This QA ITP supplements the inspection procedures of the SFQM and other supporting QA documents by tabulating the progression of QA inspections and tests required by MDOT as part of its acceptance of Level I structural precast prestressed concrete members.

Level I structural precast prestressed concrete inspection is considered standard shop inspection for main load carrying members, typically characterized by full time inspection frequency and sample size as indicated in the MDOT Work Assignment (WA). Full time inspection is defined as eight hours of inspection per day Monday through Friday while fabrication is occurring. Contact SFU for approval prior to exceeding these limits if more inspection time is expected based on the Fabricator's operations and the inspection requirements established in this ITP. QAIs are required onsite full-time, although some activities may be performed remotely when prearranged with the SFU and the Fabricator. It is important to note that some fabrication activities are performed without the QAI present (onsite or remotely). Visits to Fabricator subcontractors and component manufacturers require SFU approval or direction via WA.

QAI must not arrive to the fabrication shop earlier than the day prior to the start of fabrication to begin prefabrication activities without SFU approval.

All instances of required SFU approval noted in this document must be in writing from the MDOT PM.

1.1 QAI Activities (Inspection and Test Items)

QAI activities are listed in the table below along with their referenced requirements, activity codes, frequency, description, and output/record. Each activity is assigned a code to designate whether the activity is performed by the Fabricator and observed by the QAI or is performed by the QAI either solely or as an independent check of a QC inspection or test. The activity codes are defined in Section 1.2 below.

The term "Suitable intervals" when used in this ITP means the activity is required to occur at least once per project (or once per multiple projects going through the fabrication plant concurrently) with follow up duration and frequency determined by the QAI based on conditions such as QC inspection effectiveness and production workmanship provided the QAI works within the limits of their inspection hours. Duration is the time spent observing an activity. Frequency is how often an observation is required and is expressed as elapsed time or quantity of work completed between observations. At the QAI's discretion, duration and frequency may differ between projects based on project complexity or Fabricator experience and may change during a project based on Fabricator performance provided the QAI works within the limits of their inspection hours.

Conformance of certain quality control and fabrication activities that occur without QAI presence must be substantiated by the QAI with direct proof or competent evidence. QC inspections are substantiated by reviewing quality documentation supplied by the QCI and follow-up review with the QCI. Fabrication steps are similarly substantiated by observing and reviewing progress with the QCI.

When used in the Description column the term "verify" is the action by the QAI to establish correspondence of observed facts or details with recorded facts and details. It implies a responsibility by the QAI to confirm completion and conformance of an action or condition with expected requirements. For a Level I ITP it implies onsite QAI activity unless arrangements were made that satisfy the SFU.

1.2 Activity Codes

M = Monitor: QAI routinely observes the Fabricator's active quality control and fabrication activities at suitable intervals. The Fabricator's activities may be conducted without the QAI present to monitor, even if the QAI is onsite.

P = Perform: QAI is responsible for actual completion of the step. These activities include verification inspections, tests, and review of quality control records for adequacy and completeness.

W = Witness: QAI must be present and observe the required activity performed by the Fabricator.

1.3 Hold Points

Some activities are identified as hold points. These are sensitive steps that require QAI notification by the Fabricator. Fabrication must not proceed past these points until the QAI is either satisfied of the outcome through direct testing or observation of testing, or the QAI grants a waiver of the hold point based on situational evaluation. QAI satisfaction or waiver does not constitute product acceptance, which is the responsibility of the Fabricator.

The prefabrication meeting minute template initially establishes the minimum number of QAI hold points – see blue shaded rows below. The QAI may recommend or request modification or addition of hold points for the approval of the SFU at the start of fabrication – see note below.

QAI may request additional inspections, tests, or hold points during the fabrication process due to established action limits/suspension limits being exceeded or in reaction to a loss of confidence in a process. Additional inspections, tests, or hold points will be conveyed in writing to the Fabricator and must result in minimal impact to project schedule. Written conveyance must identify the duration and acceptance criteria in addition to the same level of detail as in the below ITP table. SFU approval is required – see note below.

Ideally, the Fabricator must convey project schedules in writing to confirm when hold point inspections will occur and that the QAI is available for the hold point inspection as requested by the Fabricator. The QAI must reply to any written requests for hold point inspections. Other forms of communication are acceptable if documented (defining Fabricator notification to the QAI and QAI response) and agreed to at the prefabrication meeting.

Note - Any increase in inspection criteria or inspection hold points must be based on objective evidence. Rationale for additional inspection or hold point should be discussed with the MDOT Structural Precast Concrete Specialist prior to notifying the Fabricator of the new inspection requirements.

1.4 Output/Record

Where the Fabrication Inspection Report (Form 5617) is listed in the Output/Record column, the QAI may substitute a Consultant form meeting the requirements of the SFQM. Where other MDOT forms are listed, it is implied they are only necessary when the associated activities are performed.

1.5 ITP Table

The ITP table starting on the next page is sufficient for most projects. However, adjustments are permitted to suit specific project needs. Any adjustments must conform to project requirements and must be made in writing and submitted to the SFU for approval. Once approved, it must be shared with the Fabricator prior to start of production, preferably before or during the prefab meeting. Adjustments to hold points must conform to Section 1.3 above.

Custom ITPs developed by the Contractor or Consultant are also permitted but must address all inspection and test activities listed in the ITP Table.

Altering the conditions detailed in the above introduction and outline is not permitted without SFU approval.

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Approved Shop Drawings	SFQM 1.9.1, 2.2.3.2 & 2.2.3.6	P	Initially and each revision	Visually confirm shop drawings in use are approved. If Engineer permits Fabricator to proceed without approved drawings, notify Consultant PM and await instruction to proceed. If non-approved drawings are used for fabrication, compare approved drawings to unapproved drawings and noted deviations during fabrication – notify Consultant PM of any discrepancy.	Fabrication Inspection Report (Form 5617)
Materials Source List (MSL)	MDOT SSC 105.01.B SFQM 2.2.4.2.2	P	At or prior to pre-fabrication meeting	Review the MSL (Form 0501) approved by the Consultant FCS and discuss sampling and testing requirements with QC. Place a copy of the form along with any supporting documents in the project folder and note material changes to the MSL.	Materials Source List (Form 0501) Fabrication Inspection Report (Form 5617)
Material Inventory	MDOT Prefabrication Meeting Minutes MDOT SSC 105.01.B SFQM 2.2.4.2.3	P	During all material inventory, prior to first use of each material	Inspect materials that will be used in the fabrication process and ensure they are being stored correctly, tagged for traceability purposes, and are in conformance with the contract. Conduct sampling and verify testing complete as required. Send email to QC and Consultant PM when there are deficiencies. Release hold point.	Fabrication Inspection Report (Form 5617) Sample Identification (Form 1923) Email
Operations (Facility and Equipment)	SFQM 2.2.4.2.3	M	Suitable intervals	Inspect and monitor the Fabricator's work area and equipment, ensuring it is adequate and maintained in a condition to yield products conforming to the project requirements. Note - Equipment includes cutting, welding, handling, forming, hole-making, surface preparation, coating, and inspection and testing as applicable. Verify calibrations of inspection and testing equipment and tensioning jack.	Fabrication Inspection Report (Form 5617)
Initial Tensioning	SFQM 2.2.4.3	W	Each bed	Witness initial tensioning and verify loading. Witness marking of strand at live and dead ends. Verify supports, hold-downs, and bond breaker or debonding. Confirm no crossed strands. Spot check strands are free of oil, foreign materials, or physical defects. QAI to create pre-pour checklist for product being inspected and document in inspection report.	Strand Tensioning Report (Form 0513) Fabrication Inspection Report (Form 5617)
Final Tensioning	SFQM 2.2.4.4	W	Each bed	Witness final tensioning and verify loading.	Strand Tensioning Report (Form 0513)
After Tensioning	SFQM 2.2.4.4	P	Each bed	Complete independent elongation calculations and verify with QC results immediately after final tensioning. Verify strand patterns. Perform the following activities after all strands have been final tensioned: Visually verify no strand slippage and net elongation of strands appear to be consistent, and measure net elongation on 25 percent of strands. Verify all wire and strand failures are resolved or acceptable as appropriate.	Strand Tensioning Report (Form 0513)

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Reinforcing Steel	SFQM 2.2.4.5.3	P	Each member, pre-pour	Spot check to confirm the reinforcing steel is of the correct size, free from defects, and properly positioned (including lap lengths) and secured in accordance with the approved shop drawings. Spot check to confirm required concrete cover. Spot check top steel just prior to the pour (after tarps have been removed or within this same time frame when heating is not applicable). QAI to create pre-pour checklist for product being inspected and document in inspection report.	Fabrication Inspection Report (Form 5617)
Void Boxes, Blockouts & Inserts - Placement	SFQM 2.2.4.5.4	M	Suitable intervals	Monitor block out and insert placement. QAI to create pre-pour checklist for product being inspected and document in inspection report.	Fabrication Inspection Report (Form 5617)
Readiness for Placing Concrete	MDOT Prefabrication Meeting Minutes SFQM 2.2.4.5.2 & 2.2.4.5.5	P	Each pour, prior to pouring concrete	Verify forms are of approved material, properly braced, clean, and coated with approved release agents. Obtain mix design number from QC prior to first fresh concrete test for the project. Perform fresh concrete testing and compare results with Fabricator's QC results. Observe strength test cylinder sampling and identification. QAI to create pre-pour checklist for product being inspected and document in inspection report. Release hold point.	Fabrication Inspection Report (Form 5617)
Placing & Consolidating Concrete	SFQM 2.2.4.5.6 & 2.2.4.5.7	M	Each member	Monitor concrete placement and consolidation. Observe placement technique limits segregation. Observe proper layered placement and consolidation.	Fabrication Inspection Report (Form 5617)
Special Consolidation	SFQM 2.2.4.5.7	M	Suitable intervals	Monitor special consolidation methods and equipment. Observe consolidation activity to ensure a rubber coated vibrator head is used when epoxy-coated or other coated reinforcement is used.	Fabrication Inspection Report (Form 5617)
Void Boxes - Movement	SFQM 2.2.4.5.4	P	Each member	Immediately after the top has been struck-off, spot check the depth of concrete over the void boxes and immediately share any concerns with QC.	Fabrication Inspection Report (Form 5617)
Curing	SFQM 2.2.4.7	M	Each member	Observe the curing method for compliance with project requirements.	Fabrication Inspection Report (Form 5617)
Release Strength Testing	SFQM 2.2.4.6	W	One set of either release strength or 28-day strength tests per week	Witness QC compression testing of cylinders that were cast and match cured.	Field and Lab Test Report (Form 0590)
Releasing Strand	MDOT Prefabrication Meeting Minutes SFQM 2.2.4.6.1	M	On same day strength testing is witnessed	Verify the release strength testing for the members being de-tensioned. Monitor the Fabricator's method and process of releasing strand and immediately share any concerns with QC.	Fabrication Inspection Report (Form 5617)

Inspection/Test Item	Referenced Requirement	QAI	Frequency	Description	Output / Record
Post-Pour Inspection	SFQM 2.2.4.6.2	P	Each member	Perform post-pour spot inspections after QC has completed their inspection and approves the member. Review temperature monitoring documentation. QAI to create post-pour checklist for product being inspected and document in inspection report.	Fabrication Inspection Report (Form 5617)
Approved Repairs – Minor Nonconformance	SFQM 2.2.5.E.7	M	Suitable intervals	QAI to inspect if this work occurs while they are at the plant during production. Special trip to the plant is not required for inspection. Visually confirm use of approved repair procedures and materials. Monitor surface preparation, application of repair material, and curing method. Review QC inspection documentation prior to accepting repair.	Fabrication Inspection Report (Form 5617)
Approved Repairs – Major Nonconformance	SFQM 2.2.5.E.7	P	Suitable intervals; at least once per repair type	Visually confirm use of approved repair procedures, repair material(s), and repair preparation. Release hold point. Witness surface preparation, application of repair material, and curing method. Review QC inspection documentation prior to accepting repair.	Repair Observation Report (Form 1981)
28-Day Compressive Strength Testing	SFQM 2.2.4.10	W	One set of either release strength or 28-day strength tests per week	Witness the compression testing performed by QC.	Field and Lab Test Report (Form 0590)
Loading & Shipping – QAI Acceptance	SFQM 2.2.7	P	Each member, prior to shipping	Inspect members after loading. Verify 28-day compressive strength test results. Verify no unauthorized or undocumented repairs. Verify receipt of QC documentation. If there are no deficiencies after loading, stamp members and BOL. Release hold point.	Fabrication Inspection Report (Form 5617)