Richmond Community Schools

Athletic Field Renovation

specifications manual

01.09.2020

2019-079.1

architects planners interiors

specifications manual specifications manual specifications manual

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SECTION 01 0400 - COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. Generals project coordination procedures.
2. Administrative and supervisory personnel.
3. General installation provisions.
4. Cleaning and protection.
5. Coordination program.

B. Related Section: The following Sections contain requirements that relate to this Section:

1. Division 01 6000 Section “Product Requirements” for coordinating materials and equipment for general installation.
2. Division 01 7300 Section “Execution Requirements” for Layout and Measurements, specifies procedures for field engineering services, including establishment of benchmarks and control points.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend upon each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make adequate provisions to accommodate items schedule for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.

3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

PART 2 – PRODUCTS (Not applicable)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each component to inspect both the substrate and conditions under which Work is to be performed. Proceed when unsatisfactory conditions have been corrected.

B. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessive internal or external pressures.
3. Excessively high or low temperatures.
4. Thermal shock.
5. Excessively high or low humidity.
6. Air contamination or pollution.
7. Water or ice.
8. Solvents.
9. Chemicals.
10. Radiation.
11. Puncture.
12. Abrasion.
13. Heavy traffic.
14. Soiling, staining and corrosion.
15. Bacteria.
16. Rodent and insect infestation.
17. Electrical current.
18. Improper lubrication.
19. Unusual wear or other misuse.
20. Contact between incompatible materials.
21. Misalignment.
22. Excessive weathering.
23. Unprotected storage.

24. Improper shipping or handling.
25. Theft.
26. Vandalism.

END OF SECTION 01 0400

SECTION 01 2200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for unit prices.

1. Material Cost.
2. Labor.
3. Taxes.

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 -

PART 4 - EXECUTION

4.1 LIST OF UNIT PRICES

A. Unit Price #1- Cost per cubic yard to excavate unsuitable materials and replace with imported Class II engineered fill, placed in 8” lifts, compacted to 95% maximum unit weight (ASTM D 1557, Modified)

END OF SECTION 01 2200

SECTION 01 2300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates as proposed by the Architect.

1. **Voluntary Alternates or Substitutions proposed by Bidders will not form the Base Bid Proposal Price.**

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

B. Voluntary Alternates: Bidders proposed voluntary alternates and substitutions will not be recognized as part of the Base Bid Price opening. Owner may review voluntary proposals with the successful Bidder.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate L1- Provide and install Performance Shock Pad layer.

END OF SECTION 01 2300

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1. Shop drawings and Samples
2. Product data submittal procedures.
3. Shop Drawing and Samples Transmittal Form.
4. Contract Close-out Deliverables Form.

B. Related Sections include the following:
1. Divisions 02 0000 through 33 0000 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals (Shop Drawings, Samples, Product Data, Catalog Cuts, etc.): Written and graphic information that requires Architect's **and Construction Manager's** responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided at Architect's discretion and at extra cost to Contractor for use in preparing submittals.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. **Architect reserves** the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on **Architect's** receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow twenty (20) calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. **Architect** will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow eighteen (18) calendar days for review of each resubmittal.
3. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow twenty (20) calendar days for initial review of each submittal.
4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow twenty (20) calendar days for review of each submittal.

D. Shop Drawing Submittal Procedures: The procedures and quantity of drawings, catalog cuts, samples and other information for submittal are minimum. The Contractor and Architect will finalize format at the Project Kick-Off Meeting.

1. Contractor to Construction Manager and then to Architect
   a. All submittals shall be sent as pdf files via email.
   b. Each submittal shall include one pdf that includes the Submittal Transmittal as provided in this specification (completely filled out) and all other 8.5 x 11 documents as a single pdf file.
   c. Submittal documents that are not 8.5 x 11 shall be submitted as a separate pdf file for each size documents. For instance, 24" x 36" sheets shall be sent as a separate pdf. Always include the separate pdf file with the filled out transmittal with each submittal pdf.

2. Architect to CM to Contractor
   a. A pdf file of each reviewed submittal will be sent via email.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 x 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

   a. Project name.
   b. Date.
   c. Name of Architect.
   d. Name of Contractor.
   e. Name and email address of subcontractor.
   f. Name and email address of supplier.
   g. Name and website address of manufacturer.
   h. Contractor's Submittal number.
   i. Number and title of appropriate Specification Section.
   j. Drawing number and detail references, as appropriate.
   k. Other necessary identification.

F. Deviations: **Highlight and encircle**, or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Transmittal: Package each submittal item individually and appropriately for transmittal and handling. Do not group submittals related to different specification sections. Transmit each submittal using the official transmittal form. Architect received submittals from sources other than General Contractor will be discarded without review.

1. Transmittal Form: **Use submittal form included at the end of Specification.**
2. Form:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Transmittal number**, numbered consecutively**.
k. Submittal and transmittal distribution record.
l. Remarks.
m. Signature of transmitter.

H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2 Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with Architect's "REVIEWED FOR CONSTRUCTION" or Architect's "REVIEWED AS NOTED" stamp

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating Architect's "REVIEWED FOR CONSTRUCTION" or "REVIEWED AS NOTED" stamp and Construction Manager's or General Contractor's release for construction stamp.

1. DO NOT USE Shop Drawings noted "XRR = RETURNED FOR CORRECTIONS" for construction or fabrication.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Submit electronic submittals directly to extranet specifically established for Project.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operating and maintenance manuals.
    k. Compliance with specified referenced standards.
    l. Testing by recognized testing agency.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.

4. Submit Product Data concurrent with Samples.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, power, signal, and control wiring.
    f. Shop work manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of professional engineer if specified.
    o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (750 by 1000 mm).

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.

c. Sample source.
d. Number and title of appropriate Specification Section.

2. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

3. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, **through Construction Manager**, will return submittal with options selected.

4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit number of samples as indicated in Part 1.4 "Submittal Procedures".

      1. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.

E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

   1. Type of product. Include unique identifier for each product.
   2. Room name, room number, space and location.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.

G. Submittals Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

H. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."

I. Schedule of Values: Comply with requirements specified in Division 01 Section “Payment Procedures.”

J. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit two (2) copies of subcontractor list, unless otherwise indicated.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements in Division 01 4000 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 3100 Section “Project Management and Coordination.”

C. Contractor's Construction Schedule: Comply with requirements in Division 01 3200 Section "Construction Progress Documentation."

D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

H. Product Certificates: Prepare written statements on manufacturer’s letterhead certifying that product complies with requirements in the Contract Documents.

I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

M. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 4000 Section "Quality Requirements."

N. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

O. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

P. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

Q. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 7700 Section "Closeout Procedures" for Operation and Maintenance Data."

R. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

S. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

T. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

U. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles and term of the coverage.

V. Material Safety Data Sheets (MSDSs): Submit information directly to Construction Manager; do not submit to Architect, **except as required in "Action Submittals´Article**."

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three (3) copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with Contractor's review approval stamp before submitting to Architect.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S AND CONSTRUCTION MANAGER'S ACTION

A. General: Architect will not review submittals that do not bear Construction Manager's or General Contractor's review approval stamp and will return them without action.

B. Action Submittals: Architect and Construction Manager will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect and Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action to be taken.

C. Informational Submittals: Architect will review each submittal and will return it to the Construction Manager or General Contractor with review comments for their review.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

3.3 ARCHITECT'S FORMS

A. Shop Drawings and Samples Transmittal form, attached at end of Section.

B. Contract Close-out Deliverables form, attached at end of Section.

END OF SECTION 01 3300

SHOP DRAWING AND SAMPLES TRANSMITTAL

FRENCH associates
architects planners interiors

FA Submittal No.

Consultant Submittal No.

Project Name:	Architect's Project No.:	Submittal Date: Resubmittal	Contr. Submittal No. Refer. Submittal No.
CM / Contr. Name: CM / Contr. Address:	Contr. Proj. No.	Sub-Contr, Supplier, Etc. Name: Sub-Contr, Supplier, Etc. Submittal No:	

Spec Section (not Bid Ctgy.)	No. of Prints	No. of Tracing	No. of Cat/etc.	No. of Sample	Sub-Contractor, Suppler, Manufacturer, Misc.	* List Each * Draw ing No.	Draw ing Title, Item Description	**Architect Review Code**	Copies Returned to Contractor

Contractor(s) certifies that the above submitted information has been review ed in detail and comply w ith the Contract Documents, except as indicated, and is submitted to the Architect, " FOR REVIEW AND COMMENTS ONLY." The Architect's and Engineer's critique w ill not relieve the Contractor(s) from compliance w ith requirements of the Contract Documents. Contractor(s) assumes responsibility for all information and comments indicated in Shop Draw ings.

Contractor / Const. Manager Comments

Priority High Normal Low

Signature

Consultant's Comments

Signature

Architect's Comments

Signature

Date: Copies: Attn:

CONTRACTOR TRANSMITTED TO:
- Structural
- Mechanical
- Electrical
- Architect
- Other

CONSULTANT TRANSMITTED TO:
- Architect
- Other Consul.
- Other

ARCHITECT TRANSMITTED TO:
- Contr./Mgr.
- Consultant
- Other

Architect Review Code Legend

RC = Reviewed for Construction
That part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance

RN = Reviewed as Noted
That part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

XRR = Returned for Corrections
Do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a "Reviewed for Construction" or "Reviewed as Noted" action mark.

Contractor / Const. Manager - Record Copy Sent To:

Date:

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:
1. Division 01 7329 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
2. Divisions 02 0000 through 33 0000 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1.4 CONFLICTING REQUIREMENTS

A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.

1.5 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.

2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Test and inspection results and an interpretation of test results.
9. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
11. Name and signature of laboratory inspector.
12. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect or Construction Manager.
2. Notify Architect and Construction Manager seven (7) calendar days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's and Construction Manager's approval of mockups before starting work, fabrication, or construction.

    a. Allow seven (7) calendar days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed, unless otherwise indicated.

J. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 02 through Divisions 33.

1.7 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, **and the Contract Sum will be adjusted by Change Order**.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least forty-eight (48) hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 3300 Section "Submittal Procedures."

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractors in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractors promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel.

1. Incidental labor and facilities necessary to facilitate tests and inspections.
2. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
3. Facilities for storage and field curing of test samples.
4. Delivery of samples to testing agencies.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within thirty (30) calendar days of date established for **commencement of the Work** or **the Notice to Proceed**.

1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect’s and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with the Contract Document requirements for Division 01 7329 Section "Cutting and Patching."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 6000 - PRODUCT REQUIREMENTS - SUBSTITUTIONS AND OPTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following administrative and procedural requirements: selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

1. Substitutions Request Procedures.
2. Product Substitutions and Options.
3. Substitution Request Form. (included at end of this Specification Section)

B. Related Sections include the following:
1. Division 01 4200 Section "References" for applicable industry standards for products specified.
2. Division 01 7700 Section "Closeout Procedures" for submitting warranties for contract closeout.
3. Divisions 02 0000 through 33 0000 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility**, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise**. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions (after selection of successful bidder): Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

A. Substitution Requests Procedures: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request must be proposed and submitted only to the Construction Manager or General Contractor. Substitution Requests must not be sent directly to the Architect.
2. Substitution Request Form: Use form provided at end of Section.
3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified material or product cannot be provided.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and other separate Contractors, that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
    i. Cost information, including a proposal of change, if any, in the Contract Sum.
    j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
    k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

4. Architect/Engineer shall have right to reject proposed substitution without explanation.
5. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within Seven (7) calendar days of receipt of a request for substitution. Architect will notify General Contractor of acceptance or rejection of

proposed substitution within Ten (10) calendar days of receipt of request, or Seven (7) calendar days of receipt of additional information or documentation, whichever is later.

a. **Should the Architect not respond within Twelve (12) calendar days of the dated date of Request, the proposed substitution is considered REJECTED.**
b. Form of Acceptance: Construction Change Directive (CCD).
c. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.
d. Owner or Architect does not have to give any reason for rejection of substitutions.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 3300 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
2. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
3. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
4. Store products to allow for inspection and measurement of quantity or counting of units.
5. Store materials in a manner that will not endanger Project structure.
6. Store products that are subject to damage by the elements, under cover in a weather-tight enclosure above ground, with ventilation adequate to prevent condensation.
7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
8. Protect stored products from damage.

B. Owner’s Storage Area: Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on

product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 0000 through Divisions 33 0000 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in the following:

1. Division 01 3300 Section “Submittal Procedures.”
2. Division 01 7700 Section "Closeout Procedures.”

PART 2 - PRODUCTS

2.1 PRODUCT OPTIONS and SUBSTITUTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product acceptable to the Architect.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.

a. The product is a single source item. Substitutions will not be considered.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.

   a. Substitutions may be considered.

3. Manufacturer's Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.

   a. Substitutions will not be considered.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

   a. Substitutions by non-listed manufacturers will not be considered.

5. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by a specified manufacturer. Comply with provisions in "Product Substitutions" Article.

6. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, design profiles, dimensions, and other characteristics that are based on the product named.

   a. Provide Basis-of Design product or by one of the listed manufacturers.
   b. Substitutions of other products will not be considered.

7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

   a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.

8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

   a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
   b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS CRITERIA

A. Timing: Architect may consider requests for substitution if received within thirty (30) calendar days after the "Notice to Proceed" or before the first (1st) "Application for Payment." Requests received after that time may be considered or rejected at discretion of Architect without explanation.

B. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action or reason, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not affect work of other Trades Contractor's construction time schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

3.1 Architect's "Substitution Request" form included at end of this Specification Section.

END OF SECTION 01 6000

FRENCH associates

architects planners interiors

SUBSTITUTION REQUEST

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 yrs old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached - < REQUIRED BY A/E >

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

Savings to Owner for accepting substitution (if applicable): _____ ($ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports
< REQUIRED BY A/E >

SUBSTITUTION REQUEST (CONT'D)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

A/E's REVIEW AND ACTION

Note: Should the Architect not respond within Twelve (12) calendar days of the dated date of Request, the proposed substitution is considered rejected.

☐ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Printed name: _____ Title: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E

_____

_____

_____

_____

_____

_____

cc: Technical Specifications Committee

SECTION 01 7300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. General installation of products.
   2. Starting and adjusting.
   3. Protection of installed construction.
   4. Correction of the Work.

B. Related Sections include the following:
   1. Division 01 3300 Section "Submittal Procedures" for submitting surveys.
   2. Division 01 7329 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility, Owner and Architect that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner and Architect not less than seven (7) calendar days in advance of proposed utility interruptions. Provide information on length of interruptions.
2. Do not proceed with utility interruptions without Owner’s and Architect’s written permission.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.

B. Building Envelope Integrity: The completed project must provide a building enclosure that does not allow water to penetrate the building envelope. Outside air infiltration into the building must be minimized unless controlled or part of hvac system operation. Outside air infiltration is not allowable in a quantity that can allow freezing or negatively impact piping (plumbing, fire protection, hvac), hvac systems, electrical systems or any other building system.

C. Structural Integrity: All walls, ceilings, soffits and other components must be adequately supported to remain plumb and square. Provide bracing as required to prevent sway, cracking or collapse.

D. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

E. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

F. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

G. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

I. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold materials more than seven (7) calendar days during normal weather or three (3) calendar days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 4000 Section "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.7 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 7329 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

SECTION 02 4110 – SALVAGE & RELOCATION OF FIELD EVENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 2010 Earthwork
2. Section 03 2400 Portland Cement Concrete

C. Work Includes Salvage of the Following Items:

1. Irrigation mainline
2. Topsoil as noted on plans

1.2 SCOPE

A. The work under this section of the specifications shall consist of the relocation of all items as indicated on the drawings. Contractor shall furnish all labor, materials and equipment to complete the work according to the drawings and specifications.

B. All other facilities and items that are indicated shall remain and be protected from construction damage.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.1 EXECUTION

A. General

1. Contractor shall relocate items shown on drawings. Locations shall be within District boundaries.
2. Methods to be used in relocating items to be determined by the Contractor and approved by the Owner. Equipment damaged during relocation shall be replaced or repaired at the Contractor's expense.
3. All work to be performed shall be under applicable Government Codes.
4. All items requiring electrical or water will be attached to existing sources and left in working condition.
5. All underground electric wiring shall be installed in PVC Conduit (with exception to 24 volt electrical irrigation wire).
6. Demolish existing footings to a depth of 24" below proposed finish grade.
7. Restoration of all existing equipment locations shall be performed by Contractor.

B. Removal of Debris

1. Prompt removal of demolished items (i.e., concrete footings, slabs, etc.) from the site. Legally dispose of debris/material, including obtaining permission from applicable regulatory authority for disposal of debris/material to proper waste disposal site.

END OF SECTION 02 4110

SECTION 02 4113 - DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 1000 Site Preparation

C. Work includes demolition of the following items:

1. Football goalposts
2. Flagpole
3. Asphalt, concrete, and base
4. All-weather surface
5. Chainlink fence and gates
6. Topsoil, irrigation, utilities

1.2 SCOPE

A. The work under this section of the specifications shall consist of the removal and disposal of all items as indicated on the drawings. Contractor shall furnish all labor, materials and equipment to complete the work according to the drawings and specifications.

B. The work under this section of the specifications shall consist of the removal and disposal of all items as indicated on the drawings. Contractor shall furnish all labor, materials and equipment to complete the work according to the drawings and specifications.

C. All other facilities and items that are indicated shall remain and be protected from construction damage. Areas damaged to known fault of the Contractor during construction shall be repaired or replaced at the expense of the Contractor. Lawn, paving, and concrete damaged during construction shall be restored to the condition which existed prior to commencement of Contractor's work.

PART 2 - PRODUCTS

N/A

PART 3 - EXECUTION

3.1 EXECUTION

A. General

1. Contractor shall not, for any reason, dump or leave any excavated materials on property.
2. Contractor shall remove all items as indicated on drawings.

B. Removal of Debris

1. Promptly remove cleared debris from the site.
2. Burning of debris on site is not permitted, unless permission is obtained from applicable regulatory authority.
3. Obtain permission from applicable regulatory authority for disposal of debris to waste disposal site.

4. Upon the removal of fence posts and or footings, excavated areas shall be backfilled.
   a. In excavated areas, backfill shall be excavated soil material, free of rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable matter, and other deleterious matter. Existing materials may be used for backfill, provided no silt is mixed with material. Backfill shall be placed in compacted layers of 8” maximum depth, using a "jumping jack or pogo stick" style compactor to achieve 95% compaction.
   b. Fill Material: Fill material shall be clean, hard, durable, uncoated particles of sand or sand gravel mixture, provided that there shall be a substantial excess of sand-screenings. Peastone is also acceptable backfill material.
   c. Holes shall not be left open for more than 10 hours.

END OF SECTION 02 4113

SECTION 03 3000 – CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 2010 Earthwork

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary to construct Portland cement concrete pad.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM C 94-97 – Standard Specification for Ready Mixed Concrete
   b. ASTM C 171-69 (1975) - Standard Specification for Sheet Materials for Curing Concrete
   c. ASTM C 309-74 - Standard Specification for Liquid Membrane Forming Compound for Curing Concrete
   d. ASTM D 1751-73 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

1.4 SUBMITTALS & TEST REPORTS

A. Submit reports of Portland cement concrete compression, yield and air content tests listed in ASTM C 94.

1.5 ENVIRONMENTAL REQUIREMENTS PORTLAND CEMENT CONCRETE

A. Allowable concrete temperatures

1. Cold Weather: Maximum and minimum, ASTM C94
2. Hot Weather: Maximum concrete temperature - 90 degrees F. (23 degrees C.)

B. Do not place concrete during rain, sleet or snow.

1.6 PROTECTION

A. Protect concrete from traffic for minimum of seven (7) days.

1.7 MEASUREMENT

A. Sidewalk shall be considered part of lump sum price as per the proposal form including installation of aggregate base course and topsoil backfilling operation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ready Mixed Concrete: ASTM C94

1. Cement type: type 3, grade A, 3500 psi (28 day compressive strength)
2. Admixtures: air-entrained 6%
3. Slump: two (2) to three (3) inches
4. Minimum 594 lbs. of cement per cubic yard.
5. No admixtures other than air-entraining without approval of the Landscape Architect.
6. Curing material: ASTM C171, 4 MIL white opaque polyethylene type, or ASTM C309, type 2, white pigmented curing compound.
7. Expansion Joint Fillers: ASTM D1751-73, performed non-extruding, resilient bituminous type, ½" width, or as indicated on plans.
8. Wire fabric: 6 X 6 10/10 fabric in all slabs on grade unless otherwise indicated.
9. Reinforcing: Reinforcing shall be new, clean and free of rust deformed steel, size and location as noted on drawings.
10. Water: Clean, fresh, potable and free of deleterious amounts of acids, alkalis, organic materials and/or dissolved or suspended materials of any kind.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify the earthwork is completed to correct line and grade. Notify the Owner/Landscape Architect of any incomplete work by previous contractors.

B. Check that sub-grade is smooth, compacted and free of frost or excessive moisture.

C. Do not commence work until conditions are satisfactory.

3.2 WEATHER PROTECTION

A. Cold weather: When the mean daily air temperature is 40 degrees F. or below, provide suitable protection for concrete work to maintain a minimum concrete temperature of 50 degrees F. for five (5) days (or 70 degrees F. for three (3) days). After the protection period, do not let concrete cool more than 20 degrees F. in each successive day

B. Hot weather: Employ suitable means to prevent too rapid drying. Shade fresh concrete as soon as possible without marring surface.

C. Wet weather: Unless adequate protection is provided, do not place concrete in rain, sleet or snow.

3.3 INSTALLATION

A. Contractor shall install the first section of sidewalk as a quality sample in place. Upon approval of sample by Landscape Architect, further installation can proceed.

B. The sub-grade upon which concrete is to be placed shall be prepared by excavation or filling with suitable earth to such depth below the finished grade line, that when tamped or rolled until smooth, firm and hard, the sub-grade will be uniform and at the required depth below finished grade line.

C. Unsuitable sub-grade soils shall be replaced as directed.

D. Gravel backfill, when specified in the drawings, shall be constructed to the required depth and thoroughly compacted.

E. Cast in Place Concrete

1. Set forms to line and grade
2. Install forms over full length of walk and oil before use.
3. Forms shall be set accurately to line and grade. If the forms are set more than 0.01 foot (3mm) above or below grade or more than 0.01 foot (6mm) from prescribed alignment, they shall be corrected before any concrete is placed
4. Flexible or curved forms of proper radii shall be used on all curves having a radius of 100 feet or less.
5. Form contraction joints by tooling.
6. Install expansion joint material behind walks at abutment curbs and adjacent structures with expansion joints every 100 feet (30m) or as detailed. Retaining wall shall have expansion joints every 25 feet.
7. Place top of expansion joint material flush with walk surface, unless noted otherwise on plans.
8. Place concrete with mechanical vibrators.
9. Consolidate concrete with mechanical vibrators.
10. Round edges of walks at top with finishing tool, 1/4" to 3/8" radius. 1" radius for retaining wall.
11. Finished exposed walk surfaces with wood float followed by brushing with broom, smooth band of 12", unless otherwise shown on drawings.
12. Apply plastic sheeting or curing material and cure for seven (7) days.
13. Apply plastic sheeting or curing material
14. Do not allow free drop of more than five (5) feet. Use elephant trunk when necessary.

F. Slip form concrete to the same quality standards as cast in place.

1. Construct concrete curb with slip form curb machine.
2. Apply curing material and cure for seven (7) days.
3. Saw expansion and contraction joints after concrete has sufficiently hardened.

3.4 FIELD QUALITY CONTROL

A. Slump Tests: Make slump tests whenever concrete is being poured at the direction of the Owner.

B. Compression Tests: Prepare standard test cylinders during the placing of concrete in accordance with ASTM 31 and ASTM 172. One set (three (3) cylinders) is required for each day's pour.

C. Maintain two (2) cylinders at 50 to 70 degrees F. and protect from loss of moisture at the job site for a period of not over 48 hours, then deliver to the laboratory for curing and testing at seven (7) and twenty-eight (28) days, respectively. Place third cylinder near the in place concrete and cure completely at the job in the same manner as the in place concrete. Deliver this cylinder to the laboratory for testing at twenty-eight (28) days. Cure and test cylinders in accordance with ASTM C31, C39 and C192. Submit test reports to the Landscape Architect in duplicate

3.5 PROTECTION OF FINISHED SURFACES

A. All finished surfaces of concrete shall be protected so as to prevent damage. Marking temporary nailing or other damaging use of surfaces will be prohibited.

3.6 PATCHING

A. Patch to match material, color and texture of surrounding area.

B. Replace defective work if patching is not acceptable to the Landscape Architect.

3.7 REPAIR/REPLACE

A. Within first year of placement, concrete will be replaced at no additional cost to the Owner, if horizontal and/or vertical cracks exceed 1/8" in width.
B. Hairline cracks do not qualify for concrete replacement.

3.8 CLEAN-UP

A. The Contractor shall remove excess excavated material from the site of the work. Spread and finish grade within five (5) feet of pad edge. Finish grading is incidental to pad installation. Contractor shall clean up and dispose of rubble and construction satisfactory to the Owner and Landscape Architect.

END OF SECTION 03 3000

SECTION 03 3010 – PORTLAND CEMENT CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 32 1124 Aggregate Base Course

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary to construct Portland cement concrete, turf anchor, concrete slabs, and foundations.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
   b. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
   c. ASTM A82 – Standard Specification for Steel Wire, Plain for Concrete Reinforcement
   d. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
   e. ASTM C192 – Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
   f. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
   g. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
   h. ASTM C31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field
   i. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
   j. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
   k. ASTM C94 – Standard Specification for Ready-Mixed Concrete
   l. ASTM C171-69 (1975) – Standard Specification for Sheet Materials for Curing Concrete
   m. ASTM C309-74 – Standard Specification for Liquid Membrane Forming Compound for Curing Concrete
   n. ASTM D1751-73 – Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

1.4 SUBMITTALS

A. Test Reports: Reports of Portland cement concrete compression, yield and air content tests.

B. Product Data: Submit data for propriety materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, and others to the Landscape Architect/Engineer.

C. Shop Drawings

1. Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures” showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

D. Samples: Submit samples of materials as specified and as otherwise requested by Landscape Architect, including names, sources and descriptions.

E. Material Certificates: Provide materials certificates in lieu of material laboratory test reports when permitted by Landscape Architect/Engineer. Material Certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Portland Cement Concrete

1. Allowable concrete temperatures
   a. Cold Weather: Maximum and minimum.
   b. Hot Weather: Maximum concrete temperature: 90°F. (23°C.)
2. Do not place concrete during rain, sleet or snow.

1.6 PROTECTION

A. Protect concrete from traffic for minimum of seven (7) days.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit. Minimum thickness for lumber form shall be 1” for boards and 5/8” for plywood.

B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

C. Forms for Slab-on-grade construction joints: Forms for slab-on-grade construction joints shall be prefabricated metal forms to produce tongue and groove joint. Form shall be approved by Architect/Engineer.

D. Synthetic turf anchoring curb system: Forms shall be prefabricated metal forms to produce tongue and groove joint. Automated self propelled curb-and-gutter equipment shall not be allowed.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: Grade 60, deformed

B. Steel Wire: Plain, cold drawn, steel

C. Welded Wire Fabric: Welded steel wire fabric, supplied in flat sheets.

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable. Wood, brick and other devices shall not be acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Concrete block or brick for support of reinforcement for slabs on grade shall be at least 2" wide, 3" long and of proper heights.

2.3 READY MIXED CONCRETE

A. Cement type: type "1, 3500 psi" (28 day compressive strength)

B. Admixtures:

1. Air-entrained - 6%
2. Fly Ash – Class C or F, except as modified herein.
   a. Loss of ignition shall not exceed 4%.
   b. Fine amount retained shall not exceed 25%.
   c. Furnish documentation from an independent testing agency that fly-ash proposed for this project conforms to this specification."

C. Slump: two (2) to three (3) inches.

D. Minimum 564 lbs. of cement per cubic yard.

E. No admixtures other than air-entraining without approval of the Architect.

F. Water: Clean, fresh, potable and free of deleterious amounts of acids, alkalis, organic materials and/or dissolved or suspended materials of any kind.

2.4 CURING MATERIAL

A. ASTM C171 4 MIL white opaque polyethylene type, or ASTM C309, type 2, white pigmented curing compound.

2.5 EXPANSION JOINT FILLERS

A. Preformed non-extruding, resilient bituminous type, ½" width, or as indicated on plans.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify the earthwork is completed to correct line and grade. Notify the Owner/Architect of any incomplete work by previous contractors.

B. Check that sub-grade is smooth, compacted and free of frost or excessive moisture.

C. Do not commence work until conditions are satisfactory.

3.2 WEATHER PROTECTION

A. Cold weather: When the mean daily air temperature is 40°F. or below, provide suitable protection for concrete work to maintain a minimum concrete temperature of 50°F. for five (5) days (or 70°F. for three (3) days). After the protection period, do not let concrete cool more than 20°F. in each successive day.

B. Hot weather: Employ suitable means to prevent too rapid drying. Shade fresh concrete as soon as possible without marring surface.

C. Wet weather: Unless adequate protection is provided, do not place concrete in rain, sleet or snow.

3.3 INSTALLATION

A. Contractor shall install the first section of sidewalk/slab/foundation as a quality sample in place. Upon approval of sample by Architect, further installation can proceed.

B. The sub-grade upon which concrete is to be placed shall be prepared by excavation or filling with suitable earth to such depth below the finished grade line, that when tamped or rolled until smooth, firm and hard, the sub-grade will be uniform and at the required depth below finished grade line.

C. Unsuitable sub-grade soils shall be replaced as directed.

D. Gravel backfill, when specified in the drawings, shall be constructed to the required depth and thoroughly compacted.

E. Cast in Place Concrete:

1. Set forms to line and grade
2. Install forms over full length of walk and oil before use.
3. Forms shall be set accurately to line and grade. If the forms are set more than 0.01 foot (3mm) above or below grade or more than 0.01 foot (6mm) from prescribed alignment, they shall be corrected before any concrete is placed.
4. Flexible or curved forms of proper radii shall be used on all curves having a radius of 100 feet or less.
5. Form contraction joints by tooling.
6. Install expansion joint material behind walks at abutment curbs and adjacent structures with expansion joints every 100 feet (30m) or as detailed. Retaining wall shall have expansion joints every 25 feet.
7. Provide sawcuts in concrete turf anchor every 10 lineal feet. Sawcut depth shall be no more 3/4" deep and 1/8" in width.

8. Provide control joints in concrete turf anchor every 100 lineal feet.
9. Place top of expansion joint material flush with walk surface, unless noted otherwise on plans.
10. Place reinforcing materials.
11. Place concrete with mechanical vibrators.
12. Consolidate concrete with mechanical vibrators.
13. Round edges of walks and turf anchor at top with finishing tool, ¼" to 3/8" radius. 1" radius for retaining wall.
14. Finished exposed walk surfaces with wood float followed by brushing with broom, smooth band of 12", unless otherwise shown on drawings.
15. Apply plastic sheeting or curing material and cure for seven (7) days.
16. Replace sections that pocket water.
17. Do not allow free drop of more than five (5) feet. Use elephant trunk when necessary.

3.4 FIELD QUALITY CONTROL

A. Slump Tests: Make slump tests whenever concrete is being poured at the direction of the Owner.

B. Compression Tests: Prepare standard test cylinders during the placing of concrete in accordance with ASTM C31 and ASTM C172. One set (three (3) cylinders) is required for each day's pour.

C. Maintain two (2) cylinders at 50 to 70°F. and protect from loss of moisture at the job site for a period of not over 48 hours, then deliver to the laboratory for curing and testing at seven (7) and twenty-eight (28) days, respectively. Place third cylinder near the in place concrete and cure completely at the job in the same manner as the in place concrete. Deliver this cylinder to the laboratory for testing at twenty-eight (28) days. Cure and test cylinders in accordance with ASTM C31, C39 and C192. Submit test reports to the Architect in duplicate.

3.5 PROTECTION OF FINISHED SURFACES

A. All finished surfaces of concrete shall be protected so as to prevent damage. Marking temporary nailing or other damaging use of surfaces will be prohibited.

3.6 PATCHING

A. Patch to match material, color and texture of surrounding area.

B. Replace defective work if patching is not acceptable to the Landscape Architect.

3.7 REPAIR/REPLACE

A. Within first year of placement, concrete will be replaced at no additional cost to the Owner, if horizontal and/or vertical cracks exceed 1/8".
B. Hairline cracks do not qualify for concrete replacement.

3.8 CLEAN UP

A. The Contractor shall remove excess excavated material from the site of the work. Spread and finish grade topsoil within five (5) feet of pad edge. Topsoiling is incidental to concrete installation. Contractor shall clean up and dispose of rubble and construction debris satisfactory of the Owner and the Landscape Architect.

END OF SECTION 03 3010

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SECTION 03 3053 – CONCRETE TURF ANCHOR

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 DESCRIPTION

A. Provide concrete curbs as shown and specified. The work includes:

1. Final subgrade preparation and paving base.
4. Concrete turf anchor

1.3 QUALITY ASSURANCE

A. Comply with Section 03 3010 Portland Cement requirements..

B. Materials and methods of construction shall comply with the following standards:

1. American Society for Testing and Materials, (ASTM).
2. American Concrete Institute (ACI).

C. Maintain field records of time, date of placing, curing, and removal of forms of concrete in each portion of work.

1.4 SUBMITTALS

A. Submit concrete mix designs. Obtain approval before placing concrete.

B. Product data:

1. Submit complete materials list of items proposed for the work. Identify materials source.
2. Submit admixture, curing, compound, retarder, and accessory item product data.
3. Submit materials certificates for aggregates, reinforcing, and joint filler

C. Submit concrete delivery tickets. Show the following:

1. Batch number.
2. Mix by class or sack content with maximum size aggregate.
3. Admixtures.
4. Air content.
5. Slump.
6. Time of loading.

D. Submit concrete test reports.

1.5 PROJECT CONDITIONS

A. Work notifications: Notify Landscape Architect at least 24 hours prior to installation of concrete.

B. Establish and maintain required lines and grade elevations.

C. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.

D. Do not install concrete when air temperature is below 40 degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.

E. Protect adjacent work.

F. Provide temporary barricades and warning lights as required for protection of project work and public safety.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland cement: ASTM C150, Type 1, natural color.

B. Aggregate: Provide ASTM C33 normal weight aggregates, 1" maximum size, clean, uncoated crushed stone or gravel coarse aggregate free of materials which cause staining or rust spots; fine aggregate shall be clean natural sand.

C. Water: Clean, fresh, an potable.

D. Air-entraining admixture: ASTM C260.

E. Water-reducing admixture: ASTM C494.

2.2 MIXES

A. Provide ASTM C94 ready-mixed concrete. Batch mixing at site not acceptable.

1. Strength: 3,500 psi minimum at 28 days.
2. Slump range: 2" to 4" maximum.

B. Provide an approved water-reducing admixture in all concrete.

C. Provide an air-entraining admixture in all concrete. Air content 5% to 7%.

D. Indicate water added to mix at job site on each delivery ticket. Show quantity of water added. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.

2.3 ACCESSORIES

A. Granular base: AASHTO M43, #6 (3/8" to 3/4") uniformly graded, clean crushed stone or gravel.

B. Forms: Wood or metal of sufficient strength to resist concrete placement pressure and to maintain

horizontal and vertical alignment during concrete placement. Provide forms straight, free of defects and distortion, and height equal to full depth of concrete work.

1. Provide 2" nominal thickness, surfaced plank wood forms for straight sections. Use flexible metal, 1" lumber or plywood forms to form radius bends.

2. Synthetic turf anchoring curb system: Forms shall be prefabricated metal forms to produce tongue and groove joint. Automated self propelled curb-and-gutter equipment shall not be allowed.

C. Joint filler: ASTM D1751, premolded non-extruding asphalt-impregnated fiberboard, thickness indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine subgrades and installation conditions. Do not start concrete work until unsatisfactory conditions are corrected

3.2 PREPARATION

A. Proof roll the subgrade and do all necessary rolling and compacting to obtain firm, even subgrade surface. Fill and consolidate depressed areas. Remove uncompactable materials, replace with clean fill and compact to 100% of the maximum dry density in accordance with ASTM D698 Standard Proctor Method.

B. Remove loose material and debris from base surface before placing concrete.

C. Install, align, and level forms. Stake and brace forms in place. Maintain following grade and alignment tolerances:

1. Top of form: Maximum 1/8" in 10'-0".
2. Vertical face: Maximum 1/4" in 10'-0".

D. Coat from surfaces in contact with concrete with form release agent. Clean forms after each use and cost with form release agent as necessary to assure separation form concrete without damage.

3.3 INSTALLATION

A. Concrete placement:

1. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.
2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306, "Recommended Practice for Cold Weather Concreting". In hot weather comply with ACI 305, "Recommended Practice for Hot Weather Concreting".
3. Moisten base to provide a uniform dampened condition at the time concrete is placed. Verify manholes or other structures are at required finish elevation and alignment before placing concrete.
4. Place and spread concrete to the full depth of the forms. Use only square-end shovels or

concrete rakes for hand-spreading and consolidating concrete. Exercise care during spreading and consolidating operations to prevent segregation of aggregate and dislocation of reinforcement.

5. Place concrete in a continuous operation between expansion joints. Provide expansion joints when sections cannot be placed continuously.
6. Place concrete in one course, monolithic construction, for the full width and depth of concrete work.
7. Provide curb profiles indicated.

B. Joints:

1. Construct control, expansion, and construction joints properly aligned with face perpendicular to concrete surface.
2. Provide tooled control joints, sectioning concrete into areas indicated. Tool joints to depth equal to not less than ½" depth.
3. Provide expansion joints using premolded joint filler at concrete work abutting curbs, walls, structures, walks, and other fixed objects.
   a. Protect the top edge of the joint filler during concrete placement.
   b. For the concrete turf anchor, place:
      - Sawcut control joints every 10' LF
      - ½" width expansion joints every 100 LF

C. Concrete finishing:

1. Perform concrete finishing using mechanical or hand methods as required.
2. Upon completion of floating, and after bleed water has disappeared and concrete can sustain foot pressure with nominal indentation, cut concrete away from forms. Work edges with an edging tool. Round edges to 1/2" radius.
3. Install control joints at indicted locations during edging operations.

D. Curing:

1. Cure concrete with a non-staining liquid membrane-forming compound. Spray apply in accordance with manufacturer's recommended coverage rate. Apply curing compound immediately after completing surface finish.

3.4 FIELD QUALITY CONTROL

A. Provide field quality control testing and inspection during concrete operations.

B. Contractor shall provide adequate notice, cooperate with, provide access to the work, obtain samples, and assist test agency and their representatives in execution of their function.

C. Testing:

1. Provide slump test on first load of concrete delivered each day and whenever requested due to changes in consistency or appearance of concrete.

2. Provide air indicator tests and air meter tests for all air-entrained concrete.
   a. Perform air indicator test with a "Chase" AE 35 or equal air indicator, and air meter test in accordance with ASTM C231 or C173. Test first load of concrete delivered each day.
   b. Furnish copies of field records and tests reports as listed for strength tests.

3. Strength testing:
   a. Provide 1 set of 3 test specimens for each 50 CY placed in any one day. Secure samples in accordance with ASTM C172 and mold specimens in accordance with ASTM C31.
   b. Test 1 specimen at 7 days and 2 specimens at 28 days in accordance with ASTM C39.
   c. Furnish copies of field records and test reports as follows:
      1 copy to Contractor
      1 copy to Ready Mix Supplier
4. Record the exact location of the concrete in the work represented by each set of cylinders and show on test reports.
5. Provide an insulated moist box for protection of the test cylinders until shipped to the laboratory.

3.5 PROTECTION

A. Protect concrete work from damage due to construction and vehicular traffic until final acceptance. Exclude construction and vehicular traffic from concrete pavements for at least 14 days.

3.6 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from concrete operations.

B. Sweep concrete sidewalks and pavement, wash free of stains, discoloration, dirt, and other foreign material immediately prior to final acceptance.

END OF SECTION 03 3053

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SECTION 04 0513 - MORTAR

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 33 4413 Manholes, Catch Basins and Similar Structures

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General Requirements:

1. Specific materials (brands, trade names, sources of supply, etc.) must be approved by Landscape Architect before any materials are ordered.
2. Once approved, the same materials must be used throughout entire job.

B. Portland Cement: ASTM C150, Type 1.

C. Sand: ASTM C144. Must be washed.

D. Lime: Hydrated lime for masonry purposes, ASTM C207, Type S.

E. Pea Gravel: ASTM C33, size #8 (1/4" – 3/8")

F. Water: Clean, fresh, potable and free of deleterious amounts of acids, alkalis, organic materials and/or dissolved or suspended materials of any kind.

G. Mortar Coloring for Block: Mortar for block shall be natural mortar color.

H. Other Admixtures: None, unless authorized by Landscape Architect prior to application.

PART 3 - EXECUTION

3.1 PREPARATION

A. Mortar shall be Portland cement-lime mortar mix proportioned with 1 part cement, 1 part lime, 6 cu.ft. sand (Type S Mix). Prepared mortar shall not be used.

B. Mortar shall comply with requirements of ASTM C270 for Type S (1500 PSI compressive strength) mortar.

C. Mortar shall contain minimum of 12% and maximum of 12% entrained air.

D. Use all mortar within 2-1/2 hours after mixing.

E. Mortar may be retempered as required, but in no case, if retempering is due to loss of water by hydration.

3.2 BOND PATTERN

A. Lay concrete block in bond pattern with uniform coursing and jointing. Maintain vertical joints in line, with bond patter carefully preserved. Joints shall be 3/8" (± 1/8").

B. Commence tooling joint when mortar is "thumb hard" and bonds to the course above without leaving hair cracks. Unless otherwise required, cut flush and concealed joints; tool interior and exterior exposed joints in block to a uniform compressed concave surface with an oversize jointing tool.

C. Rake out mortar in preparation for application of caulking or sealants where shown.

D. Joints that are not tight at time of tooling shall be raked out.

E. Units disturbed after laying: Remove, clean, and relay in fresh mortar.

END OF SECTION 04 0513

SECTION 06 1050 – TURF WOOD NAILER

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 03 3010 Portland Cement Concrete
2. Section 03 3053 Concrete Turf Anchor

1.2 SCOPE

A. Provide all material, labor, and equipment necessary to install the timber and cleanup as detailed on the drawings and herein.

PART 2 - PRODUCTS

2.1 TIMBER EDGING

A. Southern Pine or Douglas Fir pressure preservative treated with alkaline copper quaternary (ACQ) or Copper Azole (CA) preservatives in accordance with American Wood Preservers Associates (AWPA) standard C17 for ground contact use. Provide lumber sizes as indicated on drawings.

B. All hardware shall meet a minimum requirement established ASTM standard A153 and ASTM standard A653 (Class G-185).

2.2 WOODEN NAILER FASTENERS

A. Approved items for Wood Nailer Installation:

1. Nails 16 d Hot Dipped Galvanized
2. ¼ x 2 ¾" Stainless Steel Tapcon Masonry Screws
3. DEC-King Exterior Wood Screw with Climacoat
4. Wood to-Metal TEKS with Grey Spex
5. Tapcon Concrete Anchor with Blue Climaseal and White Ultrashield
6. Roofgrip with Spex or Blue Climaseal
7. GYP-FAST Nail with Climacoat
8. Maxi-set Tapcon White UltraShield
9. Ramguard Drive Pin

PART 3 - EXECUTION

3.1 DEMOLITION, EXCAVATION AND REMOVALS

A. Strip all existing topsoil, infield mix, etc. from work area. Stockpile sufficient material for restoration of perimeter area. Legally dispose of excess material off site.

3.2 GRADING

A. Grade area to elevations and slopes as indicated on the drawings. Grade shall be such that when finished grade is established, the work area and the perimeter shall be free of standing water.

3.3 INSTALLATION OF TIMBER EDGING

A. Install wood nailer using only the specified fasteners listed in Section 2.2 above.

B. Fasteners shall be placed in the middle (vertical) of nailer board. Fastener shall be no closer than 6” from end of board.

C. Fasteners spacing shall not be more than 2.5’

D. Contractor shall maximize use of treated lumber and minimize cuts to corners.

3.4 RESTORATION AND CLEAN UP

A. Clean-up all excess materials and remove from site. Adjoining areas to be the same as prior to construction, and properly graded to allow water to drain away from surface.

END OF SECTION 06 1050

SECTION 10 7516 - FLAGPOLE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 03 3010 Portland Cement Concrete
2. Section 31 2010 Earthwork

1.2 SCOPE

A. Provide and install one (1) 35' aluminum flagpole as specified with accessories, foundation construction and lightning protection as required for a complete and proper installation.

1.3 QUALITY ASSURANCE

A. Manufacturer's Standards: Provide each pole as a complete unit produced by a single manufacturer, including fittings, accessories, bases and anchorage devices.

B. Design Criteria: Provide flagpole and installation constructed to withstand an 80 mph wind velocity minimum when flying flag of appropriate size.

C. Pole Construction: Construct pole and ship to site in one piece, if possible. If more than one piece is necessary, provide snug-fitting precision joints with self-aligning, internal splicing sleeve arrangement for weather-light, hairline field joints.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each type of flagpole and flagpole component as specified.

B. Shop Drawings: Submit shop drawings of poles and bases, including connections to structure showing general layout jointing and complete anchoring and supporting systems, with all pertinent dimensional information in a clear and concise manner.

1.5 DELIVERY

A. Spiral wrap each flagpole with heavy draft paper and pack in hard fiber tube prior to shipment.

B. Deliver flagpole complete with accessories and installation instructions clearly identified, and store unwrapped and protected from weather, and moisture.

PART 2 - PRODUCTS

2.1 Flagpole Shaft

A. Style of flagpole: Grounded

B. Materials: Aluminum alloy 6063-T6 from seamless extruded tubing complying with ASTM B-241.

C. Taper Type: Cone Tapered uniform straight line rate of taper of 1" every 5'6" of pole (aluminum)

D. Shaft Finish:

1. Aluminum: Clear anodized finish, AA-M32-C22-A41

E. Mounting Classifications:

1. Groundset: Corrugated Steel Sleeve

F. Dimensions: Flagpole to be 35 feet exposed length, with butt diameter of 6 inches and butt wall thickness of .156 inches, minimum.

G. Workmanship: Fabricate all joints and seams to be inconspicuous. Grind all exposed welds smooth, and finish to match pole shaft.

2.2 Flag

A. Supplier shall provide (1) 6’x10’ American Flag as part of installation.

2.3 Method of Hoisting the Flag

A. Internal Halyard:

1. Groundset Flagpoles
   a. Truck, Winch and Halyard: System to include heavy duty cast aluminum revolving truck and hood with a heavy duty stainless steel direct drive winch with a removable handle. Winch is manually operated and has a spring loaded friction brake to lock the flag at any position on the pole. Winch is accessible through a flush pivot access door with cylinder lock and continuous aluminum piano hinge. Flag descent system consists of a plastic beaded sling, that encircles the pole and is attached to a neoprene coated counterweight at the halyard end. The flag is attached to two (2) brass snap hooks that are attached to the 1/8" diameter 7 x 19 construction stainless steel aircraft cable halyard. The cable is routed through the revolving truck down the pole shaft and is held in place by the winch for raising, lowering, and displaying the flag at any position on the flagpole.
   b. Flash Collar: Spun aluminum flash collar

PART 3 - EXECUTION

3.1 PREPARATION

A. At time of erection, remove all protective wrappings.

3.2 INSTALLATION

A. Install all flagpoles, base assemblies and fittings in compliance with approved shop drawings and manufacturer's instructions.

B. Provide proper lightning ground for each flagpole.

C. Installation shall be done by a crew experienced in this type of flagpole installation.

3.3 ADJUSTMENTS

A. Check and adjust all installed fittings for smooth and proper operation.

END OF SECTION 10 7516

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SECTION 11 6834 – FOOTBALL GOAL POSTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 03 3010 Portland Cement Concrete
2. Section 31 2010 Earthwork

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary to install new football goal posts.

1.3 QUALITY ASSURANCE

A. Warranty Guarantee: The Contractor and any Sub-Contractors hereunder guarantee their respective work against defective materials or workmanship for a period of two (2) years from the date of filing notice of completion and an acceptance by the Owner.

B. Product Testing: All material installed under this specification shall be subject to testing by Owner at his expense. Any material so inspected and found to be not in strict conformance with this specification shall be promptly removed and replaced by the Contractor at his expense.

C. General: Comply with NCAA and NFHSA specifications.

1.4 SUBMITTALS

A. Submit manufacturer literature, identifying the particular item to be installed. Manufacturer information should include photographs, catalog cut sheets and applicable technical information.

PART 2 - PRODUCTS

2.1 FOOTBALL GOAL POSTS

A. Football goal posts shall:

1. Be formed with an aluminum pipe capable of supporting the horizontal cross bar 8’-0” in front of the vertical upright.
2. Upright shall extend or be supported in a concrete footing approximately 5’ in diameter and secured with an anchor pin or anchor bolts.
3. Cross bar shall be an aluminum structural tube 10’-0” above field level.
4. Uprights shall be 4” O.D. aluminum structural tube extending 20’-0” above horizontal cross bar. Uprights and cross bar shall be capped with zinc plated formed metal caps. Upright metal caps shall incorporate nylon wind directional flags.
5. Wind directional flag shall be red.
6. Goal post shall be powder-coated yellow.

B. Goal posts shall be from one of the following manufacturers:

1. AAE - No. ASG-HS/8, (800) 523-5471
2. Sportsfield Specialties - No. GP4380PL, (888) 975-3343
3. UCS - No. 751-6120, (800) 526-4856
4. SportsEdge – No. SEF305P, (800) 334-6057

C. Goal post pads shall be “professional” style made from 6” thick cylindrical shaped high density polyurethane foam, 6’-0” in length. Foam cylinder shall have a rear cut-out and be completely covered in a 16 oz. polyester reinforced vinyl cover concealed velcro closure flaps for ease of installation and removal. Color to be selected by Owner. Letters will be stenciled onto the vinyl cover at no additional cost to the Owner. The Contractor shall supply a color sample or swatch to the Owner for color selection for the pads and a maximum of ten (10) letters per pad.

D. Goal post pads shall be from one of the following manufacturers:

1. AAE - No. GP6R
2. Sportsfield Specialties - No. GPPR
3. UCS - No. 260-67
4. SportsEdge – No. SEF302L

E. Pre-manufactured goalpost access box shall be from one of the following manufacturers:
1. Sportsfield Specialties – No. GP4570
2. SportsEdge – No. SEF304
3. AAE – No. FBC-GA

2.2 CONCRETE

A. Concrete shall conform to Section 03 30 10 Portland Cement Concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not install goal posts until site grading is complete.

3.2 INSTALLATION

A. Posts shall be set to the lines shown on the drawings, with holes drilled such that posts will be centered in the concrete bases.

B. Holes shall be filled with concrete to 6” below grade. See detail sheet as per installation of the remaining 6” to grade.

C. Concrete shall cure a minimum of 72 hours prior to installation of goal post.

D. All posts shall be set plumb.

E. Refer to Manufacturer’s installation cut sheets for exact location of sleeve or bolt template.

.

3.3 CLEAN UP AND DISPOSAL

A. Remove from the site all equipment, materials, and debris resulting from construction work including this section. Leave work area neat and clean and in a condition acceptable by the Landscape Architect and Owner. All work shall be complete, ready for use, at the time of final acceptance.

END OF SECTION 11 6834

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SECTION 11 6836 – PORTABLE SOCCER GOALS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary to furnish and install complete portable soccer goals. Includes, but not limited to goal nets, wheel kits, and safety anchoring system.

1.3 QUALITY ASSURANCE

A. Portable soccer goals shall be part of a combination package with the football goal posts. All football and soccer goals and accessories shall be from one manufacturer.

B. Warranty Guarantee: The Contractor and any Sub-contractors hereunder guarantee their respective work against defective materials or workmanship for a period of two (2) years from the date of filing notice of completion and an acceptance by the Owner.

C. Product Testing: All material installed under this specification shall be subject to testing by Owner at his expense. Any material so inspected and found to be not in strict conformance with this specification shall be promptly removed and replaced by the Contractor at his expense.

D. General: Comply with NCAA and NFHSA specifications.

1.4 SUBMITTALS

A. Submit manufacturer literature, identifying the particular items to be installed. Manufacturer information should include photographs, and applicable technical information, and other data required to demonstrate compliance with specified requirements for all athletic equipment.

PART 2 - PRODUCTS

2.1 SOCCER GOALS

A. Full size round portable soccer goals complete with nets, wheel kits and safety anchoring system, shall be from one of the following manufacturers:

1.	Aluminum Athletic Equipment Co. (AAE)	800-523-5471
2.	Sportsfield Specialties	888-975-3343
3.	SportsEdge	800-334-6057
4.	United Canvas Swing (UCS)	800-526-4856

B. Components:

1. Frame: 8’H x 24’W x 4’B x 10’D.
   a. 4” Round aluminum tubing.
   b. White powder coat finish.

2. Ground Bar: Aluminum
3. For Infill Turf Fields: Include safety anchor system to attach to football goal gooseneck.
4. Nets: 4mm braided polypropylene, 5.5" square mesh.

	Manufacturer	Product	Model No.	Type
1.	AAE	Goal	SGR-P/I	Round
		Net	Included	Color TBD
		Wheels	Included	
		Safety Anchor	SGAB-GP	
2.	SportsEdge	Goal	SE700R	Round
		Net	SE755	Color TBD
		Wheels	SE751	
		Safety Anchor	SEF390	
3.	Sportsfield Specialties	Goal	SG4950	Round
		Net	Standard	Color TBD
		Wheels	SG4955	
		Safety Anchor	SG2SGP	
4.	UCS	Goal	900-8024	Round
		Net	Included	Color TBD
		Wheels	Included	
		Safety Anchor	751-1000	

5. Contractor shall provide a minimum two sets of four (4) portable goal weights by the selected manufacturer for temporary anchoring. Portable goal weights are to be provided in addition to the manufacturer's safety anchoring system. Sand bags shall not be allowable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not install goals until site grading is complete.

3.2 INSTALLATION

A. Assembled as per manufacturer's cut sheets.

3.3 CLEAN UP AND DISPOSAL

A. Remove from the site all equipment, materials, and debris resulting from construction work including this section. Leave work area neat and clean and in a condition acceptable by the Landscape Architect and Owner. All work shall be complete, ready for use, at the time of final acceptance.

END OF SECTION 11 6836

SECTION 27 5609 – ELECTRICAL CONDUIT, FITTINGS, AND BOXES

PART 1 - GENERAL

1.1 This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 QUALITY ASSURANCE

A. Conduit shall bear the Underwriters Laboratories Inc. label and shall show the manufacturer's name and trademark and conform with the latest applicable ANSI specifications.

B. PVC conduit, fittings, elbows and solvent shall be produced by the same manufacturer and used in accordance with the recommendation of the manufacturer.

C. The half-inch conduit (minimum size) shall be installed only from the first ceiling junction box to one device outlet box.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Galvanized Rigid Steel: Rigid steel conduit, elbows, and coupling shall be heavy wall, hot dipped galvanized, standard weight, mild steel tubing of uniform thickness and of circumference sufficiently accurate to permit cutting of threads.

B. Aluminum conduit is not acceptable for this job.

C. Intermediate: Intermediate steel conduit, elbows, and couplings shall be hot dipped galvanized threaded type.

D. Electrical Metallic Tubing: EMT, elbows, and couplings shall be of mild steel tube having a circular cross section, and protected against corrosion with a thorough coating of zinc.

E. Polyvinyl Chloride:

1. Rigid plastic conduit, elbows, and fittings shall be heavy wall, Schedule 40, polyvinyl chloride with a solvent weld type joint for use at 90°C.

F. Flexible

1. Flexible steel conduit shall consist of a single strip of galvanized steel spirally wound on itself and interlocked in such a manner as to produce a round cross section.

2. Liquid-tight flexible steel conduit shall consist of a single strip of galvanized steel spirally wound on itself and interlocked in such a manner as to produce a round cross-section and provided with an overall jacket of extruded polyvinyl chloride.

2.2 CONDUIT FITTINGS

A. Indent type fittings on EMT or bolted split coupling are not acceptable. Set screw type fittings on EMT shall be acceptable only on steel body fittings. Set screws on die-cast metal fittings are not

acceptable. Coupling and connectors for EMT shall be compression type by Raco, Appleton, T&B, or other approved equal.

1. Pipe straps used in exposed work shall be one hole malleable iron galvanized. The use of perforated strap or wire shall not permitted. Groups of conduit shall be supported on trapeze hangers by Unistrut, Kindorf, Powerstrut, or Super-strut.

2. Individual conduit not supported on pipe straps shall be provided with clevis type hangers. Hanger supports shall be rod or pipe with threaded connections. Exposed conduit shall be supported at least every 8 feet if smaller than 2 inches, and every 10 feet if 2 inches and larger, unless otherwise noted on drawings.

3. Beam clamps for the support of conduit shall be malleable iron or wrought steel with hook rods to grip the beam flange (J-bolt type). C-clamps shall not be used.

B. Galvanized Rigid Steel and Intermediate

1. Fittings shall be cast or malleable iron bodies, cadmium or zinc-plated, with screw attached cover plates. For installation in moist or wet locations, fittings shall have gaskets of an appropriate material. Fittings shall be of a type providing maximum wiring space and shall be Appleton “Form 35” or similar fittings by another listed approved manufacturer.

2. Expansion fittings shall be cast or malleable iron bodies, with threaded end caps for receiving fixed and movable conduits, metallic pressure packing and copper bonding jumper assembly. Fittings shall provide for a minimum of 2” movement of the conduit in either direction. Fittings shall be Appleton “Type XJ” or similar fittings by another listed approved manufacturer.

3. Expansion-deflection fittings shall consist of a neoprene sleeve secured to silicon bronze threaded coupling by means of stainless steel bands. Fitting shall be designed to provide for a movement of not less than ¾ inch from the normal in all directions and shall be complete with a tinned flexible copper braid bonding jumper protected by the neoprene sleeve and securely bolted to the couplings for grounding continuity through the joint. Fittings shall be O.Z./Gedney Electric Company, “Type DX” or similar fittings by another listed approved manufacturer.

4. Locknuts shall be made of malleable iron or steel (zinc or cadmium plated). Bushings shall be made of malleable iron or steel or plastic. Malleable iron or steel bushings shall be zinc or cadmium plated and shall have an insulating insert of thermosetting plastic molded and locked into the bushing ring. Plastic bushings shall be thermosetting phenolic insulating type. The use of non-rigid plastic bushings is prohibited.

5. Flexible:

    a. Galvanized flexible steel conduit fittings shall be clamp type with a bolt and made of malleable iron or steel and shall secure the conduit by clamping action around the periphery of the conduit.

    b. Liquid-type flexible conduit fittings shall be insulated type complete with Neoprene “O” ring designed to maintain the liquid-tight and grounding feature of the installation and shall be the appropriate Appleton “STG or STNM Series” or approved equal.

2.3 CONDUIT BOXES

A. Galvanized Rigid Steel, Intermediate, EMT, and Flexible:

1. Outlet, switch, junction and pull boxes, extension rings, adapters and cover plated shall be sherardized, galvanized or cadmium plated. Boxes for concealed work shall be stamped steel bodies with stamped steel accessories. Boxes for exposed rigid steel conduit work shall be cast or malleable iron.

2. Recessed mounted junction or splice boxed for circuit wiring shall have a minimum wiring capacity of 12.2 sq. inch (3 ½" octagonal).

3. Flush mounted boxes for single gang outlets shall be not less than 4" square and 2-1/8" deep. Flush mounted boxes for multiple outlets shall be of the gang type and shall be not less than 2-1/4" deep and not less than 3" deep for ceiling boxes. Plaster rings shall be not less than 1-1/8" deep. Junctions boxes for use where exposed to the weather shall be cast aluminum with gasketed cover plates and secured with tamperproof screws.

4. Special junction and pull boxes shall be of the type and minimum dimensions indicated on the drawings or as required by NEC. Boxes shall conform to NEC requirements for wiring space.

2.4 CONDUIT TERMINATIONS

A. Terminations to NEMA 1 enclosure shall be made with bushing and locknuts.

B. Terminations to NEMA 12 enclosure shall be made on oil-tight hubs with an O-ring and insulated throat.

PART 3 - EXECUTION

3.1 PREPARATION

A. Metal conduit shall be cut, bent and joined per manufacturer's instructions and Code.

B. Any conduit or box whose galvanized finish is damaged shall be repaired by applying two coats of Z.R.C. Products Co., (Quincy, Mass.) cold galvanizing compound.

3.2 INSTALLATION METHODS

A. Conduit runs shall be placed neatly and orderly at parallel or perpendicular lines into the building walls.

B. Conduit runs parallel to or crossing uninsulated hot water or steam pipes shall be separated from same by 12" if parallel, or 7" if crossing. Where hot water or steam pipe lines are insulated, conduit shall clear the insulation surface by 2". Conduit shall not be installed directly under cold water lines.

C. No more than two concealed conduits shall cross over at the same point in a poured slab.

D. Conduit and pull boxes shall be installed mechanically secure to permit the pulling in or pulling out of all cable proposed for same. Double locknuts and bushing shall be used for termination of conduit at boxes and equipment.

E. Provide insulating bushings at ends of conduit or box connectors except on threaded type hubs and fittings.

F. Joints of conduits shall be tight, low resistance connections.

G. A #6 pullcord shall be provided for all new empty conduits. Pullcord shall be wax impregnated, nylon or other synthetic material that is resistant to moisture and mildew so as to prevent deterioration.

H. Conduit and boxes for equipment and devices shall be run and firmly secures as close as practical to building ceiling structures with final connection from junction box to unit made in flexible conduit, unless otherwise noted. Loosely mounted outlet box on ceiling is not acceptable.

I. Conduit shall be anchored to masonry and concrete by means of drilled in anchors with clips. Space clips at not more than 8'-0" on center.

3.3 APPLICATION

A. Size restrictions on liquid-tight flexible conduit shall be ½" minimum diameter, 12" minimum length and 24" maximum length.

B. Various conduit applications shall be as follows:

1. Galvanized Heavy Wall Rigid Steel Conduit:

    a. Acceptable for use in all applications.

2. Intermediate Metal Conduit:

    a. Acceptable for use in poured concrete.

    b. Acceptable for building interior.

    c. Not acceptable for above 600 volts.

3. Electric Metallic Tubing:

    a. Acceptable for exposed work indoor and dry condition only.

    b. Acceptable where concealed in ceilings and walls except poured concrete walls or floor decks.

    c. Not acceptable for above 600 volts.

4. Schedule 40 Rigid Plastic Conduit:

    a. Acceptable for direct burial outdoor only.

    b. Acceptable for underground outdoor concrete encased.

    c. A separate color-coded ground wire shall be provided.

5. Galvanized Flexible Steel Conduit:

    a. Acceptable for connection of lighting fixtures above suspended ceiling, 6 ft. maximum length.

    b. Acceptable for connection from outlets to special equipment, 4 ft. maximum length.

    c. A separate color-coded ground wire shall be provided.

    d. For connection to vibrating equipment and transformer, 4 ft. maximum length.

6. Liquid-Tight Flexible Steel Conduit

    a. For connections between motors and rigid conduits connected thereto.

    b. Acceptable for connections between rigid conduits and devices subject to vibration where subject to moist or corrosive environmental conditions.

    c. A separate color-coded ground wire shall be provided.

END OF SECTION 26 5609

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SECTION 27 5117 – FIELD COMMUNICATION BOXES

PART 1 - GENERAL

1. SUMMARY

   A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

2. SCOPE

   A. Furnish all labor, materials, and equipment necessary to install pre-manufactured synthetic turf field communication boxes.

3. GUARANTEE AND SERVICE:

   A. The completed system shall be guaranteed to be free from all defects for a period of manufacturer's warranty/guarantee or one (1) year from the date of final acceptance, whichever is greater. Any defects or system malfunctions shall be immediately corrected at not cost to the Owner for the warranty/guarantee period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

   A. Furnish and install synthetic turf communication boxes as detailed.

   B. Synthetic Turf Surface Communication boxes shall be from one of the following (or approved equal)

      1. Sportsfield Specialties: Model CBIT 1830 (18”x30”)

      2. SportsEdge: Model SEF900 (18”x30”)

      3. Gill Athletics: Model F960 (18”x30”)

PART 3 - EXECUTION

3.1 INSTALLATION

   A. Install equipment in accordance with manufacturer’s written instructions and as indicated on the drawings.

   B. Field install synthetic turf surfacing.

END OF SECTION 27 5119

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SECTION 31 1500 – SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Protecting existing trees, shrubs and other vegetation to remain.
2. Removing existing trees, shrubs and other vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above-grade and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place or removing site utilities.
7. Temporary erosion and sedimentation control measures.

1.2 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials. Bidders shall refer to Soil Report Recommendations.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.3 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site unless otherwise noted on the plans.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Division 01 7700 Section "Closeout Procedures."

1. Identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract. Contractor is to confirm that this authority has been obtained before beginning work on adjoining property.

C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing, which shall include all public and private utilities.

E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 31.

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site. Contractor is responsible for doing an independent earthwork computation and including all necessary import and/or export of materials in their bid.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction. If said points will be disturbed, establish new points prior to removal.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and the sediment and erosion control drawings, whichever is more stringent.

B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls only after all areas are restored and stabilized.

3.3 TREE PROTECTION

A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.
2. Do not permit vehicles, equipment, or foot traffic within fenced area.
3. Maintain fenced area free of weeds and trash.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.4 UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.
2. Owner will arrange to shut off indicated utilities when requested by Contractor.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

E. Removal of underground utilities is included in Division 33 Sections “Common Work Results for Utilities.” for covering site utilities.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
4. Use only hand methods for grubbing within tree protection zone.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile topsoil material in locations approved by the Owner or Architect.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.8 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, other vegetation and waste materials including trash and debris, and legally dispose of them off Owner's property.

1. Burning of materials on project property is prohibited.

END OF SECTION 31 1500

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SECTION 31 2010 – EARTHWORK – TURF

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the provisions of the other parts.

B. Section Includes:

1. Excavation
2. Grading
3. Backfill and Fill

1.2 SCOPE

A. Furnish approved labor, materials, equipment, transportation, and services required to complete all earthwork as indicated on the drawings and specified herein The Base Bid includes all earthwork and grading to provide a subgrade for other improvements. Adjustment of grades will be permitted, providing the overall grading concept and the positive drainage swales are maintained.

1.3 QUALITY ASSURANCE

A. Excavation team shall be established and experienced with a minimum of 5 years experience constructing athletic fields.

1.4 EXAMINATION OF SITE

A. The contractor is expected to visit the site to determine all conditions to be encountered, protect improvements on adjoining properties, as well as those on the owner's property, and to restore any improvements damaged by his work to their original condition, as acceptable to the owner or other parties or authorities having jurisdiction.

1.5 SAFETY CODES AND STANDARDS

A. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.6 LINES AND GRADES

A. The plans indicate lines, grades and elevations of the finish work. In general, areas to be turfed shall be excavated and/or filled and graded to the bottom elevations of drainage aggregate.

1.7 DEWATERING

A. The contractor shall perform all work so as to permit the site to be free draining at all times and to prevent ponding. Contractor shall provide positive drainage for the entire site during the course of construction to eliminate standing water in excavated areas.

1.8 DEBRIS

A. All debris is to be disposed off Owner's property unless otherwise directed.

B. Debris may not be buried over existing sewers or water mains.

C. All debris must be removed on a daily basis.

PART 2 - PRODUCTS

2.1 BACKFILL AND FILL MATERIALS

A. Backfill shall be excavated soil material, free of rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable matter, organic matter, and other deleterious matter. Existing materials may be used for backfill, provided no silt is mixed with material. Backfill consists of placement of acceptable soil material in layers, in excavations, to required subgrade elevation, for each area classification listed below.

B. Fill Material: Fill material shall be clean, hard, durable, uncoated particles of sand or sand gravel mixture, provided that there shall be a substantial excess of sand-screenings.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavation consists of removal of material encountered to obtain required subgrade elevations.

1. Excavation for Trench: Cut trench to cross-sections and grades as shown. Deposit excavated materials a sufficient distance from the edge of trench to prevent cave-ins or material from sliding into ditch. Keep trench free of leaves, sticks, and other debris until final acceptance of work.
2. Removal of Unsatisfactory Soil Materials: Excavate unsatisfactory soil materials encountered that extend below required elevations, to additional depth directed by the Geotechnical Engineer and reviewed with Landscape Architect; refer to geotechnical evaluation report. All organic matter within the synthetic turf footprint shall be removed.
3. Material Storage: Place excavated materials classified as unsatisfactory fill materials where directed by Owner's geotechnical consultant.
4. Stability: Slope sides of excavations over five feet (5') deep to angle of repose of material excavated; otherwise shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfill by scaling, benching, shelving, or bracing. Take precautions to prevent slides or cave-ins when excavations are made in locations adjacent to backfill excavations, and when sides of excavations are subjected to vibrations from vehicular traffic or the operation of machinery or any other source. Remove soft or unstable soil below finish grade elevations and backfill such voids with compacted fill material.

3.3 BACKFILL AND FILL MATERIALS

A. Surface Preparation

1. Remove vegetation, debris, unsatisfactory soil materials, obstruction and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than one

(1) vertical to four (4) horizontal so that fill material will bond with existing surface. When the existing ground surface has a density less than that specified under "Compaction" (3.2 A 2) for the particular area classification, break up ground surface, pulverize, and compact to the required depth and percentage of maximum density.

2. Compaction: Perform compaction of soil materials for fills and backfills using suitable soil compaction equipment for materials to be compacted and work area locations. Control soil compaction during construction for compliance with percentages of maximum density specified for each classification. All compaction tests shall be in accordance with ASTM D1557 or AASHO T180 C Modified Proctor Method.
3. Placement And Compaction: Place backfill materials in layers not more than eight inches (8") in loose depth. Before compaction, moisten or aerate each layer, as necessary, to provide the optimum moisture content. Compact each layer to required percentage of maximum density for each area classification. Do not place backfill or fill material on surfaces that are muddy, or frozen, or contain frost or ice. Thoroughly compact all fill and backfill by rolling each layer, following spreading, as closely as possible. Roll the areas in equal amounts in two directions. Provide compaction equipment or type best suited to achieve the desired results with the type of soil. In general, use sheeps foot and/or tamping type rollers on soils of a cohesive type; pneumatic wheeled or vibrating rollers on granular fill material, all as approved by the Landscape Architect. Operate compacting equipment on each layer until the entire area has been thoroughly and uniformly compacted to the required density.
4. Maximum Density Requirements: Provide not less than the following percentages of maximum density of the same soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place. Any soils found unsuitable for specified compaction requirements shall be removed as directed by Owner.
5. Lawn or Unpaved Areas: Compact top six inches (6") of subgrade and each layer of backfill or fill material at eighty-five percent (85%) maximum density.
6. Grading: Preparation of subgrade: Rough grade all areas within the limits of site grading under this section, including adjacent transition areas. The rough grade shall be compacted as required. Shape the surface of future lawn areas to the line grade and cross-section with the surface not more than 0.10 feet above or below a subgrade elevation. Take extreme care in the grading of swale areas to insure free movement of surface runoff. Ponding shall be non-existent or at a minimum.

3.4 FINISH GRADING:

A. Sub-Soil Preparation:

1. Fine grade sub-soil systematically to eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc., in excess of two inches (2") in size. Remove sub-soil which has been contaminated with petroleum products.
2. Bring sub-soil to required levels, profiles and contours suitable for receiving the required finish surfaces. Make changes in grade gradual; blend slopes into level areas. Maximum slope 4:1 unless otherwise indicated.
3. Cultivate sub-grade to a depth of six inches (6") where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.
4. Compact sub-soil at the following percentages to a depth of 12 inches:
an 85% Modified Proctor where topsoil is to be placed.

END OF SECTION 31 2010

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SECTION 31 3219 – GEOTEXTILE FABRIC

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 SCOPE

A. The work under this section shall consist of furnishing all labor, materials and equipment for the installation of the geotextile fabric.

1.3 SUBMITTALS

A. Manufacturer's Literature: Furnish to Landscape Architect, when required, copies of manufacturer's specifications, and installation instructions for geotextile fabric. Include photographs, catalogue cuts, samples as may be required to show compliance with these specifications.

PART 2 - PRODUCT

2.1 GEOTEXTILE FABRIC

A. The product shall be AMOCO CEF2006, Mirafi - 600x, LINQ Industrial Fabrics - GTF-300, CSI Geoturf - W315 or an approved equivalent.

B. The geotextile shall be of woven construction and consist of long-chain polymeric yarns. The yarns must be composed of at least 95% propylene or ester polymers. The fibers shall be produced in a manner which achieves a stable network. The geotextile shall conform to the mechanical and hydraulic property requirements listed below:

MINIMUM AVERAGE

PROPERTY	VALUE	UNIT	TEST PROCEDURE
Grab Tensile Strength	315	lbs.	ASTM D-4632
Grab Tensile Elongation	15	%	ASTM D4632
Wide Width Tensile	175/175	lbs/in	ASTM D4595
Wide Width Elongation	15/8	%	ASTM D4595
Mullen Burst	600	Psi	ASTM D3786
Puncture	145	lbs	ASTM D4833
Trapezoidal Tear	120	lbs	ASTM D4533
UV Resistance	70	% @ 500 hr	ASTM D4355
Apparent Opening Size (max)	40	AOS	ASTM D4751
Permitivity	.055	1/sec	ASTM D4491
Flow Rate	4.0	gpm/ft2	ASTM D4491

PART 3 - EXECUTION

3.1 INSTALLATION

A. The geotextile fabric shall be furnished and stored in a wrap which will protect the geotextile fabric from ultraviolet radiation and abrasion. The geotextile fabric shall be covered with the appropriate soil cover within two weeks of its placement.

B. Should the geotextile fabric be damaged during construction, the torn or punctured section shall be repaired by placing a piece of fabric that is sufficiently large enough to cover the damaged area plus two feet (2') of adjacent undamaged geotextile fabric in all directions.

C. Fabric shall be installed on dry soil as per manufacturer.

D. Overlap the fabric as recommended by the manufacturer.

E. Installation and Unit Price shall include overlap quantities.

END OF SECTION 31 3219

SECTION 32 1123 – AGGREGATE DRAINAGE LAYER

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 2010 Earthwork – Turf

1.2 SCOPE

A. The work under this section of the specification shall consist of furnishing all labor, materials and equipment to produce, place, spread, compact and finish to proper grade and cross section all aggregate base courses according to the drawings and specifications.

1.3 QUALITY ASSURANCE

A. Contractor shall have previously installed twelve (12) artificial infill turf bases for turf fields larger than 80,000 square feet in the last three (3) years.

1. The contractor is responsible for subgrade fine grading, installation of geotextile fabric, installation of field drainage system, installation of the perimeter nailing system, installation of field water distribution system, and installation of the dynamic stone base.

B. Firms must have been in business under the same ownership for at least five (5) years and shall have been installing similar sports fields for that entire period.

C. Contractor shall provide a sieve analysis prior to placement for every 150 ton of stone delivered to site.

D. The synthetic turf manufacturer/installer shall perform an inspection of the field base onto which the synthetic turf system is to be installed to examine the finished surface for required compaction, permeability and grade tolerances. Earthwork contractor is responsible for correcting deficient items noted by the turf manufacturer/installer prior to acceptance. The turf installer will accept the aggregate stone base in writing when the Owner's representative provides test results for compaction, permeability and planarity that are in compliance with the project plans and specifications. After any discrepancies between the required materials, application and tolerance requirements noted have been corrected, the synthetic turf installer should submit a written certification of acceptance of the base for installation of synthetic turf system.

1.4 SUBMITTALS

A. Submit to the Landscape Architect a sieve analysis of the proposed stone to be installed. Sieve analysis shall be dated within 14 days of submission.

1.5 ACCEPTABILITY OF THE WORK

A. Grade: Grade conformance tests shall be conducted on the entire surface. The surface shall have positive drainage of 0.50% inclination.

B. Planarity: After completion of the compacting operations, the compacted aggregate base shall be

tested with a 10' straightedge. Measurements shall be made perpendicular to and across the field at a distance not to exceed 25' feet. The grade will not vary by 1/8" from proposed grades, elevations and slopes provided.

C. The grade of the aggregate base shall be evaluated with a "string test". The contractor shall identify, with paint, every 5 yd line, in-bound lines, side line, touch line and end lines.

D. Aggregate shall be tested as per ASTM F1551-09 at a minimum of 8 locations after final grade as been achieved and accepted.

E. Foresite Design commits to being onsite for a maximum 3 hours during string check. Any additional time required will be billed as an Additional Service to be compensated by the Base Contractor or Construction Manager. Hourly rates are between $125 - $150 depending on which personnel are present.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate base material shall conform to specifications for 100% crushed 100% limestone and shall be placed and compacted to the minimum depth shown on plans. Crushed concrete, slag, etc. shall not be allowed. DOT standard classifications do not conform. Modifications of standard DOT aggregate classification maybe required to meet specification. On-site mixing will not be an acceptable method for providing this material.

Aggregate Sieve Analysis	Percent Passing	
	Base Material	Finishing Stone (Not to exceed 1" compacted depth)
1 1/2"	90-100	
1"	75-100	
¾"	65-95	100
3/8"	40-75	85-100
¼"	25-65	75-100
No. 4	15-60	60-90
No. 8	0-40	35-75
No. 16	0-20	10-55
No. 30	0-7	0-40
No. 60	0-5	0-15
No. 100	0-3	0-8
No. 200	0-2.0	0-2.0
LBW	Maximum 2.5	Maximum 2

B. The hydraulic conductivity of the aggregate shall be such that is capable of draining the entire synthetic surface at a minimum of 10"/hr for the carpet and 14"/hr including aggregate drainage stone with perforated under drain system acting as the main water displacement conductor. The aggregate shall maintain its finished grade elevations. Migration of fines and subsequent loss of finished tolerances will not be accepted.

C. Material shall be tested by a testing agency selected by the Owner to ensure compliance with the submitted documentation (ASTM D422 particle size analysis and ASTM F1551-09/DIN 18-035:6, permeability to water). A minimum of 8 tests shall be performed at random locations selected by Owner's representative.

PART 3 - EXECUTION

3.1 SUB-GRADE CONSTRUCTION

A. The sub-grade shall be so constructed as to have uniform stability for a width at least equal to that of the proposed improvements plus of the proposed anchoring system. It shall be brought to an elevation and cross section such that, after being rolled, the surface will be at the required elevation. At the time the sub-grade is prepared, the fill area shall have been constructed to the full width and to at least the elevation of the finished sub-grade.

B. The material present in the next six (6) inches below the elevation of the sub-grade shall be scarified, mixed and recompacted, or otherwise treated to produce a uniform condition. Stones over four (4) inches in size shall be removed from the loosened portion of the sub-grade and disposed as directed by the project representative.

C. Depressions that develop during the following shall be filled with suitable material, and the rolling shall continue until the sub-grade is uniformly firm, properly shaped and substantially true to grade and cross section. It shall be so maintained until the pavement is place.

D. Material, other than sand, which will not compact readily under roller shall be removed and replaced with material which will compact readily and that portion of the sub-grade shall be rolled again.

E. The rolling of the sub-grade shall extend for at least twelve (12) inches outside of each edge of the proposed turf boundaries when possible. Piles or ridges of earth or material that would seriously interfere with the operations of finishing the pavement shall not be left on the shoulders.

F. During the process of construction sub-grade, the soil shall be maintained in a condition sufficiently moist to facilitate compaction and produce a firm, compact surface.

G. If, in the preparation of the sub-grade, it becomes necessary to excavate below the elevation of the earth shoulders, ditches or drains shall be provided at frequent intervals to permit ready drainage of surface water from sub-grade to side ditches.

H. If ruts or other objectionable irregularities form in the sub-grade during construction, the Contractor shall reshape and re-roll the sub-grade before the drainage course is laid. The material used for filling ruts or other depressions shall be of such character as to make it equally desirable for sub-grade purposes as the material presented in the sub-grade.

I. When the sub-grade is being prepared for placement as an aggregate base course, the elevation of the most finished surface, at the time the next layer is placed, shall not vary by more than 0.02 foot above or below the prescribed elevation at any point where measurement is made.

3.2 AGGREGATE DRAINAGE COURSE

A. Base course construction shall proceed as follows only after the qualified testing firm has approved the sub-grade construction and the gravel tests.

B. The base shall be constructed in layers of not more than three (3) inches (75mm) compacted thickness when conventional rolling equipment is used.

C. If vibratory or other approved special equipment is used, the thickness of every compacted layer may be increased to a maximum of eight (8) inches (200mm).

D. The finished surface of any aggregate drainage layer shall not vary more than 1/8" from the elevations, grades and cross sections on the drawings.

E. Compacted full profile aggregate drainage stone base dimensions shall be a minimum of 8". The thickness of the finishing stone shall not exceed one (1) inch of compacted depth.

F. It shall be the contractor's responsibility to maintain a uniform consistent stone base gradation during the installation process. This shall include but not limited to keeping aggregate base at optimum moisture content (5%, ± 1%) and/ or providing, placing, and compacting a ½ " layer of stone chips.

G. Installation shall be accomplished using automated laser grade control, equipment, with dual-slope capabilities.

H. Prior to calling for grade verification from Landscape Architect, the contractor shall have a registered land surveyor establish and set PK nails at the following locations:

1. Back of end zone.
2. Goal line.
3. Every 5 yard line.
4. Football side line
5. Soccer touch line

I. PK nails, or equivalent, shall be placed on turf nailer system. Do not set flush into nailer. Allow enough to loop grade line onto nail for grade verification. String Check.

J. Contractor shall have on-site, prior to Landscape Architect arrival, the following equipment:

1. One (1) ton steel drum rover – rubber tired equipment not acceptable.
2. 50 ton 3/8" stone chips.
3. Topdresser – to distribute 3/8" stone chips.
4. Two (2) 48"/38" aluminum landscape rakes.
5. 24" wide broom.
6. There must be enough personnel to operate all equipment simultaneously.

K. It will be the contractor's obligation and responsibility to have all of the above items in place prior to grade verification by Landscape Architect.

3.3 COMPACTION REQUIREMENTS

A. Sub-grade shall be compacted to not less than ninety-two percent (92%) of maximum density at not less than seventy-five percent (75%) of optimum moisture content.

B. Aggregate drainage layer shall be compacted to not less than eighty-five percent (85%) of maximum density. Using conventional rolling equipment, moisture content shall not be less than ninety percent (90%) nor more than one hundred-ten percent (110%) of optimum moisture content. Using vibrating equipment, moisture content shall not be less than seventy-five (75%) of optimum moisture content.

C. Maximum density shall be determined in accordance with AASHO Modified Method of Test for the Compaction and Density of Soil, Designation T-180, and the optimum moisture content shall be that corresponding to the maximum density in the above test.

D. Contractor shall maintain optimum moisture content during the installation, (placement, grading, compacting, etc.) of the aggregate base materials.

3.4 ROLLERS

A. Smooth steel-wheeled rollers shall be self-propelled and have a total weight not less than 8 tons. The compression (driving) roller shall exert a pressure of not less than 250 lbs. per inch width of the roller.

B. Pneumatic-tire rollers shall have a compacting width of sixty (60) inches (1.5m) or more and shall be capable of varying the weight from 100 to 250 lbs. per inch of rolling width.

END OF SECTION 32 1123

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SECTION 32 1815 – SYNTHETIC TURF

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents, including General and Supplementary Conditions. Drawings shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 32 1123 Aggregate Drainage Layer

1.2 SCOPE OF WORK

A. The work under this section shall consist of furnishing all labor, materials and equipment, necessary to install, in place, all synthetic turf materials as indicated on the plans and as specified herein. The installation of all new materials shall be performed in strict accordance with these specifications, the manufacturer's instructions and in accordance with all details and shop drawings. The scope of work shall include the following:

1. Provide and install a parallel slit polyethylene turf carpet, infill system shall be recyclable SBR rubber and silica sand. Infill to be provided by the turf manufacturer, along with additional components including inlaid game lines, markings and logos as indicated, for a complete system.
2. Inlaid football inbound lines, individual yardline markings, restraining line, field numbers, football kick-off, soccer lines, centerfield logo and endzone graphics.
3. Maintenance Equipment
4. Manufacturer's Warranty – Guarantee (8 Years)
5. 3rd Party Insured Warranty
6. Manufacturer/Installer shall provide +/- 2000 lbs of additional rubber infill material to the Owner.
7. Manufacturer/Installer shall provide +/- 200 sf of each color of the synthetic turf installed.
8. Manufacturer/Installer shall provide +/- 100 lf of each 4" line color of the synthetic turf installed.

1.3 QUALITY ASSURANCE AND REFERENCE STANDARDS

A. Bidders shall submit a color roll of standard manufacturer colors with their bid.

B. Following acceptance of bids and evaluation of all product related information submitted with bid and requested additionally, the Owner reserves the right to award to the Contractor based on factors other than low bid.

C. Turf System Provider (Builder/Installer) must be experienced in the installation of fifty (50) fields of the synthetic turf system being proposed in the last (5) five years with the same manufacturer, product and infill proposed for this project. This includes the fiber, backing, the secondary backing and installation method. Product shall meet the following criteria:

1. Have a NCAA Division 1 football field installed with parallel slit or monofilament fiber product.
2. Have a football field of 85,000 sq. ft. or more of the exact specified material, including the infill material and fiber, in play for at least two years with the same turf manufacturer and company they are proposing for this field.
3. Must have five fields in play for the past year, utilizing the same fiber and fiber manufacturer

that is being proposed for this field.

4. Verification that provider meets these requirements shall be included with Bid.

D. Builder/Installer Experience:

1. Must be a member in good standing of the Synthetic Turf Council (STC) and/or American Sports Builders Association (ASBA). Provider shall employ one ASBA Synthetic Turf Certified Turf Builder.
2. Turf Contractor shall provide a competent installation team skilled in this specific type of synthetic turf installation. Installation team shall be established and experienced in the field with a minimum of 5 years experience with 15 foot wide materials.
3. On-Site superintendent shall have at least 25 installations for at least five years of synthetic turf system specified.

E. PRE-BID TESTING: Turf System Provider shall submit test results from that are not older than one year, from an independent lab certifying their product meets or exceeds the following test requirements. Provider shall furnish test results to Landscape Architect for approval prior to bidding.

1. Player/Surface Interaction Characteristics:

PROPERTY	TEST METHOD	REQUIREMENT	LAB AND FIELD TEST
Shock Absorption	ASTM F1936	≤165 G's	Lab / Field
Force Reduction	ASTM F2157-02	55% - 70%	Lab / Field
Vertical Deformation	ASTM F2157-02	4 - 9 mm	Lab / Field
Rotational Resistance	EN 15301 Method 1	25 Nm – 50 Nm	Lab / Field

2. Ball/Surface Interaction Characteristics:

PROPERTY	TEST METHOD	REQUIREMENT	LAB AND FIELD TEST
Vertical Ball Rebound	ASTM F2117	30% - ≤ 50%	Lab / Field
Ball Roll	EN 12234	≤10m	Lab / Field

F. PRE-SHIPMENT TESTING

1. Prior to delivery of materials to site, Turf Provider shall submit the test results, from an independent lab, of (5) random rolls manufactured for this project. These test results must be sent and approved prior to product shipping to site. Any test result not meeting specification minimums is grounds for rejection of entire product.
   a. Test sample shall be from five random rolls manufactured for this project. Proof of documentation must be provided upon delivery of the carpet to the job site.
   b. Test results shall identify manufacturer, date of test(s), lab technician, project, lot number, etc.
   c. Testing based on the following physical characteristic data:

Test Property	ASTM Test
Denier	ASTM D418
Pile Ribbon Wt	ASTM D5848
Primary Backing Wt	ASTM D5848
Secondary Backing Wt.	ASTM D5848
Tuft Bind	ASTM D1335
Yarn Elongation	ASTM D2265
Grab Tear Strength	ASTM D5034

Flammability	ASTM D2859
Lead Content	ASTM F2765

G. POST-INSTALLATION TESTING:

1. Following installation, the turf field shall be tested by an independent lab certifying product specified meets or exceeds the following test requirements. Installer and Owner shall be furnished test results and installer shall be required to make adjustments to comply with specified values noted below. Test site locations for shock absorption shall be as noted in ASTM F1936. The test procedure will be ASTM 1936, Procedure A.

PROPERTY	TEST METHOD	REQUIREMENT	LAB AND FIELD TEST
Shock Absorption	ASTM F1936	≤110 G's	Lab / Field

2. Following installation and acceptance by the Owner, the turf field may be tested by an independent lab certifying product specified meets or exceeds the following test requirements. Installer shall be furnished test results if requested, be required to make adjustments to comply with specified values noted below. Testing shall be coordinated by and paid for by the Owner.

1. Player/Surface Interaction Characteristics:

PROPERTY	TEST METHOD	REQUIREMENT	LAB AND FIELD TEST
Shock Absorption	ASTM F1936	≤165 G's	Lab / Field
Force Reduction	ASTM F2157-02	55% - 70%	Lab / Field
Vertical Deformation	ASTM F2157-02	4 - 9 mm	Lab / Field
Rotational Resistance	EN 15301 Method 1	25 Nm – 50 Nm	Lab / Field

2. Ball/Surface Interaction Characteristics:

PROPERTY	TEST METHOD	REQUIREMENT	LAB AND FIELD TEST
Vertical Ball Rebound	ASTM F2117	30% - ≤ 50%	Lab / Field
Ball Roll	EN 12234	≤10m	Lab / Field

H. REFERENCE STANDARDS:

1. American Society for Testing and Materials (ASTM):

F1551-03 - Standard Test Method for Comprehensive Characteristics of Synthetic Turf Playing Surfaces and Materials
D5848-98 - Standard Test Method for Mass Per Unit Area of Pile Yarn Floor Covering
D418 - Standard Test Method for Testing Pile Yarn Floor Covering Construction (Withdrawn)
D1335 - Standard Test Method for Bind of Pile Yarn Floor Coverings
D638-03 - Standard Method of Test for Textile Properties of Plastics
D5034 - Standard Test Method of Breaking Strength and Elongation of Textile Fabrics (Grab Test)
F1015-03 - Standard Test Method for Relative Abrasiveness of Synthetic Turf Playing Surfaces

D2256-02	Standard Test Method for Tensile Properties of Yarns by the Single Strand Method
D2157-02	Standard Specification for Synthetic Surface Running Tracks
F2117	Standard Test Method for Vertical Rebound Characteristics of Sports Surfaces/Ball Systems; Acoustical Measurement
D4491 -	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
D2859-04 -	Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
F355 -	Standard Test Method for Shock-Absorbing Properties of Playing Surfaces.
F1936-	Standard Test Method for Shock-Absorbing Properties of North American Football Field Playing Systems as Measured in the Field
D1557 -	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
F2765 -	Standard Test Method for Total Lead Content in Synthetic Turf Fibers

2. National Collegiate Athletic Association (NCAA)
3. National Federation of State High School Associations (NFHS)

I. RESUMES: Upon request, Bidder shall submit resumes detailing level of experience of each installation foreman or supervisor.

J. MANUFACTURER'S INSTRUCTIONS: Comply with the manufacturer's applicable instructions and recommendations for installation to whatever extent these are more stringent or explicit than indicated in the contract documents.

K. MATERIALS: All supplied and installed materials and products will meet or exceed the minimum specifications designated in this section. The synthetic turf colors specified and detailed shall be standard manufacturer colors, unless otherwise noted. Contractor shall submit test results, from an independent lab of 5 random rolls of carpet intended for this project, before shipping to the site.

L. INSPECTION: Inspect delivered field surface fabric components immediately prior to installation. Any damaged or defective items shall be rejected. Installed artificial system shall be inspected for, but not limited to the following: acceptable seams, glue bonding, uniformity of product and color, surface bubbles, field markings, and field edge installation. The pile height of each roll supplied fabric shall be measured. Any material(s) that does not meet minimum height and thickness specifications shall be rejected. Pile height shall be measured in its finished position. Manufacturer shall provide evidence of random samplings obtained during the manufacturing process that the carpet meets or exceeds the specifications below.

M. BASE ACCEPTANCE: The synthetic turf manufacturer and/or installation contractor shall perform an inspection of the field base onto which the synthetic turf system is to be installed and to examine the finished surface for required compaction, permeability and grade tolerances. The turf installer will accept the aggregate stone base in writing when the Owner's representative provides test results for compaction, permeability and planarity that are in compliance with the project plans and specifications. After any discrepancies between the required materials, application and tolerance requirements noted have been corrected, the synthetic turf installer should submit a written certification of acceptance of the base for installation of subsequent layers of the synthetic turf system. The acceptance of the base construction should be included in the certification for warranty validation.

N. FIELD DIMENSIONS: Turf Provider is responsible for verifying field size and layout of markings and dimensions to verify conformity to specifications and governing standards.

O. WARRANTY SAMPLES: Submit 3 "sample copies" of the PROPOSED WARRANTY" to be provided at the completion of the Contract. Warranty period shall be for not less than eight (8) years after final acceptance and incorporate all components. Warranty shall be provided by system installer who shall be responsible for carpet, inlays and infill. Maintenance is an essential element in the performance and life cycle of each system. The maintenance procedures and equipment as specified by the manufacturer and required for the system shall be evaluated during the selection process so that the appropriate budget resources (manpower & equipment) may be allocated.

1. All turf warranties shall be full, non-prorated, limited to repair or replacement of the affected areas, at the option of the Manufacturer, and shall include all necessary materials, labor, transportation costs, etc. to complete said repairs. All warranties are contingent on the full payment by the Owner of all pertinent invoices.
2. The artificial grass field turf must maintain an ASTM 1936 G-max between 85-165 for the life of the Warranty.

   * Warranties for the synthetic turf field systems shall address the following:
   - Acceptable uses for the field
   - Fading
   - Color match within specifications
   - Excessive fiber wear
   - Wrinkling and panel movement
   - Shock absorbency (G-max)
   - Seam Integrity
   - Drainage (of Carpet and Infill only)
   - Flammability
   - Response time for required repairs/replacement

3. Results of G-max shall not deviate by more than 10%. See chart below.

Football Field	6 pts
Average Initial G-max (w/o E-layer)	100-110
Average Initial G-max (w/ E-layer)	85-100

4. Contractor shall provide an independent 3rd party insurance policy to cover items identified above.
5. Infill shall be evaluated and accepted during initial installation. Contractor shall provide shipping receipts verifying specified rubber quantity was delivered. If the field lacks sufficient material to properly support P.E. fiber, contractor shall provide and install additional rubber as needed at no additional cost to the owner. Contractor shall inspect the field after 1 year to provide and install sufficient amount of rubber to support all except ½" of the turf fiber.

P. FINAL ACCEPTANCE:

1. At the completion of the project, Contractor shall provide the following:

   a. Certificate of Substantial Completion.
   b. Certification of Owner Attic Stock Materials.
   c. Warranty: Submit warranty and ensure forms have been completed in Owner's name and registered with Manufacturer.
   d. 5 complete sets of Maintenance Manuals, which will include necessary instructions for the proper care and preventative maintenance of the synthetic turf system, including line/marking installation and removal, small repair procedures and cleaning.
   e. List of procedures required to maintain surface condition and activities to be avoided in order to prolong the life and maintain the warranty, including static and dynamic load limits, snow clearing, etc.

f. Project Record Documents: Record actual locations of seams or other pertinent information that is different from approved shop drawings.

2. Within twelve months after initial installation, Turf Provider may be required to return to supplement rubber and perform maintenance.
3. Installer shall provide training session for Owner and their selected representatives.

1.4 SUBMITTALS

A. All submittals shall be provided within 14 days after Notice to Proceed.

1. Shop Drawings - Submit complete and detailed shop drawings including layout of all components, parts and materials installed under this section. Shop drawings shall show proposed locations of all seams in fabric surfacing. Custom logos can be provided in AutoCad 2000 format to expedite shop drawing process.
2. (4) 1'x1' samples of turf proposed for project.
3. (4) samples of inlaid or tufted colors proposed for project.
4. Field Lining and Marking - Submit a complete scale and dimensional drawing of inlaid or tufted field linings including proposed method of seaming panels.
5. Fiber manufacturer's name, type of fiber and composition of fiber.
6. Proposed infill composition, including pounds of sand and pounds of rubber per square foot.
7. Rubber, with certification of availability, from supplier guaranteeing product supply reserved for Richmond High School.
8. The Turf Contractor and the Turf Manufacturer (if different from the company) shall provide a sample copy of warranty and insurance policy information.
9. Maintenance Equipment submittals, including product data, operational instruction, etc.
10. The Turf Contractor and the Turf Manufacturer (if different) shall provide written documentation that patents are not being violated, and also include all patent information that may be pending for the specified products.

B. MAINTENANCE EQUIPMENT

1. The Turf Contractor/Manufacturer shall supply, as part of the Base bid the following equipment to each site. Contractor shall provide one (1) Groomer and one (1) Sweeper for routinely brushing the field to be a single unit of putting green quality.

a. Groomer/Sweeper combined unit shall be:
i. "Turfcare TCA1400 with magnet" by SMG (attn: Kevin Dorney), Renton, WA (425) 687-1560

PART 2 - PRODUCTS

2.1 MATERIALS

A. The turf system shall consist of an artificial grass-like surface pile, which shall be tufted into a primary backing and coated with a secondary backing to lock in the tufted fibers.

B. The entire system shall be resistant to weather, insects, rot, mildew, and fungus growth, and will be non-allergic and non-toxic.

C. The entire system shall be constructed for porous standards as specified.

D. The pile surface shall provide good traction in all types of weather with the use of conventional sneakers type shoes, composition mold sole athletic shoes, baseball spikes, and screw-on football

cleats.

E. In addition to the tufted lines, inlaid lines and logos, the pile surface shall be suitable for both temporary and permanent line markings using paint specifically developed for this use and as recommended by the turf manufacturer.

F. The fabric surface shall be installed in 15 foot widths.

G. All synthetic turf seams shall be sewn with a double-lock stitch on the 4" white yardline of the panel.

H. The dynamic cushioning of combined turf and infill material supplied shall not exceed an average maximum value of 110 G's, at 70°F upon initial installation, utilizing ASTM Test F-1936-95, not to exceed 165 G's over warranty period.

I. The entire system will be constructed to maximize dimensional stability, to resist damage, resistant to ultraviolet radiation, and sustain normal wear and tear for its designated uses.

J. All adhesives used in bonding the inlaid markings to the adjacent carpet shall be resistant to moisture, bacteria and fungus attacks, and resistant to ultraviolet radiation.

K. Rubber will either be ambient ground or cryogenic produced (supplier to submit verification) and be sized to allow a system infiltration of water at a rate of 10" per hour.

2.2 PRODUCTS

A. The synthetic turf material and resilient infill shall be in accordance with the following:

1. The fiber shall be an 8,000 denier, 100 micron thickness 100% polyethylene, low friction fiber, measuring not less than 2" inches high. The fiber shall be specifically designed to virtually eliminate abrasion.
2. The fiber weight shall not be less than 44 ounces per square yard. The overall product weight must not be less than 76 ounces per square yard. The low friction non-abrasive fiber shall be 100% polyethylene, treated with a UV inhibitor.
3. The primary backing shall consist of a one part, three component polyester/polypropylene backing with a minimum weight of 8 ounces per square yard. The secondary backing shall consist of an application of porous polyurethane (minimum of 24 ounces per square yard), heat activated to permanently lock fibers in place. Products using latex based secondary backings will not be acceptable. The synthetic grass system can be perforated with 1/4" holes every four (4") inches in both directions or the secondary backing can be applied to the tufted fiber rows, to provide for maximum drainage. Complete synthetic grass system shall drain in excess of 10" per hour.
4. The carpet shall be delivered in 15-foot wide rolls with the four 4 inch white, 5-yard lines tufted into each roll. The rolls shall be of sufficient length to go from sideline to sideline. The perimeter white line shall also be tufted into the individual sideline. Head seams between the sidelines of the football field will not be acceptable. The perimeter white line shall also be tufted into the individual sideline rolls.
5. All field lines, numbers and markings indicated on plans can be permanently inlaid.
6. The primary fiber color shall be alternating panels of Field Green and Field/Lime Green Blend, in color and treated with UV inhibitor, guaranteed a minimum of eight years.
7. Primary Field Markings and Lines:
    a. Football: 4" White
    b. Soccer: 4" Yellow
8. The rubber infill shall consist of a non-compacting mixture of uniformly sized ambient and/or cryogenic recycled SBR crumb rubber.
    a. No factory tires rejects are allowed.

b. The Crumb Rubber shall have a specific gravity range from 1.1 minimum to 1.2 maximum as determined by ASTM D 297.
c. The CRI used as infill shall conform to the following chemical analysis:

TEST	ASTM TEST METHOD	MAX.	MIN.
Acetone Extract	D 297	16.0%	-
Ash Content	D 297	4.0%	-
Rubber Hydrocarbon	D 297	55.0%	40%
SBR Content	D 297	-	75%

8. Rubber Mesh

a. *Mesh (ASTM E-11)

Sieve Size	Percent Retained
8	
12	1.3%
16	58.8%
20	38.2%
30	1.0%
40	0.0%
50	0.0%
PAN	Not-to-exceed 0.004%

b. Provide a minimum 3.0 pounds per square foot

9. Synthetic Turf Physical Characteristics:

Physical Properties:	Minimum Specification Requirements
Pile Ht	2.0”
Pile Ribbon Wt	44 oz./sy
Primary Backing Wt	8 oz./sy
Secondary Backing Wt.	24 oz./sy
Total Face weight	76 oz/sy
Denier	8,000
Fiber Thickness	100 Micron
Primary Backing Material	Polypropylene
Secondary Backing	Polyurethane
Tuft Bind	8 lbs w/o infill
Fiber Composition	Polyethylene, Parallel-slit
Yarn Supplier	● Bonar Yarns & Fabrics ● Tencate ● Polytex (Duramax minimum) ● Proprietary fiber shall be pre-approved by Architect
Yarn Elongation	50%
Grab Tear Strength - Width	300 lbs/force
Grab Tear Strength - Length	180 lbs/force
Flammability	Pass
Carpet Drainage	4” on-center, both ways or tufted fiber rows only

10. Silica Sand
    a. Round, uniformly-sized pure silica sand
    b. Sized between US Sieve 20 to 40
    b. Provide a minimum 3.0 pounds per square foot

PART 3 - EXECUTION

3.1 CERTIFICATION OF BASE CONSTRUCTION

A. GENERAL: A written “Certification of Acceptance of the Base Construction" is required from the artificial turf/surfacing system prior to proceeding with any installation work under this section of the specifications.

B. SCOPE: This certification shall include but not be limited to the acceptance of:

1. The base construction finish surface is completely acceptable for the application of work specified under this section.
2. The materials and method of installation for the aggregate stone base construction is in conformance with the manufacturer's current recommendations for the application of the turf to be installed under this section.
3. The aggregate stone base construction is totally suitable for work to proceed with the assurance that the final installation of the work under this section will result in a high quality athletic sub-base. In order to provide these assurances and the Certificate of Acceptance, the turf system installer shall cooperate and communicate fully, at all times, with the construction manager. This contractor shall inspect the base construction work and verify that conditions and tolerances required for application of the artificial turf system are being met and that the Owner’s representative has provided test results for compaction, porosity and planarity.
4. All discrepancies between the required materials, application and tolerance requirements noted by the installer shall be brought immediately to the attention of the Contractor and Landscape Architect. Failure to immediately inform the contractor and Landscape Architect of any prior work which does not meet the required specifications for installation of the artificial turf surfacing system shall be considered an acceptance by the installer of the non-conforming work. Any additional work later required to bring the base to acceptable conditions shall be preformed by this installer at no additional cost to the Owner. Any discrepancies in the prior work which does not meet the specifications and noted in writing to the Owner and Landscape Architect shall be preformed immediately at no additional cost to the Owner.

3.2 INSTALLATION OF THE TURF

A. GENERAL: All installation shall be done in strict accordance with the manufacturer's current printed installation instructions approved by the Landscape Architect.

B. REPLACEMENT: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Landscape Architect and at no additional cost to the Owner.

C. ENVIRONMENTAL CONDITIONS: Weather conditions are important for the successful installation of the systems. No work under this section will proceed when:

1. Ambient air temperatures are below 40 degrees F.
2. Material temperatures are below 40 degrees F.
3. Surfaces are wet or damp
4. Rain is imminent or falling
5. Conditions exist or are imminent, which will be unsuitable to installation requirements of the

systems specified herein. Humidity levels will be inside the limits recommended by the adhesive manufacturer to obtain optimum bonding characteristics of the surfaces.

D. BONDING OF MATERIAL SURFACES

1. The adhesive bonding of all system material components shall provide a permanent, tight, secure and hazard free athletic playing surface.
2. The following components, at a minimum, shall meet the bonding requirements noted below:
   a. Turf to turf sewn.
   b. All turf terminal edges shall be stapled/nailed.
   c. Turf inlays as indicated on drawings shall be cut and glued or shaved and hot melt.

E. WORK QUALITY: All seams shall be flat and tight, with no separation or fraying. Submit seaming procedures to Architect for review, prior to installation. Install all lines, markings, logos per manufacturer's recommendations and as shown on documents. Any deviations to the plans shall be brought to the attention of the Architect prior to installation, Seams that appear separated shall be corrected immediately.

F. SEAM SPACINGS

1. All seams widths are to be held to the absolute minimum and as approved.
2. All seams (butt joints) shall be traverse to the field direction; i.e. run across the field.
3. All field traversing seams are to occur on the 5 yard lines.
4. All lateral seams are to be sewn with a double-lock stitch. Hand sewing/bagger machines are not permitted.

G. EDGES: Turf edges will be shown on details and specified herein.

1. The perimeter of the field shall be firmly secured to the edge anchors, for the life of the warranty and as detailed, using stainless steel or hot dipped galvanized fastener space $\pm$ 18" oc. Anchor/nailer installed by others.

H. TURF SYSTEM DRAINAGE: Turf system shall include, upon completion of turf, perforation of same for drainage. Method of porosity shall be reviewed prior to award of any contract. System shall provide a minimum rate of infiltration of 10" per hour.

3.3 FIELD LINING AND MARKINGS

A. GENERAL: A complete field "Lining, Marking and Field Boundary" system will be provided with the installation of the surfacing system specified herein.

B. INLAYS: Shave and hot-glue or cut and glue.

C. LAYOUT: Striping layouts shall be accurately surveyed by the Contractor before installation of inlays.

D. WORKMANSHIP: All seams shall be flat, tight, and permanent with no separation or fraying. Inlaid markings shall be adhered to a special tape or shaved and adhered to a two-part, high strength polyurethane adhesive applied per the Turf Manufacturer's standard procedures for

3.4 SITE TESTING

A. Site testing shall be at ambient shaded air temperature of 40 - 100°F. Laboratory testing shall be at ambient indoor temperature unless otherwise specified by the test method. Unless otherwise specified, field test measurements shall be made at a minimum of 5 locations. Test locations

shall conform as closely as possible to the test sites specified in ASTM F1936 (field used primarily for North American Football).

3.5 ENVIRONMENTAL CONDITIONS

A. Weather conditions are important for the successful installation of the systems. No work should proceed when:

1. Conditions exist or are imminent, which will be unsuitable to installation requirements of the systems specified herein.
2. Humidity levels will be inside the limits recommended by the adhesive manufacturer to obtain optimum bonding characteristics of the surfaces.
3. Ambient air temperatures are below 50ºF.
4. Material temperatures are below 50ºF.
5. Surfaces are wet or damp.
6. Rain is imminent or falling.

3.5 CLEANING

A. Contractor shall be responsible for clean up on a daily basis of all materials utilized. Upon completion of installation, all surrounding areas, including turf area, shall be clean and in “game” condition.
B. Contractor shall utilize magnetic bar to remove any metal objects within the field prior to infill and after infill, before final acceptance.
C. All turf remnants of desirable size shall become property of the Owner. Contractor will be responsible to neatly place attic stock on pallets and deliver to a suitable location as directed by Owner.

END OF SECTION 32 1815

SAMPLE SYNTHETIC TURF WARRANTY

1.1 Warranty

A. System Installer/Manufacturer ("_____") hereby warrants to Richmond Community Schools subject to the limitations and conditions set forth below, that its entire synthetic turf installation described as _____ , is free from defects in material workmanship, meets or exceeds the specifications, and shall (for a period of EIGHT (8) YEARS from the date of final acceptance) remain acceptable for multiple sports activities.

B. System Installer/Manufacturer warrants to Richmond Community Schools that its synthetic turf system shall not unevenly fade, shall not fail, shrink, expand, flood, tear, bubble and shall not reflect unusual excessive wear and shall meet specified Gmax values, for a period of EIGHT (8) YEARS from the date of final acceptance. In the event that the synthetic turf shall unevenly fade, fail, shrink, expand, flood, tear, bubble or reflect excessive water, System Installer/Manufacturer shall replace such areas of the synthetic turf that are affected.

C. System Installer/Manufacturer warrants to Richmond Community Schools that the installation of the entire synthetic turf and all associated turf components (i.e. Inlays and seams) shall be performed in a professional manner under the supervision of highly-trained employees familiar in the installation of their tufted synthetic turf system. The supervisor and key installers shall have installed synthetic turf systems for at least three (10) previous system installations.

D. System Installer/Manufacturer warrants that the finished synthetic turf system shall have an initial G-max (shock attenuation) value of approximately 130 G's and shall not become harder than 165 G's over the life of the system at any point on the field of play. The manufacturer shall make only the necessary repairs if, at any time during the warranty period, the G-max force at any point exceeds the specified 165 G's.

E. The term "not fade" in the context of the warranty shall mean that the synthetic turf shall remain uniformly true in color without unsightly or uneven change, except as affected by changes in texture resulting from normal wear and tear.

F. The term "not fail" or "excessive wear" as used in the context of this warranty shall mean that the length and weight of the face yarn or pile material in the synthetic turf shall not have decreased by more than 2% per year (according to ASTM D-418) not to exceed 25% (averaged over the entire field) anytime during the EIGHT-YEAR warranty period. Any panels where face yarn has decreased more than 2% per year or more than 25% during the EIGHT-YEAR warranty period will be replaced.

G. System Installer/Manufacturer shall warrant seams against separation, puncturing, bubbling, etc., for any reason.

H. This warranty does not cover any defect, failure, damage or undue wear in or to the synthetic turf system caused by or connected with abuse, neglect, deliberate act, Act of God, casualty, static or dynamic loads exceeding recommended levels, footwear having metal cleats, spikes, or similar projections (other than conventional football, baseball, soccer or rugby shoes having cleats of not more than ½" in length).

I. System Installer/Manufacturer shall be allowed to examine the synthetic turf system regarding any claim which Richmond Community Schools makes, to be present at and to analyze the results of all tests conducted by Richmond Community Schools or others, and to conduct such tests incurred by Richmond Community Schools or others with respect to such tests.

J. All claims made by Richmond Community Schools under this warranty must be made in writing to System Installer/Manufacturer.

K. This warranty, when signed and notarized by all parties, shall constitute a contract made in the State of Michigan and shall be governed by the laws thereof.

L. Contractor shall provide an independent 3rd party insurance policy to cover all items identified above.

OWNER: Richmond Community Schools DATE: _____

BY: _____

CONTRACTOR: DATE: _____

BY: _____

MANUFACTURER: DATE: _____

BY: _____

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SECTION 32 1852 – PERFORMANCE SHOCK PAD

PART 1- GENERAL

1.1 SUMMARY

A. This section is part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 32 1123 Aggregate Drainage Layer
2. Section 32 1815 Synthetic Turf

C. The work under this section of the Specifications is listed as Alternate L1.

1.2 SCOPE

A. This document defines requirements for the installation and operating performance of an athletic field synthetic base underlayment material needed for a synthetic turf field. Defined are the primary system requirements for insuring optimum safety of the playing surface (impact attenuation/surface playability) and high capacity subsurface drainage of the installed playing field.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM) , International Standards Organization (ISO) and European Committee for Standardization (EN):

a. EN 12616 – Water Infiltration Rate
b. ISO 8295 – Plastic Film and Sheet – Determination of Coefficient of Friction
c. ISO 4897 – Cellular plastics - Determination of the coefficient of linear thermal expansion
d. ISO 8301 – Thermal Resistance
e. ISO 1798 – Standard Specification for Flexible Materials-Tensile Strength
f. ASTM F355 – Standard Test Method for Shock-Absorbing Properties of Playing Surface Systems and Materials
g. EN 14809 – Surfaces for sports areas - Determination of vertical deformation
h. ISO 1856 – Flexible cellular polymeric materials -- Determination of compression set
i. ASTM G22-76 – Determining the Resistance of Plastics to Bacteria
j. ASTM G21-96 – Determining Resistance of Synthetic Materials to Fungi
k. ESSM 105-d – Environmental Compatibility of Elastic Synthetic Surfaces on Sports Grounds
l. ASTM F925 – Test Method for Resistance to Chemicals of Resilient Flooring

B. The sub-base (underlayment) material is to be manufactured in an ISO-9000 certified facility. No exceptions allowed.

C. Company must demonstrate successful installations in the United States for at least 5 million sq. feet of manufacturers material.

D. Use only new materials manufactured and shipped for the specific installation. No used or refurbished materials are to be installed. Manufacturer must provide documentation of material content and MSDS sheet for submittal package.

E. Product to be shipped as flat panels on prepackaged pallets. Pallets to be wrapped with heavy-duty barrier for protection from moisture and UV exposure.

F. Seams should be mechanically locked into place by hand without use of additional materials, glue, fasteners or secondary processes and equipment.

G. Material must be installed using manufacturers guidelines, without exception.

H. Manufacturer must provide written procedures to selected turf supplier for the installation of turf on top of underlayment.

I. Turf Contractor must send G-Max test results to Underlayment manufacturer once completed.

1.4 SUBMITTALS

A. General: Bidding contractor must identify performance base system with bid package. If a non-specified product is identified, the proposed alternate product must be submitted and pre-approved by the design architect/engineer 10 days prior to the bid opening. If bidding contractor does not identify a manufacturer, the Township/School District will assume that the specified product is included in the bid package and will not consider substitutions.

B. Product Data: Submit 8” x 8” product sample and technical data sheet.

C. Shop Drawings: Submit cross-sectional view showing product installation in relation to sub-base and synthetic turf (including edge attachment).

D. Test Data: Submit listing of all applicable test data for compliance to specifications. All testing to be performed by independent sources following applicable ASTM or other internationally recognized standards and procedures.

E. Installation: Submit copy of product installation instructions. Submit copy turf installation recommendations.

F. Warranty: Submit copy of product 16 -Year warranty coverage.

PART 2 - PRODUCTS

A. OPTION 1

1. Description: Expanded Polypropylene Composite

2. Product Requirements: An impact energy absorbing sub-base drainage material designed specifically for use with synthetic turf is required. The specified material must have both impact absorption and drainage properties that meet the following typical performance requirements

a.	Thickness:	0.55” (14mm) +/- 2mm
b.	Material Density	3.85 lbs/CF
c.	Area/Panel	15.9 SF/Panel
d.	Weight:	2.81 lbs/panel
e.	Permeability	>50 in/hr

f. Vertical Deformation <4 mm w/o turf overlay (EN14809)
g. Product must be made in United States of America
h. Product must be of a homogeneous material composition. Variable material content will not be accepted

B. OPTION 2

1. Description: Thermal Bonded (closed cell) Cross-Linked Polyethylene Foam

2. Product Requirements: An impact energy absorbing sub-base drainage material designed specifically for use with synthetic turf is required. The specified material must have both impact absorption and drainage properties that meet the following typical performance requirements

a. Thickness: 0.91" (20mm) +/- 2mm
b. Material Density 0.82 lbs/SF
c. Area/Panel 23.1 SF/Panel
d. Permeability >1000 in/hr
e. Vertical Deformation <7 mm w/o turf overlay (EN14809)
f. Product must be made in United States of America

C. PRODUCT SUBSTITUTIONS

1. Product substitutions are allowed only in accordance with pre-bid substitution request procedures outlined in the contract documents. No substitutions will be allowed after the bid date. Bidding contractor must identify performance base system with bid package. If a non-specified product is identified, the proposed alternate product must be submitted and pre-approved by the design architect/engineer 10 days prior to the bid opening. If bidding contractor does not identify a manufacturer, the Owner will assume that the specified product is included in the bid package and will not consider substitutions.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Finished aggregate base installation workmanship must be approved in advance by the pad manufacturer. Approvals to be based on a physical inspection performed at the site prior to installation of any pad material.

B. Manufacture shall provide written installation instructions and procedures and on-site supervision during material installation. On-site supervision will be waived if site contractor can provide 3 projects references demonstrating successful product installation.

C. Finished pad base installation workmanship must be approved in advance by the synthetic turf manufacturer. Approvals to be based on a physical inspection performed at the site prior to installation of any synthetic turf material.

D. Surplus Pad Material: Contractor shall provide a minimum 100 sf of surplus pad material.

E. Project Completion- Upon completion of installation, a walk-through will be conducted to inspect the quality of work and ensure all details meet specifications. A punch list of unacceptable or incomplete items will be documented and agreed upon for completion prior to final project closeout and acceptance.

END OF SECTION 32 1852

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SECTION 32 3100 – CHAINLINK FENCE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 2010 Earthwork
2. Section 03 3010 Portland Cement Concrete

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary for a new chainlink fence system as indicated herein and on Contract Documents. Work shall include but not limited to footings, posts, fabric, rails, gates, and all related hardware.

B. The work under this section of the Specifications is applicable to supplement portions of the track fencing as shown on the plans.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM C94 – Standard Specification for Ready-Mixed Concrete
   b. ASTM A116 – Standard Specification for Metallic-Coated, Steel Woven Wire Fence Fabric
   c. ASTM A120 – Standard Specification for Black and Hot-Dipped Zinc Coated (Galvanized) Welded Seamless Pipe
   d. ASTM A491 – Standard Specification for Aluminum Coated Steel Chain Link Fence Fabric
   e. ASTM F567 – Standard Practice for Installation of Chainlink Fence
   f. ASTM F900 – Standard Specification for Industrial and Commercial Swing Gates
   g. ASTM 1083 – Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
   h. ASTM F1184 – Standard Specification for Industrial and Commercial Horizontal Slide Gates
   i. ASTM F2631 – Standard Practice for Installation of Chain-Link Fence for Outdoor Sports Fields, Sports Courts and Other Recreational Facilities

B. Weights and tolerances to conform to Federal Specification RR-F-191/1D, dated May 14, 1990. Mill certificates shall be made available at the request of the Landscape Architect or Owner.

C. All material installed under this specification shall be subject to testing by the Owner. Any material so inspected and found to be not in strict conformance with this specification shall be promptly removed and replaced by the Contractor at his expense.

1.4 WARRANTY GUARANTEE

A. The Contractor and any Sub-contractors hereunder guarantee their respective work against defective materials or workmanship for a period of one (1) year from the date of filing Certificate of Substantial Completion and as accepted by the Owner.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chainlink fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacturing of products specified in this section with a minimum of ten (10) years experience

B. Installer: Company specializing in performing work of this section with a minimum of five (5) years experience of comparable projects. Must have a minimum of two in-house fence installation crews.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.

B. Identify each package with manufacturer's name.

C. Store fence fabric and accessories in a secure and dry place.

1.8 SUBMITTALS

A. Shop drawings showing plan layout, spacing of components, post foundation dimensions, hardware, gates and schedule of components.

B. Product Data: Submit product data on fabric pattern, posts, accessories, fittings, and hardware.

C. At the request of the Architect, provide Material Certificates confirming product provided is Domestic pipe.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Framing Steel: ASTM F1083 domestic Schedule 40 galvanized steel pipe weighing three and sixty-five one-hundredths (3.65) lbs. per lineal foot or domestic SS-40 galvanized steel pipe weighing three and sixty-five one-hundredths (3.65) lbs. per lineal foot with hot dip galvanized zinc exterior and interior. Pipe shall utilize flow coat or inline galvanization process.

B. Fabric Wire: ASTM A392 Class 1 zinc coated steel wire or aluminized steel wire.

C. Concrete: ASTM C94; Portland Cement 3,500 psi strength at 28 days.

2.2 COMPONENTS

A. Chain Link Fabric: The chain link fabric shall be 2" mesh, 9 gauge. Top and bottom selvage shall have knuckle finish. Fabric shall be free from barbs, icicles or other projections resulting from the

aluminizing process, and any fabric not free thereof will be rejected even though erected. Bottom of fence fabric shall be 3/4" plus or minus 1/4" above grade.

B. Line Posts: Line posts shall not be splice welded in such a manner that the weld appears above the grade line. All line posts shall have an outside diameter of 2 ½". The chain link fabric shall be tied to the line posts with No. 9 gauge annealed galvanized steel tie wire. Fence fabric shall be secured to line posts no more than 18"O.C., with excess wire cut off and turned down.

C. Terminal and Gate Post: Terminal and gate posts shall not be splice welded in such a manner that the weld appears above the grade line. End, corner and gate posts shall have an outside diameter of 3" and weight of not less than five and seventy-nine one-hundredths (5.79) lbs. per lineal foot. Post caps at terminal posts shall be securely fastened to prevent removal.

D. Terminal and Gate Post Fittings: Terminal and gate post fittings including tension bands, brace connections and top rail connections shall be No. 11 gauge. Hot-dipped iron or pot metal fittings will be accepted as equals or substitutes. Top rail, brace and truss bands shall not be less than one inch (1") wide, secured by five-sixteenths inch (5/16") diameter carriage bolts and nuts.

E. Top Rail: Top rail shall meet the same specifications of quality as line and terminal posts. The top rail shall have an outside diameter of one and five-eighths inches (1-5/8") and weigh two and twenty-seven one-hundredths (2.28) lbs. per lineal foot. An outside sleeve-type coupling measuring not less than 6" in length shall be provided at each interval of twenty feet (20'). The chain link fabric shall be tied to the top rail at intervals of twenty-four inches (24") with No. 9 gauge annealed galvanized steel tie wire. Rail(s) shall be securely fastened by means of suitable malleable iron or pressed steel connections. The terminal ends of all top, bottom, mid and bracing rails shall utilize boulevard hardware that prevents insects from gaining access into rails.

F. Braces and Terminal Gate and Gate Posts: Terminal and gate posts shall be strengthened and reinforced by braces meeting the same specifications of quality as line and terminal posts. Braces shall be installed midway between top rail and grade and extend from each terminal post to the first adjacent line posts. Braces shall be securely fastened to posts by heavy pressed steel connections and also be trussed from line posts back to terminal post with a three-eighths inch (3.8") round truss rod complete with tightened unit.

G. Bottom Tension Wire: Bottom tension wire shall be No. 6 gauge galvanized steel coil tension wire, high carbon or hard drawn, Class II, Aluminum Coated, fastened to the chain link fabric at intervals of twenty-four inches (24") with No. 11 gauge galvanized steel hog rings.

H. Post Spacings and Settings:

1. Gate, terminal and end posts shall be set in concrete foundation not less than twelve inches (12") in diameter and not less than forty-two inches (42") in depth. Concrete shall attain a compressive strength of not less than three thousand five hundred (3,500) lbs. per square inch at the twenty-eighth (28th) day after pouring. Spacing of posts in the line of fence shall be uniform. See plans for dimensions.
2. Line posts can either be set in concrete foundations as noted above or pneumatically driven.
3. Refer to Chart in Section 3.2, A.

I. Gates:

1. Gates shall be not less than four feet (4') wide and constructed and hung as detailed on drawings.
2. Frames shall be constructed of pipe, having an outside diameter of 1.9" or alternately, being two inches (2") square and weighing two and seventy-two one-hundredths (2.72) lbs. per lineal

foot. Gate frames shall be welded, or alternately, shall utilize corner fittings of heavy malleable iron or pressed steel securely riveted to the frame.

3. Fabric matching the system fence fabric shall be installed in the frame by means of tension bars and hook bolts.
4. Frames having corner fittings shall be equipped with adjustable truss rods having a diameter of three-eighths inches (3/8").
5. Hinges shall be of adequate strength to support the gate and have large bearing surfaces for clamping in position. Under no conditions of use or abuse shall the hinges twist or turn under action of the gate.
6. Gates shall be capable of being opened and closed quickly and easily by one (1) person. Gates shall be equipped with a positive strong arm latching device that will accommodate padlocking. A plunger rod, catch and semi-automatic outer catch shall be installed on drive gates so as to secure gates in an open position. Hinges, latches and catches shall be approved by the Landscape Architect.

J. Driven Post Caulk

1. For installations in concrete or asphalt, Contractor is responsible to caulk around all driven fence posts.
2. Caulk shall be supplied from the following manufacturer:
    a. Sportmaster “Courtflex Crack Sealant”
       Phone: 800-395-7325
    b. Color: Neutral

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless permitted by Architect.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Stake locations of fence lines, gates and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks and property monuments.

3.2 INSTALLATION

A. All posts shall be set plumb and in accordance with the following table (unless specified otherwise):

1. Corner/Terminal and Bracing Post - General Fence

Fabric Height	Post Depth	Diameter of Foundation	Foundation Depth	Maximum Spacing
0’ - 6’-0”	36”	12” min	42”	10’-0”
6’-1” - 12’-0”	36”	12” min	42”	10’-0”

2. Line posts shall be pneumatically driven into the ground using the following chart*:

Fabric Height	Pipe Below Grade	Total Length of Post
4’	4’	8’
6’	5’	11’
8’	6’	14’
10’	7’	17’
12’	8’	20’

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned and at correct height and spacing, and hold position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

D. Fence posts shall be installed with maximum 6 inches clear opening from end posts to buildings, fences, property lines or other structures.

E. Install gates level, plum and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Adjust hardware for smooth operation and lubricate where necessary.

F. The fabric shall be installed on the court/playing side of posts. Bottom of fence fabric shall be 3/4" (+/-1/4") above the finished court surface. Fabric shall be furnished with selvage knuckled on both ends.

G. Top of concrete footing shall be left down and topped with surrounding pavings as detailed. Asphalt cold patch is not acceptable.

3.3 CLEAN UP AND DISPOSAL

A. Remove from the site all equipment, materials, and debris resulting from construction work included in this section. Leave work area neat and clean and in a condition acceptable by the Landscape Architect and Owner. All work shall be complete, ready for use, at the time of final acceptance.

END OF SECTION 32 3100

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SECTION 32 3130 – CHAINLINK FENCE - VINYL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 03 3010 Portland Cement Concrete

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary for a new black vinyl chainlink fence system as indicated herein and on the Contract Documents. Work shall include but not limited to footings, posts, fabric, rails, gates and all related hardware.

B. Furnishing and installation of black vinyl fencing is applicable to all perimeter fence and gates shown on plans.

1.3 QUALITY ASSURANCE AND WARRANTY GUARANTEE

A. American Society for Testing and Materials (ASTM):

1. ASTM A53 – Standard Specification for Pip, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
2. ASTM A90 – Standard Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
3. ASTM C94 – Standard Specification for Ready-Mixed Concrete
4. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM F626 – Standard Specification for Fence Fittings
6. ASTM F668 – Standard Specification for Polymer Coated Chainlink Fence Fabric
7. ASTM F900 – Standard Specification for Industrial and Commercial Swing Gates
8. ASTM F934 – Standard Practice for Standard Colors for Polymer Coated Chainklink
9. ASTM F1043 – Standard Specification for Strength and Protective Coatings on Steel Industrial Chainlink Fence Framework
10. ASTM F1083 – Standard Specification for Pipe, Hot-Dipped Zinc-Coted (Galvanzied) Welded, for Fence Structures
11. ASTM F2631 – Standard Practice for Installation of Chain-Link Fence for Outdoor Sports Fields, Sports Courts and Other Recreational Facilities

B. Weights and tolerances to conform to Federal Specification RR-F-191G dated January 25, 1974.

C. The Contractor and any Sub-Contractor hereunder guarantee their respective work against defective materials or workmanship for a period of one (1) year from the date of filing Certificate of Substantial Completion and as accepted by the Owner.

D. All material installed under this specification shall be subject to testing by the Owner. Any material so inspected and found to be not in strict conformance with this specification shall be promptly removed and replaced by the Contractor at his expense.

1.4 SUBMITTALS

A. Shop drawings showing plan layout, spacing of components, post foundation dimensions, hardware, gates and schedule of components.

B. Product Data: Submit product data on fabric pattern, posts, accessories, fittings and hardware.

C. Samples: Color selection for vinyl finishes. If requested, samples of materials (e.g., fabric, wires, and accessories).

D. Mill Certificates conforming to ASTM F1043 (06), Part 8.1.4 – Adhesion Testing

1. Test Results shall be provided before material is shipped to site.
2. Minimum (3) random tests for each post size specified.

E. At the request of the Architect, provide Material Certificates confirming product provided is Domestic pipe.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in the manufacturing of products specified in this section with a minimum of ten (10) years experience

B. Installer: Company specializing in performing work of this section with a minimum of five (5) years experienced. Must have a minimum of two in-house fence installation crews.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chainlink fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.

B. Identify each package with manufacturer’s name.

C. Store fence fabric and accessories in a secure and dry place.

1.8 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which Installer agrees to repair or replace components of chainlink fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 15 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Framework, posts, rails, fabric and fittings for chainlink fence system shall be domestic pipe manufactured and supplied by:

1. Merchants Metals – Color Bond Product:
Phone: (888) 260-1600

2.2 VINYL CLAD CHAINLINK FENCE

A. This specification covers chain link fabric made from galvanized steel wire which has been coated with polyvinyl chloride compound hereinafter designated as "vinyl." The base metal shall be steel of such quality and purity that, when drawn to the size of wire specified and coated with vinyl, the finished fencing shall be of uniform quality and have the properties and characteristics as prescribed in the specification. Wire used for the manufacture of this fabric shall be capable of being woven into fabric without the vinyl coating voiding, cracking or peeling. Vinyl shall be plasticized and thoroughly compounded.

B. Thermal Fused Vinyl: The thermally fused vinyl coated wire shall consist of vinyl thermally fused to primed zinc coated wire. The zinc coating shall be in accordance with ASTM A641, .30 oz. per square foot. The vinyl adhesion shall be greater than the cohesive strength of the vinyl material itself.

C. Physical Properties of Coating

1. Accelerated Aging: PVC coated wire from which the fabric is woven shall withstand exposure for 1000 hours without failure at a black panel temperature of 145°F, Type BH apparatus described in ASTM G155 shall be used for the test. The product shall be construed to have failed the test if:

a. The wire fails to withstand the Mandrel Bend Test described below.
b. Shrinkage of the PVC coating is greater than 1/16” per foot of wire.
c. There is a significant change in color or gloss of the PVC surface as determined by visual inspection.

2. Mandrel Bend Test: PVC coated wire when subjected to a single bend at -20°F around a mandrel no larger than ten times the diameter of the wire shall not exhibit breaks or cracks in the PVC coating. The Mandrel Bend Test shall be performed on an individual piece of wire removed from the fabric. This specimen may be any length of wire over 12“and shall include both bends and straight sections, but shall not include either twists or knuckles.

3. Color of Coatings:

Hue	Black
Tolerance	2.0 G
Value	3.02
Chroma	2.35

D. Workmanship: Vinyl coated chain link fabric shall be produced by methods recognized as good commercial practices. Careful inspection shall be made to determine the quality of vinyl coating. Coatings not free from pinholes, bubbles or voids, rough or blistered surfaces shall provide a basis for rejection. An apparent mismatch of color readily discernible by visual inspection shall be cause for rejection.

E. Weight of Zinc Coating: The weight of coating shall be determined on individual pieces of wire removed from the fabric. The specimens may be of any continuous length of 12 inches, but preferably about 24 inches long. The weight of coating shall be determined in accordance with tests for weight of coating described in ASTM A90. The weight of zinc coating shall be determined after removing the vinyl coating from the fabric.

2.3 VINYL CLAD FRAMEWORK

A. General: The framework consists of all line, corner, terminal posts, horizontal rails and gate frame materials which shall be coated with a polyvinyl chloride coating 10 to 12 mils in thickness over galvanized steel or aluminum. These surfaces shall be thermally fused to the metal surface with an appropriate sured primer. The PVC shall be plasticized and thoroughly compounded so that all pigments, stabilizers and other ingredients are fully dispersed.

B. Color of Framework: The color of framework shall match the fabric.

F. Fabric: The wire used in the vinyl coated fences shall possess a minimum breakload of 850 pounds. The coated size of the thermally fused vinyl fence wire shall be 9 gauge core, 8 gauge finish (Class 2B). Vinyl coated fabric shall be woven to form a 2" mesh. The size of mesh shall be determined by measuring the minimum clear distance between the wires forming the parallel sides of the mesh, measured in either direction. The tolerance in the size of mesh shall be +/- 1/8" inch. The thickness of the vinyl coating shall be 0.007".

C. Framework Materials: Framework materials shall be, before coating with PVC, either Type I Schedule 40 pipe with 1.8 ounce per square foot zinc coating before resin coating, or Type II pipe manufactured from steel conforming to the Standard Specification for Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses, ASTM A53; or TYPE II pipe manufactured from steel conforming to ASTM A1011, Cold-Rolled, Electric welded and Triple Coated with 1.0 ounce, +/- 0.1 ounce zinc per square foot. The internal surface shall have corrosion protection by a zinc-rich based organic coating with 87% minimum zinc powder loading, with the capability of withstanding 350 hours when subjected to Salt Spray Test ASTM B117, with a 5% minimum Red Rust.

D. Line Posts: Shall be one of the following vinyl coated materials: Type I, 2.375“ O.D. round steel posts weighing 3.65 lbs. per lineal foot; or, alternately, Type II 2.375“ O.D. round steel pipe weighing 2.78 lbs. per foot or roll-formed "c" section posts measuring 2.25 inches by 1.70” weighing 2.73 lb. per lineal foot. Posts shall not be splice welded in such a manner that the weld appears above the grade line. The chain link fabric shall be tied to the line posts with vinyl coated clips or tie wires with a minimum steel diameter of 0.132” and spaced on 15” maximum centers.

E. Terminal and Gate Posts: Terminal and gate posts shall be one of the following vinyl coated materials: two and one-half inch (2 1/2") square tubing weighing 5.10 lbs per lineal foot, or alternately, Type I, 2.875” OD steel round posts weighing 3.66 lbs. per lineal foot, or Type II 2.875” OD steel round posts weighing 4.64 lbs per lineal foot. Posts shall not be splice welded in such a manner that the weld appears above the grade line.

F. Terminal and Gate Post Fittings: Terminal and gate post fittings, including tension bands, brace connections and top rail connections, shall be 14 gauge, hot-dipped galvanized, cold-rolled, carbon steel. Top rail, brace and truss bands shall not be less than ¾" wide, secured by 5/16" diameter carriage bolts. Tension bars shall not be less than 2" shorter than the nominal height of the fabric with which they are to be used. One tension bar shall be provided for each end and gate post, and two for each corner and pull post.

G. All fixed component parts such as post tops, bands, connectors, and rail ends shall be vinyl coated on visible surfaces of a color to match the fabric and framework. Non-visible portions of parts may be uncoated in the case of aluminum components. Non-visible portions of steel or iron components not vinyl coated must be coated with zinc as per ASTM A153. All hardware shall come vinyl coated or shall be coated in the field with a vinyl base compound after installation. Aerosol spray paint to match the color of vinyl fencing will not be accepted.

H. Top Rail: Top rails shall be vinyl coated Type I, 1.660" O.D. round steel pipe weighing 2.27 lbs. per lineal foot, or Type II, 1.660" O.D. round steel pipe weighing 1.59 lbs. per lineal foot. An outside sleeve type coupling measuring not less than 6" in length shall be provided at each interval of twenty-one feet. The chain link fabric shall be tied to the rails at intervals of 24" with vinyl clad tie wires, 13 gauge for double wrap ties or 9 gauge for single wrap ties. Intermediate rails shall be fastened between posts with vinyl clad boulevard type connectors or bands and rail end caps. The terminal ends of all top, bottom, mid and bracing rails shall utilize boulevard hardware that prevents insects from gaining access into rails.

I. Bottom Tension Wire: Bottom tension wire shall be No. 6 gauge galvanized steel coil, vinyl coated tension wire, high carbon or hard drawn, Class II, Aluminum Coated, fastened to the chain link fabric at intervals of twenty-four inches (24") with No. 11 gauge galvanized steel hog rings.

J. Brace Rail for Terminal and Gate Posts: Vinyl coated terminal and gate posts shall be strengthened and reinforced by vinyl coated braces meeting the same specifications as above. Braces shall be installed midway between top rail and court surface and extend from each terminal post to the first adjacent line post. Braces shall be securely fastened to posts by vinyl coated heavy pressed steel connections and also be trussed from line post back to terminal post with a 5/16" vinyl coated round truss rod complete with tightening turnbuckle.

K. Posts Spacing and Settings: Line and terminal posts shall be set in concrete foundations not less than 12" in diameter and not less than 42" in depth. The concrete shall have a design mix of 3500 PSI. Spacing of posts in the line of fence shall be uniform and no more than ten-feet (10') apart. The smaller side of a "C" post shall be touching the chain link fabric and all open slots shall be facing in the same direction.

L. Post Tops: Tops of line posts shall be of a vinyl coated steel or aluminum casting capable of providing a through passage for top rail. Terminal post tops shall be of a vinyl coated steel or aluminum casting and be designed so as to exclude all moisture from the terminal post. Post caps at terminal posts shall be securely fastened to prevent removal.

M. Gates: Gate openings shall not be less than 4 feet wide and constructed and hung as detailed on drawings. Frame shall be assembled from vinyl coated 2" square aluminum, alloy 6063-T6 or 6061-T6, weighing 0.940 lbs. per foot, Type I pipe weighing 2.72 lbs. per foot, or Type II, 1.90" O.D. round steel pip weighing 2.28 lbs. per foot. Gate frames shall be welded or alternately shall utilize corner fittings of compressed or riveted type. A diagonal truss rod not less than 5/16" diameter shall be used on frames utilizing corner fittings. Color or the gate frame materials shall match the fence framework and component parts.

1. Fabric matching the fence fabric shall be installed in the frame by means of tension bars and hook bolts or bands. Galvanized gate frame and gate post hinges shall be furnished of adequate strength for the gate size specified and to allow for a 180° swing. Gates shall be equipped with a positive strong arm latching device that will accommodate padlocking. A plunger rod, catch and semi-automatic outer catch shall be installed on drive gates so as to secure gates in an open position. Hinges, latches and catches shall be approved by the Landscape Architect.

N. Foul Poles:

a. Baseball/Softball foul poles shall be constructed and installed as detailed in the drawings.
b. Pre-manufactured poles can be provided by:
   a. Beacon Sports Products Inc., (800) 747-5985
      Item 130-380-209 Color: Yellow
   b. BSN Sports
      SKU# BSFOUL Color: Yellow
   c. Sportsfield Specialties
      Model: FPW420-YELLOW
   d. Douglas Sports
      SKU: 36652 Color: Yellow

N. Driven Post Caulk

1. For installations in concrete or asphalt, Contractor is responsible to caulk around all driven fence posts.
2. Caulk shall be supplied from the following manufacturer:
   a. Sportmaster “Courtflex Crack Sealant”
      Phone: 800-395-7325
   b. Color: Neutral

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless permitted by Architect.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Stake locations of fence lines, gates and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks and property monuments.

3.2 INSTALLATION

A. All posts shall be set plumb and in accordance with the following table (unless specified otherwise):

1. Corner/Terminal and Bracing Post - General Fence

Fabric Height	Post Depth	Diameter of Foundation	Foundation Depth	Maximum Spacing
0’ - 6’-0”	36”	12” min	42”	10’-0”
6’-1” - 12’-0”	36”	12” min	42”	10’-0”

2. Line posts shall be pneumatically driven into the ground using the following chart*:

Fabric Height	Pipe Below Grade	Total Length of Post
4’	4’	8’
6’	5’	11’
8’	6’	14’
10’	7’	17’
12’	8’	20’

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned and at correct height and spacing, and hold position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

D. Fence posts shall be installed with maximum 6 inches clear opening from end posts to buildings, fences, property lines or other structures.

E. Install gates level, plum and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Adjust hardware for smooth operation and lubricate where necessary.

F. The fabric shall be installed on the court/playing side of posts. Bottom of fence fabric shall be 3/4" (+/-1/4") above the finished court surface. Fabric shall be furnished with selvage knuckled on both ends.

G. Top of concrete footing shall be left down and topped with surrounding pavings as detailed. Cold patch is not acceptable.

3.3 CLEAN UP AND DISPOSAL

A. Remove from the site all equipment, materials, and debris resulting from construction work including this section. Leave work area neat and clean and in a condition acceptable by the Landscape Architect, Owner. All work shall be complete, ready for use, at the time of final acceptance.

END OF SECTION 32 3130

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SECTION 32 9227 – GENERAL LAWN RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections:

1. Section 31 2010 Earthwork

1.2 SCOPE

A. The work under this section of the specifications shall consist of furnishing all labor, materials and equipment necessary for restoring disturbed lawn areas and maintaining lawns until final acceptance.

1.3 QUALITY ASSURANCE AND WARRANTY GUARANTEE

A. Grass seed shall meet the tolerance for germination and purity of the Official Seed Analysis of North America.

B. Submit all seed tags after completion of seeding.

C. The Contractor, and its Subcontractors, shall provide a staff adequate to coordinate and expedite the work properly and shall maintain competent supervision of its own work to insure compliance with contract requirements.

D. Contractor responsible for seeding and fertilizing shall inspect the finish grade for acceptability prior to application. Areas of discrepancy shall be indentified and Landscape Architect or Owner's Representative shall be notified.

E. It is the responsibility of the Contractor to establish a dense lawn of permanent grasses, free from lumps, depressions and settlement. Any part of the area that fails to show a uniform germination shall be re-seeded and such re-seeding shall continue until a dense lawn is established. Damage to seeded areas resulting from erosion and through no fault of the Owner shall be repaired by the Contractor, at his expense.

1. Guarantee shall extend for one year from the date of acceptance.

1.4 SUBMITTALS

A. Submit product data for seed and fertilizer to Landscape Architect for approval, prior to application.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver grass seed in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 - PRODUCTS

2.1 SEED

A. Seed shall be provided from one of the following suppliers

- EcoGreen Supply- 616-877-5326
- John Deere Landscapes - (800) 347-4272 (now Site One Landscapes)
- TurfGrass, Inc. – (248) 437-1427 (now Residex)
- Commerce Corp. – (800) 243-4769- closed (now BFG)
- Rhino Seed & Supply - (800) 482-3130
- Michigan State Seed Solutions - (800) 647-8873 (now Lacrosse Seeds)
- Tri Turf – (800) 636-7039

B. Contractors shall seed all areas disturbed during construction and not otherwise developed or indicated to be sodded. Topsoiling, finish grading and fertilization is to remain the same. *Seed shall be new crop, cleaned, and comprising of the following varieties:

1. Athletic Field Seed blend shall consist of a minimum of 3 of the listed bluegrass varieties and one of the listed ryegrass varieties. Blend shall be 80% Kentucky Bluegrass and 20% Perennial Ryegrass by weight. Only Elite bluegrasses (according to NTEP characteristics ratings) will be allowed on Athletic surfaces. No “named common” types will be accepted. Enhanced Elite varieties will be allowed at same seeding rates.
2. General Seeding Areas: “Varieties Named” blend shall be 50-60% Kentucky Bluegrass and 40-50% Perennial Ryegrass by weight for irrigated fields. A “Varieties Named” blend of 60-70% bluegrass, 30-40% perennial ryegrass for non-irrigated fields, and a blend of 20-40% bluegrass, 20-40% perennial rygrass and 20-30% creeping red fescue for general turf areas.(VNS-varieties not stated- blends will not be accepted)
3. Athletic Fields

Seed Varieties	Purity	Germination
• Shannon Kentucky Bluegrass	95%	85%
• Lunar Kentucky Bluegrass	95%	85%
• SPF 30 Kentucky Bluegrass	95%	85%
• Fullback Kentucky Bluegrass	95%	85%
• Midnight Kentucky Bluegrass	95%	85%
• Hampton Kentucky Bluegrass	95%	85%
• Gaelic Kentucky Bluegrass	95%	85%
• BlueBank Kentucky Bluegrass	95%	85%
• Noble Kentucky Bluegrass	95%	85%
• Touchdown Kentucky Bluegrass	95%	85%
• Salinas Perennial Ryegrass	95%	85%
• Gray Star Perennial Ryegrass	95%	85%
• Sox Fan Perennial Ryegrass	95%	85%

4. General Seeding Areas

Seed Variety	Purity	Germination
• Shannon or Bluestar Kentucky Bluegrass	98%	85%
• Gaelic or Corsair Kentucky Bluegrass	98%	85%
• Lunar or Avalanche Kentucky Bluegrass	98%	85%

- Gray Star or Salinas Perennial Ryegrass 98% 90%
- SoxFan or Showtime Perennial Ryegrass 98% 90%
- Charger 2 Perennial Ryegrass 98% 90%
- Oracle Creeping Red Fescue 98% 85%

2.2 COMMERCIAL FERTILIZER

A. Fertilizer shall be uniform in composition, free-flowing and suitable for application with approved spreader, granular or pelleted with 50 percent (50%) of total nitrogen derived from a synthetic or natural organic material, delivered in original unopened containers with the analysis, type and trade name attached to each container. The composition shall be:

Fertilizer "A": applied at the time of seeding at 50 lbs. per 8000 square feet.
16-32-4 (14.3% Ammoniacal Nitrogen, 1.7% Urea Nitrogen, 32% Phosphorus, 4% Available Potassium (SOP)

Fertilizer "B": applied 3-4 weeks after seeding at 50 lbs. per 8,000-10,000 square feet.
22-16-6 (6.3% Ammoniacal Nitrogen, 15.7% Urea Nitrogen, 16% Phosphorus, 6% Soluble Potassium.

Fertilizer “C” for enhanced establishment program (seed in lieu of sod)
5-5-5 with Mycorrhiza (1.7% Ammoniacal Nitrogen, 3.3% Water Insoluble Nitrogen, 5% Available Phosphorus, 5% Available Potassium, 4% Calcium, 2.5% Magnesium, .2% Copper, 5% Iron, .2% Manganese, .2% Zinc, complete Mycorrhiza and Bacterial Package.

Fertilizer “D” for enhanced establishment program (seed in lieu of sod)
15-0-7 with Broad Spectrum Innoculant (bacterial package (.75% Ammoniacal Nitrogen, 3.75% Urea Nitrogen, 3.50% other water soluble nitrogen, 7% water insoluble nitrogen, 7% soluble potash, 1% Calcium, .5% Magnesium, 1% Sulphur, .1% Copper, 1% Iron, .5% Manganese, .1% Zinc. 100% slow release nitrogen derived from Feather Meal and Methylated Urea.

B. Complete Soil testing for both fertility (including micronutrients, CEC, pH) and particle size is required on all new establishment sites

C. A critical establishment fertilizer application comes at planting whereas fertilizer in a ratio of 2-4-1 is applied directly adjacent to the seed to compensate for the seeds inability to extract phosphorus and other nutrients out of the soil Usually approx. 1lb. of P205 is applied with ½ lb. of N and ¼- ½ lb of K20 is applied. An analysis of 16-32-4 would be an example. Fertilizer ingredients with lower chloride index are preferred at seeding, such as Ammonium Sulfate and Sulfate of Potash.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing underground improvements from damage.

B. Remove all foreign materials, plants, roots, stones, and debris larger than 1" in any dimension from site. Do not bury foreign material.

C. Loosen soil to a depth of four inches (4") in lawn areas by approved method of scarification and

grade to remove ridges and depressions. Remove all stones or foreign matter from top two inches (2") of soil.

D. If above steps have had rain in sufficient quantity to cause soil to recompact, entire steps are to be done prior to seeding.

E. Where no grades are shown, areas shall have a smooth and continual grade between existing or fixed controls and elevations shown on plans. Roll, scarify, rake and level as necessary to obtain true, even lawn surfaces. All finish grades shall meet approval of the Owner.

F. Grade lawn areas to finish grades, filling as needed or removing surplus dirt and floating areas to a smooth, uniform grade. All lawn areas shall slope to drain.

3.2 PREPLANT FERTILIZING

A. Broadcast spread fertilizer “A” (or Alternates “C” and “D”) after seeding at a rate of 2 lbs. of Phosphorus per 1000 square feet. (Apply Alternate “C” at 50 lbs. per 5000 square feet and Alternate “D” at 50 lbs. per 10,000 square feet.)

3.3 SEEDING

A. Dates of Seeding:

1. Grass seed shall be sown in the fall from August 15th until October 15th or in the spring between March 1st and May 15th or at such other times as approved by the Landscape Architect. All seeding is to be done in dry or moderately dry soil and at times when the wind does not exceed a velocity of five (5) miles per hour.
2. If special conditions exist, which may warrant a variance in the above dates, submit a written request to the Landscape Architect stating the conditions and proposed variance. Permission for the variance will be given if, in the opinion of the Landscape Architect, the variance is warranted.

B. Seed Application:

1. Immediately before sowing the seed, the earth surface shall be re-worked until it is a fine, pulverized, smooth seedbed, showing not more than 1/4" variance from grade.
2. Apply seed mixture, as specified, at a rate of two and one half to four (2.5-4) lbs/1000 sq. ft. Apply seed in two directions where possible at a rate of 1.25-2 lbs. /1000 sq. ft. in each direction with seeder, using a cultipacker type seeder such as Brillion (or equal) mounted on tractor. Seed shall be uniformly spread over the previously fine graded and fertilized topsoil. The surface shall be dry when seed is planted. Hand sew seed around each irrigation system head. Hydro-seeding is not acceptable.
3. Mulching: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer’s recommended steel wire staples, 6 inches (150mm) long.
4. Contractor shall return to site six (6) weeks after installation to evaluate germination. If germination of seed exceeds 70%, Contractor to remove mesh. If germination of seeds is less than 70%, mesh shall remain and Contractor shall reevaluate in ten (10) days.

C. Summer Seeding:

1. If seeding is authorized between June 1 and August 15, annual rye shall be sown separately in addition to specified seed mix. Sow at the rate of (one) 1 lbs./1000 sq. ft.

2. Cultipacker or approved similar equipment may be used to cover the seed and to firm the seed bed in one operation. In areas inaccessible to cultipacker, the seeded ground shall be lightly raked and rolled in two directions with a water ballast roller. Extreme care shall be taken during seeding and raking to insure that the seed in not raked from one spot to another.
3. The seeded areas are to be protected, watered, mowed and otherwise maintained until Owner Acceptance.

D. Post Seeding Fertilizer: Supply fertilizer “B” when grass reaches height of one (1) inch or 3 weeks after seeding at .75-1 lbs Phosphorus per 1000 square feet.

E. Maintenance

1. Maintenance of all lawns consist of mowing, watering and repairing erosion. Maintenance of lawns shall commence when any portion of the seeding has been completed. Seeded lawns shall never reach a height of three (3) inches prior to a cutting and shall be cut to a height of two (2) inches.
2. If, for reasons beyond the Sub-contractor's control, the height of the grass has exceeded three (3) inches, the mower blades shall be raised so that at no time will more than 1/3 of the grass leaf surface be removed.
3. Contractor shall notify the Owner through the Landscape Architect in writing one (1) week in advance of the final lawn cutting to allow the Owner and the Landscape Architect to inspect the lawns and schedule his maintenance work. The Owner will accept the lawns after a minimum of three (3) cuttings if a uniform cover of grass is established and is acceptable to Owner and Landscape Architect. **If a uniform stand of grass is not established, contractor shall continue cutting until lawn is accepted.**
4. If an infestation of weeds or crab grass develops prior to acceptance of the lawn, the Contractor shall treat the infestation by hand weeding or chemical control. The chemical control shall be furnished and installed by the contractor as recommended by the manufacturer and approved by the Landscape Architect. At least two weeks shall elapse after chemical control is applied before a request or inspection for acceptance is made to the Landscape Architect.

3.4 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

a. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over an 10 square foot and bare spots not exceeding 5 by 5 inches.
b. Use specified materials to reestablish turf that does not comply with the requirements and continue watering and maintenance until turf is satisfactory.
c. If the lawn is not acceptable after 18 months, the owner shall contract with an independent contractor, of their choosing, to complete the work.

3.5 CLEAN UP AND DISPOSAL

A. Remove from the site all equipment, materials, and debris resulting from construction work including this section. Leave work area neat and clean and in a condition acceptable by the Landscape Architect and School District. All work shall be complete, ready for use, at the time of final acceptance.

END OF SECTION 32 9227

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SECTION 33 4605 – SUBDRAINAGE SYSTEMS (FLAT DRAINTILE)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections

1. Section 31 2010 Earthwork (Turf)
2. Section 31 3219 Geotextile Fabric
3. Section 32 1815 Synthetic Turf

1.2 SCOPE

A. The work under this section consists of furnishing all labor, materials and equipment to install the drainage system, couplings and accessories for the artificial turf subdrainage system.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM D2729 – Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
   b. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
2. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO M294 – Standard Specification for Corrugated Polyethylene Pipe

1.4 SUBMITTALS

A. Manufacturer's Literature: Furnish to Landscape Architect, copies of manufacturer's specifications, maintenance, and installation instructions for each item specified herein. Include photographs, catalogue cuts, and other data as may be required to show compliance with these specifications.

PART 2 - PRODUCTS

2.1 DRAINTILE - GENERAL

A. High Density corrugated polyethylene (HDPE), tubular-style perforated type, pipe and fittings.

B. Hancor "HI-Q", ADS N-12, or approved equal.

C. Diameter of systems lateral and collector lines as shown on plans.

2.2 DRAINTILE - FLAT DRAIN

A. AdvanEDGE pipe with geotextile sock manufactured by Advanced Drainage Systems, Inc. (800) 733-9554. Size as indicated on Drawings.

B. Multi-Flow manufactured by Varicore Technologies, Inc., (800) 978-8007. Size as indicated on Drawings.

2.3 TRENCH MATERIAL

A. Filter Aggregate: Evenly graded mixture of ¾" diameter clean crushed stone.

PART 3 - EXECUTION

3.1 INSTALLATION FOR CORRUGATED POLYETHYLENE TUBING

A. Hand trim excavating to required elevations. Do not over excavate. Remove large stones or other hard matter which could damage drain tile.

B. Place a two inch (2") thick bed of filter aggregate.

C. Install the drainage tile on the filter aggregate bed.

D. Ensure complete connection to storm sewer using perforated pipe.

E. Cover the pipe with filter aggregate to top of trench and compact to 90% Modified Proctor.

3.2 INSTALLATION FOR "FLAT DRAIN" PIPE

A. Install flat drain pipe horizontally, being sure to allow for a minimum of 8" of stone below turf material.

B. Joints shall be made using manufacturers couplers prior to placing flat drain on subgrade. Use 2 coupling pins for each coupler. Couplers shall be placed under the fabric at the joint to prevent backfill infiltration. To accomplish this, split the fabric seam and lay back the fabric approximately 8". Install the coupler with 2 pins. Replace fabric over the coupler and secure the fabric with suitable tape.

C. End caps shall be used at all termination points to prevent soil infiltration into system.

D. Compact stone to appropriate modified proctor density value.

END OF SECTION 33 4605

SECTION 33 4615 – SUBDRAINAGE SYSTEMS (PEASTONE)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

B. Related Sections

1. Section 04 0513 Mortar
2. Section 31 2010 Earthwork - Turf
3. Section 33 4413 Manholes, Catch Basins and Similar Structures

1.2 SCOPE

A. The work under this section consists of furnishing all labor, materials and equipment to install the drainage system, couplings and accessories for an operating sub-drainage system.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. American Society for Testing and Materials (ASTM):
   a. ASTM D1785 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe
   b. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fitting Materials
   c. ASTM F405 – Standard Specification for Corrugated Polyethylene Pipe and Fittings
2. American Association of State Highway and Transportation Officials (AASHTO):
   a. AASHTO M294 – Standard Specification for Corrugated Polyethylene Pipe

1.4 SUBMITTALS

A. Manufacturer's Literature: Furnish to Landscape Architect, copies of manufacturer's specifications, maintenance, and installation instructions for each item specified herein. Include photographs, catalogue cuts, and other data as may be required to show compliance with these specifications.

PART 2 - PRODUCTS

2.1 DRAINAGE TILE

A. Perforated corrugated polyethylene tubing (with filter wrap) complete with required couplings and fittings.

2.2 PEASTONE

A. 3/8" minus peastone to be used as backfill material.

PART 3 - EXECUTION

3.1 EXECUTION FOR CORRUGATED POLYETHYLENE TUBING

A. Hand trim excavating to required elevations. Do not over excavate. Remove large stones or other hard matter which could damage drain tile.

B. Place a two inch (2") thick bed of filter aggregate.

C. Install the drainage tile on the filter aggregate bed.

D. Ensure complete connection to storm sewer using perforated pipe.

E. Cover the pipe with filter aggregate to top of trench and compact to 90% Modified Proctor.

END OF SECTION 33 4615