FISHER ARNOLD

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ADDENDUM NUMBER ONE
October 22, 2024

Brookland Sportsplex Phase 2

Brookland, Arkansas

The following additions, deletions and/or revisions shall be made part of the Plans dated October 7, 2024 of the referenced project. This addendum shall have precedence over the plans and specifications on all items listed and described herein, however, it shall not change the intent and requirements of the plans and specifications for any item not specifically mentioned.

ITEM NO. 1

REFERENCE SPECIFICATIONS: Technical Specifications

The technical specifications sections were inadvertently omitted from the Specifications manual and are attached to this Addendum Number One.

ITEM NO. 2

RESPONSES TO QUESTIONS RECEIVED:

1. Question: Part 1 – Section C specifies Fields 3, 4 and 5, however the drawings and lighting requirements are for Fields 1 and 2. Could you please confirm which fields we're lighting?
   Answer: The only fields included in this phase are Fields 1 and 2. Fields 3, 4, and 5 are not included in the Work.
2. Question: Is a two piece direct embedded pole ok to use?
   Answer: Substitutions for products identified in the plans and specifications may be approved during construction, utilizing the procedure identified in the specifications. However, bidding must be based upon the information provided on the issued plans and specifications. Please see General Condition GC.23 in the Specifications.
3. Question: Will the school require a 25-year warranty?
   Answer: Please see sheet E201 – Specifications – Sports Lighting, Section 3.4, Warranty and Guarantee for the specifics regarding the sports lighting warranty requirements.

ATTACHMENTS:

Technical specifications Sections 03 10 00 – Concrete Forming and Accessories; 03 20 00 – Concrete Reinforcement; 03 30 00 – Cast-in-Place Concrete; 07 92 00 – Sealants and Caulking; 31 20 10 – Finish Grading of Athletic Fields; 32 13 20 – Expansion, Construction, and Control Joints; 32 13 40 – Concrete Curbs, Gutters and Sidewalks; 32 31 13 – Chain Link Fencing and Gates; 32 84 00 – Underground Irrigation System; 32 92 10 – Hydraulic Seeding and Sodding; and 32 92 20 – Infield Soil Mix.

END OF ADDENDUM NO. 1

REGISTERED LANDSCAPE ARCHITECT
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10-22-24

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 20 00: Concrete Reinforcement

B. Section 03 30 00: Cast-In-Place Concrete

1.02 QUALITY ASSURANCE

A. Design, construct and erect formwork per ACI 347, Recommended Practice for Concrete Formwork.

1.03 ALLOWABLE TOLERANCES

A. In accordance with ACI 301; Tolerances for Formed Surfaces.

1.04 REFERENCES

A. The following references shall be obtained by the Contractor and maintained at the job site in a readable condition:

1. ACI 347, Recommended Practice for Concrete Formwork.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concealed concrete: No. 2 Common Southern Pine, 545

B. Exposed concrete: B-B Plyform, Class I or II, EXT-APA, Metal or fiberglass forms may be used.

C. Construction joint forms: Key-type steel formers, Vulcan Screed Joints, Burke Keyed Kold Joint Form or equal.

D. Form coating: Non-staining mineral oil.

E. Form ties: Snap-off type which will break off at least 1/2" below surface of concrete. For sanitary structures, the form times shall be of the "snap tie type", which can be removed to at least 1" below the surface leaving an opening no larger than the tie diameter, with or without cones. Wall ties for

structures containing liquid shall have integral water stops.

G. Expansion joint filler: Asphalt impregnated, pre-molded fiberboard by full thickness of slab or joint. ASTM D 994.

2.02 EARTH FORMS

A. Where soil is firm enough to permit cutting to true size, concrete may be placed without forms.

PART 3 - EXECUTION

3.01 ERECTING

A. Erect forms to obtain shapes, designs and dimensions indicated. Make forms sufficiently tight to prevent leakage. Brace, shore and tie forms together to maintain position without sagging or bulging.

B. Provide 3/4" chamfering at exposed corners.

C. Prepare insides of forms so that concrete will have a smooth, uniform finish, free from fins, stone pockets, voids and other surface defects.

D. Provide construction joint forms where concrete placement terminates at the end of a day or because of other reasons.

E. Provide bulkheads, with reinforcing steel penetrating bulkheads, where concrete placement stops at end of day or for other reasons.

F. Where soil conditions are such that concrete cannot be placed without forms, and where other conditions cause trenches to be opened wider than footing or slab widths, erect forms for footing or slabs.

G. Install items furnished by others for installation in concrete. Use templates to locate anchor bolts and other critical items.

3.02 PREPARING

A. Prepare insides of forms so that concrete will have a smooth, uniform finish free of surface defects.

B. Coat forms before reinforcement steel is placed. Where mill-oiled forming material is used, follow manufacturer's instructions for recoating. Where forming material is not mill-oiled, coat forms before each use.

C. Before reusing forms, thoroughly clean them and remove projecting nails or similar devices.

3.03 FORM REMOVAL

A. Remove forms in such manner and such time as to ensure safety of structure and to avoid chipping and spalling of concrete. In no case shall forms be removed before limits set forth in the Commentary to ACI 318.

END OF SECTION

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SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 30 00: Cast-In-Place Concrete

1.02 SUBMITTALS

A. Submit warranty from mill or supplier stating that materials meet requirements of referenced ASTM and ACI Standards.

B. Detail reinforcing steel in accord with ACI 315-80, "Details and Detailing of Concrete Reinforcement." Submit one digital copy and three prints of shop drawings indicating bending and placement of reinforcement as well as sleeve and built-in work locations. Do not fabricate reinforcement steel until approval of Owner's Representative has been obtained.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in bundles marked with metal tags for easy identification.

B. Handle and store materials to prevent contamination.

C. Deliver and store welding electrodes in accord with American Welding Society D 1.4-79.

1.04 REFERENCES

A. The following references shall be obtained by the Contractor and maintained at the job site in readable condition at all times:

1. CRSI, Manual of Standard Practice, Latest Edition
2. CRSI, Placing Reinforcing Bars, Latest Edition
3. AWS D1.4-79, Reinforcing Steel Welding Code

PART 2 - PRODUCTS

2.01 REINFORCEMENT STEEL

ASTM A 615-80, Grade 60, conforming to supplemental requirements S1.

2.02 REINFORCEMENT WIRE

Welded steel wire fabric, ASTM A 185-79.

2.03 TIE WIRE

ASTM A 82-79, Plain, cold-drawn steel.

2.04 BAR SUPPORTS

A. All surfaces exposed to weather or liquid or which can be seen in service condition shall have bar supports conforming to Class C, D, or E as defined in CRSI, Placing Reinforcing Bars, Latest Edition. Where no protection is required, Class A supports may be used.

2.05 FABRICATING

A. In accord with CRSI Manual of Standard Practice, Latest Edition.

PART 3 - EXECUTION

3.01 CONDITION OF SURFACES

A. Maintain reinforcement surfaces free of rust scale and other coatings which might impair concrete bond as described in Section 7.4 of ACI 318-77.

3.02 INSTALLING REINFORCING STEEL

A. Handle, place and tie reinforcement steel in accord with "Building Code Requirements for Reinforced Steel," ACI 318-77 and CRSI publication "Placing Reinforcing Bars," Latest Edition.

B. All reinforcement bars shall be supported and secured as directed in ACI 315-80 and CRSI Manual of Standard Practice, Latest Edition.

C. Provide Class C tension splices for all splices unless indicated or noted otherwise. Do no splicing of reinforcement steel except as authorized by

Engineer.

D. Reinforcement shall not be heated or welded without written permission of Engineer. Where permission is obtained, welding shall be in accordance with American Welding Society publication "Recommended Practices for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction," AWS D 1.4-79.

E. Bend bars cold. Do not field bend bars partially embedded in concrete except as specifically permitted by Project Engineer. Do not heat or cut bars with a torch.

3.03 INSTALLING WELDED WIRE FABRIC:

After vapor barrier or underfloor waterproofing, as applicable, for slab-on-grade has been placed, install welded wire fabric.

Locate welded wire fabric in center third of slabs.

Lap side one full mesh plus 2". Lap ends two full meshes. Offset end laps in adjacent width to prevent continuous laps.

3.04 CONCRETE PROTECTION FOR REINFORCEMENT

A. Protect reinforcing by thickness of concrete indicated.

B. Where not indicated, thickness of concrete over reinforcing shall be as follows:

1. Where concrete is deposited against the ground without the use of forms - 3".
2. Where concrete is exposed to weather or to ground but placed in forms - 2" for bars larger than No. 5 and 1- 1/2" for No. 5 bars or smaller.
3. In slabs and walls not exposed to the ground or to the weather - 3/4".
4. In beams, girders, and columns not exposed to the ground or to the weather - 1-1/2".

C. Variation from clear cover shall conform to Section 7.5 of ACI 318-77.

END OF SECTION

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SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. Furnishing of and paying for all labor, materials, services, equipment, and appliances required for execution, installation, and completion of all work specified herein and/or shown on the drawings.

B. Use these specifications in conjunction with General Notes and specific directives on the Contract Drawings.

C. Work includes:

1. All cast-in-place (CIP) concrete work used in building structures and appurtenances including building foundations, interior slabs-on-grade, and all accessories for and items incidental thereto as required for completion as specified herein and shown on the drawings.
2. All formwork for concrete formed surfaces
3. All reinforcing steel, welded wire mesh, and accessories required for their support and securement
4. Surface finishes
5. Concrete curing and protection
6. Steel centering including accessories required for support and securement (See drawings.)
7. Install only in accord with drawings provided all embedded-type reglets, sleeves, anchors, and/or other like devices for use of other sections of these specifications. Drawings and devices will be provided by the using sections showing proper location and installation.
8. Furnish and place the female section of wedge inserts or dovetail anchor slots shown or as required and spaced for masonry walls, partitions, and veneers as specified under Section 04200 or other such anchors as may be shown on drawings or required for other sections of work in these specifications. Male portion will be by using section.
9. Non-shrink grout for structural steel bearing including installation, forming, etc.
10. Concrete work not specifically described otherwise on the plans or in these specifications is to comply with this section except exterior site work concrete

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Section GC.21: Shop Drawings

B. Section GC.24: Samples, Certificates and Texts

C. Section SC19: Testing, Inspection and Control

D. Section 03 10 00: Concrete Forming and Accessories

E. Section 03 20 00: Concrete Reinforcement

F. Section 31 23 00: Excavation and Fill

1.03 REFERENCE STANDARDS:

A. All concrete work shall conform to the American Concrete Institute "Specifications for Structural Concrete for Buildings" ACI 301-89 including reference standards in Section 1.4 except as modified by requirements specified herein or as noted on the Drawings.

B. A copy of ACI SP-15 (84) "Field Reference Manual" which includes ACI 301 and reference standards specified therein shall be kept at the job site for ready reference.

C. ACI 318-83 Building Code Requirements for Reinforced Concrete.

D. ACI 117-81 Standard: "Standard Tolerances for Concrete Construction and Materials" except as modified by requirements specified herein.

1.04 QUALITY ASSURANCE:

A. It is solely the responsibility of the Contractor to maintain control of the quality of the materials, workmanship, and conformance of all work to the project contract documents.

B. All materials, equipment, and methods shall be subject to verification inspections and/or testing by the Owner’s Representative as specified herein.

C. Engineering verification inspection: Periodic inspection of the cast-in-place, reinforced concrete shall be performed by the Project Engineer, and is to consist of the following services:

1. The Owner’s Representative is to make periodic observations and investigations during construction of the CIP reinforced concrete

portions of the project to promote conformity to the intent of the Contract Documents and to aid the Contractor in the interpretation of these documents. The Owner's Representative's knowledge of the structural design, concrete technology, and the overall design requirements is to be made available to the Contractor through consultation to assist in expediting this portion of the work for the purpose of obtaining the best construction consistent with the intent of the Contract Documents.

2. The Owner's Representative is not to be responsible for or to perform any of the Contractor's supervisory functions; nor will engineering inspection in any way relieve the Contractor of his complete responsibility for these supervisory functions. The General Contractor is solely responsible for the direction and supervision of the entire construction operation, the performance of materials and labor, safety of working conditions, and the ultimate quality of the structure. The Owner's Representative is to make periodic inspections while the work is in progress to provide a reasonable measure of assurance to the Owner that the concrete work is conforming to the intent of the Contract Documents as the work is being accomplished, but he does not thereby serve as guarantor of the Contractor's work.

D. Testing Laboratory Services:

1. The Testing Laboratory shall have prime responsibility for review, verification inspection, and/or testing of the concrete producer's materials, operations, facilities, and quality control procedures for conformance with these specifications until the mixed concrete is discharged from the mixer or truck at the project site.
2. Concrete testing services are supplementary adjuncts to the Engineering Verification Inspections and will be provided by an independent testing laboratory conforming to ASTM E 329-77 in accordance with Section 01 40 00 and ACI 301, Chapter 16.
3. The Testing Laboratory will be required to provide evidence of recent inspection of its facilities by the Cement and Concrete Reference Laboratory of the National Bureau of Standards (NBS) and to show that any deficiencies have been corrected.
4. In addition to the requirements and duties in ACI 301, Chapter 16, comply with the following provisions:
    a. One or more additional test cylinders than required in ACI 301, are to be taken during cold weather concreting and cured on the job site under conditions of concrete represented to determine safe form-stripping period.
    b. Sample (and test when directed) each shipment of cement, aggregates, and admixtures. Store samples in a protected place until authorized to dispose of them. (See 2.02 herein.)
    c. Inspect concrete batching, mixing, and delivery operations

periodically or as directed.

d. Review Manufacturer's reports and/or certification for each shipment of cement and reinforcing steel and/or conduct laboratory tests or spot checks of the materials as received for compliance with specifications.

e. Other testing or inspection as required.

5. Field inspections are to be made by a competent representative of the Testing Laboratory during all structural concreting operations including periodic audit and spot check of the Producer's and/or Contractor's quality control procedures to assure proper and adequate control. When it appears that any material furnished fails to fulfill specification requirements, the Testing Laboratory is to report such deficiency immediately to the Owner’s Representative and Contractor and appropriately record it in his report.

6. Authority and duties of Testing Laboratory: Refer to Section 01 40 00 and ACI 301, Section 16.6.

7. Responsibilities and duties of Contractor: ACI 301, Section 16.7. To facilitate testing services, the Contractor shall:

   a. Secure and deliver, at his expense, preliminary representative samples of the materials he proposes to use and which are required to be tested.

   b. Submit the concrete mix design(s) he proposes to use and make written request for approval.

   c. Furnish labor as is necessary to obtain and handle samples at the project or at other sources of material.

   d. Advise the Testing Laboratory sufficiently in advance of operations to allow for completion of quality tests and for the assignment of personnel.

   e. Provide and maintain for the sole use of the Testing Laboratory adequate facilities for safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours as required by ASTM C 31.

   f. Furnish copies of Mill Test Reports of all shipments of cement and reinforcing steel to the Owner’s Representative and the Testing Laboratory.

   g. Maintain records of cast-in-place concrete items. Record date, location of placement, quantity, air temperature, and test samples taken.

   h. Materials certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by the Owner’s Representative. Materials certificates shall be signed by Manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements.

E. Enforcement of strength requirements: Concrete compression strength test

results are to be evaluated in accordance with ACI 214 and ACI 301, Chapters 17 and 18. Should the average strength determined by the control cylinders fall below the required strength, the necessary changes in the design mix shall be made in accordance with ACI 301. Should the strength indicated by the field test cylinders fall below nominal strength, additional curing of those portions represented will be required. In the event that such additional curing will not give the strength required or in other cases where, due to faulty workmanship, the strength is in doubt, load tests conforming to ACI 318- 75, Chapter 20 or core samples (ASTM C 42) will be required as appropriate to determine the adequacy of the members in question. Should these tests show that the strength of the concrete is inadequate, strengthening or replacement will be required. All of the above requirements are to be fulfilled at the Contractor's expense.

1.05 SHOP DRAWINGS:

A. Submit shop drawings for cast-in-place concrete shown on structural drawings in accordance with Section 01 33 23, Shop Drawings, Product Data and Samples, including:
   1. Rebar placing drawings: Show bar sizes, spacing, locations, and quantities of reinforcing steel and wire fabric and supporting and spacing accessories. Provide steel order lists including bending and cutting details for all reinforcement shown on the structural "S" drawings.

B. All work covered by shop drawings is to be constructed in accordance with the approved shop drawings.

1.06 SAMPLES AND CERTIFICATES:

A. Manufacturer's specifications: Where Manufacturer's specifications, recommendations, and/or directions are referred to in the specifications, the Contractor shall deliver to the Owner’s Representative two (2) copies of such printed specifications, recommendations, and/or directions before any work is commenced.

B. Materials: The Contractor shall submit signed certificates from the suppliers of materials and manufactured items certifying that such materials and manufactured items conform to the requirements set forth in this specification. This is in addition to the requirements of Section 01 70 00, Closeout Procedures.

1.07 PRE-CONSTRUCTION CONFERENCE:

A. Prior to any construction of the concrete portions of the project, the Contractor is to call a preconstruction conference, including the project superintendent, his concrete foreman, subcontractors for this portion of the work, the Testing Laboratory, the Owner's Representative may direct in accordance with the procedures established by Section 01 31 19, Project Meetings. The purpose of this meeting is to review the requirements of the Contract Documents to assure complete understanding of the specific responsibilities of each participant and his relationship with the others involved.

PART 2 - PRODUCTS

2.01 GENERAL:

A. See General Notes on structural drawings for specific requirements (i.e., type concrete and reinforcing, design assumptions, formwork and flat work finishes, tolerances, etc.). Otherwise, conform to ACI 301 except as herein modified. All materials are to be sampled and pre-tested or certified by the Manufacturer and approved before use.

2.02 CONCRETE MATERIALS:

A. Cements: ACI 301, Section 2.1
   1. Portland Cement ASTM C 150 - Type I or II
   2. The Contractor shall assume full responsibility for the quality and soundness of cement. Cement is to be of one type and from the same mill; it is to be of uniform color for all concrete with exposed architectural concrete finishes.
   3. Where appropriate, the Manufacturer's Mill Test Reports may be accepted as certification of pre-testing of cement to be used. Where the delivery methods make it impractical to pretest and/or maintain proper identity of the tested cement, pretesting may be waived; in which case, samples are to be taken of all shipments of cement used and retained by the testing lab for a period of one year. Such samples are to be tested as directed.

B. Admixtures: ACI 301, Sections 2.2 and 3.7 - The following admixtures are permitted (or required as specified herein) if used in strict accordance with the Manufacturer's specifications or recommendations:
   1. Air-entraining admixtures: ASTM C 260 shall be used to achieve the specified air content in all permanently exposed exterior concrete. (See ACI 301, Section 3.4.)

a. "MB-AE" series or "MB-VR" series - Master Builders Co.
b. "Air Mix" - The Euclid Chemical Company

2. Calcium chloride: ACI 301, paragraph 3.4.4 and Section 3.7
3. Water-reducing admixtures: ASTM C 494, Type A containing not more than 1% chloride ions.
   a. "Eucon WR-75" - The Euclid Chemical Company
   b. "Plastocrete 160" - Sika Chemical Company
   c. "Pozzolith 322N" (Normal) - Master Builders Company
   d. "Lubricon 300 or 400" - American Admixtures and Chemical Corporation
      "Chemtard" - Chem-Masters Corporation
4. Water-reducing/accelerating Admixtures: ASTM C494, Type C or E having long-term test results showing non-rusting on metal deck and reinforcing steel shall be used in all concrete placed at air temperature below 50 degrees F.
   a. "Accelguard" - The Euclid Chemical Company
   b. "Darex Set Accelerator" - W.R. Grace and Company
   c. "LL880" - Master Builders Company
   d. "Lubricon RS" - American Admixtures & Chemical Corp.
   e. "Sikacrete" - Sika Chemical Corporation
5. Water-reducing/retarding admixtures: ASTM C 494, Type D containing not more than 1% chloride ions shall be used when concrete is placed in an ambient temperature over 80 degrees F.
   a. "Eucon Retarder 75" - The Euclid Chemical Company
   b. "Pozzolith 300R" - Master Builders Company
   c. "Plastiment" - Sika Chemical Corporation
   d. "Lubricon R" - American Admixtures & Chemical Corp.
   e. "Daratard" - W.R. Grace and Company
6. High-range/water-reducing (HRWR) admixtures: ASTM C 494, Type F or G super plasticizers containing 1% maximum chloride ions may be used with low slump (3" maximum) concrete to produce flowable concrete (up to 8" slump) with early strength gain and 28-day strengths equal to reference concrete. HRWR admixture may be used providing not more than 60 minutes is allowed from addition of admixture to final placement of concrete. HRWR admixture shall be used in concrete with a maximum water/cement ratio of 0.50 and is suggested in the following:
   a. In pumped concrete.
   b. In lieu of the specified water-reducing admixture (Type A) where confinement of placing due to heavy reinforcement or narrow space requires flowable concrete.
   c. In concrete topping slabs.
7. Materials approved for use are:
   a. "Eucon Super 37" - The Euclid Chemical Company
   b. "LA-8" - Master Builders Company

c. "Melment" - American Admixtures & Chemical Corporation
d. "WRDA 19" - W.R. Grace and Company
e. "PSP" - Protex Industries, Inc.
f. "Super P" - Anti-Hydro Waterproofing Company
g. "Sikament" - Sika Chemical Corporation
h. "Mighty 150" - ICI Americas Corporation
i. "PSI Super" - Gifford-Hill
j. Where more than 30 minutes is required between the addition of admixtures to final placement of the concrete, a combination of water-reducing, set-controlling admixtures (ASTM C 494, Types A, D, & E) as in Master Builders Company "Synergized Performance System" may be used.

8. Fly ash - ASTM C 618: The use of a quality fly ash will be permitted as a cement-reducing admixture (maximum 20%). The fly ash shall meet all of the requirements of ASTM C 618, Class C or Class F, with the following special requirements: The loss on ignition in Table 1 shall not exceed 3%. Compliance to Table 1A shall apply. The mount retained on the 325 sieve in Table 2 shall not exceed 20%. The chemical analysis of the fly ash shall be reported in accordance with ASTM C 114. Quality assurance testing and reports for a minimum of six (6) months shall be submitted by the fly ash supplier. The option to use fly ash must be approved.

C. Aggregates: ACI 301, Section 2.4
1. Normal-weight concrete - ASTM C 33
2. Lightweight concrete - ASTM C 330: Lightweight aggregates shall produce a concrete with a split cylinder strength factor (Fsp) of not less than 5.5 and a dry weight of not more than 110 pounds per cubic foot after 28 days.
3. Local aggregates: Local aggregates not complying with ASTM C 33 but which have been shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Owner’s Representative.
4. Maximum size of coarse aggregates: ACI 301, Sect. 3.6
5. Abrasive aggregates non-slip finishes: Aluminum oxide grits (Alundum), silicon carbide (Crystolon), crushed emery or carborundum particles uniformly factory-graded from 100% passing a No. 8 sieve to 90-100% retained on a No. 50 sieve.

D. Water: ACI 301, Section 2.3

E. Non-Shrink Grout: Factory premixed grout containing nonmetallic aggregates or mineral aggregates and requiring only addition of water at the site. Euco NS (non-metallic) by The Euclid Chemical Company, or masterflow 713" (non-metallic) by Master Builders. The grout shall conform to CRD-621, US

Army Corps of Engineers Specifications for Non-Shrink Grout

F. Liquid membrane-forming compounds for curing concrete - ASTM C309, Type I Class A or Federal Specification TT-C-800 Type 1 (Curing Compound shall be compatible with floor sealer or finish specified.):
   1. "Masterseal" - Master Builders Company
   2. "A-H 3-Way" Sealer - Anti-Hydro Waterproofing Company
   3. "Ecocure" - The Euclid Chemical Company
   4. "Clear Seal" - W.R. Grace and Company
   5. "Sealkure" - Toch Division, Carboline
   6. "Kure-N-Seal" - Sonneborn/Contech, Inc.
   7. "Polyclear" - Upco Chemical Division, USM Corp.
   8. "L & M Cure" - L & M Construction Chemical Company
   9. "Klearseal" - Setcon Industries
   10. "LR 151" - Protex Industries, Inc.
   11. "Hardtop" - Gifford-Hill
   12. "Quad Cure" - Symous Corporation

Note: Method of curing is to be approved by the resilient, seamless, or terrazzo flooring applicator where finishes are specified and are to meet the Resilient Tile Institute Specifications.

G. Bonding compound: Polyvinyl acetate, rewettable type
   1. "Weldcrete" - Larson Products
   2. "Everbond" - L & M Construction Chemical Company
   3. "EucoWeld" - The Euclid Chemical Company
   4. "Daraweld C" - W.R. Grace and Company
   5. "Sonocrete" - Sonneborn/Contech, Inc.

H. Epoxy adhesive: 100% solids, to component material suitable for use on dry damp surfaces
   1. "Thiopoxy" - W.R. Grace and Company
   2. "Sikadur 32 Hi-Mod" - Sika Chemical Corporation, pourable grout for anchors
   3. "Euco Epoxy" - The Euclid Chemical Company

I. Vapor Barrier:
   1. 6 Mill (0.006) Clear Visqueen
   2. "Moiststop" - Fortifiber Corporation

J. Storage of materials: ACI 301, Section 2.5

K. Certification: Certification of the above requirements is required from the admixture manufacturer prior to mix design review and approval by the Engineer. Upon request of the Owner's Representative, the Contractor shall

provide a qualified representative to assure proper use of admixtures. Use of admixtures other than listed above will be permitted only when approved prior to bidding.

2.03 PROPORTIONING: ACI 301, Chapter 3

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301, Section 3.8. If trial batch method is used, use an independent testing facility acceptable to Owner's Representative for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to the Owner's Representative.

B. Submit written reports of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed and approved.

C. Concrete types and strengths: See General Notes on drawings and ACI 301, Section 3.2.

D. Weights: All concrete shall be normal-weight concrete unless otherwise designated on the structural drawings. See ACI 301, Section 3.3 and General Notes on drawings for lightweight concrete.

E. Durability: ACI 301, Section 3.4 and ACI 201 - All concrete exposed to potentially destructive weathering, such as freezing and thawing, or to de-icing chemicals is to be air-entrained.

F. Slump: ACI 301, Section 3.5
   1. 4" maximum for consolidation by vibration
   2. 5" maximum for consolidation by other methods
   3. 8" maximum for concrete containing HRWR admixture (super plasticizer), 3" maximum before addition of HRWR

G. Selection of proportions (Mix design): ACI 301, Sect. 3.8

H. Production of concrete: (ACI 301, Chapter 7)
   1. Ready-mixed concrete:
      a. Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C94.
      b. All concrete shall be proportioned conforming to the approved mix designs and of the materials contained in those approved mixes.
      c. Plant equipment and facilities are to conform to the "Check List

for Certification of Ready-Mixed Concrete Production Facilities" of the National Ready-Mixed Concrete Association and have NRMCA certification within the past year. No switching of plants will be permitted without prior approval.

d. An approved recording device will be required to record all batches furnished or an independent testing laboratory approved by the Owner's Representative shall be employed by the Contractor to observe and record all concrete batched at the plant.

2. All other concrete: ACI 301, Section 7.2
3. Concrete produced by on-site volumetric batching and continuous mixing shall conform to ASTM C 685.
4. Use of accelerating admixtures in cold weather and retarding admixtures in hot weather shall not relax placement requirements specified herein.
5. Admixtures: ACI 301, Section 3.7 and 2.2.2 above. All concrete placed at ambient temperatures below 50 degrees F. is to contain a specified accelerator. All concrete placed at ambient temperatures above 80 degrees F. is to contain a specified retarder. All concrete required to be air-entrained is to contain an approved air-entraining admixture. When improved workability, pumpability, lower water-cement ratio, or high ultimate and/or early strength is required, the HRWR admixture (super plasticizer) may be used.
6. Adjustments to concrete mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant at no additional cost to Owner. Laboratory test data for revised mix design and strength results must be submitted and accepted before using in work.

2.04 FORMWORK: ACI 301, Chapter 4

A. The design, construction, and removal of all formwork together with its safety and performance is the complete responsibility of the Contractor.

B. The Owner's Representative will observe formwork before the concrete is placed, but the Contractor is solely responsible for adequately constructing and maintaining the forms so that they will be safe, function properly, and produce the required results. Such observation is intended to ascertain that the formwork is deemed capable of producing the desired final product.

C. Structural concrete: (Surfaces covered with other finishes - not exposed to view after completion of project)
   1. Wood form materials:
      a. Plywood: Moisture-resistant, concrete form plywood

commercial standard Exterior grade, edges sealed

b. Lumber: No. 2 dressed lumber: Southern yellow pine, white pine, or Douglas fir

c. Nails, spikes, lag bolts, thru bolts, ties, and anchorages: Sized as required and of sufficient strength and character to maintain formwork in place while pouring concrete

2. Steel centering: Corrugated steel forms (permanent), see Structural Drawings.

3. Tolerances: ACI 301, Section 4.3

D. Formwork accessories:

1. Form ties: Removable or snap-off metal type with sufficient strength to support formwork and free of defects which will leave holes larger than 1" in concrete surface

2. Pre-formed construction joints: ACI 301, Sections 6.1 and 8.5

3. Expansion joints: ACI 301, Section 6.2 - ASTM D 994

4. Dovetail anchor slots, securable to concrete form work: Equal to Heckman #100, 16-gauge steel, foam-filled, sealed slots with bent tab anchors to mate with Section 04200 ties.

5. Flashing reglets: Stainless or galvanized steel of sizes and at locations shown on drawings complete with alignment splines for joints and securable to concrete formwork.

6. Wedge inserts: Equal to Heckman #425 in size and location shown on the drawings.

7. Other embeds as furnished by needing contractor.

2.05 REINFORCING MATERIALS: ACI 301, Section 5.2

A. Reinforcing bars (rebars): Grade 60, deformed. Provide certification of "Carbon Equivalent" AWS D1.4-79, para. 1.2.4 for all rebars to be welded.

B. Welded wire mesh: ACI 301, sub-para. 5.2.5.2 - ASTM A 185-79

C. Welding: ACI 301, Section 5.3 and AWS D1.4-79

D. Accessories: ACI 301, para. 5.5.3 - As called for in the ACI Manual of Standard Practice for Detailing Concrete Structures (ACI 315-80), the CRSI Manual of Standard Practice (MSP-2-81), or other suitable types approved unless specifically shown otherwise on plans.

E. Fabrication and placement tolerances: (ACI 301, Sections 5.4 and 5.5 or CRSI Code of Standard Practice, Chapter 7)

2.06 Vapor Barrier: Provide cover over prepared base material at slabs-on-grade. Use only materials which are resistant to decay when coated and tested in accordance

with ASTM E 154.

A. Provide polyethylene sheet not less than 6 mils thick, or

B. Vapor barrier shall be placed beneath all concrete interior building slab-on-grade.

PART 3 - EXECUTION

3.01 GENERAL:

A. Install all CIP concrete work in accordance with ACI 301 except as herein specified.

3.02 FORMWORK: ACI 301, Chapter 4 and ACI 347

A. Formwork erection:
   1. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions agree with drawings.
   2. Design and construct formwork, shoring, and bracing to meet design and code requirements so that resultant finished concrete conforms to required shapes, lines, and dimensions and will safely support the wet concrete.
   3. Arrange and assemble formwork to permit dismantling and stripping so that concrete is not damaged during its removal.
   4. Align joints and make watertight to prevent leakage of mortar and disfigured appearance of concrete. Keep form joints to a minimum.
   5. When using earth forms, hand-trim sides and bottoms and remove loose dirt prior to placing concrete
   6. Obtain Engineer's review before framing openings in structural elements which are not indicated on approved shop drawings.
   7. Provide bracing to ensure stability of formwork including provision for construction loads.
   8. Tolerances: See ACI 30l, Table 4.3.1.
   9. Preparation of formed surfaces: ACI 301, Section 4.4 Where a finished surface is to be painted or covered, the materials applied to the formed surfaces are to be compatible with the type of covering to be used. Apply in accordance with Manufacturer's recommendations. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which may be affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

B. Joints and embedded items: ACI 301, Chapter 6

1. Installation of embedded items: Set and build into work anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached thereto.
2. Coordinate work of other sections and cooperate with trade involved in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts. Do not perform work unless specifically indicated on approved shop drawings or as approved.
3. Install concrete accessories in accordance with Manufacturer's recommendations and straight, level, and plumb. Ensure that items are not disturbed during concrete placement.
4. Install water stops continuous without displacing reinforcement; seal joints watertight.

C. Openings: The Contractor shall form all mechanical openings except pipe and sleeve inserts. Pipes and sleeves are to be set by the appropriate subcontractor responsible for that portion of the work as approved.

3.03 REINFORCEMENT: ACI 301, Chapter 5

A. Placement: ACI 301, Section 5.5
1. Place reinforcing, supported and secured against displacement as indicated on approved rebar placing drawings.

3.04 CONCRETE:

A. Placement: ACI 301, Chapter 8
1. Notify Owner’s Representative a minimum of 24 hours prior to commencement of concreting operations.
2. Ensure that anchors, seats, plates, and other items to be cast into concrete are placed, held securely, and will not cause hardship in placing concrete.
3. Ensure that reinforcement, inserts, embedded parts, and formed expansion and contraction joints are not disturbed during concrete placement.
4. At construction joints, prepare previously placed concrete by cleaning with steel brush.

B. Depositing concrete: ACI 301, Section 8.3
1. Pour concrete continuously between predetermined approved construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
2. Conform to ACI 305 when concreting during hot weather.
3. Conform to ACI 306 when concreting during cold weather.

4. Maintain concrete cover around reinforcing as per Section 3.03 above and ACI 301, paragraph 5.5.1.

C. Protection of cast concrete: ACI 301, Section 3.4

D. Repair of surface defects: ACI 301, Chapter 9
   1. Allow Engineer to inspect concrete surfaces immediately upon removal of forms. Patch imperfections as needed or as directed.
   2. Modify or replace concrete not conforming to required lines, details, and elevations.
   3. Repair or replace concrete with excessive honeycombing and other defects due to improper placement. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of the Owner's Representative for each individual area.
   4. Tie holes shall be filled solid with patching mortar.

E. Finishing of formed surfaces: ACI 301, Chapter 10
   1. Tops of forms:
      a. Strike concrete smooth at tops of forms.
      b. Float to texture comparable to formed surfaces.
   2. Formed surfaces:
      a. Permanently exposed surfaces and surfaces to be painted: ACI 301, paragraph 10.2.2 - Smooth Form Finish
      b. Surfaces in unfinished areas unexposed to public 4view: ACI 301, para. 10.2.1 - Rough Form Finish

F. Slabs: ACI 301, Chapter 11
   1. Slabs-on-grade:
      a. Preparation of sub-grade (ACI 301, Section 11.2)
      b. Place floor slabs on grade by "strip cast" method. Contraction joints where shown on drawings shall be saw-cut 1/4 of the depth of slab thickness or a "Zip Cap" control joint former as manufactured by Greenstreak Plastic Products, installed in accord with the Manufacturer's recommendations.
      c. Where indicated on the plans, separate slabs- on-grade from vertical surfaces with 1/2" thick joint filler. Extend joint filler from bottom of slab to within 1/8" of finished slab surface.
      d. Finishes: ACI 301, para. 11.7.3 - Troweled finish, Class A tolerance.
      e. Finishing Tolerances: ACI 301, Section 11.9, Class A. In addition, floor slabs shall not vary more than 1/16" in any 2'-0 from a true, straight edge.
      f. Slope to floor drains typically to be 1/2" unless shown.
   2. Floor slabs: ACI 301, Chapter 11
      a. Finishes: ACI 301, paragraph 11.7.3, - Troweled finish, Class

A tolerance

b. Tolerances: Floors - ACI 301, Section 11.9, Class A. In addition, floor slabs shall not vary more than 1/16 inch in any 2'-0" from a true, straight edge. Floated finish, Class B tolerance - para. 11.9.3

3. Non-slip aggregate finish: Apply non-slip aggregate finish to concrete stair treads, platforms, and ramps; also provide elsewhere as indicated on drawings. After completion of float finishing and before starting trowel finish, uniformly spread 25 pounds of dampened non-slip aggregate per 100 square feet of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose non-slip aggregate.
4. Slopes to floor drains typical to be 1/2" unless shown otherwise.

G. Curing and protection: ACI 301, Chapter 12

1. All exposed surfaces of concrete including floor slabs, whether or not they receive a finish flooring, shall be protected from premature drying for a minimum of seven days. Freshly placed concrete shall be protected against wash by rain.
2. Contractor's attention is directed to the fact that experience shows the most important time of curing is from three to four hours after placing and extending five to six hours thereafter. It is extremely important, therefore, to prevent loss of moisture, particularly during this period when concrete is especially vulnerable to shrinkage cracks.
3. During the period of curing, no traffic on or loading of the floors will be permitted.
4. All interior floor slabs to receive resilient tile or carpet or to be left exposed shall be cured with the specified clear curing compound, ASTM C 309 Type 1, Class A, (2.02 above). The resulting surface is to be dust-free and compatible with all resilient floor adhesives, toppings, or other finish materials specified.
5. All other interior slabs shall be cured with a curing compound applied. (See 2.02 above.)
6. All curing compounds are to be placed immediately after final finishing (i.e., within two hours).

H. Patching: ACI 301, Section 13.6

I. Evaluation and acceptance of concrete: ACI 301, Chapter 17

3.05 ACCEPTANCE OF STRUCTURE: ACI 301, Chapter 18

3.06 MISCELLANEOUS CONCRETE:

A. Equipment bases and foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment with template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

B. All site concrete for curbs, sidewalks, stairs, etc. shall be 4,500 lb. limestone aggregate concrete (air- entrained).

3.07 NON-SHRINK GROUT:

A. Preparation:
   1. All defective concrete, laitance, dirt, oil, grease, and loose material shall be removed from the concrete bearing surface by bushhammering, chipping, or other means until sound, clean concrete is obtained. The bearing surface shall be left reasonably rough but not so rough as to interfere with proper placing of the grout. The area shall be covered as completely as possible with waterproof paper to prevent contamination prior to grouting.
   2. The bottom of the setting plates shall be cleaned of all dirt, rust, oil, grease, and loose material. Setting plates shall be aligned and leveled in their final position and maintained in that position during grouting.
   3. Special care shall be taken with the grout in hot and cold weather to ensure proper setting and gain of strength in accordance with the information supplied by the manufacturer of the ready-to-use grouting materials.
   4. Prior to grouting, the waterproof paper shall be removed and all loose dirt and matter cleaned away by compressed air or other means. Remove oil, grease, and other foreign matter from the bearing surface and setting plate. Saturate concrete surfaces with water and scrub sides and bottom with a circular brush such as a bottle brush. Remove excess water from the surface just prior to placing the grout.

B. Mixing:
   1. Grout material and water shall be mixed in accordance with Manufacturer's recommendations in a mortar mixer to ensure even distribution of components.
   2. Mixer shall be as close as possible to the plate to be grouted. Adequate means shall be provided to transport the mixed grout to the plate being grouted as quickly as possible and in such a manner as to prevent segregation.
   3. No more grout shall be mixed at one time than can be placed in a period of 30 minutes. After the grout has been mixed, it shall not be re-tempered by adding additional water.

C. Grouting:

1. The grout shall be placed quickly and continuously to avoid undesirable effects of overworking or stiffening which might result in breaking down of the initial set.
2. The grout shall be placed by the most practical means that results in completely filling the space to be grouted. The grout may be poured in place or pressure grouted by gravity or a plunger.
3. Whenever practical, grout shall be poured from one side only so as to flow across to the open side to avoid air entrapment.
4. Grout shall be thoroughly compacted and free of air pockets.
5. Form shoulder and trowel smooth.

END OF SECTION

SECTION 07 92 00

SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 SUMMARY

A. Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and air.

B. Related Work:

Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.02 SUBMITTALS:

A. Product data: Within 45 calendar days 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. Manufacturer's recommended installation procedures which, when approved, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Samples: Upon request, submit samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used.

1.03 QUALITY ASSURANCE

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.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of the General Conditions and Supplemental General Conditions of the Work.

B. Do not retain at the job site material which has exceeded the shelf life

recommended by its manufacturer.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Sealants for all exterior locations and at interior locations where color coordination is required shall be Tremco Dymeric. Provide Tremco Primers and Bond Breakers as recommended by the sealant manufacturer.

B. Sealant for horizontal installation over the expansion joints in the exterior Portland cement concrete paving shall be self-leveling Tremco THC-901 sealant. Colors shall be as selected from the manufacturer's standard colors.

C. Back-up materials for sealants shall be as recommended by the sealant manufacturer. Back-up materials shall have a diameter of approximately 25% to 50% greater than the width of the joint.

D. Solvents, primers and cleaning agents as recommended by the caulking and sealant manufacturers.

E. Colors:

1. Colors for each sealant installation will be selected by Owner's Representative from standard colors normally available from the specified manufacturer.
2. In concealed installations, and in partially or fully exposed installations where so approved, use standard gray sealant.

2.02 PRIMERS

A. Use only those primers which have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials which are non-absorbent non-staining, and specifically recommended for this installation by the manufacturer of the sealant used.

2.04 MASKING TAPE

A. For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to substrate.

2.05 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a 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. Examine the areas and conditions under which the 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 PREPARATION

A. Concrete and CMU surfaces:

1. Install only surfaces which are dry, sound, and well brushed, wiping free from dust.
2. At open joints, remove dust by mechanically blown compressed air if so required.
3. To remove oil and grease, use sandblasting or wire brushing.
4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
5. Remove laitance and mortar from joint cavities.

B. Metal surfaces:

1. Metal surfaces in contact with sealant:
   a: Remove temporary protective coatings, dirt, oil, and grease.
   b: When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION

A. Caulking and sealants application shall include, but is not limited to the following:

1. Expansion joints.
2. Between dissimilar materials.

3. At areas to prevent the entrance of moisture.
4. Other areas as detailed on the Drawings.

B. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

C. Installation tool:

1. For installation of backup material, provide a blunt-surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protrusion of the required dimensions to assure uniform depth of backup material below the sealant.
2. Using the approved tool, smoothly and uniformly place the backup material to the dept indicated on the Drawings or otherwise required, compressing the backup material 25% to 50% and securing a positive fit.

D. Apply sealants and caulking only when temperatures are as recommended by the manufacturers. Storage of all material shall be at room temperature with material being used on a first in, first out basis.

E. All caulking and sealants will be installed with guns having the proper size nozzles. Use even pressure, sufficient to fill all voids and joints solid.

F. Joints to be painted shall be even and smooth. Caulking that is to be painted shall be installed before the last coat of paint is applied.

G. Sealant to be installed over horizontal expansion joints shall be installed after area is cleaned and primed as outlined above. Fill in joints in a manner to avoid air voids. Bring to a level, even joint, slightly below the top of the paving. Minimum depth of the joint shall be one-half inch (1/2”) at Portland cement concrete paving.

H. Install backer rods in joints more than one-half inch (1/2”) deep of size and type specified. Rod shall be set for approximately three-eighths inch (3/8”) depth of compound.

I. Every caulked or sealed joint shall be watertight.

3.04 PRIMING

A. Use only the primer approved for the particular installation, applying in strict accordance with the manufacturer’s recommendations.

3.05 BOND-BREAKER INSTALLATION

A. Provide an approved bond-breaker where recommended by the manufacturer of the sealant, adhering strictly to the manufacturer's installation recommendations.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings and verify that the required proportion of width of joint to depth of joint has been surfaced.

B. Equipment:

1. Apply sealant under pressure with power-actuated hand gun or manually-operated hand gun, or by other appropriate means.
2. Use guns with nozzle of proper size, providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

1. Provide uniformly smooth joints with slightly concave surface.
2. Do not use tooling agent unless specifically so recommended in writing by the manufacturer of the sealant.

F. Cleaning up:

1. Remove masking tape immediately after joints have been tooled.
2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
3. Upon completion of the work of this Section, promptly remove from the job site all debris, empty containers, and surplus material derived from this portion of the Work.

END OF SECTION

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SECTION 31 20 10

FINISH GRADING OF ATHLETIC FIELDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Project Condition

Finished grades of athletic fields must conform to the elevations indicated on the plans, within a tolerance of plus or minus 1/2". All fields require dual slope laser grading.

B. Scope of Work

Excavate, fill, grade and install materials required for the successful construction of playing fields, as shown on the plans. Work includes, but is not limited to:

1. Fine grading of the athletic fields to required elevations.
2. Sand base material.
3. Dust control.
4. All fields will require dual slope laser grading.

1.02 PROTECTION

A. Protect excavations and grounds from water ponding and water damage. Construct and maintain temporary drainage pumping if required to keep excavations free of water. Maintain site in a well-drained condition at all times.

B. Protect, maintain and restore bench marks, monuments, and other reference points affected by this work. If bench marks, monuments or other permanent reference points are displaced or destroyed, points shall be re-established and markers reset under supervision of a licensed surveyor who shall furnish Owner's Representative with certification of his work.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 ATHLETIC FIELDS

A. Field surface to be compacted to 90% Proctor density.

B. All fields are to be raked with a hard rake.

C. Contractor shall drag or rake the athletic fields with a rock picker to remove small stones and debris prior to seeding or sodding, to level all areas to the finish grades indicated, plus or minus 1/2". All stone and debris are to be removed off-site and properly disposed of.

3.02 DUST CONTROL

Use all means necessary to control dust on and near the Work if such dust is caused by the Contractor's operations during performance of the Work or is resulting from the condition in which the Contractor leaves the site.

3.03 VERIFICATION

A. At end of construction, Owner's Representative will verify all grades of athletic fields.

B. All fields will be checked for elevation and if not within 1/2" plus or minus per foot, regrading will be required.

END OF SECTION

SECTION 32 13 20

EXPANSION, CONSTRUCTION, AND CONTROL JOINTS

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03 10 00: Concrete Forming and Accessories

B. Section 03 30 00: Cast-in-Place Concrete

1.02 SUBMITTALS

A. Submit warranty from supplier stating that materials meet requirements referenced herein.

1.03 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site marked for easy identification.

B. Handle and store materials to prevent contamination.

PART 2 - PRODUCTS

2.01 BOND BREAKERS

A. Tape for Expansion Joints: Adhesive-backed glazed butyl or polyethylene tape, same width as the joint, that will adhere to the pre-molded joint material or concrete surface.

B. Use either bond breaker tape or a bond prevention material, non-staining type, as specified in Section 03 30 00, Cast-in-Place Concrete, except where a tape is specifically called for.

2.02 PREMOLDED JOINT FILLER

A. As specified in Section 07900, Sealants and Caulking.

2.03 ACCESSORIES

A. Non-Shrink Grout: MasterFlow 713 (non-metallic) by Master Builders, or approved equal. The grout shall conform to CRD-C-621-80, US Army Corps

of Engineers Specifications for Non-Shrink Grout.

B. Reinforcing Steel: As specified in Section 03 20 00, Concrete Reinforcement.

C. Masking Tape: As required to temporarily adhere to concrete at each side of joint to receive filler.

D. Waterstops

1. Waterstops at joints shall be Sika Greenstreak, 3400 Tree Court Industrial Blvd., St. Louis, Missouri 63122, PVC waterstops or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Locate joints as shown.

B. Construct straight joints; make vertical or horizontal, except where walls intersect sloping floors.

C. Commence concrete placement after the joint preparation is complete.

3.02 SURFACE PREPARATION

A. Construction Joints: Prior to placement of abutting concrete, clean contact surface:

1. Remove laitance and spillage from reinforcing steel and dowels.
2. Roughen surface to a minimum of 3" amplitude:
   a. Sandblast after the concrete has fully cured.
   b. Water blast after the concrete has partially cured.
   c. Green cut fresh concrete with high pressure water and hand tools.

3.03 INSTALLATION

A. Secure pre-molded joint filler to form and/or adjacent concrete with galvanized nails and/or construction adhesive.

END OF SECTION

SECTION 32 13 40

CONCRETE CURBS, GUTTERS AND SIDEWALKS

PART 1 - GENERAL

1.01 INSPECTION AND TESTING

A. Perform work in accordance with ACI 31.

B. Inspection and testing concrete will be performed in accordance with Arkansas State Highway and Transportation Department's Standard Specifications for Highway Construction.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Materials: As specified in Section 03 30 00, Cast-in-Place Concrete.

B. Air entraining admixtures: ASTM C260.

C. Reinforcing Steel and Welded Wire Fabric: As specified in Section 03 20 00, Concrete Reinforcement.

2.02 FORMWORK AND ACCESSORIES

A. Formwork: Adequately stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of concrete.

B. Isolation Joint Fillers: Closed cell polyethylene joint backing with minimum ¼" x ¼" joint.

C. Poured Joint Sealer: FS TT-S00227E, Type 1, Class A and ASTM C920-86, Type M, Grade P, Class 25. Vulkem 245 by Mameco, Polyurethane Sealant.

D. Construction Joint Forms: Keyed load-transfer shape.

E. Drain Pipe: Reinforced Concrete, ASTM C76.

F. Curing Compound: Ashford Formula manufactured by Curecrete Chemical Co.

1. Must meet ASTM-C42, ASTM-C805 and ASTM-G213

2.03 CONCRETE MIX

A. As specified on Plans; 4,000 psi at 28 days; maximum slump: five inches (5").

PART 3 - EXECUTION

3.01 PREPARATION OF SUB-GRADE

A. Ensure rough grading has brought sub-grade to require elevations, uniform in composition and compaction and moist when concrete is deposited.

B. Remove water, snow, ice, hardened concrete and foreign matter.

C. Fill soft spots and hollows with additional fill and re-compact.

3.02 PLACING CONCRETE

A. Place concrete, screed and provide broom finish, free of open texturing and exposed aggregate, or as specified on the plans. Provide steel trowel finish at all paving edges and joints.

B. Avoid working mortar to surface.

C. At walks, make one-fourth inch (1/8") wide sawed or dummy joints at intervals shown on the plans, or six feet (6') on centers if not shown on the plans.

D. Round edges, including edges of construction and control joints, with one fourth inch (1/4") radius edging tool, or as detailed on the plans.

E. Form curbs, doweled to concrete paving.

F. Where paved surfaces are adjacent to walks, make concrete curbs and gutters integral with walks. Make expansion joints of walks coincide with expansion joints in paving. Make expansion and contraction joints of curbs coincide with walk joints.

END OF SECTION

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SECTION 32 31 13

CHAIN LINK FENCING AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification sections, apply to the work of this section.

B. Related Work Specified Elsewhere

1. Section 31 23 00: Excavation and Fill
2. Section 03 10 00: Concrete Formwork
3. Section 03 30 00: Cast-in-Place Concrete

1.02 DESCRIPTION OF WORK

A. Installation of chain link fences and gates as indicated on drawings.

1.03 QUALITY ASSURANCE

A. Provide chain link fences as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

1.04 REFERENCES

The chain link fences shall comply with the following standards:

A. ASTM A392 Specification for Zinc-Coated Steel Chain-Link Fence Fabric

B. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

C. ASTM F552 Standard Terminology Relating to Chain Link Fencing

D. ASTM F567 Standard Practice for Installation of Chain Link Fence

E. ASTM F626 Specification for Fence Fittings

F. ASTM F900 Specification for Industrial and Commercial Swing Gates

G. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework

H. ASTM F1083 Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures

1.05 SUBMITTALS

A. Product Data: Submit manufacturer's technical data, and installation instructions for metal fencing and steel chain link fence fabric and accessories.

PART 2 - PRODUCTS

2.01 GENERAL

A. Dimensions indicating form pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

B. Available Manufacturers: Submit to compliance with requirements, manufacturers offering products offering products which may be incorporated in the work include the following (in alphabetical order):

1. Allied Tube and Conduit Corporation (www.atcfence.com)
2. American Fence Corporation (www.americanfencecorporation.com)
3. Jamieson Fence Supply (www.jamiesonfence.com)
4. Master Halco (www.masterhalco.com)
5. Merchants Metals (www.merchantsmetals.com)

2.02 STEEL FABRIC

A. Fabric: No 9 gauge wires, two-inch (2") mesh with both top and bottom selvages knuckled (K&K).

B. Furnish one-piece fabric widths for fencing up to six (6) feet in height.

C. Fabric and Post Finish: Finish shall be Galvanized Steel Chain Link Fence Fabric. Class 1 GAW, as per ASTM A-392.

2.03 FRAMING AND ACCESSORIES

A. Finish: All framing and accessories to match finish of fence fabric.

B. Steel Framework, General: Galvanized steel, ASTM A53, with not less than 1.8 ounces zinc per square foot of surface.

1. Fittings and Accessories: Galvanized, ASTM A 153, with zinc weights per Table I.

C. End, Corner and Pull Posts: Minimum sizes and weights as follows:

1. 3.0" OD steel pipe.

D. Line Posts: Space ten (10) feet on centers (o.c.). maximum, unless otherwise indicated, of the following minimum sizes and weights.

1. 2.0" OD steel pipe, Type I

E. Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

1. 3.0" OD steel pipe, Type I, overall gate widths up to ten (10) feet
2. 4.0” OD steel pipe, Type I, overall gate widths ten (10) feet or greater

F. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately six (6) inches long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

1. 1.66" OD pipe, Type I.

G. Tension Wire: 7 gauge, coated coil spring wire, metal and finish to match fabric. Locate four (4) inches above bottom of fabric.

H. Wire Ties: 9 gauge galvanized steel or aluminum alloy.

I. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375-inch diameter rod and adjustable tightener.

J. Post Tops: Provide weathertight closure cap with loop to receive tension wire or top rail and set screw retainer; one cap for each post.

K. Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 1/4" x 3/4". Provide one (1) stretcher bar for each gate and end post, and two (2) for each corner and pull post, except where fabric is integrally woven into post.

L. Stretcher Bar Bands: Space not over fourteen (14) inches o.c. to secure stretcher bars to end, corner, pull, and gate posts.

2.04 FIELD SIGNS

A. Field signs shall be as detailed on the plans.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Final grading must be completed before beginning installation and erection of fence.

B. Excavation: Drill or hand excavate (using post hole digger) holes for posts to diameters and spacings shown, in firm, undisturbed or compacted soil.

C. Setting Posts: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Center and align posts in holes six (6) inches above bottom of excavation. Place concrete around posts and vibrate to tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Top of concrete footing to be crowned to shed water away from the post. Line posts installed at intervals not exceeding ten (10) feet on centers.

D. Hydroseeding shall be placed, as specified on the plans, after installation of fabric.

E. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.

F. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.

G. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.

H. Tension Wire: Tension wire to be stretched taut, independently and prior to the fabric, between the terminal posts and secured to the terminal post using a brace band. Install tension wires through the brace band before stretching fabric and tie to each post cap with not less than 6 gauge galvanized wire. Fasten fabric to tension wire using 11 gauge galvanized steel hog rings spaced twenty-four (24) inches o.c.

I. Fabric: Leave approximately one (1) inch between finish grade and bottom selvage, unless otherwise indicated. Ground clearance is not to exceed two (2) inches. Pull fabric taut and tie to posts, clay rails, and tension wires. Install fabric on inside of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

J. Stretcher Bars: Thread through or clamp to fabric four (4) inches o.c., and secure to posts with metal bands spaced fourteen (14) inches o.c.

K. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached,

clasping pipe and fabric firmly with ends twisted at least two (2) full turns. Bend ends of wire to minimize hazard to persons or clothing.

1. Tie fabric to line posts, with wire ties spaced twelve (12) inches o.c. Tie fabric to rails and braces, with wire ties spaced twenty-four (24) inches o.c. Tie fabric to tension wires, with hog rings spaced twenty-four (24) inches o.c.

L. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

M. Bolts: Carriage bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

N. Gates: Installation of swing gates and gateposts shall be in compliance with ASTM F 567. Direction of swing shall be or outward. Gates shall be plumb in the closed position having a bottom clearance of three (3) inches, grade permitting. Hinge and latch offset opening space shall be no greater than three (3) inches in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum six (6) inches in diameter, twenty-four (24) inches deep. Gate leaf holdbacks shall be installed for all double gates.

O. Clean Up: The area of the fence line shall be left neat and free of any debris caused by the installation of the fence.

END OF SECTION

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SECTION 32 84 00

UNDERGROUND IRRIGATION SYSTEM

PART 1 - GENERAL

1.01 PROJECT DESCRIPTION

A. The Contractor shall provide all materials, labor, tools, equipment and other items required for the execution and completion of the irrigation work for areas of the project as herein specified and indicated on the drawings.

B. The completed system shall be fully operational including electric irrigation controller and valves. The system shall apply an even amount of water to the coverage areas as per the plans and equipment manufacturer's specifications.

1.02 GUARANTEE AND MAINTENANCE

A. All materials shall be new, and fully guaranteed for one year to be without defect, and of commercial quality or better. The installed system is guaranteed by the Contractor for one year from date of written acceptance to give uniform distribution and even coverage.

B. Maintenance of the system: (i.e., raising and lowering of heads, cleaning and adjustment of heads, raising and lowering of trenches, and assurance that the system will give full and adequate coverage.) Maintenance of the system shall be provided by the Contractor at no charge until the completion and written acceptance of the installation as part of the contract. This maintenance shall include draining and winterizing the system in the winter, as well as starting up the system in the spring.

1.03 SUBMITTALS

A. Design of System: The irrigation system has been designed specifically for the use of certain sprinkler equipment meeting this specification. Pipe sizes have been determined by computation of pressure losses in the piping and equipment based on column demand and required operation.

B. The system design is based on the operating pressure of the specified sprinkler equipment. The positioning and placement of the sprinklers have also been determined by the operating characteristics of the specified sprinklers. Therefore, substitution shall not destroy the operation and intent of design of the irrigation system.

C. Substitutions: In view of the foregoing, no substitutions will be allowed except with a similar brand, the following procedure must be used to obtain approval of substitute equipment. The Bidder desiring to make a substitution for the specified equipment shall submit the following to the Owner's Representative:

1. Actual samples of each type of irrigation equipment proposed as a substitute.

2. Manufacturer's catalog sheet showing full specification of each sprinkler/equipment proposed as a substitute, i.e., discharge in GPM, minimum allowable operating pressure at the sprinkler, maximum allowable spacing and distance of throw of the written approval must accompany the bid.

3. No approval by the Owner's Representative of a substitution for the specified equipment will be obtained before a bid is submitted.

4. Revised irrigation drawing showing head layout, valve locations, etc.

5. No increased cost to the Owner.

1.04 SPECIAL REQUIREMENTS

A. The Contractor shall verify pressure and volume of supply as provided by the existing water system and the pump system proposed. The Contractor shall guarantee the operation of the system. Upon completion of the project, each sprinkler on the system shall have sufficient pressure and volume of water for optimum performance and coverage.

B. Do not willfully install the sprinkler system as indicated on the drawings when it is obvious in the field that unknown obstructions or grade differences exist that might not have been considered in the engineering, or if discrepancies are discovered. All such obstructions or discrepancies shall be brought to the attention of the Owner's Representative. In the event this is not done, the Contractor must assume full responsibility for revisions if necessary.

C. Comply with all local and state codes, ordinances, safety orders, and regulations of all legally constituted authorities having jurisdiction over this work.

D. The Contractor shall make sufficient provisions that the Owner's property will not be damaged by any construction operation.

E. The Contractor shall schedule all work so that there is no conflict with the visitors or staff of the Owner.

F. The Contractor will be required to locate or coordinate the irrigation system with any underground utilities. Damage to existing underground utilities will be paid for by irrigation Contractor. Particular attention must be addressed to the installed electrical system.

PART 2 - PRODUCTS

2.01 POLYVINYL CHLORIDE PIPE AND FITTINGS

A. PVC pipe shall be manufactured in accordance with standards noted herein.

1. Marking and identification: PVC pipe shall be continuously and permanently marked with the following information: Manufacturer's name, pipe size, type of pipe and material SDR number, ASTM standard number, and the NSF (National Sanitation Foundation) seal.

2. All PVC piping and sleeves shall be Class 200 except 1/2" diameter and below which shall be Class 315. All backflow preventer piping shall be Schedule 40 PVC as per codes.

3. All PVC solvent weld and threaded nipples shall be Schedule 80.

B. PVC pipe fittings shall be Schedule 40 solvent weld or thread type and shall be compatible with PVC pipe furnished.

2.02 SWING JOINTS

A. Swing joints will be required for all sprinkler connections. Flexible pipe is not acceptable.

B. Use Schedule 40 swing joints.

2.03 WIRE

A. Type UF, 14 Gauge, Solid Strand Copper, which is Underwriters' Laboratory approved for direct underground burial when used in a National Electrical Code Class II Circuit (30v AC or less).

B. All wire splices shall be made with an epoxy or resin splice kit with a locking cap. Spears Drisplice, 3M DBY, 3M DBR or equal.

C. Provide decoder wiring and decoder units for the specified controller, in accordance with manufacturer's recommendations.

2.04 SPRINKLER HEADS AND NOZZLES

A. Sprinkler heads shall be supplied in accordance with the specifications, details, and legend on the drawing.

B. Sprinkler heads shall be connected to the lateral line by swing joints.

C. All pop-up sprinklers in established turf areas shall be installed with the top of the cap at finished grade.

2.05 ELECTRIC IRRIGATION CONTROLLER

A. The electric irrigation controller shall be fully automatic and energized by 120 v. electric power supplied by the Owner as per local electrical codes. The controller shall send a 24v. current to the control valves via control wire pairs.

B. The controller shall have A & B programming flexibility. The controller shall have the number of control stations as indicated on the drawing.

C. The controller shall be capable of a remote pump start and master valve operation.

D. Connect only one control valve hot wire to one wire terminal position at the controller.

E. Manufacturer's specifications and installation instructions for the irrigation controller and rain switch shall become part of these specs.

2.06 CONTROL VALVES & VALVES BOXES

A. All electric irrigation control valves shall be fully automated by a 24v. electric current sent from the irrigation controller. All valves shall be plastic, globe configuration, commercial grade, and have a flow control adjustment stem.

B. Plastic, 15" standard, valve boxes shall be installed flush with the finished grade for each valve location shown on the drawings. Each valve box lid shall be lockable and accessible only with a valve box key. Valve box top will

have a valve number stenciled on top that corresponds to number in controller.

C. Manufacturer's specifications and installation instructions for control valves shall become a part of these specifications.

D. All control valves shall be installed with a minimum of 2" horizontal clearance of the valve box, and the valve stem shall have a 4" to 6" vertical clearance of the valve box lid.

2.07 QUICK COUPLERS

A. Provide 1" quick coupler with same number of keys and swivel els.

B. All quick couplers to be brass and staked as shown in details.

C. Once key and swivel els have been attached, entire assembly must move freely.

PART 3 - EXECUTION

3.01 INSTALLATION GENERAL

A. Staking: Should a discrepancy in the plans become apparent during installation, such discrepancy shall be brought to the attention of the Owner's Representative.

3.02 EXCAVATION, BACKFILL, AND SAFETY PRECAUTIONS

A. All excavation in this contract shall be unclassified and is to include earth, loose rock, rock or any combination thereof, in wet or dry state. The Contractor may use a vibratory plow to pull irrigation pipes in to the ground for the system.

B. It shall not be necessary for the Contractor to remove any turf or sod prior to trenching or pulling.

C. All trenches shall be backfilled with the materials removed and shall conform to adjacent grades without dips, sunken areas, humps, or other irregularities.

D. The Contractor shall take precautions to avoid accidental injury to persons and pedestrians in the project area. At no time shall equipment or materials

be stored on walkways. Materials, pipes, and other items shall be stored in one designated, and approved, storage area away from pedestrian traffic.

E. All suitable backfill material shall be loaded into the trench in four-inch lifts. Each lift shall be tamped or flooded to prevent after settling. The Contractor may leave a three-inch soil layer over trenches to accommodate for initial settling. After initial settling, and prior to establishment of the surface treatment, all excavated areas shall be hand raked to leave the soil grade in as good or better condition than before excavation.

F. Should settlement of the grade over irrigation trenches occur, the Contractor shall be required to remove surface vegetation, refill soil to proper grade, and replace the surface treatment without extra cost to the Owner. In turf areas where excavated settling is less than one inch, the Contractor may bring the settled area back to grade with a sand top-dress process. The Contractor shall perform this work as necessary during the guarantee period.

G. Existing trees and shrubs shall not be damaged. Route all trenches outside of tree drip lines to minimize damage to existing tree roots. When necessary, the Contractor shall excavate under or around any major tree roots. Major tree roots shall not be cut.

H. It is understood that the piping layout is diagrammatic, and piping shall be routed around existing underground pipes or utilities in such a manner as to avoid damage to these elements. The Contractor shall have all existing pipes and utility lines located within the work area prior to any trenching. Any damage and subsequent repair of streets, walks, pipes, and utility lines shall be the responsibility of the Contractor.

3.03 PIPE INSTALLATION

A. Main Line Pipe: The piping between the source of water supply and the electric control valves which is under constant pressure is hereinafter referred to as the "main line" in this project.

B. Lateral Line Pipe: The piping on the discharge side of the control valves which connects the sprinkler heads to the valve is hereinafter referred to as the "lateral line".

C. Main line: All electric control valves shall be installed on the main line. The Contractor shall maintain at least 24" of fill over all main line pipes.

D. Lateral lines: The Contractor shall maintain at least 18" of fill over all lateral line pipes.

E. All lumber, rubbish, and large rocks shall be removed from the excavated trenches. Snake the pipe in the trenches to allow for expansion and contraction. Wedging or blocking of pipe will not be permitted. Do not glue and install PVC pipe when temperature is 32 degrees F. or below.

F. Install a continuous strip of metal detector tape on the top side of all mainline piping.

3.04 PVC PIPE AND FITTING ASSEMBLY

A. Cleaning: All foreign matter or dirt shall be removed from inside and outside of pipe before gluing, and piping shall be kept clean by approved means during and after installation of pipe.

B. All glue joints shall be made using PVC primer and PVC medium bonded cement as recommended by the manufacturer.

C. Flush pipes with water within twenty-four hours of installation to remove excess glue that may collect at pipe joints and fittings.

D. All threaded fittings on the main line side of the control valves shall be made watertight with the use of Teflon tape preparation.

3.05 CONTROL VALVE WIRING

A. Wire from the electric irrigation controller to the control valves, and wire splices, shall be supplied in accordance with the Product Section 2.03. Use white insulated wire for the hot wires.

B. No conduit is required for the control wires, and they shall be laid in trenches provided for main line piping as indicated on the drawings.

C. At the connections of the control wires to the control valves, create a wire expansion coil by turning each wire around a 1" pipe ten times.

D. The Contractor shall make all provisions for mounting and wiring in the controller and the control wires as indicated on the drawings.

3.06 FINAL ADJUSTMENT

A. The system shall be completely flushed to remove any and all debris from the lines prior to mounting the sprinkler heads onto the swing joints.

B. After all sprinkler heads have been properly mounted, install all sprinkler nozzles and adjust for proper radius and arc of throw.

C. Adjust each control valve flow stem to the proper operating position for the valve zone flow demand. This position is found by turning the flow control stem down until the spray of the sprinklers are slightly reduced.

3.07 PRESSURE TESTING PROCESS

A. Once the mainline and irrigation valves have been installed, the Contractor shall center load the mainline piping leaving all mainline connections and joints exposed and visible for inspection.

B. The Contractor shall mount a water pressure gauge on the backflow preventer for verification of the pressure test process. The Contractor shall isolate the mainline and increase the mainline static water pressure to 120 psi with a hydrostatic water pressure pump. The mainline shall remain pressurized for four hours under the Owner’s Representative's supervision without any leaks or mainline pressure drop.

C. If any pressure drop occurs during the testing process, the Contractor shall repair the leak and repeat the test process.

D. The Owner’s Representative shall notify the Contractor upon successful completion of the test process. Upon notification of completion of testing, the Contractor may completely backfill and cover the mainline.

3.08 PRELIMINARY INSPECTION

A. Upon completion of all previous items, the Owner’s Representatives shall inspect the system. The Contractor shall be present to operate the system as required.

3.09 FINAL INSPECTION

A. At the final inspection the Contractor shall provide an "as-built" drawing showing to scale accurate locations of materials and trenches as installed. The Contractor shall indicate system installation modifications with a red pen on a print of the original scaled irrigation drawing. Where modifications are indicated, the Contractor shall provide at least two exact measurements from its location to a known object or system element.

B. Contractor shall teach City of Brookland personnel proper usage of the controller and irrigation system.

3.10 GUARANTEE AND MAINTENANCE

A. The Contractor shall guarantee for one year all materials, and workmanship within the system as these specifications call for in Section 1.02. The Contractor will not be responsible for the condition of any materials damaged by others.

B. During the guarantee and maintenance period, the Contractor shall return to the site at the request of the Owner to repair any elements or materials in the system that have failed, fallen out of adjustment, or broken due to work performed during installation. The Contractor shall provide all labor and materials to bring the system back to a full and correct operational condition.

C. The Contractor shall also make any repairs to the turf or shrub areas where the finished grade has changed due to settling trenches.

D. At the end of the guarantee and maintenance period, the Owner's Representative shall inspect the system to make sure that the guarantee and maintenance provisions have been complied with.

E. The Contractor shall supply eight (8) irrigation heads and nozzles of each type, and two (2) spare quick coupler keys for future requirements.

END OF SECTION

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SECTION 32 92 10

HYDRAULIC SEEDING AND SODDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

This section shall cover the work of furnishing, sowing and establishing an acceptable growth of grass from hydraulically placed seed, as well as covering the work of furnishing and planting solid grass sodding in various locations throughout the limits of Work.

B. Related Work Described Elsewhere:

1. Section 31 23 00: Excavating and Grading

1.02 QUALITY ASSURANCE

A. Qualifications of Workmen

Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and the best methods for their installation and who shall direct all work performed under this Section.

B. Approvals and Rejection of Materials and Work

1. The selection of all materials and execution of all preparations required under the Drawings and Specifications shall be subject to the approval of the Owner's Representative.

2. The Owner's Representative shall have the right to reject any and all materials, any and all work, which in his opinion does not meet the requirements of the Specifications or Drawings at any stage of the operations. All rejected materials shall be removed from the site and shall not be discarded on adjacent sites.

3. The Contractor shall notify the Owner's Representative at least 48 hours in advance of the time he intends to begin hydraulic seeding and sodding and shall not proceed with such work until permission to do so has been granted by the Owner's Representative. Before

starting the grassing operation on any area, final dressing shall have been completed. Final dressing implies that all stones and debris, etc. larger than two inches (2") in diameter be removed from the surface.

4. All hydraulic seeding, sodding, and related operation shall be continuous operations.

5. Do not proceed with lawn preparation when ambient air temperature is below 32 degrees Fahrenheit.

C. Maintenance of Site During Planting

1. Sidewalks, roads and other pavement adjacent to planting operation shall be kept clean and free from obstructions, mud and debris at all times. Wheels of vehicles used in work shall be cleaned if necessary. Flushing of streets or disposal of dirt or debris into sewers or drainage ditches will not be permitted. Dust shall be controlled by approved means to the satisfaction of the Owner's Representative.

2. Provide hose and lawn watering equipment as required.

1.03 PLANT AVAILABILITY

All hydraulic seed and sod specified shall be located and certified available to be installed following completion of the related work.

1.04 PRECAUTIONS

Locate underground utilities and drainage lines on the site with flags or similar markings prior to excavating or driving stakes. Take proper precautions to prevent damaging or disturbing these improvements. Contractor is responsible for damage or dislocation by his company.

1.05 WARRANTY PERIOD

A. Six months after final completion of maintenance period, lawn shall be solid color, well matted, and reasonably free from weeds.

B. Initial acceptance of the hydraulic seeded and sodded areas shall coincide with substantial completion and acceptance of the project.

C. Inspection for Beginning of Warranty Period

1. Inspection of the planting work, to determine its completion for beginning the guarantee period, will be made by the Owner's Representative, and given approval in writing upon notice requesting such inspection by the Contractor.

2. Any delay in completion of planting operations which extends the planting into more than one planting season shall extend the warranty period correspondingly.
3. Contractor shall not be held responsible for failures due to neglect by Owner, vandalism, etc., during warranty period. Report such conditions to Owner in writing.

D. Final Inspection and Replacements

Inspection of the planting to determine its final acceptance will be made at the conclusion of the warranty period by the Owner's Representative. No grass shall be accepted unless the area shows a uniform, healthy stand of grass.

1.06 PRODUCT HANDLING

A. DELIVERY AND STORAGE

1. Insofar as is practicable, sod shall be laid the day of delivery. In the event that this is not possible, the Contractor shall protect the sod not laid by placing it in a shaded area.
2. Sod that cannot be laid immediately on delivery shall be kept well-watered and shall not remain unplanted for longer than 48 hours after delivery to the site.

1.07 SOIL TEST

A. Take four (4) soil samples in areas where sod or seeding is to take place and submit to testing lab for nitrogen, phosphorous, potassium, soluble salts and percent of organic material.

B. Testing lab to be as directed by the Owner's Representative..

PART 2 - PRODUCTS

2.01 GENERAL

A. The health of all materials shall be in accordance with the Arkansas Department of Transportation Specification Section 620 - Seeding.

2.02 HYDRAULIC SEEDING

A. Grass seed, fertilizer and hydro mulch shall be delivered and stored in original containers in such a manner that protection from freezing, heat moisture, rodents or other causes is ensured.

B. Seed shall meet the requirements of the Arkansas Department of Agriculture and no "Below Standard" seed will be accepted.

1. Seed shall be furnished in new bags that are sound and not mended.
2. Each bag of seed shall bear the growers guarantee of analysis.
3. Wet, moldy or otherwise contaminated seed shall be rejected.
4. Seed Mixture and time of Seeding:

January-March:	Annual Rye at a rate of 7 lbs. per 1000 square feet.
April-May:	Annual Rye at a rate of 7 lbs. per 1000 square feet. Fescue at a rate of 7 lbs. per 1000 square feet. Sahara II Bermuda, unhulled, at a rate of 1 lb. per 1000 square feet.
June-August:	Sahara II Bermuda, hulled, at a rate of 2 lbs. per 1000 square feet.
Sept.-Dec.:	Annual Rye at a rate of 7 lbs. per 1000 square feet. Fescue at a rate of 7 lbs. per 1000 square feet. Sahara II Bermuda, unhulled at a rate of 1 lbs. per 1000 square feet.

Note: If Contractor is seeding with either the January - March or the September - December mix, they shall be required to reseed site at the appropriate time in the following May with Sahara II Bermuda at the rate of 2 lbs. per 1000 square feet.

5. Weed seed content shall not exceed 0.25%.

C. Fertilizer: the type specified by the soil test recommendations, at a rate determined by soil testing and paragraph 3.02B, whichever is less.

D. Liquid Lime: at a rate determined by soil testing and paragraph 3.02B, whichever is less.

E. Mulch: Profile Product's Seed Aide® CoverGrow™ spray mulching granules, Rainier's Fiber Bonded Fiber matrix, or approved equal capable of dispersing rapidly in water. The mulch shall be free of weeds and other foreign matter, containing no growth or germination inhibiting factors.

F. At the discretion of the Owner's Representative, samples may be taken for testing. Sampling and testing will be in accordance with the requirements of the Arkansas Department of Agriculture.

2.03 SOD

A. Sod shall be cleanly cut in rolls having a reasonably uniform thickness of not less than one and one-half inches (1 1/2") and a uniform width.

B. Sod shall consist of live, dense, well rooted growth of 419 Tifway Bermuda, free from Johnson grass, nut grass and other noxious grasses and weeds.

2.04 MISCELLANEOUS MATERIALS

A. Fertilizer

1. Commercial Fertilizer: Commercial fertilizer as required for compliance with the recommendations provided in the soil test results. Fertilizer shall be a standard commercial fertilizer containing the specified percentages by weight of nitrogen, phosphoric acid, and potash.
   a. The fertilizer shall be furnished in standard containers with the name, weight, and guaranteed analysis of the contents clearly marked. The container shall insure proper protection in handling and transporting the fertilizer.
   b. All commercial fertilizer shall comply with local, state, and federal fertilizer laws.
2. Agriculture Limestone: Agriculture limestone shall contain not less than eighty-five (85%) of calcium carbonate and magnesium carbonate combined and shall be crushed so that at least eighty-

five (85%) will pass the No. 10 mesh sieve.

B. Water

Water shall be in potable, free from harmful or objectionable qualities or organisms.

PART 3 - EXECUTION

3.01 HYDRAULIC SEEDBED PREPARATION AND SEEDING METHOD

A. The seedbed shall be prepared in the following manner and sequence.

1. Each area to be hydroseeded shall be scarified, disked, harrowed, raked, or otherwise worked until it has been loosened and pulverized to a depth of not less than one and one-half inches (1-1/2”). This operation shall be performed only when the soil is in a tillable and workable condition. All construction material debris, rocks, etc., shall be removed from the seed beds.
2. Fertilizer and agricultural limestone shall be distributed evenly over the seedbed as indicated by soil tests and these specifications.
3. The limestone shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of approximately one-half inch (1/2”).
4. The contractor shall accurately measure the quantities of each of the materials to be charged into the hydraulic mulcher, either by mass or by a system of mass-calibrated volume measurements approved by the Owners’ Representative.
5. Seed fertilizer and hydraulic mulch shall be thoroughly mixed in a water slurry and be distributed uniformly over the surface area via an approved hydraulic mulcher.
6. The rate of application per acre shall be as indicated below:

Seed Mix	As indicated in Section 2.02-B.4.
Hydraulic Mulch	1785 pounds per acre
Water	3240 gallons per acre

Where mulching is determined to be insufficient through hydraulic seeding application, additional straw mulching must be applied to the seeded areas.

7. After charging, no water or other material shall be added to the mixture in the hydraulic mulcher.
8. The Contractor shall ensure that fertilizer in solution does not come in contact with the foliage of any trees, shrubs, or other susceptible vegetation. Slurry mixture which has not been applied within 4

hours of mixing shall not be used and shall be removed from the site.

9. The Contractor shall take all reasonable care to prevent the contamination by operations of structures, fences, utilities and all such installations and where such contamination occurs, he shall remove it to the satisfaction of and by means approved by the Owner Representative.
10. Due to the variation in soil types and particle size, topography, contours and various land forms, the slurry shall be applied in such a manner as to prevent puddling or movement on the soil surface.
11. Contractor to obtain approval of hydromulch areas preparation from the Owner's Representative prior to application.

B. If, in the opinion of the Owner's Representative, any seeded areas that do not show a uniform or healthy stand of grass after thirty (30) days, the Contractor shall reseed and/or re-fertilize those areas as directed by the Owner's Representative without any additional cost to the Owner.

3.02 SODDING METHOD

A. The area to be sodded shall be brought to the lines and grades shown on the plans allowing for the sod thickness to be installed or as directed by the Owner's Representative. The surface of the ground to be sodded shall be loosened to a depth of not less than one inch (1") with a rake or other device. The ground shall be sprinkled until saturated for a minimum depth of one inch (1") and kept moist until the sod is placed.

B. Three (3) days after placing the sod, fertilizer and lime shall be applied uniformly to the prepared surface of the sod. Fertilizer shall be applied at the rate recommended by soil testing, but no less than eight (8) pounds of grade 13-13-13 or equivalent per one thousand (1,000) square feet. Agricultural limestone shall be applied at the rate recommended by soil testing, but no less than seventy-five (75) pounds per one thousand (1,000) square feet.

C. Sod shall be placed as soon as practical after removal from the point of origin and shall be kept in a moist condition during the interim. The sod shall be carefully placed by hand on prepared ground surface with the edges in close contact and as far as possible in a position to break joints.

D. Immediately after placing the sod, it shall be thoroughly wetted and rolled with an approved roller or hand tamped as approved by the Owner's Representative. On slopes of 2-to-1, or steeper, pinning or pegging is required to hold the sod in place.

3.03 CARE DURING CONSTRUCTION

A. All hydraulically seeded areas shall be cared for properly to the Owner's Representative satisfaction until acceptance of the work. Such care shall include watering and mowing the seeding areas when required by Section 3.05. When mowing is required, mower blades shall be set at sufficient height to protect the vitality of the growth.

B. Surfaces gullied, eroded areas, or any damaged areas found following seeding shall be repaired by regrading and reseeding as directed by the Owner's Representative.

C. The Contractor shall regrade, re-fertilize, and hydraulically reseed any or all seeded areas as directed by the Owner's Representative to correct any unsatisfactory and unacceptable conditions as determined by the Owner's Representative regardless of who may have caused the unacceptable or unsatisfactory area.

D. The Contractor shall be responsible for protecting his work at all times and shall erect temporary barricades to do so.

3.04 MAINTENANCE

A. General

1. Maintain, protect and care for newly seeded lawns and reconditioned areas until a healthy, uniform, close stand of grass is established free of weeds, bare spots or surface irregularities. Hydraulically seeded and sodded areas will not be accepted prior to substantial completion of project.

2. Maintenance period for newly hydraulically seeded and sodded areas shall not be less than a period of sixty (60) calendar days.

3. If the sixty (60) day period has not elapsed by November 15, the maintenance period shall be suspended and shall recommence on March 30 until the full sixty (60) days plus thirty (30) days have been provided.

4. Maintenance requirements include: mowing, spraying for weeds, insects and disease for a minimum period of sixty (60) days and until all surfaces irregularities do not exceed two percent (2%) of the area. Water as required to maintain adequate moisture in top four inches (4") of topsoil and when directed by Owner's Representative.

5. Mow when grass height exceeds two inches (2”).

6. Immediately hydraulically seed or sod any areas that show bare spots.

3.05 INSPECTIONS

A. Inspections to determine acceptance of warranty period of hydraulically seeded and sodded areas will be made by the Owner’s Representative upon Contractor’s request at completion.

1. Lawn areas will be acceptable provided all requirements including maintenance have been complied with, and a healthy uniform, closed stand of the specified grass is established free of weeds, undesirable grass species, disease and insects.

B. Upon written notice of final acceptance of maintenance period, the Owner will assume lawn maintenance and the six (6) month warranty period will begin.

END OF SECTION

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SECTION 32 92 20

INFIELD SOIL MIX

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section of the specifications includes work, materials, equipment, and all items necessary to provide and install the infield mix where indicated on the Drawings.

B. Infield mix is to be provided at all skinned areas of the playing fields.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Infield Mix: Infield mix shall be a consistent minimum depth of four (4) inches in all infield areas. Infield mix shall be as provided by one of the following manufacturers / products:
   a. Southern Athletic Fields “Premium Infield Mix”, 1309 Mainsail Drive, Columbia, TN 38401, (800) 837-8062
   b. Turface Athletics “Diamond Mix’, SiteOne Landscape Supply,9 Maumelle Curve Court, North Little Rock, AR 72213 (800) 347-4272
   c. Estes Material Sales, Inc. “Washington Ball Mix”, 11793 N. State Rd. 9 Hope, IN 47246 (812) 546-6181.

PART 3 - EXECUTION

3.01 EXECUTION

A. Installer shall examine the substrate on which the infield mix is to be installed and notify the Contractor in writing of conditions detrimental to the proper installation of the material.

3.02 INSTALLATION

A. The materials shall be installed in accordance with the plans and specifications.

B. Place four inches (4") of infield soil mix in the infield area. Moisten evenly, grade low spots, then drag until smooth.

1. For resurfacing repairs, level and lightly scarify existing surface to assure good bonding. Apply necessary quantity for proper elevation then moisten, roll, and drag as above.
2. Repair grass adjacent to infield soil mix and establish straight, uniform lines at the transition between grass and infield.
3. Product shall be "dragged" regularly during construction period using a method approved by Owner's Representative.

C. Cleanup: The areas surrounding the infield shall be left neat and free of any debris caused by installation of the infield mix. All seeded and sodded areas disturbed by infield mix installation shall be restored to their original condition by the infield mix installer, at no cost to the Owner.

END OF SECTION