

BID PACKAGE 10-003 – OLIVE GARDEN SITE UTILITIES WORK

TULALIP, WASHINGTON

SECTION 014500 – QUALITY CONTROL

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Drawings and General Provisions of Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to Work of this Section.
- B. Section 010500 – FIELD ENGINEERING.
- C. Section 014510 – TESTING LABORATORY SERVICE.

1.02 SUMMARY

- A. This Section includes Contractor's responsibilities of quality control services and extent of quality control services to be performed.
- B. 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 Project Engineer. 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 Contractor.
 - 1. Testing service is required to immediately notify 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 Contractor's quality control procedures which facilitate compliance with requirements of Contract Documents.
- D. Requirements for quality control services by Contractor, as requested or to be requested by Project Engineer, Owner, governing authorities, or other authorized entities are not limited by provisions of this Section.
- E. Contractor shall review and become familiar with the requirements of the General and Special Conditions covering the provisions for testing of the Work.

1.03 RESPONSIBILITIES

- A. Contractor shall coordinate with independent testing agency performing inspections, tests, and quality control services.
 - 1. The Construction Manager will schedule services of independent testing agency to perform services so specified.
 - 2. Owner will pay for quality control services specified.

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- B. Retest Responsibility: Where results of required inspection, test, or similar service are unsatisfactory (i.e., do not indicate compliance of related work with requirements of Contract Documents), retests are responsibility of Contractor. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work.
- C. Responsibility for Associated Services: 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 project site.
- D. Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for 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, taking of samples, and similar activities is Contractor's responsibility through the Construction Manager.
- E. As it applies to Work being performed as part of this Contract sampling and testing is required for the following Sections of Work and shall be performed by an independent testing lab and paid for by the Owner.
 - 1. Section 31 20 00 – Earthwork: Soil testing and inspection service during earthwork operations for subgrades, engineered fill, and other materials as required.
 - 2. Section 32 12 00 – Flexible Paving: Quality control testing of uncompacted asphalt concrete mix and in-place compacted pavement.
 - 3. Section 32 16 13 – Curbs and Sidewalks: Quality control testing for concrete materials and mix design tests. Inspection of reinforcing steel placement. Field quality control of concrete.
 - 4. Section 33 30 00 – Sanitary Sewerage Utilities: Field quality control of concrete. Tests for concrete materials and mix design tests.
- F. Contractor shall submit to the Construction Manager for review, the names and addresses of testing laboratories to be used by Contractor in making their required inspections, sampling, and testing as outlined herein or other tests 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 Contractor to use the same testing lab selected by the Owner or to submit names of other laboratories that will be acceptable to the Owner at no additional cost to the Owner.

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- G. Test procedures to be used shall be submitted for approval of the Project Engineer where other than those specified are recommended by the testing agency.

1.04 QUALIFICATION OF LABORATORY

- A. Refer to Section 014510 – TESTING LABORATORY SERVICE for requirements.

1.05 SUBMITTALS

- A. Submit 2 copies of test reports directly from the approved testing services, with one copy each to Contractor and Construction Manager.

1.06 SOIL COMPACTION TESTING

- A. Contractor shall cooperate and coordinate with the soil testing and inspection service for quality control testing during earthwork operations as follows:
 - 1. Field density test reports.
 - 2. One optimum moisture-maximum density curve for each type of soil encountered.
 - 3. Contractor shall arrange for soil testing and inspection service to be on the site for observation and testing during times when the following operations are being performed.
 - a. Proofrolling.
 - b. Compaction of subgrades and fill. During compaction operations, Contractor shall carefully monitor existing foundations to detect possible foundation movements. If movement is detected, Work shall be stopped and the Project Engineer and the Construction Manager immediately notified.
- B. Percentage of Maximum Density Requirements: Provide not less than following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place.
 - 1. Foundations: NOT USED.
 - 2. Building Slabs and Steps: NOT USED.
 - 3. Lawn, Unpaved Areas, and Borrow Pit: Compact top 6 inches of subgrade and each 8 inch layer of backfill or fill material to 85 percent of a modified Proctor (ASTM method D1557).
 - 4. Walkways: Compact top 6 inches of subgrade and each 8 inch layer of backfill or fill material to 95 percent of a modified Proctor (ASTM method D1557).

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5. Pavements: Compact top 12 inches of subgrade and each 8 inch layer of backfill or fill material to 95 percent of a modified Proctor (ASTM method D1557).
 6. Underground Utilities: Provide the preceding requirements for the respective utility location(s).
 7. Storm Piping Outside Building
 - a. Bedding shall begin by placing 4 to 6 inch bedding of the approved backfill material and compacting to 95 percent of a modified Proctor (ASTM method D1557). The width of the bedding shall be the diameter of the pipe plus 2 feet.
 - b. Haunching shall consist of placing the approved backfill material to the spring line of the pipe and compacting to 95 percent of a modified Proctor (ASTM method D1557). This lift shall not exceed 9 inches loose. The pipe bedding and flow line shall not be disturbed as a result of the haunching operation.
 - c. Initial backfill shall consist of placing the approved backfill material to the top of the pipe and compacting to 95 percent of a modified Proctor (ASTM method D1557). This lift shall not exceed 9 inches loose. Crushed or buckled pipe as a result of the backfilling operations will be removed and replaced with no additional payment.
 - d. Initial backfill shall continue in 6 inch lifts with the approval backfill material to a depth of 12 inches above the pipe.
 - e. Finish backfilling of the trench shall consist of placing the approved backfill or material from the trench excavation in 6 inch lifts to the grade of the trench. Finish backfilling within paved areas shall continue to the base of the compacted aggregate with the approved backfill material.
 8. Retaining Walls: NOT USED.
- C. Quality Control Testing During Construction: Testing service must inspect and approve subgrades and fill layers before further construction work is performed thereon. Tests of subgrades and fill layers will be taken as follows:
1. Footing Subgrade: NOT USED.
 2. Paved Areas: Make at least one field density test of subgrade for every 2,000 square feet of paved area, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 square feet of overlaying paved area, but in no case less than 3 tests.
 3. Foundation and Retaining Wall Backfill: NOT USED.

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4. Trench Backfill: For each compacted backfill layer make at least one field density test between each drainage structure if the distance between drainage structures is less than 100 feet. Make a field density test for every 100 feet between each drainage structure if the distance between drainage structures is greater than 100 feet.
- D. If, in the opinion of the Project Engineer, based on reports of testing service and inspection, subgrade or fills which have been placed are below specified density, additional compaction work and testing shall be provided by Contractor for the Section of Work involved at no additional expense to the Owner, until subgrades or fills meet or exceed specified density.

1.07 BITUMINOUS PAVING TESTING

- A. Contractor shall cooperate and coordinate with the testing laboratory to perform field inspection of the pavement work, unless specifically noted otherwise.
- B. Field quality control testing shall be performed during paving operations. Perform the following sampling and testing of asphalt concrete mixtures for quality control during paving operations. Record the locations where samples are taken to correlate with subsequent testing.
- C. Test uncompacted asphalt concrete mix and report the following:
 1. Sampling: AASHTO T168 (ASTM D979).
 2. Asphalt Cement Content: AASHTO T164 (ASTM D2172).
 3. Perform at least one initial test for paving, unless otherwise specified or directed.
- D. Test in-place, compacted pavement for density and thickness, as herein specified. For testing in-place density and thickness perform five (5) tests for each 400 tons or fraction thereof, unless otherwise specified or directed.
- E. Contractor shall pay for and perform additional Work and testing as may be required if any of the previous tests indicate insufficient values or if directed by the Project Engineer. Continue Work and testing until specified values have been attained.
- F. Asphalt concrete material not complying with specified requirements will not be acceptable. Contractor shall repair or remove and replace defective paving as directed by the Project Engineer, at no additional cost to the Owner.

1.08 INSPECTION OF REINFORCING STEEL PLACEMENT – NOT USED

1.09 CONCRETE TESTING

- A. Contractor shall cooperate and coordinate with the testing laboratory to perform field quality control testing during concrete work under Division 3.

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- B. Quality Control Testing During Construction: Perform sampling and testing for field quality control during the placement of concrete, as follows:
1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 2. Slump: ASTM C143, one test for each concrete load at point of discharge, and one for each set of compressive strength test specimens.
 3. Air Content: ASTM C231, pressure method; one for every other concrete load at point of discharge or when the indication of change requires.
 4. Compression Test Specimens: ASTM C31, one set of 4 standard cylinders for each compressive strength test, unless otherwise directed.
 - a. Cast and store 4 cylinders for laboratory cured test specimens and as specified in ASTM C31.
 5. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below and when 80 degrees F. and above; and each time a set of compressive test specimens is made.
 6. Compressive Strength Tests: ASTM C39, one set for each 100 cubic yards or fraction thereof, of each mix design placed in a day or for each 5,000 square feet of surface area placed; 1 specimen (lab cured) tested at 7 days, 2 specimens (lab cured) tested at 28 days, and 1 specimen (lab cured) retained in reserve for later testing if required.
 - a. When the frequency of testing will provide less than 5 strength tests for a given mix design, conduct testing strength tests for a given mix design from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When the total quantity of a given mix design of concrete is less than 50 cubic yards, the strength tests may be waived by the local authority having jurisdiction (AHJ) if, in his judgment, adequate evidence of satisfactory strength is provided.
 - c. When the strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.

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- C. Report test results in writing to the Construction Manager, Contractor, and ready-mix supplier on the same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials, type and amount of fibrous reinforcement, compressive breaking strength, and type of break for both 7 day tests and 28 day tests.

- D. Additional Tests: The testing service will make additional tests of in-place concrete, as directed by the Project Engineer, when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure. The testing service shall conduct tests to determine the strength and other characteristics of the in-place concrete by compression tests on cored cylinders complying with ASTM C42 or by load testing specified in ACI 318 or other acceptable nondestructive testing methods, as directed. Contractor shall pay for such tests conducted and other additional testing as may be required, when unacceptable concrete is verified.

- E. Evaluation of Quality Control Tests: Do not use concrete delivered to the final point of placement which has slump or total air content outside the specified values.
 - 1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of 3 consecutive compressive strength tests results equal or exceed the 28 day design compressive strength of the type or class of concrete; and no individual strength test falls below the required compressive strength by more than 500 psi.

 - 2. Strength tests of specimens cured under field conditions may be required by the Project Engineer to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded by the field quality control laboratory at the same time and from the same samples as the laboratory cured specimens.
 - a. Provide improved means and procedures for protecting concrete when the 28 day compressive strength of field cured cylinders is less than 85 percent of companion laboratory cured cylinders.

 - b. When laboratory cured cylinder strengths are appreciably higher than the minimum required compressive strength, field cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.

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- c. If individual tests of laboratory cured specimen produce strengths more than 500 psi below the required minimum compressive strength or if tests of field cured cylinders indicates deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question may be required.
 3. If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests will be considered deficient in strength.
- F. Deficient concrete shall be removed and replaced by Contractor without additional cost to the Owner.

1.10 CONCRETE MATERIALS AND MIX DESIGN

- A. Concrete Materials and Mix Design: Contractor shall provide the following in conformance with the requirements of Section 32 16 13 – CURBS AND SIDEWALKS.
 1. Ready-mixed concrete shall be mixed and delivered in accordance with ASTM C94.
 2. Product Data: Submit 3 copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures, bonding agents, water stops, joint systems, chemical floor hardeners, and dry shake finish materials.
 3. Laboratory Test Reports: Submit 2 copies of laboratory test reports for concrete materials and mix design tests. The Project Engineer's review will be for general information only. Production of concrete to comply with specified requirements is Contractor's responsibility.
 4. Mix Design: Submit 3 copies of concrete mix designs for each type of mix required by the Concrete Schedule indicating the amount of each ingredient (by weight) in one cubic yard of concrete, the calculated water / cement ratio, and the slump, two weeks prior to placement of concrete.
- B. Tests for Concrete Materials
 1. For normal weight concrete, test aggregates by the methods of sampling and testing of ASTM C33.
 2. For light weight concrete, test aggregates by the methods of sampling and testing of ASTM C330.
 - a. For Portland cement, sample the cement and determine the properties by the methods of test of ASTM C33.

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3. Submit written reports for each material sampled and tested, prior to the start of Work. Provide the project identification name and number, date of report, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material, and test results. Indicate whether or not material is acceptable for intended use.
- C. Submit signed statement from ready-mix plant that concrete furnished for the Project will exactly conform to the approved design mixes.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 REPAIR AND PROTECTION

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

END OF SECTION 014500