

2022

**PW-7045 WIGLE PHASE II – MIDTOWN WEST
Concrete Quality Assurance Plan**

1.0 INTRODUCTION

This project consists sidewalk improvements, curb & gutter replacement on 4th Street Extension between Tuscola Street and Brainard Street in the City of Detroit. This is a Public Work Project.

The following Quality Assurance Plan details the procedures that will be used to ensure that the concrete portion of this project is constructed in accordance with the Special Provision for Quality Control and Acceptance of Portland Cement Concrete MDOT 2020 Standard Specification for Construction and Project Specifications. Lacey Hoefler and Steve Drummond will be responsible for administering this Quality Assurance Plan during the Project and will institute any actions necessary towards its successful implementation.

2.0 PERSONNEL

The personnel selected for this project that are responsible for obtaining acceptance samples all have the required current certifications including MCA Level I and/or MCAT certified aggregate technician where applicable. The following is a list of personnel that will work on this project (HRC – Hubbell, Roth & Clark, Inc. and SE – Somat Engineering, Inc.):

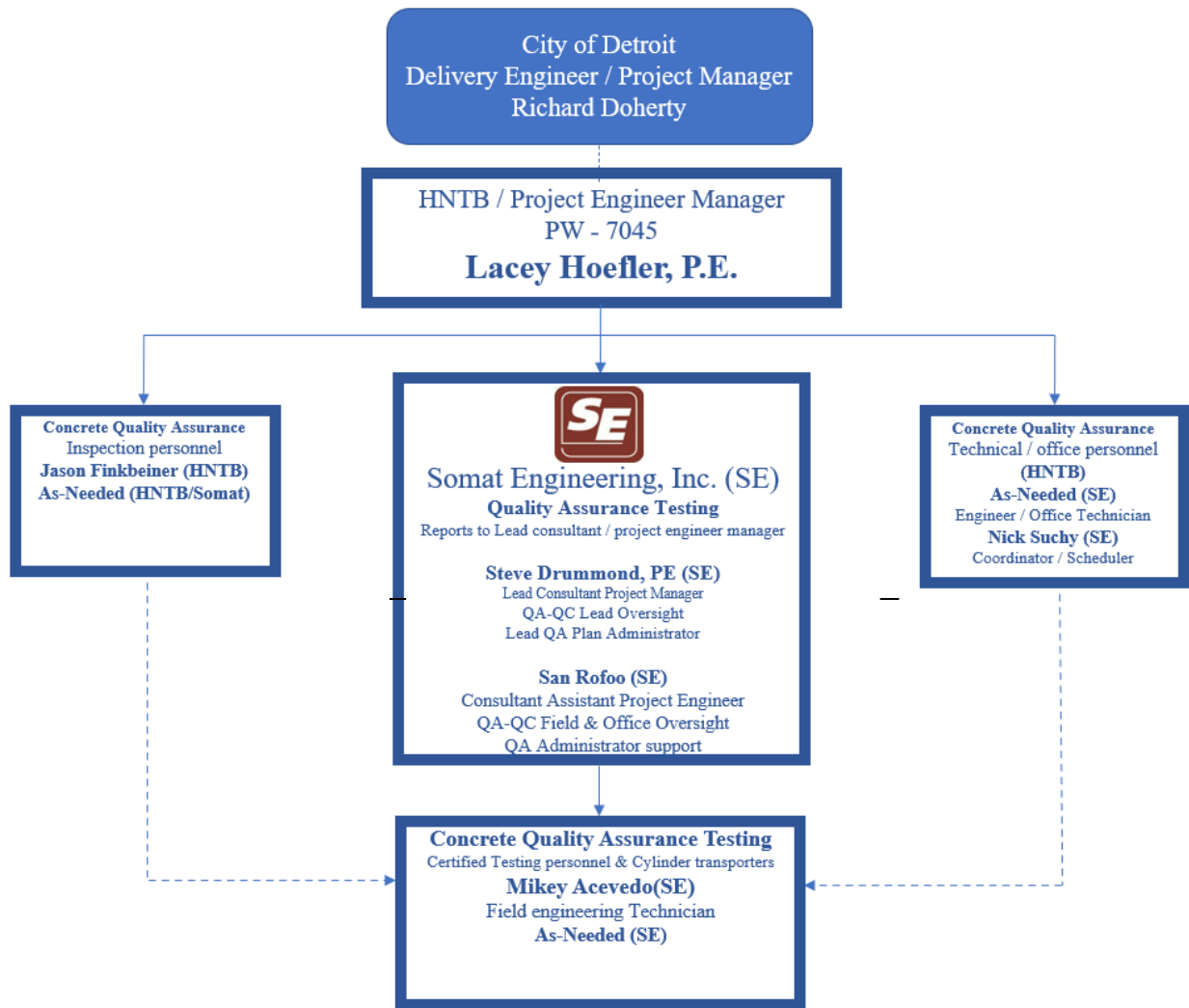
<u>Name</u>	<u>Title</u>	<u>Organization</u>	<u>Phone No.</u>	<u>Email Address</u>
Richard Doherty	Construction Eng.	Detroit DPS		dohertyri@detroitmi.gov
Lacey Hoefler	Project Engineer	HNTB		lhoefler@hntb.com
Marc Ledent	Asst. Project Engineer	HNTB	313.410.0208	mledent@hntb.com
Steve Drummond*	Project Manager	SE	313.304.9287	sdrummond@somateng.com
San Rofoo	Project Engineer	SE	313.706.2119	srofoo@somateng.com
Nick Suchy	Field Coordinator	SE	313.409.6019	nsuchy@somateng.com
	Office Technician	HNTB		
Jason Finkbeiner	Lead Inspector	HNTB		JFinkbeiner@hntb.com
Cory Gray	Inspector	HNTB		cgray@hntb.com
Mikey Acevedo	Field Technician	SE	313.409.2496	macevedo@somateng.com
	Field Technician	SE		
	As Needed**	SE/HNTB		

NOTE: Various other field staff not indicated above shall be utilized throughout the project, as necessary.

* Indicates key personnel and QA Plan Administrator

** Indicates field technicians that are certified to perform concrete testing on MDOT LAP projects, certifications **APPENDIX A**

2.1 ORGANIZATIONAL CHART



3.0 WORK PLAN

The following section details the work to be completed by the Engineer which will include developing and managing a Quality Assurance Plan, quality assurance sampling and testing, PWL calculations for contractor payment, inspection, project management, and laboratory testing.

3.1 CONCRETE COORDINATOR

The Engineer will be responsible for field documentation of all concrete items incorporated into this Project and will provide a concrete coordinator that will be responsible for the following tasks:

- Track all concrete placements and determine sampling locations (MDOT Form 1174) using random number generation and lot/sublot configurations. Track all non-PWL concrete.
- Witness QA/QC correlation tests at the beginning of each work day for each mix transported to the site for air content, slump, and temperature. Witness QC beam breaks for early open to traffic or construction traffic.
- Sign each concrete ticket that arrives onsite and verify the delivered concrete matches approved mixed designs.
- Verify proper storage boxes are utilized onsite including approved locking mechanisms and temperature/moisture control.
- Coordinate cylinder transport to the Somat Engineering Laboratory. Somat personnel will be equipped with a vehicle that secures cylinders with cushioned racks that are able to transport 4" x 8" and 6" x 12" cylinders.

The following is a list of responsibilities for the field inspectors

- Document quantities and track daily production.
- Verify work is completed according to all project documents, drawings, and specifications.
- Witness the QC technician perform the breaking of concrete beams for early to open applications.

The following is a list of responsibilities for the field engineering technician

- Perform side by side correlation testing at the beginning of each day and whenever there is a change in QC or QA equipment and/or personnel, for temperature and air content of fresh concrete.
- Perform concrete testing in accordance to ASTM C31 for slump, temperature, and air content.
- Mold two strength specimens for compressive strength testing. No dispute resolution cylinders will be molded for this project (Two 28-Day Breaks).
- Place molded specimens in the designated storage box supplied by the Contractor immediately after molding.
- Once the Contractor and Engineer have placed their molded specimens in the curing box, secure the box with the designated locking mechanism, provided by Somat Engineering.

The report forms are shown in **APPENDIX B**

3.2 TESTING REQUIREMENTS

The testing requirements for all concrete placed on this job will be in accordance with the MDOT 2020 Standard Specification for Construction and Project Specifications. All testing will be performed by a qualified engineering technician with calibrated equipment.

- All personnel responsible for field inspection and for molding acceptance sample will possess the required qualifications and certifications.
- The Engineer and Contractor will perform side by side correlation testing for air content at the beginning of each day of concrete production and/or when there is a change in QA/QC personnel or equipment.
- Concrete classified as non PWL will be tested at the discretion of the Engineer.
- The Engineer will issue a notice of non-compliance with contract requirements and concrete production will stop when one or more of listed items are encountered from Section D (Department Administered Quality Assurance) Sub-Section D (QA Stop Production Criteria). Once all deficiencies are corrected, the Engineer will issue a notice to resume work.
- All specimens must be placed in the contractor supplied curing box immediately upon completion of molding. The box must be secured by the Engineer.

- The Engineer will keep a record of all QA tests and inspections including signed original acceptance results and raw data, random numbers used for that set of specimens, and resulting calculations.
- The acceptance, final curing and testing will be performed by Somat Engineering's testing laboratory located at 6680 Middlebelt Road, Romulus, Michigan.
- The Engineer will not release the QA results until the Contractor has submitted their QC results.

3.3 LOT INFORMATION

During the pre-production meetings, concrete testing requirements were determined and agreed upon by the Contractor and the Engineer including Lot and Sublot sizes, small production quantities, incidental quantities, and cylinder size. For the project the Engineer and the Contractor agreed to mold 4"x8" cylinders molds. Production Lot sizes per the following:

- All project concrete items – 50 cubic yard sublots or days production

(For acceptance testing, additional cylinders may be requested at the discretion of the Engineer)

3.4 SPECIMEN TRANSPORT

The transport vehicle for Quality Assurance cylinders molded for this project will be fully equipped to safely secure cylinders from the site to the Somat Lab. This vehicle will be equipped with cushioned cylinder transport racks that will supply a secure housing for 4" x 8" and 6" x 12" cylinders. The cylinders will be transported, by Somat, after the initial cure to the Somat testing laboratory located at 26445 Northline Road in Taylor, Michigan. Somat will transport the molded specimens from the job site within 48 hours after molding, but not prior to 8 hours after final set of the concrete. The transportation time will not exceed 4 hours from the job site to the testing laboratory.

3.5 STORAGE BOXES FOR CURING CYLINDERS

Storage boxes must be provided by the Contractor and placed in such a way on the job site that is easily accessible by both the Engineer and the Contractor. These curing boxes must be used to store all cylinders and beams molded for this project in accordance with the following requirements:

- Contractor must supply a sufficient number of curing boxes and strategically place them throughout the site within reasonable length determined by the Engineer. If the nearest curing facility is beyond reasonable distance for safe transport of fresh concrete specimens, determined by the Engineer, the Contractor will be required to move the curing box closer to the testing location.
- Curing boxes must be equipped with High/Low thermometers and be well ventilated or insulated to keep from exposing test specimens from extreme weather.
- Each box must have an Engineer supplied locking mechanism.
- Immediately upon molding test specimens, the Engineer will transport the specimens to the nearest cure facility.
- Once the Engineer and Contractor have placed their test specimens in the cure box, the Engineer will secure the box. Entering the cure boxes will only be permitted in the presence of the Engineer.

3.6 QUALITY CONTROL VERIFICATIONS

The Engineer will perform weekly quality assurance verifications on the contractor's Quality Control personnel and equipment. The Engineer will carry calibration tools for air meter gauges with the engineering technicians on site, so both the Engineer's QA and Contractor's QC testing equipment may be checked on the spot if any test results cannot be verified. The Engineer will conduct various Quality Control Meetings with the contractor to discuss any current quality issues and help plan for the upcoming schedule of work items.

3.7 QUALITY ASSURANCE AIR CONTENT LOSS TESTING (SLIPFORM PAVER OR PUMP TRUCK)

The Engineer's QA Representative will perform Air Content Loss testing when the contractor elects to place concrete by the method of a Slipform Paver and/or Pump Truck.

Placement Method – Slipform Paver

The air content loss test will be performed by the QA once at any time during each concrete production day or if there is a significant change in the paving operation (such as change of pavers). The QA will first perform front air content test. This test will require the QA to sample concrete from the grade in front of the paver (prior to concrete being consolidated and finished by the paver) after all the contents of the load are deposited on to grade (by dump truck, conveyor, ready mix truck, etc.). The QA will mark this location at the point of sample and sample material using scoop (need to obtain just enough concrete to run a single air content test). The paving operation will proceed and pass over the concrete that was sample for the front air content test, consolidating the material resulting in a finished paved product. At this point the QA will identify the location marked of the front air content test and obtain another sample of the same concrete from the same location and perform another air content test, recorded as back air content. Prior to sampling material, the contractor will be notified that the sample is going to take place and that the area the back sample was obtained needs to be filled back in with concrete. The difference is the front air content test result and back air content test result will be considered passing if the results do not differ by more than 1.5%.

Placement Method – Pump Truck

The air content loss testing will be performed by the QA once at any time during each concrete production day or the concrete pump truck is relocated (where applicable) or concrete pump boom configuration (angle) changes significantly. The QA will first perform front air content test. In the event that this is the first load of concrete delivered to site, the QC will obtain sample directly from the top load of the concrete truck delivering material (not from the pump truck) and at this point the QC is to allow the QA to also use their sample. The QA and QC will perform a standard air content test and temperature test for QA/QC correlation on the sample the was obtained from the first concrete truck delivered to site by the QC. The air content test result that is established by the QA from the correlation will be considered the front air content test result. In the event that the concrete pump truck is relocated or the concrete pump boom configuration (angle) changes significantly the QA will not perform a QA/QC correlation test, only a single air content test which indicates the air content front test and the QC is under no obligation to sample concrete for the QA (QA has to receive sample themselves). Next the QA will sample concrete to perform the back air content test. The sample will be obtained by the QA (the QC is under no obligation to receive sample for the QA testing) from the end of the pump. Prior to taking sample from the end of the pump the QA will ensure that there is no indication of slick back or grout in the discharged concrete which will be done when the pump truck operator primes the pump. The QA will also ensure that the contractor has established a consistent flow while discharging the concrete from the end of the pump. If there is any indication of slick back/grout or inconsistent flow through the pump as concrete is being discharged, the QA will discard sample and notify the

Engineer and contractor of the issue and sample again. The QA will request the contractors pump operator to deposit concrete sample on to the ground or in the QA wheelbarrow. If the concrete pump hose needs to be moved the QA will notify the contractor of this and will not touch the pump for any reason. Once the above criteria has been met, the QA will obtain sample and perform a standard air content test on the concrete. This air content test result will then be recorded as back air content test result. The difference is the front air content test result and back air content test result will be considered passing if the results do not differ by more than 1.5%.

If the air content loss test for either placement method described above is within 1.5% between the front and back test results, the Engineer will be notified and the contractor can proceed with concrete placement production. If the air content loss test for either placement method described above is NOT with 1.5% between the front and back test results, the Engineer will be notified and the contractor will not be able to proceed with concrete placement production until the QC test results verify passing results. In no event is the QA obligated to reject or retest the concrete being tested for air content loss.

4.0 DEFICIENCY RESOLUTION

The following section details corrective actions for deficiencies encountered during the placement of concrete.

4.1 CORRELATION TESTING DISPUTE

The Engineer and Contractor will perform side by side correlation testing for air content at the beginning of each day of concrete production and/when there is a change in QA/QC personnel and/or equipment. The Engineer will designate an independent third party to conduct an air content test (established at Concrete PPM) in the event the air content results of two tests conducted between the Engineer's and the Contractor's testers differ by more than 0.8% air by volume of concrete. The designated third party determined by the Engineer will conduct an air content test of the fresh concrete, independent of the project, prior to commencement of concrete placement in efforts to resolve issues relative to non-correlation.

4.2 ADHERENCE TO QC PLAN

The Contractor has developed a Concrete Quality Control Plan that has been approved by the Engineer that details the Contractor's means and methods to successfully fulfill the scope of services listed in the project's documents, including MDOT 2020 Standard Specification for Construction and Project Specifications. The Engineer will be responsible for enforcing the Contractor's adherence to this QC Plan and will have the authority to institute any actions necessary toward the successful implementation. If the Contractor is found not adhering to this QC plan the following actions will be taken until the Contractor corrects all deficiencies:

- Notify the Contractor's Quality Control Plan Administrator of the deficiencies, describing which sections of the plan they are violating.
- Allow the Contractor to make corrections before taking further action.
- Document the deficiency and generate a corrective action report detailing which sections are in violation and what action was taken by the Contractor to correct the deficiency.
- If the Contractor does not correct the deficiencies, the Engineer may issue a notice of Non-Compliance (MDOT Form 1165)
- If a work stoppage is instituted, the Engineer will confirm all deficiencies are corrected before work is allowed to resume.

4.3 AIR CONTENT LOSS

The Engineer will verify the QC sampling and testing of the fresh concrete for air content loss once during each week of concrete production or when action limits are exceeded. Verification that a representative sample is tested immediately after discharge from the truck but before the mainline slip form paver/pump and ten again from the same haul unit, after the mainline slip form paver/pump. QA is to verify that the difference in measured air content from both samples does not exceed 1.5% air by volume of concrete.

4.4 ACTION AND SUSPENSION LIMITS

The Contractor has developed a QC plan that has action and suspension limits for materials placed on the job site. The Engineer will monitor the Contractor's sampling rate and test results to determine if the action and/or suspension limits have been reached. If these limits are reached, the Contractor must follow what is stated in the QC plan, and if the suspension limits are reached the Engineer will order a work stoppage until the Contractor can prove the necessary adjustments were made and the concrete mix is restored to conformance with the project specifications. Once the Contractor has proven the mix is within specification, the Engineer will submit a resume work order.

5.0 LAB TESTING INFORMATION

Somat Engineering's testing laboratory will be conducting all testing for concrete specimens. The Somat Engineering's testing laboratory and personnel have the required certifications and the equipment is calibrated to meet all requirements.

Location: 6680 Middlebelt Road, Romulus, MI, 48174
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APPENDIX A

