### **Construction Quality Assurance Plan (CQAP)**

### For

### Town of Warsaw, Rte. 360 Sidewalk Enhancement Project

### (UPC 105961)

### **Cover Sheet for CQAP**

- I. Date of Original CQAP Submittal: December 14, 2023
- II. QAP Revision Date (if applicable): N/A
- III. Locality Name and Physical Address: Town of Warsaw
   78 Belle Ville Lane
   P.O. Box 730
   Warsaw, VA 22572
- IV. Contact Person for the CQAP / Consultant Construction Project Manager(s):

Printed Name: Mr. Grant Howerton, PE, CCM Signature of Consultant Responsible Charge Person: \_\_\_\_\_\_ Contact Information: <u>ghowerton@rkk.com</u> (804) 874-5500

Printed Name: Mr. Mohammed Aziz, CCM, PMP Signature of Consultant CM / CQAP Contact Person: \_\_\_\_\_\_ Contact Information: maziz@rkk.com (804) 441-1623

V. Locality Project Manager:

Printed Name: Ms. Melissa Coates Signature of Locality Responsible Charge Person: \_\_\_\_\_\_ Contact Information: <u>mcoates@town.warsaw.va.us</u> (804) 333-3737

### VI. Organizational Chart:

a. See Appendix A

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### **CQAP** Document

### I. Mission Statement:

All materials shall be approved, sampled, and/or tested in conformance with contract specifications, the current edition of Virginia Department of Transportation's (VDOT) Locally Administered Projects Manual (LAP MANUAL) and VDOT's Materials Manual of Instruction (MOI) test method and frequencies referenced herein.

This Construction Quality Assurance Plan (CQAP) identifies the guidelines under which the Town of Warsaw's inspection and testing staff, Virginia Department of Transportation testing staff and the Contractor's and/or the Contractor's material testing subcontractor will perform their jobs.

The acceptance testing and inspection will be performed by Rummel, Klepper and Khal, LLC (RK&K) and its subconsultant ECS Mid-Atlantic, LLC (ECS) for all contract items other than asphalt concrete pavement as shown in Appendix 13.2-G of the LAP MANUAL. For the purposes of the document herein, the inspection team of RK&K and ECS will be referred to as either the Inspector or RK&K. The contractor will provide quality control (QC) testing for asphalt concrete pavement, with RK&K providing verification samples and tests (VST) with assistance from the material technician. Material lab and technician services will also be provided by ECS. VDOT will waive the requirement and not provide Independent Assurance (IA) testing but may be conducted by the Town of Warsaw (TOWN) on an as needed basis for the project. VDOT will perform additional testing via the Off-Site Plant QA Programs as shown in Table 1 in Section 13.2.3 of the current edition of the VDOT LAP Manual. IA Testing <u>is</u> required on this project (see Section III).

This project <u>is</u> funded with a combination of federal, state and local funds is maintained by the VDOT and is on the National Highway System (NHS); therefore, IA testing <u>is</u> required.

The Contractor will ultimately be responsible for the quality of the construction. However, the Town of Warsaw has hired ARM Resource, who has hired RK&K to provide inspection services to assess construction processes relative to the applicable standards and specifications. RK&K will serve as the Inspection Firm for the project, provide an Inspector on site at all times that construction is being performed on the project. RK&K will also perform all Acceptance Testing in accordance with this CQAP Plan which is based on the current edition the VDOT Materials Manual of Instruction (MOI), VDOT's Construction Manual, the current edition of the VDOT LAP Manual and VDOT's Materials Testing Methods and Frequencies contained in Appendix 13.2-G (refer to Appendix C). ECS will serve as the materials testing laboratory and will assist RK&K with onsite testing as needed. The Inspection staff (RK&K) will provide feedback to the TOWN and the Consultant Responsible Charge Engineer (RCE) and / or Construction Manager (CM). The Inspector in coordination with the RCE / CM will assure that the necessary documentation regarding inspections and testing of materials and in-place

construction has been performed and adheres to the contract before any payment is recommended for approval by the Town of Warsaw to the Contractor.

Submittal of this CQAP designates a commitment to adhere to its contents as well as the LAP MANUAL. Any deviation from this CQAP shall not occur without a revision submittal of this CQAP to the District Project Coordinator (DISTRICT PC) for approval or the Construction Project Monitor (during construction).

II. **Personnel Certification & Licenses:** Copies of Personnel Certifications and Licenses as required by the Contract are available upon request and are kept on file by the Inspection Firm and can be made available to VDOT Fredericksburg District for review upon request. All personnel performing materials testing shall have the necessary certifications and experience/expertise required by the contract documents and the current edition of the VDOT LAP MANUAL. No work shall be performed otherwise.

The Inspection firm and testing staff will provide inspection and testing to assess construction processes relative to the applicable standards and specifications. The Inspection Firm, Laboratory Testing Firm, and Testing Firm will be responsible for performing and reporting of all sampling, testing and reports directly to the Inspection Firm RCE/CM and TOWN. All team members providing testing and inspection will be required to follow the approved CQAP.

The identity of the contractor's supervising staff will be given to the Inspector prior to the start of each work activity.

The Engineer of Record's (EOR) role is as defined in the scope of work of the Construction Administration Contract. Generally, the EOR will be consulted by the Inspector for all changes or RFIs to the contract documents. Consulting firm ARM Group, LLC, **Michael E. Fiore, PE** is the Engineer of Record.

The Town of Warsaw (or Town) is the OWNER. The Owner's role is as defined in the contract between the EOR's firm and the OWNER, and the CONTRACTOR and the OWNER. The INSPECTION FIRM is subtracted with the EOR. The LOCALITY PROJECT MANAGER is **Mellissa Coates**. RK&K is providing a Responsible Charge Engineer (RCE) and Construction Manager (CM) for this project. Generally, the CM or his/her designee will represent the Owner / RCE and recommend for approval of work performed and necessary changes to the work. The CONSULTANT RCE is **Grant Howerton, PE, CCM**. Payment applications and changes to the contract will be reviewed by the EOR, the CM and INSPECTOR with a recommendation sent to the RCE by the CM. The CONTRACTOR, EOR, and the INSPECTION FIRM will perform services for the Owner as defined in their respective contracts with the Owner or EOR.

The Contractor's role is as defined in the contract. Generally, as related to this plan, the contractor is responsible for all control of quality functions. The CONTRACTOR is **TBD** 

- III. Independent Assurance: This project <u>is</u> funded with a combination of federal, state and local funds, and the facility <u>is</u> on the National Highway System (NHS). The project is on an Urban Road that will be maintained by VDOT. The TOWN and its Consultant will provide Acceptance Testing in accordance with Appendix 13.2-G of the LAP Manual. Since the project being funded with federal funds and lying on a VDOT maintained Urban Road, Independent Assurance (IA) is required and will be performed for this project. Independent Assurance (IA) Testing in accordance with the testing frequency table in Appendix 13.2-G will be required but and conducted by the Town or its Consultant as VDOT's designated agent.
- IV. Communication Channels: Once construction starts, the Inspector will coordinate, as appropriate, with the Contractor regarding the inspection and testing frequencies outlined in the CQAP, ensuring that adequate inspection and testing forces are available to meet the scheduled construction activities. The Inspector will interface on a daily basis with the Contractor and the testing team. The Inspector's primary point of contact on site will be the Superintendent. The inspection staff, including the technicians, and laboratory, will submit all daily documentation to the Inspector for review and acceptance. The Inspection Firm Construction Manager will review/audit these documents routinely (no less than monthly) to assure they are accurate and complete. Lab results may be submitted at a later date in conjunction with internal QA/QC reviews. Any unacceptable work identified by the inspection staff will be scheduled for correction, to include additional inspection and testing requirements. In conjunction with the Contractor's weekly look-ahead schedule, The Inspector will assure that upcoming work items are inspected and tested in accordance with the approved CQAP.

Communications will be handled by the inspection staff via the following meetings:

- 1. Monthly Progress Meetings: The CM will lead the monthly progress meeting that is attended by the Contractor, Inspector, TOWN's staff (as appropriate) and VDOT staff (as appropriate).
- 2. Periodic QA/QC Staff Meetings: These informal meetings will be held to ensure each individual understands his or her respective responsibilities and that all work is properly assigned, inspected, tested and documented. Daily communication with the Inspector will take place to review the project's scheduled activities and to ensure proper coordination of QA/QC activities.
- 3. Daily communication between the Inspector and Contractor will take place to review the project's scheduled activities and to ensure proper coordination of QA/QC activities.

The CONTRACTOR will provide a two-week look ahead schedule to the Construction Manager (CM) / Inspector each week and perform daily coordination with the Inspector for advance notice of inspection/testing. Per the contract documents the Contractor shall notify the Engineer (Inspector) in a timely manner prior to any required inspections / tests. For the purposes of this project, this notice shall be at least 24 hours in advance or greater as defined in the contract, of any activity requiring acceptance testing. The contractor will contact its subcontractors when required. The Inspector will contact the independent laboratory when testing is required and coordinate on-stie testing, sample deliveries and laboratory testing. The

Inspector will conduct or oversee all onsite materials testing and will also coordinate directly with the CM, TOWN, VDOT, and testing staff if needed. The Inspector will also be responsible for maintaining the materials notebook in accordance with VDOT Materials Division requirements.

- V. Resolution Procedure: In the event of unclear provisions in the CONTRACT, Specifications, published guidelines, or disputes related to substandard materials, the dispute will be resolved in the following manner. The Contractor shall immediately report to the RCE, CM and EOR, in writing, all discrepancies, that it finds between the Contract Documents, actual site conditions and any inconsistencies or ambiguities in the Contract Documents. The CM shall coordinate with the TOWN, RCE and EOR and promptly correct such discrepancies, inconsistencies or ambiguities in writing with the Contract Documents. Work done by the Contractor after it discovers such discrepancies, inconsistencies, or ambiguities but before the CM has provided a written correction, shall be performed at the CONTRACTOR'S risk. The most stringent requirement will be considered the controlling requirement.
- VI. **Progress Reports:** Daily Work Reports (DWRS) will be provided by the Inspector to the TOWN, and CM on a daily basis. DWR(s) will be available in a shared on-line folder for VDOT DISTRICT PC review at any time.
- VII. Materials Acceptance Records and Test Data: During construction and prior to acceptance of the project, materials acceptance records and test data shall be kept by the Inspector. Materials acceptance records and test data shall be readily available for inspection at all times by the VDOT DISTRICT PC.

This section describes the responsibilities and requirements for the identification, preparation, and maintenance of records that furnish objective documented evidence of quality. The term "records," used throughout this section, refers to testing and inspection records attesting to the achievement of the quality and technical requirements of the work generated during the various phases of project construction activities of the Contractor and its subcontractors and suppliers. Quality records shall be available for review by the CM, EOR, TOWN and VDOT DISTRICT PC at all times.

### General

A quality record is defined as a completed document that furnishes objective evidence attesting to the quality of items and/or activities. Quality records shall be legible, identifiable, and retrievable. These records shall be protected against damage, deterioration, or loss by the QA Inspection Firm. Requirements and responsibilities for record transmittal, distribution, retention, maintenance, disposition, and department or organization responsibilities shall be in accordance with the Contract Documents and the appropriate rules and regulations contained therein, the current edition of the VDOT LAP Manual and the current edition of the VDOT Construction Manual, where applicable.

Quality records shall be indexed. The indexing system shall include, as a minimum, record retention times and the location of the record within the record system. The records indexing system shall provide sufficient information to permit prompt retrieval, and identification between the record and the item(s) or activity(ies) to which it applies. The retention period for quality records shall be in accordance with the requirements of the current edition of the VDOT LAP Manual and the current edition of the VDOT Post Construction Manual, which states that records must be retained "for three years after receipt of final payment."

The Inspection Firm shall maintain the project Materials Notebook, recording materials used, source of material and method of verification used to demonstrate compliance with the current edition of the VDOT Specifications and Standards. The Materials Notebook shall be maintained according to the current edition of VDOT Materials Division requirements and the VDOT LAP Manual.

The Inspector shall also maintain project Diary. The Inspection firm will utilize a software database for the Diary and a standard VDOT Form TL-142 for the materials notebook. The Inspection firm may also utilize other collaborative electronic software as appropriate for sharing records.

Each Inspector and testing technician shall summarize their tests, and material sampling activities in a Daily Work Report or testing report. The report will include a summary of the Contractor's daily construction activities. Supporting inspection data sheets will be attached to the daily report where needed. Copies of the inspector's records shall be provided to VDOT upon request. All reports will be completed and incorporated in the project records within 24 hours.

At a minimum, the project diary will include the following information:

- Work performed by the firm, subcontractor, or material supplier, identified by Work Package notation
- Weather conditions
- Inspections performed and their results
- Communications
- Type, location, and results of all tests performed
- Delays encountered
- Safety related problems and corrective action taken
- Non-conforming work and the corrective action taken
- Reports on any meetings held and their results
- Record of visitors to site
- Quantity of items accepted and approved for payment with supporting measurements and calculations.
- Signature of inspector

The Inspector will be responsible for the creation and/or management of the following additional reports and logs:

- Materials Invoices and Delivery Tickets
- Nonconformance Log
- Test Reports
- Punchlist
- Progress Meeting Minutes

VDOT Form	By Contractor	Inspection Firm / Town
VDOT C-25, Source Materials	Complete, review and submit to CM / TOWN A new form is required for any material change or changes to previously	C-25s will be reviewed, approved list/method noted along special inspection/documentation. Submit completed C-25 to VDOT
VDOT C-107, Run-off Report	Complete per DEQ Requirements (1) Once every five days or 48 hours after a significant rain event, classified as 0.25" in 24 hours or schedule or (2) Once every four business days	Compile documentation to show that materials used complies with the approved C-25. Review and sign all submitted by Contractor.
VDOT TE 97001, Work Zone Safety Checklist	Contractor's certified WZ Supervisor will establish and maintain the WZ.	Conduct weekly (or daily for short term work zones) and after each traffic pattern change (day and night).
C-85, Pavement Markings	One form for each day's production – signed by certified applicator and QC Tech	Review forms submitted by Contractor.

The Inspector and Contractor will refer to the following documents during inspection and testing:

- Current edition of the VDOT Construction Resource Guidebook
- Current edition of the VDOT Construction Quality Improvement Program Checklists
- Current edition of the VDOT Construction Manual (2005 with 2016 amendments)
- Current edition of the VDOT Post Construction Manual (Dec 2016)
- Current edition of the VDOT Instructional & Information Memorandums (I&IM) All Divisions
- Current edition of the VDOT Road and Bridge Standards, Vol. 1 and Vol. 2 (2016)
- Current edition of the VDOT Road and Bridge Specifications (2020)
- Current edition of the VDOT Guardrail Installation Training (GRIT) Manual
- Current edition of the VDOT Survey Manual
- Current edition of the VDOT Manual of Instructions for the Material Division
- Current edition of the VDOT Virginia Work Area Protection Manual

### **Control of Quality Records**

The Construction Manager verifies record accuracy and maintains copies of all quality-related documentation. These records will be stored in files maintained in the project document control files. All original documents pertaining to project information will be maintained in the project file. A complete set of project records (paper copies and/or electronic copies) will be provided to the TOWN at the completion of the project. The Inspection Firm will maintain the physical records (if applicable) at its office. These records will be made available to TOWN and VDOT DISTRICT PC upon request.

### **Source of Materials**

The Contractor shall document all materials sources using a Source of Materials, Form C-25 in accordance with VDOT Specification 109. The Contractor is responsible for providing materials sources currently shown on VDOT's approved products list(s). Should a material required by the Contract not be located on a VDOT approved list(s), the Contractor shall notify the CM immediately. The Construction Manager / TOWN will review C-25s submitted by the Contractor, verify source of materials with VDOT approved lists, assign TL #'s and provide required acceptance testing. The Construction Manager/ TOWN will forward the revised C-25 form to the VDOT District Materials contact and VDOT DISTRICT PC. An initial source of materials forms for this project shall be submitted by the Contractor within one week of the Preconstruction meeting and a minimum of two (2) weeks prior to the materials proposed use on the project. The Inspector will not approve installation of materials without an approved Source of Materials Form C-25.

### **Off-Site Fabricated Materials**

The Contractor will identify to the CM / TOWN any offsite fabricated materials from producers not in an existing VDOT QA/QC program and the Contractor shall procure the services of an independent testing agency to satisfactorily show that the materials meet the requirements of the contract. The Contractor shall document all materials sources using a Source of Materials, Form C-25.

### **Red-Line Record Drawings**

The Contractor will be responsible for the preparation and submission (at the end of the project) of red-line record drawings that are maintained daily throughout the construction process. The red-line record drawings will record approved actual field conditions upon completion of the work. Where there was a change to a specified material, dimension, location, or other feature, the red-line drawing will indicate the work performed. The CM / Inspector will review red-line record drawings and provide to the EOR.

### VIII. Materials Testing Methods and Frequencies

All materials testing, testing methods and frequencies shall follow the LAP Manual Appendix 13.2-G, Materials Testing Methods and Frequencies Table. The Inspector will review the materials testing results for compliance with the LAP Manual requirements. All deviations are as follows:

 Monitoring of installation and maintenance of traffic (specification 512) will be inspected daily by the Inspector. Work Zone safety checklists will be completed weekly, alternating daytime and nighttime inspections. This is consistent with current VDOT policy. The modified test reference, frequency of testing, and IA requirements for these tests are shown in the table in Appendix C.

Field and laboratory sampling will be performed for each material type that meets the frequencies outlined in Appendix C of this CQAP. Work will be sampled so that it meets the 2020 VDOT Road and Bridge Specifications, the Construction Manual (current version), Materials Manual of Instructions, and LAP Manual (Chapter 13). In addition, any material that appears defective or inconsistent with similar material being produced will be sampled, unless such material is voluntarily removed and replaced or corrected. Samples will be taken in accordance with Virginia Test Methods (VTM), American Association of Highway and Transportation Officials (AASHTO) procedures or other acceptable procedures by personnel approved by VDOT.

All materials testing will be performed in the presence of the Inspector unless observation is waived by the inspector at his/her own discretion. Field and laboratory testing will be performed for each material type that meets the frequencies outlined in the LAP Manual. The testing requirements can be found in Appendix C. Copies of all test results will be furnished to the Inspector as soon as possible after the test has been performed, recorded, and the results checked to ensure compliance with the appropriate testing guidelines. The requirements for furnishing test results do not include sample aging or curing time; therefore, reporting times will be extended accordingly. If necessary, proposals will be submitted in writing for approval to use alternate AASHTO or state-approved test methods.

All sampling and testing will be performed by a laboratory that is either:

- A. Accredited in the applicable AASHTO procedures by the AASHTO Accreditation Program, or
- B. Complies with the requirements of AASHTO R18 (18th edition) for those tests to be performed and compliance with R18 for those tests not covered by ASSHTO Material Reference Laboratory, or
- C. A laboratory approved by VDOT's Materials Division or other accreditation program meeting the requirements of R18.

Acceptance Lab testing will be performed by ECS.

All materials testing laboratories shall meet the requirements as outlined in the LAP MANUAL, Chapter 13.2 for "Qualified Laboratories". No work shall be authorized otherwise.

- IX. **Right to Inspect:** VDOT has the right to inspect the work in accordance with the LAP MANUAL, as noted herein. No hold points have been identified at this time.
- X. **Non-compliance:** Non-compliance to this CQAP shall be promptly reported through the established communications process in this CQAP.

Through the course of the project items will be identified that are not in accordance to the plans and specifications. Most of these items will be identified as they happen and corrected immediately. Consequently, there are two classifications of non-compliant work:

- Level 1 Deficient work noted and corrected in the same day. Inspector points out a
  deficiency to the contractor Superintendent and it is corrected immediately. The issue
  is noted in the inspector's daily DWR. The inspector notes the issue identified and
  Contractor's corrective action. The issue is closed.
- 2. Level 2 Deficient work is identified and corrected on a later date. The inspector points out a deficiency to the contractor superintendent, the superintendent agrees to correct the deficiency at a later date. The inspector will then log the deficiency in a deficiency log, along with the Contractor's proposed corrective action, and anticipated date the deficiency will be corrected. The inspection team and Contractor will regularly review the deficiency log to ensure deficiencies are corrected in a timely manner. All issues must be corrected before the Contractor receives full payment for that item.

In the event of disputes, or noncompliant work that is not resolved by the Contractor refer to Part V of this CQAP, and the applicable contract documents.

### XI. Appendices

Appendix A – Organizational Chart Appendix B – Staff Qualifications Matrix Appendix C – Testing Requirements and Laboratories Appendix A – Organizational Chart



### Appendix B - Staff Qualifications Matrix

Inspector Name	Firm	Experi ence	Asphalt Concrete Field	HCC Field (ACI)	Soils & Aggregate	Nuclear Safety	Pavement Marking	GRIT	OSHA 10-HR	DEQ Storm- Water Inspector	DEQ E&S Inspector	Flagger	Work Zone Training (Intermediate)
Inspector - TBD	RK&K												
Grant Howerton (RCE)	RK&K	10+ years	-	6/10/25	12/31/25	YES	12/31/25	2/2/25	YES	5/24/25	5/24/25	1/31/27	1/31/27
Mohammed Aziz (CM)	RK&K	10+ years	12/31/26	2/20/25	12/31/25	YES	12/31/25	5/31/25	YES	2/7/27	2/7/27	3/31/27	3/31/27
TBD	ECS												
TBD	ECS												
TBD	ECS												
TBD	ECS												

### Appendix C – Testing Requirements and Laboratories

### Acceptance / VST / IA Frequency Table

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
	Acc	ceptance/VST/I	A Frequency – Hydraulic Cer	nent Concrete	
217	Cast-in-place Structures & Bridge Concrete				
217.08	Concrete entrained air content	ASTM C231	Test every load, except for bridge decks, in which case one test per truck-load for the first 3 trucks and then one test for every third truckload thereafter, provided results remain within 1.0% of median of design range. Test also required when making compressive specimens	N/A	One test shall be made on the same batches of concrete from which cylinders are taken
217.08	Slump of hydraulic cement concrete	ASTM C143	Test every load and when making compressive specimens	N/A	One test shall be made on the same batches of concrete from which cylinders are taken
217.10	Temperature of concrete	ASTM C1064	Test every load and when making compressive specimens	N/A	One test shall be made on the same batches of concrete from which cylinders are taken
218.08	Compressive strength of concrete cylinders	ASTM C31 & C39	One set of three cylinders per every 100 CY and at least two sets of cylinders per structure per class of concrete.	N/A	Minimum of one set per 1,000 cubic yards of structural concrete. Not required for projects having less than 300 cubic yards. Cylinders

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
					should be from the same load as acceptance samples.
Plan	Chloride permeability concrete cylinders	VTM-112	One set of three cylinders per every 100 CY and at least two sets of cylinders per structure per class of concrete.	N/A	Non required if performed in VDOT or AMRL accredited laboratory
223	Concrete reinforcing steel, elongation, yield strength and ultimate strength	ASTM A615	Accepted based on certification provided by the fabricator. Verify manufacturer's certificates for every shipment for acceptance prior to placement.	One sample per project per manufacture per most common size bar	Non required if performed in VDOT or AMRL accredited laboratory
217	Hydraulic Cement Concrete <i>Miscellaneous</i> <i>Items</i>				
217.08	Concrete entrained air content	ASTM C231	One (1) test per day and when cylinders are casts.	N/A	N/A
217.08	Slump of hydraulic cement concrete	ASTM C143	One (1) test per day and when cylinders are casts.	N/A	N/A
217.10	Temperature of concrete	ASTM C1064	One (1) test per day and when cylinders are casts.	N/A	N/A
218.08	Compressive strength of concrete cylinders	ASTM C31 & C39	One (1) set of three (3) cylinders per every 250 CY.	N/A	One (1) set of three (3) cylinders every 25,000 CY (cumulative) minimum one per project
223	Concrete reinforcing steel	ASTM A615	Accepted based on certification provided by fabricator. Verify manufacturer's certificates for	One sample of two pieces 24 inches long from the most prevalent bar size	Non required if performed in VDOT or AMRL accredited laboratory

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
			every shipment for acceptance prior to placement.	per structure, with no two samples being the same size	
220	Concrete Curing Materials				
	Burlap	AASHTO M182, class 3	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	N/A	Non required if performed in VDOT or AMRL accredited laboratory
	White liquid membrane Curing Compound	VTM-2	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	N/A	Non required if performed in VDOT or AMRL accredited laboratory
	Fugitive Dye Liquid Membrane Curing Compound	VTM-2	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	N/A	Non required if performed in VDOT or AMRL accredited laboratory
	Polyethylene Film	AASHTO M171	Verification of LM # and lot numbers if from QA supplier Approved list 44, if not test one sample per lot number	N/A	Non required if performed in VDOT or AMRL accredited laboratory
		Acceptance/	/ST/IA Frequency - Soils & Ag	ggregate	
303	Backfill				
	Moisture density relations – standard proctor, atterberg limits and grain size analysis	VTM-1, VTM- 7 and VTM-25	Done during project development	N/A	Non required if performed in VDOT or AMRL accredited laboratory
	One point proctor check compare to nuclear gauge	VTM-012	As needed	N/A	Run split sample when needed. 1 test per project to check procedure and equipment.

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
302,303	In place density tests – box culverts and pipes.	VTM-10	A minimum of one (1) test shall be performed per lift on alternating sides of the structure for each 300 linear ft. or portion thereof in structure length. This test pattern shall begin after the first 4-in. compacted layer above the structure's bedding and shall continue to one (1) foot above the top of the structure.	.N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.
302,303	In place density tests – backfill for drop inlets, junction boxes etc.	VTM-10	Minimum one (1) test every other lift around the perimeter of each structure, after first 4- in. layer above bedding and continue to top of structure.	N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
302,303	In place density tests – backfill for manholes	VTM-10	Minimum one (1) test (around the perimeter of the structure) every fourth compacted layer until the top five (5) feet of the structure, after 4-in. layer above bedding and continue to the top five (5) feet. Top five (5) feet shall have one (1) test every other lift around the structure to the top of structure.	N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.
303,401	In place density tests – abutments, retaining walls, MSE walls	VTM-10	A minimum of two (2) tests every other lift up to 100linear ft. shall be performed. Testing shall be performed behind these structures at a distance from the heel no farther than a length equal to the height of the structure plus 10 ft. For MSE Walls, Less than 100 linear ft. a minimum of one (1) test every other lift shall be performed. The testing shall be performed a minimum distance of 8 ft. away from the face of the wall, to within three feet of the back edge of the zone of the reinforced fill area. Test sites shall be staggered throughout the length of the wall to obtain uniform overage. Testing shall begin after the	N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations.

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
			first two (2) lifts of reinforced fill have been placed and compacted. Walls more than 100 linear ft., a minimum of two (2) tests every other lift not to exceed 200 linear ft. shall be performed.		
	Soils / Embankment				
	Moisture density relations – standard proctor, atterberg limits and grain size analysis (soils/embankment)	VTM-1, VTM- 7 and VTM-25	Done during project development	N/A	1 test per year during production; minimally perform one (1) in first five (5) sets taken for QA
	One Point proctor check compare to nuclear gauge (soils/embankment)	VTM-012	As needed	N/A	1 test per year during production; minimally perform one (1) in first five (5) sets taken for QA
303	Embankment in Place Density (soils/embankment)	VTM-10	The minimum number of field density tests required shall be one for each 2500 yd <sup>3</sup> or less of fill material placed, with the following additional requirements: (a) For fill areas less than 500 ft. in length, a minimum of one (1) field density test for every other 6-in. compacted layer from the bottom to the top of fill starting with the second lift.	N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
			<ul> <li>(b) For fills 500 to 2000 ft. in length, a minimum of two (2) field density tests for each 6-in. compacted layer within the top five (5) ft. of fill.</li> <li>(c) For fills greater than 2000 ft. in length, break into equal sections not to exceed 2000 ft. and test each section in accordance with (b) above.</li> </ul>		
305	Subgrade	VTM-10	In the finished subgrade in both cut and fill sections, a minimum of one (1) test represented by the average of five nuclear density readings shall be performed for each 2000 linear ft. of subgrade for each roadway (full width).	N/A	One IA shall be conducted on each compaction technician once per project regardless of the structure or material type (box culvert, pipe, Abutment, retaining wall or embankment). IA shall consist of a split density test in situ, observing technician technique, checking equipment calibrations and calculations
306, 307, 309	Aggregate Base & Subbase Material				
	Depth Checks	VTM-38	For Method VTM-38A, one (1) depth test shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied width of stabilization, regardless of roadway width, shall require a series of tests.	N/A	Minimum of one per project, unless quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test required for that material

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
			For method VTM-38B, the project shall be divided into lots, with each lot stratified, and the location of each test within the stratified section determined randomly. A lot of material is defined as the quantity being tested for acceptance, except the maximum lot size shall be two (2) miles for each paver application width. The randomization procedure used shall be at the direction of the Engineer. (See VTM-38 for example.) Samples shall be taken from the lot at the following rate: Lot Size No. of Samples Required 0 - 1 Mile 2 1 - 1 1/2 Miles 3 1 1/2 - 2 Miles 4		
	In Place Density	VTM-10	When the subgrade, consisting of material-in-place or imported material other than aggregate base, subbase, or select material, is stabilized with cement or lime, one density test (average of 5 readings) shall be conducted for each one-half (1/2) mile of stabilization per paver (mixer) application width. In other words, each separately applied	N/A	One test per project, consisting of the average of 5 readings. Minimum of 5 readings per project, unless total quantity of individual material(Base, sub-base, etc.) is less than 500 tons per project, in which case no IA test

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (RK&K / ECS)	VST Frequency (*)	OIA Frequency (TOWN / RK&K)
			width of stabilization, regardless of roadway width, shall require a separate series of tests.		
301	Clearing & Grubbing				
	Ensure activities are confined to limits of seeding with 30 days of disturbance	N/A	Daily	N/A	Weekly (or as needed)
303.03 & DEQ Specs	Erosion and Siltation Control				
	Monitor for correct installation and maintenance		Daily	N/A	After rain event (or as needed)
303.04	Undercut				
	Review area to determine need for undercut	N/A	Prior to start of work at each location	All reports reviewed by Locality Project Manager to verify qualified inspector and correct equipment	One (1) report reviewed per month during production to verify qualified inspector and qualified personnel
	Measure undercut area	N/A	Prior to backfill at each location	All reports reviewed by Locality Project Manager to verify qualified inspector and correct equipment	One (1) calculation/report checked/reviewed to verify qualified inspector and correct equipment

\*VST Testing is required if contractor's workforce performs QC testing. If locality or consultant performs Acceptance testing, VST is not required.

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (Contractor)	VST Frequency (RK&K / ECS)	OIA Frequency (TOWN / RK&K)
		QC/	VST/IA Frequency – Asphalt		
315	Asphalt Concrete Pavement		Contractor QC Testing	VST (RK&K / ECS)	IA (TOWN / RK&K)
	Pavement Density by Nuclear Method with In Place Pavement Density (Asphalt Pavement)	VTM-76, VTM-6	Establish Roller pattern, control strips and test sections, 10 stratified random density test sites per test section (5,000 ft.)	VST is performed on Twenty (20) percent of QC lots. Obtain two cores in one randomly selected QC lot out of five lots to verify in place density. Minimum one VST sample per project.	IA=10%*QC Readings Locality representative observe and witness QC testing to assure gauge is calibrated and accurate. Observe and verify test sites are random and match selected sites. Verify that QC tests are done using proper procedures. Observe one control strip per density technician and obtain all cores from control strip for reweighing in laboratory (randomly select a minimum 10% of cores) to confirm field density testing.
	In Place Pavement Density (for all asphalt except Stone Matrix Asphalt (SMA))	VTM-006; VTM-32	<b>Density</b> - min. 1 core per location not long enough to establish roller pattern/control strip	<b>Density -</b> One (1) random core per 10 QC locations. Independent of contractor cores.	Obtain cores taken for density. Reweigh at least 10% of these cores in laboratory to confirm density. Observe one (1) density determination per ten (10) locations performed by QC technician. Minimum 1 per project.

### QC / VST / IA Frequency Table

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (Contractor)	VST Frequency (RK&K / ECS)	OIA Frequency (TOWN / RK&K)
	Depth Checks	VTM-32	Depth checks of surface and intermediate material required only if specific plan depths are called for, not when plans specify rate of application. One (1) per 1/2 mile per lane width, minimum one (1) test per roadway, maximum lot size 2 mile (4 tests)	N/A	Select one (1) QC core per five (5) lots and remeasure thickness. A minimum of one (1) per project.
512	Permanent Pavement Marking		Contractor QC Testing	VST (RK&K)	IA (TOWN / RK&K)
	Permanent Pavement Marking - Preformed Tape	VTM-94	Daily perform VTM 94 at start up with periodic checks every three hours of operation	Randomly select three (3) ten foot in place sections of markings per day and measure thickness and width. Skip lines and edge lines are considered separately. Inspect PM for correct placement, straightness and edges. Observe the bead embedment, color (night and day) and brightness/reflectivity Inspect structure of tape to ensure patterned waffles have not been damaged by roller	Review all C-85 reports during production to verify that plan quantities match application quantities and that daily measurements are performed according to VTM 94.

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (Contractor)	VST Frequency (RK&K / ECS)	OIA Frequency (TOWN / RK&K)
	Permanent Pavement Marking - Liquid Materials (Paint, thermoplastic and epoxy)		Daily perform VTM 94 at start up with periodic checks every three hours of operation	Randomly select three (3) ten-foot in place sections of markings per day and measure thickness and width. Skip lines and edge lines are considered separately. Inspect PM for correct placement, straightness and edges. Observe the bead embedment, color (night and day) and brightness/reflectivity. Review application rates to ensure proper thickness has been applied	Review start up calibrations. Ensure one plate sample is taken and tested for thickness, width, bead distribution and embedment. Retain sample for further testing if needed. Review all C-85 reports during production to verify that calculated quantities match application rates and that daily measurements are performed according to VTM 94.
	-	QC/VS1/IA Fr	equency – Misc. Roadway & S	Structure	
404	Pre-cast Structures	N1/A			
	verify bedding material is installed properly and that pre-cast materials are not chipped or cracked	IN/A	on project	Inspect Precast structure before backfilling operations begin.	Inspect Pre-cast structures when received on job site. Inspect bedding before setting structure.
505	Guardrail				
	Verify that guardrail is installed per specifications and at proper height	N/A	Daily	Spot-check every 500 linear feet for proper height	Spot-check every 50 linear feet for proper height
507	Fencing				

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (Contractor)	VST Frequency (RK&K / ECS)	OIA Frequency (TOWN / RK&K)
	Verify fencing type, height and location	N/A	Daily	Weekly	N/A
503	ROW Monuments				
	Verify monument type and location	N/A	10% of ROW monuments	1% of ROW monuments	N/A
512	Maintenance of Traffic				
	Monitor installation and maintenance. Use Work Zone Safety Checklist	N/A	Monitor installation and maintenance daily. Complete TE-97001 weekly (locality Inspector)	Monitor installation and maintenance weekly. Complete TE-97001 monthly (Locality Project Manager)	N/A
602/603	Topsoil & Seeding				
	Verify proper material is utilized at application rates from plans	N/A	Daily	Weekly	N/A
512	Traffic Signs				
	Verify that signs meeting current standards are utilized in locations per plans	N/A	Daily	Weekly	N/A
703	Traffic Signals/TMS Equipment				
	Monitor installation for conformance with plans and specifications	N/A	Daily	Weekly	N/A
520	Water & Sewer Facilities				
	Monitor installation for conformance	N/A	Daily	Weekly	N/A

VDOT Specification Section	Material Type	Test Reference	Acceptance Test Frequency (Contractor)	VST Frequency (RK&K / ECS)	OIA Frequency (TOWN / RK&K)
	with plans and specifications				
238	Electrical & Signal Components				
	Tether Wire	ASTM A475	One sample per project	N/A	N/A
	Span Wire	ASTM A475	One sample per project	N/A	N/A
202	Masonry				
	Wall Units		one sample consisting of 10 units per 10,000 units	N/A	N/A

\*VST Testing is required if contractor's workforce performs QC testing. If locality or consultant performs Acceptance testing, VST is not required.

Testing Laboratory Certifications (See Attachment) Acceptance / VST / OIA Testing: RK&K / ECS Contact Name: Grant Howerton 2100 E. Cary Street, Suite 309 Richmond, VA 23223 Phone: (804) 874-5500

Testing Laboratory: ECS Mid-Atlantic, LLC Contact Name: Lincoln Swineford 2119-D North Hamilton Street Richmond, VA 23230 Phone: 804-353-6333 PROJECT: CQAP for Town of Warsaw, Rte. 360 Sidewalk Enhancement Project (UPC 105961)

**REVISION DATE:** 12/14/2023

### SUBMITTED BY:

Locality CQAP Contact Person

Date

Date

Printed Name: \_\_\_\_Grant Howerton, PE, CCM\_\_\_\_\_\_

### **APPROVED BY:**

VDOT Construction Project Monitor

Printed Name: \_\_\_\_\_Jessica Graves\_\_





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### **Quality Management System**

### Standard:

standard:	Accredit	ed Since:
318	Establishing and Implementing a Quality System for Construction Materials Testing Laboratories	07/23/2018
C1077 (Aggregate)	Laboratories Testing Concrete and Concrete Aggregates	12/20/2019
C1077 (Concrete)	Laboratories Testing Concrete and Concrete Aggregates	07/23/2018
03666 (Aggregate)	Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials	01/11/2021
33740 (Soil)	Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction	10/26/2018
Ξ329 (Aggregate)	Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction	01/11/2021
E329 (Concrete)	Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction	06/08/2022
E329 (Soil)	Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction	01/11/2021
E329 (Sprayed Fire-Resistive Material	) Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction	01/11/2021

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### Soil

Stan	idard:	Accredited Since:
R58	Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test	01/11/2021
T88	Particle Size Analysis of Soils by Hydrometer	01/11/2021
T89	Determining the Liquid Limit of Soils (Atterberg Limits)	01/11/2021
T90	Plastic Limit of Soils (Atterberg Limits)	01/11/2021
T99	The Moisture-Density Relations of Soils Using a 5.5 lb [2.5 kg] Rammer and a 12 in. [305 mm] Drop	01/11/2021
T134	Moisture-Density Relations of Soil-Cement Mixtures	01/11/2021
T180	Moisture-Density Relations of Soils Using a 10 lb [4.54 kg] Rammer and an 18 in. [457 mm] Drop	01/11/2021
T193	The California Bearing Ratio	01/11/2021
T217	Determination of Moisture in Soils by Means of a Calcium Carbide Gas Pressure Moisture Tester	01/11/2021
T265	Laboratory Determination of Moisture Content of Soils	01/11/2021
T288	Minimum Soil Resistivity	01/11/2021
T289	pH of Soils for Corrosion Testing	10/26/2018
T310	In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)	01/11/2021
D421	Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test	10/26/2018
D422	Particle Size Analysis of Soils by Hydrometer	10/26/2018
D558	Moisture-Density Relations of Soil-Cement Mixtures	10/26/2018
D698	The Moisture-Density Relations of Soils Using a 5.5 lb [2.5 kg] Rammer and a 12 in. [305 mm] Drop	10/26/2018
D114(	0 Amount of Material in Soils Finer than the No. 200 (75-µm) Sieve	10/26/2018
D1557	7 Moisture-Density Relations of Soils Using a 10 lb [4.54 kg] Rammer and an 18 in. [457 mm] Drop	10/26/2018
D188	3 The California Bearing Ratio	10/26/2018
D2216	6 Laboratory Determination of Moisture Content of Soils	10/26/2018
D2487	7 Classification of Soils for Engineering Purposes (Unified Soil Classification System)	10/26/2018
D2488	8 Description and Identification of Soils (Visual-Manual Procedure)	01/11/2021

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### Soil (Continued)

Standard:	Accredited Since:
D4318 Determining the Liquid Limit of Soils (Atterberg Limits)	10/26/2018
D4318 Plastic Limit of Soils (Atterberg Limits)	10/26/2018
D4718 Oversize Particle Correction	10/26/2018
D4944 Determination of Moisture in Soils by Means of a Calcium Carbide Gas Pressure Moisture Tester	01/11/2021
D4972 pH Testing of Soils	10/26/2018
D6913 Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis	01/11/2021
D6938 In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)	01/24/2019

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### Aggregate

Standard:	Accredited Since:
R90 Sampling Aggregate	01/11/2021
T11 Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	01/11/2021
T27 Sieve Analysis of Fine and Coarse Aggregates	01/11/2021
T84 Specific Gravity (Relative Density) and Absorption of Fine Aggregate	01/11/2021
T85 Specific Gravity and Absorption of Coarse Aggregate	01/11/2021
T255 Total Moisture Content of Aggregate by Drying	01/11/2021
C117 Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing	10/26/2018
C127 Specific Gravity and Absorption of Coarse Aggregate	10/26/2018
C128 Specific Gravity (Relative Density) and Absorption of Fine Aggregate	10/26/2018
C136 Sieve Analysis of Fine and Coarse Aggregates	12/20/2019
C566 Total Moisture Content of Aggregate by Drying	10/26/2018
D75 Sampling Aggregate	10/26/2018

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## **Sprayed Fire-Resistive Material**

### Standard:

10/26/2018 Accredited Since: E605 Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members

E736 Cohesion/Adhesion of Sprayed Fire-Resistive MaterialsApplied to Structural Members

01/11/2021

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### Concrete

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Standard:	A	Accredited Since:
C31	Making and Curing Concrete Test Specimens in the Field	07/23/2018
C39	Compressive Strength of Cylindrical Concrete Specimens	07/23/2018
C42	Obtaining and Testing Drilled Cores and Sawed Beams of Concrete	06/08/2022
C78	Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)	07/23/2018
C138	Density (Unit Weight), Yield, and Air Content of Concrete	07/23/2018
C143	Slump of Hydraulic Cement Concrete	07/23/2018
C172	Sampling Freshly Mixed Concrete	07/23/2018
C173	Air Content of Freshly Mixed Concrete by the Volumetric Method	07/23/2018
C231	Air Content of Freshly Mixed Concrete by the Pressure Method	07/23/2018
C511	Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the testing of Hydraulic Cements and Concretes	07/23/2018
C617 (10000 psi and below	) Capping Cylindrical Concrete Specimens	01/12/2022
C1064	Temperature of Freshly Mixed Portland Cement Concrete	07/23/2018
C1202	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration	06/08/2022
C1231 (7000 psi and below	) Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders	07/23/2018
C1542	Measuring Length of Concrete Cores	06/08/2022

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