SECTION 014000 - QUALITY CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. All Drawings and Specifications inclusive of the Commission's General Conditions and Commission's Special Provisions, Supplementary Conditions, and other Division 1 specifications, apply to the Work of this Section. The Prime Contractor shall be responsible for reviewing the complete set of Contract Documents for procedures, space requirements, materials, installation sequence, and other similar items that will require their direct coordination efforts with the other Contractors on this Project.

1.02 SUMMARY

A. Definitions: Quality control services include inspections and tests, and actions related thereto including reports, but do not include Contract enforcement activities performed directly by the Construction Manager. Quality control services include those inspections and tests and related actions performed by independent agencies and governing actions performed by independent agencies and governing authorities, as well as directly by the Contractor.

B. The testing service is required to immediately notify the Construction Manager of discrepancies observed in the Work performed and to be performed to the Contract Documents.

C. Inspections, tests, and related actions specified in this Section and elsewhere in Contract Documents are not intended to limit the Contractor's quality control procedures which facilitate compliance with requirements of the Contract Documents.

D. Requirements for quality control services by the Contractor, as requested or to be requested by the Construction Manager, the Commission, governing authorities, or other authorized entities, are not limited by the provisions of this Section.

E. The Contractor shall review and become familiar with the requirements of the January 1, 2016 Edition of ODOT CMS, the requirements for testing in the technical section of the Special Provisions, the General Conditions and all technical specifications covering the provisions for testing of the Work.

1.03 RESPONSIBILITIES

A. The Contractor shall coordinate and schedule all tests and inspections with the independent testing agency performing inspections, tests, and quality control services so specified through the Construction Manager.

B. The Contractor shall furnish labor to assist the designated testing agency in obtaining and handling samples at the Project.

C. The Contractor that are responsible for placement of cast-in-place concrete, grout, and/or mortar shall furnish and install for the sole use of the testing agency wooden cure boxes, unless other methods are specifically approved by the Chief Engineer, for safe storage and proper curing of concrete test specimens on the Project site for the first twenty-four (24) hours as required by "Method of Making and Curing Concrete Test Specimens in the Field" (ASTM C31).

D. The Commission will pay for the testing laboratory services specified in this Section, unless otherwise noted.

E. The Contractor shall notify the Construction Manager forty-eight (48) hours in advance of testing/inspection required.

F. The Contractor shall provide access to the area to be tested and provide trade specific equipment as required to perform the testing and inspection

G. Retest Responsibility: Where results of a required inspection, test, or similar service are unsatisfactory (do not indicate compliance of related Work with requirements of Contract Documents), retests are the responsibility of the Contractor. Retesting of Work revised or replaced by the Contractor is the Contractor's responsibility.

H. Responsibility for Associated Services: The Contractor is required to cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at the Project site.

I. Coordination: The Contractor and each engaged independent agency performing inspections, tests, and similar services for the Project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need for removal/replacement of Work to accommodate inspections and tests. Scheduling of times for inspections, tests, sampling, and similar activities are the Contractor's responsibility to coordinate with the Construction Manager.

J. Sampling and testing are required for the following Sections of Work and shall be performed by an independent testing lab and paid for by the Commission.

ODOT Item 203 – Roadway Excavation and Embankment
ODOT Item 204 – Subgrade Compaction and Proof Rolling
Section Item 451 – Reinforcement Portland Cement Concrete Pavement: Pavement Quality Control.
Section 033000 – Cast-in-Place Concrete: Field quality control for cast-in-place concrete.
Section 042613 – Masonry Veneer: Field quality control.
Section 051200 - Structural Steel Framing: Field quality control for welds and high strength steel torque- bolted connections.
Section 053100 – Steel Decking
Section 055000 – Metal Fabrication
Section 055113 – Metal Pan Stairs
Section 099000 – Painting
Section 310000 - Earthwork: Field quality control for earthwork.
Section 321313 – Concrete Paving

K. ~~The Contractor shall submit to the Construction Manager for approval, the names and addresses of testing laboratories to be used in making their required inspections, sampling, and testing that may be required by the Contract Documents and not covered herein.~~ Testing laboratories must have sufficient experience in making the inspections, sampling or testing they will be required to complete. Where sufficient evidence or knowledge of the testing laboratory is not available, the Construction Manager shall have the right to require the Prime Contractor to use the same testing lab selected by the Commission or to submit names of other laboratories that will be acceptable to the Construction Manager and the Commission at no additional cost to the Commission.

L. Test procedures to be used shall be submitted for approval of the Construction Manager where alternates to those specified are recommended by the testing agency.

1.04 SOILS TESTING

A. The testing herein shall apply to all work of ODOT Item 203, "Roadway Excavation and Embankment," ODOT Item 204, "Subgrade Compaction and Proof Rolling" and Section 31 00 00 "Earthwork." The requirements of this Section are to supplement the requirements of said Section 31 00 00.

B. The Testing Agency shall provide an engineer or qualified technician in constant attendance during excavation, filling and compaction operations to perform inspection and tests as specified.

C. The Testing Agency shall verify the load carrying capacity of the soils encountered at the design elevations for footing and fill. If the bearing characteristics are below the design values, the Contractor shall not proceed with the related work until the Architect/Engineer defines corrective measures.

D. The Testing Agency's inspection and evaluation shall include, but not necessarily be limited to, the following:

1. Inspection of excavation operations.

2. Evaluation of materials encountered for use as fill.

3. Inspection of exposed subgrade.

4. Testing of subgrade soils for design bearing capacity.

5. Evaluation of subgrade soils to determine need of and design of underdrain system.

6. Determinations of the Project suitability of on-site borrow materials.

7. Inspection of the placement of fill materials.

8. Testing the compaction of fill materials.

9. Directing the removal of unsuitable materials.

E. The Testing Agency's testing program shall include, but not necessarily be limited to the following:

1. Measuring the strength and density of exposed subgrade soils at design elevations.

2. Determining the frost susceptibility characteristics for the top three (3) feet of exterior pavement and sidewalk subgrades.

3. Determining the control values for cohesive soils per ASTM D557.

4. Determining the control values for cohesionless soils per ASTM D2049.

5. Measuring the strength and density of bearing soils relative to the design loads by taking one strength or density test for each 2,500 square feet of undisturbed subgrade under structure slabs, pavements and sidewalks.

6. Measuring the compacted density of fill and base course materials by taking one (1) field density test for every 2,500 square feet of area or portion thereof of each layer of compacted fill using an approved nuclear density meter, or per ASTM 67 and ASTM D1556.

7. Measuring the compacted density of backfill against foundation walls and in utility trenches by taking one test for each layer of compacted fill for every 100 linear feet of backfill using an approved nuclear density meter of per ASTM D1556 and D2167.

1.05 CAST-IN-PLACE CONCRETE TESTING

A. The testing herein shall apply to all Work of the following Sections. The requirements of this Section are to supplement the requirements of said Sections.

Section 033000 "Cast-in Place Concrete."
Section 321313 "Concrete Paving."

B. The Testing Agency shall provide an engineer or qualified technician in constant attendance during concrete operations to perform inspection and tests as specified.

C. If directed by the Construction Manager, the Testing Agency shall inspect the concrete plant's batching, mixing and discharge facilities. The Testing Agent report conditions relative to producing concrete to meet the specified requirements, conformance with design mix proportions, conditions of materials used, mixing time, delivery time and any additional pertinent controls that affect delivery of acceptable concrete to the Project site. During the concrete plant inspection, the Testing Agency shall sample the materials and check the mix proportions.

D. The Testing Agency shall perform the following tests at the jobsite.

1. Slump tests shall be performed per ASTM C134. Make one (1) slump test of the initial batch of each mix, one (1) test for each compression test and other tests as often as appropriate thereafter. Observe the slump in all batches to verify uniformity of concrete delivered to the jobsite.

2. Air content tests shall be performed per ASTM C173 or ASTM C230. Test the initial batch of each mix, make one test for each compression test and measure the air content as often as appropriate thereafter.

3. Compression tests shall be performed per ASTM C31 and ASTM C39. Sample the concrete at the location of deposit. Tests shall be made for every fifty (50) cubic yards or fraction thereof.

   a. For non post-tensioned concrete, each test shall consist of a set of five (5) cylinders. Two cylinders shall be tested after seven (7) days and two (2) shall be tested after twenty-eight (28) days. The remaining cylinder shall be held in reserve for further testing, if necessary.

   b. For post-tensioned concrete, each test shall consist of a set of seven (7) cylinders. Two cylinders shall be field cured and shall be tested after three (3) days of cure, two after seven (7) days of cure and two after twenty-eight (28) days of cure. The remaining cylinder shall be held in reserve for further testing, if necessary.

   c. Additional cylinders may be made and tested for other purposes, including stripping of forms and removal of shoring. These additional tests shall be arranged and paid for by the Contractor.

E. The Testing Agency shall recommend to the Architect/Engineer and the Construction Manager any design mix changes which may be necessary to correct the characteristics of the material being delivered to the jobsite. The Architect/Engineer will evaluate the recommended changes and issue appropriate direction to the Contractor through the Construction Manager. The Contractor shall direct the concrete supplier to make any and all recommended adjustments to the mix design. The Contractor is responsible for any additional cost that the concrete supplier may request because of the revisions.

1.06 MASONRY

A. The testing herein shall apply to all Work of the following Sections. The requirements of this Section are to supplement the requirements of said Sections.

   042613 – Masonry Veneer.

B. The Testing Agency shall provide an engineer or qualified technician to perform inspection and tests as specified.

C. The Testing Agency shall perform the following tests at the jobsite:

   1. Mortar properties shall be tested per ASTM C-270. Mortar composition shall be tested per ASTM C-780.

   2. Grout compressive strength shall be tested per ASTM C-1019.

3. Masonry prism tests shall be made for each type of wall per ASTM E447, Method B.

1.07 WELDING QUALITY CONTROL

A. Welding operators shall be qualified under the provisions of the AWS Structural Welding Code on test pieces in positions and with clearances equivalent to those actually to be encountered in construction. Welders shall make only those types of welds for which they are specifically certified. Certification shall be submitted to the Construction Manager prior to commencement of Work.

B. Welds requiring inspection shall be so indicated in the Drawings. Welds indicated as requiring visual inspection shall be visually inspected by an independent inspector, acceptable to the Architect/Engineer, pre-qualified to make the weld being inspected. Welders and inspectors shall be pre-qualified by the American Welding Society Qualification Test.

C. Submit written reports for each weld tested. Provide Project identification and number, date of report, name of Welding Contractor, name of testing service, location of weld, type of weld, and test results. Indicate whether or not weld is acceptable for intended use.

D. If by inspection welds fail to meet minimum acceptable criteria, the welds shall be cut out and replaced.

1.08 BOLTED STRUCTURAL CONNECTIONS QUALITY CONTROL

A. The General Contractor for the Work of Section 05120, "Structural Steel" shall coordinate with a separate testing laboratory, employed and paid by the Commission, to perform field quality control inspection of slip-critical and snug-tight bolted connections.

1. Inspection of slip-critical connections shall be visual. The inspector shall be present at the beginning of steel erection to ensure that the erector is conforming to the Contract Documents and AISC Specifications. The inspector shall verify that the erector is marking the bolts and nuts prior to the turn-of-nut procedure. Ten (10) percent of all slip-critical bolted connections shall be observed as they are installed. The erector shall correct any connections, which, in the opinion of the inspector, do not meet the tightening requirements of the Contract Documents.

2. Inspection of snug-tight connections shall be made by use of a spud wrench. Ten (10) percent of all snug-tight bolted connections selected randomly over the entire limits of the building structure shall be tested to verify tightness. If more than

twenty (20) percent of the bolts tested do not meet the General Requirements of the Contract Documents, the erector shall be required to retighten all snug-tight bolted connections on the Project.

1.09 STRUCTURAL STEEL ALIGNMENT QUALITY CONTROL

A. The General Trades Contractor shall coordinate with a independent testing laboratory, paid for by the General Trades Contractor, to perform field measurement of structural steel beams, columns, joist, and deck alignment.

B. Alignment shall be measured and compared to the AISC "Code of Standard Practice for Steel Buildings and Bridges."

C. The independent testing laboratory shall submit to the Construction Manager, a written report summarizing the measurements performed and the equipment used in the fieldwork. Where alignment fails to meet AISC requirements, the General Trades Contractor for the work in Section 05120 shall make the required corrections.

1.10 QUALIFICATIONS OF LABORATORY AND SUBMITTALS

A. Meet requirements of ASTM E329, current edition "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as used in Construction."

1. The term "Agency" as used in Section 4 of ASTM E329 shall mean the local or closest office of said Agency.

B. Laboratory qualifications for inspection, sampling and testing of soils and aggregates shall be comparable to the requirements of ASTM E329.

C. Testing Equipment

1. Calibrated at maximum twelve (12) month intervals by devices of accuracy acceptable to the Architect/Engineer.

D. Submit documentation of specified requirements. Submit two (2) copies to the Architect/Engineer.

E. All testing and inspection performed by the testing laboratory shall be under the direct supervision of a professional engineer licensed in the state of the Ohio. This professional engineer shall submit a letter certifying that all testing services are in conformance with the standards and specifications as specified in these Contract Documents. The letter shall also certify that all tested and inspected

items and procedures conform to the Contract Documents, except where specifically noted on the inspection reports.

1.11 LABORATORY DUTIES, LIMITATIONS OF AUTHORITY

A. Provide authorized personnel promptly on notice.

B. Perform specified inspections, sampling, and testing of materials and methods of construction.

1. Comply with specified standards; ASTM, other recognized authorities and as specified.

2. Ascertain compliance with requirements of the Contract Documents.

C. Promptly notify the Construction Manager and the Contractor of irregularities in the Work to be performed with the Documents and deficiencies of Work performed, which are observed during performance of services.

D. Promptly submit three (3) copies of reports of inspections and tests to the Construction Manager, including the following information, as applicable:

10. Date issued.

11. Project title and number.

12. Testing laboratory name and address.

13. Name and signature of inspector.

14. Date of inspection or sampling.

15. Record of temperature and weather.

16. Date of test.

17. Identification of product and Specification Section.

18. Location in Project.

10. Type of inspection or test.

11. Observations regarding compliance with Contract Documents.

E. Perform additional services as required by the Commission on a unit cost, as submitted and approved by tickets signed daily.

F. Laboratory is not authorized to:

1. Release, revoke, alter, or enlarge on requirements of the Contract Documents.

2. Approve or accept portion of the Work.

3. Perform duties of the Prime Contractor

1.12 PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

1. General: Upon completion of inspection, testing, sample-taking, and similar services performed on the Work, repair any damaged Work and restore substrates and finishes to eliminate deficiencies including defects in visual qualities of exposed finishes. Except as otherwise indicated, comply with the requirements of the Contract Documents for "Cutting and Patching." Protect Work exposed by or for service activities and protect repaired Work. Repair and protection is the Contractor's responsibility, regardless of assignment of responsibility for inspection, testing, or similar service.

END OF SECTION 014000
QUALITY CONTROL