



CITY EXPERIENCE
City Design Studio

DATE:
October 23, 2025

TO:
Plan Holders
Contractors

FROM:
Jenna Richardson
918-596-9637
jennarichardson@cityoftulsa.org

EMAIL TRANSMITTAL

ADDENDUM NO. 1

PROJECT NO. PR 25-6 LEGACY PARK IMPROVEMENTS

Number of pages: **93**

All addenda to the contract documents should be denoted on the last page of the Proposal in the space provided.

Thank you,
Contract Administration



PARKS & FACILITIES
CABS – City Architectural Building Services

DATE:
October 23, 2025

ADDENDUM NO. 1
TO
PROJECT NO. PR 25-6
LEGACY PARK IMPROVEMENTS

This Addendum No.1 consisting of two (2) items, submitted by City of Tulsa, is hereby made a part of the Contract Documents to the same extent as though it were originally included therein and shall supersede anything contained in the Plans and Specifications with which it might conflict. **All addenda to the contract documents should be denoted on the last page of the Proposal in the space provided.**

This Addendum No. 1 consists of the following:

1. Please add the attached **TECHNICAL SPECIFICATION** to the Contract book. Four Divisions containing 23 Sections, total of 91 pages.
2. **Bid Opening Date** changing from November 14, 2025, to **November 21, 2025.**

All other provisions of the Plans and Specifications shall remain in full force and effect.

CITY OF TULSA

A blue ink signature of Anna America, written in a cursive style.

Anna America
Director

A blue ink signature of MW/SL/PDZ/HAS/JR/kt, written in a cursive style.

MW/SL/PDZ/HAS/JR/kt

TECHNICAL SPECIFICATIONS TABLE OF CONTENTS LEGACY PARK IMPROVEMENTS PROJECT

These Special Provisions are included in and are a part of the Bidding Documents for this project.

Division 1 - General:

01050	Field Engineering
01152	Application for Payment
01200	Project Meetings
01340	Submittals
01500	Temporary Facilities and Controls
01510	Site Access
01700	Contract Closeout
01720	Project Record Documents
01730	Operation and Maintenance Data

Division 2 - Site Work:

02000	Site Work
02070	Selective Demolition
02100	Site Preparation
02211	Rough Grading
02220	Earthwork
02265	Finish Grading
02790	Synthetic Turf
02810	Irrigation System
02900	Planting

Division 3 - Concrete:

03100	Concrete Formwork
03210	Steel Reinforcement
03300	Cast-In-Place Concrete
03345	Concrete Finishing

Division 7 – Moisture Protection:

07900	Sealants
-------	----------

**SECTION 01050
FIELD ENGINEERING**

PART I - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide and pay for field engineering services required for project.
 - 1. Survey work required in execution of project.
 - 2. Civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.
 - 3. Record drawings.
- B. Owner's Representative will identify existing control points indicated on the drawings as required.

1.02 QUALIFICATIONS OF SURVEYOR OR ENGINEER

- A. Qualified engineer or registered land surveyor, acceptable to Contractor and Owner.
- B. Registered professional engineer in the State of Oklahoma, of the discipline required for the specific service required.

1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the project are those designated on drawings.
- B. Locate and protect control points prior to starting site work and preserve all permanent reference points during construction.
 - 1. Make no changes or relocations without prior written notice to Owner.
 - 2. Report to Owner's Representative when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

1.04 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of one permanent bench mark on each site, referenced to data established by survey control points.
 - 1. Record locations with horizontal and vertical data on project record documents.
- B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means.
 - 1. Site improvements:
 - a. Stakes for grading, fill and topsoil placement.

- b. Utility slopes for invert elevations.
- 2. Batter boards for structures.
- 3. Building foundation, column locations and floor levels.
- 4. Controlling lines and levels required for Divisions 15 and 16.

C. From time to time, verify layouts by same methods.

1.05 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.06 SUBMITTALS

- A. Submit name and address of surveyor and professional engineer to Owner's Representative.
- B. Submit certificates signed by registered surveyor certifying that elevations and locations of improvements are in conformance or non-conformance with contract documents.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

**SECTION 01152
APPLICATION FOR PAYMENT**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.
- B. Related work:
 - 1. Proposal and contract documents.

1.02 QUALITY ASSURANCE

- A. Prior to start of construction, secure the Owner's Representative's approval of the schedule of values required to be submitted.
- B. During progress of the work, modify the schedule of values as approved by the Owner's Representative to reflect changes in the contract sum due to change orders or other modifications of the Contract.
- C. Base requests for payment on the approved schedule of values.

1.03 SUBMITTALS

- A. Formal submittal: Unless otherwise directed by the Owner's Representative:
 - 1. Make formal submittal of request for payment by filling in the agreed data, by typewriter or neat lettering in ink, on AIA Document G702, "Application and Certificate for Payment", plus continuation sheet or sheets, or other form as approved by Owner.
 - 2. Sign and notarize the Application and Certificate for Payment and the City "Uniform Voucher and Invoice for Construction Services".
 - 3. Submit the original of the Application and Certificate of Payment plus three (3) identical copies of the continuation sheet or sheets to the Owner's Representative.
 - 4. The Owner's Representative will sign the Application and Certificate for Payment, and distribute:
 - a. One original and two copies to Owner;

END OF SECTION

**SECTION 01200
PROJECT MEETINGS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: To enable orderly review during progress of the work and to provide for systematic discussion of problems, the Owner's Representative will conduct project meetings throughout the construction period.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Proposal and Contract Documents and Sections in Division 1 of these Specifications.
 - 2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are not the Owner's Representative responsibility and normally are not part of project meetings content.

1.02 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

- A. Job notes:
 - 1. The Owner's Representative will compile job notes of each project meeting and will furnish copies to the Contractor and to the Owner.
 - 2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 - PRODUCTS

No products are required in this Section.

PART 3 - EXECUTION

3.01 MEETING SCHEDULE

- A. Except as noted below for Pre-construction Meeting, project meetings will be held monthly or as requested by the City or contractor.
- B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

- A. The Owner's Representative will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRECONSTRUCTION MEETING

- A. A Pre-construction meeting will be scheduled after issuing the Notice to Proceed.
 - 1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
 - 2. The Owner will advise other interested parties, including the Owner's Representative, and request their attendance.
- B. Minimum agenda: Data will be distributed and discussed on at least the following items.
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers and Owner's Representative.
 - 2. Channels and procedures for communication.
 - 3. Construction schedule, including sequence of critical work and closing of any facilities.
 - 4. Contract documents, including distribution of required copies of original documents and revisions.
 - 5. Processing of shop drawings and other data submitted to Owner's Representative for review.
 - 6. Rules and regulations governing performance of the work.
 - 7. Procedures for safety and first aid, security, quality control, housekeeping and related matters.
 - 8. Location of underground utilities.
 - 9. Notification procedures for adjacent property owners.

3.04 PROJECT MEETINGS

- A. Attendance:
 - 1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the work.
 - 2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the work is involved.
- B. Minimum agenda:
 - 1. Review, revise and approve job notes of previous meetings.
 - 2. Review progress of the work since last meeting, including status of submittals for approval.
 - 3. Identify problems which impede planned progress.
 - 4. Develop corrective measures and procedures to regain planned schedule.
 - 5. Complete other current business.

END OF SECTION

**SECTION 01340
SUBMITTALS**

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Procedures:
 - 1. Wherever possible throughout the Contract Documents the minimum acceptable quality of workmanship and materials has been defined by manufacturer's name and catalog number, reference to recognized industry and government standards, or description of required attributes and performance.
 - 2. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for their review by the Owner's Representative.
 - 3. Make all submittals required by the Contract Documents and revise and resubmit as necessary to establish compliance with the specified requirements.
- B. Construction progress schedules.
- C. Schedule of values.
- D. Shop drawings, product data and samples.
- E. Manufacturer's instructions and certificates.
- F. Submittal log.

1.02 RELATED REQUIREMENTS

- A. Individual requirements for submittals are described in pertinent sections of these Specifications.
- B. Related work:
 - Section 01700: Contract Closeout: Project Record Documents, Operating and Maintenance Data, Warranties and Bonds.

1.03 QUALITY ASSURANCE/CONTRACTOR RESPONSIBILITIES

- A. Coordination of submittals: Before each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item, and the submittal for it, conforms in all respects with the requirements of the Contract Documents. Coordinate with other trades as required. By affixing the

Contractor's signature to each submittal, certify that this coordination has been performed.

- B. Grouping of submittals: Unless otherwise specified, make all submittals in groups containing all associated items to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays so occasioned.
- C. Timing: Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing deliveries.
- D. Notify Owner's Representative in writing with submittal of any deviations in submittals from Contract Document requirements.
- E. Do no fabrication or work which requires submittals until accepted by the Owner's Representative.

1.04 SUBMITTAL SCHEDULE

- A. Compile a complete and comprehensive schedule of all submittals anticipated to be made during progress of the work. Include a list of each type of item for which Contractor's drawings, shop drawings, certificates of compliance, material samples, guarantees or other types of submittals are required. Adhere to the schedule except when specifically otherwise permitted. Submittal log is for Owner's Representative to track review.
- B. Coordinate the schedule with all necessary subcontractors and materials suppliers to ensure their ability to adhere. Coordinate as required to ensure the grouping of submittals.
- C. Revise and update the schedule on a monthly basis to reflect conditions and sequences. Promptly submit revised schedules to Owner's Representative for review and comment.

1.05 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Shop Drawings:
 - 1. Present in clear and thorough manner, with details referenced to sheet, detail, schedule or room numbers shown on Contract Drawings. Provide quantity directed by Owner's Representative.
- B. Product Data:

1. Preparation: Clearly mark each copy to identify pertinent products or models. Show performance characteristics and capacities, dimensions and clearances required, and wiring or piping diagrams and controls.
 2. Modify manufacturer's standard drawings, diagrams and literature to delete information not applicable to work and supplement information specifically applicable to the work.
- C. Samples:
1. Office samples: Provide in quantity and size directed, complete with integrally related parts and attachment devices and illustrating functional characteristics of product and full range of color, texture and pattern.
 2. Field samples/mock-ups: Erect at project site at location acceptable to Owner's Representative in size or area specified in other specification sections. Fabricate to be complete and finished. Remove at conclusion of work or when directed.
- D. Make submittals promptly and in such sequence as to cause no delay in work.
- E. Submission Requirements:
1. Quantity required:
 - a. Shop drawings: Submit digital copies each..
 - b. Submit index brochures of mechanical and electrical submittals (manufacturer's literature and drawings) for final approval and distribution.
 - c. Product data: Complete catalogs will not be acceptable. Manufacturer's regular catalog sheets will be acceptable if they indicate completely all specification requirements. When manufacturer's catalog sheets are submitted, material not directly connected with subject shall be completely lined out. Where drawings cover several sizes or types of construction they shall clearly indicate size or type of construction to be used including a schedule identifying each piece of equipment. Submittals containing more than five different items of equipment shall be assembled with a table of contents.
 2. Submittal contents:
 - a. Submission date and dates of any previous submissions.
 - b. Project title and number.
 - c. Names of Contractor, supplier and manufacturer.
 - d. Identification of product, with specification section number.
 - e. Field dimensions, clearly identified as such.
 - f. Applicable standards, such as ASTM, Federal Spec numbers, etc.
 - g. Relation to adjacent or critical features of work or materials.
 - h. Identification of deviations from Contract Documents.
 - i. Identification of revisions on resubmittals.
 - j. Contractor certification of submittal review, to include product verification, field measurements, quantities, coordination with adjacent equipment structural members, or architectural features, and

coordination of information within submittal with requirements of work and Contract Documents. Certification may be by stamp of approval or a letter of transmittal containing a statement to the effect that they have been reviewed. Uncertified submittals will be rejected.

F. Resubmission Requirements:

1. Make corrections or changes required by Owner's Representative and resubmit until accepted.
2. Shop drawings and product data: Revise and resubmit as specified for initial submittal; indicate any changes which have been made other than those requested by Owner's Representative.
3. Samples: Submit new samples as required for initial submittal.
4. Resubmission of structural shop drawings and product data: Resubmit finalized drawings and product data. File copy to Owner's Representative and Owner; field copy to field office. Resubmit all subsequent changes with changes and dates noted.

G. Distribution:

1. Distribute reproductions of shop drawings and product data which carry Owner's Representative and Owner's stamp of approval to job site and record documents file, other affected contractors, subcontractors and supplier or fabricator.
2. Distribute samples with Owner's Representative and Owner's stamp of approval as directed by Owner's Representative.

1.06 SUBSTITUTIONS AND PRODUCT OPTIONS

Not Used

1.07 MANUFACTURER'S CERTIFICATES

- A. Submit certificates in accordance with requirements of each specification section.

1.08 PROJECT RECORD DOCUMENTS

- A. Submit in accordance with Section 01720 Project Record Documents.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 GENERAL PROCEDURES

- A. Deliver submittals to Owner's Representative.
- B. Transmit each item under Contractor's Standard Letter of Transmittal. Identify project, contractor, subcontractor, major supplier, pertinent drawing sheet and detail number and specification section number as appropriate. Identify deviations from Contract Documents.
- C. Submit initial progress and submittal schedules within 15 days after execution of Contract and schedule of values with first application for payment. Update with each Application for Payment reflecting changes since previous submittal.
- D. Comply with progress schedule for submittals related to work progress.
- E. After Owner's Representation and Owner's review of submittal, revise and resubmit as required, identifying changes made since previous submittal.
- F. Distribute copies of review submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

3.02 OWNER'S REPRESENTATIVE REVIEW

- A. Owner's Representative duties:
 - 1. Review submittals with reasonable promptness.
 - 2. Affix stamp and initials or signature and indicate re-submittal requirements or approval of submittal.
 - 3. Submit to Owner for approval.
 - 4. Return submittals to Contractor for distribution or for resubmission.
- B. Review by the Owner's Representative shall not be construed as a complete check, but only that the general method of construction and detailing is satisfactory. Review shall not relieve the Contractor from responsibility for errors which may exist.
- C. Authority to Proceed: The notations "Approved" or "Approved as Corrected" authorizes the Contractor to proceed with fabrication, purchase, or both, of the items so noted, subject to the revisions, required by the Owner's Representative review comments.
- D. Revisions: Make only those revisions directed or approved by the Owner's Representative and Owner.
- E. Revisions after approval: When a submittal has been reviewed by the Owner, re-submittal for substitution of materials or equipment will not be considered unless accompanied by an acceptable explanation as to why the substitution is necessary.

END OF SECTION

**SECTION 01500
TEMPORARY FACILITIES AND CONTROLS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide temporary facilities and controls needed for the work including, but necessarily limited to:
 - 1. Temporary utilities such as heat, water, electricity and telephone;
 - 2. Field office for Contractor's personnel;
 - 3. Sanitary facilities;
 - 4. Enclosures such as tarpaulins, barricades and canopies;
 - 5. Temporary fencing of the construction site;
 - 6. Project sign.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Proposal and Contract Documents and Sections in Division 1 of these Specifications.
 - 2. Except that equipment furnished by Subcontractors shall comply with requirements pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work are not part of this Section.
 - 3. Permanent installation and hookup of the various utility lines are described in other Sections of these Specifications.

1.02 PRODUCT HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the work.

PART 2 - PRODUCTS

2.01 UTILITIES

- A. Water:
 - 1. Provide as necessary temporary piping and water supply and, upon completion of the work, remove such temporary facilities.
- B. Electricity:
 - 1. Provide necessary temporary wiring and, upon completion of the work, remove such temporary facility.
 - 2. Provide and pay for electricity used in construction.
- C. Heating: Provide and maintain heat necessary for proper conduct of operations needed in the work.

- D. Telephone and Fax:
 - 1. Contractor and superintendent to have cellular telephones accessible during normal business hours.
 - 2. Contractor to maintain telephone and fax service at the Contractor's primary office to receive job correspondence. On-site fax not required.

2.02 FIELD OFFICES AND SHEDS

- A. Contractor's facilities:
 - 1. Contractor may at his discretion provide a field office building and sheds adequate in size and accommodation for Contractor's offices, supply and storage.
 - 2. Within the Contractor's facilities, provide enclosed space, for holding project meetings. Furnish with table, chairs and utilities.
- B. Sanitary facilities:
 - 1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
 - 2. Maintain in a sanitary condition at all times.

2.03 ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges and other temporary construction necessary for proper completion of the work in compliance with pertinent safety and other regulations.

2.04 TEMPORARY FENCING

- A. Provide and maintain for the duration of construction a temporary safety barricade of design and type needed to prevent entry onto the work by the public.

PART 3 - EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the work.
- B. Remove such temporary facilities and controls as rapidly as progress of the work will permit, or as directed by the Owner's Representative.

END OF SECTION

**SECTION 01510
SITE ACCESS**

PART 1 - GENERAL

1.01 REQUIREMENTS

- A. Work included: this information applies to situations in which a Contractor or his representatives including, but not limited to, suppliers, subcontractors, employees and field engineers enter upon The Project property.
- B. Related work:
 - Section 02000: Site Work.
 - Section 02070: Selective Demolition.
 - Section 02100: Site Preparation.
 - Section 02220: Excavating, Backfilling & Compacting.

1.02 QUALITY ASSURANCE

- A. Upon approval by Owner for access, notify all pertinent personnel regarding requirements of this information.
- B. Require that all personnel who will enter upon property certify their awareness of and familiarity with the requirements of the Owner.
- C. Tree protection in accordance with Section 02100.

1.03 SUBMITTALS

- A. Maintain an accurate record of the names and identification of all persons entering upon Park property and permit periodic review of record by Owner and/or Owner's Representative.
- B. Pre-construction photographs per Paragraph 1.07.

1.04 TRANSPORTATION FACILITIES

- A. Vehicle and equipment access:
 - 1. Provide protection for curbs, sidewalks, roads, parking, utilities and amenities over which trucks and equipment pass to reach work areas.

Contractor's vehicles:

Limit the access of vehicles belonging to employees and all other vehicles entering upon Park property to use only the access route shown on the drawings.

Do not permit vehicles to park on any other area of the property except in the areas so designated at the pre-construction meeting.

1.05 NOTIFICATION BY CONTRACTOR

- A. The Contractor shall notify the Owner, in writing, two weeks in advance of any proposed construction activity on Owner's property. Said notice does not constitute authority to proceed with work in the Park. Official notice of approval will be at the discretion of the Owner.

1.06 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE

- A. The Contractor shall be responsible for the preservation of all property and shall protect carefully from disturbance or damage all said property witnessed or otherwise referenced their location and shall not move any item until directed.
- B. The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the work, or at any time due to defective work or materials.
- C. The Contractor shall consult with the Owner regarding his work activities and shall install any and all barriers, warning signs, fencing, property protection, access control or other devices to the satisfaction of the Owner and needed to provide for public safety and protection of Property.
- D. When or where any direct or indirect damage or injury is done to property by or on account of any act, omission, neglect, or misconduct in the execution of the work or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring as may be directed by the Owner or he shall make good such damage or injury in an acceptable manner to the Owner.
- E. Tree protection in accordance with Section 02100.
- F. The contractor will work out a mutually acceptable plan with the Owner to provide access to the existing tennis courts and existing parking lot to accommodate league play.

1.07 PRE-CONSTRUCTION PHOTOGRAPHS OR VIDEO

- A. The Contractor shall provide digital photographs or video tapes of the specified work area one day prior to any work starting, but after appropriate construction staking and protection.
- B. Photographs shall be 3" x 5" color prints with information on the back of each print as follows: Show the job name, location of photograph, date of photograph and photographer's name, address and photograph number.

- C. Photographs shall be from a minimum of twenty-four (24) diversified overall views of the work area and of any pertinent Park property within construction limits. Additional photos may be required in unusual or extremely large sites.
- D. Each photograph shall be clear, in focus, with high resolution and sharpness and with minimum distortion.

1.08 CLEANING

- A. Progress cleaning:
 - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, packaging and shipping material. Remove such items from premises weekly.
 - 2. Weekly, and more often if necessary, inspect all materials stored on site, re-stack, tidy, or otherwise arrange in safe condition.
- B. Final cleaning:
 - 1. Completely remove resultant construction debris, particularly any loose rock or stone imported or uncovered during construction.
 - 2. Broom clean paved areas on site.
 - 3. Mow grass areas as directed which had not been under normal maintenance.
 - 4. Repair any areas of turfing that have been damaged by construction operations in accordance with Section 02934 Sodding.
 - 5. Alleviate compacted turf areas if access has been over turf, but no turf has to be placed. Compaction should be alleviated by a coring implement with 6" O.C. minimum coverage of 3" deep. Drag cores until leveled.
 - 6. Often when fences are erected for protection, holes are left when fence posts are pulled. Holes should be filled with appropriate top soil and settled with water to grade.

1.09 RECORD DOCUMENTS

- A. Submit to Owner a complete record drawing clearly indicating all work both concealed and visible.
- B. Information shall be tied to base line control data of the Owner and so noted on the Owner's field books.

1.10 FINAL APPROVAL

- A. Upon the completion of all work a final inspection must be made by the Owner to determine whether the work has been completed in accordance with the contract, plans and/or specifications.

- B. When the work has been so completed the Owner will provide certification of same and forward to appropriate contracting authorities.
- C. Acceptance by Owner shall not restrict or prohibit the rights provided for in regard to latent defects, frauds or such gross mistakes as may amount to fraud or as regards the rights under any warranty guarantee.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

**SECTION 01700
CONTRACT CLOSEOUT**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide an orderly and efficient transfer of the completed work to the Owner.
- B. Related work:
 - 1. Proposal and contract documents.

1.02 QUALITY ASSURANCE

- A. Prior to requesting inspection by the Owner's Representative, use adequate means to assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.03 PROCEDURES

- A. Substantial Completion:
 - 1. Contractor:
 - a. Submit written certification through Owner's Representative to the Owner that project is substantially complete in accordance with the construction contract.
 - b. Submit list of major items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the contractor to complete all work in accordance with the contract documents.
 - 2. Owner's Representative will make an inspection within seven (7) days after receipt of certification together with the Owner.
 - 3. Should Owner's Representative consider that work is substantially complete in accordance with the construction contract:
 - a. Contractor shall prepare a punch list of items to be completed or corrected as determined by the inspection.
 - b. The Owner will prepare a Certificate of Substantial Completion for the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate. The Certificate of Substantial Completion shall contain the following:
 - (1) Date of Substantial Completion;
 - (2) Punch list of items to be completed or corrected.
 - (3) The time within which Contractor shall complete or correct work of listed items.
 - (4) Date and time Owner will assume possession of work or designated portion thereof.

- c. Contractor shall:
 - (1) Complete work listed for completion or correction within the designated time.
 - (2) Refer to Construction Contract for post substantial completion requirements.
 - 4. Should Owner's Representative consider that work is not substantially completed:
 - a. He shall immediately notify Contractor in writing stating reasons.
 - b. Contractor: Complete work and send second written notice through Owner's Representative to Owner certifying that the project is substantially complete.
 - c. Owner's Representative will re-inspect work.
- B. Final Completion:**
- 1. Contractor shall submit written certification that:
 - a. Contract documents have been reviewed;
 - b. Project has been inspected for compliance with contract documents.
 - c. Work has been completed in accordance with the construction contract.
 - d. Equipment and systems have been tested in presence of Owner and are operational.
 - (1) Equipment and systems shall be operated in a normal mode for a minimum period of three (3) weeks prior to final inspection.
 - e. Owner's personnel have been instructed in operation of all systems, mechanical, electrical and other equipment.
 - f. Project is completed, ready for final inspection.
 - 2. Owner's Representative will make final inspection within seven (7) days after receipt of certification.
 - 3. Should Owner's Representative consider that work is finally complete in accordance with contract documents, contractor shall submit final Application for Payment.
 - 4. Should Owner's Representative consider that work is not finally complete:
 - a. He shall notify contractor, in writing, stating reasons.
 - b. Contractor shall take immediate steps to remedy the stated deficiencies and send second written notice through Owner's Representative to Owner certifying that work is complete.
 - c. Owner's Representative will re-inspect work.

1.04 REINSPECTION COSTS

- A. Should Owner's Representative be required to perform more than two (2) inspections for project substantial completion and project final completion, respectively because of failure of work to comply with original certifications of contractor, the contractor will compensate Owner's Representative for additional services to include time and reimbursable expenses incurred by the Owner's Representative and his consultants. This amount will be deducted from final payment to the Contractor.

1.05 RETURN OF CONTRACT DOCUMENTS

- A. Return of Drawings: Drawings, details, sketches and specifications are property of Owner, and are issued to contractor as instruments of service only. If required, contractor shall return same to Owner.

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

Not used

END OF SECTION

**SECTION 01720
PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included:
 - 1. Throughout progress of the work, maintain an accurate record of changes in the Contract Documents as described in Article 3.01 below.
 - 2. Upon completion of the work, transfer the recorded changes to a set of Record Documents, as described in Article 3.02 below.
- B. Related work:
 - 1. Proposal and contract documents.
 - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Owner's Representative.
- B. Accuracy of records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.
- C. Make entries within 24 hours after receipt of information that the change has occurred.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. The Owner's Representative's approval of the current status of Project Record Documents may be a prerequisite to the Owner's Representative approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting each request for progress payment, secure the Owner's Representative's approval of the current status of the Project Record Documents.

- D. Prior to submitting request for final payment, submit the final Project Record Documents to the Owner's Representative and secure his approval.

1.04 PRODUCT HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the work and transfer all recorded data to the final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Owner's Representative's approval.
 - 1. Such means shall include, if necessary in the opinion of the Owner's Representative, removal and replacement of concealing materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 - PRODUCTS

2.01 RECORD DOCUMENTS

- A. Job set: Promptly following receipt of the Owner Notice to Proceed, secure from the Owner's Representative at no charge to the Contractor one complete set of all Documents comprising the Contract.
- B. Final Record Documents: At the time of completion of the work, deliver all job as-built plans to the Owner's Representative clearly marked and legible.

PART 3 - EXECUTION

3.01 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.01 above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET."
- B. Preservation:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Owner's Representative.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Owner's Representative until start of transfer of data to final Project Record Documents.
 - 3. Maintain the job set at the site of work as that site is designated by the Owner's Representative.

- C. Making entries on Drawings:
 - 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
 - 2. Date all entries.
 - 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
 - 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Owner's Representative.
- E. Conversion of schematic layouts:
 - 1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts and similar items is shown schematically and is not intended to portray precise physical layout.
 - a. Final physical arrangement is determined by the Contractor, subject to the Owner's Representative's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
 - 2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.01 E. 1. above.
 - a. Clearly identify the item by accurate note such as "cast iron drain", "galv. water" and the like.
 - b. Show, by symbol note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed" and the like).
 - c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
 - 3. The Owner's Representative may, subject to Owner approval, waive the requirements for conversion of schematic layouts where, in the Owner's Representative's judgement, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Owner.

3.02 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the work, both concealed and visible, to enable future modification of the work to proceed without lengthy and expensive site measurement, investigation and examination.
- B. Approval of recorded data prior to transfer:

1. Secure the Owner's Representative's approval that all recorded data is clearly marked and legible.
 2. Make required revisions requested by the Owner's Representative.
- C. Transfer of data to other Documents:
1. If the Documents other than Drawings have been kept clean during progress of the work, and if entries thereon have been orderly to the approval of the Owner's Representative, the job set of those Documents other than Drawings will be accepted as final Record Documents.
 2. If any such Document is not so approved by the Owner's Representative, secure a new copy of that Document from the Owner's Representative at the Owner's Representative's usual charge for reproduction and handling and carefully transfer the change data to the new copy to the approval of the Owner's Representative.
- D. Review and submittal:
1. Submit the completed set of Project Record Documents to the Owner's Representative.
 2. Participate in review meetings as required.
- E. Final Record Documents: At the time of completion of the work, deliver all job as-built plans to the Owner's Representative clearly marked and legible. The Owner's Representative will transfer the contractor's information electronically to the original contract documents.
1. The Contractor is responsible for the accuracy of all information contained within the Record Documents. The Owner's Representative is not responsible for the accuracy of the information and is responsible only for entering the information into the original Construction Documents.
 2. The Owner's Representative will be responsible for delivering the final Record Documents to the Owner.

END OF SECTION

**SECTION 01730
OPERATION AND MAINTENANCE DATA**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: To aid the continued instruction of operating and maintenance personnel and to provide a positive source of information regarding the products incorporated into the work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.
- B. Related work:
 - 1. Proposal and construction documents.
 - 2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section and skilled in technical writing to the extent needed for communicating the essential data.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Submit two copies of a preliminary draft of the proposed Manual or Manuals to the Owner's Representative for review and comments.
- C. Unless otherwise directed in other Sections, or in writing by the Owner's Representative, submit four copies of the final Manual to the Owner's Representative prior to indoctrination of operation and maintenance personnel.

PART 2 - PRODUCTS

2.01 INSTRUCTION MANUALS

- A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format:
 - 1. Size: 8-1/2" x 11".
 - 2. Paper: White bond, at least 20 lb. Wt.
 - 3. Text: Neatly written or printed.

4. Drawings: 11' in height; bind in with text; foldout acceptable, not to exceed 11x17".
 5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
 6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to Owner's Representative's approval.
 7. Measurements: Provide all measurements in U.S. standard units such as feet and inches, lbs, and cfm.
- C. Provide front and back covers for each Manual, using durable material approved by the Owner's Representative and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS

Name and address of work
Name of Contractor
General Subject of this Manual

Owner's Representative

- D. Contents: Include at least the following:
1. Neatly typewritten index near the front of the Manual.
 2. For architectural products, applied materials and finishes:
 - a. Manufacturer's data, giving full information on finishes:
 - (1) Catalog number, size, composition.
 - (2) Color and texture designations.
 - (3) Information required for reordering special manufactured products.
 - b. Instructions for care and maintenance:
 - (1) Manufacturer's recommendations for types of cleaning agents and methods.
 - (2) Cautions against cleaning agents and method which are detrimental to product.
 - (3) Recommended schedule for cleaning and maintenance.
 - c. All approved submittals.
 3. For moisture protection and weather exposed products:
 - a. Manufacturer's data, giving full information on products:
 - (1) Applicable standards.
 - (2) Chemical composition.
 - (3) Details of installation.
 - b. Instructions for inspection, maintenance and repair.
 - c. All approved submittals.
 4. For each electric and electronic system and mechanical system as appropriate:

- a. Description of system and component parts. Function, normal operating characteristics and limiting conditions. Complete nomenclature and commercial number of replaceable parts.
 - b. Circuit directories of panel boards: Electrical service, controls and communications.
 - c. Operating procedures: Routine and normal operating instructions, sequences required and special operating instructions.
 - d. Maintenance procedures: Routine operations, guide to "trouble-shooting", disassembly, repair and re-assembly and adjustment and checking.
 - e. Manufacturer's printed operating and maintenance instructions.
 - f. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
 - g. Other data as required under pertinent sections of specifications.
 - h. All approved submittals.
5. Certificate of substantial completion.
 6. Master list of extended warranty items.

PART 3 - EXECUTION

3.01 INSTRUCTION MANUALS

- A. Preliminary:
 1. Prepare a preliminary draft of each proposed Manual.
 2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.
 3. Secure the Owner's Representative's approval prior to proceeding.
- B. Final:
 1. Complete the Manuals in strict accordance with the approved preliminary drafts and the Owner's Representative's review comments.
- C. Revisions:
 1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Owner's Representative.

END OF SECTION

**SECTION 02000
SITE WORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. These general site work requirements apply to all site work operations. Refer to Division 2 specification sections for specific general, product and execution requirements.
- B. Related work:
 - Section 01510: Site Access.
 - Section 02070: Selective Demolition.
 - Section 02100: Site Preparation.
 - Section 02220: Excavating, Backfilling and Compacting.

1.02 QUALITY ASSURANCE

- A. Comply with all applicable local, state and federal requirements regarding materials, methods of work and disposal of excess and waste materials.

1.03 PROJECT CONDITIONS

- A. Locate and identify existing underground and overhead services and utilities within contract limit work areas. Provide adequate means of protection of utilities and services designated to remain. Repair utilities damaged during site work operations at Contractor's expense.
- B. Arrange for disconnection, disconnect and seal or cap all utilities and services designated to be removed before start of site work operations. Perform all work in accordance with the requirements of the applicable utility company or agency involved.
- C. When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation. If the services are Owner maintained, notify Owner's Representative immediately.
- D. Locate, protect and maintain bench marks, monuments, control points and project engineering reference points. Re-establish disturbed or destroyed items at Contractor's expense.
- E. Perform site work operations and the removal of debris and waste materials to assure minimum interference with streets, walks and other adjacent facilities.

- F. Give the owner 24 hour advanced notice to close or obstruct street, walks and adjacent facilities. Provide alternate routes around closed or obstructed traffic ways.
- G. Control dust caused by the work. Dampen surfaces as required. Comply with pollution control regulations of governing authorities.
- H. Protect existing buildings, paving and other services or facilities on site and adjacent to the site from damage caused by site work operations. Cost of repair and restoration of damaged items at Contractor's expense.
- I. Protect and maintain street lights, utility poles and services, traffic signal control boxes, curb boxes, valves and other services, except items designated for removal. Remove or coordinate the removal of traffic signs, parking meters and postal mail boxes with the applicable governmental agency. Provide for temporary relocation when required to maintain facilities and services in operation during construction work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which site work is performed. Do not proceed with the work until unsatisfactory conditions are corrected.
- B. Consult the records and drawings of adjacent work and of existing services and utilities which may affect site work operations.

END OF SECTION

**SECTION 02070
SELECTIVE DEMOLITION**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Carefully demolish and remove from the site those items scheduled to be demolished and removed.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to Proposal and Contract Documents and Sections in Division 1 of these Specifications.
 - 2. Section 01510: Site Access.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. By careful study of the Contract Documents, determine the location and extent of selective demolition to be performed.
- B. Visit the site and verify the extent and location of selective demolition required.
 - 1. Carefully identify limits of selective demolition.
 - 2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
- C. Prepare and follow an organized plan for demolition and removal of items.
 - 1. Shut off, cap and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.
 - 2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid and ready to receive new materials specified elsewhere.

**SECTION 02070
SELECTIVE DEMOLITION**

- 3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.
- D. Demolished material shall be considered to be property of the Contractor and shall be completely removed from the job site unless otherwise specified.
- E. Use means necessary to prevent dust becoming a nuisance to the public, to neighborhoods and to other work being performed on or near the site.

3.02 REPLACEMENTS

- A. In the event of demolition of items not so scheduled to be demolished, promptly replace such items to the approval of the Owner at no additional cost to the Owner.

END OF SECTION

**SECTION 02100
SITE PREPARATION**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Perform site preparation work as shown and specified. The work includes:
 - 1. Protecting existing trees to remain.
 - 2. Removing trees and other vegetation.
 - 3. Removing designated site improvements.
- B. Related work:
Section 01510: Site Access.

1.02 QUALITY ASSURANCE

- A. Comply with Section 02000 Site Work requirements.
- B. Notify all contractor employees and subcontractors of provisions of this Section.
- C. Council of Tree and Landscape Appraisers

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials and equipment: As selected by the contractor except as noted.
- B. Tree protection:
 - 1. Wood fencing, snow fencing.

PART 3 - EXECUTION

3.01 TREE PROTECTION

- A. Protect existing trees scheduled to remain against injury or damage, including cutting, breaking or skinning of roots, trunks or branches; smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.
 - 1. Protect designated trees with temporary wood or vinyl snow fence enclosure. Provide a minimum 12'-0" radius from center of tree trunk. Increase enclosure size as directed for large trees up to and including the drip line.

2. Erect temporary fencing before commencing site preparation work. Maintain fencing during full construction period. Remove temporary fencing when acceptable to Owner's Representative.
4. Repair trees scheduled to remain and damaged by construction operations in a manner acceptable to the Owner's Representative. Repair damaged trees promptly to prevent progressive deterioration caused by damage.
5. Replace trees scheduled to remain and damaged beyond repair by construction operations as determined by the Owner's Representative with trees of similar size and species of equal dollar value. Cost for tree replacement shall be determined in accordance with the "Guide for Establishing The Value of Trees and Other Plants", published by the Council of Tree and Landscape Appraisers.
6. Tree replacement as required by paragraph 5 shall be in accordance with Specification Section 02900 Trees, Plants and Ground Covers.
7. Replacement of trees scheduled to remain and damaged by construction operations during construction operations, and securing an opinion as to the tree or plant's health and its value, shall be at contractor's expense.
8. Tree loss appraisal shall be in accordance with the "Guide for Establishing the Values of Trees and Other Plants", by the Council of Tree and Landscape Appraisers.

3.02 CLEARING

- A. Locate and suitably identify trees and improvements indicated to remain.
- B. Clear and grub areas within contract limits as required for site and execution of the work.
- C. Remove trees as designated on the plans with the approval of the Owner's Representative.

3.03 STRIPPING TOPSOIL

- A. Strip topsoil to its full depth at all areas to be re-graded, resurfaced or paved within contract limit work area.
- B. Stockpile topsoil in a location acceptable to the Owner's Representative for use in finish grading and preparation of lawns and planting beds.
 1. Grade and slope stockpiles for proper drainage and to prevent erosion.
 2. No topsoil shall be removed from the site.
- C. Protect all areas which are not to be resurfaced or re-graded and adjacent areas outside of the contract limits from damage due to site preparation work.

3.04 SITE IMPROVEMENTS

- A. Existing Utilities
 - 1. Information on the drawings relating to existing utility lines and services is from the best sources presently available. All such information is furnished only for information and is not guaranteed. Excavate test pits as required to determine exact locations of existing utilities.
 - 2. Call Okie for utility staking not County owned.
 - 3. Call Owner's Representative to coordinate County maintained utility staking.

3.05 DISPOSAL OF WASTE MATERIALS

- A. Stockpile, haul from site and legally dispose of waste materials and debris. Accumulation is not permitted.
- B. Maintain disposal routes clear, clean and free of debris.
- C. On-site burning of combustible cleared materials is allowed with proper permit and burn pit.

3.06 CLEANING

- A. Upon completion of site preparation work, clean area within contract limits, remove tools and equipment. Provide site clear, clean and free of materials and debris and suitable for site work operations.

END OF SECTION

**SECTION 02211
ROUGH GRADING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal and stockpiling of topsoil and subsoil.
- B. Cutting, grading, filling and rough contouring the site.

1.02 RELATED SECTIONS

- A. Section 021010 - Site Preparation.
- B. Section 02220 - Excavating, Backfilling & Compaction.
- C. Section 02265 - Finish Grading: Finish grading with topsoil to contours.

1.03 REFERENCES

- A. Relations of soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- B. ANSI/ASTM D 1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 inch Drop.

1.04 PROJECT RECORDS DOCUMENTS

- A. Submit under provisions of section 01700.
- B. Accurately record actual locations of utilities remaining, by horizontal dimensions, elevations or inverts, and slopes gradients.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

- A. Off-Site Fill: Off-site fill shall be material with plasticity index less than 18 and shall contain at least 15% fines (material passing #200 sieve.)

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify site conditions.
- B. Verify that survey benchmark and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known underground, above ground, and aerial utilities. Stake and flag locations.
- C. Notify utility company as necessary to remove and relocate utilities.
- D. Protect above and below grade utilities which are to remain.
- E. Protect plant life, lawns, rock outcropping and other features remaining as portion of final landscaping.
- F. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.03 TOPSOIL EXCAVATION

- A. Excavate topsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Stockpile in area designated on site. Remove excess topsoil not being reused, from site.
- C. Do not excavate wet topsoil.
- D. Stockpile to depth not exceeding 8 feet. Cover to protect from erosion.

3.04 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Stockpile in area designated on site. Remove excess subsoil not being reused, from site.
- C. Do not excavate wet subsoil.
- D. Stockpile subsoil to depth not exceeding 8 feet. Cover to protect from erosion.
- E. When excavation through roots is necessary, perform work by hand and cut roots with sharp axe.

3.05 FILLING

- A. Fill areas to contours and elevations with unfrozen materials
- B. Granular Fill: Place and compact materials in continuous layers not exceeding 8 inches compacted depth, compacted to 95 percent.
- C. Subsoil and Topsoil Fill: Place and compact material in continuous layers not exceeding 9 inches compacted depth compacted to 95 percent.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.
- F. Make grade changes gradual. Blend slope into level areas.
- G. Remove surplus fill materials from site.

3.06 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot.

3.07 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01410.
- B. Tests and analysis of fill materials will be performed in accordance with ANSI/ASTM D698 D1557 and with Section 01410.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D968 and with Section 01410.
- D. If test indicate Work does not meet specified requirements, remove work, replace and retest at no cost to owner.
- E. Frequency of Test: 50 feet on center.

END OF SECTION

**SECTION 02220
EARTHWORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Excavate, backfill, compact and grade the site to the elevations shown on the drawings as specified herein and as needed to meet the requirements of the construction shown in the Contract Documents.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Proposal and Contract Documents and Sections in Division 1 of these Specifications.
 - 2. Section 01510: Site Access.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity and numbers to accomplish the work of this Section in a timely manner.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

- A. Fill and backfill materials:
 - 1. Provide soil materials free from organic matter and deleterious substances, containing no rocks or lumps over 6" in greatest dimension and with not more than 15% of the rocks or lumps larger than 2-1/2" in their greatest dimension.
 - 2. Fill material is subject to the approval of the Owner's Representative and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from roots and other deleterious matter.
 - 3. Do not permit rocks having a dimension greater than 1" in the upper 12" of fill or embankment.
 - 4. Where fill material is required to build up a building pad and/or under building slabs, provide select low PI material. Select fill material used should be free of organic or other deleterious matters, have a maximum particle size of three (3) inches, and have a liquid limit less than thirty-five (35) and a plasticity index between six (6) and twelve (12) and consist of sandy clays or clayey sands.

5. Where granular base is called for under building slabs, provide aggregate complying with requirements of Section 03300 of these Specifications.

2.02 TOPSOIL

- A. Where shown on the drawings or otherwise required, provide topsoil consisting of friable fertile soil of loamy character containing a minimum of 2% decayed organic matter (humus) normal to the region, capable of sustaining healthy plant life and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than 1" in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter.
- B. Obtain topsoil from sources within the project limits or provide imported topsoil obtained from sources outside the project limits or from both sources.

2.03 OTHER MATERIALS

- A. Provide other materials not specifically described but required for complete and proper installation as selected by the Contractor subject to the approval of the Owner's Representative.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Utilities: Refer to Section 2000 Site Work.
- B. Protection of persons and property:
 1. Barricade open holes and depressions occurring as part of the work and post warning lights on property adjacent to or with public access.
 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, washout and other hazards created by operations under this Section.
- C. De-watering:
 1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains and other approved methods.
 2. Keep excavations and site construction area free from water.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.
- E. Maintain access to adjacent areas at all times.

3.02 EXCAVATING

- A. Perform unclassified excavating of every type of material encountered within the limits of the work to the lines, grades and elevations indicated and specified herein.
- B. Excavation of rock:
 - 1. Where rocks, boulders, or similar material is encountered and where such material cannot be removed or excavated by conventional earth moving or ripping equipment, take required steps to proceed with the general grading operations of the work and remove or excavate such material by means which will neither cause additional cost to the Owner nor endanger buildings or structures whether on or off the site.
 - 2. Do not use explosives without written permission from the Owner's Representative.
 - 3. The definition of "Rock Excavation" will apply as stated in the "Standard Specifications for Highway Construction", Oklahoma Department of Transportation, edition of 1988 or latest revision.
- C. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.
- D. Borrow:
 - 1. Obtain material required for fill or embankment in excess of that produced within the grading limits of the work from borrow areas selected and paid for by the Contractor and approved by the Owner's Representative.
 - 2. Grade borrow areas upon completion to provide complete surface drainage and to blend with surrounding contours.
 - 3. Contractor is required to excavate sufficient material to construct contours and features as per plans. Payment of all excavation will be paid as a lump sum.
- E. Surplus material:
 - 1. Owner's Representative will direct contractor in the placement of surplus excavated material.
 - 2. Surplus material will be used on the project or stored on site at a location approved by the Owner's Representative.
- F. Swales, ditches and gutters:
 - 1. Cut accurately to the cross sections, grades and elevations shown on the grading plans.
 - 2. Maintain excavations free from detrimental quantities of leaves, sticks, trash and other debris until completion of the work.
 - 3. Swales and ditches shall be smooth in nature to accommodate standard mowing practices and equipment.
- G. Unauthorized excavation:
 - 1. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimensions without specific instruction from the Owner's Representative.
 - 2. Under footings, foundations or retaining walls:

- a. Fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the excavation bottom without altering the required top elevation.
 - b. When acceptable to the Owner's Representative, lean concrete fill may be used to bring the bottom elevation to proper position.
 3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Owner's Representative.
- H. Stability of excavations:
 1. Slope sides of excavations to 1:1 or flatter, unless otherwise directed by the Owner's Representative.
 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
 3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- I. Excavating for structures:
 1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required and for inspection.
 2. In excavating for footings and foundations, take care not to disturb bottom of excavation:
 - a. Excavate by hand tools to final grade just before concrete is placed.
 - b. Trim bottoms to required lines and grades to leave solid base to receive concrete.
 3. Excavate for footings and foundations only after general site excavating, filling and grading are complete.
- J. Cold weather protection:
 1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.
- K. Excavating for detention ponds:
 1. The exposed sub-grade of pond areas shall be scarified to a minimum depth of 8 inches. Before compaction, the scarified soils shall be adjusted to within a moisture content range of plus or minus 2 percent of optimum moisture content.

3.03 FILLING AND BACKFILLING

- A. General:
 1. For each classification listed below, place acceptable soil material in layers to required sub-grade elevations.

2. In excavations:
 - a. Use satisfactory excavated or borrow material.
 3. Building pads and/or under building slabs:
 - a. Provide Select low PI material to build up building pad and slab to elevations called out on the drawings. If the material on site is not suitable, the select material will need to be imported from off site.
 - b. Use granular fill, if so called for on the drawings or soils report, complying with aggregate acceptable under Section 03300 of these Specifications.
- B. Ground surface preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions and deleterious matter from ground surface prior to placement of fills.
 2. Plow, strip or break up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.
 3. When existing ground surface has a density less than that specified under "compacting" for the particular area, break up the ground surface, pulverize, moisture-condition to the optimum moisture content and compact to required depth and percentage of maximum density.
- C. Placing and compacting:
1. Place backfill and fill materials in layers not more than 8" in loose depth.
 2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
 3. Compact each layer to required percentage of maximum density for area. Compact per paragraph 3.05 A., B. and C. this Section.
 4. Do not place backfill or fill material on surfaces that are muddy, frozen or containing frost or ice.
 5. Place backfill and fill materials evenly adjacent to structure's required elevations.
 6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.

3.04 GRADING

- A. General:
1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
 2. Smooth the finished surface within specified tolerance.
 3. Compact with uniform levels or slopes between points where elevations are shown on the drawings or between such points and existing grades.

4. Where a change of slope is indicated on the drawings, construct a rolled transition section having a minimum radius of approximately 8'-0" unless adjacent construction will not permit such a transition or if such a transition defeats positive control of drainage.
- B. Grading outside building lines:
1. Grade adjacent to buildings to achieve drainage away from the structures and to prevent ponding.
 2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade and cross-section with finished surface not more than 0.10 ft above or below the required sub-grade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade and cross-section, with finished surface not more than 0.05 ft above or below the required sub-grade elevation.

3.05 COMPACTING

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557. All areas are to achieve a 95% proctor density minimum, and an 85% proctor density for the final lift in sod and planting areas only.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place and/or as specified by the Soil Engineer's report.
1. Structures:
 - a. Compact the top 8" of sub-grade and each layer of fill material or backfill material at 98% of maximum density unless otherwise called out in the plans or soils report.
 2. Lawn and unpaved areas:
 - a. Compact the top 8" of sub-grade at 85% of maximum density, all other layers of fill material or backfill material are to be 95% of maximum density. The top 8" of sub-grade in lawn areas is not to exceed 90% of maximum density.
 3. Walks
 - a. Compact the top 8" of sub-grade and each layer of fill material or backfill material at 95% of maximum density unless otherwise called out in the plans or soils report.
 4. Pavements:
 - a. Compact the top 8" of sub-grade and each layer of fill material or backfill material at 95% of maximum density unless otherwise called out in the plans or soils report.
- C. Moisture control:

1. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the Owner's Representative.

3.06 TREATED SUBGRADE

- A. All parking lot pavement sub-grade shall be treated in accordance the plans and Engineers Soils Report.

3.07 FIELD QUALITY CONTROL

- A. Secure Owner's Representative's inspection and approval of sub-grades and fill layers before subsequent construction is permitted thereon.
- B. Provide at least the following tests to the approval of the Owner's Representative.
 1. At paved areas, a minimum of one field density test for every 7,500 square feet, but a minimum of three tests for all areas or as requested by the Owner's Representative. Testing to be paid for by the City.
 2. At lawn and unpaved areas, at least one field density test for every 20,000 square feet, but a minimum of three test for all areas or as requested by the Owner's Representative. Testing to be paid for by the City.
 3. Sub-grade shall be checked for stability even though it may meet the compaction requirements. The check for stability shall be proof rolling with a large roller or loaded dump truck and visual observation to insure that there is no pumping of the sub-grade.
- C. If, in the Owner's Representative's opinion based on reports of the testing laboratory, sub-grade or fills which have been placed are below specified density, provide additional compacting and testing under the provisions of Section 01410 of these Specifications. Re-testing of areas that failed and have to be re-tested to be paid for by the contractor.

3.08 MAINTENANCE

- A. Protection of newly graded areas:
 1. Protect newly graded areas from traffic and erosion and keep free from trash and weeds.
 2. Repair and reestablish grades in settled, eroded and rutted areas to the specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact to the required density prior to further construction.

3.09 CERTIFICATION

- A. Upon completion of this portion of the work and as a condition of its acceptance, deliver to the Owner's Representative a written report certifying that the compaction requirements have been obtained. State in the report the area or fill or embankment, the compaction density obtained and the type or classification of fill material placed.

END OF SECTION

**SECTION 02265
FINISH GRADING**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Finish grade subsoil.
- B. Place, level, and compact topsoil.

1.02 RELATED WORK

- A. Section 02211 - Rough grading subsoil to site contours.
- B. Section 03300 – Cast In Place Concrete

1.03 PROTECTION

- A. Protect landscaping and other features remaining as final work.
- B. Protect existing structures, fences, sidewalks, paving and curbs.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: Imported, see Section 02220 – Excavating, Backfilling and Compaction; and 02934 – Sodding.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify site conditions and note irregularities affecting work of this Section.
- B. Beginning work of this Section means acceptance of existing conditions.

3.02 SUBSOIL PREPARATION

- A. Eliminate uneven areas and low spots. Remove debris, roots, branches, and stones, in excess of ½ inch in size. Remove subsoil contaminated with petroleum products.

3.03 PLACING TOPSOIL

SECTION 02265
FINISH GRADING

- A. Place topsoil in areas where earth or no other building or paving is scheduled on the drawings.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.
- D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- E. Manually spread topsoil around trees, plants, building, and concrete curbs to prevent damage.
- F. Remove surplus subsoil and topsoil from site.
- G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 TOLERANCES

- A. Top of Topsoil: Plus or minus 1/10 ft.

END OF SECTION

SECTION 02790
DOG SPECIFIC SYNTHETIC GRASS OUTDOOR SURFACE

1.1 DESCRIPTION OF WORK

The contractor shall provide all labor, materials, equipment, and tools necessary for the complete installation of a “no infill” synthetic grass dog surface with a stable draining base. The complete synthetic grass system shall consist of, but not necessarily be limited to the following:

- A. Area of construction with the extent of artificial turf work as shown on the drawings.
- B. Subgrade, base, and drainage construction as specified in Section 2 and Section 3 of this document.
- C. Quality synthetic grass product manufactured in the USA according to specifications in Section 2 of this document. Product shall be a knitted synthetic grass product (not tufted) and contain an antimicrobial agent while meeting or exceeding all guidelines as established herein. For characteristics not specifically stated, they shall meet or exceed all guidelines published by the Synthetic Turf Council.
- D. The synthetic grass surface shall be specifically designed, manufactured, and installed for the intended use as a commercial/high use dog surfacing solution.
- E. Plastic perimeter boards (“2x4” or “2x2” set vertically) are to surround the entire area for anchoring of the turf. The top edge of this surface is to be a minimum of 1/2” below any adjacent solid walking surfaces where there could be foot traffic.
- F. Stainless steel staples, 1” in length, are to be used to anchor the synthetic turf to the perimeter boards.

1.2 SYSTEM PERFORMANCE

Contractor shall ensure that products for pet/dog system meet the following performance requirements:

- A. The components, as well as the installation methods utilized, shall be designed and executed in a manner to hold up to the unique challenges dogs present. The materials as herein after specified shall withstand full climatic exposure in the location of the play yard/dog run, be resistant to insect infestation, rot, fungus, mold and mildew, shall also withstand ultra-violet rays, and allow the free flow of water vertically through the surface and into the drainage below.

- B. The seams of all system components shall provide a permanent, tight, secure, and hazard free surface.
- C. The installed synthetic grass and drainage system shall allow for drainage and water flow through the system at a rate of not less than 800" per hour.

1.3 SERVICE AND QUALITY ASSURANCE

Synthetic grass vendor shall provide ongoing service, quality assurance, and warranty, consisting of, but not necessarily be limited to, the following:

- A. The synthetic grass vendor must provide competent workmen skilled in this type of dog surface installation. The synthetic grass vendor shall provide a qualified installation foreman to coordinate and review the component parts of the synthetic grass system. Foreman shall be introduced to owner or owner's representative prior to start of construction.
- B. The synthetic grass vendor and installer must be experienced with no less than six completed commercial dog installations (2500 sf or greater) where a knitted synthetic grass surface was installed. Installer must be competent in the installation of this material, including attachment of seams, proper trimming, and attaching techniques, prior to the start of turf installation.
- C. The synthetic grass vendor shall submit its manufacturer's warranty, which warrants the synthetic grass product:
 - 1. Provide coverage of synthetic grass for a minimum of fifteen (15) years from the date of substantial completion.
 - 2. Warrant that the materials installed meet or exceed the product specifications.
 - 3. Be from a single source (certified by manufacturer) covering workmanship and all materials.
 - 4. Assure the availability of exact or substantially the same replacement materials for the synthetic grass system for the full warranty period.
 - 5. Include general wear and damage caused by UV degradation. The warranty may specifically exclude vandalism and Acts of God beyond the control of the manufacturer or installer.

1.4 SUBMITTALS

Synthetic grass vendor must submit the following to owner or owner's representative with the official bid package:

- I. One (1) copy of the most recent installation reference list for projects of similar scope to this project completed in last five years.
- II. One (1) 12"x12" loose sample of proposed synthetic grass product.
- III. One (1) of the product warranty for proposed synthetic grass product.
- IV. One (1) copy of their maintenance instructions. These instructions will include all necessary instructions for the proper care and maintenance of the newly installed synthetic turf system.
- V. One (1) copy of edge details of proposed installation and terminations of synthetic grass system.
- VI. One (1) copy (if requested) of a signed letter from synthetic grass vendor certifying that the proposed synthetic grass product is manufactured in the USA.
- VII. One (1) copy (if requested) of independent laboratory test reports on system or components.
- VIII. Recommend there is drainage/water permeability test of sub-base.

2 PRODUCTS

- A. Synthetic grass: ForeverLawn K9Grass Classic +

Pile Weight: 65 oz. /sy.

Face Yarn Type: Primary: Polyethylene; Secondary: Heat set textured nylon monofilament containing antimicrobial agent

Yarn Count: Primary 5,000/4; Secondary: 4,200/8

Pile Height (knitted): 7/8" (+/- 1/8).

Color: Primary: Summer Green; Secondary: Turf green

Construction: Knitted

Antimicrobial Protection: AlphaSan (manufactured into yarn)

Tufting Gauge: N/A – knitted product

Backing: Flow-through knitted backing

Seaming: Turf adhesive

Total Product Weight: 70 oz. /sy.

Finished Roll Width: 15 ft. (4.6 m)

Finished Roll Length: Up to 150 ft. (45.72 m)

- I. The synthetic grass shall be delivered in 15-foot-wide rolls. The rolls will be laid out and installed as specified in the site layout and equipment placement drawings.
 - II. All seams shall be installed and secured with approved turf adhesive. Seams secured with stitching alone shall not be acceptable.
 - III. No infill material is to be used.
- B. Base and Attaching Components: Base is to be prepared using plastic "2x4" or "2x2" plastic board and secured using 1" length 1/4" crown stainless steel staples. Turf is to be secured around all edges.

3 EXECUTION

3.1 BASE AND DRAINAGE CONSTRUCTION

The synthetic grass base contractor shall strictly adhere to the installation procedures outlined under this section and by the engineer's drawings. Any variance from these requirements must be accepted in writing, by the synthetic grass vendor, and submitted to the owner or owner's representative, verifying that the changes do not adversely affect the performance or warranty.

- A. Excavation: Existing ground cover shall be excavated to the depth established on the excavation plan. The sub-grade shall also be compacted to a recommended 90% compaction rate.
- B. Plastic Nailer Board: The synthetic turf perimeter fastening structure shall be installed before the drainage aggregate.
 - I. Install a synthetic nailer board around perimeter and all penetrating objects. Nailer board shall be flush to grade (or as specified in site detail drawings) when adjacent to soft surface (i.e. natural grass, mulch). Nailer board shall be 1/2" to 3/4" below grade when adjacent to hard walking surface (i.e. concrete or tile).
 - II. This shall be the responsibility of the synthetic turf base contractor. See synthetic turf edge attachment detail.

- C. **Base Drainage Aggregate:** Installation of the free draining base aggregate of 3/8" to 5/8" clean compactable angular stone (any mix with fines in excess of 20% must be approved by manufacturer), shall follow procedures provided. If the sub-base does not permit liquids to freely percolate, auxiliary drainage is required. Base material must be installed to a recommended depth of 3 1/2". The drainage network and its existing elevations shall not be disrupted through ground pressures from trucks, dozers, or by any other means.
 - I. The stone shall be left firm and compacted while allowing the porosity and drainage capabilities of the aggregate profile.
 - II. The free draining base course should be designed to meet local soil and weather conditions. It must be installed to a minimum depth of 3" with a recommended compaction rate of 90%.

3.2 SYNTHETIC GRASS SYSTEM INSTALLATION

After a final inspection of the stone base by the synthetic grass contractor and the owner's representative, the synthetic turf installation shall begin. The synthetic grass product shall be delivered in 15-foot-wide rolls.

- A. Synthetic grass rolls shall be joined via adhesive bond seaming and reinforced with specialty turf adhesive where necessary.
 - I. Seams shall be flat, tight, and permanent with no separation or fraying.
 - II. Grass rolls must be installed with pile leaning the same direction.
- B. **Synthetic Turf Perimeter Attachment:**
 - I. After final layout and seaming of the synthetic grass product, the synthetic turf material shall at a minimum be secured to the top of plastic nailer board firmly anchored to sidewalk, curb, wall, or by rebar making up the perimeter of the synthetic turf area.
 - II. The turf shall be attached to plastic nailer board by stainless steel staples, screws, and/or nails.
 - III. Soil or surfacing material outside of the defined synthetic turf area shall be backfilled against turf wrapped perimeter edge and have zero transition edge to synthetic turf unless otherwise specified.
 - IV. Concrete and solid walking surfaces should be 1/2" to 3/4" higher than the top of the board.

- C. Infill Application: It is imperative that no infill is utilized with synthetic turf used with dogs.

3.3 CLOSEOUT

- A. The synthetic grass vendor must verify that a qualified representative has inspected the installation and that the finished surface conforms to the manufacturer's requirements.
- B. Extra materials: Owner shall be given the option to retain and store excess materials such as excess turf left over from the project.

3.4 CLEAN UP

- A. Contractor shall provide the labor, supplies, and equipment as necessary for final cleaning of surfaces and installed items.
- B. During the contract and at intervals as directed by the owner or owner's representative and as synthetic grass system installation is completed, clear the site of all extraneous materials, rubbish, or debris, and leave the site in a clean, safe, well-draining, neat condition.
- C. Surfaces, recesses, enclosures, etc. shall be cleaned as necessary to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the owner.

END OF SECTION

**SECTION 02810
IRRIGATION SYSTEM**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Codes and Standards:
 - 1. NFPA 70: National Electric Code
 - 2. American Water Works Association (AWWA) for pipe and fitting manufacturer compliance
 - 3. American Society for Testing and Materials International (ASTM) for pipe and fitting manufacturer compliance

1.02 SUMMARY

- A. Section Includes:
 - 1. Piping.
 - 2. Encasement for piping.
 - 3. Manual valves.
 - 4. Pressure-reducing valves.
 - 5. Automatic control valves.
 - 6. Automatic drain valves.
 - 7. Transition fittings.
 - 8. Dielectric fittings.
 - 9. Miscellaneous piping specialties.
 - 10. Sprinklers.
 - 11. Quick couplers.
 - 12. Drip irrigation specialties.
 - 13. Controllers.
 - 14. Boxes for automatic control valves.
 - 15. Booster Pump.
 - 16. Backflow Preventer.
 - 17. Rain/Freeze Sensor
- B. Use equipment adequate in size, capacity and numbers to accomplish the work of this Section in a timely manner.

1.03 DEFINITIONS

- A. Lateral Piping: Downstream from control valves to sprinklers, specialties, and drain valves Piping is under pressure during flow.
- B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.
- C. Main Piping: Downstream from point of connection to water distribution piping

to, and including, control valves. Piping is under water-distribution-system pressure.

- D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50V or for remote-control, signaling power-limited circuits.

1.04 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Location of Sprinklers and Specialties: It is hereby specified that the system shall be complete and fully operational covering 100% of the planted area.
- C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
 - 1. Minimum Pressure at spray heads: 30 psi. Minimum Pressure at rotors: psi. Encasement for piping.
 - 2. Maximum Pressure at spray heads: 40 psi. Maximum Pressure at rotors: 60 psi. Pressure-reducing valves.

1.05 CLOSEOUT SUBMITTALS

- A. As-built Drawings: Document each zone, zone type, and a color coded laminated exhibit (zone guide). The zone guide should be void of minute detail. In addition closeout submittals should include:
 - 1. Controller keys.
 - 2. Controller manual.
 - 3. Quick Coupler key.
 - 4. As-built drawings.1 Electronic copy in .pdf format.
 - 5. Controller schedule.
 - 6. Backflow preventer test certificate.
 - 7. Warranty documents for the irrigation system.
 - 8. Backflow preventer enclosure keys (if existing backflow is relocated outside).

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Contractor shall be Rain Bird "Prequalified Installer" and a Hunter Industries "Preferred Contractor".

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.08 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than two (2) days in advance of proposed interruption of water service.
 - 2. Do not proceed with interruption of water service without Construction Manager's permission.

1.09 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled employees of irrigation Installer. Begin maintenance immediately after each area is planted and continue until not less than the following period:
 - a. Maintain until turnover to Operations. Immediately prior to turnover Construction Manager will perform 'Walk" with installers to ensure overall compliance with plan.

1.10 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace irrigation and accessories that fail in materials or workmanship within specified warranty period of 1 year.

PART 2 - PRODUCTS

2.01 PIPES, TUBES, AND FITTINGS

- A. Comply with requirements for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
- B. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.
 - 1. PVC Socket Fittings: ASTM D 2466, Schedule 40.
 - 2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
 - 3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

2.02 PIPING JOINING MATERIALS

- A. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.03 MANUAL VALVES

- A. Brass Ball Valves:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. NIBCO INC.
 - d. Red-White Valve Corporation.
3. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Forged brass.
 - f. Ends: Threaded.
 - g. Seats: PTFE or TFE.
 - h. Stem: Brass.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.

2.04 PRESSURE-REDUCING VALVES

- A. Water Regulators:
 1. Manufacturer/ Product: Rain Bird PRS Dial – PRS-D or equivalent (if needed).

2.05 AUTOMATIC CONTROL VALVES

- A. Master Valve:
 1. Site is not equipped with master valve
- B. Plastic, Automatic Circuit Control Valves
 1. Manufacturers: Rain Bird PEB Series or equivalent
 2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-Vac solenoid.

2.06 AUTOMATIC DRAIN VALVES

- A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig.

2.07 TRANSITION FITTINGS

- A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined. Provide products compatible with piping, valves, heads and controllers for proposed system which conform to standards of practice.

2.08 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature. Provide products compatible with all piping, valves, heads and controllers for proposed system which conform to industry standards of practice.

2.09 SPRINKLERS

- A. General Requirements: Designed for uniform "Head to Head" coverage over entire spray area indicated at available water pressure.
- B. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:
 - 1. Barricade open holes and depressions occurring as part of the work and post warning lights on property adjacent to or with public access.
- C. Plastic, Pop-up Spray Sprinklers:
 - a. Manufacturers: Rain Bird Corporation 1804-PRS, 1806-PRS or 1812-PRS series or equivalent.

2.10 QUICK COUPLERS

- A. Manufacturers: Rain Bird Corporation 5-LRC or equivalent.

2.11 DRIP IRRIGATION SPECIALTIES

- A. All trees to be equipped with drip line tree rings. Location and quantity may change do to site conditions. Contractor is responsible for site modifications.
- B. Drip Tubes with Direct-Attached Emitters:
 - 1. Tubing: RainBird XFS-09-12 Drip Tubing or equivalent.
 - a. Body Material: PE or vinyl, with flow control.
 - b. Mounting: Inserted into tubing at set intervals.
- C. Off-Ground Supports: Plastic stakes.
- D. Application Pressure Regulators: Brass or plastic housing, NPS 3/4, with corrosion-resistant internal parts; capable of controlling outlet pressure to approximately 20 psig.
- E. Filter Units: Brass or plastic housing, with corrosion-resistant internal parts; of size and capacity required for devices downstream from unit.
- F. Air Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.
- G. Vacuum Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

2.12 CONTROLLERS

- A. Controller is Rain Bird LXME

2.13 BOXES FOR AUTOMATIC CONTROL VALVES

- A. Plastic Boxes:
1. Manufacturers:

Retain first subparagraph below for standard.

- a. Ametek
 - i. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
- b. Size: 10" Round-Zone Valve; Rectangular-Multiple Valves.
- c. Shape: Round and Rectangular.
- d. Sidewall Material: PE.
- e. Cover Material: PE.
- f. Lettering: Irrigation Valve Box.

Retain first subparagraph below for PHX.

- a. Carson-Brooks
- b. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
 - i. Size: 10" Round-Zone Valve; Rectangular-Multiple Valves.
 - ii. Shape: Round and Rectangular
 - iii. Sidewall Material: HDPE.
 - iv. Cover Material: HDPE.

2.14 BOOSTER PUMP

- A. In the case of low pressure a booster Pump will be required. Pump should be a Rain Bird LP 5HP B1WPS Series or equivalent. Pump shall be installed inside mechanical room. Pump and pump cover shall be anchored to the concrete. Pump shall be installed using brass fittings for the first 8" on the inlet and outlet side and shall have unions installed on both side for easy change out.

2.15 BACKFLOW PREVENTER

- A. Existing 1" Wilkins 975XL RP backflow preventer.

2.16 RAIN/FREEZE SENSOR

- A. Manufacturer / Product:
1. Rain Bird WR2 Series rain/freeze sensor, install in an unobstructed position on the roof or in the field not to exceed 300ft from the controller.

PART 3 - EXECUTION

3.01 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."
- B. Provide minimum cover over top of underground piping according to the following:
 - 1. Irrigation Main Piping: Minimum depth of 18 inches
 - 2. Lateral Piping: 12 inches.
 - 3. Drain Piping: 12 inches.
 - 4. Sleeves: 18 inches

3.02 PREPARATION

- A. Set stakes to identify locations of proposed irrigation system. Obtain Construction Manager's approval before excavation. Notify Construction Manager of any conflicts prior to installation.

3.03 PIPING INSTALLATION

- A. Location and Arrangement: Drawings indicate schematic location and arrangement of piping systems.
- B. Install drain valves at low points/sags along the line. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- C. Install fittings for changes in direction and branch connections.
- D. Lay piping on solid sub-base, uniformly sloped without humps or depressions.
- E. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above
- F. Install piping in sleeves under parking lots, roadways, and sidewalks.
- G. Sleeves to be Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.

3.04 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672.
 - 3. PVC Non-pressure Piping: Join according to ASTM D 2855.

3.05 VALVE INSTALLATION

- A. Valve(All) Location:
 - 1. Valve and Control Boxes must be a minimum 3' behind face of curb.
 - 2. Any location where 2 or more valves are to be located together a minimum of 4" separation between fittings shall be required for future service or replacement.
- B. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.
- C. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
- D. Aboveground Valves: Install as components of connected piping system.
- E. Pressure-Reducing Valves: Pressure over 70 psi requires the use of a Pressure Regulating Device on the Master Valves and installed in tap assembly, 18" below grade. Throttling Valves: Install in underground piping in boxes for automatic control valves.
- F. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.06 SPRINKLER INSTALLATION

- A. Install sprinklers after hydrostatic test is completed.
- B. Install sprinklers as indicated in the Irrigation Plans, otherwise at manufacturer's recommended heights.
- C. Locate part-circle sprinklers to maintain a minimum distance of 6 inches from walls, header, sidewalk and other boundaries unless otherwise indicated.

3.07 DRIP IRRIGATION SPECIALTY INSTALLATION

- A. Install drip assembly pressure regulator and filter should be located below grade in a valve box as shown on the Y-strainer/Pressure regulator detail. Locate within 2' of the electronic control valve.
- B. Install air relief valves, and vacuum relief valves in piping, and aboveground and in control-valve boxes.

3.08 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

- A. Equipment Mounting:
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.

- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape and compact to the required density prior to further construction.

3.09 CONNECTIONS

- A. Comply with requirements for piping specified in Division 22 Section "Facility Water Distribution Piping" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.
- C. Connect wiring between controllers and automatic control valves.

3.10 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
 - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 4. Any irrigation product will be considered defective if it does not pass tests and inspections.

3.11 STARTUP SERVICE

- A. Perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Verify that controllers are installed and connected according to the Contract Documents.
 - 3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.12 ADJUSTING

- A. Adjust settings of controllers.
- B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C. Adjust sprinklers and devices, except those intended to be mounted above ground, so they will be flush with finish grade.

3.13 CLEANING

- A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.14 DEMONSTRATION

- A. Coordinate an operating demonstration and acceptance meeting with Construction Manager.

END OF SECTION

**SECTION 02900
PLANTING**

1.01 SCOPE:

- A. Perform all work required to complete the planting as described herein and shown on accompanying drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. General Conditions
- B. General Requirements - Division 1

1.03 REFERENCE STANDARDS:

- A. American Joint Committee on Horticultural Nomenclature: 1942 Edition of Standard Plant Names.
- B. American Standard for Nursery Stock (ANSI 260), latest edition, American Association of Nurserymen.

1.04 QUALITY ASSURANCE:

- A. All work shall be performed by skilled personnel within the industry in a workmanlike manner and supervised by an experienced foreman.
- B. The contractor, when required, will submit samples of all trees, for the Landscape Architect and/or Owners approval. When approved, these will be tagged and maintained as representative samples for all future plant materials. Rejected material shall be removed from the site immediately. The Landscape Architect reserves the right to reject any material he deems unsatisfactory.
- C. When required, the contractor shall also submit for approval sufficient quantities of loam, manure, peat moss and fertilizer as to be representative. All samples must be approved by the Landscape Architect before use in the job.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver all packaged material in original unopened and undamaged containers bearing manufacturer's label identifying name, weight, analysis and any other pertinent data.
- B. Protect plant material during delivery to prevent damage to root ball and desecration of leaves. Damaged material will be rejected.

1.06 WARRANTY PERIOD AND REPLACEMENT:

- A. All trees and shrubs shall be warranted for one (1) years after Final Acceptance. Plants shall be in full leaf for a minimum of 30 days at the end of the warranty period. Termination of the warranty period will be extended as necessary to comply.
- B. Plants used for replacement shall be of the same kind and size as those originally specified. All work, including materials, labor and equipment used in replacements, shall be at no cost to the owner. Any damage, including ruts in lawn or bed areas, incurred in making replacements, shall be immediately repaired.
- C. Plant material will be replaced once at the owners request and at the end of the twelfth (12th) month. A list of material to be replaced shall be submitted to the Landscape Architect and/or Owner prior to any replacements being made.

1.07 ACCEPTANCE:

- A. Substantial completion and contract close-out shall be in accordance with Division 1.
- B. Final acceptance shall be when the contractor has completed to the Landscape Architect's satisfaction, the final punch list.

1.08 MAINTENANCE:

- A. The contractor shall maintain all plant materials under this contract by watering, cultivating, weeding, spraying and replacing as necessary to keep plants in a vigorous, healthy condition until final acceptance.

PART II PRODUCTS

2.01 MATERIAL:

- A. Plants (general): All plants shall be well-formed No. 1 grade or better nursery stock and shall meet the applicable standards noted herein for nursery stock and shall be subject to rejection by the Landscape Architect. All plants shall remain the property of the contractor until final acceptance.
- B. Ornamental trees: Plants shall be healthy, vigorous, bushy, well-branched, of normal habit of growth for the species, and shall be free from disease, insect eggs and larvae. The specified sizes shall be before pruning, and the plants shall be measured with their branches in normal position.

- C. Shade trees: Shall be healthy, vigorous, full-branches, well-shaped, and shall meet trunk diameter and height requirements of the plant list. Balls shall be firm, neat, slightly tapered and well burlapped. Any tree loose in the ball or with broken ball at the time of planting will be rejected. Any trees are subject to approval by the Landscape Architect.
- D. Topsoil: Where additional topsoil is needed, it shall be fertile, sandy loam of natural occurrence, free of rubble, stones, lumps and perennial plant root stocks. The presence of noxious weeds will be cause for rejection.
- E. Mulch: Shredded cedar bark.
- F. Compost: Back to Nature, composed cotton seed hulls with iron sulfate as manufactured by Back to Nature Resources, Inc., Dallas, Texas, or approved equal.
- G. Fertilizer: Osmocote 18-6-12, or approved equal. To be paid as part of the installed plant cost.
- H. Steel bed Edging: Ryerson Steel Bed Edging, 3/16" x 4" steel landscape edging with steel stakes as manufactured by Joseph Ryerson, Dallas, Texas.

2.02 ACCESSORIES:

- A. Tree Wrap: Not used on this project.
- B. Tree Stakes: Split tee metal fence post, green.
- C. Wire, eye bolts: Non corrosive of sufficient strength.
- D. Straps for staking: 2" Flexible Tree Strap

PART III EXECUTION

3.01 PREPARATION:

- A. Verify grades and conditions prior to accepting any portion of the site from general contractor before commencing with work. Beginning work under this section indicates acceptance of existing site conditions.
- B. All planting beds should have a minimum of 6" of amended topsoil.
- C. Outline all planting beds for approval by the Landscape Architect. Prior to commencing with bed preparation.
- D. Stake all tree locations for approval by the Landscape Architect prior to digging tree pits.

- E. Remove all weeds and grasses from planting beds. If Bermuda grass is present, it shall be eradicated by approved means.
- F. Within approved bed lines prepare soil by roto-tilling two inches (2") of compost over entire bed area to a depth of six inches (6").
- G. Azaleas and rhododendron shall be planted in 100% pure sphagnum peat moss. Place peat moss to a height of 4" above surrounding bed grade, (12" total depth).
 - 1. Excavate entire area to be planted to a depth of 8" and backfill with peat
 - 2. Peat moss shall be thoroughly wetted with water prior to planting.
 - 3. Scarify root balls so plants will not become root bound.
- H. Position plants and groundcover on prepared beds prior to planting for approval of Landscape Architect.

3.02 INSTALLATION:

- A. Plant in Landscape Architect's approved location, setting plant with top of ball even with top of bed, and compact soil carefully around each plant ball. Water each plant thoroughly with hose to eliminate air pockets. Plants shall be carefully pruned to remove dead or broken branches, and entire bed area shall be hand raked to a smooth, even surface.
- B. Spread an even 2" layer of mulch over entire planting bed.
- C. Shade Trees: Will be planted in tree pits twenty four inches (24") greater in diameter than the size of the ball or root system. Scarify sides and slope pit bottom.
- D. Ornamental Trees: Will be planted in tree pits eighteen inches (18") greater in diameter than the size of the ball or root system. Scarify sides and slope pit bottom.
- E. All trees are to be set so that top of ball is even with finish grade or if poor soil conditions and with the architect's approval 1/4 of the root ball above finish grade.
- F. On all trees the top 6" of backfill shall consist of a 1:1 mixture of compost to soil.
- G. On all trees thoroughly water to eliminate air pocket and future settling.

**SECTION 02900
PLANTING**

- H. Around all trees form a circular ring free of any vegetation. For trees 3" and greater in caliper form a 5' diameter ring and for trees less than 3" caliper form a 3'-6" diameter ring. Circle shall be true in form and centered on tree.
- I. Cut all strings and wires, etc. from around the top of the root balls and tree trunks.
- J. Spread an even 2" layer of mulch within all tree rings.
- K. Prune all trees after planting to remove dead and broken branches.
- L. All trees shall be staked with two (2) metal split tee green fence posts and tied north and south with wire through tree straps.
- M. Apply Osmocote at a rate of 1/2 pound per tree and as per the manufacture's Recommendations for all shrub and groundcover planting beds.

3.03 CLEANING:

- A. During the work, the premises are to be kept neat and orderly at all times. Storage areas for planting and other materials shall be organized so that they, too, are neat and orderly. All trash, including debris from removing weeds or rocks from planting areas, preparing beds, or planting plants, shall be removed from the site daily as the work progresses. All walk and driveway areas shall be kept clean by sweeping or hosing.

END OF SECTION

**SECTION 03100
CONCRETE FORMWORK**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide formwork in accordance with provisions of this Section for cast-in-place concrete shown on the drawings or required by other Sections of these Specifications.
- B. Related work:
 - Section 03210: Steel Reinforcement
 - Section 03300: Cast-in-place Concrete

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Design of formwork is the Contractor's responsibility.
- C. Standards: in addition to complying with pertinent regulations of governmental agencies having jurisdiction, comply with pertinent provisions of ACI 347.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: After the Contractor has received the Owner's Notice to Proceed, submit manufacturer's data and installation instructions for proprietary materials including form coatings, ties, and accessories, and manufactured form systems if used.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Except for metal forms, use new materials. Materials may be reused during progress of the work, provided they are completely cleaned and reconditioned, re-coated for each use, and capable of producing formwork of the required quality.
- B. For footings and foundations, use boards or planks secured to wood or steel stakes, substantially constructed to shapes indicated and to support the required loads.

2.02 FORM TIES

- A. Hold inner and outer forms for vertical concrete together with combination steel ties and spreaders approved by the Owner's Representative:
 - 1. Space ties symmetrically in tiers and rows, each tier plumb from top to bottom and each row level.
 - 2. At horizontal pour lines, locate ties not more than 6" below the pour lines. Tighten after concrete has set and before the next pour is made.
 - 3. For exposed concrete surfaces, provide form ties of removable type with the bolts equipped with permanent plugs and a system approved by the Owner's Representative for fixing the plugs in place.

2.03 DESIGN OF FORMWORK

- A. General:
 - 1. Design, erect, support, brace, and maintain formwork so it will safely support vertical and lateral loads that might be applied, until such loads can be supported by the concrete structure.
 - 2. Carry vertical and lateral loads to ground by formwork system and in-place construction that has attained adequate strength for that purpose.
 - 3. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.
 - 4. Design forms and formwork to include assumed values of live load, dead load, weight of moving equipment operated on the formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of the structure during construction.
 - 5. Provide trussed supports when adequate foundations for shores and struts cannot be secured.
 - 6. Support form materials by structural members spaced sufficiently close to prevent objectionable deflection.
 - 7. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities, and within the allowable tolerances.
 - 8. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints, and provide backup material at joints as required to prevent leakage and prevent fins.
 - 9. Provide camber in formwork as required for anticipated deflections due to weight and pressure of fresh concrete and construction loads.

2.04 EARTH FORMS

- A. Side forms for footings may be omitted, and concrete may be placed directly against excavation only when requested by the Contractor and approved by the Owner's Representative.
- B. When omission of forms is accepted, provide additional concrete 1" on each side of the minimum design profiles and dimensions shown on the drawings.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FORM CONSTRUCTION

- A. General:
 - 1. Construct forms complying with ACI 347 to the exact sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades and level and plumb work in the finished structure.
 - 2. Provide for openings, offsets, keyways, recesses, moldings, reglets, chambers, blocking, screens, bulkheads, anchorages, inserts, and other features as required.
- B. Fabrication:
 - 1. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
 - 2. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
 - 3. Kerf wood inserts for forming keyways, reglets, recesses, and the like to prevent swelling and assure ease of removal.
 - 4. Provide top forms for inclined surfaces where so directed by the Owner's Representative.
- C. Forms for exposed concrete:
 - 1. Drill forms to suit ties being used, and to prevent leakage of cement paste around tie holes. Do not splinter forms by driving ties through improperly prepared holes.
 - 2. Provide sharp, clean corners at intersection planes, without visible edges or offsets. Back the joints with extra studs or girts to maintain true, square intersections.
 - 3. Use extra studs, walls and bracing to prevent objectionable bowing of forms between studs, and to avoid bowed appearance in concrete. Do not use narrow strips of form material which will produce bow.
- D. Corner treatments:
 - 1. Unless shown otherwise, form chamfers with 3/4" x 3/4" strips, accurately formed and surfaced to produce uniformly straight lines and tight edges.
 - 2. Extend terminal edges to required limit, and miter the chamfer strips at changes in direction.
- E. Locate control joints as indicated on the drawings and as approved by the Owner's Representative.
- F. Provisions for other trades:
 - 1. Provide openings in concrete formwork to accommodate work of other trades.
 - 2. Verify size and location of openings, recesses, and chases with the trade

- requiring such items.
3. Accurately place and securely support items to be built into the concrete.

3.03 REMOVAL OF FORMS

A. General:

1. Do not disturb or remove forms until the concrete has hardened sufficiently to permit form removal with complete safety.
2. Do not remove shoring until the member has acquired sufficient strength to support its own weight, the load upon it, and the added load of construction.
3. Do not strip floor slabs in less than two days.
4. Do not strip vertical concrete in less than seven days.

B. Finished surfaces:

1. Exercise care in removing forms from finished concrete surfaces so that surfaces are not marred or gouged, and that corners are true, sharp, and unbroken.
2. Release sleeve nuts or clamps, and pull the form ties neatly.
3. Do not permit steel spreaders, form ties, or other metal to project from, or be visible on, any concrete surface except where so shown on the drawings.
4. Solidly pack form tie holes, rod holes, and similar holes in the concrete. For packing, use the cement grout specified in Section 03300, flushing the holes with water before packing, screeding off flush, and grinding to match adjacent surfaces.

END OF SECTION

**SECTION 03210
STEEL REINFORCEMENT**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide concrete reinforcement where shown on the drawings specified herein, and as needed for a complete and proper installation.
- B. Related Work:
 - Section 03100: Concrete Formwork.
 - Section 03300: Cast-in-place Concrete.
 - Section 03345: Concrete Finishing.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with pertinent provisions of the following, except as may be modified herein:
 - 1. ACI 318.
 - 2. CRSI "Manual of Standard Practice."

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: After the Contractor has received the Owner's Notice to proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings showing details of bars, anchors, and other items, if any, provided under this Section.

1.04 PRODUCT HANDLING

- A. Delivery and Storage:
 - 1. Use necessary precautions to maintain identification.
 - 2. Store in a manner to prevent excessive rusting and fouling with dirt, grease, and other bond-breaking coatings.

PART 2 - PRODUCTS

2.01 REINFORCEMENT MATERIALS AND ACCESSORIES

- A. Bars:
 - 1. Provide deformed billet steel bars complying with ASTM A615. Using grades shown on the Drawings.
- B. Steel Wire:
 - 1. Comply with ASTM A82.
 - 2. For tie wire, comply with Fed Spec QQ-W-461, annealed steel, black, 16 gage minimum.
- C. Welded Wire Fabric:
 - 1. Provide welded steel, complying with ASTM A185, 6" x 6" x 10" x 10".
- D. Bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcement in place:
 - 1. Use wire bar type supports complying with CRSI recommendations, unless otherwise shown on the Drawings.
 - 2. Do not use wood, brick, or other non-complying material.
 - 3. For slabs on grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2.02 FABRICATION

- A. General:
 - 1. Fabricate reinforcing bars to conform to the required shapes and dimensions, with fabrication tolerances complying with the CRSI Manual.
 - 2. In case of fabricating errors, do not straighten or re-bend reinforcement in a manner that will weaken or injure the material.
 - 3. Reinforcement with any of the following defects will not be acceptable:
 - a. Bar lengths, depths, and/or bends exceeding the specified fabrication tolerances.
 - b. Bends and/or kinks not shown on the Drawings.
 - c. Bars with reduced cross-section due to excessive rusting or other cause.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. General:
 - 1. Comply with the specified standards for detail and method of placing reinforcement and supports, except as may be modified herein.
 - 2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.
 - 3. Position, support, and secure reinforcement against displacement by formwork, construction, and concrete placing operations.
 - 4. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
 - 5. Place reinforcement to obtain minimum coverage's for concrete protection.
 - 6. Arrange, space, and securely tie bars and bar supports together with the specified tie wire.
 - 7. Set wire ties so twisted ends are directed away from exposed concrete surfaces.
- B. Install welded wire fabric in as long lengths as practicable, lapping adjoining pieces at least one full mesh.
- C. Provide sufficient numbers of supports, and of strength to carry the reinforcement.
- D. Do not place reinforcing bars more than 2" beyond last leg of any continuous bar support.
- E. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

3.03 SPLICES

- A. Lap Splices:
 - 1. Tie securely with the specified wire to prevent displacement of splices during placement of concrete.
- B. Splice Devices:
 - 1. Obtain the Owner's Representative approval prior to using splice devices.
 - 2. Install in accordance with manufacturer's written instructions.
 - 3. Splice in a manner developing at least 125% of the yielding strength of the bar.
- C. Welding:
 - 1. Perform in accordance with AWS D1.4-79.
- D. Do not splice bars except at locations shown on the drawings, or as otherwise specifically approved by the Owner's Representative.

3.04 TESTING

- A. Samples:
1. Materials to be sampled at the building site shall have been delivered thereto at least 72 hours before it is needed.

END OF SECTION

**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The extent of cast-in-place concrete is shown on drawings.
- B. Related work specified elsewhere:
 - Section 03100: Concrete Formwork.
 - Section 03210: Steel Reinforcement.
 - Section 03345: Concrete Finishing.

1.02 TESTING

- A. Owner to employ and pay for an independent testing laboratory, to perform specified testing.
- B. Tests required for aggregate:
 - 1. Test for conformance to ASTM C-33.
 - 2. Make one test for each 100 cubic yards of fine aggregate.
 - 3. Make one test for each 250 cubic yards of coarse aggregate.
- C. Tests required for concrete:
 - 1. Make and store test specimens in conformance with ASTM C-31.
 - 2. Compressive strength tests: ASTM C-39:
 - a. Make four (4) cylinders for each test.
 - b. Break two cylinders at seven days and two at 28 days unless otherwise directed by Owner's Representative.
 - 3. Make one compressive strength test for each day's placement or each 50 cubic yards of concrete of each specified strength.
 - 4. If test strength of concrete does not comply with strength requirements of these specifications and is sufficiently low that, in opinion of Owner's Representative, performance of structure is jeopardized, the Owner's Representative may require that drilled core test specimens be cut from structure at location at which the questionable concrete was placed. Cores shall be secured and tested in accordance with ASTM C-42. If results of these tests show that actual strength of concrete is sufficiently low as to jeopardize performance of structure, the Owner's Representative may require that concrete be removed from structure, and replaced at no additional cost to Owner.
 - 5. Perform slump test at point of placement immediately prior to placing concrete. Test in accordance with ASTM C-143.
 - 6. Test for percentage of entrained air in accordance with ASTM C-231 at time of slump testing.
- D. Inspection of batch plant:

1. Batch plant operation will be inspected as required to insure that concrete delivered to the job complies with specifications. Testing laboratory engaged by Contractor will provide this service as directed by Owner's Representative.
2. Plant inspection reports shall include:
 - a. Location of plant.
 - b. Job location.
 - c. Concrete design mix number and strength.
 - d. Concrete design proportion, source, type and amount of cement, aggregates and admixtures used, surface water added and total water used.
 - e. Slump.
 - f. Air content.
 - g. Temperature of heated concrete.
 - h. Capacity and condition of mixing truck.
 - i. Percent of capacity loaded.
 - j. Condition of batching installation.
 - k. Condition of heating installation.
 - l. Period of inspection.
 - m. Number and sizes of batches delivered.

1.04 REFERENCE STANDARDS

- A. The following codes and manuals form a part of this specification:
 1. Standard Specifications for Structural Concrete for Buildings (ACI 301-72; Rev 81).
 2. Recommended Practice for Selecting Proportions for Concrete (ACI 211-77).
 3. Concrete production facilities shall have a current "National Ready Mixed Concrete Association Certificate of Conformance for Concrete Production Facilities".
 4. Building Code Requirements for Reinforced Concrete (ACI 318-77).

1.05 SUBMITTALS

- A. Submit proposed mix design to Owner's Representative for review. Include certification required in admixture specification.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement: Portland Cement (ASTM C-150, Type I). Use high early strength Portland Cement (Serial designation C-150, Type III) where specified and elsewhere at Contractor's option and at no additional cost to Owner.
- B. Fine aggregate: Sand particles shall be coarse, sharp, clean and conforming to ASTM C-33.
- C. Coarse aggregate:
 1. Crushed limestone conforming to ASTM C-33 for normal weight concrete.

2. Light weight conforming to ASTM C-330 for semi-light weight concrete. Minimum Fsp (splitting ratio) of 6.0.
- D. Water: Clean and free from injurious amounts of oil, acids, alkalines, organic materials or other deleterious substances.
- E. Admixtures:
 1. Water reducing admixture: ASTM C-494, Type A, containing no more chloride ions than are present in municipal drinking water.
 - a. Acceptable products:
 - (1) Eucone WR-75; The Euclid Chemical Co.
 - (2) Pozzolith ZOOM: Master Builders.
 - (3) Plastocrete 160; Sika Chemical Corp.
 2. Water reducing, retarding admixture: ASTM C 494, Type D, containing no more chloride ions than are present in municipal drinking water.
 - a. Acceptable products:
 - (1) Eucone Retarder-75: Euclid Chemical Co.
 - (2) Pozzolith 100XR: Master Builders.
 - (3) Plastiment: Sika Chemical Co.
 3. High range water reducing admixture (Superplasticizer): ASTM C-494, Type F or G, containing no more chloride ions than are present in municipal drinking water.
 - a. Acceptable products:
 - (1) Eucon 37; The Euclid Chemical Co.
 - (2) Sikament; Sika Chemical Corp.
 4. Non-chloride accelerator: ASTM C-494, Type C or E, containing no more chloride ions than are present in municipal drinking water.
 - a. Acceptable products:
 - (1) Accelguard 80; The Euclid Chemical Co.
 - (2) Darex Set Accelerator; W. R. Grace.
 5. Air entraining admixture: ASTM C-260.
 6. No calcium chloride or admixtures containing more than 0.1% chloride ions will be permitted.
 7. Written certification of conformance to specified requirements and the chloride ion content will be required from admixture manufacturer prior to mix design review.
- F. Curing compound: ASTM C-309 for cast-in-place slabs, except those receiving concrete staining products cementitious topping, or tennis court surfacing. No concrete treatment shall be used without Owner's Representative's approval.
 1. Acceptable products:
 - a. West Concrete Floor Treatment.
 - b. Guardian Clear Bond.
 - c. TRI-KOTE Concrete Treatment.
 - d. Horn Clear Seal.
 - e. Master Builders Master Seal.
 - f. Conspec No. 1" by Conspec Marketing & Mfg. Co.

- G. Furnish concrete in accordance with ASTM C-94, Alternate No. 3, Specification for Ready Mixed Concrete. Design concrete in accordance with ACI Standard Recommended Practice for the Design of Concrete Mixes (ACI 211-77) to produce strength of concrete with slumps and maximum sizes of coarse aggregate specified. Design concrete so the concrete materials will not segregate and excessive bleeding will not occur.
- H. Reinforcing: As specified in Division 3.
- I. Floor underlayment: Ardex K-15; Ardex, Inc., 630 Stoops Ferry Road, Corapolis, Pa. 15108, (412) 264-4240.

Note: Curing agents or hardeners are not allowed for tennis courts, sport courts, playground or spraygrounds surfaces to receive color finish.

2.02 CONCRETE MIX REQUIREMENTS

- A. Use a testing laboratory acceptable to Owner's Representative for preparing and reporting proposed mix designs. Submit written reports to Owner's Representative of each proposed mix at least 28 days prior to start of work. Do not place concrete until mixes have been reviewed and approved by Owner's Representative. The specified minimum strengths are to be exceeded in accordance with Paragraph 4.3 of Building Code Requirements for Reinforced Concrete (ACI 318-83).
- B. Minimum compressive strength 28 day: 3000 psi footings; 3500 psi, all other unless specifically called out on the plans.
- C. Minimum cement content: 5 sacks per cu. yd. for footings; 6 sacks per cu. yd. for other unless otherwise approved in submittals.
- D. Slump: 4" plus or minus 1".
- E. Maximum size aggregate: Generally 3/4".

2.03 WATER STOP

- A. Acceptable manufacturers: Williams Products, Inc.
- B. Flat, natural rubber, dumbbell type, 5" wide, 1/4" minimum center thickness, 3500 psi minimum tensile strength, 525% minimum elongation to break.

2.04 COLORING

- A. NOT USED

PART 3 - EXECUTION

3.01 PLACING

- A. Notify Owner's Representative of intent to pour at least twenty-four (24) hours prior to placing concrete.
- B. Before placing concrete, clean equipment for mixing and transporting concrete. Remove debris and ice from spaces to be occupied by concrete. Forms to be removed shall be thoroughly wetted or oiled. Sprinkle sub-grade sufficiently to prevent suction, where waterproof membrane is not required. Remove excess water from place of deposit. Reinforcement, forms, membrane, fillers and ground with which concrete is to come in contact shall be free from frost. Do not deposit concrete during rain unless it is adequately protected. In that case, be prepared to protect newly placed concrete from rain until it has hardened sufficiently so that it will not be damaged. Minimum of 2 hours between placing columns and floors.
- C. Before placing concrete, verify installation of all reinforcements, sleeves, waterproof membrane, forms for openings, fill materials, anchors and items related to mechanical, plumbing and electrical trades.
- D. Convey from mixer to place of final deposit by methods which will prevent separation or loss of materials. Do not permit concrete to drop freely any distance greater than 4 feet. Where longer drops are necessary, use a chute, tremie or other approved conveyance to assist concrete into place without separation. Chutes shall be metal and have maximum slope of 1 vertical to 2 horizontal; minimum of 1 vertical to 3 horizontal. Chutes greater than 20 feet long will not be permitted.
- E. Place concrete at a rate to keep concrete plastic and flowing readily into spaces between bars. Concrete temperature shall be 60-80°F. No concrete that is partially hardened or has been contaminated by foreign materials shall be deposited, nor shall re-tempered concrete be used.
- F. Thoroughly compact concrete by suitable means during placing and work around reinforcement and into corners and recesses of forms. Use vibrators under competent supervision to aid in placement of concrete. Insert vibrators and withdraw vertically at 18" to 30" spacing for 5 to 15 seconds duration.

3.02 HOT WEATHER CONCRETING

- A. Conform to ACI 305 when concreting during hot weather.

3.03 COLD WEATHER CONCRETING

- A. Conform to ACI 306 when concreting during cold weather.

3.04 FINISH FOR FORMED CONCRETE

- A. After removal of forms, if any honeycomb places or rock pockets exist, notify Owner's Representative and repair in accordance with his instructions. In general, remove all loose material, wet surface thoroughly, and fill all voids with a stiff mixture of one part cement to two parts sand. In exposed construction, mix white Portland Cement with standard to blend patch with surrounding surface.
- B. On exposed concrete, smooth off joint marks and fins and leave surface smooth, dense and free from honeycomb, prominent grain markings and bulges or depressions more than 3/16" in 4'.
- C. Cork floated finish (on exposed concrete, except omit at round columns):
 - 1. Remove forms at an early stage, within 2 to 3 days of placement where possible. Remove ties. Remove all burrs and fins.
 - 2. Mix one part Portland Cement and one part fine sand with sufficient water to produce a stiff mortar. Dampen wall surface. Apply mortar with firm rubber float or with trowel, filling all surface voids. Compress mortar into voids using a slow-speed grinder or stone. If the mortar surface dries too rapidly to permit proper compaction and finishing, apply a small amount of water with a fog-sprayer. Produce the final texture with a cork float.

3.05 FINISH FOR SLABS

- A. After suitable bulkheads, screens and, if specified, jointing materials have been positioned, concrete shall be placed continuously between construction joints, beginning at a bulkhead edge form or corner. Place each batch into the edge of previously placed concrete to avoid stone pockets and segregations. If there is a delay in casting, thoroughly spade concrete placed after the delay and consolidate at edge of that previously placed to avoid cold joints. Distribute concrete by shovels and consolidate by other suitable means. Bring concrete to correct level with a wood straightedge and strike off. Do not use wood bullfloats or darbies to smooth the surface.
- B. Roughen slabs to receive toppings with stiff brushes or rakes before the final set.
- C. After concrete has been properly placed, struck off and darbied or bullfloated, it shall not be worked until ready for floating. The off time between darbying and power floating may vary from 2 to 8 hours or more depending on the weather conditions, concrete temperature and concrete mixture. Begin power floating when water sheen has disappeared and mix has stiffened sufficiently that weight of a man standing on it leaves only a slight imprint on surface. If two power floating operations are necessary to bring surface to desired state, allow concrete to stiffen or become harder before beginning second floating operation.

- D. Float finish: After power floating is complete, use wood float by hand to tighten the surface and achieve a medium coarse finish. Hand wood float in a circular motion. Float sufficiently to remove cement paste from surface.
- E. Trowel finish: Both power and hand troweling shall be required. Begin power troweling as soon as little or no cement paste clings to blades. Continue troweling until surface is dense, smooth and free of all minor blemishes, such as trowel marks.
 - 1. Final hand troweling shall be required to remove slight imperfections left by troweling machines and to bring surface to a dense, smooth polished finish. Final hand troweling shall be continued until a ringing sound is heard as trowel passes over surface.
- F. Give platforms and steps a light broom finish following sufficient troweling to seal the surface and remove all minor blemishes such as trowel marks.
- G. Pitch all slabs to drain as indicated on drawings; finish exposed slab edges; stair nosings with 1/2" round radius.
- H. Finishes shall be true to planes to match requirements of Section 02514-3.01-C. If variations greater than this exist, the Owner's Representative may direct contractor to grind floor to bring surface within the requirements. Grind as soon as possible, preferably within three (3) days, but not without Owner's Representative's direction and not until concrete is sufficiently strong to prevent dislodging coarse aggregate particles. Grinding will be considered only where slabs will be covered by finish materials. Patching of low spots will not be permitted.
 - 1. Sprinkling of dry cement or a mixture of dry cement and sand on the surface of fresh concrete to absorb water or to stiffen the mix will not be permitted during any stage of floor construction. If bleeding is excessive, remove by dragging hose just ahead of floating operation.

3.06 CURING

- A. Protect freshly deposited concrete from premature drying and excessively hot or cold temperatures. Maintain without drying at a relatively constant temperature for the period of time necessary for hydration of cement and proper hardening of concrete.
- B. Initial curing shall immediately follow finishing operation. Keep concrete continuously moist at least overnight.
 - 1. On slabs, use one of the following:
 - a. Ponding or continuous sprinkling.
 - b. Absorptive mat or fabric kept continuously wet.
 - c. Sand or other covering kept continuously wet.
- C. Immediately following initial curing and before concrete has dried, additional curing shall be accomplished by one of the following materials or methods:
 - 1. Continuing the method used in initial curing.

2. Waterproof paper conforming to "Specifications for Waterproof Paper for Curing Concrete" (ASTM C-171).
 3. Other moisture-retaining coverings approved.
- D. Continue final curing until the cumulative number of days or fractions thereof, not necessarily consecutive, during which temperature of air in contact with concrete is above 50°F has totaled seven (7) days. Prevent rapid drying at end of curing period.
- E. Excessive temperature changes: Changes in temperature of concrete shall be as uniform as possible and shall not exceed 5 Deg. F in any one (1) hour or 50 Deg. F in any twenty-four (24) hour period.
- F. Steel forms heated by sun and all wood forms in contact with concrete during final curing period shall be kept wet. If forms are to be removed during curing period, immediately employ one of above curing materials or methods. Continue such curing for remainder of curing period.
- G. On completion of construction, clean all exposed slabs and apply a coat of curing compound at rate of 600 sq. ft. per gallon.

3.07 LEVELING EXISTING SLABS

- A. Mix floor underlayment with water and apply to existing slab in accordance with manufacturer's instructions. Level floor to a tolerance of 1/8" in ten feet in any direction.

END OF SECTION

**SECTION 03345
CONCRETE FINISHING**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work included: provide finishes on cast-in-place concrete as called for on the drawings, specified herein, and needed for a complete and proper installation.
- B. Related work:
Section 03300: Cast-in-place Concrete

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Section 01340.
- B. Product data: After the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this section.
 - 2. Manufacturer's recommended installation procedures which, when approved by the Owner's Representative, will become the basis for accepting or rejecting actual installation procedures used on the work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General:
 - 1. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until conditions are correct.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until conditions are correct.

3.02 FINISHING SLABS

- A. Definition of Finishing Tolerances:
 - 1. Class "B": True plane within tolerances described in Section 02514-3.01-C as determined by a ten foot straightedge placed anywhere on the slab in any direction.
 - 2. Unless otherwise directed by the Owner's Representative, provide the texturing in one direction only.
 - 3. Provide "medium" texturing as directed by the Owner's Representative or otherwise called for on the drawings.

3.03 CURING AND PROTECTION

- A. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
- B. Temperature, Wind, and Humidity:
 - 1. Cold Weather:
 - a. When the mean daily temperature outdoors is less than 40 degrees F, maintain the temperature of the concrete between 50 degrees F and 70 degrees F for the required curing period.
 - b. When necessary, provide proper and adequate heating system capable of maintaining the required heat without injury due to concentration of heat.
 - c. Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
 - 2. Hot Weather: When necessary, provide wind breaks, fog spraying, shading, sprinkling, ponding, or wet covering with a light colored material, applying as quickly as concrete hardening and finishing operations will allow.
 - 3. Rate of temperature change: Keep the temperature of the air immediately adjacent to the concrete during and immediately following the curing period as uniform as possible and not exceeding a change of 5 degrees F in any one hour period, or 50 degrees F in any 24 hour period.
- C. Protection From Mechanical Injury:
 - 1. During the curing period, protect the concrete from damaging mechanical disturbances such as heavy shock, load stresses, and excessive vibration.
 - 2. Protect finished concrete surfaces from damage from construction equipment, materials, and methods, by application of curing procedures, and by rain and running water.
 - 3. Do not load self-supporting structures in such a way as to over stress the concrete.

END OF SECTION

**SECTION 07900
SEALANTS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including Standard Requirements for Contract Work, Special Provisions and General Requirements, apply to the work specified in this Section.

1.02 SCOPE

- A. Work under this Section consists of furnishing everything necessary for and incidental to the execution and completion of all sealant work, as indicated on the Drawings and specified herein.

1.03 DESCRIPTION OF WORK

- A. The extent of sealant work is indicated on the Drawings.
- B. The required applications of sealants includes, but are not necessarily limited to the following general locations:
 - 1. New Sidewalk Expansion Joints.
 - 2. Between Courts and Fence Bands.

1.04 QUALITY ASSURANCE

- A. Obtain sealant materials only from manufacturers who will, if required, send a qualified technical representative to the project site, for the purpose of advising the installer of proper procedures and precautions for the use of the materials.
- B. Installer: A firm with a minimum of five (5) years successful experience in the application of the types of materials required.

1.05 SUBMITTALS

- A. Comply with Section 01340.
- B. Samples, Sealants and Caulking: Submit three (3), 12" long samples of each color required (except black) for each type of sealant or caulking compound exposed to view. Install sample between 2 strips of material similar to or representative of typical surfaces where sealant or compound will be used, held apart to represent typical joint widths. Samples will be reviewed by Owner's Representative for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

- C. Guarantee, Sealants: Submit four (4) copies of written guarantee agreeing to repair or replace sealants which fail to perform as air-tight and water-tight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability; or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as an inherent quality of the material for the exposure indicated. Provide guarantee signed by the Installer and Contractor.
 - 1. Guarantee period of one (1) year from and after acceptance of the project by the Owner.

1.06 JOB CONDITIONS

- A. Pre-Installation Meeting: At the Contractor's direction, the Installer, Owner and/or the Owner's Representative, sealant manufacturer's technical representative, and other trades involved in coordination with sealant work shall meet with the Contractor at the project site to review the procedures and time schedule proposed for installation of sealants in coordination with other work. Review each major sealant application required on the project.
- B. Condition of Other Work: The Installer must examine the joint surfaces, backing, and anchorage of units forming sealant rabbet, and the conditions under which the sealant work is to be performed, and notify the Contractor and the Owner's Representative in writing of conditions detrimental to the proper and timely completion of the work and performance of the sealants. Do not proceed with the sealant work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- C. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitation for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Wherever joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule with Contractor to avoid delay of project.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Colors: Provide manufacturer's standard colors plus thirty (30) additional Fastpak, as selected by Owner's Representative.
- B. Compatibility: Before purchase of each specified sealant, investigate its compatibility with the joint surfaces, joint fillers, sealers and other materials in the system. Provide only materials (manufacturer's recommended variation of the specified materials) which are known to be fully compatible with the actual installation condition, as shown by

manufacturer's published data or certification.

- C. Provide size and shape of preformed sealant units as shown or, if not shown, as recommended by the manufacturer, either in the published data or upon consultation with technical representative.

2.02 SELF-LEVELING JOINT SEALANT

- A. Materials shall be Tremco THC-900 multi-component, chemically curing, self-leveling polyurethane joint sealant as manufactured by Tremco, 10701 Shaker Blvd., Cleveland, Ohio 44104, or approved equal.

2.03 GENERAL PURPOSE SEALANT

- A. Materials shall be Tremco Dymeric, epoxidized polyurethane terpolymer general purpose sealant as manufactured by Tremco, 10701 Shaker Blvd., Cleveland, Ohio 44104, or approved equal.

2.04 MISCELLANEOUS MATERIALS

- A. Joint Cleaner: Provide the type of joint cleaning compound recommended by the sealant or caulking compound manufacturer, for the joint surfaces to be cleaned.
- B. Joint Primer/Sealer: Provide the type of joint primer/sealer recommended by the sealant manufacturer, for the joint surfaces to be primed or sealed.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.
- D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

2.05 APPLICATIONS

- A. Tremco THC-900 Sealant: Provide at all exterior horizontal slab or paving joints.
- B. Tremco Dymeric Sealant: Provide at all other joints noted on the Drawings and around steel handrail base plates where handrail has been raised.

PART 3 - EXECUTION

3.01 JOINT SURFACE PREPARATION

- A. Clean joint surfaces immediately before installation of sealants. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealants. All joint surface preparation shall be in accordance with sealant manufacturer's printed instructions.

3.02 INSTALLATION

- A. Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.
- B. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
- C. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for the application shown.
- D. Install bond breaker tape wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- E. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealants to depths as shown or, if not shown, as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.
- G. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces including rough textures such as exposed aggregate panels. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer or the sealant/caulking compound.
- H. Remove excess and spillage of compounds promptly as the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

3.03 CURE AND PROTECTION

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendation, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. The Installer shall advise the Contractor of procedures required for the curing and protection of sealants and caulking compounds during the construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at the time of Owner's acceptance.

END OF SECTION