

**CONNECTICUT DEPARTMENT OF
TRANSPORTATION**

BUREAU OF ENGINEERING & CONSTRUCTION

OFFICE OF CONSTRUCTION

***MATERIAL EVALUATION & SPECIFICATION UNIT
(MESU)***



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Quality Assurance (QA) Program for Materials
Acceptance and Assurance Testing Policies and Procedures



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Table of Contents

Chapter 1 – Purpose 4

Chapter 2 – Materials Evaluation and Specification Unit Overview 6

2.01 Hydraulic Cement Concrete and Physical Testing (HCC&PT) Section 7

2.01.01 District Laboratories 7

2.01.02 Physical Testing..... 8

2.01.03 Precast Concrete Fabrication Inspection..... 8

2.02 Asphalt Liquids & Asphalt Mixtures Section (AL&AM) 8

2.02.01 Asphalt Liquid Materials 8

2.02.02 Mixture Verification 9

2.02.03 Asphalt Mixture Independent Assurance and Dispute Resolution 9

2.02.04 In-Place Density..... 9

2.02.05 Production Facility Inspection and Mixture Acceptance..... 9

2.02.06 Accreditation and Asphalt Mixture Data Evaluation 9

2.03 Fabricated Steel and Project Support (FS&PS) Section..... 9

2.03.02 Final Materials Certification and File Retention 10

2.03.03 Structural Steel Fabrication and Consultant Administration..... 10

2.03.04 Project Support and Material Management Systems..... 10

Chapter 3 – Active Material Code Definitions 12

3.01 Paint/Coatings/Markings 12

3.01.01 Structural Steel Coatings 12

3.01.02 Pavement Markings 13

3.02 Dust, Snow, and Ice Control..... 14

3.03 Landscaping Materials 14

3.04 Precast Concrete 18

3.04.01 Drainage Structures 18

3.04.02 Structural Components 19

3.04.03 Other Concrete Members 20

3.05 Pipe 21

3.06 Steel Reinforcement 25

3.07 Hydraulic Cement Concrete 26

3.08 Prestressed/Post-Tensioned Concrete Members 28

3.09 Bonding Material, Fillers, and Sealers..... 28

3.10 Brick, Block and Pavers 31

3.11 Metal Castings 32

3.12 Fences 32



3.13 Geosynthetics	34
3.14 Railings.....	34
3.15 Structural Anchors & Bearings.....	36
3.16 Timber Piles	37
3.17 Gabions	37
3.18 Steel Items- Structural Steel.....	37
3.19 Highway Lighting & Traffic Control	42
3.20 Asphalt Liquids & Asphalt Mixtures	44
3.21 Aggregates	48
CHAPTER 4 – MATERIALS EVALUATION AND TESTING PROCEDURES	51
4.01 Materials Evaluation	51
4.02 Materials Acceptance Procedures	52
4.03 Materials Independent Assurance Procedures.....	64
Chapter 5 – Laboratory and Personnel Qualification	67
5.01 Independent Assessment.....	67
5.02 Equipment Calibrations, Standardizations, Checks, and Maintenance	67
5.03 Sampling and Testing Personnel Qualification	67
Chapter 6 – Active Material Codes	68
Chapter 7 – Minimum Schedule for Acceptance Testing for Local Transportation Capital Improvement Program (LOTICIP).....	68
Chapter 8 – Minimum Schedule for Acceptance Testing.....	68
Chapter 9 – Minimum Schedule for Independent Assurance Testing.....	68
Chapter 10 – MESU Forms	68



Chapter 1 – Purpose

This manual describes the organization, functions, and procedures performed by the Connecticut Department of Transportation's (Department) Material Evaluation and Specification Unit (MESU) relating to sampling, testing, and inspection of materials incorporated into Department projects or State funded municipal projects. Some specific laboratory procedures that are referred to in this manual are detailed in the MESU Standard Operating Procedures (SOP) Manual and the MESU Quality Management System (QMS) Manual which can be found in [QA Program for Testing Materials](#). In addition, the procedures used to verify Contractor test results and the Department's independent assurance test programs are also described. These functions and procedures comply with the criteria set forth in Federal Regulation 23 CFR 637, CONSTRUCTION INSPECTION AND APPROVAL, which governs quality assurance on all federal-aid highway projects on the National Highway System.

It is the function of MESU to predetermine in some cases and determine prior to completion of the work in other cases, if materials used by Contractors and the Department in the construction and maintenance of transportation facilities comply with the specification requirements and plans, and to assist others within the Department with developing and maintaining materials specifications and materials-related project specifications. Occasionally, MESU staff performs investigational work on new materials and procedures. Testing procedures utilized by MESU staff are as specified in the current edition of the CTDOT Standard Specifications; Standard Specifications and Methods of Sampling and Testing by the American Association of State Highway and Transportation Officials (AASHTO); the American Society for Testing and Materials (ASTM); and CTDOT Special Provisions.

The method and frequency of testing of materials used in the construction of Department projects are identified in the "*Minimum Schedule for Acceptance Testing*" and the "*Minimum Schedule for Independent Assurance Testing*," Chapters 8 and 9 of this manual, respectively. The schedules are arranged by the nomenclature used in the Department's Standard Specifications and listing of standard contract items.

MESU staff uses the enterprise Construction Management Reporting System (CMRS) and the Construction Document Management System (CDMS) used by the Departments to manage construction projects. Documentation of sampling, testing and acceptance of materials is administered within the CMRS for the Department's overall Quality Assurance program. In addition, several local materials-related applications developed and maintained by MESU staff are used to document activities not addressed by either enterprise system.

The CMRS used by MESU is AASHTOWare Project™ Construction and Materials (AWP). The materials portion of this system is maintained by MESU staff to ensure material(s) that require testing or inspection can be documented within the system. A list of standard five-digit codes used to identify each material and associated testing information can be found in [AWP Acceptance Material Codes.pdf](#) and [AWP Assurance Material Codes.pdf](#). Within the CMRS, contract items that typically encompass the use of material(s) that requires testing or inspection have that material(s) associated to the item by MESU staff. Throughout the course of a project, modifications to these associations may be required on a project-by-project basis due to a changed field condition, design change or Contractor selections. As materials are used on the project, project staff must generate a Sample Record in AWP or Daily Work Report (DWR) action at the frequency described in the Minimum Schedules for testing. MESU staff will perform the



actions necessary to make a recommendation to the District Engineer who serves as the contract administrator as to the acceptability of these materials in relation to the specific contract item and specification. These actions are typically referred to as “acceptance testing” and may include physical testing, visual inspection, and/or review of pertinent documentation for a sample of the total material used. Additional details for processing material samples in AWP are described in SOP MESU_02.

Actions showing that the samples meet the acceptance criteria stated within the contract specification generally would prompt a recommendation of acceptance from MESU staff for that material quantity represented by the sample. Conversely, actions showing that samples do not meet the acceptance criteria stated within the contract specification generally would prompt a recommendation of rejection.

The Engineer, as defined in the Department’s Standard Specifications Article 1.01.01, is ultimately responsible for the acceptance of the total material quantity used on a project and may accept materials recommended for rejection, or reject materials recommended for acceptance, in accordance with the Department’s Standard Specifications Articles 1.06.02 and 1.06.04.

Assurance testing is performed independently from acceptance testing by MESU or consultant staff to assure that staff is performing the testing procedures in accordance with the applicable sampling and testing specification and that the testing equipment used is calibrated and working properly. The results of assurance testing are not used to develop recommendations of acceptance or rejection.

After all requests for test and sample records have been processed for a project, a Final Materials Certification (FMC) process is conducted as required in 23CFR637.207 and in accordance with MESU SOP MESU_03 Final Material Certification.



Chapter 2 – Materials Evaluation and Specification Unit Overview

The Material Evaluation and Specification Unit (MESU) consists of three Sections, Hydraulic Cement Concrete and Physical Testing (HCC&PT); Fabricated Steel and Project Support (FS&PS); and Asphalt Liquids & Asphalt Mixtures (AL&AM). The Division Chief (DC) in the Division of Construction Operations (DCO) serves as the manager of the unit and the Transportation Principal Engineer (TPE) serves as the technical lead over all the sections. The TPE, as the Unit's representative on the Department's Standard Specifications Committee and the Department's representative for the AASHTO Committee on Materials and Pavements (COMP), advises and assists in the preparation and continuous revision of Department standards and AASHTO standard specifications used by the Department and transportation agencies throughout North America.

The DC is responsible for the overall operations of the MESU and other three Units in the Division of Construction Operations. This involves the approval of Units procedures including the MESU SOP Manual, the MESU QMS Manual, and this QA Program for Materials Acceptance and Assurance Testing Policies and Procedures.

The TPE maintains an association with Materials Testing Engineers of other states through AASHTO correspondence and their annual meeting and maintains a close association with the surrounding states' Materials Testing Engineers through the Northeastern States Materials Engineers' Association (NESMEA). The TPE also maintains a close relationship with professional organizations such as the Northeast Transportation Training and Certification Program (NETTCP); Northeast Asphalt User /Producers' Group (NEAUPG); and the Northeast Protective Coating Committee (NEPCOAT).

The DC and TPE are responsible for overall operation of the MESU. This include but is not limited to MESU staff procedures, and other pertinent Department policies and procedures.

The TPE is assisted by three Transportation Supervising Engineers (TSEs) who each lead a section. The organization of the MESU is graphically represented in this link [Org Chart MESU](#) .

It is the responsibility of each TSE to supervise the day-to-day operations of their respective Section. This includes but is not limited to assuring that materials are recommended for approval or rejection and the specified sampling and testing procedures are followed, the Unit procedures are being followed, DOT policies are being adhered to, needs of the section are being attended to, laboratory and technician qualification requirements are met, testing and inspection results are documented within the CMRS (AWP) for dissemination to the appropriate construction project and District staff, and other duties as signed by the TPE within the applicable job description.

The duties of the three TSEs also include the submission of budget, equipment, and resource requirements; investigation of materials failures; and communication with Contractors and Engineers on materials specifications and specific project-level issues.

One or two Transportation Engineer 3s (TE3s) assist the TSEs in the implementation of the Quality Assurance Program by supervising and monitoring lower level staff. This includes but is not limited to adherence to procedures and policies, attending to organizational needs of the areas reporting to them as well as assisting the TSEs with other duties as assigned.



The Department relies on the AASHTO Accreditation Program (AAP) to qualify the Central Laboratory facility and MESU staff in accordance with 23 CFR 637.209. This program provides accreditation for state and private laboratories that meet defined organization, staff, equipment, and that demonstrate testing proficiency on a regular periodic basis. The program covers the testing of the following construction materials pertinent to the Department: Asphalt Cement, Performance Graded Binder, Emulsified Asphalt, Asphalt Mixture, Asphalt Mixture Aggregate, Iron and Steel, Hydraulic Cement Concrete, and Hydraulic Cement Concrete Aggregate.

2.01 Hydraulic Cement Concrete and Physical Testing (HCC&PT) Section

The HCC&PT Section is responsible for the testing and inspection of hydraulic cement concrete, precast and prestressed concrete elements fabrication inspection, aggregates, and other unbound materials, reinforcing steel, and other steel-related elements. This section is also responsible for the collection of construction material samples from the project sites and their delivery to the Central Laboratory. Visits to the project sites are also commonly done to perform independent assurance testing on hydraulic cement concrete and aggregates.

The HCC&PT Section is divided into three functional subsections: the Central Laboratory and the three District satellite laboratories, the physical testing laboratory, and the precast concrete fabrication inspection subsection.

2.01.01 District Laboratories

This subsection oversees the operations of four district laboratories-District 1 (located within the central laboratory in Rocky Hill) and the three satellite laboratories located in Colchester (District 2), New Haven (District 3), and Thomaston (District 4). Combined, these laboratories support the five Districts' construction and maintenance staff to expedite the sampling and testing of common materials such as HCC and aggregates. This subsection is also responsible for maintaining an active statewide independent assurance testing program for aggregates sampling and concrete testing.

The MESU laboratories are primarily assigned materials sampling and testing for projects within the District in which they are located.

The principal duties of the District laboratories include:

- Perform acceptance testing of fine and coarse aggregates including but not limited to gradation analysis, resistance to degradation by abrasion and impact, specific gravity, density, and unit weight (MESU SOP AGG_01)
- Inspect, sample, and test aggregates utilized at hydraulic cement concrete and asphalt mixture plants (MESU SOP AGG_02)
- Independent assurance of project staff on sampling for aggregates at the project location
- Independent assurance of project staff on hydraulic cement concrete testing including side by side air content testing
- Schedule and obtain samples from projects and transport them to the central laboratory as needed.
- Assist Division of Purchasing regarding sampling and testing of road salts (MESU SOP AGG_03)
- Assist Maintenance Division with testing aggregates purchased via DAS contracts



The District 1 laboratory also performs independent assurance testing on the satellite laboratories' test results for aggregates using split samples and performs additional tests on fine and coarse aggregates such as soundness, specific gravity, absorption, unit weights, angularity, and elongation.

2.01.02 Physical Testing

The responsibilities of the physical testing subsection include testing for compressive strength of concrete cylinders, testing of drilled cores, testing of resistivity of concrete, evaluating properties of brick and block, tensile strengths of several ferrous and non-ferrous structural elements, the hardness of structural elements, the coating thickness of zinc and epoxy coated products, and evaluating weld coupons for welder certification testing (the physical testing of steel materials is described in MESU SOP STEEL_02). This subsection may also perform testing on new products and materials being evaluated by the Department.

2.01.03 Precast Concrete Fabrication Inspection

This subsection is responsible for the inspection and documentation of the fabrication of precast concrete elements at off-site fabrication facilities within and outside the State. Staff work closely with individual project staff to monitor and communicate technical and scheduling issues on that project. As the number of elements fabricated at various fabrication facilities fluctuates, daily inspections may not be possible for every project. In those cases, daily inspections are not provided. MESU staff may review documentation produced in accordance with the fabricators' Quality Control plan. Standard prefabricated concrete elements include reinforced concrete pipe (RCP), catch basins, manholes, concrete curb, and other precast structures that are stockpiled and potentially could be used on any Department projects. Non-standard prefabricated concrete products include box culverts, precast slabs, retaining walls, precast concrete foundations and other prestressed concrete items designed specifically for an individual project. For standard products, the overall duties of MESU staff include performing annual plant inspections to review all concrete components and concrete batching operations and to confirm compliance to their Quality Control (QC) Plan on file with the Department. In addition, for circular, elliptical, and arch RCP, MESU staff will witness the required three-edge testing. MESU staff will also sample all component materials for compliance with the Department's specifications in accordance with MESU's SOP HCC_04 and SOP HCC_02; inspect the casting beds and forms to ensure dimensional conformance to the approved drawings; observe the concrete batching operation to ascertain conformance to an approved mix design; witness plastic concrete testing; observe the concrete placement and consolidation operation; witness the compression testing of specimens; inspect the finished product for conformance to dimensional tolerances and finished appearance; and maintain complete and accurate Department records for all phases of the work. MESU staff typically inspect the fabrication of all non-standard concrete products installed in Department projects as part of the Department's role in Quality Assurance. Consultants under the direction of MESU staff are used to supplement MESU staff as needed to meet this responsibility.

2.02 Asphalt Liquids & Asphalt Mixtures Section (AL&AM)

This section is divided into six functional subsections: asphalt liquid materials laboratory; mix verification laboratory; asphalt mixture independent assurance laboratory; in-place density laboratory; production facility inspection and mixture acceptance; and accreditation and asphalt mixture data evaluation.

2.02.01 Asphalt Liquid Materials

This subsection is responsible for testing various petroleum-based products. Asphalt mixture paving and associated products physically tested by this subsection are PG Binders, emulsified asphalts, non-tracking tack coat, and other miscellaneous asphalt materials. In addition, this



subsection reviews all required documentation to evaluate asphalt-based filler and sealer materials.

2.02.02 Mixture Verification

This subsection is responsible for performing verification testing in accordance with project specifications and for validating contractor test results used for acceptance. Based on the type of project, PWL or Non-PWL, one-to-one comparison or statistical comparison testing is performed during the paving season on test specimens that are fabricated by both Contractor and MESU staff. Test records are maintained for each mixture type produced by each vendor providing materials to the Department. The Verification unit also performs annual mix design verifications including aggregate blends and mix properties evaluations.

2.02.03 Asphalt Mixture Independent Assurance and Dispute Resolution

This subsection follows an independent process from acceptance testing to ensure that material sampling and testing of asphalt mixture performed by Contractor and MESU staff is performed correctly. The process evaluates staff sampling and testing material for compliance with established standard test procedures and evaluates the equipment used for acceptance testing for adequacy and calibration. The evaluation process generally involves witnessing staff during the testing procedure and documenting what is observed on the "Report of Witness" (MAT-600) form. Test equipment is evaluated through calibration checks, testing split samples (MESU SOP IA_04), or any combination of these methods. This subsection is also responsible for performing asphalt mixture production dispute resolution testing when production data validation has failed and a request to dispute is made by the Contractor.

2.02.04 In-Place Density

The in-place density subsection performs tests on pavement core samples and provides results to the project staff for calculation of payment adjustments.

2.02.05 Production Facility Inspection and Mixture Acceptance

This subsection is responsible for the asphalt mixture plant inspections and acceptance of asphalt mixture acceptance. During the production facility inspection, MESU staff verifies batch weights, mix temperatures, checks plant machinery and hauling vehicles for specification compliance and may request a sample of the PG binder. Staff in this subsection are also responsible for monitoring contractor test results used for acceptance on a project-by-project basis and for tabulating results to be submitted to project staff for pay adjustment purposes. Staff in this subsection also review mix designs for compliance to the project specifications and monitor changes to material sources and the resulting mix designs during the paving season. In addition, staff in this subsection review producer generated QC Plans to ensure that the current specification requirements are recognized, and any revisions are acceptable to the Department.

2.02.06 Accreditation and Asphalt Mixture Data Evaluation

Staff in this subsection are responsible for updating and maintaining all of the documentation required for the laboratory accreditation and evaluating performance testing on asphalt mixture for the balanced mix design implementation.

2.03 Fabricated Steel and Project Support (FS&PS) Section

This section is divided into three (3) functional subsections: final material certification and file retention; structural steel fabrication and consultant administration; and project support and material management systems.



This Section of MESU is primarily responsible for assuring that fabrication, welding, unbound aggregate in-place density testing is being performed by qualified and certified Department and/or contractor staff. Independent assurance checks are performed to ensure accordance with applicable standard test procedures and that the equipment used is in working properly and is calibrated. This typically includes a review of staff qualifications, equipment calibration and maintenance records, witnessing test procedures, and performing independent assurance testing on split samples.

This section is also responsible for the day-to-day administration of a consultant contract for the testing of structural steel at various out-of-state fabricators and other seasonal inspection needs within the State; the review and processing of the consultant inspection reports; the update and maintenance of the CMRS materials module (AWP) and interacting with construction project inspectors to revise and maintain materials testing results for individual projects; addressing building-related issues for CTDOT staff within the facility. Additionally, this section is responsible for the independent assurance of unbound material in-situ density testing and making technical recommendations to the TSE of the section. The contractor performs all density acceptance testing per the applicable specification and the independent assurance testing is performed by one of the task-based independent assurance consultants. MESU staff in this subsection coordinate the independent assurance testing to be performed on each project and review the independent assurance report (MESU SOP IA_03).

This section is also responsible for the review of the Anticipated Source of Material (CON-083) form to confirm contractor self-certification of compliance with Buy America Act (BAA) and Build America, Buy America Act (BABA) requirements.

2.03.02 Final Materials Certification and File Retention

This subsection is responsible for tracking material testing data on a project to ensure that all materials permanently incorporated into the project are tested and/or certified with sufficient quantity and that the results are acceptable or alternative acceptance criteria are met. Upon request from the district, a final materials certification is provided for all completed projects stating the disposition of all materials incorporated into the project. If applicable, exceptions to the project specifications are listed individually on the certificate. MESU SOP MESU_03 includes all the procedures to be followed for issuance of this certification. Following the issuance of the Final Materials Certification for a particular project, staff in this subsection also compile and review the project records in accordance with the Department's record retention policies so that they can be transferred to the Department's record storage facility in Newington.

2.03.03 Structural Steel Fabrication and Consultant Administration

This subsection has the responsibility of assuring that all materials and physical aspects of structural steel fabrication and coatings are in compliance with the applicable specifications. Duties of this unit include: the review and approval of shop and field welding procedures, providing assistance to other Department staff regarding welding techniques and procedures, on-site audits, inspection of project site welding, in-state and out-of-state fabrication inspection (MESU SOP STEEL_01), maintaining and testing of qualified Department welders (MESU SOP STEEL_03), the review and processing of steel fabrication inspection reports, and any related duties as they apply to structural steel fabrication. Staff in this subsection are responsible for monitoring the consultant contracts and to review and process the Invoice Summary and Processing (ISP) forms.

2.03.04 Project Support and Material Management Systems



Staff in this subsection are responsible for updating and maintaining the CMRS materials module (AWP) and interacting with construction project inspectors and MESU staff to process and maintain materials testing results for individual projects. Additionally, this subsection has the responsibility of assisting projects and MESU staff on the processing of materials related submittals using Compass and assisting MESU staff on reporting and data analysis using Excel, Power BI and other data analysis and data visualization tools. Staff in this subsection are also responsible for responding to all materials sampling and testing requirements inquiries received from project staff, performing evaluation and analysis of material testing data generated by all MESU units, and assisting MESU staff in the evaluation and implementation of new workflows and procedures.



Chapter 3 – Active Material Code Definitions

This chapter includes all active material codes, corresponding acceptance action, procedure to be followed for materials acceptance and applicable specifications. The acceptance action is listed as:

- Daily Work Report (DWR): acceptance method to be processed by project inspection staff. No Sample Record is required.
- Sample Record: acceptance method to be processed by MESU staff. MESU staff determines the recommendation for acceptance or rejection of the Sample Record.

Materials that are permanently incorporated into federal-aid projects must comply with the Build America, Buy America (BABA) Act. Under this act, materials are classified in three categories:

- Iron or Steel Products
- Manufactured Products
- Construction Materials

The BABA requirement listed for each material code is only applicable when that material is permanently incorporated into federal-aid projects. The classification of a material as falling into one of the categories must be made based on its status at the time it is delivered to the job site. Additionally, some materials may not fall under any of those three categories or may fall under the list of exempt materials under the BABA Act. For those materials, the BABA requirements are listed as Not Applicable or Exempt. Compliance to BABA requirements for all materials in the Qualified Product List has been confirmed and no additional documentation is required.

3.01 Paint/Coatings/Markings

3.01.01 Structural Steel Coatings

00031 PAINT, PRIME COAT STRUCTURAL STEEL

00032 PAINT, INTERM. COAT STRUCTURAL STEEL

00033 PAINT, TOPCOAT STRUCTURAL STEEL

00039 PAINT, FIELD TOUCHUP

Scope: Structural Steel prime coat, intermediate coat, topcoat, and field touch up paint

Acceptance: DWR

Procedure: Contractors are responsible for making fabricators of structural steel aware of the entire coating specification for each individual project prior to the work starting. Standard Specifications Article 1.05.10 requires the Engineer be given sufficient advance notification of any work performed by a subcontractor, including coating work on structural steel for Department use. Field painting and touch-up work must conform to Standard Specifications, Section 6.03. Project staff performs visual inspections of the field repair paint and verifies NEPCOAT qualification on the Materials Certificate when the material is delivered to the project site.

Sampling: Samples are generally not required unless specified in the Special Provisions

Testing: Not Applicable

Specification: As specified in a Special Provision or Standard Specifications Sections 6.03 and M.07

Report Form: Not Applicable

BABA: Manufactured Product



3.01.02 Pavement Markings

00060 PAINT, WATERBORNE PVMT. MARK, 3 MIN.

Scope: White and yellow low heated, fast drying pavement marking paint
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Samples are generally not required unless specified in the Special Provisions
Testing: Not Applicable
Specification: Federal Specification Paint TT-P-1952, Manual on Uniform Traffic Control Devices (MUTCD), and Standard Specifications Section M.07
Report Form: Not Applicable
BABA: Manufactured Product

00091 PAINT, EPOXY PAVEMENT MARKINGS

Scope: White and yellow epoxy resin pavement marking paint
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Samples are generally not required unless specified in the Special Provisions
Testing: Not Applicable
Specification: Federal Specification Paint TT-P-1952, Manual on Uniform Traffic Control Devices (MUTCD), and Standard Specifications Section M.07
Report Form: Not Applicable
BABA: Manufactured Product

00206 PAVEMENT MARKING TAPE

Scope: Preformed, patterned non-reflective matte black marking tape
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Matte black, non-reflective tape precoated with a pressure sensitive adhesive capable of being adhered to the surface without the use of heat, solvents, or other additional adhesives
Sampling: Samples are generally not required unless specified in the Special Provisions
Testing: Not Applicable
Specification: Standard Specifications, Article M.07.24
Report Form: Not Applicable
BABA: Manufactured Product

00306 GLASS SPHERES

Scope: Glass spheres (glass beads) for application on pavement markings
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Samples are generally not required unless specified in the Special Provisions
Testing: Not Applicable
Specification: AASHTO M 247, Type 1 and 4



Report Form: Not Applicable
BABA: Construction Material

3.02 Dust, Snow, and Ice Control

00302 CALCIUM CHLORIDE

Scope: All calcium chloride used for snow and ice control on highways
Acceptance: DWR
Procedure: Visual inspection by Project staff. Pellet or flake form must not crust over or form clumps, become sticky or otherwise contaminated.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.12.10 / AASHTO M 144
Report Form: Not Applicable
BABA: Not Applicable or Exempt

3.03 Landscaping Materials

00327P WATER, PLANTINGS

Scope: Water for plantings
Acceptance: DWR
Procedure: Visual inspection by Project staff. Water shall be free from oil, acid, alkalis, salts and any other substances harmful to plants. Water from streams shall not be used unless authorized by the Engineer.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.07
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00496 FERTILIZER

Scope: Fertilizer for use in turf establishment, sodding and planting
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Fertilizer must be delivered to the Project in new, clean, sealed containers with a label that includes contents, chemical analysis of each nutrient, grade, brand name and address
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.03
Report Form: Not Applicable
BABA: Manufactured Product

00497 SEED

Scope: Mixtures to establish turf or grass



Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. The seed mixture must be delivered in new, clean, sealed containers. Labels and contents must conform to all State and Federal regulations
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.04, or as specified on the plans
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00510 PEAT

Scope: Commercially packaged peat from sedge, sphagnum or reed sources used on planting soil
Acceptance: DWR
Procedure: Visual inspection by Project staff. The peat must be delivered in clean, new, sealed containers bearing the brand, name and address of the packer and must be free from sticks, roots, stones, and other objectionable material
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.07.10
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00518 SOD

Scope: Sod used for the immediate establishment of a grass surface
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Project staff should contact Landscape Design Unit for source approval
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.08
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00533 LIME

Scope: Agricultural ground dolomitic limestone for use on plantings and turf establishments
Acceptance: DWR
Procedure: Visual inspection by Project Staff. Lime must conform to the standards of the Association of Official Agricultural Chemists (AOAC) and must comply with all existing State and Federal regulations
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.02
Report Form: Not Applicable
BABA: Not Applicable or Exempt



00534 MULCH, WOOD FIBER ALL TYPES

Scope: For use in plantings and turf establishments
Acceptance: DWR
Procedure: Visual inspection by Project Staff. Mulch must be free from weeds, reeds, rot, mold, leaves, twigs, shavings, debris, and any material injurious to plant growth.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.05
Report Form: Not Applicable
BABA: Manufactured Product

00536 PLANT MATERIALS

Scope: For use in plantings and turf establishment items
Acceptance: DWR
Procedure: Project staff should contact Landscape Design Unit. Source approval and visual inspection by Landscape Design staff
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.07
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00542P TOPSOIL, PLANTINGS

Scope: Premixed soil consisting of approximately 15% compost, 10% peat, and 75% native soil or topsoil used on the project site for planting
Acceptance: DWR
Procedure: Project staff should contact Landscape Design Unit. Source approval, Materials Certificate and Certified Test Report reviews by Landscape Design Staff
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.01
Report Form: Not Applicable
BABA: Not Applicable or Exempt

00542X TOPSOIL, OFFSITE

Scope: Soil brought from off the project site for use under items 0949XXX furnishing and planting trees
Acceptance: DWR
Procedure: Project staff should contact Landscape Design Unit. Source approval, Materials Certificate and Certified Test Report reviews by Landscape Design staff.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.01
Report Form: Not Applicable
BABA: Not Applicable or Exempt



00543 COMPOST

Scope: For plantings
Acceptance: DWR
Procedure: Project staff should contact Landscape Design Unit. Source approval, Materials Certificate and Certified Test Report reviews by Landscape Design staff.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.13.06
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04776 HAY, BALED

Scope: For erosion and sedimentation control
Acceptance: DWR
Procedure: Visual inspection by Project staff. Bales must weigh 40-120 pounds
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article 2.19.02
Report Form: Not Applicable
BABA: Not Applicable or Exempt

06534 EROSION CONTROL MATTING

Scope: Mulch and netting woven together as a unit, for use in highway drainage, erosion control, or sedimentation control
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List
Sampling: Not Required
Testing: Not Applicable
Specification: Qualified Product List / Standard Specifications, Article M.13.09
Report Form: Not Applicable
BABA: Manufactured Product

07547 TREE

Scope: All living plant materials for use under items 0949XXX furnishing and planting trees
Acceptance: DWR
Procedure: Project staff should contact Landscape Design Unit. Source approval and visual inspection by Landscape Design staff
Sampling: No Required
Testing: Not Applicable
Specification: As specified in a Special Provision or Standard Specifications, Article M.13.07
Report Form: Not Applicable
BABA: Not Applicable or Exempt



3.04 Precast Concrete

3.04.01 Drainage Structures

Scope: Precast concrete units to be used in the construction of drainage structures. Precast units include products such as box culverts, catch basins, drop inlet and manhole tops, riser sections, sumps, and other appurtenances. The recommendation for acceptance of precast units is based on the manufacturer's certification that the units conform to the project specifications. Ultimate acceptance of the material should be based on receipt of the manufacturer's certification MAT-314 (PC-1) and a visual inspection by project staff following delivery. Precast units that are cracked, show evidence of honeycomb, or have over 10% of their surface area patched may be subject to rejection, even though meeting other requirements.

00800 BOX CULVERT, PRECAST CONCRETE, 3 SIDED

00804 BOX CULVERT, PRECAST CONCRETE

Scope: See above
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by a MESU representative to ensure conformance with the requirements of the applicable specifications. Details of this inspection are provided in Chapter 4 and SOP HCC_04. Acceptance of this material is based the inspection performed at the fabrication facility, review of the Materials Certificate and certified test report by MESU staff and a visual inspection by project staff following delivery.

Sampling: Not Required
Testing: Not Required
Specification: Standard Specifications, Article M.08.01
Report Form: MAT-314
BABA: Manufactured Product

01440A CATCH BASIN, PRECAST (COMPLETE)

01444 CATCH BASIN RISER, PRECAST

01458 CATCH BASIN SUMP, PRECAST

01649 CATCH BASIN TOP, FRAME & GRATE

Scope: See above
Acceptance: Sample Record
Procedure: Manufacturer's certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.02
Report Form: MAT-314
BABA: Manufactured Product

01441A MANHOLE, PRECAST (COMPLETE)

01482 MANHOLE, TOP SLAB, PRECAST

01491 MANHOLE, RISER, PRECAST

01499 MANHOLE, BASE, PRECAST

Scope: See above
Acceptance: Sample Record



Procedure: Manufacturer’s certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.08.02

Report Form: MAT-314

BABA: Manufactured Product, Iron or Steel Product

03209 MANHOLE, COVERS/FRAMES

Scope: See above

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff review the documents for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.08.02

Report Form: MAT-314

BABA: Iron or Steel Product

03251 CATCH BASIN ADJ. RING, PRECAST

Scope: See above

Acceptance: Sample Record

Procedure: Manufacturer’s certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.08.02

Report Form: MAT-314

BABA: Manufactured Product

3.04.02 Structural Components

01422 CONCRETE SECTION, PRECAST

01432 FOUNDATION, PRECAST

01435 ANCHOR, PRECAST

01467 SLAB, PRECAST

06851 ARCH, PRECAST

08069 PREFABRICATED BRIDGE UNITS

Scope: Concrete members for use in structures

Acceptance: Sample Record

Procedure: Project staff must provide a minimum of two-week advanced notification to MESU on when the units will be fabricated. Concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by MESU staff to ensure conformance with the requirements of the applicable specifications. Details of this inspection are provided in Chapter 4 and SOP HCC_04. Precast elements must be identified as to Project, structure, casting date, and position in the structure by means of a non-corrosive tag embedded permanently or stenciled at a visible location on the piece mark end. Components damaged at any time by improper handling, storing, transporting, or erecting must be



repaired to the satisfaction of the Engineer by the Contractor at its expense. Acceptance of these materials is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery. Additionally, after delivery, project submits the manufacturer's certification MAT-314 (PC-1) with the Sample Record for MESU review and processing.

- Sampling:** Representative samples of component materials used in the manufacture of these concrete members may be sampled and tested to determine compliance with Standard Specifications
- Testing:** Component materials will be tested in accordance with the applicable AASHTO/ASTM standard
- Specification:** Standard Specifications, Section M.03, Articles M.06.01, M.14.01
- Report Form:** MAT-314
- BABA:** Manufactured Product

01426 ENDWALL, PRECAST

- Scope:** Concrete member for use in structures
- Acceptance:** Sample Record
- Procedure:** Manufacturer's certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications. Precast elements must be identified as to Project, structure, and casting date by means of a non-corrosive tag embedded permanently or stenciled at a visible location on the piece mark end.
- Sampling:** Not Required
- Testing:** Not Applicable
- Specification:** Standard Specifications, Sections 5.05, M.14
- Report Form:** MAT-314
- BABA:** Manufactured Product

08044 RETAINING WALL, PRECAST CONCRETE

- Scope:** Concrete member for use in structures
- Acceptance:** DWR
- Procedure:** Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List
- Sampling:** Not Required
- Testing:** Not Applicable
- Specification:** Qualified Product List / Standard Specifications, Section M.03
- Report Form:** Not Applicable
- BABA:** Construction Material, Manufactured Product, Iron or Steel Product

3.04.03 Other Concrete Members

00895 CONCRETE BARRIER, PRECAST

01462 HANDHOLE & COVER, PRECAST

01511 CURB, PRECAST

08042 PULL BOX, PRECAST CONCRETE

- Scope:** Non-structural concrete members
- Acceptance:** Sample Record
- Procedure:** Manufacturer's certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications. The manufacturer



identification and casting date must be permanently marked on the barrier curb by means of a non-corrosive metal or plastic tag as approved by the Engineer and in the location as shown on the plan.

Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Sections 8.11 and 8.21
Report Form: MAT-314
BABA: Manufactured Product

3.05 Pipe

00699 PIPE, RC & FITTINGS & ACC.

Scope: Plain and perforated concrete drainage pipe
Acceptance: Sample Record
Procedure: Manufacturer’s certification MAT-314 (PC-1) submitted with Sample Record. MESU staff review the document for compliance with the applicable specifications.
Sampling: The manufacturer will sample pipes for testing
Testing: The manufacturer will perform testing. Each size and type of pipe is subject to three-edge bearing and absorption tests each spring. Test by AASHTO T 280 with the exceptions as listed in M.08.01-7
Specification: Standard Specifications, Article M.08.01
Report Form: MAT-314
BABA: Manufactured Product

00756 PIPE, RC, JACKING

Scope: Reinforced concrete drainage pipe that is installed via jacking
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by MESU staff to ensure conformance with the requirements of the applicable specifications. Details of this inspection are provided in Chapter 4. Acceptance of this material is based the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Manufactured Product

01783 PIPE, ALUMINUM & FITTINGS & ACC.

Scope: Plain and perforated aluminum drainage pipe
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Identification must appear on the outside of the pipe.
Sampling: Not Required
Testing: Not Applicable



Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Construction Material

00823 CULVERT END, REINFORCED CONCRETE

Scope: Material used for reinforced concrete drainage pipe
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by MESU staff to ensure conformance with the requirements of the applicable specifications. Details of this inspection are provided in Chapter 4. Acceptance of this material is based the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Manufactured Product

01807 CULVERT END, ALUMINUM

Scope: Material used for aluminum drainage pipe end
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Identification must appear on the outside of the pipe
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Construction Material

02018 CULVERT END, COATED METAL

Scope: Material used for coated metal pipe end
Acceptance: Sample Record
Procedure: Materials Certificate submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01-6
Report Form: Not Applicable
BABA: Iron or Steel Product

01940 PIPE, CCM & FITTINGS & ACC.

01977 PIPE, ACCM & FITTINGS & ACC.

Scope: Material used for drainage
Acceptance: Sample Record



Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Iron or Steel Product

02449 PIPE, COPPER & FITTINGS & ACC.

Scope: This section covers welded and seamless copper pipe
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 13.01 Special Provision. ASTM B88
Report Form: Not Applicable
BABA: Construction Material

02110 PIPE, CAST IRON & FITTINGS & ACC.

Scope: This section covers cast iron pipe, fittings, and accessories
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01-1
Report Form: Not Applicable
BABA: Iron or Steel Product

02501 PIPE, DUCTILE IRON & FITTINGS & ACC.

Scope: This section covers ductile iron pipe, fittings, and accessories
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.06.02. ASTM A53. Applicable 13.01 Special Provision. AWWA C151/A21.51 and AWWA C153/A21.53 as applicable
Report Form: Not Applicable
BABA: Iron or Steel Product

02724 PIPE, STEEL & FITTINGS & ACC.

Scope: This section covers welded and seamless steel pipe
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required



Testing: Not Applicable
Specification: Standard Specifications, Article M.06.02. ASTM A53
Report Form: Not Applicable
BABA: Iron or Steel Product

02600 PIPE, POLYETHYLENE & FITTINGS & ACC.

Scope: Plastic and polyethylene corrugated pipe or tubing for use in drainage
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. The pipe and fittings must be free of foreign inclusions and visible defects including cracks, creases, delamination, and unpigmented or non-uniformly pigmented. All pipes, fittings and couplings must be clearly marked.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Construction Material

02673 CULVERT END, POLYETHYLENE

Scope: Plastic and polyethylene corrugated pipe or tubing for use in drainage
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.01
Report Form: Not Applicable
BABA: Construction Material

02649 PIPE, PVC & FITTINGS & ACC.

Scope: This section covers polyvinyl chloride plastic pipe, elbows, and couplings for highway drainage.
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Homogeneous; free of visible cracks, holes, foreign inclusions, or other defects; uniform as commercially practicable in color, opacity, and density. Marked to meet ASTM D1785
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 5.13 and Article M.08.01
Report Form: Not Applicable
BABA: Construction Material

02731 PIPE, FIBERGLASS & FITTINGS & ACC.

Scope: Pipe made of plastic reinforced with fiberglass use for bridge drainage
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required



Testing: Not Applicable
Specification: Applicable 05.12 Special Provision
Report Form: Not Applicable
BABA: Manufactured Product

3.06 Steel Reinforcement

02995 DOWEL SPLICE SYSTEM, EPOXY COATED

02996 DOWEL SPLICE SYSTEM, GALVANIZED

02997 DOWEL SPLICE SYSTEM

02998 DEFORMED STEEL BARS, EPOXY COATED

03100 DEFORMED STEEL BARS

03100-CGR DEFORMED STEEL BARS, CONTINUOUSLY

03100-HDG DEFORMED STEEL BARS, HOT-DIP GALVANIZED

03138 DOWELS, STEEL

Scope: Bars used for hydraulic cement concrete reinforcement

Acceptance: Sample Record

Procedure: Samples, Materials Certificate, and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: A sample of each bar size will be submitted for each shipment as follows: All sizes-one sample per size per manufacturer for each 400,000 lb. Samples submitted for test will be cut from the shipment on the project site and will be not less than 5 ft. (1.5 m) in length. When multiple mills are the source of the bars, a sample from each source must be provided regardless of if a sample for that size has already been tested. One dowels will be submitted per size, manufacturer, and project.

Testing: MESU staff will test the specimens in accordance with AASHTO T 244

Specification: Standard Specifications, Article M.06.01

- Bar reinforcement: ASTM A615 / AASHTO M 31
- Epoxy coated reinforcement: ASTM A775
- Galvanized reinforcement: ASTM A767

Report Form: MAT-305 or MAT-307

BABA: Iron or Steel Product

03102-FRP REINFORCING BARS, FIBER POLYMER

Scope: Bars used for hydraulic cement concrete reinforcement

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specification.

Sampling: Not Required

Testing: Not Applicable

Specification: Applicable Special Provision

Report Form: Not Applicable

BABA: Construction Material

03145 FABRIC, WIRE & WELDED STEEL

Scope: This section covers wire and welded steel wire fabric for use as concrete reinforcement

Acceptance: Sample Record

Procedure: Samples, Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.



Sampling: A 1 yd² (0.9 m²) sample of each type will be submitted for test per 60k ft² of fabric used.
Testing: MESU staff will test the specimens in accordance with AASHTO T 244
Specification: ASTM A1064 / AASHTO M 336
Report Form: MAT-306 or MAT-328
BABA: Iron and Steel Product

3.07 Hydraulic Cement Concrete

03014-HE CONCRETE, HIGH EARLY STRENGTH

Scope: High Early Strength (HE) Portland Cement testing or quick setting concrete used for depth patch and other HE-concrete applications
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Samples of HE or quick setting concrete may be required to be obtained and tested by the Contractor
Testing: Not Applicable
Specification: Applicable 06.01 Special Provisions
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03014-SP-CLSM CONCRETE, CONTROLLED LOW STRENGTH MATERIAL

03015-X PCC XXXX

Scope: Portland Cement Concrete Testing
Acceptance: Sample Record
Independent Assurance Procedure: Prior to placement, Project staff will contact the corresponding District Laboratory email address to set up Independent Assurance testing as required in Chapter 4. Project staff will create a Sample Record for every 2500 cubic yards of concrete mix design. Batch tickets, delivery rickets, and fresh concrete properties submitted with Sample Record.
Acceptance Procedure: Project staff performs fresh concrete properties and cast cylinders. Cast cylinders must be immediately placed where they can remain undisturbed for at least 24 hours. After initial curing, Project staff will contact the corresponding District Laboratory email address to set up specimen pickup. District Lab staff will pick up the cylinders from the job site and transport them to the Rocky Hill Lab for final curing, compressive strength testing and resistivity testing (only for exposure class 2 and 3). Project staff will create a Sample Record for every 75 cubic yards of concrete. MESU will make an acceptance, acceptance with pay adjustment or rejection recommendation based on the laboratory test results.
Sampling: Project staff sample the concrete at the point of placement at a frequency of one sample per each 75 cubic yards. Sample must be in accordance with AASHTO T 141.
Testing: Project staff performs fresh concrete properties tests and cast specimens in accordance with the following standards:

- Slump – AASHTO T 119
- Temperature – AASHTO T 309
- Air Content – AASHTO T 152 or AASHTO T 196
- Making Curing Concrete Test Specimens in the Field – AASHTO T 23

Specification: Standard Specifications, Section 6.01
Report Form: MAT-224 or MAT-225 for onsite testing, MAT-308 for laboratory testing, and MAT-222 for assurance testing



BABA: Not Applicable or Exempt

03015-UHPC CONCRETE, ULTRA HIGH-PERFORMANCE CONCRETE

Scope: Ultra High-Performance Concrete
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: UHPC sampling and testing will be performed by a qualified third-party laboratory in accordance with the applicable specifications
Testing: Not Required
Specification: Applicable 06.01 Special Provision
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03016 GROUT, NON-SHRINK, WITH STRENGTH REQUIREMENT

Scope: Non-shrink grout that has compressive strength requirements to be met.
Acceptance: Sample Record
Procedure: Project staff create a Sample Record and transport the cube or prism specimens after 24hr initial curing to the Rocky Hill laboratory
Sampling: Project staff prepares 2-inch cubes specimens in accordance with AASHTO T 106 or 3 (up to 3.75) x 3 (up to 3.75) x 6 (up to 7.5) inches prism in accordance with ASTM C1019 for grout used in masonry construction
Testing: MESU staff will test the specimens for compressive strength in accordance with AASHTO T 106 (cubes) or AASHTO T22 (prism)
Specification: Standard Specifications, Article M.03.05
Report Form: MAT-308
BABA: Not Applicable or Exempt

03045 GROUT, NON-SHRINK, WITHOUT STRENGTH REQUIREMENT

Scope: Non-shrink grout with no compressive strength requirements.
Acceptance: DWR
Procedure: Visual inspection by Project staff. Project staff reviews the markings on the bags containing the material indicating compliance with the specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.03.05
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03025 MORTAR, PREBAGGED

Scope: Bagged, non-shrink grout
Acceptance: DWR
Procedure: Visual inspection by Project staff. Project staff reviews the markings on the bags containing the material indicating compliance with the specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Articles M.03.01 and M.03.05



Report Form: Not Applicable
BABA: Not Applicable or Exempt

3.08 Prestressed/Post-Tensioned Concrete Members

03050 CONCRETE MEMBERS, PRESTRESSED

03051 CONCRETE PILES, PRESTRESSED

Scope: Due to the critical function of precast, prestressed, and post-tensioned concrete members as load-bearing units of bridges and structures, MESU assigns staff or a consultant to the manufacturing plant to inspect, in detail, all phases of manufacture.

Acceptance: Sample Record

Procedure: Project staff provides a minimum of two-week advance notification to MESU on when the units will be fabricated. Prestressed concrete members are inspected at the fabricating plant during fabrication and immediately prior to shipment by MESU staff to ensure conformance with the requirements of the applicable specifications. Details of this inspection are provided in SOP HCC_04. Additionally, after delivery, project submits the manufacturer complete form MAT-314, as well as a Materials Certificate and Certified Test Report, with the Sample Record for MESU review and processing.

Sampling: Representative samples of component materials used in the manufacture of these concrete members may be sampled and tested to determine compliance with Standard Specifications

Testing: Same as 03015-X (if tested)

Specification: Standard Specifications, Sections 5.14, 7.02, M.14, and Article M.09.02-6

Report Form: MAT-314 and MAT-108

BABA: Manufactured Product

03112 POST TENSION SYSTEM

Scope: Components for post tensioned concrete

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Applicable Special Provision

Report Form: Not Applicable

BABA: Iron or Steel Product

3.09 Bonding Material, Fillers, and Sealers

00072 EPOXY INJECTION RESIN

Scope: Epoxy material used for concrete crack repairs

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Applicable Special Provision



Report Form: Not Applicable
BABA: Manufactured Product

00328 PENETRATING SEALER, PROTECTIVE COMPOUND

Scope: Protective compound/sealer to be used on concrete surfaces
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List
Sampling: Not Required
Testing: Not Applicable
Specification: Qualified Product List/Standard Specifications, Article M.03.09 and applicable 819 Special Provision
Report Form: Not Applicable
BABA: Manufactured Product

03091 BITUMINOUS CONCRETE SEALER (W/ RUBBER)

03092 BITUMINOUS CONCRETE SEALER

03093 BITUMINOUS CONCRETE FILLER, PG BINDER

Scope: This section covers sealants and filler for use in asphalt mixture pavements
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 4.06 Special Provisions
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03106 ADHESIVE BONDING MATERIAL

Scope: Primarily used for bonding materials to steel
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 6.10 (2022 and newer projects)
(Note: Material code 03105 and applicable procedure must be used for 2021 and older projects)
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03158 EXPANSION JOINT, FILLER/SEALER, PREFORMED

Scope: This section covers corrosion-resistant load transfer devices, preformed fillers, and wood joint filler.
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable



Specification: Standard Specifications, Article M.03.08
Report Form: Not Applicable
BABA: Manufactured Product

03432 JOINT SEAL, ELASTOMERIC COMPRESSION

Scope: Elastomeric material and lubricant adhesives for use in transverse joints in concrete structures
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.17.02
Report Form: Not Applicable
BABA: Manufactured Product

03444 CLOSED CELL ELASTOMER

Scope: Elastomeric material and lubricant adhesives for use in transverse joints in concrete structures
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not required
Testing: Not Applicable
Specification: Standard Specifications, Article M.03.08
Report Form: Not Applicable
BABA: Manufactured Product

04177 JOINT SEALER, SILICONE

Scope: Joint sealants of the hot poured type for use in PC concrete structures
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.03.08
Report Form: Not Applicable
BABA: Manufactured Product

06659 EXPANSION JOINT, SEALER

Scope: Joint sealants of the hot poured type for use in all PC concrete and asphalt mixture pavements
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.03.08
Report Form: Not Applicable



BABA: Manufactured Product

07067 EXPANSION JOINT, SYSTEM

Scope: All types of expansion joint systems used with Contract items 05200XX
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 5.20 Special Provision
Report Form: Not Applicable
BABA: Manufactured Product

3.10 Brick, Block and Pavers

Scope: Project Staff submits delivery ticket or receipt from the manufacturer with the Sample Record. Should the manufacturer not be known MESU staff may request samples from the project. Project staff should contact MESU immediately should the manufacturer be unfamiliar to prevent potentially substandard material from being used.

03200 CONCRETE MASONRY UNIT (CMU)

Scope: Precast, rectangular blocks made from PC concrete
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.12.12
Report Form: Not Applicable
BABA: Not Applicable or Exempt

03201 BRICK, CLAY

Scope: Brick made from clay or shale and burned, primarily used for building facades
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.08.02
Report Form: Not Applicable
BABA: Not Applicable or Exempt

07679 PAVERS, STONE/CLAY/CONCRETE

Scope: Pavers used in walkways, sidewalks, patios, etc.
Acceptance: DWR
Procedure: Project personnel reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable



Specification: Applicable Special Provision
Report Form: Not Applicable
BABA: Not Applicable or Exempt

3.11 Metal Castings

03211 HANDHOLE, COVERS/FRAMES

03243 SCUPPER, GRATES & FRAMES

03252 MANHOLE, CATCH BASIN ADJ. RING, STEEL/IRON

06566 LAWN DRAIN

Scope: This section covers castings for general application in highway and bridge construction
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.06.02 and Applicable Special Provision
Report Form: Not Applicable
BABA: Iron or Steel Product

3.12 Fences

Scope: Aluminum-coated or polyvinyl chloride-coated steel chain-link fabric, aluminum alloy fabric, galvanized metal or polyvinyl chloride-coated material or aluminum alloy posts, top and brace rails, and fittings to be used in the construction of chain-link fence

03307 FENCE, CHAIN LINK, GATE

03327 FENCE, PROTECTIVE

Scope: See above
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.10.05
Report Form: Not Applicable
BABA: Construction Material (aluminum), Iron or Steel Product (steel)

03309 FENCE, CHAIN LINK, SYSTEM

Scope: See above
Acceptance: Sample Record
Procedure: Sample, Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.
Sampling: One (1) sample of chain link woven fabric at least 3 feet (1 meter) wide and the full height of the fence will be submitted to MESU for each shipment of 100 rolls or fraction thereof
Testing: MESU staff will test samples in accordance with AASHTO M 181
Specification: Standard Specifications, Article M.10.05



Report Form: MAT-303
BABA: Iron or Steel Product

METAL POSTS, RAILS, AND GATE

Scope: See above
Acceptance: Submit under 03309
Procedure: Materials Certificate submitted with Sample Record. MESU staff will review it for compliance with applicable specifications
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.10.05
Report Form: Not Applicable
BABA: Iron or Steel Product

FITTINGS

Scope: See above
Acceptance: Submit under 03309
Procedure: Sample and Materials Certificate submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.
Sampling: Submit one (1) representative sample for each size and type
Testing: MESU staff will test samples for average thickness of coating on hot-dipped galvanized fittings with the use of a magnetic thickness gauge in accordance with ASTM E376
Specification: Standard Specifications, Article M.10.05
Report Form: MAT-325
BABA: Iron and Steel Product

TENSION WIRE

Scope: See above
Acceptance: Submit under 03309
Procedure: Sample and Materials Certificate submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.
Sampling: Submit one (1) representative sample for each type of tension wire
Testing: MESU staff will test samples in accordance with AASHTO M 181
Specification: Standard Specifications, Article M.10.05
Report Form: MAT-326
BABA: Iron or Steel Product

03326 FENCE, WIRE, POSTS, & HARDWARE

Scope: Wire fence and support posts
Acceptance: Sample Record
Procedure: All fence components will be inspected in the field by Project staff to determine conformance to specifications. Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications. For treated wood posts, a certificate of treatment is also required.
Sampling: Not Required
Testing: Not Applicable



Specification: Standard Specifications, Article M.10.04
Report Form: Not Applicable
BABA: Iron or Steel Product

3.13 Geosynthetics

03985 GEOTEXTILE

Scope: For use in highway drainage, erosion control, or sedimentation control
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List
Sampling: Not Required
Testing: Not Applicable
Specification: Qualified Product List
Report Form: Not Applicable
BABA: Manufactured Product

3.14 Railings

03405 METAL BEAM RAIL, END

03406 METAL BEAM RAIL, SYSTEM

03413 BOX BEAM GUIDE RAILING

Scope: Metal beam elements attached to steel posts by various types of hardware and ending in appropriate terminal treatment for use in various highway guardrail installations
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report for the box beam guide railing and block-outs submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications. The documents must include:

1. Name or brand of the manufacturer
2. Identification symbols or codes for heat number or coating lot
3. Class (A or B)
4. Type (1 or 2)

Sampling: Not required
Testing: Not Applicable
Specification: Standard Specifications, Article M.10.02
Report Form: Not Applicable
BABA: Iron or Steel Product

03414 METAL HANDRAIL

Scope: Welded and seamless steel pipe hand railing on the proposed concrete steps
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 9.14



Report Form: Not Applicable
BABA: Iron or Steel Product

03429 METAL BRIDGE RAIL, SYSTEM

Scope: Metal pipe and fittings, structural steel shapes, castings or other material, anchor bolts, hardware fasteners, anchorages, and terminal elements for connection to bridge parapets
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 9.04
Report Form: Not Applicable
BABA: Iron or Steel Product

03430 METAL BRIDGE RAILING COMPONENTS

Scope: Metal pipe and fittings, structural steel shapes, castings or other material, anchor bolts, hardware fasteners, anchorages, and terminal elements for connection to bridge parapets
Acceptance: Sample Record
Procedure: Materials Certificates and Certified Test Reports for all the metal beam railing components submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 9.04
Report Form: Not Applicable
BABA: Iron or Steel Product

03419 CABLE GUIDE RAIL

03421 CABLE GUIDE RAILING, ANCHORAGES

Scope: Wire rope and fittings for use in wire rope railing supported by wood or steel posts
Acceptance: Sample Record
Procedure: Materials Certificate submitted with Sample Record. MESU staff will review it for compliance with applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.10.08
Report Form: Not Applicable
BABA: Iron or Steel Product

03449 TIMBER GUIDE RAIL SYSTEM

03450 TIMBER GUIDE RAIL, END

Scope: Timber and elements to be used in guardrail installations
Acceptance: Sample Record



Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Per applicable Special Provision

Report Form: Not Applicable

BABA: Construction Material

3.15 Structural Anchors & Bearings

03504 ANCHOR BOLTS

Scope: This section covers anchor bolts, nuts, and washers for structural steel construction

Acceptance: Sample Record

Procedure: For each sample, a Materials Certificate and Certified Test Report must be submitted with a Sample Record. MESU staff will test the samples and review the paperwork for compliance with applicable specifications.

Sampling: One (1) bolt for each size, heat #, and shipment is required for each Project.

Testing: MESU staff will test the specimen in accordance with AASHTO T 244

Specification: Standard Specifications, Articles M.06.02 and M.15.02

Report Form: MAT-300 or MAT-301

BABA: Iron or Steel Product

03505-L BEARING PADS, ELASTOMERIC, LAMINATED

03505-P BEARING PADS, ELASTOMERIC, PLAIN

Scope: Laminated and non-laminated bearing pads and adhesive for use in bridge structures.

Acceptance: Sample Record

Procedure: For each sample, a Materials Certificate and Certified Test Report must be submitted with a Sample Record. MESU staff will test the samples and review the paperwork for compliance with applicable specifications.

Sampling: One (1) test pad must be provided for every fifty (50) pads, or portion thereof, required on a structure. If there are multiple types/sizes of pads on a structure, the test pad must be representative of the most common type/size.

Testing: MESU staff will test the specimen in accordance with ASTM D746

Specification: Standard Specifications, Article M.17.01

Report Form: MAT-310

BABA: Manufactured Product

03540 BEARINGS, POT/SPHERICAL

Scope: This section covers bronze or copper alloy bridge bearings or expansion plates

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.06.03

Report Form: Not Applicable

BABA: Iron or Steel Product



07087 ANCHOR, GUY/GROUND SYSTEM

Scope: Used to anchor poles
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.16.04
Report Form: Not Applicable
BABA: Iron or Steel Product

3.16 Timber Piles

03539 PILES, TIMBER

Scope: Timber (treated or untreated) to be used as foundation piles
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.09.02
Report Form: Not Applicable
BABA: Construction Material

3.17 Gabions

03546 GABIONS

Scope: Open wire mesh baskets filled with aggregate
Acceptance: Sample Record
Procedure: MESU staff reviews the Materials Certificate for compliance with Contract Specifications
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 7.04
Report Form: Not Applicable
BABA: Basket: Iron and Steel Product

3.18 Steel Items- Structural Steel

03517 STEEL DECKING

Scope: Steel deck plate used in bridges
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 6.03 Special Provision
Report Form: Not Applicable
BABA: Iron or Steel Product



03532 PILE, STEEL SHELL

Scope: Driving steel shell for cast-in-place concrete piles
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.09.02
Report Form: Not Applicable
BABA: Iron or Steel Product

03535 PILES, STEEL SHEET

Scope: Sheet piling constructed wholly or substantially of steel
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: ASTM A328
Report Form: Not Applicable
BABA: Iron or Steel Product

03537 STEEL, STRUCTURAL

Scope: Structural steel elements for bridges and other structures
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: As required during shop or field visits
Testing: Not
Specification: Standard Specifications, Article M.06.02
Report Form: Not Applicable
BABA: Iron or Steel Product

03542 STUDS, WELDED/SHEAR CONNECTORS

Scope: To be used in composite structures
Acceptance: Sample Record
Procedure: Sample, Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.
Sampling: Project staff to submit 1 stud per size to MESU
Testing: Not Applicable
Specification: Standard Specifications, Article M.06.02
Report Form: Not Applicable
BABA: Iron or Steel Product



03549 H-PILES, STEEL

03559 PILE POINT, STEEL

Scope: For use in the furnishing and driving of foundation piles
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications
Sampling: Samples are not common, but field staff should contact MESU for sampling requirements
Testing: Not Applicable
Specification: Standard Specifications, Article M.09.02
Report Form: MAT-327
BABA: Iron or Steel Product

03566 STEEL PLATES

Scope: For use in the furnishing and driving of foundation piles
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Field staff should contact MESU for sampling requirements
Testing: Not Applicable
Specification: Standard Specifications, Article M.10.02
Report Form: Not Applicable
BABA: Iron or Steel Product

03802 SPAN POLE, STEEL

Scope: This section covers all structural steel for use in traffic signals
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Samples are not common, but field staff should contact MESU for sampling requirements
Testing: Not Applicable
Specification: Standard Specifications, Articles M.15.02 and M.16.04
Report Form: Not Applicable
BABA: Iron or Steel Product

01839 BOLT/NUT/WASHER

07392 BOLT/NUT/WASHER, STAINLESS STEEL

08022 BOLT/NUT/WASHER, HIGH STRENGTH

Scope: High strength bolts, nuts, and washers for use in structural steel construction
Acceptance: Sample Record



Procedure: For each sample, a Materials Certificate and Certified Test Report must be submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.

Sampling: One (1) sample per size

Testing: MESU staff will test the specimen in accordance with AASHTO T 244

Specification: Standard Specifications, Article M.06.02

Report Form: MAT-302

BABA: Iron or Steel Product

07403 ROD, THREADED

Scope: For use in anchors

Acceptance: Sample Record

Procedure: Samples, Materials Certificate, and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.

Sampling: One (1) sample per size

Testing: MESU staff will test the specimen in accordance with AASHTO T 244

Specification: Standard Specifications, Section 6.10

Report Form: Not Applicable

BABA: Iron or Steel Product

03928 SIGN SUPPORT, STRUCTURAL STEEL

Scope: Fabricated sign support of various sizes made with structural steel

Acceptance: Sample Record

Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.06.02, Section M.18

Report Form: Not Applicable

BABA: Iron or Steel Product

06923 STAY IN PLACE FORMS

Scope: Metal forms typically used in construction of bridge decks

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Standard Specifications, Article M.03.10

Report Form: Not Applicable

BABA: Iron or Steel Product



07627 EARTH RETAINING SYSTEM

Scope:	A steel or timber retaining wall of which the Contractor elects to build to satisfy the condition that existing or planned facilities be properly retained during excavation or placement of fill.
Acceptance:	DWR
Procedure:	Project staff reviews the Materials Certificate for compliance with Contract Specifications. Steel sheet piling shall meet the requirements of ASTM A328. Timber sheet piling may consist of any species which will satisfactorily stand driving, unless otherwise noted on the plans or special provisions. A parts list shall be furnished for the proprietary system and the Contractor shall provide Materials Certificates for the parts.
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Standard Specifications, Section 7.17, Article M.09.01
Report Form:	Not Applicable
BABA:	Construction Material (timber), Iron or Steel Product (steel)

07351 BOLLARD, STEEL

Scope:	Steel bollard
Acceptance:	Sample Record
Procedure:	Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Applicable 9.01 Special Provision
Report Form:	Not Applicable
BABA:	Iron or Steel Product

08060 DETECTABLE WARNING STRIP, ADA

Scope:	Surface warning strip or pad
Acceptance:	DWR
Procedure:	Project staff review the Materials Certificate for compliance with Contract specification and that the material is listed in the Department's Qualified Product List
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Qualified Product List/Standard Specifications, Section 9.21
Report Form:	Not Applicable
BABA:	Manufactured Product

07822 NOISE BARRIER WALL

Scope:	All types of walls
Acceptance:	DWR
Procedure:	Project staff reviews the Materials Certificate for compliance with Contract Specifications
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Applicable 9.16 Special Provision
Report Form:	Not Applicable



BABA: Construction Material, Iron or Steel Product

07798 BREAKAWAY SIGN BASE

Scope: To be used with signposts for the purpose of allowing the post to break away from its anchor
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 12.03
Report Form: Not Applicable
BABA: Iron or Steel Product

3.19 Highway Lighting & Traffic Control

03603 WARNING LIGHTS

03709 GROUND WIRE

03711 GROUND ROD

Scope: Materials used in electrical connection of traffic control signals
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications. Typically, the Contractor must submit catalog cuts to the Designer for approval. Refer to the "Materials Approved by Catalog Cut" section in Chapter 4.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section M.15
Report Form: Not Applicable
BABA: Iron or Steel Product

03704 LIGHT STANDARD, ALUMINUM

Scope: Materials used in highway illumination
Acceptance: Sample Record
Procedure: Materials Certificate submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.15.04
Report Form: Not Applicable
BABA: Construction Material

03724 JUNCTION BOX & COVER

Scope: Materials used in electrical connection of traffic control signals
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review it for compliance with the applicable specifications.
Sampling: Not Required



Testing: Not Applicable
Specification: Standard Specifications, Article M.15.10
Report Form: Not Applicable
BABA: Iron or Steel Product

03764 MESSAGE SIGN/BOARD

Scope: Materials used in traffic control signals
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Sections 11.16, 11.17, 11.18, 11.30, and 11.31
Report Form: Not Applicable
BABA: Iron or Steel Product

03799 EXTENSION BRACKET

Scope: Materials used in electrical connection of traffic control signals
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 11.11 Special Provisions
Report Form: Not Applicable
BABA: Iron or Steel Product

03801 PEDESTALS, ALUMINUM

Scope: Used for mounting highway lighting to a foundation
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article 16.03
Report Form: Not Applicable
BABA: Construction Material

03806 MAST ARM ASSEMBLY

Scope: Materials used in traffic control signal installations. Fabricated mast arm assembly.
Acceptance: Sample Record
Procedure: Project staff must provide a minimum of two-week advance notification to MESU on when the units will be fabricated. Acceptance of this material is based on the inspection performed at the fabrication facility, review of the Materials Certificate and Certified Test Report by MESU staff and a visual inspection by Project staff following delivery.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article 16.05



Report Form: Not Applicable
BABA: Iron or Steel Product

00298 SODIUM CHLORIDE, INERTIAL BARRIERS

03933 DELINEATOR

03943 OBJECT MARKER

03938 SIGN FACE, SHEET ALUMINUM

03945 CONSTRUCTION SIGNING

03948 TRAFFIC CONES

03956 TRAFFIC DRUMS

03970 IMPACT ATTENUATOR

03971 IMPACT ATTENUATOR, MOUNTED

03974 CONSTRUCTION BARRICADE

Scope: All signs and devices used on the Department's Projects to inform, protect, and direct traffic
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications and that the material is listed in the Department's Qualified Product List (if applicable).
Sampling: Not Required
Testing: Not Applicable
Specification: Qualified Product List / Standard Specifications, Section M.18
Report Form: Not Applicable
BABA: Construction Material, Manufactured Product, Iron or Steel Product

03952 SIGN POST

Scope: All signs on Department Projects
Acceptance: Sample Record
Procedure: Sample, Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will test the samples and review the paperwork for compliance with the applicable specifications.
Sampling: 1 full size post sample to be submitted to MESU.
Testing: Not Applicable
Specification: Standard Specifications, Article M.18.14
Report Form: Not Applicable
BABA: Iron or Steel Product

3.20 Asphalt Liquids & Asphalt Mixtures

04047 ASPHALT BINDER, PG 58-28

Scope: Materials used in rubberized chip seal
Acceptance: Sample Record
Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 4.06 Special Provision
Report Form: Not Applicable
BABA: Not Applicable or Exempt



- 04003 BITUMINOUS CONCRETE, CURB MIX**
- 04029 ULTRA-THIN BONDED PMA PAVEMENT, TYPE B**
- 04081 STONE MATRIX ASPHALT**
- 04082 BINDER RICH, INTERMEDIATE COURSE**
- 04108-SP HMA, POROUS PAVEMENT**
- 04110 BITUM. CONC. OVERLAY, LOW PERM.**
- 04111 THIN FRICTION WEARING COURSE**

04052 to 04078 HMA - Table 1 includes the appropriate material codes for each size and level

04092 to 04103 PMA - Table 2 includes the appropriate material codes for each size and level

- Scope:** Mixture of aggregate and PG binder used for paving
- Acceptance:** Sample Record
- Procedure:** Acceptance is based on MESU-verified loose mix, Contractor results and MESU core results. A Sample Record must be created per each lot.
- Sampling:** The Contractor will take loose samples as described in Chapter 4. The Contractor will extract cores after compaction as described in Chapter 4. For 04003, MESU staff will coordinate sampling at their discretion.
- Testing:** In accordance with the procedures listed in Chapter 4.
- Specification:** Standard Specifications, Sections 4.06 and M.04, and applicable 4.06 Special Provisions
- Report Form:** MAT-412
- BABA:** Not Applicable or Exempt

Table 1. Asphalt Mixture (HMA) Material Codes

Level / Size	6.25mm (1/4 in.)	9.5mm (3/8")	12.5mm (1/2 in.)	25mm (1 in.)
1	04076	04052	04056	04064
2	04077	04053	04057	04065
3	04078	04054	04058	04066

Table 2. Polymer Modified Asphalt Mixture (PMA) Material Codes

Level / Size	6.25mm (1/4 in.)	9.5mm (3/8")	12.5mm (1/2 in.)	25mm (1 in.)
1	04092	04095	04098	04101
2	04093	04096	04099	04102
3	04094	04097	04100	04103

04128 to 04152 EMULSIFIED ASPHALT – Table 3 includes the appropriate material codes for each grade

- Scope:** Emulsified asphalt used for tack coat
- Acceptance:** Sample Record
- Procedure:** For total bid quantities greater than or equal to 1,000 gallons, a physical sample w/ Bill of Lading, Materials Certificate, and Certified Test Report is to be submitted for every 10,000 gallons for each construction season. For total bid quantities less than 1,000 gallons, only Bill of Lading, Materials Certificate and Certified Test Report is required for each construction season, no physical sample is needed. The Source of Supply of the material, in accordance with 1.06.01, must be indicated on the Sample Record. The material "Source of Supply" does not include the Contractor, Subcontractor, or Vendor. Contractor, Subcontractor, or Vendor can be noted in the comments/remarks section of the Sample Record. Acceptance is based on MESU testing and/or review of the Materials Certificate



and Certified Test Report. Additionally, sources are prequalified by the MESU in accordance with AASHTO R 77.

Sampling: Project staff takes one (1) random 2-quart sample of emulsified asphalt from the distribution vehicle in accordance with AASHTO R 66 and the Minimum Schedule for Acceptance Testing.

Testing: Field Acceptance Samples (Project site): Penetration of Bituminous Materials in accordance with AASHTO T 49 and Residue by Evaporation in accordance with AASHTO T 59
 Split Source Samples: Penetration of Bituminous Materials in accordance with AASHTO T 49; Residue by Evaporation, Density, Sieve Test in accordance with AASHTO T 59

Specification: Standard Specifications, Sections 4.06 and M.04, and applicable 4.06 Special Provision

Report Form: MAT-402

BABA: Not Applicable or Exempt

Table 3. Emulsified Asphalt Material Codes and Grades

04128 RS-1	04133 SS-1	04138 CRS-1	04145 CSS-1H	04152 HFRS-2P
04147 RS-1H	04134 SS-1H	04139 CRS-2	04146 CSS-1	
		04140 CRS-1H		
		04148 CRS-1P		
04149 Non-Tracking Asphalt Tack Coat (NTT)		04151 CRS-2P		

03096 BITUMINOUS MASTIC, HOT POUR

Scope: Pre-packaged polymer-modified asphalt material (aggregate filled) used for hot-applied surface patching

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Applicable 4.06 Special Provision

Report Form: Not Applicable

BABA: Manufactured Product

04025 BITUMINOUS PATCH, PRE-BLEND POLYMER

Scope: Pre-blended polymer modified asphalt material used for patching

Acceptance: Sample Record

Procedure: Materials Certificate and Certified Test Report submitted with Sample Record. MESU staff will review them for compliance with the applicable specifications.

Sampling: Not Required

Testing: Not Applicable

Specification: Applicable 4.06 Special Provision

Report Form: Not Applicable

BABA: Manufactured Product



04026 BITUMINOUS MICROSURFACING

Scope:	Polymer modified emulsified asphalt, aggregate, mineral filler, additives, and water on existing roadway surfaces to provide a new pavement wearing course, fill ruts, or fill rumble strips
Acceptance:	DWR
Procedure:	Project staff submits mix design with the Certified Test Reports for MESU review and approval prior to production.
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Applicable 4.06 Special Provision
Report Form:	Not Applicable
BABA:	Not Applicable or Exempt

04150 HIGH FRICTION SURFACE TREATMENT

Scope:	Polymeric resin binder and calcined bauxite aggregate mix used for a treatment surface that has higher friction than a standard overlay
Acceptance:	DWR
Procedure:	Visual inspection by Project staff.
Sampling:	Not Required
Testing:	Not Applicable
Specification:	Applicable 4.06 Special Provisions
Report Form:	Not Applicable
BABA:	Not Applicable or Exempt

08010 EXPANSION JOINT, ASPHALTIC PLUG

Scope:	Components testing and application requirements for field molded asphaltic plug material used within expansion joints on bridges with asphalt concrete overlays or PC concrete decks
Acceptance:	Sample Record
Procedure:	Project staff submits the Materials Certificates and Certified Test Reports with Sample Record for APJ system components. In addition, Project staff submits sample of aggregate component (08034). Aggregate must appear to be clean and free from excess dust. Project staff is to contact MESU staff with any questions related to the aggregate.
Sampling:	Not Required
Testing:	Not Applicable
Specification:	ASTM D6297 Table 1 and Applicable Special Provision
Report Form:	MAT-248
BABA:	Iron or Steel Product

04199 MEMBRANE WATERPROOFING, COLD APPLIED

Scope:	Fully adhered built-up asphalt membrane waterproofing system for bridge decks
Acceptance:	DWR
Procedure:	Project staff reviews the Materials Certificate for compliance with Contract Specifications and to confirm the cold applied system is listed in the Department's Qualified Product List
Sampling:	Not Required
Testing:	Not Applicable



Specification: Qualified Product List / Applicable 7.07 Special Provision
Report Form: Not Applicable
BABA: Manufactured Product

04201 MEMBRANE WATERPROOFING, WOVEN GLASS FABRIC

Scope: Fully adhered built-up asphalt membrane waterproofing system for bridge decks
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 7.07 Special Provision
Report Form: Not Applicable
BABA: Manufactured Product

04207 DAMPPROOFING, PRIMER

04208 DAMPPROOFING, SEALER

Scope: Three asbestos-free asphalt roof coatings of brushing or spraying consistency suitable for use as waterproofing and damp proofing of concrete and concrete masonry
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 7.08
Report Form: Not Applicable
BABA: Manufactured Product

3.21 Aggregates

04697 SAND, MASONRY, GRADING A

04700 SAND

04704 SAND, MASONRY, GRADING B

04749 AGGREGATE, LIGHTWEIGHT

04817 STONE DUST/SCREENINGS

04819 GRAVEL, BANK RUN

04901 BEDDING MATERIAL

08034 STONE, BROKEN/CRUSHED

08035 GRAVEL, CRUSHED

08036 RECLAIMED MISC. AGGREGATE, ONSITE

08036X RECLAIMED MISC. AGGREGATE, OFFSITE

08037X RECLAIMED WASTE, OFFSITE

Scope: Various aggregates used on projects with many different applications, tested for conformance to Project specifications. Different tests include sieve analysis, washed sieve analysis, soundness, and others listed below.
Acceptance: Sample Record
Procedure: Project staff submits sample (plus Materials Certificate and Certified Test Report for 08036X and/or 08037X) with Sample Record. MESU tests the samples and reviews documentation to confirm compliance with the applicable specifications.
Sampling: Samples to be obtained by Inspection staff in accordance with AASHTO R90
Testing: MESU staff will test aggregates samples in accordance with the following procedures:
 - Sample reduction for testing – AASHTO R76



- Sieve analysis – AASHTO T 27
- Washed sieve analysis – AASHTO T 11
- Degradation resistance of aggregate (L.A. abrasion test) – AASHTO T 96
- Soundness of aggregate (magnesium sulfate) – AASHTO T 104
- Moisture density relationship of soils – AASHTO T 180
- Total evaporative moisture content of aggregate by drying – AASHTO T 255
- Flat and/or elongated in coarse aggregate – ASTM D4791
- Fractured particles in coarse aggregate – ASTM D5821
- Bulk density (unit mass) and voids in aggregate – AASHTO T 19
- Specific gravity and absorption of coarse aggregate – AASHTO T 85
- Organic impurities in fine aggregate – AASHTO T 21
- Asphalt Binder Content – AASHTO T 308 (only for 08037X)

Specification: Standard Specifications, Sections M.01, M.02, M.03, M.04, M.05, M.08, M.12, or applicable Special Provision
Report Form: MAT-205, MAT-206, MAT-207, MAT-212 (08036X, 08037X)
BABA: Not Applicable or Exempt

08034-DWR AGGREGATE, VISUAL INSPECTION

Scope: Miscellaneous aggregates to be used as borrow or streambed material
Acceptance: DWR
Procedure: Visual inspection by Project staff
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04771 STONE, MASONRY

Scope: Masonry facing stone must be either dimensioned masonry stone or ashlar masonry stone
Acceptance: DWR
Procedure: Visual inspection by Project staff. Hard and durable stone of the size, quality and color acceptable to the Engineer.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.11.01
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04782 RIPRAP

Scope: Angular shaped stones used to protect foundations of piers, abutments, walls, slopes of embankments, and waterways from water damage
Acceptance: DWR
Procedure: Visual inspection by Project staff. Sound, tough, durable, and angular rock, free from decomposed stones or other defects impairing its durability. The least dimension must meet the specified size.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Section 7.03



Report Form: Not Applicable
BABA: Not Applicable or Exempt

04821 BLOTTER AGGREGATE

Scope: Aggregate used in asphalt treatments
Acceptance: Sample Record
Procedure: Project staff submits Materials Certificate and Certified Test Report with Sample Record. MESU staff reviews them for compliance with applicable specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 4.06 Special Provision
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04909 CURBING, GRANITE STONE

Scope: Granite curbing typically used on highway bridges at the bottom of parapets adjacent to the bridge deck. Shape typically has one sloped face.
Acceptance: DWR
Procedure: Visual inspection by Project staff. Hard and durable granite with smooth-splitting uniform surface.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.12.08
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04910 CURBING, GRANITE SLOPE

Scope: Granite curbing typically used at the approaches to bridges or parking lots. Shape typically rectangular.
Acceptance: DWR
Procedure: Visual inspection by Project staff. Hard and durable granite with smooth-splitting uniform surface.
Sampling: Not Required
Testing: Not Applicable
Specification: Standard Specifications, Article M.12.07
Report Form: Not Applicable
BABA: Not Applicable or Exempt

04959 RAILROAD BALLAST MATERIAL

Scope: Materials necessary for the construction of the track beds.
Acceptance: DWR
Procedure: Project staff reviews the Materials Certificate for compliance with Contract Specifications.
Sampling: Not Required
Testing: Not Applicable
Specification: Applicable 2.13 Special Provision
Report Form: Not Applicable
BABA: Not Applicable or Exempt



CHAPTER 4 – MATERIALS EVALUATION AND TESTING PROCEDURES

This chapter describes in detail the procedures used by the Materials Evaluation and Specification Unit (MESU) staff to develop recommendations on the conformance to specification of materials purchased by the Department for its own use or used by a Contractor in the construction or maintenance of a facility. Specific laboratory procedures are detailed in the MESU Standard Operating Procedures (SOP) Manual and the MESU Quality Management System (QMS) Manual which can be found in [QA Program for Testing Materials](#). In addition, this chapter also describes the procedures used by MESU staff to inspect and qualify facilities that produce materials for use on a regular basis by the Department or Department contractors.

4.01 Materials Evaluation

4.01.01 Material Catalog Cuts

Several materials used on a project are evaluated based on catalog cuts. These materials are typically mass-produced items such as louvers, bathroom fixtures, roadway lighting, and electronic equipment available from numerous manufacturers. Due to the variety of choices, the designer typically develops a specification that can be met by several of the manufacturers. The Designer is then responsible for reviewing the catalog cuts submitted by the Contractor to the Contract Administrator and determining if the contractor-selected product meets the project specification. Consequently, the MESU will not repeat the evaluation performed by the Designer and recommend acceptance or rejection of the material. A Sample Record for the materials reviewed and approved or rejected by the Designer is not required. Project field staff are responsible for verifying that appropriate materials incorporated into the project were approved by a catalog cut submittal.

4.01.02 Visual Inspection of Materials on Project Site

Several materials used on a project must be evaluated initially or daily by project staff. The most effective method of acceptance of these materials is performing visual inspections at the project site and over the course of the entire project. Examples of these materials include but are not limited to, temporary precast concrete barrier curb, bedding material, hay bale, and mulch. A Sample Record for these materials is not required. This material evaluation corresponds to scenario 1 in the Construction Manual Section 1-402C.

4.01.03 Qualified Product Lists

Several materials used on a project have already been pre-qualified for use and are listed in the Department Qualified Products List (QPL) or North East Protective Coating Committee QPL (NEPCOAT). Project staff must confirm the material is listed in the applicable QPL and review the materials certificate. Materials Certificates must meet the requirements of Article 1.06.07. A Sample Record is not required for QPL materials. This material evaluation corresponds to scenario 2 in the Construction Manual Section 1-402C.

4.01.04 Materials Certificate

Several materials used on a project must be evaluated by Project or the MESU staff by the review of a materials certificate. The Minimum Schedule for Acceptance Testing (Minimum Schedule) and Chapter 3 clearly defines which Materials Certificates require review by project or MESU staff. A Sample Record must be created for those materials certificates to be reviewed by MESU. Materials Certificates must meet the requirements of Article 1.06.07. This material evaluation



corresponds to scenario 3 in the Construction Manual Section 1-402C for all materials with Acceptance listed as DWR in Chapter 3 of this manual.

4.01.05 Certified Test Report

Several materials used on a project must be evaluated by Project or MESU staff by the review of a certified test report. Although most of those materials will be reviewed by the MESU staff. The Minimum Schedule and Chapter 3 clearly defines which certified test reports require review by project or the MESU staff. A Sample Record must be created for those certified test reports to be reviewed by MESU. The certified test report must meet the requirements of Article 1.06.07. This material evaluation corresponds to scenario 3 in the Construction Manual Section 1-402C for all materials with Acceptance listed as DWR in Chapter 3 of this manual.

4.02 Materials Acceptance Procedures

Project produced materials as defined in AASHTO R 38 (i.e., concrete, asphalt mixture, subbase, etc.) that are used in highway and in vertical construction require physical samples and must be tested in accordance with the Minimum Schedule and Chapter 3 of this Manual. A recommendation of acceptance or rejection of the material will be made by MESU staff based on the results of this testing. Acceptance will be based on testing performed by Department staff or the Contractor or their representative. When Contractor test data is used for acceptance, MESU staff will validate this data through verification testing and/or plant and testing inspections. When the acceptance testing is performed by another laboratory in addition to the Department Central Laboratory, independent assurance testing will be performed, as detailed in Chapter 9 (Minimum Schedule for Independent Assurance Testing). AASHTO and ASTM standard test procedures will be followed unless an exception is listed in the applicable specification. In the event of a material rejection, a form MAT-103 will be issued by MESU staff as detailed in MESU SOP MESU_04.

4.02.01 Sampling Materials for Test

Sampling is a critical component of testing and is performed according to the applicable specification indicated under “sampling” in each section of this manual. Staff collecting samples must utilize every precaution to obtain unbiased samples that represent the nature and condition of the material to be sampled. MESU and project staff are certified in the applicable sampling procedures through the New England Transportation Technician Certification Program (NETTCP) and qualified by the University of Connecticut Concrete Technician Certification Course for Connecticut Department of Transportation employees to assure uniform procedures in obtaining random samples.

MESU staff also regularly transport field samples to the central or satellite laboratories for testing. It is also important that samples are carefully handled and transported to prevent damage to the samples. Containers used to transport samples should be clean and adequate for the particular material being transported. Furthermore, the containers should be durable and of a type and size that prevents loss, damage, or contamination of any portion of the sample.

MESU District laboratory staff oversee the field sampling of both fine and coarse aggregates, aggregate blends for road base applications, and other various unbound granular materials used for Construction and/or Maintenance purposes and plastic PC concrete by construction inspection staff as required for assurance purposes.



4.02.02 Aggregates Acceptance

Qualified material sources for Hydraulic Concrete production are listed on the Aggregate Qualified Material List (QML) posted in [Material Evaluation and Specification Unit \(ct.gov\)](http://www.ct.gov/mes). Source not listed on the Aggregates QML will be required to submit quality control plan and testing as listed in the applicable specifications to be considered for qualification. The asphalt mixture producer is required to submit testing in accordance with the Standard Specifications Section M.04 and a quality control plan (QCP) for fine aggregate to be used for asphalt mixture. Producers are responsible for quality control (QC) of aggregate for asphalt mixture and hydraulic cement concrete. MESU obtain random verification samples at least annually.

Preliminary testing (source testing) is the responsibility of the producer. Department representatives may request producer QC testing prior to materials being delivered to state projects. When the aggregates are delivered and used on Department projects, DOT sampling and testing will be performed in accordance with the Minimum Schedule and Chapter 3 of this Manual.

All aggregate acceptance sampling and testing will be in accordance with Chapter 3 of MESU SOP Manual and the applicable standard test procedure.

4.02.03 Field Density of Unbound Material

The Contractor must determine the in-place density of soil and soil aggregate by using a measurement device approved by the Engineer. Density measurements must be performed where specified in the Contract. The Engineer will perform assurance testing in accordance with the Minimum Schedule for Independent Assurance Testing and MESU SOP IA_03.

Field testing is performed in accordance with AASHTO T 310 or other approved industry standard test method. The density results obtained must be reported as a percent of the maximum dry density as determined by AASHTO T 180 Method D. Reclaimed material containing less than 2% by weight of asphalt mixture must have the results reported as a percent of the maximum wet density determined by the same method. All gauges used for density determination must be calibrated annually prior to use on Department projects. Correlation blocks must be provided by the gauge manufacturer. The gauge must be correlated in accordance with manufacturer's recommendations. Additionally, as a minimum, standardization of the gauge must be performed daily prior to its use. This process shall be performed in accordance with the manufacturer's recommendations.

4.02.04 Precast Concrete Production Facility Inspection

REINFORCED CONCRETE PIPE

Reinforced concrete pipe (00699) including elliptical pipe and slotted pipe, and culvert ends (00823) may be accepted by MESU based on the manufacturer's certification. Products covered under this section include, but are not limited to, reinforced concrete pipe for use as a culvert, slotted reinforced concrete pipe for use as underdrains, and reinforced concrete culvert ends.

This outline is a guide to staff involved in the inspection of the manufacture of reinforced concrete pipe and allied products. The following factors must be considered while inspecting this material.

- Testing and inspection of the various materials selected for use. Check that the testing equipment is calibrated at least once every twelve months.
- Proper proportioning and adequate mixing of the materials. Check that the plant scales are inspected and sealed at least once every twelve months.
- Sufficient reinforcement and proper placement of reinforcement within form work



- Proper handling, placing, and consolidating procedures.
- Proper curing of the product

MESU staff must become familiar with the manufacturing processes, designs, specifications, and procedures followed for any plant. Detailed information regarding the precast concrete inspection and acceptance can be found in the SOP HCC_02 and SOP HCC_04.

Annual Plant Inspection

This inspection is to ensure that a plant is capable of producing a product that meets AASHTO M 170, AASHTO M 207, and AASHTO M 175 Type II requirements, supplemented by Standard Specifications, Article M.08.01, as applicable. After the annual inspection is complete, MESU staff fills the inspection form MAT-324 "Yearly Inspection of Precast/Prestressed Concrete Structure, and Concrete Pipe Manufacturers" which includes the name, address, and plant number of the manufacturer; and lists the number, make, capacity, type, and condition of all scales and seal dates, mixers, and pipe machines.

MESU staff will also obtain samples of coarse aggregate, fine aggregate, and reinforcing steel that is proposed for use on the project from the manufacturer and indicate on MAT-324 the suppliers of the materials. Aggregate samples must be obtained from approved storage piles or bins by MESU staff during the annual inspection. In addition, one copy of the test report certifying the acceptability of the cement must be furnished to the Department. At the time of the annual inspection and at any time thereafter, MESU staff may obtain a copy of the corresponding certified test report.

Fabrication Inspection

Reinforced concrete pipe (RCP) and components must meet the requirements of the Contract Specifications. Aggregate samples must be taken at least once every month or from each new source. Reinforcement steel samples of each size and type of reinforcement must be taken every six months, or as required.

Randomly and at a minimum frequency of once per month, MESU staff will observe the production process, which must include checking the splices, spacing, and size of reinforcing at the time cages are assembled. Compliance to all specification requirements such as laps, welds, tolerance of placement in the wall of the pipe, etc., must be noted during this inspection.

The reinforcing must be free of objectionable coatings, particularly heavy corrosion prior to installation in the form. An adherent film of rust or mill scale is not considered objectionable. The reinforcement should be secure so that the placement of the concrete will not displace the steel from its proper position.

Preliminary Tests and Tests for Extended Deliveries

As part of the yearly certification process, in the Spring and Fall of each year that certification is requested, MESU staff will select two of each size pipe up through 750 mm diameter and one of each size greater than 750 mm diameter RCP units and witness 3-edge testing. The pipe sample must be tested by the 3-edge bearing test as per AASHTO T 280 with the exceptions noted in the specifications.

Rejection

The manufacturer **must** isolate the rejected pipe in its yard or provide some means to clearly indicate rejected pipe. Any size pipe previously rejected must be retested.



PRECAST CONCRETE DRAINAGE ITEMS

The following describes the role of the MESU in monitoring the production quality assurance program for acceptance of precast concrete units such as catch basins (01440, 01444, 01458, 01649) and manholes (01441, 01491, 01499). Detailed information regarding the acceptance of these materials can be found in the SOP HCC_02.

Quality Control Manual

Each fabricator, which proposes to manufacture standard (PC-1) precast units for use by the Department must develop and maintain a plant-specific Quality Control Manual addressing in detail the production and certification process of products for use on Department projects. This Manual must be submitted to the Department for initial approval and resubmitted as required due to either operational changes within the company or changes in source of materials.

Annual Plant Certification

Each plant is subject to an annual inspection by a representative of the MESU. The purpose of this inspection is to determine if the facility has the infrastructure to manufacture precast units to the Department's requirements and the staff and procedures necessary to adhere to the Quality Control Manual specific to that facility. During the annual inspection, MESU staff will review the standard fabrication process in use at the plant to determine that the precast units are manufactured according to the requirements specified in Standard Specifications, Article M.08.02, and the approved Quality Control Manual for that plant. Details of this review are listed in SOP HCC_02. MESU staff will document the results of his inspection by completing the information required on Inspection Form MAT-324.

The manufacturer is required to furnish the equipment and staff necessary to perform compressive strength tests and air content determinations to demonstrate conformance to the Contract Specifications and plans and to document the results of these tests in the plant records. During the annual inspection, MESU staff will review the testing equipment and procedures employed at the plant for conformance to the following requirements:

- Sampling Freshly Mixed Concrete - AASHTO T 41.
- Making and Curing Concrete Test Specimens in the Field - AASHTO T 23.
- Obtaining and Testing Drilled Cores and Sawed Beams of Concrete - AASHTO T 24.
- Compressive Strength of Cylindrical Concrete Specimens - AASHTO T 22.
- Air Content of Freshly Mixed Concrete by the Pressure Method – AASHTO T 52.
- Slump of Hydraulic Cement Concrete - AASHTO T 119.
- Frequency of sampling and testing must be Standard Specifications, Article M.08.02-4.
- The compressive strength machine must be calibrated by an approved agency at least once each twelve (12) months.
- The pressure/volumetric meter is to be calibrated by the plant quality control staff as required by the Engineer.

MESU staff will witness the performance of the required tests by the manufacturer's staff and must designate on Inspection form MAT-324 those plant employees qualified to perform the respective tests. MESU staff will consult the manufacturer's Quality Control Manual for the procedure for recording test results to ensure that said records are accurate, complete, and available to a representative of the MESU upon request.



Periodic Plant Inspection

Randomly and at a minimum frequency of once per every ten days of production, While the plant is producing precast units for the Department, MESU staff may visit the plant unannounced to perform periodic inspection activities as detailed in SOP HCC_02.

Sampling

The quality of the materials used in the manufacture of precast units must be determined by tests on samples taken as described in SOP HCC_02. Additionally, manhole steps must conform to AASHTO M 199. Sampling frequency will be determined by the Engineer.

PRECAST/PRESTRESSED CONCRETE (STRUCTURAL) BEAMS/PILES/SUBSTRUCTURE

Production Inspection

The MESU will assign staff to inspect/witness the fabrication of precast/prestressed items such as bridge girders, deck slabs, culverts, or piles. The length of the assignment will be prioritized as to the type of member being produced and the other current resource demands.

In general, any structure or component that primarily carries live load over or beneath a transportation facility will have oversight during production from the MESU or its representative.

Any structure or component that is used to primarily resist dead load such as, but not limited to, retaining walls and proprietary items such as gross particle separators may have oversight during the production time. The MESU may adjust the amount of inspection based on the reputation of the fabrication facility and the producer's daily adherence to their quality control plan.

Plant Inspection Procedure

Details on the inspection procedures, sampling of components materials, and reporting can be found in SOP HCC_04.

4.02.05 Hydraulic Cement Concrete Acceptance

Concrete Batch Plants and Delivery Vehicles Qualification

Producers must obtain and maintain certification of the plants and the hauling/mixing vehicles from the National Ready Mix Concrete Association (NRMCA). MESU staff may request copies of the NRMCA inspection reports from the producer.

Cement Certification Program

Before a cement producer is qualified to provide cement for use on CTDOT projects, the qualification and documentation submittal requirements listed in MESU SOP HCC_03 are required to be met. MESU staff will review all the certification request submittals before the cement certification is granted.

Concrete Acceptance Testing

During concrete placement, and at a frequency of once per every 75-cu. yd. or fraction, the project inspectors obtain a concrete sample to test in accordance with AASHTO T 141 Standard Method of Sampling Freshly Mixed Concrete, tests fresh concrete properties as listed in Chapter 3, and prepares testing specimens in accordance with AASHTO T 126 Standard Method of Making and Curing Concrete Test Specimens in the Lab, AASHTO T 126.

After initial curing at the job site, the concrete specimens are transported to the MESU Central Laboratory for testing as detailed in SOP HCC_01.



Admixtures

Project specifications require that an admixture must perform the desired function without injurious effect upon the concrete. Proof of conformance to this requirement will be in the form of a certified statement from a recognized laboratory. The certified statement will contain evidence based on tests pertinent to the admixture made in the recognized laboratory using concrete materials and by methods that meet requirements of current AASHTO standards. Tests may be made on samples taken from a quantity submitted by the Contractor for use on the project or on samples submitted and certified by the manufacturer as representative of the admixture to be supplied. A recognized laboratory is any cement and concrete laboratory accredited by the Cement and Concrete Reference Laboratory (CCRL).

4.02.06 Structural Steel and Welding Shop Inspection

All structural steel fabricated for permanent incorporation into the project must be inspected by MESU staff during fabrication as detailed in SOP STEEL_04. MESU staff supplemented by consultant inspection staff can inspect any facility no matter where it is located to determine the adherence to quality control standards and project specifications. Adherence to the “Buy America” requirements of the contract is also an important aspect of this on-site inspection. It is very important that MESU staff is notified where and when fabrication will take place at least two weeks in advance so that inspection can be scheduled. The Contractor is responsible for notifying project staff, who in turn must notify the MESU. Shop inspections will be performed as detailed in SOP STEEL_01.

In accordance with Standard Specifications Article 1.05.17, all contractor staff scheduled to perform permanent or temporary field welding on materials incorporated into Department projects must possess a valid CTDOT welder qualification record issued by MESU. This record is required to include the qualification for the specific type of welding/position to be performed. Welding performed by contractor staff without a valid welder qualification record will be rejected.

CTDOT welder qualification must be available and shown to Department staff prior to welding being performed. An electronic copy of physical record will be acceptable. The welder qualification record issued by MESU is property of the Department and is valid for Department projects only. The record must not be presented as qualification for any other work outside the Department. The Department reserves the right to revoke welder qualifications at any time for any reason. The Department may require a welding qualification test(s) or retest(s) for current qualified welders based on poor workmanship as determined by MESU’s Certified Welding Inspector (CWI) or their representative, or if a welder’s qualification has been expired for 6 months or more. Details on CTDOT welder qualification program can be found in MESU SOP STEEL_03.

4.02.07 Asphalt Mixture Acceptance

The acceptance procedure for asphalt mixture includes the annual qualification of the plant production facility, the acceptance of the job- mix formula, regular random plant inspections in accordance with SOP ALAM_07, project specific material acceptance as described in SOP ALAM_03, and project specific in-place density acceptance in accordance with SOP ALAM_05.

Annual Qualification of Asphalt Mixture Plants

The asphalt mixture producer is required to annually evaluate and document the materials, technician qualifications, mix designs procedures, calibration records, and quality control procedures. Asphalt Mixture producers are required to complete and submit MESU form MAT-405 for drum plant or form MAT-404 for batch plants. Additionally, they are required to complete form MAT-406 to document the laboratory equipment information and calibration records. The Department may perform random spot inspections of any aspect of the operation during the production season to ensure compliance to all specifications.



Asphalt Mixture Plant Routine Production Inspection

The purpose of plant routine production inspection is to monitor compliance with the producer quality control plan and the Contract Specifications. The aggregate must be of uniform quality and gradation and must be fed into the plant in a uniform manner; the heating and drying of the aggregates must be uniform; the separation of the aggregates must be controlled; and the components must be combined and mixed in a uniform, consistent manner. For these reasons, MESU staff must be thoroughly familiar with all phases of the production process.

The asphalt mixture producers are also required to comply with their quality control plan and monitor production activities. The producer activities include the following:

- Process Control (PC): Typically performed by the contractor or representative prior to shipment.
- Quality Control (QC): The sum of activities performed by the seller (producer, manufacture, contractors) to make sure that a product meets contract specification requirements.

A priority system is utilized for the assignments of MESU staff to production plants. Assignments are based on the following, in order of priority:

- Performance – review of recent plant specific test results
- Verification Sampling – as required per contract specification.
- Daily tonnage produced – larger tonnage will get higher priority.
- Random sampling – as determined by the TSE and/or TE3

The asphalt mixture plant inspection includes, but is not limited to, observing component materials in the stockpile, cold bins, hot bins; PG binder, and additive, sampling; and overall compliance of the producer with the Quality Control Plan for that facility. Details on routine plant inspections are listed in SOP ALAM_07. After each inspection, the inspector shall complete form MAT-108.

Mix Design / Job Mix Formula (JMF) Submittal and Change Procedure

The Producer must submit an annual JMF as specified in the Standard Specifications Article M.04.02. The JMF will be reviewed by MESU staff, and a mix status will be provided in accordance with Article M.04.02. Based on acceptance test results, the Contractor may be required to submit an updated JMF using MAT-429 (JMF Changes tab) for that mixture to continue supplying material.

Each plant will have each mixture evaluated based on previous year's production compliance in accordance with the current M.04 specification. Based on the ranking a mix receives, it will determine whether the material can be produced without the prior completion of a pre-production trial (PPT). Rankings will be provided to each asphalt mixture producer annually at the beginning of the paving season.

Mix Design Verification Procedure

Annually and prior to the beginning of the paving season, MESU staff will evaluate the submitted JMF using plant blended or component aggregate, RAP, and binder samples provided by the asphalt mixture producer. For a JMF to be approved, the properties of the aggregate components or mix must meet the verification tolerances shown in Table 4.



Properties	Tolerance	Properties	Tolerance
#200	1.0	Gmm	0.020
#100	3.0	Gmb	0.022
#50	3.0	Pba	0.6
#30	4.0	PD@Ni	1.5
#16	4.0	Gse	0.025
#8	5.0	Gsb	0.028
#4	5.0	Gsa	0.025
3/8"	5.0	CAA (1 face/2 faces)	10
1/2"	4.0	SE	15
3/4"	4.0	FAA	0.8
1"	3.0	F & E	5.0
Va	1.3	TSR	15 & Minimal Stripping
VMA	1.3		
VFA	6.0		

⁽¹⁾ Tolerance is the absolute difference in the measured values, not a percentage of the values.

As part of the JMF submittal, the Contractor must submit the following samples to the MESU:

- 4 - one-quart cans of PG binder, with corresponding Safety Data Sheet (SDS)
- 1 - 50 lbs bag of RAP
- 2 – 50 lbs bag of plant blended virgin aggregate
- 2 - 10,000 kg boxed split sample material for TSR design

Testing is performed by MESU staff to evaluate each proposed JMF and includes:

Combined virgin aggregate and RAP aggregate testing:

- AASHTO T 30: Mechanical Analysis of Extracted Aggregate
- AASHTO T 84: Fine Aggregate Specific Gravity
- AASHTO T 85: Coarse Aggregate Specific Gravity
- AASHTO T 176: Sand Equivalent
- AASHTO T 304, Method A: Fine Aggregate Angularity
- ASTM D4791: Flat and Elongated Particles (1:5)
- ASTM D5821: Coarse Aggregate Angularity

Laboratory Mixed virgin aggregate, RAP and binder testing:

- AASHTO R 35: Air Voids, VMA, VFA, Density to Nini
- AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface- Dry Specimens.
- AASHTO T 209: Theoretical Maximum Specific Gravity and Density of Asphalt Paving Mixtures.
- AASHTO T 283: Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
- AASHTO T 312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by means of the Superpave Gyratory Compactor

JMF verification results are reported using form MAT-418

Resistance of Compacted Asphalt Mixture to Moisture Induced Damage

As part of the JMF verification and once during the first month of mixture production, specimens are tested to evaluate the resistance to moisture induced damage by quantifying the tensile strength ratio (TSR) between unconditioned and moisture conditioned specimens. Preparation of specimens and measurement of the change of diametral tensile strength resulting from the effects



of saturation and accelerated water conditioning of compacted HMA mixtures in the laboratory. This test may be performed on laboratory mixed sample, loose mixtures obtained from newly loaded transport vehicles, loose mix samples from the job site, or pavement cores. Testing is performed in accordance with AASHTO T 283 and test results are reported using Form MAT-428. Detailed information regarding MESU TSR testing is located at MESU SOP ALAM_06.

Asphalt Mixture Pre-production Trial (PPT) Verification

For a PPT to be approved by Article M.04.02-2c Option B, the mixture properties need to be evaluated to verify conformance to the specifications. Table 5 will be used to verify PPT samples. When testing a PPT sample, if any single sieve result or any of the individual volumetric results exceed the tolerances in Table 5, the PPT will be considered as failing and the mix will remain on PPT status. If the comparison test result is within tolerances in Table 5 below, and either test result is outside of specification limits detailed in Table M.04.02-2, Table M.04.02-4 or Table M.04.02-5 the mixture will remain on PPT status. If the sample meets all the tolerances and minimum requirements, the mix will be placed on "A" status. Only mixes in A status can be used in Department projects.

At the PPT, the Contractor collects, prepares, and submits the following samples to the MESU:

- 2 – gyratory molds
- 1 – 5,000 grams of cooled loose asphalt mixture
- 1 – 5,000 grams of boxed mixture

Testing performed by the MESU to evaluate each PPT sample includes:

- AASHTO T 308: Method for Determining the Asphalt Content of HMA by the Ignition Method.
- AASHTO T 30 modified: Mechanical Analysis of Extracted Aggregate.
- AASHTO T 209: Theoretical Maximum Specific Gravity and Density of HMA Mixtures.
- AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface- Dry Specimens.
- AASHTO T 168: Sampling of Paving Mixtures.
- AASHTO T 312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the Superpave Gyratory Compactor.
- AASHTO T 329: Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method. Should the field sample be re-heated for 1.5 hours or more, this test may be omitted.

Test results of a PPT verification testing are reported using Form MAT-412PPT.

Table 5: PPT Verification

Properties	Tolerances ⁽¹⁾
#200	0.7
#100	2.0
#50	2.0
#30	2.0
#16	2.0
#8	3.0
#4	3.0
3/8"	4.0
1/2"	4.0
3/4"	4.0
1"	4.0
1 1/2"	4.0
2"	4.0
Pb	0.33
Gmm	0.020
Gmb ⁽²⁾	0.011 or 0.022
Va	0.71
VMA	0.71
VFA	3.5
PD@Ni	0.71

⁽¹⁾Tolerance is the absolute difference in the measured values, not a percentage of the values

⁽²⁾0.011 if testing the same compacted specimen or 0.022 if testing a separate compacted specimen.

Sampling Asphalt Mixtures

Sampling asphalt mixtures is performed by the Contractor in the presence of the project inspector. Sampling is required to be performed by a NETTCP certified technician.

The Contractor follows AASHTO R 97 for sampling and AASHTO R 47 for the mechanical splitting of the sample. Figures 2 and 3 demonstrate the procedure to be used.

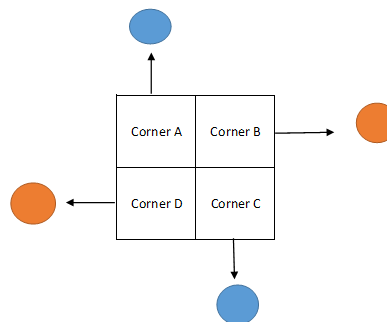


Figure 2- First Splitting Process

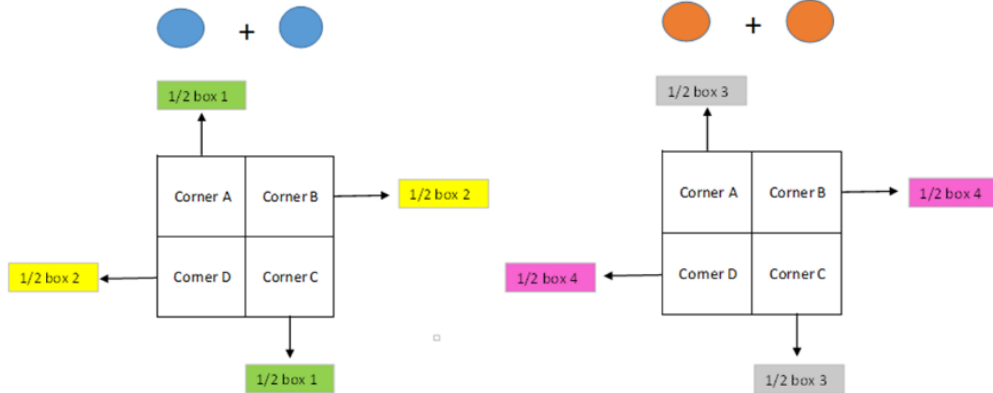


Figure 3- Second and Third Splitting Processes

Testing Asphalt Mixtures

Testing asphalt mixtures for acceptance must follow the requirements in the Standard Specifications Section M.04 and include:

- Binder Content by Ignition Method (Pb) – Testing is performed in accordance with AASHTO T 308. This method of test is for the determination of the total percentage of binder in asphalt mixtures. To monitor the difference between the target plant production binder content and the corrected binder content by ignition method using a five (5) point moving average. If two (2) consecutive differences are more than 0.3%, a new correction factor may be required for the mix.
- Mechanical Analysis of Extracted Aggregate – Testing is performed in accordance with AASHTO T 30. This test is performed to monitor mix compliance with the specifications and job mix formula (JMF) target values.
- Degree of Particle Coating – Testing is performed in accordance with AASHTO T 195 to determine the degree of coating of coarse particles of aggregate in a HMA mixture in relation to the wet mixing time. When HMA is mixed, coarse particles of aggregate are the last and the most difficult to coat, and the degree of their coating may be a measure of the degree of mixing.
- Preparation of Laboratory Compacted Specimens using the Superpave Gyratory Compactor - Preparation of test specimens using the Superpave gyratory compactor in accordance with AASHTO T 312.
- Bulk Specific Gravity of Laboratory Compacted Mixtures (Gmb) - Testing is performed in accordance with AASHTO T 166 to determine the bulk specific gravity used to calculate the volumetric properties of laboratory compacted asphalt mixtures.
- Theoretical Maximum Specific Gravity (Gmm) - Testing is performed in accordance with AASHTO T 209 to determine the maximum specific gravity of uncompacted asphalt paving mixtures.
- Volumetric Properties Calculations – To determine the air voids, void in mineral aggregate (VMA) and voids filled with asphalt (VFA) of a laboratory compacted specimen. Calculations are performed in accordance with AASHTO M 323 and AASHTO R 35 using the specimen Pb, Gmm, Gmb and the combined aggregate bulk specific gravity listed in the mix design.

Physical, volumetric, and other properties must be calculated in accordance with the Contract Specifications, AASHTO M 323 and AASHTO R 35.



All test results are reported in the corresponding form MAT-412 depending on the type of mix being evaluated. Asphalt mixture acceptance procedures follow MESU SOP ALAM_03.

Asphalt Mixture Verification Testing Procedures

Verification testing will be performed to validate Contractor's asphalt mixture test results used for acceptance. Samples for verification testing will be randomly selected by MESU staff and tested at the Department's Central Laboratory.

When an asphalt mixture is to be evaluated under Non-PWL, the ratio of verification tests to the Contractor tests will be a minimum 1 to 10. Split samples will be compared using the absolute difference of test results and will be considered validated when they conform to the tolerances in Table 4.

Should the Department be unable to validate the Contractor's Non-PWL acceptance test result(s), The Engineer will use verification results for the pay adjustment calculation in the corresponding sublots.

When an asphalt mixture is to be evaluated under PWL, the ratio of verification tests to the Contractor tests will be a minimum of 1 to 3.5. Independent samples will be compared using the F-test and t-test at a 0.01 significance level for aggregate gradation by sieve size, Gmm, Gmb, Pb, VA and VMA for PWL lots.

Samples are obtained and transported to the Central Laboratory by the Contractor within 2 business days of production.

For asphalt mixtures evaluated under PWL, the minimum number of verification tests per each data validation is three (3). Results will be considered validated when both the F- and t- tests pass.

For PWL lots with project estimated quantities over 10,500 tons, a data validation lot will include QC and verification results in three consecutive acceptance lots under the same mix design. Contractor test results from multiple projects can be combined to perform an F and t analysis provided they are from the same mix design and are within a 30 day production period if necessary. The first data validation lot will be performed when the first three acceptance lots are completed and consecutive data validation lots will be performed each time a new acceptance lot is closed. QC and verification data from the last two acceptance lots will be rolled over to be used in consecutive data validation lots except when prior data validation lots failed. Results will be considered validated when both the F- and t- tests pass.

Should the Department be unable to validate the Contractor's acceptance test result(s) in any acceptance PWL lot, The Engineer will test the remaining verification samples in the lot and use the verification results to calculate the lot pay adjustment.

When any single result fails the F- or t- tests, HMA staff will notify IA staff. HMA staff must review past tests specific to the type of material that failed to look for trends. The HMA staff will contact the Contractor's Quality Control manager to notify them of the deficiency and request that the Contractor investigate.

If the Contractor request dispute resolution testing, all sublots in the disputed lot will be tested by the Independent Assurance Section and those test results will be used for the lot pay adjustment. The Department reserves the right to deny dispute resolution testing if there is a history of disputed



lots that confirmed verification results or if the dispute resolution samples appear to be tampered.

Detailed information regarding MESU asphalt mixture verification testing procedures can be found in MESU SOP ALAM_04.

4.02.08 Performance Graded Asphalt Binder (PGAB) Prequalification

PGAB suppliers are prequalified by the MESU by participating in AASHTO Product Evaluation and Audit Solutions Asphalt Binder Supplier (ABS) program. Each supplier is required to submit a quality system manual (QSM) in accordance with the ABS work plan. AASHTO inspects the facility annually to document compliance with the work plan and QSM. MESU staff reviews AASHTO reports. Upon the supplier meeting all the requirements of the ABS work plan, and MESU's review of the AASHTO reports, they are qualified suppliers. To maintain qualified status, suppliers must submit monthly split samples to the MESU. Asphalt mixture producers must maintain a log of binder deliveries using form MAT-435 or an equivalent form approved by the Engineer.

A Certified Test Report and bill of lading representing each delivery must be provided to the producer in accordance with AASHTO R 26. Upon material delivery, asphalt mixture plant staff records lot number, date, grade of binder, witnessed by, hauler name, liquid supplier, ticket number, receiving storage tank number, quantity received, and previous tank status (quantity) in the binder log. In addition to the supplier monthly samples, the asphalt mixture producer provides binder samples from the delivery upon request by MESU staff during the routine plant inspection. The blending of PGAB from different suppliers is not allowed unless the asphalt mixture producer submits a QC plan for this purpose.

MESU PGAB verification sample handling, testing, and reporting procedures are detailed in MESU SOP ALAM_01. Sampling is performed in accordance with AASHTO T 40 and testing is performed in accordance with all the applicable AASHTO standard methods of test listed in AASHTO 332. Test results are reported using form MAT-401.

4.02.09 Density of In-Place Asphalt Pavement by the Core Method

In-place density of field compacted asphalt mixtures is evaluated after placement in accordance with the Standard Specifications Section M.04 and MESU SOP ALAM_05.

4.02.10 Emulsified Asphalts

The acceptance process for emulsified asphalts includes source approval in accordance with Standard Specifications Section M.04 and project level sampling and testing, as described in MESU SOP ALAM_02.

4.03 Materials Independent Assurance Procedures

Independent Assurance (IA) is an unbiased and independent verification of the Quality Assurance system used as a method of determining the reliability of the test results obtained in the regular sampling and testing activities.

4.03.01 Asphalt Mixture Independent Assurance

IA is performed by MESU staff to confirm that Contractor QC testing used for acceptance was performed in accordance with the applicable test procedures and that testing equipment is calibrated and in working condition. The verification test results generated from MESU's verification process will be utilized for IA analysis at a minimum frequency of 1 verification test to 5 Contractor tests. Asphalt mixture samples are randomly obtained by MESU staff from the quartered field samples obtained as indicated in the Standard Specifications Section M.04 and



Section 4.02.07 of this Manual. Test results for Gmm, Gmb, and Pb are compared using the one-to-one comparison on split sample results. In addition, MESU IA staff will perform testing on split samples and witnessing of Contractor and MESU testing as dictated by failing comparison results or as needed.

Independent assurance testing is performed in accordance with the same test procedures used for acceptance and includes:

- AASHTO T 209: Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
- AASHTO T 308: Method for Determining the Asphalt Content of HMA by the Ignition Method.
- AASHTO T 166: Bulk Specific Gravity of Compacted Asphalt Mixtures using Saturated Surface- Dry Specimens.
- AASHTO T 312: Preparing and Determining the Density of Hot Mix Asphalt Specimens by means of the Superpave Gyrotory Compactor. The compaction temperature will match the sublot compaction temperature as tested at the Contractor Laboratory.
- AASHTO T 329: Moisture Content of Hot-Mix Asphalt (HMA) by Oven Method. Should the field sample be re-heated for 1.5 hours or more, this test may be omitted.
- AASHTO T 331: Standard Method of Test for Bulk Specific Gravity (Gmb) and Density of Compacted Hot Mix Asphalt (HMA) Using Automatic Vacuum Sealing Method

Table 6 is used for asphalt mixture IA one-to-one comparisons. Tolerances in Table 6 are the absolute difference in the measured values, not the percentage of the values. When any of the tolerances in Table 6 column D are exceeded, the comparison will be deemed a failing IA test and the Department and the Contractor will work together to identify the source of the discrepancy. MESU IA staff will perform an investigation by additional testing and/or witnessing of testing to identify a possible assignable cause.

IA results are reported using form MAT-600 and/or MAT-412s

Detailed information regarding MESU asphalt mixture IA procedures can be found in MESU SOP IA_04.

<i>Table 6: Independent Assurance Asphalt Mixture Tolerances</i>				
Properties	Assessment Grade			
	A	B	C	D
	(≤)	(≤)	(≤)	(>)
Pb	0.11	0.22	0.33	0.33
Gmm	0.007	0.013	0.020	0.020
Gmb (T-166)	0.007	0.015	0.022	0.022

4.03.02 Asphalt Core Independent Assurance

IA is performed by MESU IA staff to confirm that testing performed by MESU in-place density staff is in accordance with the applicable test procedures and that testing equipment is calibrated and in working condition. Asphalt core samples are randomly selected for IA testing at a ratio of 1 to 40. Test results for Gmb will be compared using a one-to-one comparison on the same sample specimen.



Table 7 is used for asphalt core IA one-to-one comparisons. When any of the tolerances in Table 7 column D are exceeded, the MESU IA staff and the MESU in-place density staff will work together to identify the source of the discrepancy. Tolerances in Table 7 are the absolute difference in the measured values, not the percentage of the values.

Properties	Assessment Grade			
	A	B	C	D
Gmb (T-331)	0.007	0.013	0.020	0.020

4.03.03 Aggregate Independent Assurance

IA is performed by MESU to confirm that sampling was performed by the project inspector in accordance with the applicable standard test practice.

IA is performed by MESU Central Laboratory staff to confirm that testing was performed by MESU District Laboratory staff in accordance with the applicable test procedures and that testing equipment is calibrated and in working condition.

All independent assurance testing is at project level and detailed information regarding MESU Aggregate IA procedures can be found in MESU SOP IA_01.

4.03.04 In-Place Density of Unbound Material Independent Assurance

All independent assurance testing is at project level and detailed information regarding MESU in-place density of unbound material IA procedures can be found in MESU SOP IA_03.

4.03.05 Hydraulic Cement Concrete Independent Assurance

Hydraulic cement concrete IA is performed by MESU to confirm that slump, air voids, temperature, and specimen preparation testing was performed by the project inspector in accordance with the applicable test procedures and that the testing equipment is calibrated and working as intended.

All independent assurance testing is at project level and detailed information regarding MESU hydraulic cement concrete IA procedures can be found in MESU SOP IA_02.



Chapter 5 – Laboratory and Personnel Qualification

5.01 Independent Assessment

Independent assessment of MESU methods and equipment is performed through the AASHTO Accreditation Program (AAP). This program entails on-site inspection by staff from AASHTO re:source and the Cement and Concrete Reference Laboratory (CCRL).

After the inspection by AASHTO re:source or CCRL, any non-conformities noted in equipment, staff, or procedures are addressed in a timely fashion.

In addition to the on-site inspection, AASHTO re:source and CCRL also send samples of various materials for testing (proficiency samples). The results of these tests are compared with the test results for the same material from other testing facilities. If proficiency sample results vary by more than two standard deviations, an internal investigation will be undertaken to determine what may have affected the results. This investigation will include, but will not be limited to, review of work sheets and data entry, equipment check, scale check, test procedure, review of previous proficiency test results. Corrective action is taken as soon as possible. The determination is documented and kept on file before forwarding to AASHTO re:source or CCRL.

5.02 Equipment Calibrations, Standardizations, Checks, and Maintenance

MESU testing equipment calibration, standardization, check, and maintenance is performed in accordance with the schedules and procedures included in the MESU Quality Management System for Materials manual.

5.03 Sampling and Testing Personnel Qualification

MESU staff qualification is evaluated in accordance with the procedure and frequency described in the MESU Quality Management System for Materials manual.



Chapter 6 – Active Material Codes

All active AWP material codes can be located in the MESU SharePoint at [AWP Acceptance Material Codes.pdf](#) and [AWP Assurance Material Codes.pdf](#).

Chapter 7 – Minimum Schedule for Acceptance Testing for Local Transportation Capital Improvement Program (LOTICIP)

The Minimum Schedule for Acceptance Testing for LOTICIP can be located in this link [Minimum Schedule - LOTICIP](#).

Chapter 8 – Minimum Schedule for Acceptance Testing

The Minimum Schedule for Acceptance Testing can be located in these links [Minimum Schedule - Standard Items](#) and [Minimum Schedule - Selected Special Provision Items](#) .

Chapter 9 – Minimum Schedule for Independent Assurance Testing

The Minimum Schedule for Independent Assurance Testing can be located in this link [Minimum Schedule - Independent Assurance](#) .

Chapter 10 – MESU Forms

All active MESU forms can be located in the MESU SharePoint [Forms for Material Testing and Inspection](#) folder.