GENERAL SUBJECT:  
Section 204.27 Precast Products

SPECIFIC SUBJECT:  
Revised 204.22 by removing precast products and creating a new Section; 204.27 Precast Products in Chapter II of the Manual of Instructions, clarifying acceptance procedures for precast products

APPROVED:  
Charles A Babish  
State Materials Engineer  
Approved: ____________________________

EFFECTIVE DATE

- This memorandum is effective September 1, 2020

PURPOSE/NEED/SCOPE/REQUIREMENTS

- Revise Section 204.22(c) by removing Precast Products to a new section; Section 204.27
- Section 204.27 added to provide clarity and detail to the acceptance and monitoring of precast concrete quality control plans
- Clarify the Buy America requirements in precast structures
- Add a standard Batcher Certification Review (Appendix P)
- Include Non-compliance report in the Manual of Instructions (Appendix L)
- Revise Plant Inspection to cover both Precast and Pipe (Appendix E)
- Revise Quality Control Plan Review Check list to cover Precast and Pipe (Appendix H)

PROCEDURES

Sec. 204.27 Precast Products, Concrete
The following precast products may be accepted on the Manufacturer’s certification based on the requirements of the VDOT Precast Concrete Products Quality Assurance Program detailed in this section:

- Manholes
- Box Culvert Systems
- Temporary Concrete Barrier (shall be an approved product from the VDOT Provisionally Approved MASH Product list and in accordance with the current VDOT specifications)
- Water and Wastewater Drainage Structures
- Retaining Walls (proprietary wall systems must also be on VDOT Structure & Bridge Division list of approved wall systems)
- Sound Wall Components made of concrete (Refer to App List 65 for Sound wall systems)
- R/W monuments
- Other Precast Concrete Products upon approval by VDOT

Concrete pipe and prestressed concrete products are not included in the above list.

When approving hydraulic cement concrete mix designs for precast concrete, the requirements of the Specifications, Section 217.02 must be met with the exception of:

1. Yield – 27 cubic foot does not have to be exact due to aggregate deviations
2. Aggregate – Nominal maximum size aggregate for coarse and fine aggregate shall be waived under Section 217.07 Option 3.
3. Pozzolan – Minimum pozzolan requirements are not applicable in precast concrete products that are installed below the frost line

If all of the above criteria are met, the Concrete Engineer signs and dates the HCC mix design denoting approval. A copy is retained on file in the Central Office Materials Section. The original is sent to the VDOT Industrial Inspector assigned to that facility to be forwarded to the Precaster to be retained in their file and available to VDOT personnel upon request.

After determining the weight for each of the components of the mix, VDOT Industrial Inspector shall request the Precaster to perform a trial batch using the approved mix design.

Precast structure submittal drawings (excluding standard precast item drawings) shall be designed and stamped by a Professional Engineer licensed to practice in the Commonwealth of Virginia. All sheets are to be reviewed and stamped. Approved submittal drawings shall be sent by the Precaster to the Contractor who will be responsible for getting them the Department for review. Fabrication is not permitted to begin until the submittal drawings have been reviewed by the Department. The production drawings should also be reviewed by the Department prior to production. A copy of the production drawings should be emailed to the VDOT Industrial Inspector at least 5 days prior to the start of production. These drawings shall be maintained in the plant office and made available to the VDOT Industrial Inspector to compare to the production drawings used in the fabrication shop.

In order to supply precast concrete products to a VDOT project, the precast concrete Producer must be on the Materials Division Approved List No. 34. Out-of-state producing facilities must be a distance of less
than 125 road miles from the nearest Virginia state line crossing. The precast concrete Producer may qualify for placement on this list after the following is verified:

- The precast concrete Producer shall submit a QC plan defining its routine business QC practices.
- The QC plan is submitted to the Materials Division Section. After review for completeness and compliance of the Producer’s QC plan to the Department requirements of the QC Plan Checklist as found in Appendix H of this chapter, a plant visit will be made by a VDOT Industrial Inspector to evaluate the Producer’s compliance to its QC plan. If during the inspection deficiencies are noted, this will be documented in a non-compliance report (NCR) with a follow-up visit scheduled.
- If no deficiencies are found, the Producer will be granted probationary approval.

The miscellaneous precast concrete Producer will then be added to Approved List No. 34 with a “p” to denote the probationary status of the facility.

The probationary status will remain in place for a minimum of six months. After this period, the precast facility may be removed from probationary status if the following conditions have been met: 1) It has successfully completed two VDOT projects, and 2) Has not received more than eight (8) total points in the NCR. The probationary status of the facility may be removed by the VDOT Quality Assurance Section. If problems are encountered during the production and supply within this probationary period, then additional projects may be necessary for the Producer to correct QC plan compliance issues. Once the probationary period has been successfully completed, the “p” will be removed from the precast concrete facility’s listing on the approved list. The Department will continue to monitor the Producer’s facility quarterly or as needed to ensure compliance to the QC plan and project specifications.

Any precast facility that has not supplied two VDOT projects after one year will have its status listed as IDLE on Approved List No. 34. Facilities in IDLE must contact the VDOT Industrial Inspector 2 weeks prior to starting work on an awarded VDOT project.

One of the three regional Industrial Inspectors in the VDOT Materials QA Section shall be assigned to each Producer and shall visit approved, non-idle Producers at least quarterly.

The plant QC Manager shall update the QC plan anytime changes are made such as changes in QC personnel, management, plant ownership, mix designs, or changes in items manufactured. The VDOT Industrial Inspector will be notified by the QC Manager within 3 days of such changes occurring, and the updated QC plan will be sent to the VDOT Industrial Inspector within 2 weeks of the changes occurring. The Industrial Inspector will review the updated plan for approval. The VDOT QA Section Manager has the authority to revoke the QC plan should it not meet approval requirements. Any appeal of revocation shall be made to the State Materials Engineer.

Annually, the Department will review each plant’s QC plan and update Approved List No. 34 with the latest QC plan review date.

Each approved facility shall have at least one Precast Concrete QC Technician certified by VDOT on staff, responsible for ensuring that the QC plan is being followed. To qualify as a VDOT-certified Precast Concrete QC Technician, one must have (1) a current VDOT Concrete Plant Certification and (2) American Concrete Institute’s Concrete Field Testing Technician Grade I certification or a WACEL (Washington Area Council of Engineering Laboratories) Concrete Technician Level I certification. Each VDOT-certified QC Technician must have a unique QC stamp for approval of work and the stamp must be documented in the QC plan. Only a certified VDOT Precast Concrete QC Technician can approve and stamp product for VDOT use. All other facility QC personnel must have, at a minimum, an American Concrete Institute’s Concrete Field Testing Technician Grade I certification or WACEL Concrete
Technician Level I certification. Department specifications and policies over-ride other plant certifications or specifications denoted in any third-party plant certification (eg. NPCA).

In extraordinary circumstances, production personnel may be substituted for the QC Technician involved in some QC activities on a limited basis. The substitute QC Technician is only authorized to be used in this capacity no more than five days in a month and only in order to meet the quality objectives. Production personnel acting in this capacity shall not provide the quality audit or review production practices where they are directly involved. These production personnel must be identified on the QC plan along with their current certifications.

(1) Precaster Quality Control Testing

The Producer shall perform the following minimum QC test and inspections, and the statement "We certify that these items have been tested and conform to the VDOT Precast Concrete Products Quality Assurance Program" shall be on each shipping document and signed by a Precast Concrete QC Technician certified by VDOT. The shipping document shall also contain the following information: The plant name, location, telephone number, document number, Contractor’s name, VDOT project number, and all relative product information. A copy of all shipping tickets shall be emailed on a weekly basis to the Industrial Inspector assigned to that facility.

<table>
<thead>
<tr>
<th>Test</th>
<th>Minimum Frequency</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stripping, shipping, and 28-day</td>
<td>One set, per test, per lot, equaling a minimum of six 6”x12” cylinders, nine 4”x8” cylinder, or three 4” Cores</td>
<td>AASHTO T280</td>
</tr>
<tr>
<td>Compressive Strength</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two 6”x12” or Three 4”x8” cylinders or One 4” core</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absorption (Dry Cast only)</td>
<td>See Note below</td>
<td>AASHTO T280</td>
</tr>
<tr>
<td>Inspection of manufactured product for visual defects</td>
<td>Each unit.</td>
<td>AASHTO T280</td>
</tr>
<tr>
<td>Air Content and Slump (Wet Cast)</td>
<td>*One test per lot produced</td>
<td>ASTM C231</td>
</tr>
<tr>
<td></td>
<td>* One test per day for Box Culverts, Retaining Walls, or other Precast Structural products</td>
<td>ASTM C143</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ASTM 1611</td>
</tr>
<tr>
<td>Soundwall structural concrete – temperature, air, slump from same concrete as control cylinders are made</td>
<td></td>
<td>AASHTO T280</td>
</tr>
<tr>
<td>Soundwall panel – sound absorptive mixed material that is attached to or within the concrete wall material, see note below. Make one unit weight test per lot day.</td>
<td></td>
<td>AASHTO T280</td>
</tr>
</tbody>
</table>

Note: The requirements for absorption testing on precast concrete (dry-cast) units are one per lot with no history of test results. If a history of test results is available for a given mix design, then the minimum frequency of absorption testing is as follows:

Frequency of tests = one absorption test per the number of consecutive lots with passing results or a minimum of one test per twenty-five lots of production.

4
A random sampling process (as defined in the Producer’s approved QC Plan on file with the Department) will be used to determine the lot from which a specimen will be tested. If a failing result is obtained, the frequency of testing will resume at one test per lot as if no history were available.

Examples:

No. 1 – If no history is available, the frequency of testing is one per lot. If this test passes, then over the next two lots, one lot is randomly selected and tested for absorption. If the absorption test passes, then the frequency of testing will be one randomly selected lot out of the next 3 lots. The process may continue in this manner until twenty-five passing results are obtained.

No. 2 – If a precast concrete (dry-cast) Producer has 15 consecutive passing test results, then the frequency of absorption tests would be one per 15 lots. If the next random sample test passes, the number of consecutive passing test results increases by one to becomes 16. The process continues in this manner until twenty-five passing results are obtained.

No. 3 – If the number of consecutive passing test results was 35, the frequency of absorption tests would be a minimum of one per 25 lots so 2 tests would be required if the number of consecutive passing lots is any number between 26 and 50. If a failure occurred, then the number of tests would reinitialize to one test per lot.

For the purpose of this program, a lot is defined as a maximum of 250 cubic yards or no more than three consecutive calendar days of production (whichever is less) of precast concrete from each batching operation, of the same mix design, strength and manufactured by the same process. Variations in lot definition will be governed by applicable specifications and approved by the VDOT QA Section Manager.

If cylinder strength failure occurs, the lot shall be evaluated by core testing. If the core fails, two cores shall be taken to recheck the failed core. Both cores must pass for the lot represented to be acceptable. If both cores do not pass, each precast unit in the lot shall be tested individually by core for acceptance.

(2)

Test facilities Producer facilities, equipment and testing personnel shall be adequate to conduct the applicable tests outlined in AASHTO T280, and shall require Department approval. QC Procedures shall be performed by or under the direction of a VDOT-certified Precast Concrete QC Technician. The requirements to qualify as a VDOT Precast Concrete QC Technician, are given above. The QC person operating the batching equipment (batcher) must pass an annual concrete batching exam given by the Certified Concrete Plant Technician using the Annual Concrete Batcher Exam or similar. Annual exams for each QC Batcher must be included annually with the facility’s QC plan. The Annual Concrete Batcher Exam is found in Appendix P of this chapter.

Entrained air will be checked daily with a pressure type meter according to ASTM C231.

Aggregate moisture testing will be checked a minimum of once daily prior to the start of batching, or as changes occur in the condition of aggregates for facilities without moisture probes in their aggregate bins. For facilities with probes in their aggregate bins, moisture checks will be done a minimum of once a week to verify the accuracy of the probes. All probes shall be calibrated within +1% to be considered accurate.
Compression cylinders or cores shall be tested with facilities, equipment and personnel sufficient to conduct such tests as described in ASTM C39. Compressive strength cylinders may be either 6 inch diameter by 12 inch length, or 4 inch diameter by 8 inch length.

Producers shall maintain current calibration certificates as required by AASHTO R18 on all analytical equipment used in testing.

Producers may elect to use the services of an independent commercial testing laboratory acceptable to the Department in lieu of conducting their own tests.

(3) Shipment

Products may be shipped to VDOT projects under either of the two following conditions:

a) All required testing for all product in the lot has been completed with acceptable results and all of the product to be shipped is at least the age of the test specimens at the time of testing. Acceptable results for shipping are defined as 85% of design compressive strength. Strength testing shall continue until design compressive strength has been attained.

b) Product which otherwise has met all test criteria may be shipped prior to completion of absorption testing if the concrete mix and manufacturing process used have historically produced the required absorption results, and approval is received from the Engineer, with final acceptance pending acceptable results.

(4) Records

All testing and inspection documentation will be maintained at the producing plant for at least five years, and will be made available to Department personnel at their request.

Producers will also collect and maintain conformance certificates and/or mill test reports for aggregates, cement, reinforcing steel, frames, grates, collars, lids, steps, steel angles, and other applicable components intended for use in products to be used on VDOT projects. In order to document compliance with Buy America for all iron and steel components, Producers must be able to provide documentation that proves unbroken traceability of the component’s lot and heat number from initial melt and manufacture through all stages of modifications and through all stages of procurement, including for brokers who may never even receive shipment of the components.

Producers will maintain a Department approved QC form(s) for each lot of precast products, and as a minimum the form(s) will contain the following:

- Plant identification
- QC Technician signature
- Lot identification
- Production dates
- Number of units and cubic yards of concrete produced for each lot.
- Reinforcement per specification or approved drawings
  - Type – Corrosion resistant, galvanized
  - Mill test - Lot number and/or Heat number
  - Buy America documentation as described above
- Castings per specifications
  - Mill test - Lot number and/or Heat number
  - Buy America documentation as described above
- Compressive strength
Cylinder strength - required/achieved
Core strength (if needed) - required/achieved
Absorption - required/achieved
Visual inspection performed
Markings verified
Dimensions verified:
- Manholes (AASHTO M199) (ASTM C478)
- Box culverts (AASHTO M259) (ASTM C789) or (AASHTO M273) (ASTM C850)
- Water and wastewater drainage structures (ASTM C913)
  (i.e. drop inlets, junction boxes, endwalls, etc.)
Raw materials
- current certifications from vendors
Repair materials - Approved Lists 28, 29 and 31

In addition to cast date and other required markings, the plant identification and letters “QC” shall be affixed to each piece of product. Such markings shall be evidence that the required QC procedures have been performed. These markings shall not be added until final QC inspection has been performed.

(5) VDOT Quality Assurance Monitoring

The producer’s Production and testing facilities, processes, records, and product will be monitored as deemed necessary by the Department based upon the needs of project-related work. A checklist of items to be inspected is provided in Appendix E (Precast Concrete Plant Inspection Report). The checklist will be completed in its entirety each quarter. If during the VDOT Industrial Inspector’s inspection, non-compliance with specifications, or the checklist in Appendix E, or the Producer’s QC plan is observed, the VDOT Industrial Inspector will issue an NCR to the Producer’s QC Technician and plant manager. The NCR will list the violation of the QC plan, checklist in Appendix H, or specification, and rate the violation on a scale of one (1) to five (5). A one (1) is considered a small infraction within a category and is equal to one point and a five (5) is considered a major infraction within a category and is equal to 5 points. Typical Precast Concrete QC violation categories and points per category are listed in Appendix L.

The VDOT Industrial Inspector will work with the Producer’s QC Technician in making a resolute effort to resolve NCR action items and develop a procedure or process to ensure the violation does not take place again. The accumulation of fifteen non-compliance points or more within a twelve month period will result in the precast facility being placed on probation for six months. While on the first probation period, any accumulation of NCR points exceeding four points, the Producer’s probation period will restart to the date of the latest NCR. If any NCR points are issued on the second probation period, the facility will be removed from the Approved List No. 34 immediately. If the precast facility accumulates twenty non-compliance points within a twelve month period the facility will be removed from the approved list immediately. Failure to address the NCR will result in the facility’s removal from Approved List 34.

Appeal Process:

A Producer has five business days upon the notification(s) of any NCR issued by the VDOT Industrial Inspector that changes the status of the Producer on Approved List No.34 to appeal to the QA Section Manager. The appeal must be in writing. The QA Section Manager will follow the steps below:

1. The QA Section will review the VDOT Industrial Inspector’s NCR and the Producer’s documentation within five business days of notification. If the Quality Assurance Section can resolve the matter with the Producer, there will be no need to proceed to Step 2.
2. The QA Section will issue a written notice of placing the precast facility on probation for a minimum of six months or removing from the approved list. The QA Section’s decision on being placed on probation is final.

3. If the decision is to remove the Producer from the approved list, the Producer may appeal the decision in writing to the State Materials Engineer within five business days. The State Materials Engineer (or designated representative) decision is final and will be made within five business days after receiving the Producer’s written appeal. If the precast facility is removed from the approved list the facility is not eligible for reinstatement for one year from the date of notification.

(6) Annual Quality Testing

Quality testing will be performed as deemed necessary by the Department for establishing quality of raw materials. The tests may be performed on the aggregates, cement, mineral admixtures, and all types and sizes of reinforcing materials. This is more likely to occur with out-of-state Producers not using aggregate from VDOT approved lists.

(7) Repairs

Repairs will be in accordance with The Precast Concrete Repair Manual in Appendix I. Materials used in repairs will come from VDOT Materials Division Approved Lists - 28, 29, or 31.

For structural repairs, the Producer shall submit a repair plan to the QA Section for review and approval before the repairs are made. Once the plan has been approved by the QA Section the repairs can be made. No repair is to begin without written authorization from the VDOT Industrial Inspector Report QA plant monitor.

NOTES

See attached Appendix E, H, L and P

REFERENCES

COPY DISTRIBUTION:

Deputy Chief Engineer VDOT Resident Engineers
Division Administrators Federal Highway Administration
District Administrators Virginia Ready Mix Association
District Location & Design Engineers Precast Concrete Association of Virginia
District Construction Engineers Virginia Transportation Construction Alliance
District Maintenance Engineers Virginia Asphalt Association
District Bridge Engineers American Conc. Paving Assoc. Mid-Atlantic Chapter
District Traffic Engineers Old Dominion Highway Contractors Association
Appendix E: Concrete Pipe / Precast Concrete Quarterly Plant Monitor Report

Date ____________________________
Manufacturer ____________________________
Location ____________________________
Producer’s Technician ____________________________
Region ____________________________

Type Plant: ______ Concrete Pipe ______ Precast Concrete ______ Both

Raw Materials

1. All materials are from VDOT approved sources? ______ Yes ______ No

2. Stockpiles are properly segregated? ______ Yes ______ No

3. Stock piles are free of debris? ______ Yes ______ No

4. Admixtures are stored according to manufacturer’s specifications? ______ Yes ______ No

5. Is reinforcing steel/wire stored properly? ______ Yes ______ No

6. Are VDOT approved grate, frames, covers and insets stored separate from unapproved items? ______ Yes ______ No

7. Is VDOT’s “Buy America” policy observed? ______ Yes ______ No

Comments: ________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
_________________________________________________________________________
### Pre-Pour Inspection

1. VDOT approve shop drawings in use?  
   - Yes  
   - No

2. Forms are clean and in good condition?  
   - Yes  
   - No

3. Are forms tight, gap free, square, and within dimensional tolerance?  
   - Yes  
   - No

4. Excessive form oil removed?  
   - Yes  
   - No

5. Minimum cover for rebar mat checked?  
   - Yes  
   - No

6. Minimum cover for rebar ends checked?  
   - Yes  
   - No

7. Front and back depth checked?  
   - Yes  
   - No

8. Pre-pour inspection documented?  
   - Yes  
   - No

Comments:

---

### Post-Pour Inspection

1. Forms are cleaned after each use?  
   - Yes  
   - No

2. In service forms are stored in clean and good condition?  
   - Yes  
   - No

3. Out-of-service forms are clearly marked and stored separately?  
   - Yes  
   - No

Comments:

---
Testing

1. Are the Plant QC Technician’s certifications current? ______ Yes ______ No

2. Are the following tests being performed:
   - Temperature: Yes No N/A
   - Slump: Yes No N/A
   - Air Content: Yes No N/A
   - Compressive strength cylinders: Yes No N/A

3. Are all tests performed properly? ______ Yes ______ No

4. Is the laboratory adequately equipped to perform these tests?
   ______ Yes ______ No

5. Are all equipment calibrations current?
   - *Date compressive cylinder machine calibrated.
   - *Frequency cement, aggregate & water metering calibrated.
   - *Date cement, aggregate & water meter calibrated
   - *Batch plant inspection frequency?
   - *Air meter calibration frequency?

   Comments:
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________

---

Pipe Testing

1. Does the product meet dimensional requirements? ______ Yes ______ No

2. Length of pipe _______________ Diameter of pipe _______________
   - *D-Load class of pipe
   - *Required D-Load reading at .01 _______________
*Required D-load reading for ultimate

*Reading when .01 crack developed

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Workmanship

1. Does the product meet dimensional requirements? Yes No

2. Is the product substantially free of fractures, cracks and surfaces roughness? Yes No

3. Is the reinforcing wire/steel exposed? Yes No

4. Is the following information clearly marked on each section of product?
   *The specifications Yes No N/A
   *The date of manufacture Yes No N/A
   *The name or trademark of the manufacturer and identification of plant? Yes No N/A
   *Is each item given a final inspection by a QA Technician at load out and stamped QC
   Signifying it’s free of defects and or damage? Yes No

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Storage

1. Is product storage area firm and level? Yes No

2. Are units stored in a manner to minimize damage? Yes No

3. Are unacceptable units stored separately of acceptable units? Yes No

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Repairs

1. Are necessary repairs being made?  
   _______ Yes  _______ No

2. Are the patching materials used listed on Lists 28, 29 or 31?  
   _______ Yes  _______ No

3. Are repairs properly finished and cured?  
   _______ Yes  _______ No

Comments: ________________________________________________________

______________________________________________________________

______________________________________________________________

Documentation

1. Are the following documents available?  
   *Cement mill certifications  Yes  No  N/A
   *Aggregate test reports  Yes  No  N/A
   *Admixture product date sheets  Yes  No  N/A
   *Reinforcing steel mill certifications  Yes  No  N/A
   *Grates, frames, covers & inset certs  Yes  No  N/A
   *Approved VDOT mix designs  Yes  No  N/A
   *Equipment calibrations  Yes  No  N/A
   *Technician certifications  Yes  No  N/A
   *Water Test Analysis  Yes  No  N/A

2. Do shipping tickets/documents contain a statement certifying that the items shipped have been tested, inspected, and approved under an approved producer QC acceptance program signed by an authorized QC technician.  
   _______ Yes  _______ No

Comments: ________________________________________________________

______________________________________________________________

______________________________________________________________
Overall Comments: _______________________________________________________

_____________________________________________________________________

_____________________________________________________________________

Monitor Samples

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Type</th>
<th>Tested for</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

Plant Representative: ____________________________

VDOT Plant Monitor: ____________________________

Title: ____________________________
# Appendix H: Precast/Pipe Quality Control Plan Review Check List

Plant Name: ________________________________

Location: ________________________________

Date: ________________

Reviewer: ___________________ Reviewer’s Section: ___________________  

Description: This Quality Control (QC) Plan Review Check List is to be used by the VDOT Monitor to assess the completeness of the Quality Control Plan submitted by the miscellaneous precast concrete or concrete pipe producer. If the QC Plan is deemed complete, the QC Plan can be approved and the producer can make product for VDOT projects according to the instructions.

Note: N/A = Not Applicable

Does the QC Plan have a:

<table>
<thead>
<tr>
<th><strong>Cover sheet specific to the Facility with the latest revision date?</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>This sheet will also include the facility’s physical address, mailing address, telephone number and web address. Any time this plan is updated or resubmitted this cover will be updated.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Statement of Commitment to Quality Control?</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement shall reflect facility’s commitment to their Quality Control plan and VDOT specifications.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Plant Personnel Organizational Chart:</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include Plant Manager, QC Manager/Technicians/Director</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Plant Organization (line of reporting)</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>QC manager reports directly to plant management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>List of Precast concrete items produced for VDOT projects</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**Records:**

<table>
<thead>
<tr>
<th><strong>List of Records maintained in plan?</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>List of precast concrete items produced for VDOT projects?</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Retention time of records (Min. 5 years)</strong></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**Materials Section – Are the location and retention time of the following documentation included?**

<table>
<thead>
<tr>
<th><strong>Source of any concrete not produced on site, must be a VDOT approved source?</strong></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Cement Supplier’s name, location and mill certificates</strong></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
</table>
### Fine and Coarse Aggregates Suppliers

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stamped Delivery Tickets or Certifications kept on file?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Documentation of Aggregate Gradations and Aggregate moisture checks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of Visual Inspections of stored Aggregate materials.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Admixtures: Product Data sheets and types of admixtures used

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
</table>

### Water quality (Sec. 216 of Road & Bridge Spec.)

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
</table>

- Provide test reports if not local source

### Welded Wire Fabric fabrication procedure and mill certs.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- Certification
  - Mill Report
  - Buy America Compliant

### Steel/Rebar/Epoxy-coated rebar mill certifications

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- Mill Report
- Buy America Compliant

### Grates, frames and covers

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- Certifications under an approved program
  - AASHTO M105 and/or M306 compliance
- Mill Report
- Buy America Compliant

### Materials storage

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- Does the QC plan state how each type material will be stored to prevent contamination or degradation.

### Form Work

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

- Does the QC plan provide details of how form are cleaned, stored and prepared for the next pouring operation?
- How are the forms inspected and removed from service if necessary?
Prepour Inspection

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form set-up</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product set-up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Postpour Inspection

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Batching

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Moisture Checks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batcher Passed Exam</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Curing:

<table>
<thead>
<tr>
<th></th>
<th>Steam</th>
<th>Air</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Weather curing procedures:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot Weather curing procedures:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Finished Products Inspection

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the QC Plan describe how the finished product is inspected?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Product Storage and Shipping

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the QC Plan describe how the product is stored and how the product is shipped including any precautions and inspection that is performed?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patching

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Patching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brand Name of Patching Material used for Lists 28, 29 &amp; 31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedure for patching in hot and cold weather</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosmetic repair detail and structural repair procedures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Problem Resolution Procedure

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the QC Plan outline a procedure to follow when problems involving production, testing, product meeting specifications, etc. are encountered?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Quality Control Testing Frequency and their AASHTO or ASTM designations.

<table>
<thead>
<tr>
<th></th>
<th>ASTM C31</th>
<th>AASHTO T126</th>
<th>ASTM C192</th>
<th>ASTM C1064</th>
<th>ASTM C143</th>
<th>ASTM C231</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making cylinders/curing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature of Concrete</td>
<td></td>
<td></td>
<td>AASHTO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slump Test</td>
<td></td>
<td></td>
<td>ASTM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Content</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure Meter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Volumetric Meter  

Absorption tests  
ASTM C173

Tests  
AASHTO T280  ASTM C497 Strength

Scale/Balance calibration frequency  
Yes  No

Frequency of Hopper/Chute Inspection  
Yes  No

Consequences of failing tests  
Yes  No

Procedure followed when failing test occur?

Handling of rejected precast products  
Yes  No

Identifying products that are damaged?

Product stamping and Shipping Ticket with identifications  
Yes  No

Mix Designs (Form TL-27 or similar for out of state facilities)  
Yes  No

Equipment Calibration Frequencies Recorded  
Yes  No

Current Certifications for all quality personnel at facility  
Yes  No

Status: Approved / Disapproved  
By: ____________________________
Title: ____________________________

If disapproved, what areas were non-compliant?

________________________________________________________

________________________________________________________

________________________________________________________

Comments: _____
Appendix L: Non-Conformance Report for Precast/Pipe Facilities

Industrial Plant Monitor Report (NCR)

Date: ___________________________ Time In: ___________________________ Time Out: ___________________________

Plant Name: ___________________________________ Location: ___________________________

Q.C. Technician: __________________________________ Certified: __________________________

Pre-Pour

<table>
<thead>
<tr>
<th>Pre-Pour</th>
<th>Concrete</th>
<th>Workmanship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>Approved Shop Drawings</td>
<td>Slump</td>
<td>Concrete Placement</td>
</tr>
<tr>
<td>Forms Clean</td>
<td>Air</td>
<td>Vibration</td>
</tr>
<tr>
<td>Excessive Form Oil</td>
<td>Temperature</td>
<td>Embedded Items Secure</td>
</tr>
<tr>
<td>Rebar Mat Minimum Cover</td>
<td>Cylinders</td>
<td>Porosity (pipe only)</td>
</tr>
<tr>
<td>Front/Back Depth Check</td>
<td>Batch Slip</td>
<td>Overburden (pipe only)</td>
</tr>
<tr>
<td>Horizontal Ends (re-bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical Ends (re-bar)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Was the problem reported by the field/district? Yes | No

Project #/District ___________________________

Summary of Incident:

Deficiencies/Cause:

Actions taken by VDOT:

Actions taken by manufacturer:

Resolution:

Comments:

Use reverse side for additional comments

Plant Q.C. Technician/ Received Copy:
Appendix P: Annual Concrete Batcher Exam

Name ______________________________                                           Date ______________________
(Please Print)

Facility _____________________________                                           Location _____________________

Circle the best answer.

1. Who is permitted to batch concrete?
   a. Plant Manager
   b. Any production personnel
   c. A certified batch technician
   d. None of the above

2. If a batch of concrete fails testing, the appropriate action is to what?
   a. Pour it in a non VDOT form
   b. Pour the product anyway and retest later
   c. Discard the batch as trash
   d. None of the above

3. The maximum water/cement ratio for a VDOT 5000 psi mix is?
   a. 0.30
   b. 0.40
   c. 0.45
   d. 0.55

4. The maximum water/cement ratio for a VDOT 4000 psi mix is?
   a. 0.30
   b. 0.40
   c. 0.45
   d. 0.55

5. The mixer needs to be thoroughly cleaned when?
   a. Daily
   b. Hourly
   c. Weekly
   d. Only if time permits

6. Mixer blades/paddles/feet/shoes must not be more than _____ distance from the floor/drum.
   a. ½ inch
   b. 1/16 to 1/8 inch
   c. 1 inch
   d. It doesn’t matter
7. The maximum temperature for a batch of concrete is?
   a. 80 degrees
   b. 90 degrees
   c. 100 degrees
   d. 140 degree

8. Concrete testing must be performed on which batch of concrete for each mix?
   a. The 1\textsuperscript{st}
   b. The 3\textsuperscript{rd}
   c. Before the last batch
   d. Whenever it is convenient

9. Free moisture on aggregate is?
   a. Absorption plus total water
   b. The amount of water on the surface of the aggregate
   c. The water in the aggregate pores
   d. None of the above.

10. The condition of an aggregate when it will neither absorb water from the mix nor contribute water to the mix is called?
    a. Free Moisture
    b. Total Moisture
    c. Saturated Surface Dry (SSD)
    d. None of the above.

11. Who is permitted to make changes in the VDOT mix design?
    a. The Batch Technician
    b. The Production Supervisor
    c. The VDOT Quality Control Technician
    d. The Welding Shop Foreman

12. Cement and aggregate scales must be calibrated how often?
    a. Yearly
    b. Monthly
    c. Just before the VDOT inspector arrives
    d. Every six months
Batcher exam answer key

To pass VDOT’s Batcher Exam you must have 9 correct answers. This Exam shall be administered on a yearly basis. Submit the finished, graded exams to your VDOT QA Representative, so they may be added to your Facility’s VDOT Quality Control Plans.

1. C
2. C
3. B
4. C
5. A
6. B
7. B
8. A
9. B
10. C
11. C
12. D