not meet specifications, and will include a thorough explanation as to why the member does not meet specification requirements. If rejected by MCS&T, the subject member may be accepted by the District by means of a District Materials Inspection Report (DMIR).

5.2.2.3 If the Designer does not feel qualified to perform the analysis outlined in Section 4.2.2 and make the decision as to whether the dimensional variation will affect the structural performance of the subject member, the Designer shall inform MCS&T Division of this fact, and MCS&T Division will relay this to the Fabricator. The Fabricator may then elect to have the defect(s) evaluated by a Division approved, qualified, independent Engineer in the same manner that the Designer would analyze the defect(s). The Division would then review and take into consideration this Engineer's analysis as part of the acceptance decision.

5.2.3 Category III defects include structural defects (spalls that expose prestressing strand or reinforcing steel, honeycombed areas, etc.) and cracks for which the specifications require evaluation by the Designer. If a member contains any structural defect(s), the defect(s) will be noted in the Inspector's report. The Fabricator shall then provide the Contractor with detailed information regarding the type, size, and location of the defect(s). It is then the Contractor's, or his designated representative's, responsibility to contact MCS&T Division and provide them with a report containing all relevant information and a detailed summary of the structural defect(s) in the subject member for which the Fabricator is seeking acceptance. MCS&T Division shall then contact the Designer (either Engineering Division, or the appropriate District) and forward this information to them. MCS&T Division shall also contact District Construction to inform them of the situation. In situations when the member(s) was designed by a Consultant, Engineering Division may forward the information to the appropriate Consultant. The Designer will then analyze the subject defect(s) and provide a written statement to the Contractor, the Fabricator, District Construction, and to MCS&T Division as to the effect of the defect(s), if the member will be structurally adequate, if a repair may be made, and if, in the Designers opinion, the service life of the member will be reduced because of the defect. It shall also be documented in the Inspector's report whether, in the opinion of the Inspector, the service life of the member will be reduced because of the defect.

5.2.3.1 If the Designer does not feel qualified to make the decision concerning the effect of the defect(s), they shall inform MCS&T Division of this fact, and MCS&T Division will relay this to the Fabricator. The Fabricator may then elect to have the defect(s) evaluated

by a Division approved, qualified, independent Engineer in the same manner that the Designer would analyze the defect(s). The Division would then review and take into consideration this Engineer's analysis as part of the acceptance decision.

5.2.3.2 Category III defect Scenario 1 – Category III defect which will adversely affect the structural performance of the member:

If the Designer states that the defect(s) will adversely affect the structural performance of the subject member, the Division will not accept the subject member.

5.2.3.3 Category III defect Scenario 2 – Category III defect which will not adversely affect the structural performance of the member and will not reduce the service life of the member:

If the Designer states that the defect(s) will not adversely affect the structural performance of the subject member, and that a repair should be made, and if MCS&T Division and the Designer agree that the service life of the member will not be reduced, the Fabricator shall submit a repair procedure to MCS&T Division for approval. If the repair procedure is approved, the Fabricator may proceed with the approved repairs in the presence of the Inspector. If the repair(s) is satisfactory, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2.3.4 Category III defect Scenario 3 – Category III defect which will not adversely affect the structural performance of the member, but which will reduce the service life of the member:

If the Designer states that the defect(s) will not adversely affect the structural performance of the subject member, and that a repair should be made, but if either MCS&T Division or the Designer feels that the service life of the member will be reduced, the Fabricator may submit a repair procedure to MCS&T Division for approval. If the repair procedure is approved, the Fabricator may proceed with the approved repairs in the presence of the Inspector. After the inspection of the repair(s), the Inspector will document whether the repair(s) is satisfactory. Since the service life of the member will be reduced, MCS&T Division will not accept the subject member. MCS&T Division will assign a laboratory number to this member, which notes that the member does not meet specifications, and will include a thorough explanation as to why the member does not meet specification requirements. MCS&T Division will then contact District Construction, forward all information relevant to the subject member to the District, and based on the quality of the repairs and the degree to which the service life of the member will be reduced, it is the District's option whether or not to accept the subject member. If the District decides to accept the member it will be paid for at a reduced price based on 40% of the Contract Unit Bid Price. . This cost does not include the cost of items such as bearing pads, guardrail items, delivery charges, etc., which are incidental to the cost of the member. If the District accepts

the subject member with this type of defect and reduced service life, it shall be accepted by means of a DMIR.

Michael Mance, P.E.
Interim Director
Materials Control, Soils and Testing Division

MM:AT
MP 603.10.40 Steward – Cement and Concrete Section
ATTACHEMENT

ATTACHMENT: PRESTRESSED CONCRETE BRIDGE BEAMS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION
INSPECTION CHECKLIST

PROJECT NAME: _____ **AUTHORIZATION:** _____

PROJECT NUMBER: (State) _____ **(Fed.)**_____

BRIDGE NUMBER: _____ **COUNTY:** _____ **DISTRICT:** _____

MANUFACTURER: _____ **JOB NUMBER:** _____

PROPOSED PRODUCTION DATE(S): _____
INSPECTION AGENCY: _____ **INSPECTOR(S):** _____

Preliminary Verifications

SHOP DRAWING REVIEW

Approval Date: _____ **Approved By:** _____

Concrete Strength Requirements: _____ **at release** _____ **at 28 days**

Beam Type: _____ Total Number of Beams: _____

Finish Requirements: Top: _____ **Bottom/Sides:** _____ **Ends:** _____

Notes: _____

_____

_____

CONCRETE COMPONENTS

Cement Source: _____ **Mix Design Lab Number:** _____

Cement Type: _____ **Lab Number:** _____

Coarse Aggregate: _____ **Lab Number:** _____

Fine Aggregate: _____ **Lab Number:** _____

Batch Water Source: _____ **Lab Number (if applicable):** _____

Admixtures: _____

STEEL COMPONENTS

Bearing Plate: **Fabricator:** _____

Mill Certs: _____ **Galvanize Cert.:** _____ **Lab Number:** _____

Reinforcement: Supplier(s): _____

Description: _____ **Lab Number:** _____

_____

_____

Prestressing Strand: Manufacturer: _____ **Description:** _____

Coil Numbers: _____

Lab Numbers: _____

Inserts: **Supplier(s):** _____

Description: _____ **Lab Number:** _____

_____

_____

SHIPLOOSE MATERIAL

Sole Plate: **Fabricator:** _____

Mill Certs.: _____ **Galvanize Cert.:**_____ **Lab Number:** _____

Bearing Pad: **Fabricator:** _____

Inspected at: _____ **Lab Number:** _____

Diaphragm: **Fabricator:** _____

Inspected at: _____ **Lab Number:** _____

Angles: Mill Certs.: _____ **Galvanize Cert.:** _____**Lab Number:** _____

Anchor Rod: **Supplier:** _____ **Description:** _____

Mill Certs.: ____**Galvanize Cert.:** ____ **Lab Number:** _____

Repairs: **Approved Repair Procedure:** _____

Approved by: _____ **Approval Date:** _____

Repair Witnessed: _____

Repair Satisfactory? _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

Form Inspection *(Pre-Placement)*

BEAM NUMBER					
Formwork constructed of metal w/ concrete foundation					
Form clean & free of debris					
Form dimensionally correct					
Length (bulkhead to bulkhead)					
Depth of form					
Width at top flange					
Width at bottom flange					
Width of web					
End square					
Skew dimensions					
Location of inserts, sleeves, blockouts, etc.					
Reinforcing steel (condition)					
Size and grade					
Location & lapping lengths					
Spacing & Clearances					
Chairs, spacers properly used					
Hold Down locations (draped strand)					
Form properly sealed at joints & edges					
Release agent applied					
Strand Placement					
Number of strand					
Strand location (vertical & horizontal)					
Strand free of damage or contaminants					
Strand Tensioning					
Jack & gauge calibration					
Initial load					
Final Load					
Elongation					
Theoretical vs. Actual (within 5%)					
Strand symmetrically loaded					
Check for strand slippage					
Bearing plate location					

Concrete Placement

Ambient temperature, weather conditions					
Concrete Temperature					
Concrete quality (appearance)					
Placement (start/completion times)					
1st Lift					
2nd Lift					
3rd Lift					
QC Tests performed per specification					
Slump					
Air content					
Compressive strength cylinders					
Concrete placed within specified time restrictions					
Concrete properly vibrated					
External vibration applied					
Internal vibration per specification					
Top surface per specification					
Lifting loops per specification					
Curing per specification					
Heat sensors properly installed					
Beams adequately covered					
Compressive strength cylinders stored with beams					
Stress Transfer					
Cylinders loaded to failure per specification					
Release strength met – record average of 2 tests (psi)					
Strands properly cut					
Strands detensioned in specified sequence					

Product Inspection *(Post-Placement)*

Visual inspection for damage					
Note size & location of cracks, spalls, honeycomb, etc.					
Discuss damaged areas with QC Manager					
Beams in need of repair					
Repair method approved?					
Dimensional Tolerances met?					
Length					
Width(s)					
Depth					
Inserts, sleeves, etc.					
Stirrups (horizontal. & vertical within tolerance)					
Finish per specification					
Top scored per specification					
Fascia finish as specified					
Camber					
Lifting loops OK					
Beams properly transported					
Beams stored on proper dunnage at bearing points					
Sweep					
Design shipping strength (28 day) met? (avg of 2 tests)					
Repairs satisfactory					
Beam stamped for shipment					
Concrete Sealer (Silane) applied as specified					
Interior Sides blast cleaned (within 5 days of shipment)					

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL OF COMPACTION

1. PURPOSE

1.1 This procedure sets forth minimum guidelines for the Contractor's Quality Control (QC) Plan for embankment, subgrade, pipe and random fill used as structure backfill material and aggregate base courses. It is intended that these requirements be used as a procedural guide in detailing the inspection, sampling, and testing necessary to maintain compliance with the specification requirements.

1.2 To establish procedural guidelines for approval and documentation of a Master QC Plan.

2. SCOPE

2.1 This procedure is applicable to all items requiring compaction control except asphalt pavements. This outlines the QC procedures for Compaction items and includes procedures for approving and using Master and/or Project Specific QC Plans. This procedure also aids in documentation and retention of QC Plans in ProjectWise.

3. DEFINITIONS

3.1 Nuclear Gauge – Any gauge that has been approved for use on WVDOH projects. A list of these gauges and their applicable uses is available of the WVDOH MCST Webpage.

Commented [DB1]: These will be established and maintained by the compaction coordinator.

4. REFERENCED DOCUMENTS

4.1 MP 100.00.03 - Method Of Evaluation of Non-Standard or Non-Conforming Materials In Construction Via DMIR

~~4.1~~4.2 MP 109.00.21 - Basis for Charges for Non-Submittal of Sampling & Testing Documentation by the Established Deadline

~~4.2~~4.3 MP 207.07.20 - Nuclear Field Density - Moisture Test for Random Material Having Less Than 40% of +3/4 Inch Material

~~4.3~~4.4 MP 700.00.24 - Nuclear Density Test by The Roller Pass Methods ~~Revised December 2008~~

~~4.4~~4.5 MP 700.00.50 - Procedure for Monitoring the Contractor's Compaction Testing of Bituminous Concrete, Base Course, Embankment, Sub-Grade and Pipe and Structural Backfill

~~4.5~~4.6 MP 712.21.26 - Procedure for Determining Random Location of Compaction Tests

5. GENERAL REQUIREMENTS

5.1 The Contractor shall provide and maintain a QC system that will provide assurance that all materials submitted to the Division for acceptance will conform to the contract requirements whether natural, manufactured or processed by the Contractor, or procured from suppliers. The QC Plan should clearly describe the methods by which the QC Program will be conducted. For example, the items to be controlled, tests to be performed, testing frequencies, sampling locations and techniques all should be included etc. Each item should be listed separately.

5.1.1 A detailed plan of action regarding disposition of non-specification material shall be included. Such a plan shall provide for immediate notification of the Division in the event of a non-conforming situation or instance.

5.2 Inspection and testing records shall be maintained, kept current, and made available for review by the Engineer throughout the life of the contract. All other documentation, such as date of inspections, tests performed, temperature measurements, and any accuracy, calibration, or re-calibration checks performed on production or testing equipment shall be recorded and kept.

5.3 The Contractor shall maintain standard calibrated equipment and qualified personnel in accordance with the contract and Specification requirements for the applicable material.

6. QUALITY CONTROL PLAN

6.1 The Contractor shall prepare a QC Plan detailing the type and frequency of inspection, sampling, and testing necessary to measure and control the compaction properties of materials and construction governed by the Specifications. As a minimum, the sampling and testing plan should detail sampling location, sampling techniques, and test frequency. QC sampling and testing performed by the Contractor may be utilized by the Division for acceptance.

6.1.1 A QC Plan shall be developed by the Contractor and submitted to the Engineer prior to the start of construction on every project. Acceptance of the QC Plan by the Engineer will be contingent upon its concurrence with these guidelines as listed in section ~~5~~6.2 thru ~~5~~6.4.5.2.

6.1.2 As work progresses, an addendum(s) may be required to a QC Plan to keep the QC program current. Personnel may be required to show proof of certification for testing.

6.2 QC PLAN MINIMUM REQUIREMENTS

6.2.1 The QC Plan should be on Company Letterhead, be addressed to the District which it pertains, and include the items to be controlled. An example/template is provided in Attachment 1.

6.2.2 Provide the name of the Person who is responsible for the Company's QC program and will be liaison with the Division's personnel.

6.2.3 List all inspectors' names performing compaction tests on the project and their date becoming a Certified Soils & Aggregate Compaction Inspector as per WVDOH Specification Section 106 Control of Materials.

6.2.4 Compaction field tests will be performed according to MP 207.07.20, MP 700.00.24, and Standard Specification 716.32.3

6.2.5 Soft shale tests ~~are to~~shall be ~~done as per~~conducted according to Section 716 of the Standard Specifications.

6.2.6 Specify in the plan the methods by which each item will be tested. Table A and Table B summarize the different materials, minimum frequencies, and the appropriate test procedure or method for controlling each material.

Table A- COMPACTION CONTROL OF AGGREGATE BASE COURSES

TEST PROCEDURE	LOT SIZE	NUMBER OF TEST	MATERIAL TYPE			
			PORTLAND CEMENT TREATED AGGREGATE BASE COURSE	CRUSHED AGGREGATE BASES AND SUBBASE COURSES	HOT-MIX HOT-LAID BITUMINOUS TREATED BASE COURSE	SOIL CEMENT BASE COURSE
MP 700.00.24	2000 FEET	1 PER SUBLOT 5 PER LOT	X	X	X	
MP 207.07.20	2000 FEET	1 PER SUBLOT 5 PER LOT				X

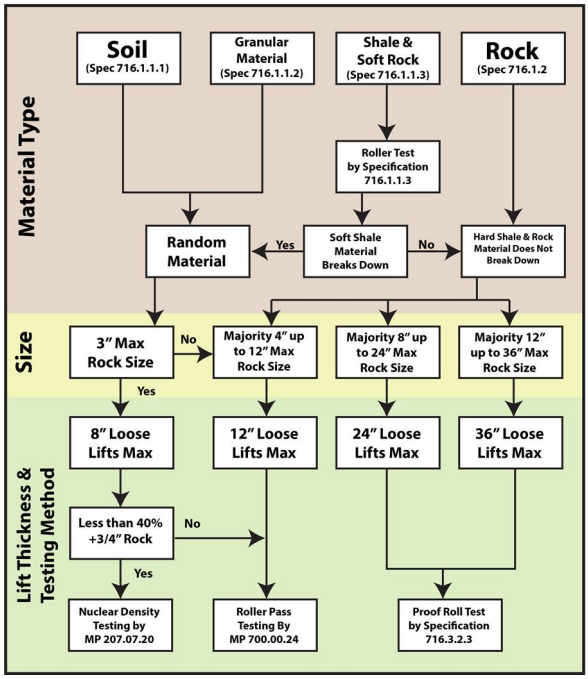
Table B - COMPACTION CONTROL OF EMBANKMENT BACKFILL AND SUBGRADE

TEST	LOT SIZE	NUMBER OF TESTS	MATERIAL WITH LESS THAN 40% RETAINED ON ¾" (19.0 mm) SIEVE	MATERIAL WITH 40% OR MORE RETAINED ON ¾" (19.0 mm) SIEVE AND CAN BE PLACED IN A 12" (300 mm) LOOSE LIFT OR LESS		MATERIAL THAT CAN BE PLACED IN A LOOSE LIFT GREATER THAN 12" (300 mm)		GRANULAR SUBGRADE	SELECT MATERIAL FOR BACKFILLING AND CLASS I AGGREGATE
				UNIFORM	NON-UNIFORM	ROCK	HARD SHALE		
MP 207.07.20	SEE STD. SPECS.	1 PER SUBLOT 5 PER LOT	X						
MP 700.00.24	SEE STD. SPECS.	1 PER SUBLOT, 5 PER LOT		X [1]	X [1]. [2]			X	X
PROOF Rolling		1 REPORT PER LIFT				X	X		

1. If a hole for a direct transmission density reading cannot be readily made due to the coarse material, proof roll the lift.
2. If density readings ~~are varying~~vary above 105 percent or below 95 percent and the material ~~appears~~appear to be non-uniform, proof roll the lift.

6.2.7 A flow chart for embankment material, Table C, shall serve as a guide for identifying material types, maximum rock size, lift thickness and compaction test method. This table shall be included in the QC Plan for making field decisions to ensure that each type of material is properly placed and compacted.

Table C – Guide for Quality Control of Embankment Material



6.2.8 The plan shall include a statement that all necessary testing equipment will be provided to perform the procedures outlined in MP 700.00.24, MP 207.07.20, and Specification 716.3.2. ~~and lists the required testing equipment for compaction tests.~~ The plan shall list the make and model of equipment for proof rolling and its weight per Specification 716.3.2. The plan shall list the make, ~~and~~ model and operating weight of the roller(s) to be used for the soft shale tests and per Specification 716.1.1.3.

6.2.9 List the type of gauge to be used. ~~(…i.e., Troxler 3430, etc).~~ The calibration frequency must be acceptable to the Division. Gauges must be calibrated ~~as per~~according to the manufacturer's requirements. This information shall be given to the Division upon their request.

6.2.10 If applicable, outline the procedure for performing a stability check on gauges that are not within the tolerance range for standard counts during the interval between calibrations. Standard counts derived during the stability check for stable gauges may be used in lieu of the manufacturer's standards. Gauges found to be unstable cannot be used until repaired and calibrated.

6.2.11 Include in the plan the lot and sublot sizes to be used for testing each type of installation. During construction, some flexibility in lot sizes may be made if the situation warrants in order to maintain a workable system. For example, two or more areas containing small quantities of embankment material might be combined into one lot at the Contractor's option and subject to the Division's approval.

6.2.12 Specify the maximum time period for completion of a lot of embankment material. As a guide, if the desired lot size cannot be obtained within seven calendar days, then the material placed up to that time would constitute the lot and the specified number of tests for a lot would still be performed.

6.2.13 Specify in the plan when quality control tests for base and subgrade will be performed. QC tests are to be performed after the material has been shaped and final rolling has been completed.

6.2.14 The Contractor is responsible for the accuracy of their individual testing and calculations.

6.2.15 List the forms and method of distribution for tests and measurements.

6.2.16 Compaction test results are reported on forms specified in MP 207.07.20 and MP 700.00.24. The forms are supplied by the Division and available on the MCS&T Webpage[1]. ~~Each form consists of an original and one copy.~~ The ~~original of a~~ completed form ~~is~~ shall be submitted to the Division's project supervisor, District Materials Lab, and ~~the other~~a copy ~~is~~ shall be retained for the Contractor's records.

6.2.17 Indicate the length of time after tests and measurements are completed that documentation will be provided.

6.2.17.1 Test results and measurements ~~are~~ shall be made available to project personnel for review on a daily basis. Formal submission of measurements should be made within 24 hours after the measurements are taken and test results within 24 hours after testing of a lot is completed.

6.2.17.2 Tests performed in a lot before final rolling is completed should be submitted to the Project Supervisor and retained in the project files. This includes test documents for failing lots and moisture checks.

6.2.18 List the compaction equipment giving the quantity, make, model, and weight or applied force at which each roller will be operated. If ballast will be added to a roller, indicate the type and quantity of ballast and the method for verifying the gross weight. Attach the manufacturer's specifications for compaction capabilities for each roller to the plan or state the procedure for verifying the compaction capabilities of each roller in cases where the manufacturer's specifications are not available. This equipment shall meet the requirements ~~as per~~of Section~~no~~ 207.7.5 of the ~~Standards~~ Specifications.

6.2.19 Indicate in the plan that a minimum of a 10-ton (9.07 Mg) roller will be used for testing ~~as per~~in accordance with MP 700.00.24 for soil and granular material only.

6.2.20 Rollers used to breakdown soft shale shall be in accordance with Section 716.1.1.3 of the ~~Standard S~~Specifications and shall have a minimum of 1.5 tons per linear foot of roller ~~or~~ drum width.

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[1] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

6.2.21 Specify the method by which proof rolling will be conducted on embankment materials. The materials to be proof rolled are summarized in Table B in Section ~~5~~6.2.6.

6.2.22 List the number of passes to be made and corrective measures if soft areas are detected. Documentation should include the type of material, number of passes, and corrective action if soft areas are detected.

6.2.23 For equipment used for proof rolling explain how the gross weight will be determined for any ballast added to the operating weight. For alternate proof rollers, attach to the QC Plan the calculations used to determine that the roller meets specifications. Also, attach the manufacturer's specifications for all proof rollers to the Plan. The following calculation is used to determine if an alternate proof roller meets specifications:

ENGLISH	Metric
$c = \frac{\sqrt{(ab\pi)}}{2}$	$c = \frac{\sqrt{(ab\pi)}}{50.8}$

Where:

a = weight (force) on a single tire = pounds (kg x .009807 = kN)
b = operating tire pressure = psi (kPa)
c = weight (force) per inch (mm) width of tire = pounds per inch (Nm)
The weight (force) per inch (mm) width of tire must be equal to or greater than 1315 pounds (9.067 kN/mm).

6.2.24 Outline the procedure for notifying the Division when the test section in MP 700.00.24 will be performed. The Division ~~should~~ shall be notified a minimum of 24 hours in advance unless other arrangements acceptable to the Division can be made.

6.2.25 Laboratory testing for random material is not required unless the material has unusual characteristics or differs from the soil and rock data used to develop the design. Testing to develop density curves, specific gravities, organic content, etc. may be required.

6.2.26 A list of test procedures is contained in Section 716 of the WVDOH Standard Specifications as a guideline for required testing should the need arise for random material.

6.2.27 Design a plan of action for the disposition of non-specification material, such as material with excessive moisture, excessive organic content, etc. These materials shall be stockpiled away from the embankment or fill placement areas. The Project Supervisor should be immediately notified in the event a nonconformance situation is detected.

6.2.28 List the method(s) and frequencies per Table ~~E~~ D ~~(attached)~~ by which lift thickness measurements will be taken. If surveying of compacted lifts is not utilized, then the maximum loose lifts per Table C shall be measured.

TABLE D - LIFT THICKNESS MEASUREMENTS

MATERIAL TYPE	NUMBER OF MEASUREMENTS
EMBANKMENT	MINIMUM OF 3 PER LIFT
SUBGRADE	MINIMUM OF ONE PER 1200 FEET PER WORKING WIDTH
PIPE BACKFILL	MINIMUM OF ONE PER SIDE PER LIFT
STRUCTURE BACKFILL	MINIMUM OF ONE PER LIFT

6.3 TYPES OF QC PLAN

6.3.1 QC Plans which are intended for use on more than one project shall be defined as Master QC Plans. Section ~~5~~6.4 outlines the procedures for Master QC Plan submittal and approval.

6.3.2 QC Plans which are intended for use on a single project shall be defined as Project Specific QC Plans. Project Specific QC Plans shall contain a cover letter which includes the following: project name/description, CID#, Federal and/or State Project Number.

6.3.3 A contractor may submit a Master QC Plan for field operations instead of a Project Specific QC Plan.

6.3.4 Once any QC Plan is approved for a project, the key date shall be entered in ~~ASSHTOWare~~ AASHTOWare software by the appropriate District Materials personnel. The first date entered shall be the date the Project QC Plan letter is received. The second date shall be when the District approves the QC Plan for use on the project.

6.4 MASTER QUALITY CONTROL PLAN

6.4.1 The intent of Master QC Plans is to facilitate the approval process in a more uniform manner. A Master QC Plan can be submitted to the Division/District by the Contractor when their work in a given District is routinely repetitive for the year. The Master Quality Control Plan is applicable for only the calendar year for which it has been approved.

6.4.2 The Contractor shall submit the Master Compaction QC Plan yearly to each District in which they have work in. If the Contractor does not have work in a given District for the year then no Master QC Plan shall be submitted to that District.

6.4.3 The District will review the submitted Master QC Plan and assign a laboratory reference number upon approval for future referencing. The District will acknowledge approval of Master QC Plan to the Contractor by letter (see Attachment #2 for an example), which will include the laboratory reference number and a copy

of the approved Master QC Plan attached. This will then be scanned and placed in ProjectWise under the appropriate District's Org for that Contractor.

6.4.4 Once a project has been awarded, if a contractor elects to use the approved Master Compaction QC Plan on that project, the Contractor shall submit a letter requesting to use the Master QC Plan for that project. This letter must be on the Contractor's letterhead, be addressed to the District Engineer/Manager or their designee, and contain the following information: project number, CID#, project name/ description, type of Quality Control Plan and the laboratory reference number for the Master QC Plan (See Attachment #3 for an example).

6.4.5 The District shall review the referenced Master QC Plan to ensure that it covers all items in the project. If the referenced Master QC Plan is found to be insufficient for some items on the project, the District shall request the Contractor to submit additional information for QC of those items as an addendum on a project specific basis. When the District is satisfied with the QC Plan for this project, a letter shall be sent to the Contractor acknowledging approval (see Attachment #4 for an example), with the following attached: the Contractor's project QC Plan request letter and the Master QCP approval letter. This shall then be placed in the project's incoming-mail mailbox in ProjectWise.

6.4.5.1 A Master QC Plan that has been approved for project use shall be acceptable for the duration of that project, even if that project continues into subsequent calendar years, unless otherwise directed by the District.

6.4.5.2 For the use of Division Personnel, the District approval letter for this project must state the ProjectWise link to the referenced Master QC Plan for that Contractor. (i.e., WVDOT ORGS > District Organization #> Materials > Year>Master QC Plans…)

7. CERTIFICATION & ACCEPTANCE SAMPLING AND TESTING

7.1 The Contractor shall certify that compaction testing and sampling is in conformance with the approved QC plan, referenced MP's and referenced Standard Specifications in a letter format on the company's letterhead. The certification shall summarize what materials w~~h~~ere encountered and the compaction method/lift thickness utilized. The letter shall state whether any deviations from the requirements of the QC plan, MP's, and Standard Specifications exist, and why.

7.2 Acceptance sampling and testing is the responsibility of the Division. QC tests by the Contractor may be used for acceptance.

7.3 The Division shall sample and test for applicable items completely independent of the contractor at a frequency equal to but not limited to approximately ten (10) percent of the frequency for testing given in the approved Quality Control Plan. Witnessing the contractor's sampling and testing activities may also be a part of the acceptance procedure, but only to the extent that such tests are considered "in addition to" the ten (10) percent independent tests.

7.4 MP 700.00.50, MP 207.07.20, and Specification Section 716.3.2.3 outlines the procedures to be followed for acceptance of compaction testing.

8. ABSENT TESTING OF MATERIAL

8.1 If the Contractor fails to perform testing of the material in accordance with the Contractor's Division Approved Quality Control Plan, payment for the portion of the item represented by the absent test shall be withheld, pending the Engineer's decision whether or not to allow the material to remain in place. Testing includes both performing the test and submitting the results as per MP 109.00.21.

8.1.1 If the Engineer allows the material to remain in place, the Division shall not pay for the material represented by the absent test. However, the Division shall pay for the cost of the placement of the material, including labor and equipment. The invoice or material supplier cost (if applicable), determined at the time of shipment, shall be used to calculate the cost of material when evaluating the total cost of labor and equipment.

8.1.1.1 If there is no material cost, the deduction shall be assessed on the tonnage of material represented by the missing test ~~that was failed to be tested~~ via a District Materials Inspection Report (DMIR).

~~**9. MATERIAL TEST DATA**~~

~~9.1 The Contractor's Quality Control Plan shall clearly state the name(s) of the individual(s) entering test data as outlined in MP 109.00.21.~~

Michael A. Mance, P.E.
Interim Director
Materials Control, Soils & Testing Division

MP 717.04.21 Steward – Pavement Analysis & Evaluation Section

MM:A
ATTACHMENTS

ATTACHMENT 1 - EXAMPLE GUIDE FOR COMPACTION QUALITY CONTROL PLAN

The Acme Company
20 First St.
Somewhere, WV XXXXXXX

Mr/./Ms/Mrs. _____
WV Division of Highways
District ___ Engineer/Manager
_____, WV _____

RE: (YEAR) Master Compaction QC Plan
DISTRICT: _____

Dear Mr./Ms/Mrs. _____

We are submitting our Compaction Quality Control Plan for field control, developed in accordance with sections 716 and 717 of the (year) WVDOH Standards and Specifications, (year) WVDOH Supplemental specifications, MP 700.0024, MP 207.07.20, MP 712.21.26 and MP 700.00.50.

The Quality Control Program is under the direction of _____ . They can be contacted by telephone number _____, email _____ and/or in person.

1.) All testing will be performed by qualified personnel as per WVDOH Specification Section 106 Control of Materials. Proof of personnel certification shall be provided to WVDOH inspectors upon request.

2.) Specify the methods by which each item will be tested .(IE.. 207,307…etc). Table A and Table B (attached) summarizes the different materials, minimum frequencies, and the appropriate test procedure or method for controlling each material. A flow chart for embankment material, Table C (attached), is intended to serve as a guide for making field decisions to insure that each type of material is properly placed.

3.) Testing Equipment used will be as required in MP 700.00.24 and MP 207.07.20.

4.) Type of gauge to be used (IE…. Troxler 3430, etc). State that calibration information is available upon request by the Division/District.

5.) Outline the procedure for performing a stability check on nuclear gauges which are not within the tolerance range for standard counts during the interval between calibrations. Gauges found to be unstable cannot be used until repaired and calibrated.

6.) Include in the plan the lot and sublot sizes to be used for testing each type of installation.

7.) Specify the maximum time period for completion of a lot of embankment material.

8.) Specify in the plan when quality control tests for base and subgrade will be performed.

9.) List the forms and method of distribution for tests and measurements. (The forms are specified in MP 207.02.20 and MP 700.00.24.) State that test results will be made available to WVDOH personnel on a daily basis.

10.) List the compaction equipment giving the quantity, make, model, and weight or applied force at which each roller will be operated. If ballast will be added to a roller, indicate the type and quantity of ballast and the method for verifying the gross weight. Attach the manufacturer's specifications for compaction capabilities for each roller to the plan or state the procedure for verifying the compaction capabilities of each roller in cases where the manufacturer's specifications are not available.

11.) Indicate in the plan that a minimum of a 10 ton (9.07 Mg) roller will be used for testing as per 700.00.24.

12.) Indicate in the plan that when shale materials are encountered, the shale hardness test will be performed to determine if material is a soft shale as per 716.1.1.3 of the WVDOH Standards and Specifications.

13.) Specify the method by which proof rolling will be conducted on embankment materials. The materials to be proof rolled are summarized in Table B (attached).

14.) Laboratory testing for random material is not required unless the material has unusual characteristics or differs from the soil and rock data used to develop the design. Testing to develop density curves, specific gravities, organic content, etc. may be required. The Yearly Quality Control Plan should state that these additional tests must be performed by qualified Aggregate testing personnel as per as per WVDOH Specification Section 106 Control of Materials.

15.) Design a plan of action for the disposition of non-specification material.

16.) List the method(s) and frequencies by which the lift thickness measurements will be taken.

Very Truly Yours,

_____

Title

ATTACHMENT 2

**** WVDOH LETTERHEAD ****

THE ACME COMPANY INC.
20 First St.
Somewhere, WV XXXXX

RE: Compaction Master QCP
Description: 20XX Year

Dear Mr./Ms/Mrs. _____,

Your Master Quality Control Plan**(M# - ######)** for Compaction has been reviewed and found to be acceptable for the following items:

- 207001-001 Unclassified Excavation		- 207002-001 Subgrade
- 211-001	- 307001 Items	- 604 items
- 212 Items	- 605 items	-etc….

As work progresses throughout the season an addendum(s) may be required to this QCP to keep the QC program current. **Please use M# - ###### when corresponding about this QC plan.** Please make sure that all appropriate personnel have a copy of this plan in their possession.

Very Truly Yours,

_____
Title

ATTACHMENT 3

The ACME COMPANY
20 First St.
Somewhere, WV XXXXX

********** **EXAMPLE** **********

Mr./Ms/Mrs _____
WV Division of Highways
District ___ Engineer/Manager
_____, WV _____

RE: Compaction Quality Control plan
for Field ---- Project

Fed. Project No _____
State Project No. _____
Contract ID No. _____
Description _____

Dear Mr./Ms/Mrs. _____,

We would like to use our approved Yearly Master Quality Control Plan, reference number _____ for the project referenced above. All Compaction items on the referenced project are covered by the Master Quality Control Plan.

The QC Plan is under the direction of _____, _____(title), and will be the company's contact representative to the Department of Highways District Materials and Construction Departments. He/She can be contacted in person at the project, by telephone _____ or at email account _____.

Very Truly Yours,

_____
Title

ATTACHMENT 4

**** WVDOH LETTERHEAD ****

THE ACME COMPANY INC.
20 First St.
Somewhere, WV XXXXX

RE: Compaction QC Plan
Project CID#: ########
Fed/State Project #: NHPP- ## - ####.##
Description: Falling Slide
County : XXXXXXX

Dear Mr./Ms/Mrs. _____,

Your request to use Master Quality Control Plan **(M# - ######)** for compaction on the project referenced above, has been reviewed and found to be acceptable for the following items on the referenced project:

- 207001-001 Unclassified Excavation - 207002-001 Subgrade
- 307001 Items - 604 items - 212 Items -etc….

As work progresses throughout this project an addendum(s) may be required to this QCP to keep the QC program current. **Please use M###### when corresponding about this QC plan.** Please make sure that all appropriate personnel have a copy of this plan in their possession.

For Division/District
The Master Quality Control Plan can be reviewed in ProjectWise folder shown below:

WVDOTORG> D0# > year > MASTERQCPLANS > Contractors >Contractor Name >
Name of Quality Control Plan

Very Truly Yours,

_____
Title

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

CERTIFICATION OF BATCH SCALES AND CALIBRATION OF STANDARD 50 POUND TEST WEIGHTS

1. PURPOSE

1.1 To provide instructions and establish frequency for having batch scales checked and approved.

1.2 To provide procedural instructions for having standard 50-pound test weights checked and approved.

2. SCOPE

2.1 This procedure will apply to all batch plants furnishing Portland cement concrete or bituminous concrete to State Highway projects.

3. INSTRUCTIONS

3.1 Batch scales shall be checked and approved by the Division of Labor at least once a year.

3.2 Standard, 50-pound, test weights shall be certified as correct by the Division of Labor at the time and location designated by their directives.

3.3 Certification of standard test weights by the West Virginia Division of Labor will be evidenced by the letters WV and a two-digit number stamped on the lead plug in each of the standard weights, the two digits representing the year in which certification is made.

3.4 Standard test weights should be treated in the following manner prior to delivery to the calibration station.

3.4.1 Wire brush to remove all dirt and rust, and paint with a light coat of aluminum paint.

4. FACILITIES LOCATED OUTSIDE OF WEST VIRGINIA

4.1 The Division may, at its option, accept inspection and sealing by out of state agencies.

4.2 The frequency of such inspection shall conform to West Virginia's Division of Labor requirements.

Michael A Mance, PE
Interim Director
Materials Control, Soils & Testing Division

MP 700.00.30 Steward – Lab Support Section
MM:B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR THE INDEPENDENT ASSURANCE PROGRAM

1. PURPOSE

1.1 To provide a procedure for meeting FHWA's requirements for the Independent Assurance (IA).

2. SCOPE

2.1 This procedure applies to the following materials:

2.1.1 Aggregate

2.1.2 Asphalt

2.1.3 Portland Cement Concrete (PCC)

3. REFERENCED DOCUMENTS

3.1 Office of Pavement Technology Publication No. FHWA-HIF-12-001[1], October 2011. Included as Attachment 2.

3.2 23 CFR - PART 637—CONSTRUCTION INSPECTION AND APPROVAL[2]

~~3.3 MP 700.00.56 Testing Procedures for Independent Assurance Sampling.~~

4. DEFINITIONS

4.1 Evaluation Period: The calendar year in which the IA program is evaluated. This begins on January 1st and ends on December 31st of the same year.

4.2 IA Material: Each unique material that is evaluated by the IA program.

4.3 IA Tester: Each technician who tests an IA Material during the Evaluation Period.

~~4.1~~4.4 IA Test Equipment – Each primary piece of equipment that is used to test an IA material during the Evaluation Period.

~~4.2~~4.5 Proficiency Sample: A single (homogeneous) sample that is distributed by an agency or designated agent to be tested at multiple laboratories. The distributing agency will provide a "score", statistically comparing results amongst the laboratories.

[1] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf
[2] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-637

~~4.3 Active Tester – A person who has performed a material test for acceptance in a calendar year.~~

4.6 AASHTO re:source[3]: A technical services program that provides resources for construction materials testing laboratories. It's part of the American Association of State Highway and Transportation Officials (AASHTO), a nonprofit organization that sets technical standards for highway systems and acts as a liaison between state and federal transportation departments.

~~4.4~~4.7 Satisfactory Evaluation: If the results of a test fall within the guidelines established in Section 12 of this document, the test will be considered satisfactory.

~~4.5~~4.8 Non-Satisfactory Evaluation: If the results of a test do not fall within the guidelines established in Section ~~11~~ 12 of this document, the test will be considered non-satisfactory.

~~4.6~~4.9 Corrective Action Report (CAR): An action report identifying the probable source of a Non-Satisfactory Evaluation. This report identifies the non-conformance, explains issues which lead to this non-conformance, and explains corrective actions to address this non-conformance.

5. SYSTEM APPROACH FOR IA SAMPLING AND TESTING

5.1 The goal of the IA program is to meet a 90% evaluation threshold for each IA tester and IA test equipment. Each of these entities is considered separate and independent of each other.

5.1.1 IA tester shall be evaluated for each unique IA material they test during the evaluation period. If a person tests multiple IA materials during the evaluation period, the will be required to be evaluated for each material independently.

6. POPULATION OF QUALITY ASSURANCE TESTERS

6.1 Once per year, before any work is performed by District Technicians, a signed letter stating the names of each of their quality assurance testers shall be submitted by the District Construction Engineer to the Director of MCS&T. In lieu of this letter, Districts may utilize a MCS&T provided online form.

6.2 If, during the calendar year, additional testers are added to the District's roster, the Construction Engineer shall submit an amended list to the Director of MCS&T. This shall be done before any quality assurance work is performed by the technician.

6.3 In the event where a project incorporates non-DOH acceptance testers, the District Construction Engineer shall submit to the Director of MCS&T a signed letter stating the names of each of the quality assurance testers.

[3] https://aashtoresource.org/

7. PORTLAND CEMENT CONCRETE

7.1 The means and methods of meeting the yearly IA requirement for PCC are outlined in MP 700.00.56.

7.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

PCC IA Samples Frequency	
Air – AASHTO T 152	1/Year
Compressive Strength Testing - AASHTO T 22	1 Set/Year
Slump – AASHTO T119	1/Year

7.3 The evaluation of these tests shall be described in Section ~~11~~ 12 of this document.

8. SUPERPAVE ASPHALT CONCRETE

8.1 The means and methods of meeting the yearly IA requirement for Superpave HMA is outlined in MP 700.00.56.

8.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

SuperPave IA Samples	
Air Voids - AASHTO T 269	1/year
Asphalt Content by Ignition - AASHTO T308	1/year
Bulk Specific Gravity, Vacuum - AASHTO T331	1/year
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Maximum Specific Gravity - AASHTO T209	1/year
Percent Passing the #200 Sieve - AASHTO T30	1/year

8.3 The evaluation of these tests shall be described in Section ~~11~~ 12 of this document.

9. MARSHALL ASPHALT CONCRETE

9.1 The means and methods of meeting the yearly IA requirement for Marshall HMA is outlined in MP 700.00.56.

9.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Marshall IA Samples	
Asphalt Content by Ignition - AASHTO T308	1/year
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Marshall Stability/Flow - AASHTO T245	1/year
Maximum Specific Gravity - AASHTO T209	1/year
Percent Passing the #200 Sieve - AASHTO T30	1/year

9.3 The evaluation of these tests shall be described in Section ~~11~~ 12 of this document.

10. AGGREGATE GRADATION

10.1 The means and methods of meeting the yearly IA requirement for Aggregate Gradation is outlined in MP 700.00.56.

10.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Aggregate Gradation Samples	
Class 1,3, or 10	1/year

10.3 The following sieves will be evaluated:

1. 1.5" Sieve (40 mm)
2. ¾" Sieve (20 mm)
3. #4 Sieve
4. #40 Sieve
5. #200 Sieve

10.4 The evaluation of these tests shall be described in Section ~~11~~ 12 of this document.

11. COMPACTION

11.1 The means and methods of meeting the yearly IA requirement for Compaction is outlined in MP 700.00.56.

11.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Compaction Samples	
Asphalt Compaction	1/year
Aggregate/Soil Compaction	1/year

11.3 The evaluation of these tests shall be described in Section 12 of this document.

~~11.1~~11.4

12. EVALUATION PROCEDURE

12.1 Samples will be evaluated statistically when the population of results is 5 or greater. If the sample is not provided by AASHTO re:source, they will be evaluated by the WVDOH IA sampler. ~~A sample that falls within 2 standard deviations of the population will be considered satisfactory~~The calculation method used by ASHTO re:source shall be followed. The calculation method is shown in Attachment 3.

12.2 If the samples are provided by AASHTO re:source a rating of 3, 4, 5 as assigned by the testing agency shall be considered satisfactory.

12.3 In the event where the population is less than 5, samples will be evaluated by averaging the tests results and using the respective AASHTO Precision and Bias Table as the acceptable range of values.

12.3.1 For example, if the average is 5.0 and the table provides a precision and biased of 1.2, the test values must fall between 3.8 and 6.2 to be considered satisfactory.

~~12.3.2 For Portland Cement Concrete, the acceptable range for the average of all results is as follows:~~

~~1. Slump: +/- 1.5 in (40 mm)~~
~~2. Air: +/- 1.5 in (40 mm)~~
~~3. Cylinders: +/- 10%~~

12.4 If the results of an evaluation are satisfactory, the evaluation will be considered successful. A successful evaluation will verify both the Active Tester and the Active Testing Equipment used during the material test.

12.5 If the results of an evaluation are deemed non-satisfactory, the material test will be reviewed by the respective District Materials Supervisor. Within 30 days of notification, the District Construction Engineer shall submit a corrective action report to the Director of Materials Control Soils and Testing Division. This Corrective Action Report will be included in the yearly IA report. A sample of this Corrective Action Report is provided in Attachment 1. The live version of the file is in the WVDOH MCS&T Toolbox[4].

12.6 The acceptance criteria shall be evaluated every three years. The most recent evaluation of this criterion was on :

_____ by _____ (Director of MCS&T)**.

** Note: This document shall be effective as per the signature date at the end of this document. However, the live version of this document will be updated as indicated above. This review date will not affect the signature nor effective date of the procedure, but rather provide documentation of WVDOH's compliance with Federal guidelines.

~~12.4.1 If a Concrete Slump and Air IA test is determined to be non-satisfactory, the IA sampler shall perform another 1-1 test with the testing technician to determine the root cause. The IA sampler may have the technician use either the IA testing equipment or another previously satisfactory test equipment to isolate the issue.~~

~~12.4.2 If the Technician is determined to be satisfactory using another piece of equipment, the IA sampler shall perform additional testing with the errant devices to determine if the testing equipment is the root cause of the unsatisfactory result.~~

[4] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

~~12.4.3 In the above-described instance, all pertinent information shall be provided in a corrective action report.~~

▪

13. REPORTING

13.1 The evaluation period shall be the calendar year, starting with January 1st and ending December 31st.

13.2 The annual I.A. report shall be submitted to FHWA. The due date for the report is April 1st of the year proceeding the evaluation period.

Ronald L. Stanevich, PE
Director
Materials Control, Soils & Testing Division

MP 700.00.53 Steward – Materials Control Section
RLS:B
ATTACHMENTS

Attachment 1: Sample Corrective Action Report

WVDOH Independent Assurance Corrective Action Report		
		Form 2024-IA-CAR
Date of Occurrence:		
Date Submitted:		
Name of Tester:		
Testing Equipment:		
Material Tested:		
Describe the issue reported:		
What was the root cause of the issue?		
What actions have been done to correct this issue?		
Signature of Testing Technician		
Signature of District Materials Supervisor		
Signature of District Construction Engineer	Review: MCST	

Attachment 2: Office of Pavement Technology Publication No. FHWA-HIF-12-001[5], October 2011.

[5] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf

Corrective Action Report

WVDOH Independent Assurance Corrective Action Report		
Form 2024-IA-CAR		
Date of Occurrence:		
Date Submitted:		
Name of Tester:		
Testing Equipment:		
Material Tested:		
Describe the issue reported:		
What was the root cause of the issue?		
What actions have been done to correct this issue?		
Signature of Testing Technician		
Signature of District Materials Supervisor		
Signature of District Construction Engineer	Review: MCST	

TechBrief

The Construction and Materials Quality Assurance Program is an integrated, national effort to improve the effectiveness of the State acceptance of materials both in the inspection, sampling and testing. The program is designed to provide tools and guidance in implementing Quality Assurance programs. The program is designed to provide tools and guidance in implementing Quality Assurance programs.

U.S. Department of Transportation
Federal Highway Administration

Office of Pavement Technology

Publication No.
FHWA-HIF-12-001

October 2011

INDEPENDENT ASSURANCE PROGRAMS

This Technical Brief provides information regarding independent assurance as it relates to activities for the evaluation of the sampling and testing procedures used in a materials and quality acceptance program.

Introduction

23 CFR 637 defines an Independent Assurance Program as: Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.

An Independent Assurance Program ensures the sampling and testing is performed correctly and the testing equipment used in the program is operating correctly and remains calibrated. It involves a separate and distinct schedule of sampling, testing and observation.

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. By regulation IA sampling and testing is conducted by agency personnel or an accredited laboratory designated by the agency.

The regulation requires IA specifically be designed to include testing performed on project produced materials. Since the testing of project produced materials are tested in multiple locations and by multiple personnel it is necessary to have some assurance the testing is being performed accurately. Manufactured products are typically tested in the State's central laboratory or by a designated consultant laboratory. Testing in the central laboratory is considered to be covered by the laboratories accreditation and participation in proficiency testing.

Background

In the early sixties Congressional investigation uncovered improper testing and fraud in some of the federally funded highway projects. To address the issue of improper testing a separate sampling and testing program was developed. The program was operated by personnel different than project personnel on different equipment. The samples were split with project personnel and the test results were compared. In addition, testing procedures were also observed. This was done to ensure sampling procedures were performed correctly and equipment stayed in calibration. In later rewrites of the regulation this program became the Independent Assurance program.

Scope

The regulation, 23 CFR 637, only covers projects that are on the National Highway System (NHS). The regulation requires testing personnel that perform any verification testing or QC testing used in the acceptance decision be covered by an IA program regardless of the agency, including a local agency or a toll authority administering a project.

Some States have IA testing personnel perform other duties such as: (1) instructing other testers, (2) obtaining samples for the verification of manufactured products,(3) obtaining samples of aggregate, cement, binder samples at production facilities for purposes other than IA, (4) inspecting precast or other facilities. Even though these functions are a necessary part of an overall Quality Assurance (QA) program they will not be discussed in this Tech Brief since the purpose of this Tech Brief is to discuss the IA functions as defined in the regulation.

Regulation 23 CFR 637

The text of the entire regulation can be found at this website:
http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html

The following is a summary of the elements of the IA program:

1. Establish IA sampling and testing frequencies;
2. Evaluate testing equipment by using one or more of the following: calibration checks, split samples, or proficiency samples.
3. Evaluate testing personnel by observations and results from testing split samples or proficiency samples.
4. Prompt comparison and documentation of test results obtained by the tester being evaluated and the IA tester.
5. Develop guidelines including tolerance limits for the comparison of test results.

6. Provide an annual report to the FHWA when the system approach is used.

The rest of the Tech Brief will discuss best practices for each of the above requirements.

System versus Project Approach

The Independent Assurance Program can be set up on a project basis, which is the traditional approach, or on a system basis. The difference in the two approaches is the basis of the frequency of testing (cover all projects versus cover all personnel).

Some States have moved away from having testing personnel on all projects and are moving toward centralizing testing away from the project level. As this occurs testers may perform testing on several projects and it becomes more efficient to have a frequency based on the testers instead of projects quantities. In addition, the project approach does not always include all the testing personnel.

As States have moved toward the system approach they have also incorporated the IA program results as part of the technician qualification program.

Frequency of Independent Assurance Testing

Project Approach - The State establishes the frequency for the IA testing based on the testing frequency performed on the project or on a time frequency on a project. Typically, the States use a frequency of 10 percent of the verification/acceptance testing. For example if the verification testing is performed at the rate of 1 per 500 tons the IA frequency would be 1 per 5000 tons.

System Approach - An alternative method to basing frequency on project testing frequencies is to base the IA frequency on a time basis for all testers and equipment. In this case, the personnel and equipment would be verified on a "system" basis. The purpose is to cover all the testers and equipment over a period of a year. While States strive to reach all testers, it is not always possible. States typically set a goal of reaching 90% of the active testers. Active testers are defined as those testers that are performing testing in a given year, in most States this is a subset that is smaller than all “qualified” testers since some qualified personnel may have retired, move to other jobs or resigned. The system 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.

One challenge is to determine the active testers. For States that have an electronic materials management system it is very easy to determine the active testers since these systems indicate who is performing a given test. The IA testers will run reports periodically (monthly) to

determine the testers that need to be reviewed. For those States that do not have an electronic materials management system it becomes more challenging to determine the active testers. A good practice under these circumstances is to require the project personnel to identify the personnel that are going to perform testing, state, consultant, and contractor, at the beginning of the project along with any changes to the IA personnel. The IA testers will then know the active testers along with the testers that they have already been reviewed and will thus know the testers that need to be reviewed in the future.

Mixed Approach - It is permissible to separate the verification of equipment and personnel, i.e., one method to check equipment is to require a calibration and inspection frequency. Personnel can be checked by sending out proficiency samples. It is permissible to use a mixed approach, i.e. where some test procedures and or some testers are covered by a project approach where the remaining procedures are covered by a system approach.

Equipment and Personnel

Testing equipment may be evaluated by using one or more of the following: calibration checks, split samples, or proficiency samples.

Testing personnel may be evaluated by observations and split samples or proficiency samples.

The typical approach for performing IA is to check equipment and personnel at the same time. This is performed by IA personnel visiting a job site to observe the sampling and testing on site and to also test a split of the sample on site with equipment the IA personnel brought or to take the split to another laboratory for testing. When the test results are compared it checks both the equipment and tester. If a set of samples do not compare further analysis is required to determine if the source of the error is in procedure or equipment.

Some States send out proficiency samples to district, other subsidiary laboratories as well as consultants and contractors. Some of these States develop their own samples, while others require the laboratories to subscribe to the AASHTO Materials Reference proficiency samples. Proficiency samples are a way to address equipment and test procedures. Some States are preparing enough proficiency samples for all the active testers. In cases where all the testers are covered by the proficiency samples additional IA work would only need to review those that did not compare. If the proficiency program did not cover all the testers additional IA work would also be required.

Another method that covers just the equipment is performed by frequent standardization and or calibration. The frequency for standardization and/or calibration differs by equipment due to the unique nature of each testing device. AASHTO R-18 and some of the test procedures contain a frequency for standardization/calibration of the testing equipment. However, if standardization/calibration is the only check on the equipment (no split samples or proficiency samples) the standardization/calibration should probably be run frequently.

As some States move toward the system approach the States are checking testers in a central location. This allows the IA inspectors to cover numerous testers at one time. This has worked especially effectively in States where the projects and or laboratories are spread across a large geographic area. The States that use this approach are also including this data for requalification of testing personnel. When this approach is used the equipment needs to also be covered by standardization/calibration, split sample or proficiency sample testing.

Some States will suspend and/or revoke a technician's qualification/certification for repeated poor performance on IA evaluations. These are in addition to suspensions and/or revocation due to fraudulent activities. Some States will also perform testing on 3 way split-samples. In this approach one split is tested by project personnel, one split is tested by the contractor personnel and the third split is tested by the IA personnel. This is typically performed at the beginning of production to ensure that all testing personnel and equipment are performing correctly.

Prompt Comparison and Documentation

It is essential the IA Program compare results and detect deficiencies in State or contractor testing procedures in a timely manner. This improves the reliability of sampling and testing. The timely comparison of data may be restricted by the resources of an agency including personnel, facilities, and geographical constraints. These resource needs must be considered in an agency program.

Deviations from the established tolerances will require an engineering audit of the respective sampling and testing procedures, and the equipment used. When comparison of QC and verification data reveals significant differences in test values, the variables involved should be evaluated by the IA personnel to determine whether further testing and investigation is needed to establish the source of the discrepancy.

Corrective actions should be incorporated as appropriate under the direction of IA personnel.

Tolerances for Comparison of Test Results

A common place to start in establishing comparison tolerances are the D2S limits in the published test procedures. However, as States reduce the options in published test procedures and as testers become more proficient, the tolerances should be reduced. When split samples are used, the materials and sampling variability are eliminated from the analysis and only the variability due to the testing procedures and the equipment are included.

The comparison of split sample test results should be based on established deviation values or tolerances that are representative of the testing procedures and materials used. AASHTO and ASTM have published precision statements for some test methods. However, many of these procedures have multiple methods and or options inside the procedure. In order to reduce

testing variability most States have specified the particular options within the test procedures. Therefore the agency should develop Independent Assurance tolerances based on their specific options that the State is requiring. Care must be taken when historical data are used in establishing theses limits to ascertain that the data are not biased; i.e., they were obtained in a random manner and that all test results have been reported. Otherwise, the variability may be underestimated and the limits too restrictive.

Many States distribute proficiency samples to their district laboratories. This data can be analyzed to determine IA tolerances. The formula for D2S is $D2S = 2\sqrt{2}(1S)$ where

$1S = the\ standard\ deviation\ of\ the\ results$.

Established tolerances should be periodically evaluated and modified to ensure that the goals of IA are being met; that is, it assures the reliability of contractor and agency test results. Some States are evaluating their tolerance every year. As a minimum the tolerances should be evaluated every 5 years.

In situations where multiple split tests are performed on a project a paired t-test can also be used to analyze data.

Annual Reports

The regulation requires those States that use a system approach to prepare and submit an annual report to the FHWA Division Office.

The annual report should include the following information: the number of certified technicians, the number of active technicians, the number of technicians covered by the IA program, the number of IA reports that had deviations, and a summary of how the deviations were addressed along with the potential systematic solutions to reoccurring deficiencies.

Alternate Approach

One State is statistically analyzing State and Contractor data in an innovative manner to accomplish both verification and IA.

An example of this approach is shown in Figure 1. In this approach the contractor performs sampling and testing at the rate of 4 samples per lot. The State takes verification samples, at the beginning of production; a minimum of 4 samples are taken the first week of production and at least 1 per lot. The State's verification samples are taken at the plant by contractor personnel under the direction of the State personnel. The verification samples are split and one split is given to the contractor. Analysis is performed in two ways. First, for IA, the split results are compared using IA comparison tolerances. In the figure below; IA1 is compared to the contractor split of that sample, sample 4 of lot 1. For validation, the State verification

samples are made independent by removing the corresponding contractor splits. In the figure below samples 1, 2, 3 from lot 1; samples 1, 2, 4 from lot 2; samples 1, 2, 3 from lot 3; and samples 1, 3, 4 from lot 4 are compared to the State's IA1, IA2, IA3, and IA4 with the F& t tests.

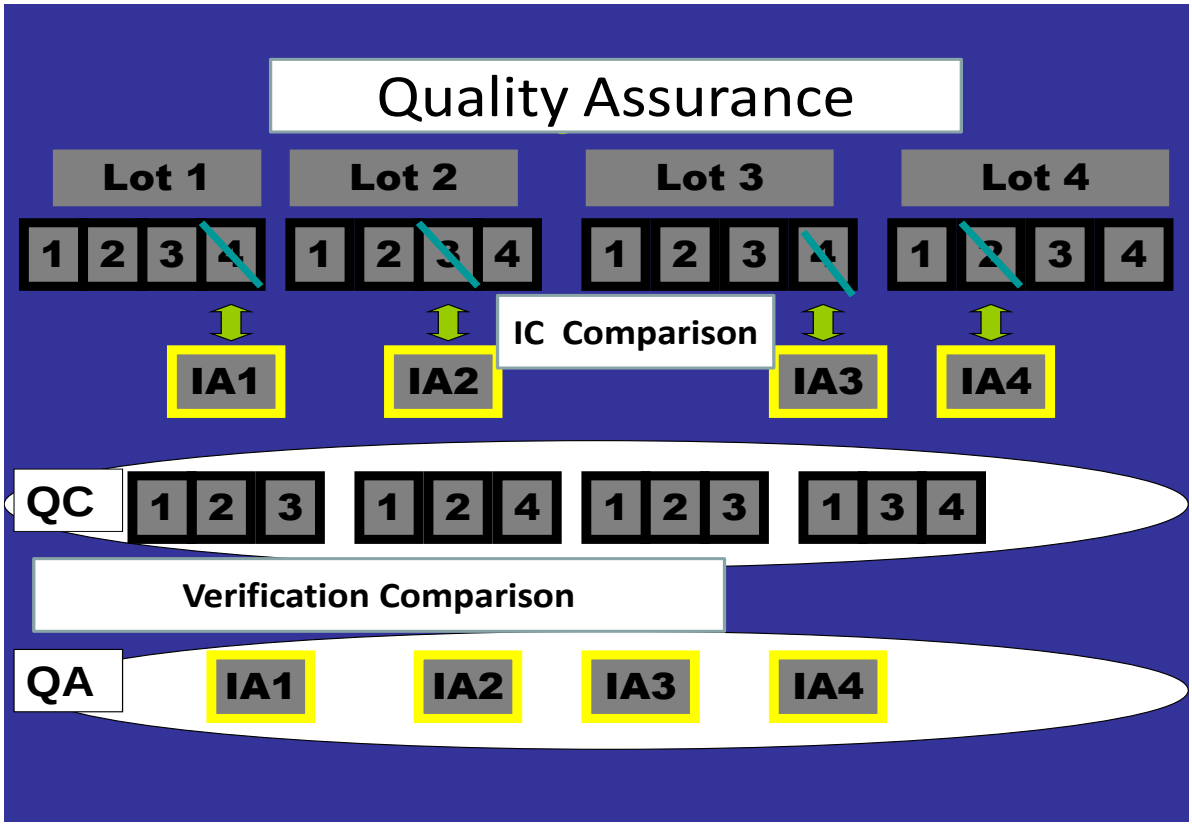

Figure 1. Example of Alternate Approach.

Conclusion - Commonly Noted Areas of Concern

- Test results from the IA program should only be compared to split test results or results from others testing the same set of proficiency samples.
- IA results are not to be used in the acceptance decision.
- IA should be based on split samples or proficiency samples not independent samples so that data can be compared without material variability.
- All tests that are performed in the field to determine the final acceptability of the materials should be covered by the IA program.

- All technicians that are performing testing that is used in the acceptance decision need to be covered by the IA program.
- Observation of sampling and testing procedures should be included as part of an IA system to evaluate sampling and testing personnel and ensure that testing and sampling procedures are performed correctly.

Further Information:

- "23 CFR Part 637," Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration, *Federal Register*, Washington, DC published on June 29, 1995, and amended on December 10, 2002, and September 24, 2007, http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html
- Non-regulatory supplement for 23 CFR Part 637, Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration. The non-regulatory supplement was updated on July 19, 2006. http://www.fhwa.dot.gov/legsregs/directives/fapg/0637bsup.htm
- Frequently asked questions (FAQ) on the Quality Assurance Regulation. The FAQs were updated on November 26, 2006. http://www.fhwa.dot.gov/pavement/materials/matnote11.cfm - qaa
- AASHTO Standard Practice R 44, “Independent Assurance Programs” has been published in the 2007 AASHTO Standards. This guide will assist the States in developing Independent Assurance Programs
- NHI Course 134042, “Materials Control and Acceptance –Quality Assurance.” The course is four days long and covers the basic essentials of QA. A two-day version of the course is also available. http://www.nhi.fhwa.dot.gov/training/brows_catalog.aspx
- NHI Course 134064 – “Transportation Construction Quality Assurance”

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Proficiency Sample Ratings: Being Average Has Never Been So Good

By Brian Johnson, AASHTO Accreditation Program Manager
Posted: October 2010

So you opened up your email notification to see that the latest AASHTO re:source proficiency sample ratings were just posted, you log into the website to view your ratings (Figure 1), and you see ratings of **, -5, -3, 5,4. You think to yourself, "I know that 4 and 5 are good, but what about the negative numbers? Those are below 3, so they must be bad... and what are the stars for? I doubt they're like the stars that my elementary school teacher used to give me... and what is this repeatability rating?"

Sieve Analysis
Total Material Passing the 2.36-mm (No. 8) Sieve (percent) - T27/C136
View Youden Diagram | View Performance Chart

	Sample 167						Sample 168					Repeatability (within-lab)		
	Total Labs	Lab Data	Avg	1S	Z-Score	Lab Rating	Lab Data	Avg	1S	Z-Score	Lab Rating	1S	Z-Score	Lab Rating
4	1448	**86.0**	85.40	0.38	**1.56**	**3**	**84.1**	83.58	0.39	**1.34**	**4**	0.24	**-0.22**	**-5**

= the line of data on the report
= the total labs that submitted data just for that line of data
= the results of sample 167 showing the lab's data, the average of all labs' data, 1 standard deviation, the z-score, and the rating
= the results of sample 168 showing the same information as shown for sample 167
= the repeatability, which shows you how close your z-scores were to each other

Figure 1: A Typical Line of Proficiency Sample Data (Color-Coded)

Calculating Averages and Standard Deviations
The first thing that you should understand is that laboratory ratings are based on the average of the results, although the reported averages are determined only after removing invalid and outlier results. It is important to eliminate them from the rating determination equations so that the ratings are not affected based on what some might consider to be "bad data." We determine a standard deviation for each data set (displayed as "1S" in Figure 1 above) and then begin the process of calculating ratings.

Calculating Z-Scores and Ratings
Each laboratory is rated with two values: a z-score and a lab rating. In statistics, the z-score, also known as the standard score, indicates how many standard deviations a result is from the average. The z-score is determined by the following calculation:

$$\text{Z-Score} = \frac{\text{(Laboratory Test Result - Average Value)}}{\text{(Standard Deviation)}}$$

The laboratory rating calculation is based on the absolute value of the z-score:

If Z-Score <= 1 Then Rating = 5

If Z-Score > 1 And <= 1.5 Then Rating = 4

If Z-Score > 1.5 And <= 2 Then Rating = 3

If Z-Score > 2 And <= 2.5 Then Rating = 2

If Z-Score > 2.5 And <= 3 Then Rating = 1

If Z-Score > 3 Then Rating = 0

Which Way Is Up?
If you're confused by all of this, check out Figure 2 below for a graphical representation of z-scores and ratings. Here are a few quick points to remember:

- Low z-scores are good.
- High ratings are good.
- A negative sign on a z-score or laboratory rating merely indicates that the laboratory's result was below the average, while a positive z-score or rating indicates that the laboratory's result was above the average.

Simply put, the closer your result is to the average, the better your rating. In the competitive world we live in, being average conjures up words like commonplace, mediocre, or ordinary; but in the world of proficiency testing, being average is the definition of excellence!

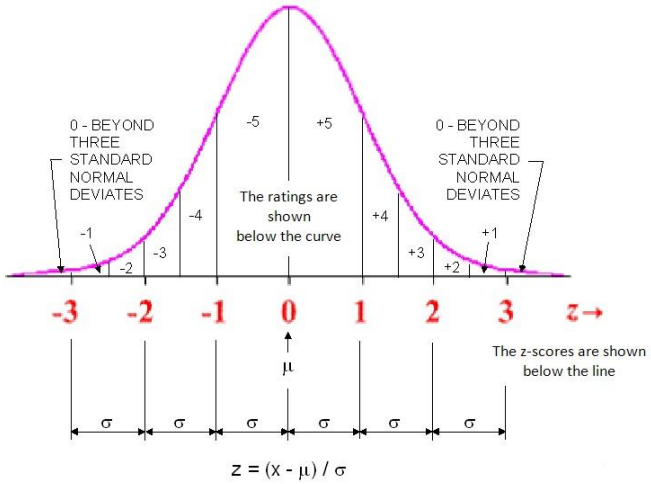


Figure 2: The Normal Distribution of AASHTO re:source Proficiency Sample Data

Low Ratings
Any rating less than a 3(z-score > 2) is considered a low rating according to the AASHTO Accreditation Program, but don't let that bother you unless you consistently receive low ratings. (See Figure 3 and the section below on Performance Charts.) Yes, low ratings are worth investigating, and you might even uncover an equipment problem or procedural mistake. Sometimes, however, your investigation of low ratings will lead you nowhere, and that's okay. The laws of statistics govern that some laboratories have to get low ratings - every lab will be on the low side of the ratings every once in a while. When an AASHTO-accredited laboratory receives low ratings for a given test, they are required to perform a root cause analysis and implement corrective action. If the laboratory receives low ratings again for that test, it might be a sign that either the corrective action was not effective or that the laboratory did not actually apply any corrective action. Now that you understand the concept of ratings, let's discuss a couple of other items that cause confusion.

The ** Rating
The ** rating indicates that the test results have been suppressed. Ratings may be suppressed for several reasons, but usually this is an indication of one of three things: 1) The data collected was for informational purposes only and is not a measure of the laboratory's competency, 2) data received is unusual and does not fit a normal distribution, or 3) there were not enough data points to provide an accurate analysis.

Repeatability (Within-Lab)
Ratings Repeatability is an estimate of the variation in results that you might expect if you repeated the same test over and over in your laboratory. The within-lab rating is based on the difference between the two individual lab results, but also any actual differences between the two sample materials.

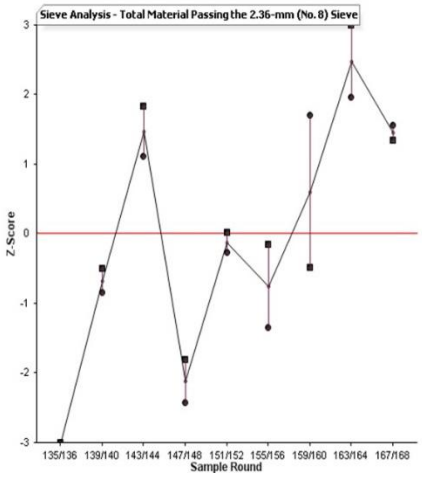


Figure 3: A Sample Performance Chart

Performance Charts
Performance charts provide an easy way to gauge your laboratory's proficiency testing performance over time (see Figure 3). As stated above, too much emphasis should not be placed on an occasional low rating. However, patterns in performance charts should be analyzed carefully, as they are usually good indicators of testing problems. The ideal scenario is to have all points over the center line - results right on the average time after time. Generally speaking, however, points scattered within the bands of +2 and -2 are indicative of good testing performance. Points drifting away from the centerline and points consistently on one side of the centerline are indicative of performance problems.

Now What?
I'm glad you asked. You've just learned all that you need to know about the proficiency sample program and how the results are reported. Now you have to take that knowledge and use it to get the most out of the program. You'll be reviewing your results, repeatability ratings, performance charts, and taking meaningful corrective actions so that you can score 5's and -5's - and you'll be more excited than ever to be average!

~~**1. TEST DATA ENTRY**~~

~~1.1 The Contractor's Quality Control Plan shall clearly state the name(s) of the individual(s) entering test data as outlined in MP 109.00.21.~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

GENERAL INFORMATION GUIDE FOR TECHNICIAN AND INSPECTOR CERTIFICATION PROGRAM (TICP)

1. PURPOSE

1.1. The purpose of the West Virginia Division of Highways (WVDOH) Technician and Inspector Certification Program is to improve the quality assurance of various materials by the certification of industry and WVDOH. This procedure is to establish guidelines for this purpose.

2. GENERAL

2.1. It is the WVDOH's intent to conduct a cooperative program of training, study, and examination so that personnel of the producer, contractor, and the WVDOH will be able to better assure, by their increased technical knowledge, the level of quality required by the governing Specifications.

3. REFERECED DOCUMENTS

3.1. MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement.

~~3.~~4. SCOPE

~~3.1.~~4.1. This procedure is applicable to all requirements, guidelines, and other support documents of the WVDOH that reference conditions, methods, and levels of qualification specific to the WVDOH Training and Certification Program.

~~4.~~5. POLICIES AND ADMINISTRATION

~~4.1.~~5.1. ~~Board of~~ Certification Board - The Certification Program will be carried out in accordance with general policy guidelines established or approved by the Chief Engineer. They will be advised by a Board composed of the following members:

1. Chief Engineer
2. ~~Human Resources Director~~Deputy General Counsel
3. Director of ~~Materials Control Soils and Testing (~~MCS&T~~)~~ - hereafter referred to as "Director"~~'s Director~~
4. Quality Assurance Training Program Administrator
5. Applicable MCS&T Supervisor(s)~~s~~

~~4.1.1.~~5.1.1 The Certification Board will meet ~~upon~~ when called ~~of~~ by the Director.~~MCS&T's Director.~~

4.1.2. Administration - The program will be administered by the Director of the MCS&T. (hereafter referred to as "Director"). The Director will have the assistance of an Implementation Committee appointed by the Chief Engineer as follows:

4.1.3. Quality Assurance Training Program Administrator

4.1.4. Applicable MCS&T Supervisors

4.1.5. A representative of the WVDOH Human Resources Division.

4.1.6.5.1.2.

4.1.7. In addition, the Certification Board may jointly select representatives of producers and contractors to work with the Implementation Committee at such times and on such matters as the Director and the representatives mutually agree. These representatives shall not be candidates for certification.

4.1.8. The Implementation Committee will meet upon call of the Director, or person authorized by the Director. The board shall have a minimum of three (3) members in order to form a quorum for a meeting.

4.1.9.5.1.3 The Program Administrator shall be appointed by the Director. The Program Administrator will be assigned to assist the Director in administering the program and to handle planning, administration, and coordinating functions as may be delegated within the scope of appropriate WVDOH directives.

5.6. REQUIREMENTS

5.1.6.1. Where applicable, quality control representatives of a the contractor and/or producer will be certified in one (or more) of the applicable certifications listed in Section 6.0below, depending upon on the individual's duties or responsibilities. Responsibilities and qualification requirements are listed in appropriate support documents such as Specifications, Materials Procedures, and/or Quality Control Plans and others..

5.2.6.2. For purposes of the WVDOH Quality Assurance Program, a non- WVDOH certified technicianTechnician/Inspector represents the company of which he/she isthey are a full-time employee on the WVDOH project, owner, or partner (as defined by the Federal Wage and Hour Legislation). If said company has subsidiary or affiliated organizations, each organization will be required to have its own certified Technicians/Inspectors where applicable unless the Chief Engineer makes an exception. Exceptions will be granted only when it can be proven that the certified Technician/Inspector actually performsperforms the duties of the technicianTechnician/inspector Inspector for all of the subsidiary or affiliated organizations.

5.3. Designated WVDOH personnel will be certified where applicable in one (or more) of the certifications listed in Section 6.0 depending upon the individual's duties and responsibilities.

7. CERTIFICATION CLASSES

7.1. The TICP offers certification classes in the following disciplines:

1. Aggregate Technician
2. Aggregate Sampling Inspector
3. Soils & Aggregate Compaction Technician
4. Asphalt Field & Compaction Technician
5. Portland Cement Concrete Technician
6. Portland Cement Concrete Inspector
7. Asphalt Plant Technician
8. Asphalt Preservation Technician
9. ~~Asphalt Field Technician~~Radiation Safety
10. Inertial Profiler Operator

Except as noted, all certifications are valid for a three-year period

7.2.

7.3. All certifications ~~listed in the sections below~~ require written examinations. Some ~~of the listed certifications~~also require a practical examination after successful completion of the written examination.

~~5.4.~~7.4. It is the responsibility of the applicant to determine which certification is applicable to ~~his/her~~their assignment. Following is a description of the certifications listing relevant information about each.~~:~~

8. AGGREGATE TECHNICIAN

8.1. Details of this class are available on the MCS&T Webpage[1]

8.2. The written examination for an Aggregate Inspector consists of the following areas:

1. Aggregate Specifications and Procedures
2. Aggregate Fundamentals
3. Sampling, Control, and Inspection of Aggregates
4. Aggregate Testing

8.3. After successful completion of the written examination, the applicant will be required to pass a practical examination. The technician must demonstrate the testing common to normal aggregate quality requirements.

8.4. Certification as an Aggregate Inspector qualifies the technician to perform sampling and/or testing of aggregates for both Quality Control and Quality Assurance.

[1] https://transportation.wv.gov/highways/mcst/Pages/Agg-Technician.aspx

~~5.5. AGGREGATE CERTIFICATIONS~~

9. AGGREGATE SAMPLING INSPECTOR~~–~~

9.1. Details of this class are available on the MCS&T Webpage[2]

~~5.5.1.~~9.2. The web-based examination for an Aggregate Sampling Inspector consists of the following areas:

1. Specifications
2. Sampling Fundamentals
3. Sampling Methods and Equipment
4. Gradations
5. T11 Wash Test

9.3. The Aggregate Sampling Inspector requires the successful completion of an online examination.

~~5.6.~~9.4. Certification as an Aggregate Sampling Inspector qualifies the ~~employee,~~technician ~~either Industry or Division,~~ to perform sampling of aggregates for both Quality Control and Quality Assurance.~~relevant to the Quality Control Program or Acceptance Program respectively.~~

~~5.6.1. AGGREGATE TECHNICIAN – THE WRITTEN EXAMINATION FOR AN AGGREGATE INSPECTOR CONSISTS OF THE FOLLOWING AREAS:~~

~~1. AGGREGATE SPECIFICATIONS AND PROCEDURES~~

~~2. AGGREGATE FUNDAMENTALS~~

~~3. SAMPLING, CONTROL, AND INSPECTION OF AGGREGATES~~

~~4. AGGREGATE TESTING~~

~~5.6.2. AFTER SUCCESSFUL COMPLETION OF THE WRITTEN EXAMINATION, THE APPLICANT WILL BE REQUIRED TO PASS A PRACTICAL EXAMINATION CONSISTING OF HIS/HER DEMONSTRATION OF TESTING COMMON TO NORMAL AGGREGATE QUALITY REQUIREMENTS. CERTIFICATION AS AN AGGREGATE INSPECTOR QUALIFIES THE EMPLOYEE, EITHER INDUSTRY OR DIVISION, TO PERFORM SAMPLING AND/OR TESTING OF AGGREGATES RELEVANT~~

[2] https://transportation.wv.gov/highways/mcst/Pages/aggsamplinspec.aspx

~~TO THE QUALITY CONTROL PROGRAM OR ACCEPTANCE PROGRAM RESPECTIVELY.~~

~~5.7. COMPACTION CERTIFICATIONS~~

10. SOILS AND AGGREGATE COMPACTION ~~INSPECTOR~~TECHNICIAN ~~-~~

10.1. Details of this class are available on the MCS&T Webpage[3]

~~5.7.1.~~10.2. The written examination for this class~~a Soils and Aggregate Compaction Inspector~~ consists of the following areas:

1. Specifications
2. Soil Compaction Test Procedures
3. Radiation Safety and Nuclear Gauge
4. Test Procedure Problems

10.3. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating ~~his/her~~their proficiency in using the testing equipment.

~~5.7.2.~~10.4. Certification of the Soils and Aggregate Compaction ~~Inspector~~ Technician qualifies the ~~employee~~technician~~, either Industry or Division,~~ to conduct tests on all Soil and Aggregate construction materials that require compaction testing.

11. ASPHALT FIELD AND COMPACTION TECHNICIAN

11.1. Details of this class are available on the MCS&T Webpage[4]

11.2. The written examination for this class consists of the following areas:

1. Specifications
2. Surface Preparation
3. Mix Delivery and Placement
4. Joint Construction
5. PWL
6. Troubleshooting
7. Compaction Test Procedures
8. Radiation Safety and Nuclear Gauge
9. Test Procedure Problems
10. Testing Forms

11.3. Successful completion of the written examination and a practical examination test is required.

11.4. Certification as an Asphalt Field and Compaction Technician qualifies the technician to oversee or inspect asphalt pavement construction. In addition, the class hand-out

[3] https://transportation.wv.gov/highways/mcst/Pages/compactioninspector.aspx
[4] https://transportation.wv.gov/highways/mcst/Pages/AsphaltFieldTech.aspx

material is a valuable reference tool for each stage of the construction process. The required radiation safety training is included in this class and will certify attendees with a passing score to perform nuclear density testing on asphalt pavements.

11.5. Asphalt Field and Compaction Technicians must also be evaluated by qualified District personnel on the first WVDOH paving project in which they perform this testing.

11.5.1. The District personnel will make the decision as to whether or not the technician is correctly conducting the nuclear density tests in accordance with the Specifications.

11.5.2. The District will also complete an evaluation form and send it to the MCS&T for processing.

11.5.3. A technician that does not demonstrate proper nuclear density testing techniques shall not be allowed to continue testing on the WVDOH project. They must be replaced by another qualified technician. Anyone who does not meet the evaluation standards must provide proof of additional WVDOH approved radiation safety training before another evaluation will be conducted.

~~5.8.~~ **PORTLAND CEMENT ~~CONCRETE CERTIFICATIONS~~**

12. CONCRETE TECHNICIAN~~.~~

12.1. Details of this class are available on the MCS&T Webpage[5]

~~5.8.1.~~12.2. The written examination this class ~~for a Concrete Technician~~ consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

12.3. The Concrete Technician requires only the successful completion of the written examination; no practical examination test is required.

~~5.8.2.~~12.4. Certification of the Concrete Technician qualifies the ~~employee, either Industry or Division,~~technician to make plant and mix adjustments, proportioning, and other concrete related duties.

13. ~~CONCRETE~~ PORTLAND CEMENT CONCRETE INSPECTOR~~INSPECTOR~~

13.1. Details of this class are available on the MCS&T Webpage[6]

~~5.8.3.~~13.2. ~~-~~The written examination for this class ~~a Concrete Inspector~~ consists of the following areas:

1. Fundamentals

[5] https://transportation.wv.gov/highways/mcst/Pages/concretetech.aspx
[6] https://transportation.wv.gov/highways/mcst/Pages/concreteinspector.aspx

2. Sampling and Testing
3. Control and Inspection
4. Specifications

13.3. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating ~~his/her~~their proficiency in conducting tests common to concrete quality control.

13.4. Certification as a Concrete Inspector qualifies the ~~employee~~technician~~, either Industry or Division,~~ to perform sampling and/or testing of concrete ~~relevant to the~~for Quality Control ~~Program~~ and/or Quality Acceptance ~~Program respectively~~.

13.4.1. American Concrete Institute (ACI) Field Testing Grade I certification will be accepted as a portion of the West Virginia PCC Inspector training. However, the applicant must pass the online West Virginia PCC Inspector written certification test before a certification will be issued.

~~5.9. ASPHALT MIXTURE CERTIFICATIONS~~

14. ASPHALT PLANT TECHNICIAN~~–~~

14.1. Details of this class are available on the MCS&T Webpage[7]

~~5.9.1.~~14.2. The written examination for ~~an Asphalt Plant Technician~~this class consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

14.2.1. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating their proficiency in conducting tests common to Asphalt quality control.

~~5.9.2.~~14.2.2. Certification of the Asphalt Technician qualifies the employee~~, either Industry or Division,~~ technician to take asphalt mixture samples, perform quality control or quality assurance testing on plant produced asphalt mixtures, make plant and mix adjustments, aggregate proportioning, and other duties.

15. ASPHALT PRESERVATION TECHNICIAN~~ASPHALT FIELD TECHNICIAN (AFT) ASPHALT FIELD TECHNICIAN~~ ~~–~~

Commented [DB1]: Is this now the Asphalt Preservation Technician?

15.1. Details of this class are available on the MCS&T Webpage[8]

[7] https://transportation.wv.gov/highways/mcst/Pages/hotmixasp.aspx
[8] https://transportation.wv.gov/highways/mcst/Pages/Asphalt-Preservation-Technician.aspx

15.2. This exam is based on web-based training found in the TC3 Course "Flexible Pavement Preservation Treatment Series."

15.3. A printed copy of the Certificate of Training from this course is required to be presented for registration on the day of the exam.

15.4. The written examination for an Asphalt Preservation Technician consists of the following areas in regards to chip seals, micro surfacing, thin overlays, and crack sealing~~The written examination for an Asphalt Field Technician. This class consists of the following areas:~~

1. Fundamentals of Preservation
2. Pavement Conditions and Treatment Selection
3. Performance Characteristics
~~1.~~ Inspection and Best Practices~~Specifications~~
4. ~~Surface Preparation~~
~~Mix Delivery and Placement~~
~~Joint Construction~~
~~Asphalt Compaction~~
~~PWL~~
~~Troubleshooting~~

15.4.1. Certification of the Asphalt Preservation Technician is currently optional. This certification is for technicians who want to be more prepared for asphalt preservation style projects.

~~Successful completion of the written examination is required. Certification as an Asphalt Field Technician qualifies the employee, either Industry or Division, to oversee or inspect asphalt pavement construction. In addition, the class hand-out material is a valuable reference tool for each stage of the construction process.~~

~~5.9.3. Asphalt Field Technician – The written examination for an Asphalt Field Technician consists of the following areas:~~

~~Surface Preparation~~
~~Mix Delivery and Placement~~
~~Joint Construction~~
~~PWL~~
~~1. TroubleshootingSpecifications~~
~~2. Surface Preparation~~
~~3. Mix Delivery and Placement~~
~~4. Joint Construction~~
~~5. PWL~~
~~6. Asphalt Compaction~~

~~5.9.4. Successful completion of the written examination and a practical examination test is required. Certification as an Asphalt Field and Compaction Technician qualifies the employee, either Industry or Division, to oversee or inspect asphalt pavement construction. In addition, the class hand-out material is a valuable reference tool for each stage of the construction process. The required radiation safety training is included in this class and will certify attendees with a passing score to perform nuclear density testing on asphalt pavements.~~

~~5.9.5. Asphalt Field and Compaction Technicians must also be evaluated by qualified District personnel on the first WVDOH paving project in which they perform this testing. The District personnel will make the decision as to whether or not the technician is correctly conducting the nuclear density tests in accordance with the Specifications. The District will also complete an evaluation form and send it to the MCS&T for processing. A technician that does not demonstrate proper nuclear density testing techniques shall not be allowed to continue testing on the WVDOH project. They must be replaced by another qualified technician. Anyone who does not meet the evaluation standards must provide proof of additional WVDOH approved radiation safety training before another evaluation will be conducted.~~

~~5.9.6. Inertial Profiler Operator- The written examination for the inertial profiler operator covers of the following areas:~~

~~1. WVDOH Specifications~~
~~2. AASHTO and ASTM Specifications~~
~~3. Knowledge of operation and analysis of collected data.~~

~~5.9.7. This certification covers an employee of either a contractor, consultant, or DOH staff to operate a lightweight/low-speed and high-speed inertial profiler.~~

~~5.10.~~16. RADIATION SAFETY

~~5.10.1.~~16.1. This certification is required by the Nuclear Regulatory Commission (NRC) before operating a portable nuclear gauge. The training consists of 3 - 4 hours classroom instruction and has a 25-50 question closed book exam. A minimum score of 70 percent is required for passing the course. The course and exam will cover the following areas:

~~2.~~5. Proper storage and security of portable nuclear gauges
~~3.~~6. Transportation of portable nuclear gauges
~~4.~~7. Personal safety while operating a portable nuclear gauge.

17. INERTIAL PROFILER OPERATOR

Commented [DB2]: Ask Vince - separate class?

17.1. This certification does not have class, nor does the test need to be proctored by the WVDOH. The exam is provided upon request. Details of this certification are in MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement

17.2. The written examination for the inertial profiler operator covers of the following areas:

1. WVDOH Specifications

2. AASHTO and ASTM Specifications
3. Knowledge of operation and analysis of collected data.

17.3. This certification allows a technician to operate a lightweight/low-speed and high-speed inertial profiler.

18. TESTING PROTOCL

18.1. TESTING PROTOCOL

18.1.1. The TICP has a testing protocol that must be followed. The protocol includes testing environment, time limits, proctoring exams, etc. The entire protocol will be covered with attendees prior to testing.

18.2. CLASS SUPPLY LIST

18.2.1. We recommend that participants bring the following items with them to the certification classes:

1. Laptop Computer or Tablet (Mandatory)
2. Photo ID
3. Current WV Specification book and the latest Supplemental to the Specification book. You will need this during the test. These are also available in printable PDF format on the WVDOH Webpage.[9]
4. Hand held calculator (No electronic devices other than a Hand held calculators are allowed to be used during testing.)
5. Highlighters
6. Sticky Notes
7. Ruler / Straight edge

~~5.11.~~18.3. Special needs and requests:

~~5.11.1.~~18.3.1. Applicants with special needs should notify the Quality Assurance Training Program Administrator prior to the class to ensure that the training location is prepared to accommodate their needs.

Commented [DB3]: Fix header to be consistent.

19. CERTIFICATION AND RE-CERTIFICATION

19.1. Certification

19.1.1. An individual must pass the examination in each level for which they are requesting certification. Unless otherwise noted, to pass the written examinations, the applicant must obtain a minimum score of 70 percent.

19.1.2. If an applicant fails to receive a minimum score of 70% on the first exam, they will be given another attempt at a later date to score a 70%. This second attempt shall be a subsequent, scheduled make-up exam. Failure to attend any examination counts as a failed exam.

[9] https://transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx

19.1.3. Upon successfully completing the requirements for certification, applicants may print their certification card from the divisions Webpage. http://dotftp.wv.gov/materialsdir/

19.1.4. This certification is not transferable. A certification is valid for up to Three years and expires December 31, of the 3rd year of certification.

19.2. Re-Certification

19.2.1. The responsibility for obtaining re-certification shall lie with the certified individual.

19.2.1.1. Certification holders are responsible to ensure that their certifications stay current. The West Virginia Division of Highways will no longer mail reminder letters to certification holders.

19.2.2. The renewal of all certifications shall require a written exam and a hands-on practical exam, where applicable.

19.2.3. Applicants will be given two scheduled attempts to pass the recertification exam and one attempt to pass the practical exam (each, respectively). Any applicant that fails to acquire a minimum score of 70% on a recertification exam or who fails the subsequent practical exam will not have their certification renewed. The applicant will be required to take the respective certification classes at the next available time given by MCS&T.

19.2.4. Any failed recertification examination taken prior to the expiration date of the current certification, either practical or written will not result in termination of any current certification prior to the expiration date of that certification.

19.2.5. The certification holder is responsible updating their personal information on the online learning website[10].

19.2.6. If an applicant seeking recertification disagrees with a recertification decision, they may file a written appeal with the board.

19.3. If certification is not renewed by December 31, the Technician should take the class and shall take the full exam and practical at the next available offering.

20. RECIPROCAL CERTIFICATIONS

20.1. Acceptance of WVDOH Certifications by other state agencies is at the sole discretion of the other agency.

~~6.~~21. TRAINING

~~6.1.~~21.1. Training - The Division of Highways, contractors, and producers may sponsor courses of instruction consisting of schools and seminars to help prepare personnel for certification under one or more of these certification programs. To the extent possible, these courses of instruction will be joint efforts of the industry and WVDOH. Nothing in this document shall be interpreted to prohibit any party from conducting courses of instruction for their personnel to assist in preparation for these exams.

[10] http://www.onlinelearning.wv.gov/student/home.html

6.2.21.2. The purpose of the schools is to provide helpful information and instruction for people preparing to take the WVDOH Technician/Inspector examinations. These courses are designed to provide instruction for people with a basic foundation in the subject matter. Work experience in the subject matter is encouraged before attending classes.

7.22. EXAMINATIONS

1.1 Examinations, both written and practical, will be coordinated by MCS&T. The locations and dates of the examinations will be announced on the MCS&T's Webpage[11]. The examinations may be held on a regional basis when feasible. Most written examinations will be an "open book" type, with a time limit. Practical examinations require performance of the tests required by the Specifications for the material type involved.

1.2 To pass the written examinations, the applicant must obtain a score of at least 70 percent. The Inertial Profiler Operator exam requires a minimum of 75 percent to pass. The applicant will be allowed two attempts within a 12-month period to obtain a passing score per each certification class attended.

1.3 After the applicant passes the written examination, the applicant will have two attempts within a 12-month period to pass the practical exam. (Where applicable)

1.4 Certificate Non-Transferable - The status of the certification for a Technician or an Inspector is not transferable and is valid only for the quality control procedures designated by the bearer's certificate.

1.5 Revocation of Certificate - If at any time a WVDOH, contractor's, producer's, or supplier's Technician or Inspector is found to have altered or falsified test reports or is found to have improperly performed tests or reported their results, the individual's certification may be rendered invalid by the Chief Engineer upon recommendation of the Implementation Committee and/or the Board.

7.1.22.1. Renewal and Certification – Certifications shall be renewed as required in the Technician Inspector Certification Program (TICP) handbookthis document. General guidance and information for renewal will be recommended by the Board as required by the Chief Engineer. All certifications shall terminate on December 31st of the year of expiration. There may be written, and practical examination required for recertification where applicable. More recertification information can be found in the Technician Inspector Certification Program (TICP) handbook available on the MCS&T's Webpage.

1.5.1 The Implementation Committee or other designated party shall establish internal criteria for renewal. The Technician Certification Handbook with the current rules and requirements shall be posted on the MCS&T's Webpage.

7.1.1.22.1.1. Upon obtaining renewal of certification, a renewal card may be printed from the MCS&T Webpage.

7.2.22.2. For further information on classes, recertification, schedules, class calendars and other helpful information please visit the MCS&T's Webpage.

[11] http://transportation.wv.gov/highways/mest/Pages/techcert.aspx

~~8.~~23. FUNCTIONS AND RESPONSIBILITIES

~~8.1.~~23.1. Contractor or Producer - The producer and contractor will be responsible for product control of all materials during the handling, blending, and mixing operations. The contractor and producer also will be responsible for the formulation of a design mix that will be submitted to the Division for approval.

~~8.1.1.~~23.1.1. Technician/Inspector - A Quality Control representative of a contractor or producer should be a certified Technician/Inspector as outlined in Section 5. and whose responsibilities may include such duties as proportioning and adjusting the mix, sampling and testing the product, and preparing control charts.

~~8.2.~~23.2. The WVDOH - The WVDOH is responsible for all acceptance decisions.

~~8.2.1.~~23.2.1. District Materials Supervisor - District Materials activities are the responsibility of the District Materials Supervisor.

23.2.2. Division Technicians and Inspectors – The WVDOH Technicians and Inspectors will be assigned as necessary to carry out the required acceptance decision activities. The WVDOH representatives will not issue instructions to the contractor or producer regarding process control activities. However, the WVDOH representatives have the responsibility to question, and where necessary to reject, any operation or sequence of operations, which are not performed in accordance with the contract documents.

~~9.~~24. REVOCATION OF CERTIFICATION

24.1. If at any time a WVDOH, contractor's, producer's, or supplier's Technician or Inspector is found to have altered or falsified test reports or is found to have improperly performed tests or reported their results, the individual's certification may be rendered invalid by the Chief Engineer upon recommendation of the Board.

~~1.6 The Certification Board grants certification upon satisfactory completion and maintenance of certain conditions and may be revoked upon any breach of these conditions.~~

~~9.1.~~24.2. Generally, certifications may be revoked if in the opinion of the certifying authority, an individual has knowingly committed acts detrimental to the integrity of the Certification Program or transportation industry. Examples of situations that warrant revocation include, but are not limited to:

1. Deliberate falsification of field or quality control test results or records.
2. Deliberate falsification of calculations, test results or materials
3. Cheating on certification/re-certification exams.
4. Submittal of false information on certification applications.
5. Submitting trial mix mixture and/or calculations completed by someone other than the signatory, or knowingly supplying trial mix mixture and/or calculations for another individual's certification.

24.3. The Quality Assurance Training Program Administrator will take the lead in gathering facts and investigating any allegations which may require revocation of a certification.

Commented [DB4]: SJ - What does this mean? What are they referring?

The review board will notify the individual in writing of intent to revoke certification(s).

25. APPEALING A DECISION

25.1. Any individual who disagrees with a decision by the Certification Board has 10 business days from the date of receipt of the notification to respond in writing to the board and present documentation to support their continued certification and/or request an opportunity for a meeting to present their case.

Appeals should be mailed to:
Certification Board
ATTN: Quality Assurance Program Administrator
West Virginia Division of Highways
190 Dry Branch Dr.
Charleston, WV 25306

25.2. If the individual fails to respond within 10 days of receipt of the original notification of revocation letter, the revocation becomes final.

25.3. Not later than 20 business days after receiving a request for a meeting from the individual, the Certification Board will schedule a meeting in which the appellant can present their case. If the Certification Board was not persuaded by the documentation provided by the appellant and believes that revocation of the certification is warranted, the appellant may file a written appeal to the Chief Engineer for review. All information including any letter(s) of explanation from the appellant will accompany the documents submitted to the Chief Engineer. The board will mail the decision of the Chief Engineer to the appellant. The decision by the Chief Engineer is final.

26. THE LENGTH OF REVOCATION:

26.1. First Offense

26.1.1. This may include revocation of all certifications for up to one year. After the revocation period the individual may obtain recertification by passing respective certification exam and a practical (if applicable). If either exam is failed, the individual will be required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.2. Second Offense

26.2.1. This may include revocation of all certifications for up to five years. There is also the possibility of demotion and reduced pay for WVDOH employees. After the revocation period the individual may obtain recertification by passing the respective certification exam and a practical (if applicable) at the discretion of the board. If either exam is failed, the individual will be required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.3. Third Offense

26.3.1. This may include revocation of all certifications for life. There is also the possibility of termination, demotion and reduced pay for WVDOH employees.

27. CONTACT INFORMATION

27.1. If an applicant/technician/appellant has any questions about the DOH program or needs more information. Please contact: Qaschoolscoordinator@wv.gov

Michael A Mance, PE
Interim Director
Materials Control, Soils & Testing Division

MP 106.03.50 Steward – Personnel, Payroll Section
MM:h
~~ATTACHMENT~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

MATERIAL CERTIFICATIONS GUIDELINES

1. PURPOSE

1.1 To set forth procedures for the submittal and acceptance of Materials Certifications.

1.2 To provide an outline for training of employees new to the Materials Certification process.

2. SCOPE

2.1 This will apply to all Materials Certifications done in the State of West Virginia, whether they are federally or non-federally funded, FEMA, or any other designation.

2.2 Though this MP references the use of AASHTOWare Project (AWP), ProjectWise (P/W), and other agency specific programs; if these programs are supplanted by other programs or are otherwise rendered obsolete, this MP will apply to the equivalent, if applicable in the new programs, pending the update of this MP.

2.3 This MP does not designate the organization structure or attempt to direct the actions of Construction or Contract Administration.

3. REFERENCED DOCUMENTS

3.1 MP100.00.02 - Method of Evaluation of Non-Standard or Non-Conforming Materials in Construction Via ST-1

3.2 MP 100.0.03 - Method of Evaluation of Non-Standard or Non-Conforming Materials in Construction Via DMIR

4. DEFINITIONS

4.1 APL: Approved Product List - This is a list of materials which have been pre-approved for use on projects. These are documented by a laboratory number such as “2903421”.

4.2 ST-1: Special Testing Form # 1- The ST-1 provides an acceptance method for a material that does not have a prescribed acceptance method or is otherwise outside the scope of the normal acceptance procedure. An ST-1 is to be approved before the material is placed.

4.3 ST-2: Special Testing Form #2: – This is the “material transfer” form. It indicates that a material that has been documented on one project is being moved to another.

4.4 DMIR: District Materials Inspection Report – A DMIR is an investigation typically into a material failure or any other situation where there is no prescribed method for the resolution of a material on a project. A DMIR can have several outcomes including, but not limited to: Remove and replace, a price reduction, or accept in place etc.

4.5 AWP: AASHTOWare Project Management Software – This is the generic term for the suite of software used by the WVDOH to manage and process projects. This system manages contracts, samples, tests and other aspects of projects.

4.6 Authorize a Sample – This is a technical AWP term in which the user closes or locks the sample. Authoring a sample indicates that the sample has been resolved in the system and the system will allow the project to proceed through certification. This does not have any indication of whether the sample has passed or failed.

4.7 Concur/Non-Concur of Sample – This is a technical AWP term in which the reviewer indicates their acceptance of a sample. A "Non-Concur" typically requires additional action to accept the material in the system.

4.8 Sample ID – This is a technical AWP term which refers to the "key" field for a record in the AWP database.

4.9 Material Exception: Also known as a material deficiency, this indicates that, for the currently placed quantity, the material requirements have not been met.

4.10 P/W – ProjectWise: This is the WVDOH approved document retention repository and the official documentation of record for the WVDOH.

4.11 DWR – Daily Work Report: This is the daily documentation of work completed, materials placed and materials tested on the project.

5. MATERIAL ACCEPTANCE METHODS

5.1 Different materials are accepted by different methods and these methods are often described in detail by various Contract Documents.

5.2 Material acceptance is done in AWP via the following methods:

1. Sample Records
    a. Direct Test
2. Daily Work Report (DWR)
    a. Approved Product List
    b. Coverage
    c. ST-1/DMIR

5.3 Two "Evidence of Inspection" reports are available in AWP. These are good starting points for guidelines on the acceptance method for materials used on the project.

5.3.1 One of these reports gives guidelines for sample records; the second gives guidelines for materials that are accepted on the DWR.

5.4 The body of this MP will generically describe, using specific examples, the certification of materials based on the above-mentioned material acceptance.

6. LINE-ITEM CERTIFICATION

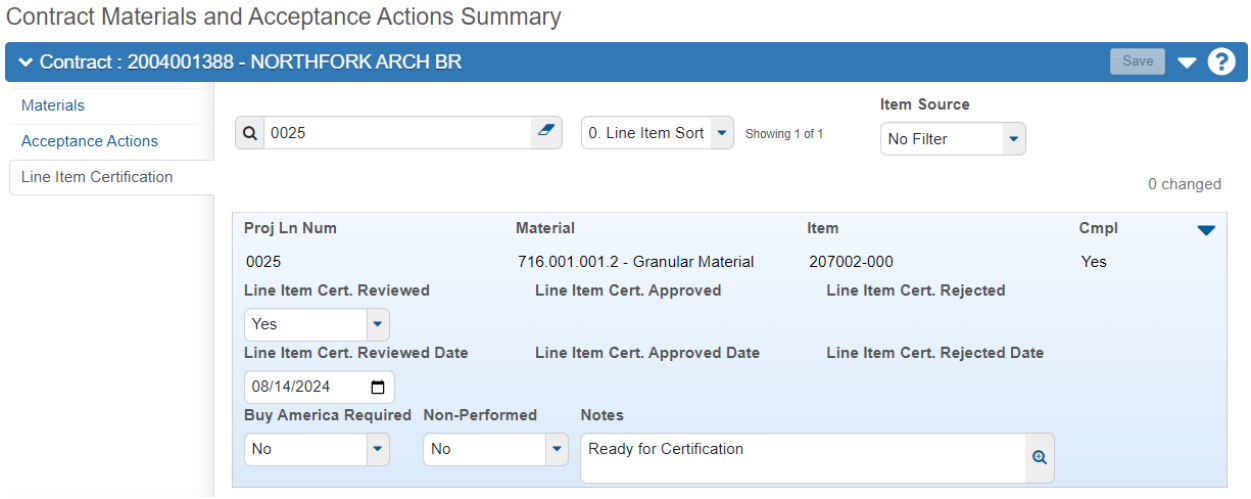
6.1 Larger projects may utilize line-item certification. This is the process by which a specific line on a project is certified independently from other items on the project.

6.2 A line-item certification assures the project that all their materials are complete on this item. Once the project is completed, no additional review is required on these lines, assuming that no additional material has been added.

6.3 To perform a line-item certification, the project must first mark the line-item complete.

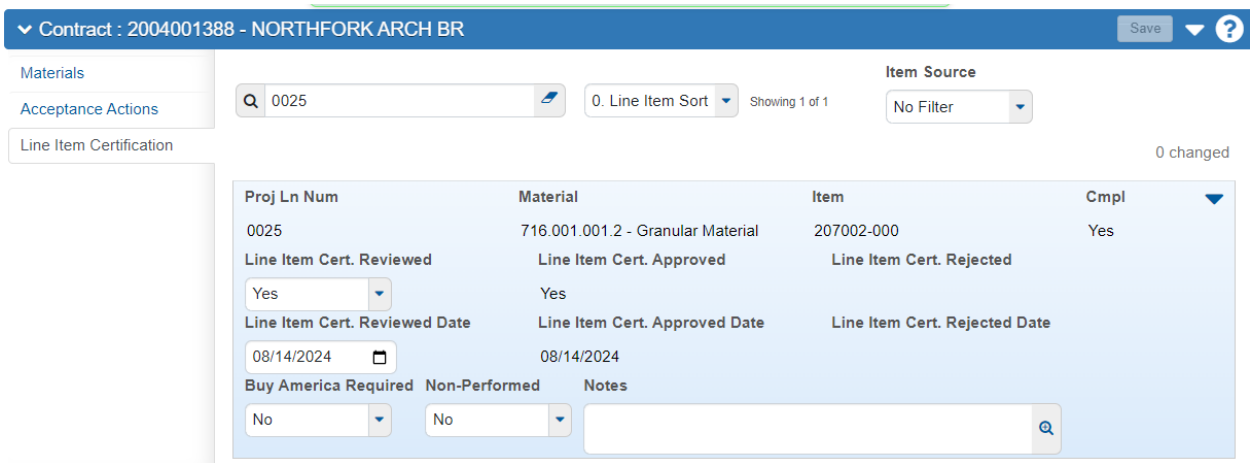
6.4 Once complete, District Materials will review the material requirements as described in this document. Once the District is certain all testing has been completed, they will mark the line-item "ready to certify" as indicated in Figure X.1

Figure X.1 – Example of Line-Item Certification



6.5 Once this has been reviewed and approved by the respective Materials Regional Coordinator, they will mark the line-item approved. If there are issues, it will be rejected and noted. Figure X.2 shows an approved line-item.

Figure X.2 – Example of a Completed Line-Item Certification



6.6 The "Line-Item Certification Status" report may be run to show the status of a line on a project. An example is shown in Figure X.3

Figure X.3 – Line-Item Certification Status Report

Date: 08/14/2024 2:27:16 PM

Line Item Certification Status

I-77 SIGNING - District 10

Contract ID	Line	Material Name	Review Date	Approve Date	Rejected Date	MCST Review	Ln Comp
2006000306	0030	607.002.000.02 - Blockout, Polymer	08/01/2024	08/12/2024		11 Days	✓
2006000306	0030	709.045.000 - Guardrail Posts, Galvanized Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0030	712.004.005 - Guardrail Beam, Panels, Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0035	607.002.000.02 - Blockout, Polymer	08/01/2024	08/12/2024		11 Days	✓
2006000306	0035	709.045.000 - Guardrail Posts, Galvanized Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0035	712.004.005 - Guardrail Beam, Panels, Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0040	607.002.000.02 - Blockout, Polymer	08/01/2024	08/12/2024		11 Days	✓
2006000306	0040	709.045.000 - Guardrail Posts, Galvanized Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0040	712.004.005 - Guardrail Beam, Panels, Steel	08/01/2024	08/12/2024		11 Days	✓
2006000306	0050	636.002.001.01 - Traffic Control Devices	08/01/2024	08/12/2024		11 Days	✓
2006000306	0065	636.002.001.01 - Traffic Control Devices	08/01/2024	08/12/2024		11 Days	✓
2006000306	0070	636.002.001.01 - Traffic Control Devices	08/01/2024	08/12/2024		11 Days	✓
2006000306	0075	636.002.001.02 - Warning Lights, Hazard	08/01/2024	08/12/2024		11 Days	✓
2006000306	0085	657.002.011.2 - Supports, Steel, Breakaway Splice	08/01/2024	08/12/2024		11 Days	✓
2006000306	0090	657.002.011.2 - Supports, Steel, Breakaway Splice	08/01/2024	08/12/2024		11 Days	✓
2006000306	0095	657.002.011.2 - Supports, Steel, Breakaway Splice	08/01/2024	08/12/2024		11 Days	✓
2006000306	0100	657.002.011.2 - Supports, Steel, Breakaway Splice	08/01/2024	08/12/2024		11 Days	✓
2006000306	0105	657.002.011.1 - Supports, Steel, Channel Bar (U	08/01/2024	08/12/2024		11 Days	✓
2006000306	0110	657.002.011.1 - Supports, Steel, Channel Bar (U	08/01/2024	08/12/2024		11 Days	✓
2006000306	0115	601.003.003.02 - Concrete, Class B, With Fly Ash, Slag	08/01/2024	08/12/2024		11 Days	✓

7. INSUFFICIENT MATERIALS REPORT

7.1 During the construction process, the project can easily monitor material deficiencies by running the "Detailed Insufficient Materials" report. This report lists the materials that are missing material coverage and whether or not those material exceptions are holding payment. This report is run on the instance of a specific estimate. An example of this report is shown in Figure X.1.

Figure X.1 – An Example of the Detailed Insufficient Materials Report

08/14/2024 14:34:27

Division of Highways

Detailed Insufficient Materials Report Report v1

Item:	662003-001 - POLYVINYLCHLORIDE CONDUIT,	**Item Qty Posted To Dt:**	0.500		
Supp Descr:	1-1/2"	**Item Qty Pd To Dt:**	0.000	**Item Qty Whld Due to Matls:**	0.500
Contract Line Number:	0185	**Item Qty Remaining:**	0.500	**Item Unit Price:**	$26,000.00
Project Item Line Number:	0185	**Item Amt Remaining:**	$13,000.00	**Item Amt Whld Due to Matls:**	$13,000.00

Insufficient Materials

Material Set	Matl Set Posted To Dt	Material	Conversion Factor	Appr Satisfied Matl Qty	Appr Reported Matl Qty	Appr Remaining Satisfied Qty	In Other Items
Default	00.500	715.042.010.3 - Conduit, Type P (Polyvinyl Chloride)	1	0.000	0.50000	-0.500	No

Exceptions	Withholding Payment?
ST1 is insufficient.	Yes

8. APPLICABLE DOCUMENTATIONS FOR THE REVIEW OF MATERIALS ON PROJECTS

8.1 The Sampling Checklist is the primary reviewing tool for Material Certifications. For smaller and or less convoluted projects, this can be used as the only reviewing report.

8.1.1 The Sampling Checklist shows the type of test(s) and or acceptance done, the results, the frequency of sampling performed and the required frequency of sampling. An example of this is show below:

Project: 2020000507 - CHEAT LAKE - COOPERS ROCK **Detailed Sampling Checklist** 11/21/2023

Line #	Item Code	Item Description	Supplemental Description	Estimated Qty	Authorize Qty	Unit	Comp
0045	410007-050	SUPERPAVE ASPHALT SKID PVT, TY 9.5		260751	279044.35	SY	✓

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
402.002.002.02-9.5 mm Skid Asphalt Mix, Superpave	Lab / Quality Control	Click Here

Test Method	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
AWP400.02 - Superpave Asphalt Mixture Test	Temporal	47	30	Not Applicable	1 / 1	1

Sample Records

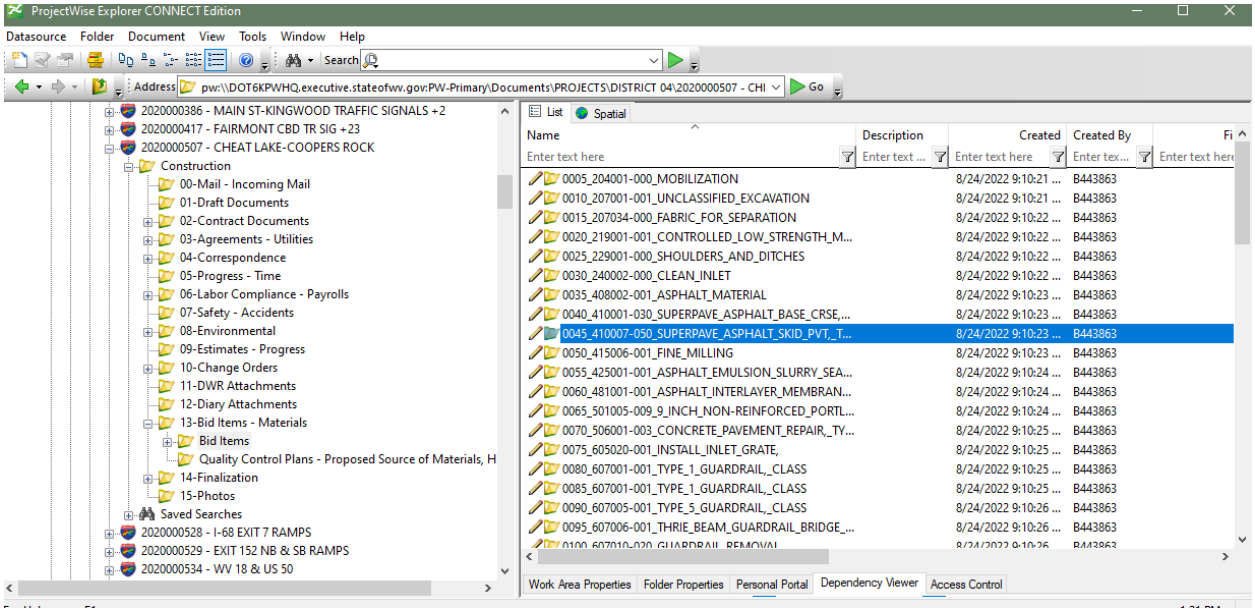
Sample Record	Sample Status	Lab Number	Tests	Sample Date	Completion Date	Authorized Date	Link to DWR	Authorized By
BDenn20230710115537	QC/QAD - Pass	C4232443	1	05/25/2023	07/10/2023	07/10/2023	Click Here	Stephen . Benedum
BDenn20230710120121	QC/QAD - Pass	C4232445	1	05/26/2023	07/10/2023	07/10/2023	Click Here	Stephen . Benedum
BDenn20230710120555	QC/QAD - Pass	C4232446	1	05/30/2023	07/10/2023	07/10/2023	Click Here	Stephen . Benedum
BDenn20230710121914	QC/QAD - Pass	C4232448	1	05/31/2023	07/10/2023	07/10/2023	No DWR	Stephen . Benedum
BDenn20230710122347	QC/QAD - Failed Left In Place	C4232465	1	06/19/2023	07/10/2023	07/10/2023	Click Here	Stephen . Benedum

Daily Work Reports

DWR Date	Sample Record	Quantity	DWR Creator
09/13/2022	AMill20230404111942	6044.44	Martha J. Wharton
09/14/2022	SBene20230629112820	18888.89	Martha J. Wharton
	SBene20230629111545		
	SDuck20230621105050		
09/15/2022	BDenn20230630075432	12504.44	Martha J. Wharton
	BDenn20230630080540		
09/16/2022	BDenn20230630081546	12895	Martha J. Wharton
	BDenn20230630083856		
09/20/2022	BDenn20230630084409	18180.56	Martha J. Wharton
	BDenn20230630085159		
	BDenn20230703081815		
09/23/2022	BDenn20230630090125	11805.56	Martha J. Wharton
	BDenn20230630085641		

8.1.2 Figure 5.1

8.1.3 The Sampling Checklist provides a guideline for the reviewer to check the corresponding ProjectWise project folder for each item. An example of the ProjectWise Folder for this Superpave Asphalt Skid Pavement example above is shown next:



8.1.4

8.2 Other reports may be utilized in addition to the Sampling Checklist but not in lieu. One example, the E440 Report, will help to separate out quantities, date placed, date tested etc. This gives more details on the Sampling Checklist which provides a total quantity and test resolutions. An example of a E440 Report is shown next:

9. GENERATING PROJECT TRACKING REPORTS

9.1 Reports are generated by using "West Virginia SiteManager Reports" through Microsoft Access. This needs to be setup by system administration. This section goes through the steps to generate both the Sampling Checklist and the E440 report.

9.2 The path for generating a sampling checklist is as follows: Materials -> Sample Reports -> Sampling Checklist (Figures 6.1 and 6.2). From here (Figure 6.3), select Contract ID and input the Sample ID (Figure 6.4). Hit Continue and continue back onto the Sampling Checklist Screen. Be sure to select the radio box for "File (.pdf)" and hit continue. This will generate the PDF file which will appear in your "documents" folder and will also open on your screen. This can sometimes take a while to "run" so be patient.

9.3

9.4

9.5 The E440 report is generated in the same manor, using the following path: Materials -> Sample Reports -> E440 Report.

10. GENERAL REJECTION REASONS

10.1 The following (though not limited to these) issues will result in a rejection:

(1) Illegible or otherwise unreadable documentation.

(2) Any discrepancy on the sampling checklist.

(3) Any unresolved material failures.

(4) Key Dates are not entered correctly (Showing 00/00/00).

(5) Lab numbers do not match approved product list or item is not on the approved product list.

(6) DMIRs have not been approved
(7) Money has not been taken off the contract for price reductions or DMIRs
(8) Quantities tested must be equivalent to or greater than material paid.
(9) Documents are not filed in the District Org folders to show A-bar for concrete and asphalt mix tests have been ran for materials shipped.
(10) There is a pending change order, which relates to a price penalty for materials.

11. DIRECT TEST

11.1 A direct test is the acceptance of a material based on a test that is performed on the material. For example, Section 401 of the Standard Specifications discusses the acceptance of Asphalt Base, Wearing and Patching & Leveling Courses. Marshall Asphalt Mixture Test and Compaction Roller Pass are all examples of direct tests performed in the field.

11.2 There are many other direct tests. For details on a specific test, refer to the Standard Specifications and if applicable, the MP.

11.2.1 Reviewing the Sampling Check List, check that each material was sampled to meet or exceed the required frequency. Confirm that each sample was completed, authorized and any failure(s) were resolved.

11.2.2 The testing documentation should be in ProjectWise under the applicable line item number.

11.3 An example of a Direct Test is shown below:

Project: 2020001411 - BEECH FK ST PARK FITNESS TRL SYS **Detailed Sampling Checklist** 11/21/2023

Line #	Item Code	Item Description	Supplemental Description	Estimated Qty	Authorize Qty	Unit	Comp
0040	401002-035	MARSHALL ASPHALT WEAR CRSE, SG, TY IV		338.8	387.56	TN	✓

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
401.002.000.05-Base 2/Wearing 4 Asphalt Mix, Marshall	Compaction / Quality Control	Click Here

Test Method	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
AWP106.18 - T407 - Compaction - Roller Pass	Contract	4	1	1	1 / 0	1

Sample Records

Sample Record	Sample Status	Lab Number	Tests	Sample Date	Completion Date	Authorized Date	Date Last Modified	Authorized By
TFarl20231106103005	QC/QAD - Pass	C2W1307	1	09/09/2023	11/06/2023	11/06/2023	11/06/2023	Tabitha . Farley
TFarl20231106103714	QC/QAD - Pass	C2W1308	1	09/11/2023	11/06/2023	11/06/2023	11/06/2023	Tabitha . Farley
TFarl20231106104315	QC/QAD - Pass	C2W1309	1	09/12/2023	11/06/2023	11/06/2023	11/06/2023	Tabitha . Farley
TFarl20231106110242	QC/QAD - Pass	C2W1310	1	09/13/2023	11/06/2023	11/06/2023	11/06/2023	Tabitha . Farley

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
401.002.000.05-Base 2/Wearing 4 Asphalt Mix, Marshall	Lab / Quality Control	Click Here

Test Method	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
AWP400.01 - Marshall Asphalt Mixture Test	Contract	3	1	1	1 / 1	1

Sample Records

Sample Record	Sample Status	Lab Number	Tests	Sample Date	Completion Date	Authorized Date	Date Last Modified	Authorized By
TFarl20231026095611	QC/QAD - Pass	C2W0444	1	09/09/2023	10/26/2023	10/26/2023	10/26/2023	Tabitha . Farley
RCoyl20231031015346	QC/QAD - Pass	C2W0446	1	09/11/2023	10/31/2023	10/31/2023	10/31/2023	Randy . Coyle
RCoyl20231031014254	QC/QAD - Pass	C2W0447	1	09/12/2023	10/31/2023	11/14/2023	11/14/2023	Tabitha . Farley

12. DIRECT COVERAGE

12.1 This type of coverage is provided directly by MCS&T or their designee. A prestressed box beam is an example of this type of coverage. The Director of MCS&T's designee, whether it be state employee or consultant will approve the material as per applicable MPs and assign a lab number to this coverage.

12.2 The lab sample shall be authorized in SiteManager and additional information about this approval may, but not is required to be provided.

12.3 An example of a direct coverage sample on the sampling checklist is provided below:

Project: 2018000052 - Pond Fork Bridge **Detailed Sampling Checklist** 11/21/2023

Line #	Item Code	Item Description	Supplemental Description	Estimated Qty	Authorize Qty	Unit	Comp
0190	603016-011	21X36 INCH PRESTRESSED CONCRETE BOX BEAM		393	393	LF	✓

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
603.002.000.02-Concrete Box Beam (Prestressed)	DC / DOC	Click Here

Action Documentation Type	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
Daily Work Report	Contract	2	1	1	1 / 0	1

Daily Work Reports

DWR Date	Rep Qty	Coverage #	Approval No.	Facility	DWR Creator
08/22/2022	0	2201212		Carr Concrete Company	Adam M. Gillispie
04/11/2023	0				Jonathan A. Bailey

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
715.005.000-Cement Grout, Pakaged Dry, Hydraulic, Non-Shrink	APL / Approved Source	Click Here

Action Documentation Type	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
Daily Work Report	Contract	1	1	1	1 / 0	1

Daily Work Reports

DWR Date	Rep Qty	Coverage #	Approval No.	Facility	DWR Creator
08/11/2022	0			BASF - Beachwood (Pending Name Change)	Jonathan A. Bailey

13. ST-1/DMIR DOCUMENTATION

13.1 If there is no other method for testing a material, or in the rare case, the material does not meet the specifications, the District may choose to accept the material using an ST-1 or DMIR.

13.2 ST-1s should been reviewed and authorized[1] by the Director of MCS&T or their designee.

13.3 A DMIR should be reviewed by the Director of MCS&T or their designee.

13.4 An example of a ST-1 Sample on the sampling checklist is provided below:

[1] As defined earlier, "authorized" does not imply approval, it is the Site Manger term for indicating that the sample has been resolved.

Project: 2020000392 - INSTITUTE LIGHTING **Detailed Sampling Checklist** 11/21/2023

Line #	Item Code	Item Description	Supplemental Description	Estimated Qty	Authorize Qty	Unit	Comp
0095	662002-001	GALVANIZED STEEL CONDUIT	CS1 PVC-COATED	1	1	LS	✓

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
715.042.010.1-Conduit, Rigid, Type R	ST1	Click Here

Action Documentation Type	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
Daily Work Report	Contract	1	1	1	1 / 0	1

Daily Work Reports

DWR Date	Rep Qty	Coverage #	Approval No.	Facility	DWR Creator
09/21/2023	1			Facility Pending Approval	Logan M. Gambill

13.5 An example of a DMIR Sample on the sampling checklist is provided below:

Project: 2021000344 - NORMANTOWN-GLENVILLE RD **Detailed Sampling Checklist** 11/21/2023

Line #	Item Code	Item Description	Supplemental Description	Estimated Qty	Authorize Qty	Unit	Comp
0100	401002-020	MARSHALL ASPHALT WEAR CRSE, SG, TY I		6611	6636.33	TN	✓

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
401.002.000.03-Wearing 1 Asphalt Mix, Marshall	DMIR	Click Here

Action Documentation Type	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
Daily Work Report	Contract	1	1	1	1 / 0	1

Daily Work Reports

DWR Date	Rep Qty	Coverage #	Approval No.	Facility	DWR Creator
08/29/2023					Shawn D. Jack

Material Code - Desc	Sample Type / Acceptance Type	Acc Action
401.002.000.03-Wearing 1 Asphalt Mix, Marshall	Lab / Quality Assurance	Click Here

Test Method	Freq Type	Completed	Current Req.	Total Expected	Frequency	Conv. Factor
AWP400.01 - Marshall Asphalt Mixture Test	Contract	2	1	1	1 / 0	1

Sample Records

Sample Record	Sample Status	Lab Number	Tests	Sample Date	Completion Date	Authorized Date	Date Last Modified	Authorized By
LConr20230616090140	QA - Similar Passed	M7A1014	1	06/07/2023	06/16/2023	06/16/2023	06/16/2023	Adam W. Nester
TKraf20230927071845	QA - Non-Similar - Failed	M7A0858	1	09/18/2023	09/27/2023	11/15/2023	11/15/2023	Gretchen S. Drake